BOARD MEETING DATE: March 3, 2017 AGENDA NO. 35

(Continued from February 3, 2017 Board Meeting for Board Deliberation and Action Only)

PROPOSAL: Adopt 2016 Air Quality Management Plan

SYNOPSIS: The Air Quality Management Plan (AQMP) is the legally enforceable blueprint for how the SCAQMD air basins will meet and maintain federal and State air quality standards. The 2016 AQMP has been developed in partnership with CARB, U.S. EPA, SCAG, and stakeholders throughout the region, including input from local governments, environmental organizations, academia, and the business community. The 2016 AQMP identifies control measures needed to demonstrate attainment with the federal 2008 8-hour ozone standard by 2031, the 2012 annual PM2.5 standard by 2025, and the 24-hour PM2.5 standard by 2019 in the South Coast Air Basin and the 2008 8-hour ozone standard by 2026 in the Coachella Valley. In addition, the 2016 AQMP provides revisions to previous plans regarding attainment of the 1997 8-hour ozone standard by 2023 and the revoked 1-hour ozone standard by 2022. Further, Appendix I (Health Effects) includes a report on the health impacts of particulate matter air pollution in the South Coast Air Basin.

COMMITTEE: Mobile Source, Reviewed (January 22, March 18, April 15, May 20, June 17, July 22, September 16 and October 21, 2016, and January 20, 2017)

RECOMMENDED ACTIONS:

1. Certify the Final Program Environmental Impact Report for the 2016 AQMP;
2. Adopt the 2016 AQMP in accordance with the attached Resolution;
3. Authorize the Executive Officer to make appropriate changes to the adopted 2016 AQMP and its appendices (if necessary) to reflect amendments adopted at the Public Hearing; and
4. Direct the Executive Officer to submit the adopted 2016 AQMP including its appendices to the California Air Resources Board (CARB) for its approval and subsequent submittal to the U.S. Environmental Protection Agency (U.S. EPA).

Wayne Nastri
Executive Officer

JW:PF:MK:KC

Background

The purpose of the 2016 AQMP is to set forth a comprehensive and integrated program that will lead the South Coast Air Basin (Basin) and the Coachella Valley into compliance with the federal 1997 and 2008 8-hour ozone standards, the revoked 1-hour ozone standard, and the annual PM2.5 and 24-hour PM2.5 air quality standards, to satisfy the planning requirements of the federal Clean Air Act (CAA). To ensure air quality goals are being met and public health protected, the 2016 AQMP includes all feasible regulatory measures, reduces reliance on the CAA Section 182(e)(5) long-term measures to the maximum extent feasible, takes credit for co-benefits from other local, state and federal planning efforts, develops a fair-share emission reduction strategy at the federal, state, and local levels, and invests in strategies and technologies meeting multiple objectives. It also identifies the need to secure significant funding for incentives to advance the deployment of zero and near-zero technologies in combination with enforceable regulatory measures. The 2016 AQMP prioritizes maximizing emission reductions utilizing zero-emission technologies wherever feasible and cost-effective, and near-zero emission technologies in all other applications.

Since the last AQMP update in 2012, several major updates related to the ozone and PM National Ambient Air Quality Standards (NAAQS) have occurred:

- Effective March 18, 2013, the U.S. EPA lowered the level of the annual PM2.5 standard, from 15.0 to 12.0 $\mu g/m^3$, while retaining the level of the 24-hour PM2.5 standard at 35 $\mu g/m^3$.
- On July 8, 2016, the U.S. EPA issued a final rule for "Clean Data Determination" based on the 2011–2013 monitoring period in the Basin, showing attainment of the 1997 annual PM2.5 (15 $\mu g/m^3$) and 1997 24-hour PM2.5 (65 $\mu g/m^3$) standards.
- The U.S. EPA reclassified the Basin as "serious" for the 2006 24-hour PM2.5 standard (35 $\mu g/m^3$) with a new attainment deadline of December 31, 2019.
- On October 19, 2016, the U.S. EPA proposed to approve a revised attainment SIP for the 1997 8-hour ozone plan in Coachella Valley, including emission inventories, Reasonably Available Control Measure (RACM), transportation control strategies, reasonable further progress (RFP), vehicle miles traveled (VMT) demonstration and transportation conformity, with no actions on contingency measures.

The Plan will also serve as the SIP submittal for the attainment demonstration and other requirements for the federal 2008 8-hour ozone standard and the new 2012 annual PM2.5 standard. The 2016 AQMP will also serve to satisfy a series of federal CAA requirements to be included in the 24-hour PM2.5 SIP for "serious" nonattainment area, and will update previous plans for the 1997 8-hour ozone standard and the (revoked) 1-hour ozone standard in the South Coast Air Basin.

Public Process

The development of the 2016 AQMP has been a regional, multi-agency effort including the SCAQMD, CARB, the Southern California Association of Governments (SCAG), and the U.S. EPA. A 2016 AQMP Advisory Group was formed in February 2014 to provide feedback and recommendations on the development of the Plan, including technical issues, policy, and control strategies. The Advisory Group represents a diverse cross section of stakeholders such as large and small businesses, government agencies, environmental and community groups, and academia. In addition, a Scientific, Technical, and Modeling Peer Review (STMPR) Advisory Group convened to make recommendations on air quality modeling, emissions inventory, as well as socioeconomic modeling and analysis. Both Advisory Groups met periodically throughout the AQMP development process and those meetings have been open to the public. Appendix I (Health Effects) in the 2016 AQMP was prepared to discuss the overall health effects of criteria pollutants and toxic air contaminants. The Appendix includes a report on the health effects of PM in the Basin as required by California Health & Safety Code Section 40471(b). The evaluation was prepared in conjunction with public health agency OEHHA and in consultation with CARB, and peer-reviewed by an Advisory Council made up of 15 members.

As part of the three-year public process, SCAQMD staff developed a series of 10 white papers, and conducted a 2016 AQMP Control Strategy Symposium to solicit new and innovative control concepts to assist in designing a control strategy for the AQMP. Staff conducted an extensive 2016 AQMP Outreach Program to inform and engage a wide range of stakeholders on the requirements, approach, goals, and impacts of the 2016 AQMP, in addition to ongoing AQMP Advisory Group and STMPR Advisory Group meetings, and the mandatory regional workshops/hearings. Staff provided numerous presentations in over 200 meetings.

Preliminary control strategy concepts were released in April 2016 to seek initial feedback. A Draft 2016 AQMP was released in June 2016 to provide the public and other stakeholders early opportunity for review, and SCAQMD held six regional public workshops throughout the four counties in July 2016 to solicit public input. Based on 69 comment letters received, a Revised Draft was released in October 2016 with key changes including prioritizing zero-emission technology whenever cost effective and feasible, and near-zero emission technology for remaining applications, strengthening two incentive measures with regulatory requirements for zero/near-zero technologies in the future, and adding serious consideration for a long-term transition of RECLAIM program to a command-and control regulatory structure.

Four regional public hearings were held in November 2016 in each of the four counties, where additional public input and comments were solicited. Transcripts of these hearings are included in the Board Package (Attachment F). The Draft Final 2016 AQMP was released on December 2, 2016 that included additional revisions to the Revised Draft Plan based on the additional 32 comment letters received. Key changes included prioritizing funding distribution to benefit disadvantaged communities, adding

additional consideration of "life cycle" emissions analysis, and adding an incentive funding shortfall procedure.

Overall, 109 written comment letters were received on the 2016 AQMP, and responses are provided in Attachment C, "Response to Comments to the 2016 AQMP."

Proposal

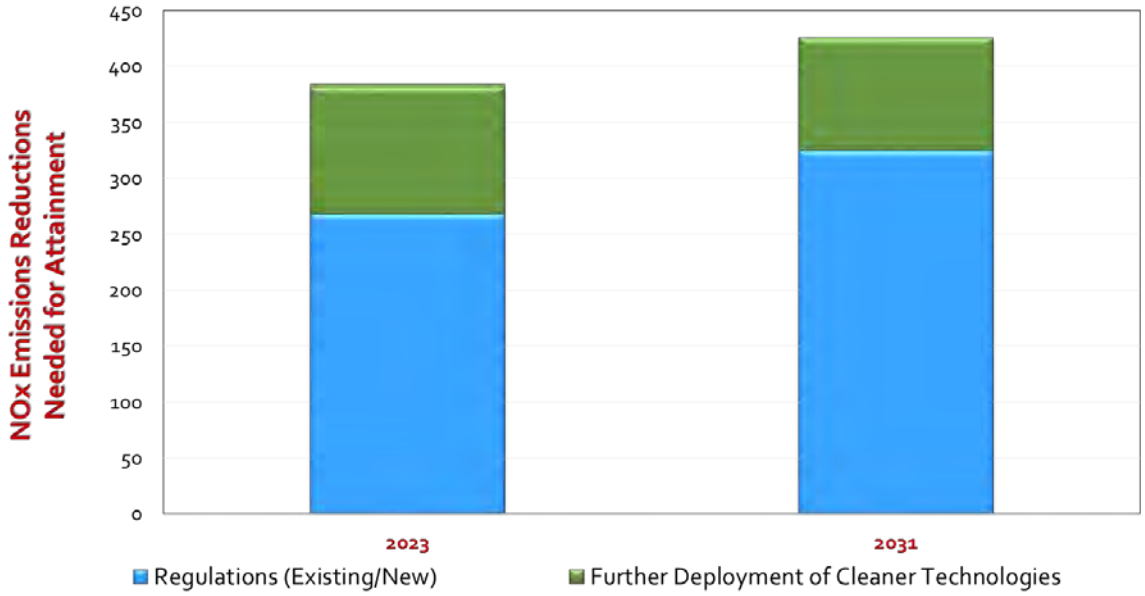
The 2016 AQMP incorporates the most recent planning assumptions and the best available information including: revised stationary (point and area) source emissions inventories; on-road and off-road mobile source emissions inventories based on CARB's latest EMFAC2014 and Off-Road Models; the use of new meteorological episodes for ozone and expanded air quality modeling analysis; and the latest demographic growth forecasts based on the approved 2016 Regional Transportation Plan/Sustainable Community Strategy (2016 RTP/SCS) developed by SCAG. The Plan also includes control strategies for demonstrating attainment with the federal ozone and PM2.5 standards, and demonstrations of compliance with other CAA requirements.

Highlights of the Plan

Some of the key findings and components of the 2016 AQMP include:

1) **Current Air Quality -** Although the long-term trend of air quality in the Basin shows substantial progress due to existing air quality regulations, voluntary actions, and partnerships with other agencies and stakeholders, more action must occur to meet the federal and California health-based standards. The five NAAQS (1979 1-hour ozone, 1997 and 2008 8-hour ozone, 2006 24-hour and 2012 annual PM2.5) that are analyzed and updated in the 2016 AQMP have yet to be met. The Basin has met the PM10 standards at all stations.
2) **Particulate Matter Health Effects -** Appendix I (Health Effects) discusses the overall health effects from criteria pollutants (e.g., ozone, PM, CO, NO2, SO2, sulfates, lead) and toxic air contaminants. Findings include a large body of scientific evidence that shows adverse impacts of air pollution including PM2.5 on human and animal health. Population-based and laboratory studies link air pollution, including PM2.5, and increased morbidity and, in some instances, earlier mortality.
3) **Emission Inventory -** Base year 2012 emissions reflect actual emissions, while future emissions are based on growth projections and adopted regulations with past and future compliance dates. Despite projected growth in the population and the economy, emissions decrease over time due to continued implementation of existing regulations. However, emissions do not decrease enough to meet future air quality standards.

4) **Control Strategy -** The overall control strategy reflects an integrated approach relying on all feasible regulatory actions at federal, state and local levels, supplemented by emissions reductions from incentives and co-benefits from other programs. Proposed and existing regulatory action constitute 66 percent of the ozone control strategy by 2023 and 71 percent by 2031.



Regional air quality modeling indicates that significant NOx reductions with additional strategic, limited VOC reductions will lead to attainment of the ozone and PM2.5 standards. Below are the proposed control strategies that aim to generate the emission reductions needed to attain the standards:

- SCAQMD Stationary Source Measures – Proposed regulatory NOx control measures are based on implementation of zero and near-zero technologies and include reductions from non-refinery flares, cooking appliances, stationary diesel engines, and further reductions from the RECLAIM facilities. Stationary source incentives serve to accelerate early deployment of advanced technologies.
- SCAQMD Mobile Source Measures – Proposed measures include enforceable facility-based measures, enhancements to SCAQMD fleet rules, and continuing incentive programs for accelerated penetration of near-zero and zero-emission vehicles.
- CARB's Measures – Released on January 3, 2017, the Revised Proposed State SIP Strategy for the South Coast Air Basin provides enforceable commitments for emission reductions from on-road vehicles, off-road equipment and consumer products.
- Federal Measures – As part of the proposed State SIP Strategy, fair share emission reductions from aircraft, locomotives and ocean going vessels are included.

Since NOx emissions also lead to the formation of PM2.5, the NOx reductions needed to meet the ozone standards will also lead to attainment of PM2.5 standards. However, PM2.5 control measures are proposed to be implemented if determined to be feasible and cost effective, including reductions from under-fired charbroilers, cooling towers, fugitive dust sources, abrasive blasting, stone cutting and finishing, agricultural and residential burning, composting, and ammonia reductions from livestock waste and NOx control equipment.

5) **Attainment Demonstrations**

- 24-hour PM2.5
  - ✓ Projected to meet NAAQS by attainment year 2019 with no reductions beyond already adopted measures
- Annual PM2.5:
  - ✓ Request for reclassification from "moderate" to "serious" nonattainment since it is impractical to attain in 2021
  - ✓ Attainment by 2025, and likely earlier with implementation of the NOx reductions in the ozone strategy
- 8-hour ozone (80 ppb/75 ppb):
  - ✓ Will meet the 1997 8-hour ozone standard by attainment year 2023 and the 2008 8-hour ozone standard by attainment year 2031 with proposed NOx and VOC control measures
- 1-hour ozone (120 ppb):
  - ✓ The 8-hour ozone strategy will assist in meeting the 1-hour ozone standard by 2022 with no reliance on Section 182(e)(5) measures

Key Issues

Based on comments and discussions with stakeholders, staff has identified six key issues related to the adoption of the 2016 AQMP.

1. **Defining CAA §182(e)(5) Measures –** Comments were received stating that the 2016 AQMP should demonstrate ozone attainment without continuing reliance on "black box" measures.

   As an "extreme" nonattainment area for ozone, the CAA allows the Basin to rely on unspecified future technological advancements ("black box") to show future attainment of air quality standards. Given the fast approaching deadlines – as early as 2022 and 2023, and given that the zero and near-zero technologies needed for attainment have already or will soon be commercially available, it is now possible for the AQMP to specify the cleaner technologies and the potential implementation pathways to attainment. Some CAA §182(e)(5) flexibility may still be needed for Plan approval by U.S. EPA given the need for continued technological and cost improvements and funding not yet secured to implement incentive programs.

2. **Regulatory Approaches and Incentive Programs –** Various comments were received on the overall strategy, some favoring a more regulatory approach and others promoting a more incentive-based approach. Concerns were raised that the Plan abandons regulatory measures and replaces them with incentives. This is not the case. The 2016 AQMP proposes a series of stringent regulatory measures aimed at reducing NOx and VOC emissions from a variety of stationary and mobile sources. These regulatory measures were established after a thorough analysis of all ozone precursor-emitting sources and available methods and technologies to further reduce emissions, and results in a similar if not more aggressive magnitude of regulatory emissions reductions as previous Plans. For example, in the 2007 AQMP, the ozone strategy committed 9 tpd NOx reduction over a 16-year timeframe while the 2016 AQMP commits to 20 tpd NOx reduction over a 15-year timeframe. As highlighted earlier, proposed and existing regulatory actions constitute 66 percent of the ozone control strategy by 2023 and 71 percent by 2031. Incentive-based approaches are proposed to supplement regulations and achieve accelerated transition to cleaner technologies that cannot be achieved quickly enough by regulations. Incentive programs make it more cost-effective to replace equipment, transition to zero or near-zero technologies, encourage earlier change-out of higher-emitting equipment, and drive technology development and cost reductions. It should be noted that the 2016 AQMP, based on comments received, has resulted in the modification of two incentive-only measures to include a future rulemaking commitment to ensure reductions continue and are permanent.

   In conjunction with the 2016 AQMP, staff has developed the Financial Incentives Funding Action Plan that describes the potential opportunities to secure funding. The Financial Incentives Funding Action Plan 1) engenders discussion on the importance and need for such programs and, 2) provides a set of proposed actions to secure additional financial incentive funding. The SCAQMD will work with all interested stakeholders to form coalitions, private and public partnerships, and a national collaborative with a common objective of identifying and supporting new sources of incentive funding revenue.

3. **NOx RECLAIM Program –** Various industry representatives raised concerns regarding the magnitude of the emission reduction commitment. Other commenters support a command and control regulatory structure to replace the current market-based program. In the 2016 AQMP there is a serious consideration for an orderly sunsetting of the RECLAIM program in order to create more regulatory certainty, reduce compliance burdens for smaller facilities, and achieve more SIP-creditable emission reductions.

4. **Technology/Fuel Neutrality with a Zero-emission Technology Policy –** Some comments were received in support of a technology/fuel neutral policy as it provides flexibility, given that some technologies may not be market ready. Other commenters preferred a zero-emission only policy.

The SCAQMD has a long-standing policy of technology and fuel neutrality, while recognizing the benefits of cleaner technologies to reduce air pollution given multiple environmental goals. The 2016 AQMP calls for a priority on maximizing emission reductions utilizing zero-emission technologies wherever feasible and cost-effective, and near-zero emission technologies in all other applications. Given fast approaching Clean Air Act deadlines and the current state of technology, staff recognizes the likely need for near-zero technologies to meet near-term objectives and maximize public health benefits. A full life-cycle emissions analysis is proposed to assess the in-basin life-cycle criteria pollutant emissions related to energy use from technologies and/or other activities such as efficiency improvements. This assessment will include future energy scenarios that are anticipated as more renewable resources are incorporated into the energy usage within the Basin, and will consider emissions associated with energy time-of-use, higher efficiencies, fuel switching, and future energy and regulatory markets.

5. **Facility-based Measures and Other Measures Classified as "TBD" Measures** – Concerns were raised as to whether the SCAQMD has legal authority over some of the facilities described in the facility-based measures, and that these measures are not necessary to meet attainment. Affected facilities include ports, warehouses, airports, railyards, and new development/redevelopment. Some commenters oppose the idea of facility caps and performance targets, as well as mitigation fees and any other measures that may increase housing costs. Comments were received stating that measures such as facility-based measures with emission reductions "to be determined" (TBD) should be eliminated if they are not needed for attainment.

   Other commenters support exercising all SCAQMD regulatory authority for indirect sources and fleets.

   The proposed SCAQMD facility-based measures are intended to assist implementation of the enforceable emission reduction commitment being made by CARB. The SCAQMD staff is proposing to work with all affected stakeholders to seek approaches to maximize the penetration of zero-emission technologies as early as possible and achieve enforceable emission reductions, whether the result of the process is a regulation or other enforceable mechanism. During the public process, SCAQMD staff will seek input and comments on identifying actions that could be voluntary or regulatory in nature, and report to the SCAQMD Board on the progress in identifying such actions. SCAQMD staff will make recommendations within one year from Plan adoption on the need for the development of rules within the SCAQMD authority. Staff believes a collaborative effort is the best approach in maximizing emission reductions, particularly in light of potential challenges to various regulatory authorities. Emission reductions from the facility-based measures are listed as "TBD" given that emission reductions are being committed to by CARB, and the public process needs to take place before reduction opportunities can be identified and quantified.

Many of the other "TBD" measures require further technical and feasibility evaluations to quantify emissions reductions, but are included in the AQMP as part of a comprehensive plan with all feasible measures. These measures can serve in case there is a possible need for additional measures to make up a shortfall in reductions. Furthermore, if emission reductions are realized for "TBD" measures and are SIP creditable, the reductions could be part of the future rate-of-progress reporting or as part of future AQMP revisions.

6. **The Role of Solar in the AQMP** – Comments by the Public Solar Power Coalition expressed the need for immediate total solar conversion to generate all energy in the Basin.

   SCAQMD staff fully supports solar powered technologies and the 2016 AQMP includes a number of control measures that promote and integrate solar. Control Measures ECC-01 recognizes criteria pollutant co-benefits from federal, state and local mandates and programs to reduce greenhouse gas (GHG) emissions including renewable portfolio standards and widely incentivized solar programs; ECC-02 seeks criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and SB 350 Clean Energy and Pollution Reduction Act; and ECC-03 seeks to provide financial incentives that go beyond the state-wide goals achieved under ECC-02. Solar PV and hot water heating are integral to these measures and will facilitate the penetration of zero-emission technologies in both stationary and mobile applications. Further, control measure CMB-01 anticipates future rulemaking in combination with financial incentives for the replacement of older equipment with zero and near-zero emission technologies. Equipment electrification, solar power, use of fuel cells, battery storage, and/or combined heating and power are all possible alternatives. Additionally, an extensive discussion of energy and climate change can be found in Chapter 10 of the 2016 AQMP and the CEQA document considers the feasibility of full solar conversion as an alternative to the project. Full solar conversion cannot achieve AQMP's attainment goals by attainment deadlines; however, solar conversion can serve to make zero-emission technologies more cost-effective and feasible.

   Solar panels are becoming more efficient, well established, and prices are declining rapidly, making them cost-effective, but there are still a number of concerns regarding the reliability, transmission, demand spikes, and intermittency associated with renewable generation. Due to these issues, technologies that provide ancillary services and grid support, such as energy storage and improved demand-side management need to be further developed and integrated into the grid. Without incorporating these technologies as higher levels of renewables are incorporated, the stability of the electrical grid can be compromised and emissions could increase as peaking generating units are increasingly used.

   To meet the federal ozone standards, the region will need to reduce 117 tpd NOx emission by 2023. Elimination of natural gas-fired electricity power plants, if

feasible, will only result in 3 tpd NOx reductions. However, great progress in solar deployment is being made in California, which is leading the nation with over half a million solar projects along with commitments towards using 50% renewables in California by 2030. Incorporating and combining newer technologies such as solar collectors, smart grid, and energy storage with better power system management at the transmission, distribution, and behind-the-meter applications can reduce the need for redundant infrastructure and emissions from fossil-based generation. In addition, by combining with other technologies, conversions to full solar power become more cost effective and subsequently decrease the need for traditional fossil based generation. Staff will continue to promote and encourage the use of solar energy systems and technology in applications where it can be shown to be cost-effective and result in emission reductions, such as being proposed in the 2016 AQMP under control measures ECC-03, CMB-01 and CMB-02. These efforts include incorporating renewable resources towards powering alternative transportation technologies.

California Environmental Quality Act Analysis

Pursuant to California Environmental Quality Act (CEQA) Guidelines §15168, the SCAQMD has prepared a Program Environmental Impact Report (PEIR) for the 2016 AQMP. The Draft PEIR was released for a 60-day public review and comment period beginning on September 16, 2016, and ending on November 15, 2016. The Draft PEIR analyzed potential significant adverse impacts that may occur from implementing the 2016 AQMP control measures for the following environmental topic areas: aesthetics; air quality and greenhouse gases; energy; hazards and hazardous materials; hydrology and water quality; noise; solid and hazardous waste; and, transportation and traffic. Responses to all comments received have been prepared and incorporated into the Final PEIR. Also, minor modifications have been made to the document. However, none of the modifications alter any conclusions reached in the Draft PEIR, nor provide new information of substantial importance relative to the draft document. Further, the modifications do not constitute significant new information that would require recirculation of the Draft PEIR pursuant to CEQA Guidelines §15088.5. Therefore, the document is a now a Final PEIR and is included as Attachment D to this Board package.

Finally, since the proposed project was concluded to have significant adverse environmental impacts for the aforementioned environmental topic areas that will remain significant and unavoidable even after mitigation measures were identified and applied, Findings, a Statement of Overriding Considerations, and a Mitigation Monitoring Plan were prepared in accordance with the requirements of CEQA and are included as Attachment 2 to the Resolution.

Socioeconomic Analysis

The socioeconomic analysis represents a rigorous application of a statistical and economic framework, epidemiological studies, and computer modeling to assess the aggregate potential impacts of the overall suite of control measures and their resulting clean air benefits. Based on recommendations made by Abt Associates in 2014 to improve the socioeconomic assessment, a concerted effort among SCAQMD staff, scientific advisors, sister agencies, and the public was made to conduct an enhanced analysis that not only utilizes state-of-the-art methods, but is more accessible and transparent to the general public.

The socioeconomic assessment for the 2016 AQMP includes costs of control measures, benefits of clean air, regional and sub-regional job impacts, and an environmental justice (EJ) analysis at the community level. Key Findings in the Draft Socioeconomic Report include:

- Two-thirds of the nearly $16 billion total incremental cost is associated with control strategies seeking reductions from mobile source emissions.
- The risk of premature deaths among Basin residents and numerous other health risks associated with air pollution would be reduced. As a result, the four-county region is expected to gain a total public health benefit of $173 billion.
- Projected job change is expected to have a minimal impact on regional job growth.
- Overall inequality of health risks are expected to decrease, with greater per-capita public health benefits accrued in EJ communities versus non-EJ communities.

Staff have incorporated public comments received along with responses to public comments in the Socioeconomic Report.

List of Documents

The 2016 AQMP submitted for the Governing Board approval consideration consists of the documents entitled:

- Resolution (Attachment A)
  - Findings, Statement of Overriding Considerations, and Mitigation, Monitoring and Reporting Plan (*Attachment 2 to the Resolution*)
- Draft Final 2016 AQMP (Attachment B)
  - Appendix I – Health Effects
  - Appendix II – Current Air Quality
  - Appendix III – Base and Future Year Emission Inventory
  - Appendix IV (A) – SCAQMD's Stationary & Mobile Source Control Measures
  - Appendix IV (B) – CARB's Mobile Source Strategy
  - Appendix IV (C) – Regional Transportation Strategy & Control Measures
  - Appendix V – Modeling & Attainment Demonstrations
  - Appendix VI – Compliance with Other Clean Air Act Requirements
- Responses to Comments on the 2016 AQMP – (Attachment C)

- Final Program Environmental Impact Report for the 2016 AQMP (Attachment D)
- Draft Final Socioeconomic Report for the 2016 AQMP (Attachment E)
- Public Hearing Transcriptions (LA, Orange, Riverside, San Bernardino) (Attachment F)

All of the above documents, as well as previous drafts and strikeout/underline versions, have been made available to the public on the SCAQMD Website. (http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan) and have also been made available through the SCAQMD Public Information Center.

Attachments

A. Resolution (*including Attachment 2 to the Resolution: Findings, Statement of Overriding Considerations, and Mitigation, Monitoring and Reporting Plan*)
B. Draft Final 2016 AQMP (*including Appendices I-VI*)
C. Responses to Comments on the 2016 AQMP
D. Final Program Environmental Impact Report for the 2016 AQMP
E. Draft Final Socioeconomic Report for the 2016 AQMP
F. Public Hearing Transcriptions
G. Board Meeting Presentation

ATTACHMENT A
RESOLUTION NO. 17-____

A Resolution of the South Coast Air Quality Management District (SCAQMD or District) Governing Board certifying the Final Program Environmental Impact Report (PEIR) for the 2016 Air Quality Management Plan (AQMP), and adopting the 2016 AQMP, which is to be submitted into the California State Implementation Plan (SIP).

WHEREAS, the United States Environmental Protection Agency (U.S. EPA) promulgated the 8-hour ozone national ambient air quality standard (NAAQS or standard) of 75 parts per billion (ppb) in 2008, followed up by implementation rules which set forth the classification and planning requirements for SIPs; and

WHEREAS, the 2008 8-hour ozone standard became effective on July 20, 2012. The South Coast Air Basin was classified as "extreme" nonattainment for this standard with an attainment date of July 20, 2032 and the Coachella Valley is classified as "severe" nonattainment with an attainment date of July 20, 2027; and

WHEREAS, the U.S. EPA revoked the 1997 8-hour ozone standard (80 ppb) in 2015, but the South Coast Air Basin has continuing anti-backsliding requirement obligations until this standard is attained by June 15, 2024; and

WHEREAS, the U.S. EPA revoked the 1-hour ozone standard (120 ppb) effective June 15, 2005, but on February 6, 2013 issued a call for a California SIP revision for the South Coast Air Basin to demonstrate attainment of the 1-hour ozone standard by December 31, 2022; and

WHEREAS, the U.S. EPA strengthened the annual average fine particulate matter (PM2.5) standard from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ in 2012, with an attainment date of December 31, 2021 for "moderate" nonattainment areas and an December 31, 2025 for "serious" nonattainment areas; and

WHEREAS, the U.S. EPA promulgated a 24-hour PM2.5 standard in 2006 and the South Coast Air Basin was originally classified as "moderate" nonattainment on December 14, 2009, with an attainment date of December 14, 2014; and

WHEREAS, it was determined impractical to meet the 2006 24-hour PM2.5 standard by the original attainment date, primarily due to unexpected drought conditions, such that the South Coast Air Basin was re-classified to "serious" nonattainment for the 24-hour PM2.5 standard, with a new attainment date of December 31, 2019; and

WHEREAS, the federal Clean Air Act (CAA) requires SIPs for regions not in attainment with the 2008 ozone NAAQS to be submitted no later than four years after the nonattainment area designation effective date of July 20, 2012, whereby, a SIP for the South Coast Air Basin should be submitted for the attainment of the 2008 8-hour ozone standard by July 20, 2016. Penalties are incurred 18 months after a finding of late submittal; and

WHEREAS, the federal Clean Air Act requires SIPs for regions not in attainment with the fine particulate standards be submitted no later than 18 months after the standards became effective, whereby, SIPs for the South Coast Air Basin must be submitted for the 2012 annual PM2.5 standard by October 15, 2016; and

WHEREAS, the SCAQMD has jurisdiction over the South Coast Air Basin and the desert portion of Riverside County known as the Coachella Valley; and

WHEREAS, the SCAQMD is committed to comply with the requirements of the federal Clean Air Act; and

WHEREAS, the Lewis-Presley Air Quality Management Act requires the SCAQMD's Governing Board to adopt an AQMP to achieve and maintain all state and federal air quality standards; to contain deadlines for compliance with federal primary ambient air quality standards; and, to achieve the state standards and federal secondary air quality standards by the application of all reasonably available control measures, by the earliest date achievable (Health and Safety Code Section 40462). Further, the California Clean Air Act (CCAA) requires the SCAQMD to endeavor to achieve and maintain the state ambient air quality standards for ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide by the earliest practicable date (Health and Safety Code Section 40910); and

WHEREAS, the CCAA requires a nonattainment area to evaluate and, if necessary, update its AQMP under Health and Safety Code §40910 triennially to incorporate the most recent available technical information; and

WHEREAS, the SCAQMD Governing Board is committed to comply with the requirements of the CCAA; and

WHEREAS, the SCAQMD is unable to specify an attainment date for the state ambient air quality standards for 8-hour ozone, PM2.5, and PM10; however, the 2016 AQMP, in conjunction with earlier AQMPs, contains every feasible control strategy and measure to ensure progress toward attainment and the AQMP will be reviewed and revised to ensure that progress toward all standards is maintained; and

WHEREAS, the 2016 AQMP must meet all applicable requirements of California law and the CAA; and

WHEREAS, the SCAQMD Governing Board is committed to achieving healthful air in the South Coast Air Basin and all other parts of the District at the earliest possible date; and

WHEREAS, the 2016 AQMP is the result of 36 months of staff work, public review, and debate, and has been revised in response to public comments; and

WHEREAS, the 2016 AQMP incorporates updated emissions inventories, ambient measurements, new meteorological episodes, improved air quality modeling analyses, and updated control strategies by the SCAQMD, the California Air Resources Board (CARB), and the Southern California Association of Governments (SCAG), and will be forwarded to the CARB for any necessary additions and submission to U.S. EPA; and

WHEREAS, as part of the preparation of an AQMP, in conjunction or coordination with public health agencies, such as CARB and the Office of Environmental Health Hazard Assessment (OEHHA), a report has been prepared and peer-reviewed by the Advisory Council on the health impacts of particulate matter air pollution in the South Coast Air Basin pursuant to California Health and Safety Code § 40471, which has been included as part of Appendix I (Health Effects) of the 2016 AQMP; and

WHEREAS, the 2016 AQMP establishes transportation conformity budgets for the 8-hour ozone standards based on the latest planning assumptions; and

WHEREAS, the 2016 AQMP demonstrates attainment for federal ambient air quality standards for 8-hour ozone, 1-hour ozone, and annual and 24-hour PM2.5 NAAQS; and

WHEREAS, the 2016 AQMP satisfies the planning requirements set forth in the federal and California Clean Air Act; and

WHEREAS, the 2016 AQMP includes the annual average and summer planning emission inventory for criteria and precursor pollutants, attainment demonstrations, reasonably available control measure (RACM) and reasonably available control technology (RACT) analyses, reasonable further progress (RFP), vehicle miles traveled (VMT) demonstrations, and transportation conformity budgets for the South Coast Air Basin and Coachella Valley; and

WHEREAS, Title 40 of the Code of Federal Regulations, Part 93 (40 CFR Part 93) requires that transportation emission budgets for certain criteria pollutants be specified in the SIP; and

WHEREAS, 40 CFR Part 93.118 (e)(4)(iv) requires a demonstration that transportation emission budgets submitted to U.S. EPA are "consistent with applicable requirements for reasonable further progress, attainment, or" maintenance (whichever is relevant to the given implementation plan submission); and

WHEREAS, the 2016 AQMP updates the ozone control plan with new measures designed to reduce reliance on the CAA Section 182(e)(5) long-term measures for NOx and VOC reductions; and

WHEREAS, significant emission reductions must be achieved from sources under state and federal jurisdiction for the South Coast Air Basin to attain the federal air quality standards; and

WHEREAS, in order to reduce reliance on the CAA Section 182(e)(5) long-term measures, the SCAQMD needs emission reductions from sources outside of its primary regulatory authority and from sources that may lack, in some cases, the financial wherewithal to implement technology with zero or near-zero air pollutant emissions; and

WHEREAS, the State SIP Strategy "Further Deployment of Cleaner Technologies" measures identify the SCAQMD as co-implementing agency relative to implementing incentive programs and help quantify potential emission reduction benefits from operational efficiency improvements and the deployment of connected vehicles and intelligent transportation systems; and

WHEREAS, the Final 2016 AQMP has provided four facility-based mobile source measures (MOB-01, MOB-02, MOB-03, and MOB-04), an on-road heavy-heavy-duty vehicles measure (MOB-08), and an emissions growth management measure (EGM-01) which will go through a one-year public process to identify actions that are either voluntary or regulatory in nature to help meet the emission reduction commitments provided in the State SIP Strategy "Further Deployment of Cleaner Technologies" measures; and

WHEREAS, a majority of the measures identified to reduce reliance on the CAA Section 182(e)(5) long-term measures rely in part on continued and sustained funding to incentivize the deployment of the cleanest stationary and mobile combustion equipment; and

WHEREAS, the 2016 AQMP integrates a variety of control measures and implementation approaches in a cost-effective, feasible, and targeted fashion

while considering the co-benefits from climate change and air toxics control programs that may also produce concurrent benefits for ozone and PM2.5; and

WHEREAS, the 2016 AQMP relies on a combination of strong regulatory actions and incentive programs as the most effective means of achieving emission reductions in order to attain the federal health-based standards; and

WHEREAS, the 2016 AQMP prioritizes maximizing emission reductions from zero-emitting technologies where cost-effective and feasible, and near-zero emission technologies in all other applications; and

WHEREAS, the 2016 AQMP includes voluntary incentive measures in the near-term to achieve attainment of the fast approaching deadline of federal 8-hour ozone standard in 2023, create opportunities and make it more cost-effective to replace equipment, transition to zero or near-zero technologies, encourage earlier change-out of higher-emitting equipment, drive technology development and cost reductions, and enhance public acceptability of new technologies; and

WHEREAS, the SCAQMD will design programs such that the NOx emission reductions from these incentive measures are proven to be real, quantifiable, surplus, enforceable, and permanent in order for the U.S. EPA to approve such reductions as creditable emission reductions in the SIP; and

WHEREAS, the SCAQMD Governing Board finds and determines with certainty that the 2016 AQMP is considered a "project" pursuant to the California Environmental Quality Act (CEQA); and

WHEREAS, the SCAQMD staff reviewed the 2016 AQMP and determined that it may have the potential to generate significant adverse environmental impacts; and

WHEREAS, pursuant to CEQA, a Notice of Preparation (NOP) of a Draft PEIR and Initial Study (IS) for the 2016 AQMP was prepared and released for a 30-day public comment period, preliminarily setting forth the potential adverse environmental impacts of adopting and implementing the 2016 AQMP; and

WHEREAS, pursuant to CEQA, a Draft PEIR on the 2016 AQMP (State Clearinghouse Number 2016071006), including comments received relative to the NOP/IS and responses to the comments, was prepared and released for a 60-day public comment period from September 16, 2016 to November 15, 2016, setting forth the potential adverse environmental impacts of adopting and implementing the 2016 AQMP; and

WHEREAS, the Draft PEIR on the 2016 AQMP included an evaluation of project-specific and cumulative direct and indirect impacts from the proposed project and four project alternatives; and

WHEREAS, the Draft PEIR has been revised to include the comments received on the Draft PEIR and the responses, as well as to reflect the comments received and modifications made to the Draft Final 2016 AQMP subsequent to the release of the Draft PEIR for public review and comment, such that it is now a Final PEIR; and

WHEREAS, the SCAQMD Governing Board finds and determines, taking into consideration the factors in §30.5 (4)(D)(i) of the Governing Board Procedures, that the modifications which have been made to the 2016 AQMP subsequent to the publication of the notice of public hearing do not significantly change the meaning of the proposed project within the meaning of the Health and Safety Code §40726 and would not constitute significant new information requiring recirculation of the Draft PEIR pursuant to CEQA Guidelines §15088.5; and

WHEREAS, it is necessary that the adequacy of the Final PEIR, including responses to comments received relative to the Draft PEIR, be determined by the SCAQMD Governing Board prior to its certification; and

WHEREAS, it is necessary that the SCAQMD prepare Findings and a Statement of Overriding Considerations pursuant to CEQA Guidelines §§15091 and 15093, respectively, regarding potentially significant adverse environmental impacts that cannot be mitigated to insignificance, and a Mitigation Monitoring Plan pursuant to Public Resources Code §21081.6, regarding the mitigation included in the Final PEIR; and,

WHEREAS, Findings, a Statement of Overriding Considerations, and a Mitigation Monitoring Plan have been prepared and are included in Attachment 2 to this Resolution, which is attached and incorporated herein by reference; and

WHEREAS, the SCAQMD Governing Board voting on the 2016 AQMP, has reviewed and considered the Final PEIR, including responses to comments relative to the Draft PEIR, the Findings, Statement of Overriding Considerations, and the Mitigation Monitoring Plan, prior to the certification of the Final PEIR; and

WHEREAS, the Draft Socioeconomic Report on the 2016 AQMP was prepared and released for public review and comment; and

WHEREAS, the Draft Socioeconomic Report for the 2016 AQMP is revised based on comments received and the Revised Draft 2016 AQMP such that it is now a Draft Final Socioeconomic Report for the 2016 AQMP; and

WHEREAS, the 2016 AQMP includes every feasible stationary and mobile source control measure and their adoption and implementation schedule; and

WHEREAS, CARB and the U.S. EPA have the responsibility to control emissions from motor vehicles, motor vehicle fuels, and non-road engines and consumer products which are primarily under their jurisdiction representing over 80 percent of ozone precursor emissions in 2023; and

WHEREAS, the 2016 AQMP shows that command and control programs alone will not provide the emission reductions needed to meet the federal Clean Air Act requirements for the federal 8-hr ozone and PM2.5 standards; and

WHEREAS, financial incentive programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program allows the SCAQMD to achieve emission reductions from these types of sources in an accelerated manner; and

WHEREAS, the U.S. EPA requires that the proposed incentive programs be federally enforceable commitments, and sources of funding, staff resources, technical analyses, outreach, and legal authority are provided; and

WHEREAS, the SCAQMD's past experience demonstrates that substantial reductions in actual emissions can be cost-effectively achieved through implementation of financial incentive programs; and

WHEREAS, the SCAQMD's 2016 AQMP identifies a control measure (2016 AQMP CM#MOB-14) for including emission reductions from past and future projects funded by financial incentive programs for SIP purposes; and

WHEREAS, U.S. EPA requires that all incentive-based reductions be real, surplus to those obtained from regulations, quantifiable, enforceable, and permanent for inclusion in the SIP; and

WHEREAS, the SCAQMD will ensure the emission reductions obtained through projects funded by financial incentive programs will meet the above minimum federal requirements for inclusion in the SIP; and

WHEREAS, the SCAQMD Governing Board adopted a Policies and Procedures Manual for Administration of the Carl Moyer Program on October 6, 2006, which contains the SCAQMD's procedures for selection, implementation, monitoring and enforcement of projects funded by the Carl Moyer Memorial Air Quality Standards Attainment Program; and

WHEREAS, the SCAQMD Governing Board directed staff to abide by said procedures for administration and implementation of the Carl Moyer Memorial Air Quality Standards Attainment Program; and

WHEREAS, an appropriate public comment period was allowed prior to the Board's adoption of the Policies and Procedures Manual for Administration of the Carl Moyer Memorial Air Quality Standards Attainment Program; and a 30-day public comment period opportunity for hearing has been provided prior to submitting these policy and procedures to U.S. EPA; and

WHEREAS, the SCAQMD will ensure that all projects selected for funding through the Carl Moyer Memorial Air Quality Standards Attainment Program will comply with the project criteria and other requirements specified in the Carl Moyer Program Guidelines developed by CARB; and

WHEREAS, the SCAQMD Governing Board in accepting funding from Proposition 1B – Goods Movement Emissions Reduction Program adopted resolutions to accept Proposition 1B funds and directed staff to enter into a Grant Agreement with CARB accepting the funding and adhering to the terms and provisions of the Proposition 1B Program and Guidelines.

WHEREAS, the SCAQMD Governing Board directed staff to move expeditiously to adopt and implement feasible new control measures to achieve short-term and long-term reductions while meeting all applicable public notice and other regulatory development requirements; and

WHEREAS, the SCAQMD held six public workshops/CEQA Scoping meetings on the Draft 2016 AQMP in July 2016, four public hearings throughout the four-county region in November 2016, 15 AQMP Advisory Group meetings, 16 Scientific, Technical, and Modeling, Peer Review Advisory Group meetings over a 3-year period, and one adoption hearing in February 2017 pursuant to Section 40466 of the Health and Safety Code; and

WHEREAS, pursuant to Section 40471(b) of the Health and Safety Code, as part of the six public workshops and the four public hearings on the 2016 AQMP, and the adoption hearing, public testimony and input were taken relative to Appendix I (Health Effects); and

WHEREAS, the record of the public hearing proceedings is located at SCAQMD, 21865 Copley Drive, Diamond Bar, California 91765, and the custodian of the record is the Clerk of the Board; and

WHEREAS, an extensive outreach program took place that included over 170 meetings with local stakeholders, key government agencies, and focus groups, topical workshops, and over 170 presentations relative to the 2016 AQMP; and

WHEREAS, the record of the CEQA proceedings is located at SCAQMD, 21865 Copley Drive, Diamond Bar, California 91765, and the custodian

of the record is the Deputy Executive Officer, Planning, Rule Development, and Area Sources; and

NOW, THEREFORE BE IT RESOLVED, that the SCAQMD Governing Board does hereby certify that the Final PEIR for the 2016 AQMP was completed in compliance with the requirements of CEQA and SCAQMD Rule 110 provisions; and finds that the Final PEIR was presented to the SCAQMD Governing Board, whose members reviewed, considered and approved the information therein prior to acting on the 2016 AQMP; and finds that the Final PEIR reflects the SCAQMD's independent judgment and analysis; and

BE IT FURTHER RESOLVED, that the SCAQMD will develop, adopt, submit, and implement the 8-hour ozone measures in Tables 4-2 and 4-4 of Chapter 4 in the 2016 AQMP (Main Document) and the PM2.5 control measures as identified in Table 4-7 and as expeditiously as possible in order to meet or exceed the commitments identified in Tables 4-8 through 4-11 of the 2016 AQMP (Main Document), and to substitute any other measures as necessary to make up any emission reduction shortfall.

BE IT FURTHER RESOLVED, the SCAQMD commits to update AQMP emissions inventories, baseline assumptions and control measures as needed to ensure that the best available data is utilized and attainment needs are met.

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board, adopts Findings and a Statement of Overriding Considerations pursuant to CEQA Guidelines §15091 and §15093, respectively, and a Mitigation Monitoring Plan pursuant to Public Resources Code §21081.6 regarding potentially significant adverse environmental impacts that cannot be mitigated to insignificance, as required by CEQA, and which are included in Attachment 2 and incorporated herein by reference; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board finds that the mobile source control measures contained in Appendix IV-A of the 2016 AQMP are technically feasible and cost-effective and requests that CARB consider them in any future incentives programs or rulemaking; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board hereby requests that CARB commit to submitting contingency measures as required by Section 182(e)(5) as necessary to meet the requirements for demonstrating attainment of the 8-hour ozone standards; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board commits under control measure MOB-14 to achieve by December 2023 and December 2031, 9.47 and 5.62 tons per day (tpd) of reductions in NOx emissions,

from the 2023 and 2031 annual average emissions inventories, respectively through the implementation of vehicle and equipment replacement projects under the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B – Goods Movement Emissions Reduction Program as provided in control measure MOB-14; and

BE IT FURTHER RESOLVED, that the SCAQMD will take all actions necessary to ensure that emission reductions resulting from projects funded by the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program will meet U.S. EPA criteria (real, surplus, quantifiable, enforceable, and permanent for life of project) and requirements for SIP creditability to meet federal Clean Air Act requirements. The specific commitments that the SCAQMD will meet to ensure the reductions obtained through implementation of the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program will meet federal Clean Air Act requirements are as follows:

1. The SCAQMD will implement projects funded by the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program through legally enforceable contracts between the SCAQMD and the grantee. These contracts will specify the emission reductions anticipated for the project and describe the actions that the grantee must take to achieve those reductions. The SCAQMD will seek enforcement of the terms of the contracts against non-compliant sources to obtain the agreed-upon reductions or may reallocate any returned funds to a new project or use excess reductions from a different project funded by the Carl Moyer Memorial Air Quality Standards Attainment Program or the Proposition 1B – Goods Movement Emissions Reduction Program to obtain the necessary reductions.

2. The SCAQMD will ensure that all emission reductions calculated for projects funded by the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program will be done using established protocols for the Carl Moyer Program. The SCAQMD will use the quantification protocols specified in the applicable Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program Guidelines in effect at the time of project award to calculate creditable emission reductions for use in the SIP.

3. The SCAQMD will verify surplus emission reductions through a comprehensive inspection, monitoring, and reporting program for each project funded by the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program, and only surplus emission reductions will be credited to the SIP.

4. The SCAQMD will continue to conduct onsite inspections and other monitoring activities for each project funded by the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program to enforce the required reductions. Each project will undergo a pre- and post-inspection to verify the project was implemented according to the terms of the contract. Digital photographs will be taken during the field inspections to verify project conditions. In addition, the SCAQMD requires the grantee to submit annual reports for at least five years following the project implementation. After the five-year annual reporting period, the grantee is required to submit biannual reports for the remaining life of the project. For any project funded by the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program that did not submit its required annual report, the SCAQMD will field inspect the said project within six months of the final due date of the annual report and may continue with on-site monitoring of the project until the annual report is submitted.

5. The SCAQMD will conduct random audits on at least ten percent of the projects funded by the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program. Project audits will also be performed when the grantee fails to submit an annual report. The audit includes verification that the project is still operational and is meeting the terms of the contract including the equipment usage requirements. This is accomplished by, but not limited to: checking the serial number on the engine, witnessing engine operation, checking the odometer reading or other device/method used to track and report equipment usage.

6. The SCAQMD will prepare and submit annual reports to the U.S. EPA by November 30 of each calendar year for the preceding Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program funding cycle and after Board approval. At a minimum, each annual

report will contain the information required by CARB for the Carl Moyer Program annual reports. The report will also include the amount of actual emission reductions versus predicted emission reductions, a discussion of any quantification or surplus issues that have arisen during the reporting period and how they were resolved, a summary of any key issues from field inspections and audits, and include or reference publicly available information or records for each grant issued.

7. If an annual report indicates a shortfall of emission reductions, the SCAQMD will flag the project and take appropriate action to ensure the contracted emission reductions are realized. The SCAQMD will hold the grantee responsible for offsetting the shortfall by using any excess reductions generated over the life of the project or the project life may be extended until the required emission reductions are achieved. In the event the shortfall cannot be remedied by the project, the grantee will be subject to the stipulated penalties in the contract and required to return a prorated share of the funds provided by the Carl Moyer Memorial Air Quality Standards Attainment Program or the Proposition 1B – Goods Movement Emissions Reduction Program. The SCAQMD may consider reallocating the returned funds to a new project or using excess reductions from a different project funded by the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program to obtain the necessary reductions. The returned funds may be used to fund an eligible project that was placed on a back-up list. SCAQMD creates a back-up list of eligible projects when the requested funds by all projects exceed the available funding limits. Projects on the back-up list have already been approved by the Board in the event a selected project cannot be completed and to ensure that all Carl Moyer Program funds are fully encumbered and expended within the requested timeframes.

8. The remedy used to make up any shortfall in emission reductions will be described in the annual report submitted to the U.S. EPA. The SCAQMD will separately track and report on any reductions that are tied to transportation conformity emissions budgets, and will work with local agencies to remedy specific shortfalls to the emissions budgets if needed.

9. The SCAQMD will use information from annual reports and field inspections to track actual emission reductions from projects funded by the Carl Moyer Memorial Air Quality Standards Attainment

Program and the Proposition 1B – Goods Movement Emissions Reduction Program on a real-time basis, and will provide quality-assured data on such emission reductions to the public annually via website posting. The real-time tracking and evaluation of emission reductions from projects funded by the Carl Moyer Memorial Air Quality Standards Attainment Program and the Proposition 1B – Goods Movement Emissions Reduction Program will ensure the projects are meeting the program requirements and achieving the required emission reductions.

10. The Board hereby finds, based on evidence and information presented at the meeting upon which its decision is based, that all notices required to be given by law have been duly given, and that the Board has allowed public testimony.

11. Adoption of these commitments is necessary to identify emission reductions for meeting the federal requirements for the 8-hr ozone and PM2.5 standards and to therefore promote the health and welfare of the residents of the South Coast Air Basin.

12. SCAQMD staff is hereby authorized to make any minor typographical and technical changes in the Resolution that are necessary to correct minor errors, clarify wording, or to satisfy CARB and U.S. EPA technical requirements.

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board finds, pursuant to U.S. EPA's 2008 ozone standard implementation requirements in 40 CFR Part 51.1114, that SCAQMD's existing New Source Review rules (Regulation XIII) that have been adopted by the Governing Board and submitted into the SIP satisfy the Clean Air Act's Sections 182(e)(1) and (e)(2) New Source Review requirements for extreme nonattainment areas; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board does hereby direct staff to work with state agencies and state legislators, federal agencies and U.S. Congressional and Senate members to identify funding sources and secure funding for the expedited replacement of older existing, high NOx-emitting equipment, on-road vehicles, and off-road equipment with zero-emission technologies whenever and wherever technically feasible and cost-effective, and near-zero technologies in all other applications, to help reduce the reliance on the CAA Section 182(e)(5) long-term measures.

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board does hereby direct staff to work with affected stakeholders including members from the public, CARB, and U.S. EPA to identify specific emission reduction actions for

each of the facility-based measures and the emissions growth management measure. In addition to identifying specific actions, staff shall work with affected stakeholders to develop quantification protocols and develop enforceable mechanisms that will be needed to demonstrate to the U.S. EPA that such actions are real, surplus, quantifiable, enforceable and permanent, and any other evidence that will be needed for the U.S. EPA to approve such actions as part of a future rate-of-progress reporting or be used in future AQMP revisions. Any enforceable mechanisms (e.g., memorandum of understanding, etc.) that are not in the form of a rule or regulation adopted by the SCAQMD, CARB, or U.S. EPA shall go through a full public process to receive public comments and input on the enforceable mechanism prior to the SCAQMD Governing Board's approval consideration of the enforceable mechanism.

BE IT FURTHER RESOLVED, that staff shall report on the progress of implementation of the facility-based measures, the on-road heavy-heavy-duty vehicle measure, and the emissions growth management measure to the SCAQMD Mobile Source Committee no later than one year after the submittal of the 2016 AQMP to the U.S. EPA. As part of the report, staff shall recommend to the SCAQMD Governing Board what steps will be taken to ensure that the actions identified will be permanent and enforceable including the potential for rule development or identification of other enforceable mechanisms for the SCAQMD Governing Board's consideration.

BE IT FURTHER RESOLVED, that staff shall report on the progress in identifying the necessary funding to accelerate deployment of zero and near-zero emission technologies in the near-term every six months to the SCAQMD Legislative Committee and other Board Committees as appropriate. As part of this report, staff shall provide a discussion on the progress to identify new funding sources and potential prospects for sustained funding. If significant funding levels are not identified within one year from the date of submittal of the 2016 AQMP to the U.S. EPA, staff shall initiate discussions with the California Air Resources Board and U.S. EPA on potential rulemaking that the state and federal government will need to adopt to meet applicable ozone air quality standards. In addition, staff shall initiate rule development for stationary and mobile sources that are within the District's legal authority to adopt unless sufficient actions have been identified as part of the public process in implementing the facility-based measures (MOB-01 through MOB-04), on-road heavy-heavy-duty measure (MOB-08), and the emissions growth management measure (EGM-01).

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board directs staff to prioritize funding in Environmental Justice areas and disadvantaged communities as defined by the agency providing the funds or if there is no definition

provided, using the definitions set by the state legislature and CARB in implementing the Low Carbon Transportation Funding programs.

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board directs staff to promote and encourage the use of solar energy systems and technology in applications where it can be shown to be cost-effective and result in emission reductions; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board directs staff to develop guidelines for incentive programs that do not have guidelines from the agency providing the funding and the emission reduction benefits are proposed to be included into the SIP. The guidelines will include creditability demonstration, enforceable commitments, technical analyses/support, demonstration of funding and legal authority, procedures for public disclosure of information, and provisions to measure and track programmatic results; and

BE IT FURTHER RESOLVED, the SCAQMD Governing Board hereby approves, pursuant to the authority granted by law, the adoption of incentive programs as an implementation tool of the incentive measures for the Final 2016 AQMP; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board commits under control measure CMB-01 to achieve by December 2023, 2.5 and 1.2 tpd of reductions in NOx and VOC emissions, respectively, from the 2023 summer planning inventory and by December 2031, 6 and 2.8 tpd of reductions in NOx and VOC emissions, respectively, from the 2031 summer planning inventory in the 2016 AQMP through the implementation of either replacement of approximately 5,800 diesel internal combustion engines (ICEs) in accordance with the incentive program guidelines to be developed in the future along with a regulatory element or a demonstration that the emission reductions associated with CMB-01 have been achieved through other enforceable actions; and

BE IT FURTHER RESOLVED, that in each annual demonstration report for Calendar Years 2018 through 2031 submitted to U.S. EPA by April 1 of the following year, the SCAQMD Governing Board commits to (1) identify each of these 5,800 projects by project identification number, project life and implementation date, description of both baseline and new equipment, applicable incentive program guideline, and quantified emission reductions; (2) document the SCAQMD's actions to monitor selected projects for compliance with contract requirements; (3) determine whether the identified projects are projected to achieve the full amount of NOx emission reductions identified; and (4) report on emission reductions in the reporting year due to other enforceable actions; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board commits under control measure CMB-02 to achieve by December 2023 and December 2031, 1.1 and 2.84 tpd of reductions in NOx emissions, respectively, from the 2023 and 2031 summer planning inventory in the 2016 AQMP through the implementation of either the replacement of approximately 82,000 – 152,000 commercial boilers, water heaters, and residential pool heaters in accordance with the incentive program guidelines to be developed in the future along with a regulatory element or a demonstration that the emission reductions associated with CMB-02 have been achieved through other enforceable actions; and

BE IT FURTHER RESOLVED, that in each annual demonstration report for Calendar Years 2020 through 2031 submitted to U.S. EPA by April 1 of the following year, the SCAQMD Governing Board commits to (1) identify each of these [82,000–152,000] projects by project identification number, project life and implementation date, description of both baseline and new equipment, applicable incentive program guideline, and quantified emission reductions; (2) document the District's actions to monitor selected projects for compliance with contract requirements; (3) determine whether the identified projects are projected to achieve the full amount of NOx emission reductions identified; and (4) report on emission reductions in the reporting year due to other enforceable actions; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board commits under control measure ECC-03 to achieve by December 2023, 1.2 and 0.2 tpd of reductions in NOx and VOC emissions, respectively, from the 2023 summer planning inventory and by December 2031, 2.1 and 0.3 tpd of NOx and VOC emissions from the 2031 summer planning inventory in the 2016 AQMP through the implementation of either advanced energy efficiency programs for residential sectors, such as advanced highly efficient zero and near-zero emission appliance technologies and weatherization along with renewable energy sources, in accordance with the incentive program guidelines to be developed in the future or a demonstration that the emission reductions associated with ECC-03 have been achieved through other enforceable actions; and

BE IT FURTHER RESOLVED, that in each annual demonstration report for Calendar Years 2020 through 2031 submitted to U.S. EPA by April 1 of the following year, the SCAQMD Governing Board commits to (1) identify each of these projects by project identification number, project life and implementation date, description of both baseline and new equipment, applicable incentive program guideline, and quantified emission reductions; (2) document the District's actions to monitor selected projects for compliance with contract requirements; and (3) determine whether the identified projects are projected to achieve the full amount of NOx emission reductions identified; and (4) report on emission reductions in the reporting year due to other enforceable actions; and

BE IT FURTHER RESOLVED, if U.S. EPA determines that information submitted by the SCAQMD is insufficient to demonstrate that the required emission reductions will occur on schedule, the SCAQMD will develop substitute rules and/or measures no later than one year from the date of the U.S. EPA finding published in the Federal Register, that will achieve the 2023/2031 committed emission reductions addressing the shortfall as expeditiously as practicable, but no later than December 2023 and December 2031, respectively; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board finds that transportation emission budgets are "consistent with applicable requirements for reasonable further progress, attainment, or maintenance (whichever is relevant to the given implementation plan submission)" pursuant to 40 CFR 93.118(e)(4)(iv); and

BE IT FURTHER RESOLVED, that the Executive Officer is hereby directed to finalize the 2016 AQMP including the main document, appendices, and related documents as adopted at the February 3, 2017 public hearing; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board, whose members reviewed, considered and approved the information contained in the documents listed herein, adopts the 2016 AQMP dated February 3, 2017 consisting of the document entitled 2016 AQMP as amended by the final changes set forth by the SCAQMD Governing Board and the associated documents listed in Attachment 1 to this Resolution; the Draft Final Socioeconomic Report for the 2016 AQMP; the Final PEIR for the 2016 AQMP; and, the Findings, Statement of Overriding Considerations, and Mitigation Monitoring Plan presented in Attachment 2 to this Resolution; and

BE IT FURTHER RESOLVED, the Executive Officer is hereby directed to work with CARB and the U.S. EPA to ensure expeditious approval of this 2016 AQMP for PM2.5 and 8-hour ozone attainment; and

BE IT FURTHER RESOLVED, the SCAQMD Governing Board requests that the 2016 AQMP serve as the SIP revision submittal for the 24-hour PM2.5 attainment demonstration plan including the BACM/BACT determinations for the PM2.5 standard for the South Coast Air Basin, and the PM2.5 Transportation Conformity Budgets for the South Coast Air Basin; and

BE IT FURTHER RESOLVED, that the 2016 AQMP serves as a revision to the previously approved 1997 8-hour ozone standard SIP with respect to emissions inventories, attainment demonstration, RFP, and transportation emissions budgets and any other required SIP elements; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board finds Appendix VI-E of the 2016 AQMP demonstrates compliance with the vehicle miles traveled requirements for the 2008 ozone NAAQS, as set forth in section 182(d)(1)(A) of the CAA; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board finds the clean fuels for boilers requirement, set forth in section 182(e)(3) of the CAA, has been satisfied by the SCAQMD's Rule 1146, Rule 2002, and Rule 1303, which have been submitted into the SIP; and.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby directed to forward a copy of this Resolution, the 2016 AQMP and its appendices as amended by the final changes, to CARB, and to request that these documents be submitted to the U.S. EPA for approval as part of the California State Implementation Plan. In addition, the Executive Officer is directed to forward a copy of this Resolution, comments on the 2016 AQMP and responses to comments, public notices, and any other information requested by the U.S. EPA for informational purposes; and

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board directs the Executive Officer to work with CARB and the U.S. EPA and take appropriate action to resolve any completeness or approvability issues that may arise regarding the SIP submission; and.

BE IT FURTHER RESOLVED, that the SCAQMD Governing Board authorizes the Executive Officer to include in the SIP submittal or supplement(s) to the SIP any technical updates, corrections, clarifications, or additional information that may be necessary to secure U.S. EPA approval.

Dated:_____ _____
Clerk of the Boards

ATTACHMENT 1

The Final 2016 Air Quality Management Plan submitted for the South Coast Air Quality Management District Governing Board's consideration consists of the documents entitled:

- Draft Final 2016 AQMP (Attachment B) including the following appendices:
  - Appendix I – Health Effects
  - Appendix II – Current Air Quality
  - Appendix III - Base and Future Year Emission Inventory
  - Appendix IV-A – SCAQMD's Stationary and Mobile Source Control Measures
  - Appendix IV-B – CARB's Mobile Source Strategy
  - Appendix IV-C – SCAG's Regional Transportation Strategies and Control Measures
  - Appendix V – Modeling and Attainment Demonstrations
  - Appendix VI – Compliance with Other Clean Air Act Requirements
- Comments on the 2016 Air Quality Management Plan, and Responses to Comments (December 2016) – (Attachment C)
- Final Program Environmental Impact Report for the 2016 Air Quality Management Plan (Attachment D)
  - Findings, Statement of Overriding Considerations, and Mitigation, Monitoring and Reporting Plan (Attachment 2 to the Resolution)
- Draft Final Socioeconomic Report for the 2016 Air Quality Management Plan (Attachment E)
- Public Hearing Transcriptions (Attachment F)

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Attachment 2 to the Governing Board Resolution for: Final Program Environmental Impact Report for the 2016 Air Quality Management Plan (AQMP)

Findings, Statement of Overriding Considerations, and Mitigation Monitoring and Reporting Plan

State Clearinghouse No: 2016071006

January 2017

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ATTACHMENT 2 TO THE GOVERNING BOARD RESOLUTION FOR: FINAL PROGRAM ENVIRONMENTAL IMPACT REPORT (EIR) FOR THE 2016 AIR QUALITY MANAGEMENT PLAN (AQMP)

FINDINGS, STATEMENT OF OVERRIDING CONSIDERATIONS, AND MITIGATION MONITORING AND REPORTINGPLAN

1.0 INTRODUCTION

The California Environmental Quality Act (CEQA), Public Resources Code §21000 et seq., requires that the potential environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid identified significant adverse environmental impacts of these projects be identified. To fulfill the purpose and intent of CEQA, the SCAQMD has prepared a Program Environmental Impact Report (EIR) to address the potential environmental impacts associated with the proposed 2016 Air Quality Management Plan (AQMP). The South Coast Air Quality Management District (SCAQMD) is the lead agency for the proposed project and, therefore, has prepared a Final Program EIR pursuant to CEQA. The purpose of the Final Program EIR is to describe the proposed project and to identify, analyze, and evaluate any potentially significant adverse environmental impacts that may result from adopting and implementing the proposed 2016 AQMP. A Draft Program EIR was circulated to the public for a 60-day review and comment period from September 16, 2016 to November 15, 2016. The SCAQMD received 11 comment letters during the 60-day public review and comment period. Responses to all comments were prepared and comments and responses are included in Appendix E of the Final Program EIR.

The California Legislature adopted the Lewis Air Quality Act in 1976, creating the SCAQMD from a voluntary association of air pollution control districts in Los Angeles, Orange, Riverside, and San Bernardino counties. The new agency was charged with developing uniform plans and programs for the South Coast Air Basin (Basin) to attain federal air quality standards by the dates specified in federal law. While the Basin has one of the worst air quality problems in the nation, there have been significant improvements in air quality in the Basin over the last two decades, although some air quality standards are still exceeded relatively frequently, and by a wide margin. The agency was also required to meet state standards by the earliest date achievable through the use of reasonably available control measures.

The Lewis Air Quality Act (now known as the Lewis-Presley Air Quality Management Act) requires that the SCAQMD prepare an AQMP consistent with federal planning requirements. In 1977, amendments to the federal Clean Air Act (CAA) included requirements for submitting State Implementation Plans (SIPs) for non-attainment areas that fail to meet all federal ambient air quality standards (Health and Safety Code §40462). The federal CAA was amended in 1990 to specify attainment dates and SIP requirements for ozone, carbon monoxide (CO), nitrogen dioxide (NO2) and particulate matter less than 10 microns in diameter (PM10). The California Clean Air Act (CCAA), adopted in 1988, requires the SCAQMD to endeavor to achieve and maintain state ambient air quality standards for ozone, CO, sulfur dioxide (SO2), and NO2 by the earliest practicable date (Health and Safety Code §40910), and establishing requirements to update the plan periodically. The first AQMP was prepared and approved by the SCAQMD in 1979 and has been updated and revised a number of times. The CCAA requires a three-year plan review and update to the AQMP.

The Air Quality Management Plan (AQMP) is the planning document that sets forth policies and measures to achieve federal and state air quality standards in the region. The proposed 2016 AQMP is considered a "project" as defined by the California Environmental Quality Act (CEQA) in California Public Resources Code section 21000 et seq., which requires the evaluation of the potential environmental impacts of proposed projects and the identification of feasible methods to

reduce or avoid identified significant adverse environmental impact from implementing these projects.

2.0 CERTIFICATION OF THE FINAL PROGRAM EIR

The SCAQMD Governing Board certifies that it has been presented with the Final Program EIR and that it has reviewed and considered the information contained in the Final Program EIR prior to making the following certifications and findings. Pursuant to CEQA Guidelines section 15090 (Title 14 of the California Code of Regulations, § 15090), the SCAQMD Governing Board certifies that the Final Program EIR, including responses to comments, has been completed in compliance with the CEQA statutes and the CEQA Guidelines. The SCAQMD Governing Board certifies the Final Program EIR for the actions described in these findings and in the Final Program EIR, i.e., the proposed project. The SCAQMD Governing Board further certifies that the Final Program EIR reflects its independent judgment and analysis. The Governing Board Resolution includes the certification of the Final Program EIR.

2.1 ENVIRONMENTAL REVIEW PROCESS

To fulfill the purpose and intent of CEQA, the SCAQMD, as Lead Agency for the proposed project, prepared a Notice of Preparation/Initial Study (NOP/IS) which identified environmental topics to be analyzed in a Draft Program Environmental Impact Report (EIR). The NOP/IS was distributed to responsible agencies and interested parties for a 30-day review and comment period from July 5, 2016 to August 4, 2016. The NOP/IS formed the basis for, and focus of, the technical analyses in the Draft Program EIR. The NOP/IS identified the following environmental topic areas as having potentially significant adverse impacts and were further analyzed in the Draft Program EIR: air quality and greenhouse gas (GHG) emissions; energy; hazards and hazardous materials; hydrology and water quality; noise; solid and hazardous waste; and transportation and traffic. The NOP/IS concluded that there would be no significant adverse impacts on aesthetics, agricultural and forestry resources, biological resources, cultural resources, geology and soils, land use and planning, mineral resources, population and housing, public services, and recreation. The NOP/IS was circulated to local jurisdictions and public agencies, 2016 AQMP stakeholders, and interested individuals in order to solicit input on the scope of the environmental analysis to be included in the Draft Program EIR. Ten comment letters were received regarding the preliminary analysis in the NOP/IS. Comments and responses to comments received on the NOP/IS are included in Appendix B of the Final Program EIR. Based on comments received, the topic of aesthetics was identified as a potentially significant impact area; as such, the topic of aesthetics was added to the list of topics to be analyzed in the Draft Program EIR.

Since the proposed project was determined to have statewide, regional or areawide significance, a CEQA scoping was required pursuant to Public Resources Code section 21083.9(a)(2). Two CEQA scoping meetings were held on each of the following dates (for a total of six scoping meetings) at various locations throughout the District: July 14, 2016, July 20, 2016, and July 21, 2016. No CEQA comments were raised at any of the CEQA scoping meetings (Appendix D of the Final Program EIR).

The Draft Program EIR was released for a 60-day public review and comment period from September 16, 2016 to November 15, 2016. The Draft Program EIR was circulated for public review and comment to local jurisdictions and public agencies, 2016 AQMP stakeholders, and interested individuals. The environmental topics that were determined to have potentially significant impacts were further analyzed in the Draft Program EIR and included the following topics: aesthetics, air quality and GHG emissions, energy, hazards and hazardous materials, hydrology and water quality, noise, solid and hazardous waste, and transportation and traffic.

The Draft Program EIR concluded that implementation of the 2016 AQMP has the potential to generate significant adverse environmental impacts for the following environmental topic areas: aesthetics; construction air quality and GHG emissions; energy (due to increased electricity demand); hazards and hazardous materials; water demand; construction noise and vibration; solid waste; and transportation and traffic. Mitigation measures were identified to mitigate to the maximum extent feasible the potentially significant adverse impacts to all of the aforementioned environmental topic areas. Even after all feasible mitigation measures are implemented, impacts to all of the environmental topic areas would remain significant. In addition, the Draft Program EIR included analyses of potentially significant adverse cumulative environmental impacts and identified and evaluated the relative merits of four project alternatives, including a No Project Alternative (Alternative 1), and compared the impacts from the project alternatives to the potential impacts from the 2016 AQMP.

Eleven comment letters were received during the public comment period on the Draft Program EIR and responses to all comments received were prepared and comments and responses are included in Appendix E of the Final Program EIR. In addition, some modifications have been made to the Draft Program EIR to make it a Final Program EIR, including addressing changes to the 2016 AQMP made after the release of the Draft Program EIR in the Revised Draft AQMP and the Draft Final AQMP. However, none of the modifications alter any of the conclusions reached in the Draft Program EIR or provide new information of substantial importance relative to the draft document that would require recirculation of the Draft Program EIR pursuant to CEQA Guidelines section 15088.5. Because the 2016 AQMP has the potential to generate significant adverse environmental impacts that cannot be mitigated to less than significance, Findings and a Statement of Overriding Considerations are required and have been prepared pursuant to CEQA Guidelines sections 15091 and 15093, respectively.

The Final Program EIR has been prepared pursuant to CEQA Guidelines section 15132 and consists of an executive summary, project description, environmental setting, environmental impacts and mitigation measures, cumulative impacts, project alternatives, the NOP/IS (Appendix A of the Final Program EIR), comments and responses to comments on the NOP/IS (Appendix B of the Final Program EIR), air quality construction – assumptions and calculations (Appendix C of the Final Program EIR), scoping meeting comments (Appendix D of the Final Program EIR), and comments and responses to comments on the Draft Program EIR (Appendix E of the Final Program EIR). All documents comprising the Final Program EIR for the proposed project are available at SCAQMD headquarters, 21865 Copley Drive, Diamond Bar, California, 91765. The Final Program EIR was made available to the public on January 25, 2017, and can be obtained by contacting the SCAQMD's Public Information Center at (909) 396-2039 or by accessing the

SCAQMD's CEQA webpage at: http://www.aqmd.gov/home/library/documents-support-material/lead-agency-scaqmd-projects.

2.2 SUMMARY OF THE PROPOSED PROJECT

Implementation of the 2016 AQMP control strategies requires a cooperative partnership of governmental agencies at the federal, state, regional and local level. At the federal level, the United States Environmental Protection Agency (U.S. EPA) is charged with regulating on-road motor vehicle standards; trains, airplanes, and ships; certain non-road engines; and off-shore oil development. At the state level, the California Air Resources Board (CARB) oversees on-road emission standards, fuel specifications, some off-road sources, and consumer product standards. At the regional level, the SCAQMD is responsible for regulating stationary sources and some mobile sources. In addition, SCAQMD has lead responsibility for the development of the AQMP. Furthermore, at the local level, the Southern California Association of Governments (SCAG) has a dual role of leader and coordinator. In their leadership role, they, in cooperation with local jurisdictions and sub-regional associations, develop strategies for these jurisdictions to implement. As a coordinator, they facilitate the implementation of these strategies (i.e., transportation control measures).

The overall control strategy for the 2016 AQMP is designed to meet applicable federal and state requirements. The 2016 AQMP focuses on achieving NOx reductions to attain ozone and PM2.5 standards, both at the federal and state levels. In addition, the 2016 AQMP also discusses the recently adopted federal 8-hour ozone standard (70 ppb). The proposed control measures in the 2016 AQMP are based on implementing all feasible control measures through the accelerated deployment of available cleaner technologies, best management practices, co-benefits from existing programs, and incentive measures. Public and private funding will help to further the development and deployment of advanced technologies. Similar to the approaches taken in previous AQMPs, the state implementation plan (SIP) commitment includes an adoption and implementation schedule for each control measure. Many of the same technologies will address both air quality and climate needs, such as increased energy efficiency. To ultimately achieve the ozone ambient air quality standards and demonstrate attainment, significant NOx emissions reductions will be necessary, not only from non-vehicular sources under the jurisdiction of SCAQMD, but substantial reductions will be necessary from sources primarily under the jurisdiction of CARB (e.g., on-road motor vehicles, off-road equipment, and consumer products) and U.S. EPA (e.g., aircraft, ships, trains, and pre-empted off-road equipment). Without an adequate and fair-share level of reductions from all sources, the emissions reduction burden would be unfairly shifted to stationary sources that are already stringently regulated. SCAQMD will continue to work closely with CARB to further control mobile source emissions where federal or state actions do not meet regional needs.

Implementation of the 2016 AQMP will be based on a series of control measures and strategies that vary by source type (i.e., mobile or stationary) as well as by the pollutant that is being addressed. Control measures were developed from a number of sources, including the AQMP Advisory Group, AQMP Control Strategy Symposium, Reasonably Available Control Technology (RACT) / Reasonable Available Control Measures Analysis (RACM), Best Available Control

Technology (BACT) / Best Available Control Measures (BACM) analysis, SCAQMD staff and public input, and previous AQMPs.

The 2016 AQMP control measures consist of three main components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) suggested State and Federal Source Control Measures; and 3) RTP/SCS Transportation Control Measures provided by SCAG. These measures rely on not only the traditional command-and-control approach, but also public incentive programs, as well as advanced technologies expected to be developed and deployed in the next several years.

2.3 ABSENCE OF NEW INFORMATION

CEQA Guidelines Section 15088.5 requires a lead agency to recirculate an EIR for further review and comment when significant new information is added to the EIR after public notice is given of the availability of the draft EIR but before certification of a final EIR. New information added to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect that the project proponent declines to implement. The CEQA Guidelines provide examples of significant new information under this standard. Recirculation is not required where the new information added to the EIR merely clarifies, amplifies, or makes insignificant modifications in an adequate EIR.

The SCAQMD Governing Board recognizes that the Final Program EIR incorporates information obtained by SCAQMD since the Draft Program EIR was completed, and contains additions and clarifications. With respect to this information, the SCAQMD Governing Board finds as follows.

Updated Information: As described in the Preface to the Final Program EIR, modifications to the proposed project were made between the release of the Draft 2016 AQMP (released to the public on June 30, 2016) and the Revised Draft 2016 AQMP (released to the public on October 7, 2016). The specific changes are documented in the following online overview: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016air-quality-management-plan/revised-draft-aqmp-plan/overview.pdf. Several additional modifications to the proposed project were made between the release of the Revised Draft 2016 AQMP and the Draft Final AQMP (released to the public on December 2, 2016), including the addition of prioritized funding distribution to benefit disadvantaged communities, the addition of the latest emission reductions based on the latest attainment modeling, updates to Chapter 2 to reflect public health comments received on Appendix I, additional consideration of "life cycle" emissions analysis, clarification of engine inventory and acknowledgement of the need for reliable emergency power in certain circumstances (CMB-01), highlighting of the small wastewater treatment inventory among non-refinery flare facilities (CMB-03), an expanded discussion of RECLAIM re-assessment (CMB-05), clarification of the review of NPDES permits to avoid conflicting requirements (BCM-03), and the addition of the incentive funding shortfall procedure in Appendix IV-B.

The SCAQMD Governing Board finds that these changes to the 2016 AQMP do not cause any new or more severe environmental impacts. Therefore, in accordance with CEQA Guidelines

Section 15088.5, no recirculation of the Final Program EIR is necessary based on the changes to the 2016 AQMP.

Responses to Comments: In response to comments, a number of environmental topic areas were clarified and described in more detail. The SCAQMD Governing Board finds that this additional information does not constitute significant new information requiring recirculation, but rather that the additional information clarifies or amplifies an adequate Program EIR. Specifically, the SCAQMD Governing Board finds that the additional information including the changes described above, does not show that:

1. A new significant environmental impact would result from the project;
2. A substantial increase in the severity of an environmental impact would result
3. A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project's proponents decline to adopt it; or
4. The Draft Program EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

Based on the foregoing reasons, and having reviewed the information contained in the Final Program EIR and in the record of SCAQMD's proceedings, including the comments on the Draft Program EIR and the responses thereto, and the above-described information, the SCAQMD Governing Board hereby finds that no significant new information has been added to the Final Program EIR since public notice was given of the availability of the Draft Program EIR that would require recirculation of the Draft Program EIR.

2.4 SCAQMD GOVERNING BOARD REVIEW

In making its determination to certify the Final Program EIR and to approve the proposed project, the SCAQMD Governing Board recognizes that the proposed project involves a number of controversial environmental issues and that a range of opinion exists with respect to those issues. The SCAQMD Governing Board has acquired an understanding of the range of opinion by its review of the Draft Program EIR, comments received on the Draft Program EIR, and the responses to those comments in the Final Program EIR (Appendix E). Additionally, the SCAQMD Governing Board has its own experience and expertise in assessing air quality effects and in administering its regulatory programs. The SCAQMD Governing Board has reviewed and considered, as a whole, the evidence and analysis presented in the Draft Program EIR, the analysis presented in the comments on the Draft Program EIR, the analysis presented in the Final Program EIR, and the expert opinions of SCAQMD staff addressing those comments. The SCAQMD Governing Board has gained a comprehensive and well-rounded understanding of the environmental issues presented by the proposed project. In turn, this understanding has enabled the SCAQMD Governing Board to make its decisions after weighing and considering the various viewpoints on these important issues. The SCAQMD Governing Board accordingly certifies that its findings are based on full appraisal of all of the information contained in the Final Program EIR, as well as the evidence and other information in the record.

3.0 FINDINGS

Public Resources Code §21081 and CEQA Guidelines section 15091(a) state that no public agency shall approve or carry out a project for which a CEQA document has been completed which identifies one or more significant adverse environmental effects of the project unless the public agency makes one or more written findings for each of those significant effects, accompanied by a brief explanation of the rationale for each finding. Additionally, the findings must be supported by substantial evidence in the record (CEQA Guidelines § 15091(b)). As identified in the Final Program EIR and summarized in this document, the 2016 AQMP has the potential to create significant adverse impacts for the following topics: aesthetics; construction air quality and GHG emissions; energy (due to increased electricity demand); hazards and hazardous materials; water demand; construction noise and vibration; solid waste; and, transportation and traffic. The SCAQMD Governing Board, therefore, makes the following findings regarding the 2016 AQMP. The findings are supported by substantial evidence in the record as explained in each finding. The findings will be included in the record of project approval and will also be noted in the Notice of Determination. The findings made by the SCAQMD Governing Board are based on the following significant adverse impacts identified in the Final Program EIR.

3.1 POTENTIALLY SIGNIFICANT IMPACTS WHICH CANNOT BE MITIGATED TO A LEVEL OF INSIGNIFICANCE

1. **Project-specific and cumulative aesthetics impacts were concluded to be significant and would remain significant following mitigation.**

   Finding and Explanation:
   Implementation of some of the 2016 AQMP control measures could: 1) change the existing visual character or quality of any site on which certain types of technologies may be installed and its surroundings; and 2) result in glare. For example, during construction associated with the installation of catenary lines, the equipment staging and laydown areas could be in close proximity to each affected site and as such, could cause a temporary, but potentially significant degradation of the existing visual character of the each affected site. Similarly, during operation, the use of bonnet technology on vessels at the Ports may also cause a potentially significant degradation of the existing visual character or quality of a site and its surroundings. In addition, the installation of solar panels and cool roof technology could significantly increase the amount of glare generated relative to the existing setting.

   SCAG's TCMs and related strategies, measures and recommendations included in the 2016 RTP/SCS are also included in the 2016 AQMP. Because the TCMs are included in the 2016 AQMP and because the TCMs and other projects in the 2016 RTP/SCS have the potential to generate related or similar impacts compared to the 2016 AQMP, the 2016 RTP/SCS is considered to be a cumulatively related project. Feasible mitigation measures to reduce significant adverse cumulative aesthetics impacts were identified in the Program EIR for the 2016 RTP/SCS.

Five aesthetics mitigation measures are identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., AE-1 through AE-5). However, because the SCAQMD cannot predict how a lead agency might choose to mitigate a particular significant aesthetics impact for future project(s) located in areas with project-specific features and issues, the potential exists for impacts from future projects to have significant adverse project-specific aesthetics impacts even after feasible mitigation measures are identified and imposed. While these aesthetics mitigation measures may reduce aesthetics impacts to the maximum extent feasible, none will avoid the significant impacts or reduce the aesthetics impacts to less than significant. Further, no other feasible mitigation measures have been identified to reduce project-specific or cumulative aesthetics impacts to a level of insignificance. Therefore, the 2016 AQMP is considered to have significant adverse unavoidable project-specific and cumulative aesthetics impacts and these impacts are expected to remain significant after mitigation.

The Governing Board finds that mitigation measures have been identified, but they would not reduce to insignificance the significant adverse project-specific or cumulative impacts to aesthetics. No other feasible mitigation measures have been identified. CEQA Guidelines section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

The Governing Board further finds that the Final Program EIR considered alternatives pursuant to CEQA Guidelines section 15126.6, but there is no alternative to the project, other than the No Project Alternative (Alternative 1), that would reduce to insignificant levels the significant project-specific or cumulative aesthetics impacts that were identified for the proposed project. However, the No Project Alternative (Alternative 1) was rejected due to infeasibility. Specifically, the No Project Alternative (Alternative 1) was determined to not be a legally viable alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates and continued implementation of the 2012 AQMP without adopting additional reduction measures would violate this requirement.

2. Project-specific and cumulative criteria air pollutant and GHG emissions during construction were concluded to be significant and would remain significant following mitigation.

Finding and Explanation:
Implementation of the 2016 AQMP is expected to result in direct air quality benefits because emission reductions are anticipated to occur as a result of implementing the various control measures. However, indirect air quality impacts resulting in potential increases in air pollutants could also occur from intended efforts or equipment employed to improve air quality. In particular, some of the control measures could: 1) generate emissions during the construction phases needed to implement the proposed control measures; 2) generate additional emissions from power plants that would need to expand in order to produce the additional electricity needed to operate zero and near-zero technologies; 3) generate

additional TACs such as from the increased use of ammonia for operating air pollution control equipment and the manufacture and use of reformulated products; 4) generate additional emissions from refineries to produce reformulated or alternative fuels; and 5) generate additional trips to transport materials. Analysis of these air quality impacts concluded that only the emissions generated during construction activities would exceed the air quality and GHG significance thresholds for construction.

SCAG's TCMs and related strategies, measures and recommendations included in the 2016 RTP/SCS are also included in the 2016 AQMP. Because the TCMs are included in the 2016 AQMP and because the TCMs and other projects in the 2016 RTP/SCS have the potential to generate related or similar impacts compared to the 2016 AQMP, the 2016 RTP/SCS is considered to be a cumulatively related project. Feasible mitigation measures to reduce significant adverse cumulative air quality and GHG impacts were identified in the Program EIR for the 2016 RTP/SCS.

Air quality mitigation measures for project-specific impacts are identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., AQ-1 through AQ-23). While implementation of these air quality mitigation measures would reduce construction emissions to the maximum extent feasible, none will reduce the construction-related air quality and GHG impacts to less than significant levels. No other feasible mitigation measures have been identified to reduce project-specific or cumulative construction air quality and GHG emissions to a level of insignificance. Therefore, the 2016 AQMP is considered to have significant adverse unavoidable project-specific and cumulative air quality and GHG impacts during construction. As improved emission reduction technologies become available and as specific control measures are developed and projects proposed, additional construction mitigation measures will be updated and implemented.

The Governing Board finds that mitigation measures have been identified, but they would not reduce to insignificance the significant adverse project-specific or cumulative impacts to air quality and GHG during construction. No other feasible mitigation measures have been identified. CEQA Guidelines section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

The Governing Board further finds that the Final Program EIR considered alternatives pursuant to CEQA Guidelines section 15126.6, but there is no alternative to the project, other than the No Project Alternative (Alternative 1), that would reduce to insignificant levels the significant project-specific or cumulative air quality and GHG impacts during construction that were identified for the proposed project. However, the No Project Alternative (Alternative 1) was rejected due to infeasibility. Specifically, the No Project Alternative (Alternative 1) was determined to not be a legally viable alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates and continued implementation of the 2012 AQMP without adopting additional reduction measures would violate this requirement.

3. Project-specific and cumulative energy impacts due to increased electricity demand were concluded to be significant and would remain significant following mitigation.

Finding and Explanation:
Implementation of some of the 2016 AQMP control measures could increase the electricity demand from 7.8 to 12.7 percent by year 2024 due to an increased penetration of near-zero and zero emission technologies combined with operating new control equipment. Because the projected increase in electricity demand would be expected to exceed the baseline by more than one percent of supply, the electricity demand impacts were concluded to have significant energy impacts.

SCAG's TCMs and related strategies, measures and recommendations included in the 2016 RTP/SCS are also included in the 2016 AQMP. Because the TCMs are included in the 2016 AQMP and because the TCMs and other projects in the 2016 RTP/SCS have the potential to generate related or similar impacts compared to the 2016 AQMP, the 2016 RTP/SCS is considered to be a cumulatively related project. Feasible mitigation measures to reduce significant adverse cumulative energy impacts were identified in the Program EIR for the 2016 RTP/SCS.

Energy mitigation measures for project-specific impacts are identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., E-1 through E-7). However, while implementation of mitigation measures E-1 to E-7 would reduce the energy impacts, the overall energy impacts after mitigation are expected to remain significant. No other feasible mitigation measures have been identified that would reduce project-specific or cumulative electricity demand impacts to a level of insignificance. Therefore, the proposed project is considered to have significant adverse unavoidable project-specific and cumulative energy impacts.

The Governing Board finds that mitigation measures have been identified, but they would not reduce to insignificance the significant adverse project-specific or cumulative impacts to energy. No other feasible mitigation measures have been identified. CEQA Guidelines section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

The Governing Board further finds that the Final Program EIR considered alternatives pursuant to CEQA Guidelines section 15126.6, but there is no alternative to the project, other than the No Project Alternative (Alternative 1), that would reduce to insignificant levels the significant project-specific or cumulative energy impacts that were identified for the proposed project. However, the No Project Alternative (Alternative 1) was rejected due to infeasibility. Specifically, the No Project Alternative (Alternative 1) was determined to not be a legally viable alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates and continued implementation of the 2012 AQMP without adopting additional reduction measures would violate this requirement.

4. Project-specific and cumulative hazards and hazardous materials impacts were concluded to be significant and would remain significant following mitigation.

Finding and Explanation:
Implementation of some of the 2016 AQMP control measures could cause significant hazards and hazardous materials impacts related to: 1) to the use of reformulated coatings, solvents, and consumer products; 2) the use of LNG, an alternative fuel, and the use of ammonia to operate air pollution control equipment; and 3) implementing the proposed project at the affected facilities located within in close proximity to sensitive receptors or within one-quarter mile of existing or proposed school sites.

SCAG's TCMs and related strategies, measures and recommendations included in the 2016 RTP/SCS are also included in the 2016 AQMP. Because the TCMs are included in the 2016 AQMP and because the TCMs and other projects in the 2016 RTP/SCS have the potential to generate related or similar impacts compared to the 2016 AQMP, the 2016 RTP/SCS is considered to be a cumulatively related project. All feasible mitigation measures to reduce significant cumulative adverse hazard and hazardous materials impacts were identified in the Program EIR for the 2016 RTP/SCS.

Two mitigation measures are identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., HZ-1 and HZ-2), which were crafted to inform consumers about any potential fire hazards that may be associated with using reformulated products that may have increased flammability. While the promotion of consumer awareness may be helpful for safety reasons, these mitigation measures do not physically reduce any fire hazards in the reformulated products themselves. Three mitigation measures are identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., HZ-3 through HZ-6) to address the transportation and storage impacts associated with LNG and ammonia. Three mitigation measures are identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., HZ-16 through HZ-18) to address the hazards impacts near sensitive receptors and schools. None of these mitigation measures will reduce all the significant hazard and hazardous materials impacts to less than significant levels. No other feasible mitigation measures have been identified that would reduce all the project-specific or cumulative hazard and hazardous materials impacts to a level of insignificance. Therefore, even after implementation of mitigation measures HZ-1 through HZ-18, the significant adverse unavoidable project-specific and cumulative hazard and hazardous materials impacts of the proposed project are expected to remain significant and unavoidable.

The Governing Board finds that mitigation measures have been identified, but none of the mitigation measures would reduce impacts to less than significant. Thus, not all of the mitigation measures would reduce to insignificance all of the significant adverse project-specific or cumulative impacts to hazards and hazardous materials. No other feasible mitigation measures have been identified. CEQA Guidelines section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable

period of time, taking into account economic, environmental, social, and technological factors."

The Governing Board further finds that the Final Program EIR considered alternatives pursuant to CEQA Guidelines section 15126.6, but there is no alternative to the project, other than the No Project Alternative (Alternative 1), that would reduce to insignificant levels the significant project-specific or cumulative hazards and hazardous materials impacts that were identified for the proposed project. However, the No Project Alternative (Alternative 1) was rejected due to infeasibility. Specifically, the No Project Alternative (Alternative 1) was determined to not be a legally viable alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates and continued implementation of the 2012 AQMP without adopting additional reduction measures would violate this requirement.

5. Project-specific and cumulative water demand impacts were concluded to be significant and would remain significant following mitigation.

Finding and Explanation:
The projected amount water demand associated with operating certain air pollution control technologies as well as the use of waterborne coatings could exceed the significance threshold of 262,820 gallons per day for potable water demand and five million gallons per day of total water demand, as a result of implementing the 2016 AQMP.

SCAG's TCMs and related strategies, measures and recommendations included in the 2016 RTP/SCS are also included in the 2016 AQMP. Because the TCMs are included in the 2016 AQMP and because the TCMs and other projects in the 2016 RTP/SCS have the potential to generate related or similar impacts compared to the 2016 AQMP, the 2016 RTP/SCS is considered to be a cumulatively related project. Feasible mitigation measures to reduce significant adverse cumulative and project-specific water demand impacts were identified in the Program EIR for the 2016 RTP/SCS.

Four mitigation measures are identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., WQ-1 through WQ-4) to address the project-specific water demand impacts. While these mitigation measures could help minimize some of the water demand on an individual facility-basis, the availability of water supplies varies throughout the region; thus, all mitigation measures may not be applied in all situations. However, none of these mitigation measures will fully eliminate the significant water demand impacts, which could impact groundwater depletion, or reduce these impacts to less than significant levels. No other feasible mitigation measures have been identified that would avoid or reduce the project-specific or cumulative water demand and groundwater depletion impacts to a level of insignificance. Therefore, even after implementation of mitigation measures WQ-1 through WQ-4, the 2016 AQMP is considered to have significant adverse unavoidable project-specific and cumulative water demand and groundwater depletion impacts.

The Governing Board finds that mitigation measures have been identified, but they would not reduce to insignificance the significant adverse project-specific or cumulative impacts to water demand. No other feasible mitigation measures have been identified. CEQA Guidelines section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

The Governing Board further finds that the Final Program EIR considered alternatives pursuant to CEQA Guidelines section 15126.6, but there is no alternative to the project, other than the No Project Alternative (Alternative 1) and Alternative 2 – Mobile Source Reduction Only, that would reduce to insignificant levels the significant project-specific or cumulative water demand impacts that were identified for the proposed project. However, the No Project Alternative (Alternative 1) was rejected due to infeasibility. Specifically, the No Project Alternative (Alternative 1) was determined to not be a legally viable alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates and continued implementation of the 2012 AQMP without adopting additional reduction measures would violate this requirement. In addition, while the water demand impacts under Alternative 2 would be less than the proposed project, Alternative 2 would also achieve fewer overall benefits than the proposed project.

6. Project-specific and cumulative noise and vibration impacts during construction were concluded to be significant and would remain significant following mitigation.

Finding and Explanation:
If the 2016 AQMP's control measures pertaining to the installation of new roadway infrastructure are implemented, construction noise and vibration impacts would be potentially significant because transportation-related construction activities can occur during the evening/nighttime hours to minimize traffic impacts during the more heavy traffic periods.

SCAG's TCMs and related strategies, measures and recommendations included in the 2016 RTP/SCS are also included in the 2016 AQMP. Because the TCMs are included in the 2016 AQMP and because the TCMs and other projects in the 2016 RTP/SCS have the potential to generate related or similar impacts compared to the 2016 AQMP, the 2016 RTP/SCS is considered to be a cumulatively related project. Feasible mitigation measures to reduce significant adverse cumulative and project-specific noise impacts were identified in the Program EIR for the 2016 RTP/SCS.

Seventeen mitigation measures are identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., NS-1 through NS-17) to address the project-specific construction noise impacts. While these mitigation measures could minimize some of the noise and vibration impacts from construction, the SCAQMD cannot predict how a lead agency or responsible agency might choose to mitigate the significant construction noise and vibration impacts for a future project. However, none of these mitigation measures will avoid the significant construction noise and vibration impacts or reduce these impacts

to less than significant levels. No other feasible mitigation measures have been identified that would reduce the project-specific or cumulative construction noise and vibration impacts to a level of insignificance. Therefore, even after implementation of mitigation measures NS-1 through NS-17, the 2016 AQMP is considered to have significant adverse unavoidable project-specific and cumulative noise and vibration impacts during construction.

The Governing Board finds that mitigation measures have been identified, but they would not reduce to insignificance the significant adverse project-specific or cumulative impacts to noise during construction. No other feasible mitigation measures have been identified. CEQA Guidelines section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

The Governing Board further finds that the Final Program EIR considered alternatives pursuant to CEQA Guidelines section 15126.6, but there is no alternative to the project, other than the No Project Alternative (Alternative 1) and Alternative 3 – CARB/SCAQMD Regulation Only, that would reduce to insignificant levels the significant project-specific or cumulative construction noise impacts that were identified for the proposed project. However, the No Project Alternative (Alternative 1) was rejected due to infeasibility. Specifically, the No Project Alternative (Alternative 1) was determined to not be a legally viable alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates and continued implementation of the 2012 AQMP without adopting additional reduction measures would violate this requirement. In addition, while the construction noise and vibration impacts under Alternative 3 would be less than the proposed project, Alternative 3 would also achieve fewer overall benefits than the proposed project because it would not achieve an important objective to eliminate reliance on future technologies (federal Clean Air Act (CAA) § 182(e)(5)) measures to the extent feasible.

7. Project-specific and cumulative solid waste impacts were concluded to be significant and would remain significant following mitigation.

Finding and Explanation:
Because the extent and timing of construction needed to implement the 2016 AQMP is not known at this time, the potential to exceed landfill capacities in the short-term was found to be significant. Additionally, the high volume of non-recyclable waste that may be generated from scrapping or retiring a large number of vehicles and equipment over a short timeframe could result in amounts that have the potential to exceed landfill capacities. Thus, construction and vehicle and equipment scrapping activities have the potential to create significant adverse solid waste impacts.

SCAG's TCMs and related strategies, measures and recommendations included in the 2016 RTP/SCS are also included in the 2016 AQMP. Because the TCMs are included in the 2016 AQMP and because the TCMs and other projects in the 2016 RTP/SCS have the potential to generate related or similar impacts compared to the 2016 AQMP, the 2016

RTP/SCS is considered to be a cumulatively related project. Feasible mitigation measures to reduce significant adverse cumulative solid waste impacts were identified in the Program EIR for the 2016 RTP/SCS.

Because of the potentially significant increase in solid waste generation from construction and vehicle and equipment scrapping, mitigation measures are required. However, no feasible project-specific mitigation measures were identified that would avoid the significant solid waste impacts or reduce these impacts to less than significant levels. No other feasible mitigation measures have been identified that would reduce the project-specific or cumulative solid waste impacts to a level of insignificance. Therefore, the 2016 AQMP is considered to have significant adverse unavoidable project-specific and cumulative solid waste impacts from construction and vehicle and equipment scrapping.

The Governing Board finds that no feasible mitigation measures have been identified that would reduce to insignificance the significant adverse project-specific or cumulative impacts to solid waste. CEQA Guidelines section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

The Governing Board further finds that the Final Program EIR considered alternatives pursuant to CEQA Guidelines section 15126.6, but there is no alternative to the project, other than the No Project Alternative (Alternative 1), that would reduce to insignificant levels the significant project-specific or cumulative solid waste impacts that were identified for the proposed project. However, the No Project Alternative (Alternative 1) was rejected due to infeasibility. Specifically, the No Project Alternative (Alternative 1) was determined to not be a legally viable alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates and continued implementation of the 2012 AQMP without adopting additional reduction measures would violate this requirement.

8. Project-specific and cumulative transportation and traffic impacts were concluded to be significant and would remain significant following mitigation.

Finding and Explanation:
Construction activities that would be necessary to implement various control measures in the 2016 AQMP could create significant, albeit temporary, transportation and traffic impacts that could cause a reduction of LOS at local intersections, result in partial or temporary road or lane closures, result in additional traffic congestion, and potentially impact roadways within each affected local agency's congestion management plan. In addition, other potentially significant increases in operational traffic will be generated due to the need to transport: 1) increased waste for disposal (e.g., construction debris, waste from scrapping of old equipment/vehicles, and waste from air pollution control equipment, such as filters); 2) increased waste for recycling (e.g., catalysts, metals); 3) increased use of products and supplies such as ammonia, SBS, fresh catalyst, etc.); and 4) increased agricultural materials generated by chipping, grinding and composting facilities. Further,

transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes, thus significantly adversely affecting traffic and increasing congestion for all other vehicles on the road. Finally, if the barge-based bonnet technology is used to reduce emissions from ocean-going vessels, the increased movement of barges within the harbors could create significant congestion and traffic impacts.

SCAG's TCMs and related strategies, measures and recommendations included in the 2016 RTP/SCS are also included in the 2016 AQMP. Because the TCMs are included in the 2016 AQMP and because the TCMs and other projects in the 2016 RTP/SCS have the potential to generate related or similar impacts compared to the 2016 AQMP, the 2016 RTP/SCS is considered to be a cumulatively related project. Feasible mitigation measures to reduce significant adverse cumulative and project-specific transportation and traffic impacts were identified in the Program EIR for the 2016 RTP/SCS.

One mitigation measure is identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., TR-1) to address the project-specific transportation and traffic impacts. While this mitigation measure could help minimize some of the significant construction impacts, the SCAQMD cannot predict how a lead agency or responsible agency might choose to mitigate a particular significant traffic and transportation impact for a future project. Thus, this mitigation measure will not avoid the significant traffic and transportation impacts or reduce these impacts to less than significant levels. No other feasible mitigation measures have been identified that would reduce the project-specific or cumulative traffic and transportation impacts to a level of insignificance. Therefore, even after implementation of mitigation measure TR-1, the 2016 AQMP is considered to have significant adverse unavoidable project-specific and cumulative traffic and transportation impacts.

The Governing Board finds that mitigation measures have been identified, but they would not reduce to insignificance the significant adverse project-specific or cumulative impacts to transportation and traffic during construction and operation. No other feasible mitigation measures have been identified. CEQA Guidelines section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors."

The Governing Board further finds that the Final Program EIR considered alternatives pursuant to CEQA Guidelines section 15126.6, but there is no alternative to the project, other than the No Project Alternative (Alternative 1) and Alternative 3 – CARB/SCAQMD Regulation Only, that would reduce to insignificant levels the significant project-specific or cumulative transportation and traffic impacts that were identified for the proposed project. However, the No Project Alternative (Alternative 1) was rejected due to infeasibility. Specifically, the No Project Alternative (Alternative 1) was determined to not be a legally viable alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and

PM2.5 NAAQS by the applicable dates and continued implementation of the 2012 AQMP without adopting additional reduction measures would violate this requirement. In addition, while the transportation and traffic impacts under Alternative 3 would be less than the proposed project, Alternative 3 would also achieve fewer overall benefits than the proposed project because it would not achieve an important objective to eliminate reliance on future technologies (CAA § 182(e)(5)) measures to the extent feasible.

3.2 POTENTIALLY SIGNIFICANT IMPACTS WHICH CAN BE MITIGATED TO A LEVEL OF INSIGNIFICANCE

Implementation of some of the 2016 AQMP control measures could cause significant hazards and hazardous materials impacts related to implementing the proposed project at the affected facilities and sites included on lists pursuant to Government Code section 65962.5 during construction.

Nine mitigation measures are identified in the Mitigation Monitoring and Reporting Plan section of this document (e.g., HZ-7 through HZ-15) to address the hazards impacts for these affected facilities and sites. The analysis in the Draft Program EIR concluded that if the operators of the affected facilities and sites comply with mitigation measures HZ-7 through HZ-15, then the hazards impacts associated with implementing the 2016 AQMP at the affected facilities and sites would be reduced to less than significant levels.

Conclusion of Findings

The Governing Board finds that feasible mitigation measures have been identified to help minimize the potentially significant adverse impacts to the following topics: aesthetics; construction air quality and GHG emissions; energy (due to increased electricity demand); hazards and hazardous materials; water demand; construction noise and vibration; and transportation and traffic. The Governing Board also finds that no feasible mitigation measures have been identified to help minimize the potentially significant adverse impacts to these topic areas. CEQA defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (Public Resources Code section 21061.1).

The Governing Board further finds that the Final Program EIR considered alternatives pursuant to CEQA Guidelines section 15126.6, but there is no alternative to the project, other than the No Project Alternative (Alternative 1), that would reduce to insignificant levels the significant impacts to all of the aforementioned environmental topic areas. However, the No Project Alternative was rejected due to infeasibility. Specifically, the No Project Alternative (Alternative 1) was determined to not be a legally viable alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates and continued implementation of the 2012 AQMP without adopting additional reduction measures would violate this requirement.

The Governing Board further finds that a Mitigation Monitoring and Reporting Plan (pursuant to Public Resources Code section 21081.6) needs to be prepared and is included herein because feasible mitigation measures were identified for the topics of: aesthetics; construction air quality

and GHG emissions; energy (due to increased electricity demand); hazards and hazardous materials; water demand; construction noise and vibration; and transportation and traffic.

The Governing Board further finds that the findings required by CEQA Guidelines section 15091(a) are supported by substantial evidence in the record. Further, to comply with CEQA Guidelines section 15091(e), the SCAQMD specifies the Deputy Executive Officer of Planning, Rule Development, and Area Sources as the custodian of the 2016 AQMP and associated documents which constitute the record of proceedings upon which the adoption and approval of the proposed project is based, and which are located at the SCAQMD headquarters, 21865 Copley Drive, Diamond Bar, California 91765.

4.0 STATEMENT OF OVERRIDING CONSIDERATIONS

If significant adverse impacts of a proposed project remain after incorporating mitigation measures, or no measures or alternatives to mitigate the adverse impacts are identified, the lead agency must make a determination that the benefits of the project outweigh the unavoidable adverse environmental effects if it is to approve the project. CEQA requires the decision-making agency to balance, as applicable, the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approve the project [CEQA Guidelines § 15093(a)]. If the specific economic, legal, social, technological, or other benefits of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered "acceptable" [CEQA Guidelines § 15093(a)]. Accordingly, a Statement of Overriding Considerations regarding potentially significant adverse impacts to aesthetics; construction air quality and GHG emissions; energy (due to increased electricity demand); hazards and hazardous materials; water demand; construction noise and vibration; solid waste; and transportation and traffic that may result from the proposed project has been prepared. This Statement of Overriding Considerations is included as part of the record of the project approval for the proposed project. Pursuant to CEQA Guidelines § 15093(c), the Statement of Overriding Considerations will also be noted in the Notice of Determination for the proposed project.

Having reduced the potential effects of the 2016 AQMP through all feasible mitigation measures as described previously in this attachment, and balancing the benefits of the proposed project against its potential unavoidable adverse impacts on aesthetics; construction air quality and GHG emissions; energy (due to increased electricity demand); hazards and hazardous materials; water demand; construction noise and vibration; solid waste; and transportation and traffic, the SCAQMD finds that the following legal requirements and benefits of the 2016 AQMP outweigh the potentially significant unavoidable adverse impacts for the following reasons:

1. Failure to submit a plan, comply with required plan provisions, or implement an approved plan to meet health-based standards within the required timeframes could result in sanctions from the federal government including restrictions on funds granted for transportation/highway projects, increased offset ratio, and a Federal Implementation Plan pursuant to the CAA section 179.
2. Failure to attain the federal standard could result in stationary sources paying a fee as a penalty for the failure pursuant to the CAA section 185.

3. The analysis of potential adverse environmental impacts incorporates a "worst-case" approach. This entails the premise that whenever the analysis requires that assumptions be made, those assumptions that result in the greatest adverse impacts are typically chosen. This method likely overestimates the actual significant adverse environmental impacts from the proposed project.
4. The proposed project would reduce PM2.5 nonattainment pollutants and their precursors on an expeditious implementation schedule.
5. The proposed project would demonstrate attainment of the 24-hour PM2.5 national ambient air quality standard by the year 2019, as required by the federal CAA.
6. The proposed project would reduce population exposure to PM2.5 by achieving the 24-hour PM2.5 national ambient air quality standard by 2019, as required by the federal CAA.
7. The proposed project will meet the 1997 8-hour ozone standard by attainment year 2023 and the 2008 8-hour ozone standard by attainment year 2031 with proposed NOx/VOC control measures.
8. The proposed project's 8-hour ozone strategy will assist in meeting the 1-hour ozone standard by 2022.
9. The proposed project's NOx control strategy will assist in reducing PM2.5 and attainment could be as early as 2023 with implementation of the ozone strategy.
10. The proposed project would reduce population exposure to ozone through continued progress towards attaining the federal one-hour (revoked) and eight-hour ozone standards by 2023 and 2031, respectively.
11. The proposed project would include all feasible measures and an expeditious adoption schedule.
12. The proposed project will demonstrate compliance with the federal CAA requirements such as RACM/BACM demonstration, the RFP and milestone years, general conformity and transportation conformity budget, and VMT offset requirements.
13. The proposed project would update planning assumptions and the best available information such as SCAG's 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and CARB's 2014 Emissions Factors Model (EMFAC2014) for the on-road mobile source emissions inventory.
14. The proposed project would update emission inventories using 2012 as the base year and incorporate emission reductions achieved from all applicable rules and regulations and the latest demographic forecasts.
15. The proposed project would update any remaining control measures from the 2007 AQMP and 2012 AQMP incorporated into the 2016 AQMP, as appropriate.
16. The proposed project would demonstrate compliance with federal contingency measure requirements.
17. Implementing Mitigation Measures AE-1 through AE-5 would reduce significant adverse aesthetics impacts to the maximum extent feasible, but not to less than significant.

18. Implementing Mitigation Measures AQ-1 through AQ-23 would reduce significant adverse construction air quality impacts to the maximum extent feasible, but not to less than significant, while also providing construction emission reduction co-benefits because using Tier 4 construction engines would additionally provide PM and hydrocarbon emission reduction benefits.
19. Implementing Mitigation Measures E-1 through E-7 would reduce significant adverse energy impacts to the maximum extent feasible, but not to less than significant.
20. Implementing Mitigation Measures HZ-1 through HZ-6 and HZ-16 through HZ-18 would reduce significant adverse hazards and hazardous materials impacts to the maximum extent feasible, but not to less than significant.
21. Implementing Mitigation Measures WQ-1 through WQ-4 would reduce significant adverse hydrology and water quality impacts to the maximum extent feasible, but not to less than significant.
22. Implementing Mitigation Measures NS-1 through NO-17 would reduce significant adverse noise impacts to the maximum extent feasible, but not to less than significant.
23. Implementing Mitigation Measure TR-1 would reduce significant adverse transportation and traffic impacts to the maximum extent feasible, but not to less than significant.

In balancing the benefits of the overall project described above with the proposed project's unavoidable and significant adverse environmental impacts, SCAQMD Governing Board finds that the proposed project's benefits individually and collectively outweigh the unavoidable adverse impacts, such that these impacts are acceptable. The SCAQMD Governing Board further finds that substantial evidence presented in the Final Program EIR supports certifying the Final Program EIR despite the proposed project's potential adverse impacts.

5.0 MITIGATION MONITORING AND REPORTING PLAN

Pursuant to CEQA Guidelines section 15097 and Public Resources Code (PRC) section 21081.6, when a public agency conducts an environmental review of a proposed project in conjunction with approving it, the lead agency shall adopt a program for monitoring or reporting on the measures it has imposed to mitigate or avoid significant adverse environmental effects. PRC section 21081.6 states in part that when making the findings required by PRC section 21081(a):

> "…the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation. For those changes which have been required or incorporated into the project at the request of a responsible agency or a public agency having jurisdiction by law over natural resources affected by the project, that agency shall, if so requested by the lead or responsible agency, prepare and submit a proposed reporting or monitoring program."

No responsible agencies or public agencies having jurisdiction by law over natural resources affected by the 2016 AQMP requested changes or mitigation measures relative to potentially

significant adverse environmental impacts be incorporated into the 2016 AQMP. Further, it should be noted that the SCAQMD does not construct or operate projects that may result from implementing 2016 AQMP control measures as rules or regulations. As a single purpose public agency responsible for adopting and enforcing air quality rules and regulations, where applicable and within the jurisdiction of the SCAQMD, enforcement of implementing mitigation measures, monitoring, and reporting requirements described in this Mitigation Monitoring and Reporting Plan (MMRP) is the responsibility of the SCAQMD as the lead agency under CEQA. However, as noted in discussions under Findings, some of the mitigation measures identified in the Final Program EIR for the 2016 AQMP may not be within the jurisdiction of the SCAQMD, but are within the jurisdiction of local land use agencies, project sponsors, public agencies having jurisdiction by law over natural resources affected by the project, or other CEQA lead agencies.

A public agency may delegate reporting or monitoring responsibilities to another public agency or to a private entity which accepts the delegation; however, until mitigation measures have been completed, the lead agency remains responsible for ensuring that implementation of the mitigation measures occurs in accordance with the program (CEQA Guidelines § 15097 (a)). As a result, this MMRP will identify other public agencies that "can and should" comply with CEQA in assessing and mitigating project-specific impacts.

Finally, the responsibility for mitigation monitoring and reporting described in this MMRP will vary depending on the location and jurisdiction of individual projects because the individual projects resulting from implementing 2016 AQMP control measures as rules or regulations may affect a wide variety of commercial, institutional, industrial, and even residential emission sources located throughout the district. It is expected that additional and more specific mitigation measures and monitoring requirements may be developed as specific rules are promulgated. Similarly, additional and more specific mitigation measures and monitoring requirements may be required for individual projects required to comply with any future rules or regulations that must also undergo an environmental analysis pursuant to CEQA.

To fulfill the requirements of Public Resources Code section 21081.6 and CEQA Guidelines section 15097, the SCAQMD has developed this MMRP for anticipated impacts resulting from implementing the 2016 AQMP. Each operator of any facility required to comply with a MMRP shall keep records onsite of applicable compliance activities to demonstrate the steps taken to assure compliance with all of the mitigation measures, as applicable.

1. Aesthetics Impacts

Impacts Summary: Implementation of some of the 2016 AQMP control measures could: 1) change the existing visual character or quality of any site on which certain types of technologies may be installed and its surroundings; and 2) result in glare. For example, during construction associated with the installation of catenary lines, the equipment staging and laydown areas could be in close proximity to each affected site and as such, could cause a temporary, but potentially significant degradation of the existing visual character of the each affected site. Similarly, during operation, the use of bonnet technology on vessels at the Ports may also cause a potentially significant degradation of the existing visual character or quality of a site and its surroundings. In addition, the installation of solar panels and cool roof technology could significantly increase the amount of glare

generated relative to the existing setting. The following mitigation measures are intended to minimize the emissions associated with these sources during construction activities. No feasible mitigation measures have been identified to reduce emissions to a level of insignificance.

Mitigation Measures: The following aesthetics mitigation measures are required during construction associated with the installation of catenary lines and during operation when bonnet technology is used on vessels at the Ports. SCAQMD staff will conduct a CEQA evaluation of each facility-specific project proposed in response to the proposed project and determine if the project is covered by the analysis in the 2016 AQMP Final Program EIR. In addition, these mitigation measures will be included in a Mitigation Monitoring and Reporting Plan as part of issuing SCAQMD permits to construct as applicable. The mitigation measures will be enforceable by SCAQMD personnel.

AE-1 To the extent feasible, the sites selected for use as construction staging and laydown areas would be areas that are already disturbed and/or are in locations of low visual sensitivity. Where feasible, construction staging and laydown areas for equipment, personal vehicles, and material storage would be sited to take advantage of natural screening opportunities provided by existing structures, topography, and/or vegetation. Temporary visual screens would be used where helpful, if existing landscape features did not screen views of the areas.

AE-2 All construction, operation, and maintenance areas would be kept clean and tidy, including the re-vegetation of disturbed soil and storage of construction materials and equipment would be screened from view and/or are generally not visible to the public, where feasible.

AE-3 Siting projects and their associated elements next to important scenic landscape features or in a setting for observation from State scenic highways, national historic sites, national trails, and cultural resources should be avoided to the greatest extent feasible.

AE-4 Apply development standards and guidelines to maintain compatibility with surrounding natural areas, including site coverage, building height and massing, building materials and color, landscaping, site grading, and so forth in accordance with general plans, master plans, and adopted design guidelines, where applicable.

AE-5 To reduce glare, provide structural and/or vegetative screening from light-sensitive uses, where feasible.

Implementing Parties: Because the 2016 AQMP is a regional plan that can be characterized as an ongoing regulatory program, some of the 2016 AQMP aesthetics mitigation measures in this MMRP may be described as general policies, although some refer to specific actions. The SCAQMD finds that the party or parties responsible for implementing aesthetics mitigation measures from the Final Program EIR for the 2016 AQMP for future projects that have the potential to generate aesthetics impacts from

complying with 2016 AQMP control measures promulgated as rules or regulations would be project applicants, project sponsors, or public agencies within the District.

To the extent that the SCAQMD is the lead agency for future projects that must comply with 2016 AQMP control measures promulgated as rules or regulations, it can enforce implementation of 2016 AQMP aesthetics mitigation measures through its authority to impose binding permit conditions on permit applicants at the time permit applications are processed and approved. Similarly, if the SCAQMD is a responsible agency for such future projects, it would still have the ability to enforce 2016 AQMP mitigation measures through its authority to impose permit conditions on permit applicants at the time permit applications are processed and approved. If the SCAQMD has no approval authority over future projects that have the potential to generate construction air quality impacts from complying with 2016 AQMP control measures promulgated as rules or regulations, then the public agency with primary approval authority over these future projects can and should impose 2016 AQMP Final Program EIR mitigation measures through its authority to impose permit conditions on permit applicants at the time permit applications are processed and approved or through other legally binding instruments.

Monitoring Agency: Because future projects to implement 2016 AQMP control measures promulgated as rules or regulations could be undertaken by project applicants, project sponsors, or public agencies throughout the district, the monitoring agency is expected to vary and may include a variety of public agencies performing the role of lead agency. The SCAQMD cannot predict how a lead agency might choose to mitigate a particular significant aesthetics impact for future project(s) located in areas with project-specific features and issues. If these mitigation measures are determined to be feasible by the Lead Agency, once future project specific details are known, the Lead Agency will ensure compliance with mitigation measures AE-1 through AE-5. Mitigation monitoring (MM) will be accomplished as follows:

MMAE-1: A project applicant, project sponsor, or public agency shall select sites for use as construction staging and laydown areas for equipment, personal vehicles, and material storage that are located in areas that are already disturbed and/or are in locations of low visual sensitivity and where feasible, to take advantage of natural screening opportunities provided by existing structures, topography, and/or vegetation. A project applicant, project sponsor, or public agency may employ temporary visual screens if existing landscape features do not screen views of the construction staging and laydown areas.

MMAE-2: A project applicant, project sponsor, or public agency shall maintain all construction, operation, and maintenance areas in a clean and tidy manner and screen from public view the storage of construction materials and equipment, where feasible. A project applicant, project sponsor, or public agency shall also re-vegetate disturbed soil after construction is completed.

MMAE-3: A project applicant, project sponsor, or public agency shall avoid siting projects and their associated elements next to important scenic landscape features or in a setting for observation from State scenic highways, national historic sites, national trails, and cultural resources, to the greatest extent feasible.

MMAE-4: A project applicant, project sponsor, or public agency shall work with the construction contractor to assure compliance with development standards and guidelines in adopted general plans, master plans, and adopted design guidelines in order to maintain compatibility with surrounding natural areas, including site coverage, building height and massing, building materials and color, landscaping, site grading, where applicable.

MMAE-5: A project applicant, project sponsor, or public agency shall provide structural and/or vegetative screening from light-sensitive uses to reduce glare, where feasible.

2. Air Quality and GHG Impacts During Construction

Impacts Summary: Project-specific and cumulative construction-related emissions of criteria air pollutants and GHG emissions, based on a "worst-case" analysis, would exceed the SCAQMD's regional mass daily significance thresholds. Emission sources include worker vehicles and heavy construction equipment. The following mitigation measures are intended to minimize the emissions associated with these sources during construction activities. No feasible mitigation measures have been identified to reduce air quality and GHG impacts to a level of insignificance.

Mitigation Measures: The construction air quality mitigation measures identified in the following paragraphs are intended to reduce potential construction emissions associated with construction-related emission sources to the maximum extent feasible. The timing of implementing the construction air quality mitigation measures would be ongoing over the life of the 2016 AQMP and includes the following mitigation measures:

AQ-1 During construction, require the use of 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export). If the Lead Agency determines that 2010 model year or newer diesel trucks cannot be obtained, the Lead Agency shall instead requires the use of trucks that meet EPA 2007 model year NOx emissions requirements.

AQ-2 Require all on-site construction equipment to meet the following:

- All off road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3

diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.

- A copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit of equipment.
- Encourage construction contractors to apply for SCAQMD "SOON" funding incentives. The "SOON" program provides funds to accelerate the clean-up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/tao/Implementation/SOONProgram.htm.

AQ-3 Prohibit vehicles and construction equipment from idling longer than five minutes at the construction site by including these restrictions in the construction company contract(s) and by posting signs on-site, unless the exceptions in the CARB regulations which pertain to idling requirements are applicable.

AQ-4 All on-road heavy-duty diesel trucks or equipment with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater shall comply with EPA 2007 on-road emission standards for PM and NOx (0.01 gram per brake horsepower - hour (g/bhp-hr) and at least 0.2 g/bhp-hr, respectively).

AQ-5 Maintain construction equipment tuned up and with two to four-degree retard diesel engine timing or tuned to manufacturer's recommended specifications that optimize emissions without nullifying engine warranties.

AQ-6 The project proponent shall survey and document the proposed project's construction areas and identify all construction areas that are served by electricity. Onsite electricity, rather than temporary power generators, shall be used in all construction areas that are demonstrated to be served by electricity.

AQ-7 Provide temporary traffic controls such as a flag person, during all phases of significant construction activity to maintain smooth traffic flow.

AQ-8 Provide dedicated turn lanes for the movement of construction trucks and equipment on- and off-site.

AQ-9 Re-route construction trucks away from congested streets or sensitive receptor areas.

AQ-10 Improve traffic flow by signal synchronization.

AQ-11 Reduce traffic speeds on all unpaved roads to 15 mph or less.

AQ-12 Prohibit truck idling in excess of five minutes, on- and off-site.

AQ-13 Schedule construction activities that affect traffic flow on the arterial system to off-peak hours to the extent practicable.

AQ-14 Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 mph.

AQ-15 Suspend all construction activities that generate air pollutant emissions during first stage smog alerts.

AQ-16 Configure construction parking to minimize traffic interference.

AQ-17 Use alternative clean fueled off-road equipment or give extra points in the bidding process for contractors committing to use such equipment.

AQ-18 Require covering of all trucks hauling dirt, sand, soil, or other loose materials.

AQ-19 Install wheel washers where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site for each trip.

AQ-20 Apply non-toxic soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for ten days or more).

AQ-21 Replace ground cover in disturbed areas as quickly as possible to minimize dust.

AQ-22 Pave road and road shoulders.

AQ-23 Sweep streets at the end of the day with SCAQMD Rule 1186 and 1186.1 compliant sweepers if visible soil is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water).

If, at the time when each facility-specific project is proposed, improved emission reduction technologies become available for on- and off-road construction equipment, the construction mitigation measures will be updated accordingly as part of the CEQA evaluation for the facility-specific project.

Implementing Parties: Because the 2016 AQMP is a regional plan that can be characterized as an ongoing regulatory program, some of the 2016 AQMP construction air quality mitigation measures in this MMRP may be described as general policies, although some refer to specific actions. The SCAQMD finds that the party or parties responsible for implementing construction air quality mitigation measures from the Final Program EIR for the 2016 AQMP for future projects that have the potential to generate construction air quality and GHG impacts from complying with 2016 AQMP control measures promulgated as rules or regulations would be project applicants, project sponsors, or public agencies within the District.

To the extent that the SCAQMD is the lead agency for future projects that must comply with 2016 AQMP control measures promulgated as rules or regulations, it can enforce implementation of 2016 AQMP air quality and GHG mitigation measures through its authority to impose binding permit conditions on permit applicants at the time permit applications are processed and approved. Similarly, if the SCAQMD is a responsible agency for such future projects, it would still have the ability to enforce 2016 AQMP

mitigation measures through its authority to impose permit conditions on permit applicants at the time permit applications are processed and approved. If the SCAQMD has no approval authority over future projects that have the potential to generate construction air quality and GHG impacts from complying with 2016 AQMP control measures promulgated as rules or regulations, then the public agency with primary approval authority over these future projects can and should impose 2016 AQMP Final Program EIR mitigation measures through its authority to impose permit conditions on permit applicants at the time permit applications are processed and approved or through other legally binding instruments.

Monitoring Agency: Because future projects to implement 2016 AQMP control measures promulgated as rules or regulations could be undertaken by project applicants, project sponsors, or public agencies throughout the District, the monitoring agency is expected to vary and may include a variety of public agencies performing the role of lead agency. Monitoring would be accomplished as follows:

MMAQ-1: A project applicant, project sponsor, or public agency shall include in all construction contracts the requirement to use 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export). In the event that that 2010 model year or newer diesel trucks cannot be obtained, the project proponent shall provide documentation as information becomes available and shall instead use trucks that meet EPA 2007 model year NOx emissions requirements.

MMAQ-2: A project applicant, project sponsor, or public agency shall include in all construction contracts the requirement that all off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 4 off-road emission standards at a minimum. In addition, if not already supplied with a factory-equipped diesel particulate filter, all construction equipment shall be outfitted with Best Available Control Technology (BACT) devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. In addition, construction equipment shall incorporate, where feasible, emissions savings technology such as hybrid drives and specific fuel economy standards. In the event that any equipment required under this mitigation measure is not available, the project proponent shall provide documentation as information becomes available. A project applicant, project sponsor, or public agency shall provide a copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit at the time of mobilization of each applicable unit of equipment.

A project applicant, project sponsor, or public agency shall also encourage construction contractors to apply for SCAQMD "SOON" funding

incentives to help accelerate the clean-up of off-road diesel vehicles, such as heavy duty construction equipment.

MMAQ-3: A project applicant, project sponsor, or public agency shall enter into a contract that notifies all vendors and construction contractors that vehicle and construction equipment idling time will be limited to no longer than five minutes or another time-frame as allowed by the California Code of Regulations, Title 13 §2485 - CARB's Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. For any vehicle delivery that is expected to take longer than five minutes, each project applicant, project sponsor, or public agency will require the vehicle's operator to shut off the engine. A project applicant, project sponsor, or public agency will notify the vendors of these idling requirements at the time that the purchase order is issued and again when vehicles enter the gates of the facility. To further ensure that drivers understand the vehicle and construction equipment idling requirement, each project applicant, project sponsor, or public agency shall post signs at each facility entry gates stating idling longer than five minutes is not permitted.

MMAQ-4: A project applicant, project sponsor, or public agency shall require the construction contractor to employ on-road heavy-duty diesel trucks or equipment with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater that complies with EPA 2007 on-road emission standards for PM and NOx (0.01 gram per brake horsepower - hour (g/bhp-hr) and at least 0.2 g/bhp-hr, respectively).

MMAQ-5: A project applicant, project sponsor, or public agency, in cooperation with the construction contractors, will maintain vehicle and equipment maintenance records for the construction portion of the proposed project. All construction vehicles must be maintained in compliance with the manufacturer's recommended maintenance schedule. A project applicant, project sponsor, or public agency will maintain their construction equipment and the construction contractor will be responsible for maintaining their equipment and maintenance records. All maintenance records for each facility and their construction contractor(s) will remain on-site for a period of at least two years from completion of construction.

MMAQ-6: A project applicant, project sponsor, or public agency and/or their construction contractor(s) will conduct a survey of the proposed project construction area(s) to assess whether the existing infrastructure can provide access to electricity, as available, within the facility or construction site, in order to operate electric on-site mobile equipment. For example, each project applicant, project sponsor, or public agency and/or their construction contractor(s) will assess the number of electrical welding receptacles available.

Construction areas within the facility or construction site where electricity is and is not available must be clearly identified on a site plan. The use of non-electric onsite mobile equipment shall be prohibited in areas of the facility that are shown to have access to electricity. The use of electric on-site mobile equipment within these identified areas of the facility or construction site will be allowed.

A project applicant, project sponsor, or public agency shall include in all construction contracts the requirement that the use of non-electric on-site mobile equipment is prohibited in certain portions of the facility as identified on the site plan. A project applicant, project sponsor, or public agency shall maintain records that indicate the location within the facility or construction site where all electric and non-electric on-site mobile equipment are operated, if at all, for a period of at least two years from completion of construction.

MMAQ-7: A project applicant, project sponsor, or public agency shall provide temporary traffic controls such as a flag person, during all phases of significant construction activity to maintain smooth traffic flow.

MMAQ-8: A project applicant, project sponsor, or public agency shall provide dedicated turn lanes for the movement of construction trucks and equipment on- and off-site.

MMAQ-9: A project applicant, project sponsor, or public agency shall re-route construction trucks away from congested streets or sensitive receptor areas.

MMAQ-10: A project applicant, project sponsor, or public agency shall coordinate with their local city to improve traffic flow by signal synchronization in the area near the construction site.

MMAQ-11: A project applicant, project sponsor, or public agency shall ensure that drivers understand that traffic speeds on all unpaved roads will be limited to 15 mph or less. In addition, a project applicant, project sponsor, or public agency shall post signs on all unpaved roads indicating a speed limit of 15 mph or less.

MMAQ-12: A project applicant, project sponsor, or public agency shall enter into a contract that notifies all vendors and construction contractors that during deliveries, truck idling time will be limited to no longer than five minutes or another time-frame as allowed by the California Code of Regulations, Title 13 §2485 - CARB's Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. For any delivery that is expected to take longer than five minutes, each project applicant, project sponsor, or public agency will require the truck's operator to shut off the engine. A project applicant, project sponsor, or public agency will notify the vendors

of these idling requirements at the time that the purchase order is issued and again when trucks enter the gates of the facility. To further ensure that drivers understand the truck idling requirement, each project applicant, project sponsor, or public agency shall post signs at each facility entry gates stating idling longer than five minutes is not permitted.

MMAQ-13: A project applicant, project sponsor, or public agency shall schedule construction activities that affect traffic flow on the arterial system to occur during off-peak hours to the greatest extent practicable.

MMAQ-14: If and when winds speeds exceed 25 mph, each project applicant, project sponsor, or public agency shall suspend all excavating and grading activities and shall record the date and time when the use of construction equipment associated with these construction activities are suspended. This log shall be maintained on-site for a period of at least two years from completion of construction.

MMAQ-15: If and when any first stage smog alert occurs, each project applicant, project sponsor, or public agency shall record the date and time of each alert, shall suspend all construction activities that generate emissions, and shall record the date and time when the use of construction equipment and construction activities are suspended. This log shall be maintained on-site for a period of at least two years from completion of construction.

MMAQ-16: A project applicant, project sponsor, or public agency shall coordinate with the construction contractor to site parking areas to minimize interference with roadway traffic.

MMAQ-17: A project applicant, project sponsor, or public agency and/or their construction contractor(s) shall evaluate the use of alternate fuels for on-site mobile construction equipment prior to the commencement of construction activities, provided that suitable equipment is available for the activity. Equipment vendors shall be contacted to determine the commercial availability of alternate-fueled construction equipment. Priority should be given during the bidding process for contractors committing to use alternate-fueled construction equipment.

MMAQ-18: A project applicant, project sponsor, or public agency shall include in all construction contracts the requirement to cover all haul trucks delivering or hauling away dirt, sand, soil, or other loose materials.

MMAQ-19: A project applicant, project sponsor, or public agency shall require the construction contractor to install and use wheel washers where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site for each trip to prevent drag-out.

MMAQ-20: A project applicant, project sponsor, or public agency shall require the construction contractor to apply non-toxic soil stabilizers according to manufacturers' specifications to all inactive construction areas (e.g., previously graded areas inactive for ten days or more).

MMAQ-21: A project applicant, project sponsor, or public agency shall require the construction contractor to replace ground cover in disturbed areas as quickly as possible to minimize dust.

MMAQ-22: A project applicant, project sponsor, or public agency shall require the construction contractor to pave road and road shoulders.

MMAQ-23: A project applicant, project sponsor, or public agency shall require the construction contractor to sweep streets at the end of the day using SCAQMD Rule 1186 and 1186.1 compliant sweepers if visible soil is carried onto adjacent public paved roads. In the event that water sweepers are used, each project applicant, project sponsor, or public agency shall recommend the construction contractor to use reclaimed water.

3. Energy Impacts Due to Increased Electricity Demand

Impacts Summary: An increase in electricity demand of 7.8 to 12.7 percent by year 2024 due to an increased penetration of near-zero and zero emission technologies combined with operating new control equipment as a result of the 2016 AQMP. Because the projected increase in electricity demand would be expected to exceed the baseline by more than one percent of supply, the electricity demand impacts were concluded to have significant energy impacts such that mitigation measures are required. The following mitigation measures are intended to minimize the emissions associated with these activities. No feasible mitigation measures have been identified to reduce energy impacts to a level of insignificance.

Mitigation Measures: The energy mitigation measures identified in the following paragraphs are intended reduce electricity demand impacts to the maximum extent feasible. The timing of implementing the energy mitigation measures would be ongoing over the life of the 2016 AQMP and includes the following mitigation measures:

E-1 Project sponsors should pursue incentives to encourage the use of energy efficient equipment and vehicles and promote energy conservation.

E-2 Utilities should increase the capacity of existing transmission lines to meet forecast demand that supports sustainable growth, where feasible and appropriate, in coordination with local planning agencies.

E-3 Project sponsors should submit projected electricity calculations to the local electricity provider for any project anticipated to require substantial electricity consumption. Any infrastructure improvements necessary should be completed according to the specifications of the electricity provider.

E-4 Project sponsors should include energy analyses in environmental documentation (e.g., CEQA document) with the goal of conserving energy through the wise and efficient use of energy.

E-5 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the charging of electrical vehicles and other mobile sources during off-peak hours.

E-6 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of catenary or way-side electrical systems developed for transportation systems to operate during off-peak hours.

E-7 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of electrified stationary sources during off-peak hours (e.g., cargo handling equipment).

Implementing Parties: Because the 2016 AQMP is a regional plan that can be characterized as an ongoing regulatory program, some of the electricity demand mitigation measures in this MMRP may be described as general policies, although some refer to specific actions. The SCAQMD finds that the party or parties responsible for implementing electricity mitigation measures in the Final Program EIR for the 2016 AQMP for future projects that have the potential to generate electricity demand impacts from complying with 2016 AQMP control measures promulgated as rules or regulations would be project applicants, project sponsors, and public agencies, including cities or counties, within the District.

To the extent that the SCAQMD is the lead agency for future projects that must comply with 2016 AQMP control measures promulgated as rules or regulations, the SCAQMD may be able to enforce implementation of some 2016 AQMP electricity demand mitigation measures through its authority to impose binding permit conditions on permit applicants at the time permit applications are processed and approved. If the SCAQMD is a responsible agency or has no approval authority over future projects that have the potential to generate electricity demand impacts from complying with 2016 AQMP control measures promulgated as rules or regulations, then the public agency with primary approval authority over these future projects can and should impose 2016 AQMP Final Program EIR mitigation measures through its authority to impose permit conditions on permit applicants at the time permit applications are processed and approved or through other legally binding instruments. Similarly, to the extent allowed by state and federal regulations, electricity generating utilities located within the District as the entities that provide electricity to users may be responsible for implementing some of the 2016 AQMP Final Program EIR mitigation measures, specifically those mitigation measures that call for increased energy generating and supply capacities.

Monitoring Agency: Because future projects to implement 2016 AQMP control measures promulgated as rules or regulations could be undertaken by project applicants, project sponsors, or public agencies throughout the District, the monitoring agency is expected to

vary and may include a variety of public agencies performing the role of lead agency. Monitoring would be accomplished as follows:

MME-1: A project applicant, project sponsor, or public agency shall provide to the lead agency documentation for approval of incentives to encourage the use of energy efficient equipment and vehicles and promote energy conservation prior to the beginning of project operation.

MME-2: To the extent allowed by state and federal law, electricity generating utilities within the District can and should increase capacity of existing transmission lines to meet forecast electricity demand that supports sustainable growth, where feasible and appropriate in coordination with local planning agencies.

MME-3 The project applicant, project sponsor, or public agency shall submit projected electricity calculations to the local electricity provider for any project anticipated to require substantial electricity consumption. Such electricity calculations can and should be used by the local electricity provider when forecasting future electricity demand. Any infrastructure improvements necessary should be completed according to the specifications of the electricity provider.

MME-4 The project applicant, project sponsor, or public agency shall include energy analyses in environmental documentation with the goal of conserving energy through the wise and efficient use of energy.

MME-5 The project applicant, project sponsor, or public agency shall evaluate the potential for reducing peak energy demand by encouraging charging of electrical vehicles and other mobile sources during off-peak hours.

MME-6 The project applicant, project sponsor, or public agency shall evaluate the potential for reducing peak energy demand by encouraging the use of catenary or way-side electrical systems developed for transportation systems to operate during off-peak hours.

MME-7 The project applicant, project sponsor, or public agency shall evaluate the potential for reducing peak energy demand by encouraging the use of electrified stationary sources during off-peak hours (e.g., cargo handling equipment).

6. Hazards and Hazardous Materials Impacts

Impacts Summary: The fire hazard impacts from the use reformulated coatings, solvents, and consumer products would be significant because more flammable materials may be used in these materials and because the SCAQMD cannot predict which materials and the quantities that maybe be used at each affected facility in the future as reformulated products become available. There may be significant hazards impacts associated with a rupture or spill occurring either during the transportation or storage of LNG and ammonia. Further, the hazard impacts would be significant during construction for facilities and sites that are included on lists pursuant to Government Code §65962.5 even though operators of these affected facilities and sites would also be required to comply with federal, state, and local regulations for the handling and disposal of hazards and hazardous materials. Finally, implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at or near sensitive receptors and school sites because it is unknown which facilities may use hazardous materials and which of those facilities may be in close proximity to sensitive receptors or located within one-quarter mile of existing or proposed school sites. The following mitigation measures are intended to minimize the emissions associated with these activities. No feasible mitigation measures have been identified to reduce hazards and hazardous materials impacts to a level of insignificance.

Mitigation Measures: The mitigation measures identified in the following paragraphs are intended reduce hazards and hazardous materials impacts to the maximum extent feasible. The timing of implementing the hazards and hazardous materials mitigation measures would be ongoing over the life of the 2016 AQMP and includes the following mitigation measures:

HZ-1 Add consumer warning requirements for all reformulated products that are flammable and extremely flammable.

HZ-2 Add requirements to conduct a public education and outreach program in joint cooperation with local fire departments regarding reformulated products that are flammable and extremely flammable, especially for reformulated consumer paint thinners and multi-purpose solvents.

HZ-3 Install secondary containment (e.g., berms).

HZ-4 Install valves that fail shut.

HZ-5 Install emergency release valves and barriers around LNG storage tanks to prevent the physical damage to storage tanks or limit the release of LNG from storage tanks.

HZ-6 Perform integrity testing of LNG storage tanks to assist in preventing failure from structural problems. Construct a containment system to be used for deliveries during off-loading operations.

HZ-7 Conduct a Phase I Environmental Site Assessment prior to construction. If known contamination is discovered, a Phase II environmental Site Assessment should be

conducted and provided to the Lead Agency. The recommendations in the Environmental Site Assessments should be implemented.

HZ-8 Consult with the appropriate local, state, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps.

HZ-9 Cease work if soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums, or other hazardous materials or wastes are encountered), in the vicinity of the suspect material. Secure the area as necessary and take all appropriate measures to protect human health and the environment, including but not limited to: notification of regulatory agencies and identification of the nature and extent of contamination. Stop work in the areas affected until the measures have been implemented consistent with the guidance of the appropriate regulatory oversight authority.

HZ-10 Use best management practices (BMPs) regarding potential soil and groundwater hazards.

HZ-11 Soil generated by construction activities should be stockpiled on-site in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. Complete sampling and handling and transport procedures for reuse or disposal, in accordance with applicable local, state and federal laws and policies.

HZ-12 Groundwater pumped from the subsurface should be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies. Utilize engineering controls, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building.

HZ-13 Prior to issuance of any demolition, grading, or building permit, submit for review and approval by the Lead Agency (or other appropriate government agency) written verification that the appropriate federal, state and/or local oversight authorities, including but not limited to the Regional Water Quality Control Board (RWQCB), have granted all required clearances and confirmed that the all applicable standards, regulations, and conditions have been met for previous contamination at the site.

HZ-14 Develop, train, and implement appropriate worker awareness and protective measures to assure that worker and public exposure is minimized to an acceptable

level and to prevent any further environmental contamination as a result of construction.

HZ-15 Where a project site is determined to contain materials classified as hazardous waste by state or federal law, submit written confirmation to appropriate local agency that all state and federal laws and regulations will be followed when profiling, handling, treating, transporting, and/or disposing of such materials.

HZ-16 The temporary storage and handling of potentially hazardous materials/wastes should be in areas away from sensitive receptors such as schools or residential areas. These areas should be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-project personnel. All project personnel that may come into contact with potentially hazardous materials/wastes will have the appropriate health and safety training commensurate with the anticipated level of exposure.

HZ-17 Where the construction or operation of projects involves the transport of hazardous materials, avoid transport of such materials within one-quarter mile of schools, when school is in session, wherever feasible.

HZ-18 Where it is not feasible to avoid transport of hazardous materials, within one-quarter mile of schools on local streets, provide notification of the anticipated schedule of transport of such materials.

Implementing Parties: Because the 2016 AQMP is a regional plan that can be characterized as an ongoing regulatory program, some of the hazards and hazardous materials mitigation measures in this MMRP may be described as general policies, although some refer to specific actions. The SCAQMD finds that the party or parties responsible for implementing hazards and hazardous materials mitigation measures in the Final Program EIR for the 2016 AQMP for future projects that have the potential to generate hazards and hazardous materials impacts from complying with 2016 AQMP control measures promulgated as rules or regulations would be project applicants, project sponsors, and public agencies, including cities or counties, within the District.

To the extent that the SCAQMD is the lead agency for future projects that must comply with 2016 AQMP control measures promulgated as rules or regulations, the SCAQMD may be able to enforce implementation of some 2016 AQMP hazards and hazardous materials mitigation measures through its authority to impose binding permit conditions on permit applicants at the time permit applications are processed and approved. If the SCAQMD is a responsible agency or has no approval authority over future projects that have the potential to generate hazards and hazardous materials impacts from complying with 2016 AQMP control measures promulgated as rules or regulations, then the public agency with primary approval authority over these future projects can and should impose 2016 AQMP Final Program EIR mitigation measures through its authority to impose permit conditions on permit applicants at the time permit applications are processed and approved or through other legally binding instruments.

Monitoring Agency: Because future projects to implement 2016 AQMP control measures promulgated as rules or regulations could be undertaken by project applicants, project sponsors, or public agencies throughout the District, the monitoring agency is expected to vary and may include a variety of public agencies performing the role of lead agency. Monitoring would be accomplished as follows:

MMHZ-1 The project applicant, project sponsor, or public agency shall add consumer warning requirements for all flammable and extremely flammable products.

MMHZ-2 The project applicant, project sponsor, or public agency shall add requirements to conduct a public education and outreach program in joint cooperation with local fire departments regarding flammable and extremely flammable products that may be included in reformulated products, especially for reformulated consumer paint thinners and multi-purpose solvents.

MMHZ-3 The project applicant, project sponsor, or public agency shall ensure the installation of secondary containment (e.g., berms) for LNG tanks.

MMHZ-4 The project applicant, project sponsor, or public agency shall ensure the installation of valves that fail shut on LNG tanks.

MMHZ-5 The project applicant, project sponsor, or public agency shall install emergency release valves and barriers around LNG storage tanks to prevent the physical damage to storage tanks or limit the release of LNG from storage tanks.

MMHZ-6 The project applicant, project sponsor, or public agency shall perform integrity testing of LNG storage tanks to assist in preventing failure occurring from structural problems. Additionally, a containment system to be used for deliveries during off-loading operations shall be constructed.

MMHZ-7 The project applicant, project sponsor, or public agency shall conduct a Phase I Environmental Site Assessment prior to construction. If known contamination is discovered, a Phase II environmental Site Assessment should be conducted and provided to the Lead Agency. The recommendations in the Environmental Site Assessments should be implemented.

MMHZ-8 The project applicant, project sponsor, or public agency shall consult with the appropriate local, state, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps.

MMHZ-9 The project applicant, project sponsor, or public agency shall cease work if soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums, or other hazardous materials or wastes are encountered), in the vicinity of the suspect material. The area shall be secured as necessary and all appropriate measures should be taken to protect human health and the environment, including but not limited to: notification of regulatory agencies and identification of the nature and extent of contamination. Work shall be stopped in the areas affected until the measures have been implemented consistent with the guidance of the appropriate regulatory oversight authority.

MMHZ-10 The project applicant, project sponsor, or public agency shall use best management practices (BMPs) regarding potential soil and groundwater hazards.

MMHZ-11 The project applicant, project sponsor, or public agency shall ensure that soil generated by construction activities should be stockpiled on-site in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. It shall also complete sampling and handling and transport procedures for reuse or disposal, in accordance with applicable local, state and federal laws and policies.

MMHZ-12 The project applicant, project sponsor, or public agency shall ensure that groundwater pumped from the subsurface should be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies. It shall also utilize engineering controls, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building.

MMHZ-13 Prior to issuance of any demolition, grading, or building permit, the project applicant, project sponsor, or public agency shall submit for review and approval by the Lead Agency (or other appropriate government agency) written verification that the appropriate federal, state and/or local oversight authorities, including but not limited to the Regional Water Quality Control Board (RWQCB), have granted all required clearances and confirmed that the all applicable standards, regulations, and conditions have been met for previous contamination at the site.

MMHZ-14 The project applicant, project sponsor, or public agency shall develop, train, and implement appropriate worker awareness and protective measures to assure that worker and public exposure is minimized to an acceptable level

and to prevent any further environmental contamination as a result of construction.

MMHZ-15 Where a project site is determined to contain materials classified as hazardous waste by state or federal law, the project applicant, project sponsor, or public agency shall submit written confirmation to appropriate local agency that all state and federal laws and regulations will be followed when profiling, handling, treating, transporting, and/or disposing of such materials.

MMHZ-16 The project applicant, project sponsor, or public agency shall ensure that the temporary storage and handling of potentially hazardous materials/wastes should be in areas away from sensitive receptors such as schools or residential areas. These areas shall be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-project personnel. All project personnel that may come into contact with potentially hazardous materials/wastes shall have the appropriate health and safety training commensurate with the anticipated level of exposure.

MMHZ-17 The project applicant, project sponsor, or public agency shall ensure that where the construction or operation of projects involves the transport of hazardous materials, avoid transport of such materials within one-quarter mile of schools, when school is in session, wherever feasible.

MMHZ-18 The project applicant, project sponsor, or public agency shall ensure that where it is not feasible to avoid transport of hazardous materials, within one-quarter mile of schools on local streets, provide notification of the anticipated schedule of transport of such materials.

7. Water Demand Impacts

Impacts Summary: The projected amount of water demand associated with operating certain air pollution control technologies as well as the use of waterborne coatings could exceed the significance threshold of 262,820 gallons per day for potable water demand and five million gallons per day of total water demand. Total water can be supplied by 100 percent of potable, groundwater or recycled water, or a combination of these water types. While the source of water supplied to meet the projected water demand will vary from jurisdiction to jurisdiction, potable, groundwater and recycled water may all be used to satisfy the water demand. In the event that groundwater is relied upon to supply water, ground water basins used for water supply are managed to minimize and prevent overdraft conditions and groundwater pumping rights restrict that amount of water that can be pumped. Nonetheless, the amount of groundwater eligible to be pumped could contribute to the exceedance of the total water demand significance threshold. The following mitigation measures are intended to minimize the emissions associated with water demand. No feasible mitigation measures have been identified to reduce water demand impacts to a level of insignificance.

Mitigation Measures: The mitigation measures identified in the following paragraphs are intended reduce water demand impacts to the maximum extent feasible. The timing of implementing the water demand mitigation measures would be ongoing over the life of the 2016 AQMP and includes the following mitigation measures:

WQ-1 Local water agencies should continue to evaluate future water demand and establish the necessary supply and infrastructure to meet that demand, as documented in their Urban Water Management Plans.

WQ-2 Project sponsors should coordinate with the local water provider to ensure that existing or planned water supply and water conveyance facilities are capable of meeting water demand/pressure requirements. In accordance with State Law, a Water Supply Assessment should be required for projects that meet the size requirements specified in the regulations. In coordination with the local water provider, each project sponsor will identify specific on- and off-site improvements needed to ensure that impacts related to water supply and conveyance demand/pressure requirements are addressed prior to issuance of a certificate of occupancy. Water supply and conveyance demand/pressure clearance from the local water provider will be required at the time that a water connection permit application is submitted.

WQ-3 Project sponsors should implement water conservation measures and prioritize the use recycled water over potable or groundwater whenever available and appropriate for end uses.

WQ-4 Project sponsors should consult with the local water provider to identify feasible and reasonable measures to reduce water consumptions

Implementing Parties: Because the 2016 AQMP is a regional plan that can be characterized as an ongoing regulatory program, some of the water demand mitigation measures in this MMRP may be described as general policies, although some refer to specific actions. The SCAQMD finds that the party or parties responsible for implementing mitigation measures for future projects that have the potential to generate hydrology and water quality impacts from complying with 2016 AQMP control measures promulgated as rules or regulations would be project applicants, project sponsors, public agencies, and water provider utilities within the District.

To the extent that water demand results from complying with SCAQMD rules that have been promulgated from the 2016 AQMP control measures, the SCAQMD can impose permit conditions on permit applicants at the time permit applications are processed and approved. If the SCAQMD is a responsible agency or has no approval authority over future projects that have the potential to generate water demand impacts from complying with 2016 AQMP control measures promulgated as rules or regulations, then the public agency with primary approval authority over these future projects can and should impose 2016 AQMP mitigation measures through its authority to impose permit conditions on permit applicants at the time permit applications are processed and approved or through other legally binding instruments. Similarly, to the extent allowed by state and federal

regulations, water provider utilities within the District as the entities that provide water to users may be responsible for implementing some of the 2016 AQMP Final Program EIR mitigation measures.

Monitoring Agency: Because future projects to implement 2016 AQMP control measures promulgated as rules or regulations could be undertaken by project applicants, project sponsors, public agencies, water provider utilities throughout the District, the monitoring agency is expected to vary and may include a variety of public agencies performing the role of lead agency. Monitoring would be accomplished as follows:

MMWQ-1 The project applicant, project sponsor, or public agency shall work with local water agencies to continue to evaluate future water demand and establish the necessary supply and infrastructure to meet that demand, as documented in their Urban Water Management Plans.

MMWQ-2 The project applicant, project sponsor, or public agency shall coordinate with the local water provider to ensure that existing or planned water supply and water conveyance facilities are capable of meeting water demand/pressure requirements. In accordance with State Law, a Water Supply Assessment shall be required for projects that meet the size requirements specified in the regulations. In coordination with the local water provider, each project sponsor shall identify specific on- and off-site improvements needed to ensure that impacts related to water supply and conveyance demand/pressure requirements are addressed prior to issuance of a certificate of occupancy. Water supply and conveyance demand/pressure clearance from the local water provider shall be required at the time that a water connection permit application is submitted.

MMWQ-3 The project applicant, project sponsor, or public agency shall implement water conservation measures and use recycled water for appropriate end uses.

MMWQ-4 The project applicant, project sponsor, or public agency shall consult with the local water provider to identify feasible and reasonable measures to reduce water consumptions.

8. Noise and Vibration Impacts During Construction

Impacts Summary: If the control measures pertaining to the installation of new roadway infrastructure are implemented, construction noise and vibration impacts would be potentially significant because transportation-related construction activities can occur during the evening/nighttime hours to minimize traffic impacts during the more heavy traffic periods. For example, construction activities related to constructing catenary overhead lines may need to occur during the evening/nighttime hours in order to minimize traffic conflicts since construction would occur along existing roadways and transportation corridors. The following mitigation measures are intended to minimize the emissions associated with construction noise and vibration. No feasible mitigation measures have

been identified to reduce construction noise and vibration impacts to a level of insignificance.

Mitigation Measures: The mitigation measures identified in the following paragraphs are intended reduce construction noise impacts to the maximum extent feasible. The timing of implementing the construction noise and vibration mitigation measures would be ongoing over the life of the 2016 AQMP and includes the following mitigation measures:

NS-1 Install temporary noise barriers during construction.

NS-2 Use noise barriers to protect sensitive receptors from excessive noise levels during construction.

NS-3 Schedule construction activities consistent with the allowable hours pursuant to applicable general plan noise element or noise ordinance. Ensure noise-generating construction activities (including truck deliveries, pile driving, and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors. Where construction activities are authorized outside the limits established by the noise element of the general plan or noise ordinance, notify affected sensitive noise receptors and all parties who will experience noise levels in access of the allowable limits for the specified land use, of the level of exceedance and duration of exceedance; and provide a list of protective measures that can be undertaken by the individual, including temporary relocation or use of hearing protective devices.

NS-4 Limit speed and/or hours of operation of rail and transit systems during the selected periods of time to reduce duration and frequency of conflict with adopted limits on noise levels.

NS-5 Post procedures and phone numbers at the construction site for notifying the Lead Agency staff, local Police Department, and construction contractor (during regular construction hours and off-hours), along with permitted construction days and hours, complaint procedures, and who to notify in the event of a problem.

NS-6 Notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance.

NS-7 Hold a preconstruction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.

NS-8 Designate an on-site construction complaint and enforcement manager for the project.

NS-9 Ensure that construction equipment are properly maintained per manufacturers' specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). All intake and exhaust ports on power equipment shall be muffled or shielded.

NS-10 Ensure that impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction are hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust can and should be used. External jackets on the tools themselves can and should be used, if such jackets are commercially available and this could achieve a reduction of 5 dBA. Quieter procedures can and should be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.

NS-11 Ensure that construction equipment is not idling for an extended time in the vicinity of noise-sensitive receptors.

NS-12 Locate fixed/stationary equipment (such as generators, compressors, rock crushers, and cement mixers) as far as possible from noise-sensitive receptors.

NS-13 Consider using flashing lights instead of audible back-up alarms on mobile equipment.

NS-14 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the potential vibration impacts to the structural integrity of the adjacent buildings within 50 feet of pile driving locations.

NS-15 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the threshold levels of vibration and cracking that could damage adjacent historic or other structure, and design means and construction methods to not exceed the thresholds.

NS-16 For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as predrilling the piles to the maximum feasible depth, where feasible. Predrilling pile holes will reduce the number of blows required to completely seat the pile and will concentrate the pile driving activity closer to the ground where pile driving noise can be shielded more effectively by a noise barrier/curtain.

NS-17 For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as the use of more than one pile driver to shorten the total pile driving duration.

Implementing Parties: Because the 2016 AQMP is a regional plan that can be characterized as an ongoing regulatory program, some of the construction noise mitigation measures in this MMRP may be described as general policies, although some refer to

specific actions. The SCAQMD finds that the party or parties responsible for implementing mitigation measures for future projects that have the potential to generate construction noise and vibration impacts from complying with 2016 AQMP control measures promulgated as rules or regulations would be project applicants, project sponsors, and public agencies within the District.

To the extent that construction noise and vibration results from complying with SCAQMD rules that have been promulgated from the 2016 AQMP control measures, the SCAQMD can impose permit conditions on permit applicants at the time permit applications are processed and approved. If the SCAQMD is a responsible agency or has no approval authority over future projects that have the potential to generate construction noise impacts from complying with 2016 AQMP control measures promulgated as rules or regulations, then the public agency with primary approval authority over these future projects can and should impose 2016 AQMP mitigation measures through its authority to impose permit conditions on permit applicants at the time permit applications are processed and approved or through other legally binding instruments. Similarly, to the extent allowed by state and federal regulations, cities or counties within the District as the entities that regulate noise sources through ordinances or general plan noise elements, may be responsible for implementing some of the 2016 AQMP Final Program EIR mitigation measures.

Monitoring Agency: Because future projects to implement 2016 AQMP control measures promulgated as rules or regulations could be undertaken by project applicants, project sponsors, or public agencies throughout the District, the monitoring agency is expected to vary and may include a variety of public agencies performing the role of lead agency. Monitoring would be accomplished as follows:

MMNS-1 The project applicant, project sponsor, or public agency shall install temporary noise barriers during construction.

MMNS-2 The project applicant, project sponsor, or public agency shall use noise barriers to protect sensitive receptors from excessive noise levels during construction.

MMNS-3 The project applicant, project sponsor, or public agency shall schedule construction activities consistent with the allowable hours pursuant to applicable general plan noise element or noise ordinance. Noise-generating construction activities (including truck deliveries, pile driving, and blasting) shall be limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors. Where construction activities are authorized outside the limits established by the noise element of the general plan or noise ordinance, the project applicant, project sponsor, or public agency shall notify affected sensitive noise receptors and all parties who will experience noise levels in access of the allowable limits for the specified land use of the level of exceedance and duration of exceedance and provide a list of protective measures that can be undertaken by the individual, including temporary relocation or use of hearing protective devices.

MMNS-4 The project applicant, project sponsor, or public agency shall limit speed and/or hours of operation of rail and transit systems during the selected periods of time to reduce duration and frequency of conflict with adopted limits on noise levels.

MMNS-5 The project applicant, project sponsor, or public agency shall post procedures and phone numbers at the construction site for notifying the Lead Agency staff, local Police Department, and construction contractor (during regular construction hours and off-hours), along with permitted construction days and hours, complaint procedures, and who to notify in the event of a problem.

MMNS-6 The project applicant, project sponsor, or public agency shall notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance.

MMNS-7 The project applicant, project sponsor, or public agency shall hold a preconstruction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.

MMNS-8 The project applicant, project sponsor, or public agency shall designate an on-site construction complaint and enforcement manager for the project.

MMNS-9 The project applicant, project sponsor, or public agency shall ensure that construction equipment are properly maintained per manufacturers' specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). Additionally, all intake and exhaust ports on power equipment shall be muffled or shielded.

MMNS-10 The project applicant, project sponsor, or public agency shall ensure that impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction are hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. External jackets on the tools themselves shall be used, if such jackets are commercially available and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.

MMNS-11 The project applicant, project sponsor, or public agency shall ensure that construction equipment is not idling for an extended time in the vicinity of noise-sensitive receptors.

MMNS-12 The project applicant, project sponsor, or public agency shall locate fixed/stationary equipment (such as generators, compressors, rock crushers, and cement mixers) as far as possible from noise-sensitive receptors.

MMNS-13 The project applicant, project sponsor, or public agency shall consider using flashing lights instead of audible back-up alarms on mobile equipment.

MMNS-14 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, the project applicant, project sponsor, or public agency shall determine the potential vibration impacts to the structural integrity of the adjacent buildings within 50 feet of pile driving locations.

MMNS-15 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, the project applicant, project sponsor, or public agency shall determine the threshold levels of vibration and cracking that could damage adjacent historic or other structure, and design means and construction methods to not exceed the thresholds.

MMNS-16 For projects where pile driving would be necessary for construction due to geological conditions, the project applicant, project sponsor, or public agency shall utilize quiet pile driving techniques such as predrilling the piles to the maximum feasible depth, where feasible. Predrilling pile holes will reduce the number of blows required to completely seat the pile and will concentrate the pile driving activity closer to the ground where pile driving noise can be shielded more effectively by a noise barrier/curtain.

MMNS-17 For projects where pile driving would be necessary for construction due to geological conditions, the project applicant, project sponsor, or public agency shall utilize quiet pile driving techniques such as the use of more than one pile driver to shorten the total pile driving duration.

9. Transportation and Traffic

Impacts Summary: The construction activities necessary to modify existing rail and truck routes/corridors would vary depending on the location. Thus, the specific traffic impacts that would be associated with modifying existing rail and truck routes/corridors are unknown at this time and would require a project-specific impact analysis in a separate CEQA evaluation. However, all other traffic impacts during construction, although temporary in nature, could be significant and result in a reduction of level of service (LOS) at local intersections, result in partial or temporary road or lane closures, result in additional traffic congestion, and potentially impact roadways within each affected local agency's congestion management plan. In addition, other increases in traffic will be generated due to the need to transport: 1) increased waste for disposal (e.g., construction debris, waste from scrapping of old equipment/vehicles, and waste from air pollution control equipment, such as filters); 2) increased waste for recycling (e.g., catalysts, metals); 3) increased use of products and supplies such as ammonia, SBS, fresh catalyst, etc.); and, 4) increased

agricultural materials generated by chipping, grinding and composting facilities. Further, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines may occur which could significantly adversely affect traffic and increase congestion for all other vehicles on the road. Finally, if the barge-based bonnet technology is used to reduce emissions from ocean-going vessels, the increased movement of barges within the harbors could create significant congestion and traffic impacts. The following mitigation measure is intended to minimize the transportation and traffic impacts. No feasible mitigation measures have been identified to reduce transportation and traffic impacts to a level of insignificance.

Mitigation Measures: The mitigation measure identified in the following paragraph is intended reduce transportation and traffic impacts to the maximum extent feasible. The timing of implementing the transportation and traffic mitigation measure would be ongoing over the life of the 2016 AQMP and includes the following mitigation measure:

TR-1 Develop a construction management plan that includes at least the following items and requirements, if determined to be feasible by the Lead Agency:

- A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes;
- Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur;
- Location of construction staging areas for materials, equipment, and vehicles at an approved location;
- A process for responding to and tracking complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. The Lead Agency shall be informed who the Manager is prior to the issuance of the first permit;
- Provision for accommodation of pedestrian flow;
- As necessary, provision for parking management and spaces for all construction workers to ensure that construction workers do not park in street spaces;
- Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the project sponsor's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat

to public health or safety shall be repaired immediately. The street shall be restored to its condition prior to the new construction as established by the Lead Agency (or other appropriate government agency) and/or photo documentation, at the sponsor's expense, before the issuance of a Certificate of Occupancy;

- Any heavy equipment brought to the construction site shall be transported by truck, where feasible;
- No materials or equipment shall be stored on the traveled roadway at any time;
- Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion;
- All equipment shall be equipped with mufflers;
- Prior to the end of each work-day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on the property, within the public rights-of-way, or properties of adjacent or nearby neighbors; and
- Promote "least polluting" ways to connect people and goods to their destinations.

Implementing Parties: Because the 2016 AQMP is a regional plan that can be characterized as an ongoing regulatory program, some elements of the transportation and traffic mitigation measure in this MMRP may be described as general policies, although some refer to specific actions. The SCAQMD finds that the party or parties responsible for implementing mitigation measures for future projects that have the potential to generate transportation and traffic impacts from complying with 2016 AQMP control measures promulgated as rules or regulations would be project applicants, project sponsors, and public agencies within the District.

To the extent that traffic impacts during construction result from complying with SCAQMD rules that have been promulgated from 2016 AQMP control measures, the SCAQMD can impose permit conditions on permit applicants at the time permit applications are processed and approved. If the SCAQMD is a responsible agency or has no approval authority over future projects that have the potential to generate significant adverse construction traffic impacts from complying with 2016 AQMP control measures promulgated as rules or regulations, then the public agency with primary approval authority over these future projects can and should impose 2016 AQMP mitigation measures through its authority to impose permit conditions on permit applicants at the time permit applications are processed and approved or through other legally binding instruments. Similarly, to the extent allowed by state and federal regulations, CalTrans or local transportation agencies within the District as the entities that may have approval authority over roadway projects and also responsible for implementing the 2016 AQMP Final Program EIR transportation and traffic mitigation measure.

Monitoring Agency: Because future projects to implement 2016 AQMP control measures promulgated as rules or regulations could be undertaken by project applicants, project sponsors, public agencies, local transportation agencies, or CalTrans throughout the

District, the monitoring agency is expected to vary and may include a variety of public agencies performing the role of lead agency. Monitoring would be accomplished as follows:

MMTT-1 The project applicant, project sponsor, or public agency shall develop a construction management plan that includes at least the following items and requirements, if determined to be feasible by the Lead Agency:

- A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes;
- Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur;
- Location of construction staging areas for materials, equipment, and vehicles at an approved location;
- A process for responding to and tracking complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. The Lead Agency shall be informed who the Manager is prior to the issuance of the first permit;
- Provision for accommodation of pedestrian flow;
- As necessary, provision for parking management and spaces for all construction workers to ensure that construction workers do not park in street spaces;
- Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the project sponsor's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat to public health or safety shall be repaired immediately. The street shall be restored to its condition prior to the new construction as established by the Lead Agency (or other appropriate government agency) and/or photo documentation, at the sponsor's expense, before the issuance of a Certificate of Occupancy;
- Any heavy equipment brought to the construction site shall be transported by truck, where feasible;
- No materials or equipment shall be stored on the traveled roadway at any time;

- Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion;
- All equipment shall be equipped with mufflers;
- Prior to the end of each work-day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on the property, within the public rights-of-way, or properties of adjacent or nearby neighbors; and
- Promote "least polluting" ways to connect people and goods to their destinations.

6.0 CONCLUSION

To the extent that the SCAQMD is the lead agency with primary approval authority over projects implementing 2016 AQMP control measures, project applicants, project sponsors, or public agencies will maintain records onsite of applicable compliance activities to demonstrate the steps taken to assure compliance with imposed mitigation measures as specified in Table A. All construction logs and other records shall be made available to SCAQMD inspectors upon request by the project proponent. The project proponent may be required to submit quarterly (or some other specified time duration) reports to the SCAQMD or lead agency during the construction phase that summarize the construction progress, including all required logs, inspection reports, and monitoring reports, as well as identify any problems and corrective actions, as necessary. SCAQMD staff and the project proponent will evaluate the effectiveness of this monitoring program during the construction period. It is expected that, as part of the CEQA document for any future projects implementing 2016 AQMP control measures, mitigation measures identified in this MMRP would be required as necessary, along with any additional mitigation measures identified at that time by the SCAQMD or other responsible agencies.

Table A - Mitigation, Monitoring and Reporting Plan for 2016 Air Quality Management Plan

Mitigation Measure/Implementation Requirement	Party Responsible for Implementing Mitigation	Monitoring Action	1. Enforcement Agency 2. Monitoring Agency 3. Monitoring Phase
Aesthetics			
MMAE-1: A project applicant, project sponsor, or public agency shall select sites for use as construction staging and laydown areas for equipment, personal vehicles, and material storage that are located in areas that are already disturbed and/or are in locations of low visual sensitivity and where feasible, to take advantage of natural screening opportunities provided by existing structures, topography, and/or vegetation. A project applicant, project sponsor, or public agency may employ temporary visual screens if existing landscape features do not screen views of the construction staging and laydown areas.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve of the location of the construction laydown areas and the use of temporary visual screens.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to the start of construction.
MMAE-2: A project applicant, project sponsor, or public agency shall maintain all construction, operation, and maintenance areas in a clean and tidy manner and screen from public view the storage of construction materials and equipment, where feasible. A project applicant, project sponsor, or public agency shall also re-vegetate disturbed soil after construction is completed.	Project Applicant / Project Sponsor / Public Agency	During construction, maintain a log documenting daily inspections of construction areas. After construction, the lead agency shall inspect the re-vegetated disturbed soil areas of the site.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Daily during construction. Re-vegetate after construction.
MMAE-3: A project applicant, project sponsor, or public agency shall avoid siting projects and their associated elements next to important scenic landscape features or in a setting for observation from State scenic highways, national historic sites, national trails, and cultural resources, to the greatest extent feasible.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve the location of the project to ensure that important scenic landscape features, State scenic highways, national historic sites, national trails, and cultural resources have been protected.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before the start of construction.
MMAE-4: A project applicant, project sponsor, or public agency shall work with the construction contractor to assure compliance with development standards and guidelines in adopted general plans, master plans, and adopted design guidelines in order to maintain compatibility with surrounding natural areas, including	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to assure compliance with development standards and guidelines in adopted general plans,	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies

site coverage, building height and massing, building materials and color, landscaping, site grading, where applicable.		master plans, and adopted design guidelines	3. During the environmental review process and before the start of construction.
MMAE-5: A project applicant, project sponsor, or public agency shall provide structural and/or vegetative screening from light-sensitive uses to reduce glare, where feasible.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to assure that applicable structural and/or vegetative screening from light-sensitive uses to reduce glare are included.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process.
Air Quality			
MMAQ-1: A project applicant, project sponsor, or public agency shall include in all construction contracts the requirement to use 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export). In the event that that 2010 model year or newer diesel trucks cannot be obtained, the project proponent shall provide documentation as information becomes available and shall instead use trucks that meet EPA 2007 model year NOx emissions requirements.	Project Applicant / Project Sponsor / Public Agency	During construction, maintain a log documenting daily equipment usage including the model year. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Daily during construction.
MMAQ-2: A project applicant, project sponsor, or public agency shall include in all construction contracts the requirement that all off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 4 off-road emission standards at a minimum. In addition, if not already supplied with a factory-equipped diesel particulate filter, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. In addition, construction equipment shall incorporate, where feasible, emissions savings technology such as hybrid drives and specific fuel economy standards. In the event that any equipment required under this mitigation measure is not available, the project proponent shall provide documentation as information becomes available. A project applicant,	Project Applicant / Project Sponsor / Public Agency	During construction, maintain a log documenting daily equipment usage including the model year and applicable emissions control equipment. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor. The lead agency shall be provided with documentation of SCAQMD "SOON" funding incentive program application.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Daily during construction.

project sponsor, or public agency shall provide a copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit at the time of mobilization of each applicable unit of equipment. A project applicant, project sponsor, or public agency shall also encourage construction contractors to apply for SCAQMD "SOON" funding incentives to help accelerate the clean-up of off-road diesel vehicles, such as heavy duty construction equipment.			
MMAQ-3: A project applicant, project sponsor, or public agency shall enter into a contract that notifies all vendors and construction contractors that vehicle and construction equipment idling time will be limited to no longer than five minutes or another time-frame as allowed by the California Code of Regulations, Title 13 section 2485 - CARB's Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. For any vehicle delivery that is expected to take longer than five minutes, each project applicant, project sponsor, or public agency will require the vehicle's operator to shut off the engine. A project applicant, project sponsor, or public agency will notify the vendors of these idling requirements at the time that the purchase order is issued and again when vehicles enter the gates of the facility. To further ensure that drivers understand the vehicle and construction equipment idling requirement, each project applicant, project sponsor, or public agency shall post signs at each facility entry gates stating idling longer than five minutes is not permitted.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to assure compliance with idling requirements. The lead agency shall inspect site to ensure proper signage is posted.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-4: A project applicant, project sponsor, or public agency shall require the construction contractor to employ on-road heavy-duty diesel trucks or equipment with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater that complies with EPA 2007 on-road emission standards for PM and NOx (0.01 gram per brake horsepower - hour (g/bhp-hr) and at least 0.2 g/bhp-hr, respectively).	Project Applicant / Project Sponsor / Public Agency	During construction, maintain a log documenting daily equipment usage including the model year. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Daily during construction.

MMAQ-5: A project applicant, project sponsor, or public agency, in cooperation with the construction contractors, will maintain vehicle and equipment maintenance records for the construction portion of the proposed project. All construction vehicles must be maintained in compliance with the manufacturer's recommended maintenance schedule. A project applicant, project sponsor, or public agency will maintain their construction equipment and the construction contractor will be responsible for maintaining their equipment and maintenance records. All maintenance records for each facility and their construction contractor(s) will remain on-site for a period of at least two years from completion of construction.	Project Applicant / Project Sponsor / Public Agency	During construction, maintain a log documenting daily equipment usage including the model year. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Daily during construction.
MMAQ-6: A project applicant, project sponsor, or public agency and/or their construction contractor(s) will conduct a survey of the proposed project construction area(s) to assess whether the existing infrastructure can provide access to electricity, as available, within the facility or construction site, in order to operate electric on-site mobile equipment. For example, each project applicant, project sponsor, or public agency and/or their construction contractor(s) will assess the number of electrical welding receptacles available. Construction areas within the facility or construction site where electricity is and is not available must be clearly identified on a site plan. The use of non-electric onsite mobile equipment shall be prohibited in areas of the facility that are shown to have access to electricity. The use of electric on-site mobile equipment within these identified areas of the facility or construction site will be allowed. A project applicant, project sponsor, or public agency shall include in all construction contracts the requirement that the use of non-electric on-site mobile equipment is prohibited in certain portions of the facility as identified on the site plan. A project applicant, project sponsor, or public agency shall maintain records that indicate the location within the facility or construction site where all	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details where existing infrastructure can provide access to electricity, as available, within the facility or construction site, in order to operate electric on-site mobile equipment. During construction, maintain a log documenting daily equipment usage. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.

electric and non-electric on-site mobile equipment are operated, if at all, for a period of at least two years from completion of construction.			
MMAQ-7: A project applicant, project sponsor, or public agency shall provide temporary traffic controls such as a flag person, during all phases of significant construction activity to maintain smooth traffic flow.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to ensure that proper traffic management controls have been included. During construction, maintain a log detailing the usage of traffic controls. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-8: A project applicant, project sponsor, or public agency shall provide dedicated turn lanes for the movement of construction trucks and equipment on- and off-site.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to ensure that proper traffic management controls have been included. During construction, maintain a log detailing the usage of traffic controls. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-9: A project applicant, project sponsor, or public agency shall re-route construction trucks away from congested streets or sensitive receptor areas.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to ensure that proper traffic management controls have been included. During construction, maintain a log detailing the usage of traffic controls. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-10: A project applicant, project sponsor, or public agency shall coordinate with their local city to improve traffic flow by signal synchronization in the area near the construction site.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to ensure	1. SCAQMD/Other Lead Agencies

		that proper traffic management controls have been included. During construction, maintain a log detailing the usage of traffic controls. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-11: A project applicant, project sponsor, or public agency shall ensure that drivers understand that traffic speeds on all unpaved roads will be limited to 15 mph or less. In addition, a project applicant, project sponsor, or public agency shall post signs on all unpaved roads indicating a speed limit of 15 mph or less.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to assure compliance with speed limit requirements. The lead agency shall inspect site to ensure proper signage is posted.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-12: A project applicant, project sponsor, or public agency shall enter into a contract that notifies all vendors and construction contractors that during deliveries, truck idling time will be limited to no longer than five minutes or another time-frame as allowed by the California Code of Regulations, Title 13 section 2485 - CARB's Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. For any delivery that is expected to take longer than five minutes, each project applicant, project sponsor, or public agency will require the truck's operator to shut off the engine. A project applicant, project sponsor, or public agency will notify the vendors of these idling requirements at the time that the purchase order is issued and again when trucks enter the gates of the facility. To further ensure that drivers understand the truck idling requirement, each project applicant, project sponsor, or public agency shall post signs at each facility entry gates stating idling longer than five minutes is not permitted.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to assure compliance with idling requirements. The lead agency shall inspect site to ensure proper signage is posted.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-13: A project applicant, project sponsor, or public agency shall schedule construction activities that affect traffic flow on the arterial system to occur during off-peak hours to the greatest extent practicable.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to ensure that proper traffic management controls, including the scheduling of construction	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies

		activities that affect traffic flow during off-peak hours, have been included. During construction, maintain a log detailing the usage of traffic controls. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	3. Before the start of construction and daily during construction.
MMAQ-14: If and when winds speeds exceed 25 mph, each project applicant, project sponsor, or public agency shall suspend all excavating and grading activities and shall record the date and time when the use of construction equipment associated with these construction activities are suspended. This log shall be maintained on-site for a period of at least two years from completion of construction.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to ensure that applicable excavation and grading suspension scenarios are included. During construction, maintain a log detailing any suspension of construction activities. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-15: If and when any first stage smog alert occurs, each project applicant, project sponsor, or public agency shall record the date and time of each alert, shall suspend all construction activities that generate emissions, and shall record the date and time when the use of construction equipment and construction activities are suspended. This log shall be maintained on-site for a period of at least two years from completion of construction.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to ensure that applicable construction suspension scenarios are included. During construction, maintain a log detailing any suspension of construction activities. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-16: A project applicant, project sponsor, or public agency shall coordinate with the construction contractor to site parking areas to minimize interference with roadway traffic.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve of the location of site parking areas to minimize interference with roadway traffic.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction.

MMAQ-17: A project applicant, project sponsor, or public agency and/or their construction contractor(s) shall evaluate the use of alternate fuels for on-site mobile construction equipment prior to the commencement of construction activities, provided that suitable equipment is available for the activity. Equipment vendors shall be contacted to determine the commercial availability of alternate-fueled construction equipment. Priority should be given during the bidding process for contractors committing to use alternate-fueled construction equipment.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details where on-site mobile construction equipment using alternative fuels is applicable.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before the start of construction.
MMAQ-18: A project applicant, project sponsor, or public agency shall include in all construction contracts the requirement to cover all haul trucks delivering or hauling away dirt, sand, soil, or other loose materials.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details truck covering requirements. During construction, maintain a log detailing the import or export of dirt, sand, soil, or other loose materials. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-19: A project applicant, project sponsor, or public agency shall require the construction contractor to install and use wheel washers where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site for each trip to prevent drag-out.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details truck entrance/exiting procedures. During construction, maintain a log detailing trucks entering/exiting the site. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
MMAQ-20: A project applicant, project sponsor, or public agency shall require the construction contractor to apply non-toxic soil stabilizers according to manufacturers' specifications to all inactive construction areas (e.g., previously graded areas inactive for ten days or more).	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details the usage of soil stabilizers. During construction, maintain a log detailing soil stabilizer application. The log will be made available on-site and be	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.

		provided upon request to the appropriate agency inspector/monitor.	
MMAQ-21: A project applicant, project sponsor, or public agency shall require the construction contractor to replace ground cover in disturbed areas as quickly as possible to minimize dust.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details ground covering requirements. After construction, the lead agency shall inspect the re-vegetated disturbed soil areas of the site.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and after construction.
MMAQ-22: A project applicant, project sponsor, or public agency shall require the construction contractor to pave road and road shoulders.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details paving requirements. After construction, the lead agency shall inspect the re-vegetated disturbed soil areas of the site.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and after construction.
MMAQ-23: A project applicant, project sponsor, or public agency shall require the construction contractor to sweep streets at the end of the day using SCAQMD Rule 1186 and 1186.1 compliant sweepers if visible soil is carried onto adjacent public paved roads. In the event that water sweepers are used, each project applicant, project sponsor, or public agency shall recommend the construction contractor to use reclaimed water.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details sweeping requirements. During construction, maintain a log detailing sweeping activities. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and daily during construction.
Energy			
MME-1: A project applicant, project sponsor, or public agency shall provide to the lead agency documentation for approval of incentives to encourage the use of energy efficient equipment and vehicles and promote energy conservation prior to the beginning of project operation.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall approve, as appropriate and adequate, any necessary documentation of incentives to encourage energy efficiency and conservation.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and throughout implementation of the 2016 AQMP.

MME-2: To the extent allowed by state and federal law, electricity generating utilities within the District can and should increase capacity of existing transmission lines to meet forecast electricity demand that supports sustainable growth, where feasible and appropriate in coordination with local planning agencies.	Electric Utilities	Local planning agencies shall maintain communications with electricity generating utilities to accurately forecast future electricity demand.	1. Electricity Utilities 2. SCAQMD/Other Lead Agencies/ Electricity Utilities 3. During the environmental review process and before the start of construction.
MME-3: The project applicant, project sponsor, or public agency shall submit projected electricity calculations to the local electricity provider for any project anticipated to require substantial electricity consumption. Such electricity calculations can and should be used by the local electricity provider when forecasting future electricity demand. Any infrastructure improvements necessary shall be completed according to the specifications of the electricity provider.	Project Applicant / Project Sponsor / Public Agency	When forecasting future electricity demand and/or infrastructure improvements, electricity utilities should consider the effects of local projects on future energy demand.	1. SCAQMD/Other Lead Agencies/Electricity Utilities 2. SCAQMD/Other Lead Agencies/ Electricity Utilities 3. During the environmental review process and before the start of construction.
MME-4: The project applicant, project sponsor, or public agency shall include energy analyses in environmental documentation with the goal of conserving energy through the wise and efficient use of energy.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall carefully evaluate the adequacy of any required energy analyses and make a determination that all feasible energy conservation goals are identified.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process.
MME-5: The project applicant, project sponsor, or public agency shall evaluate the potential for reducing peak energy demand by encouraging charging of electrical vehicles and other mobile sources during off-peak hours.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall carefully evaluate the adequacy of any required energy analyses that encourage charging electric vehicles and other mobile sources during off-peak hours.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process.
MME-6: The project applicant, project sponsor, or public agency shall evaluate the potential for reducing peak energy demand by encouraging the use of catenary or way-side electrical systems developed for transportation systems to operate during off-peak hours.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall carefully evaluate the adequacy of any required energy analyses that encourage using catenary or way-side electrical systems developed for transportation systems to operate during off-peak hours.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process.

MME-7: The project applicant, project sponsor, or public agency shall evaluate the potential for reducing peak energy demand by encouraging the use of electrified stationary sources during off-peak hours (e.g., cargo handling equipment).	Project Applicant / Project Sponsor / Public Agency	The lead agency shall carefully evaluate the adequacy of any required energy analyses that encourage using electrified stationary sources during off-peak hours.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process.
Hazards and Hazardous Materials			
MMHZ-1: The project applicant, project sponsor, or public agency shall add consumer warning requirements for all flammable and extremely flammable products.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with local fire departments or hazmat departments, as appropriate, to develop appropriate warnings and locations of warning labels.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before operation.
MMHZ-2: The project applicant, project sponsor, or public agency shall add requirements to conduct a public education and outreach program in joint cooperation with local fire departments regarding flammable and extremely flammable products that may be included in reformulated products, especially for reformulated consumer paint thinners and multi-purpose solvents.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with local fire departments or school districts, as appropriate, to develop appropriate education campaigns and outreach programs regarding the flammability of consumer paint thinners and solvents.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before operation begins.
MMHZ03: The project applicant, project sponsor, or public agency shall ensure the installation of secondary containment (e.g., berms) for LNG tanks.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with local fire departments to ensure that secondary containment has been installed before giving final approval of the project.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before operation begins.
MMHZ-4: The project applicant, project sponsor, or public agency shall ensure the installation of valves that fail shut on LNG tanks.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with local fire departments to ensure that fail shut valves have been installed before giving final approval of the project.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before operation begins.
MMHZ-5: The project applicant, project sponsor, or public agency shall install emergency release valves and barriers around LNG storage tanks to prevent the physical damage to storage tanks or limit the release of LNG from storage tanks.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with local fire departments to ensure that emergency release valves and barriers around LNG storage tanks have been installed before giving final approval of the project.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before operation begins.

MMHZ-6: The project applicant, project sponsor, or public agency shall perform integrity testing of LNG storage tanks to assist in preventing failure occurring from structural problems. Additionally, a containment system to be used for deliveries during off-loading operations shall be constructed.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with local fire departments to ensure that integrity testing of LNG storage tanks has been performed and containment systems to be used for deliveries during off-loading operations have been installed before giving final approval of the project.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before operation begins.
MMHZ-7: The project applicant, project sponsor, or public agency shall conduct a Phase I Environmental Site Assessment prior to construction. If known contamination is discovered, a Phase II environmental Site Assessment shall be conducted and provided to the Lead Agency. The recommendations in the Environmental Site Assessments shall be implemented.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent that a Phase I Environmental Site Assessment was conducted prior to construction. If known contamination is discovered, a Phase II Environmental Site Assessment shall be conducted and provided to the Lead Agency prior to construction.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before construction begins.
MMHZ-8: The project applicant, project sponsor, or public agency shall consult with the appropriate local, state, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent that the appropriate local, state, and federal environmental regulatory agencies were consulted with to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before and after construction.
MMHZ-9: The project applicant, project sponsor, or public agency shall cease work if soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums, or other hazardous materials or wastes are encountered), in the vicinity of the suspect material. The area shall be secured as necessary and all appropriate measures shall be taken to protect human health and the environment, including but not limited to: notification of regulatory agencies and identification of the nature and extent of contamination. Work shall be stopped in the areas affected until the measures have been implemented consistent with the guidance of the appropriate regulatory oversight authority.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent that work will cease if soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities. All appropriate measures to protect human health and the environment shall be taken. Maintain a log to document any suspected contamination encountered during construction activities. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During construction.

MMHZ-10: The project applicant, project sponsor, or public agency shall use best management practices (BMPs) regarding potential soil and groundwater hazards.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent to ensure best management practices (BMPs) regarding potential soil and groundwater hazards are utilized.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During construction and operation.
MMHZ-11: The project applicant, project sponsor, or public agency shall ensure that soil generated by construction activities shall be stockpiled on-site in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. Complete sampling and handling and transport procedures for reuse or disposal, in accordance with applicable local, state and federal laws and policies.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details stockpile management and profiling procedures. During construction, maintain a log detailing soil exporting activities. The log will be made available on-site and be provided upon request to the appropriate agency inspector/monitor.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction and during construction.
MMHZ-12: The project applicant, project sponsor, or public agency shall ensure that groundwater pumped from the subsurface shall be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies. Utilize engineering controls, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent to ensure that any groundwater pumped from the subsurface shall be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During construction and operation.
MMHZ-13: Prior to issuance of any demolition, grading, or building permit, the project applicant, project sponsor, or public agency shall submit for review and approval by the Lead Agency (or other appropriate government agency) written verification that the appropriate federal, state and/or local oversight authorities, including but not limited to the Regional Water Quality Control Board (RWQCB), have granted all required clearances and confirmed that the all applicable standards, regulations, and conditions have been met for previous contamination at the site.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent to ensure that prior to issuance of any demolition, grading, or building permit, the project proponent submitted for review and approval by the Lead Agency (or other appropriate government agency) written verification that the appropriate federal, state and/or local oversight authorities, including but not limited to the Regional Water Quality Control Board (RWQCB), have granted all required clearances and confirmed that the all applicable standards, regulations, and	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to construction.

		conditions have been met for previous contamination at the site.	
MMHZ-14: The project applicant, project sponsor, or public agency shall develop, train, and implement appropriate worker awareness and protective measures to assure that worker and public exposure is minimized to an acceptable level and to prevent any further environmental contamination as a result of construction.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details procedures to develop, train, and implement appropriate worker awareness and protective measures to assure that worker and public exposure is minimized to an acceptable level and to prevent any further environmental contamination as a result of construction.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to construction.
MMHZ-15: Where a project site is determined to contain materials classified as hazardous waste by state or federal law, the project applicant, project sponsor, or public agency shall submit written confirmation to appropriate local agency that all state and federal laws and regulations will be followed when profiling, handling, treating, transporting, and/or disposing of such materials.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent, where a project site is determined to contain materials classified as hazardous waste by state or federal law, that written confirmation to appropriate local agency that all state and federal laws has been submitted and regulations will be followed when profiling, handling, treating, transporting, and/or disposing of such materials. These procedures shall be reflected in the construction management plan.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to construction.
MMHZ-16: The project applicant, project sponsor, or public agency shall ensure that the temporary storage and handling of potentially hazardous materials/wastes shall be in areas away from sensitive receptors such as schools or residential areas. These areas shall be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-project personnel. All project personnel that may come into contact with potentially hazardous materials/wastes will have the appropriate health and safety training commensurate with the anticipated level of exposure.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent that the temporary storage and handling of potentially hazardous materials/wastes shall be in areas away from sensitive receptors such as schools or residential areas. Temporary storage and handling of potentially hazardous materials/wastes procedures shall also be included in the construction management plan.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During construction and operation.
MMHZ-17: The project applicant, project sponsor, or public agency shall ensure that where the construction or operation of projects involves the transport of hazardous materials, avoid transport of such materials within one-	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent that where the construction or operation of projects involves the transport of hazardous materials, avoid transport of such materials	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies

quarter mile of schools, when school is in session, wherever feasible.		within one-quarter mile of schools, when school is in session, wherever feasible. Proper protocols and procedures for any construction activities that include the transport of hazardous materials shall be included in the construction management plan.	3. During construction and operation.
MMHZ-18: The project applicant, project sponsor, or public agency shall ensure that where it is not feasible to avoid transport of hazardous materials, within one-quarter mile of schools on local streets, provide notification of the anticipated schedule of transport of such materials.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with project proponent that where it is not feasible to avoid transport of hazardous materials, within one-quarter mile of schools on local streets, proper notification of the anticipated schedule of transport of such materials has been provided.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During construction and operation.
Hydrology and Water Quality			
MMWQ-1: The project applicant, project sponsor, or public agency shall work with local water agencies to continue to evaluate future water demand and establish the necessary supply and infrastructure to meet that demand, as documented in their Urban Water Management Plans.	Local Water Agencies	Local water agencies within the District shall coordinate with local public agencies, to the extent allowed by state and federal law, with regard to forecasting future water demand and providing the necessary water supply infrastructure to meet forecast demand.	1. Local Water Agencies 2. Local Water Agencies 3. During the environmental review process and throughout implementation of the 2016 AQMP.
MMWQ-2: The project applicant, project sponsor, or public agency shall coordinate with the local water provider to ensure that existing or planned water supply and water conveyance facilities are capable of meeting water demand/pressure requirements. In accordance with State Law, a Water Supply Assessment shall be required for projects that meet the size requirements specified in the regulations. In coordination with the local water provider, each project sponsor will identify specific on- and off-site improvements needed to ensure that impacts related to water supply and conveyance demand/pressure requirements are addressed prior to issuance of a certificate of occupancy. Water supply and conveyance demand/pressure clearance from the local water provider will be required at the time that a water connection permit application is submitted.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall coordinate with local water providers to ensure that existing or planned water supply and water conveyance facilities are capable of meeting water demand/pressure requirements before giving final approval of the project.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before the start of construction.

MMWQ-3: The project applicant, project sponsor, or public agency shall implement water conservation measures and use recycled water for appropriate end uses.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall approve, as appropriate and adequate, any necessary documentation of incentives to encourage water conservation measures and recycled water use.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before the start of construction.
MMWQ-4: The project applicant, project sponsor, or public agency shall consult with the local water provider to identify feasible and reasonable measures to reduce water consumptions.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall carefully coordinate with local water providers to evaluate the adequacy of any required measures to reduce water consumption.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before the start of construction.
Noise			
MMNS-1: The project applicant, project sponsor, or public agency shall install temporary noise barriers during construction.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details all applicable noise suppression requirements to be followed.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before the start of construction.
MMNS-2: The project applicant, project sponsor, or public agency shall use noise barriers to protect sensitive receptors from excessive noise levels during construction.	Project Applicant/ Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details all applicable noise suppression requirements to be followed.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and before the start of construction.
MMNS-3: The project applicant, project sponsor, or public agency shall schedule construction activities consistent with the allowable hours pursuant to applicable general plan noise element or noise ordinance. Noise-generating construction activities (including truck deliveries, pile driving, and blasting) shall be limited to the least noise-sensitive times of day (e.g., weekdays	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details all applicable noise suppression requirements to be followed.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Before the start of construction.

during the daytime hours) for projects near sensitive receptors. Where construction activities are authorized outside the limits established by the noise element of the general plan or noise ordinance, the project applicant, project sponsor, or public agency shall notify affected sensitive noise receptors and all parties who will experience noise levels in access of the allowable limits for the specified land use, of the level of exceedance and duration of exceedance; and provide a list of protective measures that can be undertaken by the individual, including temporary relocation or use of hearing protective devices.			
MMNS-4: The project applicant, project sponsor, or public agency shall limit speed and/or hours of operation of rail and transit systems during the selected periods of time to reduce duration and frequency of conflict with adopted limits on noise levels.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall approve measures to limit speed and/or hours of operation of rail and transit systems during the selected periods of time to reduce duration and frequency of conflict with adopted limits on noise levels.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During the environmental review process and operation.
MMNS-5: The project applicant, project sponsor, or public agency shall post procedures and phone numbers at the construction site for notifying the Lead Agency staff, local Police Department, and construction contractor (during regular construction hours and off-hours), along with permitted construction days and hours, complaint procedures, and who to notify in the event of a problem.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details all applicable posting requirements at the site. The lead agency shall inspect the site to ensure posting requirements have been met.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Daily during construction.
MMNS-6: The project applicant, project sponsor, or public agency shall notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to construction.
MMNS-7: The project applicant, project sponsor, or public agency shall hold a preconstruction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.	Project Applicant / Project Sponsor / Public Agency	The lead agency shall hold a preconstruction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise measures and practices (including construction hours,	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to construction.

		neighborhood notification, posted signs, etc.) are completed.	
MMNS-8: The project applicant, project sponsor, or public agency shall designate an on-site construction complaint and enforcement manager for the project.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that designates the on-site construction complaint and enforcement manager for the project.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to construction.
MMNS-9: The project applicant, project sponsor, or public agency shall ensure that construction equipment are properly maintained per manufacturers' specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). Additionally, all intake and exhaust ports on power equipment shall be muffled or shielded.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details all applicable noise suppression requirements to be followed.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to construction.
MMNS-10: The project applicant, project sponsor, or public agency shall ensure that impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction are hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. External jackets on the tools themselves shall be used, if such jackets are commercially available and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details all applicable noise suppression requirements to be followed.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to and during construction.
MMNS-11: The project applicant, project sponsor, or public agency shall ensure that construction equipment is not idling for an extended time in the vicinity of noise-sensitive receptors.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan to assure compliance with idling and noise suppression requirements.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to and during construction.
MMNS-12: The project applicant, project sponsor, or public agency shall locate fixed/stationary equipment (such as generators, compressors, rock crushers, and	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies

cement mixers) as far as possible from noise-sensitive receptors.		the location of fixed/stationary equipment at the site.	3. Prior to and during construction.
MMNS-13: The project applicant, project sponsor, or public agency shall consider using flashing lights instead of audible back-up alarms on mobile equipment.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details applicable uses of flashing lights instead of audible back-up alarms on mobile equipment.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. During construction.
MMNS-14: For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, the project applicant, project sponsor, or public agency shall determine the potential vibration impacts to the structural integrity of the adjacent buildings within 50 feet of pile driving locations.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details measures to minimize known vibrational impacts.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to and during construction.
MMNS-15: For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, the project applicant, project sponsor, or public agency shall determine the threshold levels of vibration and cracking that could damage adjacent historic or other structure, and design means and construction methods to not exceed the thresholds.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details measures to minimize known vibrational impacts.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to and during construction.
MMNS-16: For projects where pile driving would be necessary for construction due to geological conditions, the project applicant, project sponsor, or public agency shall utilize quiet pile driving techniques such as predrilling the piles to the maximum feasible depth, where feasible. Predrilling pile holes will reduce the number of blows required to completely seat the pile and will concentrate the pile driving activity closer to the ground where pile driving noise can be shielded more effectively by a noise barrier/curtain.	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details procedures to utilize quiet pile driving techniques, where applicable.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies 3. Prior to and during construction.
MMNS-17: For projects where pile driving would be necessary for construction due to geological conditions, the project applicant, project sponsor, or public agency shall utilize quiet pile driving techniques such as the use	Project Applicant / Project Sponsor / Public Agency	Prior to the start of construction, the lead agency shall review and approve a construction management plan that details procedures to utilize quiet pile driving techniques, where applicable.	1. SCAQMD/Other Lead Agencies 2. SCAQMD/Other Lead Agencies

of more than one pile driver to shorten the total pile driving duration.			3. Prior to and during construction.
Transportation and Traffic			
MMTR-1: The project applicant, project sponsor, or public agency shall develop a construction management plan that includes at least the following items and requirements, if determined to be feasible by the Lead Agency: • A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes; • Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur; • Location of construction staging areas for materials, equipment, and vehicles at an approved location; • A process for responding to and tracking complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. The Lead Agency shall be informed who the Manager is prior to the issuance of the first permit; • Provision for accommodation of pedestrian flow; • As necessary, provision for parking management and spaces for all construction workers to ensure that construction workers do not park in street spaces; • Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the project sponsor's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat to public health or safety shall be repaired immediately. The street shall be restored to its	Project Applicant / Project Sponsor / Public Agency	Project proponents and construction contractors shall meet with the appropriate lead agency (or other public agency with approval authority over the project) to determine traffic management strategies to reduce, to the maximum extent feasible, traffic congestion and the effects of parking demand by construction workers during construction of this project and other nearby projects that could be simultaneously under construction. The project sponsor shall develop a construction management plan for review and approval by the lead agency (or other government agency as appropriate).	1. SCAQMD/ Other Lead Agencies 2. SCAQMD/ Other Lead Agencies 3. Before the start of construction.

condition prior to the new construction as established by the Lead Agency (or other appropriate government agency) and/or photo documentation, at the sponsor's expense, before the issuance of a Certificate of Occupancy; • Any heavy equipment brought to the construction site shall be transported by truck, where feasible; • No materials or equipment shall be stored on the traveled roadway at any time; • Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion; • All equipment shall be equipped with mufflers; • Prior to the end of each work-day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on the property, within the public rights-of-way, or properties of adjacent or nearby neighbors; and • Promote "least polluting" ways to connect people and goods to their destinations.			

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

DRAFT FINAL 2016
AIR QUALITY MANAGEMENT PLAN



DECEMBER 2016

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Preface

Southern California's historic battles with poor air quality are well documented. Since the mid-20th century, the greater Los Angeles region has been at the forefront of air pollution science, low-emissions technology development, and innovative air quality regulation. As long-time residents of the South Coast Air Basin can attest, these efforts have led to substantial and noticeable improvements in air quality and public health, all during a period of dramatic increases in economic activity, population, and vehicle miles traveled. Technological advances in pollution controls, pollution prevention, clean fuels, alternative energy, and combustion processes have been and will be the key to past and future progress. Less than two decades ago, newly established PM2.5 standards seemed unattainable. However, through strong emission reduction efforts at the local, state and federal levels, the Basin has met the original standards and is on track to meet the revised, more stringent standards by their statutory deadlines.

Despite these successes, the health of our residents continues to be seriously affected by the poor air quality that confronts the region. Our unique topography and meteorology, along with emissions from millions of vehicles and a thriving goods movement industry, continue to produce the worst ozone pollution in the nation. New scientific information on the health impacts of air pollution has led to progressively more stringent air quality standards to better protect public health. Limited local authority to control certain sectors of mobile sources that account for the majority of emissions poses policy challenges. Future climate variation and the effect of drought conditions add further uncertainties. Finally, as the most cost-effective emissions controls are implemented, it becomes harder to identify and implement new cost-effective control measures while minimizing impacts to the local economy and businesses.

Existing rules, regulations and programs are not sufficient to fulfill the South Coast Air Quality Management District's public health mandate. In the next seven to fifteen years, the region must achieve substantial additional reductions in nitrogen oxide emissions in order to attain the ozone standards by the approaching deadlines. Previous Air Quality Management Plans have relied heavily on unspecified future technological developments to get us there. But given the short time horizons and the emission reduction needs, there is now a need to develop specific pathways to attainment in order to clarify and accelerate the required actions to achieve our air quality goals. These actions necessarily include aggressive new regulatory approaches, and a significant expansion of incentives programs. More stringent mobile source emission standards are desperately needed to spur further development and production of zero- and near-zero emission technologies. But even with more stringent standards, natural turnover of existing vehicles and equipment will not be fast enough to achieve the requisite technology penetration. Therefore, regulations and incentives to accelerate fleet turnover in the Basin are a major element of this Plan. While previous incentive programs have been very successful in achieving real emission reductions, the incentive funding levels needed for attainment are significantly more than what has been allocated to date. Securing the necessary funding will not be easy, and will require coordinated advocacy and outreach, integrated planning, coalition building, key partnerships, and political will.

Fortunately, there is reason to be optimistic. For the first time, the specific technologies needed to achieve the ozone standards are well-defined. Many are or will be commercially available within the next few years. New technology costs have dropped and will continue to do so with refinements and higher-volume production. We can now envision future technology deployment scenarios that are consistent with attainment.

When the public, health advocates, business stakeholders, and policy makers come together and express that the national poster-child of poor air quality can actually achieve what was once thought impossible, when we articulate the benefits to public health, the local economy, and the attractiveness of the region, and when we demonstrate how disparate interests can unite in a common cause to solve environmental problems, the investments in our future should follow. This 2016 Air Quality Management Plan provides the basis to continue and strengthen the region's campaign for clean air and a healthful future for our residents.

Executive Summary



The 2016 Air Quality Management Plan is the regional blueprint for achieving air quality standards in the South Coast Air Basin, an area that includes Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties. Through a combination of regulatory and incentive approaches via partnerships at all levels of government, the elusive goal of healthy air is within reach.

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Overview

The 2016 Air Quality Management Plan (2016 AQMP or Plan) is a regional blueprint for achieving the federal air quality standards and healthful air. The South Coast Air Quality Management District (SCAQMD or District) is responsible for clean air in the South Coast Air Basin (SCAB or Basin), an area that includes Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties. While air quality has dramatically improved over the years, the Basin still exceeds federal public health standards for both ozone and particulate matter (PM) and experiences some of the worst air pollution in the nation. The 2016 AQMP represents a thorough analysis of existing and potential regulatory control options, includes available, proven, and cost-effective strategies, and seeks to achieve multiple goals in partnership with other entities promoting reductions in greenhouse gases and toxic risk, as well as efficiencies in energy use, transportation, and goods movement. The Plan recognizes the critical importance of working with other agencies to develop funding and incentives that encourage the accelerated transition to cleaner vehicles, and the modernization of buildings and industrial facilities to cleaner technologies in a manner that benefits not only air quality, but also local businesses and the regional economy. These "win-win" scenarios are key to implementation of this Plan with broad support from a wide range of stakeholders.

Air Quality Standards

The federal Clean Air Act (CAA) requires areas not attaining the national ambient air quality standards (NAAQS) to develop and implement an emission reduction strategy that will bring the area into attainment in a timely manner. The region is given a classification that describes the degree of nonattainment. This classification dictates specific planning requirements under the CAA, including the time provided to attain the standard. The CAA requires attainment of the standard to be achieved as "expeditiously as practicable," but no later than the attainment years listed in Table ES-1 below. It should be noted that the years listed in Table ES-1 are the latest calendar year to achieve the requisite emission reductions, and not the statutory attainment date. For example, the attainment date for the 2008 8-hour ozone standard in an extreme non-attainment attainment area is July 20, 2032. But attainment must be demonstrated with projected emissions reductions in the prior year (2031).

Five NAAQS are being evaluated in this integrated Plan. Three standards – the 8-hour ozone NAAQS established in 2008 (2008 8-hour Ozone), the annual PM2.5 NAAQS established in 2012 (2012 annual PM2.5), and the 24-hour PM2.5 NAAQS established in 2006 (2006 24-hour PM2.5) are required to have new attainment demonstration in this Plan. However, given the overlaps in emissions and control strategies for other yet-to-be-attained NAAQS, this integrated Plan will also include revisions to the attainment demonstrations for two other standards: the 1997 8-hour ozone NAAQS and the 1979 1-hour ozone NAAQS. While the 2012 AQMP focused on attainment of the 2006 24-hour PM2.5 standard, it has since been determined, primarily due to unexpected drought conditions, that it was impracticable to meet the standard by the original attainment year. Since that time, U.S. Environmental Protection Agency (U.S. EPA) has approved a re-classification to "serious" nonattainment for the 24-hour PM2.5 standard, which requires a new attainment demonstration with a new attainment deadline.

TABLE ES-1

Standard	Concentration	Classification	Latest Attainment Year
2008 8-hour Ozone	75 ppb	Extreme	2031
2012 Annual PM2.5	12 µg/m^3	Moderate Serious	2021 2025
2006 24-hour PM2.5	35 µg/m^3	Serious	2019
1997 8-hour Ozone	80 ppb	Extreme	2023
1979 1-hour Ozone	120 ppb	Extreme	2022

Challenges

The 2016 AQMP includes both stationary and mobile source strategies to ensure that rapidly approaching attainment deadlines are met, that public health is protected to the maximum extent feasible, and that the region is not faced with burdensome sanctions if the Plan is not approved or if the NAAQS are not met on time. As with every AQMP, a comprehensive analysis of emissions, meteorology, atmospheric chemistry, regional growth projections, and the impact of existing control measures is updated with the latest data and methods. The most significant air quality challenge in the Basin is to reduce nitrogen oxide (NOx) emissions sufficiently to meet the upcoming ozone standard deadlines. Based on the inventory and modeling results, 522 tons per day (tpd) of total Basin NOx 2012 emissions are projected to drop to 255 tpd and 214 tpd in the 8-hour ozone attainment years of 2023 and 2031 respectively, due to continued implementation of already adopted regulatory actions ("baseline emissions"). The analysis suggests that total Basin emissions of NOx must be reduced to approximately 141 tpd in 2023 and 96 tpd in 2031 to attain the 8-hour ozone standards. This represents an additional 45 percent reduction in NOx in 2023, and an additional 55 percent NOx reduction beyond 2031 levels. The following chart presents the future projections of NOx emissions, the reductions from the proposed control strategy and the levels necessary to attain the standards. The chart also illustrates how the strategy to meet the 8-hour ozone standard in 2023 should lead to sufficient NOx emission reductions to attain the 1-hour ozone standard by 2022. Since NOx emissions also lead to the formation of PM2.5, the NOx reductions needed to meet the ozone standards will likewise lead to improvement of PM2.5 levels and attainment of PM2.5 standards.

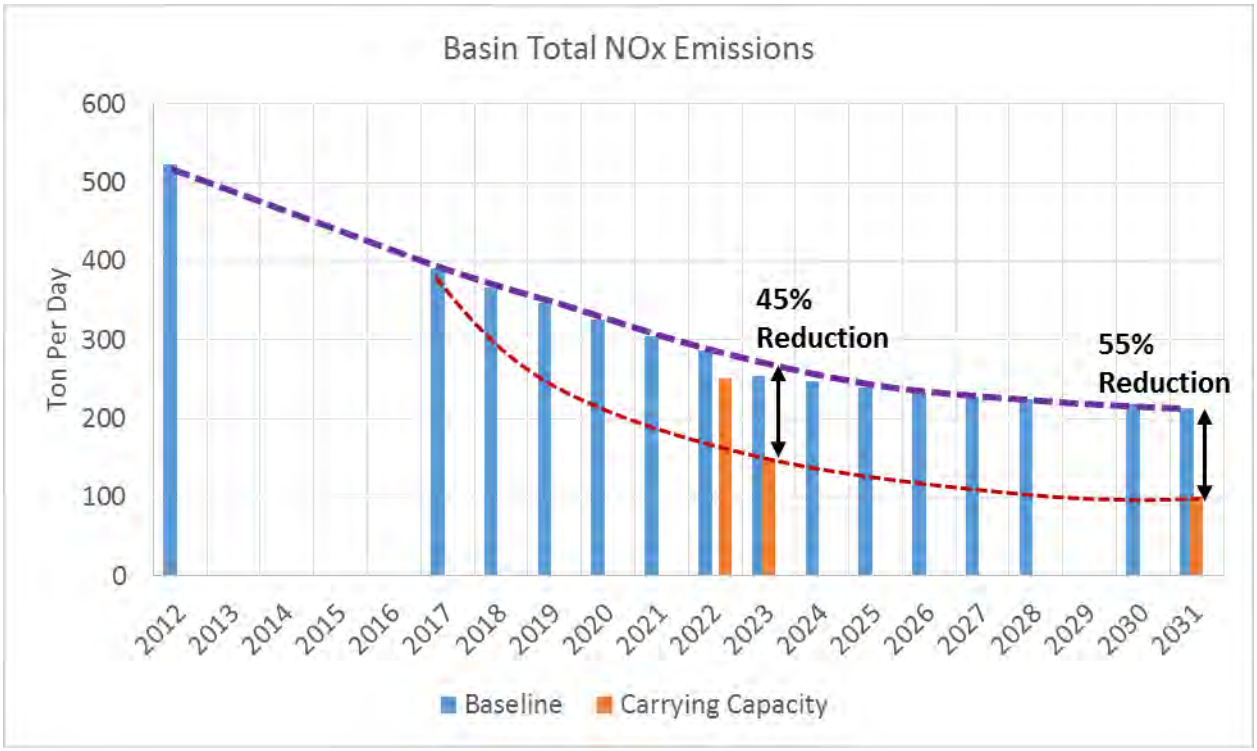


FIGURE ES-1. BASIN TOTAL NOX EMISSIONS (2012–2031)

Plan Objectives

To ensure air quality goals will be met while maximizing benefits and minimizing adverse impacts to the regional economy, the following policy objectives have guided the development of the 2016 AQMP:

Eliminate reliance on future technologies (CAA §182(e)(5)) measures to the maximum extent feasible. As an "extreme" nonattainment area for ozone, the CAA allows the Basin to rely on unspecified future technological advancements to show future attainment of air quality standards. Given the fast approaching deadlines – as early as 2022 and 2023, and given that the majority of the zero and near-zero technologies needed for attainment have already or will soon be commercially available, it is now possible to specify the technologies and the implementation pathways to attainment. Some CAA §182(e)(5) flexibility may still be needed for Plan approval by U.S. EPA given the need for continued technological and cost improvements and new funding and incentive programs.

Calculate and take credit for co-benefits from other planning efforts. Other local, state and federal efforts addressing GHG reductions, energy efficiency, transportation, and goods movement have and will continue to lead to air quality improvements. Where possible, this Plan seeks to quantify and include emission reductions from these parallel and complementary programs.

2016 AQMP Policy Objectives



Eliminate reliance on future technologies (CAA §182(e)(5)) measures to the maximum extent possible by providing specific control measures which have quantifiable emission reductions and associated costs.

Calculate and take credit for co-benefits from other planning efforts (e.g., GHG reduction targets, energy efficiency, and transportation).

Develop a strategy with fair-share emission reductions at the federal, state, and local levels.

Develop a strategy with fair-share emission reductions at the federal, state, and local levels. SCAQMD will make full use of its legal authorities to seek a cleaner air future. But with limitation on SCAQMD authority over the mobile sources that contribute the most to our air quality problems, attainment cannot be achieved without State and federal actions. Proposed measures include a new ultra-low NOx federal engine emission standard for heavy duty trucks and other State mobile source regulations. In some cases, additional authority provided to the State or SCAQMD for sources traditionally under the jurisdiction of the federal government (e.g., locomotives, aircraft, and ships) should be considered.

Invest in strategies and technologies meeting multiple objectives regarding air quality, climate change, air toxics exposure, energy, and transportation. With multiple environmental and societal objectives, targets, deadlines, and strategies underway, it is critical that planning efforts are integrated at all levels and across all agencies. To this end, when progress towards multiple goals is possible, those strategies should be designed to maximize the co-benefits and then prioritized for implementation and investment. The Plan embraces strategies that reduce toxic risk impacting local neighborhoods and disadvantaged communities adjacent to goods movement and transportation corridors.

Identify and secure significant funding for incentives to implement early deployment and commercialization of zero and near-zero technologies. The 2016 AQMP control strategy strongly relies on a transition to zero and near-zero emission technologies in the mobile source sector, including automobiles, transit buses, medium- and heavy-duty trucks, and off-road applications. The plan focuses on existing commercialized technologies and energy sources including their supporting infrastructure, along with newer technologies that are nearing commercialization based on recent demonstration programs and limited test markets. Prioritizing and expanding funding in Environmental Justice (EJ) areas will be sought.



Invest in strategies and technologies meeting multiple objectives regarding air quality, climate change, air toxics exposure, energy, and transportation. Prioritize strategies that meet fast approaching deadlines and assist EJ impacted areas.



Seek and identify significant secured funding for incentives to implement early deployment and commercialization of known zero and near-zero technologies, particularly in the mobile source sector.



Enhance the socioeconomic analysis and select the most efficient and cost-effective path to achieve multi-pollutant and multi-deadline targets.



Prioritize non-regulatory, innovative and "win-win" approaches for emission reductions. As shown in the past, air quality standards can be achieved while maintaining a healthy economy.

Enhance the socioeconomic analysis and pursue the most efficient and cost-effective path to achieve multi-pollutant and multi-deadline targets. Integrated planning across multiple pollutants and multiple deadlines allows for efficient and cost-effective control strategy design. An enhanced socioeconomic impact analysis also quantifies the impacts of the strategy on health, jobs, businesses and the local economy.

Prioritize enforceable regulatory measures as well as non-regulatory, innovative and "win-win" approaches for emission reductions. As shown in the past, significant air quality improvements can be achieved while maintaining a healthy economy. The 2016 AQMP calls for a priority on maximizing emission reductions utilizing zero-emission technologies wherever feasible and cost-effective, near-zero emission technologies in other applications, and innovative "win-win" approaches for emission reductions when new regulations are not yet practical. A full life-cycle in-Basin emissions analysis will be considered in determining the full emissions profile and cost-effectiveness of these technologies. In designing the control strategy needed to achieve the ozone and PM2.5 air quality standards, there will be special consideration of strategies that can contribute to the economic vitality of the region and the needs of both the public and local small businesses. The Plan will prioritize distribution of incentive funding to maximize emissions reductions in the most disadvantaged communities in the region.

Control Strategies

The overall control strategy is an integral approach relying on fair-share emission reductions from federal, state and local levels. The 2016 AQMP is composed of stationary and mobile source emission reductions from traditional regulatory control measures, incentive-based programs, co-benefits from climate programs, mobile source strategies and reductions from federal sources, which include aircraft, locomotives and ocean-going vessels. These strategies are to be implemented in partnership with the California Air Resources Board (CARB) and U.S. EPA. In addition, the Southern California Association of Governments (SCAG) recently approved their 2016 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS)[1] that include transportation programs, measures, and strategies generally designed to reduce vehicle miles traveled (VMT), which are contained within baseline emissions inventory in the Plan.

[1] http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx.

- Traditional regulatory measures
- Incentive-based programs
- Co-benefits from existing GHG reduction programs
- Further Deployment of Cleaner Technologies
- Reductions from State and federal mobile sources

Mobile sources contributed about 88 percent of the region's total NOx emissions in 2012. Since the SCAQMD has limited authority to regulate mobile sources, staff worked closely with CARB and U.S. EPA, which have primary authority over mobile sources, to ensure mobile sources perform their fair share of pollution reduction responsibilities. In May 2016, CARB released an updated Mobile Source Strategy[2] and a Proposed State SIP Strategy[3] supporting multiple planning efforts to meet air quality standards, greenhouse gas (GHG) emission reduction targets, petroleum consumption reduction, and reduced health risks from transportation emissions over the next 15 years. The integrated approach allows consideration of the multi-pollutant co-benefits, and identification of interaction between control measures to guide policy and maximize program effectiveness. Specifically, the mobile source strategy outlines a coordinated suite of measure concepts for on-road light- and heavy-duty vehicles, off-road equipment, as well as federal and international sources. The strategy also provides regulatory and programmatic mechanisms to implement the measures and estimated NOx reductions for the South Coast Air Basin. A subset of the statewide strategy is a mobile source strategy for the South Coast SIP. The reductions from these mobile source measures are included in the attainment demonstration and are critical for meeting the standards. Without significant reductions from the mobile source sector demonstration of attainment is not possible.

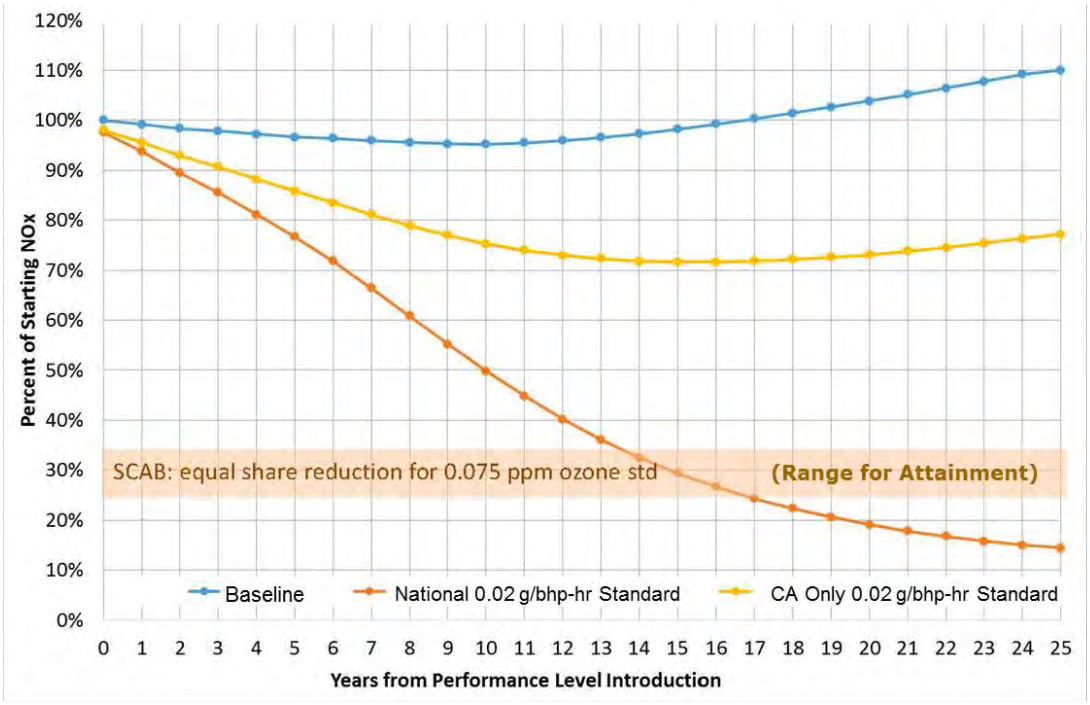


In June 2016, SCAQMD and 10 co-petitioners requested the U.S. EPA Administrator to undertake rulemaking to revise the national on-road heavy-duty engine exhaust NOx emission standard from 0.2 g/bhp-hr to 0.02 g/bhp-hr. It was recommended that the regulation be implemented by January 2022 or if not feasible, by January 2024, with a phase-in starting in January 1, 2022. A national standard is estimated to result in NOx emission reductions from this source category from 70 to 90 percent in 14 to 25 years, respectively. Given that the Basin must attain the 75 ppb ozone NAAQS by 2031 (within the

[2] http://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm.

[3] http://www.arb.ca.gov/planning/sip/2016sip/2016sip.htm.

next 15 years), a new on-road heavy-duty engine exhaust emissions standard for NOx is critical given the time needed for such standards to be adopted, for manufacturers to develop and produce compliant vehicles, and for national fleet turnover to occur. The following chart shows the difference in NOx reductions from heavy duty trucks between baseline (no action) emissions (in blue), a low NOx standard adopted only in California (yellow) and reductions if the same low NOx standard is implemented nationally (orange).



Source: Presentation by Mr. Cory Palmer, ARB at the Symposium on California's Development of its Phase 2 Greenhouse Gas Emission Standards for On-Road Heavy-Duty Vehicles (April 22, 2015)

FIGURE ES-2. YEARS FROM PERFORMANCE LEVEL INTRODUCTION

Some of the control measures achieve emission reductions by continuing existing regulatory requirements and programs and extensions of those programs, while some control measures are not regulatory in form, but instead focus on incentives, outreach, and education to bring about emission reductions through voluntary participation and behavioral changes needed to complement regulations.

Regulatory Measures

In order to meet ozone standards, both NOx and volatile organic compounds (VOC) emissions need to be addressed. However, air quality modeling demonstrates that NOx reductions prove to be much more effective in reducing ozone levels and will also lead to significant improvement in PM2.5 concentrations. NOx-emitting stationary sources regulated by the SCAQMD include RECLAIM facilities (e.g., refineries, power plants, etc.), natural gas combustion equipment (e.g., boilers, heaters, engines, burners, flares) and other combustion sources that burn wood or propane. The 2016 AQMP proposes robust NOx reductions

from new regulations on RECLAIM facilities, non-refinery flares, commercial cooking, and residential and commercial appliances. Such combustion sources are already heavily regulated with the lowest NOx emissions levels achievable but there are opportunities to require and accelerate replacement with cleaner zero-emission alternatives, such as residential and commercial furnaces, pool heaters and back-up power equipment. Such replacements can be achieved through a combination of regulations and incentives. Technology-forcing regulations can drive development and commercialization of clean technologies, with future year requirements for new or existing equipment. Incentives can then accelerate deployment and enhance public acceptability of new technologies.

It should be emphasized that beginning in 2012, continued implementation of previously adopted regulations will lead to NOx emission reductions of 68 percent by 2023 and 80 percent by 2031. Examples of stationary source reductions include 12 tpd from RECLAIM facilities, 4.1 tpd from Rule 1147 sources, 3.2 tpd from Rule 1110, 1146, and 1146.1 sources and 3 tpd from the implementation of Rule 1111. With the addition of 2016 AQMP proposed regulatory measures, a 30 percent reduction of NOx from stationary sources is expected in the 15 year period between 2008 and 2023. This is in addition to significant NOx reductions from stationary sources achieved in the decades prior to 2008. This Plan builds upon these past successes with new regulatory commitments for additional emissions reductions to the same extent as past AQMPs.

Incentive Funding

Given the significant NOx emission reductions needed to attain the federal ozone air quality standards by 2023 and 2031, a combination of regulatory actions and public funding incentives are needed. With fast approaching ozone standard attainment deadlines, faster reductions are critical to complying with federal requirements and improving public health in the short term. The purpose of incentive programs is to advance deployment of new cleaner technologies at a pace that is not feasible through regulation alone. The approach that the SCAQMD and CARB are proposing to achieve the incentive-based emission reductions identified in the State Mobile Source Strategy (Appendix IV-B) and the SCAQMD's mobile and stationary source measures (Appendix IV-A) is predicated on securing the amount of funding needed to achieve the NOx emission reductions by 2023 and 2031.

The amount of incentive funding needed is estimated to be approximately $11–14 billion in total funding over a seven to fifteen year period. Given this significant funding level needed to attain the federal ozone air quality standards, an action plan is being developed as part of the 2016 AQMP public adoption process to identify the necessary actions by the District, the region, the state, the federal government, and other partnerships to ensure the requisite levels of funding are secured as early as possible and sustained through 2031.

Currently, the SCAQMD receives around $56 million per year in incentives funding to accelerate turnover of on- and off-road vehicles and equipment under SB 1107, a portion of the state's Tire Fee, and AB923. AB 923 will sunset in 2024. In addition, the District has received close to $550 million in Proposition 1B funding. The last round of Proposition 1B will be ending in the next couple of years. The District has also received funding under the DERA program on a competitive basis. However, the amount of funding needed to achieve the NOx emission reductions associated with the "Further Deployment"

measures proposed in the State Mobile Source Strategy and the 2016 AQMP will require on the order of $1 billion per year if funding is available beginning in 2017.

Attainment Demonstration

The 2016 AQMP demonstrates how and when the South Coast Air Basin, as well as the Coachella Valley, will attain the ozone and PM2.5 standards as "expeditiously as practicable," but no later than the latest statutory attainment date. For the three ozone standards, the control strategy will reduce baseline emissions below the amount of allowable emissions in the region that would still meet the standards also referred to as the region's "carrying capacity." The following table provides the projected NOx baseline emissions and reductions in tons per day for the three ozone attainment years from implementing the different measures, programs and strategies in the overall control strategy. Traditional regulatory measures are a mix of SCAQMD and CARB control measures. Incentive measures include SCAQMD stationary and mobile source as well as CARB mobile source programs. Further deployment of cleaner technologies focus on additional incentives for the cleanest on-road vehicles and off-road equipment. Federal sources are comprised of aircraft, locomotives, and ocean-going vessels.

TABLE ES-2

Proposed NOx Reductions to Achieve Ozone Carrying Capacities

NOx Emissions (tpd)	2022 – 1-hour Ozone (120 ppb)	2023 – 8-hour Ozone (80 ppb)	2031 – 8-hour Ozone (75 ppb)
Baseline Inventory	287	255	214
Carrying Capacity	**245**	**141**	**96**
Traditional Regulatory Measures	2.6	3.5	19.2
Incentive-based Programs	18.2	23.9	25.7
CARB's Further Deployment of Cleaner Technologies (On-Road, Off-Road)	0	62	30
Federal Reductions in State Strategy	5	28	44
TOTAL Reductions	26	117	119
Remaining NOx Emissions	261	138	95
Set Aside Account	3	3	1
TOTAL Remaining NOx Emissions	264*	141	96

* *Concurrent VOC reduction will assist in meeting the carrying capacity*

The 2016 AQMP also demonstrates that the 24-hour PM2.5 standard will be met by the 2019 attainment year with no additional reductions needed beyond already adopted measures. Therefore, no additional measures are necessary for this standard. The annual PM2.5 standard, however, cannot be met by 2021 by implementing all feasible measures, which is the attainment year for our current "moderate" nonattainment area classification. As a "serious" nonattainment area, four more years are provided to attain the annual PM2.5 standard by 2025.

Since NOx emissions also lead to the formation of PM2.5, the NOx reductions needed to meet the ozone standards will lead to significant improvements in PM2.5 levels. The modeling results show that the ozone strategy will greatly assist in reducing PM2.5 concentrations, reaching attainment for the annual PM2.5 standard in 2023 when the benefits from the ozone strategy are fully realized. However, it is impracticable to demonstrate attainment by 2021, the "moderate" PM2.5 nonattainment area deadline. Thus, the SCAQMD is seeking to reclassify the South Coast Air Basin as a "serious" nonattainment area that will meet annual standard as "expeditiously as practicable" but no later than the attainment year of 2025. The impracticability demonstration can be found in Appendix VI-B.

Clean Air Act Requirements

This Plan complies with applicable federal CAA includes a series of requirements to be included in State Implementation Plans for nonattainment areas. The following required elements have been included and/or analyzed in the 2016 AQMP and corresponding appendices.

- Emission Inventory
- Reasonably Available Control Measures (RACM)
- Best Available Control Measures (BACM)
- Control Strategy and Needed Other Measures
- Attainment Demonstration
- Impracticability Demonstration (for "moderate" annual PM2.5 area)
- Reasonable Further Progress (RFP) and Milestones
- Contingency Measures
- General Conformity
- Transportation Conformity
- Vehicle Miles Traveled (VMT) Offset Demonstration
- PM Precursors
- New Source Review (NSR)
- Emissions Statements

Collaboration and Outreach

The 2016 AQMP relies on significant integration and coordination with other agencies in order to successfully meet the Basin's clean air goals. This integration included the traditional collaboration between the SCAQMD, CARB, U.S. EPA and SCAG but also includes the California Energy Commission (CEC), the California Public Utilities Commission, and the California State Transportation Agency (Caltrans). Regional and local governments, such as counties, cities, coalitions of governments, and regional transportation agencies, have also been part of the integrated planning process. Such a process is useful when implementing strategies that are consistent with the State's Vision for Clean Air[4] and strategies and goals of the 2016 AQMP. In addition to an integrated planning process with other agencies, the 2016 AQMP development process incorporates collaborative efforts by a wide range of non-government stakeholders. These efforts focus on businesses, environmental and health organizations, community groups, and academia. For example, in the months leading to the 2016 AQMP development, a series of AQMP White Papers were published in close collaboration with stakeholders.[5] These provided the technical and policy foundation for many aspects of the Plan. A two-day Control Strategy Symposium took place as a forum of ideas for new control technologies, efficiencies and innovative approaches to reduce emissions. The 2016 AQMP Advisory Group also continues to meet to discuss specific plan elements, requirements, and control strategies. The SCAQMD has a long and productive history of reducing health risk from air toxics and criteria pollutant emissions through an extensive control program including traditional and innovative rules and policies. A continuing commitment to an inclusive, transparent, and collaborative process is key to program success.

[4] http://www.arb.ca.gov/planning/vision/vision.htm.

[5] http://www.aqmd.gov/home/about/groups-committees/aqmp-advisory-group/2016-aqmp-white-papers.

Chapter 1
Introduction



Substantial progress improvements in air quality have been made, but the region still does not meet all federal and state health standards. The 2016 AQMP is designed to provide a path to clean air and address Clean Air Act requirements for ozone and PM2.5 standards.

In This Chapter

- Purpose 1-1
  Purpose of the 2016 AQMP
- Historical Perspective 1-2
  History of air pollution and the SCAQMD
- Regional Setting 1-4
  SCAQMD's jurisdiction, emission sources, and population
- U.S. EPA Standards 1-6
  U.S. EPA ozone and particulate matter standards

- Air Quality Progress 1-9
  Past successes
- Progress in Implementing the 2007/2012 AQMP 1-11
  Adopted measures from the 2012 AQMP
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- Format of This Document 1-22
  Chapters and appendices of the 2016 AQMP

Purpose

The federal Clean Air Act (CAA or Act) requires areas that are not attaining the National Ambient Air Quality Standards (NAAQS or federal standards) to develop and implement an emission reduction strategy that will bring the area into attainment in a timely manner. The State of California also requires all feasible measures towards achievement of State of California ambient air quality standards (CAAQS or State standards) at the earliest practicable date. This strategy and the underlying technical analyses are integrated into Air Quality Management Plans (AQMPs or Plans) for the region. The South Coast Air Quality Management District (SCAQMD or District), with contributions from and collaborations with the California Air Resources Board (CARB) and Southern California Association of Governments (SCAG), has developed four comprehensive AQMPs since the late 1990's to address updates to air quality standards and attainment deadlines.

The 2016 AQMP evaluates integrated strategies and control measures to meet the NAAQS in Figure 1-1 as expeditiously as practicable, but no later than the statutory attainment deadlines. A Plan integrating several NAAQS and deadlines avoids wasted resources, streamlines efforts to demonstrate compliance and review of CAA requirements, and takes advantage of the co-benefits resulting from implementation of the integrated strategies.

The 2016 AQMP also provides a preliminary evaluation of the most recent federal 8-hour ozone standard (70 ppb), and incorporates energy, transportation, goods movement, infrastructure and other planning efforts that affect future air quality.

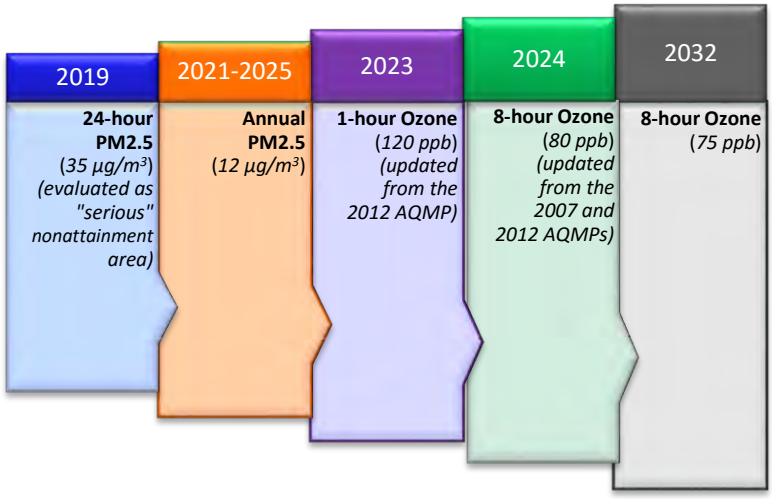


FIGURE 1-1
ATTAINMENT DEADLINES FOR NATIONAL AMBIENT AIR QUALITY STANDARDS EVALUATED IN 2016 AQMP

Historical Perspective

Photochemical smog is air pollution containing ozone and other reactive chemical compounds formed by nitrogen oxides (NOx) and hydrocarbons in sunlight. Los Angeles recorded its first smog event on July 26, 1943, although the region was experiencing smog for years before that due to the region's industrial smoke and fumes, as well as a growing population and increasing number of motor vehicles. In 1945, the City of Los Angeles established a Bureau of Smoke Control, and in 1947, State law authorized the creation of county-wide districts with jurisdiction across cities. The Los Angeles Board of Supervisors created the Air Pollution Control District (APCD), the first in the nation, as a county-wide air quality agency with broad powers to adopt and enforce air pollution regulations. That same year, the newly-formed agency required all major industries to have air pollution permits and adopted a rule to require metal melting plants to control dust and fumes with baghouse[1] controls. In 1948, Arie J. Haagen-Smit, a biochemistry professor at the California Institute of Technology in Pasadena, started examining the biology of plants and crops that had been damaged by smog. By the early 1950's, Dr. Haagen-Smit had determined smog caused eye irritation and damage to plants and materials, including rubber tubing that cracked in seven minutes when exposed to high smog levels. In 1953, the Los Angeles County APCD started requiring controls to reduce hydrocarbon emissions from industrial gasoline storage tanks, and vapor leaks from the filling of gasoline tank trucks and underground storage tanks at service stations. These actions were critical in helping to reduce the estimated 2,000 tons per day (tpd) of hydrocarbons and 250 tpd of NOx[2] at a time when the population in the region was only five million residents.



Downtown Los Angeles, 1950s
Smog got so bad in the shadow of City Hall that pedestrians would carry handkerchiefs to wipe away tears.

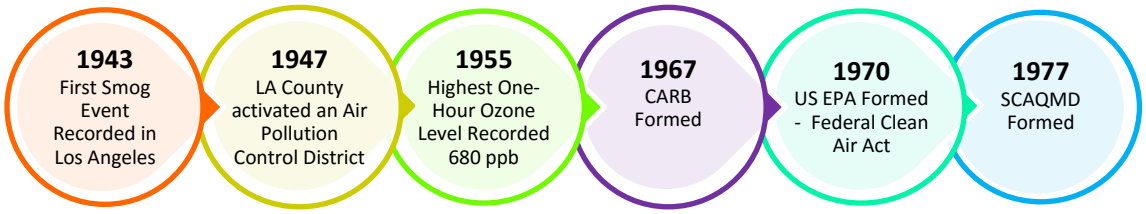
A Smog Emergency Warning System was launched in 1955 when the highest one-hour ozone level of 680 parts per billion (ppb) was recorded in downtown L.A. The first network of air monitors was initiated in 1956 and backyard trash incinerators were banned in 1958 when trash collection programs were established in the region. Other regulated sources included petroleum-based solvents, landfills, refineries, power plants, and industrial facilities.

[1] A baghouse or bag filter is an air pollution control device that removes particulates out of air or gas released from commercial or industrial processes.

[2] "Second Technical and Administrative Report on Air Pollution in Los Angeles County," Annual Report 1950–51, Air Pollution Control District, Los Angeles County, California, 1952.

Recognizing that counties could not adequately regulate motor vehicle pollution, the California Legislature established the California Motor Vehicle Pollution Control Board in 1960 to test vehicle emissions and certify emission control devices. Six years later, California became the first state in the nation to establish automobile tailpipe emission standards, one year before the creation of the CARB. By 1969, the first state ambient air quality standards were enacted in California. In the following year, the U.S. Environmental Protection Agency (U.S. EPA) was formed and the federal CAA became law. It soon became apparent that local programs were not enough to solve regional problems, as air pollution is not contained within city and county jurisdictional boundaries. Thus, air basins, defined by logical geographical/topographical boundaries, became the basis for regulatory programs.

U.S. EPA first adopted NAAQS in 1971 and California adopted regulations requiring the installation of a vehicle pollution control device, the catalytic converter, starting with the 1975 model year. Over time, motor vehicle fuels were reformulated to reduce photochemically reactive olefins, remove lead in gasoline, and utilize fewer smog-forming and toxic ingredients.



In 1977, the Los Angeles County APCD merged with the APCDs of Orange, Riverside, and San Bernardino counties to form the South Coast Air Quality Management District, pursuant to the Lewis Air Quality Management Act adopted by the California Legislature in 1976. The following year, gas stations were required to install vapor recovery "boots" on gasoline nozzles, further reducing hydrocarbon losses when filling the vehicle tank. SCAQMD has continued to adopt and implement regulatory measures in order to reduce air pollution emissions from a wide range of sources and to reduce public exposure to unhealthful air pollution. In addition, efforts on the federal and state level continue to contribute toward reducing air pollution from mobile and area sources in order to fulfill commitments to achieve the ground-level ozone and fine particulate matter (PM2.5) NAAQS.

Regional Setting

The SCAQMD has jurisdiction (Figure 1-2) over an area of approximately 10,743 square miles, consisting of the South Coast Air Basin (Basin), and the Riverside County portions of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB). The Basin, which is a sub-region of the District's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. It includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward to the Palo Verde Valley. The Coachella Valley Planning Area is a federal nonattainment area that is part of a sub-region of Riverside County in the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east. The Los Angeles County portion of the MDAB (known as North County or Antelope Valley) is bounded by the San Gabriel Mountains to the south and west, the Los Angeles/Kern County border to the north, and the Los Angeles/San Bernardino County border to the east. The SSAB and MDAB were previously included in a single large basin called the Southeast Desert Air Basin (SEDAB).

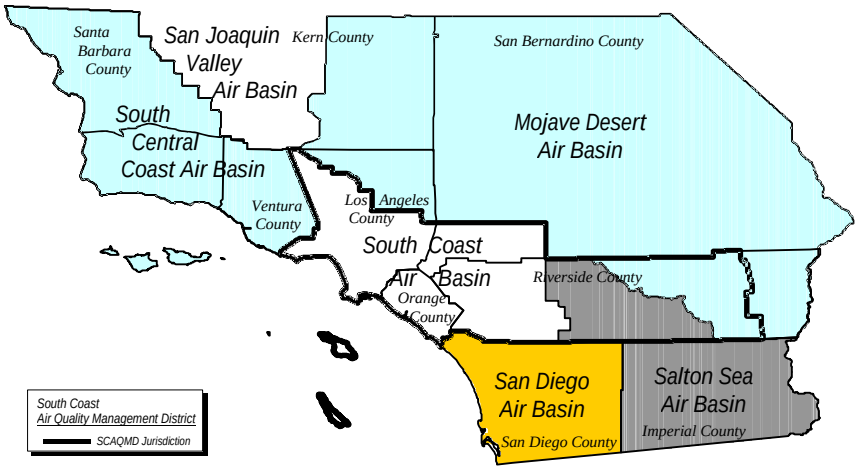


FIGURE 1-2
BOUNDARIES OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT AND NEIGHBORING FEDERAL PLANNING AREAS

The Coachella Valley Planning Area is impacted by pollutant transport from the Basin. In addition, pollutant transport also impacts the Antelope Valley, Mojave Desert, Ventura County, and San Diego County. As part of this AQMP, an update on the status of the Coachella Valley ozone nonattainment area is provided in Chapter 7.

The topography and climate of Southern California combine to make the Basin an area of high air pollution potential. A warm air mass frequently descends over the cool, moist marine layer produced by the interaction between the ocean's surface and the lowest layer of the atmosphere. The warm upper layer forms a cap over the cooler surface layer, which traps the pollutants near the ground. Light winds can further limit ventilation. Additionally, abundant sunlight triggers the photochemical reactions which produce ozone and the majority of the particulate matter. The region experiences more days of sunlight than any other major urban area in the nation except Phoenix, AZ.

The Basin's economic base is diverse. Historically, the four counties of the Basin have collectively comprised one of the largest and fastest-growing local economies in the United States. Significant changes have occurred in the composition of the industrial base of the region in the past twenty years. As in many areas of the country, a large segment of heavy manufacturing, including steel and tire manufacturing as well as automobile assembly, has been phased down. Due to growth in shipping and trade, service and logistics, businesses have replaced some of the heavy industry, although there are still significant manufacturing operations (recent report in *The Wall Street Journal*[3]).

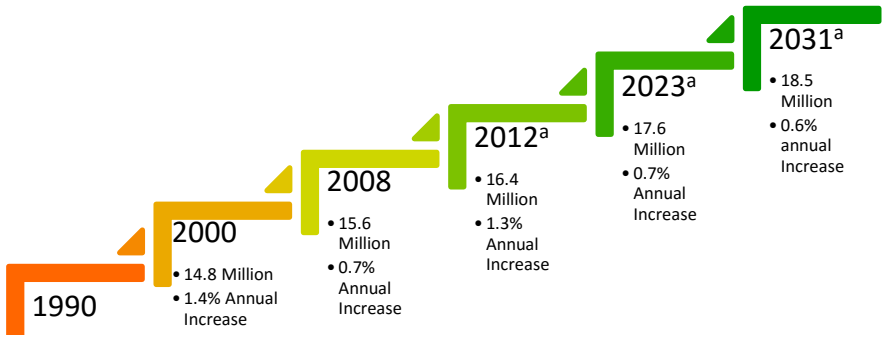
Emission Sources

In spite of substantial reductions already achieved through effective control strategies, additional significant reductions of NOx and PM in the Basin and limited, strategic reductions of volatile organic compounds (VOCs) are needed to attain the federal and State air quality standards.

Air pollution forms either directly or indirectly from pollutants emitted from a variety of sources. These sources can be natural, such as oil seeps, vegetation, or windblown dust, but the majority of emissions in the Basin are related to human activity. The air pollution control strategy in the 2016 AQMP is directed at controlling man-made sources. Examples of man-made emission sources include fuel combustion sources, such as cars and trucks, evaporation of organic liquids, such as those used in coating and cleaning processes, and abrasion processes, such as tires on roadways. The emission sources in the Basin are described in Chapter 3. Natural emissions are included in the air quality modeling analysis in Chapter 5.

Population

Since the end of World War II, the Basin has experienced faster population growth than the rest of the nation. The annual average percent growth has slowed but the overall population of the region is expected to continue to increase through 2023 and beyond. Figure 1-3 shows the estimated population and projections based on SCAG's regional growth forecast.



[a] Based on SCAG's 2016 Regional Transportation Plan

[b] Average percent increase per year over the period

FIGURE 1-3

REGIONAL POPULATION GROWTH

Despite this population growth, air quality has improved significantly over the years, primarily due to the impacts of air quality

[3] http://blogs.wsj.com/economics/2015/07/15/where-are-the-most-u-s-manufacturing-workers-los-angeles/.

control programs at the local, state and federal levels. Figure 1-4 shows the trends since 1990 of the 8-hour ozone levels, the 1-hour ozone levels, and annual average PM2.5 concentrations (since 1999), compared to the regional gross domestic product, total employment and population. The 2007–2009 recession had a clear impact on gross domestic product and employment, but as depicted by Figure 1-4, the economy is recovering with rebounding employment numbers. Human activity in the region has an impact on achieving reductions in emissions. However, the ozone and PM levels continue to trend downward as the economy and population increase, demonstrating that it is possible to maintain a healthy economy while improving public health through air quality improvements.

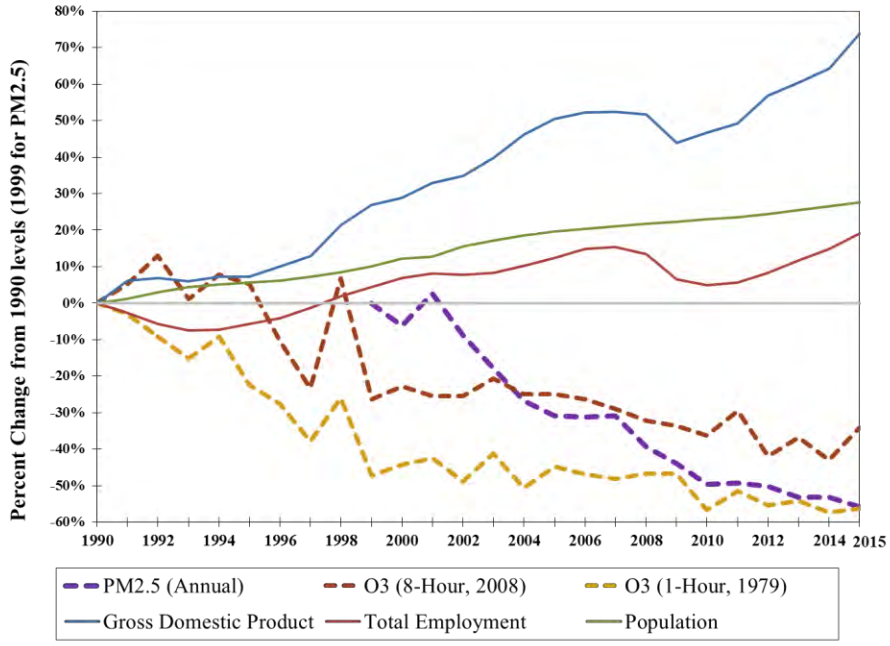


FIGURE 1-4
PERCENT CHANGE IN AIR QUALITY ALONG WITH DEMOGRAPHIC DATA FOR THE 4-COUNTY REGION (1990–2015)

U.S. EPA Standards

The federal CAA requires U.S. EPA to review NAAQS every five years considering the most recent scientific and health effects information, air quality information, and quantitative risk (e.g., size of at-risk groups affected). The review must consider the uncertainties and limitations of the scientific evidence as well as conclusions from U.S. EPA experts and advice from the Clean Air Scientific Advisory Committee (CASAC), which is an independent scientific advisory committee established by the CAA charged with providing advice to U.S. EPA. The purpose of the review is to determine if the current standards are “requisite to protect public health with an adequate margin of safety.”

It should be noted that there are both primary and secondary air quality standards. Primary standards are designed to protect public health such as the health of "sensitive" populations including persons with asthma, children, and the elderly. Secondary standards protect public welfare such as protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

After approving a standard, the U.S. EPA designates areas across the nation as attainment or as nonattainment of the standard. If an area is designated nonattainment of the NAAQS, the State is required to submit a State Implementation Plan (SIP) demonstrating compliance with a series of CAA

requirements. Chapter 6 provides a detailed explanation of the federal CAA requirements along with how the requirements are being addressed.

In addition, the U.S. EPA requires that transportation conformity budgets be established based on the most recent planning assumptions (i.e., within the last five years) and approved motor vehicle emission models. Transportation conformity ensures that transportation plans and programs do not cause or contribute to any new violation of a standard, increase the frequency or severity of any existing violation, or delay the timely attainment of the air quality standards. The 2016 AQMP is based on the most recent assumptions provided by both CARB and SCAG for motor vehicle emissions and demographic updates and includes updated transportation conformity budgets, located in Chapter 6.

Chapter 2 provides more detail on the federal and State ambient air quality standards, attainment status trends, and specific pollutant information such as the health effects due to exposure. The following is a brief overview of the ozone and PM NAAQS and attainment requirements that are included in the 2016 AQMP.

Ozone

U.S. EPA classifies areas of ozone nonattainment (e.g., "extreme," "severe," "serious," "moderate" or "marginal") based on how much an area exceeds the standard, which in turn affects the required attainment date. The higher the current exceedance, the more time is allowed to demonstrate attainment in recognition of the greater challenge involved. However, the higher classifications are also subject to more stringent requirements.

In 1979, the U.S. EPA approved a 1-hour ozone standard (120 ppb) that was replaced in 1997 with a more stringent 8-hour ozone standard (80 ppb) (U.S. EPA subsequently revoked the 1-hour standard entirely, effective in 2005). In 2008, the 8-hour ozone standard was lowered to 75 ppb. Because the Basin was designated as "extreme" nonattainment, the region has 20 years[4] to attain the ozone standards from the effective date of the final designation. For the 1997 and 2008 8-hour ozone standards, the attainment dates are June 15, 2024 and July 20, 2032, respectively. Because the attainment dates are mid-year deadlines, the demonstration of attainment and implementation of all emission reduction measures must take place by the previous calendar year, 2023 and 2031, respectively. Chapter 3 provides the emission inventory for these milestone years and Chapter 5 provides the modeled projected air quality in those years to demonstrate attainment of the standards. Although revoked in 2005, the 1-hour ozone standard originally should have been met by November 2010. The U.S. EPA then set a new deadline of February 6, 2023, with demonstration of the 1-hour ozone standard by December 31, 2022 in the Basin.

As an "extreme" nonattainment area, the Basin ozone SIP for the 2008 8-hour ozone NAAQS is required to be submitted within four years[5] after the designation effective date of July 20, 2012, thus by July 20, 2016. U.S. EPA has some discretion under the Act with submittal deadlines, and penalties are not incurred until 18 months after a finding of late submittal.

[4] CAA, Title I, Part D, Subpart 2, Section 181.

[5] CAA, Title I, Part D, Subpart 2, Section 182(e) that "extreme" areas submit according to Section 182(c)(2).

Particulate Matter

In July 1987, U.S. EPA promulgated a 24-hour NAAQS of 150 micrograms per cubic meter (μg/m^3) for particulate matter less than 10 microns (PM10), which the Basin has not violated since 2008. SCAQMD requested re-designation as attainment, and the re-designation and PM10 maintenance plan were approved by U.S. EPA effective July 26, 2013.

On December 17, 2006, the U.S. EPA strengthened the 24-hour PM2.5 NAAQS from 65 μg/m^3 to 35 μg/m^3 and the Basin was subsequently designated "moderate" nonattainment for 2006 24-hour PM2.5 NAAQS on December 14, 2009. U.S. EPA requires the SIP to be submitted no later than three years after the designation, hence December 14, 2012. The 2012 AQMP projected attainment of the 2006 24-hour PM2.5 NAAQS by 2014; however, due to the region's long-running drought conditions, attainment by 2014 or 2015 has been deemed not possible. The later date would have been an acceptable attainment date pursuant to the federal CAA.[6] Thus, the SCAQMD requested that U.S. EPA reclassify the Basin as "serious" nonattainment and committed[7] to demonstrate attainment of the 24-hour PM2.5 NAAQS as expeditiously as practicable, but not beyond December 31, 2019[8] as part of the 2016 AQMP. In addition, more stringent "serious" area requirements now apply including implementation of Best Available Control Measures / Best Available Control Technology (BACM/BACT), a lower major source threshold (from 100 tons per year to 70 tons per year), and an update to the reasonable further progress (RFP) analysis.

In 1997, U.S. EPA approved an annual PM2.5 NAAQS at 15 μg/m^3. In 2012, U.S. EPA revised the NAAQS for the annual PM2.5 standard from 15.0 μg/m^3 to 12.0 μg/m^3. The PM2.5 standard is attained when the 3-year average of the annual averages does not exceed 12.0 μg/m^3. States have until 2021 to meet the 2012 PM2.5 standard for "moderate" nonattainment areas, and if necessary, up to four additional years if the area is re-classified as "serious" nonattainment, or 2025. Annual PM2.5 emissions in the Basin have experienced a steady decline over the years since 2001, attaining the 1997 annual PM2.5 standard (15.0 μg/m^3) in 2013. On July 8, 2016 U.S. EPA issued a final rule for "Clean Data Determination" based on 2011–2013 monitoring period in South Coast Air Basin attaining the 1997 annual PM2.5 (15 μg/m^3) and 1997 24-hour PM2.5 (65 μg/m^3). The determination was published in Federal Register on July 25, 2016 *(with effective date on August 24, 2016).*

The 2016 AQMP demonstrates how the region will achieve the 2012 annual PM2.5 (12.0 μg/m^3) as expeditiously as practicable, but no later than the statutory attainment deadline.

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[6] For a "moderate" nonattainment area, "the attainment date shall be as expeditiously as practicable, but no later than the end of the sixth calendar year after the area's designation as nonattainment." (*CAA, Title 1, Part D, Subpart 4, § 188(c)(1)*).

[7] SCAQMD Reclassification letter to U.S. EPA, July 28, 2015.

[8] Based on CAA, Title 1, Part D, Subpart 4, § 188 (c)(2) for PM2.5 attainment at the end of the 10th calendar year after effective date of designations for "serious" nonattainment areas.

For PM standards, "moderate[9]" nonattainment areas and areas reclassified as "serious[10]" nonattainment are required to submit a SIP 18 months from the effective date of designation.

Air Quality Progress

Today, the population in the region is over 16 million people, with 2012 emissions of approximately 500 tpd of VOCs and 522 tpd of NOx. Based on current regulations and actions already taken, emissions are projected to be approximately 379 tpd of VOC and 255 tpd of NOx by 2023. By 2031, emissions are projected to be further reduced to approximately 362 tpd of VOC emissions and 214 tpd of NOx emissions (see Appendix III for 2012, 2023, and 2031 summer planning inventory emissions). However, these levels are not low enough to meet the NAAQS for the Basin, so additional emission reductions are necessary.



Winter day photo of downtown L.A. under snow-capped San Gabriel Mountains

Substantial progress has been made in reducing ozone and PM emissions through regulatory measures, voluntary actions and partnerships with other agencies and stakeholders. Figure 1-5 illustrates the ozone and PM ambient air concentrations as a percentage of the federal standard, demonstrating that while air quality progress has been dramatic since the 1990s, the five NAAQS that are analyzed and updated in the 2016 AQMP have yet to be met. Detailed ozone and PM concentrations and trends can be found in Chapter 2.

Even with the substantial progress, more action must occur to meet the federal and California health-based standards. The 2016 AQMP explores new and innovative ways to accomplish these goals through

[9] CAA, Title I, Part D, Subpart 4, Section 189 (a)(2)(B).

[10] CAA, Title I, Part D, Subpart 4, Section 189 (b)(2).

incentive programs, efficiency improvements, recognizing co-benefits from other programs, regulatory measures, and other voluntary actions.

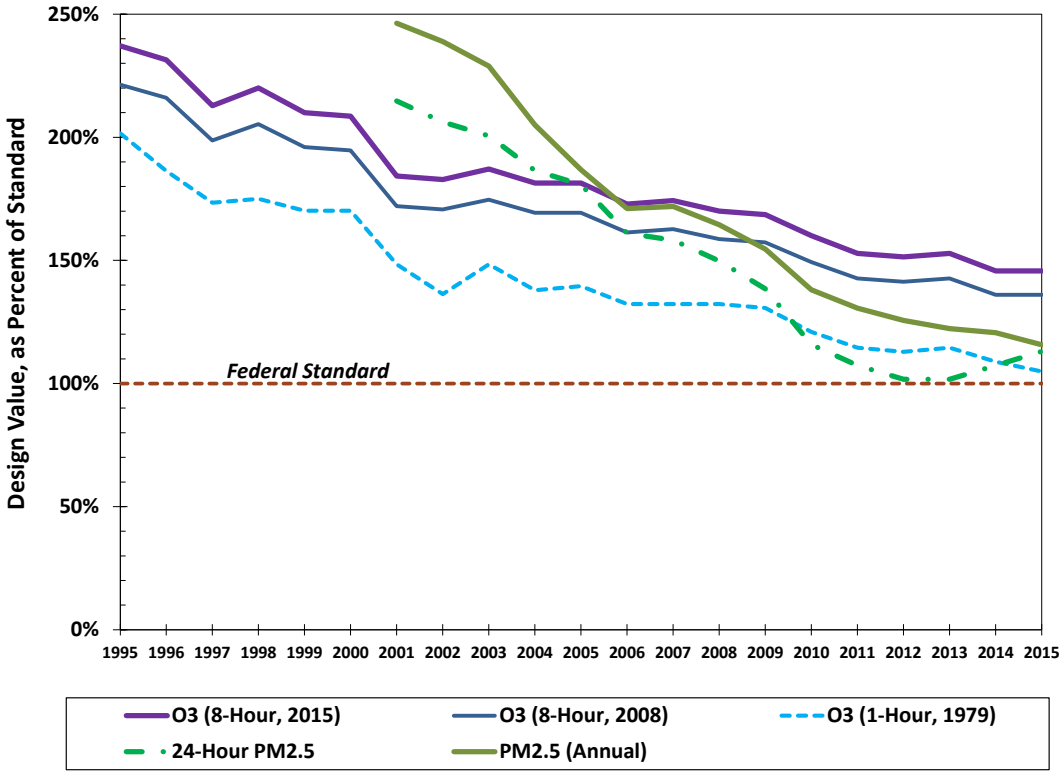


FIGURE 1-5
DESIGN VALUES IN PERCENTAGES OF THE FEDERAL STANDARDS

As vowed by Dr. Haagen-Smit 64 years ago in 1952, "Smog is on the way out; let us speed up its departure and let us keep it out."[11]

[11] Haagen-Smit, A.J. (May 1952), "Smog Research Pays Off." *Engineering and Science, Volume XV*.

Progress in Implementing the 2007/2012 AQMP

District's Actions

The ozone portion of the 2007 AQMP has been approved by U.S. EPA into the SIP. The "moderate" 24-hour PM2.5 elements of the 2012 AQMP have also been approved by U.S. EPA, and in January 2016 the U.S. EPA approved the Basin's re-designation as a "serious" nonattainment area for PM2.5. These approvals include SIP revisions submitted in response to U.S. EPA's initial findings.

The District continues to implement the 2012 AQMP, which received a limited approval and limited disapproval by U.S. EPA on April 14, 2016. Progress in implementing the 2012 AQMP can be measured by the progress in implementing control measures and the resulting emission reductions. Emission reduction commitments and reductions which were achieved in 2014 and will be achieved in 2023 through already-adopted measures are based on the emission inventories and milestone years from the 2012 AQMP.

2013	In 2013, several rulemaking efforts were completed or initiated to implement the 2012 AQMP. Specifically, Rules 444 (Open Burning) and 445 (Residential Wood Burning Devices) were amended to implement control measures BCM-01 and BCM-02, which were expected to achieve PM2.5 reductions estimated at 11.7 tons during winter episodic conditions. In addition, Rule 1114 (Petroleum Refinery Coking Operations) was adopted to implement Control Measure MCS-01, and is expected to result in a VOC reduction of 129 tons per year, a methane reduction of 547 tons per year and a reduction in hazardous air pollutants of 26 tons per year.
2014	In 2014, there were 13 rule amendments approved by the SCAQMD Governing Board. Five of these rules were amended as a result of SIP rule implementation issues (e.g., availability of advanced technology) and two of these rules were amended to strengthen public health protections with more stringent toxic emission requirements. The remaining rule amendments provided administrative revisions.
2015	In 2015, rulemaking concluded to implement Control Measure CMB-01 (Further Reductions from RECLAIM), which committed to achieve 3 tpd of NOx emissions by 2023 in the 2012 AQMP. In December 2015, the SCAQMD Governing Board approved amendments to Regulation XX which will reduce 12 tpd of NOx RECLAIM Trading Credits by 2023.

In addition, Rule 1113 was amended in 2016 achieving almost 1 tpd of VOC reductions, primarily by limiting the small container exemption. Other ongoing rulemaking efforts committed to in the 2012 AQMP seek further VOC reductions from emission sources such as adhesive and sealant applications (Rule 1168), mold release products (Rule 1161) and vacuum trucks (Rule 1188). However, these rules, and other VOC rules, have not been adopted or implemented yet as staff addresses technical and policy challenges. In lowering limits on the VOC content of coatings, solvents, adhesives, sealants, lubricants, inks and other VOC-containing products, manufacturers, in many cases, are using compounds that have

been exempted from the definition of VOC. These exemptions are based primarily on evidence that the compound does not significantly contribute to ozone formation. However, some exempt compounds may increase toxic risk to nearby receptors or workers. During the development of the VOC Controls White Paper[12] overseen by a 2016 AQMP Advisory Group, the need for regulating VOCs to assist in meeting the ozone standard was evaluated. The white paper discusses the role of VOCs in ozone and PM2.5 formation, including atmospheric chemistry, potential detrimental effects, and the rationale for the NOx heavy control strategy. Finally, the white paper considered and prioritized potential VOC control approaches such as sensitivity analysis, temporal or geographical, seasonality and incentives. It was determined that VOC reduction measures that lead to the increased use of chemicals that are known or suspected to be toxic should be avoided until it can be demonstrated that these replacement products do not lead to increased toxic risk for workers or the general public.

There were 12 amendments to rules or guidelines approved by the SCAQMD Governing Board in 2015. Two of these rules reduced NOx emissions, two rules reduced VOC emissions, two amendments focused on improving transportation rules, and six amendments strengthened public health protections by reducing air toxic emissions.

Table 1-1 lists the SCAQMD's 2012 AQMP commitments and the control measures or rules that were adopted through 2015. As shown in Table 1-1, for the control measures adopted by the SCAQMD over this period, 11.7 tons per day of PM2.5 reductions were achieved by 2014 and 2.4 tons per day of VOC reductions and 19.5 tons per day of NOx reductions will be achieved by 2023. The new control strategy and attainment demonstrations in the 2016 AQMP are expected to supersede any previous commitments not achieved and not re-introduced in the proposed control strategy.

N/A in the tables indicate a measure designed to ensure that reductions assumed to occur will in fact occur. TBD reductions are to be determined once the technical assessment is complete, and inventory and specific control approach are identified.

[12] Final VOC Controls White Paper (October 2015): http://www.aqmd.gov/docs/default-source/Agendas/aqmp/white-paper-working-groups/wp-voc-final.pdf?sfvrsn=2.

TABLE 1-1

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	COMMITMENT		ACHIEVED	
			2014	2023	2014	2023
PM2.5 EMISSIONS						
BCM-01	Further Reductions from Residential Wood Burning Devices (R445)	2013	7.1	--	7.1	--
BCM-02	Further Reductions from Open Burning (R444)	2013	4.6	--	4.6	--
BCM-03	Emission Reductions from Under-Fired Charbroilers	TBD	--	TBD	--	TBD
BCM-04	Further Ammonia Reductions from Livestock Waste	TBD	--	TBD	--	TBD
	TOTAL PM2.5 REDUCTIONS		**11.7**	**--**	**11.7**	**--**
NOx EMISSIONS						
OFFRD-01	Extension of the SOON Provision for Construction/Industrial Equipment	Ongoing	--	7.5	--	7.5
CMB-01	Further Reductions from RECLAIM [Regulation XX]	2015	2	3	0	12
CMB-02	NOx Reduction from Biogas Flares	Rulemaking Underway	--	TBD	--	TBD
CMB-03	Reductions from Commercial Space Heating	2016	--	0.18	--	TBD
	TOTAL NOx REDUCTIONS		**2**	**10.7**	**0**	**19.5**
VOC EMISSIONS						
CTS-01	Further VOC Reductions from Architectural Coatings [R1113]	2016	--	2	--	1
CTS-02	Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants	Rulemaking Underway	--	1	--	--
CTS-03	Further VOC Reduction from Mold Release Products [R1161]	Rulemaking Underway	--	0.8	--	--
FUG-01	VOC Reductions from Vacuum Trucks [R1188]	Rulemaking Underway	--	TBD	--	--
FUG-02	Emission Reduction from LPG Transfer and Dispensing [R1177]	Rulemaking Underway	--	1	--	--
FUG-03	Emission Reduction from Fugitive VOC Emissions	2016	--	1	--	--
MCS-01	Application of All Feasible Measure Assessment [R1114]	Ongoing	TBD	TBD	0.4	1.4
	TOTAL VOC REDUCTIONS		**0**	**5.8**	**0.4**	**2.4**

TABLE 1-1 (CONCLUDED)

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	COMMITMENT		ACHIEVED	
			2014	2023	2014	2023
MULTI-POLLUTANT						
IND-01	Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities [PR4001]	Rulemaking Underway	N/A[13]	N/A	N/A	N/A
MCS-02	Further Emission Reductions from Greenwaste Processing (Chipping and Grinding Operations not associated with composting)	Rulemaking Underway	--	TBD	--	TBD
MCS-03	Improved Start-Up, Shutdown and Turnaround Procedures [R1123]	2014	--	TBD[14]	--	TBD
INC-01	Economic Incentive Programs to Adopt Zero and Near-Zero Technologies	Ongoing	--	--	--	--
INC-02	Expedited Permitting and CEQA Preparation Facilitating the Manufacturing of Zero and Near-Zero Technologies [All Pollutants]	Ongoing	--	--	--	--
EDU-01	Further Criteria Pollutant Reductions from Education, Outreach and Incentives [All Pollutants]	Ongoing	--	--	--	--

[13] Measure is designed to ensure reductions projected to occur are achieved.

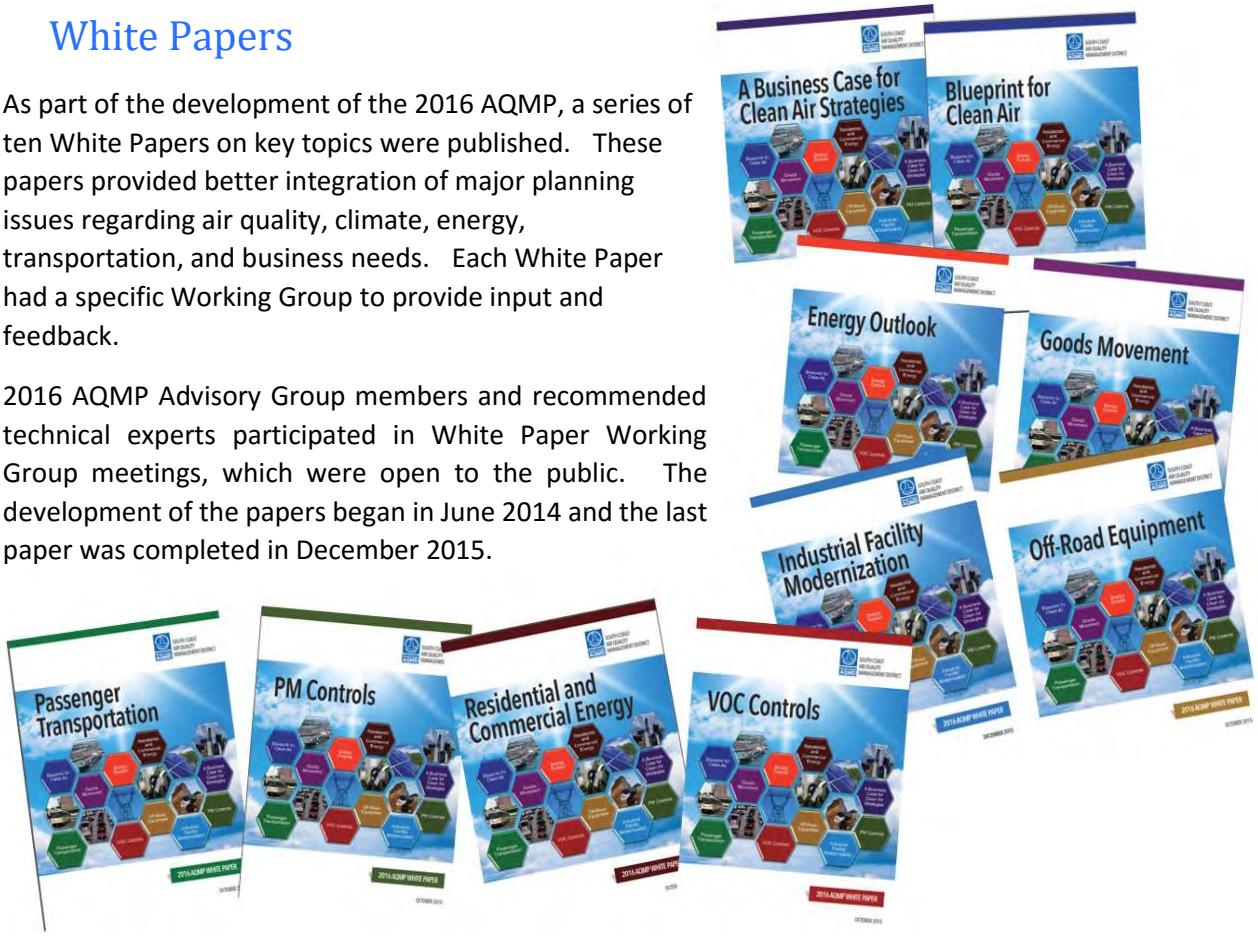
[14] Reductions to be determined once the technical assessment is complete, and inventory and control approach are identified.

2016 AQMP

White Papers

As part of the development of the 2016 AQMP, a series of ten White Papers on key topics were published. These papers provided better integration of major planning issues regarding air quality, climate, energy, transportation, and business needs. Each White Paper had a specific Working Group to provide input and feedback.

2016 AQMP Advisory Group members and recommended technical experts participated in White Paper Working Group meetings, which were open to the public. The development of the papers began in June 2014 and the last paper was completed in December 2015.



All versions of the white papers, including the final versions presented to the SCAQMD Governing Board, are available online at http://www.aqmd.gov/home/about/groups-committees/aqmp-advisory-group/2016-aqmp-white-papers along with working group meeting materials. Each of the White Papers are summarized below.

Blueprint for Clean Air

The Blueprint for the Clean Air White Paper provides background information regarding the 2016 AQMP as well as introductory discussions relevant to the other white papers. The white paper discusses the health benefits of clean air, the standards evaluated in the 2016 AQMP, the additional analysis needed, and what it will take to achieve the standards. In addition, the white paper discusses the general approaches in developing the 2016 AQMP control strategies such as striving to eliminate reliance on the CAA Section 182(e)(5) measures to the extent feasible, fair share reductions at federal, state and local levels, incentivizing zero and near-zero emission technologies, and developing efficient and cost-effective strategies.

Goods Movement

Advanced vehicle technologies will be needed to achieve clean air goals. The Goods Movement White Paper evaluates goods movement sectors such as ships, locomotives, and trucks and analyzes a variety of advanced technologies such as hybrid-electric, advanced natural gas, fuel cells, electric, as well as potential infrastructure needs and commercialization schedules. This white paper also develops scenarios that assume different future mixes of these advanced technologies.

Passenger Transportation

The Passenger Transportation White Paper examines advanced technologies and operational efficiency opportunities, as well as programs that can help accelerate fleet turnover. Advantages that could be gleaned from the implementation of other programs such as SB 375 – *The Sustainable Communities and Climate Protection Act of 2008* are also discussed.

Energy Outlook

The Energy Outlook White Paper evaluates the energy implications due to deployment of various types of advanced technologies. Some of these advanced pollution control technologies for mobile sources will be based on traditional energy sources, while others will rely on alternative energy sources such as electricity or hydrogen. The Energy Outlook White Paper describes the demand and supply of all energy sources for the Basin and explores how that might change under current and future programs to reduce greenhouse gas (GHG) and criteria pollutant emissions. In addition, this white paper evaluates the existing and needed infrastructure for various energy sources. This white paper also evaluates the cost of these energy sources – including the cost to distribute the energy, cost impact to the end user, and infrastructure costs.

Residential and Commercial Energy Use

Reducing, managing, and changing the way energy is used in the commercial and residential sectors can provide emission reductions, reduced energy costs, and cross sector benefits such as reduced water consumption. The Residential and Commercial Energy Use White Paper provides insight and analysis on energy usage, while reviewing resulting emissions within the residential and commercial sectors.

Industrial Facility Modernization

The Industrial Facility Modernization White Paper identifies the hurdles to replace older equipment and mechanisms to incentivize use of clean equipment technologies and the modernization of industrial stationary source equipment.

VOC Controls

The VOC Controls White Paper studies the role VOCs play in the ozone and PM2.5 attainment strategy. The potential contribution of intermediate and semi-volatile organic compounds are also explored. The need for VOC reductions to achieve clean air goals is re-examined, along with the requisite quantity and timing of VOC emission reductions.

PM Controls

The PM Controls White Paper continues to evaluate feasible control technologies for sources of directly emitted PM2.5 as well as precursor emission sources including commercial cooking, fugitive dust, ammonia, and SOx sources. This white paper addresses how modeling results can assist in demonstrating the benefits of targeting both direct and indirect PM2.5 emission sources, including source categories for potential control through traditional approaches as well as through seasonal, episodic or geographically focused controls.

Off-Road Equipment

The Off-Road Equipment White Paper examines advanced technology opportunities as well as programs to accelerate the transition to newer equipment. This category consists of a wide variety of emission sources including construction and mining equipment such as forklifts, cranes, and portable engines. The focus of this white paper is on advanced technologies that go beyond current emission standards and what efforts will be needed to further reduce emissions from these sources.

A Business Case for Clean Air Strategies

A Business Case for Clean Air Strategies White Paper develops principles and concepts for control measures and related programs to be included in the 2016 AQMP that, to the extent possible, create a business case for deployment of needed technologies and efficiency measures towards attaining upcoming federal air quality standards. A business case exists where a technology, fuel, or other strategy reduces emissions and also improves energy efficiency, reduces fuel or maintenance costs, creates new job opportunities, or has other economic benefits. In addition to seeking to minimize potential adverse impacts, this white paper examines how SCAQMD staff, in developing the 2016 AQMP, will explore means to maximize emission control strategies that have a business case for implementation.

Scope

As mentioned earlier in this chapter, this 2016 AQMP is designed to address the federal 2008 8-hour ozone NAAQS, 2012 annual PM2.5 NAAQS and the 2006 24-hour PM2.5 NAAQS, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. Specific federal CAA requirements to be included in the 2016 AQMP are discussed later in this section. Once approved by the SCAQMD Governing Board and CARB, the 2016 AQMP will be submitted to U.S. EPA as the SIP for the Basin.

In addition, the 2016 AQMP includes a chapter reporting on the air quality status of the Riverside County portion of the Salton Sea Air Basin (Coachella Valley) (Chapter 7) and future air quality requirements (Chapter 8). An additional chapter provides the proposed air toxics control program that will reduce toxic risk (Chapter 9) and another examines the interplay between air quality and other planning efforts addressing climate change, energy and transportation (Chapter 10).

Approach

As demonstrated in Chapter 5, with the existing control program and the new control strategy in the 2016 AQMP, the Basin can attain the 2008 8-hour ozone NAAQS by 2031, the 2012 annual PM2.5 NAAQS by

2025, and the 2006 24-hour PM2.5 NAAQS by 2019, as well as the now revoked 1-hour and 8-hour standards. Under the federal CAA, the Basin must achieve the federal NAAQS "as expeditiously as practicable." Therefore, if feasible measures are available, they must be adopted and implemented in the SIP. Chapter 4 of the 2016 AQMP outlines a comprehensive control strategy that meets the requirement for expeditious progress towards an attainment date for the five NAAQS being analyzed. A provision of the federal CAA, Section 182(e)(5), allows "extreme" ozone nonattainment areas to take credit for emission reductions from future improvements and breakthroughs in control techniques and technologies (known as the "black box"). As shown in the ozone strategy in Chapter 4, "black box" emission reductions strategies are now fully defined in terms of technology, but rely heavily on incentives to successfully achieve the emission reductions needed to reach attainment with the 8-hour ozone NAAQS. Given the magnitude of these needed emission reductions, it is critical that the SCAQMD maintain its continuing progress and work actively towards defining and achieving as many emission reductions as possible, and not wait until subsequent AQMPs to begin to address this looming shortfall.

With regard to the PM2.5 standards, only a few air monitoring stations currently exceed, and only one is projected to exceed the NAAQS. Further controls for PM2.5 are included to ensure attainment with the PM2.5 standards.

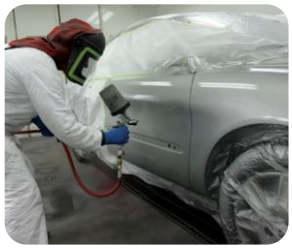
The control measures contained in the 2016 AQMP can be categorized as follows:



Ozone Measures. These measures provide for necessary actions to attain the 2008 8-hour ozone NAAQS in 2031, including incentive-based measures, co-benefits from other programs such as climate change mitigation and energy efficiency, NOx and VOC regulatory measures, technology assessments, and key investments. In addition, the accelerated measures allow for attainment of the 1997 8-hour ozone NAAQS in 2023 and the 1-hour ozone NAAQS in 2022. Ozone measures include actions to reduce NOx and VOC emissions from both stationary (point and area) and mobile sources. The mobile source measures include actions to be taken by the SCAQMD, CARB and the U.S. EPA.

PM2.5 Measures. These measures serve to reduce emissions locally and regionally in order to ensure attainment of the annual PM2.5 NAAQS. The 24-hour PM2.5 NAAQS is anticipated to be met without further controls. PM measures can be implemented as contingency measures, given that attainment of the annual PM2.5 NAAQS will be achieved through implementation of NOx reductions included in the ozone strategy.





Contingency Measures. These measures are to be automatically implemented if the Basin fails to achieve the PM2.5 standards by the latest statutory attainment date or Reasonable Further Progress requirements. Reductions achieved through adopted rules that reduce ambient levels below the NAAQS provide an alternative method to comply with contingency measure requirements.



Transportation Control Measures. These measures are generally designed to reduce vehicle miles traveled (VMT) as included in SCAG's 2016 Regional Transportation Plan.

Some of the control measures achieve emission reductions by taking advantage of existing programs, while some control measures focus on incentives, outreach, and education to bring about emission reductions through voluntary participation and behavioral changes needed to complement regulations.

Need for Integrated and Coordinated Planning

The Basin faces several ozone and PM2.5 attainment challenges, as strategies for significant emission reductions become harder to identify and the federal standards continue to become more stringent. California's greenhouse gas reduction targets under AB 32 add new challenges and timelines that affect many of the same sources that emit criteria pollutants. In finding the most cost-effective and efficient path to meet multiple deadlines for multiple air quality and climate objectives, an integrated planning approach is optimal. Responsibilities for achieving these goals span all levels of government, and coordinated and consistent planning efforts among multiple government agencies are a key component of this integrated approach.

Federal CAA Planning Requirements Addressed by 2016 AQMP

In November 1990, Congress enacted a series of amendments to the Clean Air Act (CAA), intended to intensify air pollution control efforts across the nation. One of the primary goals of the 1990 CAA Amendments was an overhaul of the planning provisions for those areas not currently meeting NAAQS. The CAA identifies specific emission reduction goals, requires both a demonstration of reasonable further progress and an attainment demonstration, and incorporates more stringent sanctions for failure to attain or to meet interim milestones.

There are several sets of general planning requirements in the federal CAA, both for nonattainment areas (Section 172(c)) and for implementation plans in general (Section 110(a)(2)). These requirements are listed and briefly described in Tables 1-2 and 1-3, respectively. The general provisions apply to all applicable pollutants unless superseded by pollutant-specific requirements. Chapter 6 and Appendix 6 describe the pollutant-specific CAA requirements and how these requirements are satisfied by the 2016 AQMP.

TABLE 1-2

Nonattainment Plan Provisions [CAA Section 172(c)]

REQUIREMENT	DESCRIPTION
Reasonably available control measures	Implementation of all reasonably available control measures as expeditiously as practicable [Section 172(c)(1)]
Reasonable further progress	Provision for reasonable further progress, which is defined as "such annual incremental reductions in emissions of the relevant air pollutant as are required for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date" [Section 172(c)(2)]
Inventory	Development and periodic revision of a comprehensive, accurate, current inventory of actual emissions from all sources [Section 172(c)(3)]
Allowable emission levels	Identification and quantification of allowable emission levels for major new or modified stationary sources [Section 172(c)(4)]
Permits for new and modified stationary sources	Permit requirements for the construction and operation of new or modified major stationary sources [Section 172(c)(5)]
Other measures	Inclusion of all enforceable emission limitations and control measures as may be necessary to attain the standard by the applicable attainment deadline [Section 172(c)(6)]
Contingency measures	Implementation of contingency measures to be undertaken in the event of failure to make reasonable further progress or to attain the NAAQS [Section 172(c)(9)]

TABLE 1-3

General CAA Requirements for Implementation Plans [CAA Section 110(a)]

REQUIREMENT	DESCRIPTION
Enforceable emission limitations	Enforceable emission limitations or other control measures as needed to meet the requirements of the CAA [Section 110(a)(2)(A)]
Ambient monitoring	An ambient air quality monitoring program [Section 110(a)(2)(B)]
Enforcement and regulation	A program for the enforcement of adopted control measures and emission limitations and regulation of the modification and construction of any stationary source to assure that the NAAQS are achieved [Section 110(a)(2)(C)]
Interstate transport	Adequate provisions to inhibit emissions that will contribute to nonattainment or interfere with maintenance of NAAQS or interfere with measures required to prevent significant deterioration of air quality or to protect visibility in any other state [Section 110(a)(2)(D)]
Adequate resources	Assurances that adequate personnel, funding, and authority are available to carry out the plan [Section 110(a)(2)(E)]
Source testing and monitoring	Requirements for emission monitoring and reporting by the source operators [Section 110(a)(2)(F)]
Emergency authority	Ability to bring suit to enforce against source presenting imminent and substantial endangerment to public health or environment [Section 110(a)(2)(G)]
Plan revisions	Provisions for revising the air quality plan to incorporate changes in the standards or in the availability of improved control methods [Section 110(a)(2)(H)]
Other CAA requirements	Adequate provisions to meet applicable requirements relating to new source review, consultation, notification, and prevention of significant deterioration and visibility protection contained in other sections of the CAA [Section 110(a)(2)(I),(J)]
Impact assessment	Appropriate air quality modeling to predict the effect of new source emissions on ambient air quality [Section 110(a)(2)(K)]
Permit fees	Provisions requiring major stationary sources to pay fees to cover reasonable costs for reviewing and acting on permit applications and for implementing and enforcing the permit conditions [Section 110(a)(2)(L)]
Local government participation	Provisions for consultation and participation by local political subdivisions affected by the plan [Sections 110(a)(2)(M) & 121]

The CAA requires that submitted plans include information on tracking plan implementation and milestone compliance. Requirements for these elements are described in CAA Section 182(g), and Chapter 4 addresses these issues.

The U.S. EPA also requires a public hearing on many of the required elements in SIP submittals before considering them officially submitted. The SCAQMD's AQMP public process includes multiple public workshops and public hearings on all of the required elements prior to submittal. Chapter 11 describes the public process, participation and comprehensive outreach program for the 2016 AQMP.

State Law Requirements Addressed by the 2016 AQMP

The California Clean Air Act (CCAA) (*Health & Safety Code §§ 40910 et seq*.) was signed into law on September 30, 1988, became effective on January 1, 1989, and was amended in 1992. Also known as the Sher Bill (AB 2595), the CCAA established a legal mandate to achieve health-based State air quality standards at the earliest practicable date. The Lewis Presley Act provides that the District's plan must also contain deadlines for compliance with all State ambient air quality standards and the federally mandated primary ambient air quality standards (Health and Safety Code (H&SC) 40462(a)). Chapter 6 describes how the 2016 AQMP meets the State planning requirements under the CCAA, including plan effectiveness, emission reductions of 5 percent per year or adoption of all feasible measures, reducing population exposure to criteria pollutants, and ranking control measures by cost-effectiveness.

Format of This Document

This document is organized into eleven chapters, each addressing a specific topic. Each of the chapters is summarized below.

Chapter 1, "Introduction," introduces the 2016 AQMP including purpose, historical air quality progress, and the approach for the 2016 AQMP.

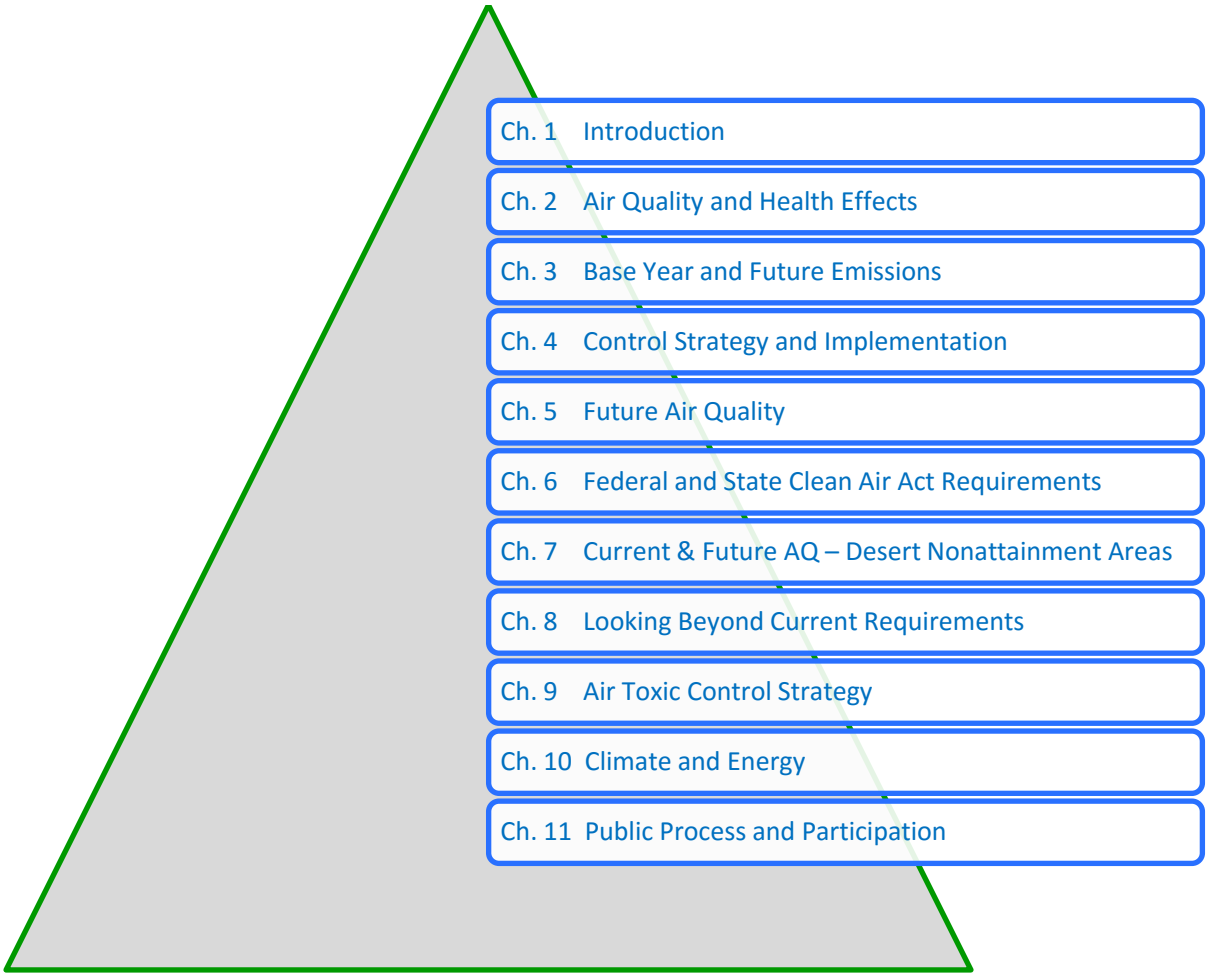
Chapter 2, "Air Quality and Health Effects," discusses the Basin's current air quality in comparison with federal and State health-based air pollution standards.

Chapter 3, "Base Year and Future Emissions," summarizes emissions inventories, estimates current emissions by source and pollutant, and projects future emissions with and without growth.

Chapter 4, "Control Strategy and Implementation," presents the control strategy, specific measures, and implementation schedules to attain the air quality standards by the specified attainment dates.

Chapter 5, "Future Air Quality," describes the modeling approach used in the AQMP and summarizes the Basin's future air quality projections with and without the control strategy.

Chapter 6, "Federal and State Clean Air Act Requirements," discusses specific federal and State requirements as they pertain to the 2016 AQMP, including anti-backsliding requirements for revoked standards.



Chapter 7, "Current and Future Air Quality – Desert Nonattainment Areas," describes the air quality status of the Coachella Valley, including emissions inventories, designations, and current and future air quality.

Chapter 8, "Looking Beyond Current Requirements," assesses the Basin's status with respect to the 2015 lowering of the 8-hour ozone standard from 75 ppb to 70 ppb.

Chapter 9, "Air Toxic Control Strategy," examines the ongoing efforts to reduce health risk from toxic air contaminants, co-benefits from reducing criteria pollutants, and potential future actions.

Chapter 10, "Climate and Energy," provides a description of current and projected energy demand and supply issues in the Basin, and the relationship between air quality improvement and greenhouse gas mitigation goals.

Chapter 11, "Public Process and Participation," describes the District's public outreach effort associated with the development of the 2016 AQMP.

A "Glossary" is provided at the end of the document, presenting definitions of commonly used terms found in the 2016 AQMP.

Numerous technical appendices are included and are listed below:

Appendix I (Health Effects) presents a summary of scientific findings on the health effects of ambient air pollutants, portions of which satisfy the requirements of California Health and Safety Code Section 40471(b).

Appendix II (Current Air Quality) contains a detailed summary of the air quality in 2014, along with prior year trends, in both the Basin and the Coachella Valley, as monitored by the SCAQMD.

Appendix III (Base and Future Year Emission Inventory) presents the 2012 base year emissions inventory and projected emission inventories of air pollutants in future attainment years for both annual average and summer planning inventories.

Appendix IV-A (SCAQMD's Stationary and Mobile Source Control Measures) describes SCAQMD staff's proposed stationary and mobile source control measures to attain the federal ozone and PM2.5 standards.

Appendix IV-B (CARB's Mobile Source Strategy) describes CARB staff's proposed 2016 strategy to attain health-based federal air quality standards as part of the SIP.

Appendix IV-C (SCAG's Regional Transportation Strategy and Control Measures) describes the SCAG's Final 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures to be included in the 2016 AQMP for the Basin.

Appendix V (Modeling and Attainment Demonstrations) provides the details of the regional modeling for the attainment demonstrations that illustrate that the proposed emission reductions will achieve the federal air quality standards by the regulatory attainment deadlines.

Appendix VI (Compliance with Other Clean Air Act Requirements) provides the details demonstrating that the 2016 AQMP complies with specific the federal and California Clean Air Act requirements.

Chapter 2

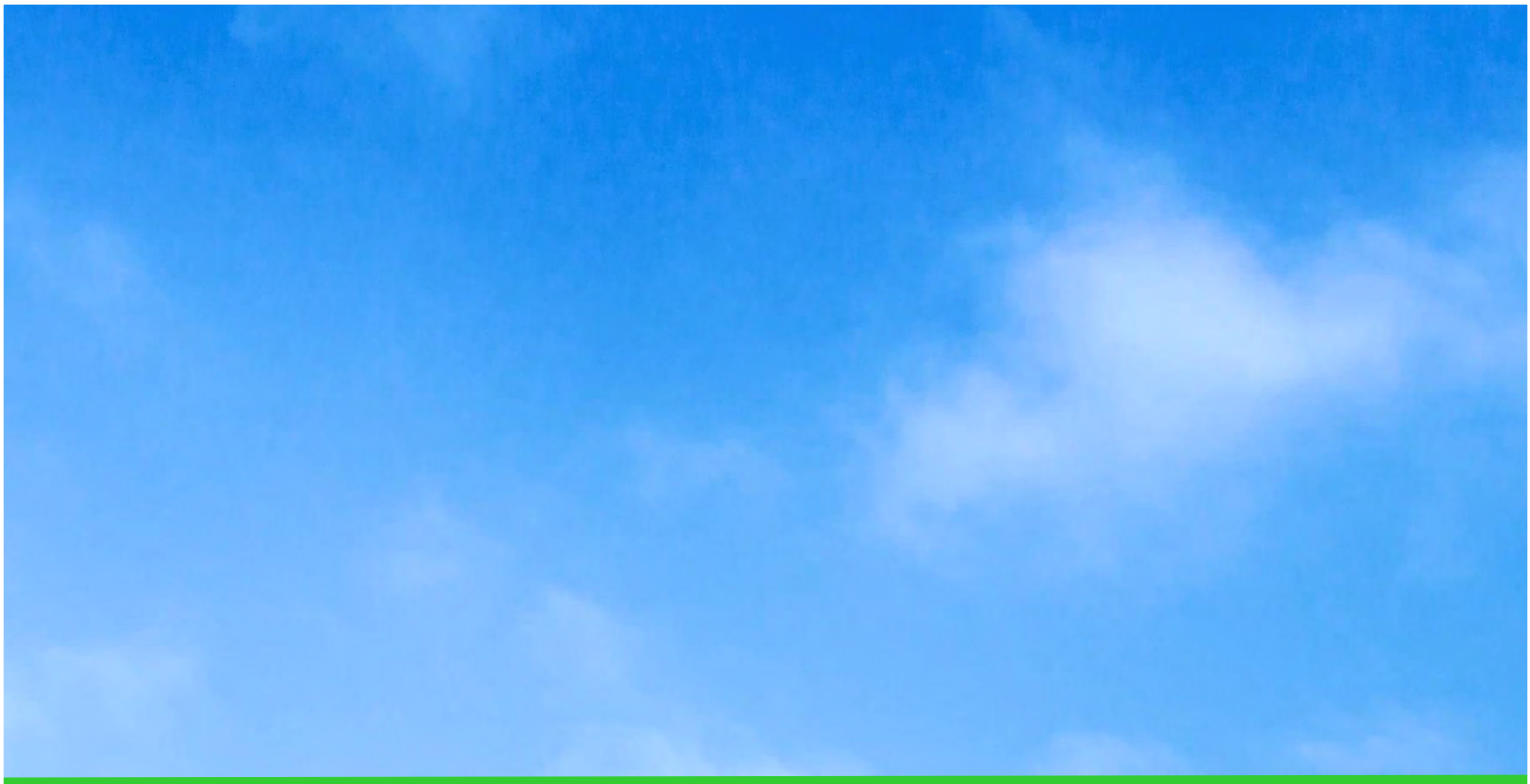
Air Quality and Health Effects



The air pollution problem in the Basin is the result of a combination of emissions, meteorological conditions and the mountainous terrain surrounding the region. High air pollution levels can have an adverse effect on public health and result in not meeting federal and State air quality standards.

In This Chapter

- Introduction 2-1
  Regional air quality and monitoring
- Ambient Air Quality Standards 2-2
  Federal and State air quality standards
- Current Air Quality 2-14
  Pollutant trends and comparisons to the standards



- Air Quality Compared to Other U.S. Metropolitan Areas 2-54
  Air pollution in the region compared to other areas in California and the U.S.
- Summary 2-59
  Ozone and PM levels in 2015

Introduction

The South Coast Air Basin's air pollution problems are a consequence of the combination of emissions from the nation's second largest urban area, meteorological conditions adverse to the dispersion of those emissions, and mountainous terrain surrounding the Basin that traps pollutants as they are pushed inland with the sea breeze. The average wind speed for Los Angeles is the lowest of the nation's 10 largest urban areas. In addition, the summertime daily maximum mixing heights[1] in Southern California are the the lowest, on average, due to strong temperature inversions in the lower atmosphere that effectively trap pollutants near the surface. Southern California also has abundant sunshine, which drives the photochemical reactions that form pollutants such as ozone (O_3) and a significant portion of fine particulate mass (PM2.5, particles less than 2.5 microns in diameter).

In the Basin, high concentrations of ozone are normally recorded during the late spring and summer months, when more intense sunlight drives enhanced photochemical reactions. Elevated PM10 (particles less than 10 microns in diameter) and PM2.5 concentrations can occur in the Basin throughout the year, but occur most frequently in fall and winter. Although there are some changes in emissions by day-of-week and season, the observed variations in pollutant concentrations are primarily the result of seasonal differences in weather conditions.

Chapter 1 introduces the National Ambient Air Quality Standards (NAAQS or federal standards), as well as the District's attainment status and progress toward meeting those standards. U.S. EPA has set NAAQS for six principal pollutants, which are called "criteria" pollutants, including ozone, PM (PM10 and PM2.5), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb).

In this chapter, ambient air quality as monitored by SCAQMD is summarized for the year 2015, along with prior year trends, in both the Basin and the Riverside County portion of the Salton Sea Air Basin (SSAB), which is primarily the Coachella Valley. The District's recent air quality is compared to the NAAQS and to the California Ambient Air Quality Standards (CAAQS or State standards). Data presented indicate the current attainment or nonattainment status for the various NAAQS and CAAQS, showing the progress made to date and assisting the District in planning for future attainment. Maps are included to spatially compare the air quality throughout the Basin in 2015, for ozone and PM2.5, the main pollutants for which the U.S. EPA has designated the Basin to be a federal nonattainment area. Nationwide air quality data is also briefly summarized in this chapter, comparing air quality in the Basin to that of other major U.S. and California urban areas. Additional details on current air quality and trends and comparisons to the federal and State standards, including spatial and temporal variability and location-specific air monitoring data can be found in Appendix II: Current Air Quality.

The health effects due to exposure to criteria air pollutants are briefly discussed in this chapter. More detailed information on the health effects of air pollution can be found in Appendix I: Health Effects. In addition to the information presented in this chapter for the Coachella Valley, current air quality and trend

[1] The maximum mixing height is an index of how well pollutants can be dispersed vertically in the atmosphere.

information specific to that planning area is also included in Chapter 7, along with the ozone attainment demonstration SIP for that area.

The Basin is designated non-attainment for current and former federal and State ozone standards, as well as the current PM2.5 standards. The Los Angeles County portion of the Basin is also designated a nonattainment area for the federal lead standard on the basis of source-specific monitoring at two locations as determined by U.S. EPA using 2007–2009 data. However, all stations in the Basin, including the near-source monitoring in Los Angeles County, have remained below the lead NAAQS for the 2012 through 2015 period. The District will request that U.S. EPA re-designate the Los Angeles County portion of the Basin as attainment for lead.

In June 2013, the U.S. EPA approved re-designation of the Basin as an attainment area for the 24-hour PM10 federal standard. The Basin also continues to be in attainment of the CO, NO_2, and SO_2 NAAQS. The Coachella Valley remains a nonattainment area for both the ozone and the PM10 NAAQS. However, with recent data from a new monitoring station and consideration of high-wind exceptional events, a re-designation to attainment of the PM10 NAAQS should be possible in the near future. Further details on the federal and State standards are presented in this chapter by pollutant, along with the District's current attainment status.

Ambient Air Quality Standards

Federal and State Standards

Ambient air quality standards have been set by both the federal government and the State of California for six air pollutants: Ozone, CO, NO_2, SO_2, PM (includes both PM10 and PM2.5), and lead. The State has also set a standard for sulfates (SO_4^{2-}), which are a component of particulate matter, and a nuisance odor standard for hydrogen sulfide (H_2S). The NAAQS and CAAQS for each of these pollutants and their effects on health and welfare are summarized in Table 2-1.

Two changes to the NAAQS have occurred since the 2012 AQMP. In a final rulemaking action on January 15, 2013, effective March 18, 2014, U.S. EPA strengthened the annual average PM2.5 standard from 15 to 12 $\mu g/m^3$. This rule also required near-roadway PM2.5 monitoring at two locations in the Basin, which was implemented by the January 1, 2015 U.S. EPA deadline. Since this NAAQS rule was proposed in 2012, it is often referred to as the 2012 annual PM2.5 federal standard.

Most recently, on October 1, 2015, U.S. EPA finalized the new 2015 ozone standard at 0.070 ppm for an 8-hour average, retaining the same form as the previous 8-hour standards. The 2015 ozone NAAQS became effective as of December 28, 2015. Attainment/nonattainment designations are expected to be finalized for the new standard by October 1, 2017, likely based on 2014–2016 ozone measurement data. It is expected that the Basin and the Coachella Valley, as well as much of California, will be designated nonattainment. SIP submittals to demonstrate attainment of the 2015 ozone standard will likely be due in the 2020–2021 time frame, with attainment dates between 2020 and 2037, depending on the severity of the ozone problem.

In this chapter and in Appendix II: Current Air Quality, air quality statistics are presented for the maximum concentrations measured at stations in each of the SCAQMD air basins, as well as for the number of days

exceeding State or federal standards. These metrics are instructive with regard to trends and control strategy effectiveness. However, it should be noted that an exceedance of the concentration level of a federal standard does not necessarily mean that the NAAQS was violated or that it would cause nonattainment. The form of the standard must also be considered. For example, for 24-hour PM2.5, the form of the standard is the annual 98th percentile measurement of all of the 24-hour PM2.5 daily samples at each station. For 8-hour ozone, the form of the standard is the annual fourth highest measured 8-hour average daily maximum concentration at each station.

For NAAQS attainment/nonattainment decisions, the most recent three years of data are considered (one year for CO and 24-hour SO_2), along with the form of the standard, to calculate a *design value* for each station.[2] The overall design value for an air basin is the highest design value of all the stations in that basin. Table 2-2 shows the NAAQS, along with the design value and form of each federal standard. The California State air quality standards are values not to be exceeded, typically evaluated over a 3-year period, and the data is evaluated in terms of a *State designation value*, which allows for some statistical data outliers and exceptional events. Attainment deadlines for the State standards are 'as soon as practicable.'

[2] Note that for modeling attainment demonstrations, the U.S. EPA modeling guidance requires a 5-year weighted average for the design value instead of the 3-year.

TABLE 2-1

Ambient Air Quality Standards and Key Health and Welfare Effects

AIR POLLUTANT	FEDERAL STANDARD (NAAQS)	STATE STANDARD (CAAQS)	KEY HEALTH & WELFARE EFFECTS[#]
	Concentration, Averaging Time, Year of NAAQS Review	Concentration, Averaging Time	
Ozone (O_3)	**0.070 ppm, 8-Hour (2015)** 0.075 ppm, 8-Hour (2008) 0.08 ppm, 8-Hour (1997) 0.12 ppm, 1-Hour (1979)	**0.070 ppm, 8-Hour** **0.09 ppm, 1-Hour**	(a) Pulmonary function decrements and localized lung injury in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Increased respiratory related hospital admissions and emergency room visits; (e) Vegetation damage; (f) Property damage
Fine Particulate Matter (PM2.5)	**35 µg/m³, 24-Hour (2006)** **12.0 µg/m³, Annual (2012)** 15.0 µg/m³, Annual (1997)	**12 µg/m³, Annual**	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Decline in pulmonary function or growth in children; (c) Increased risk of premature death; (d) Increased risk of lung cancer; (e) increased asthma-related hospital admissions; (f) increased school absences and lost work days; (g) possible link to reproductive effects; (h) visibility reduction
Respirable Particulate Matter (PM10)	**150 µg/m³, 24-Hour (1997)**	**50 µg/m³, 24-Hour** **20 µg/m³, Annual**	
Carbon Monoxide (CO)	**35 ppm, 1-Hour (1971)** **9 ppm, 8-Hour (1971)**	**20 ppm, 1-Hour** **9.0 ppm, 8-Hour**	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Possible impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide (NO_2)	**100 ppb, 1-Hour (2010)** **0.053 ppm, Annual (1971)**	**0.18 ppm, 1-Hour** **0.030 ppm, Annual**	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in children with asthma; (b) Increased airway responsiveness in asthmatics; (c) Contribution to atmospheric discoloration
Sulfur Dioxide (SO_2)	**75 ppb, 1-Hour (2010)**	**0.25 ppm, 1-Hour** **0.04 ppm, 24-Hour**	Respiratory symptoms (bronchoconstriction, possible wheezing or shortness of breath) during exercise or physical activity in persons with asthma
Lead (Pb)	**0.15 µg/m³,** **rolling 3-month average (2008)**	**1.5 µg/m³, 30-day average**	(a) Learning disabilities; (b) Impairment of blood formation and nerve conduction; (c) cardiovascular effects, including coronary heart disease and hypertension
Sulfates-PM10 (SO_4^{2-})	**N/A**	**25 µg/m³, 24-Hour**	(a) Decrease in lung function; (b) Aggravation of asthmatic symptoms; (c) Vegetation damage; (d) Degradation of visibility; (e) Property damage
Hydrogen Sulfide (H_2S)	**N/A**	**0.03 ppm, 1-hour**	Exposure to lower ambient concentrations above the standard may result in objectionable odor and may be accompanied by symptoms such as headaches, nausea, dizziness, nasal irritation, cough, and shortness of breath

ppm – parts per million by volume; ppb – parts per billion by volume (0.01 ppm = 10 ppb)
Standards in bold are the current, most stringent standards; there may be continuing obligations for former standards
State standards are "not-to-exceed" values based on State designation value calculations
Federal standards follow the 3-year design value form of the NAAQS

[#] List of health and welfare effects is not comprehensive; detailed health effects information can be found in Appendix I: Health Effects or in the U.S. EPA NAAQS documentation at http://www.epa.gov/ttn/naaqs/

TABLE 2-2

National Ambient Air Quality Standards (NAAQS) and Design Value Requirements

Pollutant	Averaging Time**	NAAQS Level	Design Value Form of NAAQS*
Ozone (O_3)	1-Hour (1979) [revoked 2005]	0.12 ppm	Not to be exceeded more than once per year averaged over 3 years
	8-Hour (2015)	**0.070 ppm**	**Annual fourth highest 8-hour average concentration, averaged over 3 years**
	8-Hour(2008) [revised 2015]	0.075 ppm	
	8-Hour(1997) [revoked 2015]	0.08 ppm	
Fine Particulate Matter (PM2.5)	**24-Hour (2006)**	**35 µg/m³**	**3-year average of the annual 98th percentile of daily 24-hour concentration**
	Annual (2012)	**12.0 µg/m³**	**Annual average concentration, averaged over 3 years** *(annual averages based on average of 4 quarters)*
	Annual (1997) [revised 2012]	15.0 µg/m³	
Respirable Particulate Matter (PM10)	**24-Hour (1987)**	**150 µg/m³**	**Not to be exceeded more than once per year averaged over 3 years**
	Annual (1987) [revoked 2006]	50 µg/m³	Annual average concentration, averaged over 3 years
Carbon Monoxide (CO)	**1-Hour (1971)**	**35 ppm**	**Not to be exceeded more than once a year**
	8-Hour (1971)	**9 ppm**	
Nitrogen Dioxide (NO_2)	**1-Hour (2010)**	**100 ppb**	**3-year avg. of the annual 98th percentile of the daily maximum 1-hour average concentrations (rounded)**
	Annual (1971)	**0.053 ppm**	**Annual avg. concentration, averaged over 3 years**
Sulfur Dioxide (SO_2)	**1-Hour (2010)**	**75 ppb**	**99th percentile of 1-hour daily maximum concentrations, averaged over 3 years**
	24-Hour (1971)#	0.14 ppm	Not to be exceeded more than once per year
	Annual (1971)#	0.03 ppm	Annual arithmetic average
Lead (Pb)	**3-Month Rolling Average (2008)##**	**0.15 µg/m³**	**Highest rolling 3-month average of the 3 years**

Bold text denotes the current and most stringent NAAQS

* The NAAQS is attained when the design value (form of concentration listed) is equal to or less than the level of the NAAQS; for pollutants with the design values based on "exceedances" (1-hour ozone, 24-hour PM10, CO, and 24-hour SO_2), the NAAQS is attained when the concentration associated with the design value is less than or equal to the standard level:

- For 1-hour ozone and 24-hour PM10, the NAAQS is attained when the fourth highest daily concentrations of the 3-year period is less than or equal to the standard level
- For CO and 24-hour SO_2, the standard is attained when the second highest daily concentration of the most recent year is equal to or less than the standard level

** Year of U.S. EPA NAAQS update review shown in parenthesis and revoked or revised status in brackets; for revoked or revised NAAQS, areas may have continuing obligations until that standard is attained: for 1-hour ozone, the Basin has continuing obligations under the former 1979 standard; for 8-hour ozone, the NAAQS was lowered from 0.08 ppm to 0.075 ppm to 0.070 ppm, but the previous 8-hour ozone NAAQS and most related implementation rules remain in place until that standard is attained

Annual and 24-hour SO_2 NAAQS are expected to be revoked 12/2021, one year from final attainment designations for the (2010) 1-hour SO_2 NAAQS expected 12/2020

3-month rolling averages of the first year (of the three year period) include November and December monthly averages of the prior year; the 3-month average is based on the average of "monthly" averages

Under the Exceptional Events Rule,[3] U.S. EPA allows certain air quality data to not be considered for NAAQS attainment status when that data is influenced by exceptional events that meet strict evidence requirements, such as high winds, wildfires, volcanoes, or some cultural events (such as Independence Day or New Year's fireworks). For a few PM measurements in the Basin and the Coachella Valley in 2012 through 2015, the District applied the U.S. EPA Exceptional Events Rule to flag some PM10 and PM2.5 data due to high-wind natural events, wildfires, and fireworks on Independence Day and New Year's Eve. All of the exceptional event flags through 2015 have been submitted with the affected data to U.S. EPA's Air Quality System (AQS) database. The preparation of the District's documentation for those events that effect regulatory decisions is under way and U.S. EPA concurrence will be requested. The process to achieve PM10 re-designation for the Coachella Valley to attainment status will likely depend upon U.S EPA's concurrence with the exceptional event flags and the appropriate treatment of high-wind natural events that are uncontrollable in spite of stringent control measures on anthropogenic emissions.

Attainment Status

Figure 2-1 shows the South Coast and Coachella Valley 3-year design values (2013–2015) for ozone, PM2.5, and PM10, as a percentage of the corresponding current and former federal standards. The current status of NAAQS attainment for all the criteria pollutants is presented in Table 2-3 for the Basin and in Table 2-4 for the Riverside County portion of the SSAB (Coachella Valley).

[3] The U.S. EPA Exceptional Events Rule, *Treatment of Data Influenced by Exceptional Events*, became effective May 21, 2007. The previous U.S. EPA *Natural Events Policy* for Particulate Matter was issued May 30, 1996. On September 16, 2016, U.S. EPA promulgated revisions to the Exceptional Event Rule.

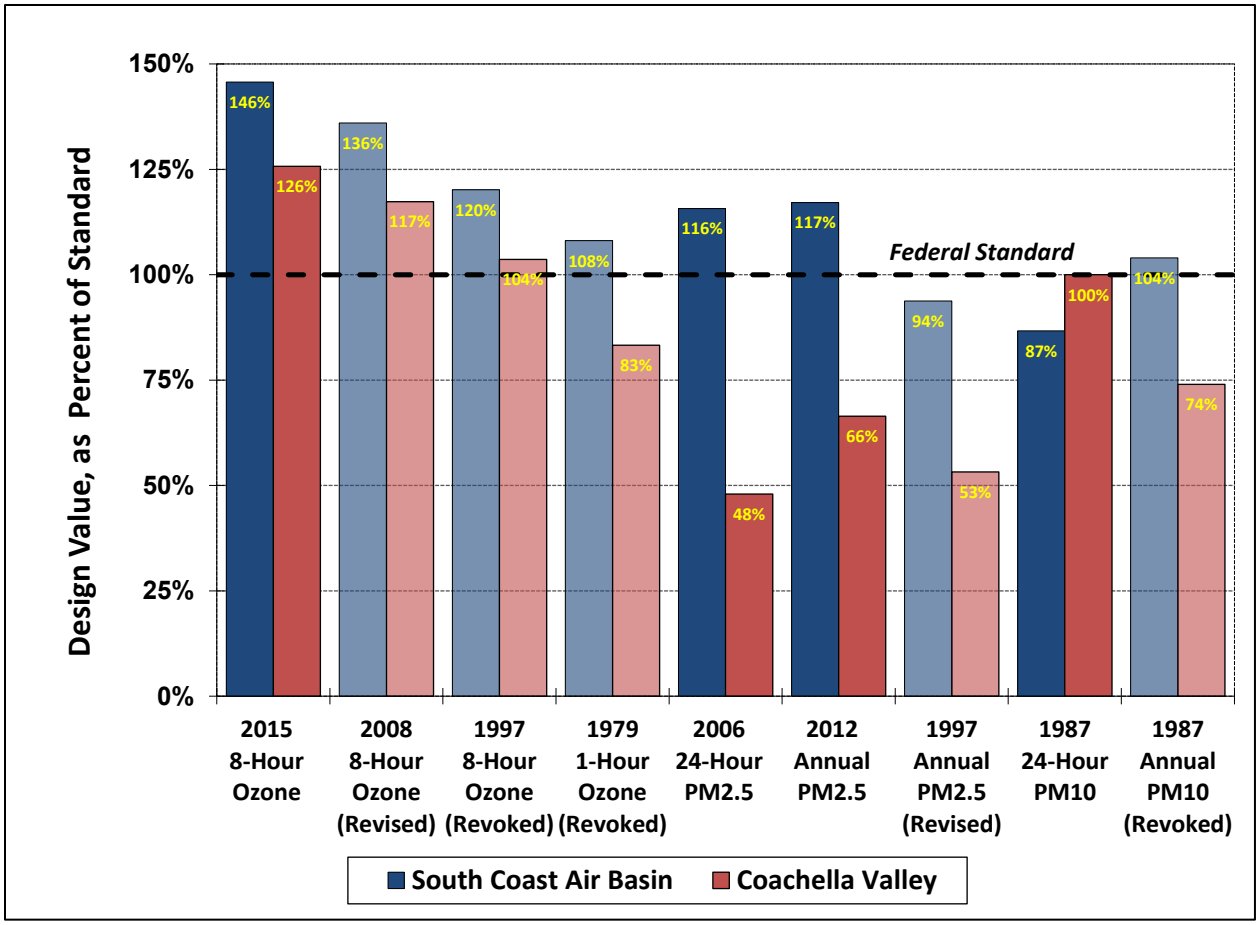


FIGURE 2-1

SOUTH COAST AIR BASIN AND COACHELLA VALLEY 2013–2015 3-YEAR DESIGN VALUES

(PERCENTAGE OF CURRENT AND FORMER FEDERAL STANDARDS, BY CRITERIA POLLUTANT; PM10 DATA FLAGGED FOR EXCEPTIONAL EVENTS EXCLUDED BUT SUPPORTING DOCUMENTATION AND U.S. EPA CONCURRENCE STILL NEEDED; PM10 DATA SHOWN USES COMBINED FEDERAL REFERENCE METHOD AND FEDERAL EQUIVALENT DATA; DARKER COLORS INDICATE THE MOST STRINGENT STANDARD)

TABLE 2-3

National Ambient Air Quality Standards (NAAQS) Attainment Status - South Coast Air Basin

Criteria Pollutant	Averaging Time	Designation[a]	Attainment Date[b]
Ozone (O_3)	(1979) **1-Hour** (0.12 ppm)[c]	Nonattainment ("extreme")	2/26/2023 (revised deadline)
	(2015) **8-Hour** (0.070 ppm)[d]	Pending – Expect Nonattainment ("extreme")	Pending (beyond 2032)
	(2008) **8-Hour** (0.075 ppm)[d]	Nonattainment ("extreme")	7/20/2032
	(1997) **8-Hour** (0.08 ppm)[d]	Nonattainment ("extreme")	6/15/2024
PM2.5[e]	(2006) **24-Hour** (35 µg/m^3)	Nonattainment ("serious")	12/31/2019
	(2012) **Annual** (12.0 µg/m^3)	Nonattainment ("moderate")	12/31/2021
	(1997) **Annual** (15.0 µg/m^3)	Attainment (final determination pending)	4/5/2015 (attained 2013)
PM10[f]	(1987) **24-hour** (150 µg/m^3)	Attainment (Maintenance)	7/26/2013 (attained)
Lead (Pb)[g]	(2008) **3-Months Rolling** (0.15 µg/m^3)	Nonattainment (Partial) (Attainment determination to be requested)	12/31/2015
CO	(1971) **1-Hour** (35 ppm)	Attainment (Maintenance)	6/11/2007 (attained)
	(1971) **8-Hour** (9 ppm)	Attainment (Maintenance)	6/11/2007 (attained)
NO_2[h]	(2010) **1-Hour** (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	(1971) **Annual** (0.053 ppm)	Attainment (Maintenance)	9/22/1998 (attained)
SO_2[i]	(2010) **1-Hour** (75 ppb)	Designations Pending (expect Unclassifiable/Attainment)	N/A (attained)
	(1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm)	Unclassifiable/Attainment	3/19/1979 (attained)

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration

c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05 ; however, the Basin has not attained this standard and therefore has some continuing obligations with respect to the revoked standard; original attainment date was 11/15/2010; the revised attainment date is 2/6/23

d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the revoked 1997 and revised 2008 ozone NAAQS until they are attained

e) The attainment deadline for the 2006 24-hour PM2.5 NAAQS was 12/31/15 for the former "moderate" classification; U.S.EPA approved reclassification to "serious," effective 2/12/16 with an attainment deadline of 12/31/2019; the 2012 (proposal year) annual PM2.5 NAAQS was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m^3; new annual designations were final 1/15/15, effective 4/15/15; on July 25, 2016 U.S. EPA finalized a determination that the Basin attained the 1997 annual (15.0 µg/m^3) and 24-hour PM2.5 (65 µg/m^3) NAAQS, effective August 24, 2016

f) The annual PM10 NAAQS was revoked, effective 12/18/06; the 24-hour PM10 NAAQS deadline was 12/31/2006; the Basin's Attainment Re-designation Request and PM10 Maintenance Plan was approved by U.S. EPA on 6/26/13, effective 7/26/13

g) Partial Nonattainment designation – Los Angeles County portion of the Basin only for near-source monitors; expect to remain in attainment based on current monitoring data; attainment re-designation request pending

h) New 1-hour NO_2 NAAQS became effective 8/2/10, with attainment designations 1/20/12; annual NO_2 NAAQS retained

i) The 1971 annual and 24-hour SO2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO2 1-hour NAAQS; final area designations expected by 12/31/20 due to new source-specific monitoring requirements; Basin expected to be in attainment due to ongoing clean data

TABLE 2-4

National Ambient Air Quality Standards (NAAQS) Attainment Status
Coachella Valley Portion of the Salton Sea Air Basin

Criteria Pollutant	Averaging Time	Designation[a]	Attainment Date[b]
Ozone (O_3)	(1979) **1-Hour** (0.12 ppm)[c]	Attainment	11/15/2007 (attained 12/31/2013)
	(2015) **8-Hour** (0.070 ppm)[d]	Pending – Expect Nonattainment (Severe)	Pending
	(2008) **8-Hour** (0.075 ppm)[d]	Nonattainment (Severe-15)	7/20/2027
	(1997) **8-Hour** (0.08 ppm)[d]	Nonattainment (Severe-15)	6/15/2019
PM2.5[e]	(2006) **24-Hour** (35 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(2012) **Annual** (12.0 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(1997) **Annual** (15.0 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
PM10[f]	(1987) **24-hour** (150 µg/m^3)	Nonattainment ("serious")	12/31/2006
Lead (Pb)	(2008) **3-Months Rolling** (0.15 µg/m^3)	Unclassifiable/Attainment	Unclassifiable/ Attainment
CO	(1971) **1-Hour** (35 ppm)	Unclassifiable/Attainment	N/A (attained)
	(1971) **8-Hour** (9 ppm)	Unclassifiable/Attainment	N/A (attained)
NO_2[g]	(2010) **1-Hour** (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	(1971) **Annual** (0.053 ppm)	Unclassifiable/Attainment	N/A (attained)
SO_2[h]	(2010) **1-Hour** (75 ppb)	Designations Pending	N/A
	(1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm)	Unclassifiable/Attainment	Unclassifiable/ Attainment

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration

c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05; the Southeast Desert Modified Air Quality Management Area, including the Coachella Valley, had not timely attained this standard by the 11/15/07 "severe-17" deadline, based on 2005-2007 data; on 8/25/14, U.S. EPA proposed a clean data finding based on 2011–2013 data and a determination of attainment for the former 1-hour ozone NAAQS for the Southeast Desert nonattainment area; this rule was finalized by U.S. EPA on 4/15/15, effective 5/15/15, that included preliminary 2014 data

d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the 1997 and 2008 ozone NAAQS until they are attained

e) The annual PM2.5 standard was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m^3

f) The annual PM10 standard was revoked, effective 12/18/06; the 24-hour PM10 NAAQS attainment deadline was 12/31/2006; the Coachella Valley Attainment Re-designation Request and PM10 Maintenance Plan was postponed by U.S. EPA pending additional monitoring and analysis in the southeastern Coachella Valley

g) New 1-hour NO_2 NAAQS became effective 8/2/10; attainment designations 1/20/12; annual NO_2 NAAQS retained

h) The 1971 Annual and 24-hour SO_2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard; final area designations expected by 12/31/2020 with SSAB expected to be designated Unclassifiable/Attainment

The current status of CAAQS attainment for the pollutants with State standards is presented in Table 2-5 for the Basin and the Riverside County portion of the SSAB (Coachella Valley).

TABLE 2-5

California Ambient Air Quality Standards (CAAQS) Attainment Status
South Coast Air Basin and Coachella Valley portion of Salton Sea Air Basin

Pollutant	Averaging Time and Level[b]	Designation[a]	
		South Coast Air Basin	Coachella Valley
Ozone (O_3)	**1-Hour** (0.09 ppm)[c]	Nonattainment	Nonattainment
	8-Hour (0.070 ppm)[d]	Nonattainment	Nonattainment
PM2.5	**Annual** (12.0 µg/m^3)	Nonattainment	Attainment
PM10	**24-Hour** (50 µg/m^3)	Nonattainment	Nonattainment
	Annual (20 µg/m^3)	Nonattainment	Nonattainment
Lead (Pb)	**30-Day Average** (1.5 µg/m^3)	Attainment	Attainment
CO	**1-Hour** (20 ppm)	Attainment	Attainment
	8-Hour (9.0 ppm)	Attainment	Attainment
NO_2	**1-Hour** (0.18 ppm)	Attainment	Attainment
	Annual (0.030 ppm)	Attainment	Attainment
SO_2	**1-Hour** (0.25 ppm)	Attainment	Attainment
	24-Hour (0.04 ppm)	Attainment	Attainment
Sulfates	**24-Hour** (25 µg/m^3)	Attainment	Attainment
H_2S[c]	**1-Hour** (0.03 ppm)	Unclassified	Unclassified [c)]

a) CA State designations shown were updated by CARB in 2016, based on the 2013–2015 3-year period; stated designations are based on a 3-year data period after consideration of outliers and exceptional events; Source: http://www.arb.ca.gov/desig/statedesig.htm#current

b) CA State standards, or CAAQS, for ozone, CO, SO_2, NO_2, PM10 and PM2.5 are values not to be exceeded; lead, sulfates, and H_2S standards are values not to be equaled or exceeded; CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations

c) SCAQMD began monitoring H_2S in the southeastern Coachella Valley in November 2013 due to odor events related to the Salton Sea; three full years of data are not yet available for a State designation, but nonattainment is anticipated for the H_2S CAAQS in at least part of the Coachella Valley

The 1979 federal 1-hour ozone standard (0.12 ppm) was revoked by the U.S. EPA and replaced by the 8-hour average ozone standard (0.08 ppm), effective June 15, 2005. However, the Basin and the former Southeast Desert Modified Air Quality Management Area (which included the Coachella Valley) had not attained the 1-hour federal ozone NAAQS by the attainment dates in 2010 and 2007, respectively, and, therefore, had continuing obligations under the former standard. On August 25, 2014, U.S. EPA

proposed a clean data determination based on 2011-2013 data and a determination of attainment for the 1-hour ozone NAAQS for the Southeast Desert nonattainment area. This rule was finalized, with the inclusion of the preliminary 2014 ozone data, by U.S. EPA on April 15, 2015, effective May 15, 2015. The Basin has not yet attained the 1-hour ozone NAAQS.

The 1997 8-hour ozone NAAQS was subsequently strengthened from 0.08 ppm to 0.075 ppm, effective May 27, 2008. The 1997 8-hour ozone standard was revoked in implementation rules for the 2008 ozone NAAQS, effective April 6, 2015. On October 1, 2015, U.S. EPA again strengthened the 8-hour ozone NAAQS to 0.070 ppm, effective December 28, 2015, retaining the same form as the previous 1997 and 2008 standards. Attainment designations for the new 2015 standard are expected to be finalized by late 2017, with SIP attainment demonstrations likely due in 2020 or 2021. The 2008 ozone NAAQS is a primary focus of this AQMP, as it is the SIP submittal to demonstrate future attainment of the 2008 standard. While the statistics presented in this chapter, and in Appendix II: Current Air Quality, primarily refer to the current (2015) and former (2008) 8-hour ozone standards, the former 1997 8-hour and 1979 1-hour ozone standards will also be presented, to show the progress toward those standards and for historical comparison.

In 2015, one or more stations in the Basin exceeded the most current federal standards on a total of 146 days (40 percent of the year), including: 8-hour ozone (113 days over the 2015 ozone NAAQS), 24-hour PM2.5 (30 days, including near-road sites; 25 days for ambient sites only), PM10 (2 days), and NO_2 (1 day). Despite substantial improvement in air quality over the past few decades, some air monitoring stations in the Basin still exceed the NAAQS for ozone more frequently than any other areas in the United States. Seven of the top 10 stations in the nation most frequently exceeding the 2015 8-hour ozone NAAQS in 2015 were located within the Basin, including stations in San Bernardino, Riverside, and Los Angeles Counties. Regarding the former ozone NAAQS,[4] 81 days exceeded the revised 2008 8-hour ozone NAAQS, 47 days exceeded the revoked 1997 8-hour ozone NAAQS, and 10 days exceeded the revoked 1-hour ozone NAAQS at one or more stations in the Basin in 2015. Table 2-6 summarizes the number of days exceeding current and former federal and State 1-hour and 8-hour ozone standard levels by county in the Basin and the Coachella Valley in 2015.

[4] While the former federal 8-hour and 1-hour ozone NAAQS have been revised or revoked by U.S. EPA, nonattainment areas, including the Basin, still have continuing obligations under each standard until it is attained.

TABLE 2-6

2015 Number of Days Exceeding Current and Former Ozone Standards
at the Peak Station by Basin and County

Basin/County	2015 # Days > Current (2015) 8-Hour Ozone NAAQS (0.070 ppm)	Area of Max Current Federal Standard Exceedances	2015 # Days > Former (2008) 8-Hour Ozone NAAQS (0.075 ppm)	2015 # Days > Former (1997) 8-Hour Ozone NAAQS (0.08 ppm)	2015 # Days > Former (1979) 1-Hour Ozone NAAQS (0.12 ppm)	2015 # Days > Current 8-Hour State Ozone Standard (0.07 ppm)	2015 # Days > Current 1-Hour State Ozone Standard (0.09 ppm)
South Coast Air Basin							
Los Angeles	74	Santa Clarita Valley	54	25	4	80	52
Orange	12	Saddleback Valley	4	0	0	14	5
Riverside	76	Metropolitan Riverside County	51	29	2	81	43
San Bernardino	**102**	**Central San Bernardino Mountains**	**75**	**42**	**8**	**102**	**65**
Salton Sea Air Basin							
Riverside	58	Coachella Valley (Palm Springs)	30	5	0	54	3

Bold text denotes the peak value

The 2015 8-hour ozone NAAQS became effective at the end of 2015; the 2008 ozone NAAQS was still in effect during the 2014 and 2015 ozone seasons; 2014–2016 data will likely be evaluated by U.S. EPA for 2015 ozone NAAQS attainment determinations; although the 2015 8-hour NAAQS and the 8-hour CAAQS are both at an equivalent level, the rounding conventions differ

PM2.5 levels in the Basin have improved significantly in recent years. By 2013 and again in 2014 and 2015, there were no stations measuring PM2.5 in the Basin violating the former 1997 annual PM2.5 NAAQS (15.0 µg/m^3) for the 3-year design value period with the filter-based federal reference method (FRM).[5] On July 25, 2016 U.S. EPA finalized a determination that the Basin attained the 1997 annual (15.0 µg/m^3) and 24-hour PM2.5 (65 µg/m^3) NAAQS, effective August 24, 2016. Of the 17 FRM PM2.5 monitors at ambient stations in the Basin and the Coachella Valley for the 2013–2015 period, five stations had design values over the current 2012 annual PM2.5 NAAQS (12.0 µg/m^3), including: Mira Loma (Basin maximum at 14.1 µg/m^3), Rubidoux, Fontana, Ontario (2013 and 2014 data only, prior to closing), Central Los Angeles, and Compton. The new near-road PM2.5 measurements, now fully implemented at two

[5] SCAQMD also employs continuous monitors at several stations in the Basin to provide real-time data for the public and to support daily air quality forecasting. U.S. EPA has granted SCAQMD a waiver from using these continuous monitors for regulatory/attainment determination purposes, since they do not meet the accuracy requirements to be considered federal equivalent method (FEM) measurements.

stations, will be evaluated for NAAQS compliance once sufficient data has been collected. These source-specific measurements are often higher than the nearest ambient measurements and may affect the Basin-wide design value. The Coachella Valley is in attainment of both the annual and 24-hour PM2.5 NAAQS.

In 2015, 14 of the stations in the Basin with FRM PM2.5 monitors had one or more PM2.5 daily average concentrations exceeding the level of the federal 24-hour PM2.5 NAAQS (35.0 µg/m^3), with a total of 25 days over that standard in the Basin (30 days with the new near-road stations included). However, in the 2013–2015 period, only two stations (in Metropolitan Riverside County at Mira Loma and Rubidoux), had design values over the 24-hour PM2.5 NAAQS.[6] While it was previously anticipated that the Basin 24-hour PM2.5 NAAQS would be attained by 2015, this did not occur, based on the data for 2013 through 2015. The higher number of days exceeding the 24-hour NAAQS, over what was expected based on the current control strategy, is largely attributed to the severe drought conditions in California in the past three years. The deficit of normal storm systems from late fall through the winter and early spring allowed for more stagnant conditions in the Basin and multi-day buildups of higher PM2.5 concentrations. This was caused by the lack of storm-related dispersion and rain-out of PM and its precursors.

The Basin is in attainment of the current PM10 24-hour NAAQS. The Coachella Valley monitored data also shows that it will meet the PM10 NAAQS, pending SCAQMD documentation submittal and subsequent U.S. EPA approval of days flagged for high-wind exceptional events. However, U.S. EPA has requested that SCAQMD conduct additional monitoring in the southeastern portion of the Coachella Valley before a re-designation can be considered. This station has been in operation since 2013 in the community of Mecca, so the District intends to propose that a re-designation decision can be based on the 2014–2016 or 2015–2017 period when the data is finalized and exceptional event exclusions can be addressed.

The District continues to be in attainment of the NAAQS for SO_2, CO, and NO_2. While the concentration level of the current 1-hour NO_2 federal standard (100 ppb) was exceeded in the Basin at one station on one day in 2015 (in the South Los Angeles County Coastal Area at the Long Beach – Hudson station), the NAAQS NO_2 design value[7] has not been exceeded. Therefore, the Basin remains in attainment of the NO_2 NAAQS. The near-road NO_2 and CO measurements, now completely phased in, will also be evaluated for NAAQS compliance once sufficient data has been collected. These source-specific NO_2 and CO measurements are often higher than the nearest ambient measurements. However, the longest running NO_2 near-road station, on I-5 in Anaheim, did not exceed the level of the NAAQS since the measurements began on January 1, 2014. Likewise, a shorter period of data from the other stations has also not exceeded the level of the NO_2 NAAQS to date. Similarly, the near-road CO measurements have not exceeded the level of the CO NAAQS to date.

U.S. EPA designated the Los Angeles County portion of the Basin (excluding the San Clemente and Santa Catalina Islands and the Antelope Valley) as nonattainment for the revised (2008) federal lead standard (0.15 µg/m^3, rolling 3-month average). This designation was based on two source-specific monitors in Vernon and in the City of Industry exceeding the 2008 standard over the 2007–2009 period. For the

[6] The 24-hour PM2.5 design value is based on the annual 98th percentile concentration for each station averaged over the 3-year period; for stations that monitor every day, this is typically the eighth highest concentration.

[7] The 1-hour NO_2 design value is the 3-year average of the annual 98th percentile of the daily 1-hour maximums.

most recent two design value periods, 2012–2014 and 2013–2015, no stations in Los Angeles County showed violations of the federal lead standard, with a maximum 3-month rolling average 2013–2015 design value of 0.08 $\mu g/m^3$ (at the highest source-specific monitor at the beginning of 2013). A request to U.S. EPA to re-designate Los Angeles County to attainment of the lead NAAQS is being prepared. The remainder of the Basin outside the Los Angeles County nonattainment area, as well as the Coachella Valley, remain in attainment of the 2008 lead standard, including both ambient monitors and source-oriented monitors.

Current Air Quality

In 2015, ozone, PM2.5, PM10, and NO_2 peak values exceeded federal standard concentration levels at one or more of the routine monitoring stations in the Basin, while ozone and PM10 exceeded those standard levels in the Coachella Valley. However, an exceedance of the concentration level does not necessarily mean a violation of the NAAQS, because the design value form of the standard must also be considered for attainment determination. For example, the 2015 1-hour maximum NO_2 concentration in the Basin was 101 ppb at the Long Beach – Hudson station, but the Basin did not violate the federal NO_2 NAAQS, based on the form of the standard, because the station's 98th percentile daily maximum hourly concentration was not over the federal standard of 100 ppb for the 2013–2015 period.

At this time, the only pollutants in the Basin with design values in violation of the respective NAAQS are ozone, (all current and former federal standards) and PM2.5 (current annual and 24-hour federal standards). In the Coachella Valley, only ozone has design values in violation of the NAAQS for the current and former 8-hour federal ozone standards. The Coachella Valley is expected to be in attainment of the 24-hour PM10 NAAQS, after accounting for days with high-wind natural events through the U.S. EPA Exceptional Event Rule.

Figure 2-2 shows the trend of the Basin maximum 3-year design value concentrations for ozone (1-hour and 8-hour) and PM2.5 (24-hour and annual) since 1995, as percentages of the corresponding current federal standards (note that PM2.5 monitoring began in 1999 so the first 3-year design value was in 2001). Although there is some year-to-year variability, these pollutants show significant improvement over the years, with PM2.5 showing the most dramatic decreases.

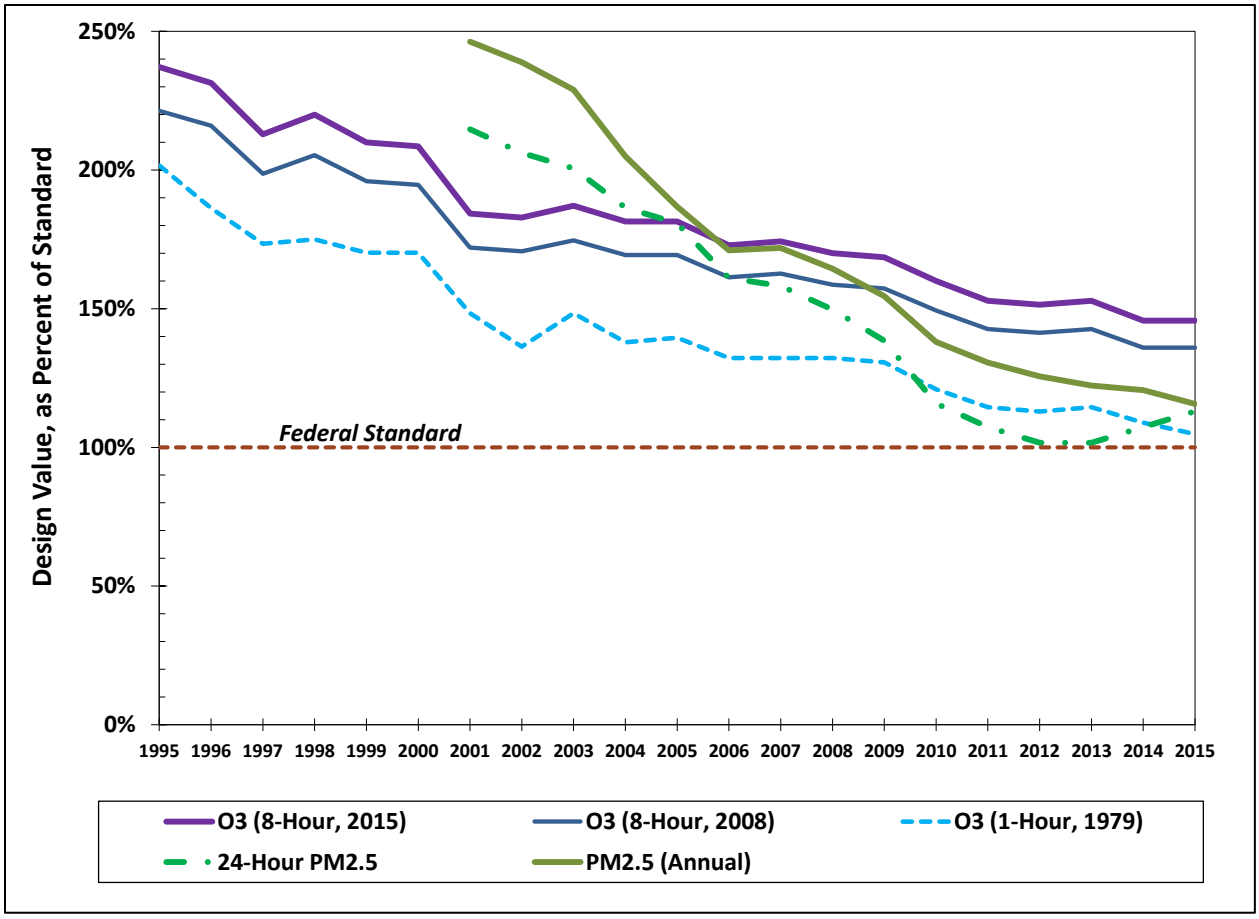


FIGURE 2-2

TRENDS OF SOUTH COAST AIR BASIN MAXIMUM 3-YEAR DESIGN VALUES FOR OZONE (2015 8-HOUR, 2008 8-HOUR, AND 1979 1-HOUR NAAQS) AND PM2.5 (24-HOUR AND ANNUAL), 1995–2015
(AS PERCENTAGES OF CURRENT FEDERAL STANDARDS)

Monitoring Network Status

There have been some changes to the SCAQMD ambient air monitoring network since the previous AQMP, which was finalized in 2012 and summarized air quality through 2011. A new special-purpose monitoring station was added, starting in January 2013, in the southeastern Coachella Valley in the City of Mecca to measure PM10 and hydrogen sulfide (H_2S). A second H_2S monitor was added on Torres-Martinez tribal property to measure naturally occurring odors from the Salton Sea close to the shoreline.

Long-term monitoring stations at North Long Beach and Burbank had to be closed due to lease decisions beyond the District's control; replacements for these two stations are being sought at this time. Filter-based PM2.5 measurements have continued at North Long Beach until a suitable replacement station can be obtained. The PM10 and PM2.5 monitors at the Ontario Fire Station were also removed in 2014, due to lack of space at the Ontario site. The Riverside-Magnolia station was also closed at the end of 2014, with those measurements (PM2.5, lead, CO and NO_2) consolidated at the nearby Riverside-Rubidoux station in 2015. Replacements for the Ontario Fire Station and Riverside-Magnolia air monitoring stations are not required and the measurements from these locations are well-represented by other SCAQMD stations.

To implement recent U.S. EPA requirements to monitor NO_2, CO, and PM2.5 near major roadways in large urban areas, four new near-road monitoring stations were installed. The NO_2 measurements began on January 1, 2014 at a near-road site at Vernon Street in Anaheim, Orange County, adjacent to Interstate Highway 5. This was followed by a new near-road site near Etiwanda Avenue in San Bernardino County next to Interstate Highway 10 in July 2014. CO measurements began at both the I-5 and I-10 near-road sites in December 2014. These two sites represent high traffic volume routes. Near-road NO_2 and PM2.5 measurements began in 2015 next to California Highway 60, west of Vineyard Avenue near the San Bernardino/Riverside County border, and next to Interstate Highway 710, at Long Beach Blvd. in Los Angeles County. These two sites represent high traffic volumes with a high fraction of diesel truck traffic.

The near-road monitoring is source-specific, that is, the pollutant measurements are directly impacted by the close proximity of the traffic-related emissions from the roadways. As a result, higher measured air pollutant concentrations are generally expected at the near-road sites than those found further away from the freeways. The near-road measurements provide representative pollutant exposure information for people who live, work, or go to school adjacent to freeways or who spend significant time traveling on the busiest southern California roadways. Once sufficient near-road data is collected for a full 3-year design value[8] calculation, it can be included in analyses for attainment of the NAAQS.

[8] A design value is a statistic that describes the air quality status of a given area relative to the level and form of the NAAQS. For most criteria pollutants, the design value is a 3-year average and takes into account the form of the short-term standard (e.g., 98th percentile, fourth high value, etc.). Design values can also be calculated for standards that are exceedance-based (e.g., 1-hour ozone and 24-hour PM10) so that they can be expressed as a concentration instead of an exceedance count, in order to allow a direct comparison to the level of the standard. Note that the modeling design values used for the AQMP attainment demonstration are based on a 5-year period, weighted toward the center year, as specified in U.S. EPA modeling guidelines.

Ozone (O_3)

Health Effects, Ozone

The adverse effects of ozone air pollution exposure on health have been studied for many years, as documented by a significant body of peer-reviewed scientific research, including studies conducted in Southern California. The 2013 U.S. EPA document, *Integrated Science Assessment of Ozone and Related Photochemical Oxidants*,[9] describes these health effects and discusses the state of the scientific knowledge and research. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

Individuals working outdoors, children (including teenagers), older adults, people with preexisting lung disease, such as asthma, and individuals with certain nutritional deficiencies are considered to be the sub-groups most susceptible to ozone effects. Short-term exposures (lasting for a few hours) to ozone at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. Elevated ozone levels are associated with increased school absences and daily hospital admission rates, as well as increased mortality. An increased risk for asthma has been found in children who participate in multiple sports and live in high-ozone communities.

Ozone exposure under exercising conditions is known to increase the severity of respiratory symptoms. Although lung volume and airway resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.

Air Quality, Ozone

In 2015, SCAQMD routinely monitored ambient ozone at 29 locations in the Basin and the Coachella Valley portion of the SSAB. The 2015 Basin maximum ozone concentrations continued to exceed federal standards by wide margins, although significant improvement has been achieved through the years. Figure 2-3 shows the trend from 1976 through 2015 of the annual number of Basin days exceeding various metrics for ozone. These metrics include the 1-hour Stage 1[10] level (0.20 ppm), the 1-hour Health Advisory level (0.15 ppm), the former (1979) 1-hour NAAQS (0.12 ppm), the former (1997 and 2008) 8-hour NAAQS (0.08 and 0.075 ppm), and the new 2015 8-hour NAAQS (0.070 ppm). All the ozone trends

[9] U.S. EPA. (2013). Integrated Science Assessment of Ozone and Related Photochemical Oxidants (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/076F. http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=247492.

[10] While the 1-hour ozone episode levels and the related 1-hour ozone health warnings still exist, they are essentially replaced by the more protective health warnings associated with the current 8-hour ozone NAAQS. The 1-hour ozone episode warning levels include the State Health Advisory (0.15 ppm), Stage 1 (0.20 ppm), Stage 2 (0.35 ppm), and Stage 3 (0.50 ppm). The State 1-hour ozone Health Advisory was last exceeded in the Basin in 2013. The Basin's last 1-hour ozone Stage 1 episode occurred in 2003. The last 1-hour ozone Stage 2 episode occurred in 1988 and the last Stage 3 episode occurred in 1974.

show significant improvements achieved through the period. However, they also show the need for continued efforts in order to meet all the 8-hour ozone standards and the 1979 1-hour standard.

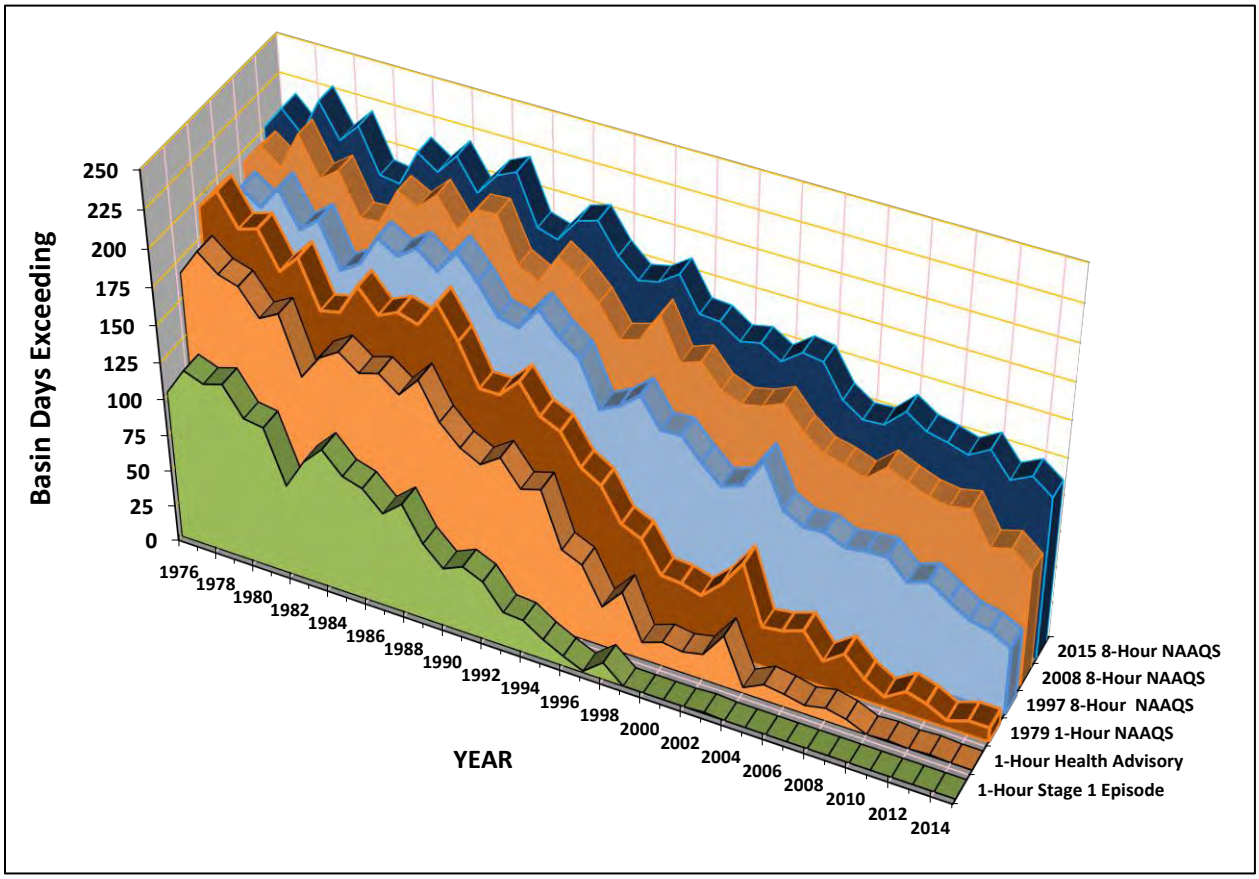


FIGURE 2-3

TREND OF NUMBER OF BASIN DAYS EXCEEDING CURRENT AND FORMER OZONE NAAQS AND 1-HOUR OZONE EPISODE LEVELS (HEALTH ADVISORY AND STAGE-1), 1976 THROUGH 2015

All counties in the Basin, as well as the Coachella Valley, exceeded the level of the new 2015 (0.070 ppm) and the former 2008 (0.075 ppm) and 1997 (0.08 ppm) 8-hour ozone NAAQS in 2015. While not all stations had days exceeding the previous 8-hour standards, all monitoring stations had at least one day over the 2015 federal standard, except the coastal station near the Port of Los Angeles/Long Beach in South Coastal Los Angeles County (Elisabeth Hudson Elementary School station).

On one or more days in the Basin, the 2015 ozone federal standard was exceeded on a total of 113 days exceeded in 2015 (81 days over the 2008 standard and 47 days over the 1997 standard). 2015 had the fewest days exceeding the 8-hour ozone standards than were recorded in any previous year since these measurements began. The 8-hour State ozone standard (0.070 ppm, although the rounding convention differs from federal standard) was exceeded in the Basin on 115 days in 2015. The Coachella Valley exceeded the 2015 8-hour ozone NAAQS on 47 days (26 days for the 2008 ozone NAAQS, five days for the 1997 ozone NAAQS, and 51 days for the State 8-hour ozone NAAQS). The station with the highest

number of days in 2015 over the 2015, 2008, and 1997 8-hour federal ozone standards (86, 61, and 30 days, respectively) was in the Central San Bernardino Mountains (Crestline-Lake Gregory). The 2015 maximum 8-hour average ozone concentration of 0.127 ppm was also measured at the Central San Bernardino Mountains station.

When compared to the design value form of the federal standard, all four of the Basin's counties were above the 2015 8-hour ozone NAAQS for the 2013–2015 design values. Three of the Basin's four counties (all but Orange County) were above both the 2008 and 1997 8-hour ozone NAAQS for the 2013-2015 design values. The Basin's highest 2013–2015 8-hour ozone design value (0.102 ppm, measured in the Central San Bernardino Mountains at Crestline-Lake Gregory) was 146 percent of the 2015 8-hour ozone NAAQS (136 percent of the 2008 NAAQS and 121 percent of the 1997 NAAQS). This was the same as the 2014 peak Basin design value and they were the lowest maximum 8-hour ozone design values in the Basin since ozone measurements began. Table 2-7 shows the 2015 maximum 8-hour ozone concentrations and design values by air basin and county, compared to current and former federal, and current State standards.

TABLE 2-7

2015 Maximum 8-Hour Average Ozone Concentrations and Design Values by Basin and County

Basin/ County	2015 Maximum 8-Hour Ozone Average (ppm)	2013-2015 8-Hour Ozone Design Value (ppm)	Percent of Current (2015) 8-Hour Ozone NAAQS (0.070 ppm)	Percent of Former (2008) 8-Hour Ozone NAAQS (0.075 ppm)	Percent of Former (1997) 8-Hour Ozone NAAQS (0.08 ppm)	Area of Design Value Maximum	2013-2015 8-Hour Ozone State Designation Value# (ppm)	Percent of State 8-hour Ozone Standard (0.070 ppm)
South Coast Air Basin								
Los Angeles	0.108	0.094	134	125	112	Santa Clarita Valley	0.109	**156**
Orange	0.088	0.075	107	100*	89	Saddleback Valley	0.082	117
Riverside	0.105	0.093	133	124	111	Metropolitan Riverside County	0.106	151
San Bernardino	**0.127**	**0.102**	**146**	**136**	**121**	**Central San Bernardino Mountains**	**0.114**	**163**
Salton Sea Air Basin								
Riverside	0.092	0.088	126	117	105	Coachella Valley (Palm Springs)	0.093	133

Bold text denotes the peak value

* 100 percent of the NAAQS is not violating that standard

\# The *State 8-Hour Designation Value* is the highest State 8-hour ozone average, rounded to three decimal places, during the last 3 years (State designation value source: https://www.arb.ca.gov/adam/select8/sc8start.php)

All monitored locations measured maximum 1-hour average ozone concentrations well below the Stage 1 episode level (0.20 ppm, 1-hour) and below the ozone health advisory level (0.15 ppm, 1-hour) in 2015. Except for one day in 2003 (at a special-purpose monitor in the San Bernardino Mountains), the Stage 1 ozone episode level has not been exceeded in the Basin since 1998.

The Basin exceeded the level of the revoked (1979) 1-hour federal ozone standard (0.12 ppm) on 10 days in 2015, with exceedances in Los Angeles, Riverside, and San Bernardino Counties; Orange County did not exceed the 1979 standard. The most exceedances of the former 1-hour standard in 2015 (6 days) occurred in the Central San Bernardino Valley at the San Bernardino air monitoring station. The 2015 peak 1-hour ozone concentration in the Basin was 0.144 ppm, measured in the Central San Bernardino Mountains (Crestline-Lake Gregory air monitoring station). This value was slightly higher than the 2014 peak of 0.141 ppm, which was the Basin's lowest annual peak 1-hour concentration since ozone measurements started in the mid-1950s. In the Coachella Valley, 1-hour ozone concentrations did not exceed the revoked 1-hour federal standard in 2015 and the peak 1-hour concentration of 0.102 ppm was the lowest annual peak ever monitored in that area. The State 1-hour ozone standard (0.09 ppm) was exceeded in the Basin on 71 days and in the Coachella Valley on 3 days.

The calculated peak 2013–2015 1-hour ozone design value[11] (0.130 ppm in the Central San Bernardino Mountains at the Crestline-Lake Gregory air monitoring station) was 104 percent of the former 1-hour NAAQS. The Coachella Valley design value did not exceed the former 1-hour federal ozone standard in 2015 and has remained in attainment of the former NAAQS since 2008. Table 2-8 shows the 2015 maximum 1-hour ozone concentrations and calculated design values by air basin and county, compared to the former federal and current State standards.

[11] The former 1979 1-hour ozone NAAQS allows for one exceedance per year on average when averaged over three years. The calculated design value is the fourth highest value over a 3-year period, allowing the design value to be expressed in terms of a concentration. When shown in parts-per-million to 3 decimal places the design value is compared to 0.125 ppm, which would exceed the NAAQS.

TABLE 2-8

2015 Maximum 1-Hour Average Ozone Concentrations and Design Values by Basin and County

Basin/ County	2015 Maximum 1-Hour Ozone Average (ppm)	2013-2015 1-Hour Ozone Design Value (ppm)	Percent of Former (1979) 1-Hour Ozone NAAQS (0.125 ppm)	Area of Design Value Max	2013-2015 1-Hour Ozone State Designation Value# (ppm)	Percent of State 1-Hour Ozone Standard (0.09 ppm)
South Coast Air Basin						
Los Angeles	0.136	0.127	102	East San Gabriel Valley	**0.13**	**144**
Orange	0.103	0.102	82	North Orange County & Saddleback Valley	0.10	111
Riverside	0.132	0.121	97	Metropolitan Riverside County	**0.13**	**144**
San Bernardino	**0.144**	**0.130**	**104**	**Central San Bernardino Mountains**	**0.13**	**144**
Salton Sea Air Basin						
Riverside	0.102	0.104	83	Coachella Valley (Palm Springs)	0.11	122

Bold text denotes the peak value

The *State 1-Hour Designation Value* is the highest hourly ozone measurement during the last 3 years, rounded to two decimal places. In practice, the designation value is the highest measured concentration in the 3-year period that remains, after excluding measurements identified as affected by highly irregular or infrequent events (State designation value source: https://www.arb.ca.gov/adam/select8/sc8start.php)

The number of days exceeding the current and former ozone standards in the Basin varies widely by area. Figures 2-4 through 2-6 map the number of days in 2015 exceeding the new 2015 8-hour ozone NAAQS and the former 2008 and 1997 8-hour ozone NAAQS in different areas of the Basin. The number of exceedances of the federal 8-hour ozone standards was lowest in the coastal areas, due in large part to the prevailing sea breeze which transports emissions inland before photochemistry produces high ozone concentrations. The concentrations increase downwind towards the Riverside County valleys and the San Bernardino County valleys and adjacent mountain areas, as well as the area around Santa Clarita in Los Angeles County. The Central San Bernardino Mountains area recorded the greatest number of exceedances of the current and former 8-hour federal standards (86 days for the 2015 ozone NAAQS, 61 days for the 2008 NAAQS, and 30 days for the 1997 NAAQS).

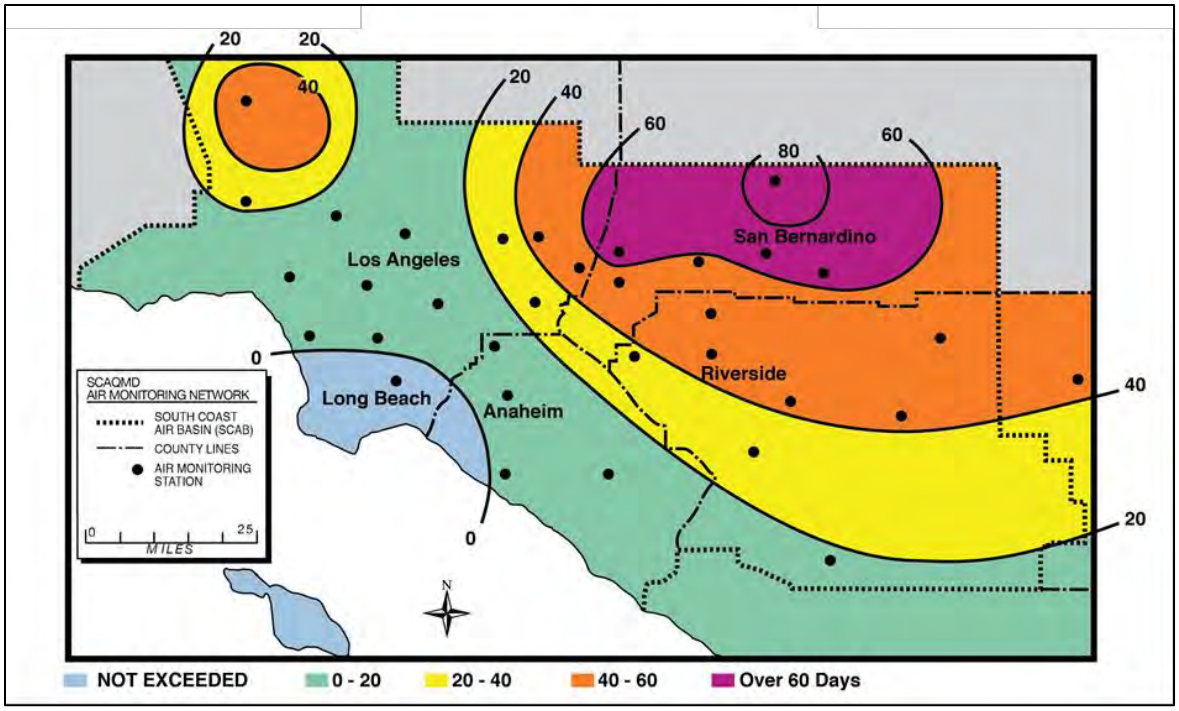


FIGURE 2-4

NUMBER OF DAYS IN 2015 EXCEEDING THE 2015 8-HOUR OZONE FEDERAL STANDARD

(8-HOUR AVERAGE OZONE > 0.070 PPM)

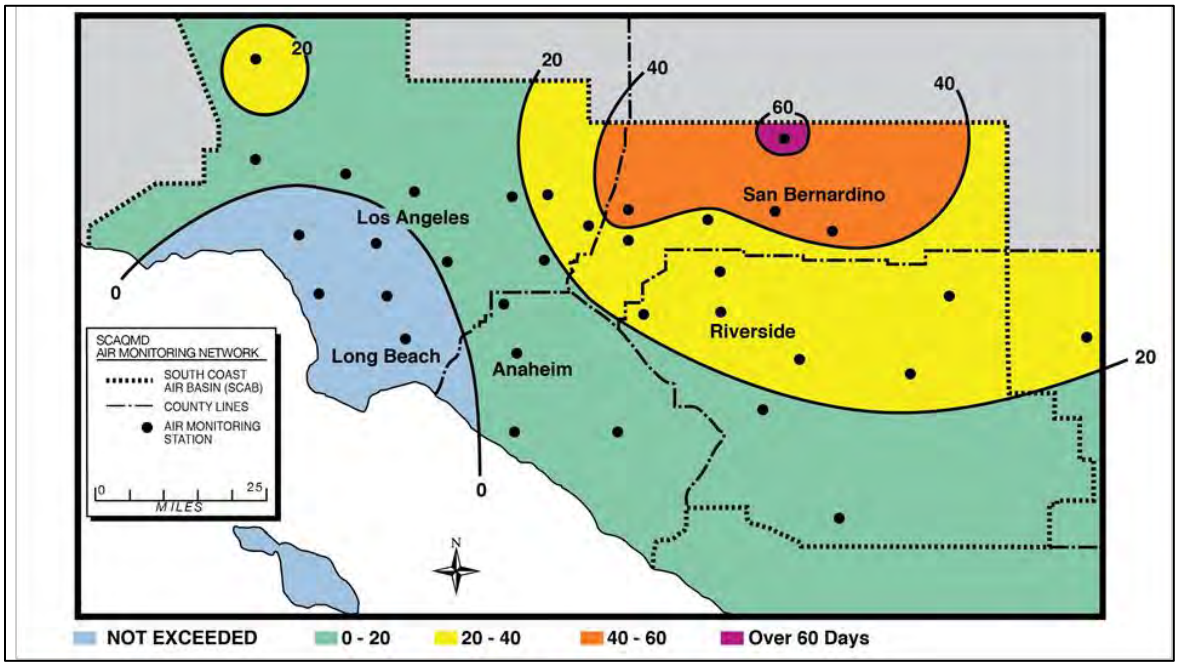


FIGURE 2-5

NUMBER OF DAYS IN 2015 EXCEEDING THE REVISED 2008 8-HOUR OZONE FEDERAL STANDARD

(8-HOUR AVERAGE OZONE > 0.075 PPM)

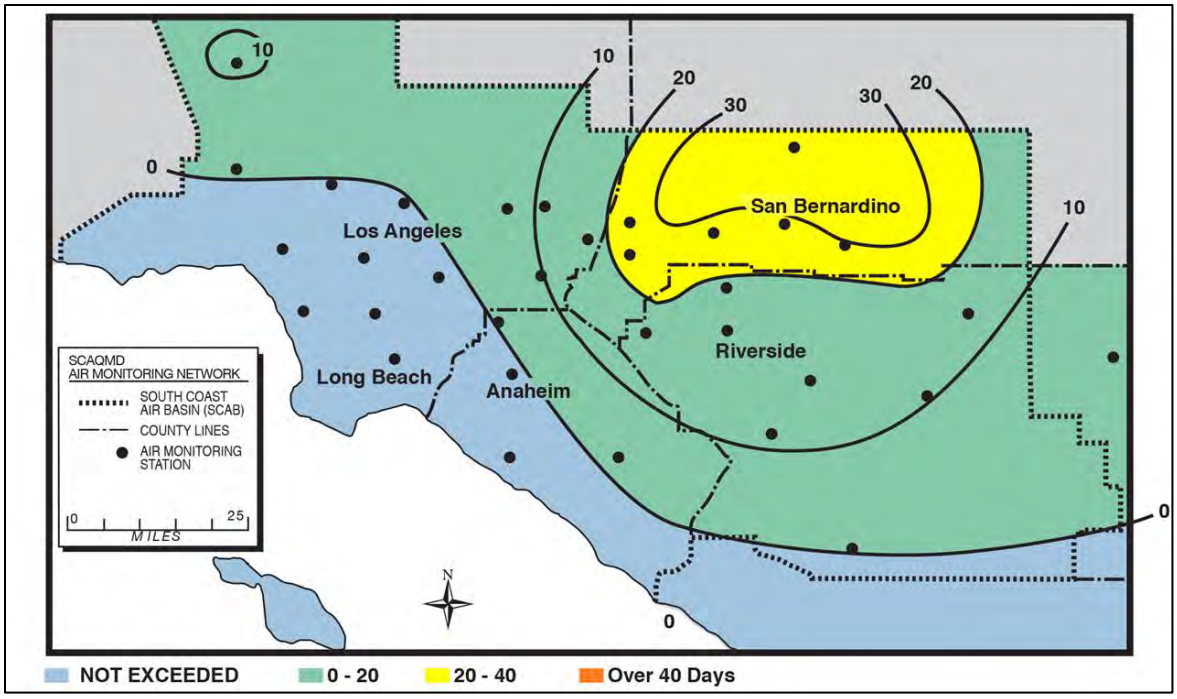


FIGURE 2-6

NUMBER OF DAYS IN 2015 EXCEEDING THE REVOKED 1997 8-HOUR OZONE FEDERAL STANDARD

(8-HOUR AVERAGE OZONE > 0.08 PPM)

Figure 2-7 maps the number of days in 2015 exceeding the revoked 1979 1-hour ozone NAAQS in different areas of the Basin. The former 1-hour federal standard was not exceeded in a large portion of the Basin. It was exceeded the most (six days) in the Central San Bernardino Valley at the San Bernardino air monitoring station. Exceedances of the 1-hour ozone standard extended to all areas monitored in San Bernardino County and in Metropolitan Riverside County, as well as in Santa Clarita and the eastern San Gabriel Valley in Los Angeles County. The Coachella Valley did not exceed the former 1-hour ozone standard in 2015.

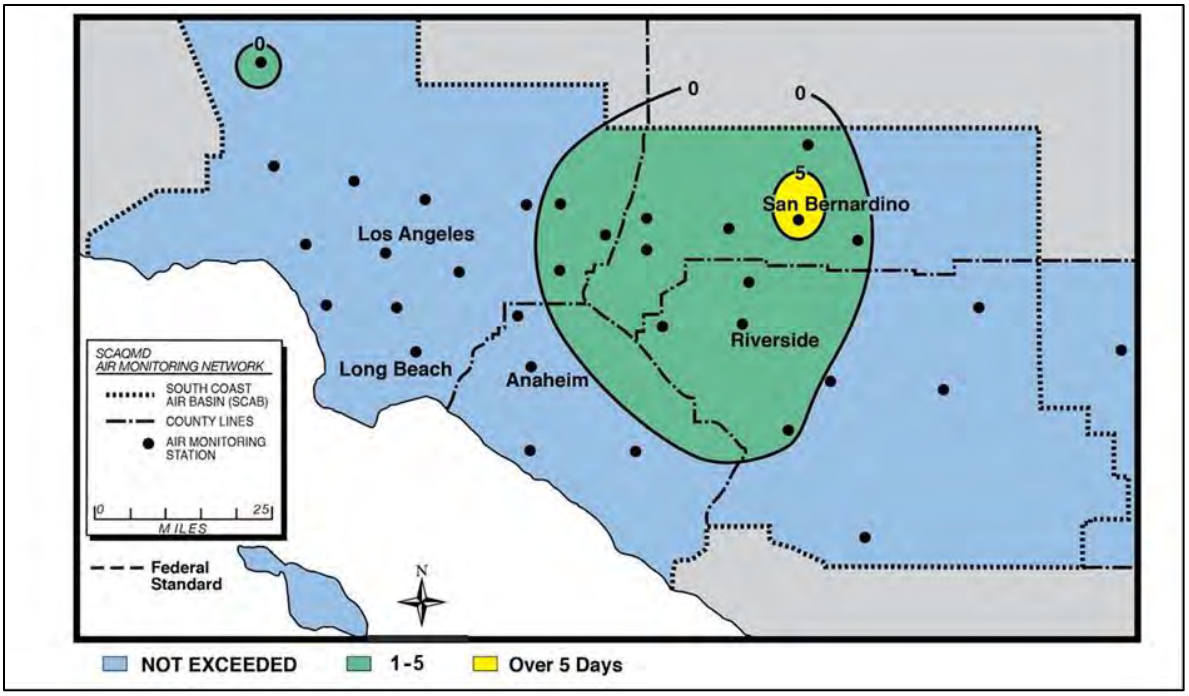


FIGURE 2-7

NUMBER OF DAYS IN 2015 EXCEEDING THE REVOKED 1979 1-HOUR FEDERAL OZONE STANDARD

(1-HOUR AVERAGE OZONE > 0.12 PPM; GREEN SHADED AREA INDICATES AREAS WITH EXCEEDANCES)

Particulate Matter (PM2.5 and PM10)

Health Effects, Particulate Matter

A significant body of peer-reviewed scientific research, including studies conducted in Southern California, points to adverse impacts of particulate matter air pollution on both increased illness (morbidity) and increased death rates (mortality). The 2009 U.S. EPA *Integrated Science Assessment for Particulate Matter*[12] describes these health effects and discusses the state of the scientific knowledge. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

There was considerable debate surrounding the review of particulate matter health effects and the consideration of ambient air quality standards when U.S. EPA promulgated the initial PM2.5 standards in 1997. Since that time, numerous additional studies have been published and key studies supporting the 1997 standards were closely scrutinized and the analyses was repeated and extended. These re-analyses confirmed the initial findings associating adverse health effects with PM2.5 exposures.

Several studies have found correlations between elevated ambient particulate matter levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks, and the number of hospital admissions in different parts of the United States and in various areas around the world. In recent years, studies have reported an association between long-term exposure to PM2.5 and increased total mortality (reduction in life-span and increased mortality from lung cancer).

Higher levels of PM2.5 have also been related to increased mortality due to cardiovascular or respiratory diseases, hospital admissions for acute respiratory conditions, school absences, lost work days, a decrease in respiratory function in children, and increased medication use in children and adults with asthma. Long-term exposure to PM has been found to be associated with reduced lung function growth in children, and increased risk of cardiovascular diseases in adults. Elderly persons, young children, and people with pre-existing respiratory and/or cardiovascular disease appear to be more susceptible to the effects of PM10 and PM2.5.

The U.S. EPA, in its most recent review, has concluded that both short-term and long-term exposure to PM2.5 are causally related to increased mortality risk. An expanded discussion of studies relating to PM exposures and mortality, including a brief description of how studies accounted for potential confounding factors, is contained in Appendix I of this document.

Air Quality, PM2.5

The District began regular monitoring of PM2.5 in 1999 following the U.S. EPA's adoption of the national PM2.5 standards in 1997. In 2015, ambient PM2.5 concentrations were monitored at 26 locations throughout the District, including two stations in the SSAB in the Coachella Valley and two near-road sites. Filter-based FRM PM2.5 sampling was employed at 19 of these stations and eight of the FRM measurement stations sampled daily to improve temporal coverage with the FRM measurements beyond

[12] U.S. EPA. (2009). Integrated Science Assessment for Particulate Matter (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546.

the required 1-in-3-day sampling schedule, including the two near-road sites. Fourteen stations, including one near-road site, employed continuous PM2.5 monitors and seven of these were collocated with FRM measurements. The continuous federal equivalent method (FEM) PM2.5 monitors in the Basin do not meet the U.S. EPA criteria to be used for NAAQS comparison[13] and SCAQMD has been granted annual waivers by U.S. EPA precluding their use in NAAQS attainment consideration, although the waiver decision for 2015 data is not yet finalized. The continuous data is used for forecasting, real-time air quality alerts, and for evaluating hour-by-hour variations.

The 2015 FRM 24-hour PM2.5 concentrations are summarized in Table 2-9. PM2.5 concentrations were higher in the inland valley areas of metropolitan Riverside County and San Bernardino County. The Basin 2015 PM2.5 maximum 24-hour average concentration of 70.3 µg/m^3 was measured in the East San Gabriel Valley area at the Azusa air monitoring station on July 5, associated with fireworks on Independence Day. The next highest 24-hour PM2.5 concentration in 2015 was 56.6 µg/m^3, measured in the Metropolitan Riverside County area at the Mira Loma air monitoring station. PM2.5 concentrations also exceeded the level of the 24-hour NAAQS (35 µg/m^3) in Los Angeles and Orange Counties in 2015.

Although maximum 24-hour concentrations exceed the standard at multiple stations, the 98th percentile form of the 2013–2015 design value only exceeded the standard at two Basin stations in Metropolitan Riverside County (Mira Loma and Riverside-Rubidoux stations), with design values of 41 µg/m^3 and 36 µg/m^3, respectively (117 percent and 103 percent of the 24-hour NAAQS). Mira Loma had been the only station with a design value violating the 24-hour PM2.5 NAAQS since the 2008-2010 design value period. There is no State 24-hour PM2.5 standard.

The higher PM2.5 concentrations in the Basin are mainly due to the secondary formation of smaller particulates resulting from precursor gas emissions (i.e., NOx, SOx, NH_3, and VOC) that are converted to PM in the atmosphere. The precursors are from mobile, stationary and area sources, with the largest portion resulting from fuel combustion. Most of the 24-hour PM2.5 exceedances in the Basin occur in the late fall and winter months. The lack of storm events and rainfall in the last three years has contributed to an increase in the number of high PM2.5 concentration days over the standard, as the precursors and particulates are not dispersed or washed out as frequently.

In contrast to PM10, PM2.5 concentrations were relatively low in the Coachella Valley area of the SSAB. PM10 concentrations are normally higher in the desert areas due to windblown and fugitive dust emissions; PM2.5 is relatively low in the desert area due to fewer combustion-related emissions sources and less secondary aerosol formation in the atmosphere. The PM2.5 federal standards were not exceeded in the Coachella Valley in 2015 and the highest 24-hour and annual average 2013–2015 design values (17 and 8.0 µg/m^3, respectively, both at the Indio air monitoring station) are well below the PM2.5 NAAQS.

[13] The continuous PM2.5 monitors deployed by SCAQMD are FEM-designated Beta Attenuation Monitor (BAM) instruments, but in use they do not meet the correlation and bias requirements set by U.S. EPA for equivalency to FRM filter measurements. The U.S. EPA waiver from NAAQS compliance for the continuous samplers is re-evaluated annually as part of the SCAQMD Annual Air Quality Monitoring Network Plan [http://www.aqmd.gov/home/library/clean-air-plans/monitoring-network-plan].

TABLE 2-9

2015 Maximum 24-hour Average PM2.5 Concentrations and 2013–2015 Design Values by Basin and County[#]

Basin/County	2015 Maximum PM2.5 24-Hour Average (µg/m³)[*]	2013-2015 PM2.5 24-Hour Design Value (µg/m³)	Percent of Current (2006) PM2.5 NAAQS (35 µg/m³)	Area of Design Value Max
South Coast Air Basin				
Los Angeles	**70.3**[**]	34	97	Central Los Angeles and South San Gabriel Valley
Orange	45.8	28	80	Central Orange County
Riverside	56.6	**41**	**117**	**Metropolitan Riverside County**
San Bernardino	50.5	35	100	Central San Bernardino Valley
Salton Sea Air Basin				
Riverside	24.6	17	49	Coachella Valley (Indio)

Bold text denotes the peak value

[#] Based on FRM filter data

[*] 100 percent of the NAAQS is not in violation of that standard

[**] Peak value associated with Independence Day fireworks – flagged as an exceptional event

The 2015 annual average PM2.5 concentrations are summarized in Table 2-10, based on the FRM measurements. The maximum annual average of 14.5 µg/m³ was measured at the CA-60 Near-Road site, located west of Vineyard Avenue near the San Bernardino/Riverside County border (near the cities of Ontario, Mira Loma, and Upland). The second highest maximum annual average PM2.5 concentration (13.3 µg/m³) was measured in the Metropolitan Riverside County area at the Mira Loma station. The Basin maximum 2013–2015 annual average design value was 14.1 µg/m³ at the Mira Loma station (118 percent of the current 2012 annual average PM2.5 NAAQS, 12.0 µg/m³). This design value is below the former 1997 annual average PM2.5 NAAQS (15.0 µg/m³), for which the Basin remains in attainment. This is the lowest PM2.5 Basin design value since these measurements began in 1999. Since the near-road PM2.5 sites only became operational in 2015, the data period is insufficient for design value calculations. The CA-60 freeway near-road station could potentially become the design value site for the Basin for the PM2.5 annual average NAAQS, once sufficient data is collected. The annual PM2.5 State standard is based on the highest annual average over the 3-year period. It is still violated in all counties of the Basin, but not in the Coachella Valley. Figure 2-8 shows the distribution of annual average PM2.5 concentrations in different areas of the Basin.

TABLE 2-10

2015 Maximum Annual Average PM2.5 Concentrations and 2013-2015 Design Values by Basin and County

Basin/ County	2015 Maximum PM2.5 Annual Average ($\mu g/m^3$)#	2013-2015 PM2.5 Annual Design Value ($\mu g/m^3$)#	Percent of Current (2012) PM2.5 Annual NAAQS (12.0 $\mu g/m^3$)#	Percent of Former (1997) Annual NAAQS (15.0 $\mu g/m^3$)	Area of Design Value Max	2013-2015 3-Year High State Annual Average PM2.5 Designation Value ($\mu g/m^3$)##	Percent of State PM2.5 Annual Standard (12 $\mu g/m^3$)
South Coast Air Basin							
Los Angeles	12.4	12.3	103	82	Central Los Angeles	**19**	**158**
Orange	9.4	10.0	83	67	Central Orange County	16	133
Riverside	**13.3**	**14.1**	**118**	**94**	**Metropolitan Riverside County**	**19**	**158**
San Bernardino	11.0	12.5	104	83	Southwest San Bernardino Valley	17	142
Salton Sea Air Basin							
Riverside	7.5	8.0	67	53	Coachella Valley (Indio)	8	67

Bold text denotes the peak value

Based on FRM filter data, excluding near-road stations due to insufficient period of record for design value calculation; the federal design value is based on the average of the 3 annual averages in the period

Based on combined FRM filter and continuous FEM data (federal FEM waiver is not applied to State designation value); data may include exceptional events; the State annual designation value is the highest year in the 3-year period

(State designation value source: https://www.arb.ca.gov/adam/select8/sc8display.php)

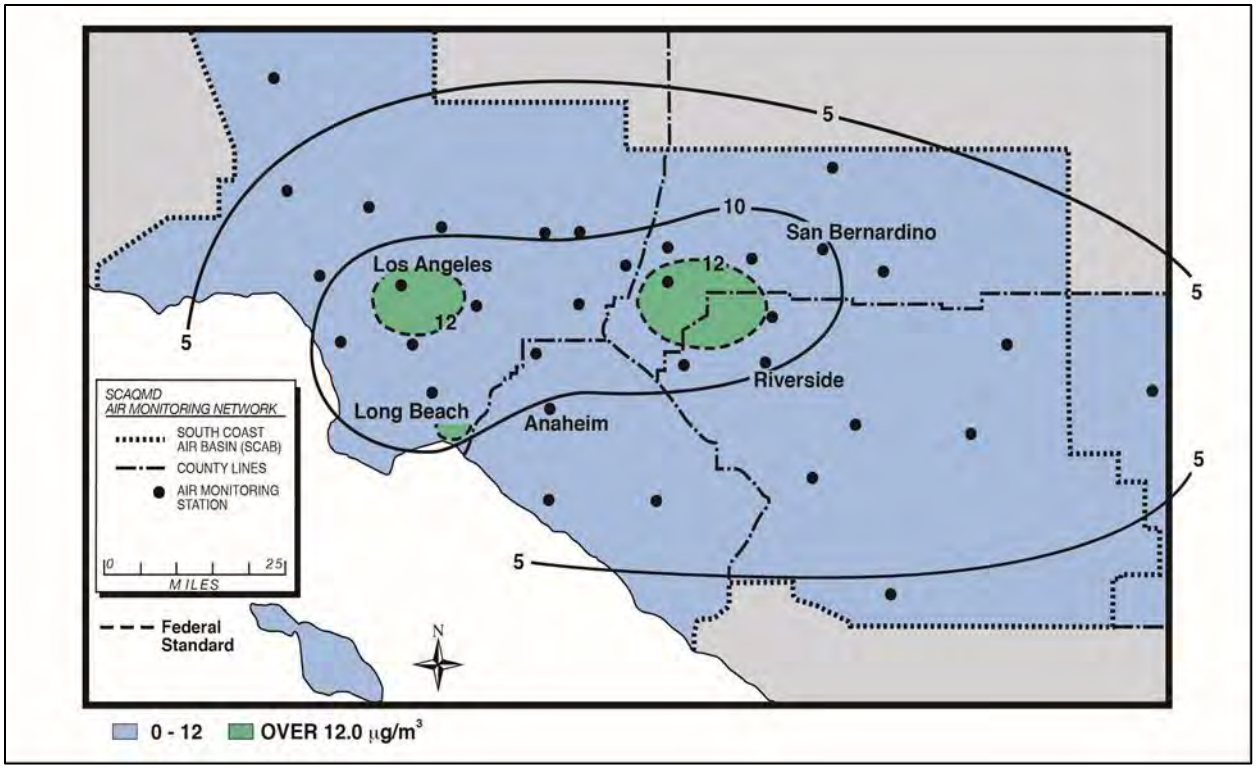


FIGURE 2-8
2015 PM2.5: ANNUAL AVERAGE CONCENTRATION COMPARED TO THE CURRENT FEDERAL STANDARD
(ANNUAL PM2.5 NAAQS = 12 µg/m^3, ANNUAL ARITHMETIC MEAN)

Near-Road PM2.5

On December 14, 2012, U.S. EPA strengthened the NAAQS for PM2.5 and, as part of the revisions, a requirement was added to monitor near the most heavily trafficked roadways in large urban areas. Particle pollution is expected to be higher along these roadways as a result of direct emissions from cars and heavy-duty diesel trucks and buses. SCAQMD has installed the two required PM2.5 monitors by January 1, 2015, at locations selected based upon the existing near-roadway NO_2 sites that were ranked higher for heavy-duty diesel traffic. The locations are: (1) I-710, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; and (2) CA-Route 60, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland. These near-road sites measure PM2.5 daily with FRM filter-based measurements.

Table 2-11 summarizes the 2015 annual and 24-hour PM2.5 data from the near-road sites and nearby ambient monitoring stations. The 2015 PM2.5 annual averages from the Route 710 and Route 60 Near-Road sites were 12.89 and 14.48 µg/m^3, respectively. The nearby ambient stations in South Coastal Los Angeles County (North Long Beach Station) and in Metropolitan Riverside County (Mira Loma station) measured 12.81 and 13.34 µg/m^3, respectively, for the 2015 annual average. Thus, the PM2.5 measurements from these sites for 2015 indicate that the near-road sites do indeed measure higher than the nearby ambient stations, on average. If this pattern holds for the long term, the CA-60 near-road station could potentially become the 3-year design value site for the Basin for the PM2.5 annual average NAAQS, once sufficient data is collected.

While it reasonably could be expected that the highest near-road site would also become the basin-maximum design value site for the 24-hour PM2.5 NAAQS, this may not be the case for the Basin. The 2015 98th percentile 24-hour PM2.5 concentration is higher at the I-710 Near-Road than at the nearby N. Long Beach station. However, the 98th percentile 24-hour concentration remains higher at Mira Loma (43.2 µg/m^3) than at the CA-60 Near-Road site (39.9 µg/m^3). The number of days over the 24-hour PM2.5 NAAQS was also significantly higher at the Mira Loma station, with 17 days over the 24-hour NAAQS compared to 10 days at the CA-60 Near-Road site. PM2.5 24-hour concentrations at the Mira Loma station are likely higher than the near-road site on the highest days, due to the influence of enhanced secondary particle formation at Mira Loma.

TABLE 2-11

2015 Annual Arithmetic Mean, Maximum and 98th Percentile 24-Hour PM2.5 Concentrations, and Number of Samples Exceeding the 24-Hour PM2.5 NAAQS at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road PM2.5*					Nearby Ambient PM2.5*				
	Annual Average PM2.5 (µg/m^3)	Peak 24-Hour PM2.5 (µg/m^3)	98th Pctl. 24-Hour PM2.5 (µg/m^3)	No. Samples Exceeding 24-Hour PM2.5 NAAQS		Annual Average PM2.5 (µg/m^3)	Peak 24-Hour PM2.5 (µg/m^3)	98th Pctl. 24-Hour PM2.5 (µg/m^3)	No. Samples Exceeding 24-Hour PM2.5 NAAQS
Near-Road Station	**2015**	**2015**	**2015**	**2015**	**Ambient Station**	**2015**	**2015**	**2015**	**2015**
Route 710 N. R. (@ Long Beach Bl., Los Angeles County)	12.89	48.8	35.7	7	**North Long Beach**	10.81	54.6	32.1	3
Route 60 N. R. (West of Vineyard Av., San Bernardino/Riverside County)	**14.48**	52.7	39.9	10	**Mira Loma**	13.34	**56.6**	**43.2**	**17**

Bold text denotes the peak value

* Filter-based FRM measurements shown

The annual PM2.5 NAAQS is 12.0 µg/m^3; the 24-hour PM2.5 NAAQS is 35 µg/m^3

Impacts of Drought on PM2.5 Air Quality

The drought conditions that have persisted in Southern California and the southwestern United States over the past few years have negatively affected air quality in many areas. The low amount and frequency of rainfall leads to less washing of road surfaces and brings drier ground surfaces, which reduces the natural crusting of soils that is improved by moisture. This can lead to enhanced resuspension of fugitive dust by moving vehicles and winds. Fugitive dust can raise concentrations of both PM10 and PM2.5. More importantly, the ongoing drought conditions have caused a reduction of the natural air pollution cleansing effect of precipitation due to washout – particulate matter and its precursors captured

and removed by raindrops. The reduced frequency of storms also translates to fewer days of enhanced pollutant dispersion. Without the storm systems and related winds, there is less mixing of air pollutants with cleaner air in the atmosphere and less of the transport that moves pollutants out of the region. The lack of windy, unstable weather conditions during storms results in longer episodes of stagnant air when particulate pollution builds to unhealthful levels. The dry conditions have also contributed to increased frequency and intensity of wildfire events throughout the State, with resulting impacts to both particulate and ozone air quality. The net impact of the drought on air quality in the Basin over the past several years has been to disrupt the steady progress seen in prior years toward attainment of the 24-hour PM2.5 NAAQS, for which the design value is based on the 3-year average of the 98th percentile measurement.

Table 2-12 shows the rainfall statistics for the National Weather Service Downtown Los Angeles meteorological station, 2006–2015. Figure 2-9 shows the 2002–2015 trend of both 98th percentile 24-hour PM2.5 values and the 3-year design value, along with the trends of PM2.5-equivalent emissions[14] and the number of rainfall days during the first and fourth quarters of the year. The first and fourth quarters are the most important to consider, since the vast majority of the days that exceed the federal 24-hour standard in the Basin occur during this period. This is also the time period that the Basin typically experiences the most rainfall and more frequent storm events.

[14] PM2.5 equivalent emissions are directly emitted PM2.5 emissions plus PM2.5 precursor emissions weighted by potential to create PM2.5 (see 2012 AQMP, Appendix V: Modeling and Attainment Demonstrations).

TABLE 2-12

Trends of Annual and Quarters 1 & 4 Rainfall Totals and Number of Rain Days for Downtown Los Angeles, 2006-2015

30-Year Average	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Annual Rainfall (inches)										
14.93	11.61	5.66	14.43	9.39	23.09	12.26	8.15	3.60	9.77	7.66
Quarter 1 & Quarter 4 (Jan., Feb., Mar., Oct., Nov., Dec.) Rainfall (inches)										
13.38	8.61	4.40	14.28	9.21	21.39	11.80	6.42	2.80	9.37	3.82
Annual Rain Days										
35.7	36	24	35	25	53	32	38	27	24	26
Quarter 1 & Quarter 4 Rain Days										
29	27	19	31	21	44	27	31	21	18	17

Rainfall data from National Weather Service, Downtown Los Angeles Meteorological Station (USC Campus);
Rainfall totals in inches; rain days defined as measured rainfall $\geq$ 0.01 inches;
30-year normal precipitation averages based on 1981-2010 data

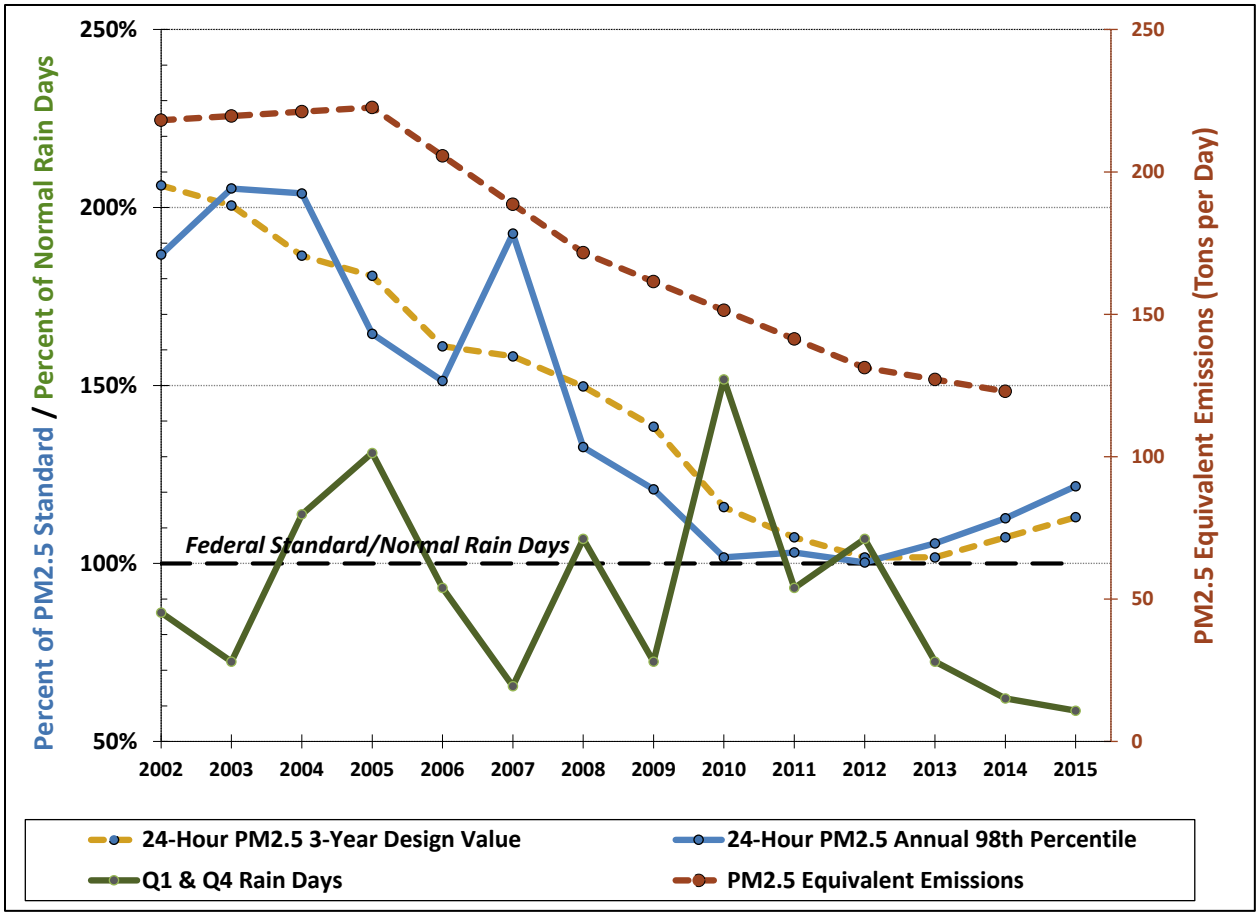


FIGURE 2-9

TREND OF SOUTH COAST AIR BASIN MAXIMUM 24-HOUR PM2.5 YEAR DESIGN VALUES AND CORRESPONDING ANNUAL 98TH PERCENTILE CONCENTRATION AS PERCENT OF THE 24-HOUR PM2.5 NAAQS (35 μg/m^3), WITH ANNUAL TRENDS OF PM2.5 EQUIVALENT EMISSIONS AND PERCENT OF NORMAL NUMBER OF RAIN DAYS FOR QUARTERS 1 (JAN.–MAR.) AND 4 (OCT.–DEC.)

(PM2.5 FROM RIVERSIDE-RUBIDOUX AIR MONITORING STATION THROUGH 2006, THEN MIRA LOMA AFTER THAT STATION WAS INSTALLED)

Annual precipitation totals have been below the normal, or average, value of 14.93 inches (30-year average, 1981–2010) at Downtown Los Angeles from 2011 through most of 2015. Similar relative rainfall deficits were seen at stations throughout Southern California in this time period. After a very wet year in 2010, Downtown Los Angeles measured 82 percent of normal annual rainfall in 2011, with the number of rain days in the first and fourth quarters at 93 percent of the average of 29 days that typically occur during those months. Annual rainfall in 2012 was only 55 percent of normal, but the number of rain days in the first and fourth quarters was a little above normal. Although these initial signs of the emerging drought existed in 2011 and 2012, the cumulative effect of multiple dry years had not yet taken a significant toll on air quality and the amount of storm systems and rain events was not significantly below average. The 98th percentile 24-hour PM2.5 concentrations continued the steady decline in 2012, as had been seen in most years since the PM2.5 measurements started in 1999. This consistent trend

of improving fine particulate air quality is associated with the continued implementation of PM2.5-related emission reductions in the Basin. In 2012, the Basin maximum annual 98th percentile 24-hour PM2.5 was at an all-time low of 35.1 µg/m^3 at Mira Loma, the Basin's highest station, which was under the federal PM2.5 standard (35.5 µg/m^3 is needed to exceed the standard due to rounding conventions).

The 2013 annual rainfall total measured at Downtown Los Angeles was just 3.6 inches, 24 percent of normal. Rainfall events of 0.01 inches or more were 27 percent fewer in 2013 than the average of 29 days that typically occur during the first and fourth quarters of the year, when the Basin historically experiences its highest 24-hour PM2.5 concentrations. As the drought intensified, the impact on PM2.5 air quality became evident in 2013. The 2013 Mira Loma annual 98th percentile concentration increased to 37.5 µg/m^3. The Basin's PM2.5-related emissions continued to decrease, while the long-term trend of steady progress seen in prior years started to reverse due to the drought-related meteorological conditions.

By 2014 the rainfall deficit from the ongoing drought in Southern California had become severe, with annual rainfall totals at 65 percent of normal at Downtown Los Angeles. With only 62 percent of the normal number of rain days and the smaller rain amounts due to the weaker and less frequent storm systems in 2014 and that year's maximum 98th percentile PM2.5 concentration increased to 40.0 µg/m^3.

Southern California annual rainfall totals for 2015 were again quite low, with only 7.66 inches measured at Downtown Los Angeles, 51 percent of normal for the year. The first quarter of 2015 had very little rain, 2.79 inches, which is 30 percent of normal rainfall for that quarter. Only 50 percent of the normal number of rain days were recorded in the first quarter of 2015. A strong El Niño pattern developed by the end of 2015, but the rainfall increased only slightly in the fourth quarter. However, the storm track frequently reached Southern California. Even though there was little precipitation, the improved ventilation from the systems led to significantly improved PM2.5 concentrations in the fourth quarter of 2015. Unfortunately, the effect on the annual 98th percentile PM2.5 concentration was already significant due to the first quarter of 2015. That value for the year 2015 increased to 43.2 µg/m^3 at Mira Loma, the highest 98th percentile concentration measured in the Basin since 2008.

With daily measurements in the Basin for PM2.5, the 98th percentile concentration is typically the eighth highest measurement at the Mira Loma air monitoring station. In recent years, the eighth or ninth highest concentration at Mira Loma may still have been over the level of the federal standard, but with the ongoing effect of the long-term drought and lack of storm systems, the 17th highest concentration, in only the first quarter of 2015, was still over the level of the NAAQS at Mira Loma. This was the highest number of days over the standard at a single station since 2007. Basin-wide, 25 days exceeded the 24-hour standard in 2015, the most in a single year since 2009. Notably, there were no additional exceedances of the 24-hour PM2.5 standard occurring at Mira Loma through the remaining three quarters of 2015, including the fourth quarter which typically includes several days over the standard.

The preliminary PM2.5 data for the first quarter of 2016 indicates that only three days exceeded the 24-hour NAAQS at Mira Loma in that quarter, as compared to 17 days for the first quarter of 2015. Only four days Basin-wide had exceedances of the NAAQS in the first quarter of 2016 at one or more stations, compared to 25 days in 2015. Likewise, the preliminary 2016 first quarter average at Mira Loma was 15.1 µg/m^3, compared to 18.4 µg/m^3 for the first quarter of 2015. As was seen in the fourth quarter of 2015, the Basin did not receive the anticipated high rainfall in the first quarter of 2016 with the El Niño

conditions, but the number of days with unsettled, breezy weather conditions was significantly greater than in 2014 and 2015, leading to fewer days with elevated PM2.5 levels.

While the 2012 AQMP PM2.5 attainment demonstration and the 2015 associated supplemental SIP submission indicated that attainment of the 24-hour standard was predicted to occur by the end of 2015, it could not anticipate the effect of the ongoing drought on the measured PM2.5. The 2006 to 2010 base period used for the 2012 attainment demonstration had near-normal rainfall. While the trend of PM2.5-equivalent emission reductions continued through 2015, the severe drought conditions contributed to the PM2.5 increases observed after 2012. As a result of the disrupted progress toward attainment of the federal 24-hour PM2.5 standard, SCAQMD submitted a request and the U.S. EPA approved, in January 2016, a "bump up" to the nonattainment classification from "moderate" to "serious," with a new attainment deadline as soon as practicable, but not beyond December 31, 2019. Further discussion of drought effects on future air quality is contained in Appendix V: Modeling and Attainment Demonstrations.

Air Quality, PM10

In 2015, SCAQMD routinely monitored PM10 concentrations at 25 locations in the Basin and the Coachella Valley. Of these, 19 employed FRM filter samplers. The FRM PM10 minimum sampling schedule set by U.S. EPA requires one 24-hour filter sample every sixth day. At the Riverside-Rubidoux, Mira Loma, and Indio stations, the 24-hour filter sample is collected once every three days. In addition, nine stations have FEM[15] continuous monitors, which supplement the collocated FRM measurements at five stations and are the primary measurement at four more stations. Unlike PM2.5 FEM measurements, there is no waiver for PM10 FEM instruments and those measurements serve as the official reading for attainment determination on the days with no collocated FRM filter sample.

The maximum 24-hour PM10 levels in 2015 are summarized by county and basin in Table 2-13, along with the design values and state designation values. The federal 24-hour standard level (155 µg/m^3 is the exceedance level) was only exceeded at two stations in the Basin on two different days in 2015, in the Perris Valley on September 9 (188 µg/m^3) and in the Central San Bernardino Valley on December 26 (187 µg/m^3), measured with FRM monitors. These high 24-hour averages were both due to high-wind exceptional events and also do not jeopardize the attainment design value at this time, which allows for one exceedance per year at a station, averaged over three years. The Basin has remained in attainment of the PM10 NAAQS since 2006. The Basin maximum 2013–2015 design value for 24-hour PM10 is 126 µg/m^3 (81 percent of the NAAQS), in Metropolitan Riverside County at the Mira Loma monitoring station. The much more stringent State 24-hour PM10 standard (50 µg/m^3) was exceeded at many stations in the Basin and in the Coachella Valley.

The Coachella Valley had eight days in 2015 exceeding the 24-hour PM10 NAAQS, with concentrations as high as 337 µg/m^3 at the Indio monitoring station – all of which were due to windblown dust and sand associated with high-wind exceptional events. The Palm Springs monitoring station only exceeded on

[15] The continuous FEM PM10 monitors deployed by SCAQMD are primarily Beta Attenuation Monitor (BAM) instruments, although some PM10 Tapered Element Oscillating Microbalance (TEOM) instruments are also used, most notably in the Coachella Valley.

two of those days. The recent FEM monitor at Saul Martinez Elementary School, in the town of Mecca in the southeastern portion of the Coachella Valley, exceeded the standard on five days in 2015, all related to high-wind events. The Coachella Valley 2013–2015 design value for 24-hour PM10 is 150 µg/m^3, at Indio, after the exclusion of the exceptional events, which would not violate the PM10 NAAQS, if U.S. EPA concurs with exceptional events upon submittal of supporting documentation.

TABLE 2-13

2015 Maximum 24-hour Average PM10 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum PM10 24-Hour Average (µg/m^3)*	2013-2015 PM10 24-Hour Design Value (µg/m^3)*	2013-2015 Percent of PM10 NAAQS (150 µg/m^3)#	Area of Design Value Max	2013-2015 High State PM10 24-Hour Designation Value (µg/m^3)##	2013-2015 Percent of State PM10 24-Hour Standard (50 µg/m^3)
South Coast Air Basin						
Los Angeles	101	93	60	East San Gabriel Valley	75.6	151
Orange	66	85	55	Central Orange County	12.1	24
Riverside	**139****	**126**	**81**	**Metropolitan Riverside County**	**123.8**	**248**
San Bernardino	96**	103	66	Central San Bernardino Valley	19.2	38
Salton Sea Air Basin						
Riverside	**152****	**150**	**100**	**Coachella Valley (Indio)**	**128.2**	**256**

Bold text denotes the peak value

* Based on the FRM data when available, otherwise FEM data is included

** Higher 24-hour PM10 concentrations were measured in 2015, up to 337 µg/m^3 in the Coachella Valley and up to 188 µg/m^3 in Riverside County (Perris station), that were related to high-wind events and have been flagged for exclusion from NAAQS comparison in accordance with the U.S. EPA Exceptional Events Rule; U.S. EPA concurrence is required for exclusion of exceptional events after submittal of supporting documentation

155 µg/m^3 is needed to exceed the level of the PM10 NAAQS

The State 24-hour Expected Peak Day Concentration (EPDC) is a calculated 3-year value after accounting for statistical outliers; the State 24-hour Designation Value is the highest concentration at or below the EPDC over the 3-year period; State data may include exceptional events; State PM10 24-hour average designation value includes FRM and BAM FEM data, but not TEOM FEM instruments since the TEOM is not a California Approved Sampler (CAS) for standard compliance (SCAQMD uses TEOM instruments to supplement FEM measurements in the Coachella Valley)

The maximum annual average PM10 in 2015 is summarized by county and air basin in Table 2-14, along with the design values and state designation values. In 2015, the revoked annual average PM10 NAAQS (50 µg/m^3) was not exceeded in the Basin, with an annual averaged concentration of 48.8 µg/m^3 in Metropolitan Riverside County at the Mira Loma station. However, the 3-year annual PM10 design value for 2013–2015 exceeded the former NAAQS at Mira Loma, at 51.8 µg/m^3. No other stations in the Basin or the Coachella Valley exceeded the former standard in 2015 or for the 2013–2015 design value. The

much more stringent State annual PM10 standard (20 µg/m^3) was exceeded in most stations in each county in the Basin and in the Coachella Valley.

TABLE 2-14

2015 Maximum Annual Average PM10 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum PM10 Annual Average (µg/m^3)*	2013-2015 PM10 Annual Design Value (µg/m^3)	2013-2015 Percent of Former PM10 Annual NAAQS** (50 µg/m^3)	Area of Design Value Max	2013-2015 3-Yr. High State PM10 Annual Designation Value (µg/m^3)#	2013-2015 Percent of Current PM10 State Standard (20 µg/m^3)
South Coast Air Basin						
Los Angeles	37.1	38.0	76	East San Gabriel Valley	43	215
Orange	24.8	26.1	52	Central Orange County	27	135
Riverside	**48.8**	**51.8**	**104**	**Metropolitan Riverside County**	**45**	**225**
San Bernardino	37.8	39.4	79	Central San Bernardino Valley	39	195
Salton Sea Air Basin						
Riverside	36.5	37.2	74	Coachella Valley (Indio)	**45**	**225**

Bold text denotes the peak value

* Based on the FRM data when available, otherwise FEM data is used; flagged exceptional event days are excluded

** The federal annual PM10 standard was revoked in 2006

\# State data may include exceptional events; State PM10 annual average designation value includes FRM and BAM FEM data, but not TEOM FEM instruments since the TEOM is not a California Approved Sampler (CAS) for standard compliance (SCAQMD uses TEOM instruments to supplement FEM measurements in the Coachella Valley); State annual designation value is the highest year in the 3-year period

Other Criteria Air Pollutants

Carbon Monoxide (CO)

Health Effects, CO

The adverse effects of ambient carbon monoxide air pollution exposure on health have been reviewed in the 2010 U.S. EPA *Integrated Science Assessment for Carbon Monoxide*.[16] This document presents a detailed review of the available scientific studies and conclusions on the causal determination of the health effects of CO. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of worsening oxygen supply delivery to the heart.

Inhaled CO has no known direct toxic effect on the lungs, but exerts its effect on tissues by interfering with oxygen transport, by competing with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, people with conditions requiring an increased oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include patients with diseases involving heart and blood vessels, fetuses, and patients with chronic hypoxemia (oxygen deficiency), such as is seen at high altitudes.

Reductions in birth weight and impaired neurobehavioral development have been observed in animals chronically exposed to CO resulting in COHb levels similar to those observed in smokers. Recent studies have found increased risks for adverse birth outcomes with exposure to elevated CO levels, including pre-term births and heart abnormalities.

Air Quality, CO

Ambient carbon monoxide concentrations were measured at 25 locations in the Basin and neighboring SSAB areas in 2015, including one station in the Coachella Valley and two year-road monitors. Tables 2-15 and 2-16 summarize the 2015 maximum 1-hour and 8-hour average concentrations of CO by air basin and county. In 2015, no areas in the Basin or the Coachella Valley exceeded the CO air quality standards, including the near-road stations. The highest concentrations of CO continued to be recorded in the areas of Los Angeles County, where vehicular traffic is most dense, with the maximum 8-hour and 1-hour concentration (4.3 ppm and 3.0 ppm, respectively) recorded in the South Central Los Angeles County area. The new near-road monitors in Orange and San Bernardino counties did not increase the Basin's maximum CO values or design values in 2015 over that from Los Angeles County, although the near-road concentrations were often higher than the nearest ambient stations.

All areas of the Basin have continued to remain below the federal standards (35 ppm 1-hour and 9 ppm 8-hour) since 2003. U.S EPA redesignated the Basin to attainment of the federal CO standards, effective June 11, 2017. There also have been no exceedances of the State 1 episode (federal alert) level (8-hour

[16] U.S. EPA. (2010). Integrated Science Assessment for Carbon Monoxide (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-09/019F. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=218686.

CO ≥ 15 ppm). The Basin and the Coachella Valley are also well below the State CO standards (20 ppm 1-hour and 9.0 ppm 8-hour).

TABLE 2-15

2015 Maximum 1-Hour CO Concentrations and 2015 Design Values by Basin and County

Basin/County	2015 Maximum CO 1-Hour Average (ppm)	2015 CO 1-Hour Design Value* (ppm)	Percent of CO 1-Hour NAAQS (35 ppm)	Area of Design Value Max	Percent of CO 1-Hour State Standard (20 ppm)
South Coast Air Basin					
Los Angeles	**4.4**	**4.3**	**11**	**South Central L.A. County**	**22**
Orange	3.1 *(3.1 at I-5 N.R.)*	2.9 *(2.9 at I-5 N.R.)*	8 *(8)*	North Orange County	15 *(15)*
Riverside	2.5	2.2	6	Metropolitan Riverside County	11
San Bernardino	2.8 *(2.7 at I-10 N.R.)*	2.2 *(2.7 at I-10 N.R.)***	6 *(8)*	Central San Bernardino Valley	11 *(14)*
Salton Sea Air Basin					
Riverside	2.0	1.9	5	Coachella Valley	10

Bold text denotes Basin maximum; I-5 and I-10 near-road monitors are shown in parenthesis

* The 1-hour CO design value is the 2nd highest 1-hour average concentration at a station in a single year

** The 2015 1-hour CO design value maximum in San Bernardino County was at the I-10 near-road station

TABLE 2-16

2015 Maximum 8-Hour CO Concentrations and 2015 Design Values by Basin and County

Basin/County	2015 Maximum CO 8-Hour Average (ppm)	2015 CO 8-Hour Design Value* (ppm)	Percent of CO 8-Hour NAAQS (9 ppm)	Area of Design Value Max	Percent of CO 8-Hour State Standard (9.0 ppm)
South Coast Air Basin					
Los Angeles	**3.3**	**3.0**	**33**	**South Central L.A. County**	**33**
Orange	2.2 *(2.3 at I-5 N.R.)*	2.0 *(2.3 at I-5 N.R.)*	22 *(26)*	Central Orange County	22 *(26)*
Riverside	1.7	1.5	17	Metropolitan Riverside County	17
San Bernardino	1.8 *(2.6 at I-10 N.R.)*	1.8 *(2.5 at I-10 N.R.)*	20 *(28)*	Central San Bernardino Valley	20 *(28)*
Salton Sea Air Basin					
Riverside	0.7	0.5	6	Coachella Valley	6

Bold text denotes Basin maximum; I-5 and I-10 near-road monitors are shown in parenthesis

* The 8-hour CO design value is the 2nd highest 8-hour average concentration at a station in a single year

Near-Road CO

On August 12, 2011 U.S. EPA issued a decision to retain the existing NAAQS for CO, determining that those standards provided the required level of public health protection. However, U.S. EPA added a monitoring requirement for near-road CO monitors in urban areas with population of 1 million or more, utilizing stations that would be implemented to meet the 2010 NO_2 near-road monitoring requirements. The two new CO monitors are at the I-5 Near-Road site, located in Orange County near Anaheim, and the I-10 Near-Road site, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The near-road CO measurements began at these two locations in late December 2014. From that time to the end of 2015, the data shows that while the near-road measurements were often higher than the nearest ambient monitors, as would be expected in the near-road environment, they did not exceed the levels of the 1-hour or 8-hour CO NAAQS. Tables 2-17 and 2-18 compare the available near-road measurements for annual peak 1-hour and 8-hour CO, respectively, to the comparable measurements from the nearby ambient stations at Anaheim and Fontana. The form of the CO standard is such that the peak concentration is not to be exceeded more than once per year. The tables include the second highest concentration for comparison to this design value form of the standard.

The 2015 near-road peak 1-hour CO concentration measured was 3.1 ppm, measured at the I-5 Near-Road site, while the peak 8-hour CO concentration was 2.6 ppm at the I-10 Near-Road site, both well below the respective NAAQS levels (35 ppm and 9 ppm, respectively). The 2015 near-road CO design values were higher than that of the nearest ambient stations for both federal standards. Based on this limited period

of data, it appears that the near-road CO design values will be very unlikely to affect the Basin's attainment status for the State and federal CO standards.

TABLE 2-17

2014 and 2015 Maximum and Second Highest 1-Hour CO Concentrations
at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road CO						Nearby Ambient CO				
		Peak 1-Hour CO (ppm)		2nd Maximum 1-Hour CO (ppm)			Peak 1-Hour CO (ppm)		2nd Maximum 1-Hour CO (ppm)	
Near-Road Station	**Start Date**	**2014**	**2015**	**2014**	**2015**	**Ambient Station**	**2014**	**2015**	**2014**	**2015**
Route 5 N. R. (at Vernon St., Orange County)	12/18/2014	N/A	3.1	N/A	**2.9**	**Anaheim**	3.1	3.1	2.6	2.6
Route 10 N. R. (at Etiwanda Av., San Bernardino County)	12/23/2014	N/A	**2.7**	N/A	**2.7**	**Fontana**	2.6	2.8	2.2	2.2

Bold text denotes maximum concentration between near-road and nearby ambient stations
N/A = complete data not available for valid calculation
The 1-hour CO NAAQS is 35 ppm, not to be exceeded more than once at a station in a single year

TABLE 2-18

2014 and 2015 Maximum and Second Highest 8-Hour CO Concentrations
at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road CO						Nearby Ambient CO				
		Peak 8-Hour CO (ppm)		2nd Maximum 8-Hour CO (ppm)			Peak 8-Hour CO (ppm)		2nd Maximum 8-Hour CO (ppm)	
Near-Road Station	**Start Date**	**2014**	**2015**	**2014**	**2015**	**Ambient Station**	**2014**	**2015**	**2014**	**2015**
Route 5 N. R. (at Vernon St., Orange County)	12/18/2014	N/A	2.3	N/A	2.3	**Anaheim**	**2.1**	**2.2**	**2.1**	**2.0**
Route 10 N. R. (at Etiwanda Av., San Bernardino County)	12/23/2014	N/A	**2.6**	N/A	**2.5**	**Fontana**	1.2	1.2	1.1	1.1

Bold text denotes maximum concentration between near-road and nearby ambient stations
N/A = complete data not available for valid calculation
The 8-hour CO NAAQS is 9 ppm, not to be exceeded more than once at a station in a single year

Nitrogen Dioxide (NO_2)

Health Effects, NO_2

The adverse effects of ambient nitrogen dioxide air pollution exposure on health were reviewed in the 2008 U.S. EPA *Integrated Science Assessment for Oxides of Nitrogen – Health Criteria*,[17] and more recently in the 2016 U.S. EPA *Integrated Science Assessment for Oxides of Nitrogen – Health Criteria*.[18] These documents present detailed reviews of the available scientific studies and conclusions on the causal determination of the health effects of NO_2, including evidence supporting the short-term NO_2 standard (1-hour, 100 ppb), which was adopted in 2010. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

The 2016 U.S. EPA review noted the respiratory effects of NO_2, and evidence suggestive of impacts on cardiovascular health, mortality and cancer. Evidence for low-level nitrogen dioxide (NO_2) exposure effects is derived from laboratory studies of asthmatics and from epidemiological studies. Additional evidence is derived from animal studies. In the 2016 ISA, the U.S. EPA cited the coherence of the results

[17] U.S. EPA. (2008). Integrated Science Assessment for Oxides of Nitrogen – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/071. http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=194645.

[18] U.S. EPA. (2016). Integrated Science Assessment for Oxides of Nitrogen – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-15/068. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=310879.

from a variety of studies, and a plausible biological mechanism to support the determination of a causal relationship between short-term NO_2 exposures and asthma exacerbations ("asthma attacks"). The long-term link with respiratory outcomes was strengthened by recent experimental and epidemiological studies, and the strongest evidence available is from studies of asthma development.

Experimental studies have found that NO_2 exposures increase responsiveness of airways, pulmonary inflammation, and oxidative stress, and can lead to the development of allergic responses. These biological responses provide evidence of a plausible mechanism for NO_2 to cause asthma. Additionally, results from controlled exposure studies of asthmatics demonstrate an increase in the tendency of airways to contract in response to a chemical stimulus (airway responsiveness) or after inhaled allergens. Animal studies also provide evidence that NO_2 exposures have negative effects on the immune system, and therefore increase the host's susceptibility to respiratory infections. Epidemiological studies showing associations between NO_2 levels and hospital admissions for respiratory infections support such a link, although the studies examining respiratory infections in children are less consistent.

Based on the review of the NO_2 standards, U.S. EPA established the 1-hour NO_2 standard to protect the public health against short-term exposure. The standard is set at 100 ppb over a 1-hour average and became effective on April 7, 2010.

Air Quality, NO_2

In 2015, ambient NO_2 concentrations were monitored at 27 locations, including one in the Coachella Valley and four near-road monitoring stations. The Basin has not exceeded the federal annual standard for NO_2 (0.0534 ppm) since 1991, when the Los Angeles County portion of the Basin recorded the last violation of that standard in the U.S. The current 1-hour average NO_2 NAAQS (100 ppb) was exceeded on one day in 2015 in the South Coastal Los Angeles County area at the Long Beach – Hudson air monitoring station (a location close to periodic diesel truck and bus activity). However, the 98th percentile form of the standard was not exceeded and the 2013–2015 design value is not in violation of the NAAQS.

The higher relative concentrations in the Los Angeles area are indicative of the concentrated emission sources, especially heavy-duty vehicles. Although the Basin is in attainment of the State and federal standards, NO_2 is still of concern, since oxides of nitrogen (NOx) are precursors to both ozone and particulate matter. Further control of NO_x will be required to attain the ozone and particulate standards. The Basin has not exceeded the federal annual standard for NO_2 (0.053 ppm or 53 ppb) since 1991, when the Los Angeles County portion of the Basin recorded the last violation of that standard in the U.S. No State NO_2 standards were exceeded in 2015. Tables 2-19 and 2-20 summarize the 2015 maximum 1-hour and annual average concentrations of NO_2 by air basin and county. These tables do not include the new near-road stations, since the period of record is not yet sufficient to calculate the 3-year NO_2 design values. The near-road NO_2 data is summarized further below.

TABLE 2-19

2015 Maximum 1-Hour NO_2 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum NO_2 1-Hour Average (ppb)	2013-2015 NO_2 1-Hour Design Value (ppb)	Percent of NO_2 1-Hour NAAQS (100 ppb)	Area of Design Value Max	2013-2015 NO_2 1-Hour State Designation Value (ppm)	Percent of NO_2 1-Hour State Standard (0.18 ppm)
South Coast Air Basin						
Los Angeles	**101.8***	**74**	**74**	**South Coastal LA Co.**	**0.14**	**78**
Orange	59.1	58	58	Central Orange County	0.09	50
Riverside	68.1	54	54	Metropolitan Riverside County	0.07	39
San Bernardino	89.1	64	64	Central San Bernardino Valley	0.09	50
Salton Sea Air Basin						
Riverside	41.5	39	39	Coachella Valley	0.05	28

Bold text denotes the peak value

This table does not include near-road stations since the data period is insufficient for 3-year design value calculation (see near-road discussion below)

The 1-hour NO_2 design value is the annual 98th percentile daily maximum 1-hour concentration, averaged over 3 years at a station

* Although the maximum 1-hour concentrations exceeded the standard on one day, the 98th percentile form of the design value did not exceed the NAAQS

TABLE 2-20

2015 Maximum Annual Average NO_2 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum NO_2 Annual Average (ppm)	2013-2015 NO_2 Annual Design Value (ppm)	Percent of NO_2 Annual NAAQS (0.053 ppm)	Area of Design Value Max	2013-2015 NO_2 Annual State Designation Value# (ppm	Percent of NO_2 Annual State Standard (0.030 ppm)
South Coast Air Basin						
Los Angeles	**0.0222**	**0.022**	**42**	**Central Los Angeles County**	**0.023**	**77**
Orange	0.0150	0.016	30	Central Orange County	0.018	60
Riverside	0.0144	0.016	30	Metropolitan Riverside County	0.017	57
San Bernardino	0.0187	0.020	38	Central San Bernardino Valley	0.021	70
Salton Sea Air Basin						
Riverside	0.0062	0.007	13	Coachella Valley	0.008	27

Bold text denotes the peak value

The annual NO_2 design value is the annual average of the quarterly averages, averaged over 3 years at a station

This table does not include near-road stations since the data period is insufficient for the design value calculation

Near-Road NO_2

With the revised NO_2 federal standard in 2010, near-road NO_2 measurements were required to be phased in for larger cities. The four near-road monitoring stations are: (1) I-5 Near-Road, located in Orange County near Anaheim; (2) I-710 Near-Road, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; (3) CA-60 Near-Road, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland; and (4) I-10 Near-Road, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The longest operating near-road station in the Basin, adjacent to I-5 in Orange County, has not exceeded the level of the 1-hour NO_2 NAAQS (100 ppb) since the measurements began on January 1, 2014. The peak 1-hour NO_2 concentration at that site in 2014 was 78.8 ppb and the peak concentration for 2015 was 70.2 ppb. This can be compared to the annual peak values measured at the nearest ambient monitoring station in Central Orange County (Anaheim station), where the 2014 and 2015 peaks were 75.8 and 59.1, respectively. In terms of the design value form of the NAAQS, the 98th percentile daily maximum 1-hour concentrations at the Anaheim near-road site were 66.0 ppb and 61.4 ppb, respectively, for 2014 and 2015, compared to 59.8 ppb and 54.6 ppb from the Anaheim ambient monitoring station. The annual average NO_2 NAAQS (0.053 ppm, or 53 ppb) was also not exceeded. Thus, while the Anaheim near-road NO_2 measurements are higher than the ambient Orange County measurements, as would be expected close to traffic emissions sources, it does not appear that NO_2 design values will violate the NAAQS or CAAQS at this location.

Likewise, the shorter period of data available from the remaining three near-road stations indicates that these locations will also likely measure higher NO_2 than the nearest ambient stations, but they have not exceeded the level of the 1-hour or annual NO_2 NAAQS or CAAQS through the end of 2015. Tables 2-21 and 2-22 compare the available near-road NO_2 measurements for peak 1-hour and annual average NO_2, respectively, to the nearest ambient measurements. The 98th percentile concentration is included for comparison to the design value form of the 1-hour NO_2 NAAQS of 100 ppb. Based on this limited period of data, it appears that the near-road NO_2 measurements will be unlikely to affect the Basin's attainment status for the State and federal NO_2 standards.

TABLE 2-21

2014 and 2015 Maximum and 98th Percentile 1-Hour NO_2 Concentrations
at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road NO_2						Nearby Ambient NO_2				
		Annual Peak 1-Hour NO_2 (ppb)		98th Pctl. 1-Hour NO_2 (ppb)			Annual Peak 1-Hour NO_2 (ppb)		98th Pctl. 1-Hour NO_2 (ppb)	
Near-Road Station	**Start Date**	**2014**	**2015***	**2014**	**2015***	**Ambient Station**	**2014**	**2015**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	1/1/2014	**78.8**	**70.2**	**66.0**	**61.4**	**Anaheim**	**75.8**	59.1	59.8	54.6
I-710 N. R. (at Long Beach Bl., Los Angeles County)	2/18/2015	N/A	**94.7**	N/A	**74.8**	**Compton**	68.2	73.6	59.2	58.7
CA-60 N. R. (West of Vineyard Av., San Bernardino/Riverside County)	7/9/2015	N/A	**79.2**	N/A	**77.2**	**Upland**	74.1	71.6	56.7	55.7
I-10 N. R. (at Etiwanda Av., San Bernardino County)	10/8/2014	**93.0**	87.2	**69.5**	**73.0**	**Fontana**	70.4	**89.1**	63.6	66.1

Bold text denotes the peak value

N/A = data not available (monitoring not started)

* 2015 data is incomplete for I-710 and CA-60 Near-Road Sites

The 1-hour NO_2 NAAQS is 100 ppb

TABLE 2-22

2014 and 2015 Annual NO_2 Concentrations at South Coast Air Basin
Near-Road Sites and Nearby Ambient Stations

Near-Road NO_2				Nearby Ambient NO_2		
		Annual Average NO_2 (ppb)			Annual Average NO_2 (ppb)	
Near-Road Station	**Start Date**	**2014**	**2015***	**Ambient Station**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	1/1/2014	**27.2**	**25.4**	**Anaheim**	15.2	14.6
I-710 N. R. (at Long Beach Bl., Los Angeles County)	2/18/2015	N/A	23.9	**Compton**	15.6	16.9
CA-60 N. R. (West of Vineyard Av., San Bernardino/Riverside County)	7/9/2015	N/A	N/A	**Upland**	16.6	15.9
I-10 N. R. (at Etiwanda Av., San Bernardino County)	10/8/2014	N/A	**29.8**	**Fontana**	20.2	18.7

Bold text denotes the peak value
N/A = data not available (monitoring not started)
* 2015 data is incomplete for I-710 and CA-60 Near-Road Sites
The annual average NO_2 NAAQS is 0.053 ppm, or 53 ppb

Sulfur Dioxide (SO_2)

Health Effects, SO_2

The adverse effects of SO_2 air pollution exposure on health were reviewed in the 2008 U.S. EPA *Integrated Science Assessment (ISA) for Sulfur Oxides – Health Criteria*.[19] This document presents a detailed review of the available scientific studies and conclusions on the causal determination of the health effects of SO_2, including the justification to rescind the 24-hour standard and replace it with the new 2010 1-hour standard (75 ppb). A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

Individuals affected by asthma are especially sensitive to the effects of SO_2. Exposure to low levels (0.2 to 0.6 ppm) of SO_2 for a few (5–10) minutes can result in airway constriction in some exercising asthmatics. Increased resistance to air flow and reduction in breathing capacity leading to severe breathing

[19] U.S. EPA. (2008). Integrated Science Assessment (ISA) for Sulfur Oxides – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/047F. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=198843#Download.

difficulties, are observed after acute high exposure to SO_2 in asthmatics. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO_2.

Animal studies suggest that SO_2 at ambient concentrations can cause allergic sensitization and airway inflammation. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO_2 levels. In these studies, efforts to separate the effects of SO_2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.

Based on the review of the SO_2 standards, U.S. EPA has established the 1-hour SO_2 standard to protect the public health against short-term exposure. The 1-hour average NAAQS was set at 75 ppb and the annual (0.03 ppm) and 24-hour (0.14 ppm) federal standards were revoked, effective August 2, 2010.

Air Quality, SO_2

No exceedances of federal or State standards for sulfur dioxide occurred in 2015, or in any recent year, at any of the six SCAQMD ambient monitoring locations. The annual and 24-hour federal standards were last exceeded in the 1960's and the State standards were last exceeded in 1990. Though sulfur dioxide concentrations remain well below the standards, sulfur dioxide is a precursor to sulfate, which is a component of fine particulate matter. Tables 2-23 and 2-24 summarize the 2015 maximum 1-hour and annual average concentrations of SO_2 by air basin and county. Sulfur dioxide was not measured at the Coachella Valley sites in 2015. Historical measurements and source emission profiles show that expected concentrations in the Coachella Valley will be well below State and federal standards.

TABLE 2-23

2015 Maximum 1-Hour SO_2 Concentrations and 2013–2015 Design Values
by Basin and County

Basin/County	2015 Maximum SO_2 1-Hour Average (ppb)	2013-2015 SO_2 1-Hour Design Value (ppb)	Percent of SO_2 1-Hour NAAQS (75 ppb)	Area of Design Value Max	Percent of SO_2 1-Hour State Standard (0.25 ppm = 250 ppb)
South Coast Air Basin					
Los Angeles	**37.5**	**11**	**15**	**South Coastal LA County**	**4**
Orange	4.5	3	4	North Coastal Orange County	1
Riverside	1.9	3	4	Metropolitan Riverside County	1
San Bernardino	4.0	3	4	Central San Bernardino Valley	1
Salton Sea Air Basin					
Riverside	N.D.	N.D.	N.D.	Coachella Valley	N.D.

Bold text denotes the peak value

N.D. = No Data. Historical measurements and lack of emissions sources indicate concentrations are well below standards

The 1-hour SO_2 design value is the annual 99th percentile 1-hour daily maximum concentration, averaged over 3 years at a station

TABLE 2-24

2015 Maximum 24-Hour Average SO_2 Concentrations and 2013–2015 Design Values
by Basin and County

Basin/County	2015 Maximum SO_2 24-Hour Average (ppm)	2013-2015 SO_2 24-Hour Design Value (ppm)	Percent of SO_2 24-Hour former NAAQS (0.14 ppm)	Area of Design Value Max	Percent of SO_2 24-Hour State Standard (0.04 ppm)
South Coast Air Basin					
Los Angeles	**0.005**	**0.003**	**2**	**South Coastal LA County**	**8**
Orange	0.001	0.001	1	North Coastal Orange County	3
Riverside	0.001	0.001	1	Metropolitan Riverside County	3
San Bernardino	0.001	0.001	2	Central San Bernardino Valley	3
Salton Sea Air Basin					
Riverside	N.D.	N.D.	N.D.	Coachella Valley	N.D.

Bold text denotes the peak value

N.D. = No Data. Historical measurements and lack of emissions sources indicate concentrations are well below standards

The 24-hour SO_2 design value is the 2nd highest 24-hour average concentration at a station in a single year

Sulfates (SO_4^{2-})

Health Effects, SO_4^{2-}

In 2002, CARB reviewed and retained the State standard for sulfates, retaining the concentration level (25 µg/m^3) but changing the basis of the standard from a Total Suspended Particulate (TSP) measurement to a PM10 measurement. In their 2002 staff report,[20] CARB reviewed the health studies related to exposure to ambient sulfates, along with particulate matter, and found an association with mortality and the same range of morbidity effects as PM10 and PM2.5, although the associations were not as consistent as with PM10 and PM2.5. The 2009 U.S. EPA *Integrated Science Assessment for Particulate Matter*[21] also contains a review of sulfate studies.

Most of the health effects associated with fine particles and SO_2 at ambient levels are also associated with sulfates. Thus, both mortality and morbidity effects have been observed with an increase in ambient sulfate concentrations. However, efforts to separate the effects of sulfates from the effects of other pollutants have generally not been successful.

Air Quality, SO_4^{2-}

Sulfates, as measured from FRM PM10 filters, was sampled at 18 stations in 2015 in the SCAQMD jurisdiction, including two locations in the Coachella Valley. Two stations were closed in 2014, Burbank and Ontario Fire Station, with only partial-year data available. The North Long Beach station was closed in 2013. New locations are pending for the Burbank and North Long Beach stations. Since the sulfate measurement is analyzed in the laboratory from the collected 24-hour PM10 filters, the sulfate network is identical to the FRM PM10 monitoring network. The measurements are done every sixth day, except that two stations in Metropolitan Riverside County (Rubidoux and Mira Loma) and one in the Coachella Valley (Indio) measure every third day.

In 2015, the State 24-hour PM10-sulfate standard (25 µg/m^3) was not exceeded anywhere in the Basin or the Coachella Valley, nor has it been exceeded since 1990. The peak Basin sulfate concentration of 21.0 µg/m^3 (84 percent of the State standard) was measured in the East San Gabriel Valley. This was higher than the peaks in recent years, due to the impact of Independence Day fireworks on the July 5 measurements. Several other stations in the Basin also had annual peaks on this day and it is anticipated that they will not be included in the State designation value calculation. There is no corresponding federal standard for sulfates. Maximum 24-hour concentrations and 3-year maximum State designation values by air basin and county are summarized in Table 2-25.

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[20] CARB. (2002). Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates. California Air Resources Board, Sacramento, CA. http://www.arb.ca.gov/regact/aaqspm/isor.pdf.

[21] U.S. EPA. (2009). Integrated Science Assessment for Particulate Matter (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546.

TABLE 2-25

2015 Maximum 24-Hour Average Sulfate (SO_4^{2-} from PM10) Concentrations by Basin and County

Basin/County	2015 Maximum SO_4^{2-} 24-Hour Average ($\mu g/m^3$)	2013-2015 SO_4^{2-} 24-Hour State Designation Value ($\mu g/m^3$)	2015 Percent of SO_4^{2-} State Standard (25 $\mu g/m^3$)	Area of Max
South Coast Air Basin				
Los Angeles	**21.0***	**6.9***	**33**	**South Coastal Los Angeles County**
Orange	4.2	4.2	17	Central Orange County
Riverside	5.9*	4.2*	17	Metropolitan Riverside County
San Bernardino	14.7*	4.6*	18	Central San Bernardino Valley
Salton Sea Air Basin				
Riverside	4.6**	2.6**	10	Coachella Valley (Palm Springs)

Bold text denotes the peak value

* The 2015 Basin maximum sulfate concentration of 21.0 $\mu g/m^3$ in Los Angeles County, as well as the peaks in Riverside and San Bernardino Counties, occurred on July 5, 2015, due to fireworks on Independence Day; it is anticipated that these may be excluded from the State designation value calculations for a peak 2015 Basin designation value of 6.9 $\mu g/m^3$

** The 2015 Coachella Valley maximum sulfate concentration of 4.6 $\mu g/m^3$ at the Palm Springs station was associated with a high-wind exceptional event; it is anticipated that this may be excluded from the State designation value calculations for a peak 2015 Basin designation value of 2.6 $\mu g/m^3$

Lead (Pb)

Health Effects, Lead

The adverse effects of ambient lead exposures on health were reviewed in the 2013 U.S. EPA document, *Integrated Science Assessment for Lead: Final Report*.[22] This document presents a detailed assessment of the available scientific studies and presents conclusions on the causal determination of the health effects of lead, including the rationale to retain the current federal lead standard. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

Fetuses, infants, and children are more sensitive than others to the adverse effects of lead exposure. Long-term exposure to low levels of lead can adversely affect the development and function of the central

[22] U.S. EPA. (2013). Integrated Science Assessment for Lead (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/075F. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=255721#Download.

nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotients. In adults, increased lead levels are associated with increased blood pressure and risk of coronary heart disease. Lead is linked to important hematological effects, such as impaired red blood cell function.

Lead poisoning can cause anemia, lethargy, seizures, and death. Lead can be stored in the bone from early-age environmental exposure, and elevated blood lead levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland), and osteoporosis (breakdown of bony tissue). Fetuses and breast-fed babies can be exposed to higher levels of lead because of previous environmental lead exposure of their mothers.

Air Quality, Lead

Lead (Pb), as analyzed from Total Suspended Particulate (TSP) samples, was measured at eight ambient locations and an additional five source-specific stations in the Basin in 2015. This includes a new source-specific lead monitor that was installed in Fontana near a recycling facility starting in January 2015.

Based on the review of the NAAQS for lead, U.S. EPA established the current standard of 0.15 µg/m^3 for a rolling 3-month average, effective October 15, 2008. There have been no violations of the lead standards at the District's regular population-based ambient air monitoring stations since 1982, primarily as a result of removal of lead from gasoline. However, monitoring at two stations immediately adjacent to stationary sources of lead recorded exceedances of the current standard in Los Angeles County over the 2007–2009 time period. These data were used for designations under the revised standard that also included new requirements for near-source monitoring. As a result, a nonattainment designation was finalized for much of the Los Angeles County portion of the Basin when the current standard was implemented.

Table 2-26 summarizes the Basin's maximum 3-month rolling average lead concentrations recorded in 2015 and in the 2013–2015 design value period, by county. The current lead concentrations in Los Angeles county are now well below the NAAQS, including the monitoring at the source-oriented locations, the highest of which is now 53 percent of the NAAQS for the maximum 3-month rolling average occurring near the beginning of the 3-year design value period. More recent lead data from the source-specific locations have been even lower due, in part, to the implementation of stricter SCAQMD rules for these sources. The peak 3-month average in 2015 (0.04 µg/m^3) was only 27 percent of the NAAQS. The other three counties in the Basin have also remained well below the NAAQS. The less-stringent State 30-day standards for lead were not exceeded in any area of the District in 2015, or in recent years.

While near-source lead measurements in Los Angeles County had previously violated the current NAAQS, there have been no exceedances of the federal standard in the Basin for either the 2012–2014 or 2013–2015 design value periods. As a result, SCAQMD will be petitioning U.S. EPA for a redesignation to attainment for the federal lead standard for the Los Angeles County nonattainment area. Stringent SCAQMD rules governing lead-producing sources will help to ensure that there are no future violations of the federal standard. Furthermore, one business that had been responsible for the highest measured lead concentrations in Los Angeles County has closed and is in the process of demolition and site clean-up.

TABLE 2-26

2015 Maximum 3-Month Rolling Average Lead (Pb) Concentrations
and 2013–2015 Design Values by Basin and County

Basin/County	2015 Max Pb 3-Month Rolling Average Design Value (µg/m³)	2013-2015 Max Pb 3-Month Rolling Average Design Value (µg/m³)	Percent of Current Pb NAAQS (0.15 µg/m³)	Area of Design Value Max	2015 Max Pb 30-Day Average (µg/m³)	Percent of State Pb Standard (1.5 µg/m³)
South Coast Air Basin						
Los Angeles*	**0.04**	**0.08**	**53**	**Southeast Los Angeles**	**0.05**	**3**
Orange	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Riverside	0.01	0.01	7	Metropolitan Riverside County	0.01	1
San Bernardino	0.03	0.03	20	Northwest San Bernardino Valley, Central San Bernardino Valley	0.04	3
Salton Sea Air Basin						
Riverside	N.D.	N.D.	N.D.	Coachella Valley	N.D.	N.D.

Bold text denotes the peak value

N.D. = No Data. Historical measurements and emissions profiles indicate concentrations would be well below standards

* The higher lead concentrations in Los Angeles and San Bernardino Counties were measured at sites immediately downwind lead sources; the maximum 3-month average design value was measured at a near-source station in Los Angeles County (Santa Fe Springs) for February through April of 2013; the single year of data from the San Bernardino County near-source lead monitor is insufficient for a complete 3-year design value calculation, but is included here

Air Quality Compared to Other U.S. Metropolitan Areas

In spite of significant improvement, the Basin still has some of the worst air quality in the nation. In 2015, seven of the country's top ten locations most frequently exceeding the 2015 8-hour ozone NAAQS were located within the Basin, including stations in San Bernardino, Riverside and Los Angeles Counties.[23] The location with the highest number of days over the 2015 8-hour ozone NAAQS was in the Basin's Central San Bernardino Mountains (86 days in the community of Crestline). The Basin exceeded the 2008 8-hour ozone NAAQS on 81 days, more days than any other areas in the country. The Basin exceeded the 2015 ozone NAAQS on 113 days. Similarly, seven out of the top ten locations with the highest maximum 8-hour average ozone concentrations in the nation were also located in the Basin. Of the top ten locations, only one area (Houston, Texas) was located outside of California. The highest maximum 8-hour average ozone concentration recorded was 0.127 ppm (in the Central San Bernardino Mountains area), almost 180 percent of the 2015 ozone NAAQS.

Figures 2-10 and 2-11 show the maximum pollutant concentrations in 2015 for the Basin compared to other major metropolitan areas in the U.S. and California air basins, respectively. Maximum concentrations in all of these areas exceeded both the 2015 and 2008 8-hour ozone NAAQS. The current annual PM2.5 standard was exceeded in the South Coast Air Basin, Houston, and Chicago metropolitan areas, as well as in California's San Joaquin Valley. The 24-hour PM2.5 standard, was exceeded in the Basin, Phoenix, and Chicago, as well as in all of the California air basins shown except San Diego.

The 24-hour PM10 standard was not exceeded in any of the U.S. areas and California air basins shown, once data flagged for exceptional events was excluded from the analysis. Of the areas shown for 2015, the level of the 1-hour NO_2 federal standard was exceeded in the Basin, Houston, and New York areas, as well as in the San Joaquin Valley. SO_2 concentrations were below the 1-hour federal standard in the Basin and in all of the urban areas shown in Figures 2-10 and 2-11. However, the SO_2 standard was exceeded in other U.S. urban and rural areas, with the highest 2015 concentrations recorded in the State of Arizona (Gila County). The CO standards were not exceeded in the U.S. in 2015 and are not shown in the figures. Nationwide, the federal lead standard (not shown) was exceeded at six locations in 2015, at source-oriented monitoring stations, in Pennsylvania and Arizona.

[23] The top 10 stations in the nation for number of exceedances in 2015 of the 2015 8-hour ozone NAAQS (0.070 ppm) include Basin stations in the areas of Central San Bernardino Mountains (in the Crestline-Lake Gregory community), Central San Bernardino Valley (San Bernardino and Fontana), East San Bernardino Valley (Redlands), Northwest San Bernardino Valley (Upland), San Gorgonio Pass (Banning), and Metropolitan Riverside County (Riverside-Rubidoux), as well as stations in the San Joaquin Valley Air Basin (Bakersfield and Fresno) and the Antelope Valley Air Basin (Lancaster).

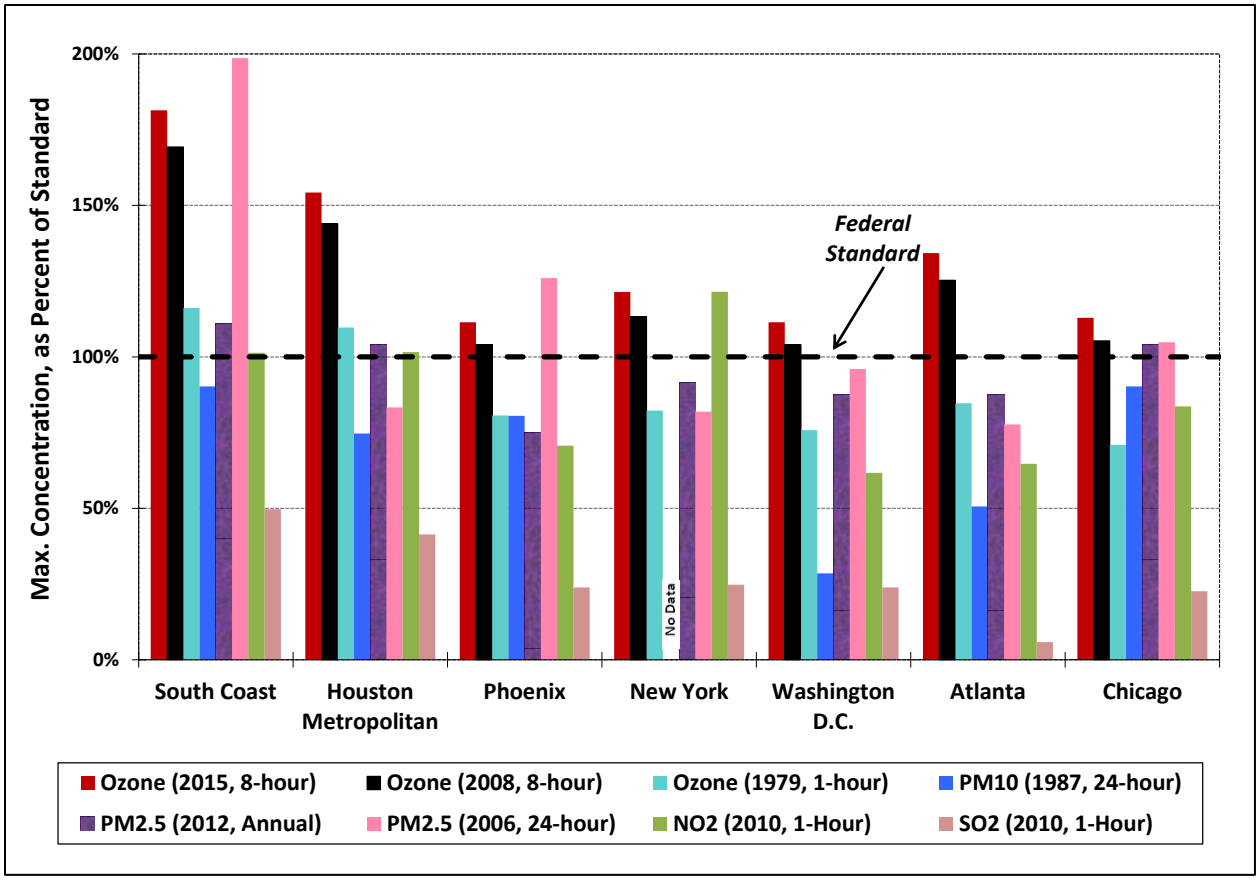


FIGURE 2-10

2015 SOUTH COAST AIR BASIN AIR QUALITY COMPARED TO OTHER U.S. URBAN AREAS

(MAXIMUM POLLUTANT CONCENTRATIONS AS PERCENTAGES OF THE NAAQS, FLAGGED EXCEPTIONAL EVENTS ARE EXCLUDED)

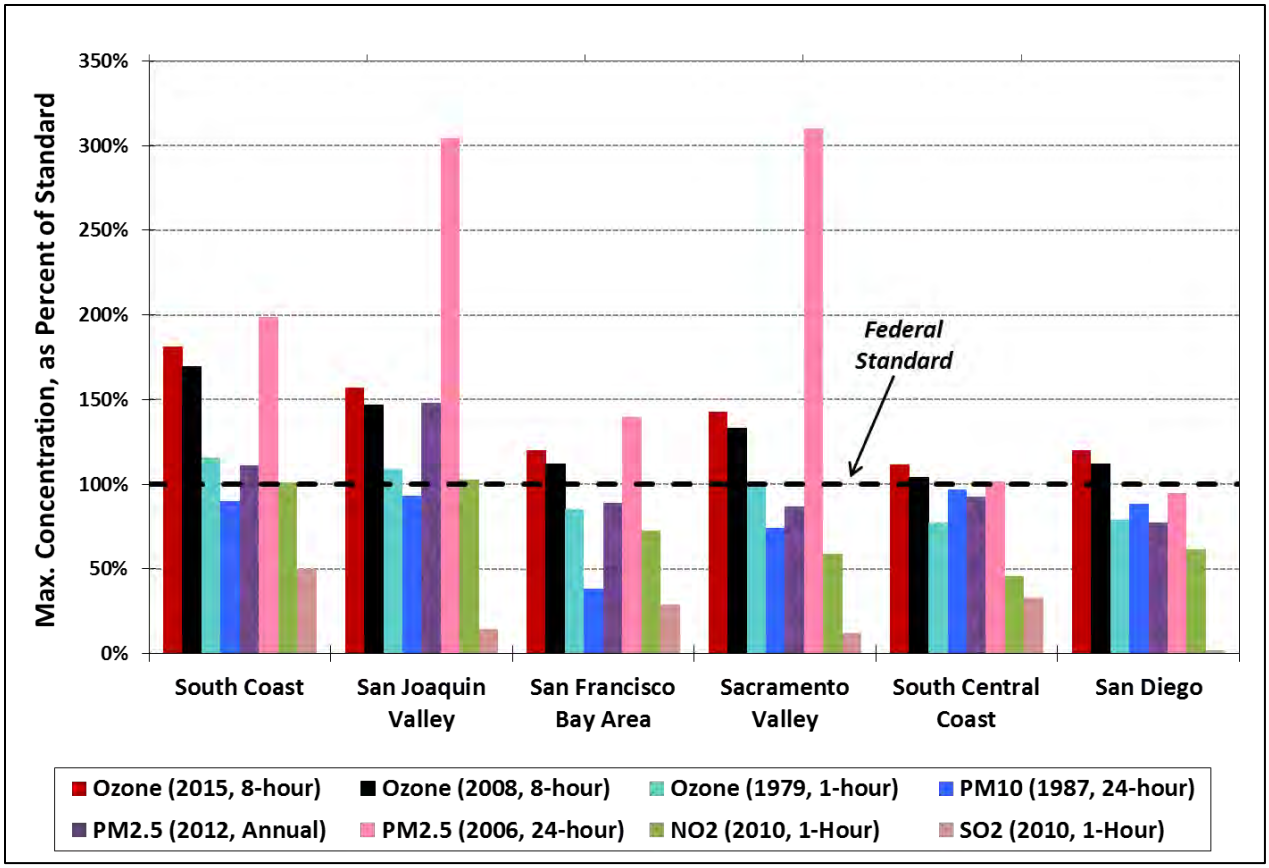


FIGURE 2-11

2015 SOUTH COAST AIR BASIN AIR QUALITY COMPARED TO OTHER CALIFORNIA AIR BASINS

(MAXIMUM POLLUTANT CONCENTRATIONS AS PERCENTAGES OF THE NAAQS, FLAGGED EXCEPTIONAL EVENTS ARE EXCLUDED)

As noted previously, maximum pollutant concentrations do not necessarily indicate NAAQS violations and subsequent attainment/nonattainment designation changes, which is determined by the design value form of the NAAQS. Figures 2-12 and 2-13 show the 2013–2015 3-year design values for the Basin compared to other urban areas in the U.S. and California, respectively. While the 2015 maximum ozone concentrations for all the urban areas shown above in Figures 2-10 and 2-11 are over the 2015 and 2008 ozone NAAQS, 2013–2015 ozone design values in some of these urban areas shown in Figures 2-12 and 2-13 are not in violation of these 8-hour ozone NAAQS. For the revoked 1979 1-hour ozone NAAQS, only the Basin had 1-hour design values over the federal standard for the 2013–2015 period. The design values for annual averaged PM2.5 are over the 2012 annual PM2.5 NAAQS for the Basin, along with Houston, the San Joaquin Valley, and California's South Central Coast. The 24-hour PM2.5 design values are over the 24-hour PM2.5 NAAQS in the Basin and the San Joaquin Valley; no other urban areas shown exceeded that standard. PM10 design values are over the standard in Phoenix and the San Joaquin Valley, although some of these may have been influenced by pending exceptional events. The design

values for NO_2, SO_2, and CO (not shown) did not violate the NAAQS for any of the urban areas shown for the 2013–2015 period.

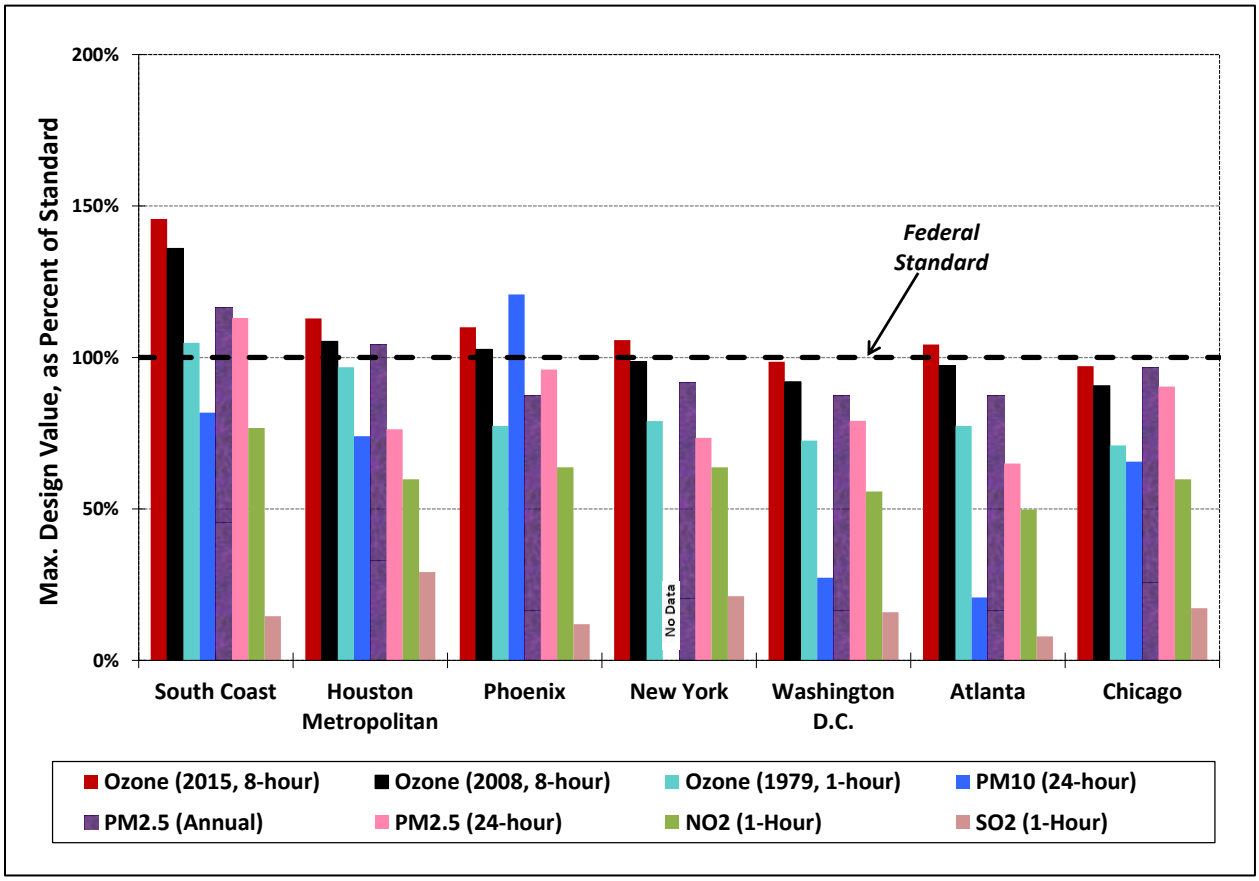


FIGURE 2-12

2015 SOUTH COAST AIR BASIN AIR QUALITY COMPARED TO OTHER U.S. URBAN AREAS

(MAXIMUM 3-YEAR DESIGN VALUE CONCENTRATIONS AS PERCENTAGES OF THE CORRESPONDING NAAQS, FLAGGED EXCEPTIONAL EVENTS ARE EXCLUDED)

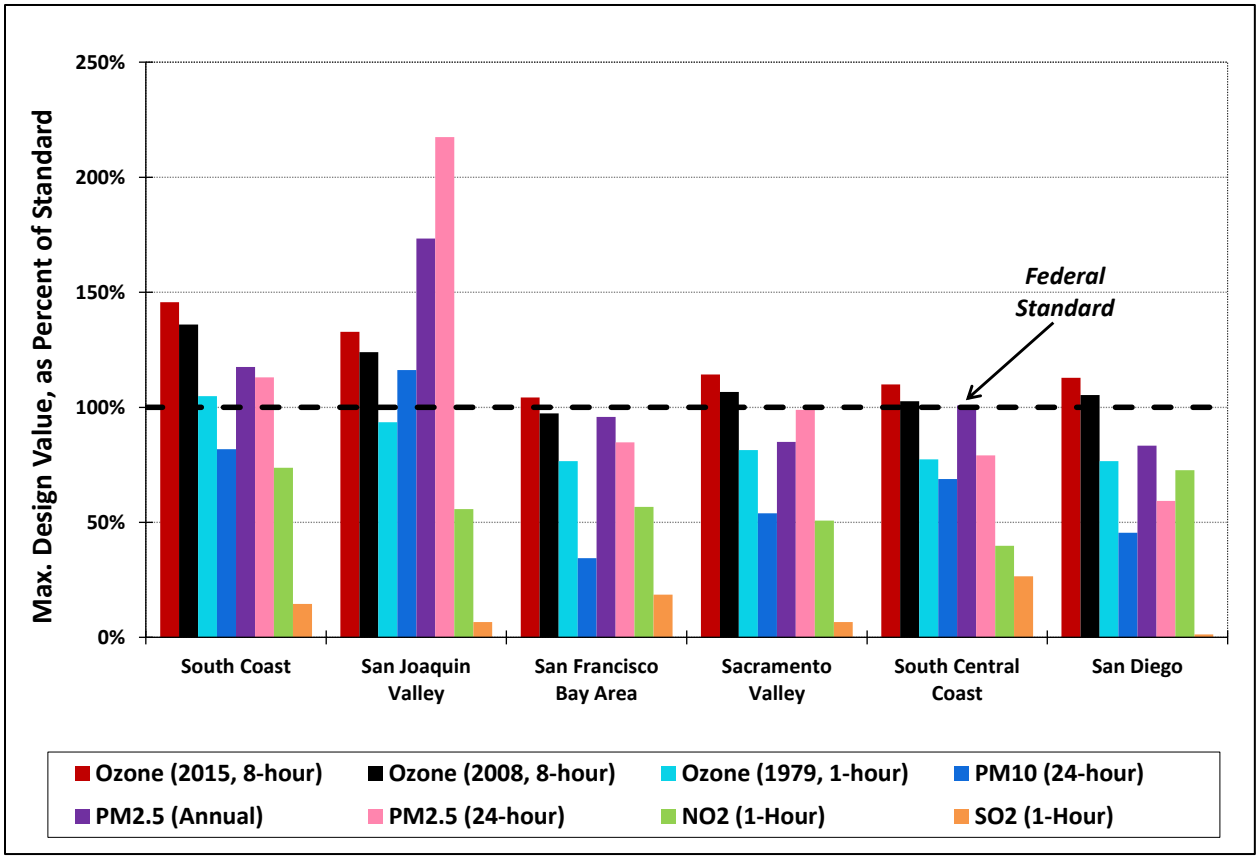


FIGURE 2-13

2015 SOUTH COAST AIR BASIN AIR QUALITY COMPARED TO OTHER CALIFORNIA AIR BASINS

(MAXIMUM 3-YEAR DESIGN VALUE CONCENTRATIONS AS PERCENTAGES OF THE CORRESPONDING NAAQS, FLAGGED EXCEPTIONAL EVENTS ARE EXCLUDED)

Summary

In the year 2015, the Basin exceeded the most recent federal standards on 40 percent of the days, mainly due to exceedances of ozone and to a lesser extent, PM2.5. The maximum measured concentrations for these pollutants in 2015 were among the highest in the country. In 2015, the Basin exceeded the level of the new 2015 8-hour ozone NAAQS on 113 days, with all four counties. It exceeded the 2008 and 1997 8-hour ozone NAAQS on 81 and 47 days, respectively. Seven of the top 10 stations in the nation most frequently exceeding the 8-hour federal ozone NAAQS in 2015 were located within the Basin, including stations in San Bernardino and Riverside Counties. However, the Basin's maximum 3-year 8-hour ozone design value was the same for the 2012–2014 and 2013–2015 periods and the lowest recorded in the Basin since measurements began in the 1950s. Also, the number of Basin days in 2015 exceeding the current and former 8-hour NAAQS was the lowest recorded since the measurements began.

The Basin exceeded the PM2.5 24-hour standard on 30 days in 2015, including the near-road measurements (25 days for ambient stations only). Significant improvement has been seen over the past decade for both 24-hour and annual PM2.5 concentrations and only one location in the Basin is currently exceeding the 24-hour design value form of the PM2.5 federal standards. However, the 24-hour PM2.5 design value trend in the Basin increased in 2014 and again in 2015. This is due in large part to the extreme drought conditions in Southern California and the associated lack of periodic storm events in the winter months that would bring better dispersion and washout of pollutants. The Basin's federal 3-year design values for annual PM2.5 have continued to exhibit downward trends through 2015.

The Coachella Valley area in the Riverside County portion of the Salton Sea Air Basin exceeded federal and State standards for ozone and PM10. However, the high PM10 concentrations exceeding the federal 24-hour PM10 standard occurred on days influenced by high-wind natural events, which the District has flagged in the U.S. EPA AQS database such that U.S. EPA will consider excluding such data when determining the NAAQS attainment status in accordance with U.S. EPA's Exceptional Events Rule. For the stations in the Coachella Valley, the federal 3-year design values for 8-hour ozone have continued to exhibit downward trends through 2015.

The NO_2 concentrations in Los Angeles County exceeded the recently established short-term (1-hour) federal standard on one day at one location in 2015, but did not exceed the standards anywhere on any other day in the Basin. The 98th percentile form of the federal NO_2 standard was not exceeded and the Basin's attainment status remains intact. The Los Angeles County lead nonattainment area portion of the Basin no longer exceeds the 3-month rolling average lead NAAQS as of the 2013–2015 design value period, including the source-specific monitors. A request to U.S. EPA for re-designation to attainment is being prepared. Maximum concentrations for SO_2, CO, and sulfate (measured from PM10) continued to remain below the State and federal standards.

Chapter 3

Base Year and Future Emissions



An inventory of regional emissions from all stationary, area and mobile sources is a requirement for the State Implementation Plan. Base year emissions are projected into the future using approved growth factors for each source category. These emissions assist in projecting the level of reductions needed to attain standards in the future.

In This Chapter

- Introduction 3-1
  Emissions in the base year and attainment years
- Emission Inventories 3-1
  Stationary sources, mobile sources, and uncertainties in the inventory
- Base Year Emissions 3-10
  2012 emissions inventory

- Future Emissions 3-17
  Demographic growth and baseline emission projections
- Impact of Growth 3-27
  Growth contribution to future emissions
- Top Ten Source Categories 3-29
  The most significant emission sources

Introduction

This chapter summarizes criteria pollutant emissions that occurred in the Basin during the 2012 base year as well as projected emissions for the years 2019, 2022, 2023, 2025, and 2031. A more detailed description of emissions and methodologies is presented in Appendix III. The 2012 base year emissions inventory reflects actual and estimated emissions subject to adopted regulations with current compliance dates as of 2012, whereas future baseline emissions inventories are based on economic projections and adopted regulations with both current and future compliance dates. A list of District and CARB rules and regulations that are part of the base year and future year baseline emissions inventories is presented in Appendix III. The District continues to implement rules that are incorporated in the 2016 AQMP future baseline emissions inventories.

The emissions inventory is divided into two major source classifications: stationary and mobile sources. The 2012 base year point source emissions are based principally on reported data from facilities using the District's Annual Emissions Reporting Program. The area source emissions are estimated jointly by CARB and the District using established inventory methods. The on-road emissions are calculated using CARB's EMFAC 2014 model and the travel activity data provided by the Southern California Association of Governments (SCAG) from their adopted 2016 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS). CARB provides emission inventories for off-road equipment which includes construction and mining equipment, industrial and commercial equipment, lawn and garden equipment, agricultural equipment, ocean-going vessels, commercial harbor craft, locomotives, cargo handling equipment, pleasure craft, and recreational vehicles. Aircraft emissions are based on an updated analysis by the District, developed in conjunction with the airports in the region. The future emission forecasts are primarily based on demographic and economic growth projections provided by SCAG. In addition, emission reductions resulting from District regulations amended or adopted by December 2015 and CARB regulations adopted by November 2015 are included in the future baseline projections.

This chapter summarizes the major components of developing the base year and future baseline inventories. More detailed information, such as CARB's and the District's emission reductions resulting from adopted rules and regulations since the 2012 AQMP, growth factors, and demographic trends, are presented in Appendix III. In addition, the top source categories contributing to the 2012, 2019, 2022, 2023, 2025, and 2031 emission inventories are identified in this chapter. An understanding of the highest emitting source categories leads to the identification of potentially more effective control strategies for improving air quality.

Emission Inventories

Two inventories are prepared for the 2016 AQMP for the purpose of regulatory and SIP performance tracking, including transportation conformity[1]: an annual average inventory and a summer planning inventory. Baseline emissions data presented in this chapter are based on average annual daily

[1] Transportation conformity is required under CAA Section 176(c) to ensure that federally supported highway and transit project activities "conform" to the purpose of the SIP. More details are provided in Chapter 4.

emissions (i.e., total annual emissions divided by 365 days) and seasonally adjusted summer planning inventory emissions. The 2016 AQMP uses annual average day emissions to estimate the cost-effectiveness of PM2.5 control measures and to perform PM2.5 modeling and analysis. The summer planning inventory emissions are developed to capture the emission levels during the high ozone season and are used to perform ozone modeling and analysis, estimate the cost-effectiveness of ozone control measures, and to report emission reduction progress as required by the federal and California Clean Air Acts.

Detailed information regarding the emissions inventory development for the base year and future years, the emissions by major source category in the base year and future baseline emission inventories are presented in Appendix III. Attachments A and B to Appendix III list the annual average and summer planning emissions by major source category for 2012, 2019, 2021, 2022, 2023, 2025, and 2031. Attachment C to Appendix III has the top VOC and NOx point source categories that emitted greater than or equal to 10 tons per year in 2012. Attachment D to Appendix III contains the on-road emissions by vehicle class and pollutant. Attachment E to Appendix III shows emissions associated with the combustion of diesel fuel for various source categories.

Stationary Sources

Stationary sources can be divided into two major subcategories: point and area sources. Point sources are permitted facilities with one or more emission sources at an identified location (e.g., power plants, refineries). These facilities generally have annual emissions of 4 tons or more of either Volatile Organic Compounds (VOC), Nitrogen Oxide (NOx), Sulfur Oxide (SOx), or total Particulate Matter (PM), or annual emissions of over 100 tons of Carbon Monoxide (CO). Facilities are required to report their criteria pollutant emissions pursuant to Rule 301 and selected air toxics to the District on an annual basis, subject to audit, if any of these thresholds are exceeded. The 2012 annual reported emissions are used to update the stationary source inventory.

Area sources consist of many small emission sources (e.g., residential water heaters, architectural coatings, consumer products and permitted sources that are smaller than the above thresholds) which are distributed across the region and are not required to individually report their emissions. There are about 400 area source categories for which emission estimates are jointly developed by CARB and the District. The emissions from these sources are estimated using activity information and emission factors. Activity data are usually obtained from survey data or scientific reports (e.g., Energy Information Administration (EIA) reports for fuel consumption other than natural gas fuel, Southern California Gas Company for natural gas consumption, paint suppliers under Rule 314 and District databases). The emission factors are based on rule compliance factors, source tests, manufacturer's product or technical specification data, default factors (mostly from AP-42, U.S. EPA's published emission factor compilation), or weighted emission factors derived from the point source facilities' annual emissions reports. Additionally, the emissions over a given area may be calculated using socioeconomic data.

Appendix III has more detail regarding emissions from specific source categories such as architectural coatings, dairy cattle, oil and gas production operations, gasoline dispensing facilities, and green waste composting. Since the 2012 AQMP was finalized, new area source inventory updates include:

- Architectural Coatings Category: Over 60 area sources in this category were updated based on information provided as part of SCAQMD Rule 314 – "Fees for Architectural Coatings" annual reports.
- Oil and Gas Production Category: The emission estimation methodology for this area source category was revised to incorporate U.S. EPA's oil and gas production inventory model modified with California-specific emission factors and technologies.
- Gasoline Dispensing Facilities Category: The emission estimation methodology for this area source category was revised to include CARB staff's updated emission factors and activity data.
- Dairy Cattle: Ammonia and VOC emissions from dairy farms were revised based on the animal head count data reported to the Santa Ana Regional Water Quality Control Board.
- LPG Combustion Categories: The emissions from this category were revised based on the LPG consumption estimation for the Basin. The fraction of California LPG use in the Basin was estimated based on GHG data reported to the CARB. The statewide total LPG consumption was retrieved from State Energy Data (2013).
- Commercial and Industrial Natural Gas Combustion Categories: 2012 actual natural gas consumption data were used, instead of the projection from the 2012 AQMP.
- Composting Waste Disposal: Ammonia and VOC emissions expected from compostable mulch were added in this category.
- REgional CLean Air Incentives Market (RECLAIM) NOx emissions: The future baseline was revised to include the 12 tons per day of RECLAIM Trading Credits (RTCs) reduction by December 2022 that was approved in December 2015.

Mobile Sources

Mobile sources consist of two subcategories: on-road sources and off-road sources. On-road vehicle emissions are calculated with CARB's EMFAC 2014 model and the travel activity data provided by SCAG from their adopted 2016 RTP/SCS. Spatial distribution data from Caltrans' Direct Travel Impact Model (DTIM4) are used to place the emissions at the proper time and place. Off-road emissions are calculated using CARB's category specific inventory models.

On-Road

CARB's EMFAC 2014 model has undergone extensive revisions from the previous version (EMFAC 2011) to make it more user-friendly, flexible, and to allow incorporation of larger amounts of data demanded by the current regulatory and planning processes. In addition to the model structural changes, other changes include:

- Revision of heavy-duty diesel (HD Diesel) truck emission rates: The emission factors for heavy heavy-duty diesel trucks were also updated using new test data on newer trucks (Model Year 2007 and newer) that more accurately represent the effectiveness of the control equipment used to meet the more stringent 2007 and 2010 emission standards.
- Incorporation of natural gas vehicles for select vehicle classes: Emission factors for natural gas powered solid waste collection vehicles and urban buses are now included in EMFAC 2014 as these classes of vehicles have sufficient penetration of natural gas engines to warrant separate treatment.

- Accounting for federal and California regulations and standards adopted post-2010: The adopted regulations and standards include the State's Advanced Clean Car Program, the April 2014 amendment to the Truck and Bus Regulation, the Tractor-Trailer Greenhouse Gas Regulation and the federal HD Greenhouse Gas Regulation.
- Socio-econometric modeling of population and VMT: EMFAC 2014 incorporates the use of socioeconomic regression model forecasting methods to predict new vehicle sales and Vehicle Miles Traveled (VMT) growth trends. This allows the use of State and national economic indicators, fuel prices, and regional human population and vehicle ownership characteristics as parameters to more accurately predict vehicle sales and VMT trends.

More detailed information on the changes incorporated in EMFAC 2014 can be found at http://www.arb.ca.gov/msei/categories.htm.

Figure 3-1 compares the on-road emissions estimated using EMFAC 2011 in the 2012 AQMP and EMFAC 2014 used in the 2016 AQMP, respectively for milestone years 2012, 2023, and 2031. It should be noted that the comparison for 2012 reflects changes in methodologies, whereas the comparison for 2023 and 2031 also includes adopted rules and updated growth projections since the release of EMFAC 2011, which was the basis of the 2012 AQMP on-road emissions.

For 2012, EMFAC 2014's newer methodologies show higher emissions of NOx and VOCs. For the future years 2023 and 2031, in general, the emissions are lower in EMFAC 2014 as compared to EMFAC 2011. The lower emissions can be attributed to additional rules and regulations, more stringent standards, and updates to the heavy-duty emission factors.

Also evident in Figure 3-1 is the change in the rate of emission reductions. The rate of change in the emissions in the early years (2012 to 2023) is significantly larger than that shown further in the later years (2023–2031). This is due to the implementation of the rules and regulations, most of which will be fully implemented by 2023 (e.g., CARB's Truck and Bus rule requires all trucks to meet the 2010 standards by 2023). The effect of the rules and regulations are significant, showing reductions of about 70 percent NOx emissions and close to 60 percent VOC emissions between 2012 and 2023, even with increases in fleet population. More modest reductions are predicted from continued fleet turnover, but fleet growth is beginning to outpace the emissions benefits of fleet turnover in the later years. Further emission reductions will require fleets to adopt the use of even cleaner equipment than the current standards require.

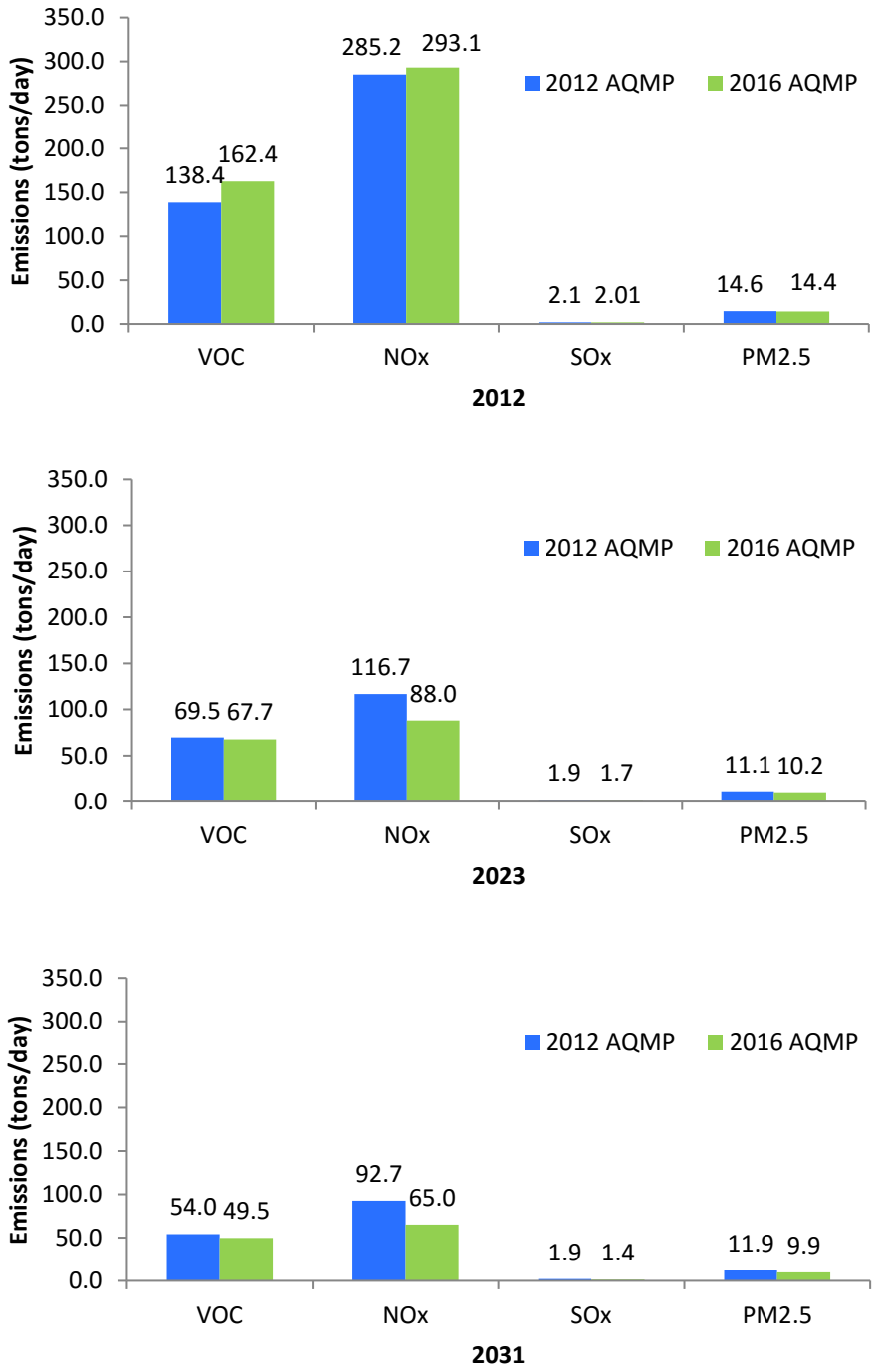


FIGURE 3-1

COMPARISON OF ON-ROAD EMISSIONS ESTIMATED USING EMFAC 2011 IN THE 2012 AQMP AND EMFAC 2014 IN THE 2016 AQMP. VOC AND NOX EMISSIONS REPRESENT SUMMER PLANNING AND SOX & PM2.5 ARE ANNUAL AVERAGE INVENTORY.

Off-Road

Emissions from off-road vehicle categories are primarily based on estimated activity levels and emission factors. Separate emission estimation models have been developed for the many categories of off-road equipment. More information on these models can be found at the following link: http://www.arb.ca.gov/msei/categories.htm. Several of these models have been updated since the release of the 2012 AQMP. The major updates include:

- Locomotives: The emissions model methodology for the freight locomotive category was completely revised. In addition, activity was updated using data from the Surface Transportation Board and Federal Highway Administration's Freight Analysis Framework. Population information was derived from the Association of American Railroads' population data.

- Ocean Going Vessels: New lower growth projections were developed and incorporated into the model using more recent information from the Federal Highway Administration's Freight Analysis Framework model and other forecasts performed for the San Pedro Bay Ports. NOx control factor calculations were updated to more appropriately represent the engine Tier levels.

- Commercial Harbor Craft: The vessel turnover rate methodology was improved to better reflect the observed age distribution. A more representative reduced turnover rate is used, which improves consistency with other off-road emissions model methodologies.

- Pleasure Craft and Off-Highway Recreational Vehicles: New survey information and DMV data were used to update the population and activity, and new emissions testing data were used to update the emission factors in newly developed models for these two categories.

- Cargo Handling Equipment: The model was updated to use growth factors consistent with those developed for ocean going vessels.

- Farm Equipment: The inventory was completely revised resulting in a new inventory based on updated equipment population, equipment age distribution, activity, load factors, and turnover practices.

- Aircraft: The aircraft emissions inventory is updated for the 2012 base year based on the 2012 aircraft activity data and latest calculation methodologies. A total of 43 airports were identified as having aircraft operations within the District boundaries including commercial air carrier, air taxi, general aviation, and military aircraft operations. The sources of activity data included airport operators and Federal Aviation Administration's (FAA) databases. The emissions calculation methodology was based on the application of FAA's Emissions and Dispersion Modeling System (EDMS) model for commercial airports with detailed aircraft activity data (by aircraft make and model). For other airports and aircraft types (e.g., general aviation, air taxi, military), the total number of aircraft operations was used in conjunction with the U.S. EPA's latest average emission factors by major aircraft type (e.g., general aviation, air taxi, military). For commercial air carrier operations, SCAG's 2040 aircraft operations forecasts from the SCAG's 2016 Regional Transportation Plan (RTP) was used.

The revised 2016 AQMP incorporated the 2040 emissions forecast (based on SCAG's latest forecasts) with interim years interpolated between 2012 and 2040.

Figure 3-2 shows a comparison between the off-road baseline emissions in the 2012 AQMP and the 2016 AQMP for the milestone years 2012, 2023, and 2031. Overall, the updates to the off-road categories result in lower emissions than those used in the 2012 AQMP. It should be noted that the comparison for 2012 reflects changes in methodology, but the comparison for the rest of the years also includes adopted rules and updated growth projections since the release of off-road inventory in the 2012 AQMP. Similar to what is shown for the on-road category, the rate of reductions in emissions of NOx and VOC is significantly larger in early years (2012 to 2023) compared to the rate seen in the later years (2023 to 2031). This is the result of the rules and regulations adopted at the State and federal levels for most of the off-road categories. As most will be fully implemented by 2023, only modest reductions will be achieved as a result of continued fleet turnover beyond 2023. Without additional rules or programs for further reductions, growth in emissions from increases in vehicle population outweighs the emissions benefits associated with fleet turnover to newer equipment. As projected for the on-road fleet, further emission reductions will require off-road fleets to use even cleaner equipment than current standards require.

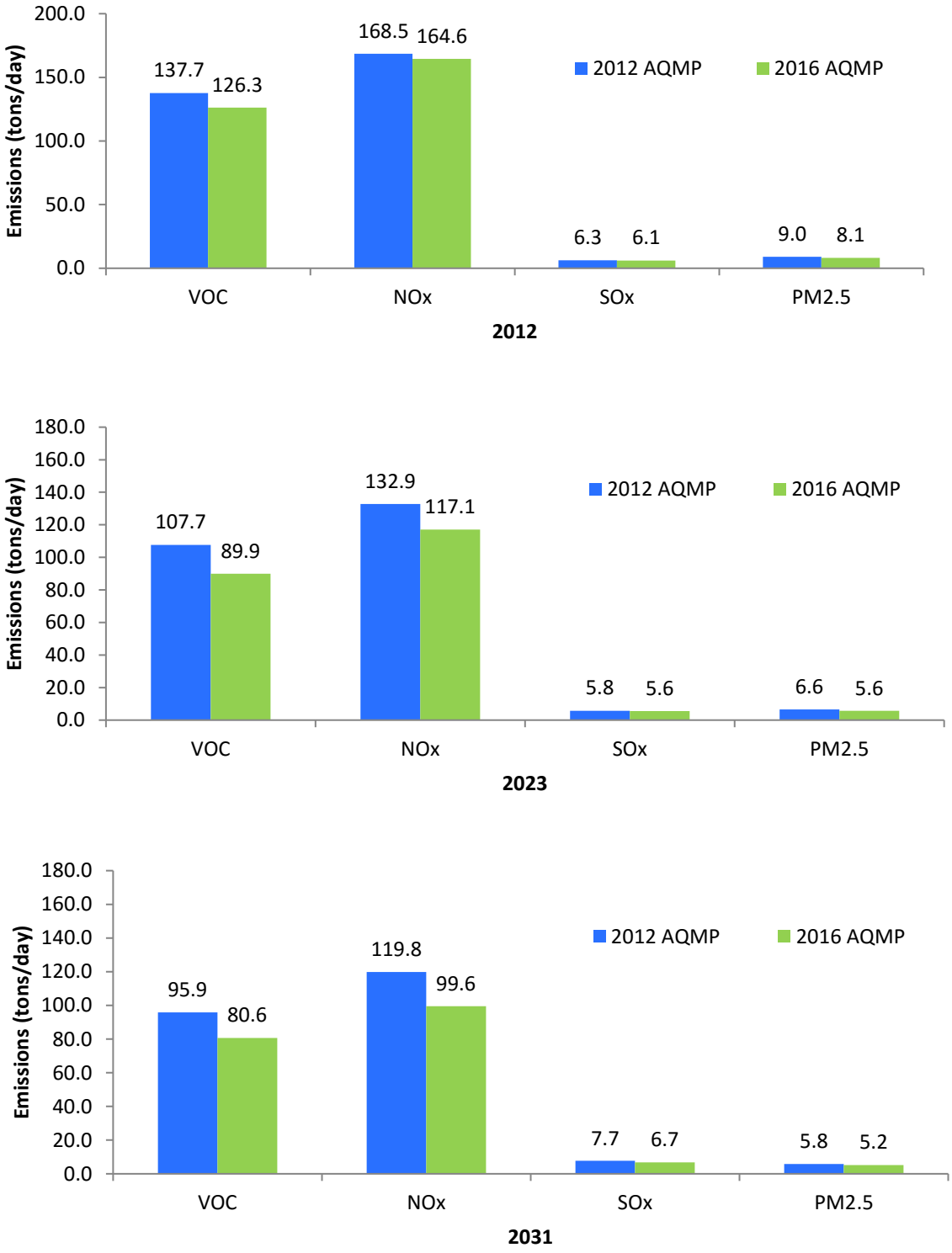


FIGURE 3-2

COMPARISON OF OFF-ROAD EMISSIONS BETWEEN 2012 AQMP AND 2016 AQMP.
VOC & NOX – SUMMER PLANNING; SOX & PM2.5 – ANNUAL AVERAGE INVENTORY

Uncertainties in the Emissions Inventory

An effective AQMP relies on a complete and accurate emissions inventory. Over the years, significant improvements have been made to quantify emission sources for which control measures are developed. Increased use of continuous monitoring and source testing has contributed to the improvement in point source inventories. Technical assistance to facilities and auditing of reported emissions by the District have also improved the accuracy of the emissions inventory. Area source inventories that rely on average emission factors and regional activities have inherent uncertainty. Industry-specific surveys and source-specific studies during rule development have provided much-needed refinement to these emissions estimates. Mobile source inventories are also continuously updated and improved. As described earlier, many improvements are included in the on-road mobile source model EMFAC 2014, which estimates emissions from trucks, automobiles, and buses. Improvements and updates are included in the off-road models for locomotives, ocean going vessels, commercial harbor craft, pleasure craft and off-highway recreational vehicles, cargo handling equipment, and farm equipment. Overall, the 2016 AQMP inventory is based on the most current data and methodologies, resulting in the most accurate inventory available.

Relative to future growth, there are many challenges inherent in making accurate projections, such as where vehicle trips will occur, the distribution between various modes of transportation (such as trucks and trains), as well as estimates for population growth and the number and type of jobs. Forecasts are made with the best information available; nevertheless, there is uncertainty in emissions projections. AQMP updates are generally developed every three to four years, thereby allowing for frequent updates and improvements to the inventories.

Gridded Emissions

For air quality modeling purposes, the domain extends to Southern Kern County in the north, the Arizona border to the east, northern Mexico to the south and more than 100 miles offshore to the west. The modeling area is divided into a grid system comprised of 4 km by 4 km grid cells. Both stationary and mobile source emissions are allocated to individual grid cells within this system. In general, the modeling emissions data features daily emissions. Variations in temperature, hours of operation, speed of motor vehicles, or other factors are considered in developing gridded motor vehicle emissions. The “gridded” emissions data used for both PM2.5 and ozone modeling applications differ from the annual average day or planning inventory emission data in two respects: (1) the modeling region covers larger geographic areas than the Basin; and (2) emissions represent day-specific instead of average or seasonal conditions. Emission inventories are generated for both the PM2.5 and ozone modeling applications. For PM2.5, the annual average day is used, which represents the characteristic of emissions that contribute to year-round particulate impacts. The summer planning inventory focuses on the warmer months (May through October) when evaporative VOC emissions and more sunlight, play an important role in ozone formation.

Base Year Emissions

2012 Emission Inventory

Table 3-1A compares the summer planning emissions between the 2012 base year in the 2016 AQMP and the projected 2012 emissions in the Final 2012 AQMP by major source category for VOC and NOx. Table 3-1B compares the annual average emissions between the 2012 base year in the 2016 AQMP and the projected 2012 emissions in the Final 2012 AQMP for SOx and PM2.5. It should be noted that the comparison for 2012 reflects updates in methodology, differences between growth projections and actual data, and adopted rules since the release of the 2012 AQMP. Specifically, the growth projection employed in the 2012 AQMP did not fully capture the impact of the economic recession which occurred between 2008 and 2010.

Overall, there is a minor net decrease in VOC emissions in the 2016 AQMP inventory as compared to the 2012 AQMP projections. Estimates of stationary source VOC emissions have decreased by approximately 12 percent, but mobile VOC source emissions have increased by 5 percent. NOx emissions remain unchanged between the 2016 AQMP inventory and the 2012 projection. As in the VOC category, stationary source NOx emissions have been revised downward and mobile source emissions have been revised slightly upward. Of note in the stationary source categories are the emission changes associated with the architectural coatings, RECLAIM categories, natural gas and LPG combustion sources, and farming operations. Architectural coatings emissions were updated for the 2016 AQMP using information provided as part of SCAQMD Rule 314 – "Fees for Architectural Coatings" annual reports, resulting in the lower emission estimate. The RECLAIM emissions cap was used to project the NOx emissions in the 2012 AQMP inventory, while in 2012, the actual emissions were lower than the cap by 7 tons per day (TPD). Use of additional actual reported information in lieu of projected emissions (used in the 2012 AQMP to estimate the 2012 emissions) explain the majority of the remaining emission differences. Refer to Appendix III for details.

For the mobile source category, the updates described earlier to the on-road emissions model EMFAC 2014 resulted in the 17 percent and 3 percent increase in VOC and NOx emissions, respectively. Updates to several of the off-road category emission estimates resulted in the 8 percent decrease in VOC emissions and a modest 2 percent decrease in NOx emissions. Updates were completed for locomotives, ocean going vessels, cargo handling equipment, commercial harbor craft, farming equipment, pleasure craft, and off-highway recreational vehicles.

Estimates of SOx emissions are 23 percent lower in the 2016 AQMP emissions inventory than 2012 projections. This is largely due to the difference in the use of actual reported information in lieu of projected emissions in the RECLAIM sources. Estimates of direct PM2.5 from stationary and mobile sources are modestly lower in the 2016 AQMP leading to a decrease of 7 percent. This revised estimation is largely due to changes in the emissions estimates from miscellaneous stationary processes and decreases in off-road vehicle emissions.

Table 3-2 shows the 2012 annual average and summer planning emissions inventory by major source category. Stationary sources are subdivided into point (e.g., chemical manufacturing, petroleum production, and electric utilities) and area sources (e.g., architectural coatings, residential water heaters,

consumer products, and permitted sources smaller than the emission reporting threshold – generally 4 tpy). Mobile sources consist of on-road (e.g., passenger cars and heavy-duty trucks) and off-road sources (e.g., trains and ships). Entrained road dust is also included.

Figure 3-3 characterizes relative contributions by stationary and mobile source categories. On- and off-road sources continue to be major contributors for each of the five pollutants. Overall, total mobile source emissions account for almost 60 percent of the VOC and 90 percent of the NOx emissions for these two ozone-forming pollutants and 95 percent of the CO emissions. The on-road mobile category alone contributes over 30 percent of the VOC and 56 percent of the NOx emissions. For directly emitted PM2.5, mobile sources represent 34 percent of the emissions with another 13 percent due to vehicle-related entrained road dust. Stationary sources emit the majority of the SOx emissions with the point source category contributing 50 percent of the SOx emissions in the Basin. Area sources play a major role in VOC emissions, emitting about 3.5 times more than point sources. Area sources, including sources such as commercial cooking, are the predominant source of directly emitted PM2.5 emissions (42 percent).

Figure 3-4 shows the fraction of the 2012 inventory by responsible agency for VOC, NOx, SOx, and directly emitted PM2.5. U.S. EPA and CARB have primary authority to regulate emissions from mobile sources. U.S. EPA's authority applies to aircraft, locomotives, ocean going vessels, and some categories of on- and off-road mobile equipment. CARB has authority over the remainder of the mobile sources, and consumer products. SCAQMD has authority over most area sources and all point sources. As can be seen in Figure 3-4, most of the NOx and VOC emissions in the District are from sources that fall under the primary jurisdiction of U.S. EPA and CARB. For example, almost 90 percent of the NOx and over 75 percent of the VOC emissions are from sources primarily under CARB and U.S. EPA control. Conversely, 56 percent of the SOx emissions and 66 percent of the directly emitted PM2.5 emissions are from sources under SCAQMD control. NOx and VOC are important precursors to ozone and PM2.5 formation, and SOx along with directly emitted PM2.5, contribute to the region's PM2.5 nonattainment challenges. This illustrates that actions at the local, State, and federal level are needed to ensure the region attains the federal ambient air quality standards.

TABLE 3-1A

Comparison of VOC and NOx Emissions By Major Source Category of
2012 Base Year in 2016 AQMP and Projected 2012 in Final 2012 AQMP
Summer Planning Inventory (tpd[1])

SOURCE CATEGORY	2012 AQMP	2016 AQMP	% Change	2012 AQMP	2016 AQMP	% Change
	VOC			NOx		
STATIONARY SOURCES						
Fuel Combustion	12.9	11.4	-12%	29.4	27.9	-5%
Waste Disposal	12.1	14.1	17%	1.5	2.3	50%
Cleaning and Surface Coatings	41.7	35.6	-15%	0	0	0%
Petroleum Production and Marketing	40.2	29.2	-27%	0	0	0%
Industrial Processes	13.8	10.8	-21%	0	0	0%
Solvent Evaporation:						
Consumer Products	86.6	86.5	0%	0	0	0%
Architectural Coatings	21.5	13.3	-38%	0	0	0%
Others	2.0	2.4	17%	0	0	0%
Misc. Processes	9.7	7.8	-20%	15.5	14.5	-6%
RECLAIM SOURCES	0	0	0%	27.2	19.6	-28%
Total Stationary Sources	**240**	**211**	**-12%**	**74**	**65**	**-13%**
MOBILE SOURCES						
On-Road Vehicles	138.4	162.4	17%	285.2	293.1	3%
Off-Road Vehicles	137.7	126.3	-8%	168.5	164.6	-2%
Total Mobile Sources	**276**	**289**	**5%**	**454**	**458**	**1%**
TOTAL	**516**	**500**	**-3%**	**528**	**522**	**-1%**

[1] Values may not sum due to rounding errors

TABLE 3-1B
Comparison of SOx and PM2.5 Emissions By Major Source Category of
2012 Base Year in 2016 AQMP and Projected 2012 in 2012 AQMP
Annual Average (tpd[1])

SOURCE CATEGORY	2012 AQMP	2016 AQMP	% Change	2012 AQMP	2016 AQMP	% Change
	SOx			PM2.5		
STATIONARY SOURCES						
Fuel Combustion	1.9	1.9	-1%	5.6	5.6	1%
Waste Disposal	0.4	0.5	20%	0.2	0.2	-13%
Cleaning and Surface Coatings	0	0	0%	1.5	1.4	-5%
Petroleum Production and Marketing	0.6	0.4	-26%	1.6	1.5	-6%
Industrial Processes	0.02	0.1	400%	6.7	6.4	-6%
Solvent Evaporation:						
Consumer Products	0	0	0%	0	0	0%
Architectural Coatings	0	0	0%	0	0	0%
Others	0	0	0%	0	0	0%
Misc. Processes	1.0	0.5	-47%	32.5	28.8	-11%
RECLAIM SOURCES	11.8	6.9	-42%	0	0	0%
Total Stationary Sources	**16**	**10**	**-34%**	**48**	**44**	**-9%**
MOBILE SOURCES						
On-Road Vehicles	2.1	2.0	-2%	14.6	14.4	-1%
Off-Road Vehicles	6.3	6.1	-2%	9.0	8.1	-10%
Total Mobile Sources	**8**	**8**	**-2%**	**24**	**23**	**-5%**
TOTAL	**24**	**18**	**-23%**	**72**	**66**	**-7%**

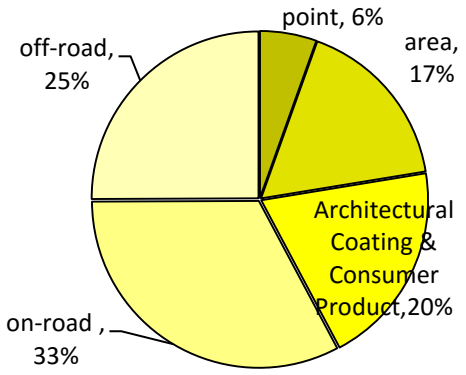
[1] Values may not sum due to rounding errors

TABLE 3-2

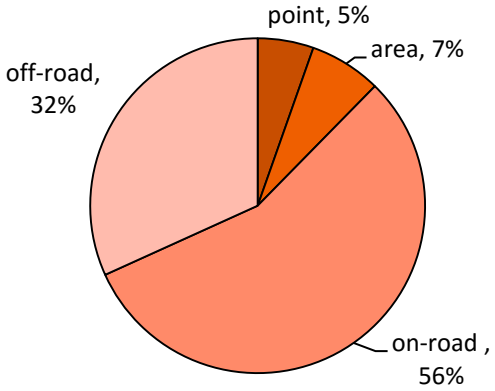
Summary of Emissions By Major Source Category: 2012 Base Year
Average Annual Day and Summer Planning (tpd[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	28	49	2	6	9	11	28
Waste Disposal	13	2	1	0	0	5	14	2
Cleaning and Surface Coatings	34	0	0	0	1	0	36	0
Petroleum Production and Marketing	29	0	5	0	2	0	29	0
Industrial Processes	10	0	0	0	6	9	11	0
Solvent Evaporation:								
Consumer Products	87	0	0	0	0	0	87	0
Architectural Coatings	13	0	0	0	0	0	13	0
Others	2	0	0	0	0	1	2	0
Misc. Processes	13	21	54	1	29	38	8	15
RECLAIM SOURCES	0	19	0	7	0	0	0	20
Total Stationary Sources	**212**	**70**	**109**	**10**	**44**	**63**	**211**	**65**
MOBILE SOURCES								
On-Road Vehicles	158	317	1328	2	14	18	162	293
Off-Road Vehicles	100	153	686	6	8	0	126	165
Total Mobile Sources	**258**	**470**	**2014**	**8**	**23**	**18**	**289**	**458**
TOTAL	**470**	**540**	**2123**	**18**	**66**	**81**	**500**	**522**

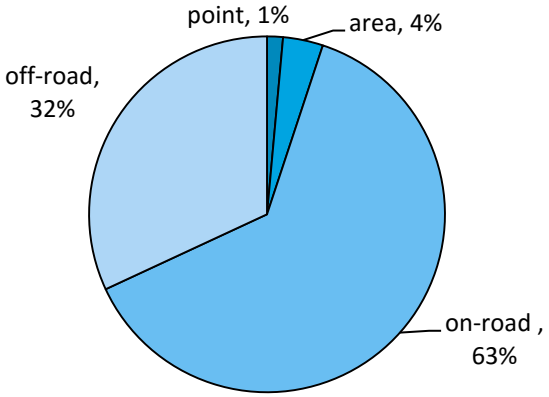
[1] Values may not sum due to rounding errors
[2] Includes entrained road dust



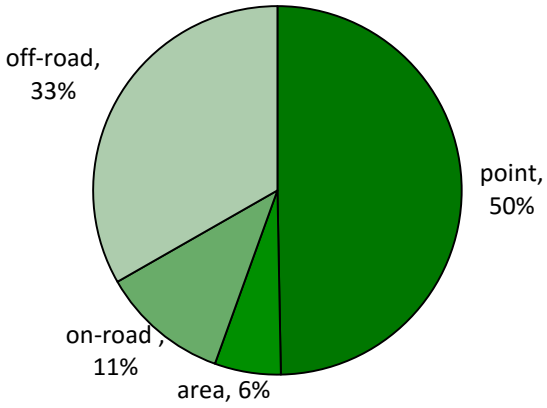
VOC Emissions: 500 tons/day



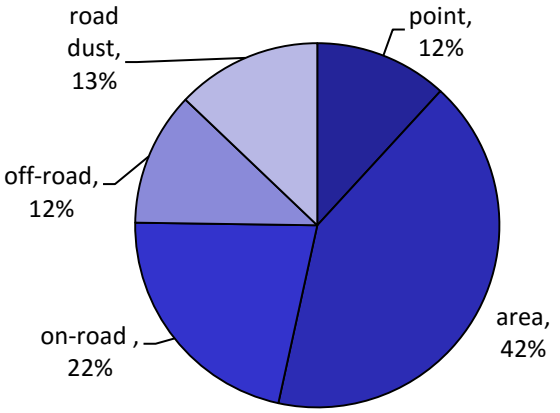
NOx Emissions: 522 tons/day



CO Emissions: 2123 tons/day



SOx Emissions: 18 tons/day



Directly Emitted PM2.5 Emissions: 66 tons/day

FIGURE 3-3

RELATIVE CONTRIBUTION BY SOURCE CATEGORY TO 2012 EMISSION INVENTORY

(VOC & NOX – SUMMER PLANNING; CO, SOX, & PM2.5 – ANNUAL AVERAGE INVENTORY VALUES ARE ROUNDED TO NEAREST INTEGER AND MAY NOT SUM DUE TO ROUNDING)

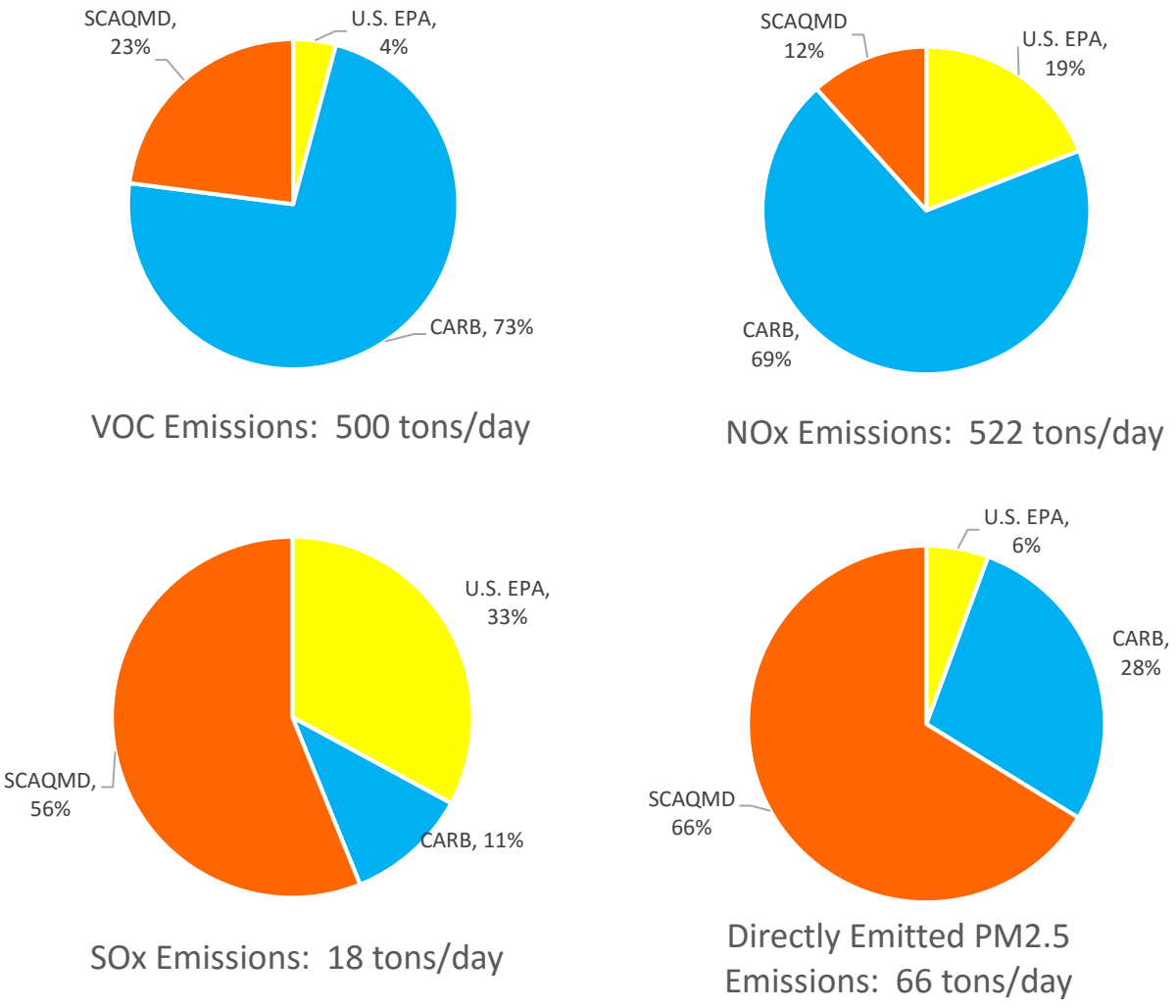


FIGURE 3-4

2012 EMISSION INVENTORY AGENCY PRIMARY RESPONSIBILITY

(VOC & NOX – SUMMER PLANNING; SOX, & PM2.5 – ANNUAL AVERAGE INVENTORY. VALUES ARE ROUNDED TO NEAREST INTEGER AND MAY NOT SUM DUE TO ROUNDING)

Future Emissions

Inventory Development

Inventories were developed for 2012, 2019, 2022, 2023, 2025, and 2031. Year 2012 is the base-year for the attainment demonstrations. Years 2023 and 2031 are the attainment years for the federal 8-hour ozone standards of 80 ppb (revoked) and 75 ppb, respectively. The 2022 inventory was developed to show attainment for the revoked 1-hour ozone standard (120 ppb). The 2019 and 2025 inventories were used to demonstrate attainment for the federal 24-hour and annual PM2.5 standards, respectively.

Future-year stationary source emissions are divided into RECLAIM and non-RECLAIM emissions. Future NOx and SOx emissions from RECLAIM sources are estimated based on their allocations as specified by District Rule 2002 –Allocations for NOx and SOx. The forecasts for non-RECLAIM emissions were derived using: (1) emissions from the 2012 base year, (2) expected controls after implementation of District rules adopted by December 2015 and CARB rules adopted as of November 2015, and (3) activity growth in various source categories between the base and future years.

Demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry), developed by SCAG for their 2016 RTP/SCS, were used. Industry growth factors for 2012, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2025, 2026, 2031, and 2037 are also provided by SCAG, and interim years are calculated by linear interpolation. Table 3-3 summarizes key socioeconomic parameters used in the 2016 AQMP for emissions inventory development.

In this chapter, the inventories for 2019, 2022, 2023, 2025, and 2031, the 8-hour ozone, 1-hour ozone, along with the annual and 24-hour PM2.5 attainment target years are discussed.

TABLE 3-3
Baseline Demographic Forecasts in the 2016 AQMP and the Final 2012 AQMP

CATEGORY	2012	2023	2023 % GROWTH FROM 2012	2031	2031 % GROWTH FROM 2012
Population (Millions)	15.9	17.1	7%	17.9	12%
Housing Units (Millions)	5.1	5.7	10%	6.0	16%
Total Employment (Millions)	6.7	7.8	16%	8.2	23%
Daily VMT (Millions)	380	407	7%	409	8%

Current forecasts indicate that this region will experience a population growth of 7 percent between 2012 and 2023, with a 7 percent increase in vehicle miles traveled (VMT) and a population growth of 12 percent by the year 2031 with an 8 percent increase in VMT.

As compared to the projections in the 2012 AQMP, the current 2023 projections in the 2016 AQMP predict a population of about 200,000 fewer people (2.8 percent less), 100,000 more total employment (1.2 percent more), and 11 million miles more in the daily VMT forecast (2.7 percent more).

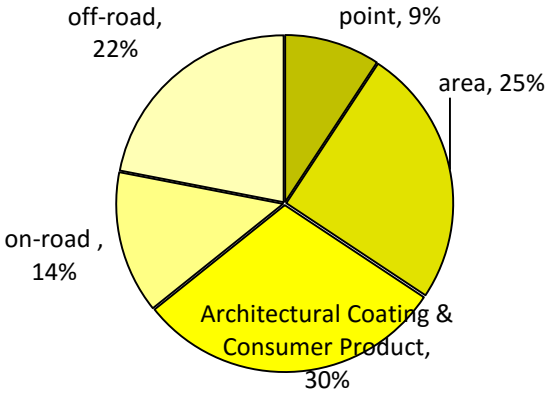
Summary of Future Baseline Emissions

To illustrate trends in the future baseline emissions inventories, emissions data by source categories (point, area, on-road mobile and off-road mobile sources) and by pollutant are presented in Tables 3-4A through 3-4E for the years 2019, 2022, 2023, 2025, and 2031. Baseline inventories are projected future emissions that reflect already adopted rules and regulations, but not additional controls proposed in the 2016 AQMP. This is in contrast to the 2012 base year emission inventory, which captures the actual 2012 emissions and is used as a basis for the projection of future inventories. Tables 3-4 provide annual average, as well as summer planning inventories. Emissions inventories for 2021, the "moderate" annual PM2.5 attainment deadline and milestone years for the Reasonable Further Progress (RTP) analysis (2024, 2027, 2028, 2029 and 2030) can be found in Appendix III.

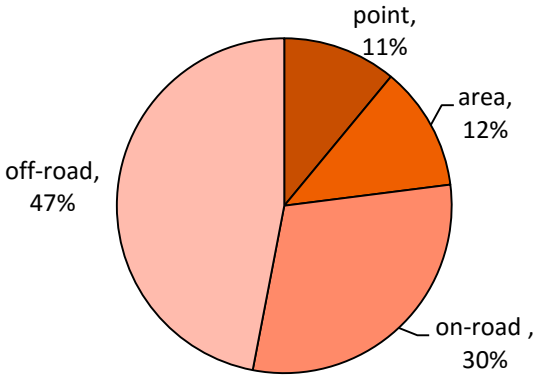
Without any additional control measures, VOC and NOx emissions are expected to decrease due to existing regulations, such as controls for on- and off-road equipment, new vehicle standards, and the RECLAIM program. However, consistent with what was shown earlier with the mobile source categories, the emissions of SOx and PM2.5 show increases after 2022, when most of the rules and regulations will be fully implemented. Increases in emissions due to increase in population and activity outpace the emission reductions from introducing newer and cleaner equipment and vehicles. Figure 3-5 illustrates the relative contribution to the 2031 inventory by source category. A comparison of Figures 3-3 and 3-

5 indicates that the on-road mobile category continues to be a major contributor to CO and NOx emissions. However, because of the implementation of most of the mobile source rules and regulations by 2023, 2031 on-road mobile sources account for much less of the VOC, NOx, and CO emissions as compared to 2012: about 14 percent of total VOC emissions compared to 33 percent in 2012; about 30 percent of total NOx emissions compared to 56 percent in 2012; and about 26 percent of total CO emissions compared to 63 percent in 2012. For directly emitted PM2.5, mobile sources will represent 23 percent of the emissions with another 14 percent due to vehicle-related entrained road dust, a reduction from the mobile source contribution in the base-year. It is projected that stationary sources will emit the majority of the SOx emissions with the point source category, contributing 55 percent of the SOx emissions in the Basin. In 2031, area sources will play even a larger role in VOC emissions, emitting more than point sources and mobile sources combined. Area sources will become the major contributor to VOC emissions from 37 percent in 2012 to 55 percent in 2031 and are projected to remain as the predominant source of directly emitted PM2.5 emissions (49 percent). See Figures 3-7 through 3-30 for the highest-ranking source categories for 2012, 2019, 2022, 2023, 2025, and 2031.

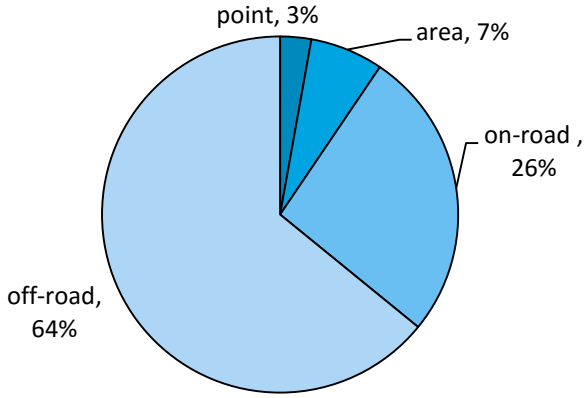
Figure 3-6 shows the fraction of the 2031 inventory by responsible agency for VOC, NOx, SOx, and directly emitted PM2.5. In 2031, a larger fraction of the NOx and VOC emissions will fall under the SCAQMD control. However, the majority of VOC and NOx emissions will remain primarily under CARB and EPA jurisdiction. The fraction of SOx emissions that fall under SCAQMD control will remain largely unchanged from the 2012 base-year inventory. However, the increasing contribution of area and point sources towards direct PM2.5 emissions in 2031 will result in a larger fraction of emissions falling under SCAQMD control.



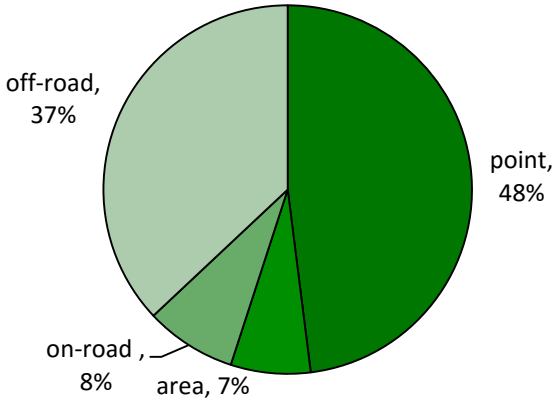
VOC Emissions: 362 tons/day



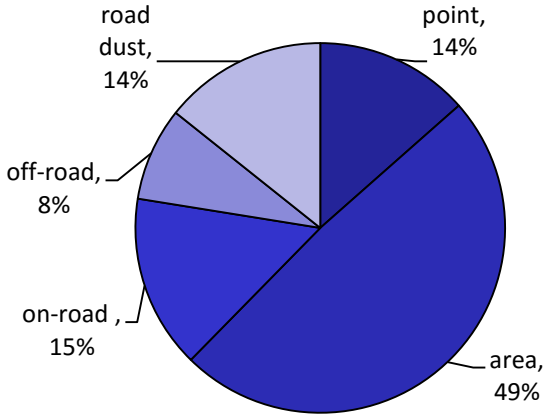
NOx Emissions: 214 tons/day



CO Emissions: 1118 tons/day



SOx Emissions: 18 tons/day



Directly Emitted PM2.5 Emissions: 65 tons/day

FIGURE 3-5

RELATIVE CONTRIBUTION BY SOURCE CATEGORY TO 2031 EMISSION INVENTORY

(VOC & NOX – SUMMER PLANNING; CO, SOX, & PM2.5 – ANNUAL AVERAGE INVENTORY - VALUES ARE ROUNDED TO NEAREST INTEGER AND MAY NOT SUM DUE TO ROUNDING)

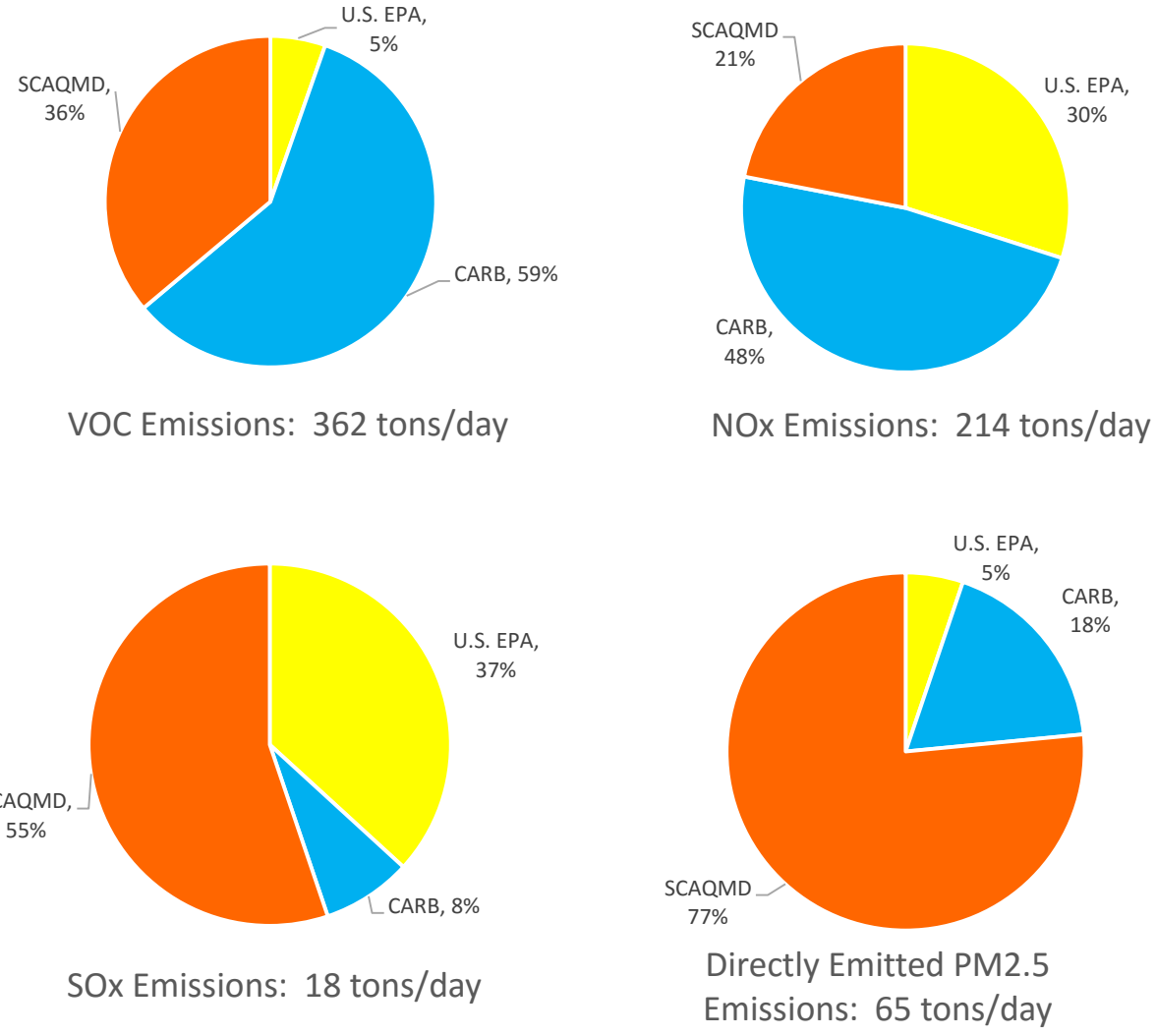


FIGURE 3-6

2031 EMISSION INVENTORY AGENCY RESPONSIBILITY

(VOC & NOX – SUMMER PLANNING; SOX & PM2.5 – ANNUAL AVERAGE INVENTORY. VALUES ARE ROUNDED TO NEAREST INTEGER AND MAY NOT SUM DUE TO ROUNDING)

TABLE 3-4A

Summary of Emissions By Major Source Category: 2019 Baseline (24-hr PM2.5 attainment year)
Average Annual Day and Summer Planning (tpd[1])

SOURCE CATEGORY	ANNUAL AVERAGE						SUMMER PLANNING	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	23	48	2	6	9	11	23
Waste Disposal	14	2	1	1	0	6	16	2
Cleaning and Surface Coatings	42	0	0	0	2	0	43	0
Petroleum Production and Marketing	21	0	5	0	2	0	21	0
Industrial Processes	12	0	1	0	7	9	13	0
Solvent Evaporation:								
Consumer Products	88	0	0	0	0	0	88	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	2	0	0	0	0	1	3	0
Misc. Processes[2]	13	14	56	1	31	35	7	10
RECLAIM Sources[3]	0	23	0	6	0	0	0	23
Total Stationary Sources	**214**	**62**	**111**	**10**	**47**	**60**	**213**	**59**
MOBILE SOURCES								
On-Road Vehicles	82	167	639	2	11	14	86	155
Off-Road Vehicles	79	124	697	5	6	0	98	133
Total Mobile Sources	**161**	**291**	**1336**	**7**	**17**	**14**	**184**	**289**
TOTAL	**376**	**353**	**1447**	**17**	**64**	**74**	**398**	**347**

[1] Values are rounded to nearest integer and may not sum due to rounding
[2] Includes entrained road dust
[3] Includes 2015 RECLAIM NOx shaves

TABLE 3-4B

Summary of Emissions By Major Source Category: 2022 Baseline (1-hr ozone attainment year)
Average Annual Day and Summer Planning (tpd[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	22	49	2	6	9	11	22
Waste Disposal	15	2	1	1	0	6	17	3
Cleaning and Surface Coatings	45	0	0	0	2	0	47	0
Petroleum Production and Marketing	20	0	5	0	2	0	20	0
Industrial Processes	12	0	1	0	7	9	13	0
Solvent Evaporation:								
Consumer Products	90	0	0	0	0	0	90	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	2	0	0	0	0	1	3	0
Misc. Processes[2]	13	13	56	1	31	35	7	10
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**220**	**53**	**112**	**10**	**48**	**60**	**220**	**50**
MOBILE SOURCES								
On-Road Vehicles	68	125	498	2	10	13	71	117
Off-Road Vehicles	74	113	715	5	6	0	92	120
Total Mobile Sources	**142**	**238**	**1213**	**7**	**16**	**13**	**163**	**237**
TOTAL	**362**	**290**	**1325**	**17**	**64**	**73**	**383**	**287**

[1] Values are rounded to nearest integer and may not sum due to rounding

[2] Includes entrained road dust

[3] Includes 2015 RECLAIM NOx shaves

TABLE 3-4C

Summary of Emissions By Major Source Category: 2023 Baseline (1997 8-hr ozone attainment year)
Average Annual Day and Summer Planning (tpd[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	22	49	2	6	9	11	22
Waste Disposal	15	2	1	1	0	6	17	3
Cleaning and Surface Coatings	46	0	0	0	2	0	47	0
Petroleum Production and Marketing	20	0	5	0	2	0	20	0
Industrial Processes	13	0	1	0	8	9	14	0
Solvent Evaporation:								
Consumer Products	90	0	0	0	0	0	90	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	2	0	0	0	0	1	3	0
Misc. Processes[2]	13	13	56	1	32	35	7	10
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**222**	**52**	**112**	**10**	**48**	**60**	**220**	**50**
MOBILE SOURCES								
On-Road Vehicles	65	94	465	2	10	13	68	88
Off-Road Vehicles	73	110	721	6	6	0	90	117
Total Mobile Sources	**137**	**204**	**1186**	**7**	**16**	**13**	**158**	**205**
TOTAL	**359**	**257**	**1298**	**17**	**64**	**72**	**379**	**255**

[1] Values are rounded to nearest integer and may not sum due to rounding

[2] Includes entrained road dust

[3] Includes 2015 RECLAIM NOx shaves

TABLE 3-4D

Summary of Emissions By Major Source Category: 2025 Baseline (annual PM2.5 attainment year)
Average Annual Day and Summer Planning (tpd[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	22	50	2	6	9	11	22
Waste Disposal	16	2	1	1	0	6	18	3
Cleaning and Surface Coatings	47	0	0	0	2	0	49	0
Petroleum Production and Marketing	19	0	5	0	2	0	20	0
Industrial Processes	13	0	1	0	8	9	14	0
Solvent Evaporation:								
Consumer Products	91	0	0	0	0	0	91	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	3	0	0	0	0	1	3	0
Misc. Processes[2]	13	13	56	1	32	35	7	9
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**224**	**52**	**112**	**10**	**49**	**60**	**223**	**49**
MOBILE SOURCES								
On-Road Vehicles	58	85	403	2	10	12	61	79
Off-Road Vehicles	71	104	731	6	5	0	87	110
Total Mobile Sources	**129**	**189**	**1134**	**7**	**15**	**12**	**148**	**190**
TOTAL	**353**	**241**	**1247**	**17**	**64**	**72**	**372**	**239**

[1] Values are rounded to nearest integer and may not sum due to rounding
[2] Includes entrained road dust
[3] Includes 2015 RECLAIM NOx shaves

TABLE 3-4E

Summary of Emissions By Major Source Category: 2031 Baseline (2008 8-hr ozone attainment year)
Average Annual Day and Summer Planning (tpd[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	22	51	2	6	9	11	22
Waste Disposal	16	2	1	1	0	6	19	3
Cleaning and Surface Coatings	50	0	0	0	2	1	52	0
Petroleum Production and Marketing	18	0	5	0	2	0	18	0
Industrial Processes	13	0	1	0	8	9	14	0
Solvent Evaporation:								
Consumer Products	94	0	0	0	0	0	94	0
Architectural Coatings	13	0	0	0	0	0	13	0
Others	3	0	0	0	0	1	3	0
Misc. Processes[2]	13	11	56	1	33	36	7	9
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**231**	**51**	**113**	**10**	**50**	**61**	**231**	**50**
MOBILE SOURCES								
On-Road Vehicles	47	69	309	1	10	12	49	65
Off-Road Vehicles	66	94	766	7	5	0	81	100
Total Mobile Sources	**114**	**163**	**1074**	**8**	**15**	**12**	**130**	**165**
TOTAL	**345**	**214**	**1188**	**18**	**65**	**73**	**362**	**214**

[1] Values may not sum due to rounding
[2] Includes entrained road dust
[3] Includes 2015 RECLAIM NOx shaves

Impact of Growth

The 2016 AQMP forecasts the 2031 emissions inventories ‘‘with growth’’ through a detailed consultation process with SCAG. The region is projected to see a 12 percent growth in population, 16 percent growth in housing units, 23 percent growth in employment, and 8 percent growth in vehicle miles traveled between 2012 and 2031. To illustrate the impact of demographic growth on emissions, year 2031 no-growth emissions were estimated by removing the growth factors from the 2031 baseline emissions. Table 3-5 presents the comparison of the projected 2031 emissions with and without growth. In this analysis, the benefit of potential applications of BACT under District’s Regulation XIII-New Source Review (NSR) is not included. The growth impacts to year 2031 for VOC, NOx, CO, SOx and PM2.5 are 48, 35, 251, 2, and 8 tons per day, respectively.

While economic growth for the region is desirable, it presents a challenge to our air quality improvement efforts since the projected growth could offset the impressive progress made in reducing VOC, NOx, and PM2.5 emissions through adopted regulations. Meeting the U.S. EPA’s current and more-stringent future air quality standards will require the continuation of emission reduction efforts from all levels of government.

TABLE 3-5

Growth Impact to 2031 Emissions[1] in Tons per Day

WITH GROWTH	VOC	NOx	CO	SOx	PM2.5
Point	30	21	34	9	9
Area	201	29	80	1	32
Road Dust	0	0	0	0	9
On-Road	47	69	309	1	10
Off-Road	66	94	766	7	5
Total	**345**	**214**	**1188**	**18**	**65**
NO GROWTH	**VOC**	**NOx**	**CO**	**SOx**	**PM2.5**
Point	24	20	31	8	8
Area	178	32	78	1	28
Road Dust	0	0	0	0	8
On-Road	46	51	299	1	9
Off-Road	49	76	519	5	4
Total	**297**	**179**	**927**	**16**	**57**
IMPACT OF GROWTH	**VOC**	**NOx**	**CO**	**SOx**	**PM2.5**
Point	6	1	3	0	1
Area	23	-3	2	0	4
Road Dust	0	0	0	0	1
On-Road	1	18	10	0	1
Off-Road	18	19	237	2	1
Total	**48**	**35**	**251**	**2**	**8**

[1]Annual Average Inventory

Top Ten Source Categories (2012, 2019, 2022, 2023, 2025, and 2031)

The rankings of the top ten source contributors to the emissions inventories for specific years for VOC, NOx, SOx and PM2.5 are listed and briefly discussed in this section. The summer planning inventories for VOC and NOx, along with the annual average inventories for SOx and PM2.5 for 2012, 2019, 2022, 2023, 2025, and 2031 are shown in Figures 3-7 to 3-30.

Figures 3-7 to 3-12 provide the top ten categories for each of the six inventory years for VOCs. Two of top four categories are on-road mobile sources in the 2012 inventory, but none of the on-road categories are found in the top four categories for 2023, 2025 or 2031. This demonstrates the effect of more-stringent on-road standards in the future. Consumer products, and off-road equipment remain as high-emitting categories over time. The coatings and related processes category becomes much more significant in future years. The top 10 categories account for 78 percent of the total VOC inventory in 2012 and continue to account for over 72 percent through 2031.

NOTE: Figures 3-7, and 3-14 thru 3-30 have been updated from the Draft Plan to reflect the latest emission inventory values (e.g., aircraft NOx and SOx, paved road dust PM2.5).

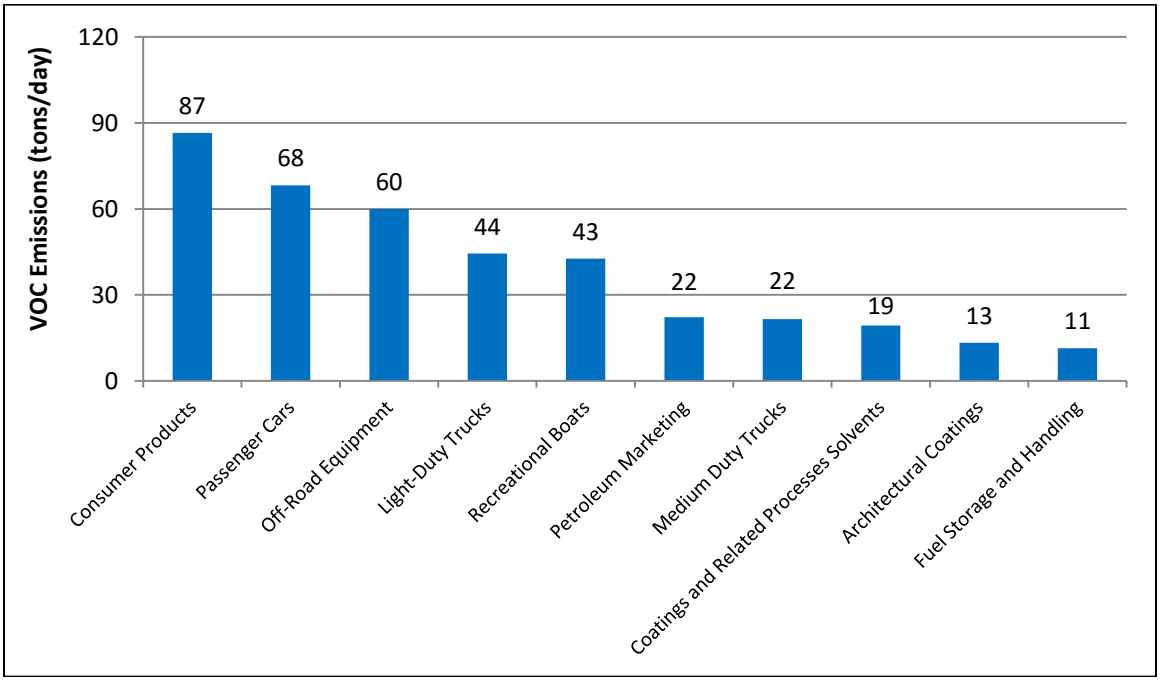


FIGURE 3-7

TOP TEN EMITTER CATEGORIES FOR VOC IN 2012 (SUMMER PLANNING)

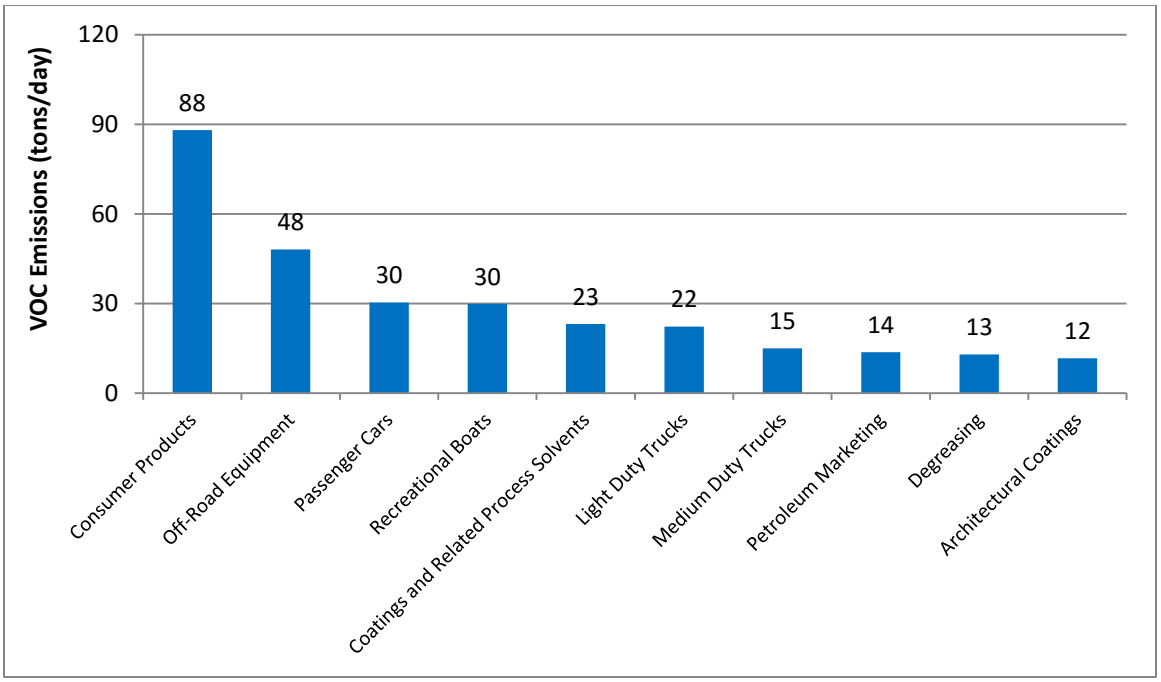


FIGURE 3-8

TOP TEN EMITTER CATEGORIES FOR VOC IN 2019 (SUMMER PLANNING)

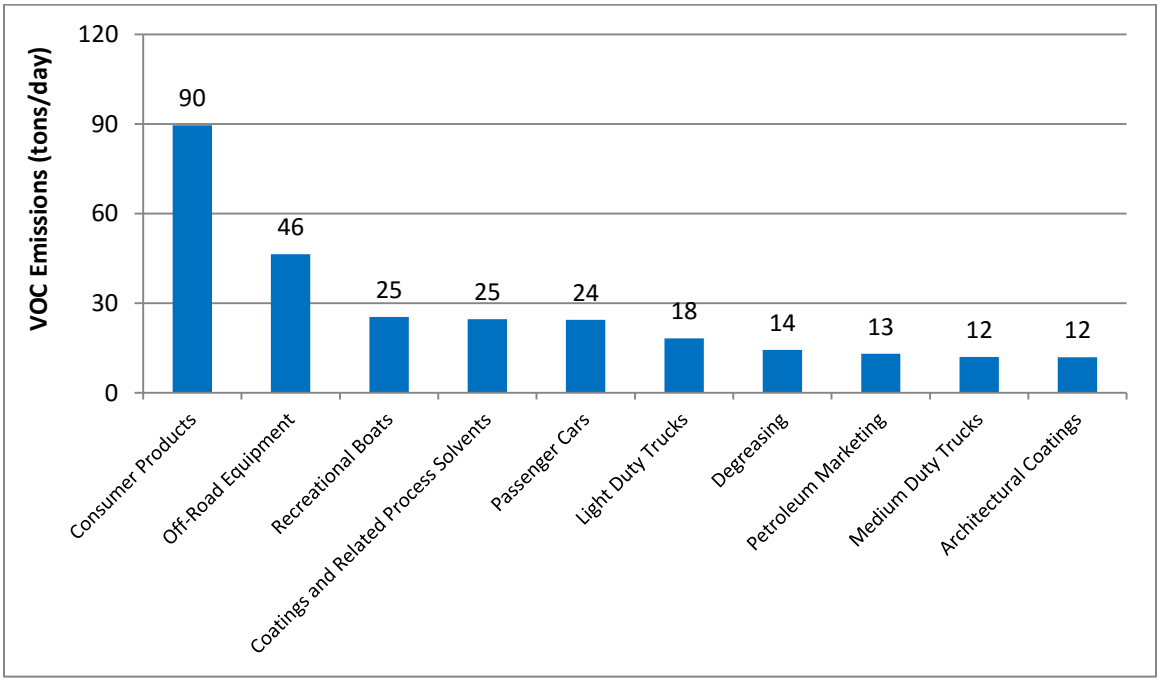


FIGURE 3-9

TOP TEN EMITTER CATEGORIES FOR VOC IN 2022 (SUMMER PLANNING)

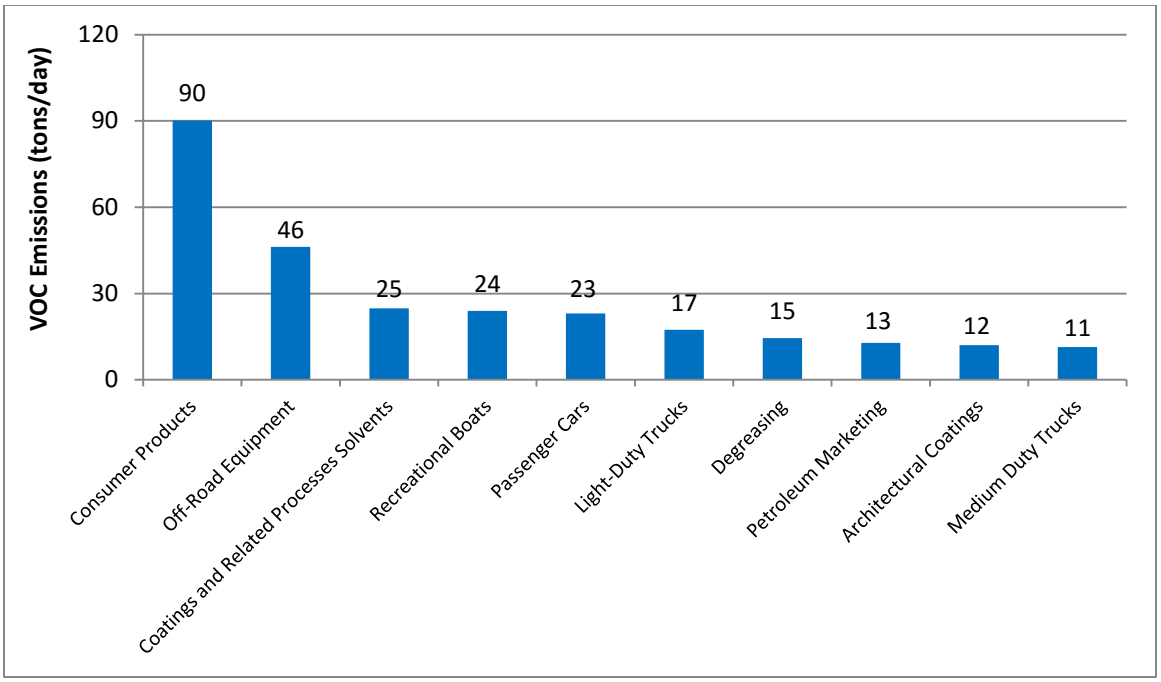


FIGURE 3-10

TOP TEN EMITTER CATEGORIES FOR VOC IN 2023 (SUMMER PLANNING)

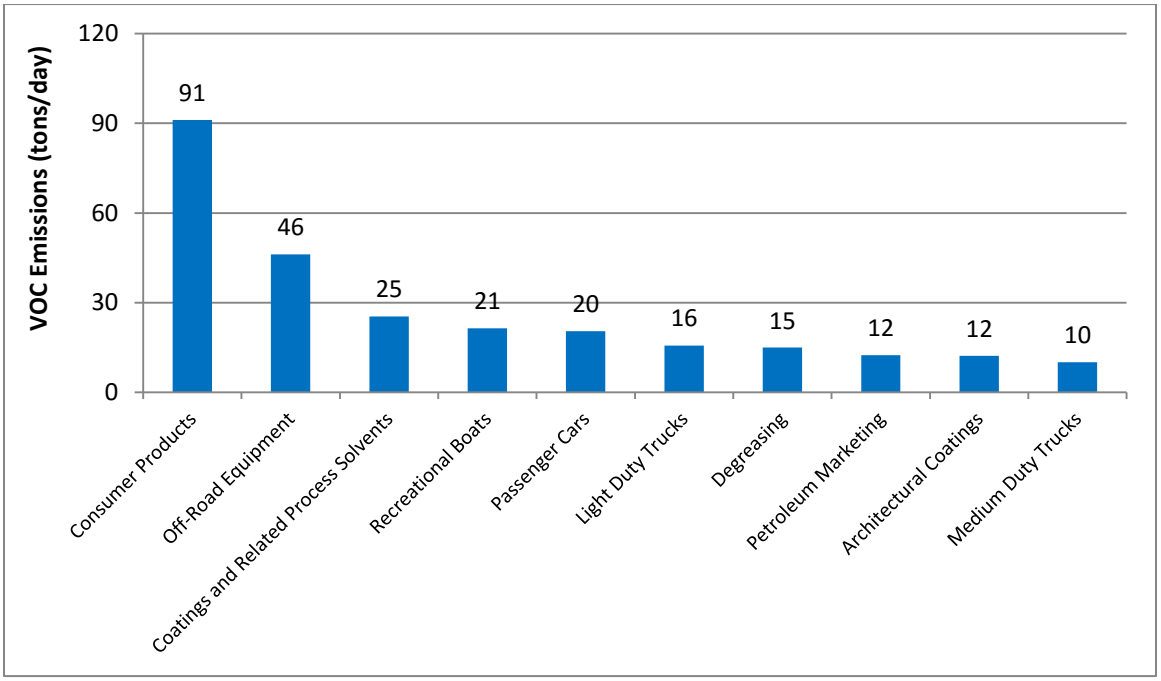


FIGURE 3-11

TOP TEN EMITTER CATEGORIES FOR VOC IN 2025 (SUMMER PLANNING)

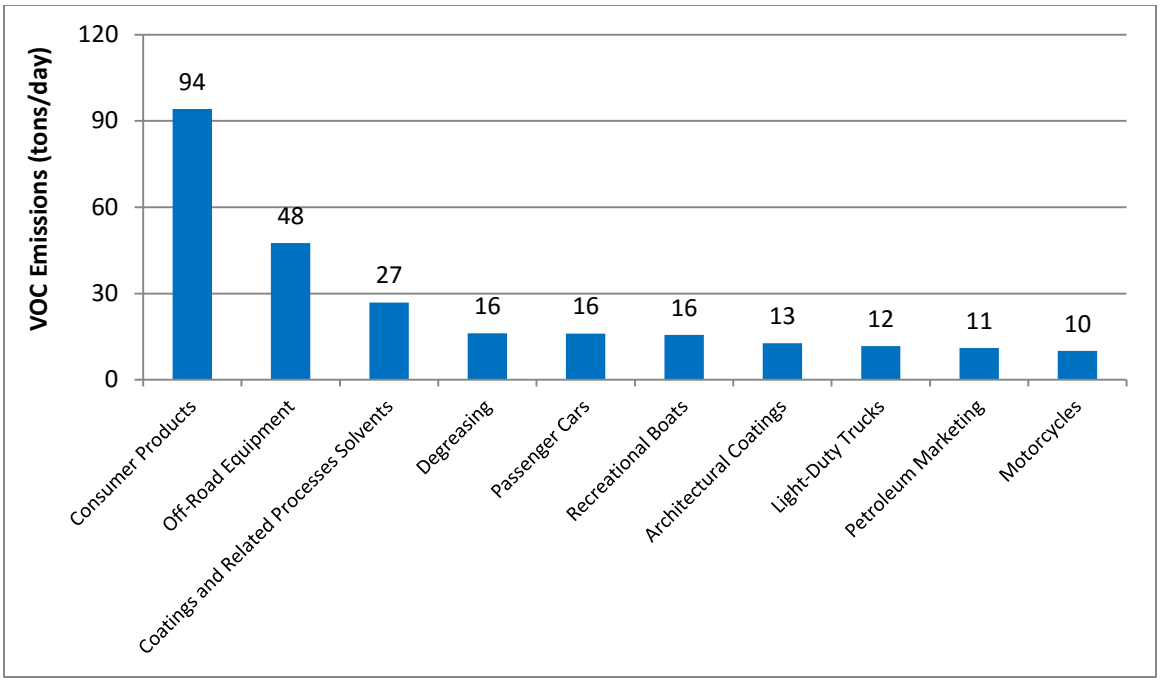


FIGURE 3-12

TOP TEN EMITTER CATEGORIES FOR VOC IN 2031 (SUMMER PLANNING)

Figures 3-13 to 3-18 show the top ten categories for NOx emissions for specific years. Mobile source categories remain the predominant contributor to NOx emissions. Heavy-duty diesel trucks, off-road equipment, and ships and commercial boats are the top three emitters on the list for all six years. NOx RECLAIM and residential fuel combustion are the only non-mobile categories which make it to the top ten list in 2012, but as the mobile source categories clean up due to the implementation of regulations, the number of non-mobile sources appearing in the top 10 categories increases with time, with four non-mobile categories in 2025 and 2031. The top ten categories account for 85 percent of the total NOx inventory in 2012, 84 percent in 2019, 83 percent in 2022, 82 percent in 2023, 83 percent in 2025 and 86 percent in 2031.

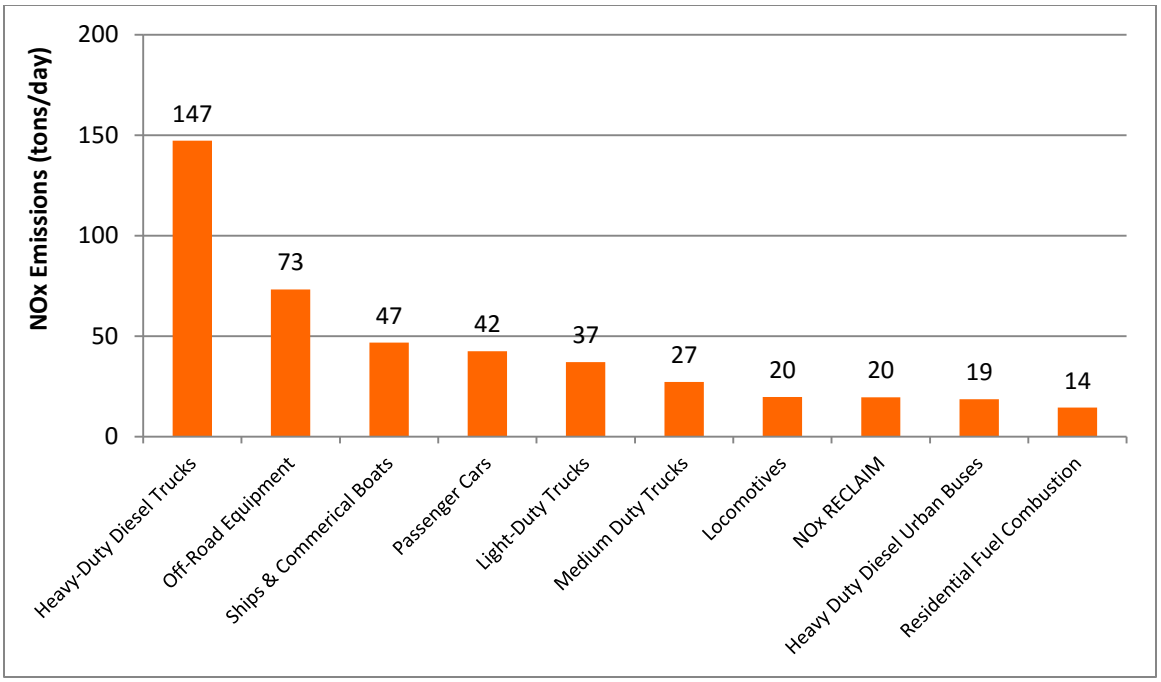


FIGURE 3-13

TOP TEN EMITTER CATEGORIES FOR NOX IN 2012 (SUMMER PLANNING)

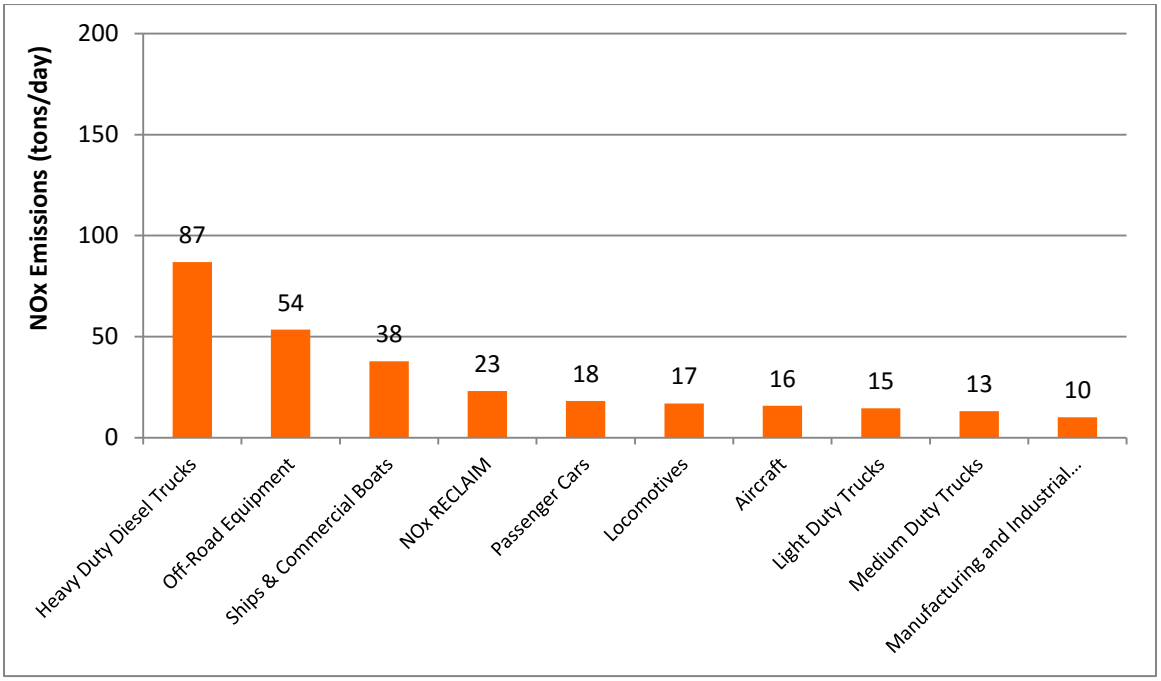


FIGURE 3-14

TOP TEN EMITTER CATEGORIES FOR NOX IN 2019 (SUMMER PLANNING)

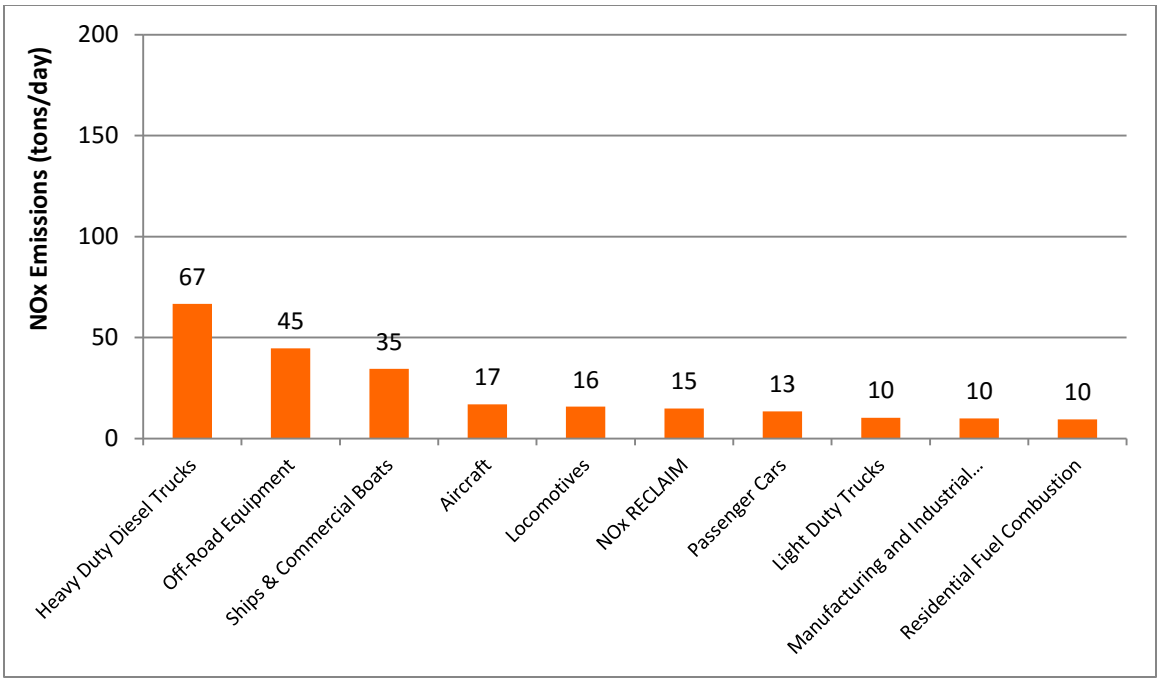


FIGURE 3-15

TOP TEN EMITTER CATEGORIES FOR NOX IN 2022 (SUMMER PLANNING)

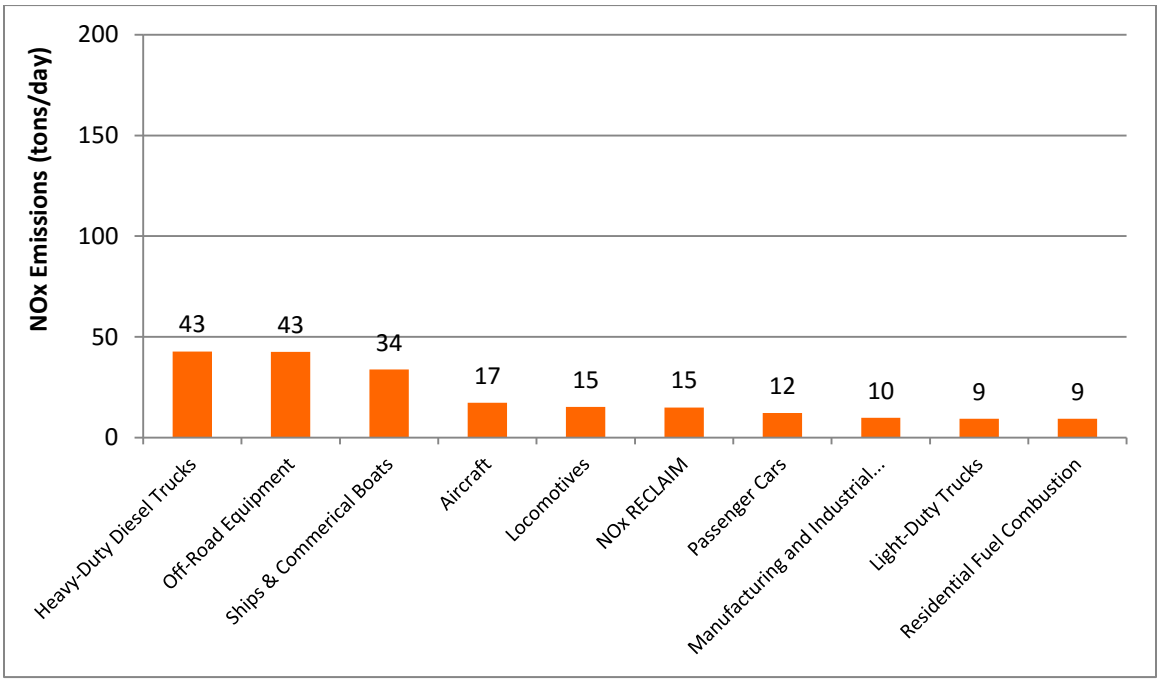


FIGURE 3-16

TOP TEN EMITTER CATEGORIES FOR NOX IN 2023 (SUMMER PLANNING)

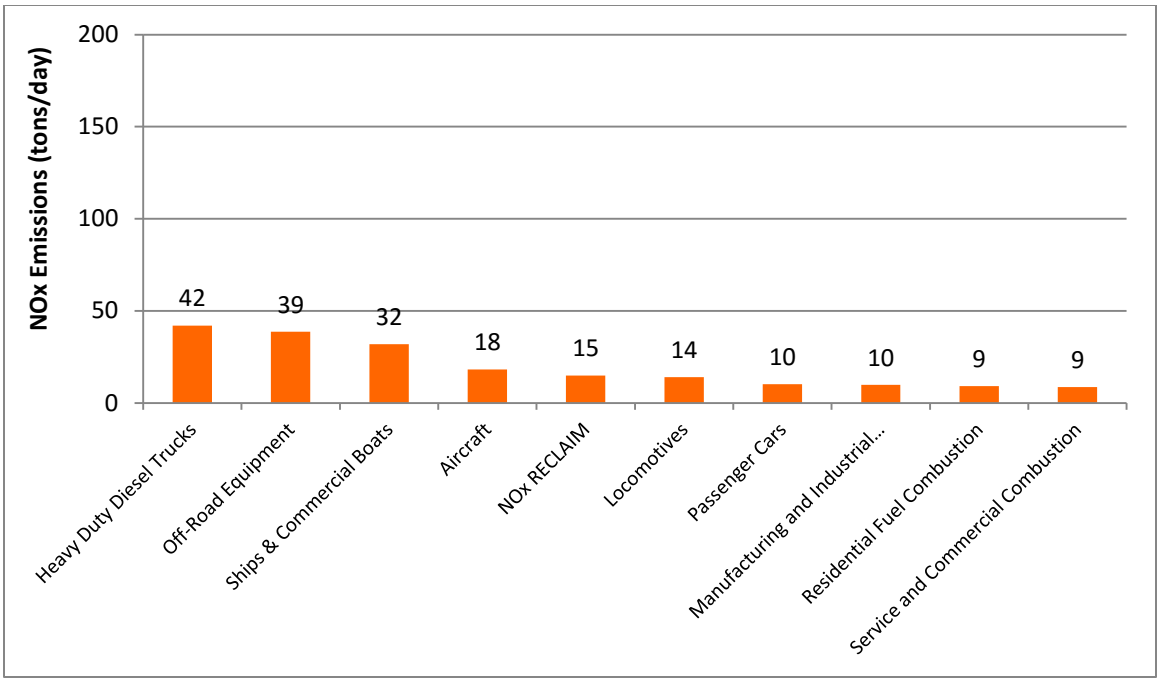


FIGURE 3-17

TOP TEN EMITTER CATEGORIES FOR NOX IN 2025 (SUMMER PLANNING)

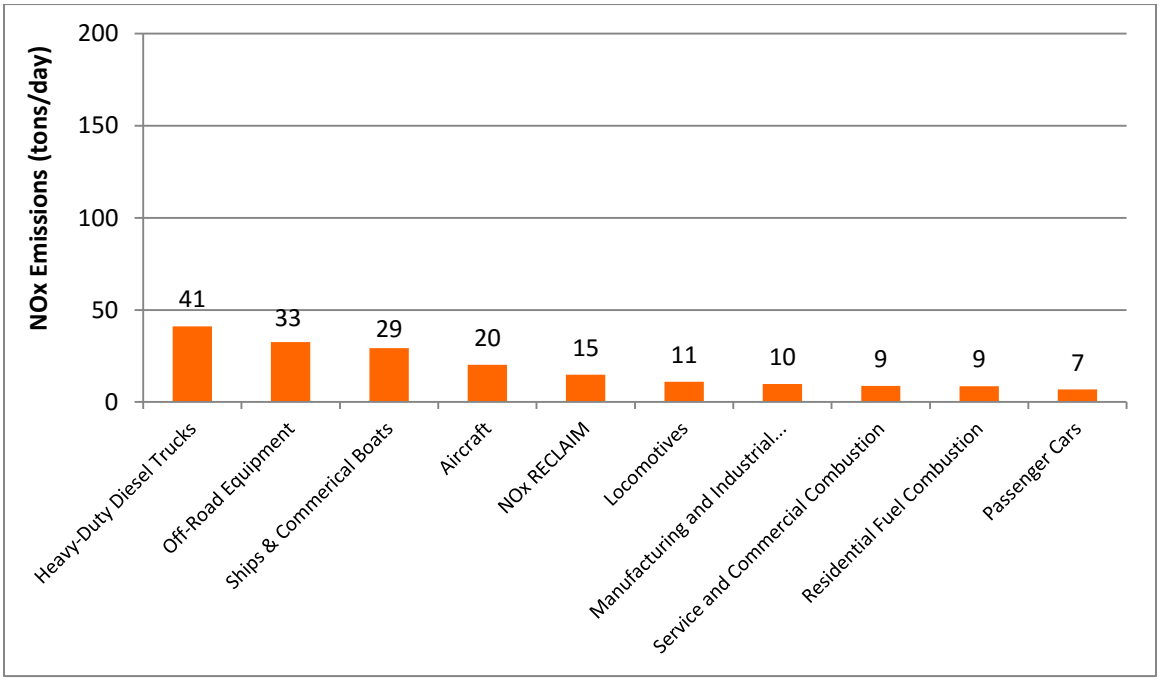


FIGURE 3-18

TOP TEN EMITTER CATEGORIES FOR NOX IN 2031 (SUMMER PLANNING)

Figures 3-19 to 3-23 show the top source categories for SOx emissions in the years 2012, 2019, 2022, 2023, 2025 and 2031. The emission levels of SOx are relatively low. Therefore, only the categories that emit more than 0.5 tons per day of SOx are ranked and listed. The top five high emitting source categories remain the same in all years. SOx RECLAIM and Ships & Commercial Boats are the most significant contributors. The top categories represent 81 percent, 79 percent, 79 percent, 79 percent, 80 percent and 81 percent of the total SOx inventory in 2012, 2019, 2022, 2023, 2025, and 2031, respectively.

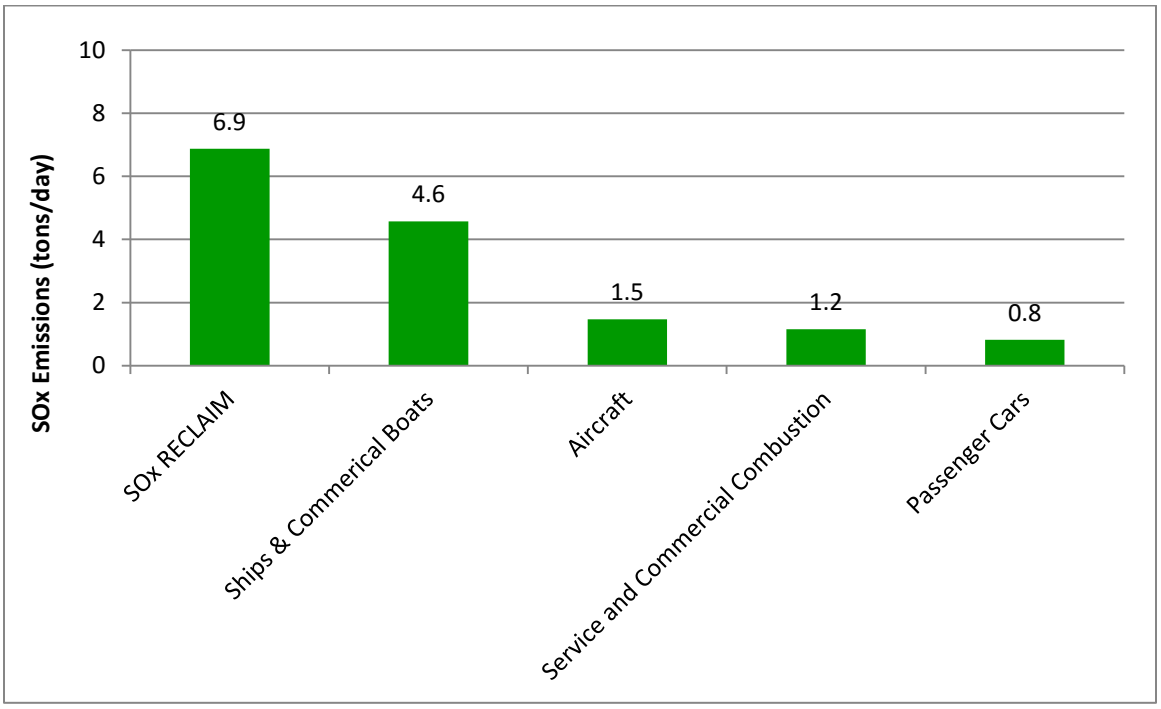


FIGURE 3-19

TOP EMITTER CATEGORIES FOR SOX 0.5 TPD AND OVER IN 2012 (ANNUAL AVERAGE)

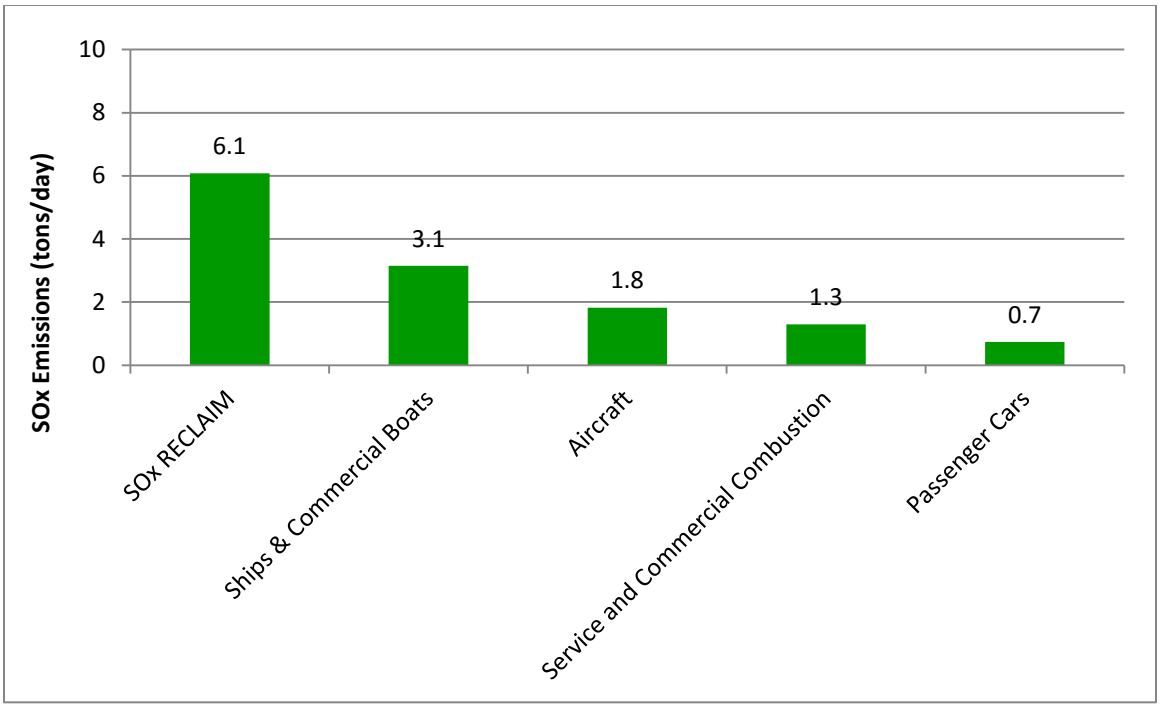


FIGURE 3-20

TOP EMITTER CATEGORIES FOR SOX 0.5 TPD AND OVER IN 2019 (ANNUAL AVERAGE)

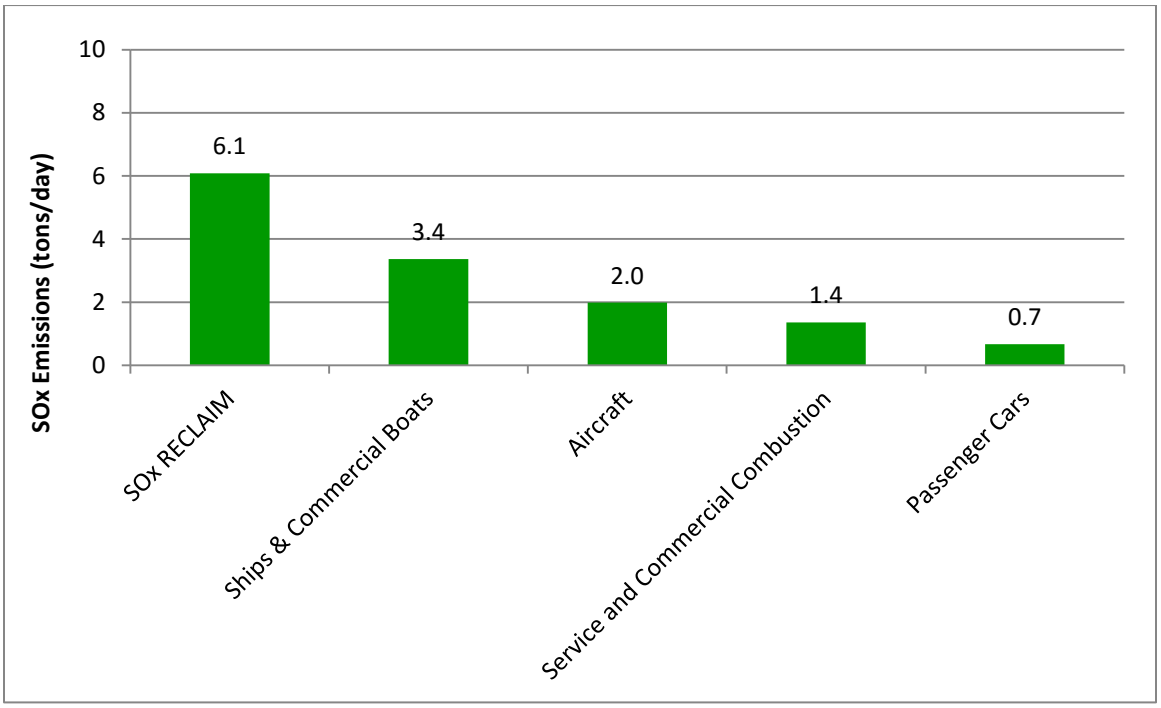


FIGURE 3-21

TOP EMITTER CATEGORIES FOR SOX 0.5 TPD AND OVER IN 2022 (ANNUAL AVERAGE)

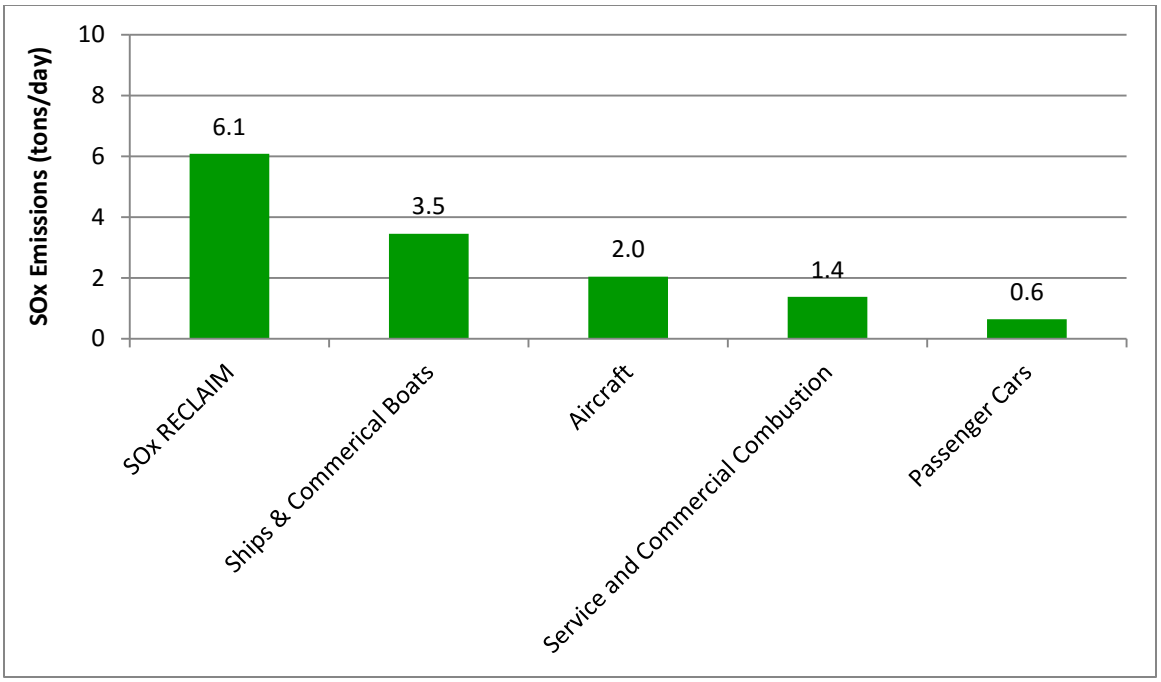


FIGURE 3-22

TOP EMITTER CATEGORIES FOR SOX 0.5 TPD AND OVER IN 2023 (ANNUAL AVERAGE)

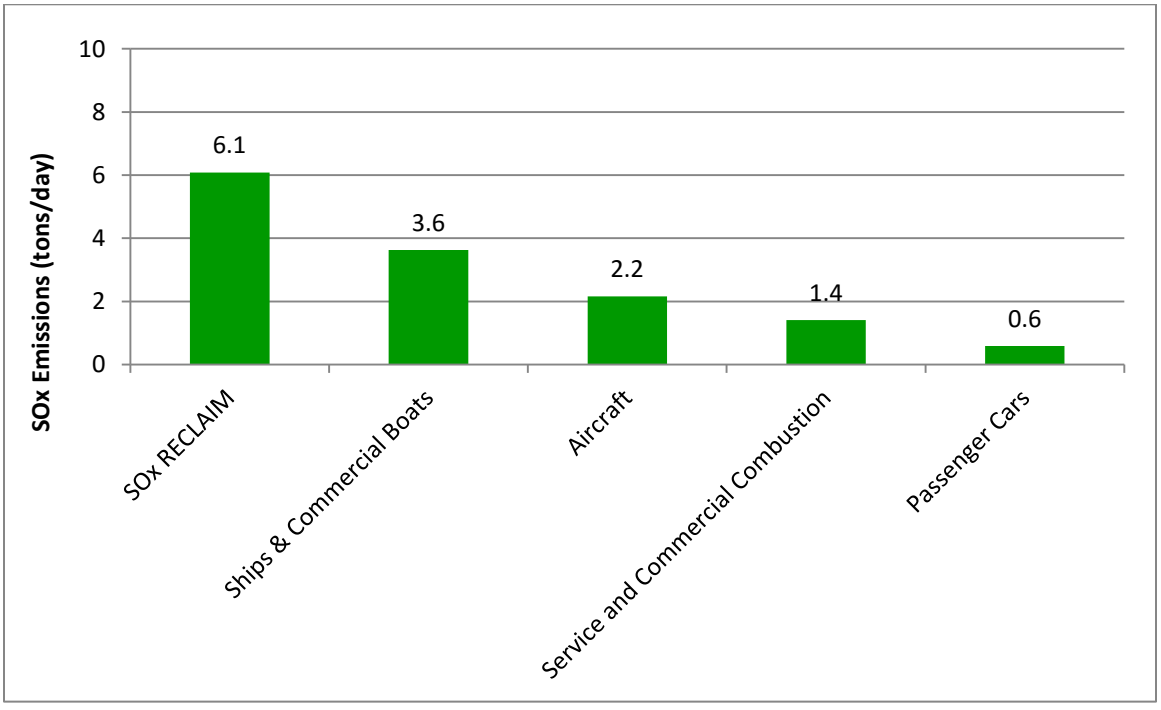


FIGURE 3-23

TOP EMITTER CATEGORIES FOR SOX 0.5 TPD AND OVER IN 2025 (ANNUAL AVERAGE)

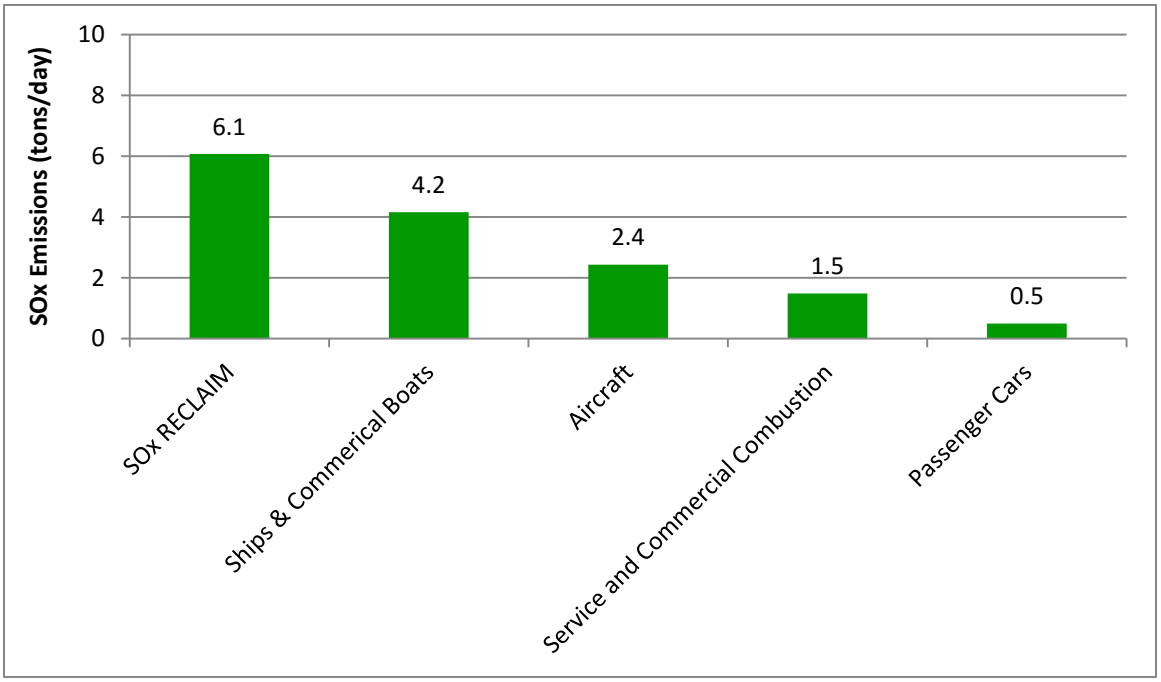


FIGURE 3-24

TOP EMITTER CATEGORIES FOR SOX 0.5 TPD AND OVER IN 2031 (ANNUAL AVERAGE)

Figures 3-25 to 3-30 show the top ten source categories in specific years for directly emitted PM2.5. Commercial cooking, paved road dust, and residential fuel combustion are the top three highest emitting categories for all six years. The top ten categories represent 72 percent of the total directly emitted PM2.5 inventory in 2012 and 2019, and 73 percent in 2023 through 2031.

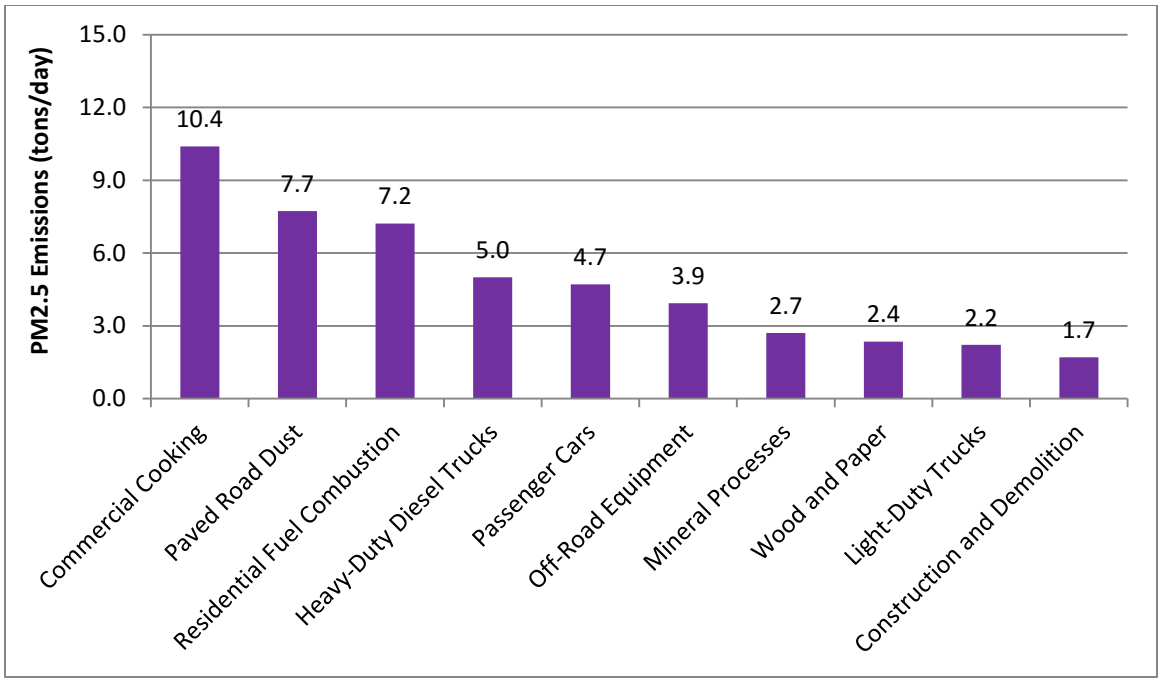


FIGURE 3-25

TOP TEN EMITTER CATEGORIES FOR DIRECTLY EMITTED PM2.5 IN 2012 (ANNUAL AVERAGE)

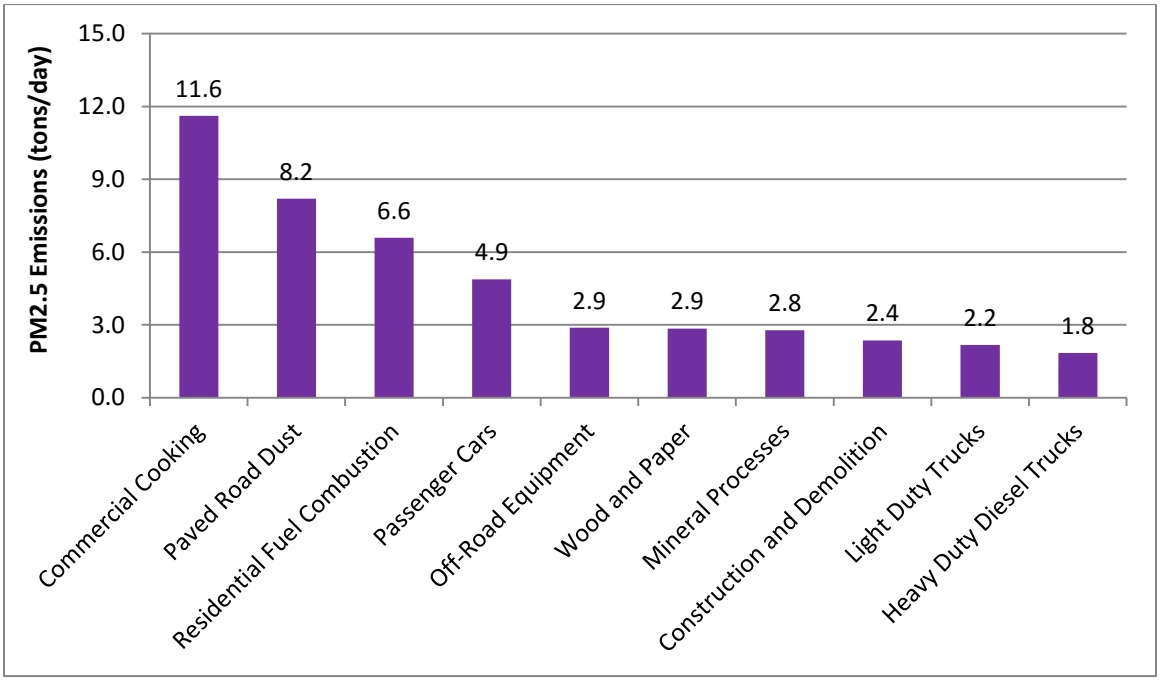


FIGURE 3-26

TOP TEN EMITTER CATEGORIES FOR DIRECTLY EMITTED PM2.5 IN 2019 (ANNUAL AVERAGE)

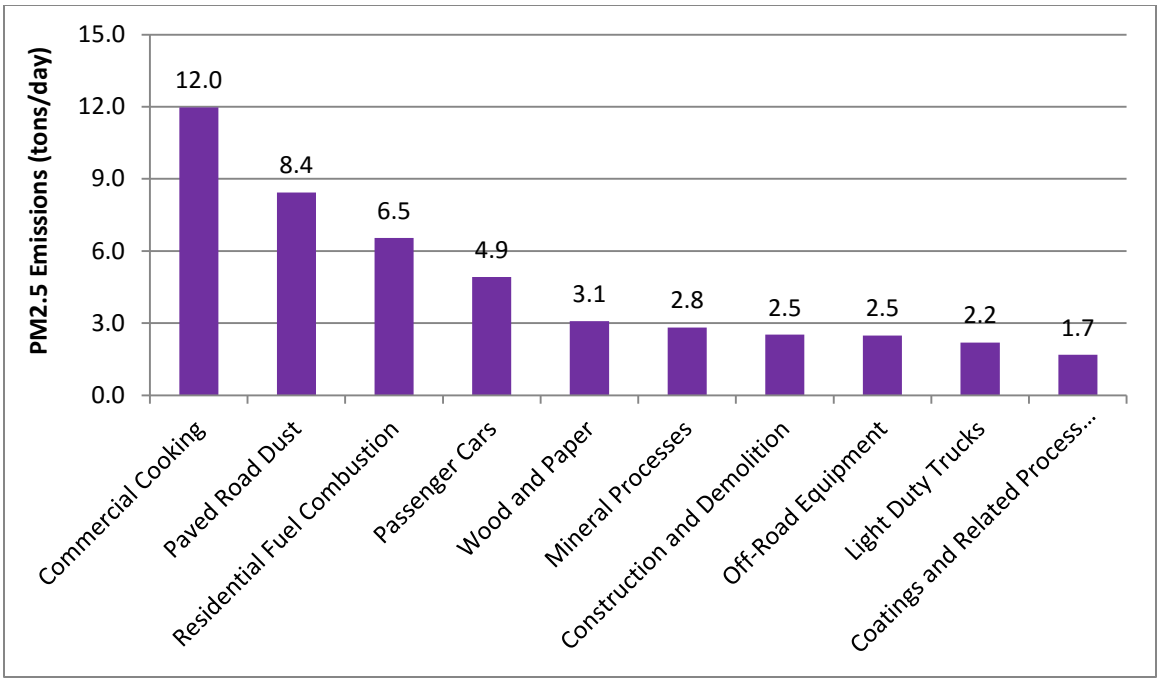


FIGURE 3-27

TOP TEN EMITTER CATEGORIES FOR DIRECTLY EMITTED PM2.5 IN 2022 (ANNUAL AVERAGE)

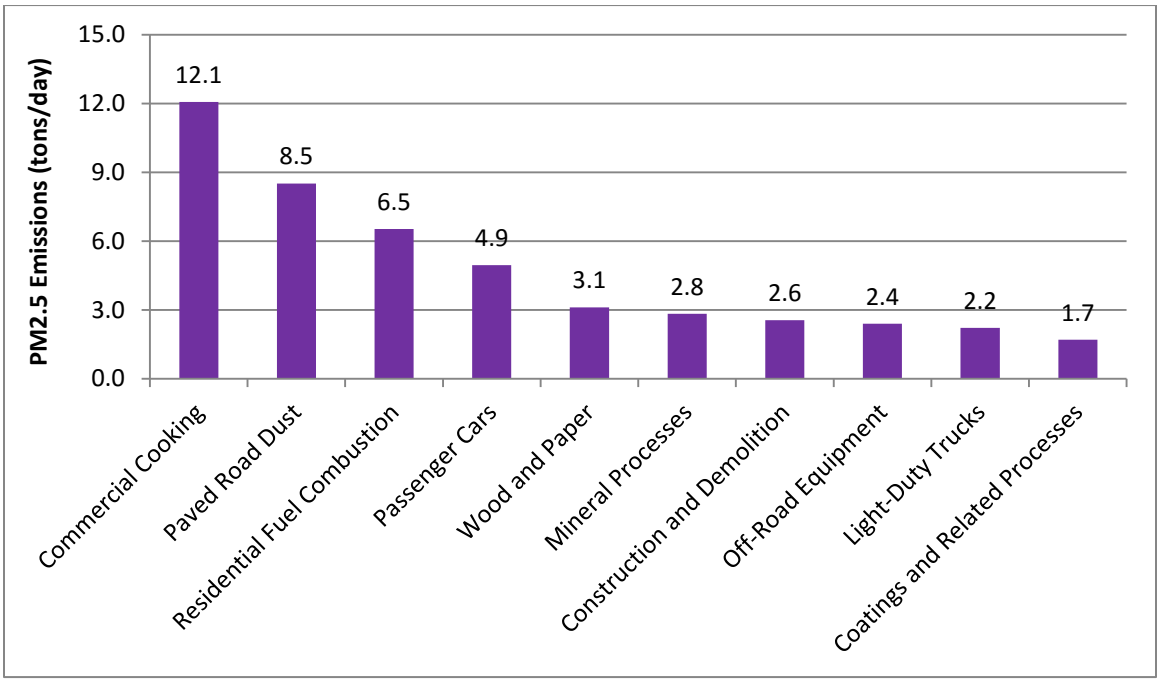


FIGURE 3-28

TOP TEN EMITTER CATEGORIES FOR DIRECTLY EMITTED PM2.5 IN 2023 (ANNUAL AVERAGE)

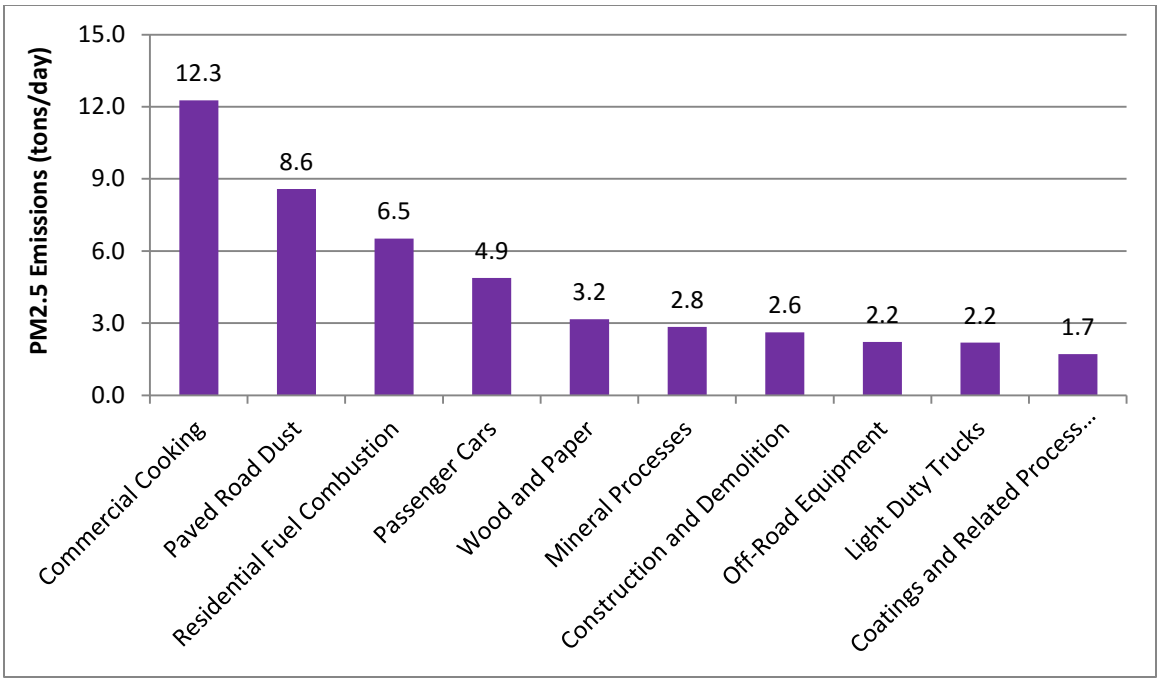


FIGURE 3-29

TOP TEN EMITTER CATEGORIES FOR DIRECTLY EMITTED PM2.5 IN 2025 (ANNUAL AVERAGE)

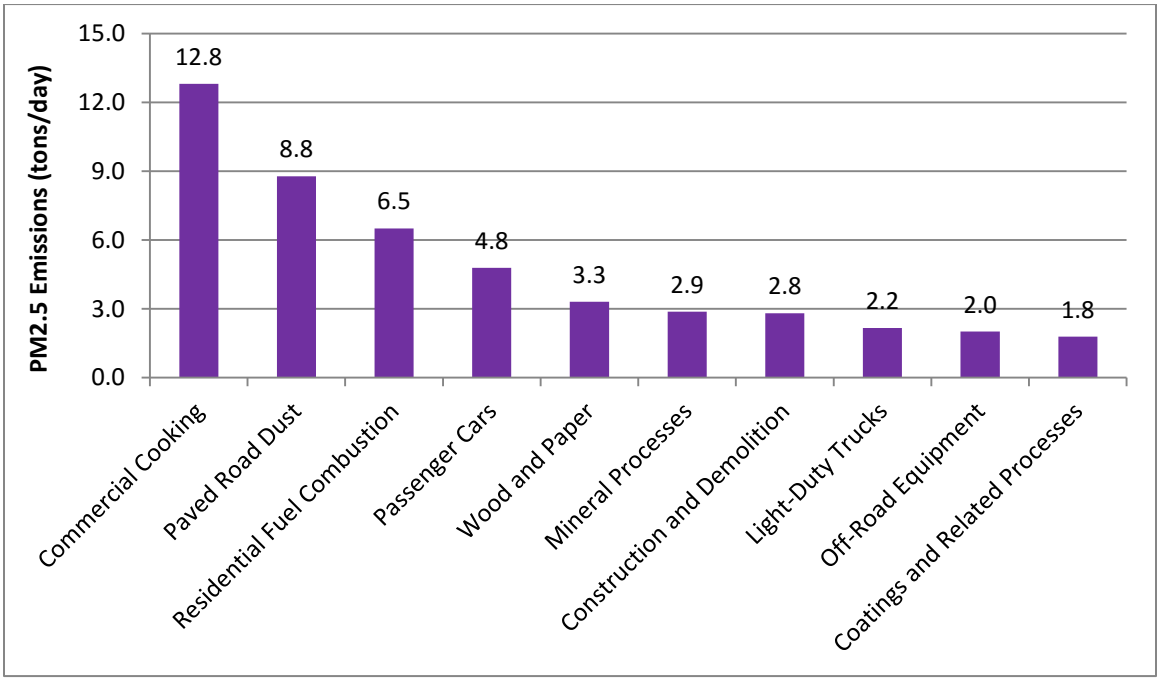


FIGURE 3-30

TOP TEN EMITTER CATEGORIES FOR DIRECTLY EMITTED PM2.5 IN 2031 (ANNUAL AVERAGE)

Chapter 4

Control Strategy and Implementation



Substantial emission reductions from mobile and stationary sources are needed to meet the federal health standards. Traditional regulatory opportunities are proposed along with innovative, non-traditional control approaches including recognizing co-benefits from other programs and incentives for advanced cleaner technology deployment.

In This Chapter

- Introduction 4-1
  Overview of proposed control strategy and implementation
- Overall Strategy 4-2
  Developing a comprehensive emission control strategy
- SCAQMD Proposed 8-Hour Ozone Strategy 4-6
  Stationary and mobile source NOx reduction strategies and strategic VOC emission reductions
- State and Federal Control Measures 4-33
  On-road, off-road, and other State and federal sources

- SCAG's RTP/SCS and Transportation Control Measures 4-41
  Regional transportation strategy and control measures
- SCAQMD Proposed PM2.5 Strategy 4-44
  Control measures to meet the federal annual PM2.5 standard
- SCAQMD Proposed Contingency Measures 4-50
  Satisfying contingency measure requirements
- SIP Emission Reduction Commitment 4-51
  PM2.5 and ozone SIPs emission reduction commitment
- Overall Emission Reductions 4-59
  Summary of annual average and summer planning emission inventory and reductions
- Implementation 4-62
  Implementation of the 2016 AQMP and incentive funding at local/regional, state, and national levels

Introduction

The overall control strategy in the Draft 2016 Air Quality Management Plan (AQMP or Plan) provides a path to achieving emission reductions to meet air quality goals. Implementation of the 2016 AQMP will be based on a series of control measures and strategies that vary by source type (i.e., mobile or stationary) as well as by the pollutant that is being addressed. Although great strides have been made in air pollution control programs, health-based air quality standards cannot be achieved without significant further emission reductions. An integrated control strategy addressing multiple objectives provides for a more efficient path in meeting all clean air standards, including the federal PM2.5 and ozone standards. For example, the NOx emission reductions that are needed for ozone attainment also reduce PM2.5 to attainment levels. Therefore, allocating resources towards NOx reductions is a more cost-effective strategy than separately implementing controls that only benefit PM2.5. Furthermore, in designing an integrated control strategy to achieve the ozone and PM2.5 air quality standards, consideration must be given to the health of the public, the economic well-being of the region, and challenges for local business. History has shown that air quality levels can be greatly improved while maintaining a growing and vibrant economy.

The 2016 AQMP is designed to achieve the federal 2008 8-hour ozone standard (75 ppb) by 2031 and the 2012 annual PM2.5 standard (12 $\mu g/m^3$) by 2025 as a "serious" nonattainment area. The Plan also addresses attainment of the 2006 24-hour PM2.5 standard (35 $\mu g/m^3$) by 2019, which was recently reclassified as "serious" nonattainment for this standard. It also updates previous plans for the revoked 1-hour (120 ppb) and 1997 8-hour (80 ppb) ozone national ambient air quality standards (NAAQS) that have not yet been met. The California state ambient air quality standard is identical to the federal standard for annual PM2.5 and there is no state 24-hour PM2.5 standard. The State has very stringent PM10 standards (annual PM10: 20 $\mu g/m^3$ and 24-hour PM10: 50 $\mu g/m^3$). While there is no effective attainment date for the state PM standards, the state standards must be achieved as soon as practicable to protect the public health and welfare of Southern Californians. Progress towards achieving the federal PM2.5 standards is most expeditious approach for attaining both the federal and state PM standards, even though state PM10 standards are more stringent than the federal standard.

The magnitude of the NOx emission reductions needed for attainment of the ozone NAAQS poses the most significant challenge. This challenge requires an aggressive mobile source control strategy supplemented with focused and strategic stationary source control measures, and close collaboration with federal, state, and regional governments, businesses, and the public. The 2016 AQMP uses a variety of implementation approaches such as regulation, accelerated deployment of available cleaner technologies (e.g., zero emission technologies, when cost effective and feasible, and near-zero emission technologies in other applications), best management practices, co-benefits from existing programs (e.g., climate, energy efficiency), and incentives. Additional demonstration and commercialization projects will be crucial to help deploy and reduce costs for zero and near-zero emission technologies. A key element of Plan implementation will be private and public funding to help further the development and deployment of these advanced technologies. Many of the same technologies will address both air quality and climate goals, such as increased energy efficiency and reduced fuel usage. The total required emission reductions, technology readiness, cost-effectiveness, economic impacts, and interaction with

other attainment deadlines for all pollutants are critical considerations in developing an integrated multi-pollutant control strategy. This chapter outlines the proposed control strategy and the adoption and implementation schedule for the 2016 AQMP to achieve the federal health-based air quality standards in the Basin.

Overall Strategy

Need for Emission Reductions

As a consequence of the region's air quality control programs at local, State, and federal levels, the concentrations of ambient PM2.5 and ozone in the Basin have improved dramatically over the previous decades. For example, by 2013 and again in 2014, no stations measuring PM2.5 in the Basin violated the former (1997) annual PM2.5 NAAQS (15.0 µg/m^3). Yet, the Basin still exceeds federal health-based standards for both ozone and PM2.5, and experiences some of the worst air pollution in the nation. The three-year (2012–2014) design values for PM2.5 and 8-hour ozone are exceeding the 2012 annual (12 µg/m^3) and 2006 24-hour (35 µg/m^3) PM2.5 standards and the 1997 (80 ppb) and 2008 (75 ppb) 8-hour ozone standards, respectively. Details on the Basin's current air quality, historical trends, and comparisons to the NAAQS are provided in Chapter 2.

Challenges

The most significant air quality challenge in the Basin, and the primary driver for the control strategy, is the need to reduce NOx emissions sufficiently to meet the upcoming ozone standard deadlines (1-hour ozone: 120 ppb by 2023[1] and 8-hour ozone: 80 ppb by 2024 and 75 ppb by 2032). For all ozone NAAQS standards, emission reductions must be in place the previous year (2022, 2023, and 2031). The approximately 522 tons per day of total Basin NOx emissions in 2012 are projected to decrease to approximately 255 tons per day and 214 tons per day in the attainment years of 2023 and 2031, respectively, due to continued implementation of already adopted control measures. Chapter 3 describes the 2012 and future year baseline (no additional actions beyond already adopted regulations) inventories in detail. However, in the absence of additional actions, these emission reductions are not sufficient to meet the ozone standards. An additional 45 percent NOx emission reductions are needed in 2023, and an additional 55 percent NOx reductions are needed in 2031 to attain the 8-hour ozone NAAQS. These percentages are based on meeting the "carrying capacity" (the maximum amount of emissions allowable in the region that would still meet the standards) of 141 tons per day in 2023 and 96 tons per day in 2031.

Strategy

To meet the targeted carrying capacity, a comprehensive emission control strategy has been developed. The 2016 AQMP integrates a variety of control measures and implementation approaches in a cost-

[1] The standard was revoked, but the Basin has not yet met the standard. Ten years from the designation date of February 6, 2013 is the latest statutory deadline (February 6, 2023).

effective, feasible, and targeted fashion considering the co-benefits from climate change and air toxics control programs that may also produce concurrent benefits for ozone and PM2.5. Regional air quality modeling indicates that significant NOx reductions with additional strategic, limited VOC reductions will lead to attainment of the ozone standards. Maximizing emission reductions utilizing zero-emission technologies, when cost effective and feasible, and near-zero emission technologies in other applications can promote significant NOx reductions with additional VOC and PM2.5 co-benefits.

The 2016 AQMP relies strongly upon partnerships at federal, State, and local levels, seeking to expand existing collaborations and establish new coalitions. These strategies include aggressive new regulations and development of incentive funding and supporting infrastructure for early deployment of advanced control technologies. Incentive funding for stationary sources can be pursued and best applied where controls are cost-effective, but not necessarily affordable, especially when controls are considered for smaller businesses or residences. Incentive funds can be used to subsidize low-emitting equipment purchases or encourage the use of alternative approaches. Additional funding for replacement of older, high-emitting vehicles with the cleanest vehicles available is the most significant need. Expansion of supporting infrastructure for implementation of cleaner fuels also helps to accelerate the use of ultra-low emitting vehicles. The SCAQMD will continue to support technology demonstration projects for both mobile and stationary sources and will work to create new or expanded funding opportunities for earlier deployment of cleaner technologies, thus contributing to a smooth transition to zero and near-zero emission technologies in the mobile and stationary source sectors. The SCAQMD will prioritize distribution of incentive funding in environmental justice (EJ) areas and seek opportunities to expand funding to benefit the most disadvantaged communities.

Control measure ideas were developed from a number of sources, including the AQMP Advisory Group, AQMP Control Strategy Symposium, development of the AQMP White Papers, Reasonably Available Control Technology (RACT)/Reasonable Available Control Measures (RACM) Analysis, Best Available Control Technology (BACT)/Best Available Control Measures (BACM) analysis (see Appendix VI), SCAQMD staff and public input, and previous Plan proposals. As part of the 2016 AQMP control measure development, SCAQMD staff conducted an AQMP Control Strategy Symposium in June 2015 to solicit new control concepts and innovative ideas from industry experts, professional consultants, government specialists, environmental and community representatives, and other stakeholders. Suggestions from staff and stakeholder recommendations assisted in identifying additional potential control measures and assessing control measure feasibility. For each control measure, the amount of emission reductions and the cost-effectiveness is considered in the selection of the measures.

The control measures were developed based on technical and economic feasibility, as well as other factors such as promoting fair share responsibility for sources under different regulatory authorities and maximizing private/public partnerships. Table 4-1 provides an overview of the criteria used in evaluating and selecting feasible control measures. The criteria are presented in alphabetical order.

TABLE 4-1

Criteria for Evaluating 2016 AQMP Control Measures (not ranked by priority)

Criteria	Description
Cost-Effectiveness	The cost of a control measure per reduction of emissions of a particular pollutant (cost includes purchasing, installing, operating, and maintaining the control technology).
Emission Reduction Potential	The total amount of pollution that a control measure can reduce.
Enforceability	The ability to ensure compliance with a control measure.
Legal Authority	Ability of the SCAQMD or other adopting agency to legally implement the measure.
Public Acceptability	The likelihood that the public will approve or cooperate in the implementation of a control measure.
Rate of Emission Reduction	The time it will take for a control measure to reduce a certain amount of air pollution.
Technological Feasibility	The likelihood that the technology for a control measure is or will be available.

Solar Energy Technology

In accordance with California Health and Safety Code Section 40404.5, the SCAQMD continues to fulfill its directive to require the use of BACT for new sources. In consideration of the state policy (Health and Safety Code Section 40404.5) to promote and encourage the use of solar energy systems, staff has made a reasonable effort to incorporate solar energy technology into the 2016 AQMP in applications where it can be shown to be cost-effective. The generation of energy through solar collectors reduces dependence on existing fossil-fuel power plants and substantial renewable energy generating capacity from solar, wind and geothermal may reduce the need to build new power plants in the future. Even as transportation is increasingly electrified, this would have a direct criteria pollutant emission reduction impact over time and would assist in meeting the federal ozone standards. It should be noted that California Health and Safety Code Section 40414 restricts the SCAQMD from infringing on existing authority of counties and cities to plan or control land use. However, the SCAQMD is tasked to reduce criteria pollutants to meet the federal and state pollutant standards and has developed innovative approaches to achieve the standards in the 2016 AQMP. These approaches have been incorporated in a few of the control measures described below and provide an opportunity to incorporate solar energy

technology. Great progress has already been achieved in California, which is leading the nation with over half a million solar projects.[2]

Control Measure ECC-01 seeks to recognize criteria pollutant co-benefits from federal, state (e.g., AB 32 – *California Global Warming Solutions Act*) and local mandates and programs to reduce greenhouse gas (GHG) emissions through several mechanisms such as market programs, renewable energy targets, incentive and rebate programs, and promoting implementation and development of new technologies. Solar programs are widely incentivized across the state and under these mandates and programs, will continue to be installed at industrial, commercial, institutional, and residential sites. As such, the criteria pollutant benefits from actions to meet climate and energy goals will be recognized under this control measure.

Similarly, control measure ECC-02 will seek criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and Senate Bill (SB) 350 (*Clean Energy Pollution Reduction Act*). The 2020 target for Title 24 will be to achieve Zero Net Energy consumption from new residential buildings utilizing new building materials, more efficient appliances, and renewable energy resources. SB 350 doubles the targeted energy efficiency savings in electricity and natural gas uses of retail customers and increases renewable energy sources to 50 percent by 2030. Solar is one form of renewable energy being implemented to assist buildings in reducing energy usage and this control measure will recognize the co-benefits from such actions. Further, control measure ECC-03 seeks to provide financial incentives to go beyond the goals achieved under ECC-02. Thus, existing residential and commercial buildings can apply for incentive monies to improve weatherization and to reduce energy use for heating, cooling, lighting, cooking, and other needs. This measure would incentivize energy efficient means such as a solar thermal pool heating system or pool covers. The most cost-effective means to achieve those reductions will vary depending on the facility, the amount of energy to be replaced, the cost of such equipment, and the life of the project. However, it is expected that applicants for the incentive money will seek the most cost-efficient options.

Modernizing industrial facilities constitutes approximately 30 percent of the total NOx emission control strategy from stationary sources in the 2016 AQMP. Control measure CMB-01 anticipates future rulemaking in combination with financial incentives for the replacement of older equipment with zero and near-zero emission technologies. Equipment electrification, use of fuel cells, battery storage, and/or combined heating and power are possible alternatives in achieving this effort. An increased need for electricity may result in increased power demand and potential emissions. Incorporating newer technologies such as solar collectors, smart grid, and energy storage with better power system management at the transmission, distribution, and behind the meter applications can reduce the need for redundant infrastructure and emissions from fossil-based generation.

[2] http://www.gosolarcalifornia.ca.gov/.

Chapter Overview

The following sections discuss the control measures, SIP commitments, overall emission reductions, and implementation as outlined below:

- SCAQMD Proposed 8-hour Ozone Strategy (see Appendix IV-A for detailed descriptions of the SCAQMD stationary source and mobile source control measures)
- State and Federal Control Measures (see Appendix IV-B for detailed descriptions of the CARB Strategy)
- SCAG's Regional Transportation Strategy and Transportation Control Measures (see Appendix IV-C for detailed descriptions of the regional transportation strategy and control measures)
- SCAQMD Proposed PM2.5 Strategy (see Appendix IV-A for detailed descriptions of the SCAQMD stationary source control measures)
- SCAQMD Proposed Contingency Measures (see Chapter 6 for a detailed discussion of the contingency requirements)
- SIP Emission Reduction Commitment
- Overall Emission Reductions
- Implementation

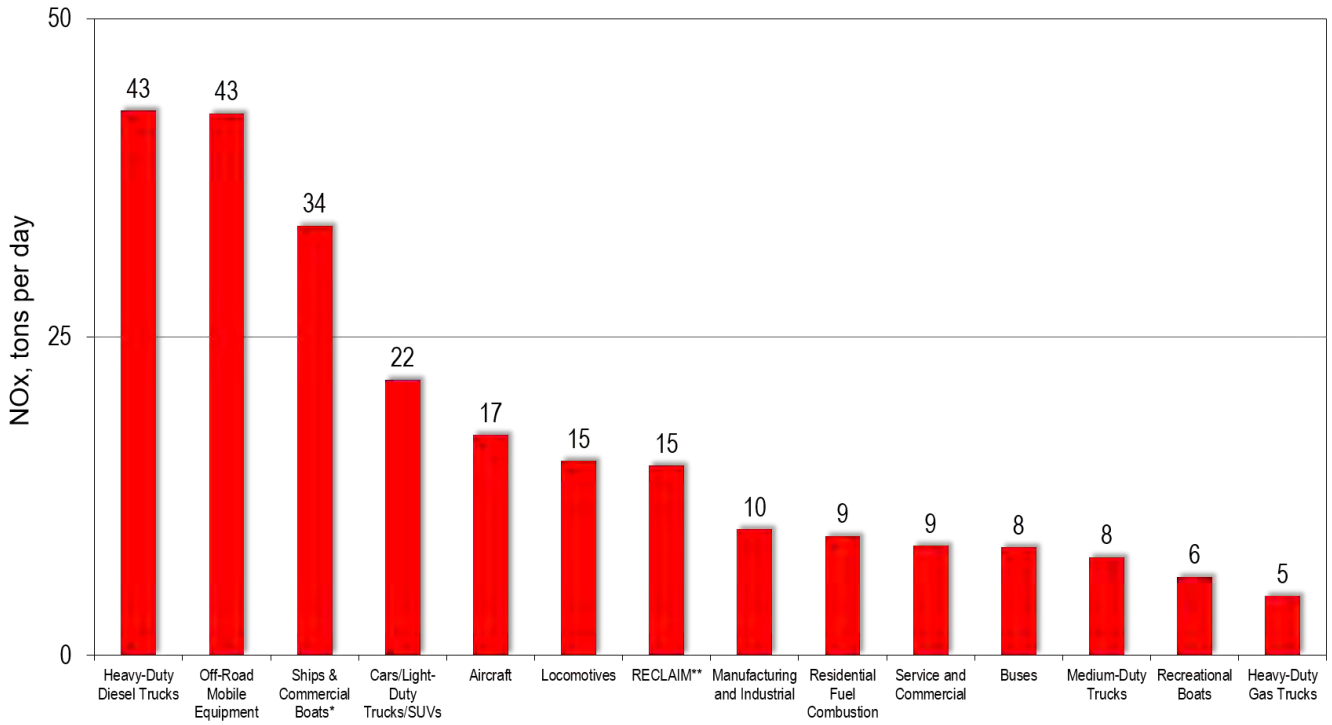
SCAQMD Proposed 8-hour Ozone Strategy

Ozone reduction strategies must be continued and accelerated to ensure that the Basin will meet the federal 8-hour ozone standards by the latest statutory deadlines in 2024 and 2032. Proposed measures to reduce ozone include stationary and mobile source NOx reduction strategies, supplemented by limited, strategic VOC emission reductions.

To ultimately achieve the ozone ambient air quality standards, significant additional emission reductions will be necessary from a variety of sources, including those primarily under the jurisdiction of CARB (e.g., on-road motor vehicles, off-road equipment, and consumer products) and U.S. EPA (e.g., aircraft, ships, trains, and pre-empted off-road equipment). Without an adequate and fair-share level of reductions from all sources, the emission reduction burden would unfairly be shifted to stationary sources, most of which are already subject to the most stringent controls in the nation. The SCAQMD will continue to use its available regulatory authority to further control mobile source emissions where federal or state actions do not meet regional needs and to ensure the effectiveness of state and federal measures. SCAQMD's proposed 8-hour ozone control measures are comprised of stationary source measures and mobile source measures. The previous 2007 SIP for the 8-hour ozone NAAQS contained commitments for emission reductions that relied on advancement or improvement of technologies, as authorized under Section 182(e)(5) of the federal CAA. These measures, which are sometimes known as the "black box", accounted for a substantial portion of the NOx emission reductions needed to attain the federal ozone standards—approximately 200 tons per day. Given that CAA deadlines are fast approaching and the

technologies needed for attainment are identifiable, reliance on 182(e)(5) measures should be minimized to the extent feasible.

Mobile sources currently emit over 80 percent of regional NOx emissions, and therefore mobile source controls must be a significant part of the control strategy. As provided in Figure 4-1, the on-road heavy-duty truck category is projected to comprise the single largest contributor to regional NOx in 2023. Other equipment involved in goods movement, such as marine vessels, locomotives and aircraft, are also substantial NOx sources.



**Ocean going vessels = 23 tons/day*

***RECLAIM: 275 largest stationary sources, including refineries and power plants*

FIGURE 4-1

TOP NOX EMISSIONS CATEGORIES AND CORRESPONDING NOX EMISSIONS (TONS PER DAY) IN 2023 IN THE SOUTH COAST AIR BASIN (SOURCE: 2016 AQMP SUMMER PLANNING EMISSIONS INVENTORY – DECEMBER 2016)

Figure 4-2 shows projections indicating that the region must reduce regional NOx emissions by an additional 45 percent in 2023, and an additional 55 percent in 2031 (beyond projected 2023 and 2031 baseline emissions, respectively) to attain the 1997 and 2008 8-hour ozone NAAQS.

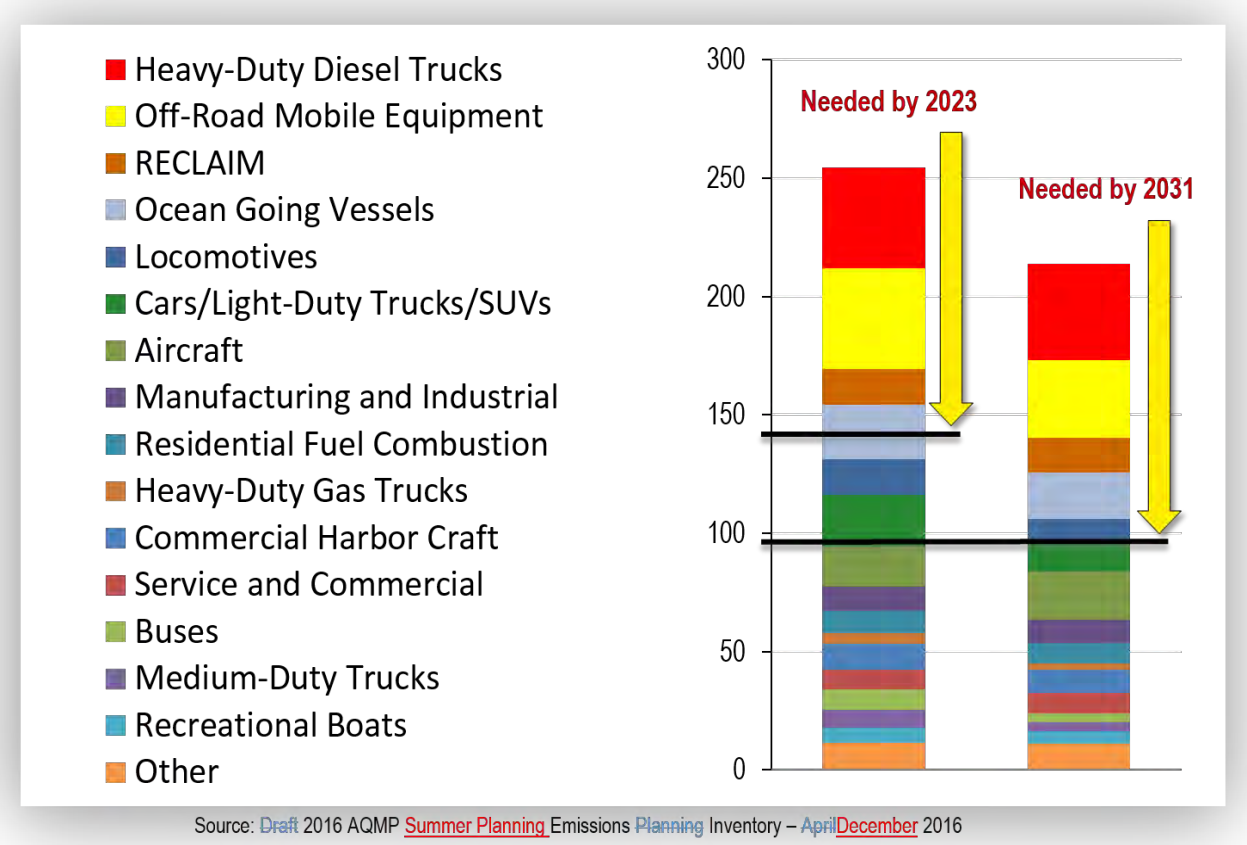


FIGURE 4-2
NEEDED NOX EMISSION REDUCTIONS TO ACHIEVE
FEDERAL 8-HOUR OZONE AMBIENT AIR QUALITY STANDARDS

Since the most significant emission sources are already subject to stringent emissions controls, attainment of the ozone standards will require broad deployment of zero and near-zero NOx emission technologies in the 2023 to 2031 timeframe. Traditional stationary combustion sources can be replaced with new lower or zero-emitting technologies, including low-NOx or more efficient equipment, electrification, or fuel cells for combined heat and power (CHP). Such replacement can apply to a single source or an entire facility. Electrification of equipment is one way to shift away from combustion sources generating NOx emissions, especially when combined with renewable, non-combustion power generation. Such combustion equipment includes engines, turbines, boilers, microturbines, etc. located at industrial and commercial facilities. The modification of residential and commercial water and space heating equipment is addressed in control measure CMB-02. Mobile sources such as trucks, locomotives, and cargo handling equipment have technological potential to achieve zero- and near-zero emission levels. Current and potential technologies include ultra-low NOx engines, hybrid-electric, battery-electric, and hydrogen fuel cell on-road vehicle technologies. New types of hybrids could also serve long-term needs while providing additional fuel diversity. These could include, for example, natural gas-electric hybrid technologies for on-road and other applications, particularly if coupled with improved after-treatment technologies. Alternative fuels such as natural gas have historically helped the region make progress toward attaining air quality standards and are generally cleaner than conventional fuels. Given the

region's need to attain air quality standards, alternative fueled engines will continue to play a major role in emission reductions. In addition, lower on-road heavy-duty engine exhaust emission standards for NOx will play an essential role for the Basin to attain the federal ozone standards since the majority of the NOx emissions from heavy-duty trucks in the Basin come from trucks that are registered out-of-state and are under federal authority. The SCAQMD Governing Board recently authorized staff to petition U.S. EPA to adopt a 0.02 g/bhp-hr NOx engine exhaust emissions standard on a nationwide basis. If successful, this action will greatly assist the region in reaching ozone air quality standards. A natural gas engine has already been certified to the 0.02 g/bhp-hr California optional NOx exhaust emissions standard, and work is underway to develop, certify and commercialize additional engines of all sizes and fuel types at or near the 0.02 g/bhp-hr level. Air quality regulatory agencies have traditionally set policies and requirements that are performance-based, and thus technology- and fuel-neutral. This is a policy that the SCAQMD intends to continue.

All technologies and fuels should be able to compete on an equal footing to meet environmental needs. This policy is consistent with the current priority on maximizing emission reductions utilizing zero-emission technologies in all applications that are shown to be cost-effective and feasible. In other applications, near-zero technologies remain essential to meet all attainment goals. In assessing these technologies for stationary sources, the SCAQMD will convene a workgroup to assess the in-basin life-cycle criteria pollutant emissions related to energy use from technologies and/or other applications such as efficiency improvements. This assessment, in part, will include future energy scenarios that are anticipated as more renewable resources are incorporated into the energy usage within the Basin. The assessments will consider emissions associated with energy time-of-use, impact of higher efficiencies, fuel switching, and future energy and regulatory markets. In addition, the assessments will consider life-cycle GHG emissions, potential toxic impacts or benefits, and utilize experts and materials from other government agencies and universities.

The SCAQMD staff believes that a combination of strong regulatory actions and incentives is the most effective means of achieving these emission reductions. In some cases, the incentive approach is the only way to address those sources currently without legal mandates to reduce emissions or not within SCAQMD authority. Other voluntary incentive programs, such as the Carl Moyer Program, provide a means to accelerate fleet turnover of outdated equipment to the cleanest commercially available equipment in a way that complements regulations. A majority of the on-road and off-road measures proposed are based on regulations combined with existing or expanded funding programs implemented by the SCAQMD or CARB. Developing, demonstrating, and deploying new technologies will require significant investments, public/private partnerships and regulatory actions.

The measures proposed in this section and further discussed in Appendices IV-A and IV-B are feasible steps that must commence in the near-term to hasten a broad transition to the technologies needed to attain federal air quality standards. Given the magnitude of needed emission reductions and the time remaining until attainment deadlines, it is important that progress and momentum to identify, and deploy needed technologies be accelerated.

Transitioning to cleaner transportation technologies will involve major costs, but also have significant public health and climate change benefits. Adopting a plan with sufficient measures to attain the ozone and PM2.5 air quality standards is not only required by federal law, but will also improve public health

and mitigate climate change. By transitioning to cleaner transportation technologies, NOx and PM2.5 emissions from transportation sources will be reduced, subsequently resulting in cleaner air quality, lower health risk across the region, and reductions in toxic risk and GHGs along goods-movement corridors. Not meeting air quality standards would not only have negative public health consequences, but would also have adverse economic impacts on the region due to potential federal sanctions.

SCAQMD Proposed Stationary Source 8-Hour Ozone Measures

The proposed stationary source ozone measures are designed to assist in the attainment of the 1997 and 2008 8-hour ozone standards (80 ppb and 75 ppb, respectively) via reductions in emissions from stationary sources of NOx and VOC. Since NOx and VOC are primary pollutants in forming ground-level ozone, the stationary source ozone measures are divided into stationary source measures for NOx and VOC. These measures target a number of source categories, including Energy and Climate Change Programs (ECC), Combustion Sources (CMB), Petroleum Operations and Fugitive VOC Emissions (FUG), Coatings and Solvents (CTS), Multiple Component Sources (MCS), Best Available Control Measures (BCM), and Compliance Flexibility Programs (FLX). Each control measure may rely on a number of control methods. There are 15 stationary source ozone measures with the majority anticipated to be adopted in the next few years and implemented after 2016. Table 4-2 provides a list of the SCAQMD proposed ozone measures for stationary sources along with the anticipated adoption date, implementation period, and emission reductions. These control measures are further categorized by the type of the measures, for example, recognition of co-benefits or incentives. Some VOC measures recognize co-benefit VOC reductions from other NOx or PM2.5 measures. There are also limited, strategic VOC control measures proposed.

The “TBD” (to be determined) measures require further technical and feasibility evaluations to determine the emission reduction potential and thus, the attainment demonstration is not dependent on these measures. However, they are included in the AQMP as part of a comprehensive plan with all feasible measures. These measures will require further development after the approval of the Plan, but could be proposed for rule or program development at a later date. Emissions reductions achieved and quantified by these measures can be applied towards contingency requirements, make up for any shortfalls in reductions from other quantified measures, be credited towards rate-of-progress reporting, and/or be incorporated into future Plan revisions.

TABLE 4-2

SCAQMD Proposed Stationary Source 8-Hour Ozone Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2023/2031)
SCAQMD Stationary Source NOx Measures:					
Stationary Source Regulatory Measures:					
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	N/A	Ongoing	SCAQMD	2.5 / 6
CMB-02	Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications [NOx]	2018	2020–2031	SCAQMD	1.1 / 2.8
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	2018	2020	SCAQMD	1.4 / 1.5
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking [NOx]	2018	2022	SCAQMD	0.8 / 1.6
CMB-05	Further NOx Reductions from RECLAIM Assessment [NOx]	2022	2031	SCAQMD	0 / 5
Recognition of Co-Benefits:					
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives [All Pollutants]	N/A	Ongoing	Various Agencies	TBD [a]
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	N/A	Ongoing	SCAQMD	0.3 / 1.1
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology [All Pollutants]	N/A	Ongoing	SCAQMD, CEC	TBD [a]

TABLE 4-2 (CONTINUED)

SCAQMD Proposed Stationary Source 8-Hour Ozone Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2023/2031)
SCAQMD Stationary Source NOx Measures (*continued*):					
Incentive-Based Measure:					
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	N/A	Ongoing	SCAQMD	1.2 / 2.1
Other Measures:					
FLX-01	Improved Education and Public Outreach [All Pollutants]	N/A	Ongoing	SCAQMD, Other Parties	N/A [b]
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	TBD	TBD	SCAQMD	N/A [b]
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD	TBD	SCAQMD	TBD [a]
SCAQMD Stationary Source VOC Measures:					
Corresponding VOC Reductions from NOx and PM Measures:					
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	N/A	Ongoing	SCAQMD	0.07 / 0.29 [c]
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	N/A	Ongoing	SCAQMD	0.2 / 0.3 [c]
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	N/A	Ongoing	SCAQMD	1.2 / 2.8 [c]
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	2018	2020	SCAQMD	0.4 / 0.4 [c]
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	2019	2020	SCAQMD	1.5 / 1.8 [c]

TABLE 4-2 (CONCLUDED)

SCAQMD Proposed Stationary Source 8-Hour Ozone Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2023/2031)
SCAQMD Stationary Source VOC Measures (*continued*):					
Limited, Strategic VOC Control:					
FUG-01	Improved Leak Detection and Repair [VOC]	2019	2022	SCAQMD	2 / 2
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	2017/2021	2020–2031	SCAQMD	1 / 2
FLX-02	Stationary Source VOC Incentives [VOC]	N/A	Ongoing	SCAQMD	TBD [a]

[a] TBD are reductions to be determined once the measure is further evaluated, the technical assessment is complete, and inventories and cost-effective control approaches are identified, and are not relied upon for attainment demonstration purposes

[b] N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur

[c] Corresponding VOC reductions from other measures

The following provides a brief description of the proposed stationary source ozone measures. Detailed descriptions of the measures are provided in Appendix IV-A.

Stationary Source Regulatory Measures

There are five stationary source regulatory measures for NOx. The first measure is to reduce NOx emissions from traditional combustion sources, such as diesel back-up generators, by replacing older, high-emitting equipment with new, lower or zero-emitting equipment. The second measure seeks NOx emission reductions from unregulated commercial space heating furnaces and from regulations and incentives to replace existing older boilers, water heaters, and space heating furnaces and other natural gas or liquefied petroleum gas (LPG) equipment with zero emitting or lower NOx technologies. The third measure seeks to reduce NOx and utilize excess gas from non-refinery flares, the fourth measure would seek reductions from commercial restaurant burners and residential cooking appliances, and the last measure would involve suggested actions for RECLAIM program assessment.

CMB-01 – TRANSITION TO ZERO AND NEAR-ZERO EMISSION TECHNOLOGIES FOR STATIONARY SOURCES: This proposed control measure reduces emissions of NOx from traditional combustion sources through replacement of old equipment with zero and near-zero emission technologies including low NOx

emitting equipment, electrification, battery storage, alternative process changes, efficiency measures, or fuel cells for CHP. Replacing older higher-emitting equipment with newer lower or zero-emitting equipment can apply to a single source or an entire facility. These sources include, but are not limited to, engines, turbines, microturbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production. Another type of combustion source identified for equipment replacement includes ovens, kilns, and furnaces. New businesses can be required or incentivized to install and operate zero-emission equipment, control equipment, technology and processes beyond the current BACT requirements. Fuel cells are also an alternative to traditional combustion methods, resulting in a reduction of NOx emissions with the co-benefit of reducing other criteria air pollutants and GHGs. Incentives may be used towards alternative process changes, such as biogas cleanup. This would help modernize a facility towards zero and near-zero technologies. This control measure would also seek energy storage systems and smart grid control technologies that provide a flexible and dispatchable resource with zero emissions. Grid based storage systems can replace the need for new peaking generation, be coupled with renewable energy generation, and reduce the need for additional energy infrastructure. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these zero and near-zero emission technologies sooner. Over the anticipated timeline of this Plan, as emerging technologies become more widely available and costs decline, the SCAQMD will undertake rulemaking to maximize emission reductions utilizing zero emission equipment where cost-effective and feasible and near-zero emission equipment in all other applications.

CMB-02 – EMISSION REDUCTIONS FROM REPLACEMENT WITH ZERO OR NEAR-ZERO NOx APPLIANCES IN COMMERCIAL AND RESIDENTIAL APPLICATIONS: This control measure seeks annual average NOx emission reductions from unregulated commercial space heating furnaces through regulations and incentives that will replace existing older NOx appliances such as boilers, water heaters, and space heating furnaces and other natural gas or LPG equipment with zero emitting or lower NOx technologies. The measure calls for a priority on maximizing emission reductions utilizing zero-emission technologies in all applications that are shown to be cost-effective and feasible. In other applications, near-zero technologies will be incentivized to meet attainment goals. In assessing the cost-effectiveness of these technologies, full life-cycle in-Basin emissions related to energy and fuel production and transmission pathways will be considered, along with GHG emissions, toxic impacts, and anticipated future changes to the energy portfolio in the Basin. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial and residential appliances and equipment. The control measure has two components. The first component is to continue to implement the Rule 1111 emission limit of NOx for residential space heaters which is 14 ng/J (20 ppm) starting in 2014. The second component is to incentivize the replacement of older boilers, water heaters and space heaters with newer and more efficient low NOx boilers, water heaters and space heaters, and/or “green technologies” such as solar heating or heat pumps. The SCAQMD will also consider potential future regulatory actions to support replacement of older space heating furnaces, water heaters and boilers with lower emissions and zero or near zero emission technologies. The new boilers and water heaters replaced through incentives would comply with current SCAQMD rule emission limits and new space heaters would meet a specified emission limit. If required, the SCAQMD will consider amending Rules 1121 and 1111 to put in place a heat input based emission limit which will result in lower NOx emissions for high efficiency units compared with

standard efficiency units. Because of the rules' heat output based limits, high efficiency water heaters and furnaces emit the same amount of NOx per day as standard efficiency units. In addition, the SCAQMD will also consider developing a rule to limit NOx emissions from those commercial and residential heating furnaces which are currently unregulated.

CMB-03 – EMISSION REDUCTIONS FROM NON-REFINERY FLARES: Flare NOx emissions are regulated through NSR and BACT, but there are currently no source-specific rules regulating NOx emissions from existing flares at non-refinery sources, such as organic liquid loading stations, tank farms, and oil and gas production, landfills and wastewater treatment facilities. This control measure proposes that, consistent with the all feasible control measures, all non-refinery flares meet current BACT for NOx emissions and thermal oxidation of VOCs. The preferred method of control would involve capturing the gas that would typically be flared and converting it into an energy source (e.g., transportation fuel, fuel cells, facility power generation). If gas recovery is not cost-effective or feasible, the installation of newer flares utilizing clean enclosed burner systems implementing BACT will be considered.

CMB-04 – EMISSION REDUCTIONS FROM RESTAURANT BURNERS AND RESIDENTIAL COOKING: This control measure applies to retail restaurants and quick service establishments utilizing commercial cooking ovens, ranges and charbroilers by funding development of, promoting and incentivizing the use and installation of low-NOx burner technologies. In addition, the SCAQMD would consider developing a manufacturer based rule to establish emission limits for cooking appliances used by restaurants and residential applications. Finally, co-benefit reductions will be sought through existing or enhanced energy efficiency programs being implemented by other entities.

CMB-05 – FURTHER NOX REDUCTIONS FROM RECLAIM ASSESSMENT: The California Health and Safety Code requires the SCAQMD to implement Best Available Retrofit Control Technology (BARCT) in the RECLAIM program as well as other stationary sources, and if BARCT advances, the SCAQMD is required to periodically re-assess the overall program caps, and reduce the RECLAIM Trading Credit (RTC) holdings to a level equivalent to command-and-control BARCT levels. The emission reductions resulting from the programmatic RTC reductions will help the Basin attain the NAAQS for ozone and PM2.5 as expeditiously as practicable. This control measure identifies a series of approaches, assessments, and analyses that can be explored to make the program more effective in ensuring equivalency with command and control regulations implementing BARCT, and to generate further NOx emission reductions at RECLAIM facilities. One approach under serious consideration is a long-term transition to a traditional command-and-control regulatory structure. As many of the program's original advantages appear to be diminishing, an orderly sunset of the RECLAIM program may be the best way to maximize emissions reductions, create more regulatory certainty, and potentially reduce compliance burdens for RECLAIM facilities. A working group of stakeholders and experts will convene in the spring of 2017 to examine the future of the RECLAIM program and develop options and timing for the transition to a command-and-control regulatory structure.

Recognition of Co-Benefits

This category includes three proposed emission reduction measures that recognize emission reductions from energy and climate change related programs that consist of general GHG programs, existing residential and commercial building energy efficiency improvement, and cool roof technology.

ECC-01 – CO-BENEFIT EMISSION REDUCTIONS FROM GHG PROGRAMS, POLICIES, AND INCENTIVES: Combustion sources that emit GHGs are typically sources of criteria pollutants. Significant efforts are currently being planned and implemented to reduce GHG emissions under the State's 2020, 2030 and 2050 targets. As these GHG reduction efforts continue across multiple sectors, the reductions of criteria pollutants should be considered along with any additional enhancements needed to achieve further criteria pollutant reductions under the GHG programs. Existing and further GHG emission reductions mechanisms, including market programs, renewable energy targets, incentive and rebate programs, and promoting implementation and development of new technologies, would be evaluated and refined to maximize criteria pollutant emission reductions.

ECC-02 – CO-BENEFITS FROM EXISTING RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES: This control measure would seek to account for criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and SB 350 (Clean Energy Pollution Reduction Act). The 2020 target for Title 24 will be to achieve zero net energy consumption from new residential buildings by utilizing new building materials and more efficient appliances. SB 350 doubles the additional achievable energy efficiency savings in electricity and natural gas energy uses in existing buildings and increases renewable energy sources as a share of a utility's power sources from 33 to 50 percent by 2030. This control measure will take advantage of the co-benefit emission reductions from implementation of these state regulations.

ECC-04 – REDUCED OZONE FORMATION AND EMISSION REDUCTIONS FROM COOL ROOF TECHNOLOGY: Cool roofs reflect a higher fraction of incident sunlight than traditional roofing materials. Widespread adoption of cool roofs can mitigate the urban heat island effect and can lower daytime ambient temperatures, thus slowing the rate of ozone formation. In addition, buildings equipped with cool roofs require less electricity for cooling, leading to reductions in emissions from the power generation sector. This control measure has the potential to reduce ambient ozone concentrations directly along with NOx, CO, PM, and CO2 emissions from the power generation sector. Evaporative VOC emissions will be reduced due to lower ambient temperatures in the urban areas of the Basin. However, ultra-violet solar energy can also be reflected, leading to increased ozone formation in the air column above the building. Depending on the extent of this potential adverse impact, additional physical property requirements on cool roof materials may be necessary. Three possible aspects of cool roof technology, including solar reflectance, radiative properties, and roof replacements will be incorporated into a technical modeling analysis to quantify the impact of this control measure on air quality.

Incentive-Based Measure

The 2016 AQMP includes voluntary incentive measures that are part of the overall Plan to satisfy the CAA emission reduction requirements needed to achieve attainment of the federal ozone standards in 2023 and 2031. Prior AQMPs relied primarily on the adoption of rules to implement the measures provided in those AQMPs. Such regulations involve mandatory requirements and result in generally straightforward and enforceable reductions. With the need for reliance on voluntary incentive measures in the near-term to achieve attainment of the federal air quality standards, the SCAQMD must design programs such that the emission reductions from these incentive measures are proven to be real, quantifiable, surplus, enforceable, and permanent in order for U.S. EPA to approve the emission reduction as part of the Plan.

There are key components required of a SIP submittal in order to rely on discretionary incentive programs to satisfy the CAA emission reduction requirements.

The components include a demonstration satisfying "integrity elements," an enforceable commitment, technical support, funding, legal authority, public disclosure and provisions to track results in accordance with the U.S. EPA's economic incentive programs (EIP) guidelines.[3] The following lists the necessary elements that will be included in each of the incentive measures:

- **Integrity Elements**
- **Commitment (Federal Enforceability)**
- **Technical Analyses**
- **Funding**
- **Resources**
- **Outreach and Public Disclosure**
- **Legal Authority**

Details regarding each of these necessary elements can be found in Appendix IV-A.

This category includes one proposed incentive-based measure for additional enhancements in building energy use. This measure may exclusively rely on incentives to achieve NOx reductions from the corresponding emission sources.

[3] References:

- "Guidance on Incorporating Voluntary Mobile Source Emission Reduction Programs in State Implementation Plans (SIPs)," October 24, 1997.
- "Improving Air Quality with Economic Incentive Programs," January 2001.
- "Guidance on SIP Credits for Emission Reductions from Electric-Sector Energy Efficiency and Renewable Energy Measures," August 5, 2004.
- "Incorporating Emerging and Voluntary Measure in a State Implementation Plan (SIP)," October 4, 2004.
- "Guidance on Incorporating Bundled Measures in a State Implementation Plan," August 16, 2005.
- "Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs into State and Tribal Implementation Plans," July 2012.
- "Diesel Retrofits: Quantifying and Using Their Emission Benefits in SIPs and Conformity: Guidance for State and Local Air and Transportation Agencies," February 2014.

ECC-03 – ADDITIONAL ENHANCEMENTS IN REDUCING EXISTING RESIDENTIAL BUILDING ENERGY USE: This control measure would seek to provide incentives to go beyond the goals within ECC-02 and CMB-02. Incentive programs would be developed for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. Incorporating newer, efficient appliance technologies, weatherization measures along with renewables such as solar thermal and solar photovoltaics can provide emission reductions within the residential sector above current SCAQMD and state regulations along with reduced energy costs. When implementing this measure the SCAQMD will collaborate with utilities, agencies, and other organizations to help leverage funding and coordinate incentives with similar existing programs. This measure will also track the requirements of the upcoming Title 24 Zero Net Energy for new residential energy building standards. SCAQMD will begin to participate in this development process to advocate for criteria and GHG emission consideration in the new standards.

Other Measures

There are three proposed measures in this category. One measure seeks improved education and public outreach. The next measure proposes breakdown limitations to be consistent with federal requirements. The third measure involves implementation of all feasible measures for stationary sources consistent with State law.

FLX-01 – IMPROVED EDUCATION AND PUBLIC OUTREACH: This proposed control measure seeks to provide education, outreach, and incentives for consumers and businesses to contribute to clean air efforts. Examples include consumer choices such as the use of energy efficient products, new lighting technology, "super-compliant" coatings, tree planting, and the use of lighter colored roofing and paving materials, which reduce energy usage by lowering the ambient temperature. In addition, this proposed measure intends to increase the effectiveness of energy conservation programs through public education and awareness as to the environmental and economic benefits of conservation. Educational and incentive tools to be used include social comparison applications (comparing your personal environmental impacts with other individuals), social media, and public/private partnerships.

This control measure is a voluntary program that provides education and outreach to consumers, business owners, and residences regarding the benefits of making clean air choices in purchases, conducting efficiency upgrades, installing clean energy sources, and approaches to conservation. These efforts will be complemented with currently available incentive programs and developing additional incentive programs. Lastly, the SCAQMD staff may develop an EIP to offer technical and financial assistance to help implement efficiency measures and other low emission technologies.

MCS-01 – IMPROVED BREAKDOWN PROCEDURES AND PROCESS RE-DESIGN: SCAQMD Rule 430 applies to breakdowns that result in a violation of any rule or permit condition, with some exceptions. U.S. EPA's May 2015 final action on startups, shutdowns, and malfunctions (SSM) stipulates that exemptions from emission limits during periods of breakdown are not allowed. This control measure would introduce breakdown limits and procedures and potential process re-designs that would apply to breakdowns from all emission sources, providing pollutant concentration or emission limits to comply with U.S. EPA's SSM policy, as applicable.

MCS-02 – APPLICATION OF ALL FEASIBLE MEASURES: This control measure is to address the state law requirement for all feasible measures for ozone. Existing rules and regulations for pollutants such as VOC, NOx, SOx and PM reflect current BARCT. However, BARCT continually evolves as new technology becomes available that is feasible and cost-effective. The SCAQMD staff will continue to review new emission limits or controls introduced through federal, state or local regulations to determine if SCAQMD regulations remain equivalent or more stringent than rules in other regions. If not, a rulemaking process will be initiated to perform a BARCT analysis with potential rule amendments if deemed feasible. In addition, the SCAQMD will consider adopting and implementing new retrofit technology control standards, based on research and development and other information, that are feasible and cost-effective.

Corresponding VOC Reductions from NOx and PM Measures

The following four measures recognize corresponding VOC reductions from other measures designed to achieve NOx and NH3 reductions.

ECC-02 – CO-BENEFITS FROM EXISTING RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES: This control measure would seek to account for criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and SB 350 (Clean Energy Pollution Reduction Act). The 2020 target for Title 24 will be to achieve Zero Net Energy from new residential buildings utilizing new building materials and more efficient appliances. SB 350 doubles the additional achievable energy efficiency savings in electricity and natural gas energy uses in existing buildings and increases renewable energy sources as a share of a utility's power sources from 33 to 50 percent by 2030. This control measure will take advantage of the co-benefit VOC emission reductions from implementation of these state regulations.

ECC-03 – ADDITIONAL ENHANCEMENTS IN REDUCING EXISTING RESIDENTIAL BUILDING ENERGY USE: This control measure would seek to provide incentives to go beyond the goals within ECC-02 and CMB-02. Incentive programs would be developed for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. Incorporating newer, efficient appliance technologies, weatherization measures along with renewables such as solar thermal and solar photovoltaics can provide emission reductions within the residential sector above current SCAQMD and state regulations along with reduced energy costs. The SCAQMD will participate in the Title 24 residential Zero Net Energy rulemaking to advocate for criteria pollutant and GHG emissions consideration.

CMB-01 – TRANSITION TO ZERO AND NEAR-ZERO EMISSION TECHNOLOGIES FOR STATIONARY SOURCES: This proposed control measure would seek corresponding VOC reductions from NOx-focused measures addressing traditional combustion sources by replacement with zero and near-zero emission technologies including low NOx emitting equipment, electrification, battery storage, alternative process changes, efficiency measures, or fuel cells for CHP. Replacing older higher-emitting equipment with newer lower or zero-emitting equipment can apply to a single source or an entire facility. These sources include, but are not limited to, engines, turbines, microturbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production. Another type of combustion source identified for equipment replacement includes ovens, kilns, and furnaces.

New businesses can be required or incentivized to install and operate zero-emission equipment, control equipment, technology and processes beyond the current BACT requirements. Fuel cells are also an alternative to traditional combustion methods, resulting in a reduction of NOx emissions with the co-benefit of reducing VOCs and GHGs. Incentives may be used towards alternative process changes, such as biogas cleanup. This would help modernize a facility towards zero and near-zero technologies. This control measure would also seek energy storage systems and smart grid control technologies that provide a flexible and dispatchable resource with zero emissions. Grid based storage systems can replace the need for new peaking generation, be coupled with renewable energy generation, and reduce need for additional energy infrastructure. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these zero and near-zero emission technologies sooner. Over the anticipated timeline of this Plan, as emerging technologies become more widely available and costs decline, the SCAQMD will undergo rulemaking to require zero emission equipment be installed where economically feasible, and require near-zero emissions levels in all other applications.

CMB-03 – EMISSION REDUCTIONS FROM NON-REFINERY FLARES: Flare NOx emissions are regulated through NSR and BACT, but there are currently no source-specific rules regulating NOx emissions from existing flares at non-refinery sources, such as organic liquid loading stations, tank farms, and oil and gas production, landfills and wastewater treatment facilities. This control measure proposes that, consistent with the all feasible control measures, all non-refinery flares meet current BACT for NOx emissions and thermal oxidation of VOCs. The preferred method of control would involve capturing the gas that would typically be flared and converting it into an energy source (e.g., transportation fuel, fuel cells, facility power generation). If gas recovery is not cost-effective or feasible, the installation of newer flares utilizing clean enclosed burner systems implementing BACT will be considered.

BCM-10 – EMISSION REDUCTIONS FROM GREENWASTE COMPOSTING: VOCs and ammonia, which are PM precursor gases, are emitted from composting of organic waste materials including greenwaste and foodwaste and are currently regulated by existing SCAQMD Rule 1133.3. Although Rule 1133.3 covers foodwaste composting, the level of emissions from foodwaste composting has not been fully characterized, mainly due to the lack of related emissions test data. This control measure proposes potential emission minimization through emerging organic waste processing technology and potential emission reductions through restrictions on the direct land application of chipped and ground uncomposted greenwaste and through increased diversion to anaerobic digestion. This proposed control measure includes a 15-day pathogen reduction process of chipped and ground uncomposted greenwaste with composting best management practices (BMPs) to reduce potential VOC and ammonia emissions from land applied greenwaste.

Limited, Strategic VOC Control

This category seeks limited, strategic VOC controls that contribute to controlling ozone levels in the Basin. The first measure utilizes more advanced, fugitive VOC leak detection systems. The second measure targets limited reductions of VOC emissions from VOC-containing products such as coatings, solvents, adhesives, and lubricants, or utilization of alternative products/equipment. The last measure proposes to incentivize efficient clean equipment purchases, efficiency projects, and conservation techniques that lead to VOC and other emission reductions.

FUG-01 – IMPROVED LEAK DETECTION AND REPAIR: This control measure seeks to reduce emissions from a variety of VOC emission sources including, but not limited to, oil and gas production facilities, petroleum refining and chemical products processing, storage and transfer facilities, marine terminals, and other sources, where VOC emissions occur from fugitive leaks in piping components, wastewater system components, and process and storage equipment leaks. Most of these facilities are required under SCAQMD and federal rules to maintain a leak detection and repair (LDAR) program that involves individual screening of all of their piping components and periodic inspection programs of equipment to control and minimize VOC emissions. This measure would utilize advanced remote sensing techniques (Smart LDAR), such as Fourier transform infrared spectroscopy (FTIR), Ultraviolet Differential Optical Absorption Spectroscopy (UV-DOAS), Solar Occultation Flux (SOF), and infrared cameras, that can identify, quantify, and locate VOC leaks in real time allowing for faster repair in a manner that is less time consuming and labor intensive than traditional LDAR.

This control measure would pursue two goals. The first is to upgrade a series of SCAQMD's inspection/maintenance rules (Rules 462, 1142, 1148.1, 463, 1178, 1173, and 1176) to require, at a minimum, a self-inspection program, or utilization of an optical gas imaging-assisted LDAR program where feasible. The second is to explore the use of new technologies to detect and verify VOC fugitive emissions in order to supplement existing programs, explore opportunities where Smart LDAR might substitute for existing LDAR programs, and achieve additional emission reductions. Both goals will be pursued in a public process allowing interested stakeholders to participate in pilot projects and the rule development process.

For new detection technology this control measure will be implemented in two phases: Phase I will be a pilot LDAR program to demonstrate feasibility with the new technology and to establish implementation protocols. The completion of Phase I will result in the identification of facilities/industries currently subject to LDAR programs and identification of those where the new technology is not yet ready to be utilized. Based on the results of Phase I, fugitive VOC rules will be amended as appropriate under the subsequent phase (Phase II) to enhance their applicability and effectiveness, and to further achieve emission reductions.

CTS-01 – FURTHER EMISSION REDUCTIONS FROM COATINGS, SOLVENTS, ADHESIVES, AND SEALANTS: This control measure seeks limited VOC emission reductions by focusing on select coating, adhesive, solvent and sealant categories by further limiting the allowable VOC content in formulations or incentivizing the use of super-compliant technologies. Examples of the categories to be considered include, but are not limited to, coatings used in aerospace applications, adhesives used in a variety of sealing applications, and solvents for graffiti abatement activities. Reductions could be achieved by lowering the VOC content of a few categories within SCAQMD source-specific Rules 1106, 1106.1, 1107,, 1124, 1128, 1136, 1143, 1168, and 1171 where possible, especially where the majority of products already meet lower limits. For Rule 1113, where annual quantity and emissions reporting is required under Rule 314, SIP credit for market-driven reductions could be pursued in categories where many coatings are already formulated below current VOC limits. For solvents, reductions could be achieved by promoting the use of alternative low-VOC products or non-VOC product/equipment at industrial facilities. Particular VOC reductions that lead to the increased use of chemicals that are known or suspected to be toxic should be avoided until it can be demonstrated that these replacement products do not lead to

increased toxic risk for workers or the general public. The tightening of regulatory exemptions can also lead to reduced emissions across multiple use categories.

FLX-02 – STATIONARY SOURCE VOC INCENTIVES: This control measure seeks to incentivize VOC emission reductions from various stationary sources through incentive programs for the use of clean, low VOC emission technologies. Facilities would be able to qualify for incentive funding if they utilize equipment or accept permit conditions which result in cost-effective emission reductions that are beyond existing requirements. The program would establish procedures for quantifying emission benefits from clean technology implementation and develop cost-effectiveness thresholds for funding eligibility. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these technologies sooner. For stationary sources, the SCAQMD staff has compiled an initial list of potential incentives to encourage businesses to use zero- or near-zero technologies or enhancements to the SCAQMD's existing programs to reduce or eliminate barriers to implement state of the art technologies. Potential incentive concepts include incentive funding, permitting and fee incentives and enhancements, New Source Review (NSR) incentives and enhancements, branding incentives, and recordkeeping and reporting incentives. The SCAQMD staff is committed to further investigating these concepts.

SCAQMD Proposed Mobile Source 8-Hour Ozone Measures

SCAQMD staff analyzed the need to accelerate the penetration of cleaner engine technologies and assist in implementing CARB's proposed State SIP strategy. Specifically, there are several measures under the proposed State SIP strategy that are titled "Further Deployment of Cleaner Technologies" (see Appendix IV-B), which identifies the SCAQMD as an implementing agency along with CARB and U.S. EPA. CARB indicated that the implementation of the "Further Deployment" measures is based on a combination of incentive funding, development of regulations, and quantification of emission reduction benefits from operational efficiency actions and deployment of autonomous vehicles, connected vehicles, and intelligent transportation systems. The SCAQMD has proposed mobile source measures to help implement CARB's "Further Development" measures. In addition, the SCAQMD is implementing several incentives funding programs that have resulted in early emission reductions (e.g., the Carl Moyer Memorial Air Quality Standards Attainment Program, the Surplus Off-Road Opt-In for NOx (SOON) program, and Proposition 1B – Goods Movement Emissions Reduction Program). The emission reduction benefits of the funding programs are quantified and are proposed to be included as part of the overall emission reductions for attainment of the NAAQS.

The proposed SCAQMD mobile source measures are based on a variety of control technologies that are commercially available and/or technologically feasible to implement in the next several years. The focus of these measures includes accelerated retrofits or replacement of existing vehicles or equipment, acceleration of vehicle turnover through voluntary vehicle retirement programs, and greater use of cleaner fuels in the near-term. The measures will encourage greater deployment of zero-emission vehicle and equipment technologies such as plug-in hybrids, battery-electric, and fuel cells to the maximum extent feasible as such technologies are commercialized and near-zero emission technologies everywhere else. In the longer-term, there is a need to significantly increase the penetration and deployment of near-zero and zero-emission vehicles , greater use of cleaner, renewable fuels (either

alternative fuels or new formulations of gasoline and diesel fuels), and additional emission reductions from federal and international sources such as locomotives, ocean-going vessels, and aircraft.

In implementing the SCAQMD mobile source measures, the SCAQMD will focus on collaborative approaches to achieve additional emission reductions to help implement the proposed State SIP Strategy "Further Deployment" measures. During the public process (which is for all intents and purposes, the SCAQMD process used to develop rules to implement the AQMP control measures), SCAQMD staff will assess the progress in identifying actions (voluntary and regulatory) that will result in additional emission reductions. SCAQMD staff will report to the Governing Board on progress on a routine basis, but no later than six months after the adoption of the Final 2016 AQMP. If progress is not made in identifying specific actions within one year of adoption of the Final 2016 AQMP, the SCAQMD staff will recommend to the Governing Board whether to consider proceeding with the development of rules within its existing legal authority or seek additional authority to adopt and implement measures. Such authority includes development of new or expanded clean vehicle fleet rules or indirect source regulations. Table 4-3 provides a schedule for the public process, which includes periodic progress reports to the SCAQMD Mobile Source Committee, convening working groups, and milestones to achieve during the one year period.

TABLE 4-3

Schedule and Milestones for the Mobile Source Measure Public Process

Public Process Activity	Time from Final Approval of the 2016 AQMP
Report to SCAQMD Mobile Source Committee on Process to move forward	• Within One Month
Convene Working Groups for MOB-01 through MOB-05 and EGM-01	• Within One Month
Working Group Meeting • **Define Objectives** • **Seek initial input on the types of actions with potential criteria pollutant reductions** • **Identify existing actions with potential emission reductions** • **Develop model quantification methodologies for emission reductions associated with identified actions** • **Identify future actions with potential emission reductions** • **Quantify potential emission reductions** • **Develop mechanisms to ensure reductions are real, surplus, and enforceable**	• Ongoing on a Monthly Basis
Report to SCAQMD Mobile Source Committee on progress	• Six Months

TABLE 4-3 (concluded)

Schedule and Milestones for the Mobile Source Measure Public Process

Public Process Activity	Time from Final Approval of the 2016 AQMP
Report to SCAQMD Mobile Source Committee/Governing Board on progress and whether to continue with process or recommend formal rule development	• 12 Months

A total of 15 measures are proposed as actions to reduce mobile source emissions. One measure is proposed to identify actions to help mitigate and potentially provide emission reductions due to new development and redevelopment projects. Four measures seek to identify actions that will result in additional emission reductions at commercial marine ports, rail yards and intermodal facilities, warehouse distribution centers, and commercial airports to help meet the emission reductions associated with the State SIP Strategy "Further Deployment" measures for on-road heavy-duty vehicles, off-road equipment, and federal and international sources. Five measures focus on on-road mobile sources and four measures focus on off-road mobile sources. Lastly, one measure seeks to recognize the criteria pollutant emission reduction benefits of existing incentives programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B – Goods Movement Emission Reduction Program. The measures call for greater emission reductions through accelerated turnover of older vehicles to the cleanest vehicles and equipment currently available and increased penetration of commercially-available near-zero and zero-emission technologies through incentives programs in the near-term. In the longer-term, CARB will identify potential regulatory actions that will lead to additional emission reductions and greater deployment of zero-emission vehicle technologies everywhere feasible and cost-effective.

Partial-zero and zero-emission technologies are rapidly being introduced into the on-road light- and medium-duty vehicle categories in large part due to the CARB Advanced Clean Car Program, which includes the Low Emission Vehicle (LEV) and the Zero-Emission Vehicle (ZEV) Regulations. In addition, next-generation electric hybrid trucks are being commercialized for light-heavy and medium-heavy heavy-duty on-road vehicles. However, additional research and demonstration are needed to commercialize zero- and near-zero emission technologies for the heavier heavy-duty vehicles (with gross vehicle weight ratings greater than 26,000 pounds).

For many of the off-road mobile sources such as cargo handling equipment, commercial harbor craft, and off-road equipment, some form of "all zero-emission range" or hybridization is being demonstrated and deployment of these technologies is expected to begin over the next few years. For other sectors such as locomotives, marine vessels and aircraft, the development of cleaner combustion technologies beyond existing emission standards will be needed as provided in the State SIP Strategy. The 2016 AQMP White Papers covering Passenger Transportation, Goods Movement, and Off-Road Equipment provide a general discussion on the need for new emission standards and development of cleaner combustion technologies. In addition, CARB's Technology Assessment documents provide in-depth evaluation of current emissions control technologies and the state of development/commercialization of zero- and near-zero advanced technologies. A summary of the 15 measures is provided in Table 4-4.

TABLE 4-4

SCAQMD Proposed Mobile Source 8-Hour Ozone Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2023/2031)
Emission Growth Management Measure:					
EGM-01	Emission Reductions from New Development and Redevelopment Projects [All Pollutants]	2018	2019–2031	SCAQMD	TBD [a]
Facility-Based Mobile Source Measures:					
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]	2018	2019–2031	SCAQMD	TBD [b]
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]	2018	2019–2031	SCAQMD	TBD
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	2018	2019–2031	SCAQMD	TBD
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	2018	2019–2031	SCAQMD	TBD [b]
On-Road Mobile Source Measures:					
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	N/A	Ongoing	CARB, SCAQMD	TBD [a]
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	N/A	Ongoing	CARB, Bureau of Automotive Repair, SCAQMD	TBD [a]
MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	N/A	Ongoing	CARB, SCAQMD	TBD [a]
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	2018	2019–2031	CARB, SCAQMD	TBD [a]
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	2018	2019–2027	CARB, SCAQMD	TBD [a]

TABLE 4-4 (CONCLUDED)

SCAQMD Proposed Mobile Source 8-Hour Ozone Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2023/2031)
Off-Road Mobile Source Measures:					
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	N/A	Ongoing	SCAQMD	2.0 / 2.0
MOB-11	Extended Exchange Program [VOC, NOx, CO]	N/A	Ongoing	SCAQMD	2.9 / 1.0 [NOx]
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	Ongoing	Beginning 2017–2023	SoCal Regional Rail Authority	TBD [b]
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	2018	2019–2027	SCAQMD	TBD [a]
Incentive Programs Measure:					
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	N/A	2016–2024	SCAQMD	11 / 7.8 [NOx]

[a] Emission reductions will be determined after projects are identified and implemented

[b] Submitted into the SIP as part of Rate-of-Progress reporting or in baseline inventories for future AQMP/SIP Revisions

The following text provides a brief description of the SCAQMD staff's proposed mobile source control measures:

Emission Growth Management Measure

There is one proposed control measure within this category. The measure addresses emission reductions from new or redevelopment projects. The SCAQMD will encourage developers and local agencies to identify actions that will result in mitigation of new criteria pollutant emissions and potentially further reduce criteria pollutant emissions from affected projects.

EGM-01 – EMISSION REDUCTIONS FROM NEW OR REDEVELOPMENT PROJECTS: Since San Joaquin Valley Air Pollution Control District Rule 9510 has been approved by U.S. EPA to be included in the SIP for the San Joaquin Valley, the SCAQMD must consider Rule 9510 under the "all feasible measures" requirement of state law. As such, the applicability of Rule 9510 in the South Coast Air Basin and

Coachella Valley will be evaluated. The proposed measure seeks to capture emission reduction opportunities during the project development phase and opportunities to enable greater deployment of zero and near-zero emission technologies. The SCAQMD will reconvene the working group made up of stakeholders from industry, local governments, and community representatives as part of the rulemaking process. The working group will provide input and comments and help identify actions that potentially result in emission reductions to mitigate any new emissions or further reduce emissions. As part of the public process, the SCAQMD staff will evaluate the need to develop a rule or other enforceable mechanisms to ensure that the emission reductions are real, surplus, quantifiable, and enforceable as defined by U.S. EPA if the emission reductions are proposed to be included in the SIP.

Facility-Based Mobile Source Measures

With economic growth projected out to 2040 by SCAG, there may be a potential increase in emissions associated with mobile sources in the goods movement sector even with the deployment of newer, cleaner vehicles and equipment. As such, four facility-based mobile source control measures are proposed. The first measure focuses on commercial marine ports in the Basin. Port-related emission sources include on-road heavy-duty trucks, locomotives, ocean-going vessels, commercial harbor craft, and cargo handling equipment. The Ports of Los Angeles and Long Beach (Ports) have been implementing the San Pedro Bay Ports Clean Air Action Plan (CAAP) since 2006. Implementation of strategies under the CAAP has led to early emission reductions as state, federal, and international regulations are developed. The Ports are in the process of updating the CAAP to implement long-term sustainable strategies that could potentially result in criteria pollutant and greenhouse gas emission reductions, while improving operational efficiencies and reducing dependence on fossil-based fuels. To the extent that criteria pollutant emission reductions associated with such actions can be quantified, a mechanism will be developed that recognizes the actions and credits the associated emission reductions into the SIP.

The second measure focuses on mobile source related vehicles and equipment operating in rail yards and intermodal facilities in the Basin. Such vehicles and equipment include cargo handling equipment, locomotives, on-road heavy-duty trucks, and passenger cars. The third and fourth measures focus on warehouse distribution centers and commercial airports. An approach similar to the marine ports measure will be taken to quantify criteria pollutant emission reductions associated with activities occurring at these facilities.

As part of the public process in implementing the four measures, the SCAQMD staff will be assessing the progress in identifying and quantifying emission reductions that are anticipated to occur at the various facilities. As part of the public process, the SCAQMD staff will evaluate the need for rule development to achieve additional emission reductions and report to the SCAQMD Governing Board six months after the Plan adoption on the progress of implementing the four measures. If after one year (from the date of adoption of the Final 2016 AQMP), voluntary actions or from CARB (since these measures are to help implement CARB's "Further Development" measures) or U.S. EPA are not identified to any significant extent or identified actions do not result in emission reductions in a timely manner to meet federal air quality standards, the SCAQMD staff will recommend that the SCAQMD Governing Board consider regulatory approaches or other enforceable mechanisms to achieve the emission reductions from the mobile source sectors associated with the various facilities.

MOB-01 – EMISSION REDUCTIONS AT COMMERCIAL MARINE PORTS: The Ports have been implementing the CAAP since 2006 and is currently in the process of updating the CAAP. The Ports have been successful for the most part in implementing the CAAP and have exceeded emission reduction goals set in the CAAP. The CAAP update has the potential to assist the region in attaining air quality standards in a timely manner. Many of the actions that have been implemented in the CAAP are voluntary in nature since these reductions are not committed in the SIP. Over time, these actions have been subsumed through regulatory actions by CARB, U.S. EPA, or international entities such as the International Maritime Organization. Regardless, the actions have led to early emission reductions. The Ports are in a unique position to work with their tenants (terminal and railroad operators) to develop strategies to further reduce emissions. This measure seeks to quantify the emission reductions realized from the CAAP and credit the reductions into the SIP to the extent that these actions are real and surplus to the existing SIP. Emission reductions that occurred through the identified actions as reported by the Ports on an annual basis will be incorporated in the revised baseline emissions as part of the SIP revision process (either as part of the Rate-of-Progress reporting requirements of the CAA or reflected in new baseline emissions inventory for future AQMP/SIP revisions). Since many of these actions are voluntary in nature, any emission reductions credited towards attainment of the federal air quality standards must contain an enforceable commitment that the emission reductions remain real and permanent (as defined by U.S. EPA) if for some reason the emission reductions are not maintained after they are reported into the SIP. As such, the enforceable commitment may be in the form of a regulation by the SCAQMD within its existing legal authority, or by the state or federal government, or other enforceable mechanisms. Regardless, the types of enforceable commitments will be developed through a public process. The proposed measure will replace control measures MOB-03 in the 2007 AQMP and IND-01 in the 2012 AQMP since the emission reductions associated with these measures have been achieved either through regulations adopted by CARB or U.S. EPA. Relative to control measure IND-01 from the 2012 AQMP, the 24-hour PM2.5 air quality standard was not attained in 2014. However, the emission reduction targets provided in IND-01 have already been met.

MOB-02 – EMISSION REDUCTIONS AT RAIL YARD AND INTERMODAL FACILITIES: The goal of this measure is to assess and identify potential actions to further reduce emissions associated with mobile sources operating in and out of rail and intermodal yards. The SCAQMD staff will convene a stakeholder working group to discuss and identify actions or approaches to further reduce emissions at rail yards and intermodal facilities. The identified actions can be voluntary or regulatory or other enforceable mechanisms adopted by local, state, or federal governmental agencies. To the extent that these actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms.

MOB-03 – EMISSION REDUCTIONS AT WAREHOUSE DISTRIBUTION CENTERS: The goal of this measure is to assess and identify potential actions to further reduce emissions associated with emission sources operating in and out of warehouse distribution centers. The SCAQMD is currently working with industry stakeholders on conducting in-use truck trip studies and obtaining emissions information from various warehouse distribution types. This information along with emissions occurring in and around individual warehouse distribution centers will serve as the basis for seeking opportunities to reduce emissions

beyond existing requirements. A stakeholder working group will be convened to discuss warehouse emissions related issues and provide input and comments on identifying actions that will result in further emission reductions. To the extent that these actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms.

MOB-04 – EMISSION REDUCTIONS AT COMMERCIAL AIRPORTS: Due to projected increases in airline passenger transportation and expansion of operations at various commercial airports, potential increases in emissions may result unless the increased emissions are fully mitigated. Several airport authorities are implementing emissions mitigation measures, while other airports have initiated actions that can lead to additional emission reductions. This measure seeks to quantify such actions and identify additional actions that can lead to additional emission reductions to assist in attainment of federal air quality standards and reduce local exposure to air toxic emissions. Quantified emission reductions that are real, surplus, permanent, and enforceable will be reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or in baseline emission inventories as part of future AQMP/SIP development. In addition, such emission reductions can be used for general conformity purposes. A working group will be convened with affected stakeholders to discuss airport emissions related issues and provide input to identify actions and develop mechanisms to implement this measure. To the extent that the identified actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms.

On-Road Mobile Source Measures

Five on-road mobile source control measures are proposed. The first two measures focus on on-road light- and medium-duty vehicles operating in the Basin. It is estimated that around 12 million registered vehicles will be operating in the Basin. The first measure would implement programs to accelerate the penetration and deployment of partial zero-emission and zero-emission vehicles in the light- and medium-duty vehicles categories. The second control measure would seek to accelerate retirement of older gasoline and diesel powered vehicles up to 8,500 pounds gross vehicle weight (GVW). These vehicles include passenger cars, sports utility vehicles, vans, and light-duty pick-up trucks.

The remaining three measures focus on heavy-duty vehicles. The first of these measures seeks additional emission reductions from the early deployment of partial zero-emission and zero-emission light- and medium-heavy-duty vehicles with gross vehicle weights between 8,501 pounds to 26,000 pounds. The second control measure for heavy-duty vehicles seeks additional emission reductions from older, pre-2010 heavy-duty vehicles beyond the emission reductions targeted in CARB's Truck and Bus Regulation. Additional emission reductions beyond the compliance requirements of the Truck and Bus Regulation could be achieved as affected fleets purchase trucks with engines that meet an optional NOx emissions standard to replace their existing heavy-duty vehicles. In addition, fleets or trucks that are

not subject to the Truck and Bus Regulation would be targeted through incentives or through regulatory actions that are within the SCAQMD's legal authority such as the SCAQMD Rule 1190 series of clean fleet vehicle rules, to purchase trucks with engines meeting an optional NOx emissions standard. The third measure will seek to accelerate the introduction of zero- and near-zero emission on-road heavy-duty trucks through mobile source emission reduction credits generating programs. SCAQMD Rules 1612 and 1612.1 have been in place since 1995 and 2001, respectively. However, the current versions of the rules need to be updated to reflect heavy-duty vehicle technologies available today and in the near-future. Mobile source emission reduction credits generated under these rules would only be available to help facilities affected by the facility-based measures (MOB-01 through MOB-04 and EGM-01). The credits are proposed to not be eligible for offset stationary source emissions.

MOB-05 – ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION VEHICLES: This measure proposes to continue incentives for the purchase of zero-emission vehicles and hybrid vehicles with a portion of their operation in an "all-electric range" mode. The State Clean Vehicle Rebate Pilot (CVRP) program is proposed to continue from 2016 to 2030 with proposed funding up to $5,000 per vehicle and for low-income eligible residents, additional funding of up to $1,500 for a total of $6,500 per vehicle. The California State legislature has appropriated $133 million statewide for the CVRP for Fiscal Year 2016–17. The proposed measure seeks to provide funding rebates for at least 15,000 zero-emission or partial-zero emission vehicles per year.

MOB-06 – ACCELERATED RETIREMENT OF OLDER LIGHT-DUTY AND MEDIUM-DUTY VEHICLES: This proposed measure calls for promoting the permanent retirement of older eligible vehicles through financial incentives currently offered through local funding incentive programs, and AB 118 Enhanced Fleet Modernization Program (EFMP), and the Greenhouse Gas Reduction Fund (EFMP Plus-Up). The proposed measure seeks to retire up to 2,000 older light- and medium-duty vehicles (up to 8,500 pounds GVW) per year. Funding incentives of up to $4,500 per vehicle are available to low- and moderate-income residents for the scrapping of the vehicle, which includes a replacement voucher for a newer cleaner conventional powered vehicle, plug-in hybrid electric or dedicated zero-emission vehicle. For low- and moderate-income residents living in a disadvantaged community, additional funding of up to $5,000 is available for a fuel efficient conventional powered vehicle, plug-in hybrid electric vehicle or dedicated zero-emission vehicle. The proposed measure seeks to provide funding assistance for at least 2,000 replacement vehicles per year.

MOB-07 – ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION LIGHT-HEAVY- AND MEDIUM-HEAVY-DUTY VEHICLES: The objective of the proposed action is to accelerate the introduction of advanced hybrid and zero-emission technologies for Class 4 through 6 heavy-duty vehicles. The State is currently implementing a Hybrid Vehicle Incentives Project (HVIP) program to promote zero-emission and hybrid heavy-duty vehicles and CARB is proposing to allocate $18 million statewide to the program. The proposed measure seeks to continue the program from 2016 to 2030 to deploy up to 120 zero- and partial-zero emission vehicles per year with up to $50,000 funding assistance per vehicle based on the current allocated funding (funding levels vary depending on technology types). Zero-emission vehicles and hybrid vehicles with a portion of their operation in an "all-electric range" mode would be given the highest priority. In addition in 2016, the California state legislature appropriated $150 million from the Greenhouse Gas Reduction Fund to invest in zero and near-zero emission on-road heavy-duty vehicles and off-road equipment.

MOB-08 – ACCELERATED RETIREMENT OF OLDER ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure seeks to replace up to 2,000 heavy-duty vehicles per year with newer or new vehicles that meet one of the optional NOx standards adopted by CARB. The funding assistance will be prorated to offer the most funding for heavy-duty engines meeting the optional NOx exhaust emissions standard of 0.02 g/bhp-hr or cleaner. Funding assistance of up to $25,000 per vehicle is proposed and the level of funding will depend upon the NOx emissions certification level of the replacement vehicle meeting one of the optional NOx emission standards. In addition, the SCAQMD may to the extent within its authority, adopt a regulation to require purchase of the cleanest commercially available engine, which may include a provision similar to the Surplus Off-Road Opt-In for NOx (SOON) provision of the Statewide In-Use Off-Road Fleet Vehicle Regulation or develop new or expanded clean fleet vehicle rules, to ensure that additional NOx emission reduction benefits are achieved. Other enforceable mechanisms may be considered providing that such mechanisms can be approved into the SIP.

MOB-09 – ON-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM: This proposed measure seeks to accelerate deployment of near-zero and zero-emission on-road heavy-duty trucks through the generation of mobile source emission reduction credits (MSERCs) that can be used for purposes of recognizing mobile source emission reductions at facilities affected by proposed AQMP measures MOB-01 through MOB-04, MOB-08, and EGM-01. The SCAQMD staff will develop amendments to SCAQMD Rules 1612 and 1612.1 to reflect the latest advanced near-zero and zero-emission technologies and revise the quantification methodologies in Rules 1612 and 1612.1. MSERCs generated will be discounted to provide additional benefits to the environment and to help meet air quality standards.

Off-Road Mobile Source Measures

Four control measures are proposed to seek further emission reductions from off-road mobile sources and industrial equipment. The first measure calls for the continuation of the SOON provision of the Statewide In-Use Off-Road Diesel Fleet Regulation beyond 2023. The SOON provision implemented to-date has realized additional NOx reductions beyond the Statewide regulation. The second measure seeks to continue the successful lawnmower and leaf blower exchange programs and expand the programs to include a greater variety of zero-emission equipment into the commercial lawn and garden maintenance activities. A significant portion of the NOx emissions from lawn and garden equipment are attributed to larger lawn and garden equipment operating on diesel fuel. The extended exchange program will focus on replacing these equipment with newer equipment. The third measure calls for additional emission reductions from passenger locomotives. The Southern California Regional Rail Authority (SCRRA or Metrolink), the region's commuter rail service, is in the process of procuring 40 Tier 4 passenger locomotives. This measure will recognize these efforts and continue the purchase of Tier 4 cleaner locomotives. The fourth measure seeks to accelerate the introduction of zero- and near-zero emission off-road equipment through mobile source emission reduction credits generating programs. SCAQMD Rule 1620 has been in place since 1995. However, the current version of the rule needs to be revised to reflect current off-road equipment technologies available today and the near-future. Mobile source emission reduction credits generated under a new amended Rule 1620 or other off-road mobile source emission reduction credit generation rule would only be available to help facilities affected by the facility-based measures (MOB-01 through MOB-04 and EGM-01). The credits are proposed to not be eligible for offset stationary source emissions.

MOB-10 – EXTENSION OF THE SOON PROVISION FOR CONSTRUCTION/INDUSTRIAL EQUIPMENT: To promote turnover (i.e., retire, replace, retrofit, or repower) of older in-use construction and industrial diesel engines, this proposed measure seeks to continue the SOON provision of the Statewide In-Use Off-Road Fleet Vehicle Regulation beyond 2023 through the 2031 timeframe. Historically, the SCAQMD Governing Board has allocated up to $30 million per year for the program. However, more recently, the Governing Board has allocated up to $10 million per year. This measure proposes to extend the current SOON Program beyond 2023 to 2031 with a minimum allocation of $10 million and potentially higher levels upon the Governing Board's approval. In order to implement the SOON program in this timeframe, funding of up to $30 million per year would be sought to help fund the repower or replacement of older Tier 0 and Tier 1 equipment to Tier 4 or cleaner equipment, with approximately 2 tpd of NOx reductions.

MOB-11 – EXTENDED EXCHANGE PROGRAM: This measure seeks to continue the successful lawnmower and leaf blower exchange programs in order to increase the penetration of electric equipment or new low emission gasoline-powered equipment used in the region. The lawnmower exchange program has resulted in over 55,000 gasoline lawnmowers replaced with zero-emission lawnmowers and over 12,000 older, dirtier gasoline-powered commercial leaf blowers replaced with newer, cleaner leaf blowers. The SCAQMD is currently conducting a lawn and garden equipment loan program with various public entities to demonstrate the feasibility of zero-emission lawn and garden equipment in various public and commercial settings. Such demonstrations will provide valuable information to lawn and garden equipment manufacturers to produce zero-emission products for the commercial environment. A segment of the lawn and garden equipment population comprised of diesel powered equipment represents a significant fraction of the total NOx emissions associated with this category. As such, the proposed extended exchange program will focus on incentives to accelerate the replacement of older equipment with new Tier 4 or cleaner equipment or zero-emission equipment where applicable. In addition, other small off-road equipment (SORE) equipment may also be considered for exchange programs for accelerating the turnover of existing engines.

MOB-12 – FURTHER EMISSION REDUCTIONS FROM PASSENGER LOCOMOTIVES: This measure recognizes recent actions by the SCRRA to replace their existing passenger locomotives with Tier 4 locomotives. The SCRRA is in the process of procuring 40 Tier 4 passenger locomotives to replace their older existing Tier 0 and Tier 2 passenger locomotives by 2020. The SCRRA Board has indicated a desire to work with the SCAQMD and other stakeholders to evaluate technologies that will further reduce NOx emissions beyond Tier 4 emissions level.

MOB-13 – OFF-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM: This measure seeks to accelerate the early deployment of near-zero and zero-emission off-road equipment through the generation of MSERCs that can be used for purposes of recognizing mobile source emission reductions at facilities affected by proposed AQMP measures MOB-01 through MOB-04 and EGM-01. The SCAQMD staff will develop amendments to SCAQMD Rule 1620 to reflect the latest advanced near-zero and zero-emission technologies and revise the quantification methodologies in Rule 1620. In addition to Rule 1620, the SCAQMD staff has been working on two additional off-road mobile source emission reduction credit generation rules to incentivize the early deployment of the cleanest ocean-going vessels that are not subject to the State Vessels At-Berth Regulation or vessel calls that are considered surplus to the Statewide regulation and locomotives that have lower NOx emissions than the

current Tier 4 locomotive engine standards. The two rules will be further developed under this measure. MSERCs generated may be discounted to provide additional benefits to the environment and to help meet air quality standards.

Incentive Programs Measure

A measure is proposed to recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B. The San Joaquin Valley Air Pollution Control District adopted Rule 9610 to recognize the emission reduction benefits of incentive programs in their region. A similar action is proposed under the current measure. The proposed measure describes the six general elements identified by U.S. EPA that will be needed in order for such benefits to be accounted in the SIP.

MOB-14 – EMISSION REDUCTIONS FROM INCENTIVE PROGRAMS: This measure seeks to develop a rule similar to the San Joaquin Valley Air Pollution Control District Rule 9610 to recognize emission reduction benefits associated with incentive programs. The proposed rule would recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B such that the emission reductions can be accounted for in the SIP. As previously mentioned, the U.S. EPA indicated that there are six general elements that need to be incorporated in a proposed rule in order for the reductions to be credited in the SIP. The six necessary elements are the minimal amount of information, documentation, or commitment needed for U.S. EPA to consider approval of emission reduction benefits associated with incentives programs. Additional elements may be identified during the implementation of this measure.

State and Federal Control Measures

In addition to SCAQMD and SCAG measures, the Draft 2016 AQMP includes additional control measures to reduce emissions from sources that are primarily under state and federal jurisdiction, including on-road and off-road mobile sources. These reductions are needed to achieve the remaining emission reductions necessary for ozone and PM2.5 attainment. The CARB released the Proposed 2016 State Strategy for the SIP (State SIP Strategy) on May 17, 2016. The new measures contained in the State SIP Strategy commitment reflect a combination of state actions, petitions for federal action, as well as actions that outline a pathway for achieving further deployment of the cleanest technologies in each sector. These measures, in conjunction with the existing control program, identify all of the reductions needed to achieve a 70 percent reduction in NOx emissions from mobile sources in 2023, and an 80 percent reduction in 2031 in the South Coast. Current control programs will reduce NOx emissions from today's levels by 209 tons per day by 2031. As part of the proposed State SIP Strategy, CARB will provide an enforceable commitment to achieve in aggregate an additional 107 tons per day of NOx reductions in 2023, and 97 tons per day in 2031. The State SIP Strategy will also provide 48 and 60 tons per day, respectively, of VOC reductions in 2023 and 2031 which provide supplemental benefits in reducing ozone in some portions of the Basin. Any additional commitments to address PM2.5 attainment needs in 2025 will be identified separately, if needed.

The NOx and VOC emission reductions from the proposed new State SIP Strategy measures in 2023 and 2031 are summarized in Table 4-5. CARB's proposed State SIP Strategy for on-road vehicles,

locomotives, ocean going vessels, and off-road equipment are briefly summarized in this section and details of these measures are provided in Appendix IV-B.

TABLE 4-5

South Coast Expected Emission Reductions (tpd) from State SIP Strategy Measures

Proposed Measure	2023		2031	
	NOx	VOC	NOx	VOC
On-Road Light-Duty:				
Advanced Clean Cars 2	—	—	0.6	0.3
Lower In-Use Emission Performance Assessment	NYQ	NYQ	NYQ	NYQ
Further Deployment of Cleaner Technologies	7	16	5	16
Total On-Road Light-Duty Reductions	**7**	**16**	**6**	**16**
On-Road Heavy-Duty:				
Lower In-Use Emission Performance Level	NYQ	NYQ	NYQ	NYQ
Low-NOx Engine Standard – California Action	—	—	5	—
Low-NOx Engine Standard – Federal Action	—	—	7	—
Medium and Heavy-Duty GHG Phase 2	NYQ	NYQ	NYQ	NYQ
Advanced Clean Transit	<0.1	<0.1	0.1	<0.1
Last Mile Delivery	<0.1	<0.1	0.4	<0.1
Innovative Technology Certification Flexibility	NYQ	NYQ	NYQ	NYQ
Zero-Emission Airport Shuttle Buses	NYQ	NYQ	NYQ	NYQ
Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles	3	0.4	3	0.4
Further Deployment of Cleaner Technologies	34	4	11	1
Total On-Road Heavy-Duty Reductions	**37**	**4**	**27**	**2**
Off-Road Federal and International Sources*:				
Aircraft				
Further Deployment of Cleaner Technologies	17	NYQ	13	NYQ
Locomotives				
More Stringent National Locomotive Emission Standards	0.7	<0.1	8	0.3
Further Deployment of Cleaner Technologies	10	0.4	7	0.3
Ocean-Going Vessels				
Tier 4 Vessel Standards	—	—	4	—
Incentivize Low Emission Efficient Ship Visits	NYQ	NYQ	NYQ	NYQ
At-Berth Regulation Amendments	0.3	<0.1	1	<0.1
Further Deployment of Cleaner Technologies	13	NYQ	10	NYQ
Total Off-Road Federal and International Reductions	**41**	**0.4**	**43**	**0.6**

TABLE 4-5 (CONCLUDED)

South Coast Expected Emission Reductions (tpd) from State SIP Measures

Proposed Measure	2023		2031	
	NOx	VOC	NOx	VOC
Off-Road Equipment:				
Zero-Emission Off-Road Forklift Regulation Phase 1	—	—	1	0.1
Zero-Emission Off-Road Emission Reduction Assessment	NYQ	NYQ	NYQ	NYQ
Zero-Emission Off-Road Worksite Emission Reduction Assessment	NYQ	NYQ	NYQ	NYQ
Zero-Emission Airport Ground Support Equipment	<0.1	<0.1	<0.1	<0.1
Small Off-Road Engines	0.7	7	2	16
Transport Refrigeration Units Used for Cold Storage	NYQ	NYQ	NYQ	NYQ
Low-Emission Diesel Requirement	0.6	NYQ	2	NYQ
Further Deployment of Cleaner Technologies	21	21	17	20
Total Off-Road Equipment Reductions	**22**	**28**	**21**	**36**
Consumer Products:				
Consumer Products Program	—	NYQ	—	5
Total Consumer Products Reductions	—	**NYQ**	—	**5**
Aggregate Emission Reductions	**107**	**48**	**97**	**60**

* Quantification of emission reductions are based on current growth forecasts, which are undergoing review

"NYQ" denotes emission reductions are Not Yet Quantified

"—" denotes no anticipated reductions

On-Road Light-Duty Vehicles

ADVANCED CLEAN CARS 2: This proposed measure is designed to ensure that zero and near-zero emission technology options continue to be commercially available, with range improvements to address consumer preferences for greater ease of use, and maximize electric vehicle miles travelled (eVMT). The regulation may include lowering fleet emissions further beyond the super-ultra-low-emission vehicle standard for the entire light-duty fleet through at least the 2030 model year, and look at ways to improve real world emissions through implementation programs. Additionally, new standards would be considered to further increase the sales of zero-emission vehicles (ZEVs) and plug-in hybrid electric vehicles (PHEVs) beyond the levels required in 2025.

LOWER IN-USE EMISSION PERFORMANCE ASSESSMENT: This proposed measure is designed to ensure that vehicles continue to operate at their cleanest possible level by evaluating California's in-use performance-focused inspection procedures and, if necessary, make improvements to further the program's effectiveness. Results from the assessment could be used to improve inspection test procedures, address program fraud, improve the effectiveness and durability of emission-related repair work, and to improve the regulations governing the design of in-use performance systems on motor vehicles to the extent necessary.

FURTHER DEPLOYMENT OF CLEANER TECHNOLOGY: ON-ROAD LIGHT-DUTY VEHICLES: This proposed measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with increased transportation efficiencies, as well as the potential for autonomous vehicles and advanced transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

On-Road Heavy-Duty Vehicles

LOWER IN-USE EMISSION PERFORMANCE LEVEL FOR HEAVY-DUTY VEHICLES: This proposed measure is designed to ensure that heavy-duty vehicles continue to operate at the cleanest possible level. CARB would develop new, supplemental actions, in the form of regulatory amendments or new regulations, to address in-use compliance and to decrease engine deterioration. This suite of actions includes: revising the warranty requirements to better reflect the operation of these vehicles; revising the current opacity limit in CARB's existing roadside and fleet inspection programs to better reflect the capability of current technology; revising the not to exceed (NTE) supplemental test procedures for heavy-duty diesel engines; revising the durability demonstration provisions within the certification requirements; and developing a comprehensive inspection and maintenance program for heavy-duty trucks to test for excessive emissions of multiple pollutants.

LOW-NOx ENGINE STANDARD: This proposed measure is designed to require near-zero emission engine technologies that will substantially lower NOx emissions from on-road heavy-duty vehicles. CARB will begin development of a new heavy-duty low-NOx emission standard in California in 2017, with CARB Governing Board action expected in 2019. A California-only low-NOx standard would apply to all vehicles with new heavy-duty engines sold in California starting in 2023. In order to achieve the maximum emission reductions from this proposed measure, CARB may also petition U.S. EPA to establish a new federal heavy-duty engine emission standard. If U.S. EPA fails to initiate the rule development process by 2017, CARB would continue with its development and implementation efforts to establish a California-only low-NOx standard. If U.S. EPA begins the regulatory development process for new federal heavy-duty emission standards by 2017, CARB will coordinate its regulatory development efforts with the federal regulation.

MEDIUM AND HEAVY-DUTY GHG PHASE 2: This proposed measure is designed to advance fuel efficiency improvements and achieve greater GHG emission reductions through the introduction of the next generation of integrated engine, powertrain, vehicle and trailer technologies designed to reduce climate emissions and fuel use. U.S. EPA is expected to finalize new federal Phase 2 standards for GHG emissions from medium- and heavy-duty vehicles in summer 2016. These new standards will build upon the Phase 1 standards and will push technology improvements beyond what is currently in widespread commercial use. CARB staff plans to present a California Phase 2 proposal for the Governing Board's consideration in 2017. In addition to harmonizing with the federal Phase 2 standards where applicable, staff's proposal may include some more stringent, California-only provisions that are necessary to meet California's unique air quality challenges.

ADVANCED CLEAN TRANSIT: This measure is designed to continue the transition of transit fleets to cleaner technologies to support NOx and GHG emission reduction goals. The measure will consider a variety of approaches to enhance the deployment of advanced clean technology and increase the penetration of the first wave of zero-emission heavy-duty technology into transit applications that are well suited to its use. CARB staff will develop and propose an Advanced Clean Transit measure with a combination of incentives, and/or other methods that would result in transit fleets purchasing advanced technology buses during normal replacement and using renewable fuels when contracts are renewed.

LAST MILE DELIVERY: This measure is designed to increase the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. This proposed measure will require the use of low-NOx engines and the purchase of zero-emission trucks for certain class 3-7 last mile delivery trucks in California starting in 2020, with a low fraction initially and gradually ramping up to a higher percentage of the fleet at time of normal replacement through 2030.

INNOVATIVE TECHNOLOGY CERTIFICATION FLEXIBILITY: This proposed measure is designed to encourage early deployment of the next generation of truck and bus technologies through defined, near-term CARB certification and on-board diagnostic (OBD) compliance flexibility for medium- and heavy-duty vehicles. This regulation is intended to balance the need to provide key, promising technologies with a predictable and practical CARB-certification pathway, while ensuring the expected emission benefits of advanced truck and bus technologies are achieved in-use. This regulation would provide flexibility for potentially transformational engine and vehicle technologies, such as robust hybrids and heavy-duty engines meeting the optional low-NOx standard.

ZERO-EMISSION AIRPORT SHUTTLE BUSES: This proposed measure is designed to achieve NOx and GHG emission reductions goals through advanced clean technology, and to increase the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. Like transit buses, the inclusion of zero-emission airport shuttles would serve as a stepping stone to encourage broader deployment of zero-emission technologies in the on-road sector. CARB would develop and propose a regulation or other measures to deploy zero-emission airport shuttles in order to further support market development of zero-emission technologies in the heavy-duty sector.

INCENTIVE FUNDING TO ACHIEVE FURTHER EMISSION REDUCTIONS FROM ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure would use existing CARB and SCAQMD incentive and other innovative funding programs for on-road, heavy-duty vehicles to increase the penetration of zero and near-zero vehicles. Funding mechanisms would target technologies that meet CARB's current optional low-NOx standard through 2023, consistent with the current round of Moyer funding.

FURTHER DEPLOYMENT OF CLEANER TECHNOLOGY: ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, emission benefits associated with increased operational efficiency strategies, and the potential for new driver assist and intelligent transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

Off-Road Federal and International Sources

FURTHER DEPLOYMENT OF CLEANER TECHNOLOGIES: OFF-ROAD FEDERAL AND INTERNATIONAL SOURCES: This measure is designed to achieve further emission reductions for the Basin's attainment needs. This proposed measure outlines a series of actions that would be taken at the State and local level to achieve further reductions among the three categories off-road federal and international sources: ocean-going vessels, aircraft, and locomotives. These actions include: expanding and enhancing incentive programs to increase the deployment of cleaner technologies; incentivizing cleaner ships and aircraft to come to California; partnering with engine manufacturers to encourage production of cleaner, more efficient engines; continuing to support demonstration projects; and encouraging efficiency improvements. Achieving the magnitude of emission reductions necessary from this category will require strong action at the federal and international level, coupled with State and local advocacy and action to facilitate these efforts.

MORE STRINGENT NATIONAL LOCOMOTIVE EMISSION STANDARDS: This proposed measure is designed to reduce emissions from new and remanufactured locomotives. CARB would petition U.S. EPA for both new Tier 5 national locomotive emission standards for new locomotives, and for more stringent national requirements for remanufactured locomotives. CARB staff estimates that the U.S. EPA could require manufacturers to implement the new locomotive emission regulations as early as 2023 for remanufactured locomotives, and 2025 for newly manufactured locomotives. A new federal standard could also facilitate development and deployment of zero-emission track mile locomotives and zero-emission locomotives by building incentives for those technologies into the regulatory structure.

TIER 4 VESSEL STANDARDS: This measure is designed to reduce emissions from ocean going vessels. CARB would advocate with U.S. EPA, the U.S. Coast Guard, and international partners for the IMO to adopt more stringent emission standards. Specifically, CARB would advocate for new Tier 4 NOx and PM standards, plus efficiency targets for existing vessels, and new vessel categories not covered by IMO efficiency standards.

INCENTIVIZE LOW EMISSION EFFICIENT SHIP VISITS: This measure is designed to achieve early implementation of clean vessel technologies (e.g., liquefied natural gas, Tier 3 standards or better), and to incentivize vessels with those technologies in California service. CARB staff would work with California seaports, ocean carriers, and other stakeholders to develop the criteria and to identify the best way to incentivize introduction of Low Emission Efficient Ships into the existing fleet of vessels that visit California seaports.

AT-BERTH REGULATION AMENDMENTS: This measure is designed to further reduce emissions from ships auxiliary engines at-berth. CARB would investigate expanding the current At-Berth Regulation to include smaller fleets and/or additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers).

Off-Road Equipment

ZERO-EMISSION OFF-ROAD FORKLIFT REGULATION PHASE 1: This measure is designed to increase penetration of ZEVs in off-road applications, advance ZEV commercialization, and to set a market signal to technology manufacturers and investors. CARB staff would develop and propose a regulation with

specific focus on forklifts with lift capacities equal to or less than 8,000 pounds for which zero-emission technologies have already gained appreciable customer acceptance and market penetration.

ZERO-EMISSION OFF-ROAD EMISSION REDUCTION ASSESSMENT: This measure is designed to transfer zero and near-zero emission technologies in non-freight, off-road applications to heavier equipment, such as high lift-capacity forklifts or other equipment in the construction, industrial, and mining sectors. Through this assessment, CARB would provide the Governing Board with an informational update regarding the status of ZEVs in off-road applications once the Phase 1 forklift regulation is in place in 2025 or later, which would focus primarily on the scalability and transferability of zero-emission technologies to larger, higher power-demand equipment types, and would be used to inform the development of the Phase 2 regulation.

ZERO-EMISSION OFF-ROAD WORKSITE EMISSION REDUCTION ASSESSMENT: This measure is designed to foster the development of a robust worksite efficiency program and to facilitate the deployment of technologies and/or strategies that increase worksite efficiency, such as connected vehicles, automation, and fleet management technologies in off-road sectors. Through this assessment, CARB would identify opportunities to further expand the use of the aforementioned strategies and/or zero and near-zero emission technologies, and would provide the Governing Board with an informational update regarding the status of the aforementioned technologies and/or strategies, with a focus on business return on investment, scalability and sustainability of the system. CARB would also encourage deployment via incentives or by providing credit in the off-road rule.

ZERO-EMISSION AIRPORT GROUND SUPPORT EQUIPMENT: This measure is designed to increase the penetration of the first wave of zero-emission heavy-duty technology in applications that are well suited to its use, and to facilitate further technology development and infrastructure expansion. CARB would develop and propose a regulation to accelerate the transition of diesel and large spark ignition airport ground support equipment to zero-emission technology.

SMALL OFF-ROAD ENGINES: This measure is designed to reduce emissions from SORE, and to increase the penetration of zero-emission technology. SORE that are subject to CARB regulations are used in residential and commercial lawn and garden equipment, and other utility applications. CARB will develop and propose tighter exhaust and evaporative emission standards, encourage increased use of zero-emission equipment, and enhance enforcement of current emission standards for SORE.

TRANSPORT REFRIGERATION UNITS USED FOR COLD STORAGE: This measure is designed to advance zero and near-zero emission technology commercialization by increasing the early penetration of hybrid electric and electric standby equipped transport refrigeration units used for cold storage, and supporting the needed infrastructure developments. CARB would develop a regulation to limit stationary operating times of internal, combustion engines in phases.

LOW-EMISSION DIESEL REQUIREMENT: This measure is designed to reduce emissions from the portion of the heavy-duty fleet that will continue to operate on internal combustion engines. The proposed measure would put into place standards for Low Emission Diesel and require that diesel fuel providers sell steadily increasing volumes of Low-Emission Diesel until it comprises 50 percent of total diesel sales by 2031. Due to the magnitude of needed NOx reductions in the Basin and the large volumes of Low-

Emission Diesel needed for full statewide implementation, the proposed measure would be phased-in with an implementation strategy that starts in the Basin, and subsequently expands statewide.

FURTHER DEPLOYMENT OF CLEANER TECHNOLOGIES: OFF-ROAD EQUIPMENT: This measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle technologies. These emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

SCAG's Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures

The Southern California Association of Governments (SCAG), the Metropolitan Planning Organization (MPO) for Southern California, is mandated to comply with federal and State transportation and air quality regulations. Federal transportation law authorizes federal funding for highway, highway safety, transit, and other surface transportation programs. The federal CAA establishes air quality standards and planning requirements for various criteria air pollutants.

Transportation conformity is required under CAA Section 176(c) to ensure that federally supported highway and transit project activities "conform to" the purpose of the SIP. Conformity currently applies to areas that are designated nonattainment, and those re-designated to attainment after 1990 ("maintenance areas" with plans developed under CAA Section 175[A]) for the specific transportation-related criteria pollutants. Conformity for the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. The transportation conformity regulation is found in 40 CFR Part 93.

Pursuant to California Health and Safety Code Section 40460, SCAG has the responsibility of preparing and approving the portions of the AQMP relating to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. The SCAQMD combines its portion of the Plan with those prepared by SCAG.

The Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and Transportation Control Measures (TCMs), included as Appendix IV-C of the 2016 AQMP/SIP for the Basin, are based on SCAG's Final 2016 RTP/SCS and consist of the following four sections.

Section I. Introduction

As required by federal and state law, SCAG is responsible for ensuring that the regional transportation plan, program, and projects are supportive of the goals and objectives of AQMPs/SIPs. SCAG is also required to develop demographic projections and a regional transportation strategy and control measures for the South Coast AQMP/SIP.

As an MPO, SCAG develops the RTP/SCS every four years. The RTP/SCS is a long-range regional transportation plan that provides for the development and integrated management and operation of transportation systems and facilities that will function as an intermodal transportation network for the SCAG region. The RTP/SCS also outlines certain land use growth strategies that provide for more integrated land use and transportation planning, and maximize transportation investments to achieve regional GHG reduction targets set by CARB pursuant to SB 375.

SCAG also develops the biennial Federal Transportation Improvement Program (FTIP). The FTIP is a multimodal program of capital improvement projects to be implemented over a six year period. The FTIP implements the programs and projects in the RTP/SCS.

Section II. RTP/SCS and TCMs

The SCAG Region faces many critical challenges including demographics, transportation system preservation, transportation funding, goods movement, housing, air quality, climate change, and public health. Under the guidance of the goals and objectives adopted by SCAG's Regional Council, the 2016 RTP/SCS was developed to provide a blueprint to integrate land use and transportation strategies to help achieve a coordinated and balanced regional transportation system. The Final 2016 RTP/SCS represents the culmination of more than three years of work involving dozens of public agencies, 197 local jurisdictions in the SCAG region, hundreds of local, county, regional and state officials, the business community, environmental groups, as well as various nonprofit organizations. The 2016 RTP/SCS was adopted by the SCAG Regional Council on April 7, 2016.

The Final 2016 RTP/SCS makes a concerted effort to integrate the region's transportation network with land uses in order to achieve an even more sustainable region over the coming decades. Accordingly, the Final 2016 RTP/SCS includes a host of regional strategies for addressing growth, land use and improving the region's transportation system. These are listed below.

Land Use Strategies

- Focus New Growth around Transit/High Quality Transit Areas (HQTAs)
- Plan for Growth around Livable Corridors
- Provide More Options for Short Trips/Neighborhood Mobility Areas
- Support Zero Emission Vehicles & Expand Electric Vehicle Charging Stations
- Support Local Sustainability Planning
- Protect Natural and Farm Lands
- Balance Growth Distribution between 500-Foot Buffer Areas and HQTAs

Transportation Strategies

- Preserve Our Existing System
- Manage Congestion through Transportation Demand Management (TDM) and Transportation System Management (TSM) including advanced ramp metering, and expansion and integration of the traffic signal synchronization network
- Expand Regional Transit System
- Expand Passenger Rail and Maintain High-Speed Rail Commitments

- Promote Active Transportation
- Improve Highway and Arterial Capacity
- Strengthen Regional Transportation Network for Goods Movement
- Improve Airport Ground Access

Included within these transportation system improvements are TCM projects that reduce vehicle use or improve traffic flow or congestion conditions. TCMs include the following three main categories of transportation improvement projects and programs:

- Transit, intermodal transfer, and active transportation measures;
- High occupancy vehicle (HOV) lanes, high occupancy toll (HOT) lanes, and their pricing alternatives; and
- Information-based transportation strategies.

Attachment A of Appendix IV-C is a list of transportation control measure projects that are specifically identified and committed to in the Draft 2016 AQMP. Per the CAA, these committed TCMs are required to receive funding priority and be implemented timely. In the event that a committed TCM cannot be delivered or will be significantly delayed, the TCM must be substituted for. It is important to note that as the SCAG's FTIP is updated every two years, new committed TCMs are added to the applicable SIP from the previous FTIP.

Section III. Reasonably Available Control Measure Analysis

As required by the CAA, a reasonably available control measure (RACM) analysis must be included as part of the overall control strategy in the AQMP to ensure that all potential control measures are evaluated for implementation and that justification is provided for those measures that are not implemented. Appendix IV-C contains the RACM TCM component for the Basin's ozone and PM2.5 control strategy. In accordance with U.S. EPA procedures, this analysis considers TCMs in the Final 2016 RTP/SCS, measures identified by the CAA, and relevant measures adopted in other ozone and PM2.5 nonattainment areas of the country. Based on this comprehensive review, it is determined that the TCMs being implemented in the Basin are inclusive of all TCM RACM.

Section IV. TCM Best Available Control Measure (BACM) Analysis for 2006 PM2.5 NAAQS

The Basin has been reclassified as a "serious" nonattainment area under the 2006 PM2.5 NAAQS effective February 12, 2016. As a result, the Basin is required to implement BACMs including TCMs for the control of direct PM2.5 and PM2.5 precursors from on-road mobile sources. This section serves as the TCM BACM component for the new South Coast 2006 PM2.5 standard SIP.

Following the applicable EPA guidance, the TCM BACM analysis consists of a review of on-going implementation of TCMs in the Basin, a review of TCM measures implemented in other "moderate" and "serious" PM2.5 nonattainment areas as well as "serious" PM10 nonattainment areas throughout the country, and a review of TCMs not implemented in the SCAG region. The analysis demonstrates that the TCM projects being implemented in the Basin constitute TCM BACM.

The emission benefits associated with the Final 2016 RTP/SCS are reflected in the 2016 AQMP projected baseline emissions. As shown in Tables 1-1 and 1-2 in Appendix IV-C, the amount of emission reductions from the RTP/SCS are significantly impacted by the change in vehicle fleet mix and vehicle emission factors. For example, assuming that the future EMFAC2014 vehicle fleet mix and emission factors remain the same as in 2012 (the 2016 RTP/SCS and 2016 AQMP base year), the 2016 RTP/SCS would yield a NOx emission reduction of 5.4 tons per day in 2021 and 9.8 tons per day in 2031 compared with the 2016 RTP/SCS baseline. However, if the future improvement in the fleet mix and emission factors as reflected in EFMAC2014 are factored in, the estimated NOx emission reduction from the 2016 RTP/SCS would drop to 2.8 tons per day in 2023 and 4.5 tons per day in 2031.

For a detailed discussion of the integrated regional land use and transportation strategies, the estimated emission reduction benefits, as well as the cost-benefit analysis, refer to Appendix IV-C: Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures.

SCAQMD Proposed PM2.5 Strategy

Despite the attainment demonstration in the 2012 AQMP, the Basin did not meet the 24-hour PM2.5 standard by 2015, mainly due to the drought conditions that persisted for the past several years. The preliminary 2015 data showed that the 24-hour PM2.5 design value was greater than the federal standard of 35 $\mu g/m^3$. U.S. EPA re-designated the Basin from a "moderate" nonattainment to a "serious" nonattainment area, effective February 12, 2016, which set 2019 as the new attainment deadline. The 2016 AQMP demonstrates that the 24-hour standard will be met by 2019 with no additional reductions beyond already adopted and implemented measures (See Chapter 5).

For the annual PM2.5 standard (12 $\mu g/m^3$), the attainment target year is 2021 for a "moderate" nonattainment area and 2025 for a "serious" nonattainment are. Modeling projections show that the annual standard will not be met by 2021 if emission reductions beyond the already adopted control measures are not introduced. The aggressive NOx and VOC reductions proposed to meet the 1997 8-hour ozone standard also do not ensure attainment of the annual PM2.5 standard by 2021. An analysis of the feasibility of additional measures focused on direct PM2.5 and its other precursors did not identify a practical path towards annual PM2.5 attainment by 2021. Therefore, the SCAQMD is requesting a reclassification of the Basin as a "serious" nonattainment area with a new attainment deadline as "expeditiously as practicable," but no later than 2025. While CAA Section 182(e)(5) measures cannot be relied on to show future attainment of PM standards, the NOx strategy to meet ozone standards will still ensure achieving the annual standard by 2025.

However, to further ensure attainment of the annual PM2.5 standards, a series of control measures specifically addressing PM2.5 are being proposed. The proposed PM2.5 control measures include 10 stationary source control measures including episodic controls and technology assessments. These PM2.5 control measures are proposed as needed to ensure or advance the attainment of federal PM2.5 NAAQS per the federal CAA requirements. Each PM2.5 control measure was evaluated to determine the potential emission reductions that could be achieved. In some cases, only a range of possible emission reductions could be determined, and for others, the magnitude of potential reductions cannot be determined at this time. As assessments and potential rule development progress, and feasible emission

reductions are identified and quantified, the measures will be implemented to advance attainment if practicable

Each type of control measure relies on a number of control methods. Table 4-6 provides an example of the type of proposed PM2.5 control measures and typical corresponding control methods.

TABLE 4-6

SCAQMD Proposed PM2.5 Measure Control Methods

Source Category	Control Method
Best Available Control Measures for PM2.5 and Ammonia Sources	• Add-On Controls • Best Management Practices • Best Available Control Technology • Best Available Retrofit Control Technology • Process Improvement • Targeted Controls • Preventative Measures • Seasonal or Episodic Controls • Market Incentives • Mandatory Curtailments

Table 4-7 provides a list of the proposed SCAQMD stationary source PM2.5 control measures along with the anticipated adoption/implementation period, implementing agency, and projected emission reductions. The measures cover a variety of source types for PM sources (BCM).

TABLE 4-7

SCAQMD Proposed Stationary Source PM2.5 Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2021/2025)
BCM-01[4]	Further Emission Reductions from Commercial Cooking [PM]	2018	2025	SCAQMD	0 / 3.3*
BCM-02	Emission Reductions from Cooling Towers [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-04[5]	Emission Reductions from Manure Management Strategies [NH3]	2019	2020	SCAQMD	0.26 / 0.2 [NH3]
BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD	TBD	SCAQMD	TBD [a]
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-08	Further Emission Reductions from Agricultural, Prescribed and Training Burning [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	2019	2020	SCAQMD	0.1 / 0.1 [NH3]

* Contingency measure

[a] TBD are reductions to be determined once the measure is further evaluated, the technical assessment is complete, and inventory and cost-effective control approach are identified, and are not relied upon for attainment demonstration purposes

[4] Formerly BCM-03 in the 2012 AQMP and BCM-05 in the 2007 AQMP.

[5] Formerly BCM-04 in the 2012 AQMP.

The following provides a brief description of the SCAQMD proposed PM2.5 control measures. This category includes 10 control measures, including PM2.5 emission reductions from under-fired charbroilers, cooling towers and fugitive dust sources, abrasive blasting, stone cutting and finishing, agricultural and residential burning, composting, and ammonia emission reductions from livestock waste and NOx control equipment.

PM Measures

BCM-01 – FURTHER EMISSION REDUCTIONS FROM COMMERCIAL COOKING: Commercial cooking activities are the largest source of directly emitted PM2.5 emissions in the Basin, and under-fired charbroilers are responsible for the majority of emissions from this source category. To date, a variety of control device technologies have been tested by CE-CERT at the University of California, Riverside, and SCAQMD staff and the inter-agency working group are reviewing draft test results. This control measure is a contingency control measure which would seek additional emission reductions if the annual average PM2.5 standard is not met by 2025. If necessary, the control program would seek to establish a tiered program targeting higher efficiency controls for under-fired charbroilers at large volume restaurants, with more affordable lower efficiency controls at smaller restaurants. As with existing Rule 1138 requirements, a potential future control program for under-fired charbroilers could establish control device efficiency requirements based on restaurant throughput. Efforts could also be taken to develop a control device registration program as an alternative to the SCAQMD permit process. Small business incentive programs funded by mitigation fees or other sources could also be explored to help offset initial purchase and installation costs for restaurants.

BCM-02 – EMISSION REDUCTIONS FROM COOLING TOWERS: This control measure seeks reductions of PM emissions from industrial cooling towers through the use of the latest drift eliminator technologies. This control measure will seek to phase-in the use of drift eliminators with 0.001 percent drift rate for existing cooling towers. This could be achieved by retrofitting older cooling towers with modification to the cooling fans to accompany the drift eliminators, which will also result in water conservation. Newly constructed cooling towers have demonstrated ultra-low drift rates down to 0.0005 percent. This drift rate has been achieved in practice and could be considered a BACT for new construction.

BCM-03 – FURTHER EMISSION REDUCTIONS FROM PAVED ROAD DUST SOURCES: Although fugitive dust emissions from agriculture and construction are primarily in the coarse size fraction (PM10-2.5), entrained road dust is still one of the major direct PM2.5 sources due to the large number of roadways and high traffic volumes in the region. Existing SCAQMD Rules 1157 and 403 requirements to reduce track out from stationary sources are based on a list of options. Further emission reductions could be achieved by specifying the most effective track out prevention measures, such as use of a wheel washing system, for sites with high vehicular activity exiting the site, or those with repeated track-out violations. Existing SCAQMD Rule 1186 requires that certified equipment be used on public roads currently subject to routine street sweeping but does not specify frequency. Further paved road dust PM2.5 emission reductions could be sought through specifying the frequency of street sweeping. Street sweeping as part of routine roadway and highway maintenance may be included in a state, regional and/or local jurisdiction's National Pollutant Discharge Elimination System (NPDES) permits as part of federal Clean Water Act provisions to reduce debris from entering the storm drain system. NPDES permits are governed by the U.S. EPA and issued and maintained by regional water quality control boards. SCAQMD will coordinate with NPDES

permittees and regional water quality control boards to ensure rules of this Plan or future Plans do not conflict with or otherwise compromise NPDES permit requirements. This review is not intended to be a part of the NPDES permit approval process or a reevaluation of existing NPDES permits, but is intended to determine current street sweeping or highway maintenance requirements and practices to ensure that any SCAQMD rulemaking would not be in conflict with existing NPDES permit requirements. As part of efforts to reduce paved road dust silt loadings and the corresponding PM emissions, an evaluation of existing SCAQMD fugitive dust rules will be conducted to determine if additional PM2.5 emissions can be achieved.

BCM-04 – EMISSION REDUCTIONS FROM MANURE MANAGEMENT STRATEGIES: This control measure seeks to use manure management systems to reduce ammonia, a PM precursor, from fresh manure. Examples include acidifier application, dietary manipulation, feed additives, and other manure control strategies which can be applied on a year-around basis. To minimize costs, some control technologies can be seasonally or episodically applied during times when high ambient PM2.5 levels are of concern. Dietary manipulation such as lowering the protein content and including high-fiber ingredients is an effective method to decrease ammonia emission from monogastric animals' and ruminants' manure. Feed additives can be considered as a seasonal or episodic control strategy when ambient PM2.5 concentrations are highest. New approaches to reduce ammonia emissions from manure can be considered that include manure slurry injection, microbial manure additives, manure belt cleaning in laying hen houses, cage-free egg laying manure removal, and poultry manure thermal gasification. Finally, this control measure will implement all feasible control measures and compliance with federal BACM requirements, including lowering the threshold for Large Confined animal facilities under Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities.

BCM-05 – AMMONIA EMISSION REDUCTIONS FROM NOx CONTROLS: This control measure seeks to reduce ammonia from NOx controls such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR). These systems are capable of reducing NOx emissions from combustion sources very effectively. However, the use of systems also results in potential emissions of ammonia that "slip" past the control equipment and into the atmosphere. Ammonia is a precursor gas for secondary PM formation. Recent advances in catalyst technology have resulted in the development of ammonia slip catalysts that selectively convert ammonia into nitrogen gas. These catalysts could be installed post-SCR and would result in less ammonia slip.

BCM-06 – EMISSION REDUCTIONS FROM ABRASIVE BLASTING OPERATIONS: Existing SCAQMD Rule 1140 regulates opacity requirements for confined and unconfined abrasive blasting operations using various abrasives. The California Health and Safety Code prohibits local districts from requiring emission and performance standards more or less stringent than the State regulation. Rule 1140 has been developed with the ultimate goal of consistency. Rule 1140 establishes the emission and performance standards, including prohibition against visible emissions from confined or unconfined abrasive blasting operations, which is conforming to the California Code of Regulations Title 17, Subchapter 6 – Abrasive Blasting. Current permit conditions for abrasive blasting require venting to a PM air pollution control (APC) equipment when in full use. Baghouses or dry filters are the most frequently used APC equipment. This control measure proposes voluntary applications of a portable blasting enclosure/booth with a dust collection system by providing incentives, primarily focusing on dry abrasive blasting operations conducted in open areas using portable blasting equipment with or without a written SCAQMD permit.

BCM-07 – EMISSION REDUCTIONS FROM STONE GRINDING, CUTTING AND POLISHING OPERATIONS: Stone fabricating operations, including, but not limited to, grinding, cutting, and polishing generate airborne dust emissions containing PM10, some PM2.5, and silica particles that are known to cause lung diseases. Many of these operations are done at confined or unconfined worksites by construction workers, remodeling contractors and individuals, and may not be sufficiently controlled for dust emissions. This control measure seeks both wet and dry methods of control, local exhaust emissions control, no visible emissions requirements, and financial incentives as a regulatory alternative for exchanging existing wet or dry equipment with new equipment that includes integrated add-on controls.

BCM-08 – FURTHER EMISSION REDUCTIONS FROM AGRICULTURAL, PRESCRIBED AND TRAINING BURNING: This control measure proposes to further reduce PM emissions from open burning sources. Further PM emission reductions could be achieved through use of a fee schedule and/or an incentive program to limit agricultural burning and promote burning alternatives (e.g., chipping/grinding or composting). One approach to reduce emissions could involve establishing an administrative fee as part of the burn permit program based on acreage or amount of material burned for the purposes of processing and enforcing. Fees would not be charged to producers using burning alternatives. Another approach could involve providing incentives to agricultural producers, especially in peak PM2.5 areas, to implement alternatives to burning. A demonstration project could also be established where a SCAQMD contractor could conduct chipping/grinding and removal activities in peak PM2.5 areas at no, or reduced, cost to producers.

BCM-09 – FURTHER EMISSION REDUCTIONS FROM WOOD-BURNING FIREPLACES AND WOOD STOVES: This control measure seeks additional emission reductions from residential wood burning activities. Residential wood burning results in directly emitted PM2.5 and curtailment programs and emission reductions can be very cost-effective relative to other source categories. Based on a review of U.S. EPA guidance documents and other air district wood smoke control programs, the existing SCAQMD curtailment program (Rule 445) threshold could be lowered. A lower curtailment criteria (e.g., 20 or 25 $\mu g/m^3$) could be established, which would increase the number of no burn days but not completely prohibit wood burning during the winter. Based on historical data (2013–2015) for the November through February winter season, it is estimated there would be 11 and 28 additional curtailment days, on average, at the 25 and 20 $\mu g/m^3$ thresholds, respectively, above the estimate of 24 days at the current threshold. The Check Before You Burn program could also be extended to include the months of October and/or March as high PM2.5 levels can occur during these periods. All of these potential control options would increase the number of no burn days which could lower the contribution of wood smoke to ambient PM2.5 levels in the winter months. Although these episodic reductions are designed to address 24-hour PM2.5 concentrations, a consistent reduction in wintertime PM2.5 from reduced wood burning could have an impact on annual average PM2.5 concentrations. Further analysis will be conducted to determine the appropriate approach to achieve the emission reductions necessary to demonstrate attainment of both the 24-hour and annual average federal PM2.5 standards. The current SCAQMD program encourages households within high PM2.5 areas to upgrade wood-burning devices through SCAQMD incentives of up to $1,600 to offset purchase and installation costs. Although this program has been effective, additional reductions may be achieved through the use of higher incentives or expansion of the eligible geographic area. Experience has shown that education and outreach to targeted households is vital to ensure program participation,

and an additional element of this control measure would focus on expanding the awareness of the incentive programs.

BCM-10 – EMISSION REDUCTIONS FROM GREENWASTE COMPOSTING: VOCs and ammonia, which are PM precursor gases, are emitted from composting of organic waste materials including greenwaste and foodwaste and are currently regulated by existing SCAQMD Rule 1133.3. Although Rule 1133.3 covers foodwaste composting, the level of emissions from foodwaste composting has not been fully characterized, mainly due to the lack of related emissions test data. This control measure proposes potential emission minimization through emerging organic waste processing technology and potential emission reductions through restrictions on the direct land application of chipped and ground uncomposted greenwaste and through increased diversion to anaerobic digestion. This proposed control measure could seek a 15-day pathogen reduction process of chipped and ground uncomposted greenwaste with composting BMPs to reduce potential VOC and ammonia emissions from land applied greenwaste.

SCAQMD Proposed Contingency Measures

Pursuant to federal CAA Section 172(c)(9), contingency measures are emission reduction measures that are to be automatically triggered and implemented if an area fails to attain the national ambient air quality standard by the applicable attainment date, or fails to make reasonable further progress (RFP) toward attainment.

> *Such plan shall provide for the implementation of specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date applicable under this part. Such measures shall be included in the plan revision as contingency measures to take effect in any such case without further action by the State or the Administrator. (CAA Section 172(c)(9))*

U.S. EPA has issued guidance that the contingency measure requirement could be satisfied with already adopted control measures, provided that the controls are above and beyond what is needed to demonstrate attainment with the NAAQS (76 FR 57891).

> *U.S. EPA guidance provides that contingency measures may be implemented early, i.e., prior to the milestone or attainment date. Consistent with this policy, States are allowed to use excess reductions from already adopted measures to meet the CAA Sections 172(c)(9) and 182(c)(9) contingency measures requirement. This is because the purpose of contingency measures is to provide extra reductions that are not relied on for RFP or attainment, and that will provide a cushion while the plan is being revised to fully address the failure to meet the required milestone. Nothing in the CAA precludes a State from implementing such measures before they are triggered.*

In August 2016, U.S. EPA issued the Final Rule of "*Fine Particle Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*" (81 FR 58010) that provides a planning requirement framework for the 2012 and future PM2.5 NAAQS pursuant to Subpart 4. Reasonable Further Progress (RFP) is tracked with milestones and the new rule requires a SIP submittal in nine months after missing a

milestone to show the next milestone will be met along with contingency measures. The compliance with RFP contingency can be found in Appendix VI-C.

The 2012 base year design value for the 24-hour PM2.5 attainment demonstration is 36.6 µg/m^3 and the 2019 attainment year design value must be less than 35.4 µg/m^3 (see Chapter 5). Linear progress towards attainment over the seven year period yields one year's worth of air quality improvements equal to approximately 0.2 µg/m^3. Thus, the contingency measures should provide for approximately 0.2 µg/m^3 of air quality improvements to be automatically implemented in 2020 if the Basin fails to attain the 24-hour PM2.5 in 2019. Because the baseline concentrations in 2019 are anticipated to be 32.1 µg/m^3, there is linear progress of about 0.6 µg/m^3 per year, with a resulting 3.3 µg/m^3 of air quality improvement beyond what is required for attainment. The improvement is occurring due to adopted measures, such as on-road and off-road mobile source regulation, that are being implemented in the future generating these annual reductions. Therefore, excess emission reductions from already adopted measures lead to much more than one year's worth of air quality improvements, and thus the contingency measure requirement for the 24-hour PM2.5 NAAQS is satisfied. In addition, SCAQMD Rule 445 (Wood Burning Devices) imposes a mandatory burning curtailment for a specific source receptor area whenever a PM2.5 level of greater than 30 µg/m^3 is predicted, or for the entire South Coast Air Basin whenever a PM2.5 level of greater than 30 µg/m^3 is predicted for a source receptor area containing a monitoring station that has recorded a violation of the federal 24-hour PM2.5 NAAQS (35 µg/m^3) for either of the two previous three-year periods. By definition, this adopted rule requirement is a contingency measure that is undertaken if the area fails to attain the 24-hour PM2.5 NAAQS (35 µg/m^3) and the timing to implement is immediate.

Similarly, the annual PM2.5 base year design value for the annual PM2.5 attainment demonstration is 14.9 µg/m^3 and the 2025 attainment year design value must be less than 12 µg/m^3 (see Chapter 5). Linear progress towards attainment over the 13 year period yields one year's worth of air quality improvements equal to approximately 0.2 µg/m^3. The NOx strategy will assist in meeting the annual PM2.5 as "expeditiously as practicable" earlier than the attainment year of 2025. Contingency measure BCM-01 will reduce emissions in excess of the equivalent of the one year's worth of reduction (0.2 µg/m^3) (see Appendix VI).

To the extent the 1997 and 2008 8-hour ozone standards will still rely on CAA Section 182(e)(5) flexibility, contingency measures for ozone are not required until three years before the attainment date. Further detailed descriptions of contingency requirements can be found in Chapter 6 – Other Clean Air Act Requirements. As discussed in Chapter 6 and consistent with U.S. EPA guidance, the SCAQMD is proposing to use excess air quality improvements from existing measures supplemented with measures in the proposed control strategy to satisfy contingency measure requirements.

SIP Emission Reduction Commitment

The SIP emission reduction commitment in the 2016 AQMP from adopted rules and proposed measures are divided into commitments for the PM2.5 and ozone SIPs. Taken together, these reductions are relied upon to demonstrate expeditious progress and attainment of the federal air quality standards. The following sections first describe the methodology for SIP emission reduction calculations and the

creditable SIP reductions, then describe what procedures will be followed to ensure fulfillment of the commitment.

SIP Emission Reduction Tracking

For purposes of tracking progress in emission reductions, the baseline emissions for the year 2019 (24-hour average), 2021/2025 (annual average) and 2023/2031 (summer planning inventory) in the 2016 AQMP will be used, regardless of any subsequent new inventory information that reflects more recent knowledge. This is to ensure that the same "currency" is used in measuring progress as was used in designing the Plan. This will provide a fair and equitable measurement of progress. Therefore, it makes no difference whether progress is measured by emission reductions or remaining emissions for a source category. However, the most recent emission inventory information at the time of rule development will continue to be used for calculating reductions, and assessing cost-effectiveness and socioeconomic impacts of the proposed rule. Therefore, for future rulemaking activity, both the most recent and AQMP inventories will be reported.

Any emission reductions achieved beyond the existing SCAQMD regulations are creditable only if they are also SIP-enforceable. Therefore, in certain instances, the SCAQMD may have to adopt regulations to reflect the existing industry practices in order to claim SIP reduction credit, with the understanding that there may not be additional reductions beyond what has already occurred. Exceptions can be made where reductions are real, quantifiable, surplus to the Final 2016 AQMP baseline inventories, and enforceable through other state and/or federal regulations. Also, any emission inventory revisions, which have gone through a peer review and public review process, can also be SIP creditable.

Reductions from Adopted Rules

A number of control measures contained in the 2012 AQMP have been adopted as rules. These adopted rules and their projected emission reductions become assumptions in developing the AQMP future year inventories. Although they are not part of the control strategy in the 2016 AQMP, continued implementation of those rules is essential in achieving clean air goals and maintaining the attainment demonstration. Table 1-2 of Chapter 1 lists the rules adopted by the SCAQMD since the adoption of the 2012 AQMP and their expected emission reductions.

Reductions from SCAQMD Control Measures

For purposes of implementing an approved SIP, the SCAQMD is committed to adopt and implement control measures that will achieve, in aggregate, emission reductions specified in Tables 4-8 through 4-11 to demonstrate expeditious implementation of measures toward meeting the federal 2012 annual PM2.5, the 1979 1-hour ozone, the 1997 8-hour ozone, and the 2008 8-hour ozone standards, respectively. Emission reductions achieved in excess of the amount committed to in a given year can be applied to the emission reduction commitments of subsequent years. The SCAQMD is committed to adopt the control measures in Tables 4-2, 4-4, and 4-7 unless these measures or a portion thereof are found infeasible and other substitute measures that can achieve equivalent reductions in the same adoption or implementation timeframes are adopted. Findings of infeasibility will be made at a regularly scheduled meeting of the SCAQMD Governing Board with proper public notification. For purposes of the SIP commitment, infeasibility means that the proposed control technology is not reasonably likely to be

available by the implementation date in question, or achievement of the emission reductions by that date is not cost-effective. It should be noted that the reductions in Tables 4-8 through 4-11 are committed only to the extent needed to achieve attainment by attainment deadlines (2025 for the 2012 annual PM2.5; 2023, 2024, and 2032 for the 1979 1-hr, 1997 8-hr, and 2008 8-hr ozone, respectively), and if any substitution is needed, the alternative measures will need to achieve the same emission reductions or air quality benefit. It should be also noted that Tables 4-8 through 4-11 not only include the aggregate emission reduction commitments, but also the anticipated specific control measures to meet that reduction commitment with the understanding that if there is a shortfall in the individual measures for a particular year, substitution to achieve the reduction could be generated from other control measures for the same or previous years. The SCAQMD acknowledges that this commitment is enforceable under Section 304(f) of the federal CAA. U.S. EPA will not credit SIP reductions unless the control measures are adopted and approved into the SIP at the time U.S. EPA takes action on the plan, except that U.S. EPA has in the past allowed about 10 percent of required reductions to be in the form of "enforceable commitments."

Adoption and Implementation

As a partial response to concerns raised by the regulated community that costly controls may be required to meet the SIP obligations, previous AQMPs have established cost-effectiveness thresholds for additional tiered levels of analysis. The 2012 AQMP established $16,500 per ton of VOC and $22,500 per ton of NOx as the thresholds. The legal requirements for emission reductions to reach attainment remain, but the cost of achieving those reductions will increases as the most cost-effective controls have already been implemented. To reflect this reality, as well as inflation adjustments since the current thresholds were established, the 2016 AQMP proposes thresholds of $30,000 per ton of VOC and $50,000 per ton of NOx for tiered levels of analysis. Note, however, with the new focus on incentives and public funding, not all of this cost will necessarily be borne by industry. Specifically, proposed rules with an average cost-effectiveness above these threshold will trigger a more rigorous average cost-effectiveness, incremental cost-effectiveness, and socioeconomic impact analysis. A public review and decision-making process will be instituted to seek lower, more cost-effective alternatives. In addition, the SCAQMD staff, with input from stakeholders, will attempt to develop viable control alternatives within the industry source categories that a rule is intended to regulate. If it is determined that control alternatives within the industry source category are not feasible, staff will perform an evaluation of the control measure as described in the next paragraph. Viable alternatives will be reviewed by the SCAQMD Governing Board at a public meeting no less than 90 days prior to rule adoption and direction can be given to staff for further analysis. During this review process, incremental cost-effectiveness scenarios and methodology will be specified, and industry-specific affordability issues will be identified as well as possible alternative control measures. The SCAQMD Governing Board may adopt the original or an alternative that is consistent with state and federal law. In addition, staff will include in all set hearing items a notification whether the proposed rules exceed the cost thresholds.

Alternative/Substitute Measures

Under the 2016 AQMP, the SCAQMD will be allowed to substitute SCAQMD source measures in Tables 4-2, 4-4 and 4-7 with other measures, provided the overall equivalent emission reductions by the adoption and implementation dates in Tables 4-2, 4-4 and 4-7 are maintained and the applicable measure in Tables

4-2, 4-4 and 4-7 is deemed infeasible. In order to provide meaningful public participation, when new control concepts are introduced for rule development, the SCAQMD is committed to provide advanced public notification beyond its regulatory requirements (i.e., through its Rule Forecast Report). The SCAQMD will also report quantitatively on the AQMP's implementation progress annually at its regularly scheduled Governing Board meetings. Included in the reports will be any control measures being proposed or measures, or portions thereof, that have been found to be infeasible and the basis of such findings. In addition, at the beginning of the year, any significant emission reduction related rules to be considered are listed in the Governing Board's Rule Forecast Report. The annual report would also provide any finding of a new feasible control measure to substitute for a measure that has been deemed infeasible. The existing rule development outreach efforts such as public workshops, stakeholder working group meetings or public consultation meetings will continue to solicit public input. In addition, if additional technical analysis, including source testing, indicates that actual emissions are less than previously estimated, the reductions would then be creditable toward SIP commitments. In order for reductions from improved emission calculation methodologies to be SIP creditable, a public process and the Governing Board adoption hearing will also be instituted to solicit comments and make appropriate revisions, if necessary.

Reductions from CARB Control Measures

CARB's overall commitment is to achieve the total emission reductions necessary to attain the federal air quality standards, reflecting the combined reductions from the existing control strategy and new measures. Therefore, if a particular measure does not get its expected emission reductions, the State is still committed to achieving the total aggregate emission reductions. If actual emission decreases occur that exceed the projections reflected in the current emission inventory and the State SIP Strategy, CARB will submit an updated emissions inventory to U.S. EPA as part of a SIP revision. The SIP revision would outline the changes that have occurred and provide appropriate tracking to demonstrate that aggregate emission reductions sufficient for attainment are being achieved through enforceable emission reduction measures.

The CARB proposed control measures presented in Table 4-5, combined with ongoing implementation of the current control program, will reduce mobile source NOx emissions 80 percent from the current levels in the Basin by 2031, as well as reduce VOC emissions by 55 percent. The remaining 20 percent will come from additional efforts to enhance the deployment of these cleaner technologies through new incentive funding, efficiency improvements in transportation and freight, and support for the use of advanced transportation technologies, such as intelligent transportation systems and autonomous vehicles. These actions will be implemented through proposed measures for each sector that are designed to provide further emission reductions from the deployment of cleaner technologies necessary to meet the Basin's "extreme" ozone nonattainment area needs. Table 4-12 specifies emission reductions in NOx and VOC emissions committed to be achieved through the CARB regulatory and incentive programs.

TABLE 4-8

Annual PM2.5 (12 µg/m^3) SIP Basin-wide Emission Reduction Commitment
to be Achieved by 2025 through SCAQMD Regulatory Programs
(Annual Average Inventory, tons per day)

YEAR	PM2.5		NOx**	
	Based on Adoption Date	Based on Implementation Date[a]	Based on Adoption Date	Based on Implementation Date[a]
2016				
2017			MOB-10 (1.9) MOB-11 (2.9) MOB-14 (11) **15.8**	
2018	BCM-01 (3.3)		CMB-01 (2.5) CMB-02 (1.1) CMB-03 (1.4) CMB-04 (0.8) ECC-02 (0.3) ECC-03 (1.2) **7.3**	
2019	BCM-04 (0.2)$^{\Delta}$ BCM-10 (0.1)$^{\Delta}$			
2020		BCM-04 (0.2)$^{\Delta}$ BCM-10 (0.1)$^{\Delta}$		CMB-03 (1.4) CMB-02 (1.1) **2.5**
2021				
2022				CMB-04 (0.8)
2023				ECC-02 (0.3) ECC-03 (1.2) CMB-01 (2.5) MOB-10 (1.9) MOB-11 (2.9) MOB-14 (11) **19.8**
2024				
2025		BCM-01 (3.3)		
TOTAL	**3.3***	**3.3***	**23**	**23**

[a] Represents the final, full implementation date; typically a rule contains multiple implementation dates

$^{\Delta}$ NH3 measure as PM2.5 precursor

* For contingency measure purposes only

** Summer planning inventory

TABLE 4-9

1979 1-hour Ozone (120 ppb) SIP Emission Reduction Commitment to be Achieved by 2022 through SCAQMD Stationary and Mobile Source Regulatory Programs
(Summer Planning Inventory, tons per day)

YEAR	VOC		NOx	
	Based on Adoption Date	Based on Implementation Date[a]	Based on Adoption Date	Based on Implementation Date[a]
2016				
2017	CTS-01 (1) **1.0**		MOB-10 (1.9) MOB-11 (2.9) MOB-14 (11) **15.8**	
2018	CMB-01 (1.2) CMB-03 (0.4) ECC-02 (0.07) ECC-03 (0.2) **1.9**		CMB-01 (2.5) CMB-02 (1.1) CMB-03 (1.4) CMB-04 (0.8) ECC-02 (0.3) ECC-03 (1.2) **7.3**	
2019	FUG-01(2) BCM-10 (1.5) **3.5**			
2020		BCM-10 (1.5) CMB-03 (0.4) CTS-01 (1) **2.9**		CMB-02 (1.1) CMB-03 (1.4) **2.5**
2021				
2022		FUG-01 (2) ECC-02 (0.06)^ ECC-03 (0.17)^ CMB-01 (1.0)^ **3.2**		CMB-04 (0.8) MOB-10 (1.9) MOB-11 (2.5) ^ MOB-14 (9.5) ^ ECC-02 (0.26)^ ECC-03 (1.03)^ CMB-01 (2.15)^ **18.1**
TOTAL*	**6.4**	**6.1**	**23**	**21**

[a] Represents the final, full implementation date; typically a rule contains multiple implementation dates

* All ozone strategy reductions are adopted by 2022. However, not all adoptions are implemented by 2022. Therefore, totals are not equal

^ 86 percent of control measures' 2023 reductions

TABLE 4-10

1997 8-hour Ozone (80 ppb)SIP Emission Reduction Commitment to be Achieved by 2023 through SCAQMD Stationary and Mobile Source Regulatory Programs
(Summer Planning Inventory, tons per day)

YEAR	VOC		NOx	
	Based on Adoption Date	Based on Implementation Date[a]	Based on Adoption Date	Based on Implementation Date[a]
2016				
2017	CTS-01 (1) **1.0**		MOB-10 (1.9) MOB-11 (2.9) MOB-14(11) **15.8**	
2018	CMB-01 (1.2) CMB-03 (0.4) ECC-02 (0.07) ECC-03 (0.2) **1.9**		CMB-01 (2.5) CMB-02 (1.1) CMB-03 (1.4) CMB-04 (0.8) ECC-02 (0.3) ECC-03 (1.2) **7.3**	
2019	FUG-01 (2) BCM-10 (1.5) **3.5**			
2020		BCM-10 (1.5) CMB-03 (0.4) CTS-01 (1) **2.9**		CMB-02 (1.1) CBM-03 (1.4) **2.5**
2021				
2022		FUG-01 (2)		CMB-04 (0.8)
2023		ECC-02 (0.07) ECC-03 (0.2) CMB-01 (1.2) **1.5**		ECC-02 (0.3) ECC-03 (1.2) CMB-01 (2.5) MOB-10 (1.9) MOB-11 (2.9) MOB-14 (11) **19.8**
TOTAL	**6.4**	**6.4**	**23**	**23**

[a] Represents the final, full implementation date; typically a rule contains multiple implementation dates

TABLE 4-11

2008 8-hour Ozone (75 ppb) SIP Emission Reduction Commitment to be Achieved by 2031 through SCAQMD Stationary and Mobile Source Regulatory Programs
(Summer Planning Inventory, tons per day)

YEAR	VOC		NOx	
	Based on Adoption Date	Based on Implementation Date[a]	Based on Adoption Date	Based on Implementation Date[a]
2016				
2017			MOB-10 (1.9) MOB-11 (1.0) MOB-14 (7.8) **10.7**	
2018	ECC-02 (0.3) ECC-03 (0.3) CMB-01 (2.8) CMB-03 (0.4) **3.8**		CMB-04 (1.6) ECC-02 (1.1) ECC-03 (2.1) CMB-01 (6.0) CMB-02 (2.8) CMB-03 (1.5) **15.1**	
2019	FUG-01 (2) BCM-10 (1.8) **3.8**			
2020		CMB-03 (0.4)		CMB-03 (1.5)
2021	CTS-01 (2)			
2022		FUG-01 (2)	CMB-05 (5)	CMB-04 (1.6)
2023		ECC-02 (0.3)		ECC-02 (1.1)
2024–2030				
2031		ECC-03 (0.3) CMB-01 (2.8) BCM-10 (1.8) CTS-01 (2) **6.9**		ECC-03 (2.1) CMB-01 (6.0) CMB-02 (2.8) CMB-05 (5) MOB-10 (1.9) MOB-11 (1.0) MOB-14 (7.8) **26.6**
TOTAL	9.6	9.6	31.0	31.0

[a] Represents the final, full implementation date; typically a rule contains multiple implementation dates

TABLE 4-12

Emission Reduction Commitment to be Achieved by 2031 through CARB Regulatory and Incentive Programs
(Summer Planning Inventory, tons per day)

YEAR	NOx		VOC	
	Based on Adoption Date	Based on Implementation Date[a]	Based on Adoption Date	Based on Implementation Date[a]
2016	11	3	0.7	0.4
2017	0.1			
2018	7.4	0.1	16	
2019	12			
2020	3.6	0.4	0.4	
2021			5	5
2022		3		16
2023	63	16	38	0.4
2024		7		
2025		4		
2026		0.6		0.3
2027				
2028				
2029				
2030				
2031		63		38
TOTAL	**97**	**97**	**60**	**60**

[a] Represents the final, full implementation date; typically a rule contains multiple implementation dates

Overall Emission Reductions

A summary of annual average emission inventory and reductions for the proposed control measures for the year 2023 and 2025 is provided in Table 4-13 and Table 4-14, respectively. A summary of summer planning emission inventory and reductions for the years 2023 and 2031 is also provided in Tables 4-15 and 4-16. These reductions reflect the emission reductions associated with implementation of control measures under local, state, and federal jurisdiction. Emission reductions represent the difference

between the projected baseline and the remaining emissions. The federal 2006 24-hr PM2.5 standard will be achieved with baseline emissions by 2019 (see Chapter 5).

Table 4-13 identifies projected reductions based on the annual average inventory for PM2.5 and its precursor gas (NOx) for basin-wide stationary and local mobile control measures to achieve the annual PM2.5 standard as "expeditiously as practicable." These reductions lead to attainment of the federal 2012 annual PM2.5 standard if all reductions from the ozone strategy are creditable towards PM2.5 attainment. However, some measures may only be approvable under CAA Section 182(e)(5), and thus not applicable to PM2.5 attainment demonstrations. SCAQMD will continue to work with U.S. EPA on approvability of measures and reducing reliance on 182(e)(5) measures. Since the creditability of emission reductions and the feasibility of other PM2.5 measures is sufficiently uncertain to advance attainment to 2023, a 2025 attainment date is proposed. Table 4-14 identifies projected reductions based on the annual average inventory for PM2.5 and NOx to achieve the federal 2012 annual PM2.5 standard by 2025 as a "serious" nonattainment area.

Tables 4-15 and 4-16 identify projected reductions based on the summer planning inventory for NOx and VOC emissions to achieve the 1997 8-hour ozone standard by 2023 and 2008 8-hour ozone standard by 2031.

TABLE 4-13

Emission Reductions for 2023 Based on Annual Average Emissions Inventory
(Tons per day)

SOURCES	NOx	PM2.5
Year 2023 Baseline[1]	257	64
Emission Reductions:		
SCAQMD Stationary Sources	8	3 [Δ]
SCAQMD Mobile Sources	14	0
CARB Mobile Sources	94	0
TOTAL Reductions (all measures)	116	3 [Δ]
2023 Remaining Emissions*	**141**	**61**

[1] Emission assumptions from SCAG's 2016 RTP/SCS are already reflected in the AQMP baseline, including TCMs

* Numbers may not sum due to rounding

[Δ] For contingency measure purposes only

TABLE 4-14

Emission Reductions for 2025 Based on Annual Average Emissions Inventory
(Tons per day)

SOURCES	NOx	PM2.5	VOC
Year 2025 Baseline[1]	241	64	353
Emission Reductions:			
SCAQMD Stationary Sources	8	3 [Δ]	6.4
SCAQMD Mobile Sources	14	0	0
CARB Mobile Sources	66	0	48
Federal Measures	28	0	0.4
TOTAL Reductions (all measures)	116	3 [Δ]	55
2025 Remaining Emissions	**125**	**61**	**298**

[1] Emission assumptions from SCAG's 2016 RTP/SCS are already reflected in the AQMP baseline, including TCMs

[Δ] For contingency measure purposes only

TABLE 4-15

Emission Reductions for 2023 Based on Summer Planning Inventory
(Tons per day)

SOURCES	VOC	NOx
Year 2023 Baseline[1]	379	255
Emission Reductions:		
SCAQMD Stationary Sources	6.4	7.3
SCAQMD Mobile Sources	0	15.8
CARB Mobile Sources	48	66
Federal Measures	0.4	28
TOTAL Reductions (all measures)	55	117
2023 Remaining Emissions	**324**	**138**

[1] Emission assumptions from SCAG's 2016 RTP/SCS are already reflected in the AQMP baseline, including TCMs

TABLE 4-16

Emission Reductions for 2031 Based on Summer Planning Inventory
(Tons per day)

SOURCES	VOC	NOx
Year 2031 Baseline[1]	362	214
Emission Reductions:		
SCAQMD Stationary Sources	9.6	20
SCAQMD Mobile Sources	0	10.7
CARB Mobile Sources	59	44
Federal Measures	0.6	44
TOTAL Reductions (all measures)	69	119
2031 Remaining Emissions	**293**	**95**

[1] Emission assumptions from SCAG's 2016 RTP/SCS are already reflected in the AQMP baseline, including TCMs

Implementation

Achieving clean air objectives requires the effective and timely implementation of the control measures. Similar to approaches taken by previous AQMPs, the SIP commitment is to bring each control measure for regulatory consideration or program implementation in a specified time frame. The time frame is based on the ability to implement certain control strategies that will result in the reductions necessary to demonstrate attainment by the required attainment date. There is a commitment to achieve a total emission reduction target, with the ability to substitute for control measures deemed technologically, legally, economically, and/or environmentally not feasible, so long as equivalent reductions are met by other means. These measures are also designed to satisfy the federal CAA requirement of RACT [Section 172(c)], BACM, and the California CAA (CCAA) requirement of BARCT [California Health and Safety Code Section 40440(b)(1)].

The adoption and implementation schedule of the control measures proposed in the 2016 AQMP can be found in Tables 4-2, 4-4, and 4-7. Implementation of the mobile source measures in Table 4-4 rely on actions from many agencies. This section describes each agency's area of responsibility.

Incentive Funding

Funding Needs for Mobile Source Emission Reductions

Given the significant NOx emission reductions needed to attain the federal ozone air quality standards by 2023 and 2031, a combination of public funding incentives along with regulatory actions are needed. In the near-term, there is a need to commercialize zero and near-zero on-road trucks and off-road equipment as early as possible. For national and international transportation sources, there is a need to accelerate deployment of the cleanest locomotives, ocean-going vessels, and aircraft as early as possible in the near-term and promulgation of cleaner exhaust emissions standard in the longer term.

The approach that the SCAQMD and CARB are proposing to achieve the emission reductions identified in the State SIP Strategy (Appendix IV-B) "Further Deployment of Cleaner Technologies" measures and the SCAQMD's mobile source measures (Appendix IV-A) is predicated on securing the amount of funding needed to achieve a significant portion of the NOx emission reductions by 2023, followed with regulatory actions that will be implemented in the mid-2020s. A lower level of funding will be needed if significant NOx emission reductions occur by other measures prior to 2023.

To illustrate this approach, an analysis has been conducted to estimate the funding needed to achieve the emission reductions identified in the "Further Deployment of Clean Technologies" measures proposed in the State SIP Strategy (Appendix IV-B, 2016 AQMP). The analysis is not meant to be the only implementation approach to achieve the emission reductions associated with the "Further Deployment" measures, but meant to illustrate an upper limit of the most likely funding necessary if no other actions are taken to achieve the associated emission reductions. As discussed above, CARB described four implementation approaches for the "Further Deployment" measures, which includes incentives programs, regulations to be developed as zero and near-zero emission vehicles and equipment are commercialized, and the quantification of the emission reduction benefits from operational efficiency improvements and deployment of connected vehicles, autonomous vehicles, and intelligent transportation systems.

Five funding scenarios were analyzed to examine the range of funding needed. The five funding scenarios are summarized below.

Funding Scenario Based on Traditional Carl Moyer Cost-Effectiveness Criteria

This scenario assumes that funding on a per vehicle/equipment basis is based on the anticipated future Carl Moyer Memorial Air Quality Standards Attainment (Moyer) Program cost-effectiveness criteria of $30,000/ton and $50,000/ton to account for near-zero and zero emission technologies. The amount of funding is calculated using the formula from the Moyer Guidelines (Moyer Guidelines, Appendix C). The following assumptions were made:

- Capital Recovery Factor: Seven years until 2020 and then three years until 2024. Three years surplus is the Moyer program minimum lead time.

- For 2031, a 10 year project life is assumed for the early years, dropping to seven years in the later years.

- Cost-effectiveness assumption: At the current $18,262/ton cost effectiveness rate the grant amount may not be sufficient to incentivize turnover. CARB is considering increasing the cost-effectiveness criteria as part of the next update of the Guidelines. For the purposes of this analysis a $30,000/ton cost-effectiveness criteria is assumed to estimate funding needs by 2023 and a $50,000/ton criteria is assumed after 2025 to 2031. If a federal ultra-low NOx exhaust emissions standard is established, the funding would be primarily for zero-emission technologies, which may have cost-effectiveness on the order of $50,000/ton or higher.

Based on the above assumptions, two scenarios are developed. The first scenario assumes that funding would be available to attain the 80 ppb federal ozone air quality standard in 2023. Funding at a lower level would continue at the level needed to meet the 75 ppb standard in 2031. Table 4-17 shows the results of this scenario.

TABLE 4-17

Funding Needed for Mobile Source Sector to Attain Ozone NAAQS
(Based on Moyer Cost-Effectiveness and Assuming Funding Needed to Achieve 2023 Attainment, and Continuing to 2031)

Year	Funding/Yr	C-E = $30,000/ton 2023 t/d NOx	C-E = $30,000/ton 2031 t/d NOx	C-E = $50,000/ton 2031 t/d NOx
2017	$100,000,000	1.4		
2018	$150,000,000	2.0		
2019	$500,000,000	6.8		
2020	$800,000,000	10.9		
2021	$900,000,000	27.9		
2022	$900,000,000	27.9		
2023	$900,000,000	27.9		
2024	$250,000,000		2.4	
2025	$250,000,000		2.4	
2026	$250,000,000		2.4	
2027	$250,000,000			2.0
2028	$250,000,000			2.0
2029	$250,000,000			2.0
2030	$250,000,000			2.0
2031	$250,000,000			2.0
Total NOx Reductions (t/d)		**104.8**	**7.2**	**10.0**
Total Funding (by C-E)		**$4,250,000,000**	**$750,000,000**	**$1,250,000,000**
Total Funding		**$4,250,000,000**		**$6,250,000,000**

Under this scenario, funding of up to $4.25 billion will be needed to achieve around 105 tons/day of NOx emission reductions identified in the State Mobile Source Strategy (Appendix IV-B) by 2023. An additional $2 billion will be needed to attain the federal 8-hour ozone air quality standard by 2031.

The second scenario assumes funding is available to attain the 75 ppb ozone air quality standard in 2031, independent of attainment of the ozone air quality standard by 2023. Table 4-18 shows the results of this analysis.

TABLE 4-18

Funding Needed for Mobile Source Sector to Attain Ozone NAAQS
(Based on Moyer Cost-Effectiveness and Assuming 2023 and 2031 Attainment Funding are Independent)

Year	Funding/Yr	(A) C-E = $30,000/ton 2031 t/d NOx	(B) C-E = $50,000/ton 2031 t/d NOx
2017			
2018			
2019			
2020			
2021	$900,000,000	8.7	
2022	$900,000,000	8.7	
2023	$900,000,000	8.7	
2024	$1,000,000,000		8.2
2025	$1,000,000,000		8.2
2026	$1,000,000,000		8.2
2027	$1,000,000,000		8.2
2028	$1,000,000,000		8.2
2029	$1,000,000,000		8.2
2030	$1,000,000,000		8.2
2031	$1,000,000,000		8.2
Total NOx Reductions (t/d)		**26.1**	**65.6**
Total Funding (by C-E)		**$2,700,000,000**	**$8,000,000,000**
Total Funding			**$10,700,000,000**

If funding is secured to achieve solely the federal ozone air quality standard by 2031, the total funding needed is $10.7 billion (Table 4-17, sum of Columns A and B). Based on these analyses, it is less costly to achieve the 80 ppb ozone air quality standard earlier (in 2023) and utilize subsequent funding to achieve the 75 ppb federal ozone air quality standard by 2031.

The two scenarios analyzed in Tables 4-17 and 4-18 provide an approximate range of $4 to $11 billion in funding over a 7 to 15 year period to achieve the projected NOx emissions reductions.

Funding Scenario Based on Per Vehicle Funding Incentive

Historically, funding for clean air projects are based either on a cost-effectiveness criteria or on a per vehicle incentive basis. Funding under the Carl Moyer Memorial Air Quality Standards Attainment Program is based on cost-effectiveness. However, funding under the Proposition 1B Goods Movement Emission Reduction Program is based on per vehicle incentive funding. For example, a typical goods movement heavy-duty truck replacement provides for up to $50,000 per truck for a new or newer replacement truck. At times, the SCAQMD has augmented the Proposition 1B funding with other funding such as the U.S. EPA Diesel Emission Reduction Act (DERA) funding to provide additional financial incentives to purchase alternative fuel trucks.

Two scenarios were analyzed based on "per vehicle" funding incentives. The assumptions for the two scenarios include:

- Funding needed is based on achieving a significant portion of the NOx emissions reduction needed in 2023 (~105 tons/day) and independently in 2031 (~66 tons/day) as provided in the State Mobile Source Strategy.

- Funding needed for NOx emissions reduction from national and international sources is based on Carl Moyer Program cost-effectiveness criteria.

- Funding needed to implement Control Measure MOB-11 – Extended Exchange Program for larger horsepower lawn and garden equipment such as riding lawnmowers.

- Current and projected NOx emissions reduction from existing projects and future anticipated projects as provided in Control Measure MOB-14 (Appendix IV-A) account for the total NOx emissions reduction in 2023 and 2031.

Table 4-19 shows the analysis of the funding needed to achieve the projected NOx emissions reductions identified in the State Mobile Source Strategy (Appendix IV-B), using per vehicle/equipment incentive amounts and populations.

TABLE 4-19

Funding Needed for Mobile Source Sector to Attain Ozone NAAQS
(Based on per vehicle funding)

(a) Funding Needed to Attain in 2023

Vehicle/Equipment Type/Sector	NOx Emission Reduction (tons/day)	Affected Population	Funding per Vehicle/ Equipment	Total Funding
LDV, LDT-1, LDT-2 (pre-1999)	7	356,825	$9,500	$3,389,837,500
Light and Medium Heavy-Duty Trucks (pre-2014)	11.8	118,590	$25,000	$ 2,964,750,000
Heavy Heavy-Duty Trucks (pre-2014)	14	31,200	$50,000	$1,560,000,000
TRUs, Forklifts, GSE …	8	61,000	$25,000	$1,525,000,000
Construction & Industrial Equipment	7	6,200	$150,000	$930,000,000
Lawn & Garden	2	2,000,000	$200	$400,000,000
Lawn & Garden - Larger Diesel/Gasoline Equipment	2.9	30,000	$2,000	$60,000,000
Passenger Locomotives	2	12	$2,000,000	$24,000,000
Aircraft, OGV, Freight Locos (assumes federal action)*	40	--	--	$2,940,000,000
Moyer, Prop 1B	9.5	--	--	
Total	**104.2**			**$13,793,587,500**

* Assumes Moyer cost/ton at $30,000/ton + 7 year life. Total funding rounded for discussion purposes

TABLE 4-19 (CONCLUDED)

Funding Needed for Mobile Source Sector to Attain Ozone NAAQS
(Based on per vehicle funding)

(b) Funding Needed to Attain in 2031

Vehicle/Equipment Type/Sector	NOx Emission Reduction (tons/day)	Affected Population	Funding per Vehicle/ Equipment	Total Funding
LDV, LDT-1, LDT-2 (pre-1999)	5	356,825	$9,500	$3,389,837,500
Light and Medium Heavy-Duty Trucks (pre-2013)	5	82,000	$35,000	$2,870,000,000
Heavy Heavy-Duty Trucks (pre-2013)	15	47,700	$50,000	$2,385,000,000
TRUs, Forklifts, GSE…	8	50,000	$25,000	$1,250,000,000
Construction & Industrial Equipment	7	20,000	$100,000	$2,000,000,000
Lawn & Garden	--	--	--	--
Lawn & Garden - Larger Diesel/Gasoline Equipment	1	30,000	$2,000	$60,000,000
Passenger Locomotives	--	--	--	--
Aircraft, OGV, Freight Locos (assumes federal action)*	20	--	--	$1,470,000,000
Moyer, Prop 1B	5.6	--	--	
Total	**66.6**			**$13,424,837,500**

* Assumes Moyer cost/ton at $30,000/ton + 7 year life. Total funding rounded for discussion purposes

Table 4-19 shows the funding needed assuming each mobile source sector achieves the NOx emissions reduction provided in the State Mobile Source Strategy. The total funding needed ranges from $13 to $14 billion to achieve the NOx emission reductions associated with the State Mobile Source Strategy. The analysis assumes every sector reduces its share of the NOx emissions needed for attainment, regardless of cost-effectiveness, and thus includes funding for a larger population of vehicles that individually have smaller emissions.

A more realistic second analysis was conducted with a focus on achieving more emission reductions from heavy-duty vehicles and off-road equipment that would provide a greater cost-effective use of funding. Under this scenario, no significant additional funding is assumed (beyond existing funding) for light-duty vehicles and light-duty trucks. Greater NOx emission reductions would occur from the on-road heavy-duty truck sector. The results of this analysis are shown in Table 4-20. Under this analysis the total funding needed ranges from $9 to $11 billion.

TABLE 4-20

Funding Needed for Mobile Source Sector to Attain Ozone NAAQS
(Based on per vehicle funding and focused on larger vehicles and equipment)

(a) Funding Needed to Attain in 2023

Vehicle/Equipment Type/Sector	NOx Emission Reduction (tons/day)	Affected Population	Funding per Vehicle/ Equipment	Total Funding
Light and Medium Heavy-Duty Trucks (pre-2016)	5.9	68,860	$15,000	$1,032,900,000
Heavy Heavy-Duty Trucks (post-2011 @ near-zero)	25	78,000	$25,000	$1,950,000,000
TRUs, Forklifts, GSE …	8	61,000	$25,000	$1,525,000,000
Construction & Industrial Equipment	7	6,200	$150,000	$930,000,000
Lawn & Garden	2	2,000,000	$200	$400,000,000
Lawn & Garden - Larger Diesel/Gasoline Equipment	2.9	30,000	$2,000	$60,000,000
Passenger Locomotives	2	12	$2,000,000	$24,000,000
Aircraft, OGV, Freight Locomotives (assumes federal action)*	40	--	--	$2,940,000,000
Moyer, Prop 1B	9.5	--	--	
Total	**102.3**			**$8,861,900,000**

* Assumes Moyer cost/ton @$30,000/ton + 7 year life. Total funding rounded for discussion purposes

TABLE 4-20 (CONCLUDED)

Funding Needed for Mobile Source Sector to Attain Ozone NAAQS
(Based on per vehicle funding and focused on larger vehicles and equipment)

(b) Funding Needed to Attain in 2031

Vehicle/Equipment Type/Sector	NOx Emission Reduction (tons/day)	Affected Population	Funding per Vehicle/ Equipment	Total Funding
Light and Medium Heavy-Duty Trucks (pre-2014)	5	82,000	$35,000	$2,870,000,000
Heavy Heavy-Duty Trucks (post-2021)	15	47,700	$50,000	$2,385,000,000
TRUs, Forklifts, GSE …	8	50,000	$25,000	$1,250,000,000
Construction & Industrial Equipment	7	20,000	$100,000	$2,000,000,000
Lawn & Garden	--	--	--	--
Lawn & Garden - Larger Diesel/Gasoline Equipment	1	30,000	$2,000	$60,000,000
Passenger Locomotives	--	--	--	--
Aircraft, OGV, Freight Locomotives (assumes federal action)*	25	--	--	$1,840,000,000
Moyer, Prop 1B	5.6			
Total	**66.6**			**$10,405,000,000**

* Assumes Moyer cost/ton @$30,000/ton + 7 year life. Total funding rounded for discussion purposes

For the socioeconomic impact analysis, an additional scenario was developed assuming that funding would be available to achieve a significant amount, but not all of the NOx emission reductions associated with the State SIP Strategy "Further Deployment" measures in 2023 and assuming that the remaining emissions after 2023 will need to be reduced further to achieve the overall 55 percent NOx emission reductions needed for attainment in 2031. The NOx emission reductions would be around 98 tons/day by 2023 and an additional 20.8 tons/day by 2031. The funding needed by emissions source category is provided in Tables 4-21(a) and 4-21(b). The funding needed for this scenario is around $12.7 billion over the period from 2017 to 2031.

TABLE 4-21

Funding Needed for Mobile Source Sector to Attain Ozone NAAQS
(Based on per vehicle funding)

(a) Funding Needed to Attain in 2023

Vehicle/Equipment Type/Sector	NOx Emission Reduction (tons/day)	Affected Population	Funding per Vehicle/ Equipment	Total Funding
Medium Heavy-Duty Trucks (pre-2017)	5.9	68,860	$15,000	$1,032,900,000
Heavy Heavy-Duty Trucks (post-2011 @ near-zero)	27.4	82,300	$25,000	$2,057,500,000
TRUs, Forklifts, GSE …	9.7	90,000	$25,000	$2,250,000,000
Construction & Industrial Equipment	9.6	10,100	$150,000	$1,515,000,000
Small Off-Road Engines	3.1	270,000	$500	$135,000,000
Passenger Locomotives	2.0	12	$2,000,000	$24,000,000
Aircraft, OGV, Freight Locomotives (assumes federal action)**	40.3	--	--	$2,745,000,000
Total	**98.0**			**$9,759,400,000**

* Note that the total emission reductions under this scenario are not intended to achieve the full emission reductions provided in the State SIP Strategy "Further Deployment of Cleaner Technologies" measures

** Assumes Moyer cost/ton at $30,000/ton + 7 year life. Total funding rounded for discussion purposes

TABLE 4-21 (CONCLUDED)

Funding Needed for Mobile Source Sector to Attain Ozone NAAQS
(Based on per vehicle funding)

(b) Funding Needed to Attain in 2031

Vehicle/Equipment Type/Sector	NOx Emission Reduction (tons/day)	Affected Population	Funding per Vehicle/ Equipment	Total Funding
Medium Heavy-Duty Trucks (pre-2020)	1.7	35,100	$35,000	$1,228,500,000
Heavy Heavy-Duty Trucks (pre-2028)	5.4	18,600	$50,000	$930,000,000
TRUs, Forklifts, GSE…	2.7	42,000	$25,000	$1,050,000,000
Construction & Industrial Equipment	2.3	3,300	$155,000	$511,500,000
Small Off-Road Engines	0.3	36,000	$500	$18,000,000
Aircraft, OGV, Freight Locomotives (assumes federal action)**	8.4	--	--	$618,200,000
Total	**20.8**			**$4,356,200,000**

* Note that the total emission reductions under this scenario are not intended to achieve the full emission reductions provided in the State SIP Strategy "Further Deployment of Cleaner Technologies" measures

** Assumes Moyer cost/ton at $30,000/ton + 7 year life. Total funding rounded for discussion purposes

In summary, the funding needed to achieve the NOx emission reductions identified in the State Mobile Source Strategy ranges from $5 billion to as high as $14 billion depending on the types of funding programs implemented and which mobile source sectors will be more cost effective to reduce emissions. The actual funding levels will most likely be on the order of $10 to $12 billion with a mix of different funding programs and technologies.

Funding Needs for Stationary Source Emission Reductions

It is clear that the majority of NOx emissions reductions needed for attainment of the ozone standards will need to come from mobile sources. However, if equally or more cost-effective incentive funding opportunities are identified in the stationary source sector, funding could be diverted to help local stationary sources reduce their emissions. Several stationary source incentive funding approaches have been developed as part of the 2016 AQMP control strategy (ECC-03, CMB-01, CMB-02, etc.). Details on cost-effectiveness and incentive funding needs for each measure are provided in Appendix IV. A total of $1.1 to $1.6 billion of stationary source incentive funding programs are proposed with projected cost-effectiveness levels in the same range as the mobile source incentives described above.

Future Funding Opportunities

Achieving the emissions reductions from 2016 AQMP incentive-based control measures for both mobile and stationary sources will likely require approximately $11 to 14 billion in total funding. Given this significant funding level needed to attain the federal ozone air quality standards over the next seven to fifteen years, an action plan will be developed as part of the AQMP public adoption process to identify the necessary actions by the District, the region, the state, the federal government, and other partnerships to ensure the requisite levels of funding are secured as early as possible and sustained out to 2031.

The District receives around $56 million per year in incentives funding to accelerate turnover of on- and off-road vehicles and equipment under SB 1107, a portion of the State's Tire Fee, and AB 923. AB 923 will sunset in 2024. In addition, the District has received close to $550 million in Proposition 1B funding. The last round of Proposition 1B will be ending in the next couple of years. The District has also received funding under the DERA program on a competitive basis. Regardless, the amount of funding needed to achieve a significant portion of the NOx emission reductions associated with the "Further Deployment" measures proposed in the State SIP Strategy and the 2016 AQMP will require on the order of $1 billion per year if funding is available beginning in 2017. The proposed actions are discussed below.

Actions at the National Level

- **Creation of a National Clean Air Investment and Cleanup Fund** – This action calls for Congress to create a national fund to assist serious or above nonattainment areas attain federal air quality standards. The concept is similar to the "superfund" programs administered by U.S. EPA to help cleanup soil and water contamination. Congress has appropriated on the order of $500 million to $1 billion per year to help fund programs to address water contamination under the Clean Water Act and clean up contaminated sites. However, a similar concept on this scale has not yet been developed for contaminated air. Such a fund could focus on reducing emissions from national and international sources for which state and local jurisdiction is limited.

- **Develop new partnerships with states and regions currently in nonattainment of existing federal air quality standards or may be in nonattainment of future air quality standards** – Regional partnerships such as the West Coast Collaborative and Northeast Diesel Collaborative provide a valuable means of pooling and coordinating funding resources to help neighboring

states and regions focus on reducing emissions from mobile sources that operate across state boundaries.

Establishing new collaboratives on a national level among nonattainment areas can provide an approach to prioritize funding in a more coordinated manner. As an example, deployment of a greater number of Tier 4 locomotives operating in the Basin is critical for the region to meet air quality standards and reduce air toxic exposure to diesel particulate matter exhaust. The same Tier 4 locomotives haul freight to different parts of the U.S. where air quality may or may not be an issue. Current funding for Tier 4 locomotives can be provided only if there is a commitment that the locomotive operates in California. However, under a collaborative approach, funding for Tier 4 locomotive could be provided on a "national" level. The approach is similar to inter-district funding in the Carl Moyer Program.

This proposed action will be coordinated among regional collaboratives through the National Association of Clean Air Agencies (NACAA). NACAA can provide the forum to initiate discussions on the creation of the Clean Air Investment and Cleanup Fund and other regional clean air projects that may benefit the South Coast Air Basin.

Actions at the State Level

- **Prioritize existing funding programs to maximize the co-benefits of criteria pollutant and GHG emission reductions** – California has several large programs to help fund the deployment of cleaner technologies including the Carl Moyer Program, Proposition 1B, Lower Emission School Bus Program, and the GHG Reduction Funds. As the California State Legislature appropriates funds for these programs, there is a need to recognize projects that provide the maximum benefits in reducing both criteria pollutant and GHG emissions without a greater emphasis on one over the other. This actions calls for greater outreach and education to state legislators and their staff on the benefits of funding for projects that achieve the goals of AB 32 and also maximize criteria pollutant emission reductions. A coordinated effort would be made by the District through CAPCOA (California Air Pollution Control Officers Association) and CARB to provide coordinated outreach and education to state lawmakers on the creation of new funding programs while providing information on the benefits of clean air programs.

- **Initiating new funding programs** – Proposition 1B is a valuable funding program in helping cleanup thousands of on-road heavy-duty trucks and off-road goods movement related equipment. Proposition 1B is in its last year of funding. The District along with interested stakeholders will explore the opportunity to develop a new mechanisms similar to Proposition 1B to improve air quality and transportation infrastructure in the goods movement sector.

Actions at the Regional/Local Level

- **Local Ballot Measures** – Efforts are currently underway in bringing measures to the ballot to provide funding for transportation improvement and air quality improvement. Such measures can provide additional funding resources for the region to help attain federal air quality standards.

- **Identify potential new sources of funding opportunities at all levels of government** – This action entails developing new innovative funding programs at all levels of government. The District working with interested stakeholders from the public and private sector will explore potential new funding opportunities. Identified opportunities may require legislative actions to implement. A working group is proposed to be established to develop ideas for new funding programs that will be provided to the District Governing Board for consideration prior to proceeding.

- **Re-invigorate the District's Strategic Alliance Initiative** – In 2002, the SCAQMD Governing Board adopted the Strategic Alliance Initiative. The initiative contains eight specific actions to help the region address air quality issues. The eight actions have been implemented for the most part. However, two of the initiatives: *Initiative #4. Formation of a Multi-Regional Alliance for Clean Air* and *Initiative #7. Strategic Alliance on Clean Fuel Vehicle Funding* have relevance to the 2016 AQMP. This action is to expand upon the efforts back in 2002 to implement the collaborative efforts identified above under "Actions at the National Level".

  Strategic Alliance Initiative #4 called for major metropolitan nonattainment areas, such as Houston, Texas; Atlanta, Georgia; New York City; and Boston, Massachusetts to work together through sharing of information and pooling technical and political resources to address common air pollution problems. This effort included seeking federal funding for the demonstration of advanced clean air strategies that may ultimately prove applicable to other non-attainment areas.

  Strategic Alliance Initiative #7 proposed that the SCAQMD form new alliances with fleet operators, including local governments, to secure long-term funding for implementation of the District's fleet vehicle program. This effort included seeking federal funding opportunities from Congress, the U.S. Department of Energy, and U.S. Department of Transportation, and other funding opportunities at the federal level.

  Under this proposed action, the SCAQMD would expand Initiatives #4 and #7 to develop the partnerships and collaboratives identified under the "Actions at the Federal Level" discussed above.

Responsible Agencies

Implementation of the control strategies requires a cooperative partnership of governmental agencies at the federal, state, regional and local level.

At the federal level, the U.S. EPA and, sometimes other federal agencies, are charged with reducing emissions from federally controlled sources such as aircraft, trains, marine vessels, and other sources.

At the state level, CARB is primarily responsible for reducing emissions from motor vehicles and consumer products.

At the regional level, SCAG assists sub-regional and local governments in playing a formative role in the air quality elements of transportation planning. In addition, local governments serve an important role in developing and implementing the transportation control measures that are included in the 2016 AQMP. SCAG is responsible for providing the socioeconomic forecast (e.g., population and growth forecasts) upon which the Plan is based. SCAG also provides assessments for conformity of regionally significant transportation projects with the overall Plan and is responsible for the adoption of the RTP and the Regional Transportation Improvement Program (RTIP) which include growth assumptions and transportation improvement projects that could have significant air quality impacts, and transportation control measures as required by the CAA.

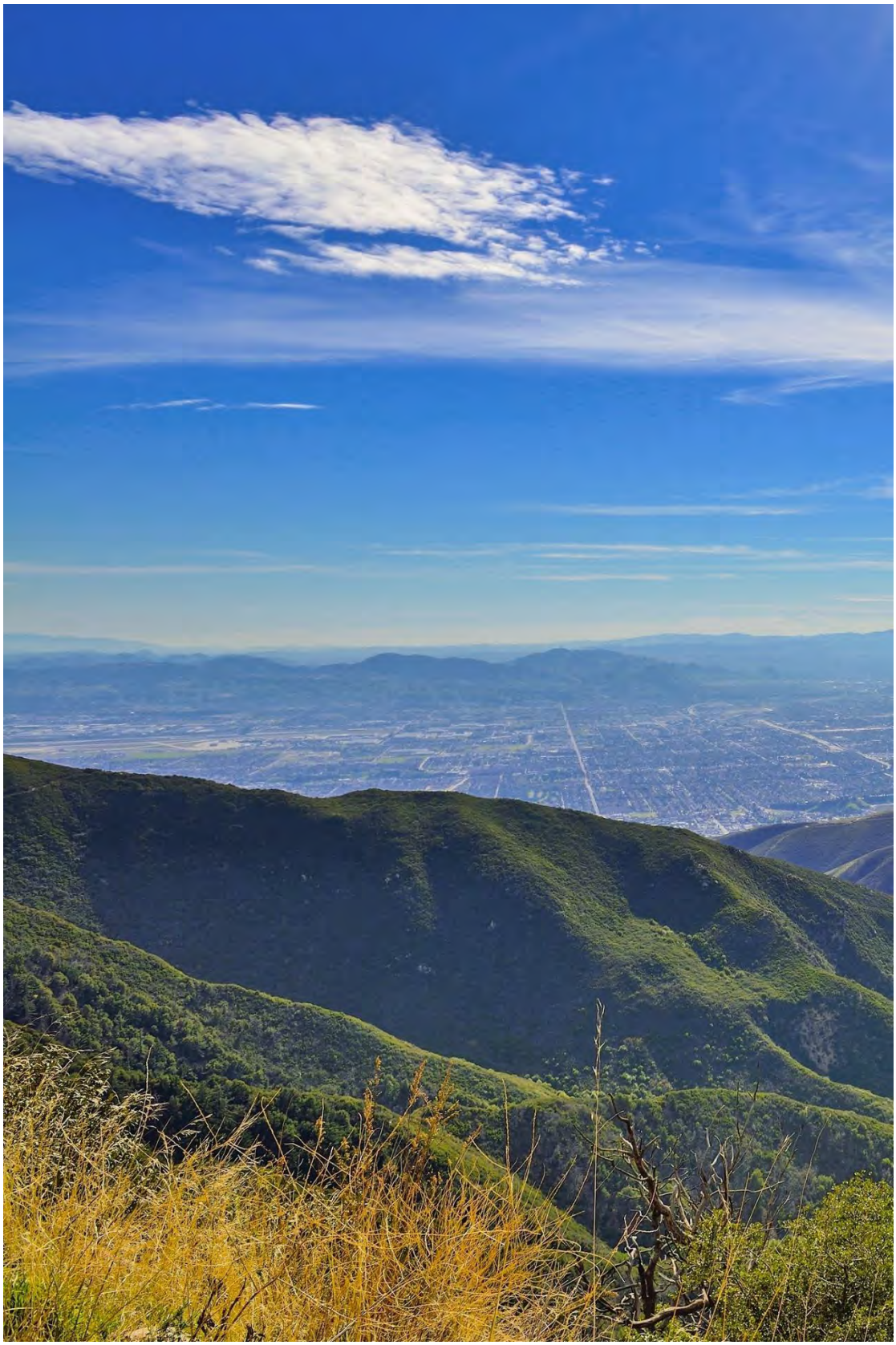
At the regional level, SCAQMD is responsible for the overall development and implementation of the AQMP. SCAQMD is specifically authorized to reduce the emissions from stationary, point, and some area sources such as coatings and industrial solvents. Emission reductions are also sought through funding programs designed to accelerate vehicle turnover and the purchase of cleaner vehicles. In addition, the SCAQMD has authority to regulate indirect sources under the California Health and Safety Code Sections 40716 (a)(1) and 40440(b)(3). As a means of achieving further emission reductions, the SCAQMD may seek additional authority to regulate sources that have not been completely under the SCAQMD's jurisdiction in the past such as marine vessels, consumer products, and other on-road and off-road sources. The SCAQMD implements its responsibilities with participation from the regulated community and other stakeholders through an extensive rule development and implementation program. This approach maximizes the input of those parties affected by the proposed rule through consultation meetings, public workshops, and ongoing working groups.

Table 4-22 list the responsibilities of the key agencies involved in the implementation of the 2016 AQMP.

TABLE 4-22

Agencies Responsible for Implementation
of the 2016 AQMP for the South Coast Air Basin

AGENCY	PRINCIPAL RESPONSIBILITIES
U.S. EPA	• National mobile vehicle emission standards • Airplanes, trains, and ships • New off-road construction & farm equipment below 175 hp
CARB	• On-road/off-road vehicles (emission standards for in-state sales and in-use fleets as authorized under Section 209(e) of the Clean Air Act) • Motor vehicle fuels • Consumer products
SCAG	• Conformity assessments for Regional Transportation Plan and other transportation projects • Regional Transportation Improvement Program • Transportation Control Measures
Local Government	• Transportation and local government actions (i.e., land use approvals & ports) • Transportation facilities
SCAQMD	• Stationary (e.g., industrial/commercial) and area sources • Indirect sources • Certain mobile sources (e.g., fleet regulations, incentives for accelerated vehicle turnover, reduction in average vehicle ridership, etc.)



Chapter 5

Future Air Quality

Air quality modeling is an integral part of demonstrating future attainment of the clean air standards, relating emission reductions to air quality improvements. The 2016 AQMP reflects an updated emission inventory, economic growth projections, enhanced air quality modeling techniques, and the impacts of the proposed control strategies.

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Introduction

Air quality modeling to demonstrate future attainment of air quality standards is an integral part of the planning process to achieve clean air. Modeling provides the means to relate emission reductions from sources of pollution to the resulting air quality improvements. The attainment demonstrations provided in the 2016 AQMP reflect updated emissions estimates, new technical information, enhanced air quality modeling techniques, updated attainment demonstration methodology, and the control strategies provided in Chapter 4. While the primary target of the 2016 AQMP is to demonstrate progress toward the 2008 8-hour ozone standard of 75 ppb by 2031, efforts to meet other air quality standards and the corresponding analyses are included in the 2016 AQMP and presented in this chapter. Both the revoked 1997 8-hour standard (80 ppb) and the revoked 1979 1-hour standard (120 ppb) are included in the analysis with attainment years of 2023 and 2022, respectively. This chapter also demonstrates future attainment of the annual and 24-hour PM2.5 standards (12 and 35 $\mu g/m^3$).

The District's goal is to develop an attainment demonstration that: 1) ensures that ambient air quality standards for all criteria pollutants are met by the established deadlines in the federal CAA and 2) achieves an expeditious rate of progress towards attaining the air quality standards. The overall control strategy is designed such that efforts to achieve the standard for one criteria pollutant complements efforts to meet the standards for other pollutants.

Background

The South Coast Air Basin is classified as an "extreme" nonattainment area for ozone. The 2016 AQMP addresses three ozone standards: the 2008 8-hour standard of 75 ppb, the revoked 1997 8-hour standard of 80 ppb, and the revoked 1-hour standard of 120 ppb. The attainment deadline years are 2031, 2023 and 2022, respectively. The emissions inventory and meteorological conditions were developed for a 2012 base year.

The Basin is currently a "serious" nonattainment area for 24-hour PM2.5 and "moderate" nonattainment for annual PM2.5. The 2012 AQMP addressed attainment of the 2006 24-hour standard of 35 $\mu g/m^3$ by 2014; however, the unforeseen drought that occurred in the 2011–2014 time period inhibited the projected progress towards attainment. The District requested a voluntary bump-up from "moderate" status to "serious" nonattainment status in the "Supplement to the 24-Hour PM2.5 State Implementation Plan for the South Coast Air Basin" submitted to U.S. EPA in 2015 and subsequently approved in 2016. For "moderate" nonattainment areas, the attainment deadline was 2015 based on CAA *Title 1, Part D, Subpart 4, Section 188(c)(l),* which establishes that attainment must be reached by the end of the 6th calendar year after the effective date of designation. The year 2019 is the new attainment deadline for "serious" nonattainment areas for the 24-hour PM2.5 standard.

The Basin was designated a "moderate" nonattainment area for the 2012 annual PM2.5 standard of 12 $\mu g/m^3$ on April 15, 2015. This designation sets an attainment deadline of December 31, 2021. Despite the recent drought, the Basin shows continued improvement in annual PM2.5 design values. The base

year annual PM2.5 design values at Mira Loma are lower than the previous 1997 standard of 15 µg/m^3, but do not yet meet the new 2012 standard of 12 µg/m^3 (Figure 5-11), indicating that additional reductions may be needed to meet the more stringent standard. Acknowledging the challenges in meeting the standard, including the feasibility of proposed measures, uncertainties in drought conditions, and the potential inability to credit all ozone strategy reductions towards PM2.5 attainment if approved under CAA Section 182(e)(5), SCAQMD will request a voluntary bump-up to the "serious" classification, with a new attainment date of 2025. Future year attainment was analyzed for 2021, the original target for "moderate" nonattainment, and 2025, the revised attainment date for the requested "serious" status. This AQMP includes all the milestone years significant to future PM2.5 attainment status: 2019 (24-hour PM2.5 attainment date), 2021 (annual PM2.5 attainment date for "moderate" nonattainment status) and 2025 (annual PM2.5 attainment date for "serious" nonattainment status). In addition, 2023 was included in the analysis to evaluate co-benefits of the ozone strategy on PM attainment and to assess the practicability of an earlier PM2.5 attainment date.

During the development of the 2012 AQMP, the District implemented an air quality modeling platform that integrates meteorological modeling, emissions inventories and atmospheric chemistry simulations into a physically and chemically consistent framework. In the 2007 and earlier AQMPs, the modeling platforms for meteorology and chemical-transport were developed separately. In addition, ozone and PM2.5 used separate modeling approaches due to the limitations of computational capacity. Recent advancements in computational technology enabled the transition to a state-of-science one-atmosphere, multi-pollutant modeling platform.

For the 2016 AQMP, the updated modeling platform has continued to serve as the primary tool to demonstrate attainment after incorporating the latest datasets and chemical mechanisms. Since completion of the 2012 AQMP, the modeling platform has been updated with satellite-based input data, improved chemical gaseous and particulate mechanisms, improved computational resources and post-processing utilities, enhanced spatial and temporal allocations of the emissions inventory, and a revised attainment demonstration methodology. Several other additional updates were also included.

The 2016 AQMP ozone and PM2.5 attainment demonstration has been developed using the U.S. EPA-supported Community Multiscale Air Quality (CMAQ) (version 5.0.2) modeling platform with Statewide Air Pollution Research Center (SAPRC) 07 chemistry, and the Weather Research and Forecasting Model (WRF) (version 3.6.1) meteorological fields. PM2.5 and ozone were modeled simultaneously using the one-atmosphere modeling platform. Ozone attainment demonstrations focused on the period from May through September, while PM2.5 was analyzed for the entire year. The simulations were conducted over an area with a western boundary over 100 miles west of the Ports of Los Angeles and Long Beach. The eastern boundary extends slightly beyond the Colorado River while the northern and southern boundaries of the domain extend to the San Joaquin Valley and the Northern portions of Mexico, respectively. CMAQ was simulated with a 4-kilometer grid resolution.

For the 2016 AQMP, WRF was updated with the most recent version (version 3.6.1) available at the time of protocol preparation and was evaluated with a set of input data, which includes land-use classification and sea-surface temperature initialization fields. The WRF simulations were initialized from National Centers for Environmental Prediction (NCEP) analyses and run for three-day increments with four-dimensional data assimilation (FDDA).

Day-specific point source emissions were extracted from the District's stationary source and RECLAIM inventories. Mobile source emissions included day and hour real-time profiles based on the CALTRANS Performance Measurement System and weight-in-motion profiles, CARB's EMFAC2014 emissions model, and vehicle population data and transportation analysis zone (TAZ) data provided by SCAG. The mobile source data and selected area source data were subjected to daily WRF-derived temperature corrections to account for enhanced evaporative emissions on warmer days. Gridded daily biogenic VOC emissions were provided by CARB using the MEGAN biogenic emissions model. The simulations benefited from enhancements made to the emissions inventory, such as day-specific adjustments in traffic volumes when generating on-road emissions and improvements in gridding surrogates for spatial allocations of area and off-road emissions.

Detailed information on the modeling approach, data retrieval, model development and enhancement, model application, emissions inventory development, and interpretation of results is presented in Appendix V. The following sections summarize the results of the 8-hour/1-hour ozone and annual/24-hour PM2.5 attainment demonstration modeling efforts and provide an update to the future projected ozone and PM2.5 levels given new emissions estimates, the latest air quality measurements, and modeling tools.

Ozone Modeling Approach

Design Values and Relative Response Factors (RRF)

To bridge the gap between air quality model predictions and measurements, U.S. EPA guidance has recommended the use of relative response factors (RRFs). In this approach, future year concentration predictions require two elements: base year design values and RRFs. The RRF is simply a ratio of the future year predicted air quality to the simulated air quality in the base year, representing the model-predicted change in air quality in response to predicted emissions changes. The attainment demonstrations are pollutant and averaging period specific. Base-year design values for 2012 were obtained from measurements and correspond to the form of the NAAQS. Eight-hour design values are calculated from the 3-year average of the fourth highest daily ozone 8-hour average concentration in each year. The 1-hour ozone design value represents the fourth highest 1-hour ozone value in a three-year period. Base year design values for the attainment demonstration are calculated as a five-year weighted average (average of the three, 3-year design values centered at the base year, 2012). Future year concentrations are estimated by multiplying the non-dimensional RRF by the base year design value, thus applying the model-predicted change in air quality directly to the actual measured concentrations in the base year. Assuming any potential modeling biases are similar in the base and future years, the RRF approach acts to minimize their impact on predictions.

Design Value Selection

U.S. EPA guidance recommends the use of multiple year averages of design values, where appropriate, to dampen the effects of single year anomalies in the air quality trend due to factors such as adverse or favorable meteorology or radical changes in the local emissions profile. The trend of Basin ozone design values is presented in Figure 5-1. Both 8-hour and 1-hour ozone design values have decreased over the

14-year period. The most recent 8-hour design value (102 ppb) continues to exceed the 1997 8-hour ozone standard (80 ppb) by 28 percent and the 2008 ozone standard (75 ppb) by 36 percent. In addition, the most recent 1-hour design value of 135 ppb exceeds the 1979 1-hour ozone standard (120 ppb) by 13 percent.

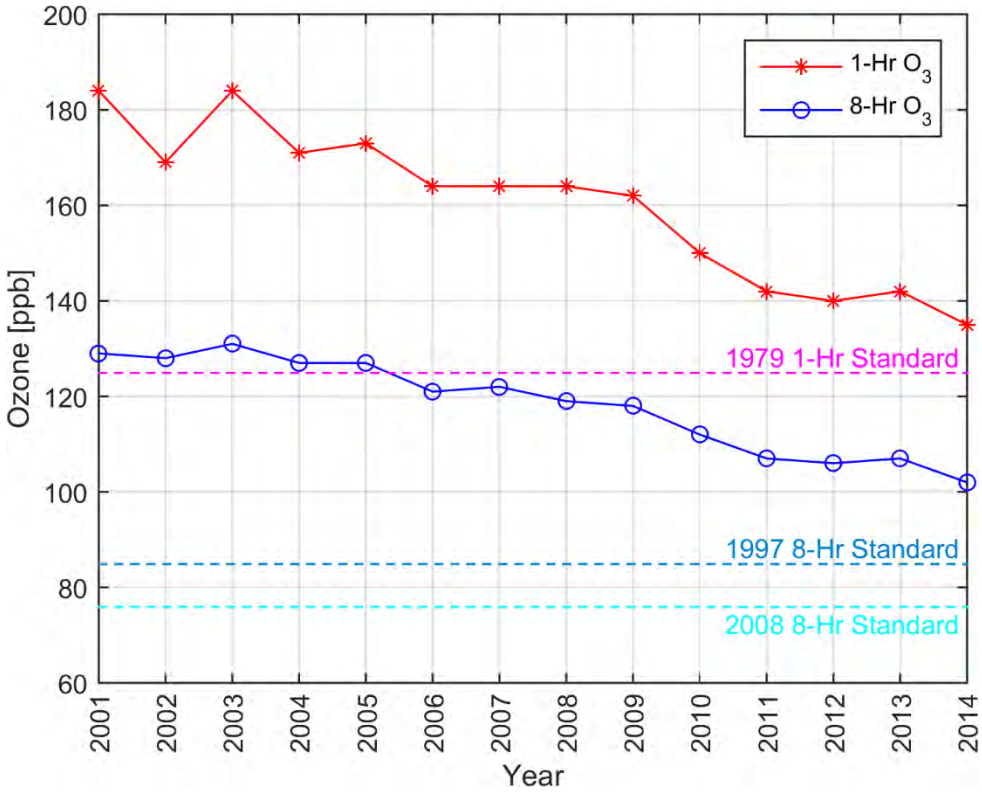

FIGURE 5-1

SOUTH COAST AIR BASIN OZONE DESIGN VALUES. Each 8-Hour value represents the 3-year average of the yearly fourth highest 8-Hour average ozone concentration. The 1-Hour values represent the fourth highest 1-Hour ozone over a 3-year period.

The 2016 AQMP attainment demonstrations rely on air quality measurements collected during the five-year period centered on 2012, which is the base year selected for the emissions inventory development, the WRF meteorological simulation, and the anchor year for the future year ozone and PM2.5 projections.

Ozone Representativeness

Past ozone attainment demonstrations, up to and including the 2007 AQMP, evaluated a set of meteorological conditions conducive for air pollutant build-up or evaluated episodes occurring during concurrent intensive field monitoring programs. These episodic periods were rated based on how representative they were in reference to the ozone standard being evaluated. The 2007 AQMP was the first plan to address the 8-hour ozone standard and use RRFs in the future year ozone projections. To

provide a robust characterization of the RRFs for use in the attainment demonstration, the analysis simulated a total of 36 days. The ozone modeling guidance used for the 2007 AQMP recommended that a minimum of five days of simulations meeting modeling acceptance criteria be used in a future year RRF calculation, but recommended incorporating as many days as possible to fully capture both the meteorological variations in the ozone season and the response of ozone formation for different daily emissions profiles.

The 2012 AQMP used a different approach. Instead of the episode-based simulation days, it included season-long (June through August) comprehensive CMAQ simulations. It analyzed 92 simulation days and chose the days that met the following selection criteria: the predicted daily max is within 20 percent of the site-specific design value, the unpaired daily maximum prediction error is less than 20 percent, and the prediction is higher than the federal standard of 75 ppb. The maximum modelled grid cell in the 3 by 3 grid centered at each station was retrieved from the base and future year simulations. The number of days used in the RRF calculation differed from station to station. Approximately 50 days met the criteria at Crestline, more than half of the entire simulation period.

The approach used in the current AQMP is similar to the approach used in the 2012 AQMP with the following changes per recent U.S. EPA guidance (U.S. EPA, 2014).[1] The ozone season was expanded from May to September (153 simulation days) in order to capture exceedances that occurred in early and late summer. Only the top 10 days are used to calculate the RRF. Some stations have fewer than 10 days meeting the specified criteria with daily maximum 8-hr values exceeding 60 ppb and the unpaired daily-max prediction error less than 20 percent. These stations are included in the analysis as long as five or more days meet the selection criteria. The maximum modeled value in the 3 by 3 grid surrounding each station is compared to the corresponding grid position in the future year. A similar approach was implemented for the 1-hour ozone future year projections; details of the 1-hour ozone and 8-hour ozone analysis are presented in Appendix 5.

Basin-wide ozone air quality simulations were conducted for each hour in the 2012 ozone season (May 1st to September 30th). Figure 5-2 depicts the observed daily maximum 8-hour ozone levels Basin-wide and at Crestline and Redlands during the 2012 ozone season. Crestline was the design value site in the past, but Redlands showed the highest design value for the five-year period in the current analysis. During this period, several well-defined multi-day ozone episodes occurred in the Basin, with 107 total days having daily maximum concentrations of 75 ppb or higher. Stations located in San Bernardino and Riverside counties show similar levels of elevated ozone as Crestline and Redlands, exhibiting the influences of similar transport and chemistry patterns.

[1] https://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

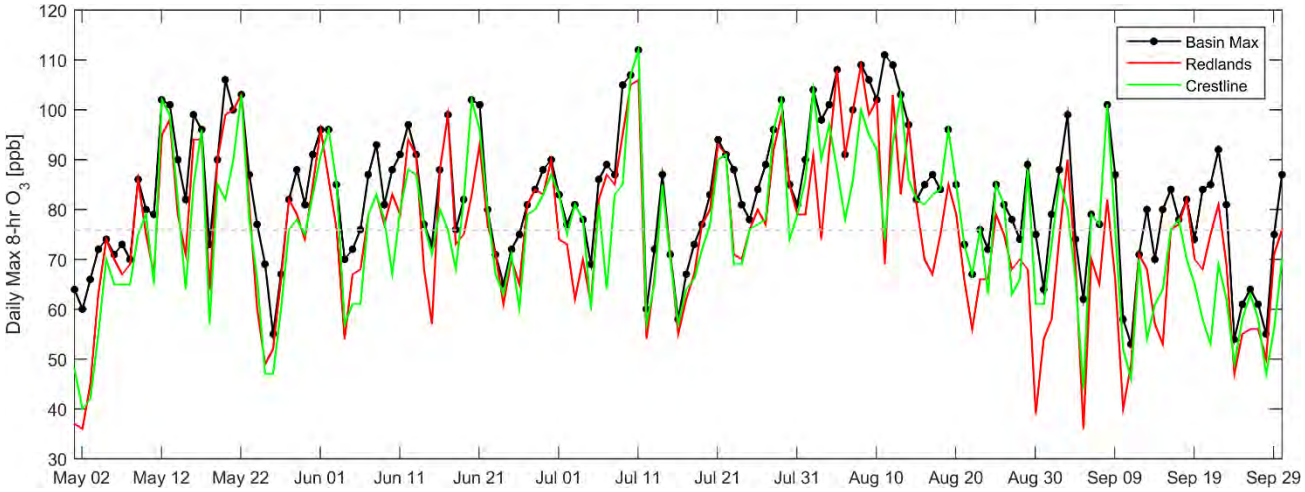

FIGURE 5-2

OBSERVED BASIN, REDLANDS, AND CRESTLINE DAILY MAXIMUM 8-HR AVERAGE OZONE CONCENTRATIONS: MAY 1 THROUGH SEPT 30, 2012.

Table 5-1 lists the number of weekend and weekday days exceeding the 8-hour ozone standard during the 2012 ozone season for stations that meet the U.S. EPA's data completeness requirement and have design values greater than 75 ppb. A "weekend effect", typically experienced in urban areas, results from reduced NOx emissions on weekends leading to higher ozone and consequently more weekend days exceeding the standard. This indicates a benefit of VOC reductions from concurrent reductions from the NOx control strategy or stand-alone VOC controls such as the consumer products program—to minimize inadvertent ozone increases during the course of NOx reduction.

TABLE 5-1

Five-year Weighted Design Values and Number of Days Daily Maximum Concentrations Exceeded 75 ppb in 2012

Station*	2012 5-Year Weighted Design Value (ppb)	Number Of Weekend Days In 2012 With Observed daily max 8-hour Ozone > 75 ppb	Number Of Weekday Days In 2012 With Observed daily max 8-hour Ozone > 75 ppb
Azusa	79.3	9	2
Banning	95.3	21	45
Crestline	103.0	30	59
Fontana	101.0	35	30
Glendora	92.7	29	18
Lake Elsinore	85.3	6	11
Mira Loma	92.7	24	29
Perris	91.0	17	32
Pomona	84.3	12	5
Redlands	104.7	35	50
Reseda	89.0	11	17
Rubidoux	96.3	24	29
San Bernardino	98.0	29	28
Santa Clarita	97.3	30	32
Upland	96.7	25	24

**Stations having design values greater than 75 ppb and meeting data completeness criteria*

Ozone Modeling Approach

The set of 153 days from May 1st through September 30th, 2012 were analyzed to determine the 8-hour maximum ozone for the base (2012) and future attainment years 2023 and 2031—the attainment years for the 1997 standard of 80 ppb and the 2008 standard of 75 ppb, respectively. Both baseline and controlled cases were simulated. The former represents the level of emissions with no additional reductions beyond existing measures, and the latter contains additional emission reductions proposed in the 2016 AQMP to reach attainment.

Finally, a set of simulations with incremental VOC and NOx emission reductions from 2023 and 2031 baseline emissions were generated to create ozone isopleths for each station in the Basin. The ozone isopleths provide guidance in developing control strategies by depicting ozone concentrations as a

function of both NOx and VOC reductions. They provide the basis for estimating the Basin carrying capacity, the maximum allowable emissions of NOx and VOC to reach attainment.

Future Ozone Air Quality

The 2016 AQMP baseline ozone simulations reflect the changes made to the 2023 and 2031 baseline inventories. The 2016 AQMP summer planning inventory for 2023 has a similar VOC/NOx emissions ratio (1.35 vs. 1.37) as the 2012 AQMP, although total tonnages of both precursor emissions are lower than those presented in the 2012 AQMP. Lower 2023 baseline VOC and NOx emissions in the 2016 AQMP relative to the 2012 AQMP reflect the impact of rules and regulations implemented after the 2012 AQMP as well as the recession occurring between 2008 and 2010. The 2012 AQMP relied on the 2012 Regional Transportation Plan (RTP) to forecast future growth. To a certain degree, the 2012 RTP incorporated the impact of the economic recession that occurred during the 2008–2010 period. But, it is unlikely that this growth forecast reflected the full intensity of the recession. For example, the consumption of taxable gasoline consumption reached its minimum level in 2012, which is after the RTP was finalized in April 2012. Therefore, some discrepancies are expected between the projected emissions inventory for 2012 and the 2012 actual emissions data. The new 2016 AQMP inventory is revised to properly account for this impact.

8-Hour Ozone Attainment

The 2016 AQMP addresses both the revoked 1997 8-hour ozone standard of 80 ppb and the 2008 8-hour ozone standard of 75 ppb, for which attainment dates are 2023 and 2031, respectively. Table 5-2 summarizes the results of the updated ozone simulations. The 2023 ozone baseline and 2023 controlled ozone projections from the 2012 AQMP are included in the table for comparison. The 2012 AQMP concluded that NOx emissions must be reduced by 65 percent of baseline emissions to meet the 80 ppb standard by 2023.

TABLE 5-2

Model-Predicted 8-Hour Ozone Concentrations (ppb)

Station	Final 2012 AQMP		2016 AQMP			
	2023 Baseline	2023 Controlled	2023 Baseline	2023 Controlled	2031 Baseline	2031 Controlled
Azusa	95	77	77	70	75	62
Banning	94	73	89	78	85	71
Crestline	107	81	93	81	89	72
Fontana	104	81	96	84	92	75
Glendora	107	84	93	83	90	74
Lake Elsinore	85	66	74	65	70	58
Perris	88	66	80	70	76	62
Pomona	100	80	83	75	81	67
Redlands	103	77	95	82	90	73
Reseda	90	73	79	71	75	64
Riverside	100	77	89	78	86	69
San Bernardino	108	83	90	78	86	70
Santa Clarita	94	73	84	76	80	68
Upland	106	83	92	82	89	73

Both 2023 and 2031 baseline scenarios that do not contain additional reductions beyond already adopted measures do not lead to attainment, indicating additional emission reductions are necessary to meet the standards. The carrying capacities, the maximum allowable NOx emissions to meet ozone standards, are estimated to be 141 TPD NOx in 2023, and 96 TPD NOx in 2031. These are equivalent to an additional 45 percent and 55 percent of NOx reductions, respectively, from the 2023 and 2031 baseline emission levels. These reductions will ensure attainment of the federal 8-hour standard by 2023 and the 2008 standard by 2031 at all stations.

The proposed needed reductions are significantly less than the estimates presented in the 2007 and 2012 AQMPs. Several factors contributed to this change. First, the 2012 base year design values are lower than the 2005 and 2008 base year design values used in the 2007 AQMP and the 2012 AQMP, respectively, due to the improvements in air quality with time, indicating greater than expected efficacy of control strategies implemented in the Basin. Secondly, improvements introduced to the emissions inventory led to better estimates of 2023 emissions. 2023 baseline emissions were revised significantly in the 2012 AQMP from the 2007 AQMP due to emission changes in the on-road truck and off-road equipment categories resulting from CARB rulemaking. The 2023 baseline emission projections were further revised in the 2016 AQMP. The revised 2023 baseline shows 255 TPD of total NOx emissions compared to the 319 TPD projected in the 2012 AQMP and the 506 TPD projected in the 2007 AQMP. The lower baseline emissions reflect the impact of rules and regulations implemented after the release of the previous AQMPs. Also, while the recession that occurred during the 2008 to 2010 period was incorporated in the 2012 AQMP inventory, its impact was further refined in the 2016 AQMP, resulting in lower 2023 emissions than what was originally predicted in the 2012 AQMP. Methodological updates to emissions estimates contributed to the changes as well. For example, the allocation of LPG consumption data for the Basin compared to the State was reduced by approximately 50 percent based on the most recent data from the State's GHG reporting system. The lower NOx emissions baseline leads to a lower percentage of needed reductions. Thirdly, the new attainment demonstration focuses only on top 10 concentration days, as discussed previously. The RRF approach used in the 2012 AQMP, based on U.S. EPA guidance available at the time, included more than 60 days, approximately two thirds of the total simulation days. According to U.S. EPA, the approach using the top 10 days yields a slightly better estimate of the actual observed ozone change than the previous approach of focusing on the days most likely to exceed the standard.

Spatial Projections of 8-Hour Ozone Design Values

The spatial distribution of ozone design values for the 2012 base year is shown in Figure 5-3. Projected 8-hour ozone design values for 2023 and 2031 with and without implementation of all proposed control measures are presented in Figures 5-4 through 5-7. The predicted ozone concentrations will be significantly reduced in future years in all parts of the Basin with the control measures proposed in the 2016 AQMP. Future design values are predicted from modeled RRFs and base-year design values. Future design values are then interpolated to cover the areas between monitoring stations using a natural neighbor interpolation, the interpolation scheme that best represents the Basin. Refer to Appendix V for details.

Appendix V also provides base year model performance statistics and grid-level CMAQ predictions for the base and future milestone years as well as a weight of evidence discussion to support the modeling attainment demonstration.

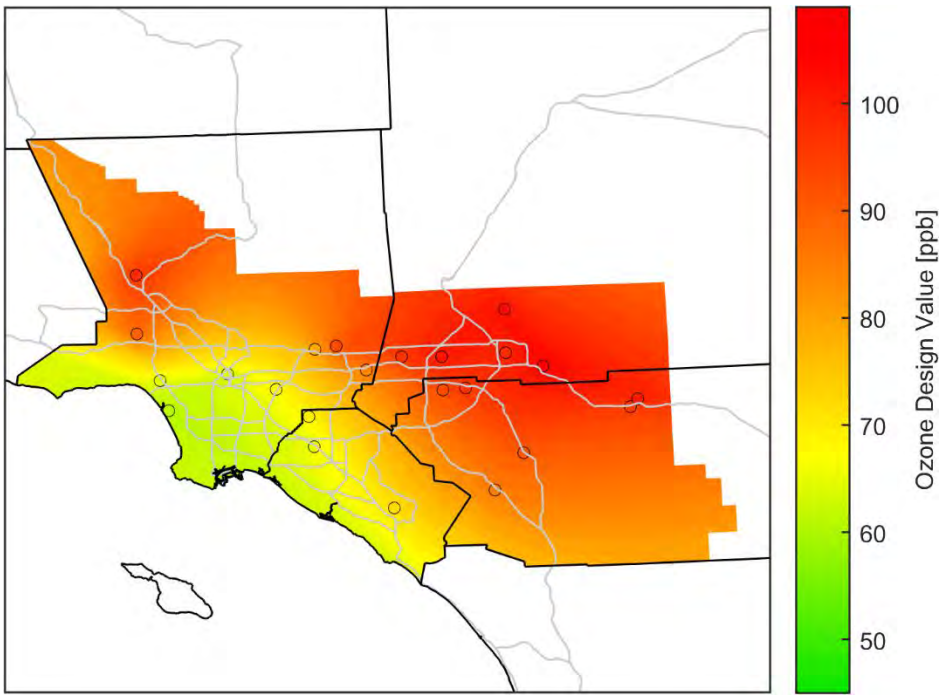

FIGURE 5-3

INTERPOLATED 5-YEAR WEIGHTED 8-HOUR OZONE DESIGN VALUES (ppb) FOR 2012. VALUES ARE COLOR-CODED TO CORRESPOND TO THE 2008 75 ppb AIR QUALITY INDEX

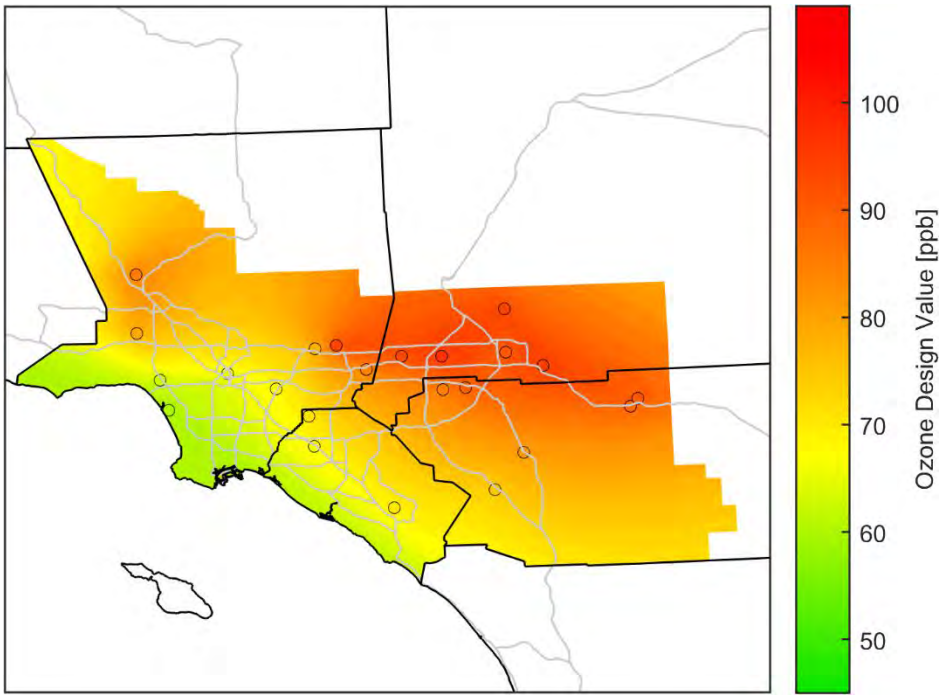

FIGURE 5-4

INTERPOLATED 2023 BASELINE 8-HOUR OZONE CONCENTRATIONS (ppb). VALUES ARE COLOR-CODED TO CORRESPOND TO THE 2008 75 ppb AIR QUALITY INDEX

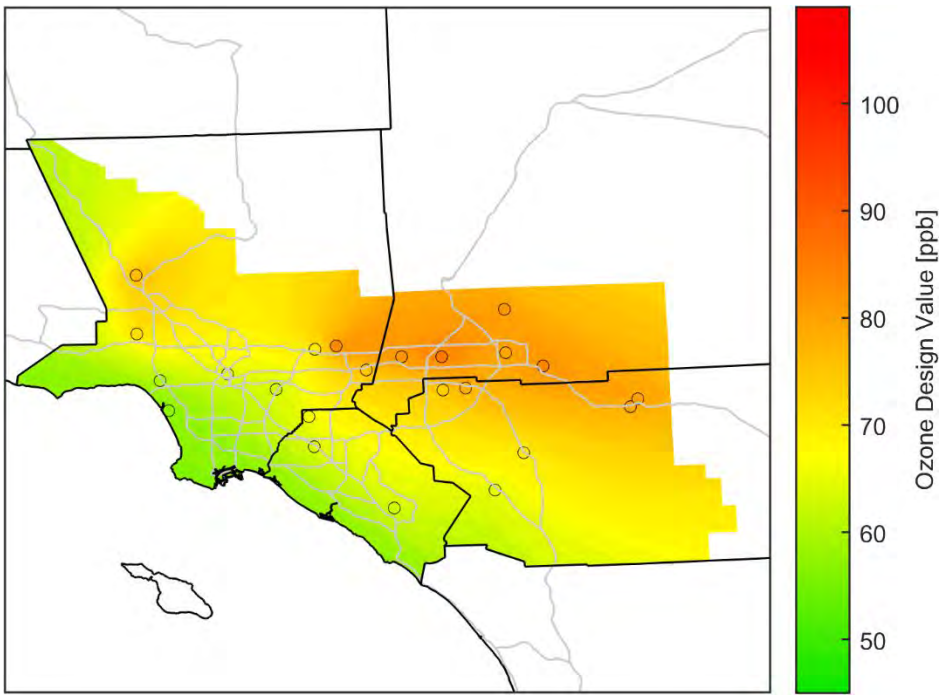

FIGURE 5-5

INTERPOLATED 2023 CONTROLLED 8-HOUR OZONE CONCENTRATIONS (ppb). VALUES ARE COLOR-CODED TO CORRESPOND TO THE 2008 75 ppb AIR QUALITY INDEX

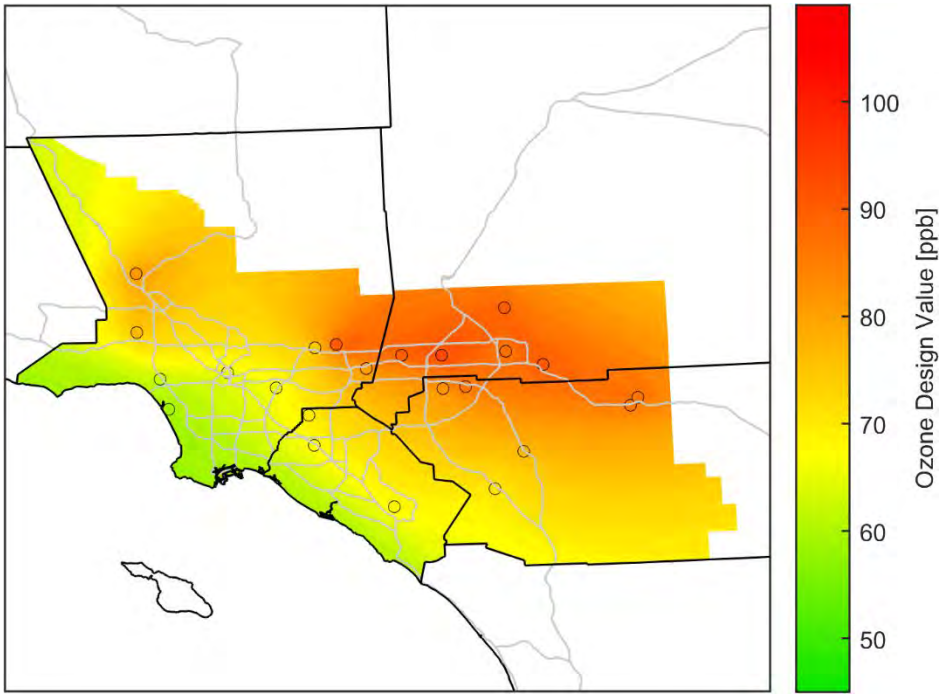

FIGURE 5-6

INTERPOLATED 2031 BASELINE 8-HOUR OZONE CONCENTRATIONS (ppb). VALUES ARE COLOR-CODED TO CORRESPOND TO THE 2008 75 ppb AIR QUALITY INDEX

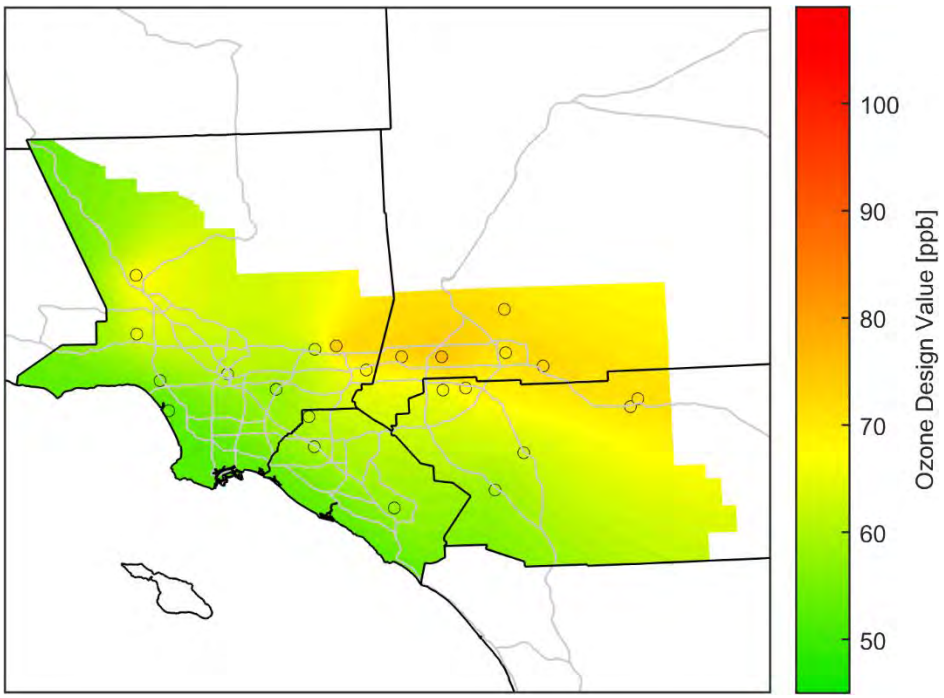

FIGURE 5-7

INTERPOLATED 2031 CONTROLLED 8-HOUR OZONE CONCENTRATIONS (ppb). VALUES ARE COLOR-CODED TO CORRESPOND TO THE 2008 75 ppb AIR QUALITY INDEX

1-Hour Ozone Attainment

The 2016 AQMP also addresses the 1979 1-hour ozone standard of 120 ppb with an attainment date of 2022. Table 5-3 summarizes the results of the updated ozone simulations. The 2012 AQMP projected baseline and controlled design values using a RRF analysis are also included for comparison. The 2022 baseline scenario with no additional reductions beyond already adopted measures does not lead to attainment, indicating that additional emission reductions are necessary to meet the standards. The carrying capacity to attain the 1-hour standard is approximately 245 TPD of NOx, indicating the need to reduce NOx emission by approximately 50 TPD. However, unlike 8-hour ozone which responds to NOx reductions much more than VOC reductions, 1-hour ozone responds to VOC reductions as sensitively as NOx reductions. Therefore, VOC reductions are as effective as NOx reduction in attaining the 1-hour standard. Consequently, the 1-hour ozone standard can be attained with a combined approximate 50 TPD reduction of either NOx or VOC emissions. The attainment scenario presented in the following table and figures were conducted with 33 TPD of NOx emissions reduction and 16 TPD of concurrent VOC reductions that are expected to occur from the NOx strategy. Note that the emission reductions for the 1-hour ozone strategy are a part of the 8-hour ozone strategy, but were identified to be feasible for early implementation. The control strategies to meet the 80 ppb 8-hour standard in 2023 are expected to achieve reductions necessary to meet the 1-hour standard in 2022.

TABLE 5-3

Base-year Design Values and Model-Predicted 1-Hour Ozone Design Values (ppb)

Station	2012 5-Year Weighted Design Value	Final 2012 AQMP		2016 AQMP	
		2022 Baseline	2022 Controlled	2022 Baseline	2022 Controlled
Azusa	112	139	131	104	101
Banning	-	119	102	--	--
Burbank	-	123	111	--	--
Crestline	132	134	116	120	118
Fontana	138	128	110	125	122
Glendora	132	143	133	121	119
Lake Elsinore	108	108	90	93	91
Pasadena	-	141	134	--	--
Perris	114	111	94	108	106
Pomona	117	124	108	103	101
Redlands	133	127	109	120	118
Reseda	125	112	101	105	103
Riverside	124	116	103	109	106
San Bernardino	123	127	110	107	104
Santa Clarita	132	119	105	110	108
Upland	135	135	121	122	119

NOTE: Burbank, Pasadena, and Banning do not have 5-year weighted 2012 base-year design values due to incomplete measurement data, and therefore, it was not possible to calculate 2022 design values at these stations. Burbank does not meet U.S. EPA data completeness requirements in 2014, Pasadena does not meet U.S. EPA data completeness requirements in 2013, and Banning does not meet U.S. EPA data completeness requirements in 2013.

With proposed controls in place, the analysis demonstrates that all stations in the Basin will meet the 1979 federal 1-hour ozone standard by 2022. The proposed reduction percentage and the carrying

capacity are lower than the estimates presented in the 2012 AQMP due to the same reasons discussed previously for the 8-hour ozone modeling.

Spatial Projections of 1-Hour Ozone Design Values

The spatial distribution of 1-Hour ozone design values for the 2012 base year is shown in Figure 5-8. Future year ozone air quality projections for 2022 with and without implementation of all proposed control measures are presented in Figures 5-9 through 5-10. The predicted ozone concentrations will be significantly reduced in the future years in all parts of the Basin with the control measures proposed in the 2016 AQMP. Future design values are predicted from modeled RRFs and measured base-year design values. Future design values are then interpolated using a natural neighbor interpolation to generate the interpolated fields.

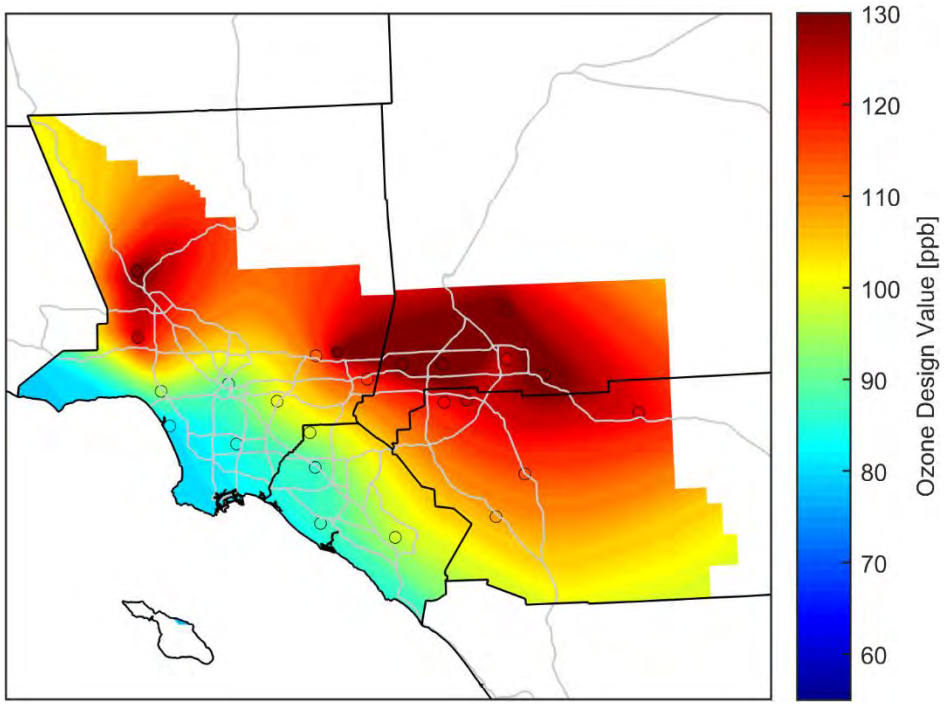

FIGURE 5-8
2012 OBSERVED 5-YEAR WEIGHTED 1-HOUR OZONE DESIGN VALUES (ppb)

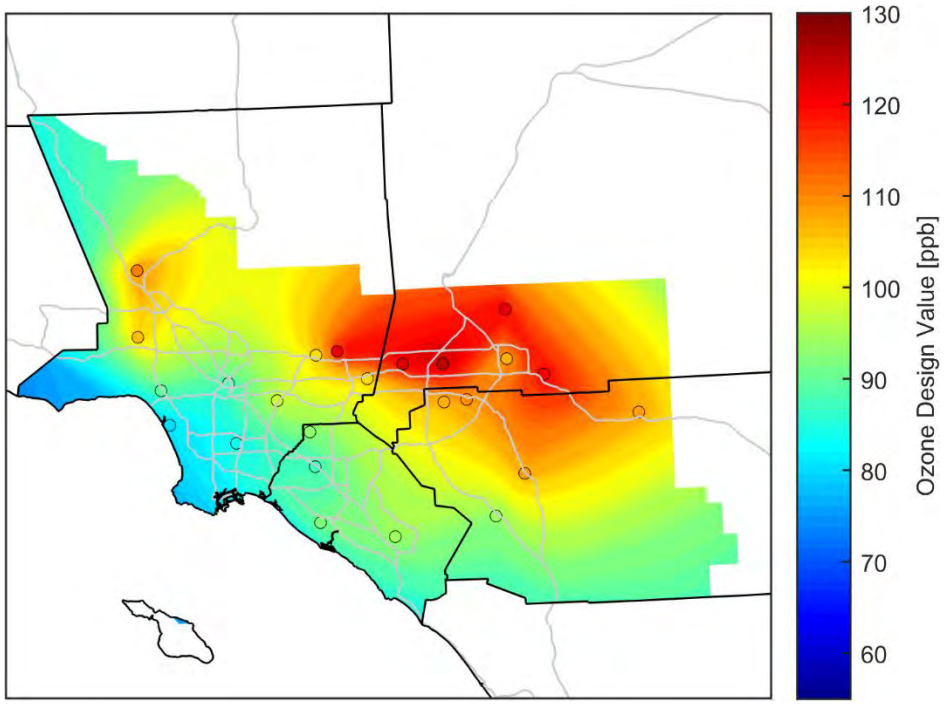

FIGURE 5-9
MODEL-PREDICTED 2022 BASELINE 1-HOUR OZONE CONCENTRATIONS (ppb)

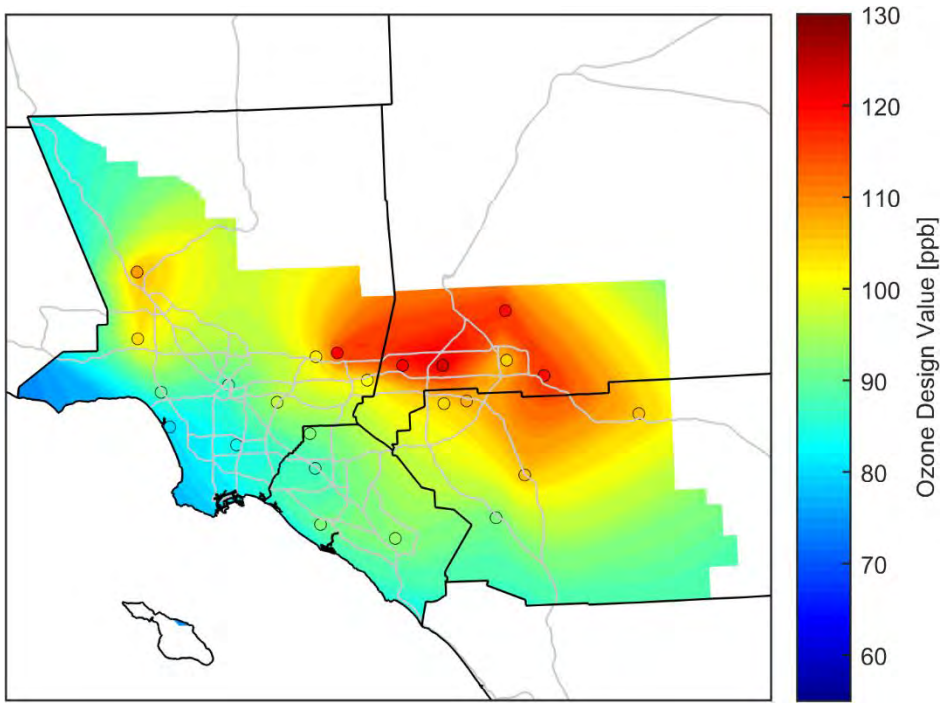

FIGURE 5-10
MODEL-PREDICTED 2022 CONTROLLED 1-HOUR OZONE CONCENTRATIONS (ppb)

Weight of Evidence

Ozone modeling guidance strongly recommends the use of corroborating evidence to support the future year attainment demonstration. The weight of evidence demonstration for the 2016 AQMP includes a model performance evaluation on the temporal profile of on-road mobile source emissions and spatial surrogate profiles of area source emissions. Detailed discussions of all model results and the weight of evidence discussion are provided in Appendix V.

PM2.5 Modeling Approach

Simulations for the PM2.5 concentrations were conducted for 2012 (base year), 2019 (24-hour PM2.5 attainment date), and 2025 (annual PM2.5 attainment date for "serious" nonattainment status). In addition, 2023 was included in the analysis to evaluate the co-benefits from the ozone control strategy.

Design Values and Relative Response Factors (RRF)

The 24-hour PM2.5 design value is determined from the three-year average of the 98th percentile of all 24-hour concentrations sampled at a monitoring site. The annual PM2.5 design value is based on the four quarterly average PM2.5 concentrations, averaged by year, for a three-year period.

Design Value Selection

U.S. EPA guidance recommends the use of multiple year averages of design values, where appropriate, to dampen the effects of single year anomalies to the air quality trend due to factors such as adverse or favorable meteorology or radical changes in the local emissions profile. The trend in the Basin 24-hour PM2.5 design values, determined from routine Federal Reference Method (FRM) samples from 1999 through 2014 (Figure 5-11), depicts large reductions in concentrations over the period. However, the rate of decrease in both annual and 24-hour design values has slowed or reversed in recent years. The 24-hour PM2.5 design value for 2001 was 76 $\mu g/m^3$ while the 2014 design value (based on data from 2012, 2013 and 2014) was 38 $\mu g/m^3$. The annual PM2.5 design value has demonstrated a reduction of 15.2 $\mu g/m^3$ over the period from 2001 through 2014. The slowing or reversal in the rate of PM2.5 reduction in recent years is largely due to the reduced atmospheric cleansing and mixing from the multi-year drought affecting the region. In the absence of this severe drought, it is anticipated that the Basin would be even closer to attaining both the annual and 24-hour PM2.5 standards, as projected in the previous AQMPs.

Consistent with U.S. EPA guidance, the 2016 AQMP relies on a five-year weighted annual average centered on 2012, the base year selected for the emissions inventory development, WRF simulations and the anchor year for the future year ozone and PM2.5 projections.

Table 5-4 provides the five-year weighted 2012 annual and 24-hour average PM2.5 design values for four Speciation Air Sampling System (SASS) sites – Anaheim, Fontana, Los Angeles and Riverside, as well as Mira Loma, the station with the highest PM2.5 design value in the Basin and the only station currently exceeding the 24-hour PM2.5 standard.

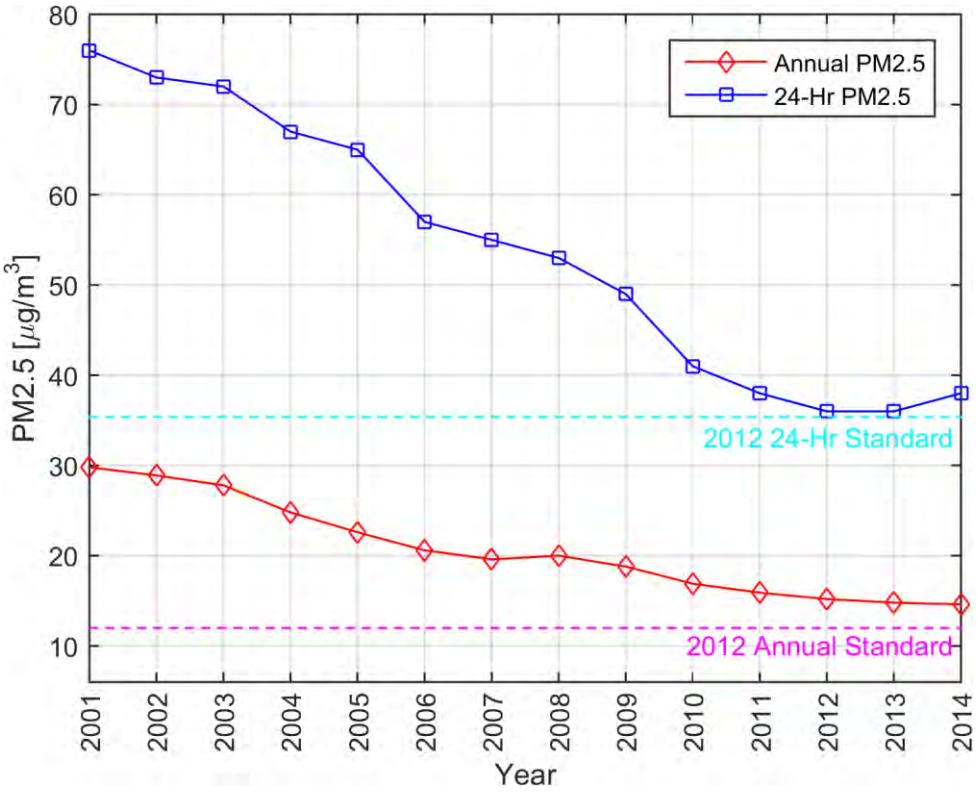

FIGURE 5-11

SOUTH COAST AIR BASIN ANNUAL PM2.5 AND 24-HOUR AVERAGE DESIGN VALUES.

TABLE 5-4

2012 Five-year Weighted PM2.5 Design Values (DV) (µg/m^3)

Monitoring Site	Annual DV	24-Hour DV
Anaheim	10.57	26.0
Fontana	12.60	32.7
Los Angeles	12.43	31.0
Mira Loma	14.87	36.7
Riverside Rubidoux	13.13	33.0

Calculated based on quarterly observed data between 2010 and 2014

PM2.5 Modeling

PM2.5 is either directly emitted into the atmosphere (primary particles), or formed through atmospheric chemical reactions from precursor gases (secondary particles). Primary PM2.5 includes road dust, diesel

soot, combustion products, and other sources of fine particles. Secondary products, such as sulfates, nitrates, and complex organic carbon compounds are formed from reactions with oxides of sulfur, oxides of nitrogen, VOCs, and ammonia.

PM2.5 speciation data measured at four SASS sites during 2012 provided the chemical characterization for evaluation and validation of the CMAQ model predictions. With one site in each county, the four SASS sites are strategically located to represent aerosol characteristics in the four counties in the Basin. Riverside-Rubidoux was traditionally the Basin maximum location. Fontana and Anaheim experience high concentrations within their respective counties, and the Central Los Angeles site was intended to capture the characteristics of an emission source area. The close proximity of Mira Loma to Rubidoux and the common in-Basin air flow and transport patterns enable the use of the Rubidoux speciated data as representative of the particulate speciation at Mira Loma. Both sites are directly downwind of the dairy production areas in Chino and the warehouse distribution centers located in the northwestern corner of Riverside County. Speciated data monitored at the selected sites for MATES IV, which were conducted for the period of June 2012 to June 2013, were analyzed to corroborate the applicability of using the 2012 chemical profiles.

Model performance was evaluated against concentrations of ammonium, nitrates, sulfates, secondary organic matter, elemental carbon, primary and total mass of PM2.5 measured at the four monitoring sites (Rubidoux, Central Los Angeles, Anaheim, and Fontana).

The following section summarizes the PM2.5 modeling approach conducted in preparation for this Plan. Details of the PM2.5 modeling are presented in Appendix V.

Annual PM2.5 Modeling Approach

The 2016 AQMP annual PM2.5 modeling employs the same approach in estimating the future year annual PM2.5 levels as was described in the 2012 AQMP attainment demonstrations except for updates in the modeling platform, input databases and emissions inventory. Future year PM2.5 annual average air quality is determined using site- and species-specific quarterly-averaged RRFs applied to the weighted quarterly average 2012 PM2.5 design values per U.S. EPA guidance (U.S. EPA, 2014[2]).

CMAQ simulations were conducted for 366 days from January 1 to December 31 of 2012. The simulations included 8,784 consecutive hours from which daily 24-hour average PM2.5 concentrations were calculated. A set of RRFs were generated for each future year simulation. RRFs were generated for ammonium (NH4), nitrate (NO3), sulfate (SO4), organic carbon (OC), elemental carbon (EC), sea salts (Salt) and a combined grouping of crustal compounds and metals (Others). For each species, a total of 16 RRFs were generated for each future year simulation (four seasons and four monitoring sites). Future year design values were calculated by multiplying the species- and site-specific RRFs by the corresponding quarterly mean component concentration. The quarterly mean components were summed to get

[2] https://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

quarterly mean PM2.5 levels, which were then averaged to determine the annual design values (Table 5-5).

24-Hour PM2.5 Modeling Approach

The RRF approach requires two components: base year design values from measurement data and RRFs from model predictions per U.S. EPA guidance. The base year design value is established using the top 8 days in each quarter per year for the five-year period used in the weighted average (2010–2014). Details on the RRF approach for the 24-hour PM2.5 attainment demonstration are provided in Appendix V. Future year PM2.5 24-hour average concentrations are presented for the 2019 24-hour PM2.5 attainment deadline. The projection suggests that the 2019 baseline with no further controls will attain the standard, which is consistent with the results presented in the 2012 AQMP. In addition, Appendix V includes discussions for chemical speciation, an unmonitored area analysis, and an analyses of the potential impact of future drought conditions.

Future PM2.5 Air Quality

Annual PM2.5

Annual PM2.5 concentrations were simulated for the base year (2012) and future milestone years (2021 and 2025). For the future years, both baseline and control scenarios were included in the analysis. The results are presented in Table 5-5 and Figure 5-12. Mira Loma, the design site for the base year, has a five-year weighted design value of 14.9 µg/m^3 in 2012, in attainment of the previous 1997 standard (15 µg/m^3), but not the 2008 standard. Mira Loma is projected to remain as the highest PM2.5 site in 2025. The baseline cases, which do not include additional controls beyond already adopted measures, project future design values close to 12.3 µg/m^3 but are not low enough to meet the standard. Still, the future year concentrations are expected to be well below the previous 1997 standard. The control scenarios capturing SCAQMD stationary source PM2.5 measures in the 2016 AQMP were evaluated as well. However, it is practically challenging to implement the directly emitted PM reductions from the SCAQMD PM control measures by 2021 and, even if so, the emission reductions from those measures are not enough to achieve attainment in 2021.

Annual PM2.5 concentrations were further evaluated using emission reduction co-benefits from the ozone strategy for 2023. When all the NOx and VOC reductions proposed to attain the 80 ppb ozone standard are implemented in 2023, the PM2.5 annual design value for 2023 is expected to be 11.1 µg/m^3, demonstrating attainment of the annual standard two years in advance of the 2025 “serious” area deadline. However, the ozone strategy may include CAA Section 182(e)(5) measures that are allowed in the SIP for ozone “extreme” nonattainment areas, but not for PM2.5. Therefore, an attainment scenario using only the control measures anticipated to be approved without 182(e)(5) flexibility was developed for 2025. This scenario showed an annual PM2.5 design value of 12.0 µg/m^3 at the Mira Loma site, indicating that the annual PM2.5 standard is expected to be met by 2025 without additional measures directed specifically at PM reductions.

TABLE 5-5

Annual Average PM2.5 Design Concentrations (µg/m^3)

Station	2012	2025 Baseline	2025 Control	2023 O3 Attainment Scenario
Anaheim	10.6	9.3	9.1	8.7
Fontana	12.6	10.5	10.3	9.7
Los Angeles	12.4	10.8	10.4	9.7
Mira Loma	14.9	12.3	11.8	11.1
Rubidoux	13.2	10.9	10.6	9.9

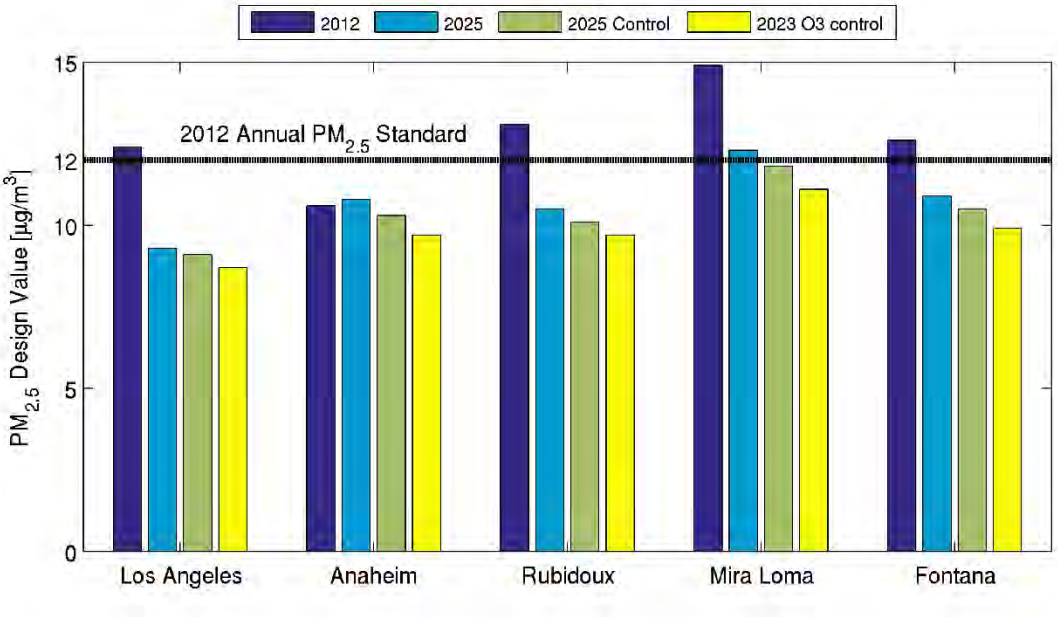

FIGURE 5-12

ANNUAL AVERAGE PM2.5 CONCENTRATIONS. FEDERAL STANDARD IS DENOTED WITH A HORIZONTAL GREY LINE

Spatial Projections of Annual PM2.5 Design Values

Figure 5-13 provides a perspective of the Basin-wide spatial extent of annual PM2.5 design values in the base year, 2012. Figure 5-14 shows the projected PM2.5 concentrations in 2023 with the full implementation of the ozone control strategy, but no additional control on directly emitted PM. The 2025 baseline case does not lead to attainment of the standard (Figure 5-15), but NOx and VOC reductions from non-182(e)(5) control measures are expected to lead to attainment as all the monitoring stations within the Basin exhibit annual PM2.5 levels below the federal standard of 12 µg/m^3 (Figure 5-16).

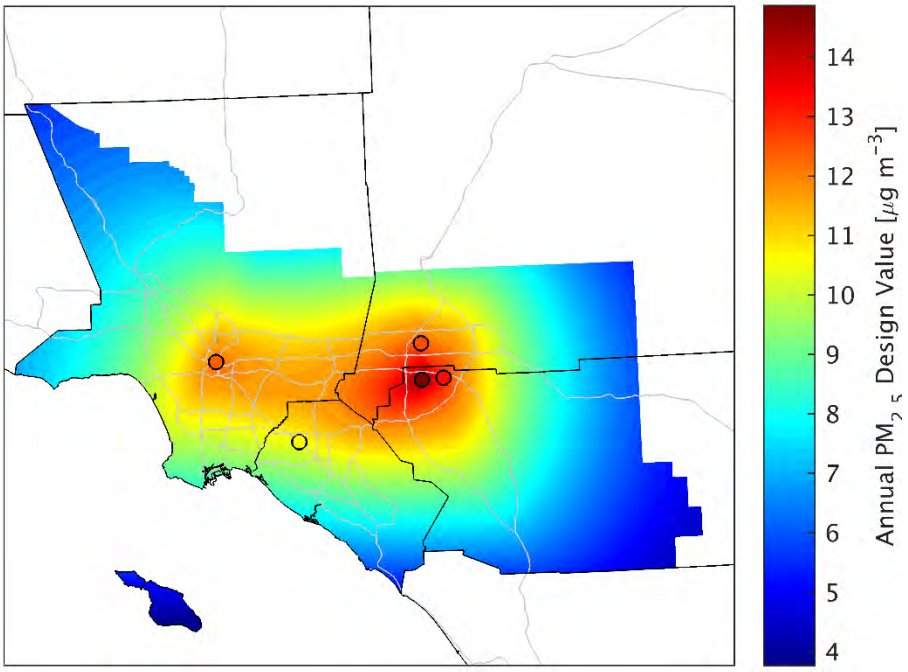

FIGURE 5-13
5-YEAR WEIGHTED ANNUAL PM2.5 DESIGN VALUES (µg/m^3) for 2012

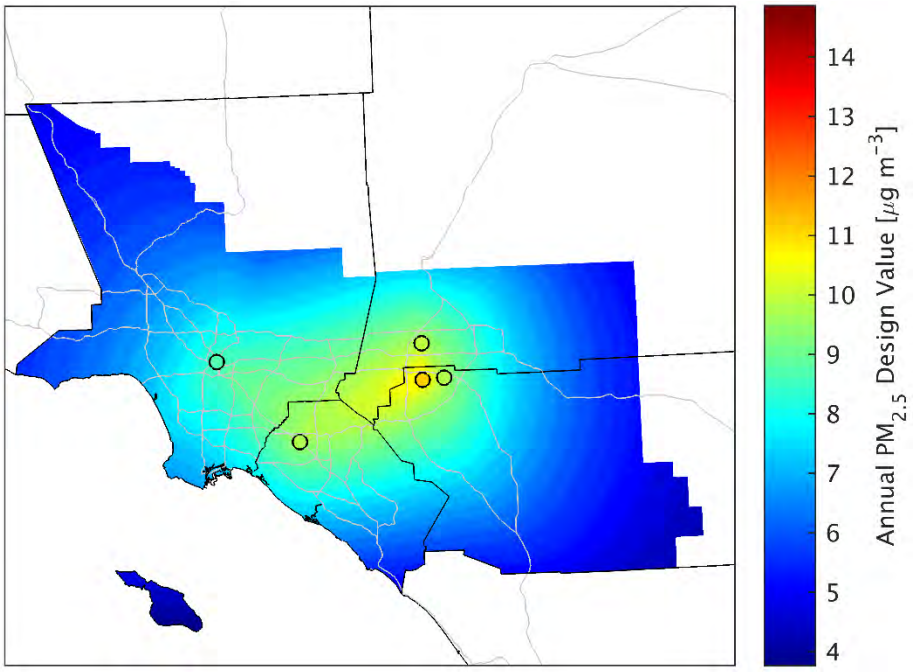

FIGURE 5-14
ANNUAL PM2.5 CONCENTRATIONS (µg/m^3) WITH 2023 8-HOUR OZONE ATTAINMENT SCENARIO

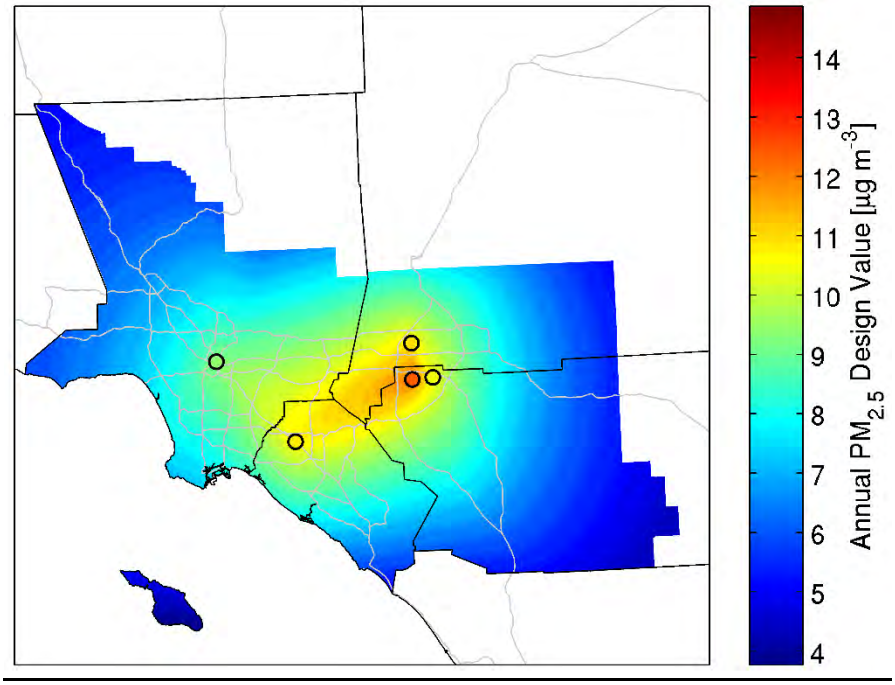

FIGURE 5-15
ANNUAL PM2.5 CONCENTRATIONS (µg/m^3) WITH 2025 BASELINE EMISSIONS

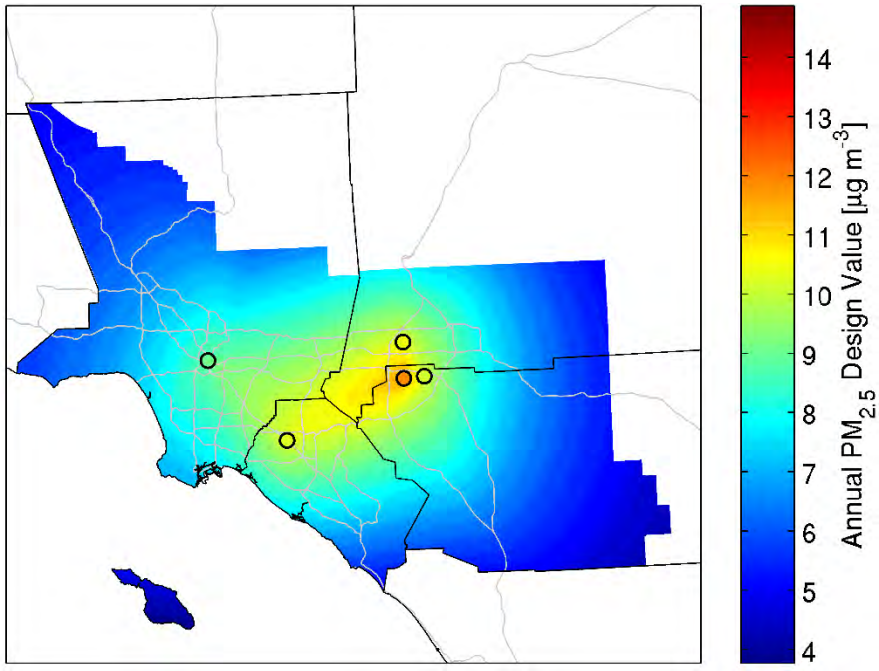

FIGURE 5-16
ANNUAL PM2.5 CONCENTRATIONS (µg/m^3) for 2025 Attainment Scenario

24-Hour PM2.5

A numerical simulation with 2019 baseline emissions was conducted to assess 24-hour PM2.5 attainment status in the Basin. Simulation of the 2019 baseline emissions indicates that the Basin will attain the federal 24-hour PM2.5 standard in 2019 without additional controls (See Table 5-6 and Figure 5-17). This is consistent with the findings of the 2012 AQMP, which demonstrated attainment in 2019 without any additional controls. The projected 2019 design value is 32.1 µg/m^3 at Mira Loma.

The level of 24-hour PM2.5 concentrations projected for 2019 is significantly lower than the standard (35 µg/m^3). While the District is committed to attain as expeditiously as practicable, unforeseen meteorological conditions such as drought or severe wild fire events would hinder the projected attainment. For example, the severe drought that prevailed from 2011 to 2015 delayed the attainment projected in the 2012 AQMP and the subsequent Supplement to the 2012 AQMP. However, the lower projected design value will help to ensure attainment even in the presence of unforeseen meteorological events. Detailed discussions of the impacts of the drought on PM2.5 are included in Appendix V.

TABLE 5-6

24-Hour Average 5-Year Weighted PM2.5 Concentrations (µg/m^3)

Station	2012 Base Year	2019 Baseline
Anaheim	25.8	23.5
Fontana	32.7	28.0
Los Angeles	30.5	27.6
Mira Loma	36.5	31.4
Rubidoux	33.2	28.3

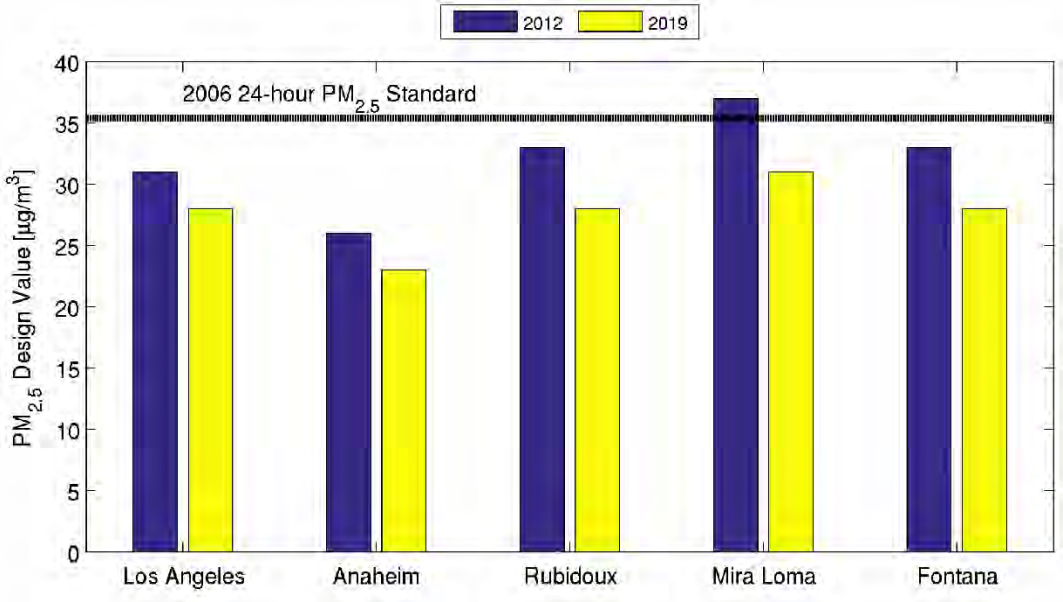

FIGURE 5-17

MAXIMUM 24-HOUR AVERAGE PM2.5 DESIGN CONCENTRATIONS: 2012 BASELINE AND 2019 BASELINE (NO ADDITIONAL CONTROLS).

Spatial Projections of 24-Hour PM2.5 Design Values

Figure 5-18 provides the Basin-wide spatial extent of 24-hour PM2.5 levels in the base year resulting from the interpolation of design values at the four speciation stations and Mira Loma. Several areas around the northwestern portion of Riverside and southwestern portion of San Bernardino Counties depict grid cells with weighted PM2.5 24-hour design values exceeding 35 µg/m^3 in 2012. Figure 5-19 shows an interpolated spatial representation of future model-predicted 24-hour design values in 2019. By 2019, Mira Loma, the PM2.5 24-hour design station, will attain the federal standard. The design values in other areas, determined by interpolation of the five stations, will also attain the federal standard.

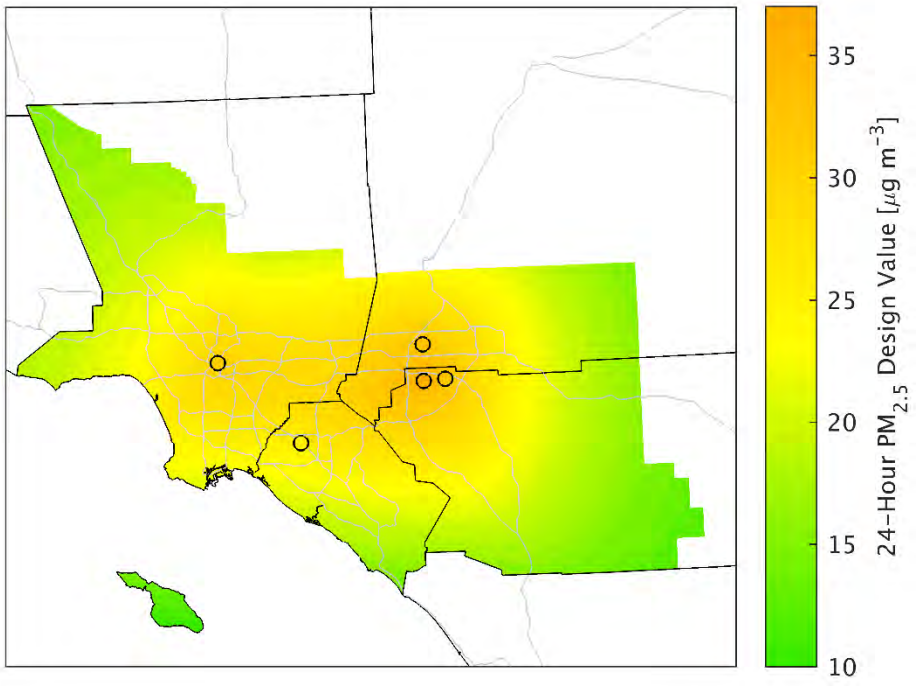

FIGURE 5-18
2012 BASELINE 24-HOUR PM2.5 CONCENTRATIONS (µg/m^3). COLORS CORRESPOND TO THE AIR QUALITY INDEX.

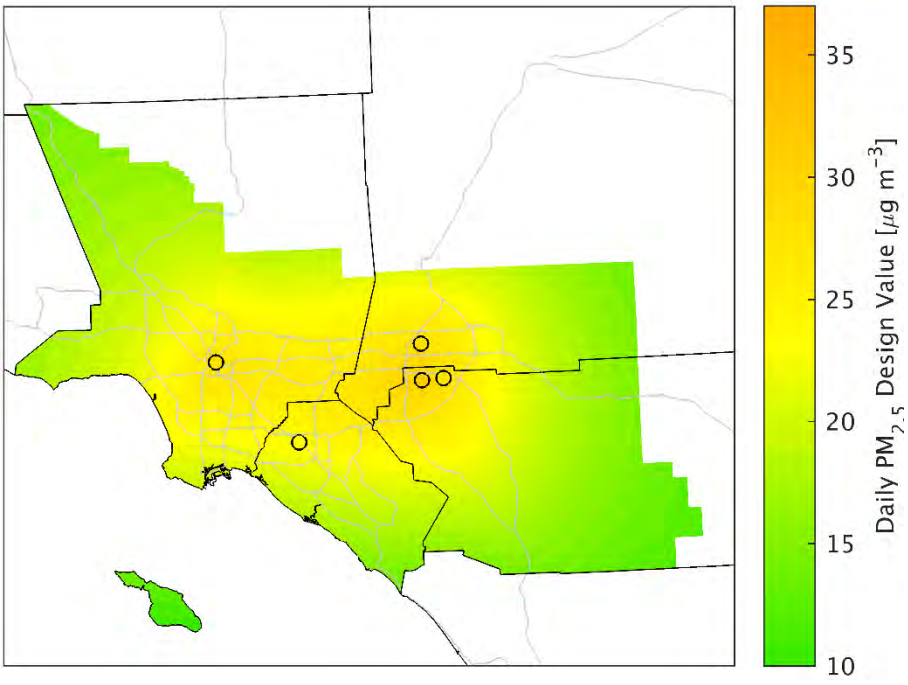

FIGURE 5-19
2019 24-HOUR PM2.5 CONCENTRATIONS (µg/m^3). COLORS CORRESPOND TO THE AIR QUALITY INDEX.

Additional Modeling Analyses

A First Look at Attaining the 2015 8-Hour Ozone Standard

In 2015, the U.S. EPA lowered the federal 8-hour ozone standard to 70 ppb. Recent 8-hour ozone rule implementation guidance requires that a SIP revision with an updated attainment demonstration and control strategy be submitted to U.S. EPA no later than four years after designation. The Basin will likely be designated as an "extreme" nonattainment area for the new standard in 2017, consistent with the classification of the 75 ppb standard. Thus, the deadline for attainment of the 70 ppb standard is 20 years after designation (likely 2037), six years after the attainment deadline for the 75 ppb federal standard. It is critical to conduct preliminary analyses to assess the need for potential adjustments to the overall control strategy when considering this new standard and deadline.

The preliminary projections, based upon ozone "isopleths" developed for the 2031 emission scenarios indicate that 2037 Basin NOx carrying capacity to meet the 70 ppb standard could be as low as 75 TPD. This is additional 62 percent NOx reduction beyond the projected 2037 baseline and 25 TPD of additional NOx emission reductions between 2031 and 2037. Further discussion of the Basin's status relative to the new 2015 8-hour ozone standard is presented in Chapter 8.

Summary and Conclusions

Figure 5-20 shows the Basin-wide maximum 8-hour ozone concentrations in the base year (2012) along with projected design values for the attainment deadline of the 1997 standard of 80 ppb (2023) and for the 2008 standard of 75 ppb (2031). Figure 5-21 shows the same projected design values relative to the California standards. With the controls proposed in the 2016 AQMP, the future year ozone concentrations are expected to meet the federal standards. NOx reductions of approximately 45 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively (Figure 5-22). Approximately 50 TPD of NOx and VOC combined reductions from the 2022 baseline are needed to meet the 1-hour ozone standard in 2022, confirming that the 8-hour standard is a more stringent form than the 1-hour standard. The strategies developed for attainment of the 2023 and 2031 8-hour standards will ensure attainment of the 1-hour standard in 2022 (Table 5-7).

The California standard for 8-hour ozone is 70 ppb, the same level as the 2015 revised federal standard. This state standard will not be achieved by 2031. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 are needed to meet the 70 ppb standard. Challenges in achieving the 70 ppb standard are discussed in Chapter 8.

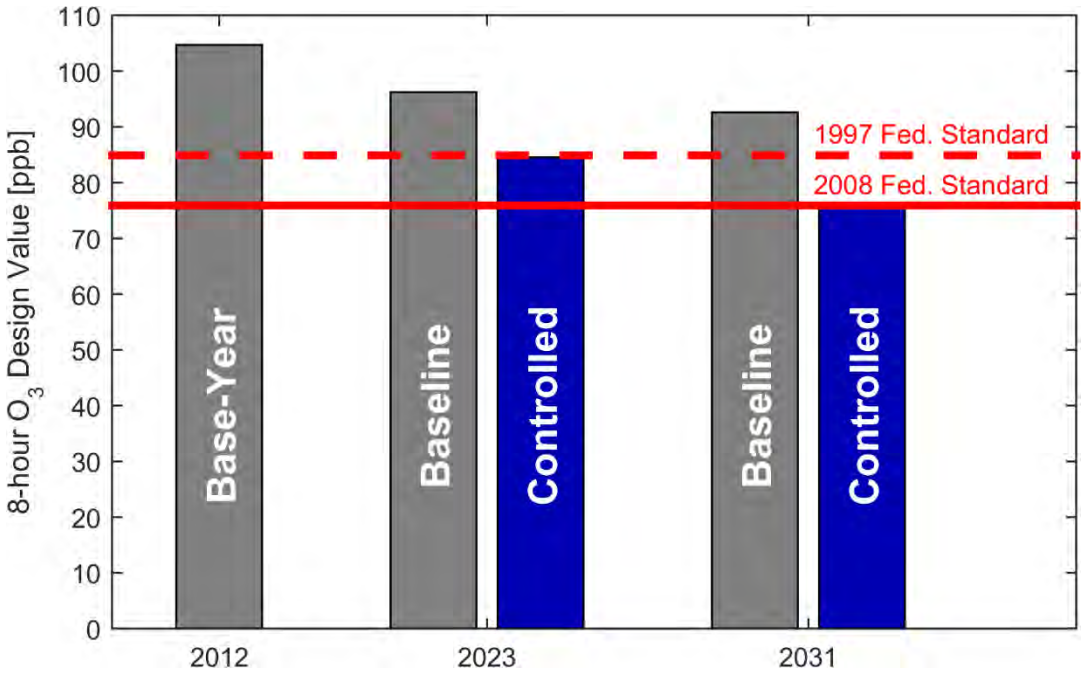

FIGURE 5-20

PROJECTION OF FUTURE 8-HOUR OZONE AIR QUALITY IN THE BASIN IN COMPARISON TO FEDERAL STANDARDS

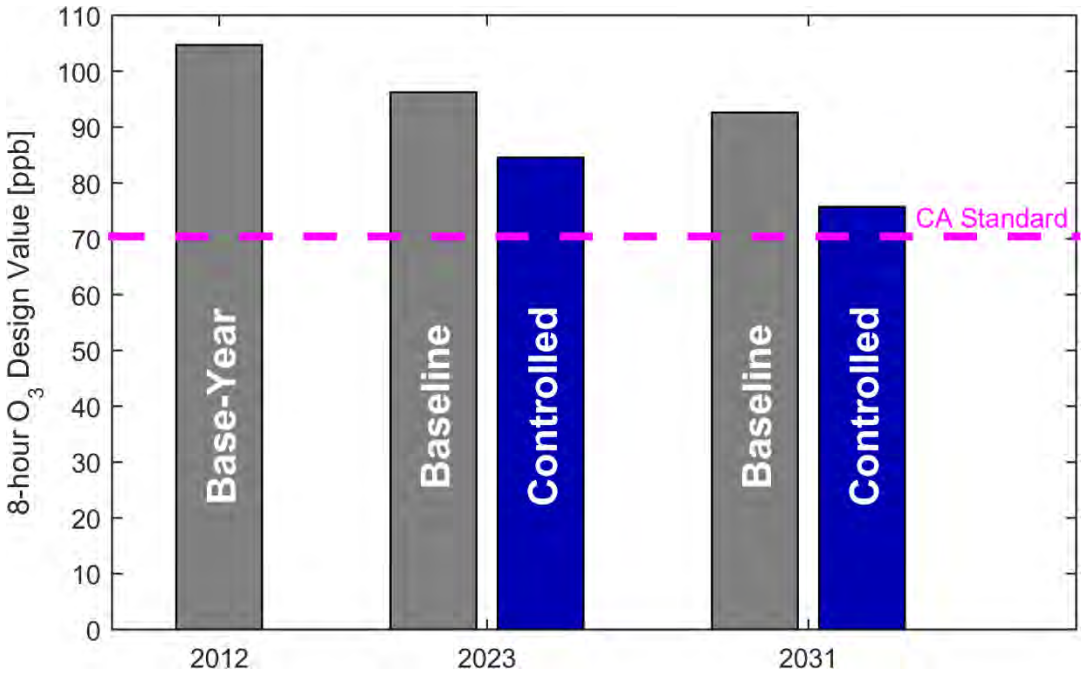

FIGURE 5-21

PROJECTION OF FUTURE 8-HOUR OZONE AIR QUALITY IN THE BASIN IN COMPARISON TO CALIFORNIA STANDARDS

TABLE 5-7

Basin NOx Carrying Capacity for Ozone Attainment

Attainment Year	2022	2023	2031
Federal Standard	1-hr Ozone (120 ppb)	8-hr Ozone (80 ppb)	8-hr Ozone (75 ppb)
NOx Carrying Capacity (TPD)	245*	141	96

*The reductions needed to attain the 1-hour standard can be achieved from either NOx or VOC emissions.

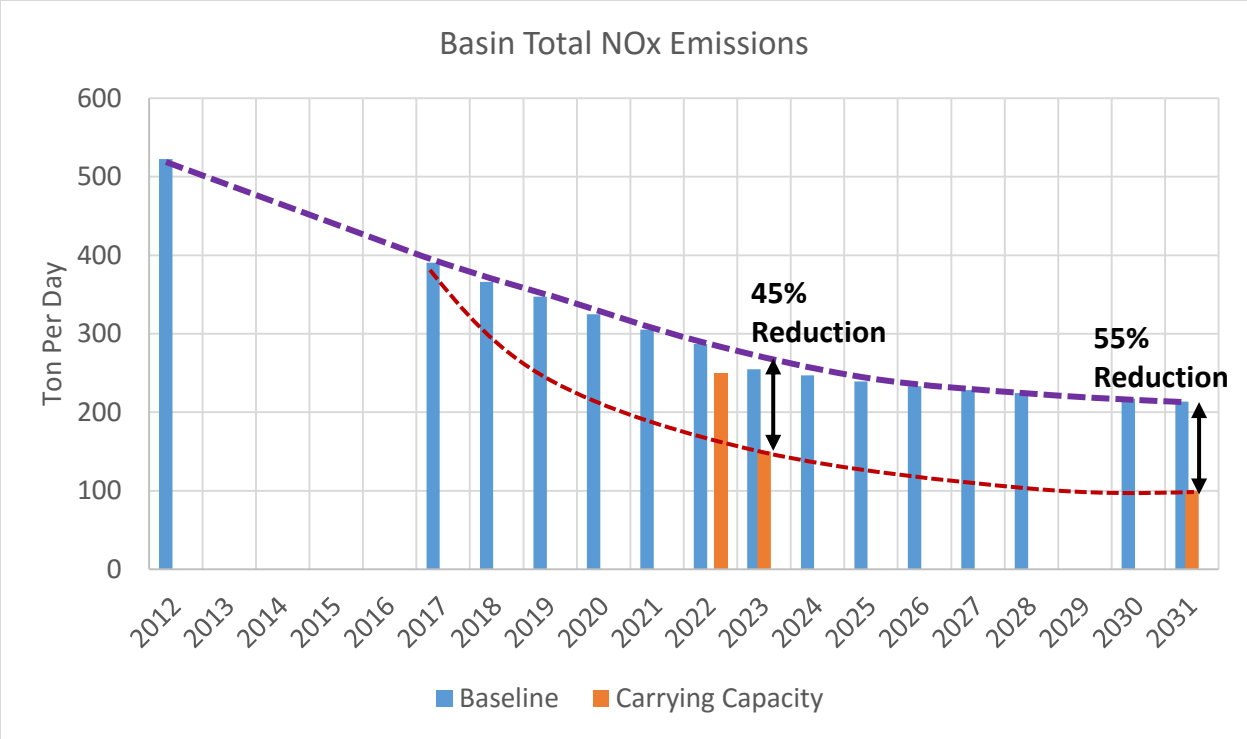

FIGURE 5-22

SUMMER PLANNING BASELINE EMISSIONS AND OZONE CARRYING CAPACITY

Figure 5-23 shows the 2012 observed base-year design value along with the2023 and 2025 model-predicted future design values of annual PM2.5. The federal annual PM2.5 standards are predicted to be achieved in 2023 with implementation of the proposed ozone strategy. However, the federal CAA does not allow 182(e)(5) measures in the attainment demonstration of PM2.5; therefore, an additional scenario using only non-182(e)(5) measures was developed for 2025 to comply with the CAA requirements. With only the non-182(e)(5) measure reductions, the annual PM2.5 standard is expected to be met in 2025.

Table 5-8 presents the future Basin annual PM2.5 design values under each control scenario. Table 5-8 also contains the predicted 2025 design value resulting from the ozone control strategy in the absence of 182(e)(5) measures. Attainment is achieved in 2025 under this scenario.

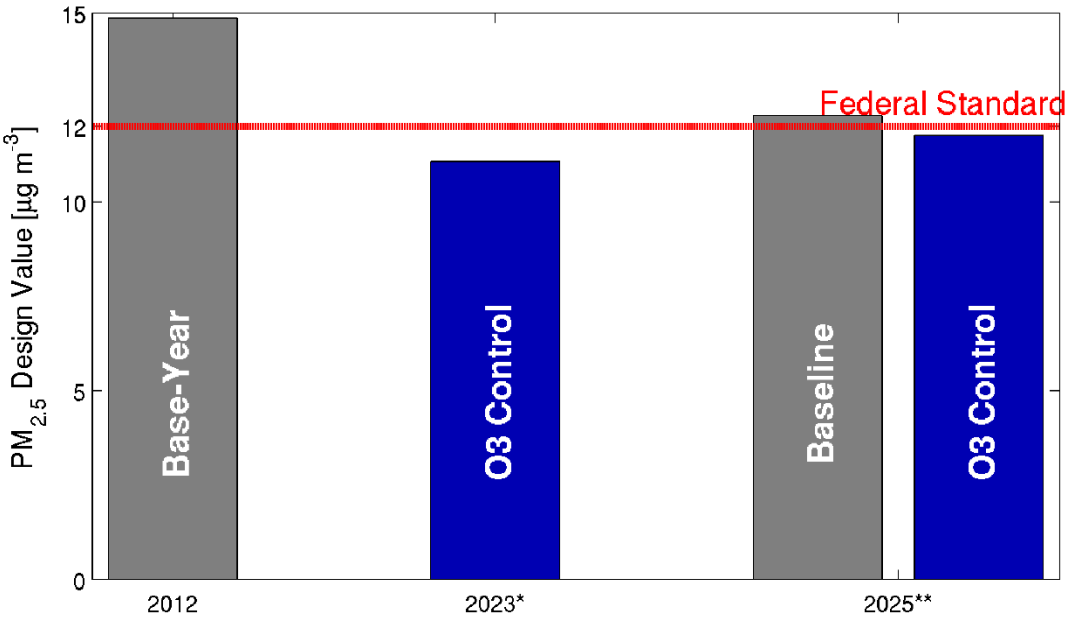

FIGURE 5-23

PROJECTION OF FUTURE ANNUAL PM2.5 AIR QUALITY IN THE BASIN IN COMPARISON WITH FEDERAL STANDARDS

*INCLUDES 182(E)(5) MEASURES
**DOES NOT INCLUDE 182(E)(5) MEASURES

TABLE 5-8

Future Design Values of Annual Average PM2.5 at Mira Loma in µg/m^3

Station	Baseline	Controlled	Control Strategy
2023	12.1	11.1	Ozone co-benefit including 182(e)(5) measures
2025	12.3	11.8	Ozone co-benefit without 182(e)(5) measures

Chapter 6

Federal and State Clean Air Act Requirements



The environmentally historic federal Clean Air Act (CAA) was amended in 1990 to require planning provisions for those areas in the nation not currently meeting the national ambient air quality standards. As such, the AQMP is required to include a series of elements and demonstrations to comply with federal CAA requirements.

In This Chapter

- Introduction 6-1
  Clean Air Act provisions for nonattainment areas
- Federal Air Quality Standards for Fine Particulates 6-2
  Annual and 24-hour PM2.5 standards, milestones, and implementation
- Federal Air Quality Standards for Ozone 6-5
  1-hour and 8-hour ozone standards, milestones, and implementation



- Federal Clean Air Act Requirements for Nonattainment Areas 6-8
  Requirements applicable to 8-hour ozone, annual PM2.5 and 24-hour PM2.5 standards addressed in the 2016 AQMP
- California Clean Air Act Requirements 6-19
  Plan effectiveness, rate of reduction, population exposure reduction and cost-effectiveness rankings
- Conclusion 6-26
  All federal CAA requirements are satisfied

Introduction

The 2016 AQMP is designed to satisfy the SIP submittal requirements of the federal CAA to demonstrate attainment of the 2006 24-hour and 2012 annual PM2.5, and the 2008 8-hour ozone ambient air quality standards, the CCAA triennial update requirements, and the SCAQMD's requirement to update transportation emissions budgets based on the latest approved motor vehicle emissions model and planning assumptions. Specific information related to the air quality and planning requirements for portions of the SSAB under the SCAQMD's jurisdiction are included in Chapter 7. The Final 2016 AQMP will be submitted to U.S. EPA as a SIP revision upon approval by the SCAQMD Governing Board and CARB.

In November 1990, Congress enacted a series of amendments to the CAA intended to intensify air pollution control efforts across the nation. One of the primary goals of the 1990 CAA amendments was to overhaul the planning provisions for those areas not currently meeting the NAAQS. The CAA identifies specific emission reduction goals, requires both a demonstration of reasonable further progress and attainment, and incorporates more stringent sanctions for failure to attain or to meet interim milestones. Title I (*Air Pollution Prevention and Control*) of the CAA contains four parts (Part A through Part D) that provide provisions for air pollution prevention and control. Specifically, Part D describes the Plan requirements for nonattainment areas within six subparts as outlined in Figure 6-1. Subpart 1 describes the general provisions that apply to all applicable criteria pollutants unless superseded by pollutant-specific requirements in Subparts 2 through 5.

There are several sets of general planning requirements in the CAA, both for nonattainment areas [Section 172(c)] and for SIPs in general [Section 110(a)(2)]. These requirements are listed and briefly described in Chapter 1. This chapter presents the CAA requirements for the PM2.5 and ozone NAAQS, and demonstrates how the 2016 AQMP satisfies these requirements.

There are both primary and secondary air quality standards. Primary standards are designed to protect public health including the health of "sensitive" populations including asthmatics, children, and the elderly. Secondary standards protect public welfare and includes the protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

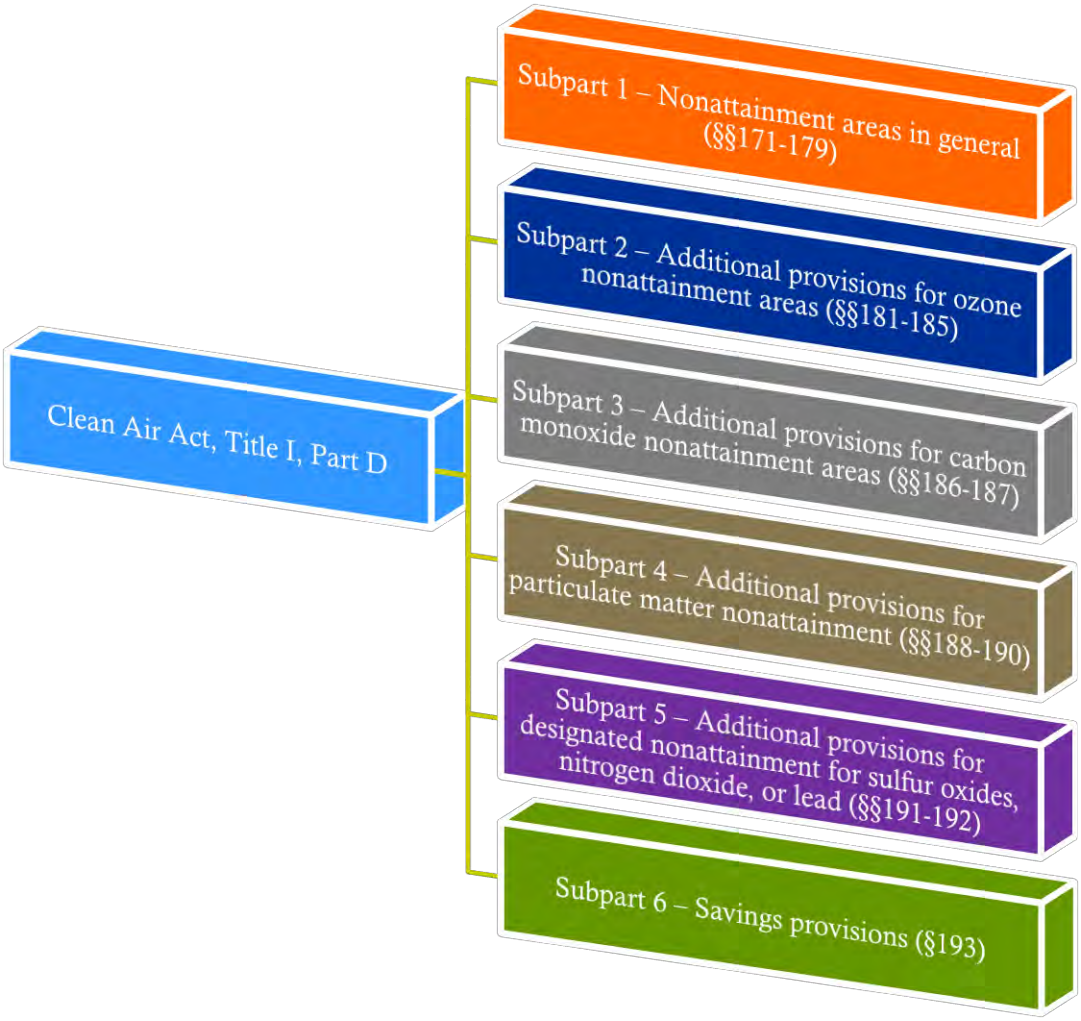

FIGURE 6-1
CLEAN AIR ACT, TITLE I, PART D – PLAN REQUIREMENTS FOR NONATTAINMENT AREAS

Federal Air Quality Standards for Fine Particulates

The U.S. EPA first promulgated the NAAQS for Fine Particles (PM2.5) in July 1997. Following legal challenges, the standards were eventually upheld in March 2002. The annual standard was set at a level of 15 micrograms per cubic meter (µg/m^3), based on the three-year average of annual mean PM2.5 concentrations. The 24-hour standard was set at a level of 65 µg/m^3 based on the three-year average of the 98th percentile of 24-hour concentrations. The U.S. EPA issued nonattainment designations in December 2004, which became effective on April 5, 2005.

In January 2006, the U.S. EPA proposed a more stringent 24-hour PM2.5 standard. Before promulgating new standards, the U.S. EPA follows an extensive review process. That process led U.S. EPA to the conclusion that the existing standards for particulates were not adequate to protect public health. The studies indicated that short-term exposures at levels below the 24-hour standard of 65 µg/m^3 caused acute health

effects, including asthma attacks and respiratory problems. As a result, in 2006 the U.S. EPA established a new, lower 24-hour average standard for PM2.5 at 35 µg/m^3. No changes were made to the annual PM2.5 standard which remained at 15 µg/m^3 at that time. For the 2006 24-hour PM2.5 standard, the form of the standard continues to be based on the 98th percentile of 24-hour PM2.5 concentrations measured in a year (averaged over three years) at the monitoring site with the highest measured values in an area. This form of the standard was determined to be health protective while providing a more stable metric (percentile form) to facilitate effective control programs. Effective December 14, 2009, the U.S. EPA designated the Basin as nonattainment for the 2006 24-hour PM2.5 NAAQS.

On June 14, 2012, the U.S. EPA proposed revisions to strengthen the primary annual PM2.5 NAAQS. The annual component of the standard provides protection against typical day-to-day exposures as well as longer-term exposures, while the daily standard protects against higher short-term events. On December 14, 2012, U.S. EPA strengthened the primary annual PM2.5 standard to 12 µg/m^3 and issued final designations on December 18, 2014, designating the Basin as nonattainment. U.S. EPA retained the secondary annual PM2.5 standard of 15 µg/m^3 and the 24-hour PM2.5 standard of 35 µg/m^3. Monitoring data indicates that the former 1997 primary annual PM2.5 standard of 15 µg/m^3 was attained in the Basin in 2015, but U.S. EPA has not yet formally acted on this finding. Figure 6-2 summarizes the U.S. EPA's PM2.5 standards to date.

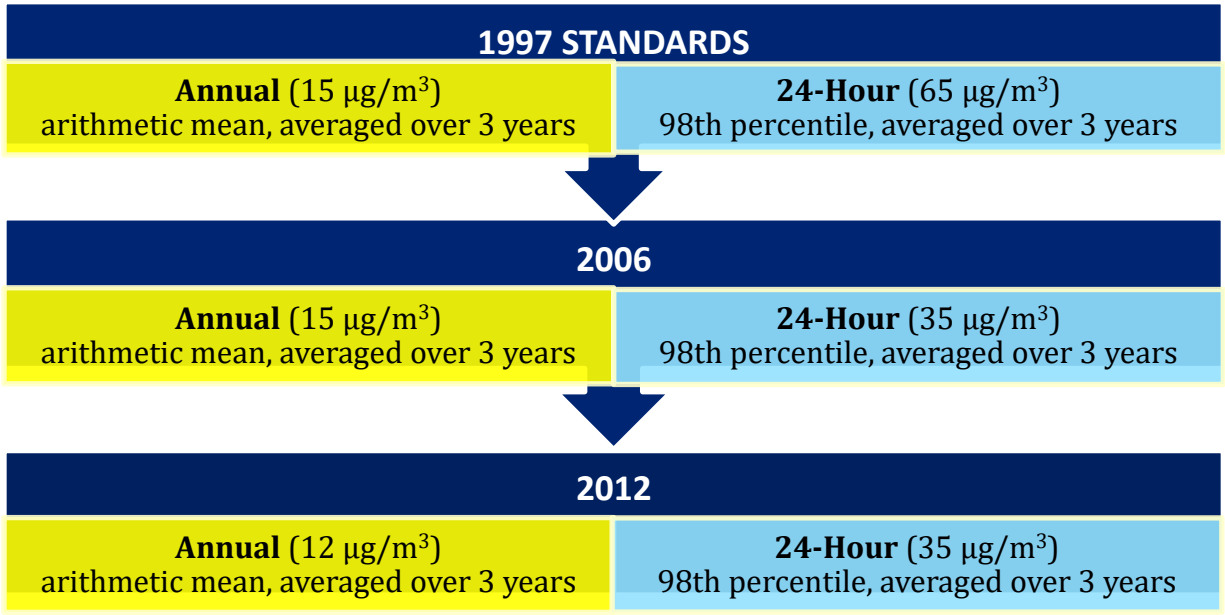

FIGURE 6-2
U.S. EPA'S PM2.5 STANDARDS

For the 2006 24-hour standards, the U.S. EPA required the SIP to be submitted no later than three years after the designation, hence December 14, 2012. The 2012 AQMP projected attainment of the 2006 24-hour PM2.5 NAAQS by 2014; however, due to the effects of the region's several-year drought on air quality, attainment by 2014 was deemed not possible.

In January 2013, the U.S. Court of Appeals, D.C. Circuit, ruled that the U.S. EPA erred in implementing the 1997 PM2.5 NAAQS pursuant solely to the general implementation provisions of Subpart 1, without considering the particulate matter specific provisions of Subpart 4. Although Subpart 4 relates to PM10, the Court reasoned that the plain meaning of the CAA requires implementation of the 1997 PM2.5 standards under Subpart 4 because PM2.5 particles fall within the statutory definition of PM10 and are thus subject to the same statutory requirements as PM10. Subpart 4 is more specific about what states must do to bring areas into attainment through the establishment of a two-tier classification system for nonattainment areas ("moderate" or "serious"). Subpart 4 also has specific provisions regarding regulation of precursors of PM emissions that are not present in Subpart 1. On June 2, 2014, U.S. EPA classified the Basin as "moderate" nonattainment under Subpart 4. In March 2015, U.S. EPA issued "*Proposed Rule for Implementing the National Air Quality Standards for Fine Particles*" that provides the proposed planning requirements framework for the 2012 and future PM2.5 NAAQS pursuant to Subpart 4, in addition to the Subpart 1 provisions. On August 24, 2016, the implementation rule was finalized (81 FR 58010), establishing nonattainment SIP requirements for areas that do not meet the NAAQS for fine particle pollution.

Consistent with Subpart 4, states have until 2021 to meet the 2012 annual PM2.5 standard for "moderate" nonattainment areas, and if necessary, up to four additional years (2025) if the area is re-classified as "serious" nonattainment. Annual PM2.5 emissions in the Basin have experienced a steady decline over the last decade with monitoring data showing attainment of the previous annual PM2.5 standard (15.0 $\mu g/m^3$). The 2016 AQMP demonstrates how the region will achieve the 2012 annual PM2.5 standard (12.0 $\mu g/m^3$) as expeditiously as practicable, but no later than the statutory attainment deadline.

Under Subpart 4, the attainment date for a "moderate" nonattainment area is the end of the 6th calendar year after the effective date of designation, and for a "serious" area, the attainment date is the end of the 10th calendar year after effective date of designation. Therefore, the "moderate" area attainment dates for the Basin are December 31, 2021 for the 2012 annual PM2.5 standard and December 31, 2015 for the 2006 24-hour PM2.5 standard. In July 2015, SCAQMD submitted a formal request to the U.S. EPA to reclassify the Basin as a "serious" nonattainment area for the 24-hour PM2.5 NAAQS based on the monitoring data, which indicated that attainment is not practicable by December 31, 2015.

On October 20, 2015, U.S. EPA issued a proposed rule to partially approve the PM2.5 portion of the 2012 AQMP and the 2015 AQMP Supplement for the 2006 24-hour PM2.5 NAAQS. Approved commitments in the Plan and Supplement included carrying out technology assessments on under-fired charbroilers (by 2017) and livestock waste (by 2016), and NOx RECLAIM reductions by 2015. The attainment demonstration was not approved as it was deemed impractical to attain by 2015 and the region was reclassified as "serious" nonattainment for 24-hour PM2.5, consistent with Subpart 4.

As a result, the 2006 24-hour standard has an attainment date as expeditiously as practicable, but no later than December 31, 2019. A "serious" area attainment plan needs to be submitted no later than 18 months after the effective date, hence, by August 12, 2017. More stringent "serious" nonattainment area requirements apply including implementation of Best Available Control Measures / Best Available Control

Technology (BACM/BACT), a lower major source emissions threshold (from 100 tons per year to 70 tons per year), and an update to the reasonable further progress (RFP) analysis given the longer attainment time frame. Figure 6-3 provides a general timeline for the implementation of the PM2.5 standards in the Basin.

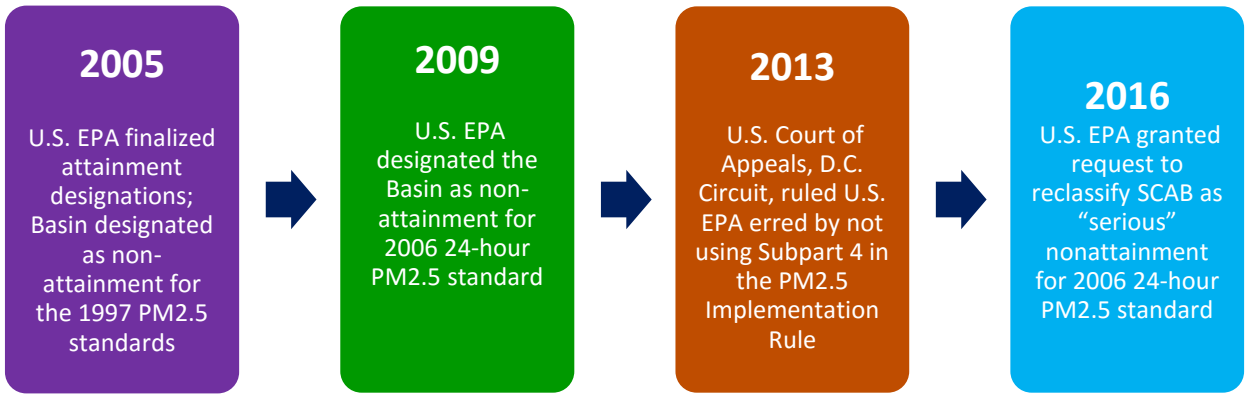

FIGURE 6-3
TIMELINE FOR THE IMPLEMENTATION OF PM2.5 NAAQS IN THE BASIN

Federal Air Quality Standards for Ozone

Background

In 1979, U.S. EPA established a primary health-based NAAQS for ozone at 120 ppb averaged over a 1-hour period. Pursuant to the 1990 CAA amendments, U.S. EPA later classified nonattainment areas on a scale from "marginal" to "extreme," based on the severity of the ozone problem. "Extreme" areas were provided the most time to attain the standard, until November 15, 2010, but with more stringent requirements. The Basin was classified as "extreme" nonattainment on November 6, 1991 and a 1-hour ozone SIP was submitted in 1994 by the SCAQMD and CARB. U.S. EPA approved the 1-hour ozone SIP for the South Coast in 1997 as well as the CARB revisions to the SIP in 2000. Subsequently, revisions to the 1-hour ozone SIP in 2003 included updated emissions inventories along with new commitments to achieve VOC and NOx reductions. In 2009, U.S. EPA approved certain elements of the 2003 SIP but disapproved the attainment demonstration, largely because CARB withdrew emission reduction commitments in 2008 rendering the plan insufficient to demonstrate attainment. U.S. EPA concluded that consequences[1] for a disapproved plan were initially not triggered because U.S. EPA determined that the approved SIP already contained an approved 1-hour attainment demonstration meeting CAA requirements, which was all that was necessary regarding the now revoked 1-hour standard.[2] Litigation on this issue resulted in the Court stating

[1] Consequences include highways sanctions, increased offset ratio (NSR), and a Federal Implementation Plan (FIP) (CAA, Title I, Part D, Subpart 1, Section 179).

[2] In 1997, U.S. EPA promulgated a new more stringent 8-hour ozone standard of 80 ppb to replace the 1-hour standard. *62 Fed. Reg. 38856 (July 18, 1997).*

in 2012 that "U.S. EPA should have ordered California to submit a revised attainment plan for the South Coast after it disapproved the 2003 Attainment Plan."

In response to a U.S. EPA "SIP call" that same year, a plan containing a demonstration of attainment of the 1-hour ozone NAAQS was included as part of the 2012 AQMP and approved by U.S. EPA effective October 3, 2014. U.S. EPA's approval of this plan is in litigation. The Basin has not achieved the current or previous 8-hour or 1-hour NAAQS to date. The 2016 AQMP provides an updated attainment demonstration with the latest NOx and VOC reduction commitments to ensure the 1-hour ozone NAAQS is met by December 31, 2022.

In July 1997, U.S. EPA replaced the 1-hour ozone standard with an 8-hour standard. The 8-hour ozone standard established by U.S. EPA was challenged, and eventually upheld in March 2002. The 1997 8-hour ozone standard was set at 0.08 ppm, calculated as the annual fourth-highest daily maximum 8-hr concentration, averaged over three years. The U.S. EPA finalized Phase 1 of the ozone implementation rule in April 2004. This rule set forth the classifications for nonattainment areas and continued obligations with respect to the existing 1-hour ozone requirements. As described by the Phase 1 rule, the Basin was classified as "severe-17" with an attainment date of June 2021, while the portion of the SSAB under the District's jurisdiction (Coachella Valley Planning Area) was classified as "serious", with an attainment date of June 2013. In May 2010, the U.S. EPA granted the State's request to (1) reclassify the Basin as an "extreme" nonattainment area with an attainment date of 2024 for ozone and (2) designate the Coachella Valley as "severe-15" with an attainment date of 2019. The federal 1-hour ozone standard was revoked, effective June 15, 2005, but "anti-backsliding" measures, including implementation of an approved attainment plan, remain in effect for areas that have not yet attained these standards.

On March 12, 2008, U.S. EPA lowered the NAAQS for ground-level ozone to a level of 75 ppb from the previous standard of 80 ppb, set in 1997. U.S. EPA designated the Basin as "extreme" nonattainment effective July 20, 2012, and pursuant to the CAA Section 181(a)(1), the U.S. EPA requires that all areas with an "extreme" classification meet the 2008 8-hour ozone standard as expeditiously as practicable but no later than 20 years from the effective date of designation, or July 20, 2032. It should be noted that since the attainment deadline falls mid-year, emission reductions need to be in place by January 1, 2031, so that they are realized in the full previous calendar of 2031. The 1997 ozone standard was subsequently revoked effective July 20, 2013, but areas are still subject to anti-backsliding provisions.

In March 2015, U.S. EPA finalized the "Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements.**"** This final rule addresses a range of nonattainment area SIP requirements for the 2008 ozone NAAQS, and serves as a guideline for the development of the 2016 AQMP. In addition, the new 2015 8-hour ozone NAAQS highlights the continuing work needed to meet the new standard. Figure 6-4 summarizes the U.S. EPA's ozone standards to date. Figure 6-5 provides a timeline for the implementation of the ozone standards.

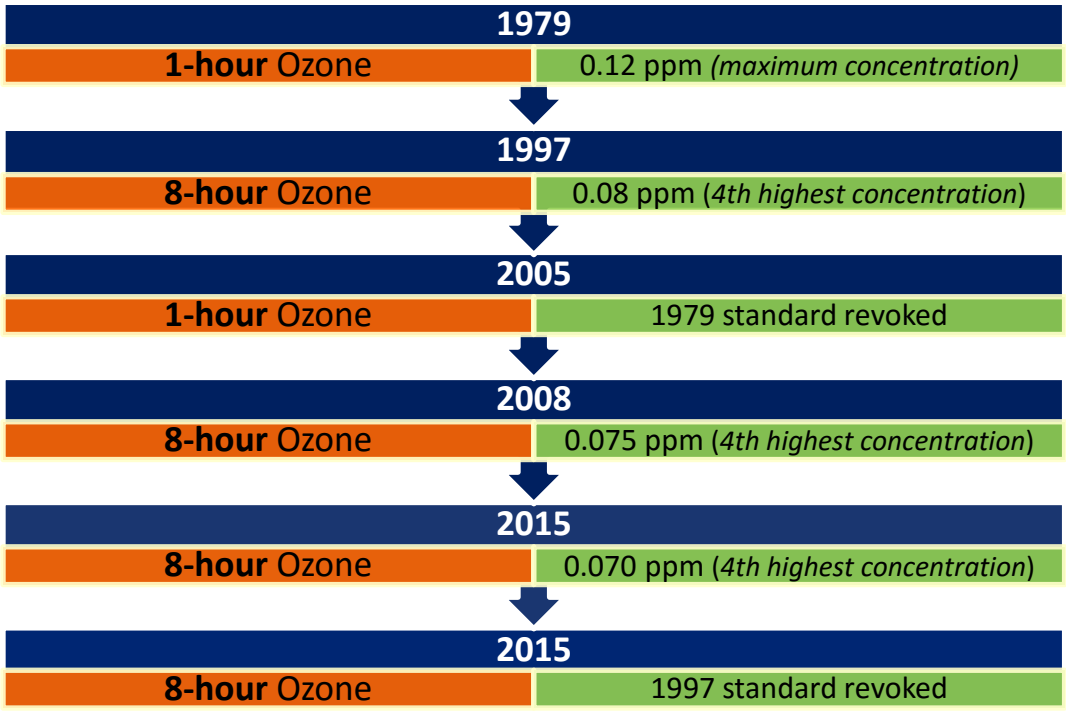

FIGURE 6-4
U.S. EPA'S OZONE STANDARDS

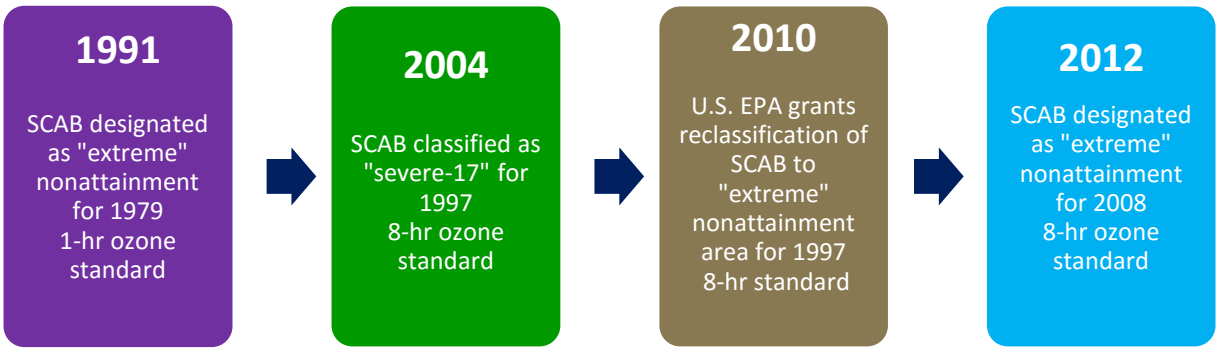

FIGURE 6-5
TIMELINE FOR THE IMPLEMENTATION OF OZONE NAAQS IN THE BASIN

Federal Clean Air Act Requirements for Nonattainment Areas

For areas such as the Basin that are classified nonattainment for the PM2.5 and ozone NAAQS, Section 172 of Subpart 1 of the CAA applies. Section 172(c)(1) of the CAA requires nonattainment areas to provide for implementation of all Reasonably Available Control Measures (RACM) as expeditiously as possible, including the adoption of reasonably available control technology (RACT). Section 172(c)(2) requires that nonattainment areas demonstrate RFP. A comprehensive emission inventory is required under Section 172(c)(3). Nonattainment area SIPs must include control strategies (Section 172(c)(6)), contingency measures (Section 172(c)(9)), and provisions for making demonstrations of conformity (Section 176(c)). However, U.S. EPA's March 2015 ozone implementation rule provides that "extreme" areas with approved Section 182(e)(5) commitments only had to submit contingency measures under three years before the attainment date, and not the general CAA contingency measures. Section 172(c)(5) requires the implementation of a new source review program including the use of "lowest achievable emission rate" for major sources referred to under state law as "Best Available Control Technology" (BACT) for contributors to PM2.5 and precursor emissions (i.e., precursors of secondary particulates).

Subpart 2

Subpart 2 provides additional provisions for ozone nonattainment areas. An attainment demonstration is required under Section 182(c)(2)(A) for areas classified as "serious" or above. Areas classified as "severe" or "extreme" nonattainment are required to demonstrate that sufficient transportation control strategies and transportation control measures have been identified to offset growth in emissions due to growth in vehicle miles traveled (VMT) under Section 182(d)(1)(A). Section 182(g) requires that each nonattainment area (other than an area classified as "marginal" or "moderate") achieve specific emission reduction targets in the applicable milestone years.

Emissions Statements

Subpart 2 Section 182(a)(3)(B)(i) requires "the SIP to require that the owner or operator of each stationary source of oxides of nitrogen or volatile organic compounds provide the State with a statement for classes or categories of sources, showing the actual emissions of oxides of nitrogen and volatile organic compounds from that source." Section 182(a)(3)(B)(ii) waives the requirement if the stationary source emits less than 25 tons per year of VOC or NOx. SCAQMD satisfies this requirement through the approved SCAQMD Rule 301[3] paragraph (e)(2) that requires emission reporting from all sources emitting 4 tons per year or more of VOC/NOx and paying a fee "for all actual source emissions including but not limited to permitted, unpermitted, unregulated and fugitive emissions." Each facility with total emissions greater than or equal to 4 tons per year from each air contaminant (e.g., specific organic gases, oxides of nitrogen, total particulate matter) shall report all emissions and incur emission fees. Thus, Rule 301 requires more stringent reporting

[3] http://www.aqmd.gov/docs/default-source/rule-book/reg-iii/rule-301.pdf?sfvrsn=4.

from VOC and NOx stationary source emissions than is required under the CAA Section 182(a)(3)(B), thus satisfying the Emissions Statements clause.

Subpart 4

Additional provisions for PM nonattainment areas are listed in Subpart 4. Section 189 requires states with nonattainment areas to submit an attainment demonstration. Section 189(c) requires the submission of quantitative milestones every three years until the attainment date. Under Section 189(e), control requirements that apply to PM2.5 are also applicable to the precursors of PM, namely NOx, SO_2, VOC and ammonia. Best Available Control Measures (BACM) are required for "serious" nonattainment areas under Section 189(b)(1)(B).

Table 6-1 summarizes the federal CAA requirements for the 2006 and 2012 PM NAAQS and the 2008 Ozone NAAQS, and outlines the 2016 AQMP chapters and appendices that fulfill the statutory requirements; for Coachella Valley, part of these plan provisions, such as attachment status, RFP and milestones, and VMT offset, are presented in Chapter 7.

While U.S. EPA revoked the 1979 1-hour ozone standard in 2005, the U.S. EPA's published "SIP call" proposal on September 19, 2012 found the then-approved 1-hour ozone SIP substantially inadequate to provide for attainment of the revoked 1-hour ozone standard by the applicable attainment date of November 15, 2010. U.S. EPA's proposed SIP call was in response to the decision of the Ninth Circuit Court of Appeals in *Association of Irritated Residents v. United States Environmental Protection Agency,* 686 F. 3d 668 (Amended January 12, 2012). As a result, the 2012 AQMP included an attainment demonstration for the 1-hour ozone standard and included demonstrations to address the VMT emissions offset requirements of CAA Section 182(d)(1)(A). Approval of this plan is under litigation. As U.S. EPA replaced the 1997 8-hour ozone standard with a more health-protective 2008 8-hour ozone standard, the 1997 ozone standard was revoked in April 2015. With respect to the 1997 8-hour ozone standard, the SCAQMD indicated that, while the 2012 AQMP updated the approved 1997 8-hour ozone control strategy with new measures for VOC and NOx reductions, it was not intended as an update to other elements of the approved 8-hour ozone control plan. In August 2014, U.S. EPA approved "*South Coast Extreme 1-Hour Ozone Attainment Demonstration and 1-Hour and 8-Hour VMT Offset Demonstrations"* of the 2012 AQMP.

TABLE 6-1

Federal Clean Air Act Requirements

Requirement	Federal CAA Section	Applicability				2016 AQMP
		2008 8-hr Ozone (Extreme)	2012 Annual PM2.5 (Moderate)	2012 Annual PM2.5 (Serious)	2006 24-hr PM2.5 (Serious)	
Emission Inventory	Subpart 1 §172(c)(3) Ozone - Subpart 2 182(a)(1)	✓	✓	✓	✓	Chapter 3 & Appendix III
Reasonably Available Control Measures (RACM)	Subpart 1 §172(c)(1) Ozone – Subpart 2 182(b)(2)	✓	✓			Appendix VI-A
Best Available Control Measures (BACM)	Subpart 4 §189(b)(1)(B)			✓	✓	Appendix VI-A
Control Strategy & Other Measures	Subpart 1 §172(c)(6)	✓	✓	✓	✓	Chapter 4, Appendix IV & Appendix VI-C
Attainment Demonstration	Ozone - Subpart 2 §182(c)(2)(A) & 182(e) PM - Subpart 4 §189(a)(1)(B) & §189(b)(1)(A)	✓		✓	✓	Chapter 5, Chapter 7 & Appendix V
Impracticability Demonstration	PM - Subpart 4 §189(a)(1)(B)		✓			Appendix VI-B
Reasonable Further Progress (RFP) & Milestones	Subpart 1 §172(c)(2) Ozone - Subpart 2 §182(c)(2)(B) & §182(g) PM - Subpart 4 §189(c)	✓	✓	✓	✓	Appendix VI-C
Contingency Measures	Subpart 1 §172(c)(9)	✓		✓	✓	Chapter 4 & Appendix IV
General Conformity	Subpart 1 §176(c)	✓	✓	✓	✓	Appendix VI-D
Transportation Conformity	Subpart 1 §176(c)	✓	✓	✓	✓	Appendix VI-D
Vehicle Miles Traveled (VMT) Offset	Subpart 2 §182(d)(1)(A)	✓	n/a*			Appendix VI-E
PM Precursors	Subpart 4 §189(e)		✓	✓	✓	Appendix VI-F
New Source Review (NSR)	Subpart 1 §172(c)(5) & §173; §182(e)(1&2) PM - Subpart 4 §189(b)(3)	✓	✓	✓	✓	Appendix VI-G

TABLE 6-1 (CONCLUDED)

Federal Clean Air Act Requirements

Requirement	Federal CAA Section	Applicability				2016 AQMP
		2008 8-hr Ozone (Extreme)	2012 Annual PM2.5 (Moderate)	2012 Annual PM2.5 (Serious)	2006 24-hr PM2.5 (Serious)	
Emissions Statements	Subpart 2 §182(a)(3)(B)	✓	n/a*			Chapter 6
Vehicle Inspection/Maintenance (I/M) Programs	Subpart 2 §182(b)(4) & Subpart 2 §182(c)(3)	✓	n/a*			Appendix IV-B
Clean Fuels Fleet Program	Subpart 2 §182(c)(4)	✓	n/a*			CARB motor vehicle program from prior SIP submittals
Clean Fuels for Boilers	Subpart 2 §182(e)(3)	✓	n/a*			SCAQMD Rule 2002 and Rule 1146
Transportation Control Measures during Heavy Traffic Hours	Subpart 2 §182(e)(4)	✓	n/a*			Appendix IV-C
Enhanced (Ambient) Monitoring	Subpart 2 §182(c)(1)	✓	n/a*			2016 Annual Air Quality Monitoring Network Plan, Chapter 2 & Appendix II
Transportation Controls	Subpart 2 §182(c)(5)	✓	n/a*			Appendix IV-B, Appendix IV-C & Appendix VI
NOx Requirements	Subpart 2 §182(f)	✓	n/a*			Appendix III, Appendix IV & Appendix VI
Penalty Fee Program Requirements	Subpart 2 §185	TBD	n/a*			-
Contingency Measures Associated with Areas Utilizing CAA §182(e)(5)	Subpart 2 §182(e)(5)	✓	n/a*			Chapter 4 and Appendix VI-C

* §182 or §185 requirements not applicable to PM

Table 6-2 provides the explanation of the different requirements and conclusions as to how the requirements are satisfied.

TABLE 6-2

Requirements and Compliance Conclusions

Requirement	Clean Air Act Title I Part D Definition	Analysis
Emission Inventory	A comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutants in such area.	Annual average and summer planning emissions from all criteria pollutants from point, area, and mobile sources are provided in Chapter 3 and Appendix III for base year (2012) and attainment years for the ozone and PM standards.
Reasonably Available Control Measures (RACM)	Lowest emissions met with reasonably available (technical and economic feasibility) technology for mobile, area, and point sources, that can collectively advance the attainment date by at least one year. Does not include unenforceable or impractical measures.	Appendix VI-A contains analyses of all potential control measures for emission reduction opportunities, as well as economic and technological feasibility. The analyses concluded that the SCAQMD's rules and regulations were in general equivalent to, or more stringent than other districts' rules and regulations. For areas where improvements are possible, they are included as plan commitments or have been targeted for further evaluation.

TABLE 6-2 (CONTINUED)

Requirements and Compliance Conclusions

Requirement	Clean Air Act Title I Part D Definition	Analysis
Best Available Control Measures (BACM)	The maximum degree of emission reductions achievable from a source or source category, considering energy, economic, and environmental impacts. They also need to advance the attainment date by at least one year. BACM is more stringent than RACM.	Appendix VI-A contains analyses of all potential control measures for emission reduction opportunities, as well as economic and technological feasibility. The analyses concluded that the SCAQMD's rules and regulations were in general equivalent to, or more stringent than other districts' rules and regulations. For areas where improvements are possible, they are included as plan commitments or have been targeted for further evaluation.
Control Strategy & Other Measures	Further emission reductions achieved from actions such as requiring air pollution control technologies and emission reduction programs.	Chapter 4 and Appendix IV provide the comprehensive control strategy that includes SCAQMD stationary and mobile measures, CARB mobile source and consumer product emission reductions, and federal actions.
Attainment Demonstration	Apply the proposed control strategy implemented as "expeditiously as practicable" to demonstrate attainment of standards based on photochemical grid modeling pursuant to U.S. EPA guidance.	Chapter 5 and Appendix V provide the attainment demonstration of the ozone standards by the statutory deadlines with the implementation of the control strategy. 24-hr PM2.5 levels will attain the standard with baseline emissions, and annual PM2.5 levels will meet the "serious" nonattainment deadline with implementation of the ozone control strategy

TABLE 6-2 (CONTINUED)

Requirements and Compliance Conclusions

Requirement	Clean Air Act Title I Part D Definition	Analysis
Impracticability Demonstration	If "moderate" area PM attainment is demonstrated as impracticable, an area can request a reclassification to "serious" nonattainment, thus providing more time to comply, along with stricter requirements such as a BACM.	Appendix VI-B determines it is impracticable for the region meet the annual PM2.5 by the "moderate" nonattainment area deadline of 2021, even after implementing all feasible measures as expeditiously as practicable.
Reasonable Further Progress (RFP) & Milestones	Annual incremental reductions in emissions of relevant air pollutant(s) generally linear to the attainment year.	As shown in Appendix VI-C, baseline VOC emissions result in a shortfall of RFP, but substitution of baseline NOx reductions make up the shortfall. Baseline PM2.5 emissions project no shortfall for PM2.5 or precursors for each milestone year through the attainment year.
Contingency Measures	Additional measure to be implemented if area fails to meet RFP milestones or attainment date based on one-year's worth of reductions. Must be fully adopted and ready to implement.	Adequate contingency measures have been provided and are discussed in Chapter 4 and Appendix IV-A.
General Conformity	SIP must account for any federal action to determine if emissions increases are less than the de minimis thresholds for the relevant pollutants or precursors. If greater, then a positive conformity determination is needed.	General conformity budgets have been established in a set-aside account, along with a tracking system for federal actions to ensure conformity is being met. More details can be found in Appendix VI-D.
Transportation Conformity	Transportation plans and programs should not cause or contribute to any new violation of a standard, increase the frequency or severity of any existing violation, or delay the timely attainment of the air quality standards.	Motor vehicle emissions budgets have been established for the purpose of ensuring the conformity of transportation plans and programs. The budgets can be found in Appendix VI-D.

TABLE 6-2 (CONTINUED)

Requirements and Compliance Conclusions

Requirement	Clean Air Act Title I Part D Definition	Analysis
Vehicle Miles Traveled (VMT) Offset	Requires offset of emission increases due to VMT. U.S. EPA allows vehicle technology improvements, motor vehicle fuels, and other transportation- related strategies to offset VMT.	Appendix VI-E demonstrates that emission increases from VMT growth is adequately offset by technology improvements and transportation strategies.
PM Precursors	Subpart 4 states control requirements for major stationary sources of PM also apply to major stationary sources of the precursors of PM unless the precursors do not significantly contribute to PM levels (CAA §189(e)).	As presented in Appendix VI-F, all four PM2.5 precursors, namely ammonia, NOx, SOx, and VOC, are considered in the evaluation of control measures. Data and analyses of the four PM2.5 precursors are included in various elements of the 2016 AQMP.
New Source Review (NSR)	A permitting requirement for new and modified major stationary sources.	SCAQMD's NSR program complies with ozone non-attainment requirements. Rule 1325 is currently being amended to include VOC and ammonia as PM2.5 precursors and to incorporate changes to the major source threshold for "serious" non-attainment areas.
Emissions Statements	Owner or operator of each stationary source of NOx or VOC provides statement for classes or categories of sources, showing the actual emissions of NOx and VOC from that source.	The SCAQMD satisfies this requirement through the approved SCAQMD Rule 301 paragraph (e)(2) that requires emission reporting from all major stationary sources of NOx and VOC greater than or equal to four tons per year.

TABLE 6-2 (CONTINUED)

Requirements and Compliance Conclusions

Requirement	Clean Air Act Title I Part D Definition	Analysis
Vehicle I/M Program	The I/M regulations establish minimum performance standards for "basic" and "enhanced" I/M programs as well as various testing requirements.	Under California law, the Bureau of Automotive Repair (BAR) is responsible for developing and implementing the smog check program. On July 1, 2010, EPA approved California's inspection and maintenance program as meeting the requirements of the CAA (75 FR 38023). Details about proposed control measure of the smog check program can be found in Appendix IV-B.
Clean Fuels Fleet Program	Under Clean-Fuel Fleet (CFF) program, a specified percentage of vehicles purchased by fleet operators for covered fleets shall be clean-fuel vehicles and shall use clean alternative fuels when operating in the covered area.	CARB submitted its Low Emission Vehicle (LEV) program with enhancements as part of its 1994 ozone SIP on November 15, 1994. EPA approved the substitution of the LEV program for a Clean Fuel Fleet program into the California SIP on August 27, 1999 (64 FR 46849).
Clean Fuels for Boilers	Each new, modified, and existing electric utility and industrial and commercial boiler that emits more than 25 tons per year (tpy) of NOX to either burn as its primary fuel natural gas, methanol, or ethanol (or a comparably low polluting fuel), or use advanced control technology (such as catalytic control technology or other comparably effective control methods).	SCAQMD Rule 1146 and SCAQMD NOx RECLAIM program (Rule 2002) satisfy the requirements of CAA section 182(e)(3). Under SCAQMD Rule 1303, new or modified boiler emitting at least 10 tpy of NOx or VOC is required to employ Best Available Control Technology, which must be at least as stringent as the Lowest Achievable Emissions Rate (LAER) as defined in CAA section 171(3).
Transportation Control Measures during Heavy Traffic Hours	Provisions establishing traffic control measures applicable during heavy traffic hours to reduce the use of high polluting vehicles or heavy-duty vehicles	This is an optional requirement. Control measures regarding transportation control measure can be found in Appendix IV-C

TABLE 6-2 (CONCLUDED)

Requirements and Compliance Conclusions

Requirement	Clean Air Act Title I Part D Definition	Analysis
Transportation Controls	Submit a demonstration as to whether current aggregate vehicle mileage, aggregate vehicle emissions, congestion levels, and other relevant parameters are consistent with those used for the area's demonstration of attainment	Transportation controls for this AQMP can be found in Appendix IV-B and Appendix IV-C. Transportation conformity and VMT offset analysis can be found in Appendix VI-D and Appendix VI-E, respectively.
Enhanced (Ambient) Monitoring	Enhanced monitoring of ozone, oxides of nitrogen, and volatile organic compounds.	The SCAQMD's 2016 Annual Air Quality Monitoring Network Plan describes the steps taken to address the requirements of section 182(c)(1). It includes descriptions of the Photochemical Assessment Monitoring stations (PAMS) program. Monitoring data used for attainment demonstration and air quality modeling can be found in Chapter 2 and Appendix II.
NOx Requirements	Major stationary sources of NOx are subject to the provisions in Subpart 2 §182 (c), (d) & (e).	Emission inventory and control strategy for major stationary sources of NOx can be found in Appendix III and Appendix IV, respectively. Other requirements such as RACM/BACM demonstration and NSR can be found in Appendix VI.
Penalty Fee Program Requirements	Section 185 requires each major stationary source of VOC and NOx to pay an annual fee for emissions in excess of 80 percent of the emissions baseline if an area fails to attain the ozone standards by its applicable attainment date.	TBD
Contingency Measures Associated with Areas Utilizing CAA §182(e)(5)	Commitments to develop and adopt contingency measures to be implemented if the anticipated technologies as described in §182(e)(5) do not achieve planned reductions.	Contingency measures can be found in Chapter 4. Appendix VI-C describes the 3% emission reduction for contingency for the 2008 8-hour ozone standard.

As measures from the more recent ozone and PM standards continue to be implemented, the District anticipates that the revoked 1979 and 1997 ozone standards will be attained. While the 2016 AQMP strengthens its control strategies to address the 2008 8-hr ozone NAAQS, it also provides updated control strategies with new measures for NOx and VOC reductions, and attainment demonstrations for the revoked ozone standards. Chapter 5 demonstrates that the District will attain the revoked 1-hour ozone standard in 2022, and the revoked 1997 8-hour ozone standard in 2023, with implementation of the already adopted and proposed measures. More details on the attainment demonstration for the revoked 1979 1-hr ozone standard and the revoked 1997 8-hr ozone standard can be found in Appendix V. Table 6-3 summarizes the anti-backsliding provisions for the revoked ozone standards and the applicable documents that demonstrate that the District fulfilled such requirements.

TABLE 6-3

Anti-backsliding Requirements for Revoked Ozone Standards

	Compliance Demonstration	
Applicable Requirements (40 CFR, Subpart X, §51.1100)	**1-hour Standard**	**1997 8-hour Standard**
1) Reasonably Available Control Technology (RACT) (CAA §172(c)(1), §182(b)(2))	Appendix VII, 2012 AQMP	Appendix VI, 2007 AQMP
2) Vehicle Inspection/Maintenance (I/M) programs (CAA §182(b)(4), §182(c)(3))	Appendix VII, 2012 AQMP	Chapter 4/ Appendix IV-B 2007 AQMP
3) Major source applicability cutoffs for purpose of RACT (CAA §172(c)(2), §182(b)(2), §182(b)(1)(A)(ii), §182(c), §182(d), §182(e), §182(f))	RACT Rules go below Major Source thresholds	
4) Reasonable Further Progress (RFP)/ Rate of Progress (ROP) reductions (CAA §172(c)(2), §182(b)(1)(A), §182(c)(2)(B))	2003 AQMP	Chapter 6, 2007 AQMP
5) Stage II vapor recovery[4]	2003 AQMP	n/a
6) Clean fuels fleet program (CAA §182(c)(4))	2003 AQMP	2007 AQMP
7) Clean fuels for boilers (CAA §182(e)(3))	2003 AQMP	2007 AQMP
8) Transportation control measures (TCMs) during heavy traffic hours (CAA §182(e)(4))	Appendix VII, 2012 AQMP	Chapter 4/ Appendix IV-C, 2007 AQMP
9) Enhanced (ambient) monitoring (CAA §182(c)(1))	Appendix VII, 2012 AQMP	Appendix V, 2007 AQMP
10) Transportation controls (CAA §182(c)(5))	Appendix VII, 2012 AQMP	Chapter 4/ Appendix IV-C, 2007 AQMP
11) Vehicle miles traveled provisions (CAA §182(d)(1)(A))	Appendix VIII, 2012 AQMP	Appendix VIII, 2012 AQMP
12) NOx requirements (CAA §182(f))	2003 AQMP	2007 AQMP

[4] Listed in 40 CFR, Subpart X, §51.900 but not in §51.1100.

TABLE 6-3 (CONCLUDED)

Anti-backsliding Requirements for Revoked Ozone Standards

	Compliance Demonstration	
Applicable Requirements (40 CFR, Subpart X, §51.1100)	**1-hour Standard**	**1997 8-hour Standard**
13) Attainment demonstrations (CAA §182(c)(2)(A), §189(a)(1)(B), §189(b)(1)(A))	Appendix VII, 2012 AQMP	Chapter 5/ Appendix V, 2007 AQMP
14) Nonattainment contingency measures (CAA §172(c)(9); §182(e)(5)) for failure to attain NAAQS or make RFP toward attainment	Appendix VII, 2012 AQMP	Chapter 9, 2007 AQMP
15) Nonattainment new source review (NSR) major source threshold and offset ratios (CAA §172(c)(5), §182(e)(3), §189(b)(3)) ("serious" PM)	SCAQMD Reg. XIII Rule 1325	SCAQMD Reg. XIII Rule 1325
16) Penalty fee program requirements for "severe" and "extreme" areas (CAA §185)	SCAQMD Rule 317	TBD
17) Contingency measures associated with areas utilizing CAA §182(e)(5)	Appendix VII, 2012 AQMP	Chapter 9, 2007 AQMP
18) Reasonably Available Control Measures (RACM) (CAA §172(c)(1), 189(a)(1)(C))[1]	Appendix VII, 2012 AQMP	Appendix VI, 2007 AQMP

California Clean Air Act Requirements

The Basin is designated as nonattainment with the state ambient air quality standards for PM10, PM2.5 and ozone. The CCAA requires that a plan for attaining the ozone standard be reviewed, and revised as necessary, every three years (Health & Safety Code § 40925). The Final 2016 AQMP satisfies this triennial update requirement. The CCAA established a number of legal mandates to facilitate achieving health-based state air quality standards at the earliest practicable date. The following CCAA requirements do not directly apply to particulate matter plans but are directed at ozone as described in the remainder of this chapter:

(1) Demonstrate attainment by the earliest practicable date (Health & Safety Code § 40913);

(2) Reduce nonattainment pollutants at a rate of 5 percent per year, or include all feasible measures and an expeditious adoption schedule (Health & Safety Code § 40914);

(3) Reduce population exposure to "severe" nonattainment pollutants according to a prescribed schedule (Health & Safety Code § 40920(c)); and

(4) Rank control measures by cost-effectiveness (Health & Safety Code § 40922).

Plan Effectiveness

The CCAA requires, beginning on December 31, 1994 and every three years thereafter, that the District assess its progress toward attainment of the state ambient air quality standards [Health & Safety Code § 40924(b)] and that this assessment be incorporated into the District's triennial plan revision. To demonstrate the effectiveness of the District's program, air quality trends since 1990 depicting maximum pollutant concentrations are provided in Figure 6-6. While this statute does not apply to particulate matter, it is useful to discuss progress towards attainment of the PM10 and PM2.5 standards. Basin annual average PM10 concentrations have decreased continuously since 1990 from a high of nearly 80 µg/m^3 to a 2015 level of 48.8 µg/m^3. PM2.5 annual concentrations have decreased by more than 50 percent since 1999 to a 2015 level of 13.3 µg/m^3. The state annual standards are 20 µg/m^3 and 12 µg/m^3 for PM10 and PM2.5, respectively.

One-hour ozone concentrations have decreased by more than 50 percent since 1990 to a 2015 level of 0.144 ppm. Eight-hour ozone concentrations have also decreased continuously from 1990 levels of 0.194 ppm to 2015 levels of 0.127 ppm. The state annual standards are 0.09 ppm and 0.07 ppm for 1-hour ozone and 8-hour ozone, respectively.

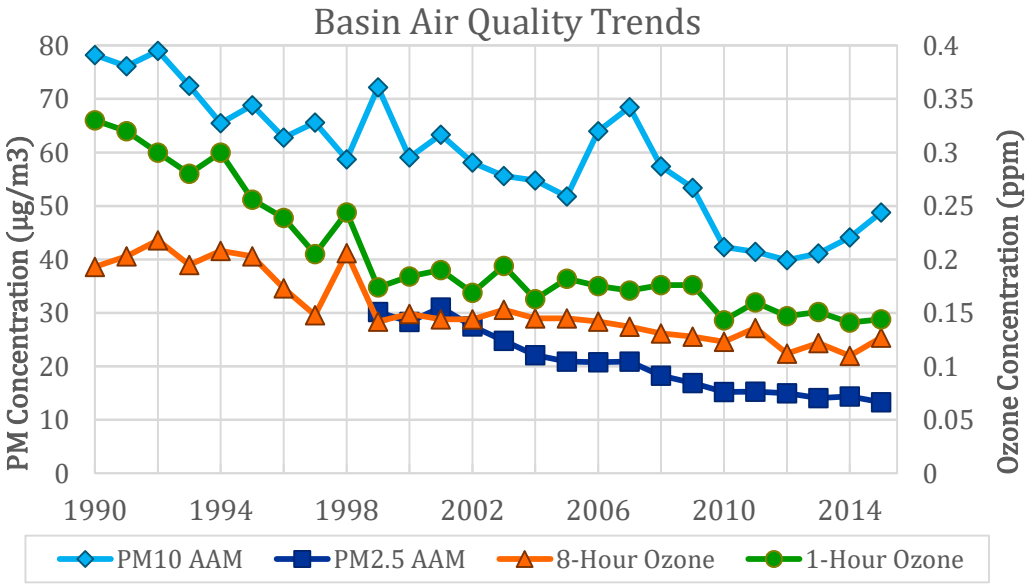

FIGURE 6-6

OZONE, PM10, AND PM2.5 TRENDS SINCE 1990

NO_2 and CO air quality have also improved substantially since 1990. NO_2 and CO metrics are not shown here since the Basin currently meets all state and federal NO_2 and CO standards. A comprehensive discussion of air quality trends was discussed in Chapter 2 and also can be found in Appendix II – Current Air Quality.

Emission Reductions

The CCAA requires that each district plan be designed to achieve a reduction in district-wide emissions of five percent or more per year for each covered nonattainment pollutant or its precursors, averaged every consecutive three-year period (Health & Safety Code § 40914). This requirement does not apply to PM. If this cannot be achieved, a plan may instead show that it has implemented all feasible measures as expeditiously as possible (Health & Safety Code § 40914(b)). Nevertheless, all feasible measures should be implemented for particulate matter in order to assure attainment as expeditiously as practicable.

The baseline NOx emissions meet the five percent averaged every consecutive three-year average reductions up to 2026 (see Appendix III for emission inventory values). As the NOx reduction strategy is being implemented, corresponding VOC and PM2.5 emissions are also expected to be reduced. As discussed in the RACM / RACT and BACM / BACT analysis in Appendix VI, this Plan implements all available feasible measures as expeditiously as possible.

Population Exposure

The CCAA also requires a reduction in overall population exposure to criteria pollutants. Reductions are to be calculated based on per-capita exposure and the severity of the exceedances. For the Basin, this provision is applicable to ozone [Health & Safety Code § 40920(c)]. The definition of exposure is the number of persons exposed to a specific pollutant concentration level above the state standard times the number of hours exposed. The per-capita exposure is the population exposure (units of parts per hundred million (pphm)-person-hours) divided by the total population. This requirement for the specific milestone years listed in the CCAA has been shown to have already been satisfied in previous AQMPs.

Cost-Effectiveness Ranking

The CCAA requires that each plan revision include an assessment of the cost-effectiveness of available and proposed control measures and contain a list which ranks the control measures from the most cost-effective to the least cost-effective (Health & Safety Code § 40922). Table 6-4 provides a list of stationary source control measures for the annual PM2.5 standard ranked by cost-effectiveness. Tables 6-5 and 6-6 provide lists of SCAQMD stationary and mobile source control measures, respectively, for ozone ranked by cost-effectiveness, and Table 6-7 ranks the CARB strategy measures.

In developing an adoption and implementation schedule for a specific control measure, a district shall consider the relative cost-effectiveness of the measure as well as other factors including, but not limited to, technological feasibility, total emission reduction potential, the rate of reduction, public acceptability, and enforceability (Health & Safety Code § 40922). These requirements do not apply to particulate matter, but provide a useful framework for evaluation. The PM2.5/ozone control strategy and implementation schedule is provided in Chapter 4.

TABLE 6-4

Cost-Effectiveness Ranking of District's Stationary Source Control Measures for PM2.5 [a,b]

MEASURE NUMBER	DESCRIPTION	DOLLARS/TON[c]	RANKING BY COST-EFFECTIVENESS
BCM-01	Further Emission Reductions from Commercial Cooking [PM]	$15,000–$18,000/ton	1
BCM-04	Emission Reductions from Manure Management Strategies [NH3]	$15,000/ton	2
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	$61,500/ton	3
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning [PM]	TBD - Minimal	4
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD - Minimal	4
BCM-02	Emission Reductions from Cooling Towers [PM]	TBD[d]	6
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD[d]	6
BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD[d]	6
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD[d]	6
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD[d]	6

[a] The cost-effectiveness values of these measures are based on the Discount Cash Flow methodology and 4 percent real interest rate

[b] Where a range exists, the ranking was done based on the low end of the range

[c] Preliminary estimate, actual cost-effectiveness will be determined by the Phase I technology assessment

[d] TBD – emission reductions and costs to be determined once the inventory and control approach are identified

TABLE 6-5

Cost-Effectiveness Ranking of Stationary Source Control Measures for Ozone [a,b]

MEASURE NUMBER	DESCRIPTION	DOLLARS/TON[c]	RANKING BY COST-EFFECTIVENESS
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives [All Pollutants]	Marginal	1
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	Marginal; short payback period	1
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	$3,400/ton	3
FUG-01	Improved Leak Detection and Repair [VOC]	$4,000–$5,000/ton	4
CTS-01	Further Emission Reductions from Coating, Solvents, Adhesives, and Sealants [VOC]	$8,000–$12,000/ton	5
CMB-05	Further NOx Reductions from RECLAIM Assessment [NOx]	$13,500–$21,000/ton	6
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking [NOx]	$15,000–$30,000/ton	7
CMB-02	Emission Reductions from Replacement with Zero or Near-Zero NOx Applications in Commercial and Residential Applications [NOx]	$15,000–$30,000/ton	7
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	< $20,000/ton	9
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	$45,000–$50,000/ton	10
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	$53,000/ton	11
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology [All Pollutants]	TBD[c] - Marginal	12
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD[c]	13
FLX-01	Improved Education and Public Outreach [All Pollutants]	N/A[d]	14
FLX-02	Stationary Source VOC Incentives [VOC]	N/A[d]	14
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	N/A[d]	14

[a] The cost-effectiveness values of these measures are based on the Discount Cash Flow methodology and 4 percent real interest rate

[b] Where a range exists, the ranking was done based on the low end of the range

[c] TBD – emission reductions and costs to be determined once the inventory and control approach are identified

[d] N/A – emission reductions and costs cannot be quantified due to the nature of the measure (e.g., outreach) or the early stage in development

TABLE 6-6
Cost-Effectiveness Ranking of Mobile Source Control Measures for Ozone

MEASURE NUMBER	DESCRIPTION	DOLLARS/TON[a]	RANKING BY COST-EFFECTIVENESS
MOB-11	Extended Exchange Program [NOx, PM]	$800–$10,000/ton	1
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	$11,300/ton	2
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	$15,000/ton	3
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	$18,262/ton	4
EGM-01	Emission Reductions from New Development and Redevelopment Projects [All Pollutants]	TBD[a]	5
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, CO]	TBD[a]	5
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]	TBD[a]	5
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	TBD[a]	5
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	TBD[a]	5
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	TBD[a]	5
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	TBD[a]	5
MOB-07	Accelerated Penetration of Partial Zero-Mission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	TBD[a]	5
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	TBD[a]	5
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	TBD[a]	5
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	TBD[a]	5

[a] Emission reductions and costs will be determined after projects are identified and implemented. See Appendix IV-A for cost information for specific measures

TABLE 6-7

Cost-Effectiveness Ranking of CARB Mobile Source Control Measures for Ozone [a]

CARB's MEASURE DESCRIPTION	DOLLARS/TON[a,b]	RANKING BY COST-EFFECTIVENESS
Advanced Clean Cars 2	TBD[a]	N/A
Lower In-Use Emission Performance Assessment	TBD[a]	N/A
Further Deployment of Cleaner Technologies	TBD[a]	N/A
Lower In-Use Emission Performance Level	TBD[a]	N/A
Low-NOx Engine Standard – California Action	TBD[a]	N/A
Low-NOx Engine Standard – Federal Action	TBD[a]	N/A
Medium and Heavy-Duty GHG Phase 2	TBD[a]	N/A
Advanced Clean Transit	TBD[a]	N/A
Last Mile Delivery	TBD[a]	N/A
Lower In-Use Emission Performance Level	TBD[a]	N/A
Low-NOx Engine Standard – California Action	TBD[a]	N/A
Low-NOx Engine Standard – Federal Action	TBD[a]	N/A
Medium and Heavy-Duty GHG Phase 2	TBD[a]	N/A
Further Deployment of Cleaner Technologies	TBD[a]	N/A
More Stringent National Locomotive Emission Standards	TBD[a]	N/A
Further Deployment of Cleaner Technologies	TBD[a]	N/A
Tier 4 Vessel Standards	TBD[a]	N/A
Incentivize Low Emission Efficient Ship Visits	TBD[a]	N/A
At-Berth Regulation Amendments	TBD[a]	N/A
Further Deployment of Cleaner Technologies	TBD[a]	N/A
Zero-Emission Off-Road Forklift Regulation Phase 1	TBD[a]	N/A
Zero-Emission Off-Road Emission Reduction Assessment	TBD[a]	N/A
Zero-Emission Off-Road Worksite Emission Reduction Assessment	TBD[a]	N/A
Zero-Emission Airport Ground Support Equipment	TBD[a]	N/A
Small Off-Road Engines	TBD[a]	N/A
Transport Refrigeration Units Used for Cold Storage	TBD[a]	N/A
Low-Emission Diesel Requirement	TBD[a]	N/A
Further Deployment of Cleaner Technologies	TBD[a]	N/A
Consumer Products Program	TBD[a]	N/A

[a] Emission reductions and costs will be determined after projects are identified and implemented

[b] Where a range exists, the ranking was done based on the low end of the range

Conclusion

As provided in Table 6-2, all federal CAA requirements are satisfied and demonstrated in the 2016 AQMP. Many of the details showing compliance are provided in Appendix VI of this Plan and are listed in both Tables 6-1 and 6-2. Compliance with anti-backsliding requirements for the revoked standards are listed in Table 6-3. While the requirements have been satisfied in existing rules, regulations and previous AQMPs, some analyses have been updated in the 2016 AQMP. For example, a new attainment demonstration performed for the revoked 1-hour ozone standard was adopted in 2012 to respond to a U.S. EPA SIP call and is being updated in the 2016 AQMP to reflect new information and the new control strategy developed to meet the 8-hour ozone standards.

Chapter 7

Current and Future Air Quality – Desert Nonattainment Areas SIP



The Coachella Valley is under the SCAQMD's jurisdiction, however it is located in another air basin where the air quality challenges differ. The 2016 AQMP addresses the Clean Air Act requirements for the 2008 8-hour ozone federal standard in the SCAQMD desert region.

In This Chapter

- Introduction 7-1
  The SCAQMD desert region
- Air Quality Setting 7-3
  Air quality, pollution transport, and attainment status

- Future Air Quality 7-25
  Emissions, reasonable further progress, and ozone attainment demonstration
- Conclusions 7-40
  Attainment dates and next steps

Introduction

The Coachella Valley Planning Area is defined, for the purposes of this discussion, as the desert portion of Riverside County in the SSAB, and is part of the SCAQMD, which also includes the Basin. The Coachella Valley is the most populated area in this desert region, which encompasses several communities, including Palm Springs, Desert Hot Springs, Cathedral City, Rancho Mirage, Palm Desert, Indian Wells, La Quinta, Indio, Coachella, Thermal, and Mecca. Figure 7-1 provides a map of the area and the surrounding topography.

The Coachella Valley is designated by U.S. EPA as a nonattainment area for the 2008 8-hour ozone NAAQS of 0.075 ppm, and for the former 1997 8-hour ozone NAAQS of 0.08 ppm. For both 8-hour ozone federal standards, the Coachella Valley is classified as a "severe-15" ozone nonattainment area, indicating that the area has 15 years from the nonattainment designation date to attain the NAAQS. The Coachella Valley is also still designated as a nonattainment area for PM10, due to windblown dust events that recur in the area, with a classification of "serious." The Coachella Valley is in attainment of the current federal standards for NO_2, CO, lead, and SO_2.

On October 1, 2015, U.S. EPA finalized the new 2015 8-hour ozone NAAQS at 0.070 ppm, retaining the same form as the previous 8-hour standards. This standard became effective on December 28, 2015. Attainment/nonattainment designations will be finalized for the new standard by October 1, 2017, likely based upon 2014–2016 air quality data. It is expected that the Basin and the Coachella Valley, as well as a significant portion of California, will be designated nonattainment. SIP submittals to demonstrate attainment of the 2015 ozone NAAQS will likely be due in the 2020–2021 time frame, with attainment dates between 2020 and 2037, depending on the severity of the ozone problem.

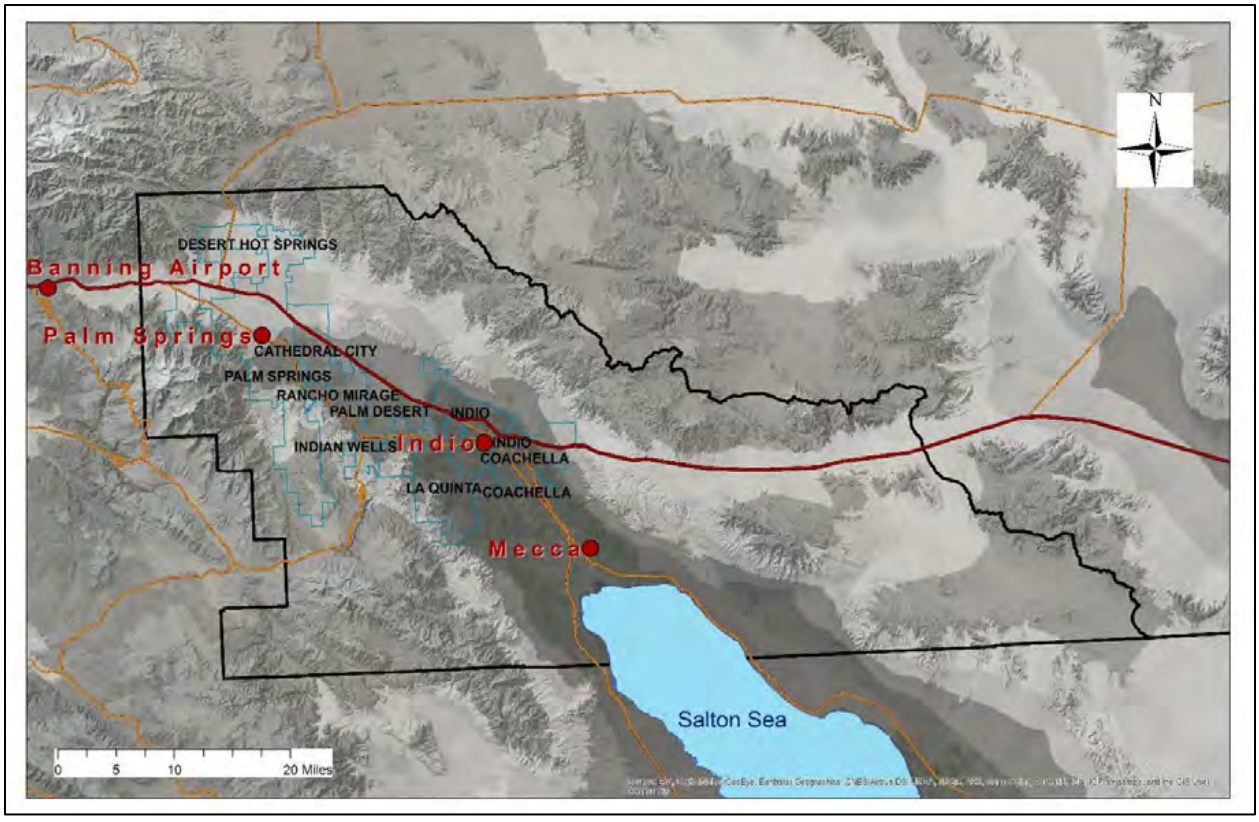

FIGURE 7-1

LOCATION AND TOPOGRAPHY OF THE COACHELLA VALLEY PLANNING AREA

[THE SAN GORGONIO PASS (AKA BANNING PASS) IS THE WEST-EAST PASS BETWEEN THE MOUNTAINS NEAR THE BANNING AIRPORT AIR MONITORING STATION THAT LEADS FROM THE SOUTH COAST AIR BASIN INTO THE COACHELLA VALLEY; SCAQMD AIR MONITORING STATIONS AT PALM SPRINGS, INDIO, AND MECCA ARE SHOWN WITHIN THE COACHELLA VALLEY BOUNDARIES]

While the 2007 AQMP adequately addressed and satisfied the CAA planning requirements for the Coachella Valley regarding the 1997 8-hour ozone NAAQS, the 2016 AQMP specifically addresses CAA planning requirements for 2008 ozone NAAQS. This chapter and associated appendices constitute the ozone SIP for the 2008 8-hour ozone NAAQS, which addresses the current status of ozone air quality and provides the strategy toward future attainment of the federal 8-hour ozone standards in the Coachella Valley, presenting the projections of future ozone levels based on the base year 2012 emissions inventories, growth projections, and control strategies within and outside the Coachella Valley.

Effective May 15, 2015, U.S. EPA finalized a clean data determination (indicating measurements in the area have reached attainment levels) for the revoked 1-hour ozone NAAQS (0.12 ppm) for the former Southeast Desert Modified Air Quality Management Area nonattainment area, including the Coachella Valley. This action was based on 2011–2013 final data and preliminary 2014 data.

On April 18, 2003, U.S. EPA approved the Coachella Valley State Implementation Plan (2003 CVSIP), which addressed future-year attainment of the annual average PM10 NAAQS with a 2006 attainment deadline. This federal standard was revoked, effective December 15, 2006. Since 2007, annual average PM10

concentrations have met the revoked federal annual standard (50 µg/m^3). The 2003 CVSIP also addressed continued attainment of the 24-hour PM10 federal standard, except for uncontrollable natural events. The 2016 AQMP does not include new modeling efforts for PM10. Since the mid-1990s, peak 24-hour average PM10 concentrations have not exceeded the current federal standard (150 µg/m^3) other than on days with windblown dust from natural events, which can be excluded upon U.S. EPA concurrence consistent with the Exceptional Event Rules and prior policies. The PM10 data from the Coachella Valley monitors shows attainment of the PM10 24-hour NAAQS after the removal of the flagged high-wind exceptional events, for which SCAQMD supporting documentation will be submitted and subsequent U.S. EPA approval will be required. However, U.S. EPA has requested that SCAQMD conduct additional ambient monitoring in the southeastern portion of the Coachella Valley before the re-designation can be considered. This new station has been in operation since 2013 in the community of Mecca, and re-designation will be revisited upon analysis of the required three full years of data.

Like the Basin, the Coachella Valley is a growing area, as shown by the historic and projected populations presented in Table 7-1. By 2030, the population in the Coachella Valley is projected to increase by 39 percent over the 2010 level. On a percentage basis, the Coachella Valley growth is expected to exceed that of the Basin for that time period. This population growth is taken into account in the emission projections for future years, which are used to demonstrate attainment of the air quality standards.

TABLE 7-1

Historic and Projected Population for Basin and Coachella Valley

AREA	Historic Population				Projected Population		
	1980	1990	2000	2010	2020	2031	2040
South Coast Air Basin	10,500,000	13,083,594	14,640,692	15,735,186	16,764,932	17,940,418	18,822,083
Coachella Valley	139,000	244,070	325,937	425,404	497,257	596,386	673,425

Source: Historic populations from Southern California Association of Governments, January 2016 CARB 2013 Almanac of Emissions and Air Quality, 2013 Edition, Appendix C [http://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm]; Population projections from Southern California Association of Governments (SCAG) [January 2016 update]

Air Quality Setting

Air Quality Summary

In 2015, the SCAQMD monitored air quality at four permanent locations in the Coachella Valley, including the two long-term stations at Indio and Palms Springs and recently added stations at Mecca and the north shore of the Salton Sea. The Palm Springs air monitoring station is located closer to the San Gorgonio Pass (also known as the Banning Pass), predominantly downwind of the densely populated Basin. The Indio station is located further east in the Coachella Valley, on the predominant downwind side of the

main population areas of the Coachella Valley. Both of these sites routinely measure ozone, PM10, PM2.5 and sulfates (from PM10). The Palm Springs station also measures CO, and NO_2.

A new station was established in 2013 in the community of Mecca, closer to the Salton Sea in the southeastern portion of the Coachella Valley. It is measuring PM10 continuously, as well as hydrogen sulfide (H_2S), a gas emitted naturally from the Salton Sea that can occasionally cause strong odors. An additional station was also established in 2013 near the shore of the Salton Sea, measuring only H_2S.

Recent and historic air pollution data collected in the Coachella Valley is summarized in this chapter, and is also presented in Chapter 2: Air Quality and Health Effects, along with that of the Basin. Additional details can be found in Appendix II – Current Air Quality. Information on the health effects associated with criteria air pollutants are summarized in Chapter 2 and detailed in Appendix I – Health Effects.

Attainment Status

The Coachella Valley remains a nonattainment area for the revoked 1997 and revised 2008 8-hour ozone NAAQS, as well as for the new 2015 ozone NAAQS. The Coachella Valley is now in attainment of the former (1979) 1-hour ozone NAAQS. The Coachella Valley is also a nonattainment area for the state 1-hour and 8-hour ozone standards.

Since the mid-1990s, the days that have exceeded the 24-hour PM10 federal standard at the SCAQMD Coachella Valley monitoring stations at Indio and Palm Springs have been associated with high-wind natural events. Much of this data has been flagged in the U.S. EPA Air Quality System (AQS) database to be excluded for comparison to the NAAQS, as allowed by the U.S. EPA Exceptional Events Rule and its predecessor, the Natural Events Policy. As a result, the District will continue to seek a re-designation by U.S. EPA for the Coachella Valley to attainment for the PM10 NAAQS, once sufficient data from PM10 monitors in Palm Springs, Indio, and the new Mecca station can be finalized and fully evaluated for exceptional events, contingent upon U.S. EPA concurrence. The Coachella Valley remains a nonattainment area for the PM10 CAAQS.

The current federal NAAQS attainment designations for the Coachella Valley are presented in Table 7-2. The state CAAQS attainment designations are presented in Table 7-3.

TABLE 7-2

National Ambient Air Quality Standards (NAAQS) Attainment Status
Coachella Valley Portion of the Salton Sea Air Basin

Criteria Pollutant	Averaging Time	Designation[a]	Attainment Date[b]
Ozone (O_3)	(1979) **1-Hour** (0.12 ppm)[c]	Attainment	11/15/2007 (attained 12/31/2013)
	(2015) **8-Hour** (0.070 ppm)[d]	Pending – Expect Nonattainment (Severe)	Pending
	(2008) **8-Hour** (0.075 ppm)[d]	Nonattainment (Severe-15)	7/20/2027
	(1997) **8-Hour** (0.08 ppm)[d]	Nonattainment (Severe-15)	6/15/2019
PM2.5[e]	(2006) **24-Hour** (35 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(2012) **Annual** (12.0 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(1997) **Annual** (15.0 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
PM10[f]	(1987) **24-hour** (150 µg/m^3)	Nonattainment (Serious)	12/31/2006
Lead (Pb)	(2008) **3-Months Rolling** (0.15 µg/m^3)	Unclassifiable/Attainment	Unclassifiable/ Attainment
CO	(1971) **1-Hour** (35 ppm)	Unclassifiable/Attainment	N/A (attained)
	(1971) **8-Hour** (9 ppm)	Unclassifiable/Attainment	N/A (attained)
NO_2[g]	(2010) **1-Hour** (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	(1971) **Annual** (0.053 ppm)	Unclassifiable/Attainment	N/A (attained)
SO_2[h]	(2010) **1-Hour** (75 ppb)	Designations Pending	N/A
	(1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm)	Unclassifiable/Attainment	Unclassifiable/ Attainment

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable
b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration
c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05; the Southeast Desert Modified Air Quality Management Area, including the Coachella Valley, had not timely attained this standard by the 11/15/07 "severe-17" deadline, based on 2005-2007 data; on 8/25/14, U.S. EPA proposed a clean data finding based on 2011-2013 data and a determination of attainment for the former 1-hour ozone NAAQS for the Southeast Desert nonattainment area; this rule was finalized by U.S. EPA on 4/15/15, effective 5/15/15, and included preliminary 2014 data
d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the 1997 and 2008 ozone NAAQS until they are attained
e) The annual PM2.5 standard was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m^3
f) The annual PM10 standard was revoked, effective 12/18/06; the 24-hour PM10 NAAQS attainment deadline was 12/31/2006; the Coachella Valley Attainment Re-designation Request and PM10 Maintenance Plan was postponed by U.S. EPA pending additional monitoring and analysis in the southeastern Coachella Valley
g) New 1-hour NO_2 NAAQS became effective 8/2/10; attainment designations 1/20/12; annual NO_2 NAAQS retained
h) The 1971 Annual and 24-hour SO_2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard; final area designations expected by 12/31/2020 with SSAB expected to be designated Unclassifiable/Attainment

TABLE 7-3

California Ambient Air Quality Standards (CAAQS) Attainment Status

Coachella Valley portion of Salton Sea Air Basin

Pollutant	Averaging Time and Level[b]	Designation[a]
		Coachella Valley
Ozone (O_3)	**1-Hour** (0.09 ppm)[c]	Nonattainment
	8-Hour (0.070 ppm)[d]	Nonattainment
PM2.5	**Annual** (12.0 µg/m^3)	Attainment
PM10	**24-Hour** (50 µg/m^3)	Nonattainment
	Annual (20 µg/m^3)	Nonattainment
Lead (Pb)	**30-Day Average** (1.5 µg/m^3)	Attainment
CO	**1-Hour** (20 ppm)	Attainment
	8-Hour (9.0 ppm)	Attainment
NO_2	**1-Hour** (0.18 ppm)	Attainment
	Annual (0.030 ppm)	Attainment
SO_2	**1-Hour** (0.25 ppm)	Attainment
	24-Hour (0.04 ppm)	Attainment
Sulfates	**24-Hour** (25 µg/m^3)	Attainment
H_2S[c]	**1-Hour** (0.03 ppm)	Unclassified [c]

a) State designations shown were updated by CARB on January 5, 2016, based on the 2012-2014 3-year period; stated designations are based on a 3-year data period after consideration of outliers and exceptional events
Source: http://www.arb.ca.gov/desig/statedesig.htm#current

b) State standards, or CAAQS, for ozone, CO, SO_2, NO_2, PM10 and PM2.5 are values not to be exceeded; lead, sulfates, and H_2S standards are values not to be equaled or exceeded; CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations

c) SCAQMD began monitoring H_2S in the southeastern Coachella Valley in November 2013 due to odor events related to the Salton Sea; three full years of data are not yet available for a designation, but nonattainment is anticipated for the H_2S CAAQS in at least part of the Coachella Valley

The maximum concentrations of ozone, PM2.5, PM10, NO_2, and CO recorded at the Coachella Valley monitoring locations in 2015 are shown in Figure 7-2, as percentages of the state and federal standards. The federal standard levels shown are only exceeded for 8-hour ozone. While PM10 concentrations also exceed the federal standards, the PM10 data flagged for exclusion due to high-wind exceptional events have been excluded from the figure although supporting documentation submittal and U.S. EPA concurrence will still be required. The stricter state standard levels are exceeded for both 1-hour and 8-hour ozone and also for PM10. While the maximum concentrations do not necessarily indicate a violation of the federal design value or state designation value form of the standards, they are a useful metric for progress toward attaining those standards.

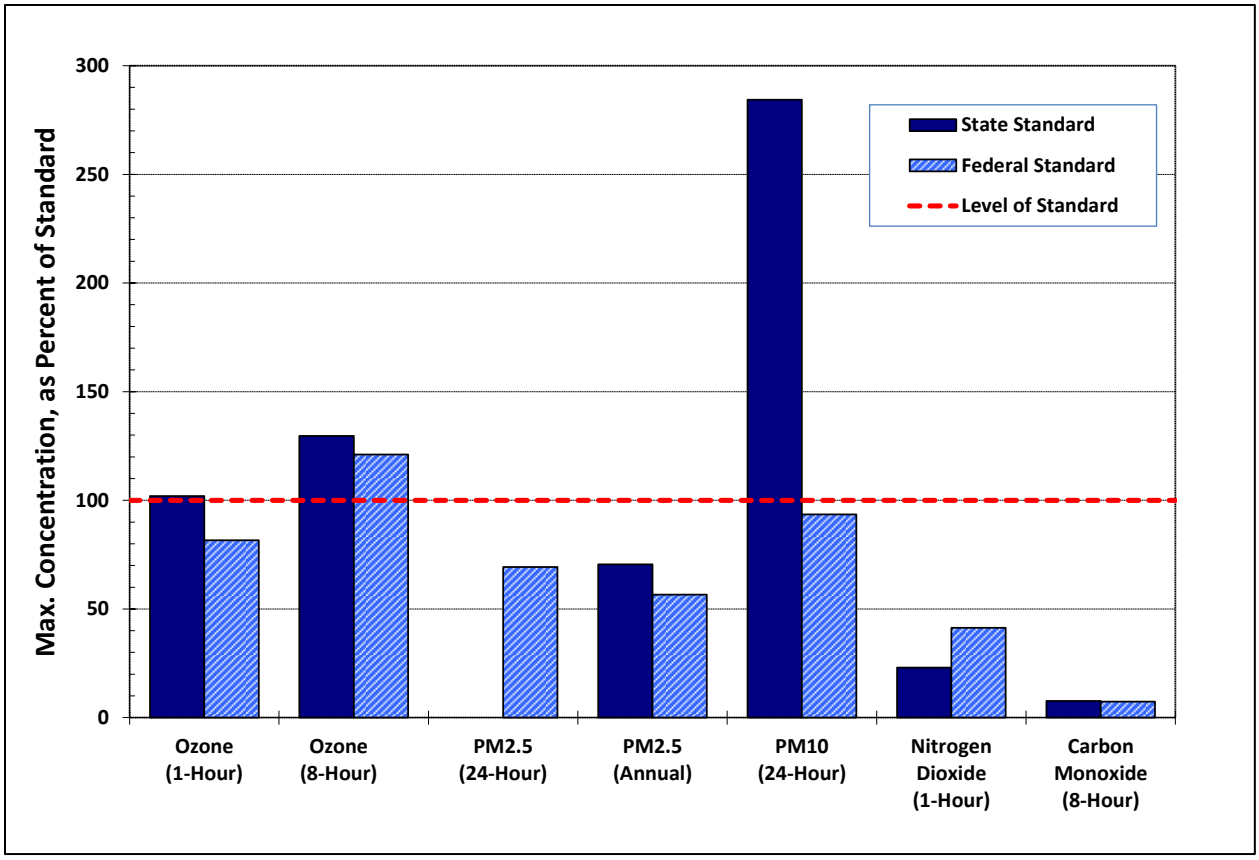

FIGURE 7-2

COACHELLA VALLEY 2015 MAXIMUM POLLUTANT CONCENTRATIONS AS PERCENT OF STATE AND FEDERAL STANDARDS

(THE 2008 8-HOUR FEDERAL OZONE STANDARD IS SHOWN – NOTE THAT THE BAR FOR THE STATE 8-HOUR OZONE STANDARD IS THE NEARLY THE SAME AS FOR THE NEW 2015 8-HOUR FEDERAL OZONE STANDARD, WHICH IS NOT SHOWN; FOR PM10, FLAGGED EXCEPTIONAL EVENTS ARE EXCLUDED, PENDING EVENT DOCUMENTATION REQUIREMENTS AND U.S. EPA APPROVAL)

Figure 7-3 shows the Coachella Valley design values[1] for ozone, PM2.5, and PM10, for the three-year period 2013–2015, as percentages of the current and revoked federal standards, as compared to the Basin. The Basin is predominantly upwind of the Coachella Valley and is the main source area for transported ozone and ozone precursor emissions.

[1] A design value is a statistic that describes the air quality status of a given area relative to the level and form of the NAAQS. For most criteria pollutants, the design value is a 3-year average and takes into account the form of the short-term standard (e.g., 98th percentile, fourth highest value, etc.). Design values can also be calculated for standards that are exceedance-based (e.g., 1-hour ozone and 24-hour PM10) so that they can be expressed as a concentration instead of an exceedance count, in order to allow a direct comparison to the level of the standard. Note that the modeling design values used for the AQMP attainment demonstration are based on a 5-year period, weighted toward the center year, as specified in U.S. EPA modeling guidelines.

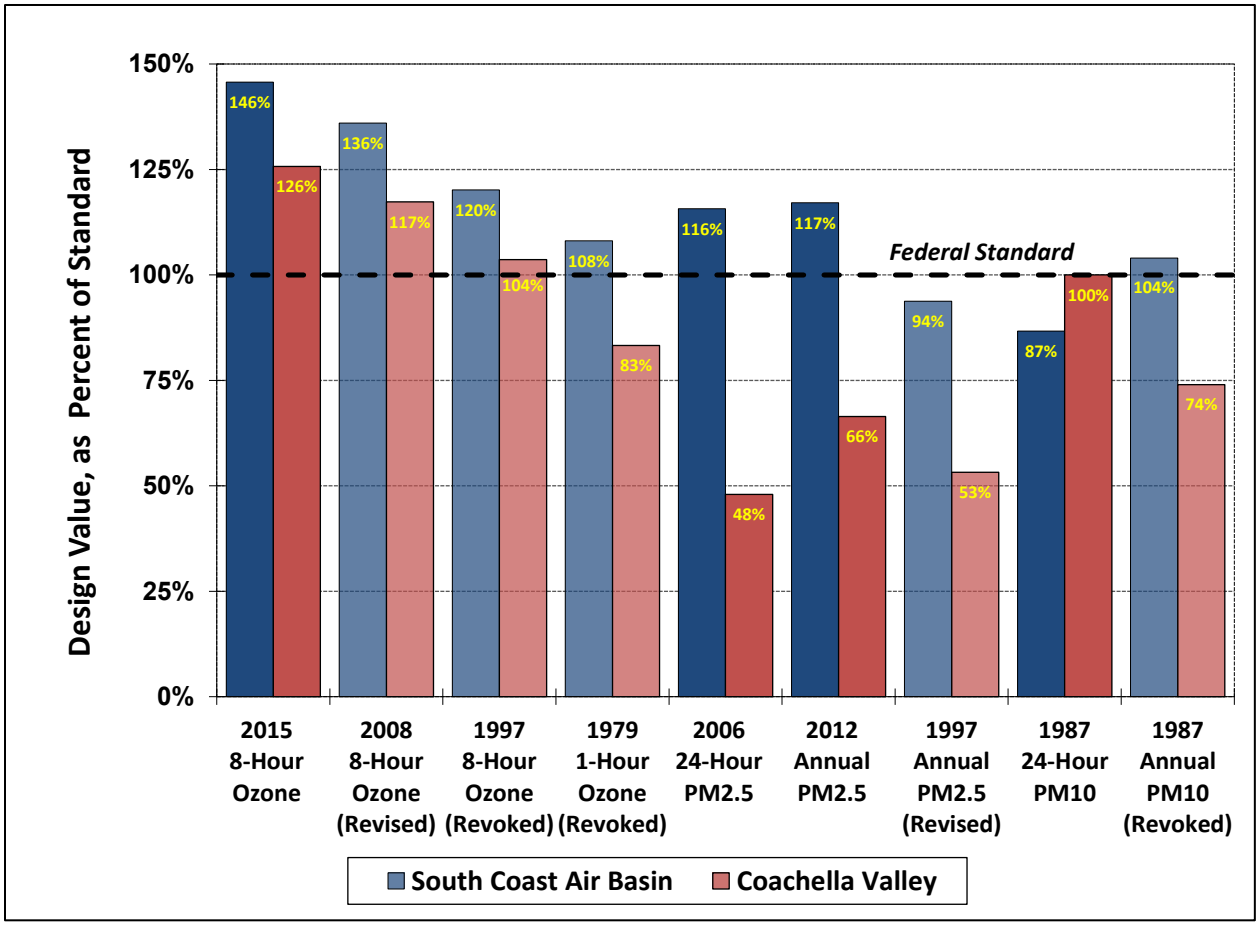

FIGURE 7-3

SOUTH COAST AIR BASIN AND COACHELLA VALLEY 2013–2015 3-YEAR DESIGN VALUES

(PERCENTAGE OF FEDERAL STANDARDS, BY CRITERIA POLLUTANT; FLAGGED PM10 EXCEPTIONAL EVENTS ARE EXCLUDED BUT SUPPORTING DOCUMENTATION AND U.S EPA CONCURRENCE IS STILL NEEDED; NOTE THAT 100 PERCENT OF THE FEDERAL STANDARD IS NOT VIOLATING THAT STANDARD; DARKER COLORS INDICATE THE CURRENT, MOST STRINGENT STANDARD)

Figure 7-4 shows the trend of 3-year design values in the Coachella Valley since 1990, including 1-hour and 8-hour ozone and 24-hour and annual PM2.5, as a percentage of the federal standards (including the former 1979 1-hour ozone NAAQS, the 1997, 2008 and 2015 8-hour ozone NAAQS, the 2006 24-hour PM2.5 NAAQS, and the 2012 annual PM2.5 NAAQS). While recent 8-hour ozone concentrations remain above the NAAQS, the trend shows continued improvement. The PM2.5 design values have remained below the federal standards since the start of these measurements in the Coachella Valley.

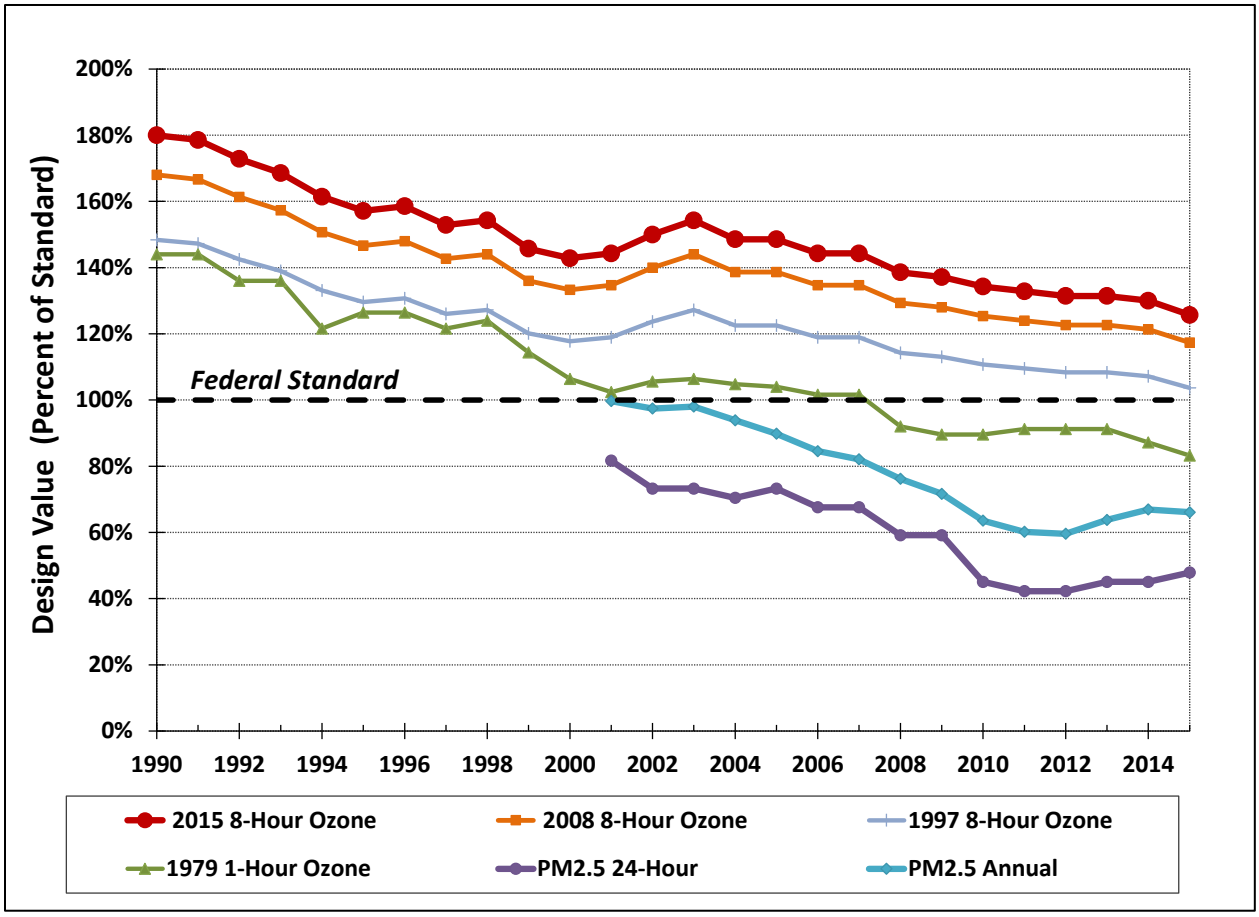

FIGURE 7-4

COACHELLA VALLEY 3-YEAR DESIGN VALUE TRENDS OF OZONE AND PM2.5 AS PERCENT OF THE MOST RECENT FEDERAL STANDARDS, 1990-2015

(PM2.5 MONITORING STARTED IN 1999; THE YEAR PLOTTED IS THE END YEAR OF THE 3-YEAR DESIGN VALUE)

Ozone (O_3)

Atmospheric ozone in the Riverside county portion of the SSAB is both directly transported from the Basin and formed photochemically from precursors emitted upwind. The precursors are emitted in greatest quantity in the coastal and central Los Angeles County areas of the Basin. The Basin's prevailing sea breeze causes polluted air to be transported inland. As the air is being transported inland, ozone is formed, with peak concentrations occurring in the inland valleys of the Basin, extending from eastern San Fernando Valley through the San Gabriel Valley into the Riverside-San Bernardino area and the adjacent mountains. As the air is transported still further inland into the Coachella Valley through the San Gorgonio Pass, ozone concentrations typically decrease due to dilution, although ozone standards can still be exceeded.

Ozone is measured continuously at two locations in the Coachella Valley at the Palm Springs and Indio air monitoring stations. In 2015, the new 8-hour ozone federal standard (0.070 ppm) was exceeded in the Coachella Valley on 47 days (13 percent of the year), while the previous 2008 (0.075 ppm) and 1997 (0.08

ppm) 8-hour standards were exceeded on 26 and 5 days, respectively. The maximum 8-hour ozone concentration was 0.092 ppm (131, 123 and 109 percent of the level of the 2015, 2008 and 1997 ozone standards, respectively). The former 1979 1-hour federal ozone standard level (0.12 ppm) was not exceeded in the Coachella Valley in 2014, with a maximum 1-hour concentration of 0.102 ppm. Ozone concentrations in the Coachella Valley, and the number of days exceeding the federal ozone standards, are greatest in the late spring and summer months, with no exceedances during the winter.

The 8-hour ozone design value for the Coachella Valley for the three-year 2013–2015 period was 0.088 ppm (126, 117, and 104 percent of the 2015, 2008 and 1997 ozone NAAQS, respectively). The 1-hour ozone design value was 0.104 ppm, which is 83 percent of the former 1979 1-hour ozone NAAQS. While the Coachella Valley remains in attainment of the former 1-hour federal standard, the 8-hour NAAQS are still exceeded. The Palm Springs station had higher ozone design values and significantly more days above the standards than the Indio station.

The 1-hour and 8-hour state ozone standards were exceeded on three days and 51 days, respectively, in the Coachella Valley in 2015. The 1-hour ozone health advisory level (≥ 0.15 ppm) has not been reached in the Coachella Valley area since 1998. No 1-hour Stage 1 episode levels (≥ 0.20 ppm) have been recorded in the Coachella Valley area since 1988.

Figure 7-5 shows the trend of the annual peak ozone concentrations (1-hour and 8-hour averages) measured in the Coachella Valley between 1990 and 2015. Figure 7-6 shows the trend of the annual number of days exceeding federal and state ozone standards at Coachella Valley monitoring sites for the years 1990–2015. Figure 7-7 shows the 3-year ozone design value trends from 1990 through 2015 (labeled as the end year of each 3-year design value period). As is illustrated, the Coachella Valley has experienced a trend of steady ozone improvements over the years. However, additional gains are needed to achieve the new and previous 8-hour ozone standards.

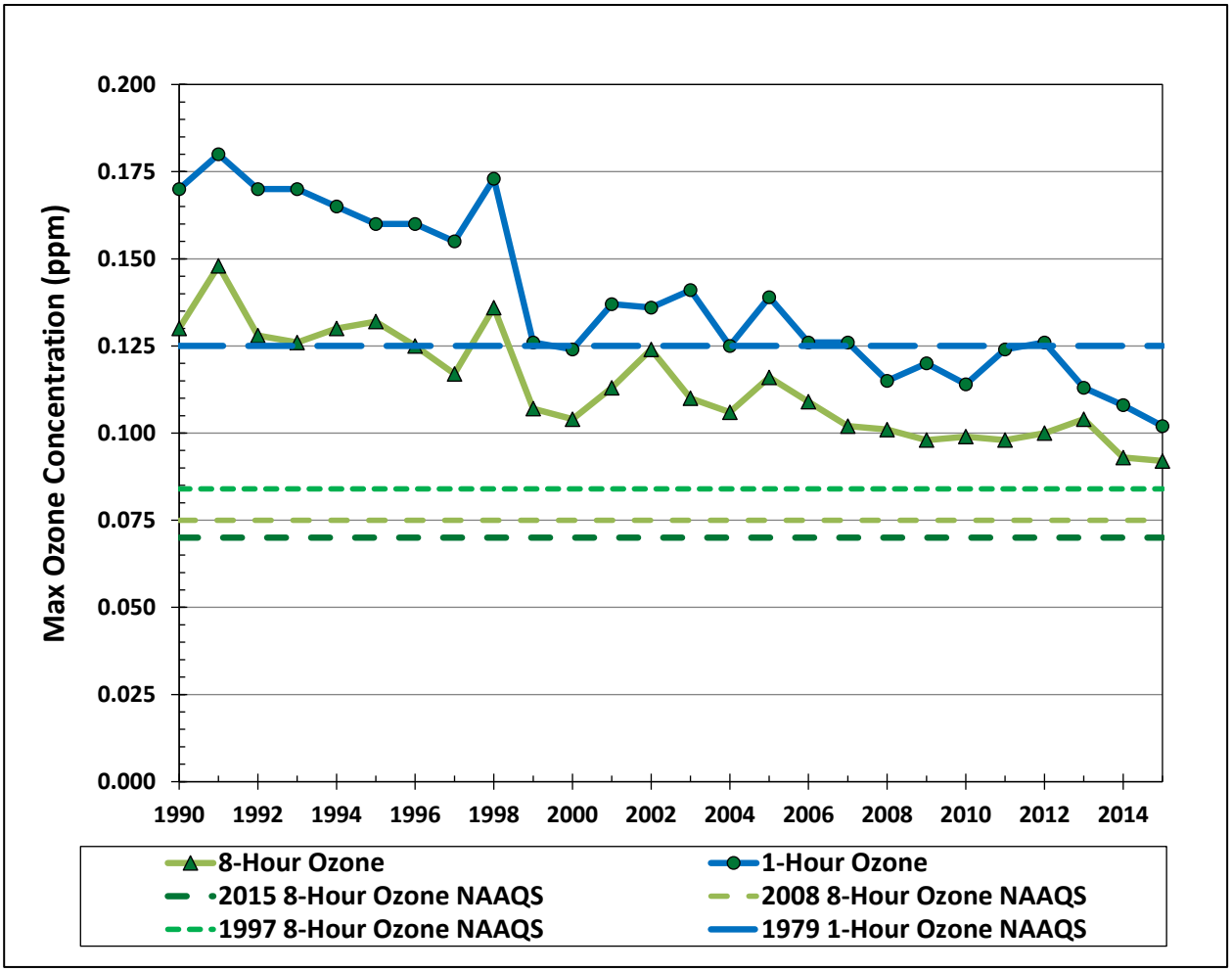

FIGURE 7-5
TRENDS OF COACHELLA VALLEY MAXIMUM 1-HOUR AND 8-HOUR OZONE CONCENTRATIONS, 1990–2015
(DASHED LINES DEPICT THE NEW 2015 8-HOUR AND THE PREVIOUS 2008 AND 1997 8-HOUR AND 1979 1-HOUR FEDERAL OZONE STANDARDS)

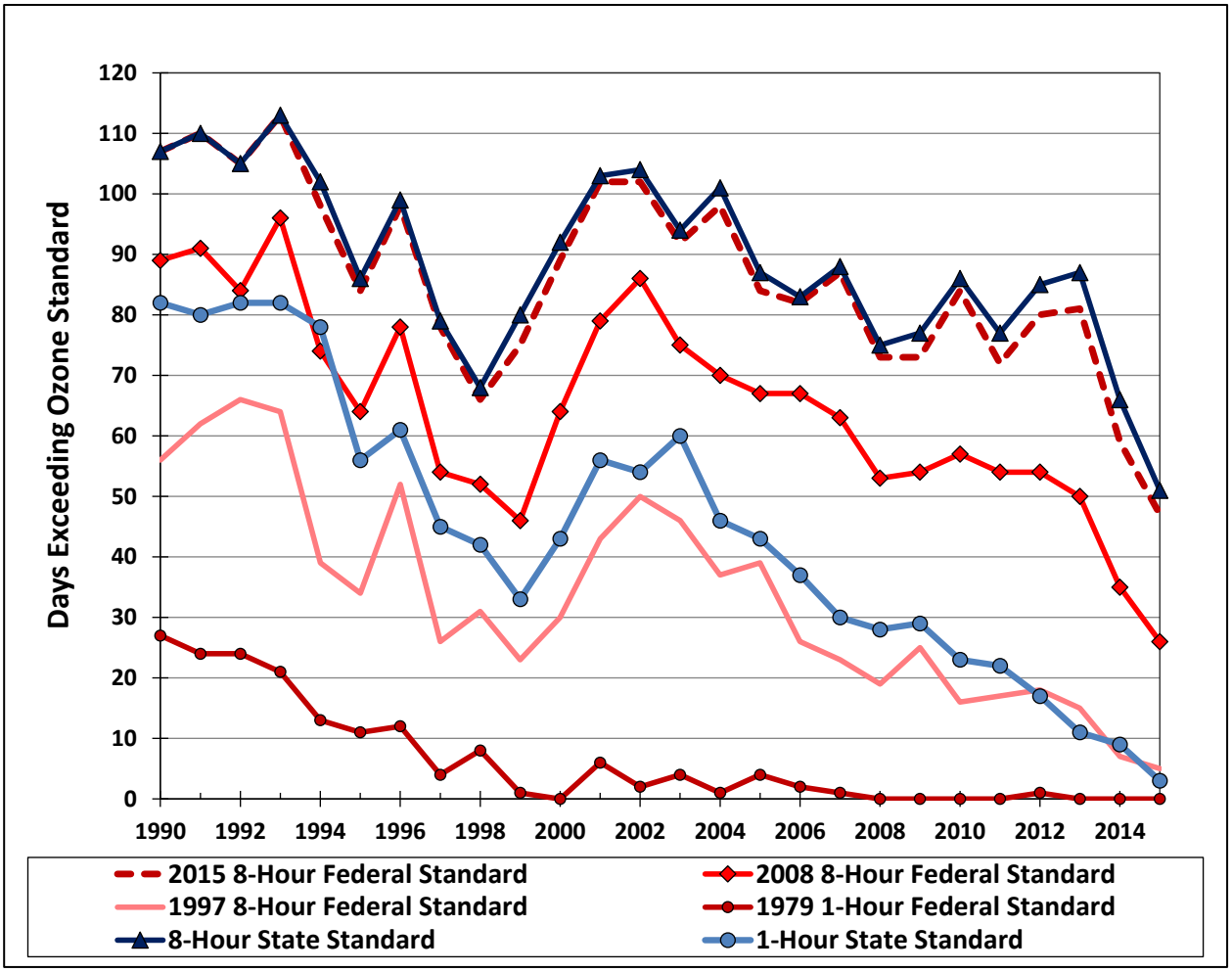

FIGURE 7-6

COACHELLA VALLEY NUMBER OF DAYS EXCEEDING FEDERAL AND STATE OZONE STANDARDS, 1990–2015

(THE NEW 2015 AND 2008 8-HOUR FEDERAL STANDARDS ARE NOW THE CURRENT OZONE NAAQS, BUT COMMITMENTS REMAIN TOWARD TIMELY ATTAINMENT OF THE FORMER FEDERAL STANDARDS; THE COACHELLA VALLEY HAS ATTAINED THE FORMER 1979 FEDERAL 1-HOUR OZONE STANDARD)

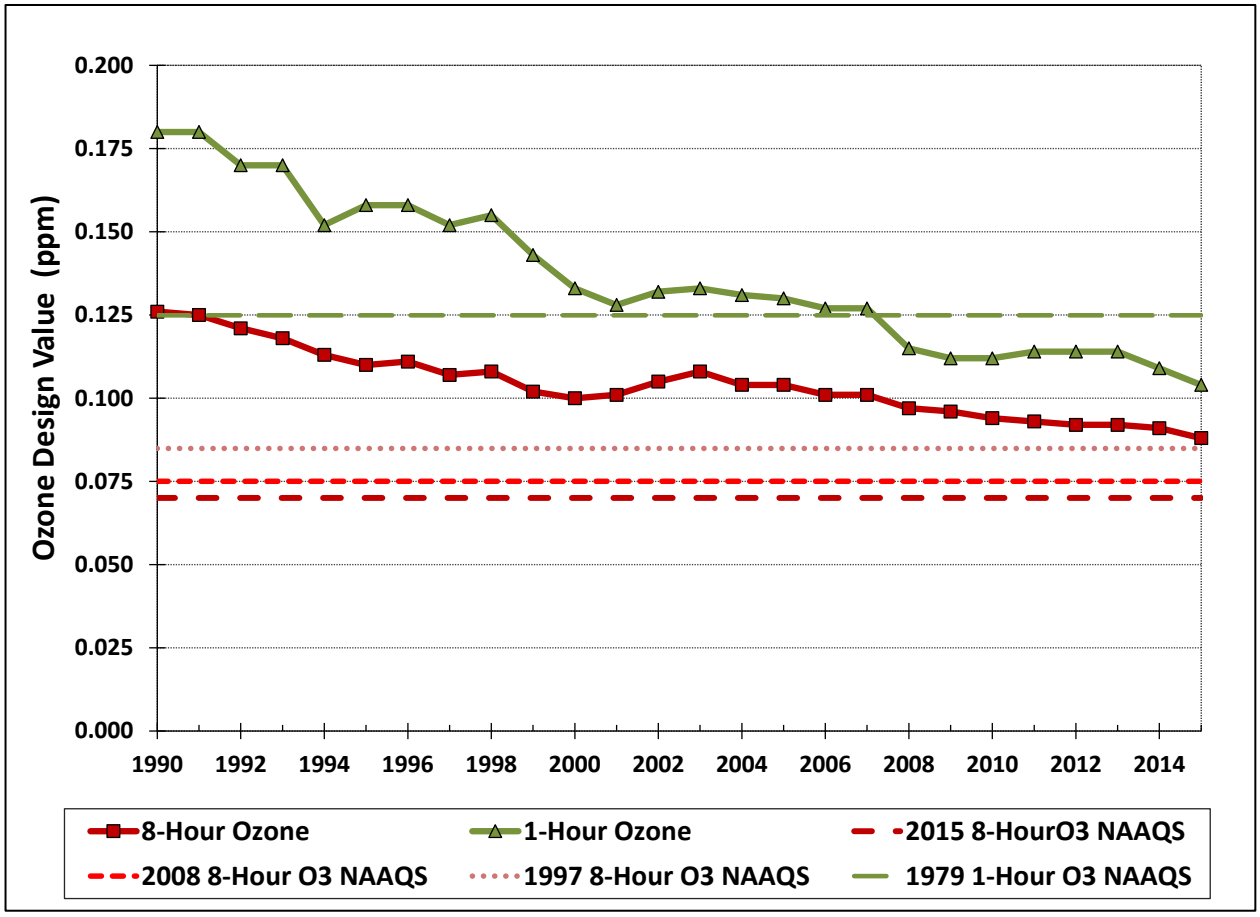

FIGURE 7-7

COACHELLA VALLEY FEDERAL 8-HOUR AND 1-HOUR OZONE 3-YEAR DESIGN VALUE TRENDS, 1990–2015

[DASHED LINES INDICATE THE CURRENT 2015 (NEW), 2008 AND REVOKED 1997 8-HOUR FEDERAL OZONE STANDARDS AND THE REVOKED 1979 1-HOUR OZONE STANDARD (ATTAINED); YEAR PLOTTED IS THE END YEAR OF THE 3-YEAR DESIGN VALUE PERIOD]

PM10

PM10 is measured daily at both Indio and Palm Springs by supplementing the (primary) 1-in-3-day Federal Reference Method (FRM) filter sampling at Indio and the 1-in-6-day FRM sampling at Palm Springs with (secondary) continuous hourly FEM measurements at both stations. In addition, a third station has been operational in the community of Mecca in the southeastern Coachella Valley since 2013, measuring PM10 with a real-time FEM sampler. This monitoring was started at the request of U.S. EPA Region IX to help evaluate windblown dust in that portion of the Coachella Valley, which is potentially impacted by high-wind natural events, agricultural activities, and fugitive dust from the exposed shoreline of the receding Salton Sea.

Although exceedances of the ozone standard in the Coachella Valley area are primarily due to the transport of ozone and its precursors from the densely populated areas of the upwind Basin to the west, PM10 in the Coachella Valley is largely due to locally generated sources of fugitive dust (e.g., construction

activities, re-entrained dust from paved and unpaved road travel, and natural wind-blown sources). The Coachella Valley is subject to frequent high winds that generate wind-blown sand and dust, leading to high episodic PM10 concentrations, especially from disturbed soil and natural desert blow sand areas. PM10 is the only pollutant which often reaches higher concentrations in the SSAB than in the Basin. On some of the high days, long-range transport of wind-generated dust and sand occurs with relatively light winds in the Coachella Valley, when entrained dust from desert thunderstorm outflows travels to the Coachella Valley from the desert areas of southeastern California, Arizona, Nevada or northern Mexico. All days in recent years that exceeded the 24-hour federal PM10 NAAQS at Indio, Palm Springs, and Mecca would not have exceeded that standard except for the contribution of windblown dust and sand due to strong winds in the upwind source area (high-wind natural events).

In 2014, high-wind natural events occurred on eight days that caused high 24-hour PM10 concentrations over the federal standard at the monitors at Indio, Palm Springs, or Mecca.[2] An additional eight days with high PM10 concentrations in 2015 were also flagged as exceptional events due to high winds. These days are summarized in Table 7-4. For 2014, the initial analysis shows that seven of the high-wind events were associated with strong onshore winds from the Basin through the San Gorgonio Pass and down the Coachella Valley. Two days in 2014 had high PM10 due to strong outflows from thunderstorms over Arizona and northern Mexico that entrained dust and sand that was transported into the Coachella Valley by southeasterly monsoonal flows. In 2015, four of the high-wind events were associated with strong winds through the San Gorgonio Pass and the remaining four were associated with summertime thunderstorm activity over the deserts of the southwestern U.S. and northern Mexico. One of the 2014 monsoonal flow days, July 17, 2015, had the highest PM10 concentration measured in the Coachella Valley in 2014 or 2015 – 337 $\mu g/m^3$ at Indio. As was done for similar high-wind events in prior years, the 2014 and 2015 events have been flagged upon submittal to the U.S. EPA AQS database as high-wind exceptional events, in accordance with the U.S. EPA Exceptional Events Rule, with further documentation and U.S. EPA concurrence pending.

[2] The FEM PM10 sampler in Mecca was treated as a special purpose monitor for evaluation purposes through 2014; the 2015 data has been submitted to the U.S. EPA AQS database along with flagging for exceptional events.

TABLE 7-4

High-Wind Exceptional Event Days in the Coachella Valley in 2014 and 2015

Date	Palm Springs PM10 (µg/m³)	Indio PM10 (µg/m³)	Mecca PM10 (µg/m³)#	Event Description
03/26/2014	113*	**168**	123*	high winds
04/12/2014	57*	**243**	**183***	high winds
04/13/2014	32*	**168**	132*	high winds
04/25/2014	49*	52	**183***	high winds
05/10/2014	73*	**215**	**226***	high winds
06/13/2014	29*	101	**183***	high winds
06/27/2014	38*	**165**	130*	high winds
07/27/2014**	106*	152	152*	high winds – monsoonal thunderstorms
08/18/2014	**313***	**298**	**237***	high winds – monsoonal thunderstorms
05/07/2015	15*	ND	**209***	high winds
07/08/2015	23*	**174**	**180***	high winds – monsoonal thunderstorms
07/17/2015	**161**	**337**	**306***	high winds – monsoonal thunderstorms
08/19/2015	48*	**181**	147*	high winds – monsoonal thunderstorms
09/09/2015	**187**	**176**	128*	high winds – monsoonal thunderstorms
11/02/2015	ND	**182**	87*	high winds
12/14/2015	11*	55	**203***	high winds
12/26/2015	13*	100	**300***	high winds

ND = No Data

Bold text indicates concentrations in excess of the PM10 NAAQS

2014 Mecca PM10 data is considered preliminary, subject to change in validation (not submitted or flagged in U.S. EPA AQS database)

* Indicates measurement with continuous FEM (TEOM) instrument; FRM filter is primary measurement when available

** Peak measured concentrations on 7/27/14 did not technically exceed the federal PM10 standard, which requires a 24-hour average of 155 µg/m³, or above, to exceed

After excluding days flagged due to high-wind natural events, the federal 24-hour PM10 standard and the revoked federal annual PM10 standard, were not exceeded at these stations in either 2014 or 2015. Therefore, the maximum 2015 24-hour PM10 concentration (152 µg/m³) and annual average (38.6 µg/m³)

were 98 and 71 percent of the current 24-hour federal PM10 standard and the revoked annual federal standard (50 µg/m^3), respectively.[3]

When considering the form of the federal PM10 standards, after excluding the flagged high-wind exceptional events, the 3-year (2013–2015) design values for the Coachella Valley are 152 µg/m^3 for the 24-hour average and 38 µg/m^3 for the annual average (former standard). These are 98 and 70 percent of the 24-hour and former annual PM10 federal standards, respectively, and 304 and 190 percent of the state 24-hour (50 µg/m^3) and annual average (20 µg/m^3) PM10 standards. Figure 7-8 shows the trend of the annual average PM10 concentrations in the Coachella Valley for the station showing the highest PM10 measurements from 1990 through 2015, along with the annual PM2.5 trend.

[3] Technically, a 24-hour PM10 concentration ≥ 155 µg/m^3 is required to exceed the federal standard, due to rounding requirements and the form of the standard. While Coachella Valley concentrations near, but below 155 µg/m^3, are also influenced by high winds, exceptional event flagging only applies to data that violates a NAAQS. The revoked federal annual PM10 standard required an annual PM10 concentration ≥ 50.05 µg/m^3 to exceed that standard, which rounds to 50.1 µg/m^3.

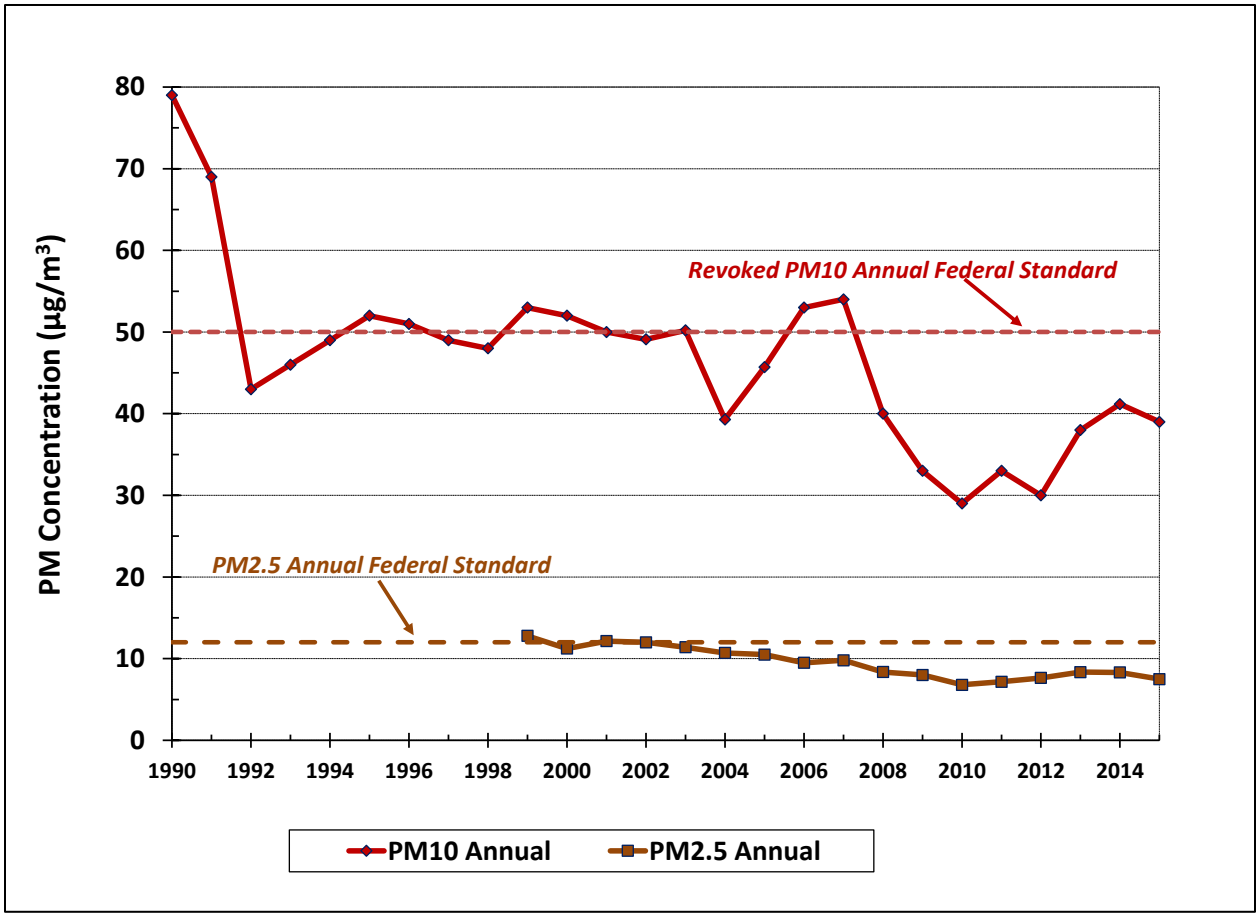

FIGURE 7-8
COACHELLA VALLEY TREND OF ANNUAL AVERAGE PM10 AND PM2.5, 1990–2015

PM2.5

SCAQMD began PM2.5 monitoring in both the Coachella Valley and the Basin in 1999. Two routine stations (Palm Springs and Indio) measure PM2.5 every third day with 24-hour filter-based FRM measurements, as required by U.S. EPA monitoring regulations. PM2.5 has remained relatively low, especially when compared to the Basin, due to fewer combustion-related emissions sources and less secondary aerosol formation in the atmosphere. There is also typically increased vertical mixing and horizontal dispersion in the desert areas. When looking at the 3-year design value for the 2013–2015 period, the Coachella Valley PM2.5 24-hour design value (17 µg/m^3) is 48 percent of the 24-hour NAAQS (35 µg/m^3) and the annual average design value (8.0 µg/m^3) is 66 percent of the current 2012 annual NAAQS (12.0 µg/m^3).

Figure 7-9 shows the trend of 3-year design values for annual average and 24-hour PM2.5 from 2001 through 2015. The stations in the Coachella Valley have not exceeded the 3-year design value form of the current standards since monitoring began. The annual average for the first year of measurements (1999) was just slightly above the level of the standard as can be seen in the trend of the annual average PM2.5 concentrations, shown in Figure 7-8 (above). As was seen elsewhere in California, the slight

increasing trend in the 24-hour design values in the Coachella Valley after 2012 is likely due, at least in part, to the ongoing drought conditions (see the PM2.5 section in Chapter 2 for additional drought discussion).

There are occasionally some individual days that exceeded the level of the 24-hour PM2.5 standard in the Coachella Valley, due to the PM2.5 fine particulate portion of windblown dust during very high PM10 events caused by high winds. Even though the PM2.5 standard can be exceeded during these exceptional events, the PM2.5 mass is a very small fraction of the total PM10 mass. These events are "extreme" and can be flagged as exceptional events, but they have not occurred frequently enough to exceed the 98th percentile form of the 24-hour PM2.5 standard.

The 2015 Coachella Valley maximum 24-hour average and the highest annual average concentrations (24.6 µg/m^3 and 7.5 µg/m^3, respectively, both at Indio) were 69 percent and 62 percent of the current federal 24-hour and annual standards. The annual PM2.5 state standard (12.0 µg/m^3), which is the same level as the federal annual standard, but with different rounding requirements, is also not exceeded in the Coachella Valley.

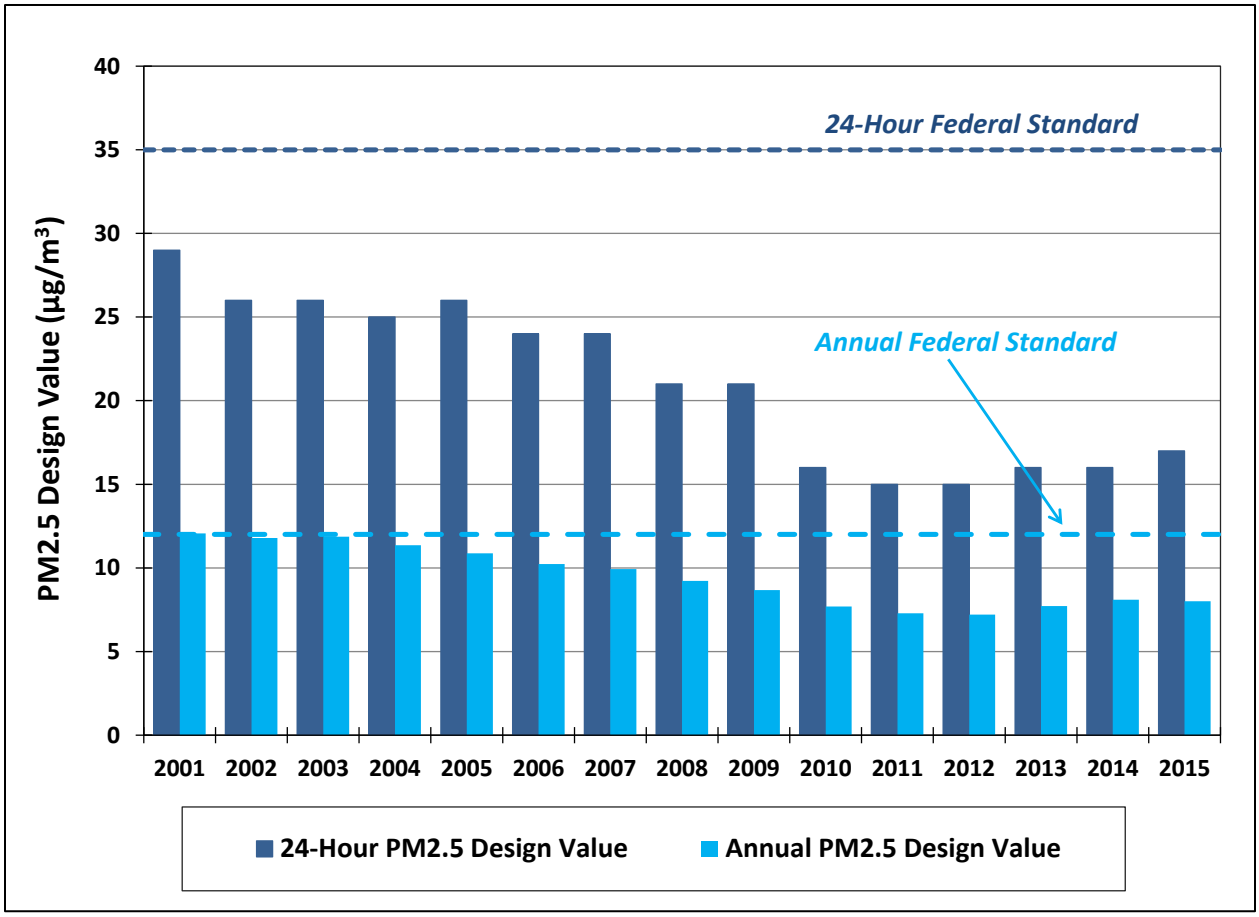

FIGURE 7-9
COACHELLA VALLEY TREND OF 24-HOUR AND ANNUAL AVERAGE PM2.5 3-YEAR DESIGN VALUES, 2001–2015

Desert Hot Springs PM2.5 Monitoring

In addition to the routine PM2.5 measurements, SCAQMD has been measuring PM2.5 since May 2014 with a continuous FEM instrument in Desert Hot Springs. This station is in the predominantly downwind direction of the 800 megawatt CPV Sentinel natural gas-powered electric generation facility.[4] Through the end of 2015, only a single day, June 19, 2015, exceeded the level of the 24-hour federal standard, with a concentration of 52.3 µg/m^3. That high day was associated with a strong windblown dust event that also had very high PM10 concentrations, due to outflows from thunderstorm activity over the desert southwest. Therefore, this day would qualify for flagging as a high-wind exceptional event and the high PM2.5 concentration was not correlated to power plant activity. In addition, such occasional single high

[4] Current and historic preliminary data from the Desert Hot Springs temporary special purpose monitor near CPV Sentinel can be found on the SCAQMD website at: http://www.aqmd.gov/home/library/air-quality-data-studies/special-monitoring/cpv-sentinel-monitoring.

values over the level of the standard have not caused a violation of the 98th percentile, 3-year design value form of the PM2.5 NAAQS.

The preliminary Desert Hot Springs PM2.5 annual average for 2015, the first full year of measurements, was 6.66 µg/m^3, well below the 12.0 µg/m^3 annual federal standard in this northern Coachella Valley location. While the concentrations from the continuous PM2.5 instruments, such as that used at the Desert Hot Springs station, are typically biased higher than the filter-based FRM PM2.5 measurements, the annual average concentration of 6.7 µg/m^3 is close to the 2014 FRM PM2.5 annual average measured at Palm Springs (6.4 µg/m^3) and below that measured at Indio (8.3 µg/m^3).

Other Criteria Pollutants

Carbon Monoxide (CO)

CO was measured at one Coachella Valley air monitoring station (Palm Springs) in 2015. Neither the federal nor state standards were exceeded. The maximum 8-hour average CO concentration recorded in 2015 (0.7 ppm) was less than 8 percent of both the federal (9 ppm) and state (9.0 ppm) 8-hour standards. The maximum 1-hour CO concentration (2.0 ppm) was 6 percent of the federal (35 ppm) and 10 percent of the State (20 ppm) 1-hour CO standards. Historical carbon monoxide air quality data show that the Coachella Valley area has not exceeded the federal CO standards in nearly three decades.

Nitrogen Dioxide (NO_2)

NO_2 was measured at one station (Palm Springs) in the Coachella Valley in 2015. The maximum annual average NO_2 concentration of 0.0062 ppm was approximately 12 percent of the federal annual standard (0.0534 ppm) and 21 percent of the state annual standard (0.030 ppm). The maximum 1-hour average concentration of 41.5 ppb was 42 percent of the 2010 federal (100 ppb) and 23 percent of the state 1-hour standard (180 ppb).

Sulfur Dioxide (SO_2)

SO_2 concentrations were not measured in the Coachella Valley in 2015. Historic analyses have shown SO_2 concentrations to be well below the state and federal standards and there are no significant emissions sources in the Coachella Valley.

Sulfates (SO_4^{2-})

Sulfate, from FRM PM10 filters, was measured at two stations (Palm Springs and Indio) in the Coachella Valley in 2015. The 2015 maximum 24-hour average sulfate concentration was 4.6 µg/m^3 (18 percent of the 25 µg/m^3 State sulfate standard) and the 3-year maximum State designation value was 2.6 µg/m^3 (10 percent of the 25 µg/m^3 State sulfate standard). While still well below the State standard, the 4.6 µg/m^3 peak value may not be the State designation value, since it was associated with a high-wind exceptional event that caused exceedances of the PM10 NAAQS at Indio at both the Palm Springs and Indio air monitoring stations. There is no federal sulfate standard.

Lead (Pb)

Lead was not measured in the Coachella Valley in 2015. Historic analyses have shown concentrations to be less than the state and federal standards as no significant sources of lead emissions are located in the Coachella Valley.

Hydrogen Sulfide (H_2S)

SCAQMD started measuring H_2S near the Salton Sea at two locations in November 2013 in order to better understand odor events related to the Salton Sea and to better communicate these events to the community. One of the H_2S monitoring stations is located on Torres-Martinez tribal land that is close to the shore, in a sparsely populated area. The second monitor is located at the SCAQMD Mecca air monitoring station site (Saul Martinez Elementary School), a more populated community approximately four miles north of the Salton Sea.

A significant H_2S odor event occurred in September 2012, bringing sulfur or rotten-egg odors and widespread attention to the issue of H_2S odors from the Salton Sea. This event affected people in communities throughout the Coachella Valley, across many areas of the Basin, and into portions of the Mojave Desert Air Basin to the north. Over 235 odor complaints were registered with SCAQMD during this event, from as far west as the San Fernando Valley in Los Angeles County.

H_2S is a product of anaerobic organic decay in the Salton Sea that is particularly active in the summer months, especially at the bottom of the shallow Sea with the abundant desert sunlight and heat. The 2012 event occurred during a period of moist southeasterly "monsoonal" flows in desert areas of southeastern California, along with desert thunderstorms. Strong outflow winds from thunderstorms to the south crossed the Salton Sea, causing mixing in the water layers that released and transported significant amounts of H_2S gas and the associated odors.

While strong events like that of September 2012 are uncommon, less extreme releases of H_2S can cause odors in areas close to the Salton Sea relatively frequently. These events are more prevalent during the hot summer months, especially when the southeasterly "monsoonal" flow events occur, but they sometimes occur at other times of the year. Elevated H_2S is typically measured in the Coachella Valley during wind shifts that bring flows from the south or east directions. These shifts occur most often in the early morning or the late afternoon/early evening hours in this area. The Salton Sea's receding shorelines and shallower waters may affect the number or severity of these odor events in the future.

While there is no federal standard for H_2S, California has set a standard of 30 parts per billion (ppb), averaged over one hour as a level not to be reached or exceeded. The state standard was adopted in 1969, based on the thresholds for annoyance and unpleasant odors, with the purpose of decreasing odor annoyances.[5] Humans can detect H_2S odors at extremely low concentrations, down to a few ppb. Above the state standard, most individuals can smell the offensive odor and many may experience temporary symptoms such as headaches and nausea due to unpleasant odors. The CAAQS for H_2S was reviewed in 1984 and retained.

In 2014 and 2015, 24 and 27 days, respectively, had exceedances of the 1-hour state H_2S standard at the sparsely populated Torres-Martinez monitoring site at the Salton Sea. Of these, five days in 2014 and 12 days in 2015 had H_2S exceedances that lasted longer than one hour. The highest number of hourly exceedances in a day was 20, on September 9, 2015, while the next highest number of hours exceeding in a single day was six. The exceedances at this station occurred between the beginning of April and the

[5] Collins, J., and D. Lewis. (2000). Hydrogen Sulfide: Evaluation of Current California Air Quality Standards with Respect to Children. California Office of Environmental Health Hazard Assessment document prepared for CARB. http://www.arb.ca.gov/ch/ceh/001207/h2s_oehha.PDF.

end of October, with most occurring in August and September. The highest 1-hour concentration measured at the Torres-Martinez station in 2014 and 2015 was 183 ppb, on September 9, 2015.

Further north from the Salton Sea in Mecca, the state H_2S standard was exceeded on three days in 2014 and six days in 2015, with a peak concentration of 129 ppb on September 3, 2015. The most hours in a day to exceed the standard at Mecca was six, on September 9, 2014. Most of the daily exceedances only lasted one or two hours. All the 2014 and 2015 Mecca exceedances occurred in the months of August and September. Figure 7-10 shows the 2014 and 2015 monthly number of days by station exceeding the state H_2S standard in the Coachella Valley.

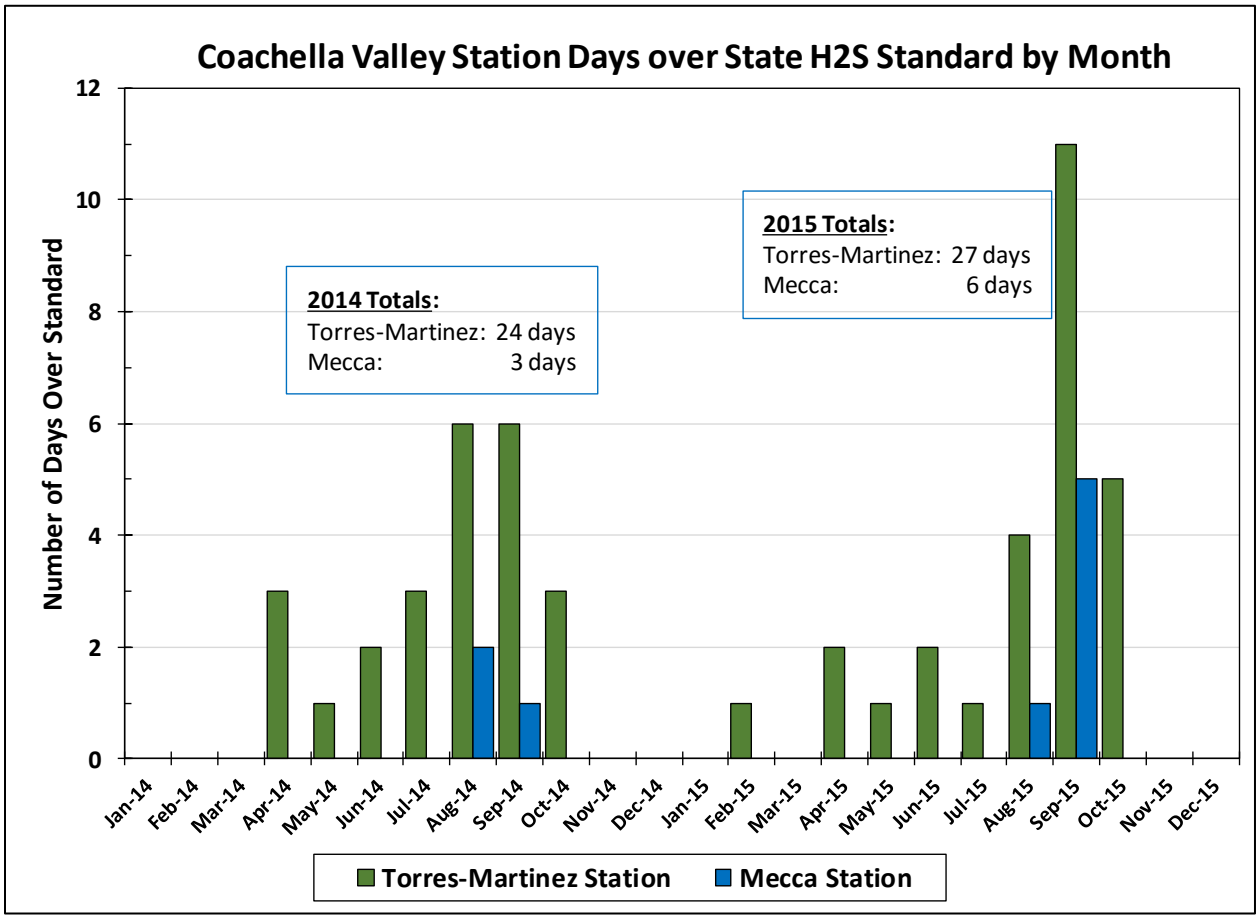

FIGURE 7-10

NUMBER OF DAYS IN EACH MONTH WITH 1-HOUR HYDROGEN SULFIDE (H_2S) OVER THE STATE STANDARD IN 2014 AND 2015 FOR COACHELLA VALLEY MONITORING STATIONS

Pollutant Transport

Pollutant transport from the Basin to the SSAB occurs through the San Gorgonio Pass (sometimes referred to as the Banning Pass) to the Coachella Valley.[6] The transport pathway to the Coachella Valley has been well documented and studied in the past. An experiment in the early 1970s concluded that the South Coast Air Basin was the source of the observed high ozone levels in the Coachella Valley.[7] Transport from Anaheim to Palm Springs was directly identified with an inert sulfur hexafluoride tracer release.[8] A comprehensive study of transport from the Basin to the SSAB also confirmed the ozone transport pathway to the Coachella Valley.[9]

Ozone pollutant transport to the Coachella Valley can be demonstrated by examining averaged ozone concentrations by time of day for various stations along the transport corridor from Los Angeles County into Riverside County and into the Coachella Valley. Figure 7-11 shows the diurnal distribution of averaged 1-hour ozone concentrations for the May–October smog season, by hour, for the 2012–2014 period. The Coachella Valley transport route is represented, starting at Central Los Angeles as the main emissions source region and passing through Riverside-Rubidoux and Banning and finally through the San Gorgonio Pass to Palm Springs in the Coachella Valley. Near the source regions, ozone peaks occur just after mid-day (1 to 2 p.m. Pacific Standard Time (PST)), on average, during the peak of incoming solar radiation and therefore the peak of ozone production. Ozone peaks near the emissions source region are not as high as those further downwind, due to the photochemical reaction time needed for ozone to form from precursor gases. Downwind of the source region, ozone peaks occur later in the day and at generally higher concentrations as ozone and ozone precursors are transported downwind and photochemical reactions continue. At Palm Springs, ozone concentration peaks occur between 4 and 6 p.m. PST. If this peak were locally generated, it would be occurring closer to near mid-day, as is seen in the major source areas of the Basin, and not in the late afternoon or early evening, as is seen at Palm Springs.

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[6] Keith, R.W. (1980). A Climatological Air Quality Profile: California's South Coast Air Basin. Staff Report, South Coast Air Quality Management District.

[7] Kauper, E.K. (1971). Coachella Valley Air Quality Study. Final Report, Pollution Res. & Control Corp., Riverside County Contract & U.S. Public Health Service Grant No. 69-A-0610 RI.

[8] Drivas, P.J., and F.H. Shair. (1974). A Tracer Study of Pollutant Transport in the Los Angeles Area. *Atmos. Environ*. 8, 1155-1163.

[9] Smith, T.B., et al. (1983). The Impact of Transport from the South Coast Air Basin on Ozone Levels in the Southeast Desert Air Basin. CARB Research Library Report No. ARB-R-83-183. CARB Contract to MRI/Caltech. http://www.arb.ca.gov/research/single-project.php?row_id=64953.

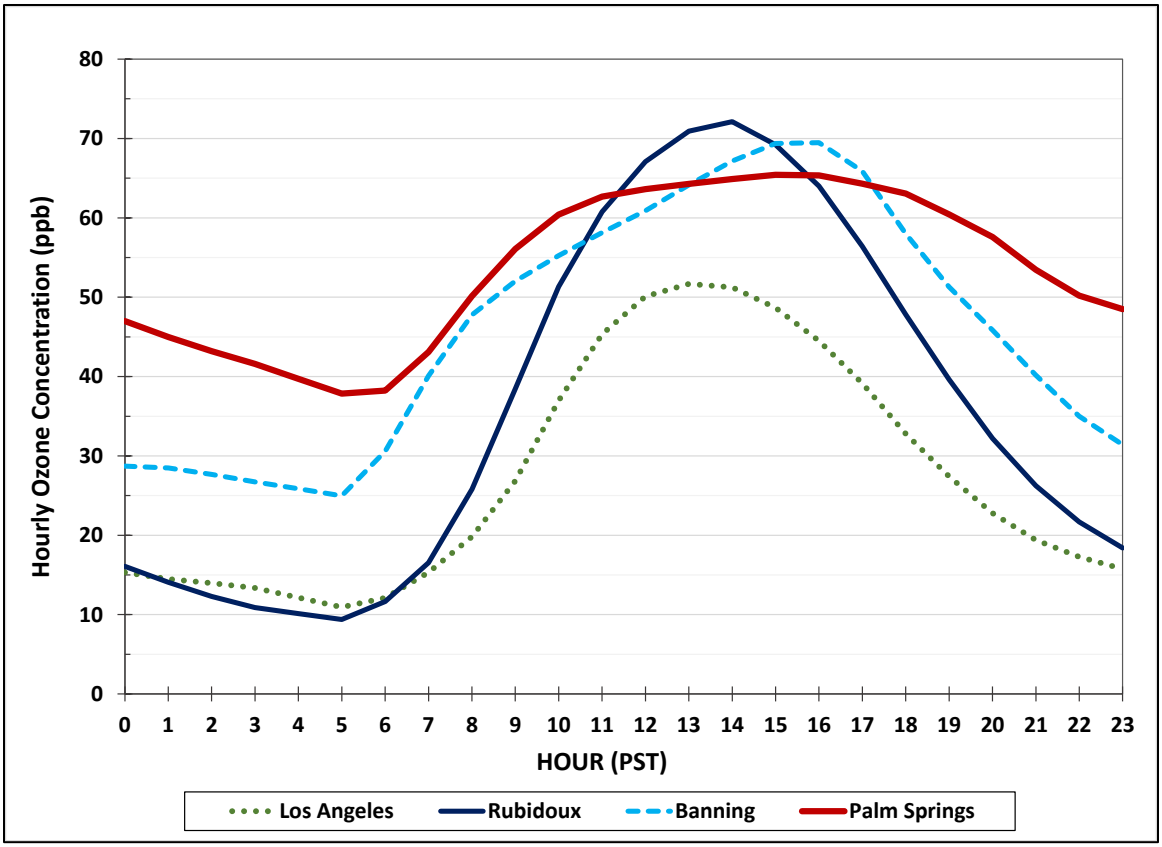


FIGURE 7-11

DIURNAL PROFILE OF 3-YEAR (2012–2014) HOURLY OZONE CONCENTRATIONS ALONG THE TRANSPORT ROUTE INTO THE COACHELLA VALLEY

(HOURS IN PACIFIC STANDARD TIME (PST), AVERAGED FOR THE MAY–OCTOBER OZONE SEASON BY HOUR)

Palm Springs also exhibits higher morning ozone concentrations, when compared to the concentrations in the morning in the Basin closer to the main emissions source areas (i.e., Los Angeles and Rubidoux). The stations in the Basin have more local NOx emissions (mostly from mobile sources) that help scavenge[10] the ozone after dark when ozone photochemistry ceases. The Coachella Valley has limited local NOx emissions to help scavenge the ozone at night. This elevated overnight ozone contributes to an early morning start to the daily ozone increase in Coachella Valley, starting after sunrise (5–6 a.m. PST), with the ample sunlight and strong overnight temperature inversions in the desert. Ozone concentrations observed on high ozone days in the Coachella Valley can reach an initial peak before noon and then drop slightly with increased mixing in the early afternoon, before climbing to the daily peak, typically between 4 and 6 p.m., as the typical onshore flow reaches the Coachella Valley through the San Gorgonio Pass, transporting new ozone from the Basin.

[10] Freshly emitted NOx includes NO, which destroys ozone through a fast reaction colloquially termed 'scavenging.'

Future Air Quality

Emissions Inventories

For illustrative purposes, Table 7-5 shows base year (2012) and future-year emission inventories for the Coachella Valley, based on the AQMP inventory methodology as described in Appendix III – Base and Future Year Emission Inventory. Emissions, in tons per day, of VOC, NOx, CO, SOx, PM10, PM2.5, and NH_3 are shown. The corresponding inventories for the Basin are shown for comparison in Table 7-6. The Basin emissions, typically upwind of the Coachella Valley, overwhelm the locally-generated emissions. Depending on the pollutant, emissions in the Basin are 10 to over 350 times greater than emissions in the Coachella Valley. Future increases in some of the pollutant emissions within the Coachella Valley are largely due to projected increases in population, VMT, and construction activity. It is clear that improved air quality in the Coachella Valley depends on reduced emissions in the Basin. This is further illustrated by the positive trends in ozone air quality in both areas, as described earlier.

TABLE 7-5

Coachella Valley Annual Average Emissions for Base Year (2012) and Future Years, without Further Controls

COACHELLA VALLEY EMISSIONS (Tons/Day)							
YEAR	**VOC**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**NH_3**
2012	14.1	27.1	59.7	0.2	15.2	3.4	2.4
2019	12.6	16.8	45.3	0.2	21.7	3.7	2.3
2021	12.6	14.7	43.6	0.2	23.3	3.9	2.3
2022	12.6	13.7	43.2	0.2	23.7	3.9	2.3
2023	12.6	11.2	43.0	0.2	24.3	4.0	2.3
2025	12.7	10.5	42.8	0.2	25.3	4.1	2.4
2026	12.8	10.3	43.1	0.2	25.8	4.2	2.4
2031	13.5	9.4	45.7	0.2	28.6	4.6	2.5

TABLE 7-6

South Coast Air Basin Annual Average Emissions for Base Year (2012) and Future Years, without Further Controls

SOUTH COAST AIR BASIN EMISSIONS (Tons/Day)							
Year	**VOC**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**	**NH_3**
2012	470.1	539.9	2123.1	18.4	152.5	66.4	81.1
2019	375.6	353.1	1447.3	16.6	158.8	63.9	74.0
2021	365.4	309.1	1357.3	16.8	160.7	63.8	72.9
2022	362.3	290.5	1324.7	17.0	161.9	64.1	72.6
2023	358.8	256.7	1298.1	17.1	162.7	64.2	72.3
2025	353.5	240.6	1246.8	17.4	163.8	64.3	72.3
2026	351.8	234.2	1231.8	17.5	164.4	64.4	72.4
2031	345.0	213.8	1187.8	18.2	167.9	65.3	73.1

Reasonable Further Progress

The federal CAA requires SIPs for most nonattainment areas to demonstrate RFP toward attainment through emission reductions phased in from the time of the SIP submission until the attainment date time frame. The RFP requirements in the CAA are intended to ensure that ozone nonattainment areas provide for sufficient progress towards ozone precursor emission reductions to attain the ozone NAAQS.

Per CAA Section 171(1), RFP is defined as "such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date." As stated in subsequent federal regulation, the goal of the RFP requirements is for areas to achieve generally linear progress toward attainment. To determine RFP for the attainment date, U.S. EPA has determined that the plan should rely only on emission reductions achieved from sources within the nonattainment area.

Subpart 2 sections 182(b)(1) and 182(c)(2)(B) contain specific emission reduction targets to ensure that ozone nonattainment areas provide for sufficient precursor emission reductions to attain the ozone national ambient air quality standard. Section 182(b)(1)(A) requires that "moderate" or above areas provide for VOC reductions of at least 15 percent from baseline emissions within six years after November 15, 1990. The U.S. EPA final rule of "*Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements*" (80 FR 12263) states that if an area has already met the 15 percent requirement for VOC under either the 1-hour ozone NAAQS or the 1997 8-hour ozone

NAAQS, such requirement under 182(b)(1) would not have to be fulfilled again. Instead, such areas would need to meet the CAA requirements under Section 182(c)(2)(B), which requires that "serious" and above areas provide VOC and/or NOx reductions (CAA, Section 182(c)(2)(C)) of 18 percent over the first six years after the baseline year for the 2008 8-hour ozone NAAQS, and an additional three percent per year averaged over each consecutive three-year period until the attainment date.

As mentioned a number of times in this chapter, poor ozone air quality in the Coachella Valley is primarily due to transport of ozone and its precursors from the upwind source region of the Basin and attainment in Coachella Valley is only possible with substantial emission reductions in the Basin. With this in mind, the proposed control strategy consists of two components: 1) an aggressive control strategy for NOx emission sources in the Basin; and 2) control of locally generated emissions via proposed state-wide or nationally applied control measures implemented by state and federal actions.

Tables 7-7 and 7-8 summarize the RFP calculations. Figure 7-12 depicts the target level and projected baseline RFP demonstration for VOC. For each of the milestone years, the District is able to show that the required progress is met on the basis of reductions from the existing control program using a combination of VOC and NOx reductions within the Coachella Valley portion of the SSAB alone. No additional reductions from the proposed control measures in the Plan are needed for progress purposes. Projected VOC baseline emissions are not sufficient to meet the CAA requirements as the baseline VOC emission levels are above the target levels of each milestone year. Therefore, projected NOx baseline emission reductions are needed to show compliance with the targeted RFP levels. The CAA Section 182(c)(2)(C) provides for NOx reductions to substitute for RFP reductions not achieved for VOC emissions. The demonstration in Tables 7-7 and 7-8 show compliance with RFP requirements as well as CAA contingency requirements.

TABLE 7-7

Summary of Reasonable Further Progress Calculations – VOC

ROW	CALCULATION STEP [a]	2012[b]	2018	2021	2024	2026
1	Baseline VOC Emissions (tpd)	16.50	14.89	14.61	14.88	15.10
2	Required Percent Change Since Previous Milestone Year (%)		18.0	9.0	9.0	6.0
3	Target VOC Level (tpd)		13.53	12.31	11.20	10.53
4	Cumulative Milestone Year Shortfall (tpd)		1.36	2.30	3.68	4.57
5	Cumulative Shortfall in VOC (%)		8.2	13.9	22.3	27.7
6	Incremental Milestone Year Shortfall (%)		8.2	5.7	8.4	5.4

[a] Units are in tons per day (tpd), based on the summer planning inventory unless otherwise noted

[b] Base Year (2012)

Row Description:

ROW 1: Projected baseline emissions from Appendix III – Baseline and Future Emission Inventory taking into account existing rules and projected growth

ROW 2: Required 18% reduction 6 years after Base Year; future milestone years are every 3 years until attainment year; and required reductions are 3% per year for each milestone year (e.g., for every 3 years, required 9% reduction)

ROW 3: [(1-Row 2/100) x Row 1 or Row 3] – Base Year Row 1 for first milestone year, and previous milestone year's target level (Row 3) for remaining milestone years

ROW 4: [(Row 1) – (Row 3)] or (Baseline – Target) – negative number meets target level and positive number is shortfall of target level

ROW 5: [(Row 4) / (Base Year Row 1) x 100]

ROW 6: Negative (Row 5) is zero shortfall; positive number is a shortfall. Incremental milestone year shortfall is determined by subtracting the previous year's shortfall from the cumulative (e.g., for 2024, cumulative shortfall of 22.3% – previous 2021 shortfall of 13.9% = 8.4%)

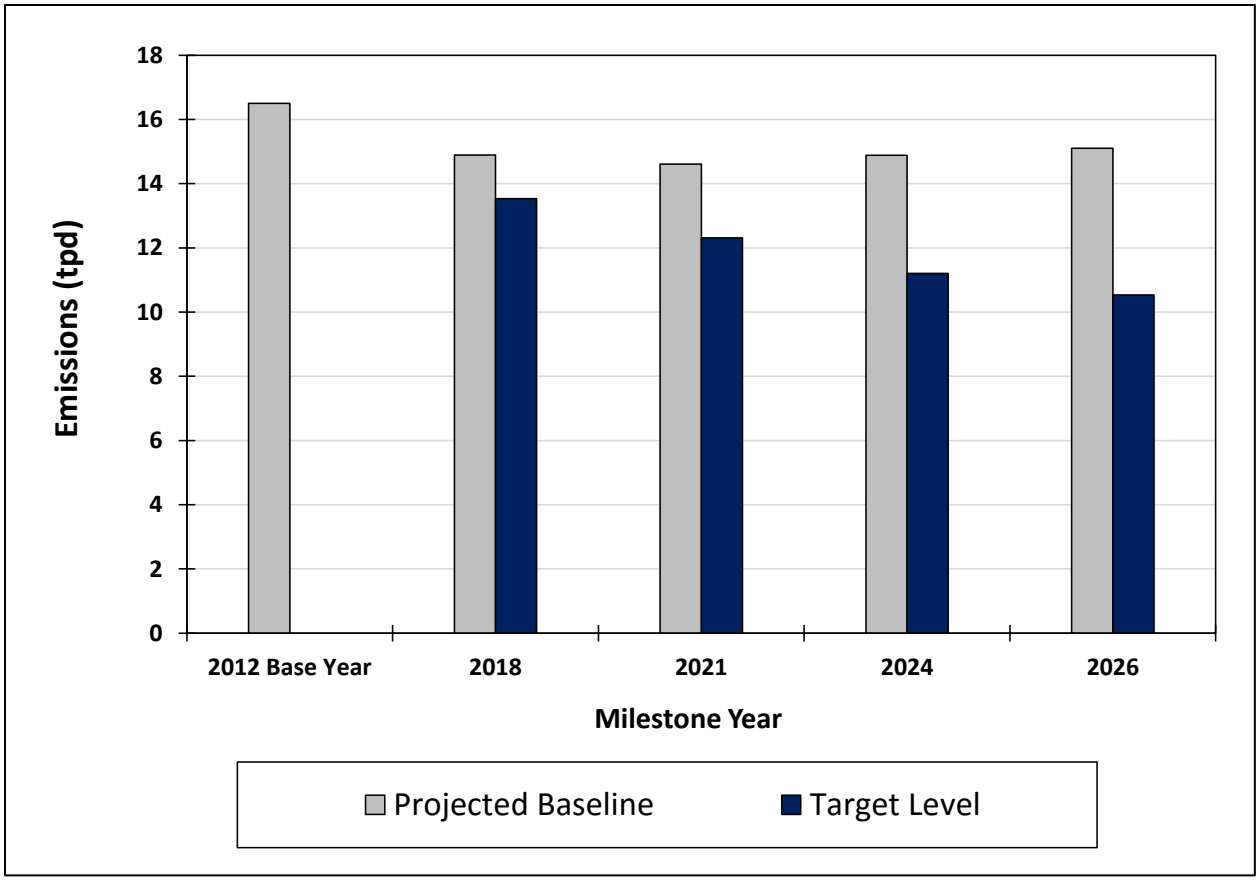


FIGURE 7-12
REASONABLE FURTHER PROGRESS – VOC

TABLE 7-8

Summary of Reasonable Further Progress Calculations – NOx

ROW	CALCULATION STEP [a]	2012[b]	2018	2021	2024	2026
1	Baseline NOx Emissions (tpd)	26.53	16.60	13.44	9.65	8.92
2	Reductions in NOx Emissions since Base Year (tpd)		9.93	13.09	16.88	17.61
3	Percent Reductions in NOx Emissions since Base Year (%)		37.4	49.3	63.6	66.4
4	Contingency plus VOC Shortfall (%)		3.0	11.2	16.9	25.3
5	Percent Available for NOx Substitution (%)		34.4	38.1	46.7	41.1
6	Incremental Milestone Year VOC Shortfall (%)		8.2	5.7	8.4	5.4
7	Percent Surplus Reduction (%)		26.2	32.4	38.3	35.7
8	RFP Compliance		Yes	Yes	Yes	Yes
9	Contingency Compliance		Yes	Yes	Yes	Yes

[a] Units are in tons per day (tpd), based on the summer planning inventory unless otherwise noted

[b] Base Year (2012)

Row Description:

ROW 1: Projected baseline emissions from Appendix III – Baseline and Future Emission Inventory taking into account existing rules and projected growth

ROW 2: Reductions achieved in Baseline: [(Row 1 Base Year) – (Row 1 Milestone Year)]; e.g., for 2018: 26.53 tpd – 16.60 tpd = 9.93 tpd

ROW 3: % Reductions achieved since Base Year: [(Row 2) / (Row 1 Base Year)] x 100; e.g., for 2018: (9.63/26.53) x 100 = 37.4%

ROW 4: Reserves 3% (1 year worth of CAA RFP reductions) for contingency measure implementation plus the previous year(s)'s incremental milestone year VOC shortfall from Table 7-7

ROW 5: [(Row 3) – (Row 4)]

ROW 6: Incremental milestone year VOC shortfall from Table 7-7

ROW 7: Surplus reductions achieved [(Row 5) – (Row 6)]

ROW 8: Positive number in Row 7 is percent surplus for each milestone year, thus meeting RFP target levels

ROW 9: Surplus includes 3% contingency carryover and VOC shortfall, and still meets RFP target levels

VMT Offset Demonstration for the 2008 Ozone Standard

In 1979, U.S. EPA established a primary health-based NAAQS for ozone at 0.12 ppm averaged over a 1-hour period [See 44 Fed. Reg. 8220 (February 9, 1979)]. The CAA, as amended in 1990, classified areas that had not yet attained that standard based on the severity of their ozone problem, ranging from "marginal" to "extreme." "Extreme" areas were provided the most time to attain, until November 15, 2010, but were also subject to the most stringent requirements. In particular, "severe" and "extreme" areas were subject to CAA Section 182(d)(1)(A), which requires SIPs to adopt "specific enforceable transportation control strategies and transportation control measures to offset any growth in vehicle miles traveled or numbers of vehicle trips in such area…." U.S. EPA designated the Coachella Valley, then as part of the Southeast Desert Modified Air Quality Management area, as "Severe-17" on November 6, 1991 (56 Fed. Reg. 56694), and thus the Coachella Valley was subject to this requirement. The U.S. EPA has historically interpreted this provision of the CAA (now called "VMT emissions offset requirement") to allow areas to meet the requirement by demonstrating that emissions from motor vehicles decline each year through the attainment year [see 57 Fed. Reg. 13498, at 13521–13523 (April 16, 1992)].

In 1997, U.S. EPA replaced the 1-hour ozone standard with an 8-hour standard of 0.08 ppm [62 Fed. Reg. 38856 (July 18, 1997)]. The U.S. EPA promulgated rules implementing this standard with the "Phase 1" rule issued on April 30, 2004 (69 Fed. Reg. 23951), and the Phase 2 rule issued on November 29, 2005 (70 Fed. Reg. 71612). These implementation rules required that areas classified as "severe" or "extreme" under the 1997 8-hour standard would also be subject to the VMT offset requirement.

In 2008, U.S. EPA revised the 8-hour ozone NAAQS to a level of 0.075 ppm (73 Fed. Reg. 16436, March 27, 2008). The Coachella Valley was subsequently designated nonattainment for the 2008 standard on May 21, 2012 and classified as a "severe-15" nonattainment area (77 Fed. Reg. 30087), making the Coachella Valley subject to the requirements of CAA Section 182(d)(1)(A) for the 2008 8-hour ozone NAAQS.

In August 2012, U.S. EPA issued guidance titled "Implementing Clean Air Act Section 182(d)(1)(A): Transportation Control Measures and Transportation Control Strategies to Offset Growth in Emissions Due to Growth in Vehicle Miles Traveled". Among other things, U.S. EPA's guidance points out that subsequent court decisions regarding previous VMT offset demonstrations omitted any reference to "transportation control strategies" (TCS). TCSs, which are not defined in the CAA or U.S. EPA regulation, are eligible to offset growth in emissions due to growth in VMT. The U.S. EPA's new guidance indicates that technology improvements such as vehicle technology improvements, motor vehicle fuels, and other control strategies that are transportation-related could be used to offset increases in emissions due to VMT growth. U.S. EPA's revised guidance sets forth a method of calculating the actual growth in emissions due to growth in VMT. Essentially, the area compares projected attainment year emissions assuming no new control measures and no VMT growth with projected actual attainment year emissions (including new control measures and VMT growth). If the latter number is smaller than the former, no additional transportation control measures or strategies would be required. If additional transportation control measures and transportation control strategies are required, they should be clearly identified and distinguished from the measures included in the initial calculations for the base year and the three scenarios identified for the attainment year.

In addition, the guidance recommends that the base year used in the demonstration be the base year used in the attainment demonstration for the ozone standard. To address U.S. EPA's guidance, 2012 is

used in this demonstration as the base year for the 2008 8-hour standard. Consistent with U.S. EPA guidance, emissions of VOC are used to determine compliance with the VMT offset requirement.

Transportation Control Strategies and Transportation Control Measures

By listing them separately, the Clean Air Act [CAA §182(d)(1)(A)] differentiates between TCS and transportation control measures (TCM), and thus provides for a wide range of strategies and measures as options to offset growth in emissions from vehicle miles traveled (VMT) growth. In addition, the example TCMs listed in Section 108(f)(1)(A) of the CAA include measures that reduce emissions by reducing VMT, reducing tailpipe emissions, and removing dirtier vehicles from the fleet. California's motor vehicle control program includes a variety of strategies and measures including new engine standards and in-use programs (e.g., smog check, vehicle scrap, fleet rules, and idling restrictions). TCMs developed by SCAG provide additional reductions. In addition, SCAG prepares a report every two years that reports on the status of implementation of TCMs.

Based on the provisions in Section 182(d)(1)(A) and the clarifications provided in the U.S. EPA guidance, any combination of TCSs and TCMs may be used to meet the requirement to offset growth in emissions resulting from VMT growth. Since 1990 when this requirement was established, California has adopted more than sufficient enforceable transportation control strategies and measures to meet the requirement to offset the growth in emissions from VMT growth.

Emissions Due to VMT Growth

The U.S. EPA guidance provides a recommended calculation methodology to determine if sufficient transportation control strategies and TCMs have been adopted and implemented to offset the growth in emissions due solely to growth in VMT. As such, any increase in emissions solely from VMT increases in the future attainment year from the base year (assuming that there are no further motor vehicle control programs implemented after the base year) would need to be offset. In addition, a calculation is needed to show the emissions levels if VMT had remained constant from the base year to the future attainment year. A comparison of the projected attainment year emissions assuming no new control measures and no VMT growth with projected actual attainment year emissions (including new control measures and VMT growth) can be made. If the latter number is smaller than the former, no additional transportation control measures or strategies would be required.

VMT Offset Demonstration Summary

For the 2008 8-hour ozone NAAQS offset demonstration, 2012 controls are used as the base case control level since 2012 is the base year of the SIP. 2026 is the Coachella Valley's attainment demonstration attainment year for the 2008 ozone NAAQS. The following calculations are based on the recommended calculation methodology provided in U.S. EPA guidance. Additional details on the analysis methodology is provided in Appendix VI-E – Compliance with other Clean Air Act Requirements.

Table 7-9 summarizes the vehicle miles traveled (VMT), vehicle starts, vehicle population, and VOC emissions for the Coachella Valley in the 2012 base year from the EMFAC2014 model. Table 7-10 summarizes the vehicle parameter and VOC emissions as projected for the Coachella Valley in the attainment year (2026), as calculated with three emissions scenarios:

1. 2026 VOC emissions calculated with the motor vehicle control program frozen at 2012 levels and with projected VMT, starts, and vehicle population for the attainment year. This represents what the emissions in the attainment year would have been if transportation control strategies and transportation control measures had not been implemented after 2012. To perform this calculation, California Air Resources Board (CARB) staff identified the on-road motor vehicle control programs adopted since 2012 and adjusted EMFAC2014 to reflect the VOC emissions levels in 2026 without the benefits of the post-2012 control programs. The projected VOC emissions are 3.1 tons/day.
2. 2026 VOC emissions calculated with the motor vehicle control program frozen at 2012 levels and assuming VMT, starts, and vehicle population do not increase from 2012 levels. In this calculation, the VOC emission levels in calendar year 2026 without benefit of the post 2012 control program are calculated. EMFAC2014 allows a user to input different VMT, starts, and vehicle population than default. For this calculation, EMFAC2014 was run without the benefit of the post 2012 control program for calendar year 2026 with the 2012 level of VMT of 11,402,997 miles per day, the 2012 level of starts at 2,006,983 per day, and the 2012 level of population at 319,781 vehicles. The VOC emissions associated with 2012 VMT, starts, and vehicle population in calendar year 2026 are 2.5 tons/day.
3. 2016 VOC emissions that represent emissions with full implementation of all transportation control strategies and transportation control measures since 2012 and which represents the projected future year baseline emissions inventory using the VMT, starts, and vehicle population for the attainment year. The VOC emission levels for 2026 assuming the benefits of the post-2012 motor vehicle control program and the projected VMT, starts, and vehicle population in 2026 are calculated using EMFAC2014. The projected VOC emissions level is 2.0 tons/day.

TABLE 7-9

Summary of 2012 Coachella Valley Base Year VMT Factors and VOC Emissions

	VMT (thousand miles/day)	Starts (thousands/day)	Vehicle Population (thousands)	VOC Emissions* (tons/day)
2012 Base Year	11,403	2,007	320	4.8

* Does not include diurnal or resting loss emissions

TABLE 7-10

Summary of 2026 Coachella 2026 Attainment Demonstration Year VMT Factors and VOC Emissions

	Description	VMT* (miles/day, thousands)	Starts (thousands/day)	Vehicle Population (thousands)	VOC Emissions** (tons/day)
(1)	**Emissions with Motor Vehicle Control Program Frozen at 2012 Levels** (VMT, starts and vehicle population at 2026 levels.)	14,977	2,738	446	3.1
(2)	**Emissions with Motor Vehicle Control Program Frozen at 2012 Levels** (VMT, starts, and vehicle population at 2012 levels)	11,403	2,007	320	2.5
(3)	**Emissions with Full Motor Vehicle Control Program in Place** (VMT, starts and vehicle population at 2026 levels)	14,977	2,738	446	2.0

* CY 2026 VMT based on the SCAG 2016 RTP

** Does not include diurnal or resting loss emissions

As provided in the U.S. EPA guidance, to determine compliance with the provisions of Section 182(d)(1)(A) of the CAA, the emissions levels calculated in Calculation 3 should be less than the emissions levels in Calculation 2 in Table 7-10. The 2026 VOC emissions with full motor vehicle control program are 2.0 tons/day, which is less than 2.5 tons/day and, therefore, this requirement is met. Figure 7-13 shows graphically that the VMT offset requirement is met due to the emissions benefits of the motor vehicle control programs in offsetting VOC emissions due to increased VMT, starts, and vehicle population in the Coachella Valley for the 2008 8-hour ozone standard with the 2012 base year. The left bar (in purple) shows the emissions in the base year with base year controls. The three bars on the right in each figure show the emissions levels in the attainment year for the three calculations identified above: (1) the red bar shows attainment year emissions with base year controls and attainment year VMT, starts, and vehicle population; (2) the green bar shows attainment year emissions with base year controls, VMT, starts, and vehicle population; and (3) the blue bar shows attainment year emissions with attainment year controls, VMT, starts, and vehicle population. Based on the U.S. EPA guidance, since the blue bar is lower than the green bar, the identified transportation control strategies and TCMs are sufficient to offset the growth in emissions.

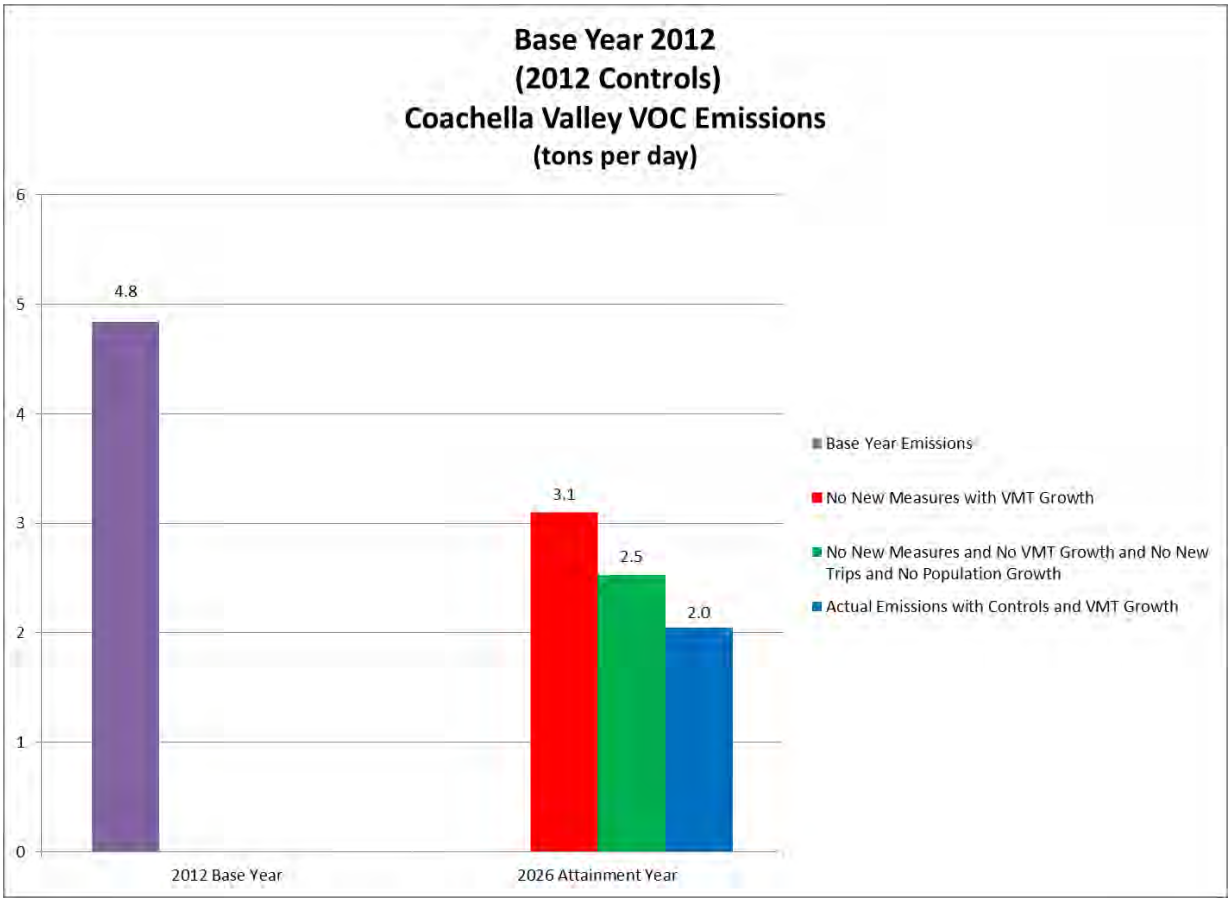


FIGURE 7-13

REASONABLE FURTHER PROGRESS – VOC

(VOC EMISSIONS FROM ON-ROAD MOBILE SOURCES IN THE COACHELLA VALLEY; 2012 BASE YEAR AND 2026 ATTAINMENT YEAR; DOES NOT INCLUDE RESTING OR DIURNAL LOSS EMISSIONS)

Ozone Attainment Demonstration and Projections

This section presents an overview of the new ozone SIP attainment demonstration for the 2008 8-hour ozone NAAQS for the Coachella Valley. It also evaluates the progress toward attainment of the 1997 8-hour ozone NAAQS, although it is not an update to the previously submitted ozone SIP attainment demonstration for that revoked standard. In addition, this section provides an initial look at future attainment of the 2015 8-hour ozone NAAQS (0.070 ppm), which is also not part of this SIP.

2008 8-Hour Ozone NAAQS Attainment Demonstration

In the 2007 AQMP and the subsequent SIP submittal, SCAQMD requested that U.S. EPA reclassify the Riverside County portion of the Salton Sea Air Basin from "serious" nonattainment to "severe-15" and extend the attainment date for the 1997 8-hour ozone NAAQS (0.08 ppm) to June 15, 2019. This voluntary nonattainment reclassification was approved by U.S. EPA on May 5, 2010. The "severe-15"

nonattainment designation was subsequently applied to the 2008 8-hour ozone NAAQS (0.075 ppm) in the Coachella Valley, for a new attainment date of July 20, 2027 for that revised standard.

The CAA requires that ozone nonattainment areas designated as "serious" and above use a regional photochemical model to demonstrate attainment. To meet this requirement, the CMAQ modeling system is used in this analysis for the Coachella Valley, as well as the Basin. The complete SCAQMD modeling system and its application is described in Chapter 5 and Appendix V – Modeling and Attainment Demonstration, along with base and future year results, sensitivity analyses and performance evaluations.

Future projected air quality for the Coachella Valley was developed using CMAQ simulations and relative response factors (RRFs, ratios of CMAQ predictions for future year over base year predictions), focusing on the 10 highest ozone episode days for the Coachella Valley stations during the five-month period encompassing the peak of the ozone season (May through September of 2012; 153 days). Of the five-month period in 2012, the 2008 8-hour federal ozone standard (0.075 ppm) was exceeded on 83 days in the Basin and 31 days in the Coachella Valley. The 1997 8-hour federal standard (0.08 ppm) was exceeded on 51 days in the Basin and 7 days in the Coachella Valley during the five-month period. For reference, the new 2015 8-hour federal ozone standard (0.070 ppm) was exceeded on 113 days in the Basin and 50 days in the Coachella Valley from May through September of 2012.

The Coachella Valley is currently a nonattainment area for the 2008 8-hour ozone NAAQS (0.075 ppm). With an attainment due date of July 20, 2027, emission reductions required to meet the standard need to be in place by the end of 2026 and the modeling demonstration must show attainment in 2026. Therefore, air quality in 2026 was simulated using CMAQ to evaluate future attainment in the Coachella Valley. The 2026 baseline future projection design values, with no additional emissions controls beyond rules and regulations already adopted, still exceed the 2008 standard at Palm Springs (0.079 ppm), but not at Indio (0.075 ppm). However, further control measures applied to upwind Basin emission reductions will be in place by 2023, as described in Chapter 4, in order for the Basin to meet the 1997 ozone NAAQS (0.08 ppm). With these additional Basin reductions, the Coachella Valley is projected to no longer exceed the 2008 NAAQS in 2023, three years before the 2026 deadline, with the Coachella Valley design value predicted to be 0.075 ppm at Palm Springs and 0.073 ppm at Indio in 2023. Thus, attainment of the 2008 8-hour ozone NAAQS in the Coachella Valley is ensured by the anticipated NOx reductions from the Basin's control strategy designed to meet the 1997 ozone standard in the Basin. As can be seen, progress toward ozone NAAQS attainment in the Basin is crucial for timely attainment in the Coachella Valley.

1997 8-Hour Ozone NAAQS Attainment Progress

Attainment of the 1997 8-hour ozone NAAQS (0.08 ppm) was demonstrated in the 2007 AQMP that was submitted to U.S. EPA as a SIP revision on November 28, 2007. U.S.EPA approved the reclassification of the Coachella Valley to "severe-15," as requested in the 2007 AQMP. A subsequent SIP update for the Coachella Valley and the Western Mojave Desert 8-hour ozone nonattainment areas was prepared and

submitted to U.S EPA by CARB on November 6, 2014.[11] The 2014 Update provided additional information to support the 2007 Coachella Valley Plan, including updates to the emission inventory, the attainment demonstration, the reasonable further progress demonstration, and the transportation conformity budget; along with an ozone vehicle miles traveled offset demonstration.

While no further submittals for the 1997 8-hour ozone NAAQS are required at this time, the Coachella Valley has seen significant progress toward attainment in recent years. The trends of both 8-hour ozone design values and the number of days exceeding the level of the 1997 8-hour ozone standards show significant improvement. The 8-hour ozone standards are based on the annual fourth highest measured 8-hour average concentration at each station. For NAAQS attainment determinations, the 3-year average of the annual fourth highest 8-hour average concentrations cannot exceed the 0.08 ppm (due to rounding it must be less than 0.085 ppm or 85 ppb). This means that exceeding the 8-hour ozone concentration does not necessarily result in nonattainment status, since the standard could be exceeded three times at any individual station, on average over the 3-year design value period.

Figure 7-13 shows the trend of annual number of days exceeding the 1997 8-hour ozone standard at the highest Coachella Valley station (Palm Springs) for 1990 through 2015. The number of days exceeding the 1997 standard shows a progressive improvement, from 18 days in the 2012 base year to only five days in 2015. Figure 7-14 shows the trend of the annual 8-hour ozone 3-year design values, showing continuing gradual improvement. These historical observations provide evidence that Coachella Valley is still expected to be in attainment of the 1997 ozone NAAQS by the end of 2018, corroborating the ozone SIP attainment modeling demonstration in the 2007 AQMP and the CARB 2014 Update.

[11] December 12, 2014 letter from Jonathan P. Taylor, California Air Resources Board, to Matt Lakin, U.S. EPA Region IX: http://www.arb.ca.gov/planning/sip/planarea/updatessubltr.pdf, with CARB Staff Report, *Proposed Updates to the 1997 8-hour Ozone Standard State Implementation Plans: Coachella Valley and Western Mojave Desert 8-hour Ozone Nonattainment Areas*: http://www.arb.ca.gov/planning/sip/planarea/antaqmp/2014update0922.pdf.

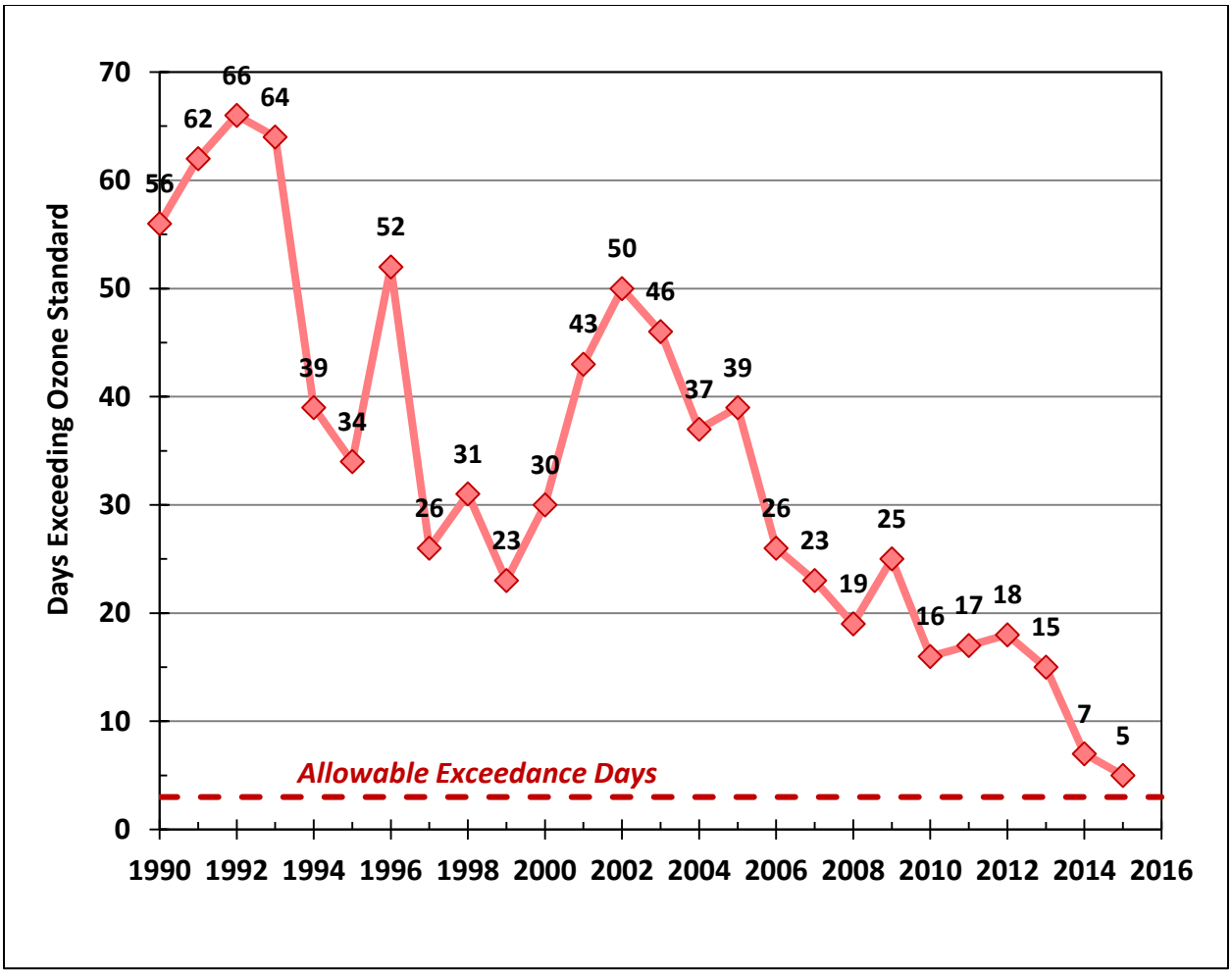


FIGURE 7-13

TREND OF ANNUAL COACHELLA VALLEY NUMBER OF DAYS EXCEEDING THE 1997 8-HOUR OZONE STANDARD, 1990–2015

(THE 8-HOUR OZONE NAAQS IS BASED ON THE FOURTH HIGHEST CONCENTRATION IN EACH YEAR, ALLOWING THREE DAYS TO EXCEED THE STANDARD)

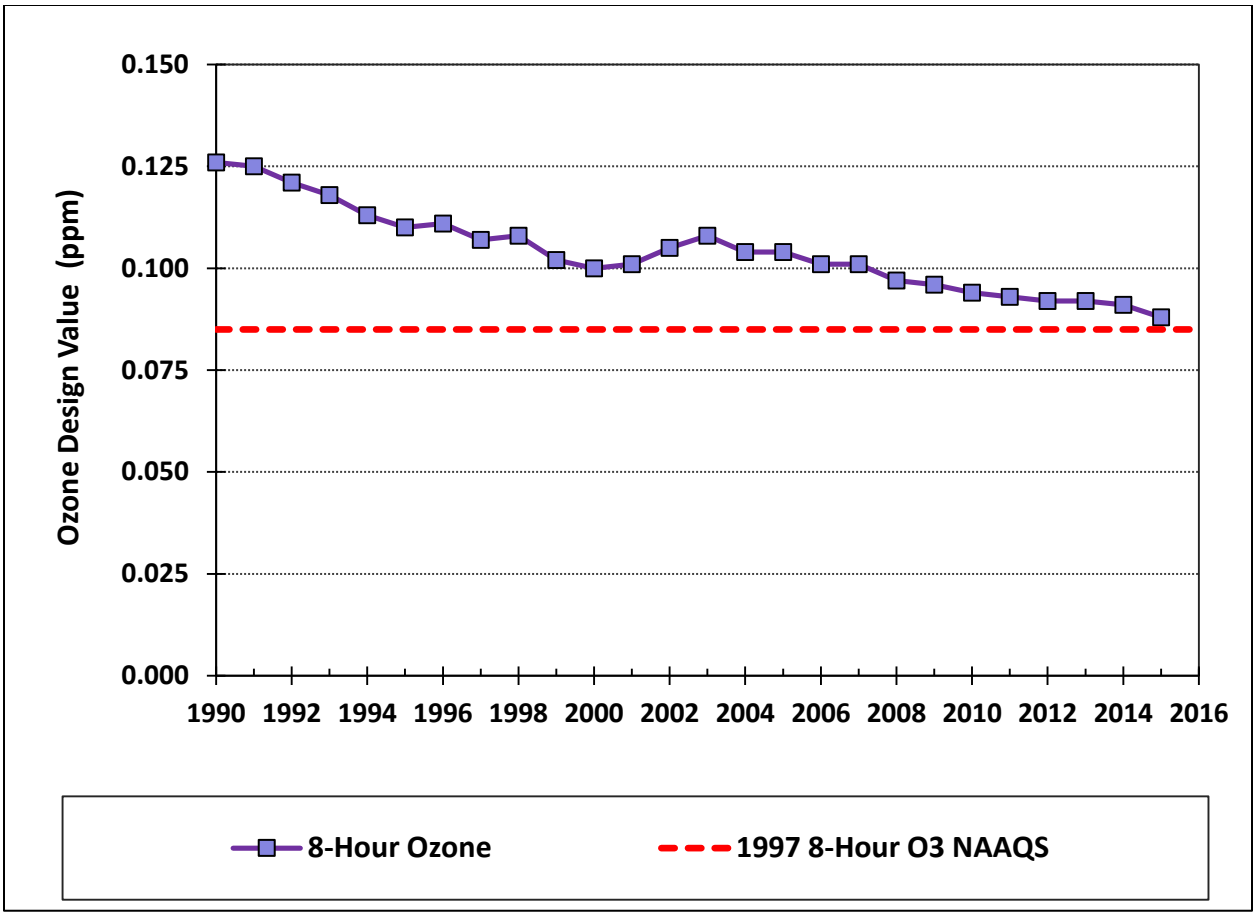


FIGURE 7-14

TREND OF COACHELLA VALLEY 8-HOUR OZONE 3-YEAR DESIGN VALUES, 1990–2015

(UPPER DOTTED LINE IS THE 1997 8-HOUR FEDERAL STANDARD AS REQUIRED TO BE ATTAINED IN 2018)

2015 8-Hour Ozone NAAQS Attainment Projection

Although it is not being addressed as part of this SIP submittal, the AQMP modeling effort provides an initial look at the potential for future attainment of the new 2015 8-hour ozone NAAQS (0.070 ppm). The designations for the new standard are anticipated by October 1, 2017. If the new attainment designation for the Coachella Valley continues to have a "severe-15" classification, the new attainment date will likely be 2032 with all control measures required to be in place for a 2031 model year demonstration date. This date would be five years later (2037) with an "extreme" nonattainment classification, which may be need to be considered due to the reliance of Coachella Valley ozone improvement on the Basin's progress in achieving emission reductions. CMAQ simulations of the future year ozone levels using the baseline (no additional controls) regional emissions indicate that the new standard will not be attained in the Coachella Valley by the "severe-15" attainment deadline of 2031, with a predicted design value over the 2015 ozone NAAQS. This scenario does not include control measures proposed in the 2016 AQMP. The emission reductions that will be in place by 2031 for the Basin to attain the 2008 NAAQS (0.075 ppm) are predicted to bring the Coachella Valley to attainment of the 2015 ozone

standard in 2031, with a peak predicted design value of 0.070 ppm. The additional emission reductions that will likely be required to attain the 2015 ozone NAAQS in the Basin by 2037 will also ensure attainment of the new standard in the Coachella Valley. A full attainment and control strategy analysis of the new 0.070 ppm ozone standard for both the Basin and Coachella Valley, including the potential need for reclassification, will be the subject of the next AQMP due in the 2020–2021 time frame. Further details of all the future-year air quality projections for the Basin and the Coachella Valley are presented in Chapter 5 and Appendix V – Modeling and Attainment Demonstrations.

Conclusions

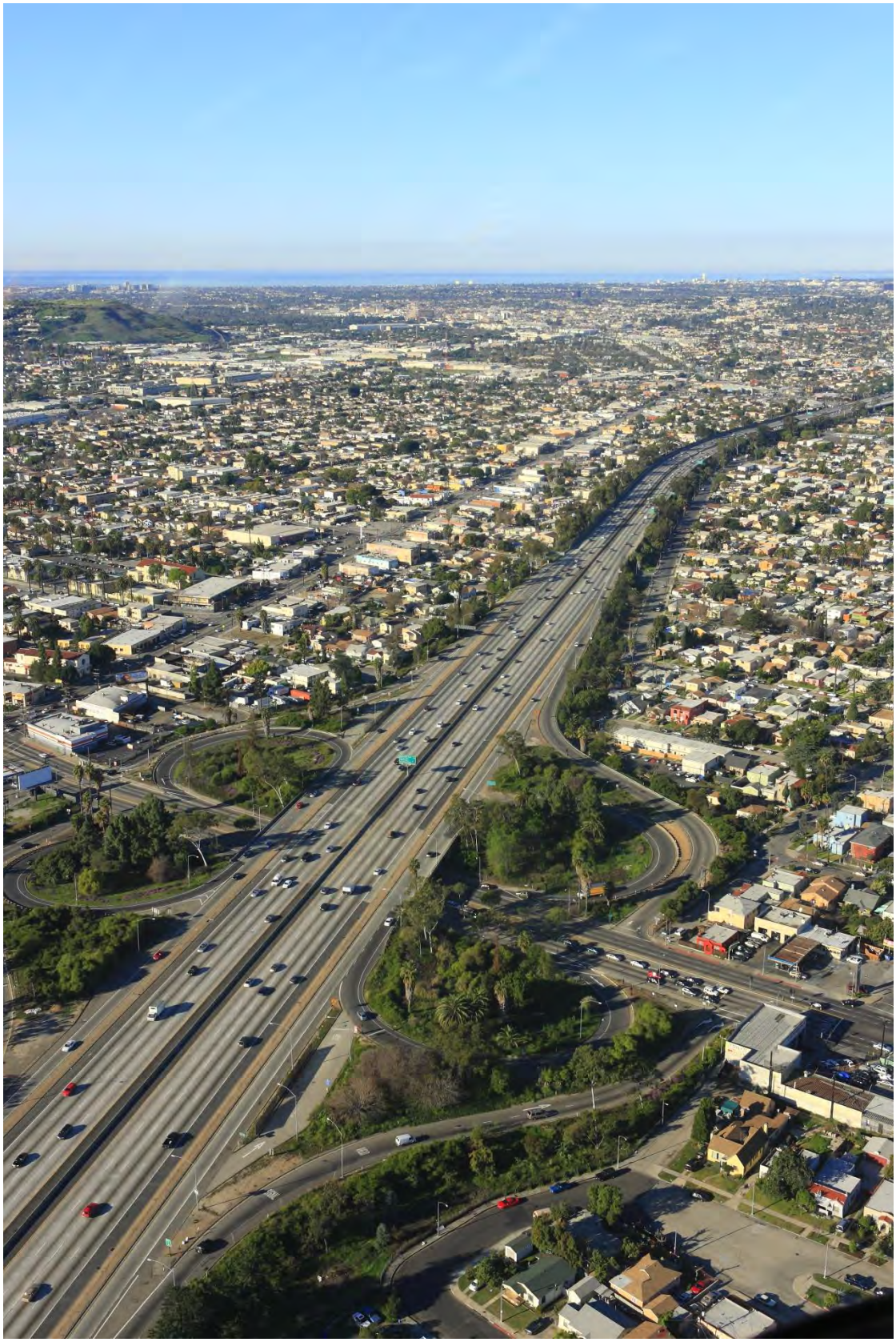
The "severe-15" attainment date for the 2008 8-hour ozone NAAQS of 2027 is the primary focus of the 2016 AQMP modeling demonstration for the Coachella Valley. With the future emission controls in place in the Basin by 2023 in order for the Basin to meet the 1997 8-hour ozone NAAQS, the 2008 ozone NAAQS will be met in the Coachella Valley in 2023. This is three years in advance of the 2026 attainment year for the 2008 NAAQS in the Coachella Valley "severe-15" nonattainment area.

With the "severe-15" ozone nonattainment designation, the Coachella Valley attainment demonstration year for the 1997 8-hour ozone NAAQS is 2018. Based on the improving trends of both the 8-hour ozone design values and the number of exceedance days, it appears that the 1997 ozone standard will be attained in the Coachella Valley by the end of 2018 with no additional emission controls needed beyond already adopted rules and regulations. This evidence supports for the modeling simulations for Coachella Valley in the 2007 AQMP.

The future emission reductions implemented in the Basin will not only ensure timely attainment of the 1997 and 2008 8-hour ozone standards in Coachella Valley, they will also help ensure progress towards the more stringent 2015 8-hour ozone standard. The classification, and thus the attainment deadlines, for this new ozone standard are pending from U.S. EPA. The full strategy for attainment of the 2015 NAAQS in the Coachella Valley will be determined based on the analysis in the next AQMP.

Chapter 8

Looking Beyond Current Requirements



U.S. EPA periodically reviews existing air quality standards in light of emerging epidemiological and toxicology studies. More stringent standards with new attainment deadlines present additional challenges for the Basin that need to be considered in the planning process.

In This Chapter

- Introduction 8-1
  Context for future air quality planning
- Criteria Pollutant NAAQS Review 8-1
  Periodic review of the existing air quality standards
- Changes in the Federal Ozone Standard 8-3
  Latest strengthening of the 8-hour ozone standard

- Implications of a New Ozone Standard for the Basin 8-5
  Estimated reductions necessary to meet the new 8-hour ozone standard
- Review of Federal PM Standards 8-6
  Current review of the primary and secondary PM standards
- World Health Organization Air Quality Standards 8-8
  Global public health air quality standards

Introduction

This chapter presents additional analyses which are not legally required, but are presented here for informational purposes to initiate stakeholder discussion on future air quality planning. The content will also help place the 2016 AQMP in context with the long-range transformation needed for this region to meet more recently promulgated health-based air quality standards.

Criteria Pollutant NAAQS Review

CAA Section 109(d) requires U.S. EPA to periodically review the existing air quality standards in light of findings of new and emerging epidemiological and health studies. If appropriate, such review may consider revision of existing air quality standards to reflect advances in scientific knowledge on the effects of the pollutant on public health and welfare. U.S. EPA reviews the scientific basis for these standards by preparing an Integrated Science Assessment (ISA), formerly called an Air Quality Criteria Document (AQCD). The evidence and conclusions presented in the ISA directly inform the technical and policy assessments conducted by the Office of Air Quality Planning and Standards (OAQPS). Collectively, these documents form the scientific and technical bases for the U.S. EPA's decisions on the adequacy of existing NAAQS and the appropriateness of new or revised standards. This process is a five-year review cycle that considers the following:



Established in 1977 under the CAA Amendments of 1977 *(42 U.S.C. § 7409(d)(2))* and part of U.S. EPA's Science Advisory Board (SAB), the Clean Air Scientific Advisory Committee (CASAC) provides independent advice to the U.S. EPA Administrator on the technical basis for the NAAQS, as well as addresses research related to air quality, sources of air pollution, the strategies to attain and maintain air quality standards, and to prevent significant deterioration of air quality. More specifically, CASAC is charged with independent expert scientific review of U.S. EPA's draft ISAs and other technical and policy assessments. CASAC provides advice to the U.S. EPA Administrator on the technical foundation for the NAAQS based on a peer review of extensive scientific information. The advice provided by CASAC assists the U.S. EPA in deciding whether the existing primary standard[1] is "requisite to protect public health with adequate margin of safety." A secondary standard[2] must "specify a level of air quality the attainment and maintenance of which is requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air." Primary standards are designed to protect public health, such as the health of "sensitive" populations, including persons with asthma, children, and the elderly. Secondary standards protect public welfare, such as protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Figure 8-1 provides an overview of the U.S. EPA process in establishing, approving, and re-evaluating a NAAQS for a particular pollutant.

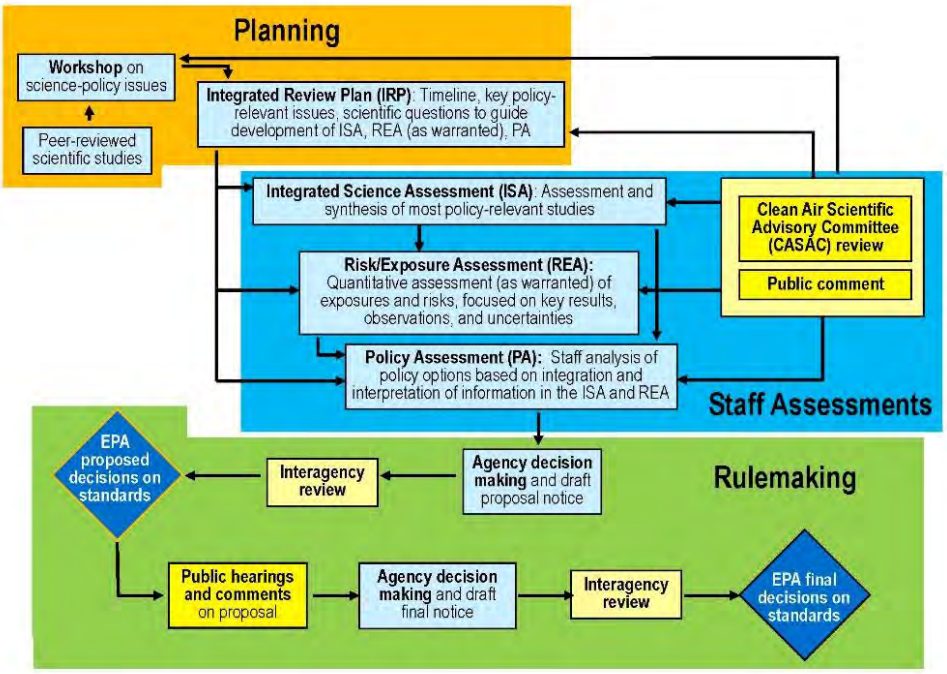


FIGURE 8-1 OVERVIEW OF THE U.S. EPA NAAQS REVIEW PROCESS

[1] CAA § 109 (b)(1), 42 U.S.C. 7409.

[2] CAA § 109 (b)(2), 42 U.S.C. 7409.

Changes in the Federal Ozone Standard

Background

Since the adoption of the 2008 8-hour ozone NAAQS of 0.075 ppm, the U.S. EPA carefully evaluated the latest available scientific literature on the health and welfare effects (primary and secondary standards, respectively) of ozone, focusing particularly on the new literature available since the conclusion of the previous review in 2008. In January 2010, U.S. EPA proposed to revise the 8-hr ozone NAAQS in the range of 0.060 ppm to 0.070 ppm. In September 2011, consistent with the direction of President Obama, the Administrator of the Office of Information and Regulatory Affairs (OIRA), Office of Management and Budget (OMB), returned the draft final rule to U.S. EPA for further consideration. Between 2008 and 2014, U.S. EPA prepared draft and final versions of the Integrated Review Plan (IRP), Integrated Science Assessment (ISA, the Health and Welfare Risk and Exposure Assessment (REA), and the Policy Assessment (PA). Multiple drafts of these documents were available for public review and comment and were peer-reviewed by CASAC. The final documents reflect U.S. EPA staff's consideration of the comments and recommendations made by CASAC and the public on draft versions of these documents.

In April 2014, the U.S. Court of Appeals for the District of Columbia issued a ruling ordering U.S. EPA to propose a rule based on latest ozone NAAQS review by December 1, 2014 and finalize by October 1, 2015. Figure 8-2 displays the timeline involved in the recent development and approval of the 8-hour ozone standard.

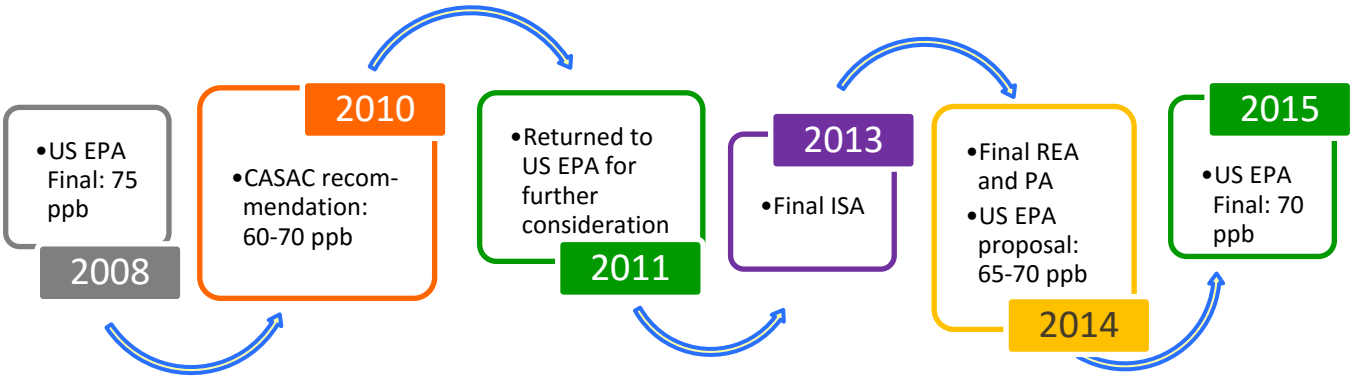


FIGURE 8-2

RECENT DEVELOPMENT AND APPROVAL OF 8-HOUR OZONE STANDARD

On December 17, 2014, U.S. EPA concluded that the primary ozone standard of 0.075 ppm is not requisite to protect public health with an adequate margin of safety, and that it should be revised to provide increased public health protection. Specifically, U.S. EPA proposed to retain the indicator, averaging time (8-hour) and form (annual fourth-highest daily maximum, averaged over three years) of the existing primary ozone standard and proposed to revise the level of that standard to within a range of 0.065 ppm to 0.070 ppm. U.S. EPA proposed this revision to increase public health protection, including for ''at-risk'' populations such as children, older adults, and people with asthma or other lung diseases, against an array of ozone-related adverse health effects. For short-term ozone exposures, these effects include decreased lung function, increased respiratory symptoms and pulmonary inflammation, effects that result in serious indicators of respiratory morbidity such as emergency department visits and hospital admissions, and all-cause (total non-accidental) mortality. For long-term ozone exposures, these health effects include a variety of respiratory morbidity effects and respiratory mortality.

Recognizing that CASAC recommended a range of levels from 0.060 ppm to 0.070 ppm in 2010, and that levels as low as 0.060 ppm could potentially be supported, the U.S. EPA Administrator solicited comments on alternative standard levels below 0.065 ppm, and as low as 0.060 ppm. However, the U.S. EPA Administrator noted that setting a standard below 0.065 ppm, down to 0.060 ppm, would inappropriately place very little weight on the uncertainties in the health effects evidence and exposure/risk information. The secondary standard was also proposed to be revised within the range of 0.065 to 0.070 ppm.

On October 26, 2015, U.S. EPA revised the primary and secondary ozone NAAQS (effective December 28, 2015) to a level of 0.070 ppm (or 70 ppb) retaining their indicators, forms, and averaging times. U.S. EPA also made corresponding revisions in data handling conventions for ozone and changes to the Air Quality Index (AQI), revised regulations for the PSD program to add a transition provision for certain applications, established exceptional events schedules, and provided information related to implementing the revised standards. Figure 8-3 displays the anticipated milestones for the 2015 8-hour ozone NAAQS.

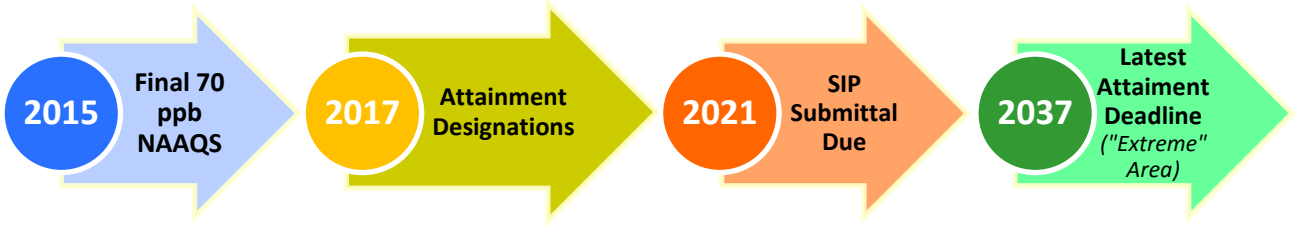


FIGURE 8-3
ANTICIPATED MILESTONES FOR 2015 8-HOUR OZONE NAAQS

Next Steps

After U.S. EPA establishes new or revised NAAQS, the CAA directs U.S. EPA and states to ensure the new or revised NAAQS are met. Areas of the country are identified as either in attainment of the new or revised NAAQS or not in attainment. Upon designation of nonattainment areas, certain states are required to develop SIPs taking into account projected emission reductions from existing federal, state, and local regulations already adopted at the time of the SIP submittal as well as additional measures as may be needed to attain the standards, including specific CAA requirements. Nonattainment designations for the 2015 ozone standard are expected to be identified in 2017 triggering the four-year deadline[3] to submit a Plan by 2021. If the region is determined to be in "extreme" nonattainment, the latest statutory deadline to demonstrate attainment would be approximately 2037 (20 years from the effective date of designation).

Implications of a New Ozone Standard for the Basin

Based on the modeling results presented in Chapter 5 and Appendix V (Modeling and Attainment Demonstration), the Basin can demonstrate attainment with the existing federal 8-hour ozone standards by the corresponding attainment deadlines (2023 and 2032). In order to meet the 80 ppb ozone level in 2023 and 75 ppb in 2031, an approximate additional 45 percent and 55 percent reduction, respectively, in NOx emissions will be necessary beyond already adopted measures. In some areas, VOC reductions are not as effective as NOx reductions, but certain concurrent VOC reductions would reduce some of the needed NOx reductions. A full discussion of the emission reductions needed to meet current ozone standards is included in Chapter 5 and Appendix V.

As stated above, the 8-hour ozone standard has been lowered to a level of 70 ppb in 2015. Therefore, in order to demonstrate attainment in the 2037 time frame, an additional 62 percent NOx emission reduction is anticipated to be needed from the 2037 baseline. Assuming the 75 ppb standard is met in 2031 with a 96 TPD NOx carrying capacity helps to illustrate the significant reductions needed to meet a new 70 ppb 8-hour ozone standard. A 70 ppb standard represents an approximately 25 TPD additional NOx reduction between 2031 and 2037. NOx emission reductions continue to be the most effective strategy to lower ozone levels.

[3] Based on CAA, Title I, Part D, Subpart 2, §182 and Final Ozone Implementation Rule (March 2015) for ozone attainment demonstration four years after effective date of designation.

Review of Federal PM Standards

On December 3, 2014, the U.S. EPA's Office of Research and Development's National Center for Environmental Assessment (NCEA) announced that it is preparing an ISA as part of the review of the primary and secondary NAAQS for PM. This ISA is intended to update the scientific assessment presented in the "ISA for Particulate Matter" published in December 2009. The public and interested parties were invited to assist U.S. EPA in developing and refining the scientific information base for the review of the PM NAAQS by submitting research studies that have been published, accepted for publication, or presented at a public scientific meeting. Figure 8-5 provides some of the studies that U.S. EPA is seeking to acquire during the process in considering the PM NAAQS.

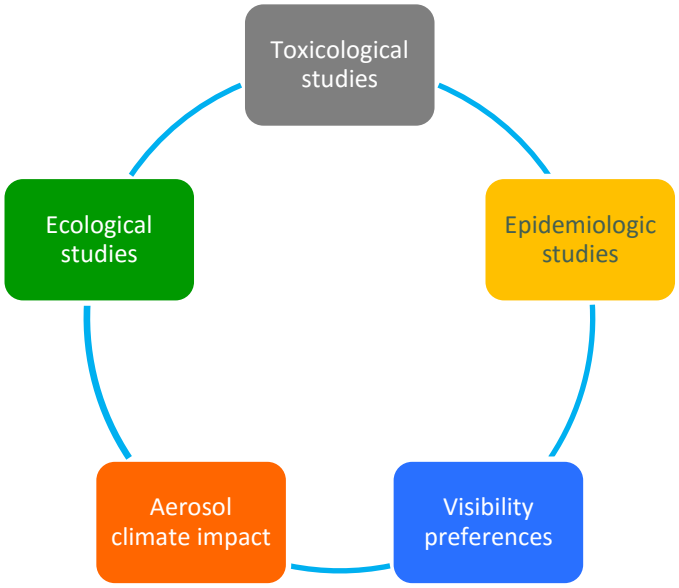


FIGURE 8-5
INFORMATION U.S. EPA IS SEEKING IN THE REVIEW OF THE PM NAAQS

For the review of the PM NAAQS, U.S. EPA is interested in obtaining additional new information concerning:

(a) toxicological studies of effects of controlled exposure to PM on laboratory animals and humans;
(b) epidemiologic (observational) studies of health effects associated with ambient exposures of human populations to PM;
(c) quantification of light extinction (loss of visibility) in urban and non-urban areas, such as new studies regarding visibility preferences, including studies in additional urban and non-urban areas that disentangle visibility preferences from health preferences, the sensitivity of visibility preferences to survey methods, and/or preferences regarding intensity versus frequency of visibility impairment;
(d) climate impacts from PM-related aerosols, particularly regarding the quantification of anthropogenic aerosol effects on radiative forcing; and

(e) ecological studies that examine the effects on agricultural crops and natural terrestrial and/or aquatic ecosystems from ambient exposures to PM, including information regarding interactions with other ecosystem stressors and co-occurring pollutants.

U.S. EPA is also seeking recent information in other areas of PM research such as chemistry and physics, sources and emissions, analytical methodology, transport and transformation in the environment, and ambient concentrations. Selected literature relevant to a review of the NAAQS for PM will be assessed in the forthcoming PM ISA. U.S. EPA has also held recent workshops on ultrafine particles and has indicated that a review of the relevant scientific information could be addressed in this review. The evaluation of PM and ecological effects will not include studies that examine effects due to the deposition of NOx or SOx in the particulate form (e.g., ammonium sulfate), that will be covered in the ongoing review of the NOx/SOx secondary standard.

The review and research process will provide an opportunity for experts to highlight significant new and emerging PM research, and to make recommendations to U.S. EPA regarding the design and scope of the review for the primary (health-based) and secondary (welfare-based) PM standards. This will ensure that the review addresses key policy-relevant issues, and considers the new and emerging science that is relevant to informing U.S. EPA's understanding of these issues.

As a result of this process, U.S. EPA developed a draft Integrated Review Plan (IRP) for the PM NAAQS that was released for public review and comments on April 19, 2016. The draft IRP outlines the schedule, process, and approaches for evaluating the relevant scientific information and addresses the key policy-relevant issues to be considered in this review. CASAC is reviewing the draft IRP and held a teleconference on May 23, 2016. The public had the opportunity to comment on the draft IRP until June 23, 2016. The final IRP, prepared in consideration of CASAC and public comments, will outline the process and schedule for conducting the review and the planned scope of the assessment documents (e.g., an ISA, an REA, and a PA) as well as the key relevant policy issues/questions that will guide the review.

The federal PM standards were reviewed in 2006 when U.S. EPA proposed to revise the level of the primary 24-hour PM2.5 standard from 65 to 35 $\mu g/m^3$ and retain the primary ("health-based") annual PM2.5 standard. The primary 24-hour PM10 standard would also be retained but the annual PM10 standard would be revoked. Finally, the secondary ("welfare-based") standards would be identical to the primary standards. Subsequent litigation concluded that U.S. EPA needed to explain why the secondary standard, identical to the primary standard, would provide the required protection from PM-related visibility impairment. This review took place between 2007 and 2011 with the preparation of the ISA, REA and PA documents that were peer reviewed by CASAC. In December 2012, U.S. EPA proposed to revise the annual PM2.5 standard by lowering the level from 15 $\mu g/m^3$ to 12 $\mu g/m^3$. With regard to the secondary standards, U.S. EPA proposed to retain the secondary standard because the visibility analysis conducted concluded that protection from visibility would not change with the adoption of a distinct visibility index. The final rule became effective on March 18, 2013.

The current review of the PM air quality criteria and standards is anticipated to involve finalizing the draft IRP by the end of 2016, the release and review of the ISA and REA from 2017 to 2019, the PA release and review taking place from 2018 to 2019, initial rulemaking in 2020, and finalizing a standard in 2021.

World Health Organization Air Quality Standards

The World Health Organization (WHO) is a specialized agency of the United Nations (UN) that is tasked with addressing international public health by mitigating communicable and non-communicable diseases, establishing policies to enhance health equity, promoting a healthier environment, and educating the public on nutrition, occupational health, and substance abuse. In reference to air quality, the WHO recognizes that "lower levels of air pollution generate better cardiovascular and respiratory health of the population long- and short-term."[4] The WHO published air quality guidelines offering global guidance on thresholds and limits for key air pollutants that pose health risks. The WHO guidelines are not regulatory limits but provide a basis for protecting public health from adverse effects of air pollutants (outdoor and indoor), to eliminate or reduce exposure to hazardous air pollutants, and to guide national and local authorities in their risk management decisions.

There are a number of considerations when establishing outdoor air quality guidelines, such as background levels of pollution, mainly of anthropogenic origin, the location of the pollution (urban vs. rural, developed vs. developing countries), effects on children and the elderly compared to healthy adults. For example, WHO's Air Quality Guidelines for Europe[5] recommend a level for ambient ozone of 100 $\mu g/m^3$ (50 ppb) for a daily maximum 8-hour average that "will provide adequate protection of public health," which is lower than the recently U.S. EPA-approved 2015 8-hour ozone NAAQS at 70 ppb. It should be noted the same guidelines provide an interim target level at 160 $\mu g/m^3$ (80 ppb) for 8-hour ozone, at which "measurable (though transient) changes in lung function and lung inflammation among healthy young adults have been demonstrated during intermittent exercise in controlled chamber tests."

Health effects from PM2.5 concentrations are measured, similar to the U.S. EPA NAAQS, on a short-term (24-hour) and long-term (annual) basis. The WHO guidelines[6] recommend 10 $\mu g/m^3$ for PM2.5 on an annual basis, which is lower than the current U.S. EPA annual PM2.5 NAAQS of 12 $\mu g/m^3$. However, the WHO guidelines suggest interim targets higher than the U.S. EPA annual PM2.5 NAAQS ranging from 35 $\mu g/m^3$ to 15 $\mu g/m^3$ lower the risk of premature mortality as the target concentrations are decreased. For 24-hour PM2.5 concentration, the WHO guidelines recommend a daily level of 25 $\mu g/m^3$, which is lower than the current 24-hour PM2.5 NAAQS of 35 $\mu g/m^3$, but suggests interim targets that are higher than the 24-hour PM2.5 NAAQS ranging from 75 $\mu g/m^3$ to 37.5 $\mu g/m^3$ lower the short-term mortality as the target concentrations are decreased. See Table 8-1 for a comparison of the air quality standards.

Protecting public health is based on a number of public policies and scientific documentation supporting those policies and decisions. Both U.S. EPA and WHO have set out to establish an effective public health policy with air quality standards that evolve over time as new scientific studies are conducted and new information is discovered. While the current U.S. EPA NAAQS seek to protect the nation from harmful

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[4] http://www.who.int/mediacentre/factsheets/fs313/en/.

[5] World Health Organization, Air Quality Guidelines (2005) pp. 324-326 http://www.who.int/phe/health_topics/outdoorair/outdoorair_aqg/en/.

[6] World Health Organization, Air Quality Guidelines (2005) pp. 278-279 http://www.who.int/phe/health_topics/outdoorair/outdoorair_aqg/en/.

adverse air pollution levels, other global health organizations working in parallel may provide additional insight on how to move forward and make progress in achieving public health goals.

TABLE 8-1

WHO Guidelines Standards Compared to U.S. EPA Standards

Pollutant	WHO Recommendation	Latest U.S. EPA-Approved NAAQS
8-hour Ozone	50 ppb	70 ppb
8-hour Ozone Interim Target	80 ppb	n/a
Annual PM2.5	10 µg/m^3	12 µg/m^3
Annual PM2.5 Interim Targets	15–35 µg/m^3	n/a
24-hour PM2.5	25 µg/m^3	35 µg/m^3
24-hour PM2.5 Interim Targets	37.5–75 µg/m^3	n/a

n/a = not applicable



Chapter 9

Air Toxics Control Strategy

There has been substantial progress in reducing air toxic exposure in the Basin. However, risks are still unacceptably high and risk reduction efforts continue. This chapter discusses the future SCAQMD control strategy for air toxic emissions.

In This Chapter

- Background 9-1
  Background information about the SCAQMD's air toxics programs
- Recent Air Toxics Findings 9-8
  Recent findings regarding fugitive toxic metal emissions
- Relationship of Air Toxics Control Strategy to the 2016 AQMP 9-8
  Concurrent air toxic reductions and criteria pollutant reductions from AQMP control strategies

- Air Toxics Control Strategy 9-10
  Overview of 2016 Mobile Source Strategies and concurrent toxic emission reductions and Stationary Source Air Toxics Control Strategies to reduce air toxics
- Conclusion 9-23

Background

Since 2000, the SCAQMD has prepared Air Toxics Control Plans to outline the overall strategy for the SCAQMD's air toxics control program. The first Air Toxics Control Plan was approved by the SCAQMD Governing Board in 2000 with an Addendum in 2004. The 2000 Air Toxics Control Plan was an outgrowth of Environmental Justice Initiatives (Initiatives) adopted by the SCAQMD Governing Board in October 1997. The Initiatives included a call to conduct enhanced air toxics monitoring and analysis, and to commence air toxics rulemaking for new and existing sources. These efforts highlighted the need for a more systematic approach to reducing airborne toxics emissions, culminating in the 2000 plan – the first local district air toxics control plan in the nation. As a continued outgrowth of the Initiatives, the SCAQMD Governing Board directed staff to report back on the feasibility of rulemaking to address the cumulative impacts of air toxics. In September 2003, the SCAQMD Governing Board approved a *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution*. The white paper included 25 cumulative impact reduction strategies including rules, policies, funding, education, and coordination with other agencies.



In 2010, the SCAQMD staff expanded the existing Air Toxics Control Plan into a "Clean Communities Plan" (CCP), which put greater emphasis on the cumulative effects of air toxics on neighborhoods and communities, and included 23 measures that utilized traditional source-specific measures and a variety of different implementation approaches such as community participation, increased outreach and communication, additional agency coordination, and enhanced monitoring and compliance programs. The CCP is the continuing effort and update to both the Air Toxics Control Plan and its Addendum. Figure 9-1 is a timeline of the agency's evolving policy and scientific efforts to date in addressing air toxics, including the umbrella rules and the Multiple Air Toxics Exposure Studies (MATES) discussed later in this chapter.

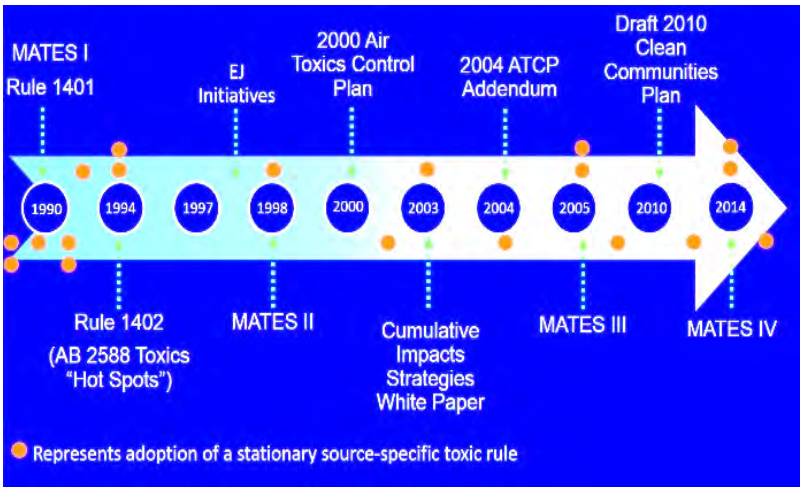


FIGURE 9-1
SCAQMD'S AIR TOXICS PROGRAM TIMELINE

Previous Air Toxic Control Plans, including the CCP, focused on developing a broad policy document for reducing air toxics. This consisted of developing potential control concepts and programs that went beyond current ongoing programs and efforts to implement the existing AQMP. This chapter presents areas of focus for the SCAQMD's air toxics control strategy over the next several years and its relationship to the 2016 AQMP.

Current Air Toxics Regulatory Program for Stationary Sources

The SCAQMD has a robust, multifaceted, and comprehensive air toxics regulatory program consisting of rules to address new and modified toxic sources through permitting, the AB2588 program (existing toxic sources), and source-specific toxics rules. The SCAQMD has three air toxics "umbrella" rules addressing new and modified, and existing sources with air toxic emissions. Rule 1401 sets health risk thresholds for air toxic emissions from new, modified, and relocated sources. Rule 1401 lists toxic air contaminants (TACs) that are evaluated during the SCAQMD's permitting process for new, modified or relocated sources. Rule 1401.1 sets more stringent risk thresholds than Rule 1401 for new and relocated facilities that are located near schools. The requirements are more stringent than Rule 1401 in order to provide additional protection to school children. The third umbrella rule is Rule 1402 which implements the Air Toxics Hot Spots (AB2588) program and establishes health risk thresholds for existing facilities. These umbrella rules include evaluation of nearly 300 TACs for existing, new, modified, or relocated sources. During the past decade, more than 80 TACs have been added or had risk values amended.

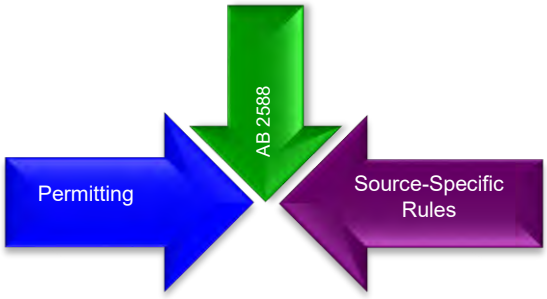


FIGURE 9-2
SCAQMD'S AIR TOXICS PROGRAM IS MULTI-

In addition to the above described umbrella toxics rules, the SCAQMD's regulatory program includes over fifteen source-specific toxics rules regulating specific equipment or industry categories such as chrome plating, asbestos remediation, lead-acid battery recycling, perchloroethylene dry cleaners, metal melting facilities, and diesel internal combustion engines. The SCAQMD's air toxics regulatory program for source-specific categories is as stringent as, or more stringent than, state Air Toxic Control Measures (ATCMs) and federal National Emission Standards for Hazardous Air Pollutants (NESHAPs). Many of the SCAQMD toxics rules incorporate requirements from state ATCMs and federal NESHAPs, and in some cases the state and federal programs have incorporated the more stringent requirements already established in SCAQMD toxic rules. Table 9-1 lists source-specific toxic rules that have been adopted or amended in the last several years, the number of affected sources, and emission reductions, if quantified.

TABLE 9-1

SCAQMD Air Toxic Rules Recently Amended or Adopted

Rule	Source Category	Key Adoption/ Amendment Dates	TAC	Number of Facilities	Estimated Emission Reductions	Final Emission Limit	Final Ambient Limit
1156	Cement Manufacturing	3/6/2009 *(amended)* 11/6/2015 *(amended)*	Hexavalent Chromium	2	32 lbs/yr (Cr^{+6})	N/A	0.2 ng/m^3 (Cr^{+6})
1401	New Source Review of Toxic Air Contaminants	6/5/2015 *(amended)*	Multiple TACs	All permitted facilities	N/A	N/A	N/A
1401.1	Requirements for New and Relocated Facilities Near Schools	6/5/2015 *(amended)*	Multiple TACs	All permitted facilities	N/A	N/A	N/A
1402	Control of Toxic Air Contaminants from Existing Sources	6/5/2015 *(amended)*	Multiple TACs	All permitted facilities	N/A	N/A	N/A
1420.1	Lead-acid Battery Recycling	11/5/2010 *(adopted)* 1/10/2014 *(amended)* 3/6/2015 *(amended)* 9/4/2015 *(amended)*	Lead Arsenic Benzene 1,3-Butadiene	2	31 lbs/yr (Arsenic) 3,673 lbs/yr (Benzene) 485 lbs/yr (1,3-Butadiene)	0.00114 lb/hr (Arsenic) 0.003 lb/hr (Lead)	10.0 ng/m^3 (Arsenic) 0.100 µg/m^3 (Lead)
1420.2	Metal Melting Facilities	10/2/2015 *(adopted)*	Lead	13	N/A	99% control efficiency or 0.0003 lb/hr (Lead)	0.100 µg/m^3 (Lead)
1470*	Stationary Diesel-Fueled Engines*	5/4/2012 *(amended)*	Diesel PM	~4900	N/A	0.01 to 0.15 g/bhp-hr for new engines near a sensitive receptor	N/A

*Implements ATCM for Stationary Compression Ignition Engines

Current Air Toxics Regulatory Approach for Mobile Sources

Mobile sources include both on- and off-road sources such as passenger cars, motorcycles, trucks, busses, heavy-duty construction equipment, recreational vehicles, marine vessels, lawn and garden equipment, and small utility engines. The existing control program for mobile sources is primarily under the jurisdiction of CARB. CARB's current mobile source control program consists of new on-road and off-

road vehicle and equipment emission standards, in-use fleet wide emission reduction regulations, and mobile source incentive programs.

The on-road new vehicle emission standards began in 1970 when CARB required new light-duty vehicles to meet NOx and reactive organic gases (ROG) standards to reduce ozone. CARB gradually lowered the standards over the years such that new light-duty vehicles are now over 90 percent cleaner than vehicles produced in the 1970's. For the on-road heavy-duty sector, CARB has adopted increasingly tighter new engine emission standards affecting NOx, non-methane hydrocarbon (NMHC), and, most relevant to air toxic risk, PM emission reductions. These standards and their accompanying inspection, monitoring , and low sulfur fuel program effectively reduce NOx, PM, and sulfur emissions, including diesel particulate matter (DPM) which is responsible for over 70 percent of the associated air emission cancer risk in the Basin.

The very first emission standards for new off-road diesel engines were adopted for 1995 and later small off-road engines less than 19 kW. In 1992, CARB approved standards for off-road diesel engines 130 kW and greater. These standards, which were implemented beginning in 1996, targeted NOx emission reductions without an increase in NMHC or PM emissions. More stringent Tier 4 emission standards were added to the existing regulation in 2004 while also being harmonized with the new non-road federal emission standards. These engine standards for off-road diesel engines had toxic pollutant co-benefits in further reducing DPM emissions in the Basin.

Beginning in 2007, CARB also developed in-use fleet regulations for compression ignited engines powering on-road and off-road vehicles, and portable and mobile equipment that reduce DPM and NOx emissions. These off-road in-use fleet regulations require existing fleets to reduce their emissions by retiring, replacing, or repowering older engines. The off-road categories subject to in-use fleet regulations include off-road construction vehicles, portable equipment and engines, cargo handling equipment, commercial harbor craft, and fishing vessels. In addition to the off-road fleet regulations, regulations targeting at-berth emissions from marine vessels, truck and off-road and marine low-sulfur fuel, and off-road vehicle idling were also adopted.

The SCAQMD also has a mobile source program that is designed to reduce both toxic and smog-forming air pollutants. Beginning in 2000, the SCAQMD adopted seven rules that gradually shifted public agencies and certain private entities under contract or exclusive franchise to public entities to use lower emitting and alternative fuel vehicles whenever a fleet operator with 15 or more vehicles replaced or purchased new vehicles. All seven fleet rules are now in effect and include fleet rules for sweepers, light and medium-duty public fleet vehicles, transit buses, refuse vehicles, airport ground access vehicles, school buses, and heavy-duty public fleet vehicles. Together, they have helped reduce the impacts to local communities from DPM and other air toxic emissions from motor vehicles.

The existing mobile source control strategy also includes a number of incentive programs which are designed to incentivize the turnover of equipment and fleets to cleaner technologies either through the introduction of compliant vehicles and equipment earlier than would be required by regulation or through the introduction of zero-, near- zero, or ultra-low emission technologies that go beyond the existing regulatory control programs. Incentive programs include such statewide programs as the Carl Moyer Memorial Air Quality Standards Attainment Program, Goods Movement Emission Reduction Program (Prop 1B), and On-Road Voucher Incentive Program (VIP), which are funded through the State of California

and SCAQMD programs such as, the Mobile Source Air Pollution Reduction Review Committee (MSRC) and special SCAQMD grant funding initiatives.

2015 OEHHA Revised Health Risk Assessment Guidelines

The SCAQMD relies on the Health Risk Assessment Guidelines developed by the Office of Environmental Health Hazard Assessment (OEHHA) in various aspects of its toxics regulatory program including the permitting program, the AB2588 Hot Spots Program as required by statute, and existing regulatory programs. In 2003, OEHHA developed and approved its Health Risk Assessment Guidance document (2003 OEHHA Guidelines) and prepared a series of Technical Support Documents, reviewed and approved by the Scientific Review Panel (SRP), that provided new scientific information showing that early-life exposures to air toxics contribute to an increased estimated lifetime risk of developing cancer and other adverse health effects, compared to exposures that occur in adulthood. As a result, OEHHA developed the Revised OEHHA Guidelines in March 2015 which incorporated this new scientific information. The new method utilizes higher estimates of cancer potency during early life exposures. There are also differences in the assumptions on breathing rates and length of residential exposures. When these revisions are combined, estimated cancer risks for the same inhalation exposure level are about 2.3 times higher using the proposed updated methods, and approximately up to six times higher for toxic air contaminants with multi-pathway exposures.

Since some source-specific toxics rules are based on health risk estimates, the SCAQMD has and will continue to re-evaluate these rules to determine whether amendments are necessary to provide consistency with the Revised OEHHA Guidelines and/or if new requirements are needed to provide adequate protection to public health in light of the higher health risk estimates. In addition, during amendments to Rule 1402 to incorporate the Revised OEHHA Guidelines in 2015, some industry representatives had requested that the SCAQMD incorporate a program to allow early risk reductions in lieu of traditional public noticing. SCAQMD staff is working on proposed amendments to Rule 1402 to incorporate a Voluntary Early Risk Reduction Program and streamline Rule 1402.

Multiple Air Toxics Exposure Study (MATES)

In 1986, the SCAQMD conducted the first Multiple Air Toxics Exposure Studies (MATES) study to determine the Basin-wide risks associated with major airborne carcinogens. Since then, the SCAQMD has conducted three further MATES studies, each of enhanced scope. Results of the MATES studies have helped guide the SCAQMD's air toxics regulatory program. In 1998, MATES II was conducted and represented one of the most comprehensive air toxics measurement programs conducted in an urban environment. MATES II included a monitoring program of 40 known air toxic compounds, an updated emissions inventory of toxic air contaminants, and a modeling effort to characterize health risks from hazardous air pollutants. MATES III was conducted between 2004 and 2006 and consisted of a two-year monitoring program as well as updates to the air toxics emissions inventory and a regional modeling analysis of exposures to air toxics in the Basin. In May 2015, the SCAQMD released the final report for MATES IV which was conducted as a one-year study between June 2012 and June 2013. This study consisted of a monitoring program at 10 fixed sites, an updated emissions inventory of TACs, and a modeling effort to characterize risk across the Basin.

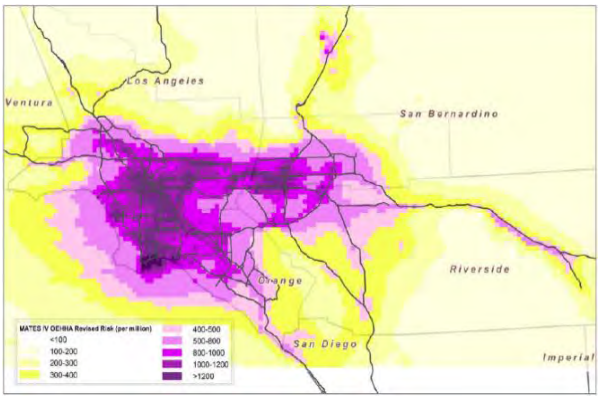


FIGURE 9-4
MATES IV MODELED AIR TOXICS RISKS ESTIMATES USING REVISED OEHHA HEALTH RISK GUIDELINES

Results of MATES IV showed a dramatic 70 percent reduction in the average level of diesel particulate emissions compared to MATES III. Additionally, the population weighted carcinogenic risk from air toxics in the Basin, based on the average concentrations monitored, was nearly 60 percent lower as compared to carcinogenic risk determined in MATES III. It should be noted that a majority of the risk was attributed to emissions associated with mobile sources, with the remainder attributed to toxics emitted from stationary sources, which include large industrial operations such as refineries and metal processing facilities, as well as smaller businesses such as gas stations and chrome platers. Although the Revised OEHHA Guidelines change the estimated cancer risk values in Figure 9-4, this does not change the fact that estimated cancer risks have been significantly reduced, between 75 to 86 percent over the last couple decades, depending on the location within the Basin.

Although the results of MATES IV have shown a significant regional reduction in exposure to key TACs and reduced cancer risk throughout the Basin, more needs to be done to reduce cancer risk levels regionally. Applying the revised OEHHA methodology to the modeled air toxics levels, the MATES IV estimated population weighted cancer risk is 897 per million. Additional toxics measures are necessary in order to further reduce toxic emissions and associated regional health risk levels.

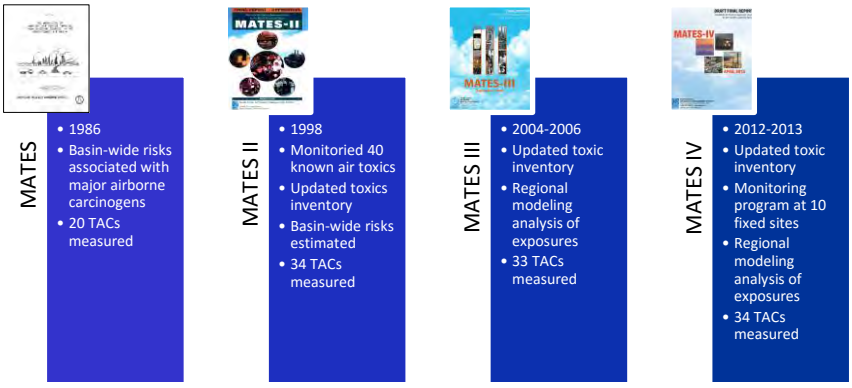


FIGURE 9-5
SUMMARY MATES STUDIES

Localized Air Toxics (Hot Spots)

Even with regional reductions in air toxics, there are areas throughout the Basin where communities are in close proximity to toxic emitting sources, resulting in an elevated health risk. Air toxics are often referred to as having "localized impacts," as the health risk is highest where the toxic emitting source is close to those communities and decreases substantially further out from the facility. Modeling data has shown that health risks generally decrease about 90 percent at 1,500 feet from the source. As such, the calculated local health risks at a residences in close proximity to a toxic emitting facility is expected to be elevated compared to the overall health risk for an entire community. The SCAQMD's regulatory program relies on source-specific rules to reduce localized health risks from toxic emitting stationary source facilities combined with facility-specific requirements to reduce facility-wide toxic emissions that are required through implementation of the Hot Spots Act and Rule 1402.

Within the past five years, the SCAQMD staff has become more aware of stationary source facilities that have posed elevated health risks to neighboring communities, highlighting the importance of rules and regulations that can address these elevated health risks. Additionally, recent ambient air monitoring in communities surrounding air toxic sources indicate that toxic emissions in the form of fugitive emissions have the potential to migrate out of some facilities and into nearby neighborhoods (see section below – *Recent Air Toxic Findings*). Any health risk impacts resulting from these types of fugitive emission issues will be localized and are unlikely to be revealed by regional modeling or monitoring.

Environmental Justice

The 2016 AQMP has identified the need for nitrogen oxide (NOx) emission reductions as the most significant air quality challenge in meeting the upcoming ozone standard deadlines. Total Basin emissions of NOx must be reduced an additional 45 percent by 2023, and an additional 55 percent by 2031. While the Basin's challenges for criteria pollutant reductions such as NOx emission reductions are significant, the Basin also contains numerous communities experiencing disproportionate environmental impacts from toxic air contaminants.

Since 1997, the SCAQMD has focused on Environmental Justice and methods to improve the air quality in specific communities. The purpose of SCAQMD's Environmental Justice program is to ensure that everyone has the right to equal protection from air pollution and fair access to the decision-making process that works to improve the quality of air within their communities. Environmental Justice, has been defined by SCAQMD as: "equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution." SCAQMD's Environmental Justice program began in 1997. The programs and initiatives have been continually reviewed to keep the Environmental Justice programs current and moving forward. One important component of that review process is the Environmental Justice Advisory Group (EJAG), which serves as an advisory group to the SCAQMD Governing Board. The mission of EJAG is to advise and assist SCAQMD in protecting and improving public health in SCAQMD's most impacted communities through the reduction and prevention of air pollution. It is anticipated that the EJAG will continue to provide input prioritizing strategies, regulations, and investments during the implementation period of the 2016 AQMP.

The 2016 AQMP control measures, including mobile source measures to reduce emissions from goods-movement vehicles and facilities, as well as the defined air toxic control measures described in this chapter, will help these communities by accelerating clean air efforts in Environmental Justice areas because many of the facilities targeted by the proposed control measures are located in disproportionately impacted communities. In addition to the toxic control measure defined in this chapter, the 2016 AQMP contains many incentive measures which will also help residences and organizations that may be more economically challenged by offsetting some of the costs of pollution reduction strategies while also promoting more livable neighborhoods and helping local businesses incorporate newer equipment and technologies.

In addition, the 2016 AQMP Socioeconomic Report will contain an enhanced impact analyses on Environmental Justice communities as a way to determine the impacts of the 2016 AQMP control strategy on Environmental Justice communities.

Recent Air Toxics Findings

Since the adoption of the 2010 CCP, more information has become available regarding fugitive toxic particulate emissions, indicating that more controls are needed for certain source categories. Ambient monitoring at a chrome plating facility, a metal forging facility with a metal grinding operation, a steel mini mill, and at two large lead-acid battery recycling facilities have shown that additional controls are needed to address fugitive toxic particulate emissions, particularly metal particulates. Heavy metals, such as arsenic, nickel, cadmium, and hexavalent chrome have high relative risks compared to other toxics. In addition to risks from inhalation, toxic metals can create health problems from ingestion, dermal exposure, and through consumption of breast-milk.



Traditionally, source-specific control strategies have focused on reducing stack emissions. Many of the SCAQMD source-specific rules reduce stack emissions by over 98 percent. In addition, some existing rules include housekeeping provisions to minimize fugitive toxic emissions. However, staff has become increasingly aware based on data from ambient monitors that certain operations with fugitive toxic dust may require an enclosure and more robust housekeeping provisions to contain fugitive emissions and minimize the release of metal particulate emissions into the air.

Fugitive metal particulate emissions can be difficult to quantify. The primary method to quantify fugitive metal particulate is using ambient monitors, which can measure both fugitive and point (or stack) emissions from a facility. The SCAQMD currently has very few rules that require ambient monitoring. Recent ambient monitoring in communities surrounding metal melting and metal finishing facilities indicate that fugitive toxic metals have the potential to migrate out of the facilities and into neighborhoods. At one large lead-acid battery recycling facility, nearly 98 percent of emissions found on ambient monitors were attributable to fugitive emissions rather than stack emissions. Air monitoring conducted by the SCAQMD staff at a chrome plating facility has shown high levels of hexavalent chromium in the ambient air due to cross-draft conditions affecting the emission collection potential of control equipment. Results of sampling data collected by SCAQMD staff at multiple forging facilities have shown that fugitive metallic dust generated from grinding activities includes TACs such as cadmium, chromium, cobalt, and nickel. The health impacts of many of these toxic metal particulate emissions warrant developing control measures to minimize exposure. Better control of fugitive emissions and improvements to housekeeping and maintenance are necessary to reduce potential impacts in surrounding communities.

Relationship of Air Toxics Control Strategy to the 2016 AQMP

Reducing air toxics in the region has been a long-term goal of the SCAQMD and has resulted in significant reduction of local risk from toxic air pollutants throughout the Basin. To the extent feasible, the 2016 AQMP is capturing co-benefit opportunities in achieving multi-pollutant reductions to meet ambient air quality standards having multiple deadlines. Some criteria pollutant control measures will concurrently reduce air toxics and some air toxics control measures will reduce criteria pollutants. The following

sections discuss the emission reductions targeted from air toxic control strategies and concurrent criteria pollutant emission reductions.

Concurrent PM Reductions

Efforts to reduce PM2.5 and its precursors will reduce particulate emissions that are toxic air contaminants, such as DPM, in the region. There have been significant decreases in air toxics exposure over the past couple of decades, primarily due to the reduction in DPM from mobile sources and stationary sources. Concurrent reductions in particulate emissions (the majority of which is DPM) have occurred from implementation of Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines, and Rule 1472 – Requirements for Facilities with Multiple Stationary Emergency Standby Diesel-Fueled Internal Combustion Engines. As a result of CARB's Diesel Risk Reduction Plan, a significant number of mobile source regulations were adopted for a variety of diesel sources including: Cargo Handling Equipment; Commercial and Charter Fishing Vessels; Commercial Harbor Craft; School Buses; Port (Drayage) Trucks; Stationary Engines and Portable Equipment; Transport Refrigeration Units (TRU) and TRU Generators. Reduction in PM emissions and DPM will continue with the turnover of existing stationary diesel engines and mobile sources.



As warranted by data and analysis, SCAQMD staff will add and strengthen requirements to reduce toxic metal emissions and exposure from various metal industry sources. These measures, although not developed for SIP attainment purposes, will achieve concurrent reductions in directly emitted PM2.5 and may be quantified and credited toward needed SIP reductions. A control strategy that reduces particulate emissions from metal grinding operations, for example, provides a means of achieving concurrent particulate and air toxic emission reductions.

Concurrent VOC Reductions

Additional VOC controls are helpful for attainment of air quality standards and one 2016 AQMP approach is to prioritize controls that will focus on VOC that are most reactive in ozone and/or PM2.5 formation. In addition to contributing to the formation of PM2.5 and ozone, many VOCs, such as benzene, are also considered air toxics.

In the past, the SCAQMD has developed source-specific controls under Regulation XI – Source Specific Rules, to reduce or eliminate the use of coatings and solvents that contain air toxics. This includes rules that require the phase-out of air toxics where alternatives exist, such as Rule 1168 – Adhesive and Sealant Applications, which required the elimination of emissions of methylene chloride, perchloroethylene, ethylene dichloride, and trichloroethylene from the application of adhesives, adhesive bonding primers, sealants, sealant primers, or any other primers. Another example is Rule 1124 - Aerospace Assembly and Component Manufacturing Operations where facilities decreased toxicity-weighted emissions of methylene chloride, perchloroethylene, and trichloroethylene when Rule 1402 levels were exceeded. A third example is the prohibition of the use of perchloroethylene in operations subject to Rule 1171 - Solvent Cleaning Operations.

Potential Tradeoffs

Unlike with PM, reducing organic air toxic emissions will not necessarily result in concurrent VOC emission reductions. A tradeoff can occur when the resulting alternative to the toxic solvent or coating is replaced with a VOC-containing compound. An example of this is Rule 1421 – Control of Perchloroethylene Emissions from Dry Cleaning Systems. The goal of Rule 1421 was to reduce perchloroethylene, a carcinogen, from dry cleaning operations through a gradual transition to non-perchloroethylene alternatives. One of the primary non-perchloroethylene alternatives included the use of halogenated solvents, some of which are classified as VOCs.

In addition, in an effort to meet more stringent federal ozone standards, the SCAQMD continues to seek further VOC emission reductions from stationary and area sources in the Basin. Manufacturers of coatings, solvents, adhesives, sealants, lubricants, ink, and other VOC-containing products often respond by reformulating their products using solvents that are exempt from the definition of VOC. Exemptions are based primarily on evidence that the solvent negligibly contributes to ozone formation, but may also consider other factors such as toxicity. Exempting VOCs has the potential to create unforeseen health impacts by increasing the use of the exempt substances that may have toxic characteristics. The SCAQMD staff is continually encouraging the use of materials that are low in reactivity (and not considered a VOC) and not considered toxic.

Air Toxics Control Strategy

The 2016 AQMP air toxics control strategy is composed of two components. The first consists of the mobile source control strategies that are designed to reduce NOx, ROG, and PM emissions in order to meet the SIP commitments in the 2016 AQMP, while also producing co-benefits for a variety of TACs. The second component includes those stationary source control strategies that are implemented by the SCAQMD in order to primarily reduce TACs that can create localized impacts to nearby communities. The second component will not be submitted as part of the SIP.

Table 9-2 shows the baseline and projected key TAC emissions from the 2016 mobile source control strategies and estimated baseline and projected TAC emissions with the control strategies in place. In addition to reductions in criteria pollutant emissions, implementation of mobile source strategies will result in significant reductions in TACs. From the 2012 baseline, implementation of mobile source control strategies is expected to reduce seven key mobile source related TACs by more than 70 percent by 2031.

TABLE 9-2

Key Toxic Air Contaminant Emissions from 2016 AQMP Mobile Source Control Measures;
Baseline and Projected Annual Average Day Emissions (pounds/day)

Toxic Air Contaminant	2012 Baseline	2023 Baseline	2023 Controlled	2031 Baseline	2031 Controlled
Naphthalene	547	305	167	264	131
Benzene	13,403	6,995	3,994	5,792	3,130
1,3-Butadiene	2,122	1,209	588	1,081	508
MTBE	311	126	102	80	62
Formaldehyde	16,120	9,315	4090	8,793	3,640
Acetaldehyde	7,113	3,969	1747	3722	1,532
Diesel particulate	20,750	6,864	6,428	5,873	5,708

Mobile Source Control Strategies

Mobile sources are responsible for approximately 90 percent of DPM emissions in the Basin, as well as other toxic air contaminants related to fuel combustion and evaporation. The 2016 AQMP mobile source component contains strategies which will reduce DPM and other TACs by deploying both zero-emission and cleaner combustion technologies. Zero-emission technologies are critical to reducing near-source exposure to air toxics, especially around freight hubs and networks such as ports, rail yards, and distribution centers. The 2016 AQMP mobile source control strategies include actions to deploy zero-emission technologies across a broad spectrum of sources, including passenger vehicles, truck and bus applications, forklifts, transport refrigeration units, and airport ground support equipment. The mobile source control strategies call for internal combustion engine technology that is effectively 90 percent cleaner than today's current standards. The introduction of zero-emission technologies in heavy-duty applications will be critical to the overall effort. Actions to promote ZEVs in these heavy-duty applications are underway and are important to further reduce regional and near-source toxics exposure, especially as it relates to reducing risk from DPM. In the off-road sector, the 2016 AQMP mobile source control strategies stress the need to reflect this same type of transformation to a mix of zero and near-zero technologies operating on renewable fuels. A summary list of CARB mobile source strategies is shown in Table 9-3.

TABLE 9-3

2016 AQMP CARB Mobile Source Control Measures
and Concurrent Key Toxic Air Contaminants (TACs) Reduced

On-Road Light-Duty	Key TACs Reduced
More stringent engine performance standards and increased fuel efficiency	Naphthalene, Benzene, 1,3-Butadiene, MTBE, Formaldehyde, Acetaldehyde
Requirements to ensure durability of passenger vehicle technologies	
Incentive funding to achieve further ZEV deployment beyond vehicle regulations	
Electricity grid representing 50 percent renewable energy generation	
Increased use of renewable fuels	
Reductions from passenger vehicle miles traveled and intelligent transportation systems	
On-Road Heavy-Duty	**Key TACs Reduced**
More stringent engine performance standards reflecting technology that is 90 percent cleaner than today's standards and increased fuel efficiency	Benzene, Formaldehyde, Acetaldehyde, Diesel Particulate Matter
Deployment of near-zero and zero-emission technologies into focused heavy-duty applications such as transit buses and last mile delivery	
Requirements to ensure durability of heavy-duty vehicle technologies	
Incentive funding to achieve further deployment of cleanest engine technologies	
Increased freight transport system efficiencies and use of intelligent transportation systems	
Increased use of renewable fuels	
Off-Road Federal and Intermodal Sources	
Call for federal and international action to set more stringent standards for ocean going vessels, locomotives, and aircraft, as well as cleaner technologies for older locomotives	Naphthalene, Benzene, Formaldehyde, Acetaldehyde, 1,3-Butadiene, Diesel Particulate Matter
Decreased emissions from ocean going vessels at berth	
Increased freight transport system efficiencies	
Incentive funding to achieve further deployment of cleanest engine technologies	
Increased use of renewable fuels	
Off-Road Equipment Sources	
Deployment of ZEV technologies into targeted equipment categories such as forklifts and airport ground support equipment	Naphthalene, Benzene, Formaldehyde, Acetaldehyde, 1,3-Butadiene, Diesel Particulate Matter
Cleaner engine technology transfer from on-road to off-road applications	
Incentive funding to achieve further deployment of cleanest engine technologies	
Increased worksite efficiencies	
Increased use of renewable fuels	

Stationary Source Toxics PM Control Strategies

The 2016 stationary source air toxic control strategy represents the overarching direction for the SCAQMD's air toxics control program. The stationary source air toxic control strategy is not required by state or federal law, and thus will not represent a commitment under the SIP. However, the stationary source air toxic control strategy are considered strategies for future agency action. As with all of SCAQMD's pollution control efforts, development and implementation of air toxics control strategies

involve partnerships with other agencies, the regulated community, environmental groups, and the public, along with the systematic assessment of potential socioeconomic impacts.

Control strategies include the reduction of air toxic metal emissions from a variety of sources including metal grinding and metal melting operations; chrome plating and spraying; nickel, cadmium and other metal plating operations; lead facilities (other than facilities subject to Rules 1420.1 and 1420.2); soil containing toxic metal that is undergoing remediation; DPM from stationary engines, and non-vehicular lead sources (Rule 1420). Table 9-4 summarizes the control measures targeting stationary source TACs.

TABLE 9-4
Summary of Stationary Source Measures to Reduce Toxic Air Contaminants

Source	Objective	Potential Toxic Air Contaminants and Co-Benefits	Control Approaches
Control of Metal Particulate from Metal Grinding Operations (TXM-01)	Reduce metal particulate emissions from metal grinding activities at forging facilities, metal foundries, and plating operations	• Cadmium • Hexavalent Chromium • Cobalt • Nickel • Particulate (metal)	• Enclosures • Pollution controls • Housekeeping measures
Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TXM-02)	Further reduce fugitive metal particulate emissions from electroplating and chromic acid anodizing processes	• Hexavalent Chromium • Nickel • Cadmium • Copper • Arsenic • Lead • Particulate (metal)	• Enclosures • Pollution controls • Enhanced housekeeping measures • Physical modifications to increase capture efficiency and reduce fugitive emissions
Control of Hexavalent Chromium from Chrome Spraying Operations (TXM-03)	Further control hexavalent chromium emissions from spraying of paints and coatings containing hexavalent chromium	• Hexavalent chromium • Particulate (metal)	• Increased housekeeping and best management practices
Control of Toxic Metal Particulate Emissions from Contaminated Soil (TXM-04)	Control toxic metal particulates during soil cleanup/remediation activities	• Lead • Hexavalent chromium • Cadmium • Nickel • Arsenic • Possibly other metal TACs • Particulate (metal)	• Soil covering • Chemical treatment • Barriers • Wheel knockout and cleaning stations • Other dust suppression techniques
Control of Toxic Metal Particulate Emissions from Laser and Plasma Cutting (TXM-05)	Control toxic metal particulates from Laser and Plasma Cutting	• Nickel • Cadmium • Hexavalent chromium, and possibly other metal TACs	• Filter technology including HEPA filters • Alternative technologies such as flame and water jet cutting
Control of Toxic Emissions from Metal Melting Facilities (TXM-06)	Further reduce metal toxic emissions from melting, pouring, casting, degating, heat treating, surface cleaning, and finishing operations at foundries	• Arsenic • Cadmium • Nickel • Other toxic metals • Particulate (metal)	• Particulate filter technologies for furnaces • Enclosures • Increased housekeeping and best management practices • Possibly ambient air monitoring

TABLE 9-4 (CONCLUDED)
Summary of Stationary Source Measures to Reduce Toxic Air Contaminants

Source	Objective	Potential Toxic Air Contaminants and Co-Benefits	Control Approaches
Control of Lead Emissions from Stationary Sources (TXM-07)	Further control lead emissions from non-vehicular sources	• Lead • Particulate (Metal)	• Reduce ambient lead concentration • Increased housekeeping and best management practices
Control of Emissions from Chemical Stripping of Cured Coatings (TXM-08)	Reduce methylene chloride emissions from chemical stripping operations	• Methylene Chloride	• Reformulation • Activated carbon • Point of sale restrictions
Control of Emissions from Oil and Gas Well Activities (TXM-09)	Reduce toxic emissions during well drilling, maintenance, and stimulation activities at oil and gas production sites	• Benzene • Toluene • Ethylbenzene • Xylene • Diesel Particulate Matter • Particulate Matter	• Pollution control and best management practices to minimize BTEX emissions from portable storage tanks, circulation tanks, and portable totes with particulates • Use of the cleanest diesel equipment available for off-road engines • Housekeeping provisions

The following sections provide additional detail on the individual control strategies that are planned to be developed to reduce exposure and impacts from air toxics. Each individual section includes a:

- General background and description of the source;
- Control objective and specifics about the source category's potential air toxic emissions;
- General control approach; and
- Implementation approach

Control of Metal Particulate from Metal Grinding Operations (TXM-01)

Background: The objective of this control measure is to control fugitive toxic metal particulate emissions at forging facilities, metal foundries, and plating operations. In general, there are no current SCAQMD regulatory requirements for metal grinding operations, and this activity is exempt from permitting. Metal grinding is a material removal and surface preparation process used to shape and finish metal parts. Grinding employs an abrasive product, usually a rotating wheel brought into controlled contact with the metal surface that removes tiny pieces of metal from the part generating metallic chips and dust. This activity is common in both heavy and light industrial processes such as metal foundries and forging and plating operations that commonly produce parts for the aerospace, automotive, and oil and gas industry.



Potential TACs: Results of sampling data collected by SCAQMD staff at multiple forging facilities have shown that fugitive metallic dust generated from metal grinding activities include TACs such as cadmium, hexavalent chromium, cobalt, and nickel. Additionally, extensive ambient air monitoring conducted at one forging facility has confirmed elevated concentrations of nickel in the ambient air due to metal grinding activities.

Affected Facilities: The SCAQMD has identified at least 24 forging facilities in the Basin that conduct metal grinding operations. SCAQMD staff is assessing metal grinding operations and foundries and other metal working facilities to identify the need for pollution controls and other requirements to contain metal TACs from those operations.

Control Approach: Potential metal particulate emission control approaches include conducting grinding within permanent enclosures, capture and control through add-on controls, and housekeeping measures. Examples of add-on controls include, cyclones, baghouses, scrubbers, and HEPA filters. Effective housekeeping measures may include routine wet washing or vacuuming, proper material storage and disposal, and routine maintenance of emission control devices.

Control of Metal Particulate from Metal Grinding Operations (TXM-01)

Objective:
Reduce metal particulate emissions from metal grinding activities at forging facilities, metal foundries, and plating operations

Potential TACs:
- Cadmium
- Hexavalent Chromium
- Cobalt
- Nickel
- Particulate (Metal)

Control Approaches:
- Enclosures
- Pollution controls

Implementation Approach: This measure will be implemented as individual source-specific rules are adopted or amended. SCAQMD staff is working on a proposed metal grinding rule for forging facilities. Staff will be also be developing a proposed source-specific rule for foundries and amending existing rules for plating operations. During those rule development efforts, staff will establish requirements to address metal particulates from grinding operations, if needed.

Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TXM-02)

Background: The purpose of this control measure is to further control metal (hexavalent chrome, nickel, cadmium, copper, arsenic, and lead) emissions from plating operations. Hexavalent chromium electroplating and chromic acid anodizing are processes currently regulated under Rule 1469 – Hexavalent Chromium Emissions from Chromium Electroplating and Chromic Acid and Anodizing Operations. Other non-hexavalent chromium plating operations are regulated under Rule 1426 – Emissions from Metal Finishing Operations. Electroplating processes involve the creation of desired metal surfaces or substrates. Both nickel and copper plating are commonly performed prior to chrome plating in order to provide a substrate for the chrome to adhere to or to add additional properties such as strength. In many cases, nickel plating is performed as the only or final stage of plating where appearance is the primary desired quality of the end product. Other sources of fugitives can come from air sparging, openings or cross-draft conditions within buildings or enclosures, poor housekeeping, improper handling of waste, and improper handling of raw products.

Potential TACs: Point and fugitive source emissions of hexavalent chromium, nickel, cadmium, copper, arsenic, and lead can be generated from electroplating or anodizing processes.

Affected Facilities: Hexavalent chromium electroplating and chromic acid anodizing processes are used in various industries including aerospace, automotive, computer electronics, machinery, and industrial equipment. There are 34 hard chrome plating facilities, 50 decorative chrome plating facilities, and 32 anodizing facilities for a total of 116 facilities in the Basin. These facilities may also do non-hexavalent chromium metal plating. Additionally, there are approximately 200 more facilities in the Basin that do metal plating other types of metal plating or anodizing.

Control Approach: Current point source control approaches include chemical or mechanical methods to control surface tension of the baths in the tank, or capture of emissions using add-on air pollution controls such as scrubbers, mesh pads, and HEPA filters. Fume suppressants are extremely effective at minimizing process fugitive emissions from the tank, especially in situations where facilities have cross draft conditions in buildings where tanks are located, or conduct operations around tanks that may affect the release or behavior of the emissions. When used in combination with add-on air pollution control equipment, fume suppressants serve as the primary control of both point source and fugitive emissions prior to collection by the control device, and optimizes the overall emission reduction potential of the system. Facilities also can utilize best housekeeping and best management practices to mitigate fugitive emissions. In some cases, facilities may use alternative materials or plating processes. Additionally, alternative methods of applying a metal coating may be used such as aluminum ion vapor deposition, physical vapor deposition, or metal spray coating.

Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TXM-02)

Objective:
Further reduce fugitive metal particulate emissions from electroplating and acid anodizing processes

Potential TACs:
Hexavalent Chromium, Nickel, Cadmium, Copper, Arsenic, Lead

Control Approaches:
- Enclosures
- Pollution controls
- Enhanced housekeeping measures
- Physical modifications to increase capture efficiency and reduce fugitive emissions



Implementation Approach: This measure would be implemented through amendments to Rules 1426 and 1469.

Control of Hexavalent Chromium from Chrome Spraying Operations (TXM-03)

Background: The objective of this control measure is to further control hexavalent chromium emissions from spraying of paints and coatings. Spraying of paints and coatings containing chromium or hexavalent chromium is currently regulated under Rule 1469.1 – Spraying Operations Using Coatings Containing Chromium. During the uncontrolled application of coatings, hexavalent chromium emissions

are generated by the inefficient transfer of paint to the part or from overspray. Emissions from spraying operations are typically conducted within a paint spray booth and exhaust through a wall of filter media or stack, assuming the facility has a properly designed booth and ventilation system. However, there is also a potential for fugitive emissions to occur from an open booth face, if capture into the ventilation system is not complete. Additionally, fugitive hexavalent chromium emissions can be generated by poor housekeeping, improper use of control equipment, and improper handling of waste or painted products. Rule 1469.1 currently includes requirements for spray enclosures, transfer efficiency, and housekeeping practices within spray enclosures.

Potential TACs: The source of air toxics from these facilities is hexavalent chromium, which is present in paint particles.

Affected Facilities: Paints and coatings containing hexavalent chromium occurs in a variety of industries including aerospace, electroplating, and coating facilities. There are approximately 70 facilities identified in the Basin that perform chrome spraying operations.

Control of Hexavalent Chromium from Chrome Spraying Operations (TXM-03)

Objective:
Further control hexavalent chromium emissions from spraying of paints and coatings

Potential TACs:
Hexavalent chromium

Control Approaches:
- Increased housekeeping and best management practices

Control Approach: Current housekeeping requirements of Rule 1469.1 include general measures and best management practices for the clean-up, handling, storage, and disposal of waste generated within spray booth enclosures. The existing provisions for enclosures can be enhanced by requiring routine and periodic housekeeping inspections, in addition to new housekeeping and work practice requirements outside of spray enclosures in order to comprehensively reduce fugitive emissions from the facility.

Implementation Approach: This measure would be implemented through amendments to Rule 1469.1.

Control of Toxic Metal Particulate Emissions from Contaminated Soil (TXM-04)

Background: Currently the SCAQMD has a rule regulating VOC emissions from contaminated soil that establishes requirements to ensure the release of VOC emissions are minimized. There is currently no rule to address metal particulate emissions that can become airborne during the handling and disturbance of soils contaminated with toxic metals. Examples of metal toxic air contaminants that can be in contaminated soil include, but are not limited to, hexavalent chromium, lead, nickel, cadmium, and arsenic. This control strategy would establish specific requirements to ensure that fugitive toxic air contaminant emissions from soils contaminated with toxic metals are minimized during the excavation, storage, and/or transportation.

Potential TACs: Potential fugitive toxic metals include, but are not limited, to hexavalent chromium, lead, nickel, cadmium, and arsenic.

Affected Facilities: Currently, the number of expected sources cannot be estimated since the activities are intermittent in nature.

Control Approach: Possible control approaches include soil covering, watering, chemical treatment, barriers, tire and wheel knockout and cleaning stations, and other dust suppression techniques. Air monitoring of the site may also be a part of the control strategy.

Implementation Approach: This measure will be implemented through a new SCAQMD rule.

Control of Toxic Metal Particulate Emissions from Contaminated Soil (TXM-04)

Objective:
Reduce fugitive emissions from soils contaminated with toxic metals

Potential TACs:
Lead, hexavalent chromium, cadmium, nickel, arsenic, and possibly other metal TACs

Control Approaches:
- Soil covering
- Chemical treatment
- Barriers
- Wheel knockout and cleaning stations
- Other dust suppression techniques

Control of Toxic Metal Particulate Emissions from Laser and Plasma Cutting (TXM-05)

Background: The control measure would control metal particulate emissions from laser and plasma cutting operations. New or modified laser plasma cutting operations are currently permitted by the SCAQMD and are subject to Rule 1401 which establishes risk thresholds for permitted sources. Laser and plasma cutting technologies are used for cutting and fabricating large sheets of metal goods. Laser cutting directs a laser onto most metals (except reflective metals including aluminum, brass and copper) which melts or vaporizes the metal. Plasma cutting uses electrically conductive gas to transfer energy from an electrical power source through the plasma to the metal being cut. The high temperature of the plasma melts the metal. The intense energy of both the laser and plasma cutting process creates fumes and smoke from vaporizing the molten material from the bottom of the cut (kerf). Uncontrolled vaporized metals such as cadmium and nickel present environmental and health concerns. Additionally, high energy processes, such as laser and plasma cutting, can oxidize the elemental chrome in stainless steel into hexavalent chrome.



Potential TACS: Potential TACs from laser and plasma cutting include nickel, cadmium, hexavalent chromium, and possibly other metals.

Affected Facilities: Approximately 150 to 200 facilities utilize laser or plasma cutting equipment on metal substrates.

Control of Toxic Metal Particulate Emissions from Laser and Plasma Cutting (TXM-05)

Objective:
Control toxic metal particulates from laser and plasma cutting operations

Potential TACs:
Nickel, cadmium, hexavalent chromium, and possibly other metal TACs

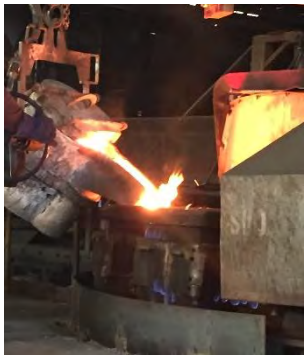
Control Approaches:
- Filter technologies such as HEPA filters
- Alternative processes

Control Approaches: Filter technologies such as high efficiency particulate arrestors (HEPA) filters or possibly other pollution controls could be used to reduce emissions. Staff will investigate alternative approaches that may result in less fugitive metal particulate emissions. Some alternative approaches include: flame cutting, water jet cutting, welding, and conventional machining.

Implementation Approach: Implementation would be through development of a proposed source-specific rule for laser and plasma cutting operations to control fugitive toxic metal emissions.

Control of Toxic Emissions from Metal Melting Facilities (TXM-06)

Background: This control measure seeks to further reduce metal toxic emissions such as arsenic, cadmium, and nickel from foundries and other metal melting facilities. Other metal melting operations include smelting, tinning, galvanizing, and other miscellaneous processes where metals are processed in molten form. Metal foundries are facilities which produce metal castings. The process involves melting metal into a liquid, pouring the liquid metal into a mold or casting, allowing the metal to cool and solidify, removing the mold or casting, degating, heat treating, surface cleaning, and finishing. Possible emission sources from such operations include, but are not limited to, fume, particulate, or dust from the melting, pouring, casting, degating, heat treating, coating, brazing, finishing, or surface cleaning processes, leftover metal or slag, and poor housekeeping.



Potential TACs: The proposal is anticipated to further reduce toxic and particulate emissions from metal melting facilities.

Affected Sources: Within the Basin, there are approximately 200 foundries serving industries such as aerospace, aircraft, automotive, industrial gas turbine, medical, and military. There are approximately another 50 other metal melting facilities that would be subject to this control measure.

Control Approaches: Emissions can potentially be reduced through venting operations to an emission collection system or improvements to existing collection systems, such as the addition of high efficiency filters. Fugitive emissions can be reduced through housekeeping measures which may include, but are not limited to, sweeping, mopping or filtered vacuuming, and enclosed material storage. Equipment may require new or updated source testing and potentially new or updated permits. Additionally, an ambient air monitoring requirement is under consideration.

Implementation Approach: This measure would be implemented through amendments to Rule 1407 and possibly through a new SCAQMD rule.

Control of Toxic Emissions from Metal Melting Facilities (TXM-06)

Objective:
Further reductions of toxic emissions from foundries and other metal melting facilities

Potential TACs:
Arsenic, cadmium, nickel, cadmium, and possibly other toxic metals

Control Approaches:
- Filter technologies such as HEPA filters
- Increased housekeeping and best management practices
- Ambient air monitoring

Control of Lead Emissions from Stationary Sources (TXM-07)

Background: The objective of this control measure is to further control lead emissions from non-vehicular sources. Lead and arsenic emissions from large lead-acid battery recycling facilities are regulated by Rule 1420.1. Emissions of lead from large (>100 ton per year) metal melting facilities are regulated by Rule 1420.2. All other non-vehicular sources of lead are regulated by Rule 1420. Lead is found in metals and aggregate processed either as an alloy or as a contaminant. Facilities process lead in aggregate processing, metal melting, metal finishing, metal machining operations, and also use lead solder for electronic circuit boards. Possible emission sources from such operations include, but are not limited to, fume, particulate, or dust from the mining, melting, finishing, or surface cleaning processes, leftover metal or slag, and poor housekeeping. Control of lead emissions often occurs concurrently with the control of other toxic metals.

Control of Lead Emissions from Stationary Sources (TXM-07)

Objective:
Further control lead emissions from non-vehicular sources

Potential TACs:
Lead

Control Approaches:
- Reduce ambient lead concentration
- Increased housekeeping and best management practices

Potential TACs: Lead is the primary metal of concern. Other toxic metals can be concurrently reduced such as hexavalent chromium, nickel, cadmium, and arsenic.

Affected Facilities: Within the Basin, there are approximately 500 stationary sources such as aerospace, computer, metal melting, mining, and roofing that process lead-containing materials.

Control Approach: Reduce the ambient lead concentration limit to be consistent with the federal lead NAAQS. Further reductions in the ambient lead concentration limit will also be considered. In addition, improved housekeeping requirements and best management practices similar to those included in Rule 1420.1, including provisions for general cleaning, rooftop cleaning, and handling, storage, and disposal of waste generated to comprehensively reduce fugitive lead emissions.

Implementation Approach: This measure would be implemented through amendments to Rule 1420.

Toxic VOCs

Control strategies focusing on VOCs will include the reduction of air toxic VOC emissions from a variety of sources including furniture stripping, oil and gas well maintenance and stimulation activities, and solvent and coating sources using recently delisted non-VOC containing materials. Each source and control strategy is discussed in the following sections.

Control of Emissions from Chemical Stripping of Cured Coatings (TXM-08)

Background: The proposed control measure would restrict the use of methylene chloride during chemical stripping operations. Methylene chloride is a suspected carcinogen and is classified as a Hazardous Air Pollutant by U.S. EPA and as a Toxic Air Contaminant by the State of California. A typical chemical stripping product contains between 70 and 85 percent methylene chloride by weight. Methylene chloride is the active ingredient that penetrates the coating film and lifts the coating off the surface. Most chemical stripper usage is done without any equipment or controls. The chemical stripper is applied by brush and then rinsed off afterwards. Larger users of chemical strippers are usually furniture stripping shops which sometimes utilize tanks and flow trays to use the chemical stripper. Other uses include automobile rim coating operations and residential furniture restoration.



Potential TACs: The proposal would reduce methylene chloride emissions from chemical stripping operations.

Affected Sources: There are approximately 40 facilities in the Basin that would be considered larger users.

Control Approaches: Reformulation is the preferred method for reducing methylene chloride emissions. The use of control equipment may also be a consideration. The control measure would potentially address both the commercial users of chemical strippers and the methylene chloride strippers sold at retail stores for home restoration projects.

Implementation Approach: This measure will be implemented through a new SCAQMD rule restricting the uncontrolled use of methylene chloride in commercial and residential chemical stripping applications.

Control of Emissions from Oil and Gas Well Activities (TXM-09)

Objective:
Reduce emission impacts from well maintenance and stimulation activities

Potential TACs:
Diesel particulate matter, benzene, toluene, ethylbenzene and xylene compounds

Control Approaches:
- Best Management Practices
- Minimize fugitive dust
- Use of cleaner diesel engine

- Reformulation
- Air pollution control equipment (i.e., carbon Adsorbers)
- Point of sale restrictions

Control of Emissions from Oil and Gas Well Activities (TXM-09)

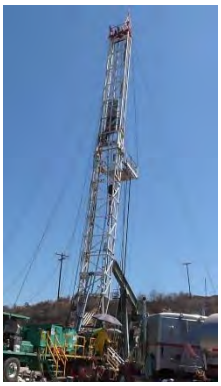
Background: Existing oil and gas field production facilities are required to notify the SCAQMD of a planned well maintenance or stimulation event under Rule 1148.2 – Notification and Reporting Requirements for Oil and Gas wells and Chemical Suppliers. In addition to the notification requirements, Rule 1148.2 also requires operators to report chemical usage during each operation, although trade secret chemicals are not revealed to the public. Oil and gas field production well maintenance and stimulation activities release emissions such as DPM, fugitive dust, and other air toxic emissions such as BTEX compounds. This control measure seeks to develop a series of Best Management Practices (BMP) to

reduce the emission impact from the well maintenance and stimulation activities. The implementation of the BMPs specified may be contingent upon the proximity to sensitive receptors.

Potential TACs: The proposal would reduce DPM and benzene, toluene, ethylbenzene, and xylene emissions from well maintenance and stimulation activities such as well drilling, redrilling, maintenance acidizing, matrix acidizing, gravel packing, and hydraulic fracturing.

Affected Sources: There are 242 facilities operating approximately 4,320 onshore oil and gas wells in the District. An analysis of data collected in 2015 under Rule 1148.2, showed that there were 275 unique well events occurring in 2015.

Control Approaches: This control measure seeks to develop a series of BMPs to reduce the emission impact from the well maintenance and stimulation activities. The BMPs may include: (1) reduction of BTEX compounds from return fluids during gravel packing and hydraulic fracturing events by using carbon absorbers to control emissions venting from portable storage tanks, covering circulation tanks, and closing access hatches on portable storage tanks; (2) reduction of BTEX compounds from drilling mud return processing equipment by covering areas open to atmosphere; (3) reduction of fugitive silica dust from the use of portable plastic totes (known as Rigid Intermediate Bulk Containers (RIBC)) in lieu of canvas or cloth bags (known as Flexible Intermediate Bulk Containers (FIBC)); (4) reduction of DPM from the use of Tier 3 and 4 off-road engines, or engines equipped with a CARB certified Level 3 diesel particulate filter (DPF); and (5) work area plastic ground coverings to collect spills and reduce fugitive dust.



Implementation Approach: This measure will be implemented through a rule making process in one of the Rule 1148-series rules.

Conclusion

Implementation of the 2016 AQMP Mobile Source strategies is expected to concurrently reduce air toxics by more than 70 percent depending on the toxic air contaminant. Over the next five years, the SCAQMD is planning to propose a suite of air toxics rules that will specifically address fugitive metal particulates that will also concurrently reduce particulate emissions. Implementation of these measures will help the Basin achieve and maintain regional air quality goals while also having significant benefits to local communities that live and work near these sources.

Chapter 10

Climate and Energy



Significant reductions in greenhouse gases are needed to achieve California's climate targets, presenting challenges for the State's energy and transportation infrastructure. Climate, energy, and transportation strategies have direct impacts on air quality, and the 2016 AQMP control strategy will affect these other objectives. Therefore, understanding the connections and coordination with other agencies is essential. A large majority of criteria pollutant and greenhouse gas emissions result from our transportation and energy choices.

In This Chapter

- Introduction 10-1
  Overview of climate change and energy issues
- South Coast Basin Energy Consumption, Emissions, and Projections 10-7
  Regional energy and fuel information
- Challenges and Opportunities in Moving Towards 100 Percent Renewable Power 10-14
  Grid collaboration, renewable generation, demand response, energy efficiency and energy storage

- Southern California's Energy and Air Quality Future 10-28
  Infrastructure and transformation of the energy sector
- References 10-33

Introduction

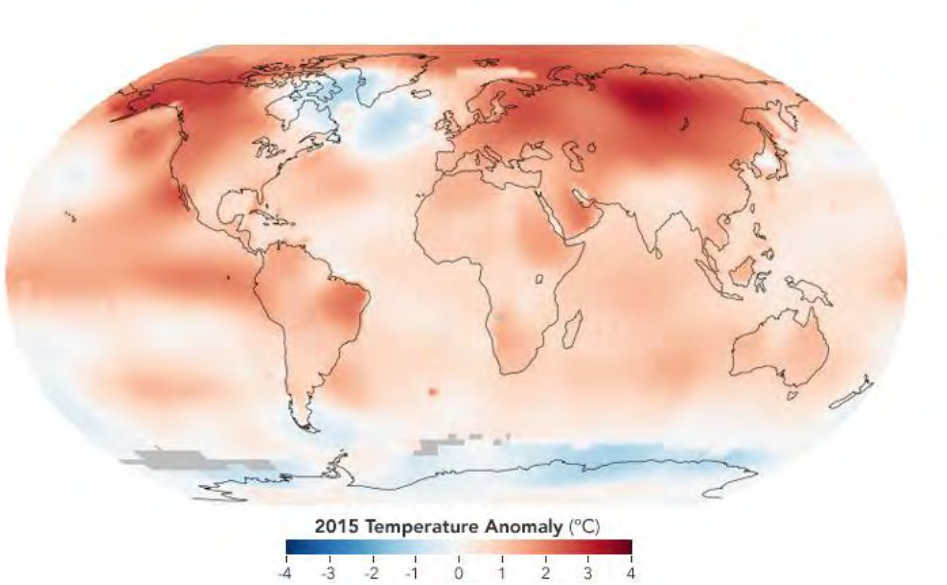


FIGURE 10-1
GLOBAL TEMPERATURE ANOMALIES IN 2015 ***(NOAA, 2016)***

In September 2011, the SCAQMD Governing Board adopted the SCAQMD Air Quality-Related Energy Policy. This policy integrates energy, air quality, and climate change by explaining how our dependence upon fossil fuels for energy generation and consumption within the Basin results in the emission of criteria pollutants, toxic pollutants, and greenhouse gases. The Air Quality-Related Energy Policy also articulates ten Policies and ten Actions to ensure clean air by promoting the development of reliable, safe, cost effective, and clean energy. For example, Policy 1 asserts the promotion of zero and near-zero emission technologies through ultra clean energy strategies to meet air quality, energy security and climate change objectives. Action 10 requires that an update of energy usage within the District is provided in each AQMP (SCAQMD, 2011). In addition, during the December 4, 2015 Governing Board hearing, the SCAQMD Governing Board requested a review of technologies and programs that can help reduce energy use, increase availability of renewable energy sources, reduce the need for new fossil fuel-based power generation in the Basin, and incorporate alternatively powered transportation.

The energy projections, technologies, and programs presented here reflect existing District policies and planning efforts. However, many newly adopted programs, as well as those under development and within the proposed 2016 AQMP control measures, will have impacts on future energy usage in California that are not yet fully accounted for in future energy use projections. In addition, ten white papers that preceded the development of the 2016 AQMP, covered an array of sectors and topics, including a survey of technologies and policies that can help achieve a zero and near-zero emission future, were integral to the development of this chapter as well as the 2016 AQMP (SCAQMD Energy Outlook White Paper). Two of the white papers were focused on energy usage in the Basin and highlighted the importance of energy and climate change objectives from other agencies in helping reduce air pollution, showing the importance of collaborative planning efforts. The Residential and Commercial Energy white paper provided an assessment of the energy usage, age of buildings, review of existing efficiency programs, and future energy usage scenarios within the Basin's commercial and residential sectors. The Energy Outlook white paper reviewed the types of energy use, focused on different end use sectors, reviewed

new technologies and the changing energy environment, and provided future emissions scenario analysis as future energy and climate change targets are achieved.

In the U.S., "criteria air pollutants," are those with health based air quality standards that set allowable concentrations of six substances in ambient air, and are regulated under the federal Clean Air Act as well as California State law. They include ozone, particulate matter (PM), carbon monoxide (CO), lead, nitrogen dioxide (NOx), and sulfur dioxide (SOx). Volatile organic compounds (VOCs), ammonia, and NOx are also regulated as ozone and PM precursors. Control strategies in this AQMP rely on a combination of available and advanced technologies along with efficiency improvements to attain the ambient air quality standards. Additionally, many of the control measures combine planning efforts for climate change, transportation, and the energy sector to achieve multiple co-benefits. As later shown, the primary sources of criteria and greenhouse gas emissions are direct and indirect energy use within the Basin.

Criteria pollutants and greenhouse gases (GHGs) are often treated separately by different regulations. However, certain air pollutants are both climate forcers and criteria pollutants. Additionally, there are interactions between climate and criteria pollutants within the atmosphere. These interactions often worsen the impacts from greenhouse gases and increase background levels of criteria pollutants. An example of this interaction is the atmospheric fate of the GHG methane. While methane persists in the atmosphere for 10 to 14 years, its atmospheric lifetime is impacted by criteria pollutants (Prather, 2007). As methane reacts within the atmosphere, it acts like a VOC and increases background tropospheric ozone levels. Over the past 12 years, global methane emissions have increased over 30 percent, which also increased background levels of tropospheric ozone (Turner, 2016). Increasing background tropospheric ozone makes achieving air quality standards more difficult. Lastly, tropospheric ozone is also one of the strongest and significant short lived climate pollutants (Intergovernmenal Panel on Climate Change [IPCC] AR5, 2013).

Climate Change

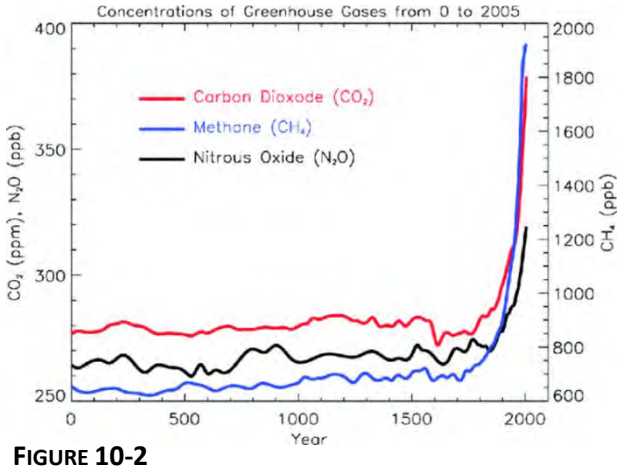


FIGURE 10-2
ICE CORE RECORD ALONG WITH ATMOSPHERIC MEASUREMENTS OF METHANE, CARBON DIOXIDE, AND NITROUS OXIDE
(Thomas Karl, 2009)

The earth's atmospheric greenhouse effect is essential for life on this planet. Greenhouse gases in the earth's atmosphere absorb outgoing infrared radiation, keeping us at a comfortable average global temperature of 60 °F. An absence of GHGs in earth's atmosphere would result in an average surface temperature of 0 °F. The earth's natural carbon cycle balances GHGs in the atmosphere to stable concentrations over thousands of years. However, this balance has been disrupted over the past 150 years due to mankind's rapid increase in consumption of fossil fuels for energy, as well as a decline in natural carbon sinks due to human land-use Revolution, fossil fuels previously

sequestered underground have been extracted and burned largely for their energy content, releasing greenhouse gases such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) into the atmosphere at an escalating rate. During the same period, synthetic gases with extremely high global warming potentials, such as chlorofluorocarbon and hydrofluorocarbon refrigerants, were developed and released into the atmosphere. In addition, human activity has led to a decline in natural carbon sinks such as forests and wetlands, which have been removed so the land could be used for agriculture, mining and, and the growth of cities and towns.

The rapid expansion of fossil fuel-based energy, the emission of synthetic gases, and the depletion of our natural carbon sinks have drastically increased the level of GHGs in the earth's atmosphere and depleted stratospheric ozone. This results in changing global weather patterns, such as more extreme storms, higher average temperatures, and more prolonged periods of drought. In addition, half of the additional CO_2 emitted into the atmosphere over this time was absorbed by the earth's oceans, leading to an increase in ocean acidity. These changes, along with other human-caused environmental impacts, have some ecologists and geologists terming the geologic epoch in which we live, "the Anthropocene Period", in which human activities have started to significantly impact global ecology and ecosystems (University of California, 2015).

Since the beginning of the Industrial Revolution, GHG concentrations in the atmosphere have increased exponentially (see Figure 10-2). As shown in Figure 10-3, average global temperatures have been increasing with some variation since the 1950's. The highest yearly average global temperature, since instrumental temperature record keeping began in 1880, was observed in 2015 (NOAA, 2016). The 2015 record average temperature broke the previous average record temperature by 0.23 °F, the widest margin documented. NOAA's recent temperature data also confirmed that July 2016 was not only the record warmest July ever, but the hottest month ever on record, in agreement with NASA data (NASA Earth Observatory, 2016).

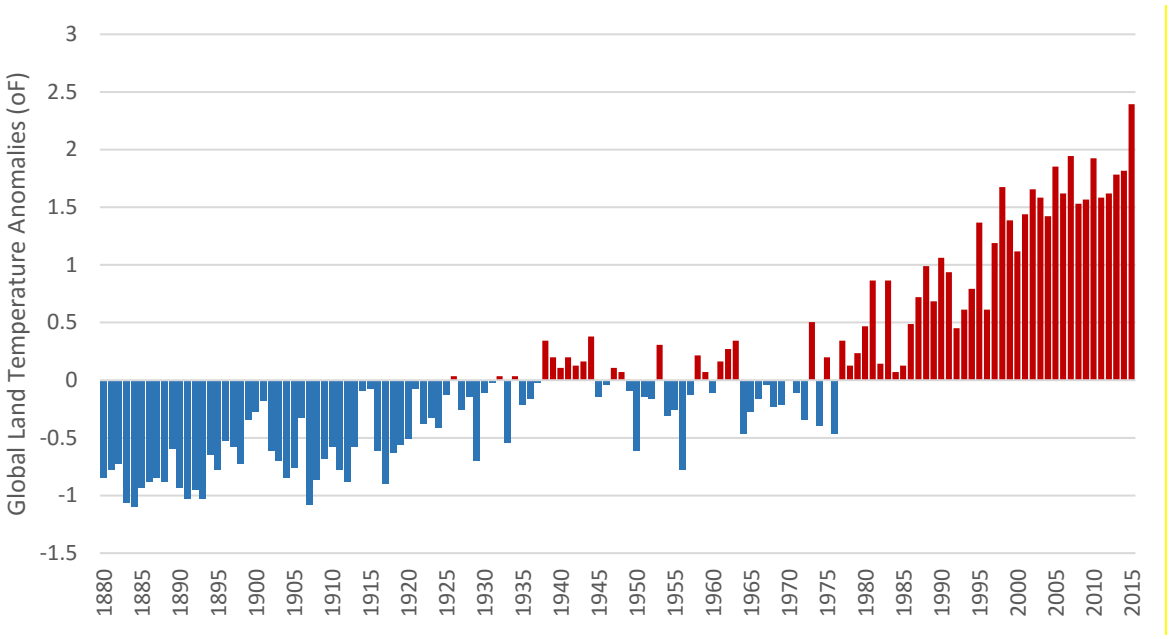


FIGURE 10-3
GLOBAL TEMPERATURE ANOMALIES (I.E. DEPARTURE FROM REFERENCE VALUE OR LONG-TERM AVERAGE) FOR LAND WITH RESPECT TO 20TH CENTURY TEMPERATURE AVERAGE ***(NOAA, n.d.)***

Even if GHG emissions were significantly curtailed today, there would continue to be climate change impacts for decades to come due to the past accumulation and slow removal processes of greenhouse gases in the earth's atmosphere. The projected impacts include extreme weather variability, rising ground-level temperatures, sea level rise, and depleted water resources. In addition, future projections of increased extreme heat events in Southern California could result in more days exceeding the ground-level ozone standard. Ground-level ozone in the Basin forms through a chemical reaction between NOx and VOCs in the presence of sunlight. The correlation of the peak hourly temperature and peak hourly ozone measurements is shown in Figure 10-4 for the SCAQMD San Bernardino monitoring station. This increase of ozone with temperature is often referred to as the "climate penalty." Additionally, increased emissions of criteria pollutants from developing countries along with higher atmospheric levels of methane have resulted in increasing levels of global background ozone, which makes it more difficult to achieve ozone standards in urban areas (Cooper, 2011) (IPCC, 2013).

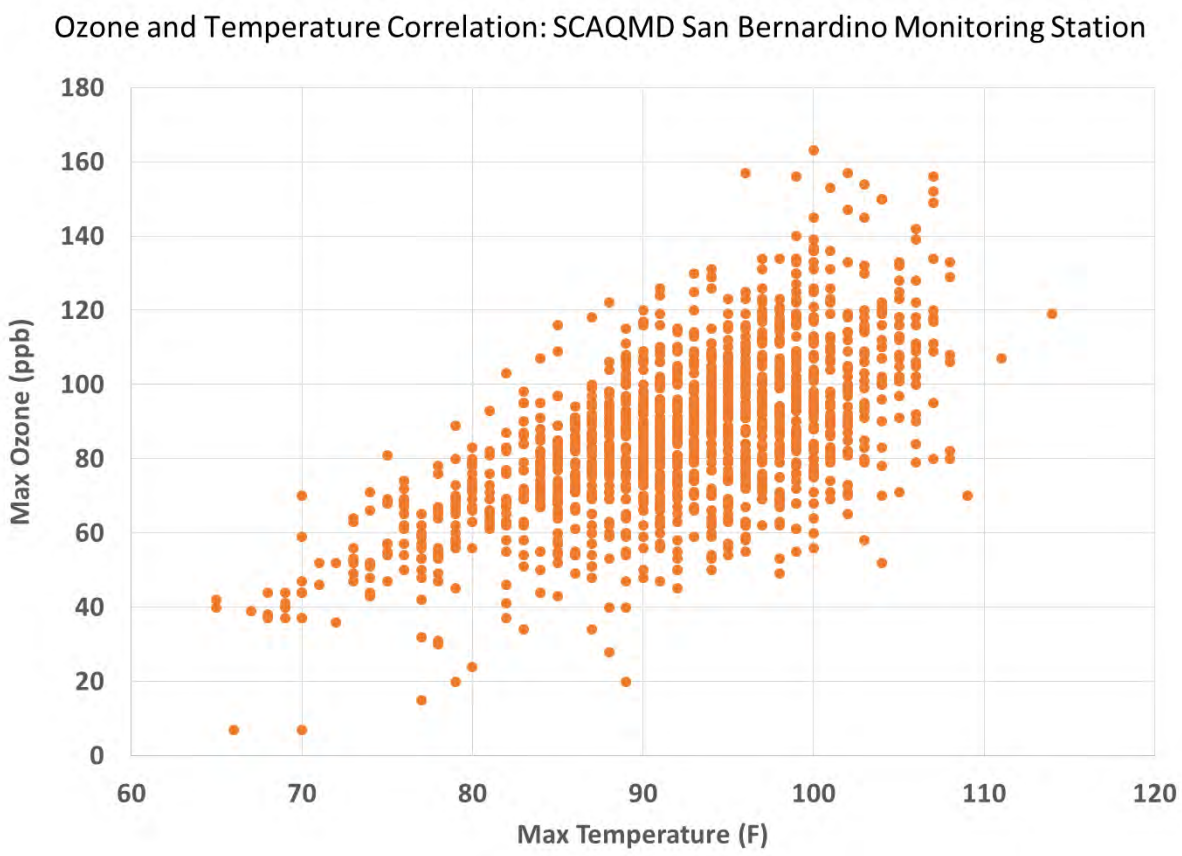


FIGURE 10-4
CORRELATION OF ONE-HOUR OZONE MAXIMUM CONCENTRATION WITH ONE-HOUR MAXIMUM TEMPERATURE DURING SUMMER MONTHS FROM YEARS 2004 TO 2015 MEASURED AT SCAQMD SAN BERNARDINO MONITORING SITE

Many GHGs undergo slow atmospheric reactions and/or uptake through biological processes or other removal mechanisms. To minimize these predicted greater future impacts of climate change and associated catastrophic weather events, the world must quickly limit its collective GHG emissions. Following a "business as usual" path without future GHG mitigation efforts could lead to increased average warming that ranges from 2.5 °C to 7.8 °C (4.5 °F to 14 °F) by the end of the century (University of California, 2015). The range of projected temperatures reflects the significant uncertainties associated with predicting future global temperatures, impacts from climate feedback mechanisms, and varying global emission levels. The consequences for each degree of increased temperature include: significant public health impacts, ecological disturbances, and sea level rise, coupled with a declining ability to adapt to these changes. In addition, as temperatures increase so does the intensity of positive feedback mechanisms, such as decreasing surface albedo from melting ice, and increased methane emissions from the thawing of permafrost. If higher levels of warming continue to occur, areas of the earth will become uninhabitable due to heat stress, lack of potable water, vector-borne transmission of disease, and sea level rise inundating coastal lands (Sherwood, 2010) (Pal, 2015). Many ecological consequences are already occurring, such as ocean acidification, species migration, and sea level rise due to ocean warming and associated thermal expansion.

The California Global Warming Solutions Act (AB 32 and SB 32), and related Executive Orders mandate that California reduce emissions to 1990 levels by 2020, 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by the year 2050. The 2050 target was based on the need to limit global warming to below 2 °C. The 2 °C limit was formally codified in the Copenhagen Accord in 2009 as a global benchmark by which nations have agreed to measure collective success in limiting global warming. The recent 21st Council of Parties (COP-21) in Paris retained the commitment of the world's nations to reduce GHG emissions to the 2 °C threshold, while also recognizing the desirability of pursuing an even lower target. As GHGs accumulate in the atmosphere, climate change impacts become more acute and mitigation of these impacts becomes more intractable, complex, and expensive. For example, future economic costs arising from the impacts of climate change are non-linear with increasing temperatures because these costs recur year-after-year (White House, 2014). Therefore, it is critical that decisions are made expeditiously to develop and implement technologies to reduce GHG emissions alongside reductions of criteria and toxic pollutants. Every year of delay allows increased accumulation of GHGs in the atmosphere, negative health impacts, and, consequently, the need for more aggressive reductions in the future. Within the Basin, use of fossil fuel based energy resources contribute the majority of criteria pollutants, air toxics, and GHG emissions. Efforts to clean the air and meet mandated air quality standards, focused on the adoption of cleaner energy sources, also achieve the co-benefit of reducing GHG emissions, thus helping to meet State and global climate goals. These efforts also provide economic benefits from the new technologies and markets associated with clean low emission technologies.

Energy

The use of energy is a necessity of modern life in Southern California. It powers our economy, our mobility, and our personal comfort, and well-being. In 2012, total energy costs in the Basin were estimated to be over $57 billion. Currently, energy use for both in-Basin mobile sources and electricity generation for stationary sources is dominated by the combustion of fossil fuels. The combustion of fossil fuels results in the emission of criteria pollutants, air toxics, and greenhouse gases. This results in short-term air quality impacts on health and longer-term climate change impacts from the accumulation of greenhouse gases in the earth's atmosphere.



FIGURE 10-5
(Bloomberg New Energy Finance , 2016)

Beginning in late 2014, global fossil fuel based energy prices dropped sharply and continued to fall. In the past, declining fossil fuel prices have hindered the growth of renewable energy resources. However, over the past two years, renewable energy technologies have also significantly declined in price, making them increasingly cost competitive with traditional fossil fuel-based energy resources (Bloomberg New Energy Finance , 2016).

The declining costs of renewable energy technologies are opening pathways for decarbonizing multiple energy sectors, thus reducing criteria and air toxic pollutants and greenhouse gas emissions, and helping achieve cleaner air and climate stability. However, at this time, most renewable energy technologies are not a direct replacement for traditional fossil fuel based resources for power generation. This is due to the intermittency of many renewable energy resources, outdated regulations and policies governing

energy generation, and necessary upgrades to grid and transmission infrastructure. A key to overcoming these roadblocks is the adoption of integrated energy strategies that achieve GHG emission reductions and commensurate reductions of criteria pollutants and toxic air emissions.

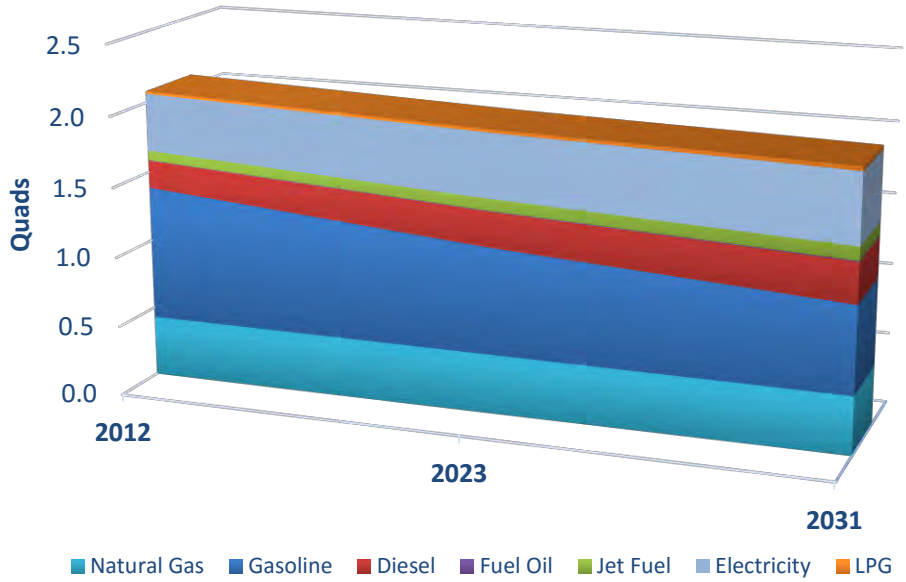
California is already transitioning towards generating power from a higher percentage of cleaner renewable energy sources as later shown in Figures 10-14 and 10-15. This is resulting in improved air and water quality, as well as greater resilience to large price fluctuations of traditional fossil fuel-based energy resources. The emission reduction efforts in California and the Basin have charted a path for the nation and other countries to follow as they also begin to develop new technologies and programs to tackle air pollution and curb GHG emissions while growing a vibrant and resilient economy.

South Coast Basin Energy Consumption, Emissions, and Projections

Energy projections, technologies, and programs presented in this section reflect information derived from many existing policies and other agencies' planning documents. However, many newly adopted programs and those still in development will also have impacts on future energy usage in California and are not yet fully represented in the future energy use projections below.

Energy Consumption Inventory and Projections

In 2012, the end use energy needs of the Basin were 2.1 quads (1 quad = one quadrillion [10^{15}] British Thermal Units). This is equivalent to over 2 percent of the energy consumption within the United States (U.S.) for approximately 5 percent of the U.S. population (EIA Consumption & Efficiency, n.d.). As shown in Figure 10-6, in 2012, the Basin consumed 0.96 quads of gasoline, over 45 percent of the total Basin energy consumed. End-use electricity and natural gas consumption account for the second and third largest categories of energy consumption in the Basin, principally the result of commercial and residential building usage.



Note: Does not include consumption of natural gas for electricity generation to avoid double counting with electricity end use. Does not include fuel oil and diesel past the 24 nautical mile buffer zone.

FIGURE 10-6
TOTAL END USE ENERGY CONSUMPTION IN QUADS FOR THE BASIN BY FUEL TYPE IN 2012 AND FORECASTED GROWTH

The largest share of energy use in the Basin is devoted to transportation purposes as shown in Figure 10-7. This is the result of several factors related to the region's dense urban population, development structure, and economy. Southern California has two of the largest maritime ports in the nation. Together, the San Pedro Bay ports of Los Angeles and Long Beach account for nearly 40 percent of all U.S. container imports (on a per twenty-foot equivalent unit (TEU) basis) (U.S. Maritime Administration, 2016). The in-Basin goods movement system includes local distribution networks based on extensive fleets of diesel powered trucks and trains transporting many millions of shipping containers to and through the area. The Basin also has three large airports that include both air and ground transportation. Most importantly, the Basin is home to more than 16 million residents who primarily rely on freeway and road infrastructure for mobility. As a result, the largest end energy use is vehicular gasoline consumption.

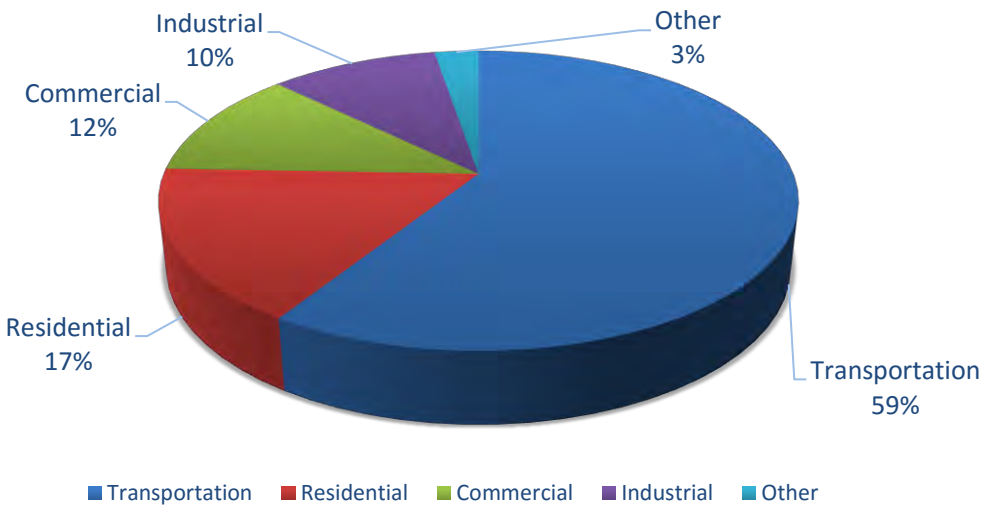
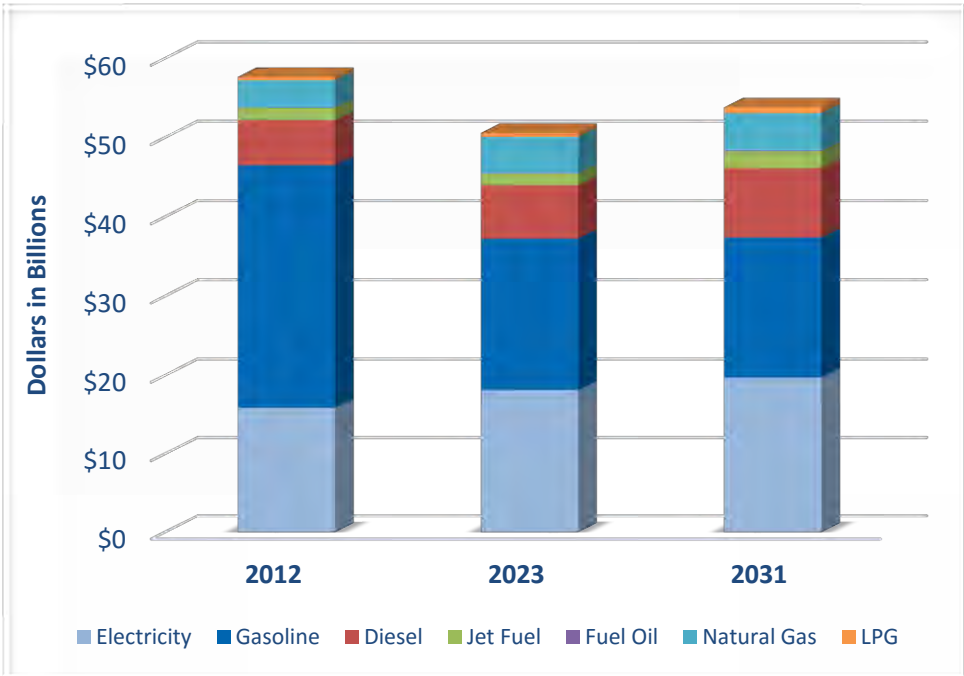


FIGURE 10-7
SHARE OF ENERGY USE IN THE BASIN

In 2012 over $57 billion was spent on energy costs within the Basin. As shown in Figure 10-8, the cost of energy is expected to decrease in 2023 to $50 billion and then increase slightly in 2031 to $53 billion. This trend is consistent with the projected energy prices of the EIA Annual Energy Outlook. As shown in Figure 10-6, the Basin energy usage is projected to decrease slowly from 2.1 to 1.9 quads largely because of improved efficiency in 2031 (i.e., a 0.2 quad decrease between 2012 and 2031) within mobile and stationary sources. Similar to the energy consumption pattern, associated GHG emissions decrease from 127 MMT (million metric tons) CO_2 in 2012 to 105 MMT CO_2 in 2031. This projected decline of GHG emissions by 2030 currently falls short of the statewide target of reducing GHG emissions 40 percent below 1990 levels by 2030. State, federal, and local mandates regarding energy efficiency standards, renewable energy portfolio standards, and the cap-and-trade program will all help to reduce both energy consumption and emissions.

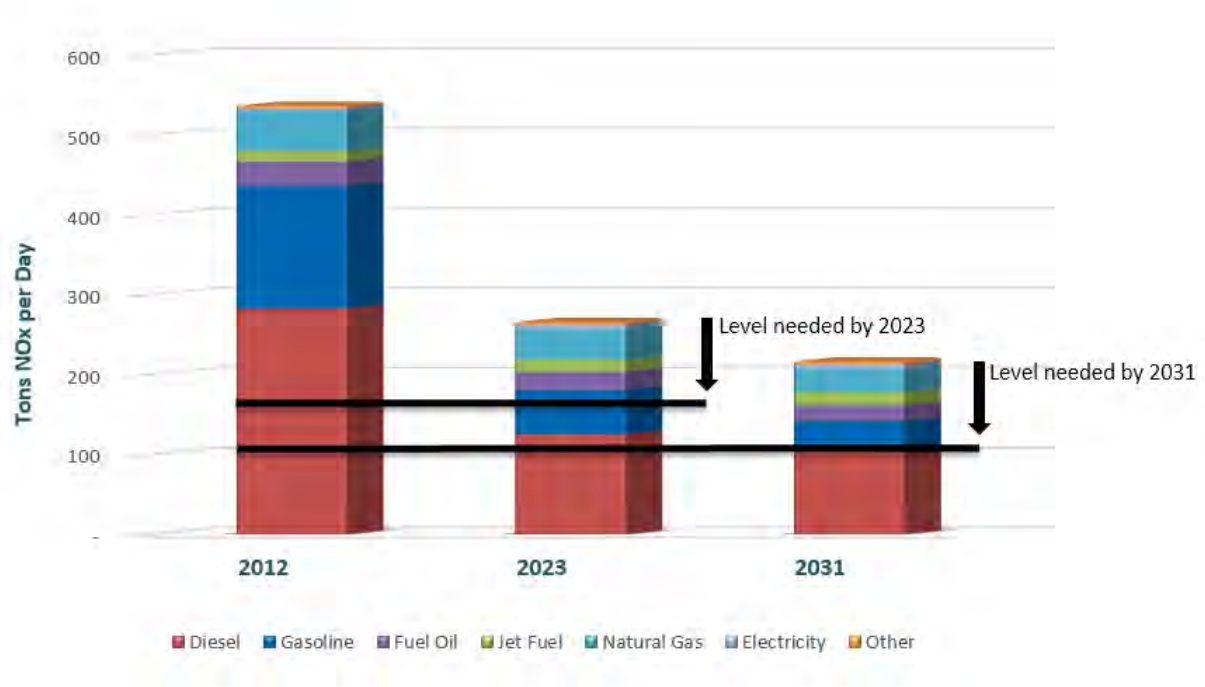


Note: Does not include cost of natural gas for electricity generation to avoid double counting with electricity end use. Prices based on EIA Energy Outlook 2011 reference case for the Pacific except electricity (EIA AEO, 2015).

FIGURE 10-8
DOLLARS SPENT AND PROJECTED ON ENERGY END USE IN 2012 AND FUTURE YEARS IN THE BASIN

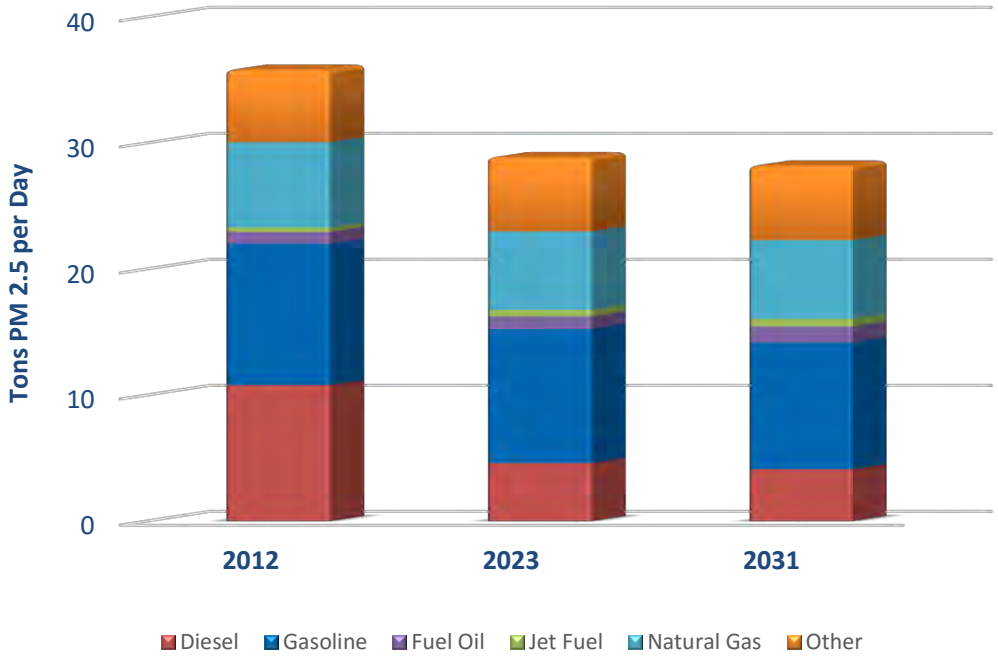
Emissions

Transportation sources account for over 50 percent of in-Basin energy use. These sources are also the main contributor to NOx emissions (Figure 10-9). Within the transportation sector, diesel-powered sources emit the majority of NOx. This is largely the outcome of years of effective stationary source and light-duty vehicle controls, the large numbers of diesel vehicles, and the slow rate of fleet turnover for diesel-powered vehicles. Increased fleet turnover, fuel economy standards, diesel repowering and other State regulations are projected to lower NOx emissions. However, these reductions are not sufficient to achieve the National Ambient Air Quality Standards (NAAQS) ozone standards. Figure 10-10 provides the corresponding data for direct PM2.5 emissions by fuel type. Similarly, the majority of PM2.5 emissions are attributable to transportation sources.



Note: Other includes Biomass, Landfill Gas, Incinerators, LPG and RECLAIM Other.

FIGURE 10-9
NOX EMISSIONS IN TONS PER DAY BY FUEL TYPE



Note: Other includes Biomass, LPG, Incinerator and Landfill Gas

FIGURE 10-10
PM 2.5 EMISSIONS IN TONS PER DAY BY FUEL TYPE

In 2012, the CO_2 emissions from direct fuel use in the Basin were 127 MMT (see Figure 10-9). These emissions account for 28 percent of the total 459 MMT CO_2 released in California in 2013 (California Greenhouse Gas Emission Inventory - 2015 Edition, n.d.). Transportation fuels dominate the CO_2 emissions in Southern California. CO_2 emissions, shown in Figure 10-9, were developed from recent fuel consumption data and future projections.

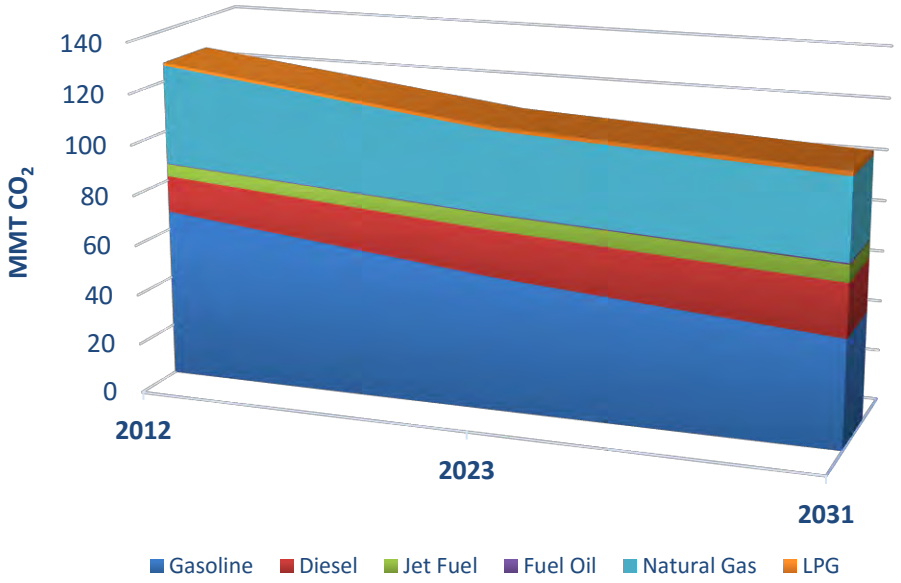


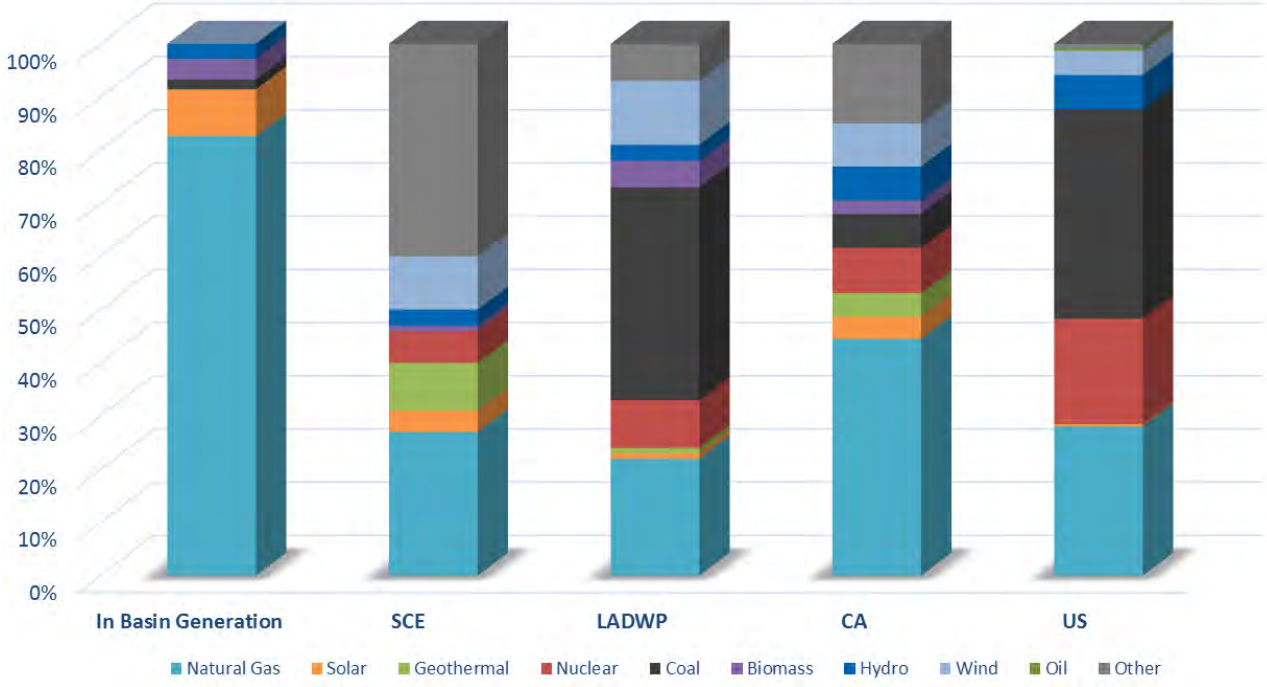
FIGURE 10-11
CARBON DIOXIDE EMISSIONS BY FUEL TYPE

Electricity Sources

In 2012, electricity end use in the Basin accounted for 120,210 gigawatt hours (GWh) of energy usage and 37 percent of the energy end use costs. Electricity generated within the Basin accounted for 45,000 GWh or 37 percent of the total electricity consumed in the Basin (CEC Energy Almanac - QFER and SB 1305 Reporting, n.d.). As of 2012, natural gas-fueled power plants produced the majority of the electricity in the Basin (Figure 10-12) as is the case for most of California; in contrast, the majority of electricity produced in the U.S. is from coal-fired power plants. Figure 10-12 also shows the percentage breakdown of the generation mix for electricity supplied to the Basin from Southern California Edison (SCE) and the Los Angeles Department of Water and Power (LADWP). From 2010 to 2014, the percentage of power used by SCE from coal has been reduced from 7 percent to 0 percent (CEC Utility Annual Power Content Labels for 2014, n.d.). LADWP energy supply from coal has recently reduced from 40 percent to between 28 and 30 percent since the start of divestiture of the Navajo Generating Station in July 2016 (LADWP Comments on Draft 2016 AQMP, 2016).

SB 1368 (CEC SB 1368 Emission Performance Standards, n.d.), and its implementing regulations promulgated by the California Energy Commission (CEC) and the California Public Utilities Commission (CPUC), have explicit constraints on utilities regarding the development of new coal-powered facilities or contracts for coal-powered generation. Due to this legislation, and as the State's renewable portfolio

standard and cap-and-trade program are implemented, power procurement from coal resources will continue to decline over time.



Note: The SCE and LADWP generation do not represent the total Basin generation and generation outside of the Basin is not subject to SCAQMD regulatory authority. These figures represent purchases of electricity products by California retail suppliers and do not correspond to utility requirements under the California Renewables Portfolio Standard. The "Other" category accounts for unspecified electricity sources.

FIGURE 10-12
ELECTRICITY GENERATING MIX BY TYPE IN 2012

In-Basin Electricity Consumption

As stated above, total electricity end use consumption within the Basin was 120,210 GWh in 2012 and expected to grow to an estimated 144,369 GWh by 2031. This is derived from the net energy loads for L.A. Basin, SCE and LADWP service territories within the CEC California Energy Demand Forecast 2010–2020, and retail supplier power content percentages (QFER CEC-1304 Reporting Database, n.d.) (CEC Utility Annual Power Content Labels, n.d.). The CEC-1304 reporting form collects data from power plants with a total nameplate capacity of 1 megawatt (MW) or more. Electricity consumption is continuing to recover from a decline experienced during the last economic recession. The projected electricity use within the Basin is estimated to grow approximately 20 percent from 2012 to 2031 (an average of 1.1 percent per year). In 2012, an estimated $15.8 billion was spent on end-use electricity deliveries within the Basin. Based on EIA Annual Energy Outlook 2015 projections, an estimated $19.7 billion is projected to be spent on electricity in the Basin in 2031.

Challenges and Opportunities in Moving Towards 100 Percent Renewable Power

Worldwide energy consumption accounts for two-thirds of global GHG emissions (International Energy Agency, 2015). Additionally, as shown previously in Figure 10-9, energy consumption accounts for all in-Basin NOx emissions, along with the majority of VOC and air toxics emissions (SCAQMD, 2015). Over the past century, the energy used by different sectors in the Basin primarily stems from specific fossil fuels: e.g., liquid fuels gasoline and diesel are used in the transportation sector, and natural gas is primarily used for electrical power generation and heating (SCAQMD Energy Outlook White Paper). Currently, California is undergoing a widespread shift in power generation and electrical infrastructure with the advent and adoption of renewable energy technologies. Renewable generation technologies such as solar photovoltaics, wind turbines, and hydrogen fuel cells are becoming more efficient and declining in cost. Solar photovoltaic technologies using crystalline silicon and other established renewable energy technologies do not need significant technological advances to achieve terawatt-scale deployment by 2050 (MIT, 2015). It is also feasible with new technology development, continued price declines, and widespread implementation to have renewable energy sources provide the majority of transportation and stationary energy needs (Jacobson, 2014). Installed costs for solar panels have been declining rapidly as shown in Figure 10-13, and wind energy capacity costs have decreased 75 percent in the past three decades (Trancik, 2015). Renewable energy generation technologies have thus become cost competitive with fossil fuel generation technologies in most locations. However, as discussed above, the renewable generation technologies, must currently still be supplemented by fossil fuel generation due to intermittency, periods of over-generation, along with lack of manageable loads and energy storage (MacDonald, 2016) (Trancik, 2015). The reliance on fossil generation to support renewables is expected to decline as more auxiliary resources are integrated onto the grid.

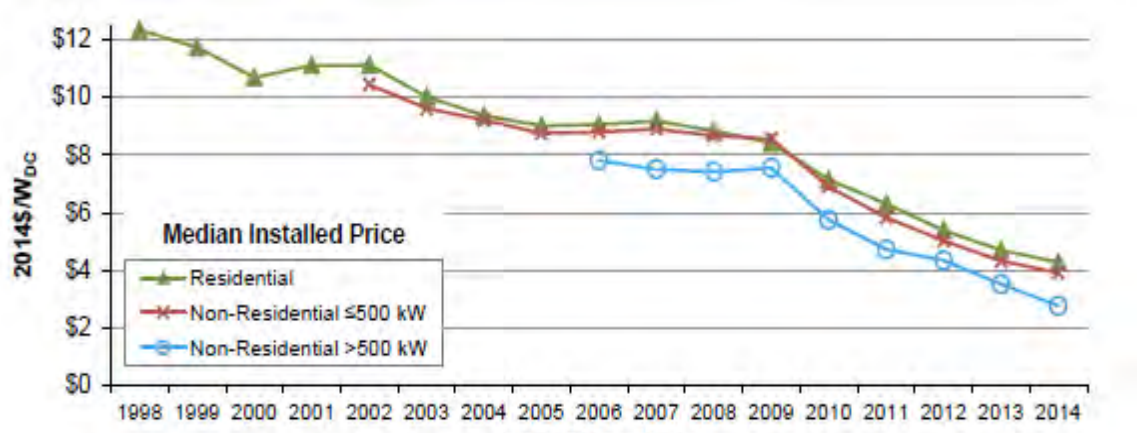


FIGURE 10-13
MEDIAN INSTALLED SOLAR PHOTOVOLTAIC PRICES ***(DOE and LBNL, 2015)***

Declining costs in solar and wind resources have made them attractive technologies to increase the amount of renewable power generation globally (Bloomberg, 2016). In California, the majority of new renewable generation has been from solar and wind resources, as shown in Figure 10-14.

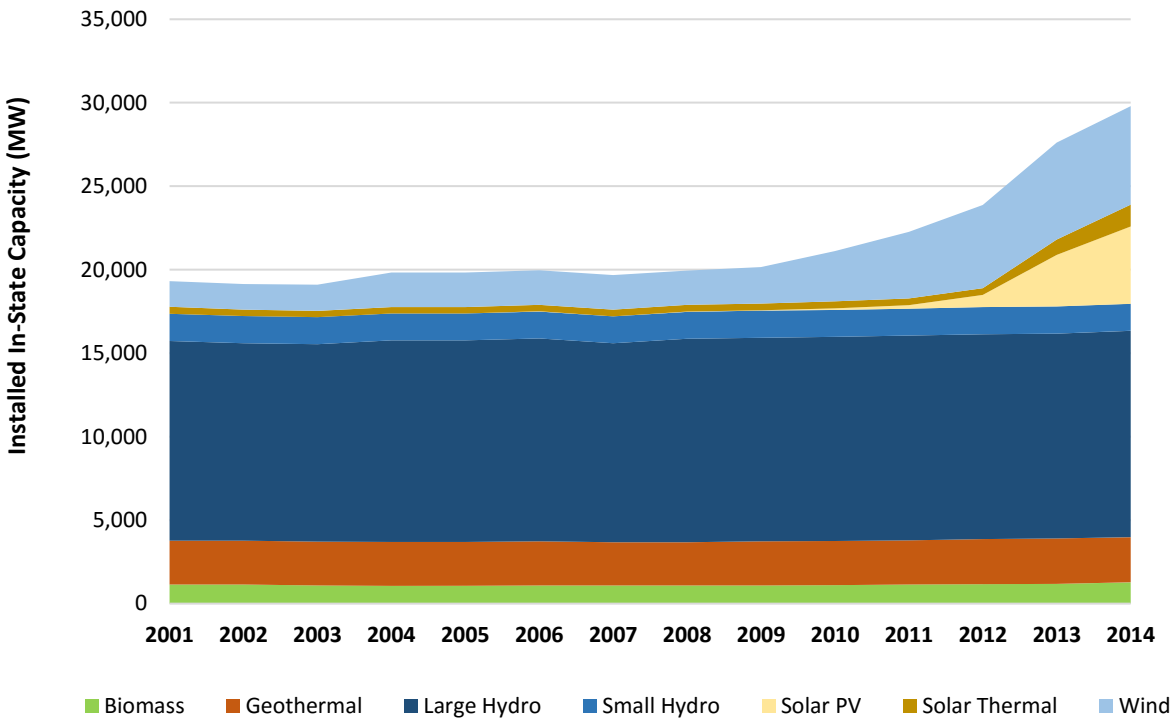


FIGURE 10-14
IN STATE RENEWABLE ELECTRICITY GENERATION BY FUEL TYPE

This shift has been in response to regulatory and policy mandates, as well as technology advancement in energy efficiency and renewable energy. The consumption of electricity is expected to increase through mid-century as alternatively powered vehicles become more reliant upon the electrical grid.

The increase in electricity consumption coincides with increasing requirements to power the grid with renewable power. As the grid shifts to operating with a higher percentage of renewable power, matching generation with demand on short-time scales becomes more complex as a result of intermittency from the renewable resources. Grid balance has historically been maintained by controllable conventional power generating resources. Currently, fossil fuel energy resources such as natural gas are able to ramp quickly to meet spikes in demand and support renewable power intermittency. With the move towards 50 percent of grid power coming from renewable energy resources, the reliance on conventional generating resources will decrease. However, intermittency and demand spikes will need to be met through additional resources that include enhanced regional grid collaboration, a diverse mix of renewable power resources, adjusting electricity loads through demand-side management, stored power, and grid integration of alternatively powered transportation. This will require policy and regulation changes to allow for new power markets, the expansion of efficiency programs and requirements to reduce the need for generation, the development of new energy storage technologies, and utilization of alternatively powered transportation for grid stability.

Increasing Grid Flexibility through Enhanced Regional Grid Collaboration and Increasing Renewable Generation Resource Diversity

California was one of the first states to implement a renewable portfolio standard (RPS) that required investor owned utilities (IOUs) to procure 20 percent of their electricity from renewable resources by 2010. In 2011, Governor Brown mandated a new RPS requiring that 33 percent of the State's electricity come from renewable resources by 2020. In the summer of 2015, the passage of SB 350 put in place a new RPS mandate to achieve 50 percent renewable energy generation by 2030, with a requirement for longer-term discussions regarding the potential for 100 percent renewable power generation (Crawford, 2015). While these California targets are ambitious, Hawaii is the first state to adopt a 100 percent renewable power target by 2045.

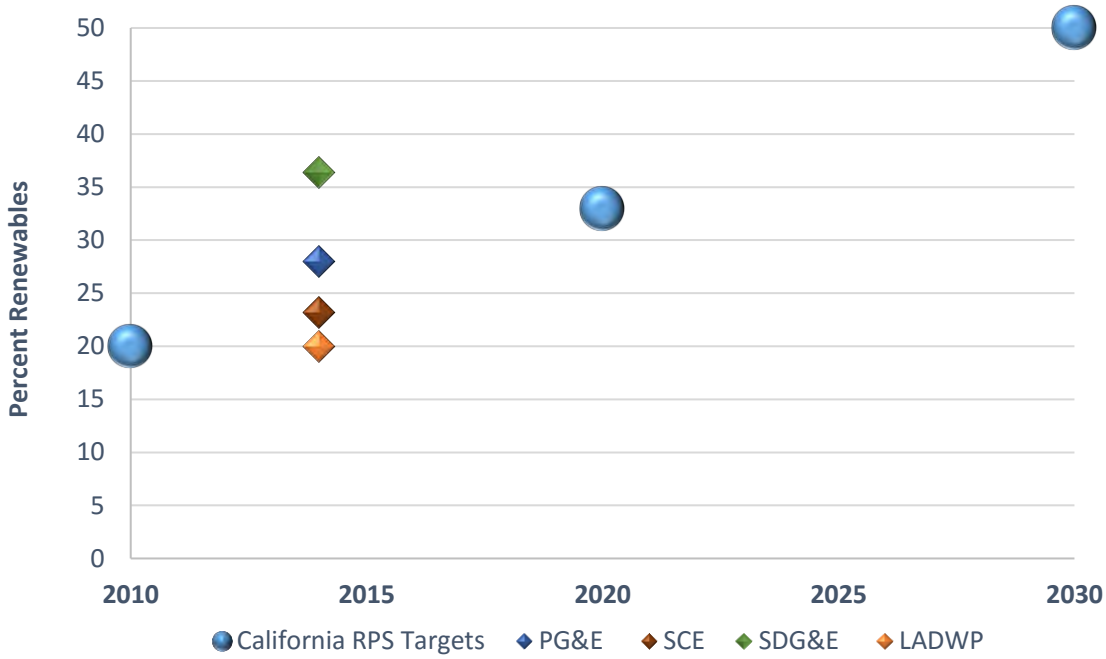


FIGURE 10-15
INCREASINGLY STRINGENT RENEWABLE PORTFOLIO MANDATES FOR CALIFORNIA AND THE LATEST PERCENTAGE OF RENEWABLES AT THE THREE LARGEST INVESTOR OWNED UTILITIES AND ONE PUBLICLY OWNED UTILITY PROCURED TO MEET THE RENEWABLE MANDATES (SOURCE: CPUC BIENNIAL RPS UPDATE JAN. 2016) (SOURCE: *CEC UTILITY ANNUAL POWER CONTENT LABELS*)

As higher levels of renewable resources power the electrical grid, flexible grid resources, such as energy storage, must be integrated to accommodate the inherent intermittency and over-generation issues. It is anticipated that California will meet the majority of its 33 percent and 50 percent RPS requirements with additional solar and wind resources. The addition of large amounts of solar is predicted to result in over-generation during periods of peak sunlight, as shown in Figure 10-16, primarily in the fall and spring.

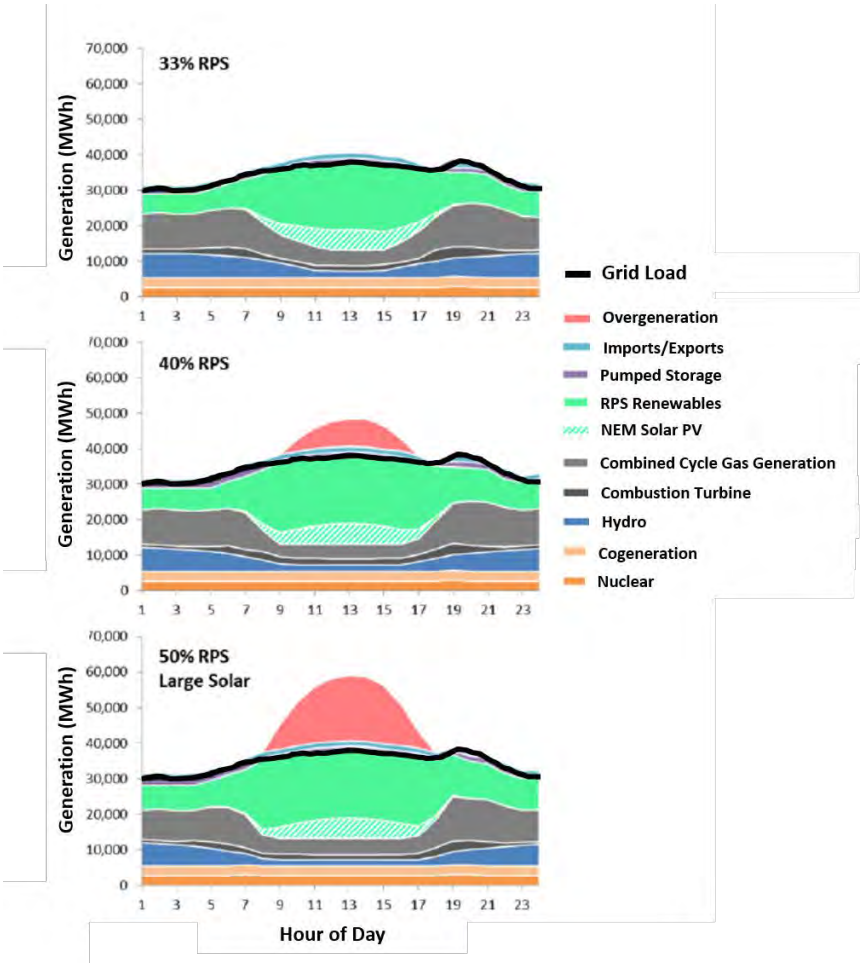


FIGURE 10-16
GRID LOAD RELATIVE TO GENERATION RESOURCES. POWER OVERGENERATION OCCURS WITH HIGHER PERCENTAGES OF RENEWABLES FROM SOLAR AND WIND. THE 50% RPS LEVEL ASSUMES 25% SOLAR AND 15% WIND. ***(Energy and Environmental Economics, 2015)***

A reliable grid must match load demand with generation supply on a second-by-second basis. Over-generation and the intermittency of renewable power resources create challenges for maintaining this stability. Therefore, the California Independent Operator (CAISO) is initiating procedures to accommodate increasing amounts of solar generation and other renewable power. Figure 10-17 shows the net load profile (net load = total grid load – renewable generation) that traditional generation resources must provide in future years as more solar and wind energy resources are added. Referred to as the "Duck Curve" due to its shape, this illustration of net load shows that adding more solar generation to the grid requires generation from other energy sources to significantly decline or idle during peak daylight hours. However, these conventional generating resources must be able to quickly ramp up to balance renewable power generation intermittency and provide power demand ramping rates as solar resources decline at day's end. Currently, gas turbine power plants and synchronous condensers are used to meet the supply interruptions associated with renewable power generation. The reliance on these fossil fuel resources to bridge these interruptions negates some of the GHG and criteria emissions benefits achieved from using clean renewable power resources.

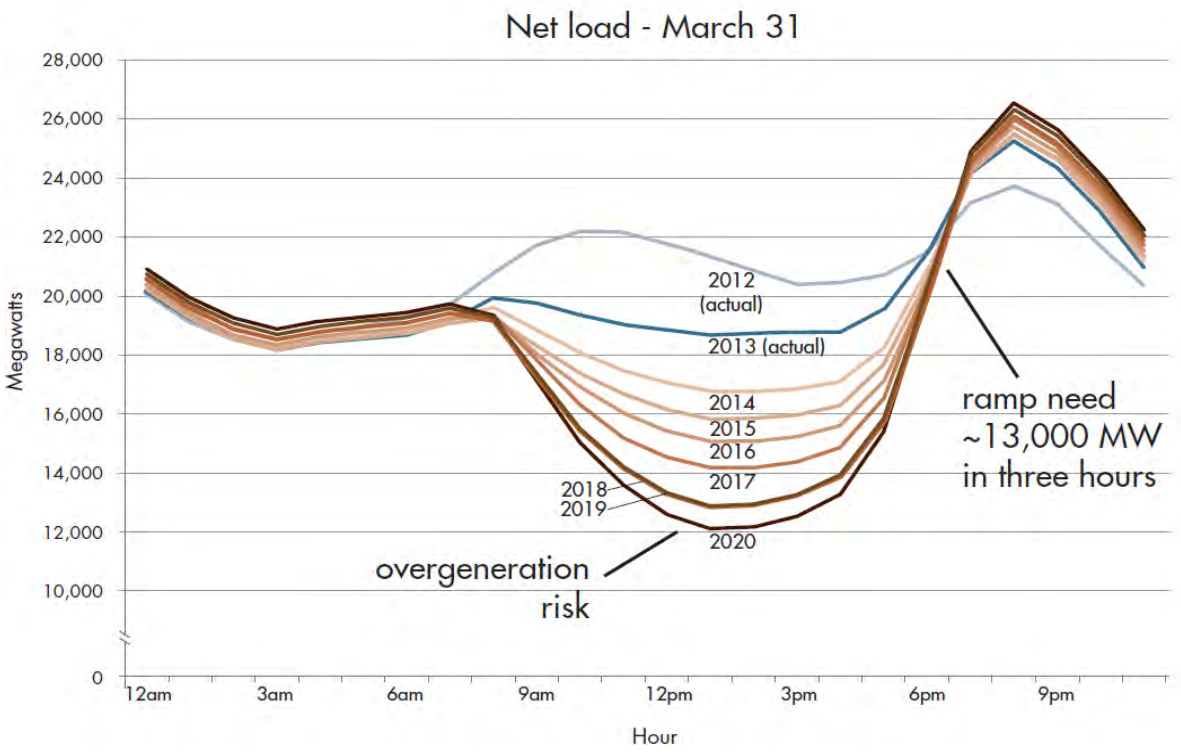


FIGURE 10-17
"DUCK CURVE" REPRESENTS THE NET LOAD FROM FLEXIBLE GENERATION SOURCES THAT CAISO MUST BALANCE ON A TYPICAL SPRING DAY. THE NET LOAD SUBTRACTS THE VARIABLE RENEWABLE GENERATION FROM THE END USER DEMAND. ***(CAISO, 2016)***

Enhanced Regional Collaboration

Linking the electrical grids operated by CAISO with the electrical grids managed by neighboring states' grid balancing authorities can utilize larger amounts of renewable resources while providing greater reliability and lower energy costs (Energy and Environmental Economics, 2015).

In 2014, CAISO developed a platform for an Energy Imbalance Market (EIM). Initially, the EIM was a collaboration with CAISO and grid operator PacifiCorp. The EIM was developed to increase grid operational efficiencies by (1) providing coordinated planning efforts and renewable resource development; and (2) providing a mechanism to export excess renewable power and import renewable power during periods of over-generation or high load needs. However, CAISO was not allowed to fully participate in the EIM until the passage of SB 350, which permitted CAISO to operate as a regional organization with authority outside of California.

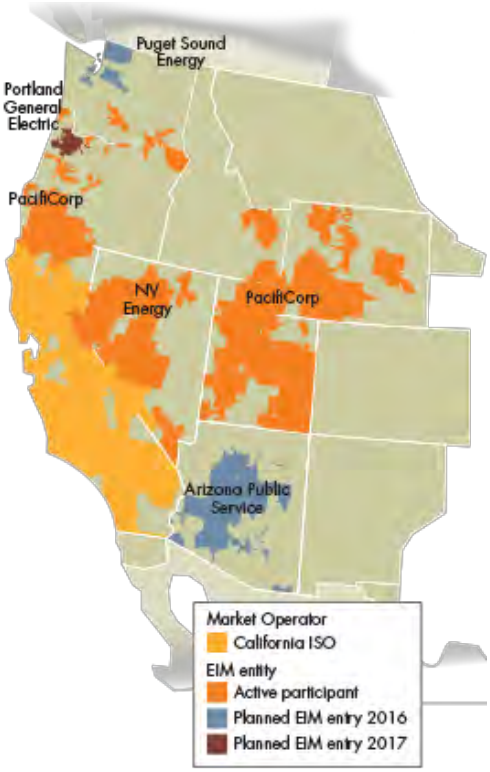


FIGURE 10-18
ENERGY IMBALANCE MARKET (EIM) PARTICIPATION ***(CAISO, 2016)***

The EIM is facilitating the utilization of renewable resources available in each territory by the other territories. Because these renewable resources vary based on local and sub-regional weather patterns and generation technologies, the over-generation from these resources in their "home territory" can be used to supplement and balance electrical loads in the other territories (see Figure 10-18). For example, the Pacific Northwest has large amounts of wind and hydropower resources. These resources can be used to balance the intermittency of solar power generation in California along with providing renewable resources for peak evening electrical loads. Because grid load profiles vary throughout the day and the grid operators are located in different time zones, the exchange of power resources within the EIM helps to accommodate these load profile variations. Finally, the ability to tap into the more abundant EIM system resources can support the high ramp rates shown in Figure 10-17 and Figure 10-19. Other grid balancing authorities in the western United States have joined the EIM and more are planning to join (Energy and Environmental Economics, 2015). While the EIM market is still relatively new, CAISO will need to avoid the import of coal and other fossil fuel energy resources

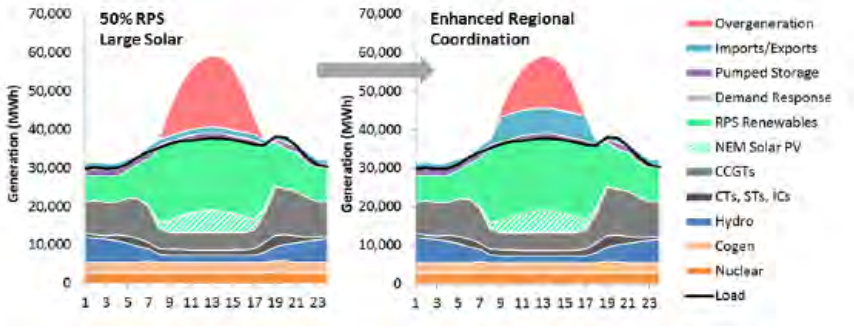


FIGURE 10-19
GRID LOAD WITH AND WITHOUT ENHANCED REGIONAL COORDINATION (*ENERGY AND ENVIRONMENTAL ECONOMICS, INC, 2014*)

utilized by some participating authorities in order to avoid jeopardizing the RPS targets for California.

Increasing Grid Flexibility through Advanced Demand Response and Energy Efficiency Measures

The two most cost-effective ways to avoid the expense of adding power generation and new infrastructure are to increase energy efficiency and to improve grid load management (Rosenfeld, 2009). The avoided use of energy through efficiency measures has been termed "negawatts" by Amory Lovins of the Rocky Mountain Institute (Economist, 2014).

Two of the greatest advantages of implementing energy efficiency measures are that benefits are cumulative and long-lasting.

The California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) have established building efficiency and appliance efficiency standards that became progressively more stringent. California Code of Regulations, Title 24 building efficiency standards, have increasingly strengthened efficiency requirements for new buildings since their adoption in the late 1970's. The target for new Title 24 standards is zero net energy consumption for new residential construction by 2020 and zero net energy consumption for newly constructed commercial buildings by 2030. The Title 24 building energy standards coupled with State and national appliance energy standards have helped keep per capita energy consumption in California stable and well below national levels since the late 1970's, (shown in Figure 10-20) along with reducing the need for 12,000 MW of new power generation (Rosenfeld, 2009).

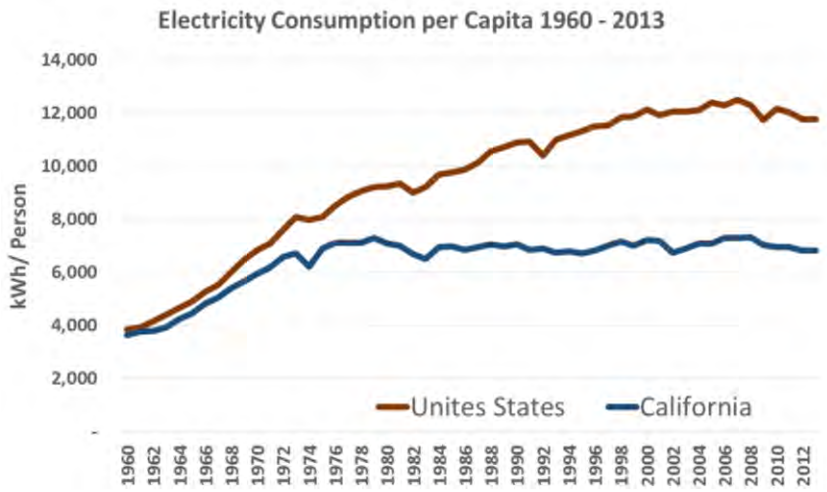


FIGURE 10-20
PER CAPITA ELECTRICITY CONSUMPTION OVER TIME FOR CALIFORNIA AND THE UNITED STATES

Improving the energy efficiency of existing buildings is a huge opportunity to realize additional energy reductions. In Southern California, 64 percent of residential homes were built prior to the adoption of the first Title 24 energy standards (SCAQMD, 2015). Ratepayer programs administered through the CPUC provide rebates for efficiency improvements in existing buildings. While these improvements drive down energy demand, the incentives to perform these retrofits are often not utilized. This is due to barriers to performing efficiency retrofits such as expensive upfront capital costs; lack of awareness of the incentives; the complexity of the retrofit projects; and, the split incentive issue associated with rented buildings whereby retrofit costs are borne by building owners but the benefit of lower energy bills is realized by tenants. The U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, has compiled key resources to help overcome some of these obstacles. In addition, California established a target to double the energy efficiency of existing buildings by 2030 with the adoption of the Clean Energy and Pollution Act of 2015 (SB 350) targets. This will help spur energy efficiency retrofits, as well.

The highest electrical loads generally occur during hot summer days when air conditioner usage spikes. The additional demand is largely met with the power produced by peaking fossil fuel generation units ("peaker plants"). These generation units typically operate with 10 percent utilization rates; therefore, have lower generation efficiencies to help lower capital costs. Since peaker plants operate infrequently, these generating resources often do not utilize the most fuel efficient generating technologies such as incorporating heat recovery steam generators.

To help limit the use and need for additional peaker plants, electrical utility pricing structures help reduce usage during peak periods by employing time-of-use rates. Time-of-use rates increase during peak demand periods, and thus act as a monetary incentive to curtail demand during peak periods. Rather than match grid load demand with additional generation, decreasing end use demand through demand response programs can help change load profiles. Demand response programs incentivize end-use customers to reduce or shift their electricity usage during peak usage demand periods. New technologies such as Wi-Fi enabled thermostats, controllable electric water heaters which can also pull power from the grid to be used as energy storage, and smart phone app-based products, are making load management easier to implement for both utilities and consumers.

As electric vehicles (EVs) become more prevalent, vehicle charging will become an important grid management tool. Intelligently integrating electric transportation charging technologies with the electrical grid is an effective way to provide grid resources. Many EV charging site hosts already have the ability to manage power flows based, in part, on electricity pricing and demand response, allowing the utility to send a signal to customers to cut back on loads during high peak grid demand. Future grid services tied to EV charging are anticipated to include bi-directional power flows, frequency response, and voltage support to enhance grid stability and storage capacity.

Increasing Grid Flexibility through Energy Storage Technologies

The energy landscape is rapidly evolving due to declining costs for generation equipment and the development of new technologies that provide grid and behind-the-meter support services, including energy storage systems.

As discussed above, renewable generation technologies are now well established and cost-effective; however, the technologies that provide ancillary services and grid support to fully integrate renewable power into the grid are still evolving. Renewable power resources are variable. This means that renewable resources may generate more power than is immediately necessary to meet demand, resulting in the need to block and thus lose the excess power from reaching the electrical grid. Another option is to store the additional energy supply. Energy storage technologies help to balance over-generation by storing excess power for later use (Figure 10-21), and by storing energy generated during weak demand periods so that it can be used during peak periods (Figure 10-22). Using energy storage technologies in large grid-scale applications along with smaller behind-the-meter energy storage systems provide flexible resources that reduce reliance on fossil-based generation plants.

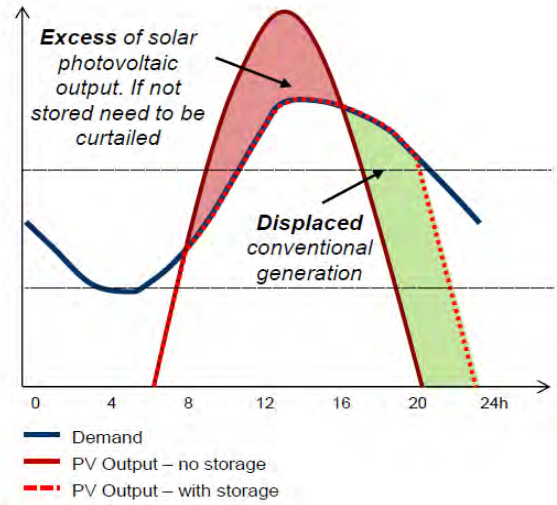


FIGURE 10-21
USE OF STORAGE TO MATCH TO RENEWABLE GENERATION AND STORE THE EXCESS SOLAR POWER FOR LATER PERIODS ***(SBC Energy Institute, 2013)***

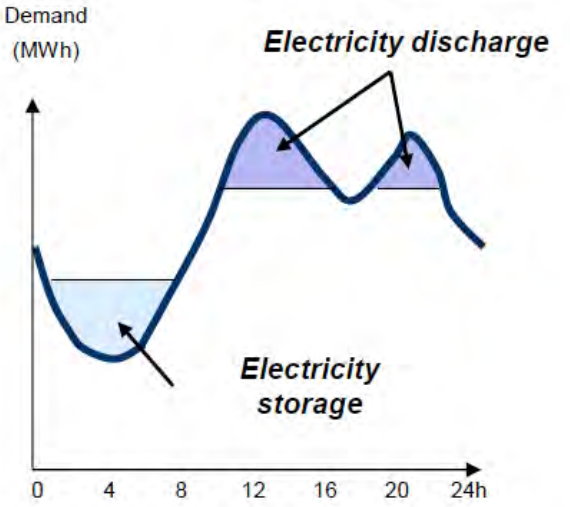


FIGURE 10-22
EXAMPLE USING STORAGE TO HELP BALANCE ELECTRICAL LOADS FOR END USE ELECTRICITY CUSTOMERS. ELECTRICITY IS STORED DURING LOWER DEMAND PERIODS AND DISCHARGED DURING PEAK USAGE PERIODS. USING STORAGE IN THIS MANNER TAKES ADVANTAGE OF LOWER ELECTRICITY RATES TO PROVIDE POWER AT HIGHER RATE PERIODS. ***(SBC Energy Institute, 2013)***

Energy storage systems can utilize different physical processes including thermal, mechanical, electrochemical, and chemical technologies, as shown in Table 10-1. Each storage technology has properties that can provide different types of support services based on their energy storage capacities, discharge rates, and ability to perform other ancillary services such as frequency regulation and voltage support.

TABLE 10-1
STORAGE TECHNOLOGIES GROUPED BY PHYSICAL PRINCIPLES

Mechanical Storage	Thermal Storage	Electrical Storage	Chemical Storage "Power to Gas"
-Pumped hydro	-Hot-water storage	-Supercapacitors	-Hydrogen
-Compressed air	- Molten salt	-Sodium-sulfur batteries	-Synthetic natural gas
-Flywheel	-Ice and chilled water	-Lithium ion batteries	-Methanol
		-Vanadium redox-flow batteries	-Synthetic diesel

Each storage technology has advantages and disadvantages with applications for transmission, distribution, and behind-the-meter power needs. Disadvantages of different storage technologies include costs, discharge rates, ease of installation, and maturity of the technology. Different storage types provide options for different applications, such as long term storage, reactive power, and peak shaving.



FIGURE 10-23
PAST ENERGY STORAGE DEPLOYMENTS IN U.S BY SECTOR UP TO 2014 AND FUTURE MARKET ESTIMATES TO 2019. FROM 2014 TO 2015 THE MARKET IS ESTIMATED TO HAVE INCREASED BY 185 PERCENT. (SOURCE GREEN TECH MEDIA RESEARCH)

Electricity pricing structures that promote load balancing and State mandates to increase the amount of renewable energy generation are driving the market for energy storage systems, a market that is projected to grow to $50 billion by 2020. Many energy storage technologies, such as compressed air and power-to-gas technologies, are still under development. However, other energy storage systems, such as lithium batteries, are currently being marketed for behind-the-meter commercial and residential applications as well as large grid applications. Energy storage can be used to lower peak consumption, which reduces load demand charges. Currently the North America cost break-even point for adding battery storage systems for customers paying demand charges is around $9 per kilowatt and is expected to drop to $4–5 per kilowatt by 2020 as battery prices continue to drop (McKinsey&Company, 2016).

Grid-level Energy Storage

Grid-level storage systems are the largest energy storage systems. They typically must be at least 1 MW in order to provide useful service at a grid scale, as shown in Figure 10-22. These systems can replace certain peak generating resources (Figure 10-23). This is important from an efficiency standpoint; peak generating resources typically have low utilization rates with flexible generating ranges that are less than total capacity due to idling requirements. In addition, peaker plants are only brought online to meet high peak demand; they sit dormant for most of the year. Battery storage systems would provide numerous valuable grid resources beyond periods of peak demand.

Cost has been a limiting factor in considering a grid storage system over natural gas peaking generation; however, prices for battery storage systems are dropping rapidly with declining battery prices (GTM Research, 2016). In addition, the system controls for grid energy storage are more dynamic than for peak generating resources. In order to ensure the energy stored can meet anticipated demand, the amount of energy storage within the system, discharge rates, and length of discharge, requires a different level of monitoring than peak generating resources. However, more widespread utilization of grid

energy storage systems will soon take place because of new regulations. Under the AB 2514 energy storage mandate, utilities are required to install 1.3 GW of storage within their electrical grids in California. Many of the large power generating companies have already embraced grid-level storage systems, and thus are beginning to help local utilities meet their AB 2514 requirement.



FIGURE 10-24
5 MW GRID LEVEL BATTERY STORAGE USED ON UC SAN DIEGO MICROGRID

Grid storage technologies include molten salt thermal storage coupled with large solar thermal generating plants and large lithium battery container installations, as shown in Figure 10-22. An emerging grid storage technology is vanadium-redox-flow batteries; this system has large storage capacities, a long lifetime, and lower costs but must operate at high temperatures.

Another emerging technology for longer-term storage is "power-to-gas" which consists of energy storage by converting electrical energy to chemical energy in the form of hydrogen. As previously mentioned, the integration of increasingly higher percentages of solar renewable energy into the grid will result in periods of electricity over-generation. Hydrogen gas can be generated during those periods of excess power through electrolysis of water, addressing renewable intermittency and excess electricity generation. This hydrogen can be used to produce natural gas and liquid fuels, can be converted back to electricity through clean combustion and fuel cells, or used for transportation by vehicles and by fossil fuel-powered electrical generation plants. Additionally, the hydrogen produced renewably through this process may eventually be blended with natural gas and added into the existing distribution pipeline infrastructure. Today, within California, hydrogen is mainly produced through steam reformation of hydrocarbons, primarily methane. However, the reformation process emits CO_2 as a byproduct. The use of electrolysis coupled with solar renewable energy provides a zero-emission hydrogen production solution. Other renewable sources would include steam-reformed biogas and biomass. Together with avoiding renewable energy curtailment, power-to-gas systems can help provide grid stabilization with renewable resources along with long term energy storage.

Hydrogen can be converted back to electricity using stationary fuel cells which have different characteristics compared to conventional power plants, allowing them to better complement the integration of renewable resources and the need to balance variability. The efficiency of conventional thermal power plants decreases when plants are operated at less than design output, thus increasing emissions. In contrast, stationary fuel cells can be operated at lower generation outputs with further increases in efficiency. Moreover, stationary fuel cells, contrary to conventional fossil based plants, have high efficiencies even at small scales. This characteristic makes for a more interesting option to support distributed power generation.

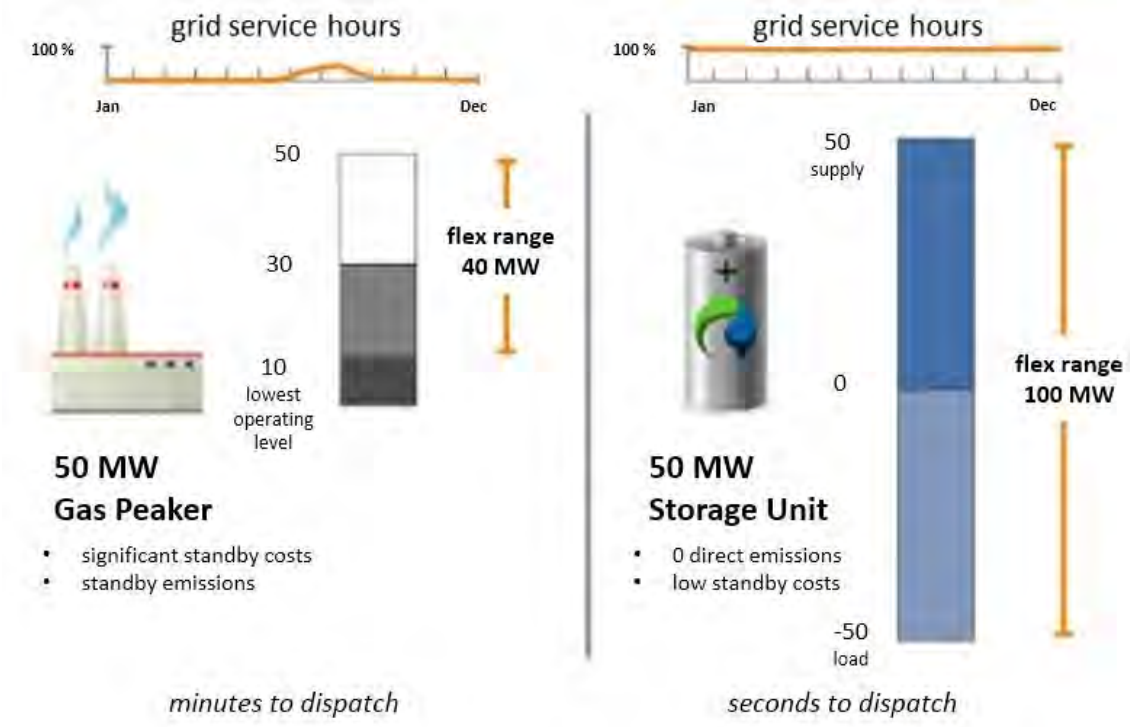


FIGURE 10-25
COMPARISON OF USING GRID STORAGE IN PLACE OF PEAKING GENERATION UNITS ***(Adapted from Greentech Media, 2016)***

Residential and Commercial Storage

Residential and commercial energy storage systems installed "behind the meter" (i.e., on the building owner's side of the meter) are becoming popular because they can decrease peak demand electrical utility costs, provide backup power, and be used as off-grid systems.

A portion of the utility rates for large commercial sites are typically set during the highest 15-minute peak power consumption during a billing cycle. In addition, many utility charges are adjusted seasonally during peak electrical demand periods. These so-called "high demand charges" have prompted the use of energy storage systems to reduce the highest peak power loads. This is known as "peak shaving" (see Figure 10-20). Under this application, electricity is pulled from the grid during low demand periods, when rates are also typically lower. The energy is stored so that it can later be used during the highest rate periods. Many commercial energy storage companies are installing systems at no cost to facilities that are subject to high demand rates. Under these installations, the electrical cost savings are shared with the storage owner/installer and the site. These arrangements are often referred to as Power Efficiency Agreements (PEAs), and are similar to the Power Purchase Agreements (PPAs) offered by many solar installers. Residential energy storage systems are being used in a similar manner because many California residences are subject to time-of-use rates that vary with peak electrical loads.

Although the market for residential and commercial energy storage systems is still in its infancy, as shown in Figure 10-21, the development of storage technologies for residential and commercial applications is beginning to grow quickly. Increases in electricity rates, coupled with declines in energy storage and

solar power prices, are creating an economic driver for new energy storage system installations. Another reason is the ease with which residential storage systems can be installed, e.g., by simply plugging into an existing wall outlet.

To meet this nascent demand, both established companies and startups are starting to offer energy storage products. Many of the startup companies are focusing on how these storage systems, when coupled with distributed power generation from solar, give the consumer the ability to manage their own energy system. In the near future, combining an energy storage system with on-site solar generation could make tying in to the electrical grid optional for some consumers (Rocky Mountain Institute, 2014). Whether many residences and commercial sites decide to unplug from traditional utility service will likely depend on how the utilities rates are structured and the cost to keep grid connections for unforeseen circumstances.



FIGURE 10-26
TESLA 'POWERWALL' HOME BATTERY

Biogas

As long as traditional power generation plants remain operational and utilize fossil fuels as source energy, the natural gas they use should come from renewable resources, when possible. In the Basin, the waste streams from wastewater treatment plants, dairies, and landfills can be utilized to generate renewable biogas. Generating biogas from these waste streams can, in some instances, reduce emissions from these facilities. Additionally, the biogas can be used by conventional power generating plants, by the transportation sector, and by commercial and residential end users while counting toward renewable mandates. Sourcing biogas from within the Basin can provide new fuel supplies that decrease reliance on existing infrastructure. There is a high potential for biogas production in the Basin, with the four county region representing slightly over 50 percent of the State's biogas availability from landfill gas and waste water treatment plants (CEC PIER Program, UC Davis, 2015). If the energy potential from biogas is developed the resulting natural gas could supply an estimated 7 percent of the Basin's natural gas consumption in 2012 and 8.5 percent of the consumption in 2023.

Policy and Regulation Changes Along with Developing New Power Markets

The electrical power industry is undergoing the most rapid change in a century since the invention and development of electrical utility grids by Thomas Edison and Nicola Tesla. As shown previously in Figure 10-11, the price of solar panels has dropped significantly over time and is expected to continue. As distributed renewable energy becomes more widely available and less costly, the electrical utilities, CAISO, and regulatory agencies will need to develop regulatory mechanisms to incentivize and integrate these resources into the grid and allow the delivery of multiple grid services, such as energy generation, energy storage and voltage support (Solar City Grid Engineering, 2016). To accommodate larger amounts of distributed renewable energy on the grid, many of the rules governing utility markets will need to be amended to allow for additional storage, EV integration, and other flexible resources. Using distributed renewable energy as an infrastructure resource by the utilities will enable a more dynamic and flexible power system than the traditional centralized energy generation system of the past.

To allow for the participation of distributed renewable energy resources in the wholesale energy market, CAISO is developing the Distributed Energy Resource Provider (DERP) market. The DERP market would allow multiple smaller energy resources to be aggregated, and then participate as a single entity in the wholesale power market. The DERP market could provide opportunities for large microgrids, such as those run by universities, to sell power back to an investor-owned utility (IOU). In addition, large buildings such as warehouses could be aggregated together, thus becoming a significant source of power generation.

As a larger percentage of distributed renewable resources power the grid, the need increases for ancillary services such as energy storage and voltage support. For example, the shutdown of the San Onofre Nuclear Generating Station (SONGS) created a significant need for voltage support and reactive power (VAR) in South Orange County. Renewable energy resources typically have smart inverters giving them the ability to provide ancillary services. However, these ancillary services are currently prohibited under CPUC Rule 21. Amending Rule 21 to allow smart inverters to provide ancillary services is currently under review. This opens up the possibility of additional grid ancillary service markets for energy storage; EV charging and storage; and distributed generation.

These changes in energy management could allow further penetration of distributed renewable resources into the energy market without the need for large centralized generation facilities. Some utilities are looking to utilize distributed renewable energy as infrastructure resources in their infrastructure planning needs assessments. For example, SCE perceives distributed renewable resources as large-scale infrastructure solutions within their Preferred Pilot Resources program (Southern California Edison, n.d.).

Southern California's Energy and Air Quality Future

Southern California's energy market has undergone three transformative events within the last two decades: the California Energy Crisis in 2000; the shutdown of the SONGS in 2012; and, the Aliso Canyon natural gas storage leak in 2015 and 2016. While the energy infrastructure in the Basin has proven resilient enough to continue providing power to millions of end-users, these unplanned events have demonstrated the vulnerabilities of traditional centralized generation in an urban region. Encouraged by technical innovation and the declining costs of renewable resources, current planning efforts are now putting a greater focus on the development of distributed renewable energy resources and their essential supporting technologies, along with the continued implementation of efficiency measures.

The development and implementation of distributed energy resources and new technologies, along with heightened energy-efficiency efforts, provide multiple benefits in the Basin. These benefits include criteria and toxic emission reductions, GHG reductions, a resilient energy infrastructure, and significant economic benefits. These economic benefits are achieved, in part, through increased energy diversity; reduced energy costs; jobs for system installation and retrofits; and the creation of new businesses focused on clean technology innovation and production.

In addition to developing a more resilient energy infrastructure and becoming increasingly reliant on renewable resources to power the electrical grid, the transportation sector must also be transformed in order to attain healthful air quality levels standards in the Basin. Transportation and goods movement are the largest energy-consuming sectors in the Basin and employ many of the oldest technologies. Internal combustion engines utilize only 20 percent to 30 percent of the energy content in gasoline or

diesel for mobility; the remaining energy is lost primarily to waste heat. Increased efficiency within the transportation sector would provide a multitude of benefits.

The light-duty transportation sector is subject to several efficiency regulations that dictate fleet fuel efficiency requirements. These regulations include federal fuel-efficiency mandates, Pavley standards, and a State of California Executive Order target to have 1.5 million electric cars on the road by 2025. The technology transition to efficient light-duty vehicles such as hybrids, plug in hybrids, EVs, and fuel cell vehicles is well underway. Incentives available from California and the federal government have resulted in the purchase of 196,500 plug-in hybrids, 106,000 EVs and 635 fuel cell vehicles in the State since 2011 (Plug-in Electric Vehicle Collaborative, n.d.) (Hybrid Cars, n.d.) (California Air Resources Board, 2016); one of the top selling vehicles in California is the Toyota Prius hybrid. While these numbers are relatively small compared to overall vehicle sales, some industry analysts are predicting that the adoption of these vehicles may follow an "S" curve adoption rate much like cell phones and computers, as illustrated in Figure 10-29. Supporting these sales projections are declining battery prices, increased range, and less frequent maintenance requirements (Randall, 2016). An indication that EVs may start to show significant sales volumes and follow the "S" curve adoption rate is the 400,000+ (as of April 28, 2016) reservations for the Tesla Model 3 immediately following its recent announcement on March 31, 2016. If sales are completed, this model alone would quadruple the number of pure EVs on the road in the next 18 months.



FIGURE 10-27
TOYOTA MIRAI ***(Toyota, 2016)***



FIGURE 10-28
TESLA MODEL 3 ***(Tesla Motors, 2016)***

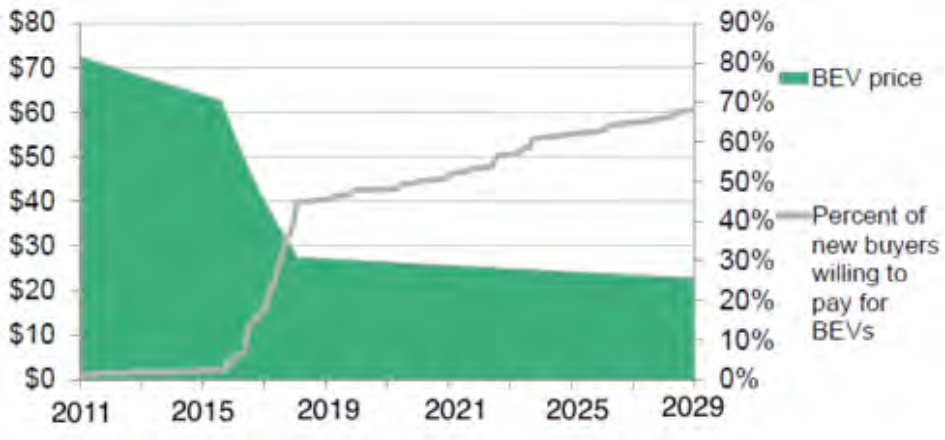


FIGURE 10-29
FORECASTED ADDRESSABLE (AVAILABLE) MARKET FOR BATTERY EV'S WITH 200-MILE RANGE IN RELATION TO BATTERY EV PRICE DECLINES (BATTERY EV PRICES IN THOUSANDS $) (SOURCE: BLOOMBERG NEW ENERGY FINANCE)

The source energy used by the transportation sector (e.g. gasoline, diesel) has historically differed from the source energy used by stationary sources (e.g. natural gas, electricity). Therefore, the transportation

fueling infrastructure has operated largely independent of the electrical grid. With anticipated widespread adoption of EVs, a large part of the transportation sector will tap into the electrical grid to supply its energy needs. In order to accommodate the acceleration of EV sales and the resultant vehicle charging requirements, the electrical grid must become more dynamic. As the grid adapts to accommodate additional power needs, there is an opportunity to strengthen its resiliency by utilizing EV battery storage. As discussed above, EVs can help control grid loads with strategic charging. When renewable resource over-generation occurs, EVs can pull power from the grid and store this energy in their batteries. Using EV charging as a grid service could be more widely implemented to take advantage of the many potential benefits.

As of July 2016 California had 20 retail hydrogen fueling stations with 14 of those stations located in the Basin, including one at the SCAQMD headquarters in Diamond Bar. Additional infrastructure will have to become available to keep up with anticipated demand and to have a robust network of fueling stations. A complete network of fueling stations will boost vehicle manufacturing, reduce industry risk while lowering cost with economies of scale, and encourage the commercialization of fuel cell vehicles such as the Toyota Mirai, Honda Clarity, and the Hyundai Tucson. The emissions associated with the production of hydrogen for transportation could be mitigated by using renewables such as solar or even steam-reformed biogas instead of the currently used steam reformation of hydrocarbons. SB 1505 (Lowenthal, 2006) mandates that once annual throughput reaches 3,500 metric tons, no less than 33.3 percent of the hydrogen produced or dispensed in California must be from renewable energy resources. Compliance with this mandate will enhance the emissions benefits of fuel cell vehicles. The National Renewable Energy Laboratory 2014 study identified both Los Angeles and Orange Counties as some of the top 5 areas in the U.S. with net availability and potential for hydrogen from waste water treatment plants and landfills.

Transformation of the Energy Sector

The path forward to achieving cleaner air and mitigating climate change requires the continued transformation of the energy sector. The past model of simply adding centralized power generation to accommodate electrical loads is becoming less cost-effective and potentially obsolete. This transformation will include integrating additional renewable resources into the electrical grid; the widespread adoption of zero emission vehicle technologies; the development and implementation of energy storage technologies; increased energy efficiency measures; the use of alternative low-emission fuels; and, the launch of new energy markets to ensure these new technologies flourish. To encourage this transformation and maximize its co-benefits, SCAQMD will engage in the following activities:

- ***Coordinate planning, technology demonstration, and incentive program efforts*** – Agencies such as CEC, CPUC, U.S. EPA, CARB, SCAG, SCAQMD, CAISO, and local agencies leverage their efforts by working together on planning and regulatory efforts. Regulation and action by one agency can potentially conflict with the planning, regulatory and incentive efforts of other agencies. In addition, agencies working in collaboration with the local ports, utilities, and Original Equipment Manufacturers (OEMs) can identify and undertake technology demonstration projects prior to widespread implementation. Working together can better identify and implement incentive-funding programs that help the transition to newer technologies.

- ***Establish Workgroup to Assess Life-Cycle Emissions –*** In assessing technologies for stationary sources, the SCAQMD will convene a workgroup to assess the in-basin life-cycle criteria pollutant emissions related to energy use from technologies and/or other activities such as efficiency improvements. This assessment, in part, will include future energy scenarios that are anticipated as more renewable resources are incorporated into the energy usage within the Basin. The assessments will consider emissions associated with energy time-of-use, impact of higher efficiencies, fuel switching, and future energy and regulatory markets. In addition, the assessments will consider life-cycle GHG emissions, potential toxic impacts or benefits, and utilize experts and materials from other government agencies and universities.
- ***Provide technical and project assistance*** – The SCAQMD in collaboration with other agencies, utilities, OEMs, and stakeholders are able to provide technical assistance to those wishing to implement distributed energy resources, efficiency measures, or new transportation technologies and infrastructure. In addition to providing technical assistance, SCAQMD can help make available incentive programs, tax credits, rebates, credit markets and other financial tools to help project managers leverage funds from multiple sources to assist with infrastructure costs.

- ***Schedule for infrastructure and technology needs*** – Implementing more efficient mobile source technologies will require that the supporting energy infrastructure can accommodate their use. SCAQMD must continue to coordinate with other agencies and utilities on the implementation of transportation infrastructure that accommodates mobile source technologies.

- ***Collaborate and participate in national and international partnerships*** – Working collaboratively with other state, national, and international entities on air pollution reduction efforts, including the development of new technologies to assist in this effort, will leverage information and programs, and transfer knowledge on successes and lessons learned.

- ***Evaluate biogas*** – The technologies to produce biogas from waste streams within the Basin should continue to be further reviewed and coordinated with State agencies that are implementing measures to achieve renewable and waste stream diversion mandates.

- ***Study the "climate penalty"*** – Future climate impacts on air quality must be further studied, taking into account scenarios regarding future projected temperatures, local and global emissions, and weather extremes. The SCAQMD should continue to work with other agencies and researchers to further understand and monitor climate change impacts on air quality.

- ***Integrate a variety of implementation approaches in collaboration with other agencies with focus on the air quality benefits from GHG reduction measures such as renewable energy, smart grid technologies, and efficiency*** – This AQMP is incorporating several control measures to account for criteria pollutant co-benefits from federal, State and local mandates and programs to reduce GHG emissions, increase energy efficiency, along with renewable power sources. These control measures include ECC-01 and ECC-02 which account for co-benefits of greenhouse gas, efficiency, and renewable energy mandates such as AB 32, SB 32, SB 350 and Title 24. Furthermore, control measure ECC-03 will pursue incentive programs to accelerate the

implementation of onsite renewable energy, solar thermal, efficiency measures, along with smart grid applications.

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Chapter 11

Public Process and Participation



The participation of stakeholders and the general public during the development of the 2016 AQMP provided critical feedback and guidance in the development of the control strategy.

In This Chapter

- Introduction 11-1
  Overview of the public process for the development of the 2016 AQMP
- Outreach Program 11-2
  The various avenues for communication and public outreach

- Outreach Activities 11-6

  Specific 2016 AQMP outreach activities

Introduction

The development of the 2016 AQMP has been a regional multi-agency effort including the SCAQMD, CARB, SCAG, U.S. EPA, and other entities. The Plan includes control strategies to demonstrate attainment with various ozone and PM2.5 NAAQS by specified deadlines; it incorporates the latest scientific and technological information and planning assumptions, including SCAG's 2016 Regional Transportation Plan/Sustainable Communities Strategy and updated emission inventories and modeling methods.

A 2016 AQMP Advisory Group was formed to provide feedback and recommendations on the development of the plan, including development of policy and control strategies. The Advisory Group represents a diverse cross section of stakeholders, such as large and small businesses, government agencies, environmental and community groups, and academia. In addition, a Scientific, Technical, and Modeling Peer Review (STMPR) Advisory Group convened to make recommendations on air quality modeling, emissions inventory, and socioeconomic modeling and analysis. Both Advisory Groups met periodically, sometimes monthly, throughout the AQMP development process and those meetings have been open to the public. There has also been ongoing close coordination between U.S. EPA, CARB, SCAG and SCAQMD staff on all elements of AQMP development.

Leading up to the development of the 2016 AQMP, SCAQMD staff in conjunction with stakeholders prepared 10 white papers on key topics to provide technical background, a policy framework for the AQMP, and better integration of major planning issues such as air quality, transportation, climate, energy, and business considerations.



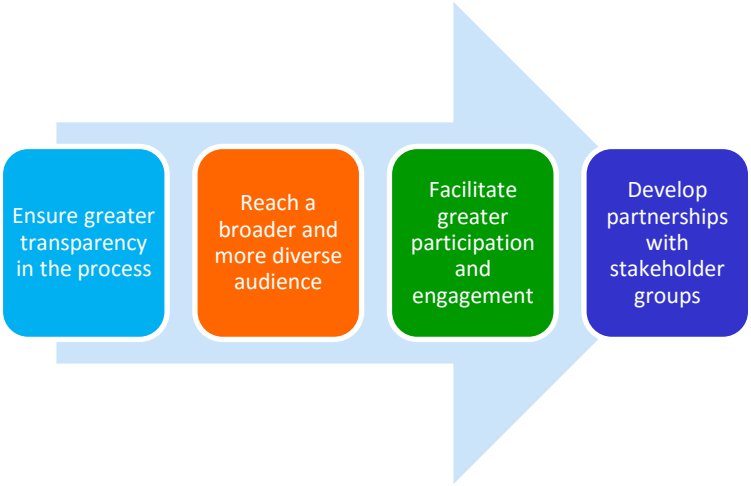
FIGURE 11-1
2016 AQMP WHITE PAPERS

These white papers were intended to assist the public, stakeholders and the SCAQMD staff to better understand key facts and policy issues related to the development of the 2016 AQMP. Each White Paper had an associated Working Group that generally met monthly until the White Paper was completed. All working group meetings were open to the public. The 2016 AQMP Advisory Group members and recommended technical experts voluntarily participated in White Paper Working Group meetings. Many of the findings, recommendations, and conclusions in the white papers have been integrated into the 2016 AQMP. Final versions of all 10 white papers are available online at

http://www.aqmd.gov/home/about/groups-committees/aqmp-advisory-group/2016-aqmp-white-papers.

Outreach Program

The 2016 AQMP Outreach Program is designed to go beyond traditional Advisory Group meetings, public workshop, and public hearing opportunities in order to more broadly disseminate information and engage a wider range of stakeholders. The approach aims to achieve multiple goals including ensuring greater transparency in the process, reaching a broader and more diverse audience, facilitating greater participation and engagement, and developing partnerships with stakeholder groups.



The outreach approach has been designed to inform the policy discussion by helping to ensure that all stakeholders have access to a common set of facts, are aware of the State and federal requirements, and have appropriate background information to engage in meaningful dialogue on the AQMP.

The clean air goals in the 2016 AQMP will not be achieved solely by the actions of the SCAQMD. The proposed control strategy will require participation from affected businesses, local communities, and multiple government agencies. Achieving the mutual goals of protecting public health, providing environmental equity and promoting robust and sustainable economic development can only be accomplished through strong partnerships. Thus, it is critical to inform and engage a wide range of stakeholders on the goals, requirements, approach, and potential impacts of the 2016 AQMP.

Stakeholders for the 2016 AQMP include community members, businesses, trade associations, environmental organizations, health advocates, academia and local, regional, state and federal government entities. Table 11-1 lists specific stakeholder groups participating in the AQMP process. The stakeholders were notified of all Advisory Group meetings, working group meetings, workshops and hearings, and were invited to participate in various activities designed to assist in enhancing communication and development of the 2016 AQMP.

A variety of formats and communication outreach methods were utilized as part of the Outreach Program. The formats used for specific activities were tailored to the particular audience or venue where information was being presented and discussed. Figure 11-2 provides an overview the variety of formats and outreach methods used by the SCAQMD during the development of the 2016 AQMP including Advisory Group and Committee meetings, working groups, printed material, conference calls, stakeholder meetings, and social media.

TABLE 11-1

Stakeholders Participating in Outreach Efforts

Stakeholder Category	Stakeholders
Public Agencies	• CARB • California Energy Commission • California Public Utilities Commission • California ISO • CalRecycle • U.S. EPA • U.S. Department of Transportation • U.S. Department of Energy
Local/Regional Government	• Councils of Governments/Associated Governments • SCAG • Transportation Commissions • Local Planning Departments • Building and Fire Departments • Tribal Governments
Special Districts	• School Districts • Sanitation Districts • Water/Power Districts
Health Advocates	• Medical Practitioners • Health Researchers • Health Providers
Community/Health/ Environmental Groups	• Public Health Departments/Associations • Environmental Justice Organizations • Environmental Advocacy Groups • Faith-based Organizations • Labor Organizations
Academia	• Universities • National Laboratories
General Public	• Residents • Students • Interested Parties

TABLE 11-1 (CONCLUDED)

Stakeholders Participating in Outreach Efforts

Stakeholder Category	Stakeholders
Business	• Energy Industry (Electricity, Petroleum Production and Refining, Natural Gas, Biofuels, Renewables, etc.) • Green Technologies • Goods Movement and Logistics (Warehousing, Trucking, Railroads, Ports/Shipping/Freight) • Dairy Operations • Printing/Coating Industry • Airport/Airline Operations • Engine Manufacturers • After-treatment Technologies • Building and Construction Industry/Realtors • Chambers of Commerce/ Business Councils • Trade Associations • Small Businesses

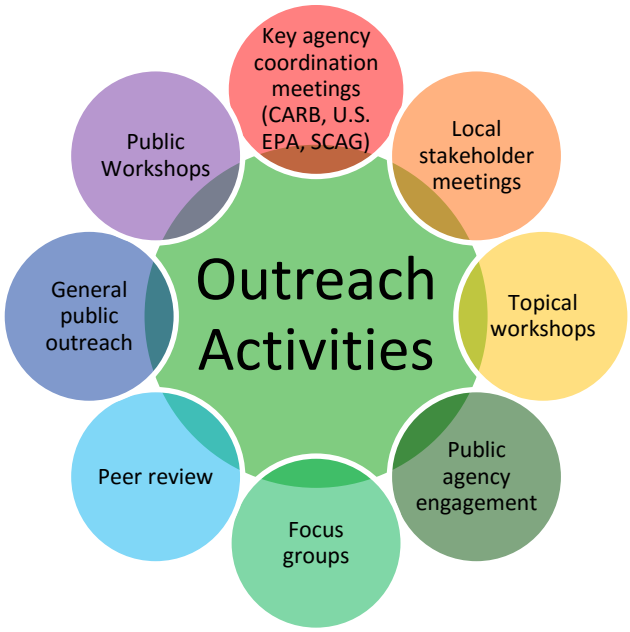


FIGURE 11-2

FORMATS AND COMMUNICATION OUTREACH METHODS USED FOR THE 2016 AQMP

Public Workshops

As in previous AQMPs, multiple public workshops are being held throughout the SCAQMD jurisdiction. Public hearings will also be held, in fulfillment of legal requirements. Regular informational updates to the SCAQMD Governing Board and its Committees and Advisory Groups provide another forum for public input. In addition to these hearings and workshops, the following describes specific activities designed to fulfill the goals of the Outreach Program. Stakeholders and interested parties were encouraged to participate and meet with SCAQMD staff to discuss emission reductions ideas, constituent concerns, and implementation suggestions.



Key Agency Coordination Meetings

Throughout the 2016 AQMP development process, staff has and continues to hold frequent coordination meetings with the key AQMP partner agencies (CARB, U.S. EPA and SCAG). Meetings occur several times per month to discuss technical, legal, policy, and control strategy topics.

Stakeholder Meetings, Topical Workshops, and Focus Groups

Meetings with specific stakeholder groups have been and will continue to be held to communicate the purpose and scope of the 2016 AQMP, discuss the concerns of the representatives, solicit recommendations for inclusion in the Plan, and gather further outreach suggestions. Stakeholders include all those listed in Table 11-1, such as regional councils of government (COGs); transportation commissions; Chambers of Commerce; business councils; trade groups and associations; environmental and health advocates; and community groups. Outreach methods include agendized SCAQMD presentations at COGs, participation at conferences and seminars, and face-to-face meetings as requested. In addition to meetings with specific stakeholders, topical workshops and focus groups on specific topics have been and will be held to focus on specific AQMP-related topics such as economics, incentives, white papers, energy, employment impacts, health benefits, modeling issues, climate/energy, transportation, environmental justice, specific control measures, and goods movement. For the preparation of the 10 2016 AQMP White Papers, working groups were formed to address specific topics addressed in each of the policy documents. The focus groups were comprised of experts for the particular subject, the inventory, the trends and/or control technology being evaluated, including equipment manufacturers and suppliers. The focus groups met as often as necessary to provide recommendations. These meetings provided a forum where different opinions on specific topics could be shared and discussed.

Peer Review

In addition to the feedback provided by the 2016 AQMP Advisory Group and the STMPR Advisory Group, additional expert peer review of specific 2016 AQMP components was sought. One specific example is a focused peer review of the socioeconomic/health impacts and a cost-benefit analysis of the 2016 AQMP and associated control strategy. Another review is focused on modeling methods and assumptions, including growth and emissions projections. Expert reviewers were from a diverse range of institutions and perspectives. All results of the peer reviews have been, and will be made public to ensure full transparency and open discussion of any issues raised. One such example of peer review is Appendix I (Health Effects) of the 2016 AQMP in accordance with California Health and Safety Code Section 40471(b) that requires the SCAQMD to prepare a report on health impacts of particulate matter air pollution in the Basin in conjunction with public health agencies. An advisory council appointed by the SCAQMD Governing Board and Board Advisory Groups has been formed to undertake peer review of the report prior to its final inclusion in the Plan.

General Public Outreach

The 2016 AQMP was included in the SCAQMD's extensive community outreach activities – including, but not limited to, events, community forums, and other meetings – to promote greater public awareness of its purpose and significance. Non-technical brochures were created and distributed at public events. Web-based and social media communication tools have been utilized to distribute AQMP information and provide an opportunity for interactive feedback.

Outreach Activities

Table 11-2 provides the specific efforts conducted to implement the Outreach Program for the 2016 AQMP since the Advisory Group convened in 2014 until the release of the Draft Plan. The table provides the date the activity took place, with what organization(s), and the audience (particular stakeholders or open to the public). In addition, over one hundred meetings and teleconferences with key agencies were conducted with SCAG, CARB, and/or U.S. EPA.

In addition to meeting and providing invited presentations, SCAQMD staff also attended a number of meetings conducted by other organizations (e.g., cities, councils of government, chambers, etc.) which included a brief announcement regarding the 2016 AQMP. These types of announcements identified the date, time and location of AQMP Advisory meetings, white paper working group meetings, or the latest status in the development and release of the 2016 AQMP.

TABLE 11-2

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
4/10/2014	SCAQMD AQMP Advisory Group Meeting	Open to Public
4/29/2014	Southern California Alliance of Publicly-Owned (SCAP) Treatment Works	Public Agencies
5/9/2014	SCAQMD Local Government and Small Business Assistance Advisory Group	Open to Public
5/29/2014	SCAQMD AQMP Advisory Group Meeting	Open to Public
6/11/2014	SCAQMD Student Interns	Government/Education
6/24/2014	Blueprint for Clean Air White Paper Working Group	Open to Public
6/25/2014	VOC Controls White Paper Working Group	Open to Public
6/25/2014	SCAQMD Student Interns	Government/Education
6/26/2014	Residential and Commercial Energy White Paper Working Group	Open to Public
6/26/2014	A Business Case for Clean Air Strategies White Paper Working Group	Open to Public
7/8/2014	Passenger Transportation White Paper Working Group	Open to Public
7/8/2014	Goods Movement White Paper Working Group	Open to Public
7/18/2014	PM Controls White Paper Working Group	Open to Public
7/23/2014	Energy Outlook White Paper Working Group	Open to Public
8/5/2014	Passenger Transportation White Paper Working Group	Open to Public
8/5/2014	Goods Movement White Paper Working Group	Open to Public

TABLE 11-2 (CONTINUED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
8/13/2014	Blueprint for Clean Air White Paper Working Group	Open to Public
8/13/2014	Industrial Facility Modernization White Paper Working Group	Open to Public
8/13/2014	A Business Case for Clean Air Strategies White Paper Working Group	Open to Public
8/19/2014	VOC Controls White Paper Working Group	Open to Public
9/4/2014	Valley Industry & Commerce Association (VICA)	Environment, Energy & Utilities Committee
9/4/2014	Passenger Transportation White Paper Working Group	Open to Public
9/4/2014	Goods Movement White Paper Working Group	Open to Public
9/10/2014	Residential and Commercial Energy White Paper Working Group	Open to Public
9/24/2014	PM Controls White Paper Working Group	Open to Public
9/30/2014	A Business Case for Clean Air Strategies White Paper Working Group	Open to Public
10/15/2014	VOC Controls White Paper Working Group	Open to Public
10/28/2014	SCAQMD AQMP Advisory Group Meeting	Open to Public
10/31/2014	A Business Case for Clean Air Strategies White Paper Working Group	Open to Public
1/13/2015	L.A. County Bar Association	Environmental Lawyers
1/23/2015	SCAQMD Mobile Source Committee	Open to Public
2/4/2015	Passenger Transportation White Paper Working Group	Open to Public

TABLE 11-2 (CONTINUED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
2/4/2015	Goods Movement White Paper Working Group	Open to Public
2/20/2015	SCAQMD Mobile Source Committee	Open to Public
2/24/2015	Off-Road Equipment White Paper Working Group	Open to Public
3/11/2015	A Business Case for Clean Air Strategies White Paper Working Group	Open to Public
3/19/2015	SCAQMD AQMP Advisory Group Meeting	Open to Public
4/1/2015	Off-Road Equipment White Paper Working Group	Open to Public
4/14/2015	VOC Controls White Paper Working Group	Open to Public
4/15/2015	Blueprint for Clean Air White Paper Working Group	Open to Public
4/15/2015	Energy Outlook White Paper Working Group	Open to Public
4/16/2015	PM Controls White Paper Working Group	Open to Public
4/17/2015	SCAQMD Mobile Source Committee	Open to Public
4/29/2015	Off-Road Equipment White Paper Working Group	Open to Public
5/20/2015	SCAQMD AQMP Advisory Group Meeting	Open to Public
6/4/2015	SCAG Energy and Environment Committee	Open to Public
6/5/2015	SCAQMD Governing Board Meeting	Open to Public
6/9/2015	SCAQMD Student Interns	Government/Education
6/10–6/11/ 2015	2016 AQMP Control Strategy Symposium	Open to Public
6/23/2015	A Business Case for Clean Air Strategies White Paper Working Group	Open to Public

TABLE 11-2 (CONTINUED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
6/23/2015	SCAQMD Student Interns	Government/Education
6/25/2015	Residential and Commercial Energy White Paper Working Group	Open to Public
6/26/2015	Off-Road Equipment White Paper Working Group	Open to Public
6/26/2015	L.A. Chamber of Commerce (*Energy, Water & Environmental Sustainability; Transportation & Goods Movement Councils*)	Joint Council meeting
7/1/2015	Goods Movement White Paper Working Group	Open to Public
7/1/2015	Gateway Cities Council of Governments	Board of Directors
7/10/2015	SCAQMD Governing Board Meeting	Open to Public
7/13/2015	California Council for Environmental & Economic Balance (CCEEB)	Business Representatives
7/21/2015	SCAQMD AQMP Advisory Group Meeting	Open to Public
7/24/2015	SCAQMD Mobile Source Committee	Open to Public
8/21/2015	China EPA	Public Agency
8/26/2015	SCAQMD AQMP Advisory Group Meeting	Open to Public
8/27/2015	SCAQMD Board Assistant Briefing	Open to Public
8/28/2015	China EPA	Public Agency
9/4/2015	SCAQMD Governing Board Meeting	Open to Public
9/9/2015	BizFed	Business Representatives
9/11/2015	Local Government & Small Business Assistance Advisory Group	Open to Public

TABLE 11-2 (CONTINUED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
9/15/2015	Energy Outlook White Paper Working Group	Open to Public
9/18/2015	SCAQMD Mobile Source Committee	Open to Public
9/23/2015	Industrial Facility Modernization White Paper Working Group	Open to Public
9/30/2015	A Business Case for Clean Air Strategies White Paper Working Group	Open to Public
10/2/2015	SCAQMD Governing Board Meeting	Open to Public
10/7/2015	San Bernardino Association of Government	Board of Directors
10/9/2015	SoCal Gas	Business
10/12/2015	Future Ports	Open to Public
10/13/2015	L.A. Chamber of Commerce (*Transportation & Goods Movement Council*)	Business Representatives
10/15/2015	Air & Waste Management Association	Annual Meeting
10/15/2015	San Gabriel Valley Council of Government	Governing Board
10/16/2015	SCAQMD Stationary Source Committee	Open to Public
10/22/2015	Orange County Council of Government	Executive Council
10/28/2015	Enviros Conference Call Meeting	Environmental
10/28/2015	SCAQMD AQMP Advisory Group Meeting	Open to Public
11/6/2015	SCAQMD Governing Board Meeting	Open to Public
11/20/2015	SCAQMD Mobile Source Committee	Open to Public
12/2/2015	Beijing Environmental Protection Bureau	Public Agency

TABLE 11-2 (CONTINUED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
12/17/2015	SCAG Technical Working Group	Open to Public
1/20/2016	Mayor Garcetti's Office of Sustainability, City of Los Angeles	Government
1/21/2016	Industrial Environmental Coalition of Orange County	Business Representatives County Program
1/22/2016	SCAQMD Mobile Source Committee	Open to Public
1/27/2016	Enviros Conference Call Meeting	Environmental Groups
1/29/2016	SCAQMD Environmental Justice Advisory Group (EJAG)	Open to Public
2/24/2016	Enviros Conference Call Meeting	Environmental Groups
2/10/2016	The Inland Empire Air Quality Committee (American Lung Association)	Air Quality Committee
3/9/2016	Beijing Environmental Protection Bureau	Public Agency
3/18/2016	SCAQMD Mobile Source Committee	Open to Public
3/23/2016	Enviros Conference Call Meeting	Environmental Groups
3/25/2016	SoCal Gas	Business
4/1/2016	SCAQMD Governing Board Meeting	Open to Public
4/8/2016	UCLA Law School	Academia
4/13/2016	SCAQMD AQMP Advisory Group Meeting	Open to Public
4/13/2016	Physicians for Social Responsibility - LA	Environmental Group
4/15/2016	SCAQMD Mobile Source Committee	Open to Public

TABLE 11-2 (CONTINUED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
4/15/2016	SCAQMD Stationary Source Committee	Open to Public
4/26/2016	Southern California Alliance of Publicly Owned (SCAP) Treatment	Public Agency
4/27/2016	Enviros Conference Call Meeting	Environmental Groups
5/3/2016	SoCal Gas Company	Business
5/12/2016	SoCal Gas Company	Business
5/13/2016	Local Government & Small Business Assistance Advisory Group	Open to Public
5/17/2016	Building Industry Association of Southern California	Business Representatives
5/18/2016	Western States Petroleum Association	Business Representatives
5/20/2016	SCAQMD Mobile Source Committee	Open to Public
5/25/2016	Enviros Conference Call Meeting	Environmental Groups
6/1/2016	SoCal Gas Company - Downey	Business
6/7/2016	SoCal Gas Company	Business
6/9/2016	Building Industry Association of Southern California	Business Representatives
6/15/2016	SCAQMD AQMP Advisory Group Meeting	Open to Public
6/17/2016	SCAQMD Mobile Source Committee	Open to Public
6/17/2016	Goods Movement Industry	Business/Port Representatives
6/22/16	Enviros Conference Call Meeting	Environmental Groups
6/23/2016	Orange County Council of Governments	Open to Public

TABLE 11-2 (CONTINUED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
6/27/2016	Realtors Committee on Air Quality	Business Representatives
7/7/2016	SCAG Energy and Environment Committee	Open to Public
7/7/2016	Architectural Coatings Association	Business Representatives
7/12/2016	Diesel 2 Gas	Business Representatives
7/14/2016	Public Workshop (Coachella Valley)	Open to Public
7/14/2016	Public Workshop (SCAQMD, Diamond Bar)	Open to Public
7/19/2016	BizFed	Business Representatives
7/20/2016	Public Workshop (Buena Park, Orange County)	Open to Public
7/20/2016	Public Workshop (Carson, Los Angeles County)	Open to Public
7/20/2016	Home Rule Advisory Group Meeting	Open to Public
7/21/2016	Public Workshop (San Bernardino County)	Open to Public
7/21/2016	Public Workshop (Riverside County)	Open to Public
7/22/2016	SCAQMD Mobile Source Committee	Open to Public
7/26/2016	University of Southern California	Academia
7/27/2016	Clean Cities Coalition - Western Riverside Council of Governments	Open to Public
7/29/2016	SCAQMD Environmental Justice Advisory Group	Open to Public
8/2/2016	Los Angeles County Board of Supervisors	Open to Public
8/3/2016	Pasadena Sierra Club	Environmental Interest

TABLE 11-2 (CONTINUED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
8/4/2016	SoCal Gas/Cooking Industry	Business Representatives
8/4/2016	ClearSign Low NOx Burner Technologies	Business Interest
8/16/2016	SCAQMD AQMP Advisory Group Meeting	Open to Public
8/31/2016	Association of Environmental Professionals	Environmental Consultants
9/1/2016	Valley Industry and Commerce Association - Energy, Environment & Utilities Committee	Business Representatives
9/6/2016	SoCal Gas Company	Business Representatives
9/7/2016	San Bernardino Associated Governments – Board Meeting	Open to Public
9/9/2016	SoCal Gas Company	Business Representatives
9/13/2016	Sanitation Districts of Los Angeles County - Industry Advisory Council	Business Representatives
9/16/2016	SCAQMD Mobile Source Committee Meeting	Open to Public
9/22/2016	South Bay Cities Council of Governments	Open to Public
9/27/2015	Inland Action - Board of Directors	Business Representatives
9/28/2016	SCAQMD AQMP Advisory Group Meeting	Open to Public
9/29/2016	SCAG Regional Council	Open to Public
10/3/2016	Western Riverside Council of Governments	Open to Public
10/5/2016	Industrial Environmental Association /CMTA Symposium and Conference	Open to Participants

TABLE 11-2 (CONTINUED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
10/12/2016	U.S. Environmental Protection Agency	Environmental Policy
10/13/2016	American Automobile Association	Business Interest
10/14/2016	SCAQMD Local Government and Small Business Assistance Advisory Group Meeting	Open to Public
10/21/2016	SCAQMD Mobile Source Committee	Open to Public
10/21/2016	Japan Automakers Association (JAMA)	Business Interest
10/25/2016	Inland Empire Economic Partnership – Logistical Council	Business Representatives
10/25/16	City of Los Angeles	Environmental Policy
10/27/2016	SCAQMD AQMP Advisory Group Meeting	Open to Public
10/28/2016	SCAQMD Environmental Justice Advisory Group	Open to Public
11/2/2016	Air & Waste Management Association	Environmental Consultants
11/15/2016	Public Hearing – Buena Park (Orange County)	Open to Public
11/15/2016	Public Hearing – Carson (Los Angeles County)	Open to Public
11/17/2016	Public Hearing – San Bernardino (San Bernardino County)	Open to Public
11/17/2016	Public Hearing – Riverside (Riverside County)	Open to Public
12/2/2016	SCAQMD Governing Board Meeting – Set Hearing	Open to Public

TABLE 11-2 (CONCLUDED)

Outreach Activities for the 2016 AQMP

DATE	ORGANIZATION	AUDIENCE
1/9/17	SCAG's Global Land Use & Economic (GLUE) Council	Business Representatives

Glossary

AAQS (Ambient Air Quality Standards): Health and welfare based standards for clean outdoor air that identify the maximum acceptable average concentrations of air pollutants during a specified period of time. (See NAAQS.)

Acute Health Effect: An adverse health effect that occurs over a relatively short period of time (e.g., minutes or hours).

Aerosol: Particles of solid or liquid matter that can remain suspended in air for long periods of time because of their small size and light weight.

Air Pollutants: Amounts of foreign and/or natural substances occurring in the atmosphere that may result in adverse effects on humans, animals, vegetation, and/or materials.

Air Quality Simulation Model: A computer program that simulates the transport, dispersion, and transformation of compounds emitted into the air and can project the relationship between emissions and air quality.

Air Toxics: A generic term referring to a harmful chemical or group of chemicals in the air. Typically, substances that are especially harmful to health, such as those considered under U.S. EPA's hazardous air pollutant program or California's AB 1807 toxic air contaminant program, are considered to be air toxics. Technically, any compound that is in the air and has the potential to produce adverse health effects is an air toxic.

ATCM (Airborne Toxic Control Measure): A type of control measure, adopted by the CARB (Health and Safety Code Section 39666 et seq.), which reduces emissions of toxic air contaminants from nonvehicular sources.

Alternative Fuels: Fuels such as methanol, ethanol, hydrogen, natural gas, and liquid propane gas that are cleaner burning and help to meet mobile and stationary emission standards.

Ambient Air: The air occurring at a particular time and place outside of structures. Often used interchangeably with "outdoor" air.

APCD (Air Pollution Control District): A county agency with authority to regulate stationary, indirect, and area sources of air pollution (e.g., power plants, highway construction, and housing developments) within a given county, and governed by a district air pollution control board composed of the elected county supervisors and in most cases, representatives of cities within the district.

AQMD (Air Quality Management District): A group or portions of counties, or an individual county specified in law with authority to regulate stationary, indirect, and area sources of air pollution within the region and governed by a regional air pollution control board comprised mostly of elected officials from within the region.

AQMP (Air Quality Management Plan): A Plan prepared by an APCD/AQMD, for a county or region designated as a nonattainment area, for the purpose of bringing the area into compliance with the requirements of the national and/or California Ambient Air Quality Standards. AQMPs designed to attain national ambient air quality standards are incorporated into the SIP.

Area-wide Sources (also known as "area" sources): Smaller sources of pollution, including permitted sources smaller than the districts's emission reporting threshold and those that do not receive permits (e.g. water heaters, gas furnace, fireplaces, woodstoves, architectural coatings) that often are typically associated with homes and non-industrial sources. The California Clean Air Act requires districts to include area sources in the development and implementation of the AQMPs.

Atmosphere: The gaseous mass or envelope surrounding the earth.

Attainment Area: A geographic area which is in compliance with the National and/or California Ambient Air Quality Standards (NAAQS OR CAAQS).

Attainment Plan: In general, a plan that details the emission reducing control measures and their implementation schedule necessary to attain air quality standards. In particular, the federal Clean Air Act requires attainment plans for nonattainment areas; these plans must meet several requirements, including requirements related to enforceability and adoption deadlines.

BACT (Best Available Control Technology): The most up-to-date methods, systems, techniques, and production processes available to achieve the greatest feasible emission reductions for given regulated air pollutants and processes. BACT is a requirement of NSR (New Source Review) and PSD (Prevention of Significant Deterioration). BACT as used in federal law under PSD applies to permits for sources of attainment pollutants and other regulated pollutants is defined as an emission limitation based on the maximum degree of emissions reductions allowable taking into account energy, environmental & economic impacts and other costs. [(CAA Section 169(3)]. The term BACT as used in state law means an emission limitation that will achieve the lowest achievable emission rates, which means the most stringent of either the most stringent emission limits contained in the SIP for the class or category of source, (unless it is demonstrated that the limitation is not achievable) or the most stringent emission limit achieved in practice by that class in category of source. "BACT" under state law is more stringent than federal BACT and is equivalent to federal LAER (lowest achievable emission rate) which applies to nonattainment NSR permit actions.

BAR (Bureau of Automotive Repair): An agency of the California Department of Consumer Affairs that manages the implementation of the motor vehicle Inspection and Maintenance Program.

Basin (South Coast Air Basin): Area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. It includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties.

Carrying Capacity: Amount of allowable regional emissions that would still meet health-based air quality standards.

CAA (Federal Clean Air Act): A federal law passed in 1970 and amended in 1977 and 1990 which forms the basis for the national air pollution control effort. Basic elements of the Act include national ambient air quality standards for major air pollutants, air toxics standards, acid rain control measures, and enforcement provisions.

CAAQS (California Ambient Air Quality Standards): Standards set by the State of California for the maximum levels of air pollutants which can exist in the outdoor air without unacceptable effects on human health or the public welfare. These are more stringent than NAAQS.

CARB (California Air Resources Board): The state's lead air quality agency, consisting of a nine-member Governor-appointed board. It is responsible for attainment and maintenance of the State and federal air quality standards, and is primarily responsible for motor vehicle pollution control. It oversees county and regional air pollution management programs.

CCAA (California Clean Air Act): A California law passed in 1988 which provides the basis for air quality planning and regulation independent of federal regulations. A major element of the Act is the requirement that local APCDs/AQMDs in violation of state ambient air quality standards must prepare attainment plans which identify air quality problems, causes, trends, and actions to be taken to attain and maintain California's air quality standards by the earliest practicable date.

CEQA (California Environmental Quality Act): A California law which sets forth a process for public agencies to make informed decisions on discretionary project approvals. The process aids decision makers to determine whether any environmental impacts are associated with a proposed project. It requires significant environmental impacts associated with a proposed project to be identified, disclosed, and mitigated to the maximum extent feasible.

CFCs (Chlorofluorocarbons): Any of a number of substances consisting of chlorine, fluorine, and carbon. CFCs are used for refrigeration, foam packaging, solvents, and propellants. They have been found to cause depletion of the atmosphere's ozone layer.

Chronic Health Effect: An adverse health effect which occurs over a relatively long period of time (e.g., months or years).

CO (Carbon Monoxide): A colorless, odorless gas resulting from the incomplete combustion of fossil fuels. Over 80 percent of the CO emitted in urban areas is contributed by mobile sources. CO interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects. CO is a criteria air pollutant.

CMAQ (Community Multiscale Air Quality Model): A computer modeling system designed to address air quality as a whole by including state-of-the-science capabilities for modeling multiple air quality issues, including tropospheric ozone, fine particles, toxics, acid deposition, and visibility degradation.

CAMx (Comprehensive Air Quality Model with Extensions): An open-source modeling system for multi-scale integrated assessment of gaseous and particulate air pollution.

Conformity: Conformity is a process mandated in the federal Clean Air Act to insure that federal actions do not impede attainment of the federal health standards. General conformity sets out a process that requires federal agencies to demonstrate that their actions are air quality neutral or beneficial. Transportation conformity sets out a process that requires transportation projects that receive federal funding, approvals or permits to demonstrate that their actions are air quality neutral or beneficial and meet specified emissions budgets in the SIP.

Congestion Management Program: A state mandated program (Government Code Section 65089a) that requires each county to prepare a plan to relieve congestion and reduce air pollution.

Consumer Products: Products for consumer or industrial use such as detergents, cleaning compounds, polishes, lawn and garden products, personal care products, and automotive specialty products which are part of our everyday lives and, through consumer use, may produce air emissions which contribute to air pollution.

Contingency Measure: Contingency measures are statute-required back-up control measures to be implemented in the event of specific conditions. These conditions can include failure to meet interim milestone emission reduction targets or failure to attain the standard by the statutory attainment date. Both State and federal Clean Air Acts require that District plans include contingency measures.

Electric Vehicle: A motor vehicle which uses a battery-powered electric motor as the basis of its operation. Such vehicles emit virtually no air pollutants. Hybrid electric motor vehicles may operate using both electric and gasoline powered motors. Emissions from hybrid electric motor vehicles are also substantially lower than conventionally powered motor vehicles.

EMFAC: The EMission FACtor model used by CARB to calculate on-road mobile vehicle emissions. The 2016 AQMP is based on the latest version, EMFAC2014.

Emission Inventory: An estimate of the amount of pollutants emitted from mobile and stationary sources into the atmosphere over a specific period such as a day or a year.

Emission Offset (also known as an emission trade-off): A regulatory requirement whereby approval of a new or modified stationary source of air pollution is conditional on the reduction of emissions from other existing stationary sources of air pollution or banked reductions. These reductions are required in addition to reductions required by BACT.

Emission Standard: The maximum amount of a pollutant that is allowed to be discharged from a polluting source such as an automobile or smoke stack.

FIP (Federal Implementation Plan): In the absence of an approved State Implementation Plan (SIP), a plan prepared by the U.S. EPA which provides measures that nonattainment areas must take to meet the requirements of the Federal Clean Air Act.

Fugitive Dust: Dust particles which are introduced into the air through certain activities such as soil cultivation, off-road vehicles, or any vehicles operating on open fields or dirt roadways.

Goods Movement: An event that causes movement of commercial materials or stock typically at ports, airports, railways, highways, including dedicated truck lanes and logistics centers.

GHGs (Greenhouse Gases): A gas in an atmosphere that absorbs long-wave radiant energy reflected by the earth, which warms the atmosphere. GHGs also radiate long-wave radiation both upward to space and back down toward the surface of the earth. The downward part of this long-wave radiation absorbed by the atmosphere is known as the “greenhouse effect.”

Growth Management Plan: A plan for a given geographical region containing demographic projections (i.e., housing units, employment, and population) through some specified point in time, and which provides recommendations for local governments to better manage growth and reduce projected environmental impacts.

HEV (Hybrid Electric Vehicles): Hybrids commercially available today combine an internal combustion engine with a battery and electric motor.

Hydrocarbon: Any of a large number of compounds containing various combinations of hydrogen and carbon atoms. They may be emitted into the air as a result of fossil fuel combustion, fuel volatilization, and solvent use, and are a major contributor to smog. (Also see VOC.)

HFCV (Hydrogen Fuel Cell Vehicles): Vehicles that produce zero tailpipe emissions and run on compressed hydrogen fed into a fuel cell "stack" that produces electricity to power the vehicle.

Incentives: Tax credits, financial rebates/discounts, or non-monetary conveniences offered to encourage further use of advanced technology and alternative fuels for stationary and mobile sources.

Indirect Source: Any facility, building, structure, or installation, or combination thereof, which generates or attracts mobile source activity that results in emissions of any pollutant (or precursor). Examples of indirect sources include employment sites, shopping centers, sports facilities, housing developments, airports, commercial and industrial development, and parking lots and garages.

Indirect Source Control Program: Rules, regulations, local ordinances and land use controls, and other regulatory strategies of air pollution control districts or local governments used to control or reduce emissions associated with new and existing indirect sources.

Inspection and Maintenance Program: A motor vehicle inspection program implemented by the BAR. It is designed to identify vehicles in need of maintenance and to assure the effectiveness of their emission control systems on a biennial basis. Enacted in 1979 and strengthened in 1990. (Also known as the "Smog Check" program.)

LEV (Low Emission Vehicle): A vehicle which is certified to meet the CARB 1994 emission standards for low emission vehicles.

Maintenance Plan: In general, a plan that details the actions necessary to maintain air quality standards. In particular, the federal Clean Air Act requires maintenance plans for areas that have been redesignated as attainment areas.

Mobile Sources: Moving sources of air pollution such as automobiles, motorcycles, trucks, off-road vehicles, boats and airplanes.

Model Year: Model year refers to the actual annual production period (year) as determined by the manufacturer.

NAAQS (National Ambient Air Quality Standards): Standards set by the federal U.S. EPA for the maximum levels of air pollutants which can exist in the outdoor air without unacceptable effects on human health or the public welfare.

Near-Zero Emission Technologies: Refers to emissions approaching zero and will be delineated for individual source categories through the process of developing the Air Quality Management Plan/State Implementation Plan and subsequent control measures.

NOx (Nitrogen Oxides, Oxides of Nitrogen): A general term pertaining to compounds of nitric acid (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid

deposition. NO_2 is a criteria air pollutant, and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility.

Nonattainment Area: A geographic area identified by the U.S. EPA and/or CARB as not meeting either NAAQS or CAAQS standards for a given pollutant.

NSR (New Source Review): A program used in development of permits for new or modified industrial facilities which are in a nonattainment area, and which emit nonattainment criteria air pollutants. The two major requirements of NSR are Best Available Control Technology and Emission Offsets.

Ozone: A strong smelling reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy. Ozone exists in the upper atmosphere ozone layer as well as at the earth's surface. Ozone at the earth's surface causes numerous adverse health effects and is a criteria air pollutant. It is a major component of smog.

Ozone Precursors: Chemicals such as hydrocarbons and oxides of nitrogen, occurring either naturally or as a result of human activities, which contribute to the formation of ozone, a major component of smog.

PZEV (Partial Zero Emission Vehicle): A vehicle emissions rating within California's exhaust emission standards. Cars that are certified as PZEVs meets the Super Ultra Low Emission Vehicle exhaust emission standard and has zero evaporative emissions from its fuel system.

Permit: Written authorization from a government agency (e.g., an air quality management district) that allows for the construction and/or operation of an emissions generating facility or its equipment within certain specified limits.

PIC (Particle-in-Cell) Model: An air quality simulation model that is used to apportion sulfate and nitrate PM10 concentrations to their precursor emissions sources. The PIC model uses spatially and temporally resolved sources of NOx and SOx emissions, with meteorological, physical, and simplified chemical processes, to calculate the contributions from various emission source categories.

PEV (Plug-in Electric Vehicle): Vehicles that can be recharged from any external source of electricity and the electricity is stored in a rechargeable battery pack to drive or contribute to drive the wheels.

PHEV (Plug-in Hybrid Electric Vehicle): Vehicles similar to traditional hybrids but are also equipped with a larger, more advanced battery that allows the vehicle to be plugged in and recharged in addition to refueling with gasoline. This larger battery allows the car to drive on battery alone, gasoline alone, or a combination of electric and gasoline fuels.

PM (Particulate Matter): Solid or liquid particles of soot, dust, smoke, fumes, and aerosols.

PM10 (Particulate Matter less than 10 microns): A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the air sacs in the lungs where they may be deposited, resulting in adverse health effects. PM10 also causes visibility reduction and is a criteria air pollutant.

PM2.5 (Particulate Matter less than 2.5 microns): A major air pollutant consisting of tiny solid or liquid particles, generally soot and aerosols. The size of the particles (2.5 microns or smaller, about 0.0001 inches or less) allows them to easily enter the air sacs deep in the lungs where they may cause adverse health effects, as noted in several recent studies. PM2.5 also causes visibility reduction and is a criteria air pollutant.

PSD (Prevention of Significant Deterioration): A program used in development of permits for new or modified industrial facilities in an area that is already in attainment. The intent is to prevent an attainment area from becoming a non-attainment area. This program, like require BACT as defined in the Clean Air Act and, if an AAQS is projected to be exceeded, Emission Offsets.

Public Workshop: A workshop held by a public agency for the purpose of informing the public and obtaining its input on the development of a regulatory action or control measure by that agency.

RTP (Regional Transportation Plan): The long-range transportation plan developed by the Southern California Association of Governments that provides a vision for transportation investments throughout the South Coast region. The RTP considers the role of transportation in the broader context of economic, mobility, environmental, and quality-of-life goals for the future, identifying regional transportation strategies to address regional mobility needs.

ROG (Reactive Organic Gas): A reactive chemical gas, composed of hydrocarbons, that may contribute to the formation of smog. Also sometimes referred to as Non-Methane Organic Compounds (NMOCs). (Also see VOC.)

SSAB (Salton Sea Air Basin): Area comprised of a central portion of Riverside County (the Coachella Valley) and Imperial County. The Riverside county portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley.

SIP (State Implementation Plan): A document prepared by each state describing existing air quality conditions and measures which will be taken to attain and maintain national ambient air quality standards. (see AQMP.)

Smog: A combination of smoke, ozone, hydrocarbons, nitrogen oxides, and other chemically reactive compounds which, under certain conditions of weather and sunlight, may result in a murky brown haze that causes adverse health effects. The primary source of smog in California is motor vehicles. (See Inspection and Maintenance Program.)

Smoke: A form of air pollution consisting primarily of particulate matter (i.e., particles). Other components of smoke include gaseous air pollutants such as hydrocarbons, oxides of nitrogen, and carbon monoxide. Sources of smoke may include fossil fuel combustion, agricultural burning, and other combustion processes.

SO_2 (Sulfur Dioxide): A strong smelling, colorless gas that is formed by the combustion of fossil fuels. Ocean-going vessels, which may use oil high in sulfur content, can be major sources of SO_2. SO_2 and other sulfur oxides contribute to ambient PM2.5. SO_2 is also a criteria pollutant.

Stationary Sources: Non-mobile sources such as power plants, refineries, and manufacturing facilities which emit air pollutants; can include area sources depending on context.

SULEV (Super Ultra Low Emission Vehicle): A vehicle emissions rating within California's LEV 1 and LEV 2 exhaust emission standards.

SCS (Sustainable Communities Strategy): Planning element in the RTP that integrates land use and transportation strategies that will achieve CARB's GHG emissions reduction targets.

TAC (Toxic Air Contaminant): An air pollutant, identified in regulation by the CARB, which may cause or contribute to an increase in deaths or in serious illness, or which may pose a present or potential hazard to human health. TACs are considered under a different regulatory process (California Health and Safety Code Section 39650 et seq.) than pollutants subject to CAAQS. Health effects due to TACs may occur at extremely low levels, and it is typically difficult to identify levels of exposure which do not produce adverse health effects.

TCM (Transportation Control Measure): Under Health & Safety Code Section 40717, any control measure to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. TCMs can include encouraging the use of carpools and mass transit. Under federal law, includes, but is not limted to those measures listed in CAA Section 108(f).

UFP (Ultrafine Particles): Particles with a diameter less than 0.1 μm (or 100 nm).

ULEV (Ultra Low Emission Vehicle): Vehicles with low emission ratings within California's LEV 1 or LEV 2 exhaust emission standards. The LEV 1 emission standards typically apply to cars from 1994–2003. The LEV 2 emission standards were adopted in 1998 and typically apply to cars from 2004–2010.

U.S. EPA (United States Environmental Protection Agency): The federal agency charged with setting policy and guidelines, and carrying out legal mandates for the protection of national interests in environmental resources.

VMT (Vehicle Miles Traveled): Total vehicle miles traveled by all or a subset of mobile sources.

Visibility: The distance that atmospheric conditions allow a person to see at a given time and location. Visibility reduction from air pollution is often due to the presence of sulfur and nitrogen oxides, as well as particulate matter.

VOCs (Volatile Organic Compounds): Hydrocarbon compounds that exist in the ambient air. VOCs contribute to the formation of smog and/or may themselves be toxic. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.

Zero-Emission Technologies: Advanced technology or control equipment that generates zero end-use emissions from stationary or mobile source applications.

ZEV (Zero Emission Vehicle): A vehicle that produces no emissions from the on-board source of power.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix I

Health Effects

2016 AIR QUALITY MANAGEMENT PLAN



December 2016

DRAFT FINAL 2016 AQMP
APPENDIX I

HEALTH EFFECTS

DECEMBER 2016

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
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INTRODUCTION

This document presents a summary of scientific findings on the health effects of ambient air pollutants. The California Health and Safety Code Section 40471(b) requires that the South Coast Air Quality Management District (SCAQMD) prepare a report on the health impacts of particulate matter in the South Coast Air Basin (SCAB) in conjunction with the preparation of the Air Quality Management Plan (AQMP) revisions. This document, which was prepared to satisfy that requirement, also includes sections discussing the health effects of the other major pollutants. The intention of this document is to provide a brief summary of the conclusions of scientific reviews conducted by U.S. EPA and other scientific agencies, with some additional information from more recently published studies.

In addition to the air pollutant health effects summaries, there is an Attachment to this Appendix, which is a list of publications that have resulted from health-related research projects sponsored by SCAQMD over the past several years. Some of these studies are discussed in this Appendix, as appropriate, although there are many other studies referenced here. The studies funded by SCAQMD also help inform the SCAQMD's work in characterizing the air pollution and its effects in our local region and the influences of sources of air pollution in the Basin.

While information on ambient air quality statistics, attainment status, spatial distribution of air pollutants, environmental justice, socioeconomic impacts, control strategies, and cost-effectiveness are important issues that may relate to health effects, these issues are not the focus of this Appendix, and are instead discussed in detail in other chapters and appendices of the AQMP, or in the AQMP Socioeconomic Report.

HEALTH EFFECTS OF AIR POLLUTION

Ambient air pollution is a major public health concern. Excess deaths and increases in illnesses associated with high air pollution levels have been documented in several episodes as early as 1930 in Meuse Valley, Belgium; 1948 in Donora, Pennsylvania; and 1952 in London. Although levels of pollutants that occurred during these acute episodes are now unlikely in the United States, ambient air pollution continues to be linked to increases in illness and other health effects (morbidity) and increases in death rates (mortality).

Adverse health outcomes linked to air pollution include cardiovascular effects, premature mortality, respiratory effects, cancer, reproductive effects, neurological effects, and other health outcomes. The evidence linking these effects to air pollutants is derived from population-based observational and field studies (epidemiological), toxicological studies, as well as controlled laboratory studies involving human subjects and animals. There have been an increasing number of studies focusing on the mechanisms (that is, on learning how specific organs, cell types, and biomarkers are involved in

the human body's response to air pollution). Yet the underlying biological pathways for these effects are not always clearly understood.

Although individuals inhale pollutants as a mixture under ambient conditions, the regulatory framework and the control measures developed are pollutant-specific for six major outdoor pollutants covered under Sections 108 and 109 of the Clean Air Act. This is appropriate, in that different pollutants can differ in their sources, their times and places of occurrence, the kinds of health effects they may cause, and their overall levels of health risk. Different pollutants, from the same or different sources, oftentimes occur together. While the combined effects of multiple air pollutants that occur simultaneously may be important, the air quality standards address each criteria pollutant separately, and thus, this Appendix is divided into sections by pollutant. To meet the air quality standards, comprehensive plans are developed such as the Air Quality Management Plan (AQMP); and to minimize exposure to toxic air contaminants in the South Coast AQMD, a local air toxics control plan is also prepared. These plans examine multiple pollutants, cumulative impacts, and transport issues related to attaining healthful air quality. A brief overview of the effects observed and attributed to various air pollutants is presented in this Appendix. Because the SCAB exceeds the federal standards for ozone and PM2.5, this Appendix focuses more attention in the discussion of these two pollutants, since the health impacts within the SCAB are potentially greater for these two pollutants compared to the health impacts of the other criteria pollutants. For the other pollutants, a brief summary of the associated health effects is provided.

This summary is drawn substantially from reviews presented previously (South Coast Air Quality Management District 1996; South Coast Air Quality Management District 2003; South Coast Air Quality Management District 2007; South Coast Air Quality Management District 2013b), and from the most recent U.S. EPA Integrated Science Assessment (ISA) reviews for Ozone (U.S. EPA 2013b), Carbon Monoxide (U.S. EPA 2010), Particulate Matter (U.S. EPA 2009), Nitrogen Oxides (U.S. EPA 2016), Sulfur Dioxide (U.S. EPA 2008), and Lead (U.S. EPA 2013a). Additional reviews prepared by the California Air Resources Board and the California EPA Office of Environmental Health Hazard Assessment for Particulate Matter (California Air Resources Board and Office of Environmental Health Hazard Assessment 2002), for Ozone (California Air Resources Board and Office of Environmental Health Hazard Assessment 2005) and for Nitrogen Dioxide (California Air Resources Board and Office of Environmental Health Hazard Assessment 2007) were included in the summary. In addition, several large review articles on the health effects of air pollution also helped inform this Appendix (American Thoracic Society 1996a; Brunekreef et al. 2002). More detailed citations and discussions on air pollution health effects can be found in these references.[1] Additionally, a supplemental literature review of mortality and morbidity impacts of PM2.5, ozone, NO_2, and SO_2 was conducted for the AQMP Socioeconomic Evaluation to identify more recent studies (Industrial Economics Inc. 2016b; Industrial Economics Inc. 2016a); this health effects summary also draws upon this literature review to discuss these more recent studies, particularly those published since the

[1] Most of the studies referred to in this Appendix are cited in the above sources. Only specific selected references to provide examples of the types of health effects are cited in this summary.

most recent ISA's. This summary highlights studies that were conducted in the South Coast Air Basin or in Southern California, or alternatively, in California, if few studies from our local region are available on the specific topic. Studies conducted in Southern California give an important "local perspective" in understanding and evaluating the health effects of air pollution. However, studies conducted in other locations also provide critical information that is pertinent to advancing the scientific understanding of the health effects of air pollution, including effects on our local population. As such, this summary also discusses key studies that were conducted in other locations.

Over the decades of national reviews of outdoor air pollution and their health impacts, the U.S. EPA has developed a list of five criteria by which the strength and credibility of data can be judged. This five-tier weight-of-evidence approach provides an objective basis for assessing the breadth, specificity, and consistency of evidence concerning a particular health outcome. Table I-1 shows the five descriptors used by the U.S. EPA for assessing causality, using a weight-of-evidence approach. Within each section discussing a specific pollutant are tables showing summaries of the U.S. EPA conclusions regarding the causality of air pollution health effects, which are the conclusions of their scientific evaluation of the research studies they have reviewed. For the criteria pollutants, the discussion in this Appendix will focus only on those categories of health effects for which the U.S. EPA has determined there is a causal or likely causal relationship with the pollutant, while other health effects may be discussed briefly. In particular, because of the relatively long time gap since the latest U.S. EPA ISA for PM (in 2009), and because the SCAB currently exceeds the federal standards for PM2.5, some additional health endpoints that are emerging as areas of interest with regard to PM exposure are discussed briefly in this Appendix.

It is important to note that the U.S. EPA is tasked with assessing new and emerging air quality science, including health studies, as part of the process of setting the federal air quality standards. In other words, the U.S. EPA's role is to assess the causal relationships between the pollutants and the different types of health endpoints. It is SCAQMD's role to describe the public health impacts of poor air quality in our region, as well as to develop and implement an emission reduction strategy to attain the federal and state ambient air quality standards. Therefore, it is not the intention of this Appendix to assess whether there is or is not an effect of a specific air pollutant on any particular health endpoint, but rather to summarize the health effects and causal determinations as assessed by U.S. EPA and other scientific agencies, to discuss some recent studies published since the latest U.S. EPA reviews, to give some quantitative estimates of the health impacts of particulate matter air pollution in the South Coast Air Basin, and to present a "local perspective" by highlighting studies conducted in the South Coast Air Basin, Southern California, or California.

TABLE I-1

U.S. EPA's Weight of Evidence Descriptions for Causal Determination of Health Effects

DETERMINATION	WEIGHT OF EVIDENCE
Causal Relationship	Evidence is sufficient to conclude that there is a causal relationship with relevant pollutant exposures. That is, the pollutant has been shown to result in health effects in studies in which chance, bias, and confounding could be ruled out with reasonable confidence. For example: (a) controlled human exposure studies that demonstrate consistent effects; or (b) observational studies that cannot be explained by plausible alternatives or are supported by other lines of evidence (e.g., animal studies or mode of action information). Evidence includes replicated and consistent high-quality studies by multiple investigators.
Likely To Be A Causal Relationship	Evidence is sufficient to conclude that a causal relationship is likely to exist with relevant pollutant exposures, but important uncertainties remain. That is, the pollutant has been shown to result in health effects in studies in which chance and bias can be ruled out with reasonable confidence but potential issues remain. For example: (a) observational studies show an association, but co-pollutant exposures are difficult to address and/or other lines of evidence (controlled human exposure, animal, or mode of action information) are limited or inconsistent; or (b) animal toxicological evidence from multiple studies from different laboratories that demonstrate effects, but limited or no human data are available. Evidence generally includes replicated and high-quality studies by multiple investigators.
Suggestive Of A Causal Relationship	Evidence is suggestive of a causal relationship with relevant pollutant exposures, but is limited because chance, bias, and confounding cannot be ruled out. For example, at least one high-quality epidemiologic study shows an association with a given health outcome but the results of other studies are inconsistent.
Inadequate To Infer A Causal Relationship	Evidence is inadequate to determine that a causal relationship exists with relevant pollutant exposures. The available studies are of insufficient quantity, quality, consistency or statistical power to permit a conclusion regarding the presence or absence of an effect.
Not Likely To Be A Causal Relationship	Evidence is suggestive of no causal relationship with relevant pollutant exposures. Several adequate studies, covering the full range of levels of exposure that human beings are known to encounter and considering susceptible populations, are mutually consistent in not showing an effect at any level of exposure.

(Adapted from U.S. EPA, 2009)

OZONE

Ozone is a gaseous air pollutant that is a highly reactive compound and a strong oxidizing agent. When ozone comes into contact with the respiratory tract, it can react with tissues and cause damage in the airways. Ozone, or its reaction products, can penetrate into the gas exchange region of the deep lung. Both short-term and long-term exposures to ozone have been linked to respiratory effects. Ozone from man-made sources is formed by photochemical reactions when pollutants such as volatile organic compounds, nitrogen oxides, and carbon monoxide react with sunlight. The main sources of such ozone precursors are discussed in detail in the draft 2016 AQMP Chapter 3. Additionally, a discussion of the spatial distribution of ozone is provided in the draft 2016 AQMP Chapter 2.

In 1997, the U.S. EPA established the first federal standard for ozone averaged over 8 hours, at 0.08 ppm. In 2005, the California Air Resources Board (CARB) established standards of 0.09 ppm averaged over one hour and at 0.070 ppm averaged over eight hours. In 2008, the U.S. EPA lowered the federal standard for ozone to 0.075 ppm averaged over eight hours. On the basis of recent evaluations of ozone health effects, U.S. EPA's Clean Air Scientific Advisory Committee recommended in 2015 that the National Ambient Air Quality Standard (NAAQS) for ozone be reduced and recommended a range in which 0.070 ppm would be the upper limit. In 2015, the U.S. EPA concluded that the current national standard was not adequate to protect public health and lowered the 8-hour ozone standard to 0.070 ppm (U.S. EPA 2015b). While the federal standards must be attained within a specified time frame, the California standards do not have specific defined deadlines, but must be attained by the earliest practicable date.

The table below provides the overall U.S. EPA staff conclusions on the causality of short-term (i.e. hours, days, weeks) and long-term (i.e. months, years) ozone health effects for the health outcomes evaluated (U.S. EPA 2013b).

TABLE I-2

Summary of U.S. EPA's Causal Determinations for Health Effects of Ozone

SHORT-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Respiratory Effects	Causal relationship
Cardiovascular Effects	Likely to be a causal relationship
Central Nervous System Effects	Suggestive of a causal relationship
Effects on Liver and Xenobiotic Metabolism	Inadequate to infer a causal relationship
Effects on Cutaneous and Ocular Tissues	Inadequate to infer a causal relationship
Mortality	Likely to be a causal relationship
LONG-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Respiratory Effects	Likely to be a causal relationship
Cardiovascular Effects	Suggestive of a causal relationship
Reproductive and Developmental Effects	Suggestive of a causal relationship
Central Nervous System Effects	Suggestive of a causal relationship
Cancer	Inadequate to infer a causal relationship
Mortality	Suggestive of a causal relationship

(From U.S. EPA, 2013a Table 1-1)

Short-Term Exposure Effects of Ozone

The adverse effects reported with short-term ozone exposure are greater with increased activity because activity increases the breathing rate, the depth of the breaths, and the volume of air reaching the lungs, resulting in an increased amount of ozone reaching deeper into the lungs. Children are considered to be a particularly vulnerable population to air pollution effects because their lungs are still growing, they typically spend more time outdoors, are generally more physically active, and have a higher ventilation rate relative to their body weight, compared to adults (U.S. EPA 2013b).

A number of adverse health effects associated with ambient ozone levels have been identified from laboratory and epidemiological studies (American Thoracic Society 1996b; U.S. EPA 2006; U.S. EPA 2013b). These include increased respiratory symptoms, damage to cells of the respiratory tract,

decrease in lung function, increased susceptibility to respiratory infection, an increased risk of hospitalization, and increased risk of mortality. For short-term ozone exposures, the U.S. EPA determined in the most recent ISA that the evidence supports a causal relationship for respiratory effects, and a likely causal relationship for cardiovascular effects and mortality.

In the laboratory, exposure of human subjects to low levels of ozone causes reversible decreases in lung function as assessed by various measures such as respiratory volumes, airway resistance and reactivity, irritative cough and chest discomfort. The results of several studies where human volunteers were exposed to ozone for 6.6 hours at levels between 0.04 and 0.12 ppm were summarized by Brown (Brown et al. 2008). As shown in Figure I-1, there is an increasing response on lung function with increasing exposure levels in moderately exercising subjects. A study published after the analysis by Brown et al. exposed healthy young adults for 6.6 hours under intermittent moderate exercise to each of the following: filtered air, and ozone at 0.06, 0.07, 0.08, and 0.87 ppm (Schelegle et al. 2009). The study found decreases in lung function (forced expiratory volume in 1 second, or FEV1) with each of the different levels of ozone exposure, although the decrease in lung function at 0.06 ppm was not statistically different from exposure to filtered air. Lung function (FEV1) decreases were approximately 5 percent, 7 percent, and 11 percent at ozone exposure levels of 0.07, 0.08, and 0.87 ppm. A more recent study (Kim et al. 2011) exposed young healthy adults to ozone in the range of 0.06 to 0.10 ppm for 6.6 hours while engaging in intermittent moderate exercise, and found that the study participants exhibited an approximately 2 percent reduction in lung function (FEV1) and an increase in pulmonary inflammation after exposure to ozone at the 0.06 ppm concentration.

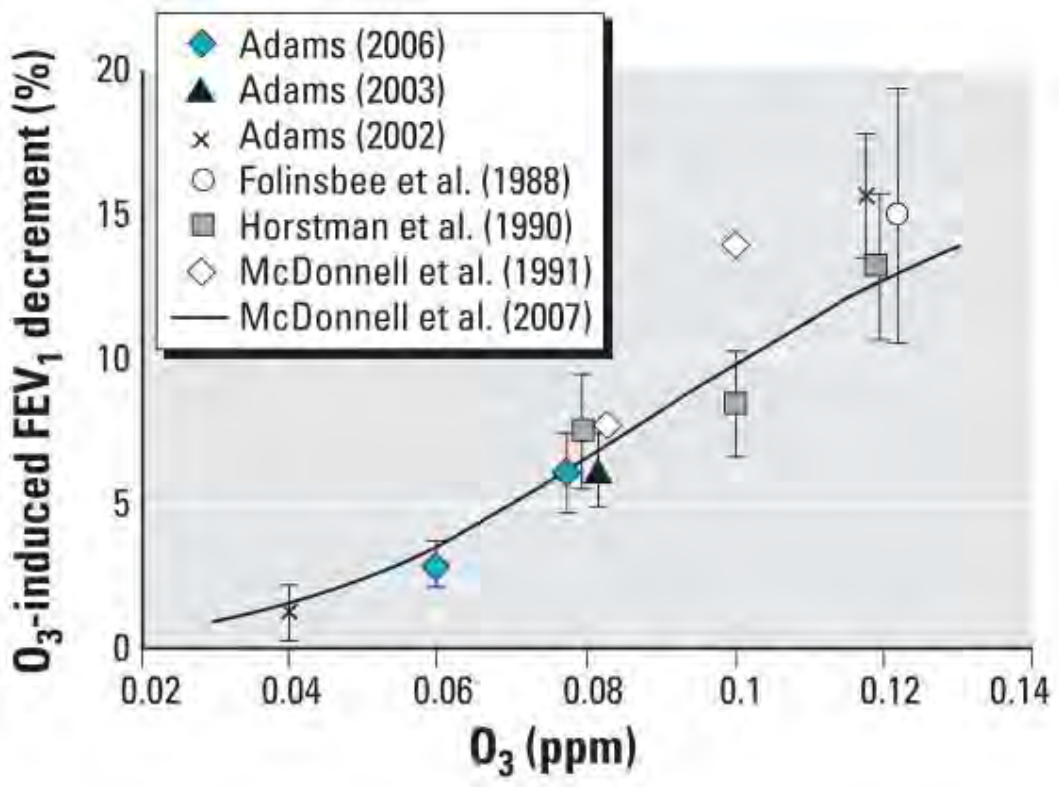


FIGURE I-1

Comparison of mean ozone-induced decrements in lung function following 6.6 hours of ozone exposure. Error bars represent the standard error. McDonnell et al. (2007) was a summary of results from several studies, and is represented by the line in the graph. (From: (Brown et al. 2008))

Some changes in lung function (volume and airway resistance changes) observed after study participants were exposed to ozone only once exhibit attenuated responses or a reduction in magnitude of responses when exposures are repeated, although there were a range of individual human responses observed, including some non-responders (Linn et al. 1988). Although it has been argued that the observed shift in response is evidence of a probable development of tolerance, it appears that while functional changes may exhibit attenuation, biochemical and cellular changes which may be associated with episodic and chronic exposure effects may not exhibit an attenuation. That is, internal damage to the respiratory system may continue with repeated ozone exposures, even if externally observable effects (chest symptoms and reduced lung function) disappear. An additional argument against toleration is that after several days or weeks without ozone exposures, the responsiveness (in terms of lung function as well as symptoms) returns, which is evidence that any tolerance developed is relatively short-lived (U.S. EPA 2013b).

Laboratory studies have also compared the degree of lung function change seen in healthy individuals versus asthmatics and those with chronic obstructive pulmonary disease (COPD). In several

laboratory studies of individuals with COPD, the percent decreases in lung function from short-term ozone exposures ≤0.30ppm among patients with COPD generally did not differ from the lung function decrements experienced by healthy patients (Linn et al. 1982; Solic et al. 1982; Linn et al. 1983; Kehrl et al. 1985). That finding, however, may not accurately reflect the true impact of exposure on these respiration-compromised individuals. Since the respiration-compromised group may have lower lung function to begin with, the same total percent change in lung function may represent a substantially greater relative adverse effect overall. Other studies have found that subjects with asthma are more sensitive to the short-term effects of ozone in terms of lung function and inflammatory response, as evidenced by measuring changes in lung function, increased hospitalizations, and emergency room visits for respiratory conditions (U.S. EPA 2013b). This evidence supports the hypothesis that asthmatics are a particularly sensitive population to the health effects of ozone.

In laboratory studies of animals, cellular and biochemical changes associated with respiratory tract inflammation have also been consistently found in the airway lining after low- level exposure to ozone. These changes include an increase in specific cell types and in the concentration of biochemical mediators of inflammation and injury such as Interleukin-1, Interleukin-6, Interleukin-8, Tumor Necrosis Factor α (TNF-α), and fibronectin (Van Bree et al. 2002; Johnston et al. 2007; U.S. EPA 2013b).

In addition to controlled laboratory conditions, epidemiological studies of individuals exercising outdoors, including children attending summer camp, have shown associations of reduced lung function with ozone exposure. There were wide ranges in responses among individuals. U.S. EPA's 2013 ISA indicated that most studies found reductions in lung function (FEV_1) in the range of approximately <1 to 2 percent when standardized to an increase of 0.04 ppm for a 1-hour maximum, an increase of 0.03 ppm for an 8-hour maximum, and an increase of 0.02 ppm for a 24-hour average (U.S. EPA 2013b). Somewhat greater decrements in lung function (4.9 to 7.3 percent) were found in children with asthma who had respiratory infections or were using corticosteroid medication.

Epidemiologic studies have found that increases in short-term ozone levels are associated with impacts on children's respiratory health, including increases in respiratory symptoms in children with asthma, and increased numbers of absences from school. Studies conducted in various cities in the U.S. and in other countries have reported increased respiratory symptoms among children with asthma, including wheeze, cough, difficulty breathing, and chest symptoms/tightness (U.S. EPA 2013b). The Children's Health Study, conducted by researchers at the University of Southern California, followed for several years a cohort of children that live in 12 communities in Southern California with differing levels of air pollution. A publication from this study reported that school absences in fourth graders for respiratory illnesses were positively associated with short-term increases in ambient ozone levels. An increase of 20 ppb (0.02 ppm) ozone was associated with a 63 percent increase in illness-related absence rates and an 83 percent increase in respiratory illnesses (Gilliland et al. 2001). A small panel study of Hispanic children with asthma living in the Huntington Park neighborhood of Los Angeles, California reported that a 10.8 ppb increase in ozone averaged

over 8 hours nearly doubled the odds of having asthma symptoms that interfered with daily activities (Delfino et al. 2003). Despite these studies, and some others linking ozone exposures with school absences, the U.S. EPA concluded that only limited evidence is currently available linking these ozone exposures to respiratory-related school absences (U.S. EPA 2013b).

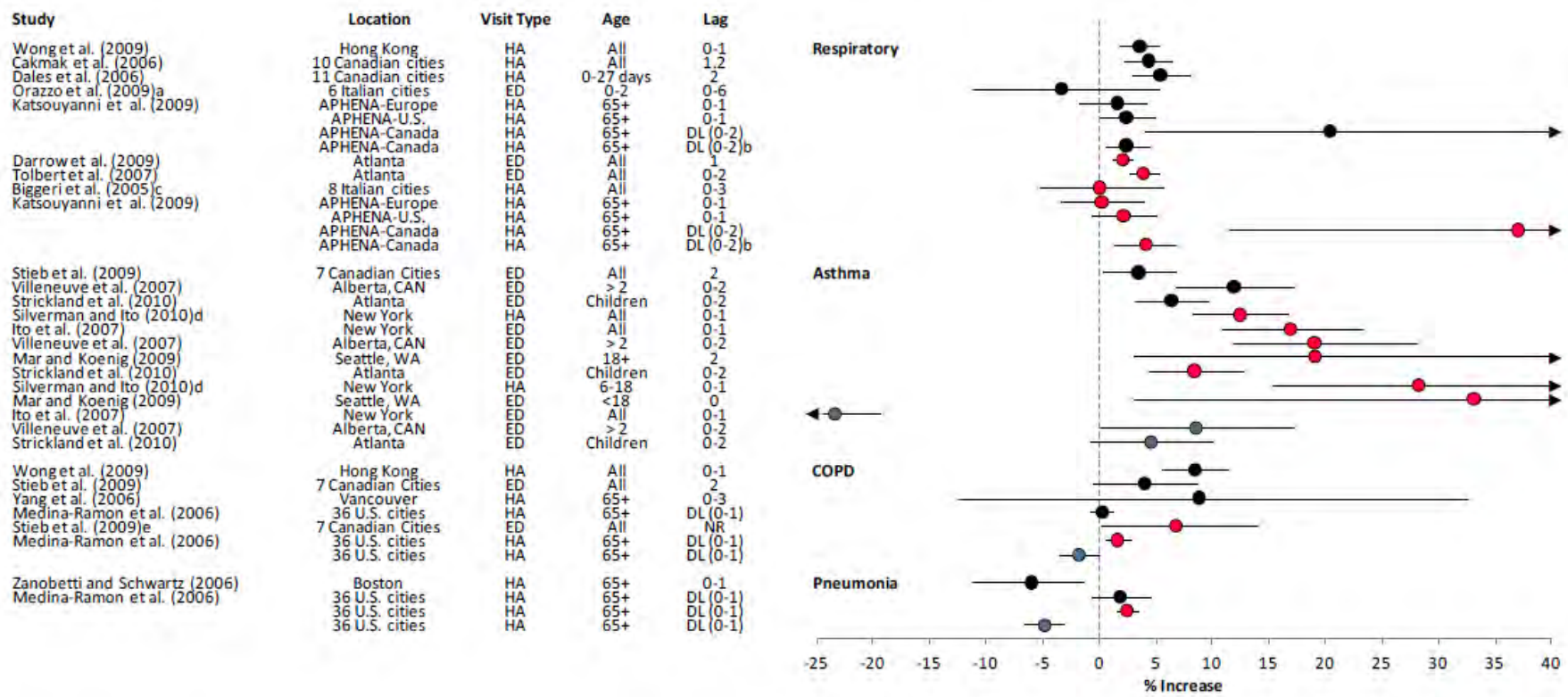
Numerous studies have found associations of short-term ozone levels and hospital admissions and emergency department admissions for respiratory conditions, and the U.S. EPA concluded in the latest ISA that the most recent epidemiological studies conducted in both single cities and multiple cities continue to provide evidence supporting a causal relationship between short-term ozone exposures and respiratory effects (U.S. EPA 2013b). The studies generally found stronger associations for asthma and COPD in the warm season or in the summer months, compared to the cold season, and also provided evidence that children are at greatest risk of ozone-related respiratory health effects. Several of these studies reviewed in the ISA had average ozone concentrations well below 60 ppb averaged over 8 hours and still reported associations with respiratory outcomes. One study of asthma emergency department visits reported ozone effects at concentrations as low as 30 ppb (Strickland et al. 2010). Figure I-2 presents examples of studies regarding all-year and seasonal analysis of ozone exposure and hospital admissions or emergency department visits. This figure illustrates the associations found between ambient ozone exposure and key respiratory outcomes (asthma, COPD and pneumonia), and shows the stronger effects with summertime ozone exposures. Recently, a study in California reported that short-term ozone exposures were associated with emergency department visits for asthma, acute respiratory infections, pneumonia, COPD, and upper respiratory tract infections, with more consistent associations during the warm season (Malig et al. 2016). This California study provides additional supporting evidence for ozone-related respiratory effects.

The potential cardiovascular effects of short-term ozone exposure have been studied in toxicological, human exposure, and epidemiological studies. Controlled human exposure studies have found that ozone exposures produce changes in heart function (as measured by heart rate variability) and increases in biomarkers in the blood for systemic inflammation and oxidative stress. The limited number of toxicological studies on this topic provide evidence of cardiovascular effects. The effects observed include increased heart rate variability, arrhythmias, vascular disease, and inflammation and oxidative stress leading to atherosclerosis, which can lead to tissue damage due to ischemia and reperfusion (i.e. having the blood supply cut off and then restored to the tissues) (U.S. EPA 2013b). The controlled human exposure and toxicological studies provide evidence of cardiovascular effects of ozone, and some plausible mechanisms for these effects. Epidemiological studies, including some recent multi-city studies show relatively consistent associations between short-term ozone exposures and cardiovascular mortality (these studies are discussed further below). However, epidemiological studies do not provide consistent evidence of cardiovascular morbidity with short-term ozone exposures. Studies conducted in the Los Angeles area or in California also do not provide consistent evidence of short-term ozone effects on cardiovascular morbidity. A study of elderly non-smokers in the Los Angeles area with a history of heart disease found no associations between ozone exposure and blood pressure nor ST-segment depression, a measure of cardiac ischemia (Delfino et

al. 2010; Delfino et al. 2011). A Los Angeles-based study of cardiovascular hospital admissions did not find increased risk with ozone exposures (Linn et al. 2000). However, a biomarker study of students at UC Berkeley who spent their summer vacation in either the Los Angeles or San Francisco Bay Area found that ozone exposures over a period of 2 weeks or 1 month were associated with increases in a biomarker of lipid peroxidation, but no association was found for a biomarker of antioxidant capacity (Chen et al. 2007). Lipid peroxidation is an indicator of oxidative stress, which may be triggered by pulmonary inflammation caused by ozone exposure. Given the strong evidence of cardiovascular morbidity from experimental studies and the consistent positive associations reported in epidemiological studies of cardiovascular mortality, but the lack of consistent evidence from epidemiological studies of cardiovascular morbidity, the U.S. EPA determined that there is a likely causal relationship between short-term ozone exposures and cardiovascular effects (U.S. EPA 2013b).

For mortality effects, the U.S. EPA 2013 ISA concluded that there was a likely causal relationship for short-term ozone exposures. This determination is supported by numerous studies have found positive associations between short-term increases in ozone levels and excess risk of mortality from all non-accidental causes, cardiovascular causes, and respiratory causes (Bell et al. 2004; Bell et al. 2005; Huang et al. 2005; Ito et al. 2005; Levy et al. 2005; Bell et al. 2008; Zanobetti et al. 2008). Studies conducted across multiple cities in the U.S. Canada, Europe and Asia reported increased cardiovascular and respiratory mortality risks with increased short-term ozone exposures, and several studies additionally reported increased mortality risk for summer season ozone exposures (Katsouyanni et al. 2009; Samoli et al. 2009; Stafoggia et al. 2010; Wong et al. 2010). Some studies have also demonstrated that these associations persist even when other variables including season and levels of particulate matter are accounted for, indicating that ozone mortality effects may be independent of other pollutants, although there is some variability across studies with regard to the sensitivity of the ozone associations to adjustment for PM (Bell et al. 2004; Huang et al. 2005; Katsouyanni et al. 2009; Stafoggia et al. 2010). With regard to respiratory effects, the substantial evidence supporting a causal relationship between short-term ozone exposures and respiratory morbidity provides strong support for the recent evidence from epidemiological studies linking such exposures to respiratory mortality. For cardiovascular effects, while there is strong evidence linking cardiovascular mortality with short-term ozone exposures, the epidemiological studies of non-fatal outcomes do not provide consistent evidence for a coherent mechanism linking ozone exposures to cardiovascular mortality (U.S. EPA 2013b).

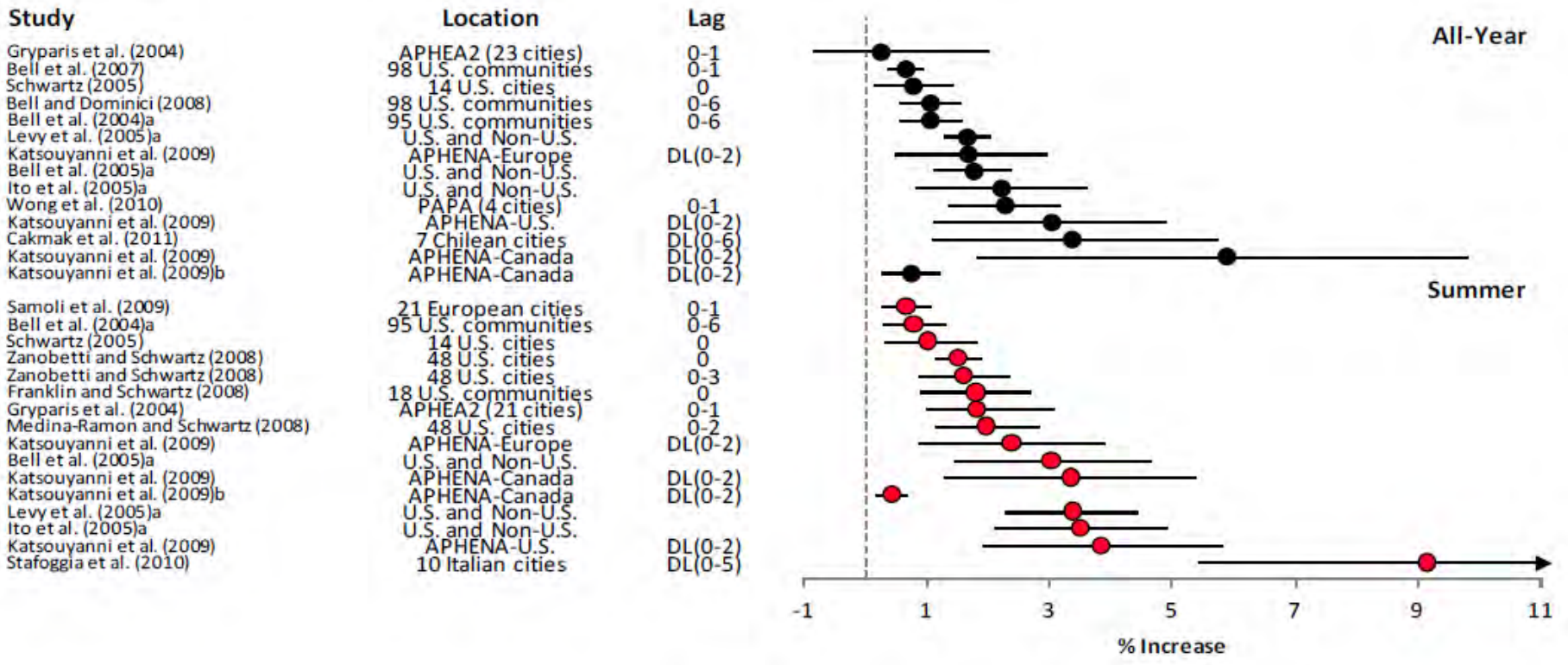
Examples of studies showing the relative change in mortality risks for all-year and summer-only analyses are shown in Figure I-3.



Note: Effect estimates are for a 20 ppb increase in 24-hour; 30 ppb increase in 8-hour max; and 40 ppb increase in 1-hour max O_3 concentrations. HA=hospital admission; ED=emergency department. Black=All-year analysis; Red=Summer only analysis; Blue=Winter only analysis. (From (U.S. EPA 2013b) Figure 6-19)

FIGURE I-2

Change in respiratory-related hospital admission and emergency department visits in studies that presented all-year and/or seasonal results.



Note: Effect estimates are for a 40 ppb increase in 1-hr max, 30 ppb increase in 8-hr max, and 20 ppb increase in 24-hr average O_3 concentrations. (From (U.S. EPA 2013b) Figure 6-27)

FIGURE I-3

Summary of mortality risk estimates for short-term O_3 exposure and all-cause (nonaccidental) mortality.

Long-Term Exposure Effects of Ozone

The U.S. EPA 2013 ISA for Ozone concluded that there was a likely causal relationship between long-term ozone exposure and respiratory effects (U.S. EPA 2013b). Evidence supporting this determination comes from epidemiological and toxicological studies, particularly studies of asthma and related symptoms, asthma-related hospital admissions, lung function, lung inflammation and oxidative stress. Other health effects of long-term ozone exposure were determined to have "suggestive" or "inadequate" evidence of causality, although the few studies of respiratory mortality provide support to the respiratory health effects of ozone.

The Adventist Health and Smog Study (AHSMOG) and Children's Health Study cohorts are two large long-term studies conducted in California that examined several aspects of long-term ozone effects in adults and children, respectively. Several of these studies focused on asthma development and exacerbation. The AHSMOG study included adult, non-smoking, non-Hispanic white Seventh Day Adventists living in California. The 10-year follow-up AHSMOG study reported that a 10 ppb increase in annual mean ozone exposures increased the risk of asthma development in males by three-fold (relative risk 3.12, 95 percent confidence interval: 1.16, 5.85), but no effect was seen among females (relative risk 0.94, 95 percent confidence interval: 0.65, 1.34) (Greer et al. 1993). The 15-year follow-up AHSMOG study used an ozone metric focusing on 8-hour average exposures, and reported that a 10 ppb increase was associated with a 30 percent increased risk of developing asthma in males (relative risk 1.31, 95 percent confidence interval: 1.01, 1.71), and these effects persisted even after accounting for other pollutants (McDonnell et al. 1999). The latter study also found no effect in females, although this may reflect a greater potential for misclassification of air pollution exposure in females compared to males, due to different time-activity patterns resulting in greater time spent outdoors among males (U.S. EPA 2013b). In the Children's Health Study, among children living in 12 Southern California communities with high ozone concentrations, the relative risk of developing asthma in children playing three or more sports was found to be over three times higher than in children playing no sports (McConnell et al. 2002). The high ozone communities had a 4-year mean daytime ozone concentration of 59.6 ppb, compared to 40.0 ppb for the low-ozone communities. These findings indicate that new cases of asthma in children may be associated with performance of heavy exercise in communities with high levels of ozone. While it has long been known that air pollution can exacerbate symptoms in individuals with preexisting respiratory disease, this is among the first studies that indicate ozone exposure may contribute to asthma onset. However, three more recent Southern California studies did not find an association between ozone exposures and childhood asthma incidence, but did report increased risks of asthma onset with higher exposures to particulate matter or NO_2 (Islam et al. 2007; McConnell et al. 2010; Nishimura et al. 2013). These studies did not examine whether genetic factors may have played a role in making some people more susceptible than others to the respiratory effects of ozone exposure. Some analyses from the Children's Health Study identified specific genetic variants that, when combined with ambient ozone exposure, either increase or decrease the risk of developing asthma (Islam et al. 2008; Islam et al. 2009; Salam et al. 2009). These genetic variants are involved with antioxidant and/or anti-

inflammatory pathways, and are likely involved in key elements of asthma development (U.S. EPA 2013b).

Other studies examined the impact of long-term ozone exposures and respiratory symptoms, particularly among asthmatics. Studies have linked long-term ozone exposures to increased risk of having poorly-controlled asthma, increased asthma symptoms, and respiratory-related school absences (Gilliland et al. 2001; Akinbami et al. 2010; Jacquemin et al. 2012). An analysis from the CHS found no association between long-term ozone exposures and chronic lower respiratory tract symptoms, and another found an increased risk of bronchitic symptoms within a community, although the association was reduced when accounting for other pollutants (McConnell et al. 1999; McConnell et al. 2003). However, two studies from the CHS demonstrated gene-environment interactions for genes that are involved in inflammation or antioxidant pathways. One study found that asthmatic children with a particular genetic variant that reduces expression of the cytokine TNF-α (as part of an inflammatory response) had reduced risk of bronchitic symptoms for children in low-ozone communities, but not for children in high-ozone communities (Lee et al. 2009). A second study found that a particular genetic variant reduced the risk of respiratory-related school absences among children living in communities with high levels of ozone (defined in this study as being above the median value of 46.9 ppb) (Wenten et al. 2009).

Results of epidemiologic studies of hospital admissions and emergency department visits support the relationship between ozone exposure and respiratory effects. In a 2007 study conducted in Southern California, an increased risk of having poorly-controlled asthma was associated with living in areas above the 90th percentile ozone level (28.7 ppb, annual average) among men and elderly individuals (Meng et al. 2007). A study in the South Coast Air Basin found that ozone was associated with increased hospital discharges for asthma among children (Moore et al. 2008). Another study in the South Coast Air Basin looked at infants hospitalized for bronchiolitis. This study found a reduced risk of infant bronchiolitis hospitalization with increased ozone exposure, although there was no association for ozone when accounting for the effect of PM2.5, which was positively associated with this respiratory outcome (Karr et al. 2007). A study of people with asthma was conducted in the San Joaquin Valley of California, and found that a 10 ppb increase in ozone exposures averaged over one year increased the odds of asthma-related hospital admissions and emergency department visits by approximately 50 percent, and the odds of asthma symptoms among adults by about 40 percent (Meng et al. 2010). Studies conducted in other locations have also reported increases in asthma hospitalizations (U.S. EPA 2013b).

Some animal studies show results that indicate possible chronic effects including functional and structural changes of the lung. However, morphological, developmental, and immunological differences make it difficult to apply these results to humans experiencing ambient exposures. These changes observed in airway responsiveness provide support for the long-term effects of ozone in asthma development or exacerbation (U.S. EPA 2013b). However, epidemiologic studies examining long-term ozone exposures and lung function deficits have reported mixed results. For example, an analysis of the first CHS cohort found that PM2.5 and NO_2 exposures were associated with decreased

lung function, but did not find an association for ozone (Gauderman et al. 2004). An autopsy study involving Los Angeles County residents who died between ages 14 and 25 years due to violent death, although conducted many years ago when pollutant levels were higher than currently measured, provided supportive evidence of lung tissue damage (structural changes), which the authors suggested were attributable to air pollution (Sherwin 1991), although many uncertainties remain about the extent to which air pollution explains the findings.

Unlike short-term ozone exposures, there is limited evidence linking long-term ozone exposures with mortality. A large study based on the American Cancer Society Cancer Prevention Study II (CPS-II) cohort included 96 metropolitan statistical areas in the U.S., and reported that a 10 ppb increase in daily maximum 1-hour ozone concentrations averaged between April and September (warm season) was associated with a relative risk of 1.040 (95 percent confidence interval: 1.010, 1.067) for respiratory deaths, but no association with cardiovascular deaths (Jerrett et al. 2009). A U.S. study of Medicare enrollees reported increased risk of mortality with higher ozone exposures averaged over the warm season, among patients who had previously been hospitalized for congestive heart failure, myocardial infarction, COPD and diabetes (Zanobetti et al. 2011). A recent large-scale study found increased risk of all-cause, cardiovascular, and respiratory mortality with long-term ozone exposures, even after accounting for the effects of PM2.5 and NO_2, as well as other behavioral and demographic factors, including smoking (Turner et al. 2016). Other studies have found temperature to be an important potential risk factor for mortality, and may confound or modify the associations between air pollution exposure and mortality (Basu et al. 2002; Cheng et al. 2008). The Turner 2016 study examined the role of temperature, and found that the associations between ozone and mortality differed based on average daily maximum temperatures (Turner et al. 2016). While the U.S. EPA determination in the latest ISA was that the evidence was suggestive of long-term ozone exposure causing mortality, the studies of respiratory mortality support the evidence for the respiratory effects of ozone exposure, for which U.S. EPA has concluded there is a causal relationship.

For non-respiratory health endpoints, the U.S. EPA causal determinations were “suggestive of a causal relationship” (for cardiovascular, reproductive and developmental, central nervous system and mortality effects) or “inadequate to infer a causal relationship” (for cancer). Some studies conducted in California have examined reproductive or developmental effects, including birth defects, low birth weight or birth weight reductions, stillbirth and autism (Ritz et al. 2002; Ritz et al. 2007; Morello-Frosch et al. 2010; Becerra et al. 2013; Mobasher et al. 2013; Trasande et al. 2013; Laurent et al. 2014; Green et al. 2015; Symanski et al. 2016). Other recent studies have examined cardiovascular effects (Koken et al. 2003; Ensor et al. 2013; Rodopoulou et al. 2014). While many of these studies have reported associations with ambient ozone levels, the most recent U.S. EPA determination in 2013 was that the evidence was suggestive of a causal determination, but did not yet rise to a higher level.

Sensitive Populations for Ozone-Related Health Effects

A number of population groups are potentially at increased risk for ozone exposure effects. In the most recent ISA for ozone in 2013, the U.S. EPA has identified several populations as having adequate evidence for increased risk from ozone exposures. These include children, older adults, outdoor workers, and individuals with asthma, certain variations in genes related to oxidative metabolism or inflammation, or reduced intake of certain nutrients such as Vitamins C and E (Kreit et al. 1989; Horstman et al. 1995; Sienra-Monge et al. 2004; Romieu et al. 2012; U.S. EPA 2013b; Bell et al. 2014). There is suggestive evidence for other potential factors, such as a person's sex, socioeconomic status, and obesity (U.S. EPA 2013b). Some other factors that could affect sensitivity to ozone have also been studied; however, there was inadequate evidence to conclude whether these were risk factors for ozone sensitivity. The table below summarizes the evidence for factors affecting sensitivity to ozone from the 2013 ISA for ozone.

TABLE I-3

Summary of Evidence for Potential Increased Susceptibility to Ozone-Related Health Effects

Evidence Classification	Potential At Risk Factor
Adequate evidence	Genetic factors Asthma Children Older adults Diet Outdoor worker
Suggestive evidence	Sex SES Obesity
Inadequate evidence	Influenza/infection COPD Cardiovascular disease Diabetes Hyperthyroidism Race/ethnicity Smoking Air conditioning use
Evidence of no effect	--

From (U.S. EPA 2013b) Table 8-6

As previously mentioned, one group that has been recognized as being particularly sensitive to the effects of ozone is young children with asthma, because their lungs are still developing, their potential for increased exposure due to time spent exercising outdoors, and their high ventilation rates relative to body weight (U.S. EPA 2013b). Some factors that may contribute to the increased sensitivity among people with asthma include having an altered innate immune function and factors that decrease their antioxidant defenses (Alexis et al. 2014). Ozone creates secondary oxidation products that are electrophilic, and certain genetic factors influence a person's ability to metabolize

these electrophiles, which can affect respiratory function (U.S. EPA 2013b). Asthma exacerbations are more prevalent and severe in young boys than in girls, but the evidence on whether boys are more susceptible than girls to the effects of air pollution on asthma symptoms is not consistent (Guarnieri et al. 2014).

Summary – Ozone Health Effects

In summary, outdoor ozone exposures have been associated with a range of negative human health effects. The strongest evidence for negative health impacts are on the respiratory system, and are measured by decreased lung function performance and increased cell injury. In addition, the 2013 ISA also concluded that there was a likely causal relationship between short-term ozone exposures and cardiovascular effects (such as changes in heart function, and increased systemic inflammation and oxidative stress) as well as respiratory mortality. Although the specific mechanisms of action for ozone effects on the various health endpoints have not been fully identified, there is evidence of the important roles of oxidation of key enzymes and proteins, inflammatory responses, changes in immune response, and modification and activation of neural reflex pathways (U.S. EPA 2013b).

The previous U.S. EPA review of ozone in the 2006 Air Quality Criteria Document (AQCD) had already concluded that there was clear, consistent evidence that acute ozone exposure is causally associated with respiratory effects (U.S. EPA 2006). Additionally, the 2006 AQCD for ozone concluded that the evidence was highly suggestive of ozone causing mortality, but that there was limited evidence for ozone causing cardiovascular effects. In the 2013 ISA, the U.S. EPA cited that several lines of evidence provide support for the respiratory effects of ozone, including human exposure studies, epidemiology and toxicology, which led to the conclusion that there was a causal relationship with short-term ozone exposures, and a likely causal relationship with long-term ozone exposures. In humans, respiratory effects were detected in laboratory studies at 0.06 ppm ozone concentrations, and in epidemiological studies with average ozone concentrations as low as 0.03 ppm (Strickland et al. 2010; Kim et al. 2011). Some populations are more sensitive to the health effects of ozone than others, including elderly persons, children, outdoor workers and persons with asthma.

PARTICULATE MATTER

Airborne particulates are a complex group of pollutants that vary in physical, chemical, and biological dimensions. Physically, particles can vary by size, surface area and roughness, shape, and mass. Chemically, they vary by chemical composition. Biologically, they can vary by toxicity. In addition, particles vary by source, and can come from anthropogenic (man-made, such as from combustion of fuels, or frictional abrasion) or “natural” (plants – for example, pollens and spores) origins. The composition of particulate matter can vary across sub-regions, and a description of the spatial differences in PM composition can be found in the draft 2016 AQMP Chapter 2 and Appendix II.

The National Ambient Air Quality Standard for particulate matter was established in 1971, and set limits on the ambient level of Total Suspended Particulates (TSP). In 1987, the national particulate matter standards were revised to focus on particles sized 10 µm (micrometers) aerodynamic diameter and smaller. These can be inhaled and deposited throughout the upper and lower

respiratory system, depositing in both airways and gas-exchange areas of the lung. These particles are referred to as PM10. U.S. EPA initially promulgated ambient air quality standards for PM10 of 150 μg/m^3 averaged over a 24-hour period, and 50 μg/m^3 for an annual average. U.S. EPA has since rescinded the annual PM10 standard, but kept the 24-hour standard.

As more health research data has become available, concerns have centered on smaller and smaller particles. Additional focus has been placed on particles having an aerodynamic diameter of 2.5 μm or less (PM2.5). A greater fraction of particles in this size range can penetrate and deposit deep in the lungs. The U.S. EPA established standards for PM2.5 in 1997 and in 2006 lowered the air quality standards for PM2.5 to 35 μg/m^3 for a 24-hour average and reaffirmed 15 μg/m^3 for an annual average standard. There was considerable controversy and debate surrounding the review of particulate matter health effects and the consideration of ambient air quality standards (Kaiser 1997; Vedal 1997) when the U.S. EPA promulgated the initial PM2.5 standards in 1997. In 2002, the California Air Resources Board adopted an air quality standard for PM2.5 at a level of 12 μg/m^3, in the form of an annual average.

Since that time, additional studies have been published and some of the key studies were closely scrutinized and the data reanalyzed by additional investigators. The reanalyses confirmed the original findings, and there are now additional data confirming and extending the range of the adverse health effects of PM2.5 exposures. In 2012, the U.S. EPA revised the PM2.5 annual average standard to 12.0 μg/m^3 (U.S. EPA 2013c). This federal standard is set at same level as the current California PM2.5 annual standard, although the California standard does not have a specified attainment date. In 2014, the U.S. EPA announced it is preparing an ISA as part of the review of the federal PM standards (the process is described briefly in the draft AQMP Chapter 8). The draft AQMP Chapter 2 and Appendix II provide additional information about how PM levels in the South Coast Air Basin compare to the federal and state standards.

There have been several reviews of the health effects of ambient particulate matter (American Thoracic Society 1996a; Brunekreef et al. 2002; U.S. EPA 2004; U.S. EPA 2009; Brook et al. 2010). In addition, the California Air Resources Board (CARB) and the Office of Environmental Health and Hazard Assessment (OEHHA) have reviewed the adequacy of the California Air Quality Standards for Particulate Matter (California Air Resources Board and Office of Environmental Health Hazard Assessment 2002).

The major types of health effects associated with particulate matter include:

- Increased mortality
- Exacerbation of respiratory disease and of cardiovascular disease as evidenced by increases in:
    - Respiratory symptoms, exacerbation of asthma
    - Cardiovascular symptoms, non-fatal myocardial infarction
    - Hospital admissions and emergency room visits

- Physician office visits
- School absences

- Adverse birth outcomes
- Effects on lung function
- Changes in lung morphology

In the 2009 Integrated Science Assessment for Particulate Matter, the U.S. EPA presented conclusions on the particulate matter causal determination of several health effects based on an updated review of scientific studies (U.S. EPA 2009). The conclusions are presented separately for particulates in the size range of 2.5 to 10 micrometers (µm) in aerodynamic diameter (PM10-2.5, often referred to as the coarse fraction) and those ≤2.5 µm (PM2.5, or fine particles). Of note, there is currently no federal or California standard for PM10-2.5, although a PM10 standard remains in effect. These conclusions are depicted in the following tables.

TABLE I-4

Summary of U.S. EPA's Causal Determinations for Health Effects of PM10-2.5

SHORT-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Cardiovascular effects	Suggestive of a causal relationship
Respiratory effects	Suggestive of a causal relationship
Mortality	Suggestive of a causal relationship
LONG-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Cardiovascular effects	Inadequate to infer a causal relationship
Respiratory effects	Inadequate to infer a causal relationship
Mortality	Inadequate to infer a causal relationship
Reproductive and developmental	Inadequate to infer a causal relationship

(From (U.S. EPA 2009) Table 2-3 and Section 2.3.4)

There are also differences in the composition and sources of particles in the different size ranges that may have implications for health effects. The particles in the coarse fraction (PM10-2.5) are mostly produced by mechanical processes. These include automobile tire wear, industrial processes such as cutting and grinding, and resuspension of particles from the ground or road surfaces by wind and human activities, such as agricultural, mining, and construction operations, which may be particularly important in rural areas.

TABLE I-5

Summary of U.S. EPA's Causal Determinations for Health Effects of PM2.5

SHORT-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Cardiovascular effects	Causal relationship
Respiratory effects	Likely to be a causal relationship
Central nervous system	Inadequate to infer a causal relationship
Mortality	Causal relationship
LONG-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Cardiovascular effects	Causal relationship
Respiratory effects	Likely to be a causal relationship
Mortality	Causal relationship
Reproductive and developmental	Suggestive of a causal relationship
Cancer, Mutagenicity, Genotoxicity	Suggestive of a causal relationship

(From (U.S. EPA 2009) Tables 2-1 and 2-2)

In contrast, particles smaller than 2.5 µm are mostly derived from combustion sources, such as automobiles, trucks, and other vehicle exhaust, as well as from stationary combustion sources. The particles are either directly emitted or are formed in the atmosphere from gases that are emitted. Components from material in the earth's crust, such as dust, are also present, with the amount varying in different locations.

Attention to another range of very small particles has been increasing over the last several years. These are generally referred to as "ultrafine" particles, with diameters of 0.1 µm or less. Ultrafine particles are mainly composed of particles from fresh emissions of combustion sources, but are also formed in the atmosphere by condensation of vapors that are emitted or by chemical or photochemical reactions with other contaminants in the air.

Ultrafine particles have relatively short half-lives (minutes to hours) and the particle size rapidly grows through condensation and coagulation processes into particles within the PM2.5 size range. Ultrafine particles are garnering interest since a limited number of epidemiological and some laboratory studies, though not all, indicate that their toxicity may be higher on a mass basis than larger particles. There is also evidence that these small particles, or toxic components carried on their surface, can translocate from the lung to the blood and to other organs of the body, or through the olfactory bulb into the brain (U.S. EPA 2009). Currently, there are no federal or California

standards for ultrafine particles. As such, the health effects of ultrafine particles is discussed in a separate section following the discussion of PM10 and PM2.5.

The current federal and California standards for particulate matter are listed in Table I-6.

TABLE I-6

Ambient Air Quality Standards for Particulate Matter

STANDARD	FEDERAL	CALIFORNIA
PM10 24-Hour average	150 μg/m^3	50 μg/m^3
PM10 Annual Average	--	20 μg/m^3
PM2.5 24-Hour Average	35 μg/m^3	--
PM2.5 Annual Average	12 μg/m^3	12 μg/m^3

Short-Term Exposure Effects of PM

Epidemiological studies have provided evidence for most of the effects listed above. In an extensive report focusing on the history of particulate matter research, the U.S. EPA reviewed several well-conducted studies that reported an association between mortality and increased daily or several-day-average concentrations of PM10 (U.S. EPA 2004). In addition, excess mortality and morbidity are reported in many studies involving communities across the U.S. as well as in Europe, Asia, and South America (U.S. EPA 2009; Lu et al. 2015; Shah et al. 2015; Cai et al. 2016), although there are some studies that show no effect for the specific exposures and outcomes evaluated (Milojevic et al. 2014; Wang et al. 2015; Zu et al. 2016). While there were some studies conducted in California, the importance of assessing results from studies from many different locations around the world should not be understated. The repeatability and consistency of results across many locations strengthens the weight of evidence in the determination of causality.

A review and analysis of epidemiological literature for acute adverse effects of particulate matter was published by the American Thoracic Society in 1996, where several adverse effects were listed as associated with daily PM10 exposures (Table I-7). The review also reported that individuals who are elderly or have preexisting lung or heart disease are more susceptible than others to the adverse effects of PM10 (American Thoracic Society 1996a).

TABLE I-7

Combined Effect Estimates of Daily Mean Particulate Pollution (PM10)

	% CHANGE IN HEALTH INDICATOR PER EACH 10 µg/m^3 INCREASE IN PM10
Increase in Daily Mortality	
Total deaths	1.0
Respiratory deaths	3.4
Cardiovascular deaths	1.4
Increase in Hospital Usage (all respiratory diagnoses)	
Admissions	1.4
Emergency department visits	0.9
Exacerbation of Asthma	
Asthmatic attacks	3.0
Bronchodilator use	12.2
Emergency department visits*	3.4
Hospital admissions	1.9
Increase in Respiratory Symptom Reports	
Lower respiratory	3.0
Upper respiratory	0.7
Cough	2.5
Decrease in Lung Function	
Forced expiratory volume	0.15
Peak expiratory flow	0.08

* One study only
(From: (American Thoracic Society 1996a))

Since then, many more recent studies have provided additional evidence that excess mortality and morbidity are associated with short-term exposure to PM10 and PM2.5 (Pope et al. 2006).

Estimates of mortality effects from studies of PM10 exposures range from 0.3 to 1.7 percent increase for a 10 µg/m^3 increase in PM10 levels. The National Morbidity, Mortality, and Air Pollution Study (NMMAPS), a study of 20 of the largest U.S. cities, determined a combined risk estimate of about a 0.5 percent increase in total mortality for a 10 µg/m^3 increase in PM10 (Samet et al. 2000a). This

study also analyzed the effects of gaseous co-pollutants. When the gaseous pollutants were included in the analyses, the estimated associations between PM10 and mortality remained, though they were somewhat reduced. These results suggest that the effects reported in the study are likely due to the particulate exposures; they cannot readily be explained by coexisting weather stresses or other pollutants.

An expansion of the NMMAPS study to 90 U.S. cities also reported association with PM10 levels and mortality (Samet et al. 2000b; Health Effects Institute 2003). After the study was published, it was discovered that some of the study analyses had been performed with incorrect default values. The strong positive association between acute PM10 exposure and mortality remained, both upon reanalysis using revised software and using alternative modeling approaches (Dominici et al. 2002; Health Effects Institute 2003).

Studies of short-term exposures to PM2.5 have also found associations with increases in mortality. The NMMAPS study conducted a national analysis of PM2.5 mortality association for 1999-2000. The risk estimates were 0.29 percent for all-cause mortality and 0.38 percent for cardio-respiratory mortality (Dominici et al. 2007). In its 2009 review, U.S. EPA determined that estimates for PM2.5 generally are in the range of 0.29 to 1.21 percent increase in total deaths per 10 $\mu g/m^3$ increase in 24-hour PM2.5 levels. The estimates for cardiovascular related mortality range from 0.03 to 1.03 percent per 10 $\mu g/m^3$, and for respiratory mortality estimates range from 1.01 to 2.2 percent per 10 $\mu g/m^3$ 24-hour PM2.5 (U.S. EPA 2009). Figure I-4 shows a summary of U.S. and Canadian studies of mortality and short-term PM2.5 exposures, which shows that the most consistent positive associations were seen with cardiovascular and all-cause deaths. Positive associations for respiratory deaths were also seen in several of these studies, although the precision of the estimates for respiratory deaths was lower relative to that of all-cause or cardiovascular deaths.

Several studies have attempted to assess the relative importance of particles smaller than 2.5 µm and those between 2.5 µm and 10 µm (PM10-2.5). While some studies report that PM2.5 levels are better predictors of mortality effects, others suggest that PM10-2.5 is also important. Most of the studies found higher mortality associated with PM2.5 levels than with PM10-2.5. For example, a study of six cities in the U.S. found that particulate matter less than 2.5 µm was associated with increased mortality, but that the larger particles were not. In the U.S. EPA review (U.S. EPA 2009), several studies were presented that found associations of PM10-2.5 and mortality. Some of the studies showed differences by region of the U.S. In one study of 47 U.S. cities that had both PM2.5 and PM10 data available to calculate PM10-2.5 as a difference, overall, the study found a significant association between the computed PM10-2.5 and all-cause, cardiovascular, and respiratory mortality. The study also reported differences by season and climate area (Zanobetti et al. 2009).

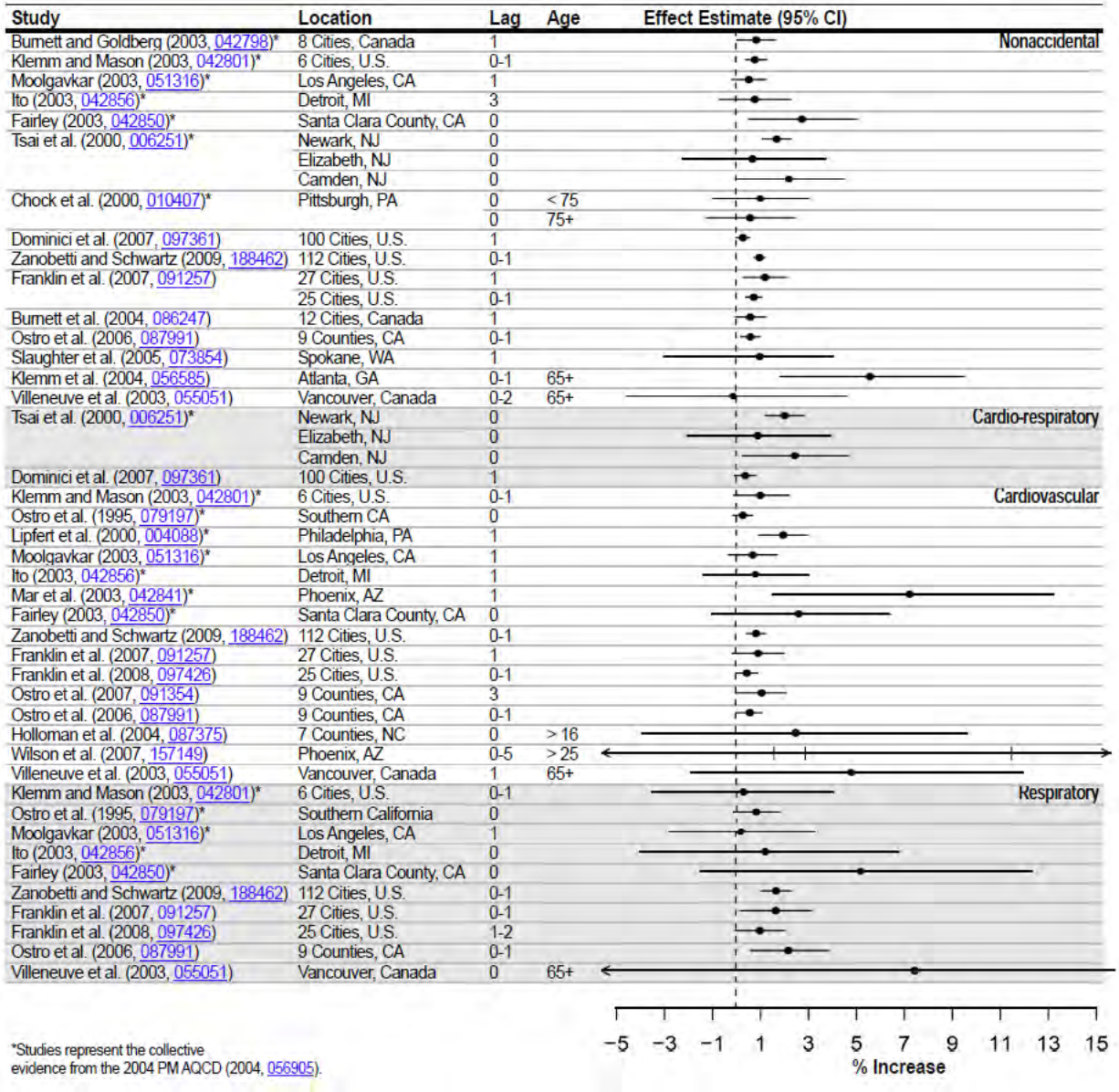


FIGURE I-4

Summary of Non-accidental All-Cause and Cause-Specific Mortality per 10 µg/m3 Increase in PM2.5 Short-term Exposures, for U.S.- and Canadian-based studies (from (U.S. EPA 2009), Figure 6-27). "Lag" indicates the number of days between the exposure and the outcome assessed.

A major knowledge gap in understanding the relative importance of "fine" PM (PM2.5) and "coarse" PM (PM10-2.5) is the relative lack of direct measurements of PM10-2.5. Most estimates are made by subtracting PM2.5 from PM10 measured at co-located samplers, a process that is subject to errors that are inherent in the subtracting of one relatively large number from another. More research is needed to better assess the relative effects of coarse (PM10-2.5) fractions of particulate matter on mortality. A graph from the U.S. EPA review is included in the figure below to demonstrate ranges

of mortality findings associated with coarse particulates. Consistent positive associations are seen, particularly for cardiovascular and nonaccidental all-cause mortality, with varying degrees of precision across the different studies.

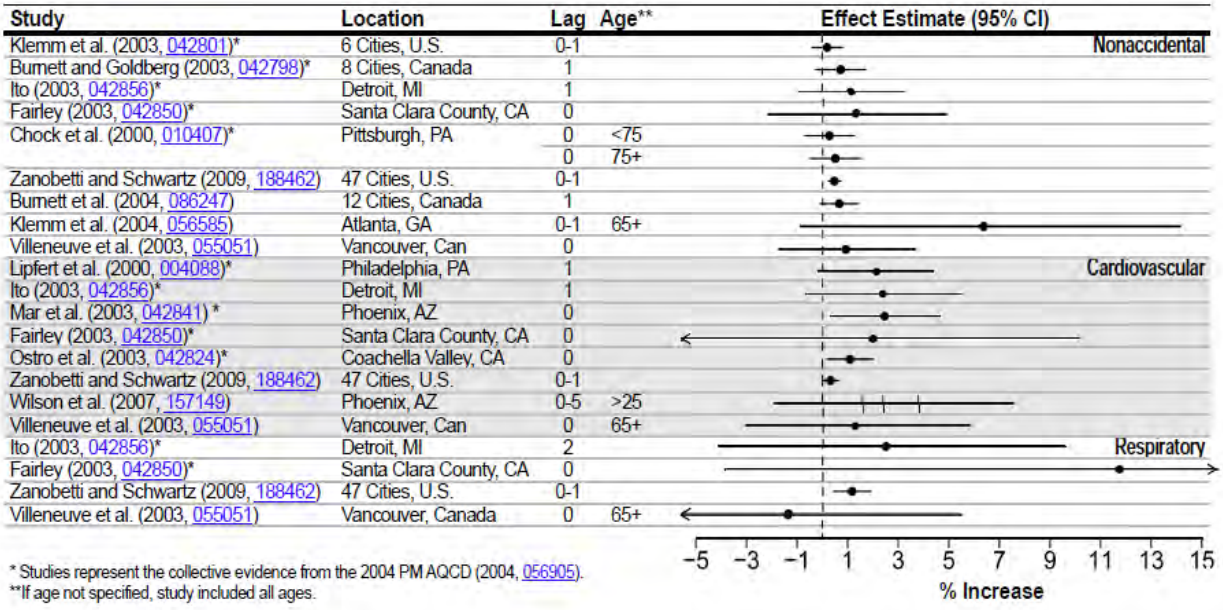


FIGURE I-5

Summary of Percent Increase in Total (Nonaccidental) and Cause-Specific Mortality Per 10 µg/m3 Increase in PM10-2.5 Short-term Exposure (from (U.S. EPA 2009), Figure 6-30). "Lag" indicates the number of days between the exposure and the outcome assessed.

A number of studies have evaluated the association between particulate matter exposure and indices of morbidity such as hospital admissions, emergency room visits or physician office visits for respiratory and cardiovascular diseases. The effect estimates for these various morbidities are generally higher than the estimates for mortality. Observed effects have been associated with PM10, PM2.5 and PM10-2.5.

In the NMMAPS study, hospital admissions for those 65 years or older were assessed in 14 U.S. cities. Several models were compared to estimate associations of hospital admissions for specific disease categories and short-term PM10 levels. Hospital admissions showed an increase ranging from 0.68 – 1.47 percent for cardiovascular diseases, a range of 1.46 – 2.88 percent increase for COPD, and a range of 1.31 – 2.86 percent increase for pneumonia per 10 µg/m^3 increase in PM_{10} (Samet et al. 2000b). In the reanalysis of the study (Health Effects Institute 2003), it was found that when using different models, the pollution coefficients were generally lower. However, the authors note that most of the conclusions of associations with PM10 exposures and hospital admissions held. Two recent Southern California studies evaluated associations between short-term PM2.5 levels and asthma-related hospital or emergency admissions. One study, based in Orange County, reported

increased risk of asthma-related hospital encounters with increased ozone and PM2.5 in the warm seasons, and with CO, NO_x, and PM2.5 in the cool seasons (Delfino et al. 2014). The second study, conducted in Los Angeles County, reported monthly average PM2.5, CO, and NO_2 levels were positively associated with asthma hospitalization rates (Delamater et al. 2012).

Similarly, school absences, lost workdays, and restricted activity days have also been used in some studies as indirect indicators of acute respiratory conditions (Ostro 1987; Ostro 1990; Ransom et al. 1992; Gilliland et al. 2001; Park et al. 2002; Hales et al. 2016). These observations help support the hypotheses that particulate matter exposures increase inflammation in the respiratory tissues and may also increase susceptibility to infection (U.S. EPA 2009).

Some studies have reported that short-term particulate matter exposure is associated with changes in lung function (lung capacity and breathing volume); upper respiratory symptoms (hoarseness and sore throat); and lower respiratory symptoms (increased sputum, chest pain and wheeze). The severity of these effects is widely varied and is dependent on the population studied, such as adults or children with and without asthma. Sensitive individuals, such as those with asthma or pre-existing respiratory disease, may have increased or aggravated symptoms associated with short-term particulate matter exposures. Several studies have followed the number of medical visits associated with pollutant exposures. A range of increases from 1 to 4 percent for medical visits for respiratory illnesses was found corresponding to a 10 $\mu g/m^3$ change in PM10. A number of studies also looked at levels of PM2.5 or PM10-2.5. The findings suggest that both the fine and coarse fractions may have associations with some respiratory symptoms (U.S. EPA 2009). Among the newer health endpoints evaluated in recent studies of short-term effects of PM2.5 is stroke. One recent meta-analysis evaluated 16 studies of short-term PM2.5 exposures and estimated a 5 percent increased risk of stroke for each 10 $\mu g/m^3$ increase in PM2.5 (Shin et al. 2014).

The biological mechanisms by which particulate matter can produce health effects have been investigated in laboratory studies. Brook et al. (Brook et al. 2010) summarized three likely pathways by which PM exerts it effects on cardiovascular health outcomes: (1) PM can activate inflammatory pathways and cause systemic oxidative stress, leading to the production of pro-inflammatory cytokines; (2) PM can disrupt the autonomic nervous system leading to increased blood pressure, increased arrhythmic potential, and decreased heart rate variability; and (3) PM, particularly UFPs or particle constituents such as organic compounds and metals, can enter the bloodstream and cause increased constriction of the blood vessels and increased blood pressure. Each of these pathways may also lead to the formation of reactive oxygenated species (ROS, or free radicals) that can cause DNA oxidation and systemic inflammation. Inflammatory responses in the respiratory system in humans and animals can lead to inflammation in fat tissues and in the liver, which can lead to vascular dysfunction (e.g. atherosclerosis), changes in metabolic function (e.g. insulin resistance), and increased thrombotic potential (Brook et al. 2010). Several reviews discuss mechanistic studies in detail (Brunekreef et al. 2002; Brook et al. 2004; Brook et al. 2010). A study in cells using ambient air samples in communities near railyards in the South Coast Air Basin found that the PM2.5 phase of ambient air pollution contains prooxidant components, primarily metals, which can trigger an

inflammatory response in the cells (Eiguren-Fernandez et al. 2015; Cho 2016). The same study noted that vapor phase pollutants, which contain most of the electrophiles, may trigger a different biological response in the cells, suppressing inflammatory responses and could result in a reduced ability to fight off infections.

Some studies have examined the health effects of short-term exposures to specific PM constituents and sources (Lippmann 2014; Basagana et al. 2015; Atkinson et al. 2016). While there is some evidence suggesting possible links with specific constituents or sources, such as diesel exhaust, sulfates (related to coal combustion), and certain metals, the U.S. EPA determined that there were not enough studies evaluating short-term constituent- or source-specific exposures at the time of the previous Integrated Science Assessment to be able to make a causal determination (U.S. EPA 2009).

Long-Term Exposure Effects of PM

Numerous studies have evaluated the health effects of long-term (months to years) or chronic exposure to particulate matter, with the largest number of studies examining cardiovascular and respiratory health endpoints, as well as mortality. Other health outcomes that have been linked to long-term PM exposures include reproductive effects, cancer outcomes, and, more recently, metabolic syndromes and neurological effects. The U.S. EPA 2009 Integrated Science Assessment for Particulate Matter (ISA for PM) concluded that sufficient evidence is available to support a causal determination for long-term PM2.5 exposures and cardiovascular and mortality effects, and a likely causal relationship for respiratory effects. A summary of the evidence is presented below, focusing on the long-term effects of PM2.5 exposures.

Many research studies, including some recent studies, have evaluated the health effects of exposures to air pollutants from traffic emissions using a variety of exposure modeling techniques (Hart et al. 2014; Harris et al. 2015; Kingsley et al. 2015; Rice et al. 2015; Danysh et al. 2016). In general, these articles are not discussed in detail here, because of the difficulty in attributing the observed effects to a specific pollutant or combination of pollutants. However, these studies do provide supporting evidence that air pollutants from traffic exhaust are linked to health effects in humans.

Long-Term Particulate Matter Exposures and Mortality

Since the initial promulgation by U.S. EPA of the National Ambient Air Quality Standards for PM2.5, controversy has remained over the association of mortality and exposures to PM2.5. Several large, prospective cohort studies conducted in the U.S. and Canada were used to evaluate long-term PM exposures and mortality, including total number of deaths and deaths due to specific causes. The strongest and most consistent evidence of long-term PM2.5 effects are for cardiovascular mortality, particularly ischemic heart disease, and there is evidence that ambient PM2.5 exposure is associated with and lung cancer mortality (Dominici et al. 2006; Krewski et al. 2009; Jerrett et al. 2013; International Agency for Research on Cancer 2015). Below is a brief discussion of the evidence linking

PM and mortality reviewed in the U.S. EPA 2009 ISA along with more recently published studies, with a focus on large prospective studies and studies conducted in California or Southern California.

In the assessment of evidence for mortality outcomes linked to long-term PM exposures, the 2009 U.S. EPA ISA for PM reviewed 15 studies evaluating PM2.5 exposures, 2 studies evaluating PM10-2.5 exposures, and 5 studies evaluating PM10 exposure. The majority of these studies were conducted in the United States, and 3 of the studies of PM2.5 exposures were conducted in California or Southern California. Previous reviews conducted in 1996 and 2004 by U.S. EPA assessed evidence primarily from large prospective cohort studies, such as the Harvard Six Cities Study (Dockery et al. 1993), the American Cancer Society (ACS) Study (Pope et al. 1995; Pope et al. 2002), and the Seventh-Day Adventist Health Air Pollution (AHSMOG) Study (Abbey et al. 1999; McDonnell et al. 2000). The U.S. EPA 2004 PM Air Quality Criteria Document concluded that there was strong evidence linking long-term PM2.5 exposures to all-cause and cardiopulmonary mortality, but not enough evidence for a link with PM10-2.5. The 2009 U.S. EPA ISA for PM similarly concluded that the newer studies provide additional evidence to support a causal determination for long-term PM2.5 exposures and increased mortality risk, but there continues to be insufficient evidence supporting such a link with particles in the coarse fraction. This most recent U.S. EPA review evaluated the additional updated analyses of the previously-established large cohort studies (Harvard Six Cities, ACS, AHSMOG, and Veterans studies), and noted two new major cohorts that provide further evidence linking PM2.5 and mortality: the Women's Health Initiative (WHI) study (Miller et al. 2007) and the Medicare Cohort Studies (Eftim et al. 2008).

The American Cancer Society Cancer Prevention Study II (ACS) is a large, prospective national cohort study of over one million participants in the U.S. recruited from all 50 states, the District of Columbia and Puerto Rico, and followed over many years. Over the past two decades, studies using data from this cohort have reported associations for PM2.5 for both total mortality and cardiorespiratory mortality (Pope et al. 1995; Krewski 2000; Pope et al. 2002; Jerrett et al. 2005; Krewski et al. 2009; Jerrett et al. 2013; Pope et al. 2015). The survey included several measures of smoking and exposure to second-hand smoke, which were included in the statistical models to account for the potential confounding effects of smoking. The original study reported that long-term exposures to fine particulate air pollution were associated with cardiopulmonary and lung cancer mortality (Pope et al. 1995). In a reanalysis of the data (Krewski 2000), mortality rates and PM2.5 levels were analyzed for 50 metropolitan areas of the U.S. Average (median) levels from monitors in each metropolitan area were used to estimate PM2.5 exposures. At these levels of aggregation, regional differences in the association of PM2.5 and mortality were noted, with higher mortality risks in the Northeast and Midwest, and more moderate mortality risks in the West.

Another follow-up study of the American Cancer Society cohort confirmed and extended the findings in the initial study. The researchers estimated that, on average, a 10 $\mu g/m^3$ increase in fine particulates was associated with approximately a 4 percent increase in total mortality, a 6 percent increase in cardiopulmonary mortality, and an 8 percent increase in risk of lung cancer mortality (Pope et al. 2002). In an additional reanalysis and extension of the American Cancer Society cohort

from 1982 to 2000 (Krewski et al. 2009), and including additional metropolitan areas for the most recent years, effects estimates on mortality were similar, though somewhat higher than those reported previously. The extended analyses included an additional 11 years of cohort follow-up compared to the original study. The authors reported positive and significant association between a 10 $\mu g/m^3$ change in PM2.5 level and all-cause, cardiopulmonary disease, and ischemic heart disease deaths. Mortality from ischemic heart disease was associated with the largest risk estimates.

Subsets of the ACS study data have also been evaluated to estimate effects in California and the metropolitan Los Angeles area (Jerrett et al. 2005; Jerrett et al. 2013). These results are discussed further below, along with results of other California or Southern California-based studies.

The Harvard Six Cities Study is a large prospective cohort study of adults in six U.S. cities, and began in the year 1974. The original analysis and a subsequent reanalysis found positive associations between particulate matter and sulfate in relation to mortality, after controlling for potential confounding factors such as smoking status, sex, age, and other factors (Dockery et al. 1993)(Krewski 2000). An extension of the Harvard Six Cities Cohort confirmed the association of mortality with PM2.5 levels, and reported that improvements in PM2.5 levels over the study time period were associated with decreased mortality risk (Laden et al. 2006). An update to this study covering the years 1974 to 2009 found a linear relationship of PM2.5 levels and mortality from all causes, cardiovascular causes, and from lung cancer (Lepeule et al. 2012). According to the authors, the PM2.5 levels decreased over time, but no evidence of a threshold for these effects was found.

AHSMOG is a cohort study of non-Hispanic white Seventh-day Adventists in California, with participants followed starting from the late 1970's. Confounding due to smoking in this study is unlikely due to very low smoking rates in this population; however, the study is limited in its the ability to apply the findings to other population groups. The study has linked long-term PM10 exposures and other air pollutants to deaths from all natural causes and deaths due to lung cancer among males (Abbey et al. 1999), although the authors concluded that these associations were likely due to exposures to fine particles rather than the coarse fraction of PM10 (McDonnell et al. 2000). In a re-analysis of the data, the study found PM2.5 was associated with an increased risk of coronary heart disease mortality among females but not among males (Chen et al. 2005). Similar associations among females only were found for coarse particles and PM10.

Other cohort studies include an analysis of mortality and PM2.5 exposures in a Medicare enrollee population. Zeger et al. (Zeger et al. 2008) assembled a Medicare enrollee cohort by including all Medicare enrollees residing in over 4,500 zip codes with centroids within six miles of a PM2.5 monitor. PM2.5 data was obtained from the monitoring stations, and mean annual levels were calculated for the zip codes within six miles of each monitor. The authors found that long-term exposures to PM2.5 was associated with all-cause mortality for the eastern and central portions of the U.S., and these mortality risk estimates were similar to those previously published in the Six Cities Study and the American Cancer Society cohorts. The authors reported that there were no statistically significant associations between zip code levels of PM2.5 and all-cause mortality rates in the western

region of the U.S. This finding was attributed largely to the higher PM2.5 levels in Los Angeles area counties compared to other western urban areas, but there were not higher mortality rates in the Los Angeles area counties. Several factors could explain this finding. The authors note that the toxicity of the PM mixture may differ by location, e.g. with higher PM2.5 sulfate levels in the eastern region. In addition, the use of ecological data rather than individual-level data for exposure assessment and some confounding factors, and the assessment of all-cause mortality rather than cause-specific mortality may have impacted the results of this study. For example, the authors used county-level COPD risk as an estimate of smoking prevalence, because individual-level measures of smoking were not available. The authors further reported that they found no associations of PM2.5 with all-cause mortality in persons aged 85 years or higher, which may reflect other competing causes of death in this age group not related to air pollution exposures.

The Women's Health Initiative (WHI) Study is a nationwide cohort of post-menopausal women in 36 metropolitan areas of the U.S. who had no history of cardiovascular disease (Miller et al. 2007). The study found that long-term exposure to PM2.5 was associated with a 24 percent increased risk of cardiovascular disease and a 76 percent increased risk of death from cardiovascular causes for each additional 10 $\mu g/m^3$ of PM2.5; these relative risk estimates are larger than those reported in the ACS and Six Cities Studies, but differences in health status, PM composition, and overall mortality risk in these distinct populations may account for such differences in the effect estimates. The WHI study results accounted for the potential confounding effects of several factors, including medical risk factors for cardiovascular disease, measures of socioeconomic status, and cigarette smoking. Another large cohort study focusing on women is the Nurses' Health Study, which found that PM10 exposures were associated with all-cause mortality and fatal coronary heart disease, with exposures 24 months prior to death having the strongest effects (Puett et al. 2008). These results accounted for several potential confounders, including smoking status and history, medical risk factors for cardiovascular disease, and area-level measures of socioeconomic status. This study did not evaluate PM2.5 exposures.

A recent pooled analysis of 22 European cohorts and including over 350,000 participants evaluated long-term air pollution exposures and exposure to PM2.5, PM10, and nitrogen oxides, using land use regression models to estimate exposures (Beelen et al. 2014). The authors reported that a 5 $\mu g/m^3$ increase in PM2.5 was associated with approximately a 7 percent increase in mortality from natural causes.

Estimates of mortality risks associated with long-term PM2.5 levels from recent studies are shown in the figure below. The recent evidence is consistent with past studies, showing increased risk of premature death with increased PM2.5 exposures. For cause-specific mortality, consistent positive associations are seen with cardiovascular mortality endpoints and with lung cancer deaths, but weak associations are seen with overall respiratory mortality.

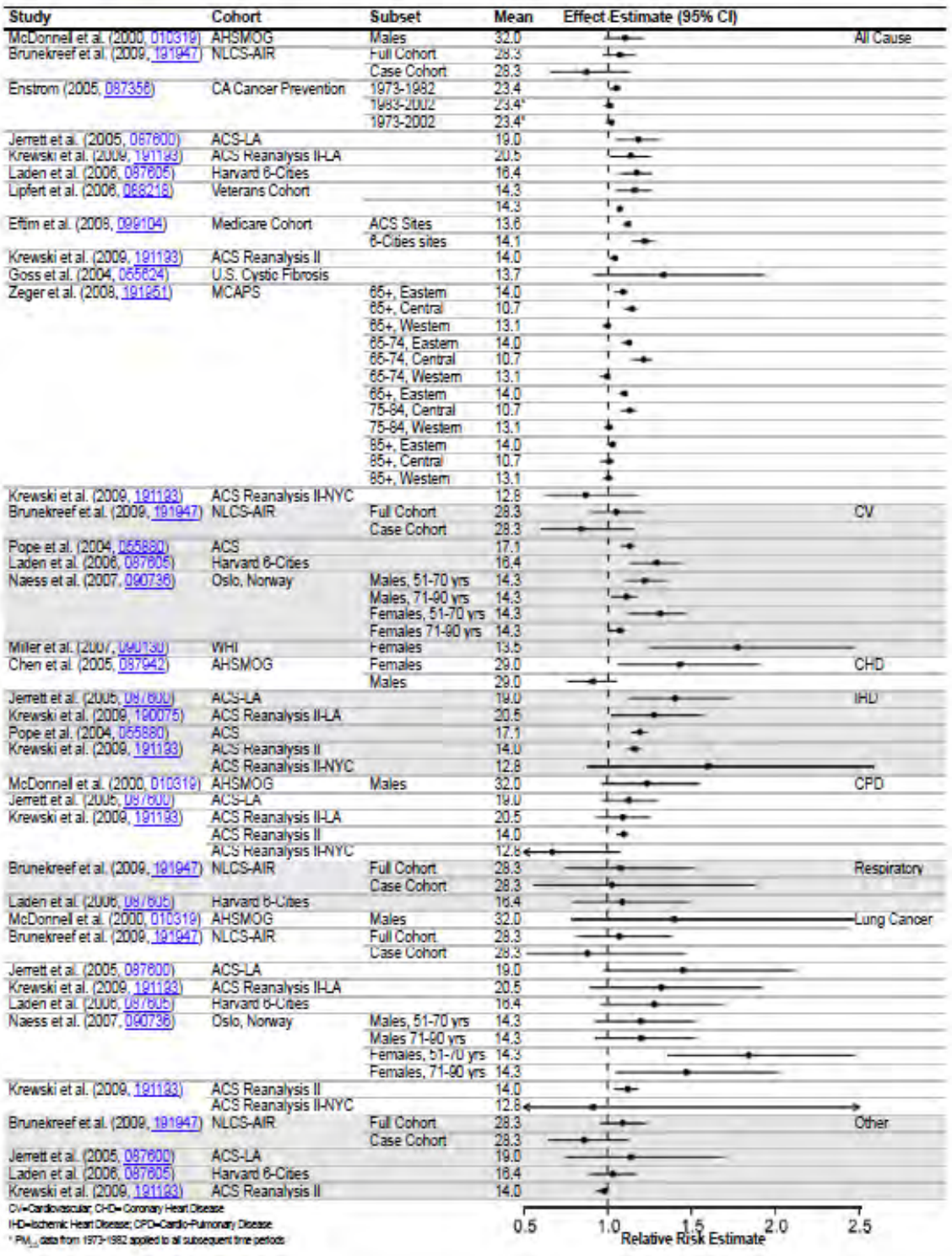


FIGURE I-6

Mortality Risk Estimates, Long-Term Exposure to PM2.5 in Cohort Studies (From (U.S. EPA 2009), Figure 7-7). "Mean"=mean PM2.5 exposure estimates in the study. CV=cardiovascular, CHD=coronary heart disease, IHD=ischemic heart disease, CPD=cardiopulmonary disease.

In addition to the AHSMOG study, other analyses of mortality and PM2.5 levels specific to California have also been reported, including an analysis of a subset of the ACS II data. An analysis of the ACS II study (Jerrett et al. 2013) followed individuals in California from that cohort recruited starting in 1982, with follow-up to 2000. PM2.5 levels at subject residences were estimated using land use regression models. Over 40 potential confounders were included in the statistical models, and included individual-level variables (e.g. smoking, diet, demographic, and other factors) and neighborhood-level variables (e.g. unemployment, poverty, income inequality, racial composition). The authors noted that mortality rates differ in urban areas compared to non-urban areas, and adjusted for urban/rural status in the model to estimate pollution effects on mortality. All-cause mortality, mortality from cardiovascular disease, and mortality from ischemic heart disease were positively associated with PM2.5 levels in single-pollutant models. These associations with PM2.5 remained after additional adjustment for ozone levels. Because of moderate correlations across pollutants, it may not be possible to draw conclusions about which pollutant(s) in this mixture cause the observed effects. Positive associations of all-cause and certain cause-specific mortality rates with estimated NO_2 and ozone levels were also found. The authors concluded that these results indicate that several components of combustion-related pollutant mixture are associated with mortality.

A study analyzed data from the California Teachers Study cohort of over 100,000 active and retired school teachers recruited in 1995, and followed through 2005 (Lipsett et al. 2011). Pollutant exposures at the subject residences were estimated using data from ambient monitors, and extrapolated using a distance-weighted method. The authors reported that a 10 $\mu g/m^3$ increase in PM2.5 was associated with a 20 percent risk increase in mortality from ischemic heart disease, but no associations were found with all-cause, cardiovascular, or lung cancer mortality. A 10 $\mu g/m^3$ increase in PM10 was associated with increased risk of ischemic heart disease and incident stroke. These results accounted for several individual- and neighborhood-level factors, including smoking, second-hand smoke, medical risk factors for cardiovascular disease, and indicators of socioeconomic status.

A more recent analysis of the California Teachers Study cohort from 2001 through 2007 estimated the association between particulate pollutants and all-cause, cardiovascular, ischemic heart disease, and respiratory mortality (Ostro et al. 2015). Exposure data at the residential level were estimated by a chemical transport model that computed pollutant concentrations from over 900 sources in California. Besides particle mass, monthly concentrations of 11 species and 8 sources or primary particles were generated at 4-km grids. The results were reported as finding statistically significant associations of ischemic heart disease mortality with PM2.5 mass and several of its components (Figure I-7). The study also found significant positive associations between ischemic heart disease mortality and ultrafine particle mass as well as several ultrafine particulate components including elemental carbon, organic carbon, copper, metals, meat cooking, and mobile source derived components. An earlier study using data from the same cohort had used monitoring data to estimate mortality risk, and similarly reported increased risk of all-cause, cardiopulmonary, and ischemic heart disease mortality with higher exposures to PM2.5 mass. This study also reported increased ischemic heart disease risk with higher exposures to PM2.5 constituents such as organic carbon, sulfates, and

nitrates (Ostro et al. 2010). Both studies adjusted for several individual- and neighborhood-level covariates, including smoking status and indicators of socioeconomic status.

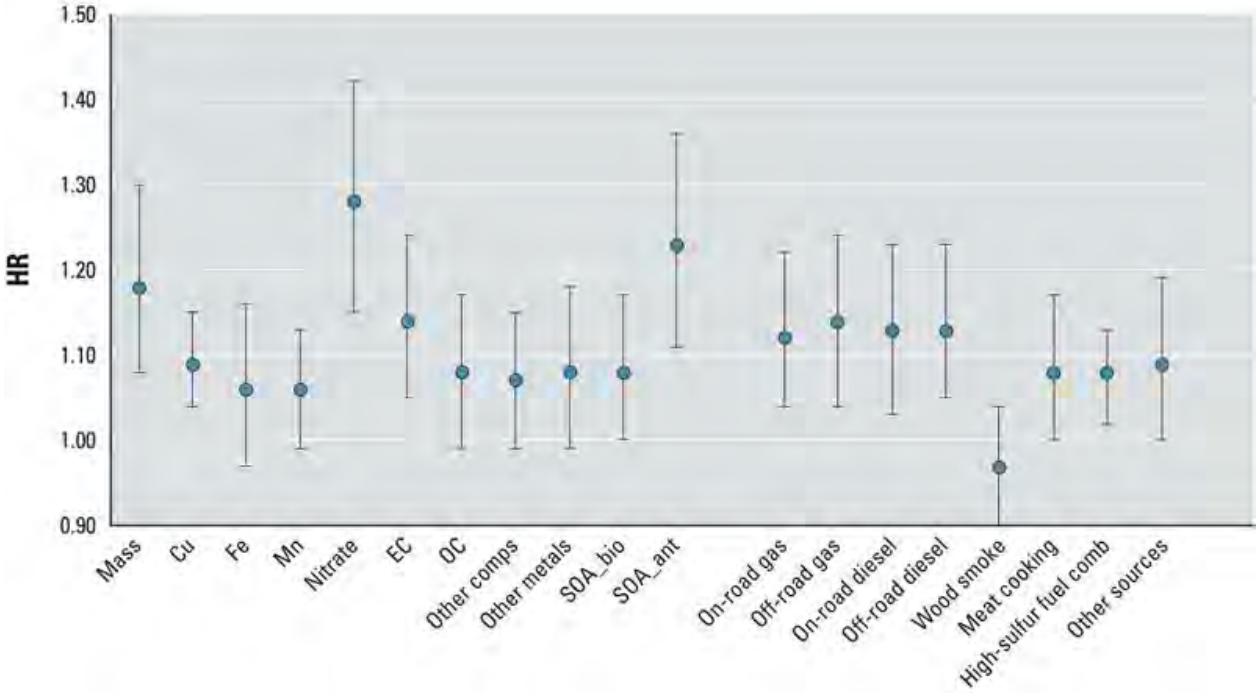


FIGURE I-7

Association of PM2.5 constituents and sources with Ischemic Heart Disease mortality (Hazard Ratios and 95 percent Confidence Intervals) using interquartile range. Abbreviations: comb = combustion; comps = components; SOA_bio= secondary organic aerosols from biogenic sources (derived from long-chain alkanes, xylenes, toluenes, and benzene and their oligomers); SOA_ant=secondary organic aerosols from biogenic sources (derived from isoprenes, monoterpenes, and sesiquiterpenes and their oligomers). (From (Ostro et al. 2015))

A cohort of elderly individuals (average age of 65 years in 1973) recruited from 11 California counties was followed over several years (Enstrom 2005). A positive association for long-term PM2.5 exposure with all-cause deaths was reported from 1973–1982. However, no significant association was found in the later time period of 1983–2002. PM2.5 levels were obtained from measurements made during 1979- 1983 by the EPA as part of the Inhalable Particle Monitoring Network and the cohort was confined to those participants in the American Cancer Society Cancer Prevention Study I who were living in the 11 counties that had one of the monitors. Pollutant levels were estimated using data from these monitors and averaged over each county, which may lead to exposure misclassification and bias toward finding no effect. The study adjusted for several potential confounding factors, including demographic factors, smoking, body mass index, and other factors.

The California Air Resources Board recently conducted a cross-sectional study of long-term PM2.5 exposures in rural and urban areas within California, using ambient monitoring data from 116

stations in the monitoring network, and calculating zip code-level exposure estimates (Garcia et al. 2016). The study observed larger effect sizes for increased PM2.5-related mortality risk in rural compared to urban areas from all causes, cardiovascular disease and cardiopulmonary disease. In urban areas, the study found PM2.5 exposures to be associated with increased risk of cardiovascular disease, ischemic heart disease, and cardiopulmonary disease; however, for all-cause non-accidental mortality risk, only an exposure model restricted to people living within 10 km of a monitoring station in urban areas showed an association with PM2.5. This study did not control for the potential confounding effects of smoking.

A recent study analyzed data from the National Institutes of Health AARP Diet and Health cohort, including about 160,000 participants in California (Thurston et al. 2016). Census tract-level PM2.5 exposures were estimated based on land use regression models. For the California cohort, PM2.5 levels were associated with an approximately 10 percent increase in cardiovascular disease mortality risk for each additional 10 $\mu g/m^3$ of PM2.5. A small but positive effect estimate was found for all-cause mortality in California, and no association was found for respiratory mortality in the California cohort, although the estimates indicated uncertainty in the magnitude and direction of these effects. This study adjusted for several potential confounders, including demographic factors, smoking, and indicators of socioeconomic status.

A few studies have focused on particulate matter exposure and health effects in residents of Southern California. Two analyses of the American Cancer Society II cohort, for example, focused specifically on the Los Angeles Metropolitan area using methods to estimate exposures on a finer geographical scale than previous studies that used geographic scales at the county or metropolitan area. Improved exposure estimation methods reduce potential bias from exposure misclassification. Using data from monitoring stations in the Los Angeles area, one study applied interpolation methods (Jerrett et al. 2005) and another applied land use regression techniques (Krewski et al. 2009) to estimate PM2.5 exposures to the study participants. Significant associations of PM2.5 with mortality from all causes and cardiopulmonary disease were reported, with the magnitude of risks being higher than those from the national studies of the American Cancer Society II cohort. Such improved exposure estimation techniques can reduce misclassification bias in epidemiological studies. It should be noted that various analyses were presented in these as well as other studies to estimate the influence of various individual-level and ecologic variables that might also be related to health effects risks. Including such variables helps control for potential confounding, but generally reduces the estimated association between PM2.5 and all-cause mortality. It may be illustrative to describe some of the estimates from the various calculations as presented by the authors of the Los Angeles area cohort (Krewski et al. 2009). In the descriptions in Table I-9, HR refers to the "hazard ratio" expressed for a 10 $\mu g/m^3$ change in PM2.5 exposure, followed by the 95 percent Confidence Interval. For example, if the hazard ratio is 2, the risk would be twice as high; and, conversely if the hazard ratio is 0.5, the risk would be one-half of that of the reference group. Several of the analyses results follow as excerpted from Krewski, 2009. Table I-8 includes PM2.5, plus various additional individual and ecological variables. Similar effects of covariate adjustment were seen for hazard ratios for

mortality from ischemic heart disease, although effect estimates were stronger for ischemic heart disease mortality compared to those for all-cause mortality.

TABLE I-8

Influence of Adding Confounding Variables on All-Cause Mortality

VARIABLE INCLUDED	HAZARD RATIO per 10 µg/m^3 change in PM2.5 exposure
PM2.5 alone (stratified for age, sex, and race)	1.197 (95% CI, 1.082–1.325);
PM2.5 with 44 individual-level covariates*	1.143 (95% CI, 1.033–1.266)
PM2.5 with 44 individual-level covariates and the ecologic covariate of unemployment	1.127 (95% CI, 1.015–1.252)
PM2.5 with 44 individual-level covariates and social factors extracted from the principal component analysis (which account for 81% of the total variance in the social variables)	1.142 (95% CI, 1.026–1.272).
PM2.5 with 44 individual-level covariates and all ecologic covariates that were individually associated with mortality in bivariate models with PM2.5 exposure	1.115 (95% CI, 1.003–1.239)
PM2.5 parsimonious model that included 44 individual-level covariates and ecologic confounder variables that both reduced the pollution coefficient and had associations with mortality	1.126 (95% CI, 1.014–1.251)

*These covariates included several measures of smoking.
(From Krewski, 2009)

U.S. EPA also released a Regulatory Impact Analysis (U.S. EPA 2012) which looked at the costs and benefits of alternate PM2.5 standard levels. As part of the analysis, U.S. EPA looked at California-specific studies regarding PM2.5 and mortality published in the scientific literature. The U.S. EPA analysis concluded "most of the cohort studies conducted in California report central effect estimates similar to the (nation-wide) all-cause mortality risk estimate we applied from Krewski et al. (2009) and Laden et al. (2006) albeit with wider confidence intervals. A couple of cohort studies conducted in California indicate higher risks than the risk estimates we applied." Thus, in U.S. EPA's judgment, the California-related studies provided estimates of mortality consistent with or higher than those from the national studies.

At the time of the 2009 ISA, few studies had examined long-term exposures to chemical-specific PM constituents or compared source-specific PM effects on mortality (U.S. EPA 2009). The 2009 ISA discussed only two studies that used direct measurements of PM constituents other than sulfates: the Veteran's Cohort (Lipfert et al. 2006) and the Netherlands Cohort Study (Beelen et al. 2008). These studies found mortality associations with long-term exposures to traffic pollutants, nitrates and sulfates.

With measures adopted to control emissions of air pollutants, ambient levels of PM2.5 have been decreasing. These reductions in particulate matter have been associated with reductions in mortality. For example, studies have found that increases in life expectancy are associated with reductions in air pollution levels, and that a portion of this increase can be attributed to reductions in PM2.5 exposures (Correia et al. 2013; Pope et al. 2013).

Long-Term Particulate Matter Exposures and Cardiovascular Effects

Studies of cardiovascular mortality provide the strongest evidence of an association between PM2.5 exposures and cardiovascular effects. The U.S. EPA 2009 ISA review determined that the evidence is sufficient to infer a causal relationship between long-term PM2.5 exposures and cardiovascular effects. In addition to the studies of mortality, other epidemiological studies provide additional evidence of sub-clinical and clinical cardiovascular effects, while toxicological studies suggest a plausible biological mechanism for such effects (Fanning et al. 2009; U.S. EPA 2009).

Epidemiological studies of subclinical effects typically have used subclinical measures of atherosclerosis, which is an underlying disease contributing to many clinical cardiovascular outcomes such as myocardial infarction, sudden cardiac death, stroke, and vascular aneurysms (U.S. EPA 2009). A study in Southern California residents used the carotid intima-media thickness (CIMT) as a measure of subclinical atherosclerosis (Kunzli et al. 2005). The subjects' residential areas were geocoded and a geospatial extrapolation of ambient monitoring data was used to assign annual mean concentrations of ambient PM2.5. The authors report results of an association between atherosclerosis and ambient air pollution as measured by PM2.5. The associations of PM2.5 and CIMT were strongest in women ≥ 60 years of age. The Multi-Ethnic Study of Atherosclerosis (MESA) is a population-based study of people living in 6 U.S. cities or counties, including Los Angeles, CA (Diez Roux et al. 2008). The MESA study reported that 20-year average PM2.5 exposures corresponded to a small increase in CIMT, although the magnitude of the increase was much smaller than the Kunzli 2005 study. The study accounted for the potential influence of sociodemographic factors, lipid status, smoking, diabetes, body mass index, and geographical location. Such differences may be attributable to differences in the study populations. Other sub-clinical outcome measures for atherosclerosis in the MESA study were weakly associated or not associated with PM exposures.

Clinical cardiovascular outcomes have also been examined in several epidemiological studies, including two that were based on prospective cohort studies: the Women's Health Initiative (WHI) Observational Study (Miller et al. 2007) and the Nurses' Health Study (Puett et al. 2008). Both these studies also examined cardiovascular mortality, and found links with long-term particulate matter

exposures. The WHI study included only women who were free of cardiovascular disease at enrollment, and estimated PM2.5 exposures using a nearest monitor approach. The study found PM2.5 exposures to be associated with cardiovascular disease outcomes, including myocardial infarction, revascularization, stroke, coronary heart disease death, and cerebrovascular disease, and accounted for the several potential confounding factors, such as sociodemographic factors, medical risk factors for cardiovascular disease, and cigarette smoking (Miller et al. 2007). An analysis of the Nurses' Health Study included women without a history of myocardial infarction and who lived in certain metropolitan areas in the northeastern U.S. (Puett et al. 2008). Long-term PM10 exposures were estimated using land use regression models as well as air pollution monitoring data, and the results accounted for potential confounding by smoking status and history, medical risk factors for cardiovascular disease, and area-level measures of socioeconomic status. This study found positive associations with the risk of all-cause and coronary heart disease mortality, and the results were suggestive of a link to coronary heart disease events although there was a great deal of uncertainty in this result. Other studies conducted in the U.S. and Europe have examined clinical cardiovascular outcomes with varying results (U.S. EPA 2009).

The U.S. EPA 2009 ISA concluded that epidemiologic studies, along with toxicological evidence linking PM exposures to atherosclerosis and other cardiovascular outcomes, provides evidence linking PM to cardiovascular effects and mortality. While the associations between PM and subclinical and clinical measures have inconsistent results, the consistency of the studies linking PM exposures to cardiovascular mortality and the coherence of the toxicological studies provide support for U.S. EPA's causal determination.

Long-Term Particulate Matter Exposures and Respiratory Effects

The U.S. EPA 2009 ISA review determined that the evidence for long-term particulate matter exposures on respiratory effects is likely to be causal. Several studies, including prospective cohort studies, have assessed the effects of long-term particulate matter exposure on respiratory symptoms and lung function changes. Consistent, positive associations have been found with respiratory symptoms, such as bronchitis, poorly controlled asthma, and decreased lung function in children (U.S. EPA 2009; Guarnieri et al. 2014). Since many of the studies of children included survey measures, these studies typically controlled for the potential confounding effect of tobacco smoking by the child and exposure to second-hand smoke at home, and some studies were also able to account for exposure to maternal smoking *in utero*.

The Southern California Children's Health Study established cohorts of school children from 12 Southern California communities, and followed these participants over time. One of the early studies from this cohort reported positive associations of particulate matter with prevalent bronchitis or phlegm among children with asthma. These effects were also associated with NO_2 and acid vapor levels (McConnell et al. 1999). Another study based on this cohort reported a lower rate of growth in lung function in children living in areas with higher levels of particulate pollution (Gauderman et al. 2000). Decreases in lung function growth were associated with PM10, PM2.5, PM10-2.5, acid

vapor, and NO_2. There was no association with ozone levels. The investigators were not able to identify independent effects of the pollutants but noted that motor vehicle emissions are a major source of the pollutants.

A follow-up study on a second cohort of children confirmed the findings that decreased lung function growth was associated with particulates, nitric oxides, and elemental carbon levels (Gauderman et al. 2002). Elemental carbon is often used as a measure for diesel particulate. Additionally, children who moved to areas with less air pollution were found to show improvement in lung function growth rate, while those who moved to areas with higher PM10 and NO_2 showed declines in lung function growth rates (Avol et al. 2001). By the time the fourth graders graduated from high school, a significant number showed lower lung function. The risk of lower lung function was about four times higher in children with the highest PM2.5 exposure when compared to the lowest exposure communities (Gauderman et al. 2004).

A follow-up report from the Children's Health Study assessed whether improving air quality in Southern California over the past decade has led to beneficial changes in health (Gauderman et al. 2015). It was reported that as the levels of nitrogen oxide and fine particulates were reduced as the result of reductions in air pollution emissions, the deficits in lung function growth were also of a smaller magnitude. Recently, the Children's Health Study cohort data were also used to evaluate associations with bronchitic symptoms in children (Berhane et al. 2016). The study found that reductions in NOx, ozone, and PM10 and PM2.5 were associated with decreases in bronchitic symptoms, with stronger effects observed in children with asthma. These results indicate that improvements in air quality, as measured by fine particulate and nitrogen oxides, are associated with improvements in children's health in Southern California.

A limited number of studies have linked PM exposures to asthma incidence. In an analysis of the Children's Health Study in Southern California, Islam et al. found that while children with better lung function are generally at lower risk of developing asthma, living in an area with long-term average PM2.5 levels ≥13.7 $\mu g/m^3$ offset this protective characteristic; in other words, this study related high PM2.5 levels with new-onset asthma in children (Islam et al. 2007). The U.S. EPA 2009 ISA report also reviewed two European studies that linked PM2.5 with asthma onset in children (Brauer et al. 2007) and adults (Kunzli et al. 2009). Two recent studies were identified in our literature search: the first study used the Sister Study national cohort and found that a 3.6 $\mu g/m^3$ increase in PM2.5 was associated with a 20 percent increased risk of incident asthma and a 14 percent increase in incident wheeze among adult females (Young et al. 2014); the second study was a study of Medicaid-enrolled children in Harris County, Texas, and found PM2.5 was associated with new-onset asthma in single-pollutant models (Wendt et al. 2014). However, accounting for the potential effects of other pollutants added substantial uncertainty in the overall effect estimates for PM2.5, meaning that it is difficult to distinguish in this study whether the effects are due to PM2.5 or other pollutant exposures.

The U.S. EPA 2009 ISA also noted that studies from many different locations, including Mexico City, Sweden, and a national cohort in the U.S. provide additional coherent and consistent evidence of respiratory effects associated with PM exposures.

Long-Term Particulate Matter Exposures and Emerging Areas of Interest

Beyond cardiovascular, respiratory and mortality effects, the U.S. EPA 2009 ISA review concluded that the evidence available at the time was suggestive of a causal relationship between long-term exposures to PM and reproductive/developmental effects, as well as cancer. Since the 2009 ISA, there have been several studies conducted that evaluated these health endpoints in relation to PM exposures, as well as studies of metabolic syndrome and neurological health outcomes. Because of the relatively long time gap since the latest ISA for PM, and because the SCAB exceeds the federal standards for PM2.5, these health endpoints are discussed briefly here, with a focus on studies conducted since the 2009 ISA, and studies conducted in California or in the SCAB.

Cancer

The U.S. EPA 2009 ISA review concluded that existing evidence is suggestive of a link between PM2.5 and cancer, with studies of lung cancer providing the strongest evidence. More recently, the International Agency for Research on Cancer (IARC) recently designated outdoor air pollution and particulate matter as carcinogenic to humans (Group 1 carcinogens), and a meta-analysis provided quantitative evidence for the associations between particulate matter and lung cancer risk (Hamra et al. 2014; International Agency for Research on Cancer 2015). The IARC review included studies evaluating associations between outdoor air pollution and lung cancer, urinary bladder cancer, breast cancer, leukemia and lymphoma, childhood cancers, and total cancers. Among these cancers, the IARC Working Group concluded that outdoor air pollution and particulate matter cause lung cancer, and that positive associations were observed between outdoor air pollution and urinary bladder cancer. The IARC Working Group also noted that associations with childhood leukemia were suggestive of an association, and, while there were some inconsistencies across studies, an association could not be ruled out. To estimate overall lung cancer risk, the meta-analysis included 14 studies reporting on PM2.5 and 9 studies reporting on PM10; the vast majority of these were cohort studies from North America and Europe. The meta-analysis found positive associations for both PM10 and PM2.5 and lung cancer risk, with the PM2.5 results being more consistent. Additionally, the study analyzed whether the association between PM2.5 and lung cancer differed by smoking status, and found positive associations for each smoking status group (current smokers, former smokers, and never-smokers).

A recent study from the Adventist Health and Smog Study-2 (AHSMOG-2) cohort in the U.S. and Canada reported that a 10 ug/m^3 increase in ambient PM2.5 increased the risk of lung cancer incidence by about 40 percent, after accounting for ozone exposures (Gharibvand et al. 2016). Because all participants are non-smokers, with over 80 percent never having smoked, and with the former smokers having an average of 24 years between quitting smoking and being diagnosed with lung cancer, the likelihood of confounding by smoking in this cohort is much lower than in most other

populations. Another recent study conducted in California evaluated air pollution in relation to survival after being diagnosed with lung cancer, and found that patients living in areas with higher NO_2, PM2.5 and PM10 had shorter survival times, particularly for those patients who were diagnosed at earlier stages of lung cancer (Eckel et al. 2016). Few other studies have evaluated air pollution effects on lung cancer survival, so this study represents a relatively newer area of research.

Reproductive Health Outcomes

The U.S. EPA 2009 ISA review concluded that existing evidence is suggestive of a link between PM2.5 and reproductive health effects. Numerous studies report evidence indicating that particulate matter exposure during pregnancy may be associated with adverse birth outcomes, with relatively consistent evidence linking PM2.5 and PM10 exposures to low birth weight or decreases in birth weight (Bobak et al. 1999; Sram et al. 2005; Stieb et al. 2012). Among the studies reviewed in the 2009 U.S. EPA ISA for particulate matter or in the literature search for more recent and/or local studies, several studies of low birth weight (defined as <2,500g or approximately 5.5 pounds at birth) or reductions in birth weight were conducted in California or in the Southern California region (Basu et al. 2004; Parker et al. 2005; Salam et al. 2005; Wilhelm et al. 2005; Morello-Frosch et al. 2010; Wilhelm et al. 2012; Basu et al. 2014; Laurent et al. 2014). Two of these studies were conducted in Los Angeles County and were published since the last AQMP in 2012, and both examined low birth weight among full-term babies ("term low birth weight"). Laurent et al. reported that a 5.82 $\mu g/m^3$ increase in PM2.5 exposures during pregnancy was linked to a 2.5 percent increased risk of term low birth weight (Laurent et al. 2014). The second study evaluated PM2.5 exposures by source, and found increased odds of term low birth weight with increased exposure to PM2.5 from diesel sources, gasoline, geological sources, as well as elemental carbon (Wilhelm et al. 2012). Studies from the U.S., Brazil, Mexico, the Czech Republic, South Korea, Japan, and Taiwan have reported that neonatal and early postnatal exposure to particulate matter may lead to increased infant mortality (U.S. EPA 2009). Among these studies, one was conducted in Southern California, and found increased risks for deaths among infants between one and 12 months old associated with exposures to particulates and other pollutants; however, no effect was seen for neonatal mortality (defined as mortality in the first month after birth) (Ritz et al. 2006). Some newer research has also linked particulate matter exposures to risk of certain birth defects and stillbirth. A California-based study used monitoring station data and traffic density measures to evaluate potential associations with a variety of birth defects in the San Joaquin Valley (Padula et al. 2013a; Padula et al. 2013b; Padula et al. 2013c; Padula et al. 2015). One of these studies reported evidence suggesting that PM10 and PM2.5 may increase the risk of certain congenital heart defects (Padula et al. 2013b). For neural tube defects, increased risks were linked to higher exposures to carbon monoxide and nitrogen oxide (Padula et al. 2013a), but higher risks for spina bifida with PM10 exposures were found only among mothers living in lower socioeconomic status neighborhoods (Padula et al. 2015). An earlier study conducted in Los Angeles County used ambient monitoring data to estimate exposures, and reported increased risk of certain congenital heart defects with higher exposures to carbon monoxide, but not for PM10; PM2.5 was not evaluated in this study (Ritz et al. 2002). A couple of recent studies evaluated PM2.5 exposures during gestation and risk of stillbirth. A recent study conducted in Ohio used monitoring station data

to evaluate stillbirth risk, and found that higher levels of PM2.5 exposure in the third trimester was linked to a 42 percent increased risk of stillbirth (DeFranco et al. 2015). A California-based study similarly found an increased risk of stillbirth with higher PM2.5 exposures averaged over the entire pregnancy, but the association may have been confounded by co-occurring nitrogen dioxide exposures (Green et al. 2015). A third study, conducted in Taiwan, found that higher PM10 and sulfur dioxide exposures in the first trimester were associated with increased risk of stillbirth among babies who were born preterm; PM2.5 was not assessed in this study (Hwang et al. 2011).

In the U.S. EPA review, it was noted that stronger associations with birth weight reductions are observed with PM2.5 compared to PM10, and animal toxicological studies provide supportive evidence, although a specific mechanism is not known (U.S. EPA 2009). These results and many other studies provide evidence that fetuses and infants are subgroups affected by particulate matter exposures.

Neurological Health Outcomes

A 2012 review conducted by a panel of research scientists convened by the National Institute of Environmental Health Sciences identified several studies that reported links between outdoor air pollution and central nervous system effects, such as decreased cognitive function, Alzheimer's disease, Parkinson's disease, and impacts on behavioral testing and development in childhood (Block et al. 2012). Toxicological studies suggest that the damage may be caused through an oxidative stress pathway, and demonstrate that PM can be inhaled into the lungs and translocated to the brain, and that ultrafine particles to reach the brain through the olfactory nerve (Peters et al. 2006). Some more recent studies have evaluated neurological impacts of PM, ranging from studies of older adults to prenatal exposures. The Normative Aging Study evaluated older men in Boston, MA, and reported an association between black carbon (a marker of traffic exhaust) and cognitive function, as measured through cognitive tests (Power et al. 2011). A study conducted in the Los Angeles Basin used monitoring data to evaluate long-term exposures in a middle-aged and older adult population, and reported PM2.5 exposure was associated with decreased verbal learning (Gatto et al. 2014). A study of school children in Spain reported that children attending schools with higher levels of air pollution, as measured by elemental carbon (a marker of diesel exhaust), NO_2, and ultrafine particles, experienced smaller growth in several cognitive measures (Sunyer et al. 2015). Three recent studies reported that PM2.5 exposures during the prenatal period were associated with autism in childhood. One study was conducted in Los Angeles County, and reported that 7 percent increased odds of autism with a 4.68 $\mu g/m^3$ increase in PM2.5; the effect estimate increased to 15 percent when accounting for ozone in the statistical models (Becerra et al. 2013). A California-based study found that an 8.7 $\mu g/m^3$ increase in PM2.5 during the prenatal period or in the first year of life doubled the odds of autism (Volk et al. 2013). The third study was based on the Nurses' Health Study II cohort, and reported an increased risk of autism with prenatal PM2.5 exposures, but not with exposures before pregnancy or after delivery (Raz et al. 2015). These studies provide emerging evidence of health effects of air pollution on neurological health outcomes.

Metabolic Syndrome

Metabolic syndrome, which is the clustering of several known risk factors for cardiovascular disease (Huang 2009), is a relatively new health outcome to be studied in relation to air pollution exposure. The U.S. EPA 2009 ISA reviewed only one epidemiological study and one toxicological study. These studies provided some evidence that particulate matter exposures may be linked to markers of metabolic syndrome, such as insulin resistance, hypertension, high cholesterol, or obesity, or that having a metabolic syndrome may increase susceptibility to the effects of PM10 exposures on cardiovascular outcomes (U.S. EPA 2009). More recently, a Swiss epidemiological study reported that long-term PM10 exposures were associated with increased risk of metabolic syndrome (Eze et al. 2015). Two other human studies found that people with metabolic syndrome exposed to particulate matter air pollution experienced cardiovascular effects and worsening insulin resistance (Devlin et al. 2014; Brook et al. 2016). Some recent animal studies have also reported impacts of PM on the development of obesity and metabolic syndrome, and that animals with pre-existing metabolic syndrome may be more sensitive to the cardiovascular effects of PM exposure (Brocato et al. 2014; Wagner et al. 2014; Wei et al. 2016).

Ultrafine Particles

As noted above, numerous studies have found associations between particulate matter levels and adverse health effects, including mortality, hospital admissions, and respiratory disease symptoms. The vast majority of these studies used particle mass of PM10, PM2.5, or PM10-2.5 as the measure of exposure. Some researchers have postulated, however, that ultrafine particles may be responsible for some of the observed associations of particulate matter and health outcomes (Oberdorster et al. 1995; Seaton et al. 1995). Ultrafine particles are typically defined as particles with aerodynamic diameters of less than 0.1 µm or 100 nm. Ultrafine particles are formed as a result of combustion processes as well as secondary atmospheric transformations. Vehicle emissions, especially diesel exhaust, are major sources of ultrafine particles; therefore, proximity to a major roadway is an important factor that affects an individual's exposure to ultrafine particles (Zhu et al. 2002; HEI Review Panel on Ultrafine Particles 2013). There is currently no federal or California standard for ultrafine particles.

U.S. EPA staff has presented conclusions on causal determination of several health effects of ultrafine PM based on a recent review of the available scientific studies (U.S. EPA 2009). These causal determinations are depicted in Table I-9.

TABLE I-9

Summary of U.S. EPA's Causal Determination of Ultrafine PM by Exposure Duration and Health Outcome

SHORT-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Cardiovascular effects	Suggestive of a causal relationship
Respiratory effects	Suggestive of a causal relationship
Central nervous system	Inadequate to infer a causal relationship
Mortality	Inadequate to infer a causal relationship
LONG-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Cardiovascular effects	Inadequate to infer a causal relationship
Respiratory effects	Inadequate to infer a causal relationship
Mortality	Inadequate to infer a causal relationship
Reproductive and developmental	Inadequate to infer a causal relationship
Cancer, Mutagenicity, Genotoxicity	Inadequate to infer a causal relationship

(From (U.S. EPA 2009) Table 2-4 and Chapters 6 and 7)

In 2013, a review of the health effects of ultrafine particles concluded that current available evidence does not support that exposures to ultrafine particles alone account for the adverse health effects that have been associated with other ambient pollutants such as PM2.5, although the report noted several limitations in the exposure data relating to ultrafine particles (HEI Review Panel on Ultrafine Particles 2013). However, a more recent assessment of the studies published since that time suggest that UFP's may be more harmful compared to health compared to PM10 and PM2.5 (Li et al. 2016). Several potential mechanisms have been brought forward to suggest that the ultrafine portion may be important in determining the toxicity of ambient particulates, some of which are discussed below.

Smaller particles can also be inhaled deeper into the lungs, although the relationship between deposition fraction and particle size is complex. The ultrafine particles between 20-30 nm generally have higher fractional deposition in the alveolar region of the lung, where air exchange takes place. Because ultrafine particles are cleared from the lung more slowly compared to larger particles, the ultrafine particles can accumulate in the lung tissue where they can also translocate into the blood and to other organs (HEI Review Panel on Ultrafine Particles 2013). Ultrafine particles can also enter the brain tissues through the olfactory nerve (Peters et al. 2006). For a given mass concentration, ultrafine particles have much higher numbers of particles and surface area compared to larger particles. Particles can act as carriers for other adsorbed agents, such as trace metals and organic

compounds; and the larger surface area may transport more of such toxic agents than larger particles. Combined with the slower clearance of UFP's from the alveolar region of the lung, these small particles can deliver a greater amount of toxics to this part of the lung, causing increased inflammation (Li et al. 2016).

Exposures of laboratory animals to ultrafine particles have found cardiovascular and respiratory effects. Using an animal model of atherosclerotic disease, mice exposed to concentrated ultrafine particles (defined as less than 0.18 µm) near a roadway in Southern California showed larger early atherosclerotic lesions than mice exposed to concentrated PM2.5 or to filtered air (Araujo et al. 2008). In a mouse allergy model, exposures to concentrated ultrafine particles (less than 0.18 µm) resulted in a greater response to antigen challenge to ovalbumin (Li et al. 2010), indicating that vehicular traffic exposure could exacerbate allergic inflammation in already-sensitized animals. More specifically, ambient UFP's with a higher polycyclic aromatic hydrocarbon (PAH) content and higher oxidant potential triggered greater allergic inflammation in mice compared to a mixture of fine and ultrafine particles (Li et al. 2009). A related study identified specific proteins that are up-regulated among the exposed mice, which were proteins involved in allergic airway inflammation and immune system response (Kang et al. 2010). These results suggest that UFP's may play a role in the development or exacerbation of asthma, and point to an oxidative stress pathway. Additionally, some experiments using engineered nanoparticles found that the particle exposure led to a suppressed immune response to infections (Li et al. 2016).

Controlled exposures of human volunteers to ultrafine particles either laboratory-generated or as products of combustion, such as diesel exhaust containing particles, have found physiological changes related to vascular effects. Mills et al., for example found exposure to diesel exhaust particulate at 300 $\mu g/m^3$ attenuated both acetylcholine and sodium-nitroprusside-induced vasorelaxation (Mills et al. 2011). These exposures were higher than typical ambient concentrations, although the authors state that such concentrations can be found regularly in heavy traffic, occupational settings, and in some of the most polluted cities in the world. This study showed that diesel exhaust particulates had impacts on vascular function while carbon nanoparticles did not change vascular function, providing evidence that is complementary to the epidemiological studies linking particulate matter exposure to cardiovascular outcomes. Several other human exposures studies have reported effects of UFP's on inflammatory markers, lung function, heart rate and heart rate variability, including effects on people with asthma, diabetes, or metabolic syndrome (Li et al. 2016).

There is a lack of long-term studies of human population exposure to ultrafine particles, as there is currently no ultrafine monitoring network in the U.S. As noted above, however, a recent study from California estimated exposures to PM2.5 and ultrafine particles among members of the California Teachers Study cohort. Positive, statistically significant associations of ischemic heart disease mortality were observed with modeled PM2.5 and with ultrafine particle mass concentrations derived from chemical transport models using California emissions inventories (Ostro et al. 2015). Other epidemiological studies have reported links between UFP exposures both indoors and

outdoors with decreased microvascular function and increased systemic inflammation in adults (Karottki et al. 2014; Olsen et al. 2014), and with oxidative DNA damage in children (Song et al. 2013).

There have been several cross-sectional epidemiological studies of ultrafine particles, mainly from Europe. Some of these studies found effects on hospital admissions and emergency department visits for respiratory and cardiovascular effects, whereas other studies did not find such effects (U.S. EPA 2009). A recent study conducted in Rochester, NY reported that ambient UFP exposures in the prior week were associated with increased risk of asthma-related medical visits indicative of asthma exacerbation; the study did not find associations with accumulation mode PM, PM2.5, black carbon, or sulfur dioxide (Evans et al. 2014). Concentrations of ultrafine particles can vary geographically, and it is not clear how well the central-site monitors used in these studies reflect actual exposures.

Additional discussion on the sources and health effects of ultrafine particles can be found in Chapter 9 of the 2012 AQMP.

Sensitive Populations for PM-Related Health Effects

Certain populations may be more sensitive to the health effects of particulate air pollution, and evidence to assess susceptibility comes from epidemiological, controlled human exposure, and toxicological studies of PM2.5 and PM10 exposures. The U.S. EPA 2009 ISA for PM concluded that there is evidence supporting increased susceptibility to the effects of PM among children (for respiratory effects) and older adults (for cardiovascular effects), individuals with pre-existing cardiovascular or respiratory conditions, individuals with lower socioeconomic status (sometimes assessed using proxy measures such as educational attainment or residential location), and individuals with certain genetic polymorphisms that control antioxidant response, regulate enzyme activity, or regulate procoagulants (U.S. EPA 2009). In addition, there is some limited evidence that additional factors may increase a person's susceptibility to PM health effects, including chronic inflammatory conditions (e.g. diabetes, obesity) and life stage, with pregnant women and fetuses *in utero* being potentially more susceptible. Table I-10 summarizes the U.S. EPA's 2009 ISA assessment of susceptibility factors for particulate matter.

TABLE I-10

Summary of Evidence for Potential Increased Susceptibility to PM-Related Health Effects

Assessment of Evidence	Potential At Risk Factor
Increased susceptibility to PM	Older Adults (≥65 years) Children (<18 years) Genetic factors Cardiovascular diseases Respiratory illnesses Socioeconomic status (SES) Educational attainment (surrogate of SES) Residential location (surrogate of SES)
Increased susceptibility to PM, but limited studies available	Pregnancy and developmental effects Diabetes Obesity Health status, e.g. nutrition (surrogate of SES)
Did not increase susceptibility to PM	Gender Race/ethnicity
Did not increase susceptibility to PM, but limited studies available	Respiratory contributions to cardiovascular effects

Adapted From (U.S. EPA 2009) Table 8-2

Summary - Particulate Matter Health Effects

A considerable body of scientific evidence from epidemiologic, controlled human exposure and toxicological studies support the causal determinations for particulate matter and several categories of health endpoints, with the strongest evidence supporting a causal relationship for PM2.5 exposures with cardiovascular effects and mortality. Specific cardiovascular effects include cardiovascular deaths, hospital admissions for ischemic heart disease and congestive heart failure, changes in heart rate variability and markers of oxidative stress, and markers of atherosclerosis. The scientific evidence also supported a likely causal relationship for PM2.5 exposure with respiratory effects, such as hospital admissions for COPD or respiratory infections, asthma development, asthma or allergy exacerbation, lung cancer, impacts on lung function, lung inflammation, oxidative stress, and airway hyperresponsiveness. Both short-term and long-term particulate matter exposures are linked to health effects in humans. Young children, older adults, and people with pre-existing respiratory or cardiovascular health conditions are among those who may be more susceptible to the adverse effects of PM.

Estimates of the Health Burden of Particulate Matter in the South Coast Air Basin

In terms of estimating health burdens of air pollution exposure, CARB has conducted analyses in the past estimating exposures and quantitative health effects from exposures to particulate matter as well as other pollutants. A recent assessment focused on premature mortality and PM2.5, and

estimated the deaths associated with exposures above 5.8 µg/m^3, which is an estimate of background PM2.5 (California Air Resources Board 2010a). The analysis used the U.S. EPA's risk assessment methodology for calculating premature mortality and used ambient air quality measurements averaged over a three-year period of 2006-2008. An update to this analysis using ambient air quality data from 2009-2011 indicated that PM2.5-related premature deaths in California due to cardiopulmonary causes as 7,200 deaths per year with an uncertainty range of 5,600 – 8,700. Estimates were also made for the California Air Basins. For the South Coast Air Basin, the estimate was 4,000 cardiopulmonary deaths per year with an uncertainty range of 3,200–4,900. These estimates were calculated using the associations of cardiopulmonary mortality and PM2.5 from the second exposure period from Krewski (Krewski et al. 2009).

Another analysis of health impacts in the South Coast was conducted as part of the Socioeconomic Report for the 2012 AQMP. The analysis estimated the anticipated costs and benefits of adopting the measures in the Final 2012 AQMP, which included the projected public health benefits associated with lower PM2.5 concentrations as a result of the 2012 plan (South Coast Air Quality Management District 2012). Based on that analysis, the projected annual number of averted deaths due to PM2.5 reductions from the 2012 AQMP was 668 deaths in year 2014, and 275 deaths in year 2023. In addition, estimated numbers of health conditions prevented per year due to the 2012 AQMP were shown for several other health endpoints, including respiratory and cardiovascular outcomes. The estimates of cases averted in year 2014 were 597 cases of acute bronchitis, 29 to 261 non-fatal heart attacks, 18,384 person-days for lower and upper respiratory symptoms, 153 respiratory emergency room visits, 151 hospital admissions, 287,447 person-days of minor restricted activity, 48,805 work loss days, and 26,910 person-days of asthma attacks. Importantly, these estimates of prevented mortality and morbidity should not be compared to the estimates of deaths attributable to PM2.5 conducted by CARB, because these analyses are intended to answer different questions. The SCAQMD estimates address the question of "how many cases are averted due to the adoption of the 2012 AQMP?" while the CARB estimates address the question of "how many deaths are attributable to PM2.5 exposures above 5.8 µg/m3?". Both analyses provide important information regarding the health impacts of PM2.5.

NITROGEN DIOXIDE

Nitrogen dioxide (NO_2) is a gaseous air pollutant that serves as an indicator of gaseous oxides of nitrogen, such as nitric oxide (NO) and other related compounds (NO_x). These gases can undergo photochemical reactions to form ground-level ozone, and are important contributors to ozone pollution levels in the SCAB. Evidence of the health effects of NO_2 is derived from human and animal studies, which link NO_2 with respiratory effects such as decreased lung function and increases in airway responsiveness and pulmonary inflammation (U.S. EPA 2016). The U.S. EPA in 2010 retained the existing standards of 53 ppb for NO_2 averaged over one year, and adopted a new short-term standard of 100 ppb (0.1 ppm) averaged over one hour. The standard was designed to protect against increases in airway reactivity in individuals with asthma based on controlled exposure studies, as well as respiratory symptoms observed in epidemiological studies. The revised standard also requires additional monitoring for NO_2 near roadways.

In the current U.S. EPA Integrated Science Assessment for Nitrogen Oxides (U.S. EPA 2016), the staff conclusion for causal relationships between exposures and health effects are shown in the following table.

TABLE I-11

Summary of U.S. EPA's Causal Determination for Health Effects of Nitrogen Dioxide

SHORT-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Respiratory effects	Causal relationship
Cardiovascular and related metabolic effects	Suggestive of a causal relationship
Total mortality	Suggestive of a causal relationship
LONG-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Respiratory effects	Likely to be a causal relationship
Cardiovascular and related metabolic effects	Suggestive of a causal relationship
Reproductive and developmental effects	Fertility, Reproduction, and Pregnancy: Inadequate to infer a causal relationship Birth Outcomes: Suggestive of a causal relationship Postnatal Development: Inadequate to infer a causal relationship
Total Mortality	Suggestive of a causal relationship
Cancer	Suggestive of a causal relationship

(From (U.S. EPA 2016), Table ES-1)

Since the previous U.S. EPA Integrated Science Assessment (ISA) for Nitrogen Oxides from 2008, the causal determination for short-term and long-term respiratory effects have been updated in the 2016 ISA to reflect the stronger evidence now available pointing to a causal or likely causal relationship. For non-respiratory outcomes, the U.S. EPA also updated their assessment of the weight of evidence to show that the evidence for several short- and long-term outcomes is suggestive, but not sufficient to infer a causal relationship. Evidence for low-level nitrogen dioxide (NO_2) exposure effects is derived from laboratory studies of asthmatics and from epidemiological studies. Additional evidence is derived from animal studies. In the 2016 ISA, the U.S. EPA cited the coherence of the results from a variety of studies, and a plausible biological mechanism (whereby NO_2 reacts with the respiratory lining and forms secondary oxidation products that increase airway responsiveness and allergic

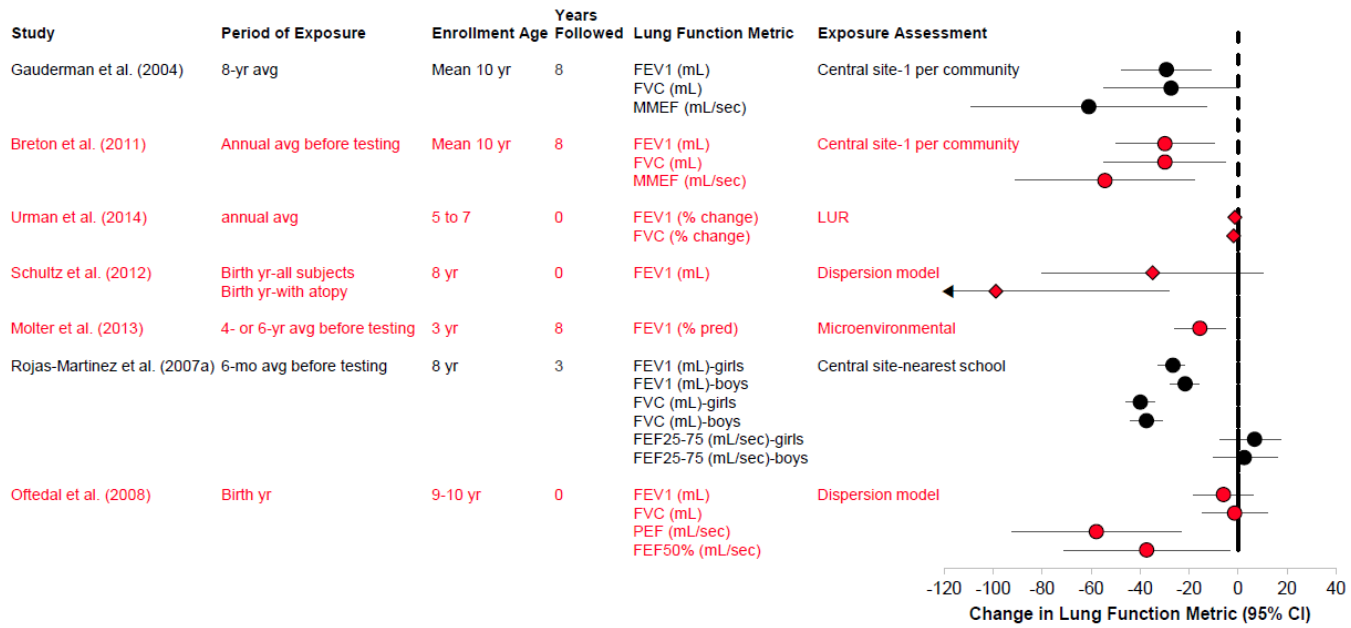
inflammation) to support the determination of a causal relationship between short-term NO_2 exposures and asthma exacerbations ("asthma attacks"). The long-term link with respiratory outcomes was strengthened by recent experimental and epidemiological studies, and the strongest evidence available is from studies of asthma development.

Several studies related to outdoor exposure have found health effects associated with ambient NO_2 levels, including respiratory symptoms, respiratory illness, decreased lung function, pulmonary inflammation, increased emergency room visits for asthma, and cardiopulmonary mortality. However, since traffic exhaust is an important source of NO_2 and several other pollutants, such as particulate matter, exposure generally occurs in the presence of other pollutants, making it more difficult for these studies to distinguish the specific role of NO_2 in causing effects independent of other pollutants. However, studies linking NO_2 to asthma exacerbations and human experimental studies provided support for the U.S. EPA determination that this causal relationship exists for short-term NO_2 exposures independent of other traffic-related pollutants (U.S. EPA 2016). The report also concludes that epidemiological studies do not rule out the possible influence of other traffic-related pollutants on the observed health effects.

The Children's Health Study in Southern California has evaluated a variety of health endpoints in relation to air pollution exposures, including lung function, lung development, school absences, and asthma. The study found associations between long-term exposure to air pollution, including NO_2, PM10, and PM2.5, and respiratory symptoms in asthmatic children (McConnell et al. 1999). Particles and NO_2 levels were correlated, and independent effects of individual pollutants could not be discerned. A subsequent analysis using more refined exposure estimation methods indicated consistent associations between long-term NO_2 exposures and respiratory symptoms in children with asthma (McConnell et al. 2003).

Ambient levels of NO_2 were also associated with a decrease in lung function growth in a group of children followed for eight years, including children with no history of asthma. In addition to NO_2, the decreased growth was also associated with particulate matter and airborne acids. The study authors postulated this may be a result of a package of pollutants from traffic sources (Gauderman et al. 2004).

A number of studies have since reported deficits in lung function associated with nitrogen oxides exposures. Examples are shown in Figure I-8.



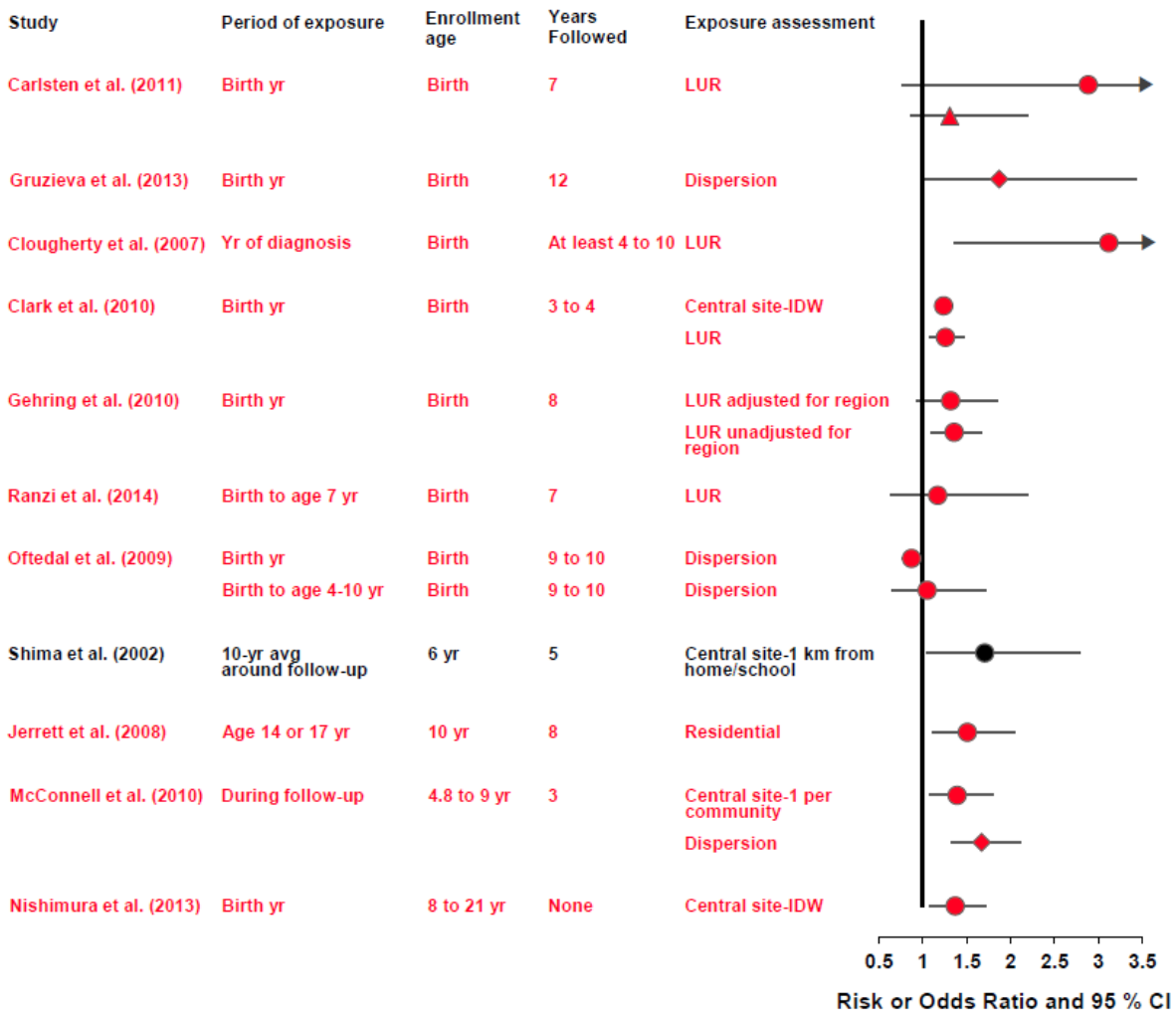
Note: Studies in red are recent studies. Studies in black were included in the 2008 ISA for Oxides of Nitrogen. Circles = NO_2; Diamonds = NO_x. All mean changes in this plot are standardized to a 10-ppb increase in NO_2 and a 20-ppb increase in NO_x concentration. Effect estimates from studies measuring NO_x in $\mu g/m_3$ (Schultz et al., 2012) have not been standardized.

FIGURE I-8

Associations of nitrogen dioxide (NO_2) or the sum of nitric oxide and NO_2 (NO_x) with lung function indices from prospective studies of children (From (U.S. EPA 2016), Figure 6-5).

A follow-up report from the Children's Health Study has assessed whether improving air quality in Southern California over the past several decades has led to beneficial changes in health among children (Gauderman et al. 2015). It was reported that as the levels of nitrogen oxide and fine particulates came down as the result of air pollution emissions reductions, the deficits in lung function growth were also of a smaller magnitude. Such improvements were observed in children with asthma as well as in those without asthma. These results indicate that improvements in air quality are associated with improvements in children's health.

In recent years, the most compelling evidence of long-term effects of NO_2 has been from prospective cohort studies that link NO_2 exposures to the development of asthma, primarily in children. The U.S. EPA included several recent studies in their review, as shown in the Figure I-9. The vast majority of these studies found that higher NO_2 exposures were linked to an increased risk or odds of developing asthma among children.



Effect estimates are standardized to a 10-ppb increase in NO_2, with the exception of Gruzieva et al. (2013) who examined NOx in µg/m3 and Oftedal et al (2009) who did not report increments for the effect estimates for the birth to age 4 years or birth to age 10 years exposure periods. Note: Black symbols = studies evaluated in the 2008 Integrated Science Assessment for Oxides of Nitrogen; Red symbols = recent studies. Circles=NO_2; triangles=NO; diamonds=NOx.

FIGURE I-9

Associations of ambient nitrogen dioxide (NO_2) concentrations with asthma incidence in longitudinal cohort studies of children (From (U.S. EPA 2016), Figure 6-1).

Among the studies of childhood asthma incidence reviewed in the 2016 U.S. EPA ISA for Oxides of Nitrogen, two studies were conducted in Southern California. Both studies were based on the Children's Health Study cohort, but one study used a smaller subset of the cohort and estimated NO_2 exposures using monitors at the children's homes (Jerrett et al. 2008). The second study examined over 2000 children and used data from air monitoring stations as well as modeled NO_2 levels to estimate exposures (McConnell et al. 2010). Both studies found a positive association between NO_2 exposures and the onset of asthma in these children, however, because NO_2 is often strongly

correlated with PM2.5 and other components of traffic-related air pollution, it is possible that the effects observed are due to some other component of traffic exhaust for which NO_2 serves as a proxy measure. The consistency of the effects found linking NO_2 exposure and asthma development in children, the use of prospective longitudinal study designs following children for several years, and the use of several different methods to estimate exposures are noted strengths of such studies. Experimental studies have found that NO_2 exposures increase responsiveness of airways, pulmonary inflammation, and oxidative stress, and can lead to the development of allergic responses. These biological responses provide evidence of a plausible mechanism for NO_2 to cause asthma.

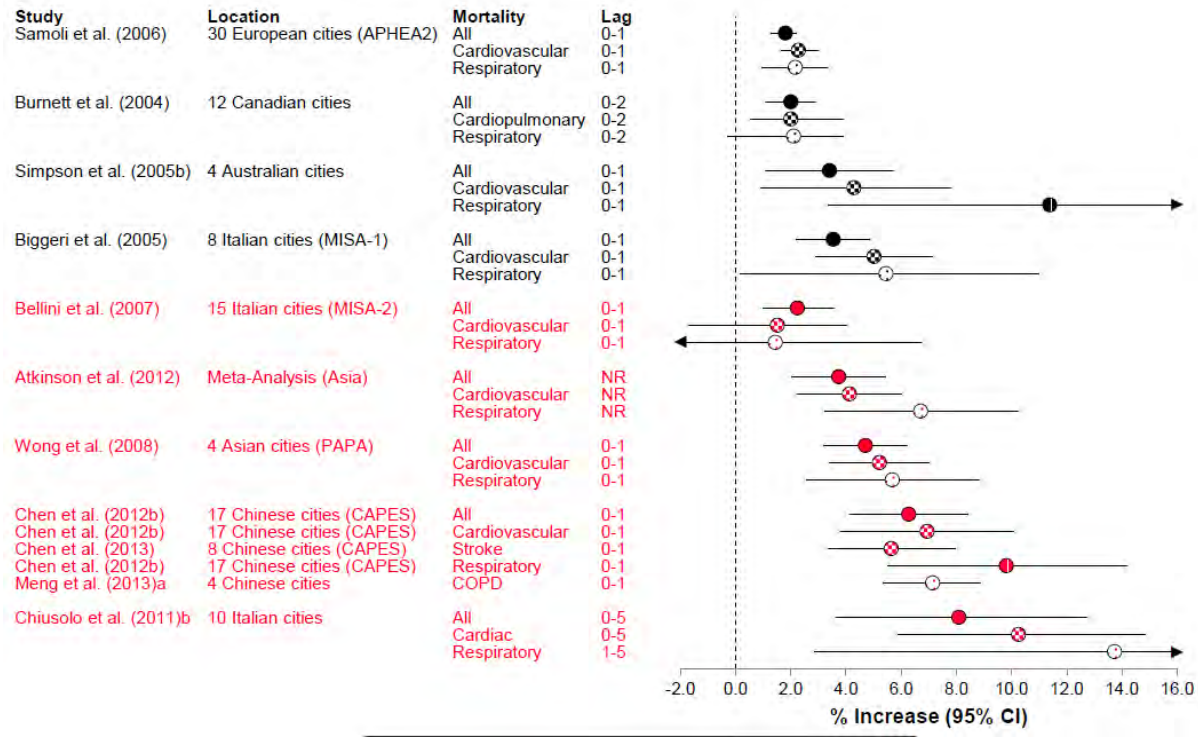
Results from controlled exposure studies of asthmatics demonstrate an increase in the tendency of airways to contract in response to a chemical stimulus (airway responsiveness) or after inhaled allergens (U.S. EPA 2016). Effects were observed among adult volunteers with asthma when exposed to 100 ppb NO_2 for 60 minutes and to 200-300 ppb for 30 minutes, with approximately 70 percent of study participants experiencing an increase in airway responsiveness. A similar response was reported in some studies with healthy subjects at higher levels of exposure (1.5 - 2.0 ppm), although these changes in healthy adults are likely of little or no clinical significance. Increased airway responsiveness among people with asthma can lead to worse symptoms and reduced lung function. Mixed results have been reported from controlled human exposure studies of people with chronic obstructive lung disease, with some studies reporting no change in symptom score while other studies reporting increased symptom scores when participants were exposed to NO_2 while exercising (U.S. EPA 2016).

Short-term controlled studies of rats exposed to NO_2 over a period of several hours indicate cellular changes associated with allergic and inflammatory responses that can lead to liver damage and reduced hepatic function. Rodent models exposed to NO_2 repeatedly for 4 to 14 days demonstrated increased airway responsiveness with high levels of exposure (4000 ppb). Animal studies also provide evidence that NO_2 exposures have negative effects on the immune system, and therefore increase the host's susceptibility to respiratory infections. Epidemiological studies showing associations between NO_2 levels and hospital admissions for respiratory infections also support such a link (U.S. EPA 2016).

Several epidemiological studies conducted in California have examined associations between NO_2 exposures and other health effects, including some recent studies evaluating cardiovascular effects (Coogan et al. 2012; Bartell et al. 2013; Wittkopp et al. 2013), mortality (Lipsett et al. 2011; Bartell et al. 2013; Jerrett et al. 2013), birth outcomes (Ghosh et al. 2012; Laurent et al. 2014; Padula et al. 2014; Ritz et al. 2014; Green et al. 2015), and cancer (Ghosh et al. 2013). Many studies conducted in other geographic areas have also found links with these health outcomes, and the latest assessment by U.S. EPA is that the existing studies are suggestive of a causal relationship for some of these endpoints or inadequate to infer a causal relationship for other endpoints (U.S. EPA 2016). In addition, some of the newer outcomes evaluated in relation to NO_2 exposures include neurological outcomes such as Parkinson's disease (Ritz et al. 2016), Alzheimer's disease (Oudin et al. 2016), and autism (Becerra et al. 2013; Volk et al. 2013), as well as metabolic diseases such as diabetes and obesity (Coogan et al. 2012; Robledo et al. 2015; White et al. 2016). However, many of these studies

use NO_2 exposures as a proxy measure for traffic-related air pollutants, and do not aim to identify a specific pollutant within the mix of pollutants from this source. Thus, there is uncertainty on whether NO_2 exposure has independent relationships with non-respiratory related health effects, or whether NO_2 is simply a marker of near-road air pollution exposure, which includes a mixture of air pollutants, including some air toxics.

Examples of studies reporting an association of mortality with short-term NO_2 exposures are shown in the figure below.



Note: Black symbols = multicity studies evaluated in the 2008 Integrated Science Assessment for Oxides of Nitrogen; Red symbols = recent studies. Filled circle = total mortality; Crosshatch = cardiovascular mortality; Vertical lines = respiratory mortality.

FIGURE I-10

Percentage increase in total, cardiovascular, and respiratory mortality from multi-city studies for a 20-ppb increase in 24-hour average or 30-ppb increase in one-hour maximum nitrogen dioxide concentrations (From (U.S. EPA 2016), Figure 5-23).

SULFUR DIOXIDE

Sulfur dioxide (SO_2) is a gaseous air pollutant that has been linked to a variety of respiratory effects, such as decreased lung function and increased airway resistance. Controlled laboratory studies involving human volunteers have clearly identified asthmatics as a very sensitive group to the effects of ambient sulfur dioxide (SO_2) exposures. Healthy subjects have failed to demonstrate any short-term respiratory functional changes at exposure levels up to 1.0 ppm over 1-3 hours. In exercising asthmatics, brief exposure (5-10 minutes) to SO_2 at levels between 0.2-0.6 ppm can result in increases in airway resistance and decreases in breathing capacity. The response to SO_2 inhalation is

observable within two minutes of exposure, increases further with continuing exposure up to five minutes, then remains relatively steady as exposure continues. SO_2 exposure is generally not associated with any delayed reactions or repetitive asthmatic attacks (U.S. EPA 2008). In 2010, the U.S. EPA SO_2 air quality standard was set at 75 ppb (0.075 ppm) averaged over one hour to protect against acute asthma attacks in sensitive individuals.

The EPA assessment based on the 2008 Integrated Science Assessment for Sulfur Oxides is shown in the table below (U.S. EPA 2008). The U.S. EPA recently released a draft of the revised ISA for SO2 (U.S. EPA 2015a) which evaluates recent evidence assessing links to mortality and cardiovascular, respiratory, carcinogenic, and reproductive effects (Brunekreef et al. 2009; Hart et al. 2011; Pascal et al. 2013; Chen et al. 2014; Gianicolo et al. 2014; Milojevic et al. 2014; Moridi et al. 2014; Stingone et al. 2014; Straney et al. 2014; Wang et al. 2014; Winquist et al. 2014; Yang et al. 2014; Ancona et al. 2015; Green et al. 2015; Rich et al. 2015; Shah et al. 2015; Yorifuji et al. 2015).

TABLE I-12

Summary of U.S. EPA's Causal Determinations for Health Effects of Sulfur Oxides

SHORT-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Respiratory morbidity	Causal relationship
Cardiovascular morbidity	Inadequate to infer a causal relationship
Mortality	Suggestive of a causal relationship
LONG-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Respiratory morbidity	Inadequate to infer a causal relationship
Carcinogenic effects	Inadequate to infer a causal relationship
Prenatal and neonatal outcomes	Inadequate to infer a causal relationship
Mortality	Inadequate to infer a causal relationship

(From (U.S. EPA 2008) Chapter 3)

In epidemiologic studies of children and adults, associations of short-term variations in SO_2 levels with increases in respiratory symptoms, emergency department visits, and hospital admissions for respiratory-related causes have been reported. There is uncertainty as to whether SO_2 is associated with the effects or whether other co-occurring pollutants may explain the observed effects, although some studies indicated that the SO_2 effects remained even after accounting for the effects of other pollutants, including PM2.5. Coupled with the human clinical studies, these data suggest that SO_2 can trigger asthmatic episodes in individuals with pre-existing asthma (U.S. EPA 2008).

Animal studies have shown SO_2 effects on pulmonary inflammation with acute exposure at concentrations consistent with ambient SO_2 levels. Toxicological studies using animals found that repeated exposures to concentrations of SO_2 as low as 0.1 ppm promoted allergic sensitization and airway inflammation. Such evidence, combined with human clinical studies and epidemiological studies in people with asthma support the U.S. EPA determination of a causal relationship between short-term SO_2 exposure and respiratory morbidity. One of these studies was conducted in the Los Angeles area, and found that higher ambient SO_2 levels were associated with increased odds of asthma symptoms among Hispanic children with asthma (Delfino et al. 2003).

Some epidemiological studies indicate that the cardiovascular mortality effects associated with short-term exposures to ambient SO_2 were generally reduced when accounting for other pollutants, although the evidence is still suggestive of a causal relationship. Few epidemiological studies are available to assess the potential confounding effects of other co-occurring pollutants in studies of long-term effects. For example, there is some evidence that sulfates, which are formed when SO_2 oxidizes rapidly in the atmosphere, may be associated with lung function changes, although the evidence is not consistent (Reiss et al. 2007). Sulfates are positively correlated with SO_2 levels, so it is difficult to distinguish the effect of one individual pollutant. Based on a level determined necessary to protect the most sensitive individuals, the California Air Resources Board (CARB) in 1976 adopted a standard of 25 $\mu g/m^3$ (24-hour average) for sulfates. There is no federal air quality standard for sulfates.

CARBON MONOXIDE

Carbon monoxide (CO) is a gaseous air pollutant that has a high affinity to bond with oxygen-carrying proteins (hemoglobin and myoglobin). The resulting reduction in oxygen supply in the bloodstream is responsible for the toxic effects of CO, which are typically manifested in the oxygen-sensitive organ systems. The effects have been studied in controlled laboratory environments involving exposure of humans and animals to CO, as well as in population-based studies of ambient CO exposure effects. People with deficient blood supply to the heart (ischemic heart disease) are known to be susceptible to the effects of CO. Protection of this group is the basis of the existing National Ambient Air Quality Standards for CO at 35 ppm for one hour and 9 ppm averaged over eight hours. The health effects of ambient CO have been recently reviewed by U.S. EPA, with the strongest evidence supporting a likely causal link between short-term CO exposures and cardiovascular outcomes, although studies have linked both short-term and long-term CO exposures to several other health outcomes (Table I-13) (U.S. EPA 2010).

TABLE I-13

Summary of U.S. EPA's Causal Determinations for Health Effects of Carbon Monoxide

SHORT-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Cardiovascular morbidity	Likely to be a causal relationship
Central nervous system	Suggestive of a causal relationship
Respiratory morbidity	Suggestive of a causal relationship
Mortality	Suggestive of a causal relationship
LONG-TERM EXPOSURES	
Health Outcome	**Causality Determination**
Cardiovascular morbidity	Inadequate to infer a causal relationship
Central nervous system	Suggestive of a causal relationship
Birth outcomes and developmental effects	Suggestive of a causal relationship
Respiratory morbidity	Inadequate to infer a causal relationship
Mortality	Not likely to be a causal relationship

(From (U.S. EPA 2010) Table 2-1)

Inhaled CO has no known direct toxic effect on lungs but rather exerts its effects by interfering with oxygen transport—through the formation of carboxyhemoglobin (COHb, a chemical complex of CO and hemoglobin)), which reduces the amount of oxygen the blood can carry to the tissues. Exposure to CO is often evaluated in terms of COHb levels in blood, measured as percentage of total hemoglobin bound to CO. Endogenous COHb is estimated to be <1 percent in healthy individuals, but COHb levels are sensitive to health status and metabolic state, with higher levels among smokers and persons with inflammatory diseases. Estimates based on a large prospective study of adults conducted in the 1970s showed a dose-response relationship between the average number of cigarettes smoked per day and the COHb concentrations (never smokers: 1.59±1.72 percent, former smokers: 1.96±1.87 percent, 1-5 cigarettes/day: 2.31±1.94 percent, 6–14 cigarettes/day: 4.39±2.48 percent, 15–24 cigarettes/day: 5.68±2.64 percent, >=25 cigarettes/day: 6.02±2.86 percent) (Hart et al. 2006).

Under controlled laboratory conditions, healthy subjects exposed to CO sufficient to result in 5 percent COHb levels exhibited reduced duration of maximal exercise performance due to the inability to deliver sufficient oxygen to the heart and other muscles. Studies involving subjects with coronary artery disease who engaged in exercise during CO exposures have shown that COHb levels as low as

2.4 percent can lead to earlier onset of electrocardiograph changes indicative of deficiency of oxygen supply to the heart. Other effects of inadequate oxygen delivery to the body tissues include earlier onset of chest pain, increase in the duration of chest pain, headache, confusion and drowsiness (U.S. EPA 2000).

A number of epidemiological studies have found associations between short-term ambient CO levels and increased hospital admissions and emergency department visits for ischemic heart disease, including myocardial infarction (U.S. EPA 2010). In studies reporting results stratified by age and sex, larger effects were generally observed among older adults and among males. Examples of such studies, including information on number of days of lag time between exposure and hospital admissions for key cardiovascular outcomes, are shown in the figure below.

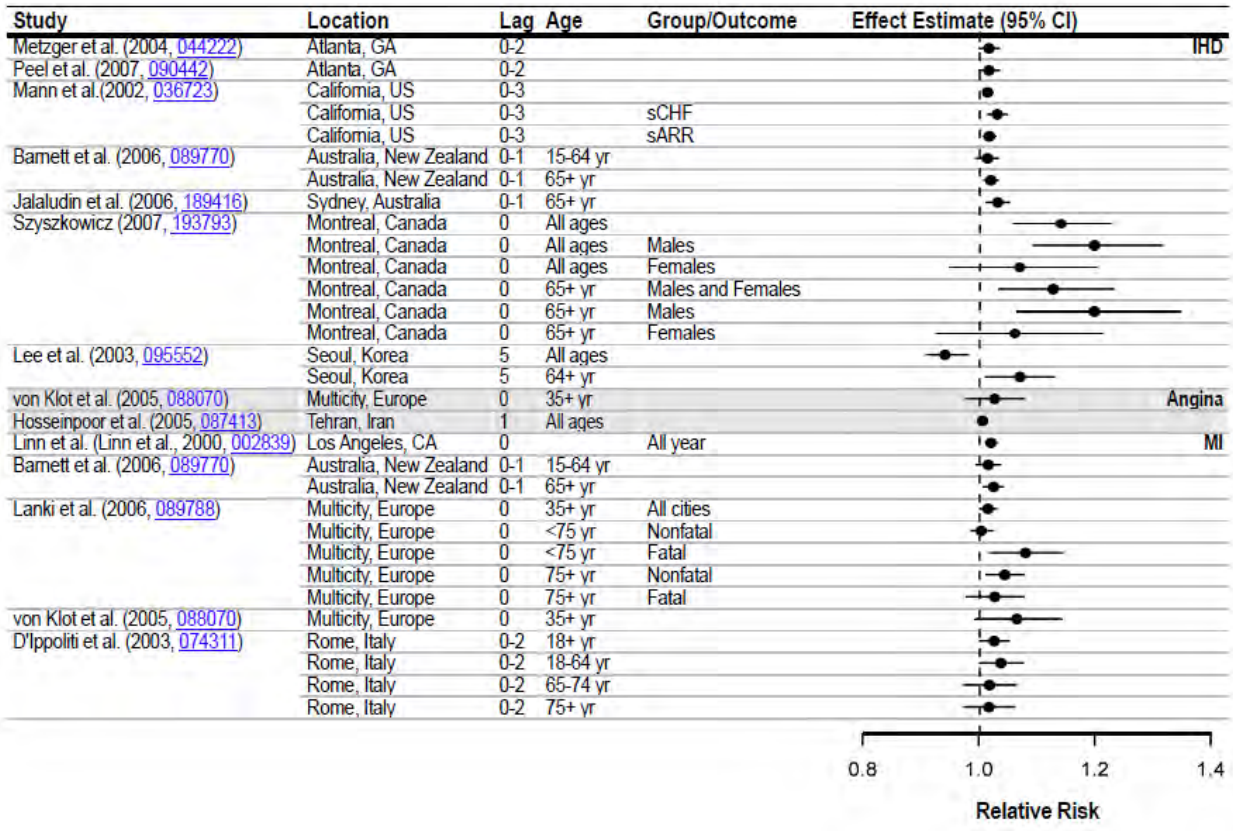


FIGURE I-11

Effect estimates (95 percent confidence intervals) associated with hospital admissions for various forms of heart disease. Effect estimates have been standardized to a 1 ppm increase in ambient CO for 1-h max CO concentrations, 0.75 ppm for 8-h max CO concentrations, and 0.5 ppm for 24-h average CO concentrations (From (U.S. EPA 2010), Figure 5-2). Lag time is the time between the exposure and the outcome measured. The closed circle on the diagram indicates the effect estimate, while the bar indicates the 95 percent confidence interval.

Research studies have also evaluated ambient CO exposures in relation to reproductive health outcomes. Epidemiological studies conducted in Southern California have reported an association

between with CO exposure during pregnancy and increases in pre-term births (Ritz et al. 2000; Wilhelm et al. 2005; Ritz et al. 2007). The increases in the pre-term births were also associated with PM10 or PM2.5 levels. There are very few studies examining CO exposure and birth defects, but one Southern California study found increased risks for cardiac-related birth defects with carbon monoxide exposure in the second month of pregnancy (Ritz et al. 2002). Toxicological studies in laboratory animals with higher than ambient levels of CO have also reported decrements in birth weight and prenatal growth, as well as impaired neurobehavior in the offspring of exposed animals (U.S. EPA 2010). The U.S. EPA concluded in their most recent review that the evidence linking long-term CO exposures with reproductive health outcomes was suggestive of a causal relationship.

LEAD

Lead (Pb) is a toxic air contaminant that is recognized to exert an array of deleterious effects on multiple organ systems. There are a number of potential public health effects at low level exposures, and there is no recognized lower threshold for health effects (U.S. EPA 2013a). The health implications are generally indexed by blood lead levels which are related to lead exposures both from inhalation as well as from ingestion. Effects include impacts on population IQ as well as heart disease and kidney disease. The initial air quality standard for lead was established by U.S. EPA in 1978 at a level of 1.5 µg /m^3 averaged over a calendar quarter. U.S. EPA revised the NAAQS for lead in 2008 to a level of 0.15 µg/m^3 averaged over a rolling three-month period to protect against lead toxicity. The SCAB's attainment status for lead is described in the draft 2016 AQMP Chapter 2.

The U.S. EPA has recently reviewed the health effects of ambient lead exposures in conjunction with an Integrated Science Assessment and a review of the NAAQS for lead (U.S. EPA 2013a; U.S. EPA 2015c). Lead can accumulate and be stored in the bone, and this lead in bone can be released into the blood when the bone is metabolized, which happens naturally and continuously. Blood lead is the most common measure of lead exposure, and it represents recent exposure and may be an indicator of total body burden of lead (U.S. EPA 2013a). The following table gives the summary of causality conclusions from the U.S. EPA review, which illustrates the wide range of health effects associated with lead exposure.

TABLE I-14

Summary of U.S. EPA's Causal Determinations for Health Effects of Lead

HEALTH OUTCOME	CAUSALITY DETERMINATION
Children - Nervous System Effects	
Cognitive Function Decrements	Causal relationship
Externalizing Behaviors: Attention, Impulsivity and Hyperactivity	Causal relationship
Externalizing Behaviors: Conduct Disorders in Children and Young Adults	Likely to be a causal relationship
Internalizing Behaviors	Likely to be a causal relationship
Auditory Function Decrements	Likely to be a causal relationship
Visual Function Decrements	Inadequate to infer a causal relationship
Motor Function Deficits	Likely to be a causal relationship
Adults – Nervous System Effects	
Cognitive Function Decrements	Likely to be a causal relationship
Psychopathological Effects	Likely to be a causal relationship
Cardiovascular effects	
Hypertension	Causal relationship
Subclinical Atherosclerosis	Suggestive of a causal relationship
Coronary Heart Disease	Causal relationship
Cerebrovascular Disease	Inadequate to infer a causal relationship
Renal Effects	
Reduced Kidney Function	Suggestive of a causal relationship
Immune System Effects	
Atopic and Inflammatory Response	Likely to be a causal relationship
Decreased Host Resistance	Likely to be a causal relationship
Autoimmunity	Inadequate to infer a causal relationship
Hemotologic Effects	
Decreased Red Blood Cell Survival and Function	Causal relationship
Altered Heme Synthesis	Causal relationship
Reproductive and Developmental Effects	
Development	Causal relationship
Birth Outcomes (low birth weight, spontaneous abortion)	Suggestive of a causal relationship
Male Reproductive Function	Causal relationship
Female Reproductive Function	Suggestive of a causal relationship
Cancer	
Cancer	Likely to be a causal relationship

(From (U.S. EPA 2013a) Table ES-1)

Children appear to be sensitive to the neurological toxicity of lead, with effects observed at blood lead concentration ranges of 2–8 µg/dL. No clear threshold has been established for such effects. According to the U.S. EPA review, the most important effects observed are neurotoxic effects in children and cardiovascular effects in adults. The effects in children include impacts on intellectual

attainment and school performance. Figure I-12 provides a summary of the lowest levels of blood lead that have been associated with certain neurological, hematological and immune effects in children.

Lowest Observed Effect Blood Lead Level	Neurological Effects	Hematological Effects	Immune Effects
30 µg/dL		Increased urinary δ-aminolevulinic acid	
15 µg/dL	Behavioral disturbances (e.g., inattention, delinquency) Altered electrophysiological responses	Erythrocyte protoporphyrin (EP) elevation	
10 µg/dL	Effects on neuromotor function CNS cognitive effects (e.g., IQ deficits)	Inhibition of δ-aminolevulinic acid dehydratase (ALAD) Pyrimidine-5′-nuclotidase (Py5N) activity inhibition	Effects on humoral (↑ serum IgE) and cell-mediated (↓ T-cell abundance) immunity
5 µg/dL	↓	↓	
	(???)	(???)	
0 µg/dL			

Note: Arrows depict cases where weight of overall evidence strongly substantiates likely occurrence of type of effect in association with blood-Pb concentrations in range of 5-10 µg/dL, or possibly lower, as implied by (???). Although no evident threshold has yet been clearly established for those effects, the existence of such effects at still lower blood-Pb levels cannot be ruled out based on available data.

Source: Adapted/updated from Table 1-17 of U.S. Environmental Protection Agency (1986a).

FIGURE I-12

Summary of Lowest Observed Effect Levels for Key Lead-Induced Health Effects in Children (From (U.S. EPA 2007), Table 3-1)

Figures I-12 and I-13, taken from the U.S. EPA review (U.S. EPA 2007), depict the health effects of lead in relation to blood levels. In the figure, the question marks indicate that there are no demonstrated threshold blood lead levels for health effects. The Centers for Disease Control (CDC) has recently revised their lead hazard information and replaced their level of concern for adverse effects of 10 µg/dL blood lead level with a childhood blood lead level reference value of 5 µg/dL to identify children and environments associated with lead-exposure hazards (Centers for Disease Control and Prevention 2016).

Figure I-13 provides a summary of the lowest levels of blood lead that have been associated with key health effects in adults. For adults, evidence supports a causal relationship between lead and increased blood pressure and hypertension, as well as coronary heart disease (myocardial infarction, ischemic heart disease, and heart rate variability). Other health effects among adults are also relatively high on the causal scale, including neurological, hematological, and renal effects.

Lowest Observed Effect Blood Lead Level	Neurological Effects	Hematological Effects	Cardiovascular Effects	Renal Effects
30 µg/dL	Peripheral sensory nerve impairment	Erythrocyte protoporphyrin (EP) elevation in males		Impaired Renal Tubular Function
20 µg/dL	Cognitive impairment			
15 µg/dL	Postural sway	Erythrocyte protoporphyrin (EP) elevation in females Increased urinary δ-aminolevulinic acid		
10 µg/dL		Inhibition of δ-aminolevulinic acid dehydratase (ALAD)	Elevated blood pressure	
5 µg/dL			(???)	Elevated serum creatine (↓ creatine clearance)
0 µg/dL				

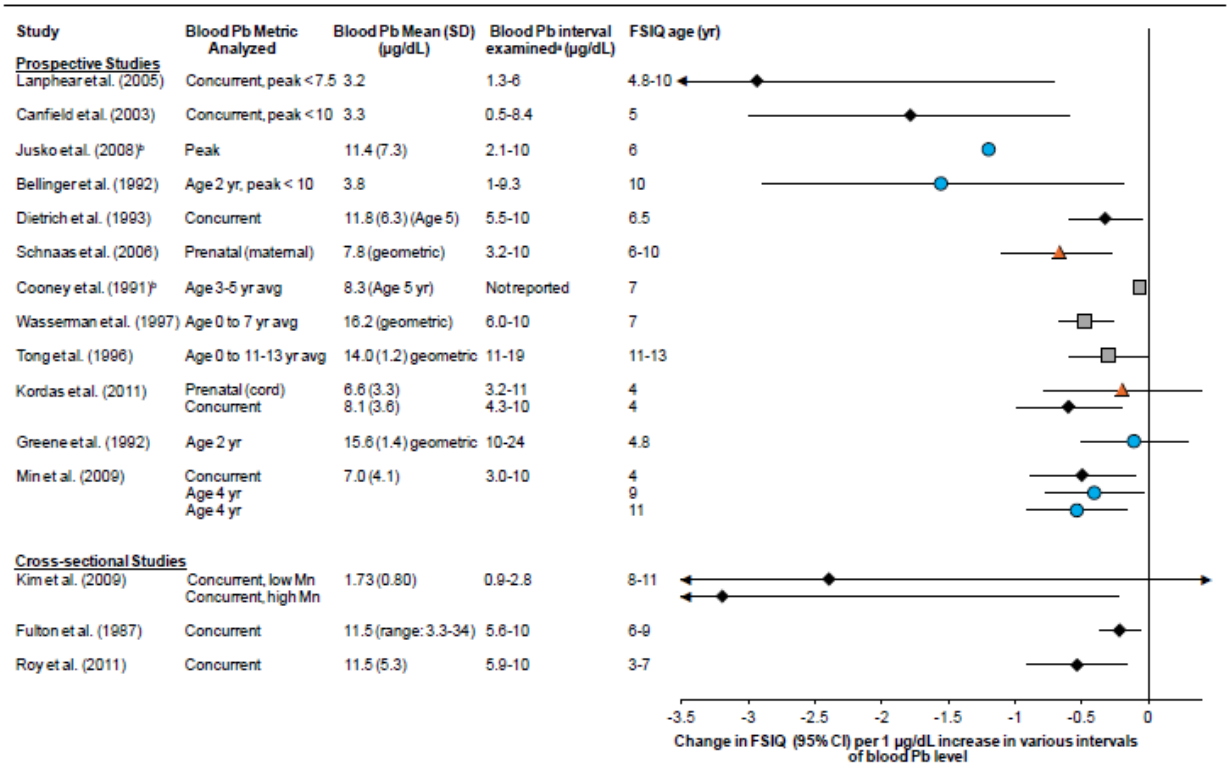
Note: Arrows depict cases where weight of overall evidence strongly substantiates likely occurrence of type of effect in association with blood-Pb concentrations in range of 5-10 µg/dL, or possibly lower, as implied by (???). Although no evident threshold has yet been clearly established for those effects, the existence of such effects at still lower blood-Pb levels cannot be ruled out based on available data.

Source: Adapted/updated from Table 1-16 of U.S. Environmental Protection Agency (1986a).

FIGURE I-13

Summary of Lowest Observed Effect Levels for Key Lead-Induced Health Effects in Adults (From (U.S. EPA 2007), Table 3-2)

In its most recent review of lead health effects, the U.S. EPA confirmed its previous conclusion regarding the cognitive decline in children as the most sensitive adverse effect associated with lead exposures. The effects as measured by a reduction in IQ from a number of studies are shown in the following figure. According to the review, the currently available evidence supports a median estimate of -1.75 IQ points for a change of 1 µg/dL blood lead to describe the neurocognitive impacts on young children (U.S. EPA 2015c).



[a]See Table 4-3 for explanation of the blood Pb level interval examined. Effect estimates were calculated for the lowest range examined in the study or the 10th percentile of blood Pb level to a blood Pb level of 10 µg/dL.
[b]Sufficient data were not available to calculate 95% CI.

Note: Mn = manganese. Results are presented for most of the cohorts examined in the literature and generally are grouped according to strength of study design, representativeness of the study population characteristics and blood Pb levels examined, and extent of consideration for potential confounding. There is not necessarily a continuum of decreasing strength across studies. Results usually are presented for the oldest age examined in cohorts. Multiple results from a cohort are grouped together. To facilitate comparisons among effect estimates across studies with different distributions of blood Pb levels and model structures (e.g., linear, log-linear), effect estimates are standardized to a 1 µg/dL increase for the lowest range of blood Pb levels examined in the study or the interval from the 10th percentile of blood Pb level to 10 µg/dL. For populations with 10th percentiles near or above 10 µg/dL, the effect estimate was calculated for the 10th to 90th percentile of blood Pb level. The percentiles are estimated using various methods and are only approximate values. Effect estimates are assumed to be linear within the blood Pb level interval evaluated. The various tests used to measure FSIQ are scored on a similar scale (approximately 40-160 FSIQ points). Black diamonds, blue circles, orange triangles, and gray squares represent effect estimates for concurrent, earlier childhood, prenatal, and lifetime average blood Pb levels, respectively. The horizontal lines associated with point estimates represent 95% confidence intervals (CI).

FIGURE I-14

Associations of Blood Pb Levels with Full-Scale IQ (FSIQ) in Children (From (U.S. EPA 2013a), Figure 4-2)

TOXIC AIR CONTAMINANTS

Toxic air contaminants are pollutants for which there generally are no ambient air quality standards. The Toxic Air Contaminant Identification and Control Act (AB 1807, Tanner, 1983) created California's first program to reduce exposures to air toxics by requiring CARB to adopt Air Toxics Control measures. Air Districts must either enforce these measures or adopt their own equally or more stringent measures. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connelly,

1987) supplements the earlier program by requiring air toxics inventories for certain facilities, notification of people's exposure to significant health risks, and facility plans to reduce these risks. Under California's Air Toxics Program, the Office of Environmental Health Hazard Assessment (OEHHA) assesses the health effects of substances that may pose a risk of adverse health effects, and CARB assesses the potential for humans to be exposed to these substances. These effects are usually an increased risk for cancer, adverse birth outcomes, or respiratory effects. After review by the state Scientific Review Panel, CARB holds a public hearing on whether to formally list substances that may pose a significant risk to public health as a Toxic Air Contaminant. Chapter 9 of the draft 2016 AQMP describes the Air Toxics Control Plan for the SCAQMD.

Air toxics include many different types of chemicals, and the discussion here will not address all air toxics in a comprehensive manner. However, this section will discuss very briefly diesel particulate matter and volatile organic compounds (VOC's), because diesel particulate matter is the most significant contributor to cancer risk in the South Coast Air Basin, and because some VOC's are air toxics, and are part of the control measures proposed in the current Air Quality Management Plan.

Diesel Particulate Matter

The California Air Resources Board listed diesel particulate matter as a Toxic Air Contaminant in 1998, based on the determination that it was a human carcinogen (California Air Resources Board 2010b). The International Agency for Research on Cancer, an arm of the World Health Organization, classified diesel exhaust as probably carcinogenic to humans in 1989 (International Agency for Research on Cancer 1989). More recently, IARC convened an international panel of scientists to review the published literature since the initial classification regarding the carcinogenicity of diesel combustion emissions. The panel concluded that diesel exhaust is a substance that causes lung cancer in humans (International Agency for Research on Cancer 2012b).

OEHHA also establishes potency factors for air toxics that are carcinogenic. The potency factors can be used to estimate the additional cancer risk from ambient levels of toxics. This estimate represents the chance of contracting cancer in an individual over a lifetime exposure to a given level of an air toxic and is usually expressed in terms of additional cancer cases per million people exposed.

SCAQMD conducted studies on the ambient concentrations and estimated the potential health risks from air toxics (South Coast Air Quality Management District 2000; South Coast Air Quality Management District 2008; South Coast Air Quality Management District 2015). In the latest SCAQMD Multiple Air Toxics Exposure Study, MATES IV, a one-year monitoring program was undertaken at 10 sites throughout the SCAB over the time period July 2012 – June 2013 (South Coast Air Quality Management District 2015). Over 30 substances were measured, which included the toxics that contributed the most to health risks in the Basin. The results showed that the overall lifetime risk for excess cancer from a 70-year lifetime exposure to the levels of air toxics calculated from the regional model was 367 in a million. This reflects a greater than 50 percent reduction in exposures and risks compared to the MATES III Study that was conducted from 2004 -2006. The largest contributor to this risk was diesel particulate matter, accounting for 68 percent of the air

toxics risk. The average measured levels were also compared to the non-cancer chronic Reference Exposure Levels (RELs), and found to be below the established RELs for the over 30 substances measured.

In 2015, OEHHA updated the calculation procedure to estimate cancer risks from air toxics exposures (Dodge et al. 2015). The revisions to the calculation methodology included accounting for higher risks attributable to early life exposures (up to age 16 years), updates to the population distribution of breathing rates by age, and a reduction in the time of household residence. In combination, these changes resulted in risk estimates in the MATES IV study to be about 2.5 times higher than the previous methodology employed in the MATES studies. The average lifetime risk for excess cancer cases is estimated to be 897 per million using the updated procedure (South Coast Air Quality Management District 2015). However, it is important to note that results from the MATES IV study still represent approximately a 50 percent reduction in air toxics levels and cancer risk compared to MATES III. In addition to the maps in the MATES IV final report (South Coast Air Quality Management District 2015), an interactive map of the MATES IV cancer risks from air toxics calculated using the 2015 OEHHA guidelines is available through this website: http://www.aqmd.gov/home/tools/public.

In 2009, the Advanced Collaborative Emissions Study (ACES) reported that newer diesel engine technologies are very effective in reducing the amount of emissions from diesel trucks, as required by recent regulations (Khalek et al. 2009). In a long-term exposure study published in 2015, rats breathing the lower emissions did not develop cancer, while the rats breathing the higher emissions from older diesel engines (in previous studies) did develop cancer (McDonald et al. 2015). However, the 2015 study did not evaluate whether the PM from the newer engines was any more or less toxic compared to the older engines on a gram per gram basis; the study was not designed to determine such differences. Therefore, without any additional data on the toxicity of PM from the newer diesel engines, the analysis done in the MATES IV study used the same risk factor for both, applied to the mass of PM. For example, whether a person is exposed to 10 ug/m^3 of particulate matter from a single old diesel engine or several new diesel engines, the cancer risk would be the same because it is calculated based on 10 ug/m^3 of exposure.

In the Particulate Matter section of this Appendix, the vast majority of the studies described evaluated the health effects of total PM2.5 exposures by mass, regardless of whether they were from newer diesel engines, older diesel engines, or other sources. While this new diesel technology is very effective in terms of reducing the amount of emissions from diesel trucks, what people are being exposed to is a total concentration of PM from many sources. Health studies generally use this total concentration to analyze whether or not there is an effect on the specific health outcomes evaluated. In addition, it is important to note that direct PM2.5 emissions from diesel engines represent a small portion of overall PM2.5 exposure. NO_x emissions from diesel engines that eventually lead to PM2.5 formation in the atmosphere, however, represent a larger component of PM2.5 exposure (South Coast Air Quality Management District 2013a; Harley 2014).

Volatile Organic Compounds

VOC's are a class of air pollutants that undergo photochemical reactions in the air to form ozone. It should be noted that there are no state or national ambient air quality standards for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because limiting VOC emissions reduces the rate of photochemical reactions that contribute to the formation of ozone.

VOCs are also transformed into organic aerosols in the atmosphere, contributing to higher PM and lower visibility levels. In addition, VOC's that have toxic properties are also regulated as air toxics. Chapter 3 of the draft 2016 AQMP presents data on VOC sources and emissions in the South Coast Air Basin.

Some examples of VOC's that are known to cause health effects include benzene, toluene, ethylbenzene and xylenes (abbreviated BTEX), 1,3-butadiene, formaldehyde, and perchloroethylene. Several of these VOC's are carcinogenic. Based on the MATES IV analysis, benzene, 1,3-butadiene, and carbonyls (formaldehyde and acetaldehyde) together account for approximately 21 percent of the total cancer risk from air toxics in the SCAB. Not all carcinogenic VOC's are known to cause the same types of cancers, although several are associated with blood cancers. For example, the cancers most closely associated with long-term benzene exposure are leukemias. Formaldehyde is linked to nasopharyngeal cancer and leukemias, while 1,3-butadiene causes cancers in both the blood and lymphatic systems (International Agency for Research on Cancer 2012a).

Many VOC's can also cause non-cancer health effects. For these types of health outcomes, OEHHA has developed acute and chronic Reference Exposure Levels (RELs). RELs are concentrations in the air below which adverse health effects are not likely to occur. Acute RELs refer to short-term exposures, generally of one-hour duration. Chronic RELs refer to long-term exposures of several years. OEHHA has also established eight-hour RELs for several substances. The ratio of ambient concentration to the appropriate REL can be used to calculate a Hazard Index. A Hazard Index of less than one would not be expected to result in adverse effects (Dodge et al. 2015).

In the MATES IV assessment of chronic non-cancer health risks, the monitored air toxics levels were found to be below the chronic RELs. In other words, the general levels of air toxics in the SCAB are not expected to cause adverse non-cancer health effects. Importantly, the MATES IV monitoring network was designed to characterize the air toxics exposures in the basin overall. Given that ambient monitoring is necessarily conducted at a limited number of locations, and modeling is limited to a spatial resolution of 2km, there may be higher exposures not captured by the fixed-site monitoring. To address this limitation, particularly in some communities with environmental justice concerns, the MATES IV study also included local-scale studies in 3 communities very close to known industrial sources or large mobile source facilities, with a focus on ultrafine particles and diesel PM emissions. Details of these study results can be found in the MATES IV final report (South Coast Air Quality Management District 2015).

ODORS

Environmental odors are recognized as having the potential to cause health effects and/or quality of life impacts. The theory of "miasma" dates back to Hippocrates in ancient Greek times, and related bad odors to disease. The health effects of environmental odors can vary widely, and depend on the compound causing the odor, the level of the compound, as well as the sensitivity and physiological responses of the person detecting the odor.

Different levels of odor exposure can cause a range of responses and health effects, and the science of odor as a potential health issue was summarized previously by Schiffman and Williams (Schiffman et al. 2005b). There are two key nerves in the nasal cavity involved in odor effects: the olfactory nerve provides the sense of smell, while the trigeminal nerve provides the sense of irritation. At very low levels, an odor can be detected (i.e. odor threshold), and at slightly higher levels, an odor can be recognized and identified. At levels higher than detection or recognition levels, an odor can cause annoyance or intolerance, and at even higher levels, an odor can cause irritation or possible toxicity, if the odor is caused by a compound that is also an air toxic (Schiffman et al. 2005b).

Schiffman and Williams proposed three mechanisms of action for odor symptoms (Schiffman et al. 2005b). In the first mechanism, an odor substance can be at the level that can produce irritation, which triggers the trigeminal nerve. This mechanism is considered a toxic effect because symptoms appear when the chemical concentration is at or above the irritation level; here, the odor serves only as the marker of the toxic effect. In the second mechanism, the odor compound is below the irritation level but above odor detection thresholds, which can result in odor annoyance. This mechanism is relatively common among environmental odors, and has been studied in communities exposed to odors from landfills, hazardous waste sites or concentrated animal feeding operations (CAFO's) (Shusterman et al. 1991; Schiffman et al. 2005a; Heaney et al. 2011; Schinasi et al. 2011; Blanes-Vidal et al. 2012; Hooiveld et al. 2015). In this mechanism, the health effect is not a toxicological effect, and the dose does not necessarily correlate well with the effect in these instances. Genetic factors, previous exposure ("learning"), and beliefs about the safety of the odor may play important roles in these odors causing health symptoms (Shusterman 2001). The third proposed mechanism is when an odor substance is present along with a co-pollutant or endotoxin that is capable of producing health effects. In this mechanism, the effect is also a toxic effect, but the odor serves as a marker of the presence of a mixture that includes a toxic compound; if the co-pollutant were not present, no health effect would be expected in this scenario.

Individual characteristics can play important roles in altering an individual's response to an odor. Factors that can influence odor perception include age, genetics, gender, medical history (including mental health, neurological conditions, and other health conditions), health-related behaviors (tobacco, alcohol), and occupational and environmental factors (Greenberg et al. 2013; Wilson et al. 2014; Agency for Toxic Substances and Disease Registry 2016). Additionally, an individual's cognitive associations with the odor prior to an exposure can result in increased reporting of health-related symptoms after exposure (Shusterman et al. 1991; Shusterman 2001; Greenberg et al. 2013). Common symptoms associated with environmental odor exposures include headache, nasal

congestion, eye, nose and throat irritation, hoarseness or sore throat, cough, chest tightness, shortness of breath, wheezing heart palpitations, nausea, drowsiness, and mental depression (Agency for Toxic Substances and Disease Registry 2016). If the concentrations of the odor compound are below irritation levels, then the symptoms are not expected to persist once the person is no longer exposed; however, being exposed to odor levels at or above irritation levels for longer periods of time may cause symptoms that persist after moving out of the exposure area (Agency for Toxic Substances and Disease Registry 2016).

CONCLUSIONS

A large body of scientific evidence shows that the adverse impacts of air pollution on human and animal health are clear. A considerable number of population-based and laboratory studies have established a link between air pollution and increased morbidity and, in some instances, premature mortality. Importantly, the health effects of air pollution extend beyond respiratory effects, and there is substantial evidence that air pollution (including particulate matter and ozone) exposures cause cardiovascular morbidity and mortality. Some air pollutants, such as diesel PM, lead, and several other air toxics, have been linked to increased cancer risk. Health studies have also identified populations who may be more susceptible to the adverse effects of air pollution, such as children, older adults, low SES communities, people with certain pre-existing health conditions, and people with certain genetic factors. Understanding the impacts of air pollution on these more susceptible populations can help inform policies that better protect public health, for example, in setting standards for criteria air pollutants, and in the development of methods to evaluate air toxics health risks. Continued research on the effects of specific PM constituents and ultrafine particles will be important in furthering the understanding of how these pollutants affect human health.

As the scientific methods for the study of air pollution health effects have progressed over the past decades, adverse effects have been shown to occur at lower levels of exposure. For some pollutants, no clear thresholds for effects have been demonstrated. The new findings have, in turn, led to the revision and lowering of National Ambient Air Quality Standards (NAAQS) which, in the judgment of the Administrator of the U.S. EPA, are necessary to protect public health. Chapter 8 of the draft 2016 AQMP provides an overview of the extensive, multi-year, public process involved in setting federal air quality standards. Assessments of the scientific evidence from health studies is an important part of the process, and has helped inform revisions to the federal air pollution standards. Figures I-15 and I-16 are meant to convey some of the historical context to recent revisions to the NAAQS for ozone and for particulate matter, with regard to key developments in the understanding of the health effects of these pollutants.

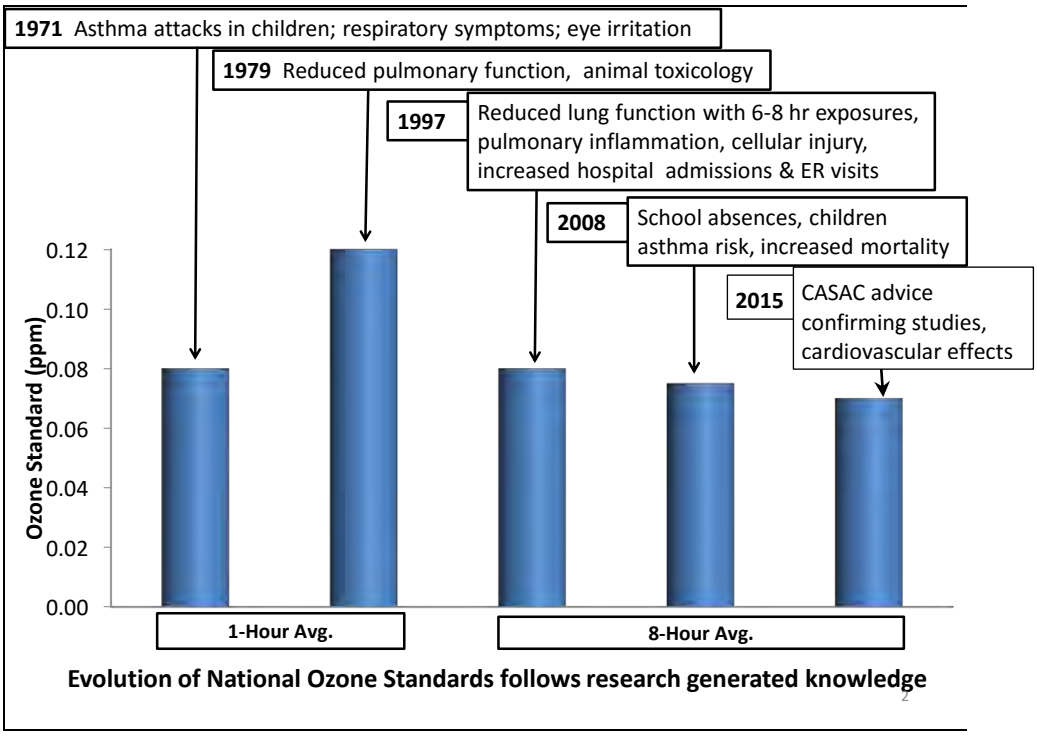


FIGURE I-15

Historical Context to Revisions of NAAQS for Ozone

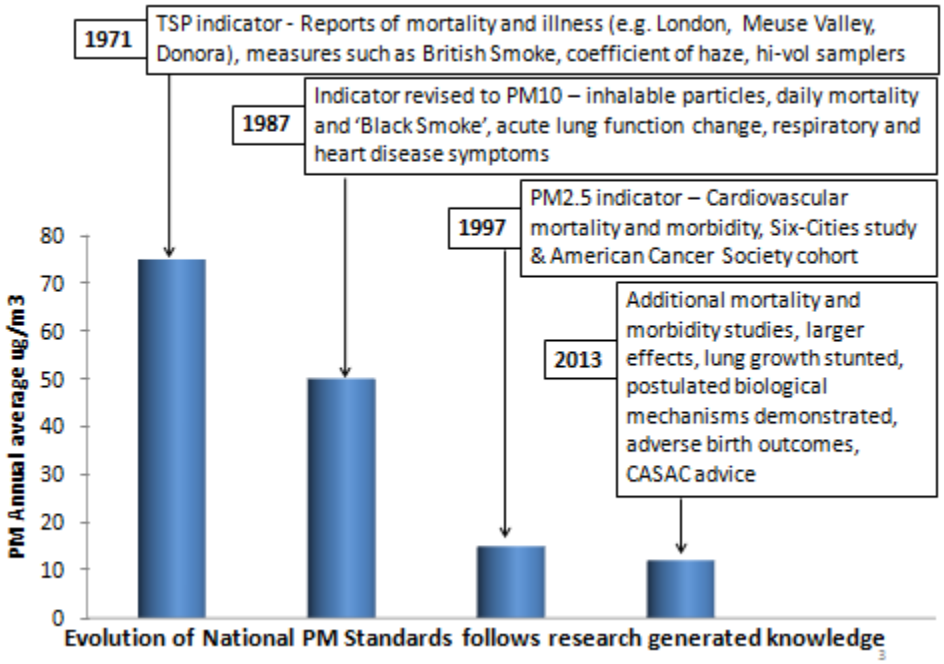


FIGURE I- 16

Historical Context to Revisions of NAAQS for PM

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Wittkopp, S., N. Staimer, T. Tjoa, D. Gillen, N. Daher, M. Shafer, J. J. Schauer, C. Sioutas and R. J. Delfino (2013). "Mitochondrial genetic background modifies the relationship between traffic-related air pollution exposure and systemic biomarkers of inflammation." PLoS ONE **8**(5): e64444.

Wong, C. M., N. Vichit-Vadakan, N. Vajanapoom, B. Ostro, T. Q. Thach, P. Y. Chau, E. K. Chan, R. Y. Chung, C. Q. Ou, L. Yang, J. S. Peiris, G. N. Thomas, T. H. Lam, T. W. Wong, A. J. Hedley, H. Kan, B. Chen, N. Zhao, S. J. London, G. Song, G. Chen, Y. Zhang, L. Jiang, Z. Qian, Q. He, H. M. Lin, L. Kong, D. Zhou, S. Liang, Z. Zhu, D. Liao, W. Liu, C. M. Bentley, J. Dan, B. Wang, N. Yang, S. Xu, J. Gong, H. Wei, H. Sun and Z. Qin (2010). "Part 5. Public health and air pollution in Asia (PAPA): a combined analysis of four studies of air pollution and mortality." Res Rep Health Eff Inst(154): 377-418.

Yang, W. S., X. Wang, Q. Deng, W. Y. Fan and W. Y. Wang (2014). "An evidence-based appraisal of global association between air pollution and risk of stroke." International Journal of Cardiology **175**(2): 307-313.

Yorifuji, T., S. Kashima and H. Doi (2015). "Outdoor air pollution and term low birth weight in Japan." Environment International **74**: 106-111.

Young, M. T., D. P. Sandler, L. A. DeRoo, S. Vedal, J. D. Kaufman and S. J. London (2014). "Ambient air pollution exposure and incident adult asthma in a nationwide cohort of U.S. women." Am J Respir Crit Care Med **190**(8): 914-921.

Zanobetti, A. and J. Schwartz (2008). "Mortality displacement in the association of ozone with mortality: an analysis of 48 cities in the United States." Am J Respir Crit Care Med **177**(2): 184-189.

Zanobetti, A. and J. Schwartz (2009). "The effect of fine and coarse particulate air pollution on mortality: a national analysis." Environ Health Perspect **117**(6): 898-903.

Zanobetti, A. and J. Schwartz (2011). "Ozone and survival in four cohorts with potentially predisposing diseases." Am J Respir Crit Care Med **184**(7): 836-841.

Zeger, S. L., F. Dominici, A. McDermott and J. M. Samet (2008). "Mortality in the Medicare population and chronic exposure to fine particulate air pollution in urban centers (2000-2005)." Environ Health Perspect **116**(12): 1614-1619.

Zhu, Y., W. C. Hinds, S. Kim and C. Sioutas (2002). "Concentration and size distribution of ultrafine particles near a major highway." J Air Waste Manag Assoc **52**(9): 1032-1042.

Zu, K., G. Tao, C. Long, J. Goodman and P. Valberg (2016). "Long-range fine particulate matter from the 2002 Quebec forest fires and daily mortality in Greater Boston and New York City." Air Qual Atmos Health **9**: 213-221.

DRAFT FINAL 2016 AQMP
APPENDIX I
Attachment

Publications from Health Related Research Projects Funded or Co-Funded by SCAQMD

DECEMBER 2016

PREFACE TO THE ATTACHMENT

This attachment provides a list of health-related publications from studies that were funded or partially funded by the SCAQMD. These include several studies that focus on evaluating health outcomes in Southern California populations, or toxicological effects of pollutants within the Southern California region. While an assessment of causality and strength of evidence should include air pollution studies conducted in many places, including other parts of the U.S. and in other countries, health studies focusing on Southern California provide an important "local perspective" in understanding and evaluating the health effects of air pollution. Some of these studies funded by SCAQMD were discussed in Appendix I, as appropriate, although the Appendix I also included many other studies that are not on this list. These studies funded by SCAQMD also help inform the SCQAMD's work in characterizing the air pollution in our local region and the influences of sources of air pollution in the Basin.

A new compact aerosol concentrator for use in conjunction with low flow-rate continuous aerosol instrumentation
Michael D. Geller∗, Subhasis Biswas, Philip M. Fine, Constantinos Sioutas
Aerosol Science 36 1006–1022, 2005

Air Pollution and Type 2 Diabetes Prevalence, Control, and Risk Factors. Final Report.
Ying-Ying Meng, Susan Babey, Michael Jerrett
UCLA Center for Health Policy Research, 2014

Air Pollution and Type 2 Diabetes Prevalence, Control, and Risk Factors
PI: Ying-Ying Meng, DrPH, Co-Is: Susan Babey, PhD, Michael Jerrett, PhD, Study Coordinator: Melissa Pickett, MPH, UCLA Center for Health Policy Research
Final Report submitted to BP SCAQMD Public Benefits Oversight Committee, October 22, 2014

Air pollution exposures and circulating biomarkers of effect in a susceptible population: clues to potential causal component mixtures and mechanisms.
Delfino RJ, Staimer N, Tjoa T, Gillen DL, Polidori A, Arhami M, Kleinman MT, Vaziri ND, Longhurst J, Sioutas C.
Environ Health Perspect.117(8):1232-8, 2009

Airway inflammation and oxidative potential of air pollutant particles in a pediatric asthma panel
Ralph J. Delfino, Norbert Staimer, Thomas Tjoa, Daniel L. Gillen James J. Schauer, and Martin M. Shafer
J Expo Sci Environ Epidemiol.; 23(5): 466–473, 2013

Ambient air pollution and brain cancer mortality
Roberta McKean-Cowdin, Eugenia E. Calle, John M. Peters, Jane Henley, Lindsay Hannan, George D. Thurston, Michael J. Thun, Susan Preston-Martin
Cancer Causes Control 20:1645–1651, 2009

Ambient ozone concentrations and cardiac mortality in Southern California 1983-2000: application of a new marginal structural model approach.
Moore K, Neugebauer R, Lurmann F, Hall J, Brajer V, Alcorn S, Tager I.
Am J Epidemiol. 2010 Jun 1;171(11):1233-43.

Ambient ozone concentrations cause increased hospitalizations for asthma in children: an 18-year study in Southern California.
Moore K, Neugebauer R, Lurmann F, Hall J, Brajer V, Alcorn S, Tager I.
Environ Health Perspect. 2008 Aug;116(8):1063-70.

Ambient Vapor Samples Activate the Nrf2-ARE Pathway in Human Bronchial Epithelial BEAS-2B Cells
Yasuhiro Shinkai, Syun Nakajima, Arantza Eiguren-Fernandez, Emma Di Stefano, Debra A. Schmitz, John R. Froines, Arthur K. Cho, Yoshito Kumagai
Environ Toxicol. (11):1292-300, 2014

Associations Between Particle Number and Gaseous Co-Pollutant Concentrations in the Los Angeles Basin.
Sardar S.B., Fine P.M., Yoon H. and Sioutas C.
Journal of the Air and Waste Management Association. 5: 4992-1005, 2004

Associations of Primary and Secondary Organic Aerosols With Airway and Systemic Inflammation in an Elderly Panel Cohort
Ralph J. Delfino, Norbert Staimer, Thomas Tjoa, Mohammad Arhami, Andrea Polidori, Daniel L. Gillen, Steven C. George, Martin M. Shafer, James J. Schauer, Constantinos Sioutas
Epidemiology 21: 892–902, 2010

Asthma Morbidity and Ambient Air Pollution. Effect Modification by Residential Traffic-Related Air Pollution
Ralph J. Delfino, Jun Wu, Thomas Tjoa, Sevan K. Gullesserian, Bruce Nickerson, Daniel L. Gillen
Epidemiology 25(1): 48-57, 2014

Bioassay Analyses of Emissions from Compressed Natural Gas and Ultra-Low Sulfur Diesel Fueled Transit Buses (Final Report).
Kado, N. Y., & Kuzmicky, P. A.
Report to The South Coast Air Quality Management District., 2003

Characterization of particle bound organic carbon from diesel vehicles equipped with advanced emission control technologies.
Pakbin, P.; Ning, Z.; Schauer, J. J.; Sioutas, C.,
Environ Sci Technol 43(13) : 4679-4686, 2009

Characterization of particulate matter and co-pollutants during the fall 2003 Southern California fires.
Phuleria, H., Fine, P. M., Zhu, Y., & Sioutas, C.
Journal of Geophysical Research, 110, D07S20 (2005).

Characterizing the range of children's air pollutant exposure during school bus commutes
Lisa D. Sabin, Eduardo Behrentz, Arthur M. Winer, Seong Jeong, Dennis R. Fitz, David V. Pankratz, Steven D. Colome, Scott A. Fruin
Journal of Exposure Analysis and Environmental Epidemiology 15: 377–387, 2005

Chemical reactivities of ambient air samples in three Southern California communities
Arantza Eiguren-Fernandez, Emma Di Stefano, Debra A. Schmitz, Aline Lefol Nani Guarieiro, Erika M. Salinas, Elina Nasser, John R. Froines, Arthur K. Cho
Journal of the Air & Waste Management Association, 65:3, 270-277, 2015

Chemical Speciation of Exhaust Emissions from Trucks and Buses Fueled on Ultra-Low Sulfur Diesel and CNG, Miriam Lev-On, Chuck LeTavec, Jim Uihlein, Teresa L. Alleman, Douglas R. Lawson, Keith Vertin, Gregory J. Thompson, Mridul Gautam, Scott Wayne, Barbara Zielinska, John Sagebiel,
SAE Technical Paper Series 2002-01-0432, 2002

Childhood Brain Tumors and Air Pollution: The West Coast Childhood Brain Tumor Study, Final Report. Roberta McKean-Cowdin, Michael Jerrett, Susan Preston-Martin. The University of Southern California (USC), Los Angeles, November 2011

Childhood Incident Asthma and Traffic-Related Air Pollution at Home and School
Rob McConnell, Talat Islam, Ketan Shankardass, Michael Jerrett, Fred Lurmann, Frank Gilliland, Jim Gauderman, Ed Avol, Nino Künzli, Ling Yao, John Peters, and Kiros Berhane
Environ Health Perspect 118:1021–1026 (2010)

Circulating biomarkers of inflammation, antioxidant activity, and platelet activation are associated with primary combustion aerosols in subjects with coronary artery disease.
Delfino RJ, Staimer N, Tjoa T, Polidori A, Arhami M, Gillen DL, Kleinman MT, Vaziri ND, Longhurst J, Zaldivar F, Sioutas C.
Environ Health Perspect.116(7):898-906, 2008

Coarse Particles and Daily Mortality in Coachella Valley, California
Bart D Ostro, Rachel Broadwin, and Michael J Lipsett
In: Health Effects Institute. Revised Analyses of Time-Series Studies of Air Pollution and Health. Special Report. Health Effects Institute, Boston MA. 2003.

Combustion Exhaust and the Respiratory Health of Port Community Children. Ed Avol, Jim Gauderman, Robert Urman, Department of Preventive Medicine, Keck School of Medicine of USC, Fred Lurmann, Sonoma Technology, Incorporated, 2009
Final Report to the South Coast Air Quality Management District Contract #07359 (Nov 2009),

Cost of near-roadway and regional air pollution–attributable childhood asthma in Los Angeles County
Sylvia Brandt, Laura Perez, Nino Kunzli, Fred Lurmann, John Wilson, Manuel Pastor, Rob McConnell
J Allergy Clin Immunol 134(5): 1028-1035

Costs of childhood asthma due to traffic-related pollution in two California communities
S.J. Brandt, L. Perez N. Künzli, F. Lurmann, R. McConnell
Eur Respir J. 40(2):363-70, 2012;

Effect of advanced aftertreatment for PM and NOx reduction on heavy-duty diesel engine ultrafine particle emissions.
Herner JD, Hu S, Robertson WH, Huai T, Chang MC, Rieger P, Ayala A.
Environ Sci Technol.45(6):2413-9, 2011.

Electrocardiographic ST-segment depression and exposure to traffic-related aerosols in elderly subjects with coronary artery disease.
Delfino RJ, Gillen DL, Tjoa T, Staimer N, Polidori A, Arhami M, Sioutas C, Longhurst J.
Environ Health Perspect. Feb;119(2):196-202, 2011

Experiences of a rail yard community: life is hard.
Spencer-Hwang R, Montgomery S, Dougherty M, Valladares J, Rangel S, Gleason P, Soret S.
J Environ Health 77(2):8-17, 2014

Field Validation of the New Miniature Versatile Aerosol Concentration Enrichment System (mVACES)
Zhi Ning, Katharine F. Moore, Andrea Polidori, and Constantinos Sioutas
Aerosol Science and Technology, 40:1098–1110, 2006

Gene expression changes in rat brain after short and long exposures to particulate matter in Los Angeles basin air: Comparison with human brain tumors
Julia Y. Ljubimova, Michael T. Kleinman, Natalya M. Karabalin, Satoshi Inoue, Bindu Konda, Pallavi Gangalum, Janet L. Markman, Alexander V. Ljubimov, Keith L. Black
Experimental and Toxicologic Pathology 65 (2013) 1063– 1071

Global perspective on the oxidative potential of airborne particulate matter: a synthesis of research findings. A. Saffari, N. Daher, M. M. Shafer, J.J. Schauer, C. Sioutas. Environmental Science and Technology, 2014, 48, 7576-7583.

Health Effects of the 2003 Southern California Wildfires on Children
Nino Kunzli, Ed Avol, Jun Wu, W. James Gauderman, Ed Rappaport, Joshua Millstein, Jonathan Bennion, Rob McConnell, Frank D. Gilliland, Kiros Berhane, Fred Lurmann, Arthur Winer, and John M. Peters
Am J Respir Crit Care Med Vol 174. pp 1221–1228, 2006

Human brain derived cells respond in a type-specific manner after exposure to urban particulate matter (PM)
Arezoo Campbell, Nancy Daher, Parrisa Solaimani, Kriscelle Mendoza, Constantinos Sioutas
Toxicology in Vitro 28(7): 1290–1295, 2014

Macrophage Reactive Oxygen Species Activity of Water-soluble and Water-insoluble Fractions of Ambient Coarse, PM2.5 and Ultrafine Particulate Matter (PM) in Los Angeles.
D. Wang, P. Pakbin, M. M. Shafer, D. Antkiewicz, J. J. Schauer and C. Sioutas.
Atmospheric Environment, 77, 301-310, 2013.

Making Human Subject Protection Training Community Responsive: Experiences Delivering on the Community-Based Participatory Research Promise
Rhonda Spencer-Hwang, Sam Soret, Linda Halstead, Molly Dougherty, Johanny Valladares, Sany Rangel, Caroline Youssef, Thelma Maldonado-Gamboa, Susanne Montgomery.
Progress in Community Health Partnerships: Research, Education, and Action 8(2): 215-224, 2014

Metals emitted from heavy-duty diesel vehicles equipped with advanced PM
and NOX emission controls
Shaohua Hu, Jorn D. Herner, Martin Shafeb, William Robertson, James J. Schauer, Harry Dwyer, John Collins, Tao Huai, Alberto Ayala
Atmospheric Environment 43: 2950–2959, 2009

Molecular Changes in Rat Brain Due to Air Nano Pollution.
Ljubimova JY, Gangalum PR, Portilla-Arias J, Patil R, Konda B, Paff M, Markman J, Inoue S, Espinoza A, Chesnokova A, Kleinman M, Holler E, Black KL.
NSTI-Nanotech, www.nsti.org, ISBN 978-1-4665-6276-9, vol.3: 261-263, 2012

Near-Roadway Air Pollution and Coronary Heart Disease: Burden of Disease and Potential Impact of a Greenhouse Gas Reduction Strategy in Southern California
Rakesh Ghosh, Frederick Lurmann, Laura Perez, Bryan Penfold, Sylvia Brandt, John Wilson, Meredith Milet, Nino Künzli, Rob McConnell
Environ Health Perspect. Advance Publication: 7 July 2015

Near-Roadway Pollution and Childhood Asthma: Implications for Developing "Win–Win" Compact Urban Development and Clean Vehicle Strategies
Laura Perez, Fred Lurmann, John Wilson, Manuel Pastor, Sylvia J. Brandt, Nino Künzli, Rob McConnell
Environ Health Perspect 120:1619–1626, 2012

On the interaction between glyceraldehyde-3-phosphate dehydrogenase and airborne particles: Evidence for electrophilic species
Masaru Shinyashiki, Chester E. Rodriguez, Emma W. Di Stefano, Constantinos Sioutas, Ralph J. Delfino, Yoshito Kumagai, John R. Froines, Arthur K. Cho
Atmospheric Environment 42(3): 517–529, 2008

Oxidative Potential of Semi-Volatile and Non Volatile Particulate Matter (PM) from Heavy-Duty Vehicles Retrofitted with Emission Control Technologies
Subhasis Biswas, Vishal Verma, James J. Schauer, Flemming R. Cassee, Arthur K. Cho, Constantinos Sioutas
Environ. Sci. Technol., 43(10): 3905–3912, 2009

Physical properties of particulate matter (PM) from late model heavy-duty diesel vehicles operating with advanced PM and NOx emission control technologies
Subhasis Biswas, Shaohua Hu, Vishal Verma, Jorn D. Herner, William H. Robertson, Alberto Ayala, Constantinos Sioutas.
Atmospheric Environment. 42(22): 5622–5634, 2008

Primary Particulate Matter from Ocean-Going Engines in the Southern California Air Basin
Harshit Agrawal, Rudy Eden, Xinqiu Zhang, Philip M. Fine, Aaron Katzenstein, J. Wayne Miller, Jean Ospital, Solomon Teffera and David R. Cocker, III
Environ. Sci. Technol., 2009, 43 (14), pp 5398–5402

Real-time characterization of particle-bound polycyclic aromatic hydrocarbons in ambient aerosols and from motor-vehicle exhaust.
Polidori, A.; Hu, S.; Biswas, S.; Delfino, R. J.; Sioutas, C.,
Atmos. Chem. Phys. 8: 1277-1291, 2008

Redox and Electrophilic Properties of Vapor- and Particle-Phase Components of Ambient Aerosols
Arantzazu Eiguren-Fernandez, Masaru Shinyashiki, Debra A. Schmitz, Emma DiStefano, William Hinds, Yoshito Kumagai, Arthur K. Cho, John R. Froines
Environ Res. 110(3): 207–212, 2010

Relative Importance of School Bus-Related Microenvironments to Children's Pollutant Exposure.
Eduardo Behrentz, Lisa D. Sabin, Arthur M. Winer, Dennis R. Fitz, David V. Pankratz, Steven D. Colome, Scott A. Fruin.
Journal of the Air & Waste Management Association, 55(10): 1418-1430, 2005

Repeated hospital encounters for asthma in children and exposure to traffic-related air pollution near the home.
Ralph J. Delfino,; Joyce Chang, Jun Wu, ; Cizao Ren, Thomas Tjoa, Bruce Nickerson, Dan Cooper, Daniel L. Gillen,
Ann Allergy Asthma Immunol. 2009;102:138–144

Respiratory Health Risks for Children Living Near a Major Railyard
Rhonda Spencer-Hwang, Sam Soret, Synnove Knutsen, David Shavlik, Mark Ghamsary, W. Lawrence Beeson, Wonha Kim, Susanne Montgomery
J Community Health. 2015 Apr 19. [Epub ahead of print]

Respiratory symptoms and peak expiratory flow in children with asthma in relation to volatile organic compounds in exhaled breath and ambient air.
Delfino RJ, Gong H, Linn WS, Hu Y, Pellizzari ED.
J Expo Anal Environ Epidemiol. 2003 Sep;13(5):348-63.

Source apportionment and organic compound characterization of ambient ultrafine particulate matter (PM) in the Los Angeles Basin.
S. Hasheminassab, N. Daher, J.J. Schauer, C. Sioutas.
Atmospheric Environment, 79, 529-539, 2013.

Seasonal and spatial trends in particle number concentrations and size distributions at the children's health study sites in Southern California.
Singh M, Phuleria HC, Bowers K, Sioutas C.
J Expo Sci Environ Epidemiol. 2006 Jan;16(1):3-18.

Seasonal and spatial variability in chemical composition and mass closure of ambient ultrafine particles in the megacity of Los Angeles.
N. Daher, S. Hasheminassab, M.M. Shafer, J.J. Schauer, C. Sioutas.
Environmental Science: Processes and Impacts, 15, 283-295, 2013.

Seasonal and spatial variation in dithiothreitol (DTT) activity of quasi-ultrafine particles in the Los Angeles Basin and its association with chemical species.
A. Saffari, N. Daher, M. M. Shafer, J.J. Schauer, C. Sioutas.
Journal of Environmental Science and Health, Part A: Toxic/Hazardous Substances and Environmental Engineering, 49 (4), 441-451, 2014

Seasonal and spatial variation in reactive oxygen species activity of quasi-ultrafine particles (PM0.25) in the Los Angeles metropolitan area and its association with chemical composition.
A. Saffari, N. Daher, M. M. Shafer, J.J. Schauer, C. Sioutas..
Atmospheric Environment, 79, 566-575, 2013.

Seasonal and spatial variation of trace elements and metals in quasi-ultrafine (PM0.25) particles in the Los Angeles metropolitan area and characterization of their sources.
A. Saffari., N. Daher, M. M. Shafer, J.J. Schauer, C. Sioutas.
Environmental Pollution, 181, 14-23, 2013.

Speciation of Organic Compounds from the Exhaust of Trucks and Buses: Effect of Fuel and After-Treatment on Vehicle Emission Profiles,
Lev-On, M., LeTavec, C., Uihlein, J., Kimura, K. et al.
SAE Technical Paper 2002-01-2873, 2002,

The relationship of respiratory and cardiovascular hospital admissions to the southern California wildfires of 2003
L Zhang, T Tjoa and D L Gillen R J Delfino, S Brummel, J Wu, H Stern, B Ostro, M Lipsett, A Winer, D H Street,
Occup. Environ. Med. 2009;66;189-197

Traffic, Susceptibility, and Childhood Asthma
Rob McConnell, Kiros Berhane, Ling Yao, Michael Jerrett, Fred Lurmann, Frank Gilliland, Nino Künzli, Jim Gauderman, Ed Avol, Duncan Thomas, John Peters
Environ Health Perspect 114:766–772, 2006

Ultra Fine Particles from Diesel Engines Induce Vascular Oxidative Stress via JNK Activation
Rongsong Li, Zhi Ning, Jeffery Cui, Bhavraj Khalsa, Lisong Ai, Wakako Takabe, Tyler Beebe, Rohit Majumdar, Constantinos Sioutas,* and Tzung Hsiai
Free Radic Biol Med. 2009 Mar 15; 46(6): 775–782.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Comments and Responses to Comments

2016 AIR QUALITY MANAGEMENT PLAN APPENDIX I



JANUARY 2017

From: StanYoung <genetree@bellsouth.net>
Sent: Tuesday, July 26, 2016 1:43 PM
To: Jo Kay Ghosh
Cc: Anthony Oliver; har@indecon.com; Margarita Felix (Ben); Marie Patrick (Bur)
Subject: air quality and health effects in South Coast Air Basin
Attachments: Comments on South Coast air quality and acute mortality V02.pdf; Young Short Bio 2016.pdf

July 26, 2016

Jo Kay Ghosh, PhD
SCAQMD Health Effects Officer
jghosh@aqmd.gov

Dear Dr. Ghosh:

I am a statistician and for the past several years I have been examining air quality, PM2.5 and ozone, and acute mortality for California. I attach a report that should be of interest to you. I find no association of air quality and acute mortality in the South Coast Air Basin. Please let me know if you have any questions on the analysis. I can provide the data set used in my analysis.

I also note that this analysis examines daily deaths of people 65 and older. The literature supports that there are no mortality effects in younger people. That is my assessment also. My reading of the literature on the "value of a statistical life" is that VSL depends on age. For people younger than 18 or so, VSL is essentially zero. Same for people older than 65. All that means that the EPA nominal VSL of $9M is surely an overestimate of the value of a statistical life. IF anyone is dying (the CA data and my analysis says that no one is), it is older people that have a very low VSL. Any analysis of economic impact should take into account the age distribution of any claimed mortality effect.

Sincerely,

S. Stanley Young, PhD, FASA, FAAS
genetree@bellsouth.net
919 782 2759

CC: Anthony Oliver aoliver@aqmd.gov
Henry A. Roman har@indecon.com
John Benoit mafelix@rcbos.org
William A. Burke mwpatrick@aqmd.gov

Short Bio 2016



Dr. S. Stanley Young worked at Eli Lilly, GlaxoSmithKline and the National Institute of Statistical Sciences on questions of applied statistics. His current mission is the evaluation of statistical claims particularly from observational studies. His research indicates that well over 50% of claims made fail to replicate when tested rigorously. His current interest is air pollution environmental epidemiology.

Dr. Young graduated from North Carolina State University, BS, MES and a PhD in Statistics and Genetics. He worked in the pharmaceutical industry on all phases of pre-clinical research. He has authored or co-authored over 60 papers including six “best paper” awards, and a highly cited book, Resampling-Based Multiple Testing. He has three issued patents. He is interested in all aspects of applied statistics, with special interest in chemical and biological informatics. He conducts research in the area of data mining.

Dr. Young is a Fellow of the American Statistical Association and the American Association for the Advancement of Science. He is an adjunct professor of statistics at North Carolina State University, the University of Waterloo, and the University of British Columbia where he has co-directed thesis work. He is also an adjunct professor of biostatistics at Georgia Southern University.

From: StanYoung <genetree@bellsouth.net>
Sent: Thursday, August 4, 2016 7:09 AM
To: Jo Kay Ghosh
Cc: Ann Scagliola; alovera@aqmd.gov; Margarita Felix (Ben); Marie Patrick (Bur); JudyM@ci.Rolling-Hills-Estates.ca.us
Subject: Material related to lack of association of air quality variables and mortality
Attachments: 02 Wang 2015 case crossover BMJ Open.pdf; 03 Young 2016 South Coast air quality and acute mortality.pdf; 00 Cover Letter to Ghosh.pdf; 00 Young 2016 Short Bio.pdf; 01 Milojevic- 2014 acute effects Heart.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Dear Dr. Ghosh:

Attached find a cover letter and materials related to air quality and health effects. Two of the papers are new and you may not have seen them. I only recently became aware of the Wang paper. I have highlighted and added notes to the items so that key findings are easily found.

Let me know that you have received this email.

I'm happy to discuss any of the items with you or with anyone on the cc list.

Sincerely,

Stan Young

Your message is ready to be sent with the following file or link
attachments:
02 Wang 2015 case crossover BMJ Open
03 Young 2016 South Coast air quality and acute mortality
00 Cover Letter to Ghosh
00 Young 2016 Short Bio
01 Milojevic- 2014 acute effects Heart

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

August 4, 2016

Jo Kay Ghosh, PhD
SCAQMD Health Effects Officer
jghosh@aqmd.gov

Dear Dr. Ghosh:

As noted previously in my letter to you, I am a statistician and for the past several years I have been examining air quality, PM2.5 and ozone, and acute mortality for California. I attach several papers a report that should be of interest to you. I have added highlights to each document and also some notes. I find no association of air quality and acute mortality in the South Coast Air Basin. Two of the papers are recent and may not have come to your attention, Milojev et al. (2014) and Wang et al. (2015). Both papers examine heart attacks and multiple air quality measurement. Both papers find no association of air quality variables and heart attacks.

I also include an analysis of data from the South Coast Air Basin. This analysis I sent to you previously; here I have added some highlights and notes.

Sincerely,

S. Stanley Young, PhD, FASA, FAAS

genetree@bellsouth.net
919 782 2759

CC: Anthony Oliver aoliver@aqmd.gov
Ann Scagliola ascagliola@aqmd.gov
Henry A. Roman har@indecon.com
John Benoit mafelix@rcbos.org
William A. Burke mwpatrick@aqmd.gov
Judy Mitchell JudyM@ci.Rolling-Hills-Estates.ca.us

Short Bio 2016



Dr. S. Stanley Young worked at Eli Lilly, GlaxoSmithKline and the National Institute of Statistical Sciences on questions of applied statistics. His current mission is the evaluation of statistical claims particularly from observational studies. His research indicates that well over 50% of claims made fail to replicate when tested rigorously. His current interest is air pollution environmental epidemiology.

Dr. Young graduated from North Carolina State University, BS, MES and a PhD in Statistics and Genetics. He worked in the pharmaceutical industry on all phases of pre-clinical research. He has authored or co-authored over 60 papers including six “best paper” awards, and a highly cited book, Resampling-Based Multiple Testing. He has three issued patents. He is interested in all aspects of applied statistics, with special interest in chemical and biological informatics. He conducts research in the area of data mining.

Dr. Young is a Fellow of the American Statistical Association and the American Association for the Advancement of Science. He is an adjunct professor of statistics at North Carolina State University, the University of Waterloo, and the University of British Columbia where he has co-directed thesis work. He is also an adjunct professor of biostatistics at Georgia Southern University.

From: Ann Scagliola
Sent: Friday, August 5, 2016 11:09 AM
To: Jo Kay Ghosh
Subject: FW: SCAQMD Advisory Council Meeting - August 18, 2016

Importance: High

A comment received today from Dr. Froines.

From: Froines, John [mailto:jfroines@ucla.edu]
Sent: Friday, August 5, 2016 11:05 AM
To: Ann Scagliola <ascagliola@aqmd.gov>
Subject: RE: SCAQMD Advisory Council Meeting - August 18, 2016

Comment on ozone for the Advisory Council meeting. Ozone may alter the chemical properties of ambient particles by ozonizing them to generate potential electrophiles. Electro[philes have the potential to act as carcinogens.

As little as a single ozone exposure (0.5 ppm, 4 hours) can induce lung inflammation without induction of HO-1.

I will have more to say later.
John

From: Ann Scagliola [mailto:ascagliola@aqmd.gov]
Sent: Wednesday, August 03, 2016 4:51 PM
To: Paul Avila; Dr. Ed Avol; Judy Chow; Curt Coleman; Dr. Afif El-Hasan; Froines, John; Sue Gornick; Dr. John Husing; Dr. Cameron Kaiser; Mary Ann Lutz; Dr. Emily Nelson; Dr. Greg Osterman; Erbie Phillips; William La Marr; William La Marr; Dr. Rhodes Rigsby
Cc: Jo Kay Ghosh
Subject: SCAQMD Advisory Council Meeting - August 18, 2016
Importance: High

Advisory Council Members:

I am preparing the agenda for the Advisory Council meeting which is scheduled for 10:00 a.m. Thursday, August 18, 2016 at SCAQMD in Conference Room CC-8. I have received requests from a couple members for the possible option of participation by conference call.

Please confirm whether you plan to participate by conference call. If you would like to participate in this meeting by conference call, please sent me an e-mail by noon tomorrow, August 4, 2016, with the address and room number if applicable. All teleconference locations must be accessible to the public and handicapped accessible. Agendas must also be posted at the teleconference locations at least 72 hours prior to the meeting to comply with the posting requirements of the Brown Act. Thank you.

Comments on Draft 2016 AQMP Appendix I: Health Effects

Ed Avol (USC Dept of Preventive Medicine)

General Comments:

What is the proposed purpose of this appendix document? The need for a Health Effects appendix is not completely clear, although it is not completely unreasonable to have some key supporting information readily handy. That said, there seems to be a lot of generic cutting and pasting from the previous USEPA Integrated Science Assessments (ISAs). This leads one to wonder why the respective ISAs are not just directly utilized as the health effects appendix (if one is needed), at least with regard to NAAQS pollutants? Since the prior ISA reviews largely occurred three to five years ago, it does make sense to conduct and report on an updated search of the more recent health literature, and some of that does appear in the document. A more current ISA has been released for oxides of nitrogen (2016), so that document should be used to summarize current knowledge of NOx health effects.

I generally found the document to be somewhat inconsistent in its approach. Sectional organization, level of detail, and approaches to summarizing cited work seemed to vary from pollutant to pollutant, without a clear rationale or reason. It seems like a similar approach could be applied for all pollutants – a summary from the most recent ISA, a summary of more recently published information, a discussion of health endpoints and judgements about confidence of association, some perspectives on susceptible sub-populations, and conclusions about the state of knowledge for the pollutant being discussed.

Additionally, the criteria for discussing health outcomes seems to shift around a bit. I think it is appropriate that the EPA tables on causal relationship status be discussed and used to prioritize presentation of health effects data. However, it should be clear what the threshold is for inclusion and discussion (in other words, outcomes determined to be “causal”, “likely causal”, or “suggestive of causal”?) are going to be discussed. This threshold seemed to vary from pollutant to pollutant…

An alternative approach would be to identify target organs or outcomes of interest (brain, heart, lungs, neonatal development, metabolic, etc), and then comment on whether the database supported any concern for health impact.

Specific Comments:

Table of Contents – question why Ultrafine Particles have their own separate section, rather than being a sub-section of Particle Matter. In a similar vein, PM2.5 (Fine PM) and PM10 (Coarse PM) arguably should have their own sub-section in the report (since for both historical and regulatory reasons, both metrics are of health and regulatory significance).

Table of Contents – should be “Conclusions” (plural), not singular…

Table of Contents – ATTACHMENT – not sure why this list of publications appears in this document; the information contained in the appendix presumably draws from the larger range of peer-reviewed published literature, of which any SCAQMD-funded work is a small subset. This

does not add to the focus of the document (a review of air pollution health effects), is a little self-serving, and is unnecessary – I suggest removing this.

I-1, Introduction, last sentence – It sounds like the Health and Safety Code requires a review of PM, and other pollutants have been added by choice. Most are NAAQS pollutants and make sense to include. In terms of regulatory policy, something might also be said about VOCs, which play an important role in photochemistry, pollution reduction strategies, and human health effects in their own right.

I-1, para 2, bulleted list of adverse health effects – I'm not sure that this bullet list is especially useful, effective, accurate, or worthwhile. Using bullet points focuses the Reader on specific issues as being especially important, and I think this does not serve the presentation well because it is a partial (and somewhat mis-directed) list. Air pollution health effects have arguably been identified with most every organ system in the body. The listing here is inconsistent in sometimes providing an explanation (which isn't appropriate or useful in this introductory passage). I suggest this bullet list be re-done to present the example information more clearly (for example, why say "increased health care utilization" when examples of that ae also included? Why not just say, "increased physicians' visits, emergency room visits, and hospitalizations"? Saying increased respiratory illness and other morbidity (symptoms, infections, and asthma exacerbation) is somewhat repetitive – just say increased respiratory symptoms, infections, and asthma exacerbation. Decreased lung function is not "just" breathing capacity, so the parenthetical comment here should be deleted for clarity. The extended explanation for increased airway reactivity is unnecessary here and should be changed to "increased airway reactivity" or "increased airway responsiveness" , or "bronchial hyper-reactivity…but using text space to explain the laboratory approach utilized to observe the response makes little sense here. It's not immediately clear to me what is meant by "a decreased tolerance for exercise"? Are you claiming that air pollution makes you tired? I think what you are talking about are secondary observations conditional upon respiratory, cardiovascular, and metabolic effects (and/or possible heat-related effects as well, given the frequent co-occurrence of pollution episodes in the SCAQMD with elevated temperatures…but I am skeptical this is a useful bullet listing. The note "adverse birth outcomes, such as low birth weight" is another inadequate mis-direction, in my opinion, since there have been a range of negative birth outcomes reported (including pre-term, neurological, and developmental) that I would think most might consider more substantive and important than low birth weight…so again, if the decision is to list a few examples, be careful to list important ones or illustrative ones, and be aware of what may be missing. Missing from this overall list are also more important topics to identify, such as neurological and neuro-developmental effects (behavior and learning), and metabolic effects (obesity, blood pressure, and even diabetes). The point is, this can be a considerable listing of outcomes, so one needs to be thoughtful of intent here.

I-2, para2, sentence 1 – Are you saying the only data used in preparation of this appendix were those from epi or clinical studies? Nothing from bench-top toxicology? Each of these three approaches (Epidemiology, toxicology, and clinical studies) provide unique and overlapping benefits to health research, thought the specific benefits and shortcomings of each approach differ (but overlap).

I-2, para2, sentence 2 – Arguably, the historical approach to understanding the health effects of air pollutants has, in the clinical and toxicological settings, been focused on specific pollutants and individual effects. In the past decade, there has been increasing pressure to investigate the combined effects of multiple pollutants on human health, since multi-pollutant exposures are a more accurate reflection of the "real" world. Given this is the case, I would delete the last half of this sentence in the text ("…and specific pollutants responsible for individual effects").

I-2, para3, sentence 4 ("Evidence for more than additive effects has not been strong…") – I am not sure you would get a consensus opinion on this claim, and more importantly, the claim is not central to the presentation here. I think the key point is that regulatory policy has, by in large, focused on individual pollutants without much regard for multi-pollutant exposures or effects. Accordingly, the document reviews the health information in an individual stepwise fashion. However, since it is acknowledged that there are multiple chemicals co-exposures occurring, a brief review of reported combined effects is also being presented herein.

I-3, para2 – The presentation of a criteria by which to gauge causal relationships of reported health data is useful here, but there is inadequate explanation as to context. I suggest adding a sentence or two prior to Table I-1 that says something like this: "Over the decades of national reviews of outdoor air pollution and their health impacts, the US EPA has developed a list of five criteria by which the strength and credibility of data can be judged. This five-tier weight-of-evidence approach provides an objective basis for assessing the breadth, specificity, and consistency of evidence concerning a particular health outcome."

I-4, Ozone, third sentence ("Since it is a gas, …") – This sentence is literally true but generally misleading to readers. Fine (and ultra-fine) particles can also penetrate into the gas-exchange regions of the lung, so I object to the phrasing "Since it is a gas,…" and suggest this qualification be removed.

I-6, Short-Term Effects of Ozone, para1, first sentence – This statement is partially true and incomplete. Increased physical activity increases both depth and frequency of inhalation. This results in higher ventilation rates ("more air and ozone" being breathed in) and increased surface areas of the lung becoming accessible to the inhaled air parcel. Therefore, additional portions of the lung are likely to come into contact with ozone during increased physical activity, compared to lower activity levels or rest.

I-6, Short-Term Effects of Ozone, para2, last sentence – The statement seems to purposely focus on respiratory outcomes. Is this because you are purposely limiting the discussion to a causal threshold of "likely to be causal"? Under a casual determination of "suggestive of a causal relationship", there are cardiovascular, reproductive, developmental, and central nervous system effects, as well. My concern here is that you are limiting the range of discussion to only respiratory endpoints, when there are many other target organs at risk.

I-7, para1, third sentence ("USEPA's recent review…") – Probably better to anchor this comment to a date rather than "recent" – suggest saying "USEPA's 2013 Integrated Science Assessment Review…" or something like that to link the comment to the data resource.

I-8, para1, inclusion of confidence intervals in discussion of CHS publication regarding school absences – This seems a little confusing and inconsistent with the previous discussion, where confidence intervals or p values have not been presented with reported observed changes in health status. In the interest of the report being consistent and accessible to a wide portion of the public, I suggest removing the confidence intervals from this passage; the citation provides a ready means of more detailed review of the research, should a Reader want more information.

I-8, para2, discussion on attenuation of response (adaptation, reduction in magnitude, …) – Not clear from your presentation what the intent or objective here, but you seem to be discrediting the notion of "adaptation", so a few comments are in order:

(1) Many researchers in the field would shy away from the phrase "adaptation", which denotes some positive evolutionary change; "toleration" or "tolerance" has been suggested as an alternative phrase, or something connoting reduced or diminished response;
(2) I don't discount what you have said in the text regarding the uncoupling of macro-system (i.e. lung function) and micro-system (i.e., biochemical) changes, but since I am one of the investigators who did several of the ozone toleration studies in controlled-exposure settings, I would note that there is a range of human response. Based on laboratory findings, it appeared that a portion of the population were "non-responders" (didn't really change much from baseline levels), a substantive portion of the population displayed some attributes of "toleration" (that is, developed some diminished response with recurring ozone exposure), and that another substantive portion did not seem to develop a diminished response (that is, with repeated challenge, there was fairly consistent and repeated loss of lung function). This was true with both consecutive (i.e. daily) and seasonal responses. Regarding seasonal response, it appeared that the observed capacity for "toleration" or diminished response was established during the early part of the "smog" season, persisted through it, and was "lost" through the winter…so the phenomenon seems to be repeatable (among certain people). I think this is what the last sentence in the paragraph is suggesting (that there is a seasonal aspect to toleration, but that it is somewhat ephemeral).

I-11, Long-Term Exposure Effects of Ozone, para2, line2 – should be "summer-only".

I-13, para2, line5 – "…Tumor Necrosis Factor α …"; add (TNF-α) to clarify (many readers may only know it by its shorthand symbol).
I-13, para2, last sentence – This paragraph is about laboratory studies of animals, but the least sentences is talking about humans (?). This last sentence seems more appropriate for I-8, para3, and should be removed from the current location.

I-13, next-to-last paragraph, first sentence – too long and awkwardly constructed. Should be broken into two sentences: "Some animal studies …changes of the lung. However, morphological, developmental, and immunological differences make it difficult to apply these results to humans."

I-13, last para, second sentence (In southern California communities with high ozone concentrations ,…") – should provide a number or range to the term "high". The key message

from the study was that children playing in currently-encountered ambient levels of ozone were at increased risk for developing asthma (not just making existing asthma worse).

I-14, para2, line7 ("…prenatal exposures and low birth weight…") – should read *on* low birth weight …

I-14, para3, first sentence – remove the word "newer" from the phrase 'other health endpoints"…

I-14, para3, second sentence – "One study of childhood autism was conducted in LA County and reported …" should be re-written to read, "A study of childhood autism conducted in LA County reported…" (…there has been more than one autism study conducted in LA County…)

I-14, last para, second-to-last sentence – should read 'first-trimester ozone", "second-trimester ozone", and "preconception-SO2 … (hyphens missing from existing text)

I-15, Sensitive Populations for Ozone-Related Health Effects – This is an important issue for the public, who always wonders who (if anyone) is at increased risk, so I think it is useful to take some care in getting this information out there in a useful way. One should probably specify which review you are drawing data from (i.e., the February 2013 USEPA Integrated Science Assessment for Ozone). Additionally, you summarized much (but not all) of the identified at-risk populations listed in Table 8 from the 2013 EPA ISA (see Table 8 below, cut and pasted from the 2013 ISA). It might also be useful to create a short table of Evidence Class, Risk Factor, short summary directional effect, and a link or citation (to either the ISA at the EPA website, or to individual peer-reviewed articles) for inclusion into the AQMP appendix.
additional

Table 8-6 Summary of evidence for potential increased risk of O_3-related health effects.

Evidence Classification	Potential At Risk Factor
Adequate evidence	Genetic factors (Section 8.1) Asthma (Section 8.2.2) Children (Section 8.3.1.1) Older adults (Section 8.3.1.2) Diet (Section 8.4.1) Outdoor workers (Section 8.4.4)
Suggestive evidence	Sex (Section 8.3.2) SES (Section 8.3.3) Obesity (Section 8.4.2)
Inadequate evidence	Influenza/Infection (Section 8.2.1) COPD (Section 8.2.3) CVD (Section 8.2.4) Diabetes (Section 8.2.5) Hyperthyroidism (Section 8.2.6) Race/ethnicity (Section 8.3.4) Smoking (Section 8.4.3) Air conditioning use (Section 8.4.5)
Evidence of no effect	–

Additional note: SES is mentioned twice in the paragraph – first as having adequate evidence, then as having suggestive. As Table above shows, it should be suggestive, based on the ISA.

I-15, Summary Ozone Health Effects, first sentence – I think this could be strengthened and clarified. I suggest the following replacement sentences: "In summary, outdoor ozone exposures have been associated with a range of negative human health effects. The strongest evidence for negative health impacts are on the respiratory system, and are measured by decreased lung function performance and increased cell injury. Effects on other organ systems, including cardiovascular, neurological, and metabolic have been shown to lead to heart disease, learning and developmental issues, and obesity. Although the specific mechanisms of action for ozone effects on the various health endpoints …

OBSERVATION: The PM Section (I-15 through mid-I-23) - The "feel" of the section discussing PM health effects in the report is different than the previous ozone section. In the PM section, there is greater reliance on and quotation of specific effect estimates from specific studies, often with study-by-study citation. In the ozone health effects section, it seemed to be a more general discussion, with less rote listing of estimates and citations. The "correct" presentation depends on the target audience and the level of intended detail. It might be sufficient to cite the EPA NAAQS documents and reproduce some of the key tables, rather than trying to cut and paste larger more detailed sections of the respective documents in to the current AQMP.

I-15, Particulate Matter, para1, first sentence – add the concept of particle toxicity and expand the impact of factors, by revising the first sentence to read: "…a complex group of pollutants that vary in physical, chemical, and biological dimensions. Physically, particles can vary by size, surface area and roughness, shape, and mass. Chemically, they vary by composition. Biologically, they can vary by toxicity. In addition to all these factors, particles vary by source, which can affect many of the previously identified factors. Particulate matter can come from anthropogenic (man-made, such as from combustion of fuels, or frictional abrasion) or "natural" (plants – for example, pollens and spores) origins."

I-15, Particulate Matter, last para, second sentence – replace "to cover particles" with "to focus on particles". This word change is necessary because PM10 was already a part of TSP, so it was already in the existing NAAQS. Based on the growing PM data base, it was determined that the health effects observed were caused by the smaller particles in TSP, so a portion of the previous NAAQS was identified for regulation.

I-15, Particulate Matter, last para, third sentence – Revise to read "These can be inhaled and deposited throughout the upper and lower respiratory system, depositing in both airways and gas-exchange areas of the lung.

I-16, para2, first sentence - Delete the "In more recent years,", and begin the paragraph this way: "As more health research data has become available, concerns have centered on smaller and smaller particles. Additional focus has been places on …"

I-16, para2, last sentence – “In 2002, the California Air Resources Board adopted an air quality standard for PM2.5 at a level of 12 ug/m3, in the form of an annual average.”

I-16, para3, first sentence – “since that time, ~~numerous~~ *additional* studies have been published…”

I-17, para1, second-to-last sentence – “Of note, there is currently no federal of California standard for PM10-2.5, *although a PM10 standard remains in effect (see Table I-6).*

I-19, last para, last sentence – replace “preexistent” with ‘preexisting”.

I-21, para1, second sentence (“The results indicated that the association of PM10 …) – what is it you are trying to say? This seems convoluted and confusing. Removal of this sentence in its entirety improves the text, in my opinion…

I-21 para1, last sentence – “these results suggest that the effects *reported* are likely due to …”

I-21, para2, lines 2 and on – Change to read “After the study was published, it was discovered that some of the study analyses had been performed with incorrect default values. When the investigators re-analyzed the data using revised settings for the data, the size of the effect diminished, but the results remained largely the same. The strong positive association between acute PM10 exposure and mortality remained, both upon reanalysis using revised software and using alternative modeling approaches.”

i-23, para1, first sentence – This sentence, while true on the face of it, is awkward because there are MANY reasons for variation in relative importance of PM2.5 or PM10-2.5. Several of these have already been discussed earlier in the text, so it is not clear why this subset (concentration, components, seasonal variation) is being reported here again. I recommend deletion of this sentence and beginning the paragraph with the following sentence: A major knowledge gap in understanding the relative importance of “fine” PM (PM2.5) and “coarse” PM (PM10-2.5) is the relative lack of direct PM10-2.5 measurements.”

I-23, para1, first & second sentences (and elsewhere in the document) – the denotation for coarse particles switches back and forth through the sections – sometimes PM10-2.5, sometimes PM2.5-10…pick one and be consistent.

I-23, last para, second sentence – “The effect estimates *for these various morbidities* are generally higher than the estimates for mortality.

I-23, last paragraph, last two sentences – change to read “Observed effects have been associated with PM10, PM2.5, and PM10-2.5.”

I-31, para2, second sentence – missing a hyphen from “distance-weighted”.

I-37, para2, third sentence – (Regarding Avol 2001 Movers’ Study…) It’s important to note that children who moved to areas of higher PM10 & NO2 showed declines in lung function growth rates. Another way of phrasing this is that the effects of exposure seemed to “work” both ways – more exposure led to poorer lung function growth rates, less exposure led to improved lung function growth rates.

I-37, para2, last sentence – “The risk of lower lung function was about ~~five~~ four times higher in children …:

I-37, last para and last sentence, AND I-38 first para, line 8 – in some places, the term “new-onset asthma” has a hyphen, while in other places it does not; be consistent.

I-39, para2, last sentence – low-term (not term low) …

I-40, first para, second sentence – should read “A couple *of* recent studies …”

I-40, Long-Term Particulate Matter Exposures and Newer Health Endpoints – It might be easier for Readers to follow along and/or locate text of interest if there were sub-headings for these paragraphs – Metabolic Syndrome, Neurological Impacts, …

I-40, Long-Term Particulate Matter Exposures and Newer Health Endpoints, para1, first sentence – Many who access this document may not be aware of what is meant by the term “metabolic syndrome”, so it would be useful to provide a working definition here. Additionally, it is my understanding that in describing this endpoint, insulin resistance, high cholesterol, obesity, hypertension, etc are *attributes, manifestations, or markers* of metabolic syndrome, not the syndrome itself (in other words, a syndrome is a collection of symptoms, not the presence of any one condition). Therefore, the phrasing in the final sentence of the first paragraph in the section should be reviewed and revised.

I-40, Long-Term Particulate Matter Exposures and Newer Health Endpoints – The topic of metabolic syndrome and particle pollution is introduced, but very little is said. There have been several dozen publications to date (just search on Pub Med for metabolic syndrome & air pollution, or see Brook et al 2016 article in Hypertension, Eze et al 2015 in PLoS One, Devlin et al 2014 in Toxicol Sci, …).

I-41, para1 – (similar comment to above) – While there are a few studies documented in the area of neurological outcomes, not that much is said. There is a growing a broad literature on the topic, with work reported by Annette Peters’ group in Germany, Jordi Sunyer’s group at CREAL in Barcelona, and the Harvard Normative Aging Study group (perhaps search on “Joel Schwartz:, Normative Aging Study, or ?).

I-41, Sensitive Populations for PM-Related Health Effects – As was done earlier in the document with regard to ozone and sensitive sub-populations, you might consider summarizing more directly from the most recent PM review by EPA CASAC to summarize who is considered to be at elevated risk and the degree of confidence associated with the respective claim (Chapter 8 of the 2010 ISA).

I-42 – Summary Particulate Matter Health Effects – this is an important section, but doesn’t quite deliver on the promise. Rather than a summary of what has been presented, this section seems to present additional information from additional sources. While the information presented is useful, it is NOT a ***summary*** of what has been presented.

I-43, Ultrafine Particles – why is this being presented AFTER the summary of the chapter? There may not be a current standard by which ultrafines are judged, but this section still provides information regarding health effects of PM…?

I-48, para1, last two lines – layout has switched to centered lines, rather than left-justified…

I-62, para2, second-to-last sentence – “However, it is important to note that these results represent a more refined risk estimation methodology, not an increase in risk.” This sentence is absurd, on the face of it. If a more refined estimate approach results in a larger risk estimate,

how can one claim there is no increase in risk? This is NOT just a numerical exercise – the implication of the numerical correction is arguably precisely that the risk is higher than was previously calculated; the sentence should be deleted.

I-63, Conclusions – This section is incomplete, arguably inadequate, and seems to just stop without concluding much of anything. Comments could have been made about improvements in the health database for each of the NAAQS

Pollutants. Comments could have been made regarding TACs or ultrafines, or improved understanding of susceptible sub-populations. Comments could have been restricted to ozone and PM, since that seems to be much of the original intent of this appendix…but instead, not much is "concluded."

I-87 – Draft 2016 AQMP Appendix I Attachment, Publications from Health Related Research Projects Funded or Co-Funded by SCAQMD – what is this even doing in this document? What does it add to the presentation? How does it help us to evaluate the health effects information presented in the body of the appendix? Possibly an interesting side discussion, but not germane to the focus of the presentation (since the source of funding for the reviewed research is not at issue); this could be deleted.

From: John Dunn <jddmdjd@web-access.net>
Sent: Sunday, August 14, 2016 5:59 PM
To: Jo Kay Ghosh; 'Henry A. Roman'; 'George D. Thurston'; Elaine Shen; Philip Fine; Wayne Nastri; Anthony Oliver
Subject: Submission to South Coast Quality Air Management District on AQMP proposals for 2016 human health effects
Attachments: Dunn Letter to SCAQMD re 2016 AQMP PM2.5 Claims 081416.pdf

Dr. Ghosh,

Attached is my letter and attachments pertinent to that letter opposing the new additional air regs that are part of the 2016 plan.

Please make sure the Board sees my critique and also the scientists engaged by South Coast to put together "research" intended to support the new regulations, that I consider inadequate to support any such regulatory proposals.

Thank you for your consideration of these matters
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8-14-16

Air Quality Management Plan (AQMP) Staff
South Coast Air Quality Management District
Diamond Bar, CA
aqmp@aqmd.gov

Re: Public Comments on Draft 2016 AQMP

Ladies and Gentlemen,

As a follow-up to my unanswered public comments on the 2012 AQMP, I am submitting these public comments on the Draft 2016 AQMP. In particular, I protest the efforts of the SCAQMD staff to try to make the air pollution research pig's ear that uses unreliable, sometimes risible claims of deaths from small particle air pollution (PM2.5) into silky purse of evidence that justifies more expensive and onerous air regulations.

I think it deceitful that the South Coast would allow small associations as evidence of their claims of thousands of deaths annually in the South Coast area from research that shows small associations of deaths from small particle air pollution. Such claims are riven with deceit. So many papers used by the SCAQMD staff contain small associations and confidence intervals that cannot support the death claims.

I have attached to this cover letter the following items as detailed criticism of the PM2.5 premature death claims made in the Draft 2016 AQMP. 5-1

1. My 15-page January 19, 2016 letter to Mr. Henry A. Roman of Industrial Economics, Inc., takes down the laughable claims of the 2015 Thurston EHP paper that has only small associations (not proof of lethality or toxicity at all) and confidence intervals that cross 1.0 and fail to prove any death effect at all from small particles air pollution. Dr. Thurston admits the weakness of his evidence in the abstract. He can't make his lack of evidence of deaths from air pollution go away. Data torturing and harvesting noise in the variability of death rates can't fix his problem.

2. The 53-page October 4, 2012 sworn declaration of US EPA senior research scientist Robert B. Devlin in human exposure experiments with small particles, who admits at Paragraph 7 that observational epidemiological studies can't prove causation. I would emphasize that Dr. Devlin fails to point out that small association/low Relative Risk or Odds Ratio results don't even achieve the level of association that allows for a researcher to assert a hypothesis of causation. You might say, a robust result from epidemiology isn't proof, a small association result is even less than that.

3. The 25-page Reference Manual chapter on Epidemiology articulates the rules on proof of causation from observational studies and I highlighted those sections on proof of causation, general causation beginning at page 597 et.seq. and specific causation at page 608 et.seq. I will not discuss the scientific deceit that is used so often trying to make statistical significance into a claim that the evidence is reliable—the scientists in the group know the deceit involved in p value cheating—which doesn't make unreliable evidence proof of anything.

4. Two pages of basic information from the website of the GRADE Working Group (http://www.gradeworkinggroup.org/), particularly regarding "Grading the quality of evidence and the strength of recommendations". This international group is focused on the need for reliable epidemiological evidence. In the 9th paper on quality of evidence in epidemiology, on page 2 item 2, read what they say about small associations and why quality of evidence depends on Relative Risks of more than 2. Every researcher in the air pollution business would be out of business if they followed the rules suggested about the strength of association to prove lethality of pollutants.

5. The 14-page September 28, 2012 American Statistical Association Proceedings paper by Dr. James E. Enstrom "Particulate Matter is Not Killing Californians", which he presented on August 1, 2012 to the ASA 2012 Joint Statistical Meeting Section on Risk Analysis. Dr. Enstrom's analysis of all sources of evidence on PM2.5 deaths relevant to California provides proof that there is no death effect in California. Tables on pages 2331 and 2332 show small associations with confidence intervals that include 1.0. On page 2333, a US map of PM2.5 mortality risk from the 2000 HEI Reanalysis Report of Krewski also shows that there is no small particle death effect in California. This paper is permanently posted on Dr. Enstrom's website (http://www.scientificintegrityinstitute.org/ASAS092812.pdf). 5-1 Con't

6. My three-page June 8, 2011 letter to CARB about the clownish performance of Michael Jerrett, trying to rehabilitate his air pollution research in California, after initially he admitted in public that his analysis showed no death effect at all. His trickster attitude shows what lots of research money and time can do to put lipstick on a research pig.

7. The 5-page August 13, 2015 SCIENCE manuscript, "Particulate Matter Does Not Cause Premature Deaths", that includes me with nine other coauthors, provides evidence, wide and deep that the claims of the South Coast researchers are faulty, and unreliable—that there is no death effect to be shown. This manuscript is permanently posted on the National Association of Scholars website (https://www.nas.org/articles/nas_letter).

Conclusions

I have provided a short version of my objections to research used to support the SCAQMD Draft 2016 AQMP claims about PM2.5 premature deaths.

I hope you read the objections see that the Thurston research cannot be cobbled together with the rest of the research, including the flawed conurbation paper of Michael Jerrett in support of any new small particle regulations BECAUSE the research shows that new air regs will not save lives because there are no deaths.

Thurston, Jerrett, and all the papers on air pollution death studies in California show an overall small particle air pollution death effect of ZERO. What you gonna do—change the rules on how to study toxicity to justify more aggressive and burdensome air regs for Southern California—to achieve what? and at what cost?

I will provide, anytime, anywhere, in any forum, responses to South Coast staff or their hired researchers on their proposed small particle proposals and asserted justifications, when necessary, and depending on what you do with the sorry Thurston results.

You also have a big problem with the other show horses you have in the air pollution research community, all of them generating small association studies that don't prove up the South Coast claims about deaths. Not at all. In fact the studies show no death effect is likely, or the associations on the studies would be more consistently robust.

The scientists reading know what I am talking about, a pile of studies with no proof of causation at all, not even a whiff of good evidence for arguments about deaths makes a good argument that the South Coast portfolio is my best exhibit to prove that South Coast is making claims that are not supported by good evidence—evidence that doesn't pass the laugh or smell test.

5-1
Con't

Dr. Thurston and his now very old small particles paper that admits extremely small Hazard Risks and even Confidence Intervals that include 1.0 is no proof. The Jerrett conurbation gambit is silliness, expensive silliness, but still no proof of a death effect.

I am happy to expand on this letter and attachments by webinar, teleconference or further correspondence in response to questions.

Please make sure this letter and the attachments are made available to the SCAQMD Governing Board.

Cordially,

/s/JDunn MD

John Dale Dunn MD JD

The following attachment(s) were included with Comment Letter #5 submitted by Dr. John Dale Dunn, and was/were duplicate entries on previous comment letter(s) received:

- Letter from Dr. John Dale Dunn to Henry Roman, dated January 19, 2016. This corresponds to Comment letter #5 under the draft Socioeconomic Report.

The following attachments were also included with Comment Letter #5 submitted by Dr. John Dale Dunn. Due to copyrights held by publishing entities, SCAQMD cannot reproduce the following attachments, however, interested parties can obtain access at the links provided below:

- Pages 21 – 23 of the Devlin Declaration Exhibit 1, which includes several copied pages of the following text: Committee on Research Priorities for Airborne Particulate Matter; Board on Environmental Studies and Toxicology; Division on Earth and Life Studies; National Research Council. "Research Priorities for Airborne Particulate Matter: IV. Continuing Research Progress". Washington, DC: National Academies Press, 2004. https://www.nap.edu/catalog/10957/research-priorities-for-airborne-particulate-matter-iv-continuing-research-progress
- Committee on the Development of the Third Edition of the Reference Manual on Scientific Evidence; Federal Judicial Center; National Research Council. "Reference Manual on Scientific Evidence: Third Edition". Washington, DC: National Academies Press, 2011. https://www.nap.edu/catalog/13163/reference-manual-on-scientific-evidence-third-edition
- GRADE working group webpage titled "Introduction"
- Joint Statistical Meeting 2012 Online Program, session 546 (Wed, 8/1/2012, 2:00PM – 3:50PM), titled "Are Fine Particulates Killing Californians?", and abstract by James Enstrom titled "Particulate Matter is Not Killing Californians". http://www.amstat.org/meetings/jsm/2012/onlineprogram/ActivityDetails.cfm?SessionID=207510 and http://www.amstat.org/meetings/jsm/2012/onlineprogram/AbstractDetails.cfm?abstractid=303741
- Joint Statistical Meeting 2012 Section on Risk Analysis paper by James Enstrom, titled "Particulate Matter is Not Killing Californians", dated September 28, 2012. http://www.scientificintegrityinstitute.org/ASA092812.pdf
- Enstrom et al. manuscript titled "Particulate Matter Does Not Cause Premature Deaths", dated August 17, 2015. Available within this link, on pages 13-17: https://www.nas.org/images/documents/PM2.5.pdf

A hard copy of all materials included in the comment letters, as provided by the submitter, is available for viewing by request and in person by contacting:

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Appendix A, Dr. Robert Devlin admission under oath
Case 1:12-cv-01066-AJT-TCB Filed 10/04/12
(53 pages)

DECLARATION OF ROBERT DEVLIN

I, Robert B. Devlin, pursuant to 28 U.S.C. § 1746, declare, under penalty of perjury, that the following statements are true and correct based upon my personal knowledge, experience or upon information provided to me by persons under my supervision:

1. I am a **Senior Scientist (ST) for the Environmental Public Health Division (EPHD), National Health and Environmental Research Laboratory (NHEERL), Office of Research and Development (ORD), U.S. Environmental Protection Agency.** As one ofthree STs in NHEERL I am expected to be a scientific leader in the area of air pollution research, to define important areas of research, assemble teams to carry out that research and ensure it is completed in a timely manner and published in peer-reviewed journals. I am currently on detail as Acting Associated Director for Health for NHEERL. Prior to my current position, I was Chief of the Clinical Research Branch (CRB) ofthe EPHD from 1994 – 2008. The CRB is responsible for doing nearly all controlled human exposure studies within NHEERL. I as also acting Director of
EPHD (then call Human Studies Division) in 2007; the Director oversees all research in the Division including epidemiology, clinical and in vitro studies. **I was acting National Program**

Director for ORD's Air Research Program in 2000. This position is the lead for developing research plans related to air pollution for all of ORD and representing the program to groups outside the EPA. I hold adjunct faculty appointments at the University ofNorth Carolina (Chapel Hill) and North Carolina State University. I have been engaged in performing controlled human exposure studies as an EPA investigator since 1986. I have authored or co-authored more than 190 scientific articles, 53 of which involved controlled exposure of human volunteers to air pollutants. The quality of my work at EPA has been recognized by several awards, including one gold and 9 bronze medals, and 8 EPA Scientific and Technological Achievement Awards. I have been invited to present my research at more than 100 Universities, Workshops, and International Meetings.

2. I have a B.S. Degree from the University of Texas (El Paso) that was granted in 1969 and a **Ph.D. degree from the University of Virginia** that was granted in 1976. I was a member of the faculty at Emory University (Atlanta) from 1979 – 1986.

3. I have reviewed the Complaint and exhibits filed in the above-captioned case

4. The term particulate matter (PM) covers a broad class of discrete, but chemically and physically diverse, particles that are ubiquitously pres nt in the ambient air and are emitted from different sources such as power plants, mobile sources, biomass burning, and dust generated by mechanical processes. There are three generally recognized modes of PM defined by particle diameter: very small so-called ultrafine particles that result from the primary emissions related to engine combustion and which are usually in close proximity to those sources; large (coarse) particles primarily generated by abrasive processes and from wind-blown dust; and so-called fme particles which derive from combustion by-products that volatilize and quickly condense or from gases (such as sulfur oxides and nitrogen oxides) that react and transform in the atmosphere after

being emitted. PM2.5 is roughly synonymous with fine PM, and generally includes all particulate matter with an aerodynamic diameter of2.5 micrometers or less. 40 CFR § 50.7(a). Principal sources of PM2.5 are fossil fuel combustion, including motor vehicle and power plant emissions, natural and anthropogenic biomass burning, as well as other industrial processes such smelting The EPA has specific regulations to control levels of both fine and coarse particles.

5. **In December 2009 EPA issued the Integrated Science Assessment (ISA) for Particulate Matter, pursuant to section 108 ofthe Clean Air Act (CAA), 42 U.S.C. § 7408.** The ISA is an update of prior science assessments of PM, and reflects the state of the science at that time. The ISA was developed after lengthy review by the Clean Air Scientific Advisory Committee, a federally mandated body charged with advising EPA about scientific matters relating to particulate matter and other forms of air pollution. CAA § 109(d)(2), 42 U.S.C. § 7409(d)(2). Development of an ISA typically involves the consideration of thousands of scientific studies conducted in the U.S. and around the world as part of assessing the relationship between air pollutant exposures and health effects. In the ISA, the entire body of scientific evidence, including epidemiological, controlled human exposure, animal toxicological studies, studies with cultured cells, as well as other sources of information, is assessed and an overall judgment is made on the causal relationship between exposure to ambient PM2.5 and health effects. The ISA provides the scientific basis for development of the National Ambient Air Quality Standards (NAAQS) for an air pollutant. CAA § 109(b).[1]

6. Epidemiological studies typically use data from large populations of people with varying susceptibility to PM2.5 and evaluate the relationship between short or long-term changes in ambient levels ofPM2.5, e.g. changes in the 24-hour average level ofPM2.5 measured at

[1] Ambient air refers to outdoor air in places that members of the public have access to. 40 C.F.R. § 50.1.

monitors in a metropolitan area, with changes in mortality and morbidity such as the numbers of emergency department visits and hospital admissions. This generally involves the use of complex statistical methods to evaluate the mathematical relationship between variations in measured ambient air pollution levels and health data.

7. **Epidemiological observations are the primary tool in the discovery of risks to public health such as that presented by ambient PM2.5. However, epidemiological studies do not generally provide direct evidence of causation. They indicate the existence or lack of a statistical relationship between ambient levels of PM2.5 and adverse health outcomes**. Large population studies cannot assess the biological mechanisms (called biological plausibility) that could explain how inhaling ambient air pollution particles can cause illness or death in susceptible individuals. This sometimes leaves open the question of whether the observed association in the epidemiological study is causal or whether PM2.5 is merely a marker for some other unknown substance.

8. **Controlled human exposure studies conducted by EPA scientists and EPA funded scientists at multiple universities in the United States fill an information gap that cannot be filled by large population studies. In 1998 the Committee on Research Priorities for Airborne Particulate Matter was established by the National Research Council in response to a request from Congress. The committee was charged with producing four reports over a five-year period which describe a conceptual framework for an integrated national program of particulate-matter research and identified the most critical research needs linked to key policy-related scientific uncertainties. Excerpts from their most recent report (published in 2004) are attached as Exhibit**

1 to this Declaration. On page 36 the Committee says:

Controlled human exposure studies offer the opportunity to study small numbers of human subjects under carefully controlled exposure conditions and gain valuable insights

into both the relative deposition of inhaled particles and the resulting health effects. Individuals studied can range from healthy people to individuals with cardiac or respiratory diseases of varying degrees of severity. In all cases, the specific protocols defining the subjects, the exposure conditions, and the evaluation procedures must be reviewed and approved by institutional review boards providing oversight for human experimentation. The exposure atmospheres studied vary, ranging from well-defined, single-component aerosols (such as black carbon or sulfuric acid) to atmospheres produced by recently developed particle concentrators, which concentrate the particles present in ambient air. The concentrations of particles studied are limited by ethical considerations and by concern for the range of concentrations, from the experimental setting to typical ambient concentration, over which findings need to be extrapolated.

Exhibit 1 at 36. Controlled human exposures studies have been conducted for decades on important pollutants such as ozone, particulate matter, nitrogen dioxide (NO_2), sulfur dioxide (S02), VOCs emitted in from new homes, and carbon monoxide (CO).

9. **Controlled human exposure studies assess the biological plausibility of the associations observed in the large-population epidemiological studies.** Controlled human exposure studies usually compare the response of an individual following exposure to clean air with their response following exposure to a pollutant that was generated or prepared under carefully controlled conditions, thus providing direct causal evidence that observed effects are related to the pollutant of interest. These studies are done under conditions that are controlled to ensure safety, with measurable, reversible physiological responses. **They are not meant to cause clinically significant adverse health effects, but rather reversible physiological responses can be indicators of the potential for more serious outcomes in susceptible populations identified in epidemiology studies.** As such, controlled human exposure studies do not study individuals felt to be at significant risk; they almost always study healthy individuals or people with conditions such as mild asthma. Controlled human exposure studies, together with toxicological studies, provide important insights which can improve our understanding of the potential biological mechanisms or pathways for effects observed in epidemiological studies (e.g., respiratory symptoms or

cardiovascular events, hospital admissions or emergency department visits, or premature death).

10. **Obtaining information on the biological impacts of exposure to PM2.5 from controlled human exposure studies such as the CAPTAIN study is a very important element in developing an integrated body of scientific knowledge to evaluate the impact on health from exposure to PM**

2.5 air pollution. The CAPTAIN study is particularly important in that it addresses an area of PM research where there are still important questions related to fully understanding the role of specific components included in the mixtures of fine particles represented by PM2.s that may be more closely related to the cardiovascular health effects observed in epidemiological studies. PM2.5 is a complex mixture derived from several different sources**. There is still uncertainty as to which components or sources of PM2.5 are most responsible for causing effects people and if different components or sources cause effects by different biological mechanisms. This type of research can help address existing uncertainties in the PM scientific literature, providing important evidence for informing future PM NAAQS reviews and, in particular, consideration of possible alternative particle indicators and/or standard levels.** In some cases, research in these areas can go beyond aiding standard setting to informing the development of more efficient and effective control strategies.

11. **For ethical and safety reasons, controlled human exposure studies to air pollution conducted by NHEERL are initiated only if there is evidence that any effects to the subjects resulting from exposure will be mild, transient, and reversible, and if there is prior data from one or more of the following types of research:**

a. Testing in laboratory animals.

b. Observational research involving only naturally occurring human exposures.

c. Human studies involving a closely related air pollutant.

12. Based on the entire body of scientific evidence, including epidemiological, controlled human exposure, and toxicological studies, the ISA for PM drew several important conclusions about the relationship between exposure to PM2.5 and health effects. For short-term exposures to PM2.5, the ISA concluded there was a causal relationship between ambient PM and cardiovascular effects. The epidemiologic evidence showed that increases in 24-hour levels of ambient PM2.5 was mathematically associated with an increase in hospital admission or emergency room visits, predominantly for ischemic heart disease [IHD] and congestive heart failure [CHF]). See ISA p. 2-9, attached as Exhibit 2 to this Declaration. **There was also evidence from a small number of toxicological and controlled human exposure studies that supported the biological plausibility of this conclusion, although these studies needed to be duplicated and expanded to identify specific PM components and sources which are of most concern. The ISA also concluded there was a causal relationship between ambient PM and mortality. An evaluation of the epidemiological literature indicates consistent positive associations between short-term exposure to PM2.5 and all-cause, cardiovascular-, and respiratory-related mortality. ISA p. 2-10, Exhibit 2 to this Declaration. Finally, the ISA concluded that there was a likely casual relationship between ambient PM and respiratory effects. The recent epidemiological studies that have been evaluated report consistent positive associations between short-term exposure to PM2.5 and respiratory emergency department visits and hospital admissions for chronic obstructive pulmonary disease (COPD) and respiratory infections. ISA p.2-10, Exhibit 2 to this Declaration. The evidence of serious health effects such as hospital admissions, emergency department visits, and death, all derived from a large body of epidemiological studies.**

13. The risk of serious health effects from exposure to typical levels ofPM2.5 is largely focused on people with preexisting illnesses, such as elderly people with cardiovascular diseases or COPD. Even for people with preexisting diseases, there is no evidence that all persons are affected the same way or have the same degree of risk.

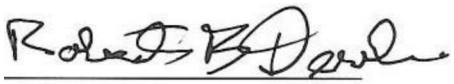
14. The body of scientific evidence also informs us on what risks there are to an individual that is exposed to PM2.5. For example, **it is clear that PM2.5 is not lethal or toxic to all people. The risk of serious health effects is clearly focused on people such as those with pre-existing cardio or respiratory illness. When very large numbers of people are exposed, as occurs in major population centers, the overall risk to the public is large enough to present a serious public health problem in the form of increased mortality and morbidity. It is this serious risk to the overall public health that leads EPA to describe PM as a serious public health problem.**

15. **However, the risk to an individual is very different from the overall public health risk associated with exposures of large populations of people to ambient air levels of PM2.5. This is especially true if the individual does not have pre-existing health conditions such as preexisting cardiovascular disease. While it is impossible to say there is no risk to a healthy individual, epidemiology studies provide evidence that the risk to healthy individuals is considered to be very small. Institutional review boards (IRBs) are charged with overseeing the safe and ethical conduct of human studies. IRBs from the University of North Carolina Medical School (which oversee EPA studies done on the campus of the University ofNorth Carolina) as well as those which oversee human studies at several universities throughout the US, in Canada, England, and Sweden have all examined the risk posed to individuals exposed to particulate air pollution and concluded that these studies are safe and ethical to perform.**

16. EPA relies on the entire body of scientific evidence to draw judgments about the risk to the

public health from exposure to ambient PM. In settings the NAAQS, EPA exercise it scientific and public health judgment and determines levels that will protect the public health, including groups of people that are more at risk to the air pollutant under consideration, with an adequate margin of safety. In the case ofPM2.5, the people most at risk from exposure to ambient PM2.5 include those with pre-existing cardiovascular illness or respiratory illness. The current NAAQS is 15.0 ug/m3 annual average, and a 35 *uglm3* 24-hour average. The 24 hour average is met if the 3 year average of the 98th percentile is 35 ug/m3 or below. The 98th percentile means that approximately 6 or 7 days in the year can have higher concentrations than the day used to compare to the 35 ug/m3. [2]

Dated: October 3, 2012



Robert B. Devlin

[2] The air quality in Chapel Hill, NC, where the subjects are tested, is wel1 within the levels that attain the current NAAQS.

Devlin Declaration Exhibit 1

Devlin Declaration Exhibit 2

Chapter 2. Integrative Health and Welfare Effects Overview

The subsequent chapters of this ISA will present the most policy-relevant information related to this review of the NAAQS for PM. This chapter integrates the key findings from the disciplines evaluated in this current assessment of the PM scientific literature, which includes the atmospheric sciences, ambient air data analyses, exposure assessment, dosimetry, health studies (e.g., toxicological, controlled human exposure, and epidemiologic), and welfare effects. The EPA framework for causal determinations described in Chapter 1 has been applied to the body of scientific evidence in order to collectively examine the health or welfare effects attributed to PM exposure in a two-step process.

As described in Chapter 1, EPA assesses the results of recent relevant publications, building upon evidence available during the previous NAAQS reviews, to draw conclusions on the causal relationships between relevant pollutant exposures and health or environmental effects. This ISA uses a five-level hierarchy that classifies the weight of evidence for causation:

- Causal relationship
- Likely to be a causal relationship
- Suggestive of a causal relationship
- Inadequate to infer a causal relationship
- Not likely to be a causal relationship

Beyond judgments regarding causality are questions relevant to quantifying health or environmental risks based on our understanding of the quantitative relationships between pollutant exposures and health or welfare effects. Once a determination is made regarding the causal relationship between the pollutant and outcome category, important questions regarding quantitative relationships include:

- What is the concentration-response or dose-response relationship?
- Under what exposure conditions (amount deposited, dose or concentration, duration and pattern) are effects observed?
- What populations appear to be differentially affected (i.e., more susceptible) to effects?
- What elements of the ecosystem (e.g., types, regions, taxonomic groups, populations, functions, etc.) appear to be affected, or are more sensitive to effects?

To address these questions, in the second step of the EPA framework, the entirety of quantitative evidence is evaluated to identify and characterize potential concentration-response relationships. This requires evaluation of levels of pollutant and exposure durations at which effects were observed for exposed populations including potentially susceptible populations.

This chapter summarizes and integrates the newly available scientific evidence that best informs consideration of the policy-relevant questions that frame this assessment, presented in Chapter 1. Section 2.1 discusses the trends in ambient concentrations and sources of PM and provides a brief summary of ambient air quality. Section 2.2 presents the evidence regarding personal exposure to ambient PM in outdoor and indoor microenvironments, and it discusses the

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[10] Note: Hyperlinks to the reference citations throughout this document will take you to the NCEA HERO database (Health and Environmental Research Online) at http://epa.gov/hero. HERO is a database of scientific literature used by U.S. EPA in the process of developing science assessments such as the Integrated Science Assessments (ISA) and the Integrated Risk Information System (IRIS).

relationship between ambient PM concentrations and exposure to PM from ambient sources. Section 2.3 integrates the evidence for studies that examine the health effects associated with short- and long-term exposure to PM and discusses important uncertainties identified in the interpretation of the scientific evidence. **Section 2.4 provides a discussion of policy-relevant considerations, such as potentially susceptible populations, lag structure, and the PM concentration-response relationship, and PM sources and constituents linked to health effects. Section 2.5 summarizes the evidence for welfare effects related to PM exposure. Finally, Section 2.6 provides all of the causal determinations reached for each of the health outcomes and PM exposure durations evaluated in this ISA.**

2.1. Concentrations and Sources of Atmospheric PM

2.1.1. Ambient PM Variability and Correlations

Recently, advances in understanding the spatiotemporal distribution of PM mass and its constituents have been made, particularly with regard to $PM_{2.5}$ and its components as well as ultrafine particles (UFPs). Emphasis in this ISA is placed on the period from 2005-2007, incorporating the most recent validated EPA Air Quality System (AQS) data. The AQS is EPA's repository for ambient monitoring data reported by the national, and state and local air monitoring networks. Measurements of $PM_{2.5}$ and PM_{10} are reported into AQS, while $PM_{10-2.5}$ concentrations are obtained as the difference between PM_{10} and $PM_{2.5}$ (after converting PM_{10} concentrations from STP to local conditions; Section 3.5). Note, however, that a majority of U.S. counties were not represented in AQS because their population fell below the regulatory monitoring threshold. Moreover, monitors reporting to AQS were not uniformly distributed across the U.S. or within counties, and conclusions drawn from AQS data may not apply equally to all parts of a geographic region. Furthermore, biases can exist for some PM constituents (and hence total mass) owing to volatilization losses of nitrates and other semi-volatile compounds, and, conversely, to retention of particle-bound water by hygroscopic species. The degree of spatial variability in PM was likely to be region-specific and strongly influenced by local sources and meteorological and topographic conditions.

2.1.1.1. Spatial Variability across the U.S.

AQS data for daily average concentrations of $PM_{2.5}$ for 2005-2007 showed considerable variability across the U.S. (Section 3.5.1.1). Counties with the highest average concentrations of $PM_{2.5}$ (>18 $\mu g/m^3$) were reported for several counties in the San Joaquin Valley and inland southern California as well as Jefferson County, AL (containing Birmingham) and Allegheny County, PA (containing Pittsburgh). Relatively few regulatory monitoring sites have the appropriate co-located monitors for computing $PM_{10-2.5}$, resulting in poor geographic coverage on a national scale (Figure 3-10). Although the general understanding of PM differential settling leads to an expectation of greater spatial heterogeneity in the $PM_{10-2.5}$ fraction, deposition of particles as a function of size depends strongly on local meteorological conditions. Better geographic coverage is available for PM_{10}, where the highest reported annual average concentrations (>50 $\mu g/m^3$) occurred in southern California, southern Arizona and central New Mexico. The size distribution of PM varied substantially by location, with a generally larger fraction of PM_{10} mass in the $PM_{10-2.5}$ size range in western cities (e.g., Phoenix and Denver) and a larger fraction of PM_{10} in the $PM_{2.5}$ size range in eastern U.S. cities (e.g., Pittsburgh and Philadelphia). UFPs are not measured as part of AQS or any other routine regulatory network in the U.S. Therefore, limited information is available regarding regional variability in the spatiotemporal distribution of UFPs.

Spatial variability in $PM_{2.5}$ components obtained from the Chemical Speciation Network (CSN) varied considerably by species from 2005-2007 (Figures 3-12 through 3-18). The highest annual average organic carbon (OC) concentrations were observed in the western and southeastern U.S. OC concentrations in the western U.S. peaked in the fall and winter, while OC concentrations in the Southeast peaked anytime between spring and fall. Elemental carbon (EC) exhibited less seasonality than OC and showed lowest seasonal variability in the eastern half of the U.S. The

highest annual average EC concentrations were present in Los Angeles, Pittsburgh, New York, and El Paso. Concentrations of sulfate (SO_4^{2-}) were higher in the eastern U.S. as a result of higher SO_2 emissions in the East compared with the West. There is also considerable seasonal variability with higher SO_4^{2-} concentrations in the summer months when the oxidation of SO_2 proceeds at a faster rate than during the winter. Nitrate (NO_3^-) concentrations were highest in California and during the winter in the Upper Midwest. In general, NO_3^- was higher in the winter across the country, in part as a result of temperature-driven partitioning and volatilization. Exceptions existed in Los Angeles and Riverside, CA, where high NO_3^- concentrations appeared year-round. There is variation in both
$PM_{2.5}$ mass and composition among cities, some of which might be due to regional differences in meteorology, sources, and topography.

2.1.1.2. Spatial Variability on the Urban and Neighborhood Scales

In general, $PM_{2.5}$ has a longer atmospheric lifetime than $PM_{10-2.5}$. As a result, $PM_{2.5}$ is more homogeneously distributed than $PM_{10-2.5}$, whose concentrations more closely reflect proximity to local sources (Section 3.5.1.2). Because PM_{10} encompasses $PM_{10-2.5}$ in addition to $PM_{2.5}$, it also exhibits more spatial heterogeneity than $PM_{2.5}$. Urban- and neighborhood-scale variability in PM mass and composition was examined by focusing on 15 metropolitan areas, which were chosen based on their geographic distribution and coverage in recent health effects studies. The urban areas selected were Atlanta, Birmingham, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Phoenix, Pittsburgh, Riverside, Seattle and St. Louis. Inter-monitor correlation remained higher over long distances for $PM_{2.5}$ as compared with PM_{10} in these 15 urban areas. To a large extent, greater variation in $PM_{2.5}$ and PM_{10} concentrations within cities was observed in areas with lower ratios of $PM_{2.5}$ to PM_{10}. When the data was limited to only sampler pairs with less than
4 km separation (i.e., on a neighborhood scale), inter-sampler correlations remained higher for $PM_{2.5}$ than for PM_{10}. The average inter-sampler correlation was 0.93 for $PM_{2.5}$, while it dropped to 0.70 for PM_{10} (Section 3.5.1.3). Insufficient data were available in the 15 metropolitan areas to perform similar analyses for $PM_{10-2.5}$ using co-located, low volume FRM monitors.

As previously mentioned, UFPs are not measured as part of AQS or any other routine regulatory network in the U.S. Therefore, information about the spatial variability of UFPs is sparse; however, their number concentrations are expected to be highly spatially and temporally variable. This has been shown on the urban scale in studies in which UFP number concentrations drop off quickly with distance from roads compared to accumulation mode particle numbers.

2.1.2. Trends and Temporal Variability

Overall, $PM_{2.5}$ concentrations decreased from 1999 (the beginning of nationwide monitoring for $PM_{2.5}$) to 2007 in all ten EPA Regions, with the 3-yr avg of the 98th percentile of 24-h $PM_{2.5}$ concentrations dropping 10% over this time period. However from 2002-2007, concentrations of $PM_{2.5}$ were nearly constant with decreases observed in only some EPA Regions (Section 3.5.2.1).
Concentrations of $PM_{2.5}$ components were only available for 2002-2007 using CSN data and showed little decline over this time period. This trend in $PM_{2.5}$ components is consistent with trends in $PM_{2.5}$ mass concentration observed after 2002 (shown in Figures 3-44 through 3-47). Concentrations of PM_{10} also declined from 1988 to 2007 in all ten EPA Regions.

Using hourly PM observations in the 15 metropolitan areas, diel variation showed average hourly peaks that differ by size fraction and region (Section 3.5.2.3). For both $PM_{2.5}$ and PM_{10}, a morning peak was typically observed starting at approximately 6:00 a.m., corresponding with the start of morning rush hour. There was also an evening concentration peak that was broader than the morning peak and extended into the overnight period, reflecting the concentration increase caused by the usual collapse of the mixing layer after sundown. The magnitude and duration of these peaks varied considerably by metropolitan area investigated.

UFPs were found to exhibit similar two-peaked diel patterns in Los Angeles and the San Joaquin Valley of CA and Rochester, NY as well as in Kawasaki City, Japan, and Copenhagen, Denmark. The morning peak in UFPs likely represents primary source emissions, such as rush-hour traffic, while the afternoon peak likely represents the combination of primary source emissions and nucleation of new particles.

2.1.3. Correlations between Copollutants

Correlations between PM and gaseous copollutants, including SO_2, NO_2, carbon monoxide (CO) and O_3, varied both seasonally and spatially between and within metropolitan areas (Section 3.5.3). On average, $PM_{2.5}$ and PM_{10} were correlated with each other better than with the gaseous copollutants. Although data are limited for $PM_{10-2.5}$, the available data suggest a stronger correlation between PM_{10} and $PM_{10-2.5}$ than between $PM_{2.5}$ and $PM_{10-2.5}$ on a national basis.There was relatively little seasonal variability in the mean correlation between PM in both size fractions and SO_2 and NO_2. CO, however, showed higher correlations with $PM_{2.5}$ and PM_{10} on average in the winter compared with the other seasons. This seasonality results in part because a larger fraction of PM is primary in origin during the winter. To the extent that this primary component of PM is associated with common combustion sources of NO_2 and CO, then higher correlations with these gaseous copollutants are to be expected. Increased atmospheric stability in colder months also results in higher correlations between primary pollutants (Section 3.5).

The correlation between daily maximum 8-h avg O_3 and 24-h avg $PM_{2.5}$ showed the highest degree of seasonal variability with positive correlations on average in summer (avg = 0.56) and negative correlations on average in the winter (avg = -0.30). During the transition seasons, spring and fall, correlations were mixed but on average were still positive. $PM_{2.5}$ is both primary and secondary in origin, whereas O_3 is only secondary. Photochemical production of O_3 and secondary PM in the planetary boundary layer (PBL) is much slower during the winter than during other seasons. Primary pollutant concentrations (e.g., primary $PM_{2.5}$ components, NO and NO_2) in many urban areas are elevated in winter as the result of heating emissions, cold starts and low mixing heights. O_3 in the PBL during winter is mainly associated with air subsiding from above the boundary layer following the passage of cold fronts, and this subsiding air has much lower PM concentrations than are present in the PBL. Therefore, a negative association between O_3 and $PM_{2.5}$ is frequently observed in the winter. During summer, both O_3 and secondary $PM_{2.5}$ are produced in the PBL and in the lower free troposphere at faster rates compared to winter, and so they tend to be positively correlated.

2.1.4. Measurement Techniques

The federal reference methods (FRMs) for $PM_{2.5}$ and PM_{10} are based on criteria outlined in the Code of Federal Regulations. They are, however, subject to several limitations that should be kept in mind when using compliance monitoring data for health studies. For example, FRM techniques are subject to the loss of semi-volatile species such as organic compounds and ammonium nitrate (especially in the West). Since FRMs based on gravimetry use 24-h integrated filter samples to collect PM mass, no information is available for variations over shorter averaging times from these instruments. However, methods have been developed to measure real-time PM mass concentrations. Real-time (or continuous and semi-continuous) measurement techniques are also available for PM species, such as particle into liquid sampler (PILS) for multiple ions analysis and aerosol mass spectrometer (AMS) for multiple components analysis (Section 3.4.1). Advances have also been achieved in PM organic speciation. New 24-h FRMs and Federal Equivalent Methods (FEMs) based on gravimetry and continuous FEMs for $PM_{10-2.5}$ are available. FRMs for $PM_{10-2.5}$ rely on calculating the difference between co-located PM_{10} and $PM_{2.5}$ measurements while a dichotomous sampler is designated as an FEM.

2.1.5. PM Formation in the Atmosphere and Removal

PM in the atmosphere contains both primary (i.e., emitted directly by sources) and secondary components, which can be anthropogenic or natural in origin. Secondary PM components can be produced by the oxidation of precursor gases such as SO_2 and NO_X to acids followed by neutralization with ammonia (NH_3) and the partial oxidation of organic compounds. In addition to being emitted as primary particles, UFPs are produced by the nucleation of H_2SO_4 vapor, H_2O vapor, and perhaps NH_3 and certain organic compounds. Over most of the earth's surface, nucleation is probably the major mechanism forming new UFPs. New UFP formation has been observed in environments ranging from relatively unpolluted marine and continental environments to polluted

urban areas as an ongoing background process and during nucleation events. However, as noted above, a large percentage of UFPs come from combustion-related sources such as motor vehicles.
Developments in the chemistry of formation of secondary organic aerosol (SOA) indicate that oligomers are likely a major component of OC in aerosol samples. Recent observations also suggest that small but significant quantities of SOA are formed from the oxidation of isoprene in addition to the oxidation of terpenes and organic hydrocarbons with six or more carbon atoms. Gasoline engines have been found to emit a mix of nucleation-mode heavy and large polycyclic aromatic hydrocarbons on which unspent fuel and trace metals can condense, while diesel particles are composed of a soot nucleus on which sulfates and hydrocarbons can condense. To the extent that the primary component of organic aerosol is overestimated in emissions from combustion sources, the semi-volatile components are underestimated. This situation results from the lack of capture of evaporated semi-volatile components upon dilution in common emissions tests. As a result, near-traffic sources of precursors to SOA would be underestimated. The oxidation of these precursors results in more oxidized forms of SOA than previously considered, in both near source urban environments and further downwind. Primary organic aerosol can also be further oxidized to forms that have many characteristics in common with oxidized SOA formed from gaseous precursors. Organic peroxides constitute a significant fraction of SOA and represent an important class of reactive oxygen species (ROS) that have high oxidizing potential. More information on sources, emissions and deposition of PM are included in Section 3.3.
Wet and dry deposition are important processes for removing PM and other pollutants from the atmosphere on urban, regional, and global scales. Wet deposition includes incorporation of particles into cloud droplets that fall as rain (rainout) and collisions with falling rain (washout). Other hydrometeors (snow, ice) can also serve the same purpose. Dry deposition involves transfer of particles through gravitational settling and/or by impaction on surfaces by turbulent motions. The effects of deposition of PM on ecosystems and materials are discussed in Section 2.5 and in Chapter 9.

2.1.6. Source Contributions to PM

Results of receptor modeling calculations indicate that $PM_{2.5}$ is produced mainly by combustion of fossil fuel, either by stationary sources or by transportation. A relatively small number of broadly defined source categories, compared to the total number of chemical species that typically are measured in ambient monitoring source receptor studies, account for the majority of the observed PM mass. Some ambiguity is inherent in identifying source categories. For example, quite different mobile sources such as trucks, farm equipment, and locomotives rely on diesel engines and ancillary data is often required to resolve these sources. A compilation of study results shows that secondary SO_4^{2-} (derived mainly from SO_2 emitted by Electricity Generating Units [EGUs]), NO_3^- (from the oxidation of NO_x emitted mainly from transportation sources and EGUs), and primary mobile source categories, constitute most of $PM_{2.5}$ (and PM_{10}) in the East. $PM_{10-2.5}$ is mainly primary in origin, having been emitted as fully formed particles derived from abrasion and crushing processes, soil disturbances, plant and insect fragments, pollens and other microorganisms, desiccation of marine aerosol emitted from bursting bubbles, and hygroscopic fine PM expanding with humidity to coarse mode. Gases such as HNO_3 can also condense directly onto preexisting coarse particles. Suspended primary coarse PM can contain Fe, Si, Al, and base cations from soil, plant and insect fragments, pollen, fungal spores, bacteria, and viruses, as well as fly ash, brake lining particles, debris, and automobile tire fragments. Quoted uncertainties in the source apportionment of constituents in ambient aerosol samples typically range from 10 to 50%. An intercomparison of source apportionment techniques indicated that the same major source categories of $PM_{2.5}$ were consistently identified by several independent groups working with the same data sets. Soil-, sulfate-, residual oil-, and salt-associated mass were most clearly identified by the groups. Other sources with more ambiguous signatures, such as vegetative burning and traffic-related emissions were less consistently identified.
Spatial variability in source contributions across urban areas is an important consideration in assessing the likelihood of exposure error in epidemiologic studies relating health outcomes to sources. Concepts similar to those for using ambient concentrations as surrogates for personal exposures apply here. Some source attribution studies for $PM_{2.5}$ indicate that intra-urban variability increases in the following order: regional sources (e.g., secondary SO_4^{2-} originating from EGUs) < area sources (e.g., on-road mobile sources) < point sources (e.g., metals from stacks of smelters).

Although limited information was available for $PM_{10-2.5}$, it does indicate a similar ordering, but without a regional component (resulting from the short lifetime of $PM_{10-2.5}$ compared to transport times on the regional scale). More discussion on source contributions to PM is available in Section 3.6.

2.1.7. Policy-Relevant Background

The background concentrations of PM that are useful for risk and policy assessments, which inform decisions about the NAAQS are referred to as policy-relevant background (PRB) concentrations. PRB concentrations have historically been defined by EPA as those concentrations that would occur in the U.S. in the absence of anthropogenic emissions in continental North America defined here as the U.S., Canada, and Mexico. For this document, PRB concentrations include contributions from natural sources everywhere in the world and from anthropogenic sources outside continental North America. Background concentrations so defined facilitated separation of pollution that can be controlled by U.S. regulations or through international agreements with neighboring countries from those that were judged to be generally uncontrollable by the U.S. Over time, consideration of potential broader ranging international agreements may lead to alternative determinations of which PM source contributions should be considered by EPA as part of PRB. Contributions to PRB concentrations of PM include both primary and secondary natural and anthropogenic components. For this document, PRB concentrations of $PM_{2.5}$ for the continental U.S. were estimated using EPA's Community Multi-scale Air Quality (CMAQ) modeling system, a deterministic, chemical-transport model (CTM), using output from GEOS-Chem a global-scale model for CMAQ boundary conditions. PRB concentrations of $PM_{2.5}$ were estimated to be less than 1 $\mu g/m^3$ on an annual basis, with maximum daily average values in a range from 3.1 to 20 $\mu g/m^3$ and having a peak of 63 $\mu g/m^3$ at the nine national park sites across the U.S. used to evaluate model performance for this analysis. A description of the models and evaluation of their performance is given in Section 3.6 and further details about the calculations of PRB concentrations are given in Section 3.7.

2.2. Human Exposure

This section summarizes the findings from the recent exposure assessment literature. This summary is intended to support the interpretation of the findings from epidemiologic studies and reflects the material presented in Section 3.8. Attention is given to how concentration metrics can be used in exposure assessment and what errors and uncertainties are incurred for different approaches. Understanding of exposure errors is important because exposure error can potentially bias an estimate of a health effect or increase the size of confidence intervals around a health effect estimate.

2.2.1. Spatial Scales of PM Exposure Assessment

Assessing population-level exposure at the urban scale is particularly relevant for time-series epidemiologic studies, which provide information on the relationship between health effects and community-average exposure, rather than an individual's exposure. PM concentrations measured at a central-site ambient monitor are used as surrogates for personal PM exposure. However, the correlation between the PM concentration measured at central-site ambient monitor(s) and the unknown true community average concentration depends on the spatial distribution of PM, the location of the monitoring site(s) chosen to represent the community average, and division of the community by terrain features or local sources into several sub-communities that differ in the temporal pattern of pollution. Concentrations of SO_4^{2-} and some components of SOA measured at central-site monitors are expected to be uniform in urban areas because of the regional nature of their sources. However, this is not true for primary components like EC whose sources are strongly spatially variable in urban areas.

At micro-to-neighborhood scales, heterogeneity of sources and topography contribute to variability in exposure. This is particularly true for $PM_{10-2.5}$ and for UFPs, which have spatially

variable urban sources and loss processes (mainly gravitational settling for $PM_{10-2.5}$ and coagulation for UFPs) that also limit their transport from sources more readily than for $PM_{2.5}$. Personal activity patterns also vary across urban areas and across regions. Some studies, conducted mainly in Europe, have found personal $PM_{2.5}$ and PM_{10} exposures for pedestrians in street canyons to be higher than ambient concentrations measured by urban central site ambient monitors. Likewise, microenvironmental UFP concentrations were observed to be substantially higher in near-road environments, street canyons, and tunnels when compared with urban background concentrations.

In-vehicle UFP and $PM_{2.5}$ exposures can also be important. As a result, concentrations measured by ambient monitors likely do not reflect the contributions of UFP or $PM_{2.5}$ exposures to individuals while commuting. There is significant variability within and across regions of the country with respect to indoor exposures to ambient PM. Infiltrated ambient PM concentrations depend in part on the ventilation properties of the building or vehicle in which the person is exposed. PM infiltration factors depend on particle size, chemical composition, season, and region of the country. Infiltration can best be modeled dynamically rather than being represented by a single value. Season is important to PM infiltration because it affects the ventilation practices (e.g., open windows) used. In addition, ambient temperature and humidity conditions affect the transport, dispersion, and size distribution of PM. Residential air exchange rates have been observed to be higher in the summer for regions with low air conditioning usage. Regional differences in air exchange rates (Southwest < Southeast < Northeast < Northwest) also reflect ventilation practices. Differential infiltration occurs as a function of PM size and composition (the latter of which is described below). PM infiltration is larger for accumulation mode particles than for UFPs and $PM_{10-2.5}$. Differential infiltration by size fraction can affect exposure estimates if not accurately characterized.

2.2.2. Exposure to PM Components and Copollutants

Emission inventories and source apportionment studies suggest that sources of PM exposure vary by region. Comparison of studies performed in the eastern U.S. with studies performed in the western U.S. suggest that the contribution of SO_4^{2-} to exposure is higher for the East (16-46%) compared with the West (~4%) and that motor vehicle emissions and secondary NO_3^- are larger sources of exposure for the West (~9%) as compared with the East (~4%). Results of source apportionment studies of exposure to SO_4^{2-} indicate that SO_4^{2-} exposures are mainly attributable to ambient sources. Source apportionment for OC and EC is difficult because they originate from both indoor and outdoor sources. Exposure to OC of indoor and outdoor origin can be distinguished by the presence of aliphatic C-H groups generated indoors, since outdoor concentrations of aliphatic C-H are low. Studies of personal exposure to ambient trace metal have shown significant variation among cities and over seasons. This is in response to geographic and seasonal variability in sources including incinerator operation, fossil fuel combustion, biomass combustion (wildfires), and the resuspension of crustal materials in the built environment. Differential infiltration is also affected by variations in particle composition and volatility. For example, EC infiltrates more readily than OC. This can lead to outdoor-indoor differentials in PM composition.

Some studies have explored the relationship between PM and copollutant gases and suggested that certain gases can serve as surrogates for describing exposure to other air pollutants. The findings indicate that ambient concentrations of gaseous copollutants can act as surrogates for personal exposure to ambient PM. Several studies have concluded that ambient concentrations of O_3, NO_2, and SO_2 are associated with the ambient component of personal exposure to total $PM_{2.5}$. If associations between ambient gases and personal exposure to $PM_{2.5}$ of ambient origin exist, such associations are complex and vary by season and location.

2.2.3. Implications for Epidemiologic Studies

In epidemiologic studies, exposure may be estimated using various approaches, most of which rely on measurements obtained using central site monitors. The magnitude and direction of the biases introduced through error in exposure measurement depend on the extent to which the error is associated with the measured PM concentration. In general, when exposure error is not strongly correlated with the measured PM concentration, bias is toward the null and effect estimates are

underestimated. Moreover, lack of information regarding exposure measurement error can also add uncertainty to the health effects estimate.

One important factor to be considered is the spatial variation in PM concentrations. The degree of urban-scale spatial variability in PM concentrations varies across the country and by size fraction. $PM_{2.5}$ concentrations are relatively well-correlated across monitors in the urban areas examined for this assessment. The limited available evidence indicates that there is greater spatial variability in $PM_{10-2.5}$ concentrations than $PM_{2.5}$ concentrations, resulting in increased exposure error for the larger size fraction. Likewise, studies have shown UFPs to be more spatially variable across urban areas compared to $PM_{2.5}$. Even if $PM_{2.5}$, $PM_{10-2.5}$, or UFP concentrations measured at sites within an urban area are generally highly correlated, significant spatial variation in their concentrations can occur on any given day. In addition, there can be differential exposure errors for PM components (e.g., SO_4^{2-}, OC, EC). Current information suggests that UFPs, $PM_{10-2.5,}$ and some PM components are more spatially variable than $PM_{2.5}$. Spatial variability of these PM indicators adds uncertainty to exposure estimates.

Overall, recent studies generally confirm and build upon the key conclusions of the 2004 PM AQCD: separation of total PM exposures into ambient and nonambient components reduces potential uncertainties in the analysis and interpretation of PM health effects data; and ambient PM concentration can be used as a surrogate for ambient PM exposure in community time-series epidemiologic studies because the change in ambient PM concentration should be reflected in the change in the health risk coefficient. The use of the community average ambient $PM_{2.5}$ concentration as a surrogate for the community average personal exposure to ambient $PM_{2.5}$ is not expected to change the principal conclusions from time-series and most panel epidemiologic studies that use community average health and pollution data. Several recent studies support this by showing how the ambient component of personal exposure to $PM_{2.5}$ could be estimated using various tracer and source apportionment techniques and by showing that the ambient component is highly correlated with ambient concentrations of $PM_{2.5}$. These studies show that the non-ambient component of personal exposure to $PM_{2.5}$ is largely uncorrelated with ambient $PM_{2.5}$ concentrations. A few panel epidemiologic studies have included personal as well as ambient monitoring data, and generally reported associations with all types of PM measurements. Epidemiologic studies of long-term exposure typically exploit the differences in PM concentration across space, as well as time, to estimate the effect of PM on the health outcome of interest. Long-term exposure estimates are most accurate for pollutants that do not vary substantially within the geographic area studied.

2.3. Health Effects

This section evaluates the evidence from toxicological, controlled human exposure, and epidemiologic studies that examined the health effects associated with short- and long-term exposure to PM (i.e., $PM_{2.5}$, $PM_{10-2.5}$ and UFPs). The results from the health studies evaluated in combination with the evidence from atmospheric chemistry and exposure assessment studies contribute to the causal determinations made for the health outcomes discussed in this assessment (a description of the causal framework can be found in Section 1.5.4). In the following sections a discussion of the causal determinations will be presented by PM size fraction and exposure duration (i.e., short- or long-term exposure) for the health effects for which sufficient evidence was available to conclude a causal, likely to be causal or suggestive relationship. Although not presented in depth in this chapter, a detailed discussion of the underlying evidence used to formulate each causal determination can be found in Chapters 6 and 7.

2.3.1. Exposure to $PM_{2.5}$

2.3.1.1. Effects of Short-Term Exposure to $PM_{2.5}$

Table 2-1. Summary of causal determinations for short-term exposure to $PM_{2.5}$.

Size Fraction	Outcome	Causality Determination
$PM_{2.5}$	Cardiovascular Effects	Causal
	Respiratory Effects	Likely to be causal
Mortality		Causal

Cardiovascular Effects

Epidemiologic studies that examined the effect of $PM_{2.5}$ on cardiovascular emergency department (ED) visits and hospital admissions reported consistent positive associations (predominantly for ischemic heart disease [IHD] and congestive heart failure [CHF]), with the majority of studies reporting increases ranging from 0.5 to 3.4% per 10 µg/m^3 increase in $PM_{2.5}$. These effects were observed in study locations with mean[1] 24-h avg $PM_{2.5}$ concentrations ranging from 7-18 µg/m^3 (Section 6.2.10). The largest U.S.-based multicity study evaluated, Medicare Air Pollution Study (MCAPS), provided evidence of regional heterogeneity (e.g., the largest excess risks occurred in the Northeast [1.08%]) and seasonal variation (e.g., the largest excess risks occurred during the winter season [1.49%]) in $PM_{2.5}$ cardiovascular disease (CVD) risk estimates, which is consistent with the null findings of several single-city studies conducted in the western U.S. These associations are supported by multicity epidemiologic studies that observed consistent positive associations between short-term exposure to $PM_{2.5}$ and cardiovascular mortality and also reported regional and seasonal variability in risk estimates. The multicity studies evaluated reported consistent increases in cardiovascular mortality ranging from 0.47 to 0.85% in study locations with mean 24-h avg $PM_{2.5}$ concentrations above 12.8 µg/m^3 (Table 6-15).

Controlled human exposure studies have demonstrated $PM_{2.5}$-induced changes in various measures of cardiovascular function among healthy and health-compromised adults. The most consistent evidence is for altered vasomotor function following exposure to diesel exhaust (DE) or CAPs with O_3 (Section 6.2.4.2). Although these findings provide biological plausibility for the observations from epidemiologic studies, the fresh DE used in the controlled human exposure studies evaluated contains gaseous components (e.g., CO, NO_x), and therefore, the possibility that some of the changes in vasomotor function might be due to gaseous components cannot be ruled out. Furthermore, the prevalence of UFPs in fresh DE limits the ability to conclusively attribute the observed effects to either the UF fraction or $PM_{2.5}$ as a whole. An evaluation of toxicological studies found evidence for altered vessel tone and microvascular reactivity, which provide coherence and biological plausibility for the vasomotor effects that have been observed in both the controlled human exposure and epidemiologic studies (Section 6.2.4.3). However, most of these toxicological studies exposed animals via intratracheal (IT) instillation or using relatively high inhalation concentrations. In addition to the effects observed on vasomotor function, myocardial ischemia has been observed across disciplines through $PM_{2.5}$ effects on ST-segment depression, with toxicological studies providing biological plausibility by demonstrating reduced blood flow during ischemia (Section 6.2.3). There is also a growing body of evidence from controlled human exposure and toxicological studies demonstrating $PM_{2.5}$-induced changes on heart rate variability (HRV) and

[1] In this context mean represents the arithmetic mean of 24-h avg PM concentrations.

markers of systemic oxidative stress (Sections 6.2.1 and 6.2.9, respectively). Additional but inconsistent effects of $PM_{2.5}$ on blood pressure (BP), blood coagulation markers, and markers of systemic inflammation have also been reported across disciplines. Toxicological studies have provided biologically plausible mechanisms (e.g., increased right ventricular pressure and diminished cardiac contractility) for the associations observed between $PM_{2.5}$ and CHF in epidemiologic studies. Together, the collective evidence from epidemiologic, controlled human exposure, and toxicological studies is sufficient to conclude that **a causal relationship exists between short- term exposures to $PM_{2.5}$ and cardiovascular effects.**

Respiratory Effects

The recent epidemiologic studies evaluated report consistent positive associations between short-term exposure to $PM_{2.5}$ and respiratory ED visits and hospital admissions for chronic obstructive pulmonary disease (COPD) and respiratory infections (Section 6.3). Positive associations were also observed for asthma ED visits and hospital admissions for adults and children combined, but effect estimates are imprecise and not consistently positive for children alone. Most studies reported effects in the range of ~1% to 4% increase in respiratory hospital admissions and ED visits and were observed in study locations with mean 24-h avg $PM_{2.5}$ concentrations ranging from 6.1-22 $\mu g/m^3$. Additionally, multicity epidemiologic studies reported consistent positive associations between short-term exposure to $PM_{2.5}$ and respiratory mortality as well as regional and seasonal variability in risk estimates. The multicity studies evaluated reported consistent, precise increases in respiratory mortality ranging from 1.67 to 2.20% in study locations with mean 24-h avg $PM_{2.5}$ concentrations above 12.8 $\mu g/m^3$ (Table 6-15). Evidence for $PM_{2.5}$-related respiratory effects was also observed in panel studies, which indicate associations with respiratory symptoms, pulmonary function, and pulmonary inflammation among asthmatic children. Although not consistently observed, some controlled human exposure studies have reported small decrements in various measures of pulmonary function following controlled exposures to $PM_{2.5}$ (Section 6.3.2.2). Controlled human exposure studies using adult volunteers have demonstrated increased markers of pulmonary inflammation following exposure to a variety of different particle types; oxidative responses to DE and wood smoke; and exacerbations of allergic responses and allergic sensitization following exposure to DE particles (Section 6.3). Toxicological studies have provided additional support for $PM_{2.5}$-related respiratory effects through inhalation exposures of animals to CAPs, DE, other traffic-related PM and wood smoke. These studies reported an array of respiratory effects including altered pulmonary function, mild pulmonary inflammation and injury, oxidative responses, airway hyperresponsiveness (AHR) in allergic and non-allergic animals, exacerbations of allergic responses, and increased susceptibility to infections (Section 6.3).
Overall, the evidence for an effect of $PM_{2.5}$ on respiratory outcomes is somewhat restricted by limited coherence between some of the findings from epidemiologic and controlled human exposure studies for the specific health outcomes reported and the sub-populations in which those health outcomes occur. Epidemiologic studies have reported variable results among specific respiratory outcomes, specifically in asthmatics (e.g., increased respiratory symptoms in asthmatic children, but not increased asthma hospital admissions and ED visits) (Section 6.3.8). Additionally, respiratory effects have not been consistently demonstrated following controlled exposures to $PM_{2.5}$ among asthmatics or individuals with COPD. Collectively, the epidemiologic, controlled human exposure, and toxicological studies evaluated demonstrate a wide range of respiratory responses, and although results are not fully consistent and coherent across studies the evidence is sufficient to conclude that **a causal relationship is likely to exist between short-term exposures to $PM_{2.5}$ and respiratory effects.**

Mortality

An evaluation of the epidemiologic literature indicates consistent positive associations between short-term exposure to $PM_{2.5}$ and all-cause, cardiovascular-, and respiratory-related mortality (Section 6.5.2.2.). The evaluation of multicity studies found that consistent and precise risk estimates for all-cause (nonaccidental) mortality that ranged from 0.29 to 1.21% per 10 $\mu g/m^3$

increase in $PM_{2.5}$ at lags of 1 and 0-1 days. In these study locations, mean 24-h avg $PM_{2.5}$ concentrations were 12.8 µg/m^3 and above (Table 6-15). Cardiovascular-related mortality risk estimates were found to be similar to those for all-cause mortality; whereas, the risk estimates for respiratory-related mortality were consistently larger (i.e., 1.01-2.2%) using the same lag periods and averaging indices. The studies evaluated that examined the relationship between short-term exposure to $PM_{2.5}$ and cardiovascular effects (Section 6.2) provide coherence and biological plausibility for $PM_{2.5}$-induced cardiovascular mortality, which represents the largest component of total (nonaccidental) mortality (~ 35%) (American Heart Association, 2009, 198920). However, as noted in Section 6.3, there is limited coherence between some of the respiratory morbidity findings from epidemiologic and controlled human exposure studies for the specific health outcomes reported and the subpopultions in which those health outcomes occur, complicating the interpretation of the $PM_{2.5}$ respiratory mortality effects observed. Regional and seasonal patterns in $PM_{2.5}$ risk estimates were observed with the greatest effect estimates occurring in the eastern U.S. and during the spring. Of the studies evaluated only Burnett et al. (2004, 086247), a Canadian multicity study, analyzed gaseous pollutants and found mixed results, with possible confounding of $PM_{2.5}$ risk estimates by NO_2. Although the recently evaluated U.S.-based multicity studies did not analyze potential confounding of $PM_{2.5}$ risk estimates by gaseous pollutants, evidence from the limited number of single-city studies evaluated in the 2004 PM AQCD (U.S. EPA, 2004, 056905) suggest that gaseous copollutants do not confound the $PM_{2.5}$-mortality association. This is further supported by studies that examined the PM_{10}-mortality relationship. An examination of effect modifiers (e.g., demographic and socioeconomic factors), specifically air conditioning use as an indicator for decreased pollutant penetration indoors, has suggested that $PM_{2.5}$ risk estimates increase as the percent of the population with access to air conditioning decreases. Collectively, the epidemiologic literature provides evidence that **a causal relationship exists between short-term exposures to $PM_{2.5}$ and mortality.**

2.3.1.2. Effects of Long-Term Exposure to $PM_{2.5}$

Table 2-2. Summary of causal determinations for long-term exposure to $PM_{2.5}$.

Size Fraction	Outcome	Causality Determination
$PM_{2.5}$	Cardiovascular Effects	Causal
	Respiratory Effects	Likely to be causal
	Mortality	Causal
	Reproductive and Developmental	Suggestive
Cancer, Mutagenicity, and Genotoxicity		Suggestive

Cardiovascular Effects

The strongest evidence for cardiovascular health effects related to long-term exposure to $PM_{2.5}$ comes from large, multicity U.S.-based studies, which provide consistent evidence of an association between long-term exposure to $PM_{2.5}$ and cardiovascular mortality (Section 7.2.10). These associations are supported by a large U.S.-based epidemiologic study (i.e., Women's Health Initiative [WHI] study) that reports associations between $PM_{2.5}$ and CVDs among post-menopausal women using a 1-yr avg $PM_{2.5}$ concentration (mean = 13.5 µg/m^3) (Section 7.2). However, epidemiologic studies that examined subclinical markers of CVD report inconsistent findings. Epidemiologic studies have also provided some evidence for potential modification of the $PM_{2.5}$-CVD association when examining individual-level data, specifically smoking status and the use of anti-

hyperlipidemics. Although epidemiologic studies have not consistently detected effects on markers of atherosclerosis due to long-term exposure to $PM_{2.5}$, toxicological studies have provided strong evidence for accelerated development of atherosclerosis in $ApoE^{-/-}$ mice exposed to CAPs and have shown effects on coagulation, experimentally-induced hypertension, and vascular reactivity (Section 7.2.1.2). Evidence from toxicological studies provides biological plausibility and coherence with studies of short-term exposure and cardiovascular morbidity and mortality, as well as with studies that examined long-term exposure to $PM_{2.5}$ and cardiovascular mortality. Taken together, the evidence from epidemiologic and toxicological studies is sufficient to conclude that **a causal relationship exists between long-term exposures to $PM_{2.5}$ and cardiovascular effects.**

Respiratory Effects

Recent epidemiologic studies conducted in the U.S. and abroad provide evidence of associations between long-term exposure to $PM_{2.5}$ and decrements in lung function growth, increased respiratory symptoms, and asthma development in study locations with mean $PM_{2.5}$ concentrations ranging from 13.8 to 30 $\mu g/m^3$ during the study periods (Section 7.3.1.1 and Section 7.3.2.1). These results are supported by studies that observed associations between long-term exposure to PM_{10} **and an increase in respiratory symptoms and reductions in lung function growth in areas where PM_{10} is dominated by $PM_{2.5}$. However, the evidence to support an association with long-term exposure to $PM_{2.5}$ and respiratory mortality is limited (Figure 7-7). Subchronic and chronic toxicological studies of CAPs, DE, roadway air and woodsmoke provide coherence and biological plausibility for the effects observed in the epidemiologic studies. These toxicological studies have presented some evidence for altered pulmonary function, mild inflammation, oxidative responses, immune suppression, and histopathological changes including mucus cell hyperplasia** (Section 7.3). Exacerbated allergic responses have been demonstrated in animals exposed to DE and wood smoke. In addition, pre- and postnatal exposure to ambient levels of urban particles was found to affect lung development in an animal model. This finding is important because impaired lung development is one mechanism by which PM exposure may decrease lung function growth in children. Collectively, the evidence from epidemiologic and toxicological studies is sufficient to conclude that **a causal relationship is likely to exist between long-term exposures to $PM_{2.5}$ and respiratory effects.**

Mortality

The recent epidemiologic literature reports associations between long-term $PM_{2.5}$ exposure and increased **risk of mortality. Mean $PM_{2.5}$ concentrations ranged from 13.2 to 29 $\mu g/m^3$ during the study period in these areas (Section 7.6). When evaluating cause-specific mortality, the strongest evidence can be found when examining associations between $PM_{2.5}$ and cardiovascular mortality, and positive associations were also reported between $PM_{2.5}$ and lung cancer mortality (Figure 7-7). The cardiovascular mortality association has been confirmed further by the extended Harvard Six Cities and American Cancer Society studies, which both report strong associations between long- term exposure to $PM_{2.5}$ and cardiopulmonary and IHD mortality (Figure 7-7). Additional new evidence from a study that used the WHI cohort found a particularly strong association between long-term exposure to $PM_{2.5}$ and CVD mortality in post-menopausal women. Fewer studies have evaluated the respiratory component of cardiopulmonary mortality, and, as a result, the evidence to support an association with long-term exposure to $PM_{2.5}$ and respiratory mortality is limited (Figure 7-7). The evidence for cardiovascular and respiratory morbidity due to short- and long-term exposure to $PM_{2.5}$ provides biological plausibility for cardiovascular- and respiratory-related mortality. Collectively, the evidence is sufficient to conclude that a causal relationship exists between long-term exposures to $PM_{2.5}$ and mortality.**

Reproductive and Developmental Effects

Evidence is accumulating for $PM_{2.5}$ effects on low birth weight and infant mortality, especially due to respiratory causes during the post-neonatal period. The mean $PM_{2.5}$ concentrations during the study periods ranged from 5.3-27.4 $\mu g/m^3$ (Section 7.4), with effects becoming more precise and consistently positive in locations with mean $PM_{2.5}$ concentrations of 15 $\mu g/m^3$ and above (Section 7.4). Exposure to $PM_{2.5}$ was usually associated with greater reductions in birth weight than exposure to PM_{10}. The evidence from a few U.S. studies that investigated PM_{10} effects on fetal growth, which reported similar decrements in birth weight, provide consistency for the $PM_{2.5}$ associations observed and strengthen the interpretation that particle exposure may be causally related to reductions in birth weight. The epidemiologic literature does not consistently report associations between long-term exposure to PM and preterm birth, growth restriction, birth defects or decreased sperm quality. Toxicological evidence supports an association between $PM_{2.5}$ and PM_{10} exposure and adverse reproductive and developmental outcomes, but provide little mechanistic information or biological plausibility for an association between long-term PM exposure and adverse birth outcomes (e.g., low birth weight or infant mortality). New evidence from animal toxicological studies on heritable mutations is of great interest, and warrants further investigation. Overall, the epidemiologic and toxicological evidence is **suggestive of a causal relationship between long-term exposures to $PM_{2.5}$ and reproductive and developmental outcomes.**

Cancer, Mutagenicity, and Genotoxicity

Multiple epidemiologic studies have shown a consistent positive association between $PM_{2.5}$ and lung cancer mortality, but studies have generally not reported associations between $PM_{2.5}$ and lung cancer incidence (Section 7.5). Animal toxicological studies have examined the potential relationship between PM and cancer, but have not focused on specific size fractions of PM. Instead they have examined ambient PM, wood smoke, and DEP. A number of studies indicate that ambient urban PM, emissions from wood/biomass burning, emissions from coal combustion, and gasoline and DE are mutagenic, and that PAHs are genotoxic. These findings are consistent with earlier studies that concluded that ambient PM and PM from specific combustion sources are mutagenic and genotoxic and provide biological plausibility for the results observed in the epidemiologic studies. A limited number of epidemiologic and toxicological studies examined epigenetic effects, and demonstrate that PM induces some changes in methylation. However, it has yet to be determined **how these alterations in the genome could influence the initiation and promotion of cancer. Additionally, inflammation and immune suppression induced by exposure to PM may confer susceptibility to cancer. Collectively, the evidence from epidemiologic studies, primarily those of lung cancer mortality, along with the toxicological studies that show some evidence of the mutagenic and genotoxic effects of PM is suggestive of a causal relationship between long-term exposures to $PM_{2.5}$ and cancer.**

2.3.2. Integration of $PM_{2.5}$ Health Effects

In epidemiologic studies, short-term exposure to $PM_{2.5}$ is associated with a broad range of respiratory and cardiovascular effects, as well as mortality. For cardiovascular effects and mortality, the evidence supports the existence of a causal relationship with short-term $PM_{2.5}$ exposure; while the evidence indicates that a causal relationship is likely to exist between short-term $PM_{2.5}$ exposure and respiratory effects. The effect estimates from recent and older U.S. and Canadian-based epidemiologic studies that examined the relationship between short-term exposure to $PM_{2.5}$ and health outcomes with mean 24-h avg $PM_{2.5}$ concentrations <17 $\mu g/m^3$ are shown in Figure 2-1. **A number of different health effects are included in Figure 2-1 to provide an integration of the range of effects by mean concentration, with a focus on cardiovascular and respiratory effects and all-cause (nonaccidental) mortality (i.e., health effects categories with at least a suggestive causal determination). A pattern of consistent positive associations with mortality and morbidity effects can be seen in this figure. Mean $PM_{2.5}$ concentrations ranged from 6.1 to 16.8 $\mu g/m^3$.in these study locations.**

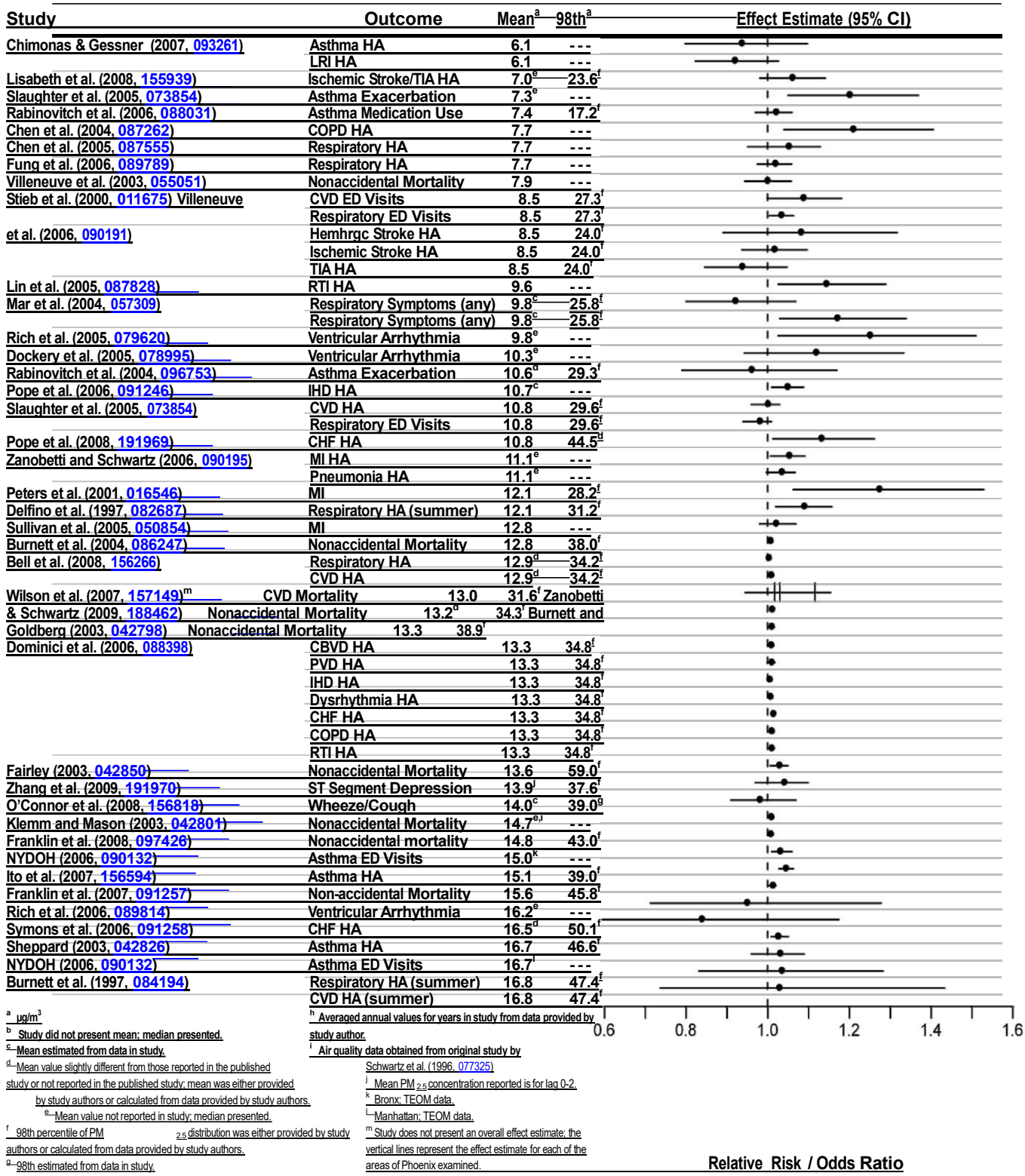


Figure 2-1. Summary of effect estimates (per 10 µg/m^3) by increasing concentration from U.S. studies examining the association between short-term exposure to $PM_{2.5}$ and cardiovascular and respiratory effects, and mortality, conducted in locations where the reported mean 24-h avg $PM_{2.5}$ concentrations were <17 µg/m^3.

Long-term exposure to $PM_{2.5}$ has been associated with health outcomes similar to those found in the short-term exposure studies, specifically for respiratory and cardiovascular effects and mortality. As found for short-term $PM_{2.5}$ exposure, the evidence indicates that a causal relationship exists between long-term $PM_{2.5}$ exposure and cardiovascular effects and mortality, and that a causal relationship is likely to exist between long-term $PM_{2.5}$ exposure and effects on the respiratory system.

Figure 2-2 highlights the findings of epidemiologic studies where the long-term mean $PM_{2.5}$ concentrations were ≤ 29 µg/m^3. A range of health outcomes are displayed (including cardiovascular mortality, all-cause mortality, infant mortaltiy, and bronchitis) ordered by mean concentration. The range of mean $PM_{2.5}$ concentrations in these studies was 10.7-29 µg/m^3 during the study periods. Additional studies not included in this figure that focus on subclinical outcomes, such as changes in lung function or atherosclerotic markers also report effects in areas with similar concentrations (Sections 7.2 and 7.3). Although not highlighted in the summary figure, long-term $PM_{2.5}$ exposure studies also provide evidence for reproductive and developmental effects (i.e., low birth weight) and
cancer (i.e., lung cancer mortality) in response to to exposure to $PM_{2.5}$.

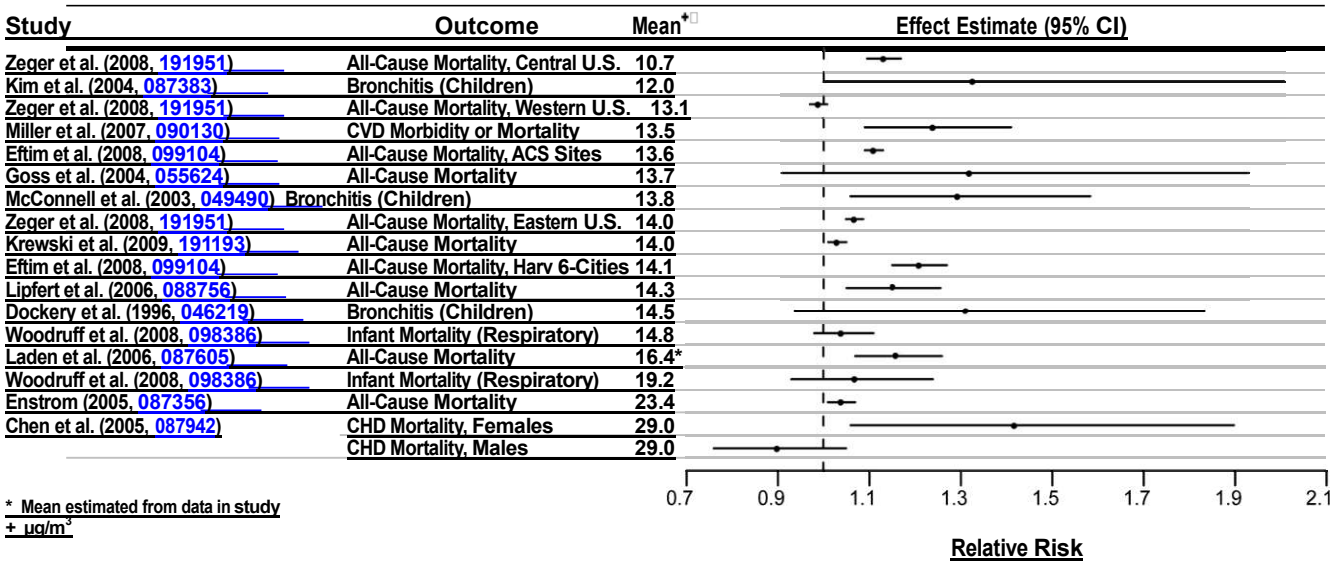


Figure 2-2. Summary of effect estimates (per 10 µg/m^3) by increasing concentration from U.S. studies examining the association between long-term exposure to $PM_{2.5}$ and cardiovascular and respiratory effects, and mortality.

The observations from both the short- and long-term exposure studies are supported by experimental findings of $PM_{2.5}$-induced subclinical and clinical cardiovascular effects. Epidemiologic studies have shown an increase in ED visits and hospital admissions for IHD upon exposure to $PM_{2.5}$. These effects are coherent with the changes in vasomotor function and ST- segment depression observed in both toxicological and controlled human exposure studies. It has been postulated that exposure to $PM_{2.5}$ can lead to myocardial ischemia through an effect on the autonomic nervous system or by altering vasomotor function. PM-induced systemic inflammation, oxidative stress and/or endothelial dysfunction may contribute to altered vasomotor function. These effects have been demonstrated in recent animal toxicological studies, along with altered microvascular reactivity, altered vessel tone, and reduced blood flow during ischemia. Toxicological studies demonstrating increased right ventricular pressure and diminished cardiac contractility also provide biological plausibility for the associations observed between $PM_{2.5}$ and CHF in epidemiologic studies. Thus, the overall evidence from the short-term epidemiologic, controlled human exposure, and toxicological studies evaluated provide coherence and biological plausibility for cardiovascular effects related to myocardial ischemia and CHF. Coherence in the cardiovascular effects observed

can be found in long-term exposure studies, especially for CVDs among post-menopausal women. Additional studies provide limited evidence for subclinical measures of atherosclerosis in epidemiologic studies with stronger evidence from toxicological studies that have demonstrated accelerated development of atherosclerosis in ApoE$^{-/-}$ mice exposed to $PM_{2.5}$ CAPs along with effects on coagulation, experimentally-induced hypertension, and vascular reactivity. Repeated acute responses to PM may lead to cumulative effects that manifest as chronic disease, such as atherosclerosis. Contributing factors to atherosclerosis development include systemic inflammation, endothelial dysfunction, and oxidative stress all of which are associated with $PM_{2.5}$ exposure. However, it has not yet been determined whether PM initiates or promotes atherosclerosis. The evidence from both short- and long-term exposure studies on cardiovascular morbidity provide coherence and biological plausibility for the cardiovascular mortality effects observed when examining both exposure durations. In addition, cardiovascular hospital admission and mortality studies that examined the PM_{10} concentration-response relationship found evidence of a log-linear no-threshold relationship between PM exposure and cardiovascular-related morbidity (Section 6.2) and mortality (Section 6.5). Epidemiologic studies have also reported respiratory effects related to short-term exposure to $PM_{2.5}$, which include increased ED visits and hospital admissions, as well as alterations in lung function and respiratory symptoms in asthmatic children. These respiratory effects were found to be generally robust to the inclusion of gaseous pollutants in copollutant models with the strongest evidence from the higher powered studies (Figure 6-9 and Figure 6-15). Consistent positive associations were also reported between short-term exposure to $PM_{2.5}$ and respiratory mortality in epidemiologic studies. However, uncertainties exist in the $PM_{2.5}$-respiratory mortality associations reported due to the limited number of studies that examined potential confounders of the $PM_{2.5}$- respiratory mortality relationship, and the limited information regarding the biological plausibility of the clinical and subclinical respiratory outcomes observed in the epidemiologic and controlled human exposure studies (Section 6.3) resulting in the progression to $PM_{2.5}$-induced respiratory mortality. Important new findings, which support the $PM_{2.5}$-induced respiratory effects mentioned above, include associations with post-neonatal (between 1 mo and 1 yr of age) respiratory mortality. Controlled human exposure studies provide some support for the respiratory findings from epidemiologic studies, with demonstrated increases in pulmonary inflammation following short-term exposure. However, there is limited and inconsistent evidence of effects in response to controlled exposures to $PM_{2.5}$ on respiratory symptoms or pulmonary function among healthy adults or adults with respiratory disease. Long-term exposure epidemiologic studies provide additional evidence for $PM_{2.5}$-induced respiratory morbidity, but little evidence for an association with respiratory mortality. These epidemiologic morbidity studies have found decrements in lung function growth, as well as increased respiratory symptoms, and asthma. Toxicological studies provide coherence and biological plausibility for the respiratory effects observed in response to short and long-term exposures to PM by demonstrating a wide array of biological responses including: altered pulmonary function, mild pulmonary inflammation and injury, oxidative responses, and histopathological changes in animals exposed by inhalation to $PM_{2.5}$ derived from a wide variety of sources. In some cases, prolonged exposures led to adaptive responses. Important evidence was also found in an animal model for altered lung development following pre- and post-natal exposure to urban air, which may provide a mechanism to explain the reduction in lung function growth observed in children in response to long-term exposure to PM.

Additional respiratory-related effects have been tied to allergic responses. Epidemiologic studies have provided evidence for increased hospital admissions for allergic symptoms (e.g., allergic rhinitis) in response to short- and long-term exposure to $PM_{2.5}$. Panel studies also positively associate long-term exposure to $PM_{2.5}$ and PM_{10} with indicators of allergic sensitization. Controlled human exposure and toxicological studies provide coherence for the exacerbation of allergic symptoms, by showing that $PM_{2.5}$ can promote allergic responses and intensify existing allergies. Allergic responses require repeated exposures to antigen over time and co-exposure to an adjuvant (possibly DE particles or UF CAPs) can enhance this response. Allergic sensitization often underlies allergic asthma, characterized by inflammation and AHR. In this way, repeated or chronic exposures involving multifactorial responses (immune system activation, oxidative stress, inflammation) can lead to irreversible outcomes. Epidemiologic studies have also reported evidence for increased hospital admissions for respiratory infections in response to both short- and long-term exposures to $PM_{2.5}$. Toxicological studies suggest that PM impairs innate immunity, which is the first line of

defense against infection, providing coherence for the respiratory infection effects observed in epidemiologic studies.

The difference in effects observed across studies and between cities may be attributed, at least in part, to the differences in PM composition across the U.S. Differences in PM toxicity may result from regionally varying PM composition and size distribution, which in turn reflects differences in sources and PM volatility. A person's exposure to ambient PM will also vary due to regional differences in personal activity patterns, microenvironmental characteristics and the spatial variability of PM concentrations in urban areas. Regional differences in $PM_{2.5}$ composition are outlined briefly in Section 2.1 above and in more detail in Section 3.5. An examination of data from the CSN indicates that East-West gradients exist for a number of PM components. Specifically, SO_4^{2-} concentrations are higher in the East, OC constitutes a larger fraction of PM in the West, and NO_3^- concentrations are highest in the valleys of central California and during the winter in the Midwest. However, the available evidence and the limited amount of city-specific speciated $PM_{2.5}$ data does not allow conclusions to be drawn that specifically differentiate effects of PM in different locations.

It remains a challenge to determine relationships between specific constituents, combinations of constituents, or sources of $PM_{2.5}$ and the various health effects observed. Source apportionment studies of $PM_{2.5}$ have attempted to decipher some of these relationships and in the process have identified associations between multiple sources and various respiratory and cardiovascular health effects, as well as mortality. Although different source apportionment methods have been used across these studies, the methods used have been evaluated and found generally to identify the same sources and associations between sources and health effects (Section 6.6). While uncertainty remains, it has been recognized that many sources and components of $PM_{2.5}$ contribute to health effects. Overall, the results displayed in Table 6-18 indicate that many constituents of $PM_{2.5}$ can be linked with multiple health effects, and the evidence is not yet sufficient to allow differentiation of those constituents or sources that are more closely related to specific health outcomes.

Variability in the associations observed across $PM_{2.5}$ epidemiologic studies may be due in part to exposure error related to the use of county-level air quality data. Because western U.S. counties tend to be much larger and more topographically diverse than eastern U.S. counties, the day-to-day variations in concentration at one site, or even for the average of several sites, may not correlate well with the day-to-day variations in all parts of the county. For example, site-to-site correlations as a function of distance between sites (Section 3.5.1.2) fall off rapidly with distance in Los Angeles, but high correlations extend to larger distances in eastern cities such as Boston and Pittsburgh. These differences may be attributed to a number of factors including topography, the built environment, climate, source characteristics, ventilation usage, and personal activity patterns. For instance, regional differences in climate and infrastructure can affect time spent outdoors or indoors, air conditioning usage, and personal activity patterns. Characteristics of housing stock may also cause regional differences in effect estimates because new homes tend to have lower infiltration factors than older homes. Biases and uncertainties in exposure estimates resulting from these aspects can, in turn, cause bias and uncertainty in associated health effects estimates.

The new evidence reviewed in this ISA greatly expands upon the evidence available in the 2004 PM AQCD particularly in providing greater understanding of the underlying mechanisms for $PM_{2.5}$ induced cardiovascular and respiratory effects for both short- and long-term exposures. Recent studies have provided new evidence linking long-term exposure to $PM_{2.5}$ with cardiovascular outcomes that has expanded upon the continuum of effects ranging from the more subtle subclinical measures to cardiopulmonary mortality.

2.3.3. Exposure to $PM_{10-2.5}$

2.3.3.1. Effects of Short-Term Exposure to $PM_{10-2.5}$

Table 2-3. Summary of causal determinations for short-term exposure to $PM_{10-2.5}$.

Size Fraction	Outcome	Causality Determination
$PM_{10-2.5}$	Cardiovascular Effects	Suggestive
	Respiratory Effects	Suggestive
Mortality		Suggestive

Cardiovascular Effects

Generally positive associations were reported between short-term exposure to $PM_{10-2.5}$ and hospital admissions or ED visits for cardiovascular causes. These results are supported by a large U.S. multicity study of older adults that reported $PM_{10-2.5}$ associations with CVD hospital admissions, and only a slight reduction in the $PM_{10-2.5}$ risk estimate when included in a copollutant model with $PM_{2.5}$ (Section 6.2.10). The $PM_{10-2.5}$ associations with cardiovascular hospital admissions and ED visits were observed in study locations with mean 24-h avg $PM_{10-2.5}$ concentrations ranging from 7.4 to 13 $\mu g/m^3$. These results are supported by the associations observed between $PM_{10-2.5}$ and cardiovascular mortality in areas with 24-h avg $PM_{10-2.5}$ concentrations ranging from 6.1-16.4 $\mu g/m^3$ (Section 6.2.11). The results of the epidemiologic studies were further confirmed by studies that examined dust storm events, which contain high concentrations of crustal material, and found an increase in cardiovascular-related ED visits and hospital admissions. Additional epidemiologic studies have reported $PM_{10-2.5}$ associations with other cardiovascular health effects including supraventricular ectopy and changes in HRV (Section 6.2.1.1). Although limited in number, studies of controlled human exposures provide some evidence to support the alterations in HRV observed in the epidemiologic studies (Section 6.2.1.2). The few toxicological studies that examined the effect of $PM_{10-2.5}$ on cardiovascular health effects used IT instillation due to the technical challenges in exposing rodents via inhalation to $PM_{10-2.5}$, and, as a result, provide only limited evidence on the biological plausibility of $PM_{10-2.5}$ induced cardiovascular effects. The potential for $PM_{10-2.5}$ to elicit an effect is supported by dosimetry studies, which show that a large proportion of inhaled particles in the 3-6 micron (d_{ae}) range can reach and deposit in the lower respiratory tract, particularly the tracheobronchial (TB) airways (Figures 4-3 and 4-4). Collectively, the evidence from epidemiologic studies, along with the more limited evidence from controlled human exposure and toxicological studies **is suggestive of a causal relationship between short-term exposures to $PM_{10-2.5}$ and cardiovascular effects.**

Respiratory Effects

A number of recent epidemiologic studies conducted in Canada and France found consistent, positive associations between respiratory ED visits and hospital admissions and short-term exposure to $PM_{10-2.5}$ in studies with mean 24-h avg concentrations ranging from 5.6-16.2 $\mu g/m^3$ (Section 6.3.8). In these studies, the strongest relationships were observed among children, with less consistent evidence for adults and older adults (i.e., $\geq$ 65). In a large multicity study of older adults, $PM_{10-2.5}$ was positively associated with respiratory hospital admissions in both single and copollutant models with $PM_{2.5}$. In addition, a U.S.-based multicity study found evidence for an increase in respiratory mortality upon short-term exposure to $PM_{10-2.5}$, but these associations have not been consistently

observed in single-city studies (Section 6.3.9). A limited number of epidemiologic studies have focused on specific respiratory morbidity outcomes, and found no evidence of an association with lower respiratory symptoms, wheeze, and medication use (Section 6.3.1.1). While controlled human exposure studies have not observed an effect on lung function or respiratory symptoms in healthy or asthmatic adults in response to short-term exposure to $PM_{10-2.5}$, healthy volunteers have exhibited an increase in markers of pulmonary inflammation. Toxicological studies using inhalation exposures are still lacking, but pulmonary injury has been observed in animals after IT instillation exposure (Section 6.3.5.3). In some cases, $PM_{10-2.5}$ was found to be more potent than $PM_{2.5}$ and effects were not attributable to endotoxin. Both rural and urban $PM_{10-2.5}$ have induced inflammation and injury responses in rats or mice exposed via IT instillation, making it difficult to distinguish the health effects of $PM_{10-2.5}$ from different environments. Overall, epidemiologic studies, along with the
limited number of controlled human exposure and toxicological studies that examined $PM_{10-2.5}$ respiratory effects provide evidence that **is suggestive of a causal relationship between short-term exposures to $PM_{10-2.5}$ and respiratory effects.**

Mortality

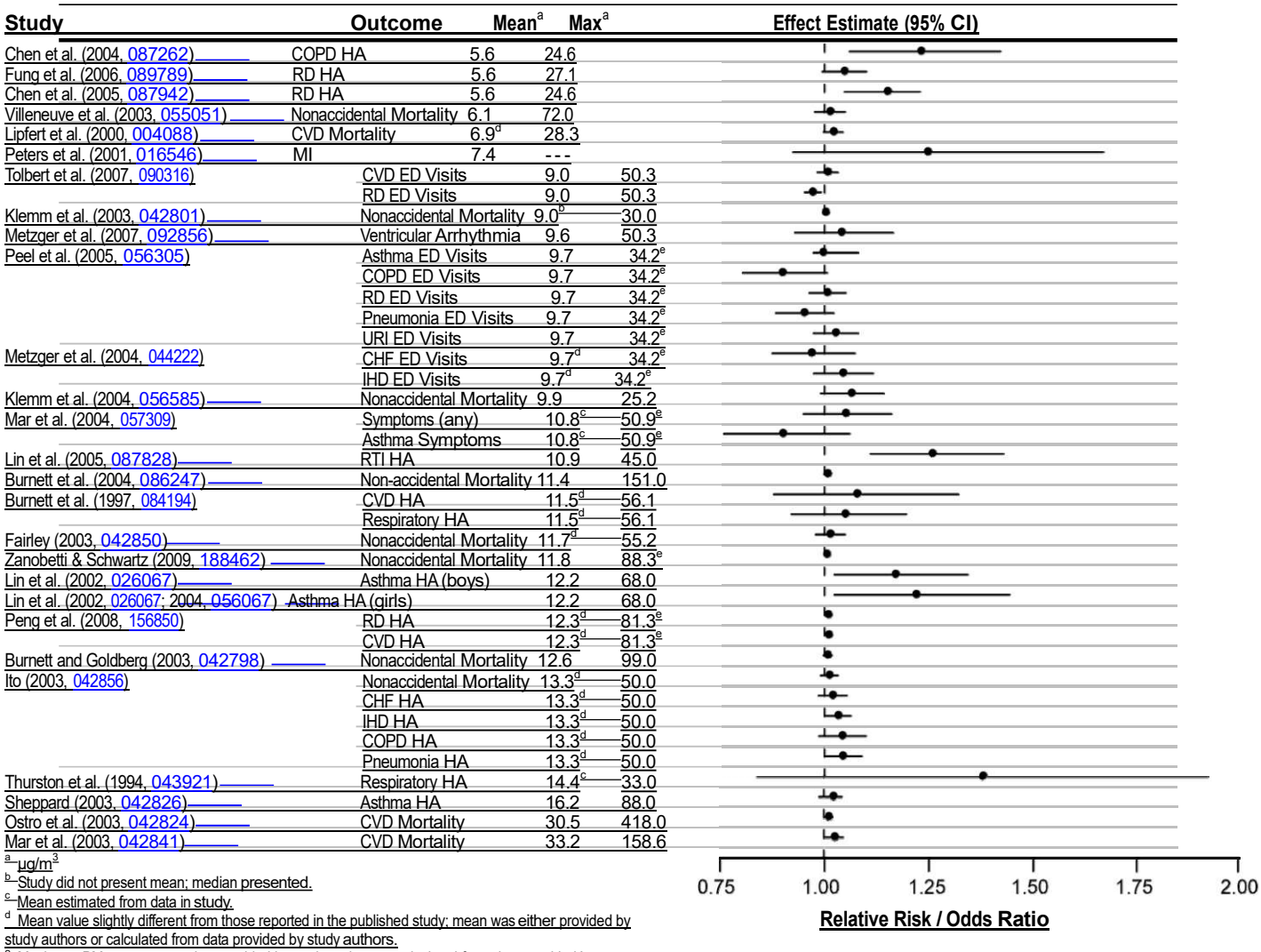
The majority of studies evaluated in this review provide some evidence for mortality associations with $PM_{10-2.5}$ in areas with mean 24-h avg concentrations ranging from 6.1-16.4 $\mu g/m^3$. However, uncertainty surrounds the $PM_{10-2.5}$ associations reported in the studies evaluated due to the different methods used to estimate $PM_{10-2.5}$ concentrations across studies (e.g., direct measurement of $PM_{10-2.5}$ using dichotomous samplers, calculating the difference between PM_{10} and $PM_{2.5}$ concentrations). In addition, only a limited number of $PM_{10-2.5}$ studies have investigated potential confounding by gaseous copollutants or the influence of model specification on $PM_{10-2.5}$ risk estimates.
A new U.S.-based multicity study, which estimated $PM_{10-2.5}$ concentrations by calculating the difference between the county-average PM_{10} and $PM_{2.5}$, found associations between $PM_{10-2.5}$ and mortality across the U.S., including evidence for regional variability in $PM_{10-2.5}$ risk estimates (Section 6.5.2.3). Additionally, the U.S.-based multicity study provides preliminary evidence for greater effects occurring during the warmer months (i.e., spring and summer). A multicity Canadian study provides additional evidence for an association between short-term exposure to $PM_{10-2.5}$ and mortality (Section 6.5.2.3). Although consistent positive associations have been observed across both multi- and single-city studies, more data are needed to adequately characterize the chemical and biological components that may modify the potential toxicity of $PM_{10-2.5}$ and compare the different methods used to estimate exposure. Overall, the evidence evaluated **is suggestive of a causal relationship between short-term exposures to $PM_{10-2.5}$ and mortality.**

2.3.4. Integration of $PM_{10-2.5}$ Effects

Epidemiologic, controlled human exposure, and toxicological studies have provided evidence that is suggestive for relationships between short-term exposure to $PM_{10-2.5}$ and cardiovascular effects, respiratory effects, and mortality. Conclusions regarding causation for the various health effects and outcomes were made for $PM_{10-2.5}$ as a whole regardless of origin, since $PM_{10-2.5}$-related effects have been demonstrated for a number of different environments (e.g., cities reflecting a wide range of environmental conditions). Associations between short-term exposure to $PM_{10-2.5}$ and cardiovascular and respiratory effects, and mortality have been observed in locations with mean $PM_{10-2.5}$ concentrations ranging from 5.6 to 33.2 $\mu g/m^3$, and maximum $PM_{10-2.5}$ concentrations ranging from
24.6 to 418.0 $\mu g/m^3$) (Figure 2-3). A number of different health effects are included in Figure 2-3 to provide an integration of the range of effects by mean concentration, with a focus on cardiovascular and respiratory effects, and mortality (i.e., health effects categories with at least a suggestive causal determination). To date, a sufficient amount of evidence does not exist in order to draw conclusions regarding the health effects and outcomes associated with long-term exposure to $PM_{10-2.5}$.

In epidemiologic studies, associations between short-term exposure to $PM_{10-2.5}$ and cardiovascular outcomes (i.e., IHD hospital admissions, supraventricular ectopy, and changes in HRV) have been found that are similar in magnitude to those observed in $PM_{2.5}$ studies. Controlled human exposure studies have also observed alterations in HRV, providing consistency and coherence

for the effects observed in the epidemiologic studies. To date, only a limited number of toxicological studies have been conducted to examine the effects of $PM_{10-2.5}$ on cardiovascular effects. All of these studies involved IT instillation due to the technical challenges of using $PM_{10-2.5}$ for rodent inhalation studies. As a result, the toxicological studies evaluated provide limited biological plausibility for the $PM_{10-2.5}$ effects observed in the epidemiologic and controlled human exposure studies.



[a] µg/m^3
[b] Study did not present mean; median presented.
[c] Mean estimated from data in study.
[d] Mean value slightly different from those reported in the published study; mean was either provided by study authors or calculated from data provided by study authors.
[e] Maximum $PM_{10-2.5}$ concentration provided by study authors or calculated from data provided by study authors.

Figure 2-3. Summary of U.S. studies examining the association between short-term exposure to $PM_{10-2.5}$ and cardiovascular morbidity/mortality and respiratory morbidity/mortality. All effect estimates have been standardized to reflect a 10 µg/m^3 increase in mean 24-h avg $PM_{10-2.5}$ concentration and ordered by increasing concentration.

Limited evidence is available from epidemiologic studies for respiratory health effects and outcomes in response to short-term exposure to $PM_{10-2.5}$. An increase in respiratory hospital admissions and ED visits has been observed, but primarily in studies conducted in Canada and Europe. In addition, associations are not reported for lower respiratory symptoms, wheeze, or medication use. Controlled human exposure studies have not observed an effect on lung function or respiratory symptoms in healthy or asthmatic adults, but healthy volunteers have exhibited pulmonary inflammation. The toxicological studies (all IT instillation) provide evidence of

pulmonary injury and inflammation. In some cases, $PM_{10-2.5}$ was found to be more potent than $PM_{2.5}$ and effects were not solely attributable to endotoxin.
Currently, a national network is not in place to monitor $PM_{10-2.5}$ concentrations. As a result, uncertainties surround the concentration at which the observed associations occur. Ambient concentrations of $PM_{10-2.5}$ are generally determined by the subtraction of PM_{10} and $PM_{2.5}$ measurements, using various methods. For example, some epidemiologic studies estimate $PM_{10-2.5}$ by taking the difference between collocated PM_{10} and $PM_{2.5}$ monitors while other studies have taken the difference between county average PM_{10} and $PM_{2.5}$ concentrations. Moreover, there are potential differences among operational flow rates and temperatures for PM_{10} and $PM_{2.5}$ monitors used to calculate $PM_{10-2.5}$. Therefore, there is greater error in ambient exposure to $PM_{10-2.5}$ compared to $PM_{2.5}$. This would tend to increase uncertainty and make it more difficult to detect effects of $PM_{10-2.5}$ in epidemiologic studies. In addition, the various differences between eastern and western U.S. counties can lead to exposure misclassification, and the potential underestimation of effects in western counties (as discussed for $PM_{2.5}$ in Section 2.3.2).
It is also important to note that the chemical composition of $PM_{10-2.5}$ can vary considerably by location, but city-specific speciated $PM_{10-2.5}$ data are limited. $PM_{10-2.5}$ may contain Fe, Si, Al, and base cations from soil, plant and insect fragments, pollen, fungal spores, bacteria, and viruses, as well as fly ash, brake lining particles, debris, and automobile tire fragments.
The 2004 PM AQCD presented the limited amount of evidence available that examined the potential association between exposure to $PM_{10-2.5}$ and health effects and outcomes. The current evidence, primarily from epidemiologic studies, builds upon the results from the 2004 PM AQCD and indicates that short-term exposure to $PM_{10-2.5}$ is associated with effects on both the cardiovascular and respiratory systems. However, variability in the chemical and biological composition of $PM_{10-2.5}$, limited evidence regarding effects of the various components of $PM_{10-2.5}$, and lack of clearly defined biological mechanisms for $PM_{10-2.5}$-related effects are important sources of uncertainty.

2.3.5. Exposure to UFPs

2.3.5.1. Effects of Short-Term Exposure to UFPs

Table 2-4. Summary of causal determinations for short-term exposure to UFPs.

Size Fraction	Outcome	Causality Determination
UFPs	Cardiovascular Effects	Suggestive
	Respiratory Effects	Suggestive

Cardiovascular Effects

Controlled human exposure studies provide the majority of the evidence for cardiovascular health effects in response to short-term exposure to UFPs. While there are a limited number of studies that have examined the association between UFPs and cardiovascular morbidity, there is a larger body of evidence from studies that exposed subjects to fresh DE, which is typically dominated by UFPs. These studies have consistently demonstrated changes in vasomotor function following exposure to atmospheres containing relatively high concentrations of particles (Section 6.2.4.2). Markers of systemic oxidative stress have also been observed to increase after exposure to various particle types that are predominantly in the UFP size range. In addition, alterations in HRV parameters have been observed in response to controlled human exposure to UF CAPs, with inconsistent evidence for changes in markers of blood coagulation following exposure to UF CAPs

and DE (Sections 6.2.1.2 and 6.2.8.2). A few toxicological studies have also found consistent changes in vasomotor function, which provides coherence with the effects demonstrated in the controlled human exposure studies (Section 6.2.4.3). Additional UFP-induced effects observed in toxicological studies include alterations in HRV, with less consistent effects observed for systemic inflammation and blood coagulation. Only a few epidemiologic studies have examined the effect of UFPs on cardiovascular morbidity and collectively they found inconsistent evidence for an association between UFPs and CVD hospital admissions, but some positive associations for subclinical cardiovascular measures (i.e., arrhythmias and supraventricular beats) (Section 6.2.2.1). These studies were conducted in the U.S. and Europe in areas with mean particle number concentration ranging from ~8,500 to 36,000 particles/cm^3. However, UFP number concentrations are highly variable (i.e., concentrations drop off quickly from the road compared to accumulation mode particles), and therefore, more subject to exposure error than accumulation mode particles. In conclusion, the evidence from the studies evaluated **is suggestive of a causal relationship between short-term exposures to UFPs and cardiovascular effects.**

Respiratory Effects

A limited number of epidemiologic studies have examined the potential association between short-term exposure to UFPs and respiratory morbidity. Of the studies evaluated, there is limited, and inconsistent evidence for an association between short-term exposure to UFPs and respiratory symptoms, as well as asthma hospital admissions in locations a median particle number concentration of ~6,200 to a mean of 38,000 particles/cm^3 (Section 6.3.10). The spatial and temporal variability of UFPs also affects these associations. Toxicological studies have reported respiratory effects including oxidative, inflammatory, and allergic responses using a number of different UFP types (Section 6.3). Although controlled human exposure studies have not extensively examined the effect of UFPs on respiratory outcomes, a few studies have observed small UFP-induced asymptomatic decreases in pulmonary function. Markers of pulmonary inflammation have been observed to increase in healthy adults following controlled exposures to UFPs, particularly in studies using fresh DE. However, it is important to note that for both controlled human exposure and animal toxicological studies of exposures to fresh DE, the relative contributions of gaseous copollutants to the respiratory effects observed remain unresolved. Thus, the current collective evidence **is suggestive of a causal relationship between short-term exposures to UFPs and respiratory effects.**

2.3.6. Integration of UFP Effects

The controlled human exposure studies evaluated have consistently demonstrated effects on vasomotor function and systemic oxidative stress with additional evidence for alterations in HRV parameters in response to exposure to UF CAPs. The toxicological studies provide coherence for the changes in vasomotor function observed in the controlled human exposure studies. Epidemiologic studies are limited because a national network is not in place to measure UFP in the U.S. UFP concentrations are spatially and temporally variable, which would increase uncertainty and make it difficult to detect associations between health effects and UFPs in epidemiologic studies. In addition, data on the composition of UFPs, the spatial and temporal evolution of UFP size distribution and chemical composition, and potential effects of UFP constituents are sparse. More limited evidence is available regarding the effect of UFPs on respiratory effects. Controlled human exposure studies have not extensively examined the effect of UFPs on respiratory measurements, but a few studies have observed small decrements in pulmonary function and increases in pulmonary inflammation. Additional effects including oxidative, inflammatory, and pro- allergic outcomes have been demonstrated in toxicological studies. Epidemiologic studies have found limited and inconsistent evidence for associations between UFPs and respiratory effects. Overall, a limited number of studies have examined the association between exposure to UFPs and morbidity and mortality. Of the studies evaluated, controlled human exposure and toxicological studies provide the most evidence for UFP-induced cardiovascular and respiratory effects; however, many studies focus on exposure to DE. As a result, it is unclear if the effects observed are due to UFP, larger particles (i.e., $PM_{2.5}$), or the gaseous components of DE. Additionally, UF CAPs systems

are limited as the atmospheric UFP composition is modified when concentrated, which adds uncertainty to the health effects observed in controlled human exposure studies (Section 1.5.3).

2.4. Policy Relevant Considerations

2.4.1. Potentially Susceptible Populations

Upon evaluating the association between short- and long-term exposure to PM and various health outcomes, studies also attempted to identify populations that are more susceptible to PM (i.e., populations that have a greater likelihood of experiencing health effects related to exposure to an air pollutant (e.g., PM) due to a variety of factors including, but not limited to: genetic or developmental factors, race, gender, life stage, lifestyle (e.g., smoking status and nutrition) or preexisting disease; as well as, population-level factors that can increase an individual's exposure to an air pollutant (e.g., PM) such as socioeconomic status [SES], which encompasses reduced access to health care, low educational attainment, residential location, and other factors). These studies did so by conducting stratified analyses; by examining effects in individuals with an underlying health condition; or by developing animal models that mimic the pathophysiologic conditions associated with an adverse health effect. In addition, numerous studies that focus on only one potentially susceptible population provide supporting evidence on whether a population is susceptible to PM exposure. These studies identified a multitude of factors that could potentially contribute to whether an individual is susceptible to PM (Table 8-2). Although studies have primarily used exposures to $PM_{2.5}$ or PM_{10}, the available evidence suggests that the identified factors may also enhance susceptibility to $PM_{10-2.5}$.

The examination of susceptible populations to PM exposure allows for the NAAQS to provide an adequate margin of safety for both the general population and for susceptible populations.

During specific periods of life (i.e., childhood and advanced age), individuals may be more susceptible to environmental exposures, which in turn can render them more susceptible to PM-related health effects. An evaluation of age-related health effects suggests that older adults have heightened responses for cardiovascular morbidity with PM exposure. In addition, epidemiologic and toxicological studies provide evidence that indicates children are at an increased risk of PM-related respiratory effects. It should be noted that the health effects observed in children could be initiated by exposures to PM that occurred during key windows of development, such as in utero. Epidemiologic studies that focus on exposures during development have reported inconsistent findings (Section 7.4), but a recent toxicological study suggests that inflammatory responses in pregnant women due to exposure to PM could result in health effects in the developing fetus.

Epidemiologic studies have also examined whether additional factors, such as gender, race, or ethnicity modify the association between PM and morbidity and mortality outcomes. Although gender and race do not seem to modify PM risk estimates, limited evidence from two studies conducted in California suggest that Hispanic ethnicity may modify the association between PM and mortality.

Recent epidemiologic and toxicological studies provided evidence that individuals with null alleles or polymorphisms in genes that mediate the antioxidant response to oxidative stress (i.e., GSTM1), regulate enzyme activity (i.e., MTHFR and cSHMT), or regulate levels of procoagulants (i.e., fibrinogen) are more susceptible to PM exposure. However, some studies have shown that polymorphisms in genes (e.g., HFE) can have a protective effect against effects of PM exposure. Additionally, preliminary evidence suggests that PM exposure can impart epigenetic effects (i.e., DNA methylation); however, this requires further investigation.

Collectively, the evidence from epidemiologic and toxicological, and to a lesser extent, controlled human exposure studies, indicate increased susceptibility of individuals with underlying CVDs and respiratory illnesses (i.e., asthma) to PM exposure. Controlled human exposure and toxicological studies provide additional evidence for increased PM-related cardiovascular effects in individuals with underlying respiratory health conditions.

Recently studies have begun to examine the influence of preexisting chronic inflammatory conditions, such as diabetes and obesity, on PM-related health effects. These studies have found some evidence for increased associations for cardiovascular outcomes along with pathophysiologic alterations in markers of inflammation, oxidative stress, and acute phase response. However, more

research is needed to thoroughly examine the affect of PM exposure on obese individuals and to identify the biological pathway(s) that could increase the susceptibility of diabetic and obese individuals to PM. There is also evidence that SES, measured using surrogates such as educational attainment or residential location, modifies the association between PM and morbidity and mortality outcomes. In addition, nutritional status, another surrogate measure of SES, has been shown to have protective effects against PM exposure in individuals that have a higher intake of some vitamins and nutrients. Overall, the epidemiologic, controlled human exposure, and toxicological studies evaluated in this review provide evidence for increased susceptibility for various populations, including children and older adults, people with pre-existing cardiopulmonary diseases, and people with lower SES.

2.4.2. Lag Structure of PM-Morbidity and PM-Mortality Associations

Epidemiologic studies have evaluated the time-frame in which exposure to PM can impart a health effect. PM exposure-response relationships can potentially be influenced by a multitude of factors, such as the underlying susceptibility of an individual (e.g., age, pre-existing diseases), which could increase or decrease the lag times observed.

An attempt has been made to identify whether certain lag periods are more strongly associated with specific health outcomes. The epidemiologic evidence evaluated in the 2004 PM AQCD supported the use of lags of 0-1 days for cardiovascular effects and longer moving averages or distributed lags for respiratory diseases (U.S. EPA, 2004, 056905). However, currently, little consensus exists as to the most appropriate a priori lag times to use when examining morbidity and mortality **outcomes. As a result, many investigators have chosen to examine the lag structure of associations between PM concentration and health outcome instead of focusing on a priori lag times. This approach is informative because if effects are cumulative, higher overall risks may exist than would be observed for any given single-day lag.**

2.4.2.1. PM-Cardiovascular Morbidity Associations

Most of the studies evaluated that examined the association between cardiovascular hospital admissions and ED visits report associations with short-term PM exposure at lags 0- to 2-days, with more limited evidence for shorter durations (i.e., hours) between exposure and response for some health effects (e.g., onset of MI) (Section 6.2.10). However, these studies have rarely examined alternative lag structures. Controlled human exposure and toxicological studies provide biological plausibility for the health effects observed in the epidemiologic studies at immediate or concurrent day lags. Although the majority of the evidence supports shorter lag times for cardiovascular health effects, a recent study has provided preliminary evidence suggesting that longer lag times (i.e., 14- day distributed lag model) may be plausible for non-ischemic cardiovascular conditions (Section 6.2.10). Panel studies of short-term exposure to PM and cardiovascular endpoints have also examined the time frame from exposure to health effect using a wide range of lag times. Studies of ECG changes indicating ischemia show effects at lags from several hours to 2 days, while lag times ranging from hours to several week moving averages have been observed in studies of arrhythmias, vasomotor function and blood markers of inflammation, coagulation and oxidative stress (Section 6.2). The longer lags observed in these panel studies may be explained if the effects of PM are cumulative. Although few studies of cumulative effects have been conducted, toxicological studies have demonstrated PM-dependent progression of atherosclerosis. **It should be noted that PM exposure could also lead to an acute event (e.g., infarction or stroke) in individuals with atherosclerosis that may have progressed in response to cumulative PM exposure. Therefore, effects have been observed at a range of lag periods from a few hours to several days with no clear evidence for any lag period having stronger associations then another.**

2.4.2.2. PM-Respiratory Morbidity Associations

Generally, recent studies of respiratory hospital admissions that evaluate multiple lags, have found effect sizes to be larger when using longer moving averages or distributed lag models. For example, when examining hospital admissions for all respiratory diseases among older adults, the strongest associations were observed when using PM concentrations 2 days prior to the hospital

admission (Section 6.3.8). Longer lag periods were also found to be most strongly associated with asthma hospital admissions and ED visits in children (3-5 days) with some evidence for more immediate effects in older adults (lags of 0 and 1 day), but these observations were not consistent across studies (Section 6.3.8). These variable results could be due to the biological complexity of asthma, which inhibits the identification of a specific lag period. The longer lag times identified in the epidemiologic studies evaluated are biologically plausible considering that PM effects on allergic sensitization and lung immune defenses have been observed in controlled human exposure and toxicological studies. These effects could lead to respiratory illnesses over a longer time course (e.g., within several days respiratory infection may become evident, resulting in respiratory symptoms or a hospital admission). However, inflammatory responses, which contribute to some forms of asthma, may result in symptoms requiring medical care within a shorter time frame (e.g., 0-1 days).

2.4.2.3. PM-Mortality Associations

Epidemiologic studies that focused on the association between short-term PM exposure and mortality (i.e., all-cause, cardiovascular, and respiratory) mostly examined a priori lag structures of either 1 or 0-1 days. Although mortality studies do not often examine alternative lag structures, the selection of the aforementioned a priori lag days has been confirmed in additional studies, with the strongest PM-mortality associations consistently being observed at lag 1 and 0-1-days (Section 6.5). However, of note is recent evidence for larger effect estimates when using a distributed lag model.
Epidemiologic studies that examined the association between long-term exposure to PM and mortality have also attempted to identify the latency period from PM exposure to death
(Section 7.6.4). **Results of the lag comparisons from several cohort studies indicate that the effects of changes in exposure on mortality are seen within five years, with the strongest evidence for effects observed within the first two years. Additionally, there is evidence, albeit from one study, that the mortality effect had larger cumulative effects spread over the follow-up year and three preceding years.**

2.4.3. PM Concentration-Response Relationship

An important consideration in characterizing the PM-morbidity and mortality association is whether the concentration-response relationship is linear across the full concentration range that is encountered or if there are concentration ranges where there are departures from linearity
(i.e., nonlinearity). In this ISA studies have been identified that attempt to characterize the shape of the concentration-response curve along with possible PM "thresholds" (i.e., levels which PM concentrations must exceed in order to elicit a health response). The epidemiologic studies evaluated that examined the shape of the concentration-response curve and the potential presence of a threshold have focused on cardiovascular hospital admissions and ED visits and mortality associated with short-term exposure to PM_{10} and mortality associated with long-term exposure to $PM_{2.5}$.

A limited number of studies have been identified that examined the shape of the PM-cardiovascular hospital admission and ED visit concentration-response relationship. Of these studies, some conducted an exploratory analysis during model selection to determine if a linear curve most adequately represented the concentration-response relationship; whereas, only one study conducted an extensive analysis to examine the shape of the concentration-response curve at different concentrations (Section 6.2.10.10). Overall, the limited evidence from the studies evaluated supports the use of a no-threshold, log-linear model, which is consistent with the observations made in studies that examined the PM-mortality relationship.
Although multiple studies have previously examined the PM-mortality concentration-response relationship and whether a threshold exists, more complex statistical analyses continue to be developed to analyze this association. Using a variety of methods and models, most of the studies evaluated support the use of a no-threshold, log-linear model; however, one study did observe heterogeneity in the shape of the concentration-response curve across cities (Section 6.5). Overall, the studies evaluated further support the use of a no-threshold log-linear model, but additional issues such as the influence of heterogeneity in estimates between cities, and the effect of seasonal and regional differences in PM on the concentration-response relationship still require further investigation.

In addition to examining the concentration-response relationship between short-term exposure to PM and mortality, Schwartz et al. (2008, 156963) conducted an analysis of the shape of the concentration-response relationship associated with long-term exposure to PM. Using a variety of statistical methods, the concentration-response curve was found to be indistinguishable from linear, and, therefore, little evidence was observed to suggest that a threshold exists in the association between long-term exposure to $PM_{2.5}$ and the risk of death (Section 7.6).

2.4.4. PM Sources and Constituents Linked to Health Effects

Recent epidemiologic, toxicological, and controlled human exposure studies have evaluated the health effects associated with ambient PM constituents and sources, using a variety of quantitative methods applied to a broad set of PM constituents, rather than selecting a few constituents a priori (Section 6.6). There is some evidence for trends and patterns that link particular ambient PM constituents or sources with specific health outcomes, but there is insufficient evidence to determine whether these patterns are consistent or robust.

For cardiovascular effects, multiple outcomes have been linked to a $PM_{2.5}$ crustal/soil/road dust source, including cardiovascular mortality and ST-segment changes. Additional studies have reported associations between other sources (i.e., traffic and wood smoke/vegetative burning) and cardiovascular outcomes (i.e., mortality and ED visits). Studies that only examined the effects of individual $PM_{2.5}$ constituents found evidence for an association between EC and cardiovascular hospital admissions and cardiovascular mortality. Many studies have also observed associations between other sources (i.e., salt, secondary SO_4^{2-}/long-range transport, other metals) and cardiovascular effects, but at this time, there does not appear to be a consistent trend or pattern of effects for those factors.

There is less consistent evidence for associations between PM sources and respiratory health effects, which may be partially due to the fact that fewer source apportionment studies have been conducted that examined respiratory-related outcomes (e.g., hospital admissions) and measures (e.g., lung function). However, there is some evidence for associations between respiratory ED visits and decrements in lung function with secondary SO_4^{2-} $PM_{2.5}$. In addition, crustal/soil/road dust and traffic sources of PM have been found to be associated with increased respiratory symptoms in asthmatic children and decreased PEF in asthmatic adults. Inconsistent results were observed in those $PM_{2.5}$ studies that used individual constituents to examine associations with respiratory morbidity and mortality, although Cu, Pb, OC, and Zn were related to respiratory health effects in two or more studies.

A few studies have identified $PM_{2.5}$ sources associated with total mortality. These studies found an association between mortality and the $PM_{2.5}$ sources: secondary SO_4^{2-}/long-range transport, traffic, and salt. In addition, studies have evaluated whether the variation in associations between $PM_{2.5}$ and mortality or PM_{10} and mortality reflects differences in $PM_{2.5}$ constituents. PM_{10}-mortality effect estimates were greater in areas with a higher proportion of Ni in $PM_{2.5}$, but the overall PM_{10}-mortality association was diminished when New York City was excluded in sensitivity analyses in two of the studies. V was also found to modify PM_{10}-mortality effect estimates. When examining the effect of species-to-$PM_{2.5}$ mass proportion on $PM_{2.5}$-mortality effect estimates, Ni, but not V, was also found to modify the association.

Overall, the results indicate that many constituents of PM can be linked with differing health effects and the evidence is not yet sufficient to allow differentiation of those constituents or sources that are more closely related to specific health outcomes. These findings are consistent with the conclusions of the 2004 PM AQCD (U.S. EPA, 2004, 056905) (i.e., that a number of source types, including motor vehicle emissions, coal combustion, oil burning, and vegetative burning, are associated with health effects). Although the crustal factor of fine particles was not associated with mortality in the 2004 PM AQCD (U.S. EPA, 2004, 056905), recent studies have suggested that PM (both $PM_{2.5}$ and $PM_{10-2.5}$) from crustal, soil or road dust sources or PM tracers linked to these sources are associated with cardiovascular effects. In addition, $PM_{2.5}$ secondary SO_4^{2-} has been associated with both cardiovascular and respiratory effects.

2.5. Welfare Effects

This section presents key conclusions and scientific judgments regarding causality for welfare effects of PM as discussed in Chapter 9. The effects of particulate NO_X and SO_X have recently been evaluated in the ISA for Oxides of Nitrogen and Sulfur – Ecological Criteria (U.S. EPA, 2008, 157074). That ISA focused on the effects from deposition of gas- and particle-phase pollutants related to ambient NO_X and SO_X concentrations that can lead to acidification and nutrient enrichment. Thus, emphasis in Chapter 9 is placed on the effects of airborne PM, including NO_X and SO_X, on visibility and climate, and on the effects of deposition of PM constituents other than NO_X and SO_X, primarily metals and carbonaceous compounds. EPA's framework for causality, described in Chapter 1, was applied and the causal determinations are highlighted.

Table 2-5. Summary of causality determination for welfare effects.

Welfare Effects	Causality Determination
Effects on Visibility	Causal
Effects on Climate	Causal
Ecological Effects	Likely to be causal
Effects on Materials	Causal

2.5.1. Summary of Effects on Visibility

Visibility impairment is caused by light scattering and absorption by suspended particles and gases. There is strong and consistent evidence that PM is the overwhelming source of visibility impairment in both urban and remote areas. EC and some crustal minerals are the only commonly occurring airborne particle components that absorb light. All particles scatter light, and generally light scattering by particles is the largest of the four light extinction components (i.e., absorption and scattering by gases and particles). Although a larger particle scatters more light than a similarly shaped smaller particle of the same composition, the light scattered per unit of mass is greatest for particles with diameters from ~0.3-1.0 μm. For studies where detailed data on particle composition by size are available, accurate calculations of light extinction can be made. However, routinely available PM speciation data can be used to make reasonable estimates of light extinction using relatively simple algorithms that multiply the concentrations of each of the major PM species by its dry extinction efficiency and by a water growth term that accounts for particle size change as a function of relative humidity for hygroscopic species (e.g., sulfate, nitrate, and sea salt). This permits the visibility impairment associated with each of the major PM components to be separately approximated from PM speciation monitoring data.

Direct optical measurement of light extinction measured by transmissometer, or by combining the PM light scattering measured by integrating nephelometers with the PM light absorption measured by an aethalometer, offer a number of advantages compared to algorithm estimates of light extinction based on PM composition and relative humidity data. The direct measurements are not subject to the uncertainties associated with assumed scattering and absorption efficiencies used in the PM algorithm approach. The direct measurements have higher time resolution (i.e., minutes to hours), which is more commensurate with visibility effects compared with calculated light extinction using routinely available PM speciation data (i.e., 24-h duration).

Particulate sulfate and nitrate have comparable light extinction efficiencies (haze impacts per unit mass concentration) at any relative humidity value. Their light scattering per unit mass concentration increases with increasing relative humidity, and at sufficiently high humidity values (RH>85%) they are the most efficient particulate species contributing to haze. Particulate sulfate is

the dominant source of regional haze in the eastern U.S. (>50% of the particulate light extinction) and an important contributor to haze elsewhere in the country (>20% of particulate light extinction). Particulate nitrate is a minor component of remote-area regional haze in the non-California western and eastern U.S., but an important contributor in much of California and in the upper Midwestern U.S., especially during winter when it is the dominant contributor to particulate light extinction.

EC and OC have the highest dry extinction efficiencies of the major PM species and are responsible for a large fraction of the haze, especially in the northwestern U.S., though absolute concentrations are as high in the eastern U.S. Smoke plume impacts from large wildfires dominate many of the worst haze periods in the western U.S. Carbonaceous PM is generally the largest component of urban excess $PM_{2.5}$ (i.e., the difference between urban and regional background concentration). Western urban areas have more than twice the average concentrations of carbonaceous PM than remote areas sites in the same region. In eastern urban areas $PM_{2.5}$ is dominated by about equal concentrations of carbonaceous and sulfate components, though the usually high relative humidity in the East causes the hydrated sulfate particles to be responsible for about twice as much of the urban haze as that caused by the carbonaceous PM.

$PM_{2.5}$ crustal material (referred to as fine soil) and $PM_{10-2.5}$ are significant contributors to haze for remote areas sites in the arid southwestern U.S. where they contribute a quarter to a third of the haze, with $PM_{10-2.5}$ usually contributing twice that of fine soil. Coarse mass concentrations are as high in the Central Great Plains as in the deserts though there are no corresponding high concentrations of fine soil as in the Southwest. Also the relative contribution to haze by the high coarse mass in the Great Plains is much smaller because of the generally higher haze values caused by the high concentrations of sulfate and nitrate PM in that region.

Visibility has direct significance to people's enjoyment of daily activities and their overall sense of wellbeing. For example, psychological research has demonstrated that people are emotionally affected by poor VAQ such that their overall sense of wellbeing is diminished. Urban visibility has been examined in two types of studies directly relevant to the NAAQS review process: urban visibility preference studies and urban visibility valuation studies. Both types of studies are designed to evaluate individuals' desire for good VAQ where they live, using different metrics. Urban visibility preference studies examine individuals' preferences by investigating the amount of visibility degradation considered unacceptable, while economic studies examine the value an individual places on improving VAQ by eliciting how much the individual would be willing to pay for different amounts of VAQ improvement.

There are three urban visibility preference studies and two additional pilot studies that have been conducted to date that provide useful information on individuals' preferences for good VAQ in the urban setting. The completed studies were conducted in Denver, Colorado, two cities in British Columbia, Canada, and Phoenix, AZ. The additional studies were conducted in Washington, DC. The range of median preference values for an acceptable amount of visibility degradation from the 4
urban areas was approximately 19-33 dv. Measured in terms of visual range (VR), these median acceptable values were between approximately 59 and 20 km.

The economic importance of urban visibility has been examined by a number of studies designed to quantify the benefits (or willingness to pay) associated with potential improvements in
urban visibility. Urban visibility valuation research was described in the 2004 PM AQCD (U.S. EPA, 2004, 056905) and the 2005 PM Staff Paper (U.S. EPA, 2005, 090209). Since the mid-1990s, little new information has become available regarding urban visibility valuation (Section 9.2.4).

Collectively, the evidence is sufficient to conclude that **a causal relationship exists between PM and visibility impairment.**

2.5.2. Summary of Effects on Climate

Aerosols affect climate through direct and indirect effects. The direct effect is primarily realized as planet brightening when seen from space because most aerosols scatter most of the visible spectrum light that reaches them. The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) (IPCC, 2007, 092765), hereafter IPCC AR4, reported that the radiative forcing from this direct effect was -0.5 (±0.4) W/m^2 and identified the level of scientific understanding of this effect as 'Medium-low'. The global mean direct radiative forcing effect from
individual components of aerosols was estimated for the first time in the IPCC AR4 where they were reported to be (all in W/m^2 units): -0.4 (±0.2) for sulfate, -0.05 (±0.05) for fossil fuel-derived organic

carbon, +0.2 (±0.15) for fossil fuel-derived black carbon (BC), +0.03 (±0.12) for biomass burning, -0.1 (±0.1) for nitrates, and -0.1 (±0.2) for mineral dust. Global loadings of anthropogenic dust and nitrates remain very troublesome to estimate, making the radiative forcing estimates for these constituents particularly uncertain.

Numerical modeling of aerosol effects on climate has sustained remarkable progress since the time of the 2004 PM AQCD (U.S. EPA, 2004, 056905), PM AQCD, though model solutions still display large heterogeneity in their estimates of the direct radiative forcing effect from anthropogenic aerosols. The clear-sky direct radiative forcing over ocean due to anthropogenic aerosols is estimated from satellite instruments to be on the order of -1.1 (±0.37) W/m^2 while model estimates are -0.6 W/m^2. The models' low bias over ocean is carried through for the global average: global average direct radiative forcing from anthropogenic aerosols is estimated from measurements to range from -0.9 to -1.9 W/m^2, larger than the estimate of -0.8 W/m^2 from the models.

Aerosol indirect effects on climate are primarily realized as an increase in cloud brightness (termed the 'first indirect' or Twomey effect), changes in precipitation, and possible changes in cloud lifetime. The IPCC AR4 reported that the radiative forcing from the Twomey effect was -0.7 (range: -1.1 to +4) and identified the level of scientific understanding of this effect as “Low” in part owing to the very large unknowns concerning aerosol size distributions and important interactions with clouds. Other indirect effects from aerosols are not considered to be radiative forcing.

Taken together, direct and indirect effects from aerosols increase Earth's shortwave albedo or reflectance thereby reducing the radiative flux reaching the surface from the Sun. This produces net climate cooling from aerosols. The current scientific consensus reported by IPCC AR4 is that the direct and indirect radiative forcing from anthropogenic aerosols computed at the top of the atmosphere, on a global average, is about -1.3 (range: -2.2 to -0.5) W/m^2. While the overall global average effect of aerosols at the top of the atmosphere and at the surface is negative, absorption and scattering by aerosols within the atmospheric column warms the atmosphere between the Earth's surface and top of the atmosphere. In part, this is owing to differences in the distribution of aerosol type and size within the vertical atmospheric column since aerosol type and size distributions strongly affect the aerosol scattering and reradiation efficiencies at different altitudes and atmospheric temperatures. And, although the magnitude of the overall negative radiative forcing at the top of the atmosphere appears large in comparison to the analogous IPCC AR4 estimate of positive radiative forcing from anthropogenic GHG of about +2.9 (± 0.3) W/m^2, the horizontal, vertical, and temporal distributions and the physical lifetimes of these two very different radiative forcing agents are not similar; therefore, the effects do not simply off-set one another.

Overall, the evidence is sufficient to conclude that a causal relationship exists between PM and effects on climate, including both direct effects on radiative forcing and indirect effects that involve cloud feedbacks that influence precipitation formation and cloud lifetimes.

2.5.3. Summary of Ecological Effects of PM

Ecological effects of PM include direct effects to metabolic processes of plant foliage; contribution to total metal loading resulting in alteration of soil biogeochemistry and microbiology, plant growth and animal growth and reproduction; and contribution to total organics loading resulting in bioaccumulation and biomagnification across trophic levels. These effects were well- characterized in the 2004 PM AQCD (U.S. EPA, 2004, 056905). Thus, the summary below builds upon the conclusions provided in that review.

PM deposition comprises a heterogeneous mixture of particles differing in origin, size, and chemical composition. Exposure to a given concentration of PM may, depending on the mix of deposited particles, lead to a variety of phytotoxic responses and ecosystem effects. Moreover, many of the ecological effects of PM are due to the chemical constituents (e.g., metals, organics, and ions) and their contribution to total loading within an ecosystem.

Investigations of the direct effects of PM deposition on foliage have suggested little or no effects on foliar processes, unless deposition levels were higher than is typically found in the ambient environment. However, consistent and coherent evidence of direct effects of PM has been found in heavily polluted areas adjacent to industrial point sources such as limestone quarries, cement kilns, and metal smelters (Sections 9.4.3 and 9.4.5.7). Where toxic responses have been

documented, they generally have been associated with the acidity, trace metal content, surfactant properties, or salinity of the deposited materials.

An important characteristic of fine particles is their ability to affect the flux of solar radiation passing through the atmosphere, which can be considered in both its direct and diffuse components. Foliar interception by canopy elements occurs for both up- and down-welling radiation. Therefore, the effect of atmospheric PM on atmospheric turbidity influences canopy processes both by radiation attenuation and by changing the efficiency of radiation interception in the canopy through conversion of direct to diffuse radiation. Crop yields can be sensitive to the amount of radiation received, and crop losses have been attributed to increased regional haze in some areas of the world such as China (Section 9.4.4). On the other hand, diffuse radiation is more uniformly distributed throughout the canopy and may increase canopy photosynthetic productivity by distributing radiation to lower leaves. The enrichment in photosynthetically active radiation (PAR) present in diffuse radiation may offset a portion of the effect of an increased atmospheric albedo due to atmospheric particles. Further research is needed to determine the effects of PM alteration of radiative flux on the growth of vegetation in the U.S.

The deposition of PM onto vegetation and soil, depending on its chemical composition, can produce responses within an ecosystem. The ecosystem response to pollutant deposition is a direct function of the level of sensitivity of the ecosystem and its ability to ameliorate resulting change. Many of the most important ecosystem effects of PM deposition occur in the soil. Upon entering the soil environment, PM pollutants can alter ecological processes of energy flow and nutrient cycling, inhibit nutrient uptake, change ecosystem structure, and affect ecosystem biodiversity. The soil environment is one of the most dynamic sites of biological interaction in nature. It is inhabited by microbial communities of bacteria, fungi, and actinomycetes, in addition to plant roots and soil macro-fauna. These organisms are essential participants in the nutrient cycles that make elements available for plant uptake. Changes in the soil environment can be important in determining plant and ultimately ecosystem response to PM inputs.

There is strong and consistent evidence from field and laboratory experiments that metal components of PM alter numerous aspects of ecosystem structure and function. Changes in the soil chemistry, microbial communities and nutrient cycling, can result from the deposition of trace metals. Exposures to trace metals are highly variable, depending on whether deposition is by wet or dry processes. Although metals can cause phytotoxicity at high concentrations, few heavy metals (e.g., Cu, Ni, Zn) have been documented to cause direct phytotoxicity under field conditions. Exposure to coarse particles and elements such as Fe and Mg are more likely to occur via dry deposition, while fine particles, which are more often deposited by wet deposition, are more likely to contain elements such as Ca, Cr, Pb, Ni, and V. Ecosystems immediately downwind of major emissions sources can receive locally heavy deposition inputs. Phytochelatins produced by plants as a response to sublethal concentrations of heavy metals are indicators of metal stress to plants. Increased concentrations of phytochelatins across regions and at greater elevation have been associated with increased amounts of forest injury in the northeastern U.S.

Overall, the ecological evidence is sufficient to conclude that **a causal relationship is likely to exist between deposition of PM and a variety of effects on individual organisms and ecosystems, based on information from the previous review and limited new findings in this review.** However, in many cases, it is difficult to characterize the nature and magnitude of effects and to quantify relationships between ambient concentrations of PM and ecosystem response due to significant data gaps and uncertainties as well as considerable variability that exists in the components of PM and their various ecological effects.

2.5.4. Summary of Effects on Materials

Building materials (metals, stones, cements, and paints) undergo natural weathering processes from exposure to environmental elements (wind, moisture, temperature fluctuations, sunlight, etc.). Metals form a protective film of oxidized metal (e.g., rust) that slows environmentally induced corrosion. However, the natural process of metal corrosion is enhanced by exposure to anthropogenic pollutants. For example, formation of hygroscopic salts increases the duration of surface wetness and enhances corrosion.

A significant detrimental effect of particle pollution is the soiling of painted surfaces and other building materials. Soiling changes the reflectance of opaque materials and reduces the transmission

of light through transparent materials. Soiling is a degradation process that requires remediation by cleaning or washing, and, depending on the soiled surface, repainting. Particulate deposition can result in increased cleaning frequency of the exposed surface and may reduce the usefulness of the soiled material. Attempts have been made to quantify the pollutant exposure levels at which materials damage and soiling have been perceived. However, to date, insufficient data are available to advance the knowledge regarding perception thresholds with respect to pollutant concentration, particle size, and chemical composition. Nevertheless, the evidence is sufficient to conclude that **a causal relationship exists between PM and effects on materials.**

2.6. Summary of Health Effects and Welfare Effects Causal Determinations

This chapter has provided an overview of the underlying evidence used in making the causal determinations for the health and welfare effects and PM size fractions evaluated. This review builds upon the main conclusions of the last PM AQCD (U.S. EPA, 2004, 056905):

- "A growing body of evidence both from epidemiological and toxicological studies… supports the general conclusion that $PM_{2.5}$ (or one or more $PM_{2.5}$ components), acting alone and/or in combination with gaseous copollutants, are likely causally related to cardiovascular and respiratory mortality and morbidity." (pg 9-79)

- "A much more limited body of evidence is suggestive of associations between short-term (but not long-term) exposures to ambient coarse-fraction thoracic particles… and various mortality and morbidity effects observed at times in some locations. This suggests that $PM_{10-2.5}$, or some constituent component(s) of $PM_{10-2.5}$, may contribute under some circumstances to increased human health risks… with somewhat stronger evidence for… associations with morbidity (especially respiratory) endpoints than for mortality." (pg 9-79 and 9-80)

- "Impairment of visibility in rural and urban areas is directly related to ambient concentrations of fine particles, as modulated by particle composition, size, and hygroscopic characteristics, and by relative humidity." (pg 9-99)

- "Available evidence, ranging from satellite to in situ measurements of aerosol effects on incoming solar radiation and cloud properties, is strongly indicative of an important role in climate for aerosols, but this role is still poorly quantified." (pg 9-111)

The evaluation of the epidemiologic, toxicological, and controlled human exposure studies published since the completion of the 2004 PM AQCD have provided additional evidence for PM-related health effects. Table 2-6 provides an overview of the causal determinations for all PM size fractions and health effects. Causal determinations for PM and welfare effects, including visibility, climate, ecological effects, and materials are included in Table 2-7. Detailed discussions of the scientific evidence and rationale for these causal determinations are provided in the subsequent chapters of this ISA.

Table 2-6. Summary of PM causal determinations by exposure duration and health outcome.

Size Fraction	Exposure	Outcome	Causality Determination
$PM_{2.5}$	Short-term	Cardiovascular Effects	Causal
		Respiratory Effects	Likely to be causal
		Central Nervous System	Inadequate
		Mortality	Causal
	Long-term	Cardiovascular Effects	Causal
		Respiratory Effects	Likely to be Causal
		Mortality	Causal
		Reproductive and Developmental	Suggestive
	Cancer, Mutagenicity, Genotoxicity		Suggestive
$PM_{10-2.5}$	Short-term	Cardiovascular Effects	Suggestive
		Respiratory Effects	Suggestive
		Central Nervous System	Inadequate
		Mortality	Suggestive
	Long-term	Cardiovascular Effects	Inadequate
		Respiratory Effects	Inadequate
		Mortality	Inadequate
	Reproductive and Developmental		Inadequate
	Cancer, Mutagenicity, Genotoxicity		Inadequate
UFPs	Short-term	Cardiovascular Effects	Suggestive
		Respiratory Effects	Suggestive
		Central Nervous System	Inadequate
		Mortality	Inadequate
	Long-term	Cardiovascular Effects	Inadequate
		Respiratory Effects	Inadequate
		Mortality	Inadequate
		Reproductive and Developmental	Inadequate
	Cancer, Mutagenicity, Genotoxicity		Inadequate

Table 2-7. Summary of PM causal determinations for welfare effects

Welfare Effects	Causality Determination
Effects on Visibility	Causal
Effects on Climate	Causal
Ecological Effects	Likely to be causal
Effects on Materials	Causal

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June 8, 2011

Research Screening Committee Members

California Air Resources Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812

RE: Draft report for the contract No. 06-332 "Spatiotemporal Analysis of Air Pollution and Mortality in California Based on the American Cancer Society Cohort"

Ladies and Gentlemen of the Screening Committee,

Your have a choice in your consideration of this study by Dr. Michael Jerrett and many Co-Authors on whether you will properly execute your duties to assure good science informs good policy making, or you can be complicit in a scientific fraud of great magnitude. This study and report, particularly its conclusions, are a scientific fraud that not only ignores the rules of epidemiology and good human health effects science, but are complicit in fraudulent activity that uses public moneys, by faculty members of the University of California and others who put their names to the study.

I have reviewed the "Jarrett" study, paid for by 750,000 taxpayer dollars, which is an important consideration expanded on herein below. The Jarrett 3 year effort is based on assumptions that are derivative of previous studies, but in the main it is a modeling exercise intended to dredge for proof that there are small particle air pollution deaths that justify a California Air Resources Board small particle regulatory regime. Nothing in this expensive desk top computer modeling study is adequate to the task. After all is said and done, now looking at the Jarrett study, it shows no evidence that current ambient small particles in the air of California air are killing anyone.

Here is where the fraud begins, members of the Screening Committee.

The models failed to provide the proof that Dr. Enstrom was wrong in 2005 when he said there is no small particle death effect in California. The elaborate Jarrett study confirms what Jarrett admitted in February of 2010, that he could find no human health effect from California small particle air pollution. The study presented to the committee fails to disprove or contradict the assertion of Dr. Enstrom in 2005 or the admission of Dr. Jarrett in 2010 that CARB claims of deaths from small particles were not evident in his research. Dr. Jarrett in 2010 was admitting that, even as the chosen researcher for CARB, he could not find evidence to show

death effects from small particles in the air.

The only model in the elaborate and thick Jarrett study before you that provides even a glimmer, A GLIMMER, for the CARB agenda of small particle regulations failed when the minor relative risk of 1.08 was combined with a confidence interval that included 1.0. ATTENTION, LADIES AND GENTLEMEN OF THE SCREENING COMMITTEE—THAT MEANS THAT THE JARRETT STUDY SHOWS NO SMALL PARTICLE EFFECTS. PERIOD. NONE, IN ANY OF THE MODELS OR ALTERNATIVE SCENARIOS.

However, because this is such a scandal, and because criticizing Dr. Jarrett's study is so easy, I would like to list a few points for your consideration: ,

1. The Jarrett study, if intended to show small particles kill, came a cropper (that means it failed, folks), since it fails in every effort to find significant evidence that small particles kill Californians. In fact it shows what we all knew, that Californians are not dying from small particles. All of the studies showed effects with a confidence interval that crossed or included 1.0. As Bugs Bunny would say—that's all folks! You have nothing to hang your hat on and approval of this study will show your lack of good faith.
2. All 9 modeling exercises, intended to dredge for proof to support CARB had no effects that escaped the confidence interval that made them mean nothing—NOTHING. The studies showed the confidence intervals meeting or crossing 1.0, confirming that there is of NO EFFECT of small particles on premature death in California from small particles of 2.5 microns or less.
3. When the 9 studies offered by the Jarrett study show no effect, any CARB decision to pursue the Small Particle regulations would not only violate a committee public duty to pursue policies that are based on sound science, I WOULD ARGUE THAT SUCH A DECISION BY CARB WOULD INDICATE COMPLICITY BY THE COMMITTEE AND BY CARB LEADERSHIP IN A FRAUD, A FRAUDULENT STUDY PAID FOR BY THE BELEAGURED TAXPAYERS OF CALIFORNIA WHO COULD HAVE BEEN SPARED THE THREE QUARTERS OF A MILLION DOLLARS WASTED ON THE STUDY.
4. I would remind the review committee that complicity in a fraud exposes individuals, either in their official or their individual capacities as parties to misuse of taxpayer funds.

I will not belabor the members of the committee with the epidemiological rules and the toxicology rules that are applicable to studies such as the Jarrett study. Suffice it to say that Federal Judicial Rules of Evidence specify that scientific evidence such as that contained in the Jarrett study should be reliable and relevant for the case in hand—the question of whether CARB has the science to justify its policy decisions.

<u>The misrepresentation and fraud of the Jarrett group and the Jarrett study is most evident in the conclusions.</u> The authors state "We conclude that combustion-source air pollution, especially from traffic, is significantly associated with premature death in this large cohort of Californians." A reasonable citizen reviewer of the study, knowledgeable in the science of epidemiology would ask--how could the authors use words like "conclude" or "significantly associated" when they have nothing in the study to support an assertion?

Have the authors sold their scientific integrity for $750,000? Are they implicated in a fraud on the citizens of California, claiming their "show nothing" study is adequate to support a new ambitious and onerous CARB regulatory regime focused on small particles?

There is retribution in the law for fraud on the taxpayers. Laws were enacted to prevent dishonest and

fraudulent use of public moneys. Committees that fail to recognize their responsibility as fiduciaries for the taxpayers could also be considered complicit in the fraud if they have been properly warned.

This letter is proper warning to the members of the review committee.

Consider your options when I am telling you, as an experienced and knowledgeable man of science and the law. You and the CARB and the scientists involved in this disgraceful study may have to answer questions on whether the study was properly conducted, but more importantly, were the conclusions proper, given the evidence or, were those conclusions bought and paid for?

Respectfully,

John Dale Dunn MD JD

GORDON J. FULKS, PHD
PORTLAND, OREGON USA

August 15, 2016

South Coast Air Quality Management District
Attn: Health Effects Officer Jo Kay Chan Ghosh, PhD
Air Quality Specialist Anthony Oliver, PhD
21865 Copley Drive
Diamond Bar, CA 91765

Ladies and Gentlemen,

We all want to live in a clean environment, and I applaud your efforts to improve air quality in Southern California. As someone who lived in the severe air pollution in Chicago in the 1950s through the 1970s and then experienced the different but still severe air pollution in Southern California in later decades, I appreciate clean air.

But at some point we reach diminishing returns for dollars expended. That point is clearly reached when there are no further health benefits to be realized from trying to control the last tiny amount of man-made pollution that becomes lost in natural background levels or in artificial background levels floating over from China.

6-1

Of course, 'Linear No-Threshold' (LNT) arguments insist that there is no threshold below which poisons become unimportant. Hence, it is possible to extrapolate fatalities at high doses to far less but still finite fatalities at low doses. **This is nonsense**, as was shown, for instance, in studies of those clearly exposed to radiation from the nuclear weapons that devastated Hiroshima and Nagasaki. There was a radiation exposure below which the population suffered no increased risk of premature death. **The LNT arguments are bad science.**

Yet we still see far too many attempts to apply LNT arguments based on statistical techniques trying to correlate mortality records with vague low level exposures. This is bad science on top of bad science. **Entirely random data sets will still show clusters of false positives, because random data is never completely smooth.** Every gambler in Las Vegas playing a game of pure chance will have good and bad nights.

And then there is the problem of confusing correlation with causation. Even if researchers are able to spot legitimate correlations, they MUST go further to establish whether A causes B or B causes A or C causes both of them. Failing to do this is bad science on top of bad science on top of bad science.

Five years ago, I pointed out that the PM 2.5 studies of small particulate air pollution performed by Michael Jerrett et al. (2011), for the California Air Resources Board did NOT meet elementary scientific standards and should be rejected. Please see my attached 10/26/2011 letter. Yet Jerrett et al. is still alive in a revised 2013 version that ignored our criticism and even ignored their own previous findings of no effect in eight of nine statistical models. Such bad behavior has no place in science.

To be fair to Jerrett et al., I do not place all the blame on them, because they were just doing what CARB and SCAQMD paid them to do, and that was not science. Both agencies wanted to regulate diesel engines. **That is a poor reason to support heavily flawed scientific studies. It gives both the regulators and the scientists a bad name.** While peer-review is the weakest of the validation criteria for scientific theories, it is far better than just ignoring scientific criticism and compounding the bad science with bad regulations.

I hope you will do what CARB failed to do: pay attention to criticism from those of us qualified to critique the studies you propose to rely upon. Failing to do so will come back to haunt you. The Devil always comes to collect on Faustian Bargains.

Since my critical comments about Jerrett et al five years ago, others have pointed out that we face an epidemic of poor science that has overwhelmed the field of Epidemiology. Too many researchers try to make a name for themselves by pointing out the false positives to be found in completely random data. And while they can get past peer-review when it is merely 'pal-review', they fail replication tests run by truly independent researchers. Such bad behavior from those who should know better costs our society dearly. **Regulators MUST ask the hard questions to weed out the bad science** that does not meet basic requirements for honesty, let alone the "Utter Honesty" expected of scientists.*

It is long past time for California air pollution agencies to reject the defective work of Jerrett at al and stop imposing even more draconian regulations on the citizens of California. If Southern Californians really have $38 billion dollars to spend on environmental improvements, surely you can find more productive ways to improve the environment in Southern California.

Gordon J. Fulks, PhD
Portland, Oregon USA

P.S. I am an astrophysicist, originally from the University of Chicago Laboratory for Astrophysics and Space Research. I have a Bachelors, Masters, and PhD, all in Physics and all from the University of Chicago. As with many physicists, I have a strong interest in the integrity of science. I also have no conflicts of interest in this matter. No one is paying me to critique your work. We realize that science is much more than a good story. It is a story that must survive verification tests. If it does not, it must be scrapped! There are no exceptions for stories that please regulatory agencies.

* "Utter Honesty" is a term coined by the great Southern California Physicist, Nobel Laureate, and Professor at Cal-Tech Richard Feynman. He used it to explain to students of science what would be expected of them in their careers. Too many missed that lecture.

From: James E. Enstrom <jenstrom@ucla.edu>
Sent: Monday, August 15, 2016 11:55 PM
To: Jo Kay Ghosh
Cc: Elaine Shen; Shah Dabirian; Anthony Oliver; Philip Fine; Wayne Nastri; 'Henry A. Roman'; 'George D. Thurston'; 'Kevin R. Cromar'; AQMP Inquiries
Subject: Enstrom Comments re SCAQMD 2016 AQMP Health Effects
Attachments: Enstrom Comments re SCAQMD 2016 AQMP Health Effects 081516.pdf

August 15, 2016

Jo Kay Chan Ghosh, Ph.D.
Health Effects Officer
South Coast Air Quality Management District
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Dear Dr. Ghosh,

Attached are my public comments regarding the SCAQMD Draft 2016 AQMP Appendix I Health Effects. I plan to speak about these comments at the August 18, 2016 SCAQMD AQMP Advisory Council meeting in Diamond Bar. Please acknowledge receipt of these comments.

Thank you very much.

Sincerely yours,

James E. Enstrom, Ph.D., M.P.H.
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August 15, 2016

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jghosh@aqmd.gov

Dear Dr. Ghosh,

I am writing to express serious concern that my July 26, 2016 public comments below regarding the health effects/impacts of particulate matter in the South Coast Air Basin (SCAB) are not being addressed. In particular, the August 16, 2016 PPT by Dr. Elaine Shen Update on the Preliminary Draft Socioeconomic Report claims that there will be 2,111 premature deaths due to PM2.5 in 2023. This is the same number of deaths shown in the attached July 28, 2016 PPT slide by Dr. Anthony Oliver Preliminary Public Health Benefits of the Draft 2016 AQMP . This scientifically invalid claim does not provide valid public health justification for a 2016 AQMP that will impose an estimated $38.2 billion in compliance costs on the SCAB economy. 7-1

Since 2006 I have repeatedly presented to CARB and SCAQMD strong epidemiologic evidence that there is no relationship between PM2.5 and total mortality in California. The latest version of this evidence is the attached table with 16 null results and 1 essentially null result from six different California cohorts (http://scientificintegrityinstitute.org/NoPMDeaths081516.pdf). Seven of the null results come from studies that were partially funded by SCAQMD. In addition, a very strong case has recently been made by nine accomplished experts, including myself, that "Particulate Matter Does Not *Cause* Premature Deaths" (https://www.nas.org/articles/nas_letter). Furthermore, I have now submitted for publication a manuscript with null findings that invalidate the positive nationwide relationship between PM2.5 and total mortality published in the seminal Pope 1995 paper, which is based on the American Cancer Society Cancer Prevention Study II (CPS II) cohort. My null CPS II cohort findings raise serious doubts about validity of the positive CPS II cohort findings in Jerrett 2005, Jerrett 2009, and Jerrett 2013, which have been used as the basis for the PM2.5 premature death claims in the PPTs of Drs. Oliver and Shen. 7-2

All epidemiologic evidence relevant to the SCAB must be properly presented and summarized in the revised Draft 2016 AQMP Appendix I Health Effects (http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/DRAFT2016AQMP/appi.pdf?sfvrsn=2). Indeed, Appendix I must be finalized in strict compliance with all provisions of California Health and Safety Code (CHSC) Section 40471 (b): "On or before December 31, 2001, and every three years thereafter, as part of the preparation of the air quality management plan revisions, the south coast district board, in conjunction with a public health organization or agency, shall prepare a report on the health impacts of particulate matter air pollution in the South Coast Air Basin. The south coast district board shall submit its report to the advisory council appointed pursuant to Section 40428 for review and comment. The advisory council shall undertake peer review concerning the report prior to its finalization and public release. The south coast district board shall hold public hearings concerning the report and the peer review, and shall append to the report any additional material or information that results from the peer review and public hearings." (http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=40001-41000&file=40460-40471). 7-3

As I have previously requested, the 2016 AQMP must present current data on the average human exposure levels for PM2.5, ozone, and NOx in the SCAB. My evidence dating back decades indicates that the actual human exposure levels are far below the EPA National Ambient Air Quality Standards (NAAQS) and well below the levels for which there are proven adverse health effects. Furthermore, the tiny health effects of air pollution must be put into perspective with all the factors that influence human health, such as, employment, and with the fact that the SCAB has 2014 age-adjusted death rates for all causes, all cancer, and all respiratory diseases that are among the lowest in the entire US. These low death rates are summarized the attached table.

7-3 Con't

The ultimate scientific and regulatory fate of the 2016 depends upon the scientists who have conducted air pollution epidemiology research and upon the SCAQMD scientists who summarize these research findings in Appendix I Health Effects. We will soon find out if the SCAQMD scientists have the honesty and integrity to state that air pollution *does not cause* premature deaths in the SCAB, that the average daily human exposures to PM2.5, ozone, and NOx in the SCAB are well below the levels that *cause* adverse health effects, and that tougher air pollution regulations in the already healthy SCAB are not justified on a public health or socioeconomic basis.

In closing, please read my attached July 19, 2016 statement to the BizFed Southern California Business Coalition "AQMD Must Reassess Its Air Quality Regulations" and the attached page summarizing my scientific credentials and academic career.

Thank you very much for your consideration.

Sincerely yours,

James E. Enstrom, Ph.D., M.P.H.
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu
(310) 472-4274

cc: Elaine Shen <eshen@aqmd.gov>
Shah Dabirian <sdabirian@aqmd.gov>
Anthony Oliver <aoliver@aqmd.gov>
Philip M. Fine <pfine@aqmd.gov>
Wayne Nastri <wnastri@aqmd.gov>
Henry A. Roman <har@indecon.com>
George D. Thurston <George.Thurston@nyumc.org>
Kevin R. Cromar <kevin.cromar@nyu.edu>
AQMP Comment <aqmp@aqmd.gov>

Preliminary Health Impacts - Mortality

- Health impacts for mortality are based on the previous data and:
  - Ozone: Pooling of L.A.-specific NMMAPS and meta-analysis estimates from Bell et al. (2005).
  - $PM_{2.5}$: Pooling of Jerrett et al. (2005), Jerrett et al. (2013), and Kriging and LUR estimates from Krewski et al. (2009).

- No threshold effects assumed for either pollutant
  - IEc recommendation based on latest scientific evidence
  - U.S. EPA's practice

> In the absence of substantial information in the scientific literature on alternative forms of C-R functions at low O3 concentrations, the best estimate of the C-R function is a linear, no-threshold function.
>
> U.S. EPA, 2014 Health Risk and Exposure Assessment for Ozone

Note: Confidence intervals provided on supplementary handout.

Preliminary Health Impacts – Mortality (cont'd)

Premature Mortalities Avoided		
	2023	**2031**
Mortality, All Cause	**2193**	**2563**
Short-term Ozone Exposure	**51**	**87**
Los Angeles	22	40
Orange	10	14
Riverside	11	16
San Bernardino	9	15
Long-term $PM_{2.5}$ Exposure	**2111**	**2425**
Los Angeles	1481	1707
Orange	321	356
Riverside	141	166
San Bernardino	169	197

Note: Confidence intervals provided on supplementary handout.

The following attachment(s) were included with Comment Letter #7 submitted by Dr. James Enstrom, and was/were duplicate entries on previous comment letter(s) received:

- Letter from Dr. James Enstrom to Dr. Anthony Oliver, dated July 26, 2016. This corresponds to Comment letter #10 under the draft Socioeconomic Report.

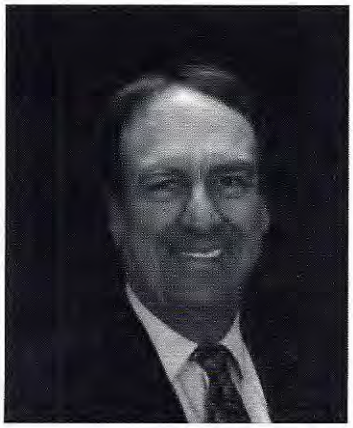
The following attachments were also included with Comment Letter #7 submitted by Dr. James Enstrom, and we are pending permission from the author to post to the website.

- Summary table of epidemiologic cohort studies of PM2.5 and total mortality in California, 2000-2016
- Table of 2014 age-adjusted death rates by state and county
- Presentation by James Enstrom titled “AQMD must reassess its air quality regulations” dated July 19, 2016

A hard copy of all materials included in the comment letters, as provided by the submitter, is available for viewing by request and in person by contacting:

Jo Kay Ghosh
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765
(909) 396-2582

Guest Speaker: James E. Enstrom, Ph.D., M.P.H.



Dr. Enstrom is a native Californian who has lived most of his life in Los Angeles County. In 1965 He graduated co-valedictorian of his class at Harvey Mudd College in Claremont, CA, where he obtained a B.S. in physics. In 1970 Dr. Enstrom obtained his Ph.D. in experimental elementary particle physics at Stanford University from Nobel Laureate Melvin Schwartz. During 1971-1973 he worked as a physicist at the Lawrence Berkeley Laboratory in research group of Nobel Laureate Luis Alvarez. He then came to the UCLA School of Public Health as a postdoctoral fellow in cancer epidemiology and received an M.P.H. and postdoctoral certificate in 1976 from renowned public health epidemiologist Dr. Lester Breslow.

He then joined the UCLA School of Public Health faculty as a Research Professor / Researcher and he held that position for 36 years until June 2012. He currently retains a similar affiliation with UCLA, although he is now drawing retirement. He has been a Fellow of the American College of Epidemiology since 1981, he has been listed in Who's Who in America since 1990, and he has been President of the Scientific Integrity Institute in Los Angeles since 2005.

During his long career, he has explored many important epidemiological issues, particularly focusing on California. A major theme of his research has been identifying healthy lifestyles. He has shown that it is possible to reduce mortality risk from cancer and heart disease by 70% in the middle age range and to increase longevity by as much as 10 years. Examples of healthy populations that he has examined include religiously active California Mormons, California Cancer Prevention Study subjects, California PREVENTION Magazine Readers, and California and national samples of adults adhering to good health practices.

He has also examined the influence of environmental factors on mortality. In December 2005 he published a major paper on fine particulate matter and mortality in California and he has numerous other fm. Since then he has conclusively documented that fine particulate matter does not cause premature death in California. Since 2013, following the lead of the US House Science Committee, he has been involved with efforts to obtain the access to the "secret science" data that EPA has used to justify its fine particulate and ozone air pollution regulations in California and the United States. These efforts include the August 1, 2013 House subpoena of EPA, as well as the Secret Science Reform Acts of 2014 and 2015.

He is currently conducting important new air pollution epidemiology research that is relevant to the EPA, CARB, and SCAQMD regulations. More information can be found at his Scientific Integrity Institute website (http://www.scientificintegrityinstitute.org/).

Angela Kim

From: StanYoung <genetree@bellsouth.net>
Sent: Tuesday, August 16, 2016 7:48 PM
To: Jo Kay Ghosh
Cc: Margarita Felix (Ben); James E. Enstrom
Subject: Enstrom 2005 data and analysis
Attachments: Enstrom 2005 data and analysis.docx

Dear Dr. Ghosh:

I was reading ISA 2009 and I came across this data set for California. I dropped it into SAS JMP and just looked at the data.

You and the staff really need to look at the actual data for California.
Enstrom published in 2005. I've looked at all the data from 2000 to 2012. It is available. There are no excess statistical deaths. You really need to talk to the rest of the staff and fill them in.

8-1

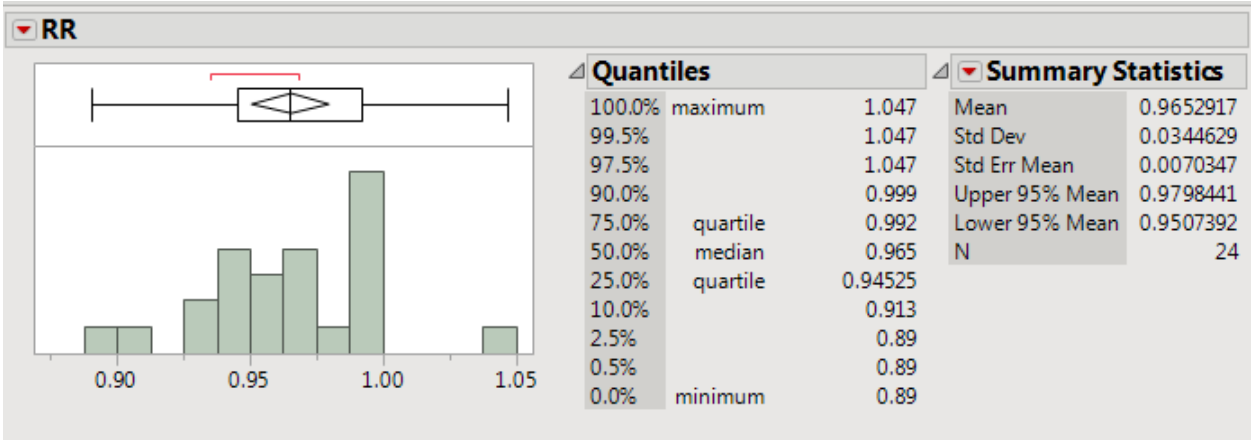
You need to take Jim Enstrom seriously. Look at the things I have sent to you.

Eventually, it will all come out.

Stan Young

Enstrom 2005 data and analysis

This data came from Enstrom (2005) as given in EPA ISA 2009, page E-503. Risk ratios, RR. A RR of 1.00 is no effect. RR<1.00 is beneficial side and RR>1.00 is detrimental. Trace down the RR col of the data table looking at the various California counties and note that all but one RR are less than 1.00. There is no increase in deaths due to PM2.5. The average level of the RR is 0.965.



	County	RR	CIL	CLH
1	Alameda	0.962	0.926	0.999
2	Butte	0.999	0.910	1.096
3	Contra Costa	0.999	0.943	1.058
4	Fresno	0.935	0.872	1.002
5	Humboldt	0.992	0.900	1.092
6	Kern	0.944	0.872	1.023
7	Marin	0.939	0.867	1.016
8	Napa	0.949	0.868	1.038
9	Orange	0.990	0.948	1.034
10	Riverside	0.959	0.906	1.015
11	Sacramento	0.998	0.944	1.055
12	San Bernardino	0.992	0.938	1.049
13	San Diego	0.992	0.954	1.033
14	San Francisco	0.963	0.914	1.014
15	San Joaquin	0.925	0.816	1.049
16	San Mateo	0.949	0.899	1.003
17	Santa Barbara	0.968	0.878	1.068
18	Santa Clara	0.955	0.910	1.003
19	Santa Cruz	0.890	0.793	0.999
20	Solano	0.901	0.815	0.995
21	Sonoma	0.968	0.884	1.060
22	Stanislaus	0.984	0.904	1.072
23	Tulare	1.047	0.979	1.119
24	Ventura	0.967	0.872	1.072

From: Michael T. Kleinman <mtkleinm@uci.edu>
Sent: Tuesday, August 16, 2016 5:28 PM
To: Jo Kay Ghosh
Subject: enstrom
Attachments: Some background on PM and mortality.docx

I disagree with Enstrom's conclusion that "Particulate Matter Does Not *Cause* Premature Deaths" I selected a few papers from reputable scientists that counter Enstrom's, as yet unpublished remarks. Epidemiology studies are always hard pressed when it comes to determining causality. However EPA has gone with a weight of evidence approach that has been peer reviewed by CASAC.

As stated in the 2009 US EPA Integrated Scientific Assessment for PM2.5,
"Regional and seasonal patterns in PM2.5 risk estimates were observed with results similar to those presented for PM10 (Dominici et al., 2007, 097361; Peng et al., 2005, 087463; Zeka et al., 2006, 088749), with the greatest effects occurring in the eastern U.S. (Franklin et al., 2007, 091257; Franklin et al., 2008, 097426) and during the spring (Franklin et al., 2007, 091257; Zanobetti and Schwartz, 2009, 188462). Of the studies evaluated only Burnett et al. (2004, 086247), a Canadian multicity study, analyzed gaseous pollutants and found mixed results, with possible confounding of PM2.5 risk estimates by NO2. Although the recently evaluated U.S.-based multicity studies did not analyze potential confounding of PM2.5 risk estimates by gaseous pollutants, evidence from singlecity studies evaluated in the 2004 PM AQCD (U.S. EPA, 2004, 056905) suggest that gaseous copollutants do not confound the PM2.5-mortality association, which is further supported by studies that examined the PM10-mortality relationship. An examination of effect modifiers (e.g., demographic and socioeconomic factors), specifically AC use which is sometimes used as a surrogate for decreased pollutant penetration indoors, has suggested that PM2.5 risk estimates increase as the percent of the population with access to AC decreases (Franklin et al., 2007, 091257; 2008, 097426). Collectively, the epidemiologic evidence is sufficient to conclude that a causal relationship exists between short-term exposure to PM2.5 and mortality." 9-1

A new ISA is in the works.

Michael Kleinman
Department of Medicine
Occupational and Environmental Medicine
100 Theory STE 100
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(949)824-4765

"Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health" [1]. "PM2.5 exposure was associated with CVD mortality, with the hazards ratios (95% confidence interval) per 10 µg/m(3) increase in PM2.5 equal to 1.12 (1.10-1.15). Pollution-induced CVD mortality risk is observed for those with and without existing cardiometabolic disorders. Long-term exposure may also contribute to the development or exacerbation of cardiometabolic disorders, increasing risk of CVD, and cardiometabolic disease mortality" [2]. "In [a] large national cohort of nonimmigrant Canadians, mortality was associated with long-term exposure to PM(2.5). Associations were observed with exposures to PM(2.5) at concentrations that were predominantly lower (mean, 8.7 mug/m(3); interquartile range, 6.2 mug/m(3)) than those reported previously" [3].

In a study of Canadian women, "a 10 mug/m(3) increase in PM2.5 exposure was associated with elevated risks of nonaccidental (HR: 1.12; 95% CI = 1.04, 1.19), and ischemic heart disease mortality (HR: 1.34; 95% CI = 1.09, 1.66)" [4].

"The association between PM(2.5) and lung cancer mortality was similar in men and women and across categories of attained age and educational attainment, but was stronger in those with a normal body mass index and a history of chronic lung disease at enrollment (P < 0.05). CONCLUSIONS: The … findings strengthen the evidence that ambient concentrations of PM(2.5) measured in recent decades are associated with small but measurable increases in lung cancer mortality." [5]

"Long-term exposure to particulate matter less than 10 mum in aerodynamic diameter (PM10) was associated with elevated risks for IHD mortality (1.06; 95% CI, 0.99-1.14) and incident stroke (1.06; 95% CI, 1.00-1.13), while exposure to nitrogen oxides was associated with elevated risks for IHD and all cardiovascular mortality. CONCLUSIONS: This study provides evidence linking long-term exposure to PM2.5 and PM10 with increased risks of incident stroke as well as IHD mortality; exposure to nitrogen oxides was also related to death from cardiovascular diseases. [6]"

1. Pope CA, 3rd, Dockery DW. Health effects of fine particulate air pollution: lines that connect. J Air Waste Manage. 2006; 56:709-42.
2. Pope CA, 3rd, Turner MC, Burnett RT, Jerrett M, Gapstur SM, Diver WR, et al. Relationships between fine particulate air pollution, cardiometabolic disorders, and cardiovascular mortality. Circ Res. 2015; 116:108-15.
3. Crouse DL, Peters PA, van Donkelaar A, Goldberg MS, Villeneuve PJ, Brion O, et al. Risk of nonaccidental and cardiovascular mortality in relation to long-term exposure to low concentrations of fine particulate matter: a Canadian national-level cohort study. Environmental Health Perspectives. 2012; 120:708-14.
4. Villeneuve PJ, Weichenthal SA, Crouse D, Miller AB, To T, Martin RV, et al. Long-term Exposure to Fine Particulate Matter Air Pollution and Mortality Among Canadian Women. Epidemiology. 2015; 26:536-45.
5. Turner MC, Krewski D, Pope CA, 3rd, Chen Y, Gapstur SM, Thun MJ. Long-term ambient fine particulate matter air pollution and lung cancer in a large cohort of never-smokers. Am J Respir Crit Care Med. 2011; 184:1374-81.
6. Lipsett MJ, Ostro BD, Reynolds P, Goldberg D, Hertz A, Jerrett M, et al. Long-term exposure to air pollution and cardiorespiratory disease in the California teachers study cohort. American Journal of Respiratory and Critical Care Medicine. 2011; 184:828-35.

From: Froines, John <jfroines@ucla.edu>
Sent: Wednesday, August 17, 2016 11:52 AM
To: Jo Kay Ghosh
Subject: FW: HO-1
Attachments: 160408 AQMD final summary V5.docx

Please delete my name from progress report. My involvement was earlier. Thanks.
John

From: Froines, John
Sent: Wednesday, August 17, 2016 10:49 AM
To: jghosh@aqmd.gov
Subject: FW: HO-1

For interest and relevant to Appendix 1.
John Froines

UCLA HEALTH SCIENCES IMPORTANT WARNING: This email (and any attachments) is only intended for the use of the person or entity to which it is addressed, and may contain information that is privileged and confidential. You, the recipient, are obligated to maintain it in a safe, secure and confidential manner. Unauthorized redisclosure or failure to maintain confidentiality may subject you to federal and state penalties. If you are not the intended recipient, please immediately notify us by return email, and delete this message from your computer.

Quantitative assays in the characterization of ambient air.

A report to the South Coast Air Quality Management District for Contra

Arthur K. Cho

Summary

1. Quantitative chemical reactivity and cellular assays have been performed on ambient air particles and their corresponding volatile components collected in three sites in the Los Angles Basin. The chemical results indicate that the particle (PM2.5) phase contains most (~75-80%) of the DTT based prooxidants and the vapor phase, defined as the dichloromethane soluble semivolatile organic species, contain most of the electrophiles (80-95%). The assoicated cellular assays showed that these reactive species exhibited caused inflammatory and adaptive responses by a mouse macrophage cell line to which the samples were exposed.

2. Most of the prooxidants present in the particle phase were associated with metals, as shown by the sensitivity of the DTT activity to a metal chelator, whereas the electrophiles were organic compounds. Seasonal differences in prooxidant content were also noticed, with the winter season PM2.5 higher for Commerce and Long Beach than that for the summer. Samples from San Bernardino differed from the other two sites in that levels of both reactive species in the summer samples were elevated. This observation was attributed to greater photochemical alterations of the air mass generated in the western end of the Los Angeles Basin as it moved east with the prevailing winds during the summer months.

3. The cellular actions of the ambient samples on cells were assessed in terms of two general responses, inflammation and adaptation. The inflammatory response is associated with, for example, the exacerbation of asthma and atherosclerosis, two dieseases with which air pollution has been associated. The adaptive response reflects an attempt by the cell to minimize the chemical insult associated

with the pollutants through the increased expression of antioxidant and foreign compound eliminated proteins.

4. The two cellular responses were monitored with tumor necrosis factor alpha (TNFa) as the inflammatory marker and heme oxygenase-1 (HO-1) as the adaptive marker. The summer particle phase from San Bernardino was the most potent in inducing the inflammatory respose and its corresponding vapor phase the most potent in inducing adaptation. Subsequent experiments showed that the semivolatile components of the vapor phase were capable of suppressing the inflammatory response of the particle phase and an inverse relationship was observed, with increasing adaptation suppressing the inflammatory response. Taken together, the results suggest that the inflammatory effects of ambient air may be less than would be expected from assessment of PM2.5 phase alone and point out the critical importance of analysis of both particle and vapor phases in studies of air pollutants. It should be pointed out however, that suppression of the inflammatory response could result in a reduced ability to respond to pathogenic microbial infections.

5. Analogous observations were with biodiesel exhaust and of cooking oil smoke samples obtained from the University of California Riverside College of Engineering Center for Environmental Research and Training (CE-CERT). Particle and vapor phases were also examined and the results showed an inverse relationship between the expression of TNFa and HO-1 by components of the vapor phase which had a high content of HO-1 inducers and a positive correlaton between samples with low levels of HO-1 and TNFa found in the particle phases. Thus, these data also support the notion that the response by cells to the chemical insults provided by the particle phase components are inflammatory but that this action is suppressed by adaptation which, when sufficiently intense, can suppress even baseline cellular TNFa expression.

6. The unique aspect of this work was its quantitative approach. The quantitative nature of each analysis allowed us to compare samples across locations, between seasons and in a limited study, comparing different biodiesel fuels. This approach

provided evidence for an antagonistic relationship between the inflammatory and adaptive responses by cells which could determine the net health outcome of exposure of air pollution in terms of exacerbation of vascular and pulmonary diseases on the one hand and a compromisd immune system on the other.

Objective

The objective of the project was to develop protocols for quantitatively assessing potential adverse biological effects of emission samples from vehicles and ambient air. The quantitative output of the assays could then be archived and compared with data from subsequent studies. A second objective was to develop a protocol for the fractionation of diesel exhaust to characterize the chemical classes involved in the biological responses observed for the total exhaust as a whole. This objective was dependent on a large scale collection of diesel exhaust particles and vapors to be made by the Center for Environmental Research Technology of the College of Engineering at the University of California at Riverside (CE-CERT). However, CE-CERT did not deliver the sample to us and our results for this objective were limited to preliminary procedural experiments with a diesel exhaust sample collected by Japanese colleagues in an earlier study.

The samples used in the first objective were:

1. Ambient air samples collected in the communities of Commerce, Long Beach and San Bernardino in the Los Angeles Basin. Collections were made in the summer and winter months and included particulate and vapor phase components. The latter were the volatile organic species collected in XAD resin beds placed below the filter holders which trapped PM2.5 particles.
2. Selected particle and vapor samples collected at the CE-CERT. These samples included biodiesel exhaust, cooking oil smoke and ethanol fuel exhaust from vehicles.

The samples were subjected to two sets of analytical procedures, chemical reactivity assays measuring pro-oxidant and electrophilic activities and cellular assays that determined the

capacity of the samples to initiate inflammatory and adaptive responses. The hypothesis leading to the assays is described in the background section.

Methods

Chemical assays

We used the DTT based prooxidant (1; 2)and the GAPDH based electrophile assay (3; 4)to measure chemical reactivity. The DTT assay measures the ability of the sample to transfer electrons from dithiothreitol (DTT) to oxygen in a reaction analogous to that occurring in cells. Electrophiles, as defined by the GAPDH assay, are organic compounds with the ability to form covalent bonds with the thiol of glyceraldehyde-3-phosphate dehydrogenase, a reaction that would occur with other available thiols in cells. In studies of ambient air mixtures collected with the VACES concentrator, we have shown that the DTT activity correlates with the ability of the sample to induce HO-1 in macrophages and with the polynuclear aromatic hydrocarbon content of the sample (1).

Cellular assays

Cells

Raw 264.7 cells were cultured in DMEM, supplemented by 1% penicillin-streptomycin and 10% FBS as described by Li et al. (5) with slight modifications. Cells were exposed to the entire particle suspension or to the DMSO solution of the dichloromethane extract of the XAD resin as the particle and vapor phases, respectively. The samples were added to the media to attain air volume equivalent concentrations from 0.1 to 2.0 m^3/mL. A filter blank suspension and DMSO in volumes corresponding to the particle and vapor samples, respectively, were used as controls. The stimulation was allowed to proceed for time periods of 3, 6 or 16 hours and the cells and media collected for subsequent ELISA analysis.

In a 2 phase exposure study with the summer San Bernardino samples, cells were exposed to the vapor phase components at 1 m^3/mL and relevant controls for 24 hours, the DMEM removed and replaced with fresh DMEM containing the challenge agent, or PM2.5, also at 1 m^3/mL. This mixture was cultured for 16 hours after which the cells and media were processed as above for analysis of HO-1 and TNFα.

The shorter stimulation period of 3 hours was used in subsequent studies because at this time levels of marker proteins were found to be high and the time period more suitable for multiple sample studies.

ELISA assay for markers

The ELISA assays were performed following instructions provided by the manufacturers (HO-1; Enzo Life Sciences; TNFα, BD Pharmingen). The results reported are the difference between the control and the experimental cultures. The HO-1 results were expressed as ng/mg protein and the TNFα results were expressed as pg/mL medium.

Data analysis

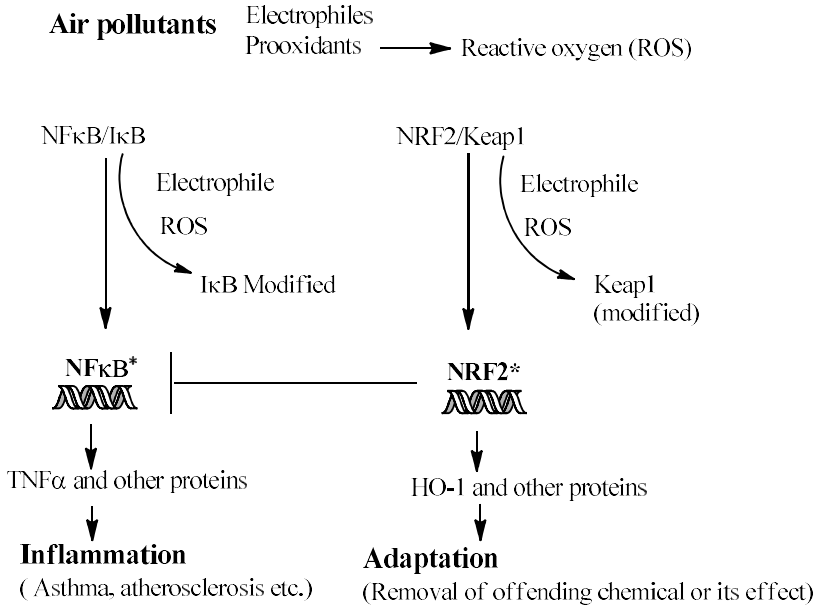
Whenever possible, attempts were made to conduct experiments using three concentrations of test sample to assess concentration dependency of the response. The multiplicity of components involved in the responses measured can result in a non-linear response reflecting issues such as saturation and possible hormetic responses or a "U" shaped dose response relationship. Linear concentration dependency is thus critical in comparing cellular responses.

Background

Although air pollutants include precursors to toxins such as polynuclear aromatic hydrocarbons (e.g., (6-8)) that can be bioactivated to their toxic metabolites, the focus of our research has been the reactive substances present in air pollution mixtures. In our view, these reactive substances can have immediate health effects on humans by undergoing chemical reactions with available biological molecules. These chemical reactions are of two types, the generation of so called reactive oxygen species, superoxide, hydrogen peroxide and hydroxyl radical and the formation of covalent, irreversible bonds between the pollutant and a protein. There are two types of cellular responses to these chemical insults, adaptation and inflammation. In the adaptive response, levels of antioxidant molecules, proteins or small molecules that convert the oxygen species to water, are increased together with increases in levels of biological "traps", substances such as glutathione that reduce the concentration of the reactive substance by converting the offending agent to an inactive metabolite that can be excreted (9; 10). Inflammation is a more general process, in which phagocytic cells remove the offending particle or microorganism from the general circulation by internalizing them and rendering them inactive(11). It is also the

process by which the organism protects itself from the invasion of pathogenic microorganisms, using the immune system. The overall process is a cascade of cellular events involving multiple cells and is initiated by the expression of triggering proteins called cytokines. Adaptation and inflammation are mediated by distinct pathways and like most biological responses, are dependent on the concentration of the triggering agent(s). It should also be pointed out that both adaptation and inflammation can be considered adverse health responses. Adaptation can increase organism sensitivity to microbial attack by suppressing the immune response and inflammation can result in exacerbation of chronic diseases such as asthma and atherosclerosis through the increased expression of cytokines. Figure 1 is a highly simplified summary of the interrelationship between the two processes.

Figure 1 Air pollutants and cellular targets



Two cellular signaling cascades are summarized in the figure, a proinflammatory cascade, mediated by the transcription factor NFκB and an adaptive cascade with Nrf2 as the transcription factor. These cascades have a "ying-yang" relationship in that the adaptive response antagonizes the inflammatory response, shown by the line. In the resting state the transcription factors are complexed with inhibitory regulators which dissociate upon reaction with electrophiles or ROS generated by the prooxidants of the pollutant mixture. The result of the activation can be inflammation or adaptation, depending on the concentrations and nature of the offending chemical mixture. The line between Nrf2 and NFkB is meant to indicate an antagonistic relationship between the actions of the two factors.

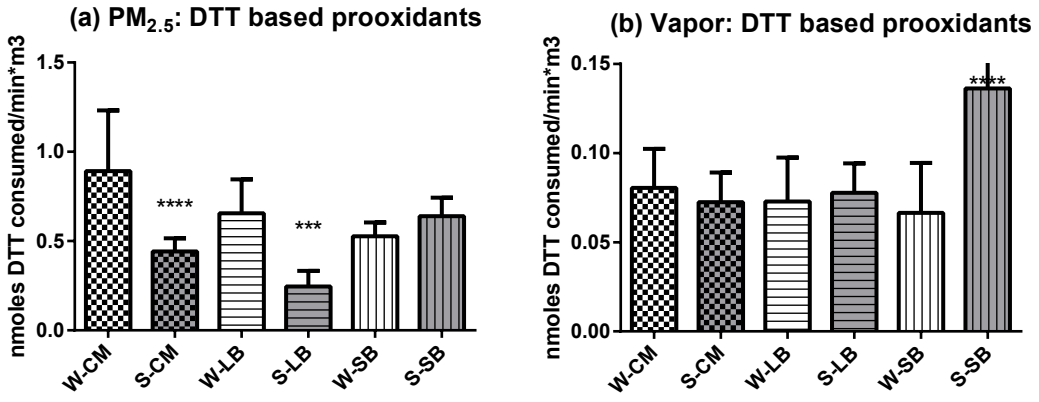
The cytokine, tumor necrosis factor alpha (TNFa), is a marker for NFkappaB activation and the antioxidant enzyme, hemeoxygenase-1 (HO-1) as a marker for Nrf2 activation, the transcription factors associated with the inflammatory and adaptive responses, respectively. We have used lipopolysaccharide (LPS) and a Japanese diesel exhaust sample (J-DEP) used by many investigators as a HO-1 stimulant, as standards. As such, levels of TNFa and HO-1 were shown to increase with increasing concentration of the LPS and J-DEP.

We hypothesize that the chemical species in air pollutant mixtures involved in these interactions are prooxidants and electrophiles. Prooxidants are compounds that engage in electron transfer reactions or the reduction of molecular oxygen to the ROS using endogenous biological antioxidants such as NADPH, NADH and ascorbate as reducing agents (12). Prooxidants generate ROS from oxygen and biochemical agents such as NADPH. These ROS, most notably hydrogen peroxide modify cysteine thiols, causing the breakdown of inactive complexes of transcription factors to their active forms indicated by asterisks in figure 1. Electrophiles are compounds that react with electron rich functionalities such as cysteine thiol and lysine amino groups of proteins to form irreversible covalent bonds (13-15). By this reaction, then electrophiles also modify the same thiols but irreversibly and dissociate the transcription factor complex to active factor. The transcription factors then enter the nucleus and stimulate expression of multiple proteins including the two marker proteins, TNFa and HO-1. Thus, the relative quantities of the two proteins reflects the activation status of the processes. A recent review of the inflammatory actions of DEPs relevant to atherosclerosis, indicates the increase in TNFa and HO-1 can be antagonized by N-acetyl cysteine (16). Although commonly referred to as an “antioxidant”, this compound is actually a neucleophile, reacting with sulfenic acids to form disulfides (17) and covalent bonds with electrophiles such as quinones (18). In addition to electrophiles, air pollutants include prooxidants and there is evidence to suggest that metals play an important role in this component of air toxicant (4; 19; 20).

Results

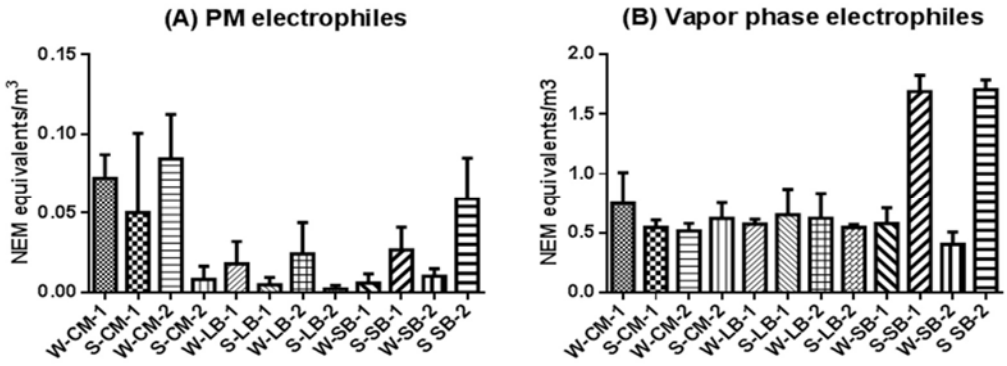
Figure 2 shows the chemical reactivities of particulate (PM2.5) and semi volatile organic species (XAD) in samples collected from sites neighboring railyards in Commerce, Long Beach and San Bernardino using a Tisch sampler to collect filter and XAD resin based volatile organic species (21).

Figure 2a Prooxidant content in PM2.5 and semivolatile organics (XAD) .



*The abbreviations used are W- winter, S-summer, CM Commerce, LB, Long Beach and SB, San Bernardino. Asterisks are used to denote p values for significance: 0.01 to 0.05, *; 0.001 to 0.01, **; < 0.001 *** to ****.*

Figure 2b Electrophile content in content in PM2.5 and semivolatile organics (XAD)



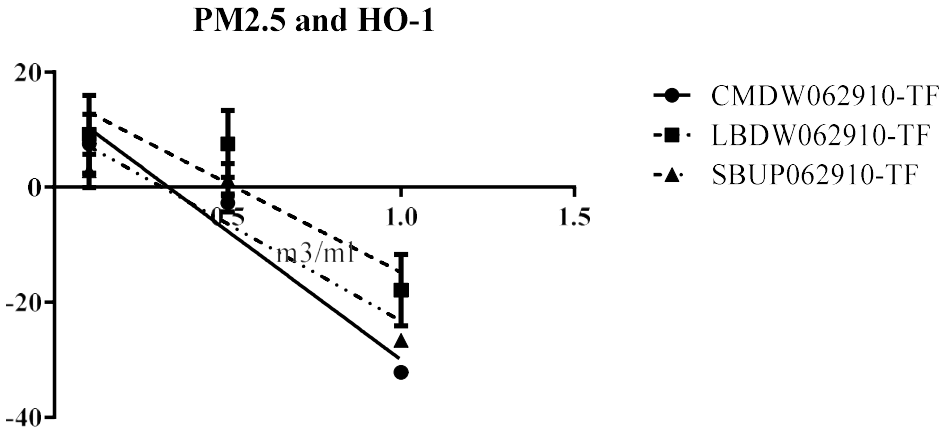
Wide differences in the distribution of the two reactivities were observed (note differences in Y axis scale) between the particle and vapor or semi-volatile organic phases. The ambient electrophiles were mostly in the vapor phase but the prooxidants were mostly in the particle

phase. Significant seasonal differences were observed for Commerce and Long Beach with the winter samples containing higher levels of prooxidant compared to the summer. The San Bernardino samples exhibited the opposite trend but it was not significant. The high winter sample prooxidant content could reflect the influence of the Santa Ana winds common in the Basin during the fall and winter. These winds typically move easterly from the mountains to the coast and could limit the movement of pollutants from downtown traffic and railyards in Commerce and Long Beach. That effect and the slightly lower temperature may result in retention of the reactive chemicals by the particles from these locations.

Celllular responses to PM2.5 and XAD resin extracts of summer samples collected in the Basin

The availability of the large scale samples of ambient air samples allowed us to examine cellular effects of selected samples with measured chemical reactivities. The first study examined the actions of summer San Bernardino samples because of their high reactivity compared to those from Commerce or Long Beach. Responses were measured at three different concentrations to permit analysis for linear relationships between concentration and response and expression of the potency of a given sample by the regression slope. This approach allowed us to identify a negative concentration response for particles and HO-1 expression, i.e., the particles exhibited a negative concentration dependency with minimal differences between the slopes of the concentration response curves (see figure 2). The negative values observed reflect differences between the "filter blank" and the particles on the sample filters and indicate the samples suppressed normal HO-1 expression. As the concentration of PM2.5 was increased, HO-12 levels decreased and at 1 m3/mL, were significantly lower than the control expression.

Figure 2 Effect of PM2.5 concentration on HO-1 induction.



Net expression, based on differences between PM2.5 and corresponding filter blanks, of HO-1 by cells following stimulation by PM2.5 samples.

This observation supported the notion of antagonism between inflammation and adaptation (figure 1), as the PM2.5 fractions increased TNFa expression (table 2). Furthermore, the biological potency of the samples on a per volume basis reflected the chemical reactivity. TNFa expression induced in macrophages by the particle phase increased in the order SB>CM≥LB which followed the order of prooxidant content, although the responses from the CM and LB samples were mostly if not altogether due to the lipopolysaccharide contents of the samples with minimal contributions from chemical sources. Table 2. Slopes of the concentration-marker protein concentration following a 16 hour stimulation by PM2.5 and XAD resin extracts of the 6/29 samples.

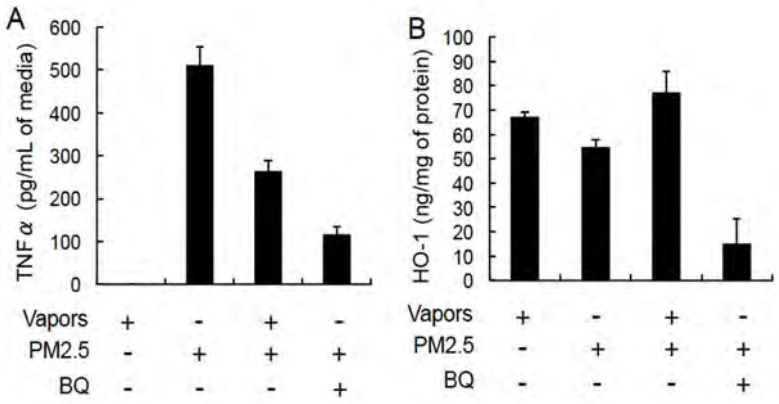
From samples of 6/29	**Commerce**	**Long Beach**	**San Bernardino**
PM 2.5 TNFa expression	18.7*X + 0.07	11.1*X - 0.38	413.9*X - 16.64
PM2.5 HO-1 expression	-44.69*X + 14.71	-30.88*X + 16.09	-33.67*X + 10.46
XAD HO-1 expression	34.49*X - 10.98	43.23*X - 12.14	182.4*X - 22.49
Units are ng HO-1 or pg TNFa per mg protein/m3 per mL			

We then tested whether the notion of TNFa and HO-1 antagonism could be demonstrated in PM2.5 and XAD extracts from the same air sample. Since the PM2.5 samples were

proinflammatory and the XAD samples adaptive, the inflammatory response should be suppressed if the cells were first exposed to the adaptive XAD sample. In the experiment, summarized in figure 3, cells were exposed to blank XAD extract and XAD extract from sample for 16 hours then the cells were washed and challenge with the particle phase for 16 hours and TNFa response measured (figure 3).

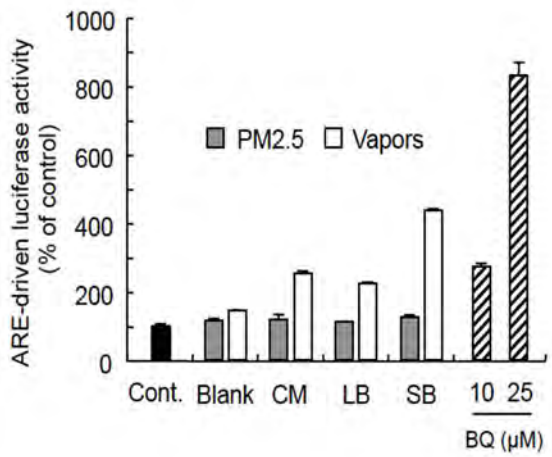
Interaction between XAD and PM2.5 samples; inhibition of the inflammatory response.

Figure 3



The results of the experiment showed indeed, that preexposure to XAD extract (identified as Vapors), reduced the subsequent TNFa response to PM2.5 exposure, i.e., components of the XAD extract suppressed the inflammatory response to the PM2.5 components by about 50%. The suppression is likely due to activation of the antioxidant/antielectrophile response element (ARE) as shown in experiments in which only vapor phase components activate the ARE (figure 4). This DNA element binds the transcription factor Nrf2 following its dissociation from the Nrf2-keap-1 complex, and in turn, increases the expression of HO-1 and other antioxidant proteins that serve to reduce the oxidative stress caused by prooxidants. In the figure, only the vapor phase increased the ARE driven luciferase activity. BQ is benzoquinone, which was used as a reference electrophile.

Figure 4. Stimulation of the ARE by XAD extracts (vapors) and benzoquinone (BQ).



Conclusions

The results of this study showed:

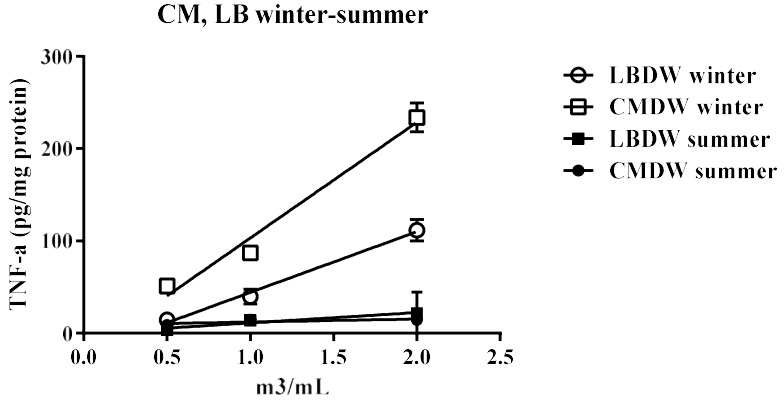
1. That the PM2.5 and semi-volatile organic components of ambient air samples with varying levels of prooxidants and electrophiles were capable of affecting the internal cell biology of macrophages with potencies that reflected chemical reactivity.
2. The PM2.5 prooxidants in the SB sample induced an inflammatory response, indicated by higher levels of TNFa and the semi-volatile organics induced HO-1 in a mouse macrophage preparation.
3. The induction of HO-1 by the semi-volatile organics reflects activation of the ARE through dissociation of the Nrf2/keap 1 complex. ARE activation results in increased antioxidant enzymes and other proteins that can serve to attenuate an inflammatory response, as demonstrated by preexposure of the cells to XAD extracts which suppressed the inflammatory response to PM2.5.
4. This result points out the role of volatile organics in the overall effects of ambient air on cells and, by extrapolation to, intact organisms. The net effect of chronic exposure to the mixture of particles and vapors could be an anti-inflammatory response resulting in a greater susceptibility to infections.

Seasonal differences in the cellular effects of PM2.5 from the Los Angeles Basin.

In contrast to the SB samples, the winter CM and LB PM2.5 samples had significantly higher prooxidant content compared to the summer samples (figure 1) and based on the results above, would be expected to exhibit greater inflammatory responses than those from the corresponding

summer. The sample from 11/12/2009 was used for this study. The values of the PM2.5 samples are shown in table XX

Winter PM2.5	DTT Activity	DTT/DTPA	DHBA	GAPDH
Commerce	0.960	0.147	0.336	0.128
Lomg Beach	0.590	0.000	0.451	0.000



Linear regression results

	LBDW winter	CMDW winter	LBDW summer	CMDW summer
Equation	Y = 65.81*X - 21.58	Y = 125.4*X - 22.30	Y = 11.25*X - 0.07500	Y = 3.264*X + 8.875
R square	0.974	0.9719	0.3437	0.4762

Linear regression analysis of the concentration-TNFa expression data indicated that the winter samples exhibited slopes that followed prooxidant content with Commerce higher than Long Beach. In contrast, the concentration dependency of TNFa expression was not deemed to have a significant slope, i.e, TNFa expression did not increase with concentration. In summary, winter samples from both CM and LB were proinflammatory with potencies that reflected their prooxidant content and the corresponding summer samples were inactive.

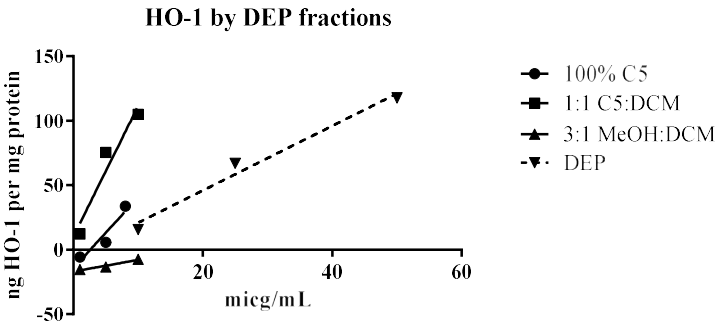
Fractionation of Japanese diesel exhaust particle (J-DEP) preparation

As stated above, we did not receive the DEP – vapor preparation that was to be provided by CE-CERT and were therefore unable to perform a fractionation as originally planned. However, to prepare for the samples, we began experiments to establish a fractionation protocol that could be used to prepare fractions for chemical and cellular analyses that could provide useful information

on the physical properties of the biologically active components of a test air pollutant sample. The procedure was a conventional sequential extraction that used solvents of increasing polarity starting with pentane then dichloromethane then methanol with mixtures of the solvents (Table 3). The cellular activities of each fraction were determined and recoveries determined using the mass following evaporation. The total cellular activity for a given fraction was defined as the product of the slope of HO-1 regression curve and the fraction mass. The nature of the chemical components of each fraction is shown in the 6th column. The TNFa responses were positive for the most polar fraction and the residue. DATA MISSING

Solvent	HO-1 regression	mass	total per fraction	% of total activity	Chemical groups present
	ng HO-1/micgmL^-1	mg	micg		
100% Pentane	Y = 5.508*X - 14.44	44.18	243.4	71%	Low MW PAHs, olefins, alkanes
50% Pentane/CH2Cl2	Y = 10.12*X + 10.20	8.66	87.5	25%	Quinones, PAHs
75% methanol/CH2Cl2*	Y = 0.8910*X - 16.89	14.97	13.3	4%	Quinones, phenols
Residue*	Negative values				Polar organics, metals
DEP	Y = 2.503*X - 4.132	67.81	344.2	100%	

The relationship between the HO-1 inducing capacity of the different fractions is shown in Figure 5.

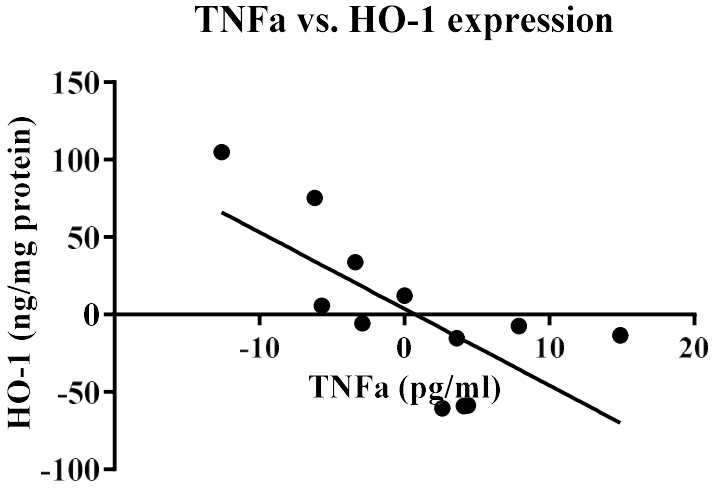


A DEP sample of about 100 mg was sequentially extracted with the indicated solvent mixtures and the extracts evaporated and used in subsequent cell assays. The cells were exposed to the fractions in concentrations that reflected the original sample

mass so that total activities could be estimated. The high recovery (327/256 or ~127%) may be due to the separation of the fractions, for example removal of TNFa inducing agents may increase the HO-1 inducing ability of the sample. .

Most of the HO-1 inducing capacity is associated with the non-polar solvent extracts, i.e., pentane and dichloromethane-pentane mixtures. The only significant TNF inducing activity was observed in the more polar methanol/DMC fraction and residue. These results suggest HO-1 induction is due primarily to non-polar compounds which include low molecular weight electrophiles such as reactive olefins and quinones that are active in the GAPDH assay. TNFa induction appears to be due to the more polar fraction and may be due to some quinones but more likely metals which are insoluble in non polar organic solvents but may be extractable by methanol if complexed with organic compounds such as polyphenols (4; 22). It should be pointed out that this DEP preparation has a high content of organic compounds, particularly quinones compared to other preparations we have examined (23) which may account for the dominant HO-1 response which could be suppressing the inflammatory response, as shown in figure 6.

Figure 6 Relationship between TNFa and HO-1 inducing abilities of the fractions of table XX



The HO-1 and TNFa expression values for the different concentrations of fractions used to generate table XX are shown with a regression line. Although the regression fit was poor (r2 = 0.49) the Pearson correlation coefficient (0.7) and p value (<.011) indicate they correlated well. This relationship has been observed with other samples examined in this study.

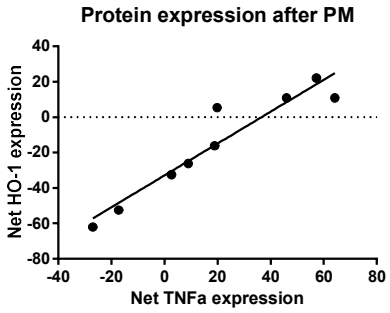
Conclusions

Preliminary extraction experiments using the cellular assay procedures on selected fractions of a commonly used Japanese DEP preparation (e.g., (10; 24-27)) showed the adaptive response to be associated with non-polar organic components and the inflammatory response with more polar organic and metal components. These observations suggest that this DEP preparation, with its high polar organic content, may be less inflammatory and more adaptive than ambient particles such as those found in the LA Basin. If this is a general property of diesel exhaust particles compared to ambient air PM2.5, there may be a difference in the primary response, i.e., the higher adaptive response associated with DEPs may contrast with the proinflammatory ambient PM2.5 from multiple sources.

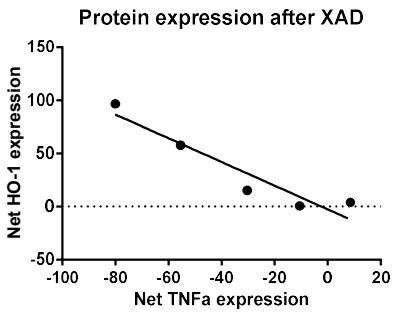
1. Studies of other air pollution samples

The notion of attenuation of inflammation by components of air samples was consistent with observations made in studies of biodiesel (figure 3) and cooking oil (figure 4) samples as part of collaborative study with the UCR College of Engineering Center for Environmental Research and Training (C E-CERT). Thus, analysis of the two phases, particulate and vapor (semivolatile organic species) of biodiesel exhaust showed that the volatile components were much stronger inducers of HO-1 (note difference in the values of the Y axis) , the adaptation marker and in the case of the vapor phase, were able to suppress the normal or background level of TNFa expression by the cells, evidenced by a negative correlation between the expression levels of the proteins. In contrast, the particle phase was capable of increasing TNFa expression beyond background levels but with much lower efficacy in HO-1 induction.

Figure 8A Comparison of adaptive and inflammatory responses to PM2.5 and vapors from biodiesel exhaust.



Plot of respective protein expression following exposure to PM from ULSD, AFME, Soy and WCO. r^2 + 0.952, p<0.0001



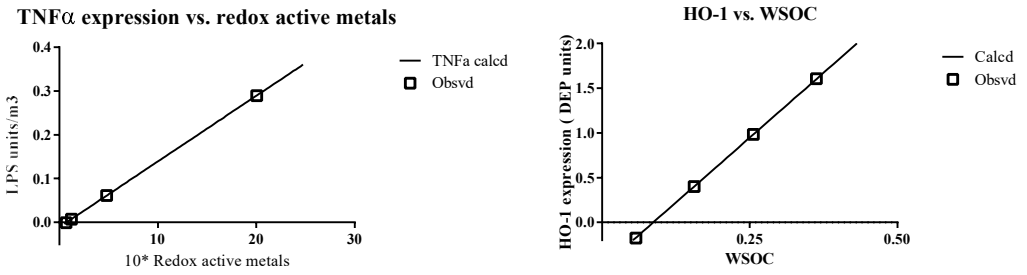
Plot of respective protein expression following exposure to XAD from ULSD, AFME, Soy and WCO. r^2 = 0.899, p<0.0014

The values shown are cellular responses to a fixed concentration of a different sample. Note the smaller negative values for TNFa expression from PM2.5 (-30 is smallest value) compared to XAD samples (-80 is the smallest value). Although the control expression of TNFa is suppressed by both phases, PM2.5 are weaker in their ability to induce HO-1 or promote adaptation. An inverse correlation between the expression of HO-1 and TNFa is shown, consistent with the antagonistic relationship between the two responses shown in figure 1.

In an attempt to assess the roles of redox active metals and water soluble organic species in the PM2.5, averaged values from the samples used here for the cell studies and those from the different samples used by CE-CERT were compared with the assumption that exhaust samples

from the same fuels would, on average contain the same components. The results from that assessment are shown in figure 8B, together with the best fit line from regression analysis. This analysis indicates that TNFa expression correlated with redox metal content and the HO-1 response correlated with water soluble organic compound content (WSOC).

Figure 8B Regression of HO-1 and TNFa responses of PM2.5 against chemical analyses (N = 4) .



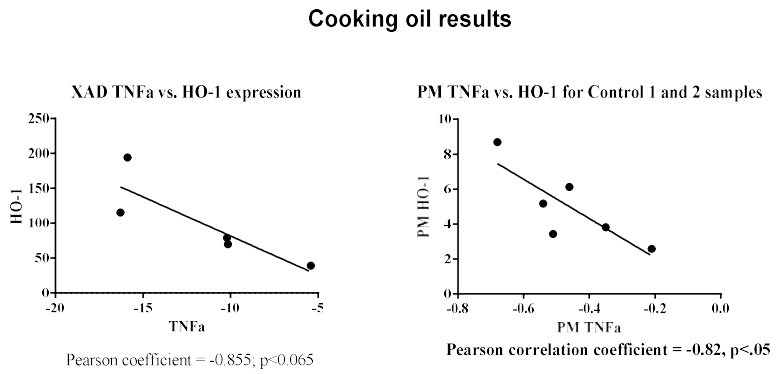
TNFα = 0.015*[Redox active metals] -0.011

HO-1 = 4.65*[WSOC] -0.41

The averaged TNFa response to the particle samples (expressed as LPS units) were compared to averaged redox active metal content for samples from the same fuels (Correlation coefficient was 0.95, with p<.05). Analogously, the HO-1 response with WSOC content of the sample with a correlation coefficient of 0.953 and p<.047)

Similar observations were made with samples from cooking oil smoke (figure 9). The chemical constituents of cooking oil smoke contain prooxidants and electrophiles but not necessarily the same compounds as those from engine exhaust. The vapor phase components induced HO-1 much more strongly than the particle phase but the relationship between the two protein markers was an inverse one with higher levels of HO-1 expression associated with greater suppression of TNFa expression.

Figure 9. Cellular responses to cooking oil particle and vapor phase samples.



Cells were exposed to the samples at fixed concentrations and the proteins measured by ELISA procedures. The negative values reflect the differences between the sample effect and that of a filter (PM) or the solvent (XAD) and are interpreted to reflect a net suppression of TNFa expression.

Chemical properties and cell responses

Using the available data, the potential for the DTT and GAPDH assays as predictors of the cellular response was assessed by determining Pearson correlation coefficients for the DTT values and the cell responses. We found positive correlations for DTT activity-based prooxidant content with particle based HO-1 (0.86; $p<.016$), TNFa (0.96; $p<.04$) for the biodiesel samples and HO-1 (0.905; $p<0.013$) for the cooking smoke samples. The vapor phase chemical reactivities did not correlate with either cell response. These results suggest that the prooxidant content of the particles could be predictors of cell responses but there is insufficient data to be conclusive.

Conclusions

The quantitative nature of the data obtained has provided the ability to compare and further characterize combustion based air pollutants from different locations, seasons and fuel sources. The results show that the analyzed samples contained common chemical reactivities and elicited similar biological activities but with quantitative differences. The major findings from the application of the assays are the following:

1. There are seasonal differences in the nature of ambient air samples which can affect the potential health effects. Specifically, the decrease in volatile organic species associated with the winter season may enhance the potential adverse effects of the particle phase.

2. The vapor phase with its semi volatile organic components has been largely ignored in studies of air pollution because of the focus on particulates. The results here show that the volatile fraction includes both prooxidants and electrophiles and reacts in the chemical and biological assays accordingly. The higher electrophile content observed may be responsible for adaptive responses associated with this fraction. It is possible however, that adaptation could result in suppression of the immune system resulting in a greater susceptibility to infections. Thus, the vapor phase of air pollution mixtures is clearly an important component of the exposome that should be monitored and studied.
3. There appears to be an inverse relationship between the inflammatory and adaptive responses by the cells upon exposure to the samples, with the vapor phase components more effective in promoting the adaptive response. One interpretation of this finding is that the vapor phase components reduce the inflammatory or potential adverse health effects of the particles. Thus, when assessing the health effects of air pollution mixtures, the combined effect of both particle and vapor phases need to be examined.
4. The relationship between the inflammatory and adaptive responses were discernable because of the quantitative nature of the assays performed and demonstrate the importance of quantitative data. However, cellular responses are variable so that values from separate experiments are often difficult to compare. To address this variability, we are now collecting data with selected agents to identify appropriate standards.

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From: Froines, John <jfroines@ucla.edu>
Sent: Wednesday, August 17, 2016 3:40 PM
To: Jo Kay Ghosh
Subject: FW: View your article Chemical reactivities of ambient air samples in three Southern California communities on the new Taylor & Francis Online

See below for reference on air pollutants from three communities. The article is relevant to health issues and relevant to Appendix 1. Thank you.
John

From: Taylor and Francis Group [mailto:TaylorandFrancis@tandf.msgfocus.com]
Sent: Monday, August 15, 2016 10:01 AM
To: Froines, John
Subject: View your article Chemical reactivities of ambient air samples in three Southern California communities on the new Taylor & Francis Online

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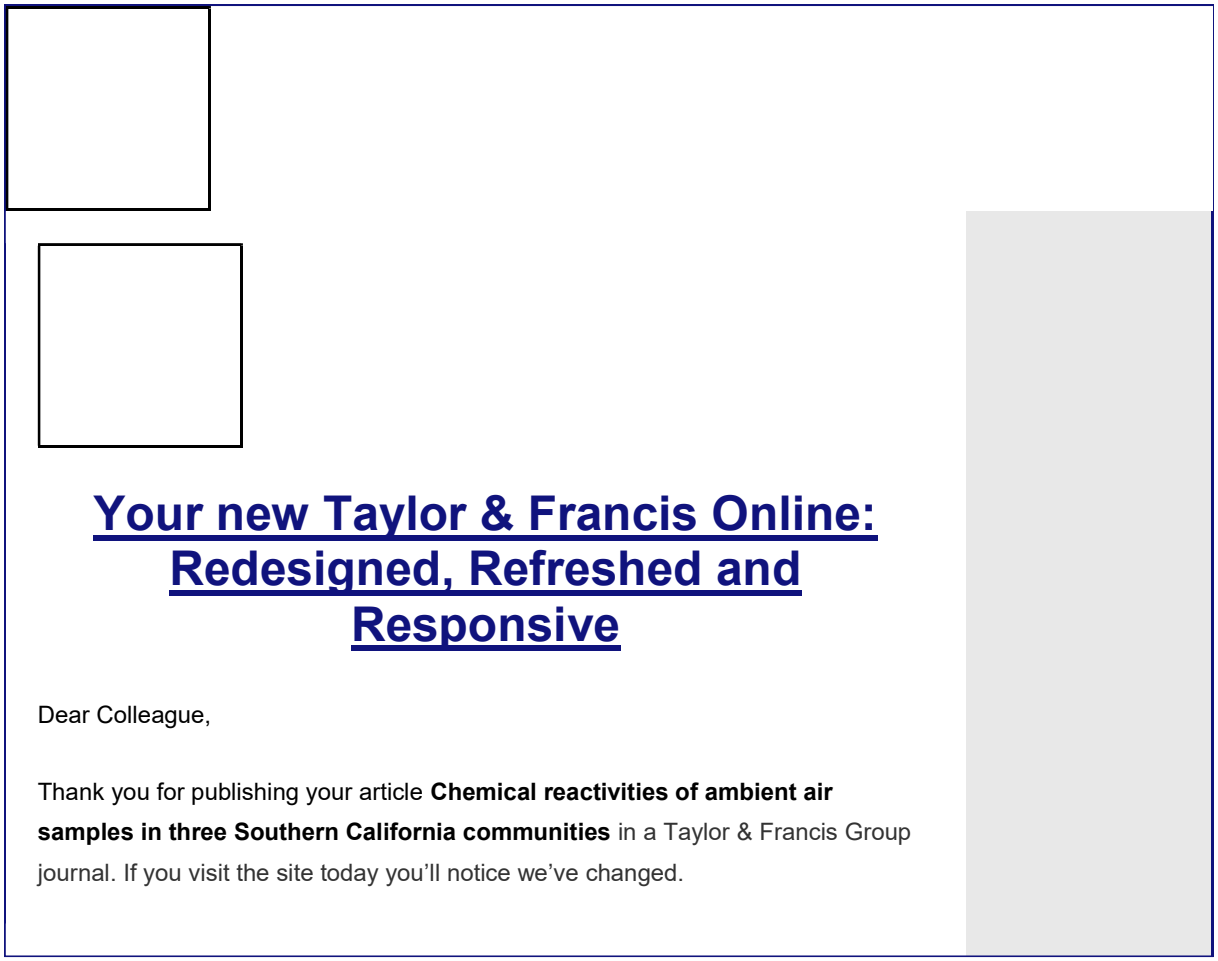

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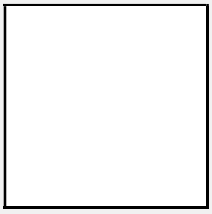

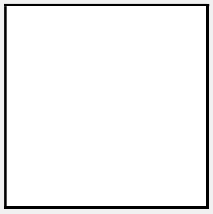

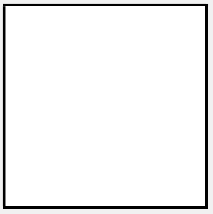

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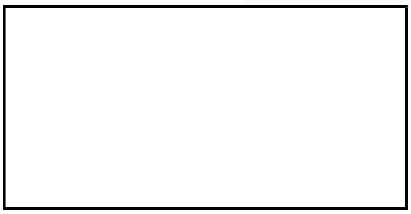

From: Emily Nelson <dremilynelson@gmail.com>
Sent: Friday, August 19, 2016 11:46 AM
To: John J. Benoit (GBM)
Cc: Jo Kay Ghosh; Philip Fine; Barbara Baird
Subject: Draft AQMP 2016 Appendix I Health Effects Advisory Council Comment

Dear Supervisor Benoit,
Thank you for the opportunity to participate on the Advisory Council for the review of the Draft 2016 AQMP Appendix I Health Effects. Our meeting yesterday was meaningful and I believe the SCAQMD staff have done an excellent job. Since I have participated on the AQMD review of Health Effects for the third or fourth time, I just have a few conceptual comments to contribute to the Final Draft.
Dr. Jo Kay Ghosh, SCAQMD Health Effects Officer, and her staff have admirably expanded the prior Health Effects summaries to include the latest research available. This job was made more difficult since the U.S. EPA is also updating their Integrated Science Assessment review for Particulate Matter which was last completed in 2009. Their soon to be published more recent review would have made the job much easier. Since I was once the only biologist on staff at the District and served as the prototype for Health Effects Officer, I know that I would not want to tackle some of this work with this matter of timing.
Overall, my comments are:

1) Explain the purpose of this appendix more clearly in the Introduction. Also state that it is not the purpose of this appendix to present data on ambient air quality statistics, attainment status, air pollution geographic distribution, environmental justice, socioeconomic impacts, preferred control strategies, or cost effectiveness. All of these discussions can be found in the complete AQMP document and its other appendices. Unfortunately, some of the Advisory Council members seemed to be unclear on the purpose of Appendix I and there was much discussion that did not belong to yesterday's meeting.

2) Since most of the readers of Appendix I will not have scientific health effects background, it might be most useful to define some additional regulatory and medical terms. Specifically, EPA's designations for weight of evidence presented in Table I-1 were apparently unclear to some Advisory Council members. Perhaps a statement that these are determined by EPA and are a result of scientific evaluation of the research studies they have reviewed. I'm still waiting for a creative numbering system that would more clearly identify weight of evidence that the public would understand. Perhaps a Richter scale of weight of evidence? Also, a quick definition of FEV1 could be very useful for some readers.

3) The introduction should also describe the legislative and regulatory mandates for each agency involved in this scientific review. It should be clear that the SCAQMD, while commenting on and contributing to proposed ambient air quality standards, must do all in its power to attempt to attain those standards once they are adopted by EPA. Once the CA state standards are mentioned, it would be useful to quote the Health and Safety Code that only requires the SCAQMD to attain these usually more stringent standards at the earliest practicable time with no specific deadlines codified.

One final comment would be to carefully select the Advisory Council members for each appendix based on their expertise. I truly was hoping for more discussion of the latest health effects research from others such as DRI or Dr. Froines.
Again, thank you for this opportunity to be a small part of your AQMP review process.
Sincerely, Emily Nelson, D.Env.
Health and Environmental Risk Consultant

From: Edward Lawrence Avol <avol@usc.edu>
Sent: Sunday, August 21, 2016 2:53 PM
To: Jo Kay Ghosh
Subject: RE: DEADLINE EXTENDED - AQMP, Appendix I Comments
Attachments: AQMD 2016 AQMP Health Section AVOL rev.docx

Jo Kay,

Please find attached my slightly revised comments on the AQMP Appendix devoted to Health Impacts (Appendix I). The meeting discussion did help to clarify a few points, and I have made one or two small changes to my previously-submitted draft comments based on the meeting discussions.

Thank you for the opportunity to participate in this important process. Understanding the basis for strategies and actions, and effectively communicating complex scientific information in a way that becomes accessible and useful to the public is a critically-important task; I hope these comments, and the comments of my colleagues on the committee, help you in that objective.

Take care,
Ed

From: Ann Scagliola [mailto:ascagliola@aqmd.gov] **On Behalf Of** Jo Kay Ghosh
Sent: Friday, August 19, 2016 10:15 AM
To: Bill LaMarr <billlamarr@msn.com>; Bill LaMarr <billlamarr113@gmail.com>; Curtis Coleman <colemanlaw@earthlink.net>; Dr. Afif El-Hasan <afif.h.el-hasan@kp.org>; Dr. Cameron Kaiser <ckaiser@rivcocha.org>; Dr. Emily Nelson <dremilynelson@gmail.com>; Dr. Greg Osterman <gregory.b.osterman@jpl.nasa.gov>; Dr. John Froines <jfroines@ucla.edu>; Dr. John Husing <john@johnhusing.com>; Dr. Rhodes Rigsby <rrigsby@llu.edu>; Erbie Phillips <erbiejr@gmail.com>; Judy Chow <judy.chow@dri.edu>; Mary Ann Lutz <maryann@lutz-co.com>; Paul Avila <paulavila51@aol.com>; Edward Lawrence Avol <avol@usc.edu>; Sue Gornick <sgornick@wspa.org>
Cc: Jo Kay Ghosh <jghosh@aqmd.gov>
Subject: DEADLINE EXTENDED - AQMP, Appendix I Comments
Importance: High

Sent on Behalf of Jo Kay Ghosh

Advisory Council Members,

As discussed in yesterday's Advisory Council meeting, the deadline for submitting comments for the draft 2016 AQMP, Appendix I has been extended to August 26, 2016. Please send your comments to the attention of Jo Kay Ghosh (jghosh@aqmd.gov).

Thank you,

Ann Scagliola
South Coast Air Quality Management District
Planning, Rule Development & Area Sources
ph: 909.396.2423 | fax: 909.396.3931
ascagliola@aqmd.gov

Revised Comments on Draft 2016 AQMP Appendix I: Health Effects

Ed Avol (USC Dept of Preventive Medicine)

(19Aug2016)

General Comments:

The purpose and format of this appendix document is not clear. There may be a legal requirement for a Health Effects appendix, but the public should have a better sense (with a clear statement of purpose and approach) of why this is being provided beyond, "it's required."

That said, there seems to be a lot of generic cutting and pasting from previous USEPA Integrated Science Assessments (ISAs). However, because the ISAs are thousands of pages, there needs to be some careful selection and decisions regarding what is brought forward from the EPA efforts. Since the prior ISA reviews largely occurred three to five years ago, it does make sense to conduct and report on an updated search of the more recent health literature, and some of that does appear in the document. A more current ISA has been released for oxides of nitrogen (2016), so that document should be used to summarize current knowledge of NOx health effects.

I generally found the document to be somewhat inconsistent in its approach. Sectional organization, level of detail, and approaches to summarizing cited work seemed to vary from pollutant to pollutant, without a clear rationale or reason. Order of presentation was odd (ozone, then PM, then NOx, then SOx, then lead, then CO, then HAPs seems more sensible, based on control strategies and interactive photochemical impacts). Organizationally, it seems like a similar approach could be applied for all pollutants – a summary from the most recent ISA, a summary of more recently published information, a discussion of health endpoints and judgements about confidence of association, some perspectives on susceptible sub-populations, and conclusions about the state of knowledge for the pollutant being discussed.

Additionally, the criteria for discussing health outcomes seems to shift around a bit. I think it is appropriate that the EPA tables on causal relationship status be discussed and used to prioritize presentation of health effects data. However, there needs to be a brief discussion about what the causality table means, so that the different thresholds are understandable to the public. It also needs to be made clearer what the causality threshold selection criteria is for inclusion of data in this document (in other words, is there only going to be discussion regarding outcomes determined to be "causal", "likely causal", or "suggestive of causal"?). This decision regarding causality threshold seemed to vary from pollutant to pollutant…but was not explained or discussed in the text.

An alternative approach would be to identify target organs or outcomes of interest (brain, heart, lungs, neonatal development, metabolic, etc), and then comment on whether the database supported any concern for health impact.

I think it is useful to inform the public that health concerns extend well beyond respiratory alone…and provide the data to support the claim. It certainly makes sense to think about air pollution affecting breathing, but the impacts go far beyond that…and that does come across as clearly as one would expect in appendix devoted to health outcomes of air pollution.

Specific Comments:

Table of Contents – I question why “Ultrafine Particles” have their own separate section, rather than being a sub-section of Particle Matter. If one were being consistent and logical, an introductory section would talk generically about PM, then individual sub-sections would talk about PM10, PM2.5, PM 10-2.5, and ultrafines. PM2.5 (Fine PM) and PM10 (Coarse PM) arguably should have their own sub-section in the report (since for both historical and regulatory reasons, both metrics are of health and regulatory significance).

Table of Contents – should be “Conclusions” (plural), not singular…

Table of Contents – ATTACHMENT – not sure why this list of SCAQMD efforts appears in this health appendix document. The information contained in the appendix obviously draws from a larger range of peer-reviewed published literature beyond SCAQMD-funded work. Inclusions of this section does not add to the focus of the document (a review of air pollution health effects), is a little self-serving, and seems unnecessary. If the intent is to demonstrate that the SCAQMD has and does fund health research, then this might merit another separate appendix, with an explanatory paragraph or two.

I-1, Introduction, last sentence – It sounds like the Health and Safety Code requires a review of PM, and other pollutants have been added by choice. Most are NAAQS pollutants and make sense to include. In terms of regulatory policy, something might also be said about VOCs, which play an important role in photochemistry, pollution reduction strategies, and human health effects in their own right.

I-1, para 2, bulleted list of adverse health effects – I’m not sure that this bullet list is especially useful, effective, accurate, or worthwhile. Using bullet points focuses the Reader on specific issues as being especially important, and I think this does not serve the presentation well because it is a partial (and somewhat mis-directed) list. Air pollution health effects have arguably been identified with most every organ system in the body. The listing here is inconsistent in sometimes providing an explanation (which isn’t appropriate or useful in this introductory passage). I suggest this bullet list be re-done to present the example information more clearly (for example, why say “increased health care utilization” when examples of that are also included? Why not just say, “increased physicians’ visits, emergency room visits, and hospitalizations”? Saying increased respiratory illness and other morbidity (symptoms, infections, and asthma exacerbation) is somewhat repetitive – just say increased respiratory symptoms, infections, and asthma exacerbation. Decreased lung function is not “just” breathing capacity, so the parenthetical comment here should be deleted for clarity. The extended explanation for increased airway reactivity is unnecessary here and should be changed to “increased airway reactivity” or “increased airway responsiveness” , or “bronchial hyper-reactivity…but using text space to explain the laboratory approach utilized to observe the response makes little sense here. It’s not immediately clear to me what is meant by “a decreased tolerance for exercise”? Are you claiming that air pollution makes you tired? I think what you are talking about are secondary observations conditional upon respiratory, cardiovascular, and metabolic effects (and/or possible heat-related effects as well, given the frequent co-occurrence of pollution episodes in the SCAQMD with elevated temperatures)…but I am skeptical this is a useful bullet listing. The note “adverse birth outcomes, such as low birth weight” is another inadequate mis-direction, in my opinion, since there have been a range of

negative birth outcomes reported (including pre-term, neurological, and developmental) that I would think most might consider more substantive and important than low birth weight…so again, if the decision is to list a few examples, be careful to list important ones or illustrative ones, and be aware of what may be missing. Missing from this overall list are also more important topics to identify, such as neurological and neuro-developmental effects (behavior and learning), and metabolic effects (obesity, blood pressure, and even diabetes). The point is, this can be a considerable listing of outcomes, so one needs to be thoughtful of intent here.

I-2, para2, sentence 1 – Are you saying the only data used in preparation of this appendix were those from epi or clinical studies? Nothing from bench-top toxicology? Each of these three approaches (epidemiology, toxicology, and clinical studies) provide unique and overlapping benefits to health research, thought the specific benefits and shortcomings of each approach differ (but overlap).

I-2, para2, sentence 2 – Arguably, the historical approach to understanding the health effects of air pollutants has, in the clinical and toxicological settings, been focused on specific pollutants and individual effects. In the past decade, there has been increasing pressure to investigate the combined effects of multiple pollutants on human health, since multi-pollutant exposures are a more accurate reflection of the "real" world. Given this is the case, I would delete the last half of this sentence in the text ("…and specific pollutants responsible for individual effects").

I-2, para3, sentence 4 ("Evidence for more than additive effects has not been strong…") – I am not sure you would get a consensus opinion on this claim, and more importantly, the claim is not central to the presentation here. I think the key point is that regulatory policy has, by in large, focused on individual pollutants without much regard for multi-pollutant exposures or effects. Accordingly, the document reviews the health information in an individual stepwise fashion. However, since it is acknowledged that there are multiple chemicals co-exposures occurring, a brief review of reported combined effects is also being presented herein.

I-3, para2 – The presentation of a criteria by which to gauge causal relationships of reported health data is useful here, but there is inadequate explanation as to context. I suggest adding a sentence or two prior to Table I-1 that says something like this: "Over the decades of national reviews of outdoor air pollution and their health impacts, the US EPA has developed a list of five criteria by which the strength and credibility of data can be judged. This five-tier weight-of-evidence approach provides an objective basis for assessing the breadth, specificity, and consistency of evidence concerning a particular health outcome."

I-4, Ozone, third sentence ("Since it is a gas, …") – This sentence is literally true but generally misleading to readers. Fine (and ultra-fine) particles can also penetrate into the gas-exchange regions of the lung, so I object to the phrasing "Since it is a gas,…" and suggest this qualification be removed.

I-6, Short-Term Effects of Ozone, para1, first sentence – This statement is partially true and incomplete. Increased physical activity increases both depth and frequency of inhalation. This results in higher ventilation rates ("more air and ozone" being breathed in) and increased surface areas of the lung becoming accessible to the inhaled air parcel. Therefore, additional

portions of the lung are likely to come into contact with ozone during increased physical activity, compared to lower activity levels or rest.

I-6, Short-Term Effects of Ozone, para2, last sentence – The statement seems to purposely focus on respiratory outcomes. Is this because you are purposely limiting the discussion to a causal threshold of "likely to be causal"? Under a casual determination of "suggestive of a causal relationship", there are cardiovascular, reproductive, developmental, and central nervous system effects, as well. My concern here is that you are limiting the range of discussion to only respiratory endpoints, when there are many other target organs at risk.

I-7, para1, third sentence ("USEPA's recent review…") – Probably better to anchor this comment to a date rather than "recent" – suggest saying "USEPA's 2013 Integrated Science Assessment Review…" or something like that to link the comment to the data resource.

I-8, para1, inclusion of confidence intervals in discussion of CHS publication regarding school absences – This seems a little confusing and inconsistent with the previous discussion, where confidence intervals or p values have not been presented with reported observed changes in health status. In the interest of the report being consistent and accessible to a wide portion of the public, I suggest removing the confidence intervals from this passage; the citation provides a ready means of more detailed review of the research, should a Reader want more information.

I-8, para2, discussion on attenuation of response (adaptation, reduction in magnitude, …) – Not clear from your presentation what the intent or objective here, but you seem to be discrediting the notion of "adaptation", so a few comments are in order:

(1) Many researchers in the field would shy away from the phrase "adaptation", which denotes some positive evolutionary change; "toleration" or "tolerance" has been suggested as an alternative phrase, or something connoting reduced or diminished response;
(2) I don't discount what you have said in the text regarding the uncoupling of macro-system (i.e. lung function) and micro-system (i.e., biochemical) changes, but since I am one of the investigators who did several of the ozone toleration studies in controlled-exposure settings, I would note that there is a range of human response. Based on laboratory findings, it appeared that a portion of the population were "non-responders" (didn't really change much from baseline levels), a substantive portion of the population displayed some attributes of "toleration" (that is, developed some diminished response with recurring ozone exposure), and that another substantive portion did not seem to develop a diminished response (that is, with repeated challenge, there was fairly consistent and repeated loss of lung function). This was true with both consecutive (i.e. daily) and seasonal responses. Regarding seasonal response, it appeared that the observed capacity for "toleration" or diminished response was established during the early part of the "smog" season, persisted through it, and was "lost" through the winter…so the phenomenon seems to be repeatable (among certain people). I think this is what the last sentence in the paragraph is suggesting (that there is a seasonal aspect to toleration, but that it is somewhat ephemeral).

I-11, Long-Term Exposure Effects of Ozone, para2, line2 – should be "summer-only".

I-13, para2, line5 – "…Tumor Necrosis Factor α …"; add (TNF-α) to clarify (many readers may only know it by its shorthand symbol).
I-13, para2, last sentence – This paragraph is about laboratory studies of animals, but the last sentences is talking about humans (?). This last sentence seems more appropriate for I-8, para3, and should be removed from the current location.

I-13, next-to-last paragraph, first sentence – too long and awkwardly constructed. Should be broken into two sentences: "Some animal studies …changes of the lung. However, morphological, developmental, and immunological differences make it difficult to apply these results to humans."

I-13, last para, second sentence (In southern California communities with high ozone concentrations ,…") – should provide a number or range to the term "high". The key message from the study was that children playing in currently-encountered ambient levels of ozone were at increased risk for developing asthma (not just making existing asthma worse).

I-14, para2, line7 ("…prenatal exposures and low birth weight…") – should read ***on*** low birth weight …

I-14, para3, first sentence – remove the word "newer" from the phrase 'other health endpoints"…

I-14, para3, second sentence – "One study of childhood autism was conducted in LA County and reported …" should be re-written to read, "A study of childhood autism conducted in LA County reported…" (…there has been more than one autism study conducted in LA County…)

I-14, last para, second-to-last sentence – should read 'first-trimester ozone", "second-trimester ozone", and "preconception-SO2 … (hyphens missing from existing text)

I-15, Sensitive Populations for Ozone-Related Health Effects – This is an important issue for the public, who always wonders who (if anyone) is at increased risk, so I think it is useful to take some care in getting this information out there in a useful way. One should probably specify which review you are drawing data from (i.e., the February 2013 USEPA Integrated Science Assessment for Ozone). Additionally, you summarized much (but not all) of the identified at-risk populations listed in Table 8 from the 2013 EPA ISA (see Table 8 below, cut and pasted from the 2013 ISA). It might also be useful to create a short table of Evidence Class, Risk Factor, short summary directional effect, and a link or citation (to either the ISA at the EPA website, or to individual peer-reviewed articles) for inclusion into the AQMP appendix.

additional

Table 8-6 Summary of evidence for potential increased risk of O_3-related health effects.

Evidence Classification	Potential At Risk Factor
Adequate evidence	Genetic factors (Section 8.1) Asthma (Section 8.2.2) Children (Section 8.3.1.1) Older adults (Section 8.3.1.2) Diet (Section 8.4.1) Outdoor workers (Section 8.4.4)
Suggestive evidence	Sex (Section 8.3.2) SES (Section 8.3.3) Obesity (Section 8.4.2)
Inadequate evidence	Influenza/Infection (Section 8.2.1) COPD (Section 8.2.3) CVD (Section 8.2.4) Diabetes (Section 8.2.5) Hyperthyroidism (Section 8.2.6) Race/ethnicity (Section 8.3.4) Smoking (Section 8.4.3) Air conditioning use (Section 8.4.5)
Evidence of no effect	–

Additional note: SES is mentioned twice in the paragraph – first as having adequate evidence, then as having suggestive. As Table above shows, it should be suggestive, based on the ISA.

I-15, Summary Ozone Health Effects, first sentence – I think this could be strengthened and clarified. I suggest the following replacement sentences: “In summary, outdoor ozone exposures have been associated with a range of negative human health effects. The strongest evidence for negative health impacts are on the respiratory system, and are measured by decreased lung function performance and increased cell injury. Effects on other organ systems, including cardiovascular, neurological, and metabolic have been shown to lead to heart disease, learning and developmental issues, and obesity. Although the specific mechanisms of action for ozone effects on the various health endpoints …

OBSERVATION: The PM Section (I-15 through mid-I-23) - The “feel” of the section discussing PM health effects in the report is different than the previous ozone section. In the PM section, there is greater reliance on and quotation of specific effect estimates from specific studies, often with study-by-study citation. In the ozone health effects section, it seemed to be a more general discussion, with less rote listing of estimates and citations. The “correct” presentation depends on the target audience and the level of intended detail. It might be sufficient to cite the EPA NAAQS documents and reproduce some of the key tables, rather than trying to cut and paste larger, more detailed sections of the respective documents into the current AQMP.

I-15, Particulate Matter, para1, first sentence – add the concept of particle toxicity and expand the impact of factors, by revising the first sentence to read: "…a complex group of pollutants that vary in physical, chemical, and biological dimensions. Physically, particles can vary by size, surface area and roughness, shape, and mass. Chemically, they vary by composition. Biologically, they can vary by toxicity (and even by biological availability [i.e., what chemical form] of the chemicals present). In addition to all these factors, particles vary by source, which can affect many of the previously identified factors. Particulate matter can come from anthropogenic (man-made, such as from combustion of fuels, or frictional abrasion) or "natural" (plants – for example, pollens and spores) origins."

I-15, Particulate Matter, last para, second sentence – replace "to cover particles" with "to focus on particles". This word change is necessary because PM10 was already a part of TSP, so it was already in the existing NAAQS. Based on the growing PM data base, it was determined that the health effects observed were caused by the smaller particles in TSP, so a portion of the previous NAAQS was identified for regulation.

I-15, Particulate Matter, last para, third sentence – Revise to read "These can be inhaled and deposited throughout the upper and lower respiratory system, depositing in both airways and gas-exchange areas of the lung.

I-16, para2, first sentence - Delete the "In more recent years,", and begin the paragraph this way: "As more health research data has become available, concerns have centered on smaller and smaller particles. Additional focus has been places on …"

I-16, para2, last sentence – "In 2002, the California Air Resources Board adopted an air quality standard for PM2.5 at a level of 12 ug/m3, in the form of an annual average."

I-16, para3, first sentence – "since that time, ~~numerous~~ *additional* studies have been published…"

I-17, para1, second-to-last sentence – "Of note, there is currently no federal or California standard for PM10-2.5, *although a PM10 standard remains in effect (see Table I-6).*

I-19, last para, last sentence – replace "preexistent" with 'preexisting".

I-21, para1, second sentence ("The results indicated that the association of PM10 …) – what is it you are trying to say? This seems convoluted and confusing. Removal of this sentence in its entirety improves the text, in my opinion…

I-21 para1, last sentence – "these results suggest that the effects *reported* are likely due to …"

I-21, para2, lines 2 and on – Change to read "After the study was published, it was discovered that some of the study analyses had been performed with incorrect default values. When the investigators re-analyzed the data using revised settings for the data, the size of the effect diminished, but the results remained largely the same. The strong positive association between acute PM10 exposure and mortality remained, both upon reanalysis using revised software and using alternative modeling approaches."

i-23, para1, first sentence – This sentence, while true on the face of it, is awkward because there are MANY reasons for variation in relative importance of PM2.5 or PM10-2.5. Several of these have already been discussed earlier in the text, so it is not clear why this subset (concentration, components, seasonal variation) is being reported here again. I recommend

deletion of this sentence and beginning the paragraph with the following sentence: A major knowledge gap in understanding the relative importance of “fine” PM (PM2.5) and “coarse” PM (PM10-2.5) is the relative lack of direct PM10-2.5 measurements.”

I-23, para1, first & second sentences (and elsewhere in the document) – the denotation for coarse particles switches back and forth through the sections – sometimes PM10-2.5, sometimes PM2.5-10…pick one and be consistent.

I-23, last para, second sentence – “The effect estimates *for these various morbidities* are generally higher than the estimates for mortality.

I-23, last paragraph, last two sentences – change to read “Observed effects have been associated with PM10, PM2.5, and PM10-2.5.”

I-31, para2, second sentence – missing a hyphen from “distance-weighted”.

I-37, para2, third sentence – (Regarding Avol 2001 Movers’ Study…) It’s important to note that children who moved to areas of higher PM10 & NO2 showed declines in lung function growth rates. Another way of phrasing this is that the effects of exposure seemed to “work” both ways – more exposure led to poorer lung function growth rates, less exposure led to improved lung function growth rates.

I-37, para2, last sentence – “The risk of lower lung function was about ~~five~~ four times higher in children …:

I-37, last para and last sentence, AND I-38 first para, line 8 – in some places, the term “new-onset asthma” has a hyphen, while in other places it does not; be consistent.

I-39, para2, last sentence – low-term (not term low) …

I-40, first para, second sentence – should read “A couple *of* recent studies …”

I-40, Long-Term Particulate Matter Exposures and Newer Health Endpoints – It might be easier for Readers to follow along and/or locate text of interest if there were sub-headings for these paragraphs – Metabolic Syndrome, Neurological Impacts, …

I-40, Long-Term Particulate Matter Exposures and Newer Health Endpoints, para1, first sentence – Many who access this document may not be aware of what is meant by the term “metabolic syndrome”, so it would be useful to provide a working definition here. Additionally, it is my understanding that in describing this endpoint, insulin resistance, high cholesterol, obesity, hypertension, etc are *attributes, manifestations, or markers* of metabolic syndrome, not the syndrome itself (in other words, a syndrome is a collection of symptoms, not the presence of any one condition). Therefore, the phrasing in the final sentence of the first paragraph in the section should be reviewed and revised.

I-40, Long-Term Particulate Matter Exposures and Newer Health Endpoints – The topic of metabolic syndrome and particle pollution is introduced, but very little is said. There have been several dozen publications to date (just search on Pub Med for metabolic syndrome & air pollution, or see Brook et al 2016 article in Hypertension, Eze et al 2015 in PLoS One, Devlin et al 2014 in Toxicol Sci, …).

I-41, para1 – (similar comment to above) – While there are a few studies documented in the area of neurological outcomes, not that much is said. There is a growing and broad literature on the topic, with work reported by Annette Peters' group in Germany, Jordi Sunyer's group at CREAL in Barcelona, and the Harvard Normative Aging Study group (perhaps search on "Joel Schwartz:, Normative Aging Study, or ?).

I-41, Sensitive Populations for PM-Related Health Effects – As was done earlier in the document with regard to ozone and sensitive sub-populations, you might consider summarizing more directly from the most recent PM review by EPA CASAC to summarize who is considered to be at elevated risk and the degree of confidence associated with the respective claim (Chapter 8 of the 2010 ISA).

I-42 – Summary Particulate Matter Health Effects – this is an important section, but doesn't quite deliver on the promise. Rather than a summary of what has been presented, this section seems to present additional information from additional sources. While the information presented is useful, it is NOT a ***summary*** of what has been presented.

I-43, Ultrafine Particles – why is this being presented AFTER the summary of the chapter? There may not be a current standard by which ultrafines are judged, but this section still provides information regarding health effects of PM…?

I-48, para1, last two lines – layout has switched to centered lines, rather than left-justified…

I-62, para2, second-to-last sentence – "However, it is important to note that these results represent a more refined risk estimation methodology, not an increase in risk." This sentence is absurd, on the face of it. If a more refined estimate approach results in a larger risk estimate, how can one claim there is no increase in risk? This is NOT just a numerical exercise – the implication of the numerical correction is arguably precisely that the risk is higher than was previously calculated; the sentence should be deleted.

I-63, Conclusions – This section is incomplete, arguably inadequate, and seems to just stop without concluding much of anything. Comments could have been made about improvements in the health database for each of the NAAQS

Pollutants. Comments could have been made regarding TACs or ultrafines, or improved understanding of susceptible sub-populations. Comments could have been restricted to ozone and PM, since that seems to be much of the original intent of this appendix…but instead, not much is "concluded."

I-87 – Draft 2016 AQMP Appendix I Attachment, Publications from Health Related Research Projects Funded or Co-Funded by SCAQMD – what is this even doing in this document? What does it add to the presentation? How does it help us to evaluate the health effects information presented in the body of the appendix? Possibly an interesting side discussion, but not germane to the focus of the presentation (since the source of funding for the reviewed research is not at issue); this could be deleted.

From: John Husing <john@johnhusing.com>
Sent: Wednesday, August 24, 2016 12:13 PM
To: Jo Kay Ghosh; Larry McCallon (GBM); Ben Benoit (GBM); Margarita Felix (Ben); Ben Benoit (GBM)
Subject: Missing appendix item or discussion

As a member of the AQMP Advisory group, I note that in your 26 pages of references to studies on the health impacts of pollution, I the only study (*title and summary below*) that directly measured the impact of the 2007 and later diesel engines on long term health and cancer was not listed. This despite the fact that it concludes no cancer risk and was paid for, among others, by CARB, NRDC and EPA. It appears to be research that AQMD does not even want to acknowledge exists.

Advanced Collaborative Emissions Study (ACES): Lifetime Cancer and Non-Cancer Assessment in Rats Exposed to New-Technology Diesel Exhaust Jacob D McDonaldJeffrey C BemisLance M HallbergDaniel J ConklinResearch Report 184, January 2015 Health Effects Institute

ww

FOR RELEASE TUESDAY, JANUARY 27, 2015

For More Information:

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STUDY OF LIFETIME ANIMAL EXPOSURE TO NEW TECHNOLOGY DIESEL ENGINE EXHAUST FINDS NO LUNG CANCER

(Boston, January 27. 2015) The first study to conduct a comprehensive evaluation of lifetime exposure to new technology diesel exhaust (NTDE) has found no evidence of carcinogenic lung tumors.
The Advanced Collaborative Emissions Study (ACES), issued today by the Health Effects Institute
(HEI)1also confirmed that the concentrations of particulate matter and toxic air pollutants emitted from
NTDE are more than 90% lower than emissions from traditional older diesel engines (TDE).
The study exposed laboratory rats 80 hoursa week, for up to 30 months, to emissions from a heavy-
duty diesel engine meeting stringent 2007 US EPA standards that use new filters and oth
er control technology to reduce emissions significantly. In contrast to previous health studies of TDE, the ACES
study found that lifetime exposure did not induce tumors or pre-cancerous changes in the lung and did not
increase tumors related to NTDE in any other tissue. A few mild changes were seen in the lungs,
consistent with long-term exposure to NO2, a component of NTDE that has been further substantially
reduced in 2010-and later model year engines compliant with US EPA rules.

The ACES results are expected to play an important role in future risk reviews of diesel engines by
international and US agencies. "We are already seeing a transition in America's roads with over 30% of
the trucks and buses in use today meeting these new standards and the trend is growing in Europe as
well," said Dan Greenbaum, President of HEI. "These results confirm the great strides that government
and industry have made to reduce diesel risk – and argue for even greater efforts to accelerate the
replacement of older diesel engines."

From: Froines, John <jfroines@ucla.edu>
Sent: Thursday, August 25, 2016 8:30 AM
To: Jo Kay Ghosh
Subject: FW: relevant references
Attachments: UFP_NP_AAAAI report_Highlighted.pdf

Hello: I work as a colleague with two other investigators, Dr. Arthur Cho and Dr. Ning Li. We have had AQMD funded research in the past. I will be sending a few documents that may have use in Appendix 1. Hopefully they will be useful. More to come.
John

The following attachment(s) were included with Comment Letter #16 submitted by Dr. John Froines. Due to copyrights held by publishing entities, SCAQMD cannot reproduce the following attachments, however, interested parties can obtain access at the links provided below:

Li, N., S. Georas, N. Alexis, P. Fritz, T. Xia, M. A. Williams, E. Horner and A. Nel (2016). "A work group report on ultrafine particles (American Academy of Allergy, Asthma & Immunology): Why ambient ultrafine and engineered nanoparticles should receive special attention for possible adverse health outcomes in human subjects." J Allergy Clin Immunol **138**(2): 386-396.

http://linkinghub.elsevier.com/retrieve/pii/S0091-6749(16)30011-2

A hard copy of copyrighted material, as provided by the submitter, is available for viewing by request and in person by contacting:

Jo Kay Ghosh
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765
(909) 396-2582

From: Froines, John <jfroines@ucla.edu>
Sent: Thursday, August 25, 2016 8:36 AM
To: Jo Kay Ghosh
Subject: report
Attachments: 160408 AQMD final summary V5.docx

An older report.
John

Quantitative assays in the characterization of ambient air.

A report to the South Coast Air Quality Management District for Contra

Arthur K. Cho

Summary

1. Quantitative chemical reactivity and cellular assays have been performed on ambient air particles and their corresponding volatile components collected in three sites in the Los Angles Basin. The chemical results indicate that the particle (PM2.5) phase contains most (~75-80%) of the DTT based prooxidants and the vapor phase, defined as the dichloromethane soluble semivolatile organic species, contain most of the electrophiles (80-95%). The assoicated cellular assays showed that these reactive species exhibited caused inflammatory and adaptive responses by a mouse macrophage cell line to which the samples were exposed.

2. Most of the prooxidants present in the particle phase were associated with metals, as shown by the sensitivity of the DTT activity to a metal chelator, whereas the electrophiles were organic compounds. Seasonal differences in prooxidant content were also noticed, with the winter season PM2.5 higher for Commerce and Long Beach than that for the summer. Samples from San Bernardino differed from the other two sites in that levels of both reactive species in the summer samples were elevated. This observation was attributed to greater photochemical alterations of the air mass generated in the western end of the Los Angeles Basin as it moved east with the prevailing winds during the summer months.

3. The cellular actions of the ambient samples on cells were assessed in terms of two general responses, inflammation and adaptation. The inflammatory response is associated with, for example, the exacerbation of asthma and atherosclerosis, two dieseases with which air pollution has been associated. The adaptive response reflects an attempt by the cell to minimize the chemical insult associated

with the pollutants through the increased expression of antioxidant and foreign compound eliminated proteins.

4. The two cellular responses were monitored with tumor necrosis factor alpha (TNFa) as the inflammatory marker and heme oxygenase-1 (HO-1) as the adaptive marker. The summer particle phase from San Bernardino was the most potent in inducing the inflammatory respose and its corresponding vapor phase the most potent in inducing adaptation. Subsequent experiments showed that the semivolatile components of the vapor phase were capable of suppressing the inflammatory response of the particle phase and an inverse relationship was observed, with increasing adaptation suppressing the inflammatory response. Taken together, the results suggest that the inflammatory effects of ambient air may be less than would be expected from assessment of PM2.5 phase alone and point out the critical importance of analysis of both particle and vapor phases in studies of air pollutants. It should be pointed out however, that suppression of the inflammatory response could result in a reduced ability to respond to pathogenic microbial infections.

5. Analogous observations were with biodiesel exhaust and of cooking oil smoke samples obtained from the University of California Riverside College of Engineering Center for Environmental Research and Training (CE-CERT). Particle and vapor phases were also examined and the results showed an inverse relationship between the expression of TNFa and HO-1 by components of the vapor phase which had a high content of HO-1 inducers and a positive correlaton between samples with low levels of HO-1 and TNFa found in the particle phases. Thus, these data also support the notion that the response by cells to the chemical insults provided by the particle phase components are inflammatory but that this action is suppressed by adaptation which, when sufficiently intense, can suppress even baseline cellular TNFa expression.

6. The unique aspect of this work was its quantitative approach. The quantitative nature of each analysis allowed us to compare samples across locations, between seasons and in a limited study, comparing different biodiesel fuels. This approach

provided evidence for an antagonistic relationship between the inflammatory and adaptive responses by cells which could determine the net health outcome of exposure of air pollution in terms of exacerbation of vascular and pulmonary diseases on the one hand and a compromisd immune system on the other.

Objective

The objective of the project was to develop protocols for quantitatively assessing potential adverse biological effects of emission samples from vehicles and ambient air. The quantitative output of the assays could then be archived and compared with data from subsequent studies. A second objective was to develop a protocol for the fractionation of diesel exhaust to characterize the chemical classes involved in the biological responses observed for the total exhaust as a whole. This objective was dependent on a large scale collection of diesel exhaust particles and vapors to be made by the Center for Environmental Research Technology of the College of Engineering at the University of California at Riverside (CE-CERT). However, CE-CERT did not deliver the sample to us and our results for this objective were limited to preliminary procedural experiments with a diesel exhaust sample collected by Japanese colleagues in an earlier study.

The samples used in the first objective were:

1. Ambient air samples collected in the communities of Commerce, Long Beach and San Bernardino in the Los Angeles Basin. Collections were made in the summer and winter months and included particulate and vapor phase components. The latter were the volatile organic species collected in XAD resin beds placed below the filter holders which trapped PM2.5 particles.
2. Selected particle and vapor samples collected at the CE-CERT. These samples included biodiesel exhaust, cooking oil smoke and ethanol fuel exhaust from vehicles.

The samples were subjected to two sets of analytical procedures, chemical reactivity assays measuring pro-oxidant and electrophilic activities and cellular assays that determined the

capacity of the samples to initiate inflammatory and adaptive responses. The hypothesis leading to the assays is described in the background section.

Methods

Chemical assays

We used the DTT based prooxidant (1; 2)and the GAPDH based electrophile assay (3; 4)to measure chemical reactivity. The DTT assay measures the ability of the sample to transfer electrons from dithiothreitol (DTT) to oxygen in a reaction analogous to that occurring in cells. Electrophiles, as defined by the GAPDH assay, are organic compounds with the ability to form covalent bonds with the thiol of glyceraldehyde-3-phosphate dehydrogenase, a reaction that would occur with other available thiols in cells. In studies of ambient air mixtures collected with the VACES concentrator, we have shown that the DTT activity correlates with the ability of the sample to induce HO-1 in macrophages and with the polynuclear aromatic hydrocarbon content of the sample (1).

Cellular assays

Cells

Raw 264.7 cells were cultured in DMEM, supplemented by 1% penicillin-streptomycin and 10% FBS as described by Li et al. (5) with slight modifications. Cells were exposed to the entire particle suspension or to the DMSO solution of the dichloromethane extract of the XAD resin as the particle and vapor phases, respectively. The samples were added to the media to attain air volume equivalent concentrations from 0.1 to 2.0 m^3/mL. A filter blank suspension and DMSO in volumes corresponding to the particle and vapor samples, respectively, were used as controls. The stimulation was allowed to proceed for time periods of 3, 6 or 16 hours and the cells and media collected for subsequent ELISA analysis.

In a 2 phase exposure study with the summer San Bernardino samples, cells were exposed to the vapor phase components at 1 m^3/mL and relevant controls for 24 hours, the DMEM removed and replaced with fresh DMEM containing the challenge agent, or PM2.5, also at 1 m^3/mL. This mixture was cultured for 16 hours after which the cells and media were processed as above for analysis of HO-1 and TNFα.

The shorter stimulation period of 3 hours was used in subsequent studies because at this time levels of marker proteins were found to be high and the time period more suitable for multiple sample studies.

ELISA assay for markers

The ELISA assays were performed following instructions provided by the manufacturers (HO-1; Enzo Life Sciences; TNFα, BD Pharmingen). The results reported are the difference between the control and the experimental cultures. The HO-1 results were expressed as ng/mg protein and the TNFα results were expressed as pg/mL medium.

Data analysis

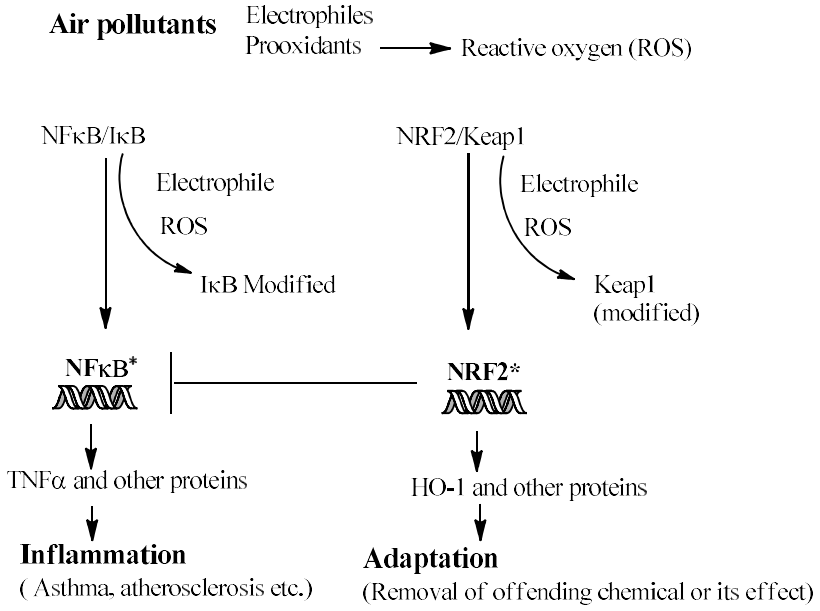
Whenever possible, attempts were made to conduct experiments using three concentrations of test sample to assess concentration dependency of the response. The multiplicity of components involved in the responses measured can result in a non-linear response reflecting issues such as saturation and possible hormetic responses or a "U" shaped dose response relationship. Linear concentration dependency is thus critical in comparing cellular responses.

Background

Although air pollutants include precursors to toxins such as polynuclear aromatic hydrocarbons (e.g., (6-8)) that can be bioactivated to their toxic metabolites, the focus of our research has been the reactive substances present in air pollution mixtures. In our view, these reactive substances can have immediate health effects on humans by undergoing chemical reactions with available biological molecules. These chemical reactions are of two types, the generation of so called reactive oxygen species, superoxide, hydrogen peroxide and hydroxyl radical and the formation of covalent, irreversible bonds between the pollutant and a protein. There are two types of cellular responses to these chemical insults, adaptation and inflammation. In the adaptive response, levels of antioxidant molecules, proteins or small molecules that convert the oxygen species to water, are increased together with increases in levels of biological "traps", substances such as glutathione that reduce the concentration of the reactive substance by converting the offending agent to an inactive metabolite that can be excreted (9; 10). Inflammation is a more general process, in which phagocytic cells remove the offending particle or microorganism from the general circulation by internalizing them and rendering them inactive(11). It is also the

process by which the organism protects itself from the invasion of pathogenic microorganisms, using the immune system. The overall process is a cascade of cellular events involving multiple cells and is initiated by the expression of triggering proteins called cytokines. Adaptation and inflammation are mediated by distinct pathways and like most biological responses, are dependent on the concentration of the triggering agent(s). It should also be pointed out that both adaptation and inflammation can be considered adverse health responses. Adaptation can increase organism sensitivity to microbial attack by suppressing the immune response and inflammation can result in exacerbation of chronic diseases such as asthma and atherosclerosis through the increased expression of cytokines. Figure 1 is a highly simplified summary of the interrelationship between the two processes.

Figure 1 Air pollutants and cellular targets



Two cellular signaling cascades are summarized in the figure, a proinflammatory cascade, mediated by the transcription factor NFκB and an adaptive cascade with Nrf2 as the transcription factor. These cascades have a "ying-yang" relationship in that the adaptive response antagonizes the inflammatory response, shown by the line. In the resting state the transcription factors are complexed with inhibitory regulators which dissociate upon reaction with electrophiles or ROS generated by the prooxidants of the pollutant mixture. The result of the activation can be inflammation or adaptation, depending on the concentrations and nature of the offending chemical mixture. The line between Nrf2 and NFkB is meant to indicate an antagonistic relationship between the actions of the two factors.

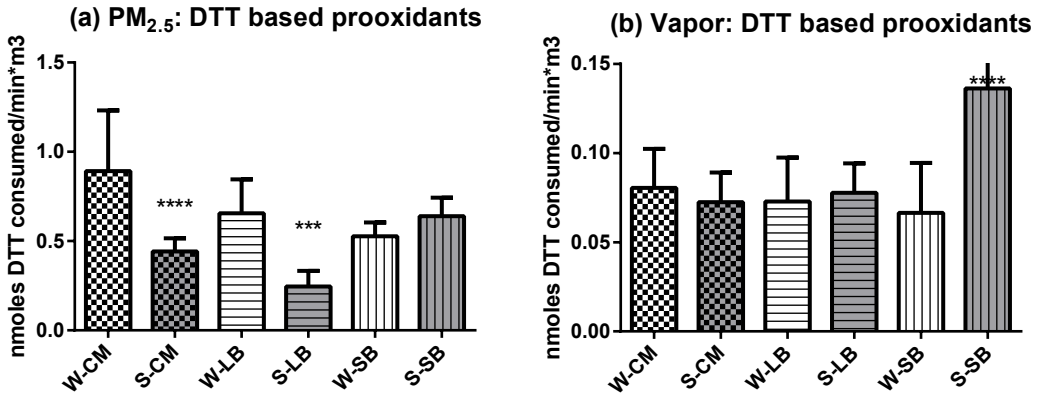
The cytokine, tumor necrosis factor alpha (TNFa), is a marker for NFkappaB activation and the antioxidant enzyme, hemeoxygenase-1 (HO-1) as a marker for Nrf2 activation, the transcription factors associated with the inflammatory and adaptive responses, respectively. We have used lipopolysaccharide (LPS) and a Japanese diesel exhaust sample (J-DEP) used by many investigators as a HO-1 stimulant, as standards. As such, levels of TNFa and HO-1 were shown to increase with increasing concentration of the LPS and J-DEP.

We hypothesize that the chemical species in air pollutant mixtures involved in these interactions are prooxidants and electrophiles. Prooxidants are compounds that engage in electron transfer reactions or the reduction of molecular oxygen to the ROS using endogenous biological antioxidants such as NADPH, NADH and ascorbate as reducing agents (12). Prooxidants generate ROS from oxygen and biochemical agents such as NADPH. These ROS, most notably hydrogen peroxide modify cysteine thiols, causing the breakdown of inactive complexes of transcription factors to their active forms indicated by asterisks in figure 1. Electrophiles are compounds that react with electron rich functionalities such as cysteine thiol and lysine amino groups of proteins to form irreversible covalent bonds (13-15). By this reaction, then electrophiles also modify the same thiols but irreversibly and dissociate the transcription factor complex to active factor. The transcription factors then enter the nucleus and stimulate expression of multiple proteins including the two marker proteins, TNFa and HO-1. Thus, the relative quantities of the two proteins reflects the activation status of the processes. A recent review of the inflammatory actions of DEPs relevant to atherosclerosis, indicates the increase in TNFa and HO-1 can be antagonized by N-acetyl cysteine (16). Although commonly referred to as an “antioxidant”, this compound is actually a neucleophile, reacting with sulfenic acids to form disulfides (17) and covalent bonds with electrophiles such as quinones (18). In addition to electrophiles, air pollutants include prooxidants and there is evidence to suggest that metals play an important role in this component of air toxicant (4; 19; 20).

Results

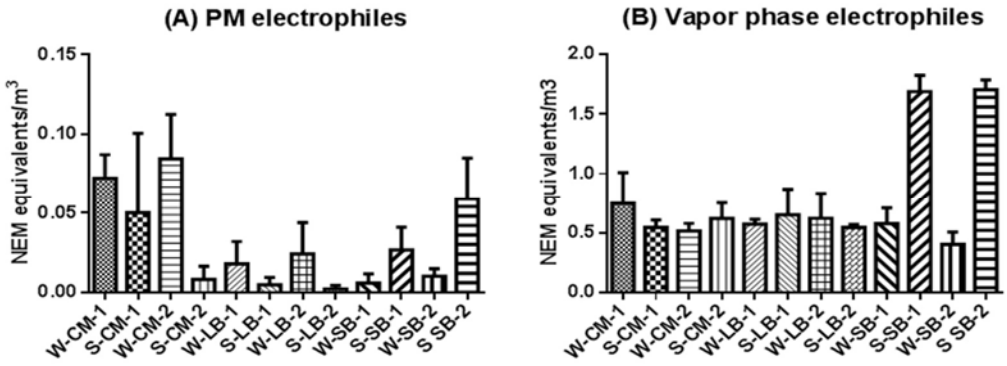
Figure 2 shows the chemical reactivities of particulate (PM2.5) and semi volatile organic species (XAD) in samples collected from sites neighboring railyards in Commerce, Long Beach and San Bernardino using a Tisch sampler to collect filter and XAD resin based volatile organic species (21).

Figure 2a Prooxidant content in PM2.5 and semivolatile organics (XAD) .



*The abbreviations used are W- winter, S-summer, CM Commerce, LB, Long Beach and SB, San Bernardino. Asterisks are used to denote p values for significance: 0.01 to 0.05, *; 0.001 to 0.01, **; < 0.001 *** to ****.*

Figure 2b Electrophile content in content in PM2.5 and semivolatile organics (XAD)



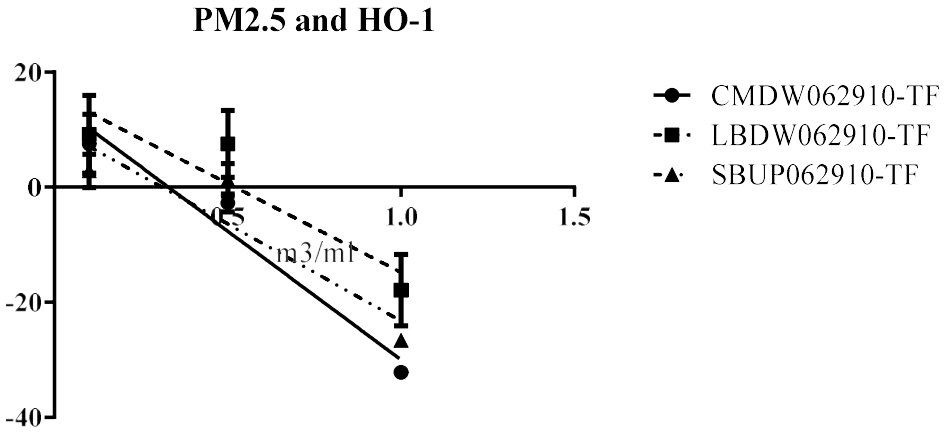
Wide differences in the distribution of the two reactivities were observed (note differences in Y axis scale) between the particle and vapor or semi-volatile organic phases. The ambient electrophiles were mostly in the vapor phase but the prooxidants were mostly in the particle

phase. Significant seasonal differences were observed for Commerce and Long Beach with the winter samples containing higher levels of prooxidant compared to the summer. The San Bernardino samples exhibited the opposite trend but it was not significant. The high winter sample prooxidant content could reflect the influence of the Santa Ana winds common in the Basin during the fall and winter. These winds typically move easterly from the mountains to the coast and could limit the movement of pollutants from downtown traffic and railyards in Commerce and Long Beach. That effect and the slightly lower temperature may result in retention of the reactive chemicals by the particles from these locations.

Celllular responses to PM2.5 and XAD resin extracts of summer samples collected in the Basin

The availability of the large scale samples of ambient air samples allowed us to examine cellular effects of selected samples with measured chemical reactivities. The first study examined the actions of summer San Bernardino samples because of their high reactivity compared to those from Commerce or Long Beach. Responses were measured at three different concentrations to permit analysis for linear relationships between concentration and response and expression of the potency of a given sample by the regression slope. This approach allowed us to identify a negative concentration response for particles and HO-1 expression, i.e., the particles exhibited a negative concentration dependency with minimal differences between the slopes of the concentration response curves (see figure 2). The negative values observed reflect differences between the "filter blank" and the particles on the sample filters and indicate the samples suppressed normal HO-1 expression. As the concentration of PM2.5 was increased, HO-12 levels decreased and at 1 m3/mL, were significantly lower than the control expression.

Figure 2 Effect of PM2.5 concentration on HO-1 induction.



Net expression, based on differences between PM2.5 and corresponding filter blanks, of HO-1 by cells following stimulation by PM2.5 samples.

This observation supported the notion of antagonism between inflammation and adaptation (figure 1), as the PM2.5 fractions increased TNFa expression (table 2). Furthermore, the biological potency of the samples on a per volume basis reflected the chemical reactivity. TNFa expression induced in macrophages by the particle phase increased in the order SB>CM≥LB which followed the order of prooxidant content, although the responses from the CM and LB samples were mostly if not altogether due to the lipopolysaccharide contents of the samples with minimal contributions from chemical sources. Table 2. Slopes of the concentration-marker protein concentration following a 16 hour stimulation by PM2.5 and XAD resin extracts of the 6/29 samples.

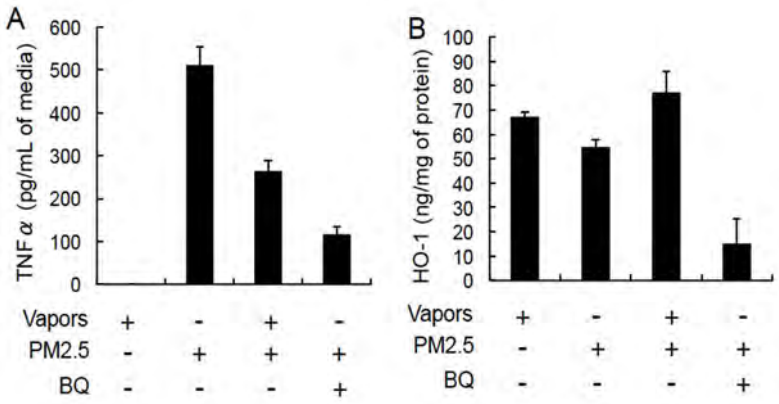
From samples of 6/29	**Commerce**	**Long Beach**	**San Bernardino**
PM 2.5 TNFa expression	18.7*X + 0.07	11.1*X - 0.38	413.9*X - 16.64
PM2.5 HO-1 expression	-44.69*X + 14.71	-30.88*X + 16.09	-33.67*X + 10.46
XAD HO-1 expression	34.49*X - 10.98	43.23*X - 12.14	182.4*X - 22.49
Units are ng HO-1 or pg TNFa per mg protein/m3 per mL			

We then tested whether the notion of TNFa and HO-1 antagonism could be demonstrated in PM2.5 and XAD extracts from the same air sample. Since the PM2.5 samples were

proinflammatory and the XAD samples adaptive, the inflammatory response should be suppressed if the cells were first exposed to the adaptive XAD sample. In the experiment, summarized in figure 3, cells were exposed to blank XAD extract and XAD extract from sample for 16 hours then the cells were washed and challenge with the particle phase for 16 hours and TNFa response measured (figure 3).

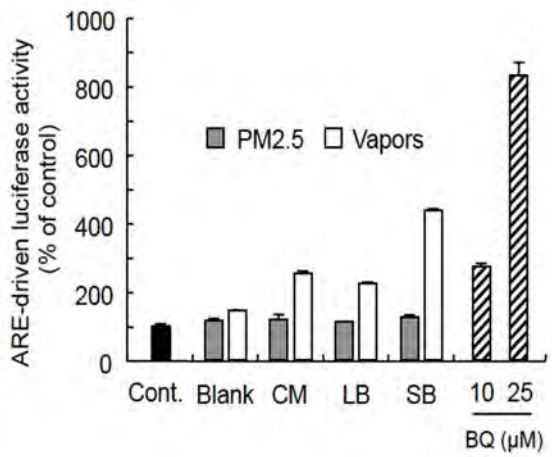
Interaction between XAD and PM2.5 samples; inhibition of the inflammatory response.

Figure 3



The results of the experiment showed indeed, that preexposure to XAD extract (identified as Vapors), reduced the subsequent TNFa response to PM2.5 exposure, i.e., components of the XAD extract suppressed the inflammatory response to the PM2.5 components by about 50%. The suppression is likely due to activation of the antioxidant/antielectrophile response element (ARE) as shown in experiments in which only vapor phase components activate the ARE (figure 4). This DNA element binds the transcription factor Nrf2 following its dissociation from the Nrf2-keap-1 complex, and in turn, increases the expression of HO-1 and other antioxidant proteins that serve to reduce the oxidative stress caused by prooxidants. In the figure, only the vapor phase increased the ARE driven luciferase activity. BQ is benzoquinone, which was used as a reference electrophile.

Figure 4. Stimulation of the ARE by XAD extracts (vapors) and benzoquinone (BQ).



Conclusions

The results of this study showed:

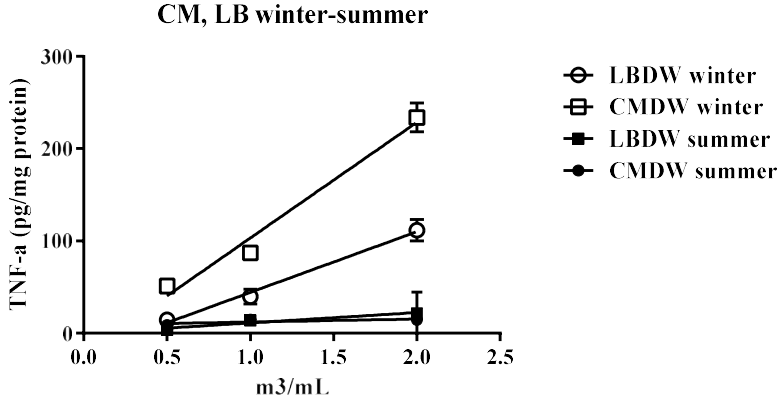
1. That the PM2.5 and semi-volatile organic components of ambient air samples with varying levels of prooxidants and electrophiles were capable of affecting the internal cell biology of macrophages with potencies that reflected chemical reactivity.
2. The PM2.5 prooxidants in the SB sample induced an inflammatory response, indicated by higher levels of TNFa and the semi-volatile organics induced HO-1 in a mouse macrophage preparation.
3. The induction of HO-1 by the semi-volatile organics reflects activation of the ARE through dissociation of the Nrf2/keap 1 complex. ARE activation results in increased antioxidant enzymes and other proteins that can serve to attenuate an inflammatory response, as demonstrated by preexposure of the cells to XAD extracts which suppressed the inflammatory response to PM2.5.
4. This result points out the role of volatile organics in the overall effects of ambient air on cells and, by extrapolation to, intact organisms. The net effect of chronic exposure to the mixture of particles and vapors could be an anti-inflammatory response resulting in a greater susceptibility to infections.

Seasonal differences in the cellular effects of PM2.5 from the Los Angeles Basin.

In contrast to the SB samples, the winter CM and LB PM2.5 samples had significantly higher prooxidant content compared to the summer samples (figure 1) and based on the results above, would be expected to exhibit greater inflammatory responses than those from the corresponding

summer. The sample from 11/12/2009 was used for this study. The values of the PM2.5 samples are shown in table XX

Winter PM2.5	DTT Activity	DTT/DTPA	DHBA	GAPDH
Commerce	0.960	0.147	0.336	0.128
Lomg Beach	0.590	0.000	0.451	0.000



Linear regression results

	LBDW winter	CMDW winter	LBDW summer	CMDW summer
Equation	Y = 65.81*X - 21.58	Y = 125.4*X - 22.30	Y = 11.25*X - 0.07500	Y = 3.264*X + 8.875
R square	0.974	0.9719	0.3437	0.4762

Linear regression analysis of the concentration-TNFa expression data indicated that the winter samples exhibited slopes that followed prooxidant content with Commerce higher than Long Beach. In contrast, the concentration dependency of TNFa expression was not deemed to have a significant slope, i.e, TNFa expression did not increase with concentration. In summary, winter samples from both CM and LB were proinflammatory with potencies that reflected their prooxidant content and the corresponding summer samples were inactive.

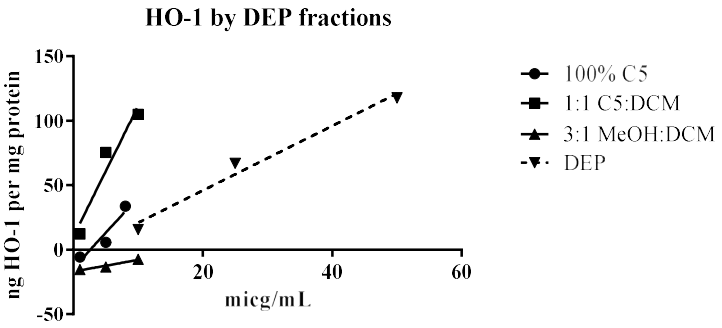
Fractionation of Japanese diesel exhaust particle (J-DEP) preparation

As stated above, we did not receive the DEP – vapor preparation that was to be provided by CE-CERT and were therefore unable to perform a fractionation as originally planned. However, to prepare for the samples, we began experiments to establish a fractionation protocol that could be used to prepare fractions for chemical and cellular analyses that could provide useful information

on the physical properties of the biologically active components of a test air pollutant sample. The procedure was a conventional sequential extraction that used solvents of increasing polarity starting with pentane then dichloromethane then methanol with mixtures of the solvents (Table 3). The cellular activities of each fraction were determined and recoveries determined using the mass following evaporation. The total cellular activity for a given fraction was defined as the product of the slope of HO-1 regression curve and the fraction mass. The nature of the chemical components of each fraction is shown in the 6th column. The TNFa responses were positive for the most polar fraction and the residue. DATA MISSING

Solvent	HO-1 regression	mass	total per fraction	% of total activity	Chemical groups present
	ng HO-1/micgmL^-1	mg	micg		
100% Pentane	Y = 5.508*X - 14.44	44.18	243.4	71%	Low MW PAHs, olefins, alkanes
50% Pentane/CH2Cl2	Y = 10.12*X + 10.20	8.66	87.5	25%	Quinones, PAHs
75% methanol/CH2Cl2*	Y = 0.8910*X - 16.89	14.97	13.3	4%	Quinones, phenols
Residue*	Negative values				Polar organics, metals
DEP	Y = 2.503*X - 4.132	67.81	344.2	100%	

The relationship between the HO-1 inducing capacity of the different fractions is shown in Figure 5.

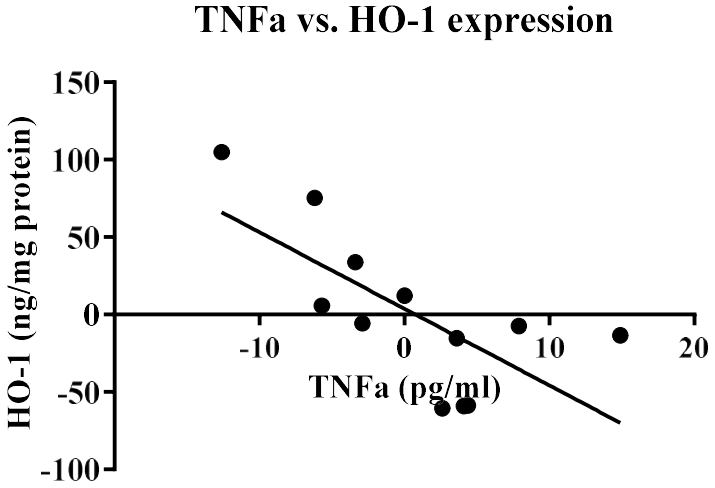


A DEP sample of about 100 mg was sequentially extracted with the indicated solvent mixtures and the extracts evaporated and used in subsequent cell assays. The cells were exposed to the fractions in concentrations that reflected the original sample

mass so that total activities could be estimated. The high recovery (327/256 or ~127%) may be due to the separation of the fractions, for example removal of TNFa inducing agents may increase the HO-1 inducing ability of the sample. .

Most of the HO-1 inducing capacity is associated with the non-polar solvent extracts, i.e., pentane and dichloromethane-pentane mixtures. The only significant TNF inducing activity was observed in the more polar methanol/DMC fraction and residue. These results suggest HO-1 induction is due primarily to non-polar compounds which include low molecular weight electrophiles such as reactive olefins and quinones that are active in the GAPDH assay. TNFa induction appears to be due to the more polar fraction and may be due to some quinones but more likely metals which are insoluble in non polar organic solvents but may be extractable by methanol if complexed with organic compounds such as polyphenols (4; 22). It should be pointed out that this DEP preparation has a high content of organic compounds, particularly quinones compared to other preparations we have examined (23) which may account for the dominant HO-1 response which could be suppressing the inflammatory response, as shown in figure 6.

Figure 6 Relationship between TNFa and HO-1 inducing abilities of the fractions of table XX



The HO-1 and TNFa expression values for the different concentrations of fractions used to generate table XX are shown with a regression line. Although the regression fit was poor (r2 = 0.49) the Pearson correlation coefficient (0.7) and p value (<.011) indicate they correlated well. This relationship has been observed with other samples examined in this study.

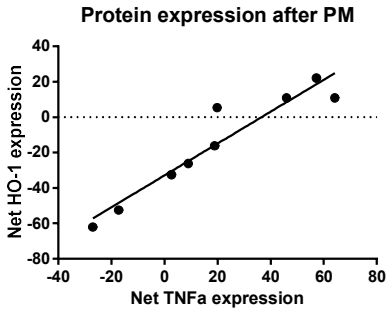
Conclusions

Preliminary extraction experiments using the cellular assay procedures on selected fractions of a commonly used Japanese DEP preparation (e.g., (10; 24-27)) showed the adaptive response to be associated with non-polar organic components and the inflammatory response with more polar organic and metal components. These observations suggest that this DEP preparation, with its high polar organic content, may be less inflammatory and more adaptive than ambient particles such as those found in the LA Basin. If this is a general property of diesel exhaust particles compared to ambient air PM2.5, there may be a difference in the primary response, i.e., the higher adaptive response associated with DEPs may contrast with the proinflammatory ambient PM2.5 from multiple sources.

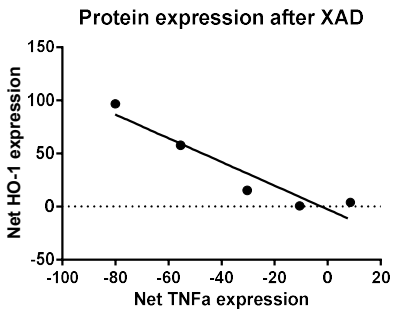
1. Studies of other air pollution samples

The notion of attenuation of inflammation by components of air samples was consistent with observations made in studies of biodiesel (figure 3) and cooking oil (figure 4) samples as part of collaborative study with the UCR College of Engineering Center for Environmental Research and Training (C E-CERT). Thus, analysis of the two phases, particulate and vapor (semivolatile organic species) of biodiesel exhaust showed that the volatile components were much stronger inducers of HO-1 (note difference in the values of the Y axis) , the adaptation marker and in the case of the vapor phase, were able to suppress the normal or background level of TNFa expression by the cells, evidenced by a negative correlation between the expression levels of the proteins. In contrast, the particle phase was capable of increasing TNFa expression beyond background levels but with much lower efficacy in HO-1 induction.

Figure 8A Comparison of adaptive and inflammatory responses to PM2.5 and vapors from biodiesel exhaust.



Plot of respective protein expression following exposure to PM from ULSD, AFME, Soy and WCO. r^2 + 0.952, p<0.0001



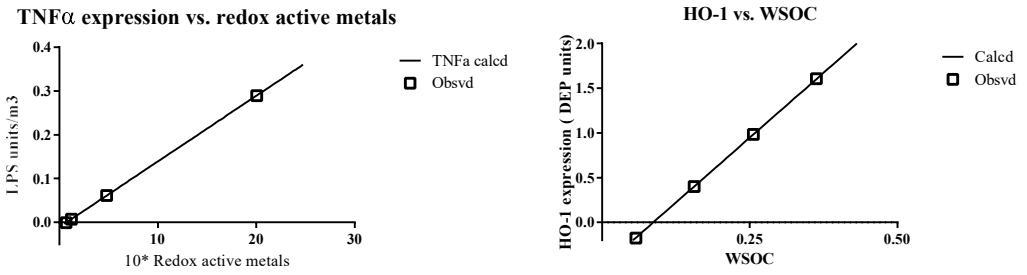
Plot of respective protein expression following exposure to XAD from ULSD, AFME, Soy and WCO. r^2 = 0.899, p<0.0014

The values shown are cellular responses to a fixed concentration of a different sample. Note the smaller negative values for TNFa expression from PM2.5 (-30 is smallest value) compared to XAD samples (-80 is the smallest value). Although the control expression of TNFa is suppressed by both phases, PM2.5 are weaker in their ability to induce HO-1 or promote adaptation. An inverse correlation between the expression of HO-1 and TNFa is shown, consistent with the antagonistic relationship between the two responses shown in figure 1.

In an attempt to assess the roles of redox active metals and water soluble organic species in the PM2.5, averaged values from the samples used here for the cell studies and those from the different samples used by CE-CERT were compared with the assumption that exhaust samples

from the same fuels would, on average contain the same components. The results from that assessment are shown in figure 8B, together with the best fit line from regression analysis. This analysis indicates that TNFa expression correlated with redox metal content and the HO-1 response correlated with water soluble organic compound content (WSOC).

Figure 8B Regression of HO-1 and TNFa responses of PM2.5 against chemical analyses (N = 4) .



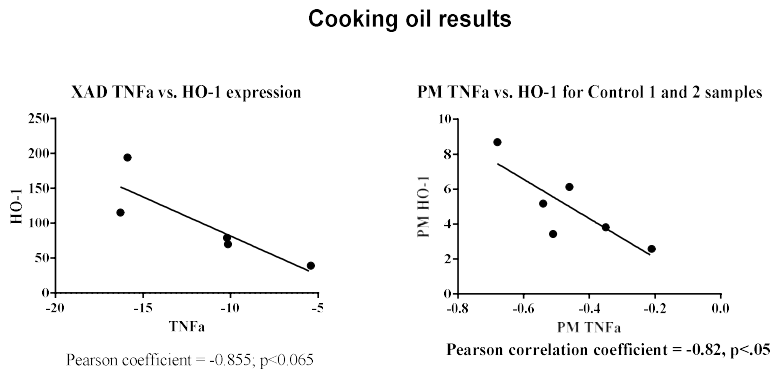
TNFα = 0.015*[Redox active metals] -0.011

HO-1 = 4.65*[WSOC] -0.41

The averaged TNFa response to the particle samples (expressed as LPS units) were compared to averaged redox active metal content for samples from the same fuels (Correlation coefficient was 0.95, with p<.05). Analogously, the HO-1 response with WSOC content of the sample with a correlation coefficient of 0.953 and p<.047)

Similar observations were made with samples from cooking oil smoke (figure 9). The chemical constituents of cooking oil smoke contain prooxidants and electrophiles but not necessarily the same compounds as those from engine exhaust. The vapor phase components induced HO-1 much more strongly than the particle phase but the relationship between the two protein markers was an inverse one with higher levels of HO-1 expression associated with greater suppression of TNFa expression.

Figure 9. Cellular responses to cooking oil particle and vapor phase samples.



Cells were exposed to the samples at fixed concentrations and the proteins measured by ELISA procedures. The negative values reflect the differences between the sample effect and that of a filter (PM) or the solvent (XAD) and are interpreted to reflect a net suppression of TNFa expression.

Chemical properties and cell responses

Using the available data, the potential for the DTT and GAPDH assays as predictors of the cellular response was assessed by determining Pearson correlation coefficients for the DTT values and the cell responses. We found positive correlations for DTT activity-based prooxidant content with particle based HO-1 (0.86; $p<.016$), TNFa (0.96; $p<.04$) for the biodiesel samples and HO-1 (0.905; $p<0.013$) for the cooking smoke samples. The vapor phase chemical reactivities did not correlate with either cell response. These results suggest that the prooxidant content of the particles could be predictors of cell responses but there is insufficient data to be conclusive.

Conclusions

The quantitative nature of the data obtained has provided the ability to compare and further characterize combustion based air pollutants from different locations, seasons and fuel sources. The results show that the analyzed samples contained common chemical reactivities and elicited similar biological activities but with quantitative differences. The major findings from the application of the assays are the following:

1. There are seasonal differences in the nature of ambient air samples which can affect the potential health effects. Specifically, the decrease in volatile organic species associated with the winter season may enhance the potential adverse effects of the particle phase.

2. The vapor phase with its semi volatile organic components has been largely ignored in studies of air pollution because of the focus on particulates. The results here show that the volatile fraction includes both prooxidants and electrophiles and reacts in the chemical and biological assays accordingly. The higher electrophile content observed may be responsible for adaptive responses associated with this fraction. It is possible however, that adaptation could result in suppression of the immune system resulting in a greater susceptibility to infections. Thus, the vapor phase of air pollution mixtures is clearly an important component of the exposome that should be monitored and studied.
3. There appears to be an inverse relationship between the inflammatory and adaptive responses by the cells upon exposure to the samples, with the vapor phase components more effective in promoting the adaptive response. One interpretation of this finding is that the vapor phase components reduce the inflammatory or potential adverse health effects of the particles. Thus, when assessing the health effects of air pollution mixtures, the combined effect of both particle and vapor phases need to be examined.
4. The relationship between the inflammatory and adaptive responses were discernable because of the quantitative nature of the assays performed and demonstrate the importance of quantitative data. However, cellular responses are variable so that values from separate experiments are often difficult to compare. To address this variability, we are now collecting data with selected agents to identify appropriate standards.

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From: Froines, John <jfroines@ucla.edu>
Sent: Thursday, August 25, 2016 12:33 PM
To: Jo Kay Ghosh
Subject: FW: relevant references
Attachments: Detailed summary for JF_NL_Asthma.docx; DEP_Ozone_Alexis N-2014.pdf; Outdoor air pollution_Balmes JR-2014_highlighted.pdf

Dear Jo. Here are more relevant referemces. I hope they are useful. The Balmes paper is particularly good.
John

The following attachment(s) were included with Comment Letter #19 submitted by Dr. John Froines. Due to copyrights held by publishing entities, SCAQMD cannot reproduce the following attachments, however, interested parties can obtain access at the links provided below:

Alexis, N. E. and C. Carlsten (2014). "Interplay of air pollution and asthma immunopathogenesis: a focused review of diesel exhaust and ozone." Int Immunopharmacol **23**(1): 347-355

http://www.sciencedirect.com/science/article/pii/S1567576914003233

Guarnieri, M. and J. R. Balmes (2014). "Outdoor air pollution and asthma." Lancet **383**(9928): 1581-1592.

http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)60617-6/abstract

A hard copy of copyrighted material, as provided by the submitter, is available for viewing by request and in person by contacting:

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Summary for JF

DEP, ozone, asthma

Alexis NE[1], Carlsten C[2]. *Interplay of air pollution and asthma immunopathogenesis: a focused review of diesel exhaust and ozone. Int Immunopharmacol. 2014 Nov;23(1):347-55.*

Diesel:
"In summary, research over recent decades suggests that diesel exhaust can enhance allergen-driven airway immunopathology, but the ability of diesel exhaust to do so appears highly dependent on a wide range of variables and the evidence is stronger for the exacerbation of an existing disease than for the development of a new disease. To the extent that this enhancement occurs, the augmentation of Th2-type immunity seems a common element, but a diversity of mechanisms have been implicated and our perspective regarding mechanisms is evolving rapidly in face of an explosion of basic knowledge regarding immunity and genetics."

Ozone:
"Although not all studies support the assertion that asthmatics (compared to non-asthmatics), have increased susceptibility to the deleterious effects of air pollution, several human and animal exposure studies, both past and recent, have shown that asthmatics have heightened immuno-inflammatory responses to air pollutants like PM2.5–10 [39] and ozone [40–43]. Several factors likely play a role in contributing toward the predisposition of asthmatics to the adverse health effects of ozone, but chief among them are constitutively altered innate immune function [44–46]; other factors may include depleted antioxidant defense capabilities [47]."

"In summary, there is mounting evidence that air pollutants such as diesel exhaust and ozone impact both inflammatory and immune responses in the airways of asthmatics. The interplay therefore between these air pollutants and asthma immunopathogenesis is an ongoing concern in terms of understanding how exposure to these agents can lead to worsening of disease. Key innate immune cells in the airways such as macrophages, monocytes, dendritic cells, eosinophils and neutrophils are adversely affected following exposure to diesel exhaust and ozone, and both pollutants have priming capabilities making exposure to subsequently inhaled allergens or pathogens more problematic for those with pre-existing airway disease. Adding to the issue is the fact that asthmatics may be pre-disposed to the deleterious effects of pollutants like ozone, having constitutively modified host defense functions and gene signatures. More research is needed to better understand the interplay between air pollution and asthma immunopathogenesis."

Guarnieri M[1], Balmes JR[2]. *Outdoor air pollution and asthma. Lancet. 2014 May 3;383(9928):1581-92.*

"In view of the burden of asthma attributed to outdoor air pollution, a better understanding of why asthmatic individuals are susceptible to this exposure should enable the design of effective preventive strategies. The idea that air pollution can cause exacerbations of pre-existing asthma is supported by an evidence base that has been accumulating for several decades,[7–10] but evidence has emerged that suggests air pollution might cause new onset asthma as well.[11–21]"

"Why are individuals with asthma so aff ected by exposure to air pollution? At the lower concentrations that are more typical in high-income countries, other mechanisms are probably in operation. Specific pollutants can induce airway inflammation (eg, ozone, nitrogen dioxide, and PM <2.5 μm in diameter [PM2.5])[23–28] and airway hyper-responsiveness (ozone and nitrogen dioxide),[23,29] two characteristic features of asthma. In addition, oxidative stress (a feature of severe asthma) has been associated with pollutant exposures (ozone, nitrogen dioxide, and PM2 · 5).[30–32] Therefore, exposure to these pollutants is unsurprisingly associated with exacerbations and possibly even the onset of asthma."

“A framework for how air pollution might contribute to the development and exacerbation of asthma proposed by the UK’s Committee on the Medical Effects of Air Pollutants identified four main mechanisms: oxidative stress and damage, airway remodelling, inflamatory pathways and immunological responses, and enhancement of respiratory sensitisation to aeroallergens (figure 2).[33] Variation in the genes that regulate these mechanisms could confer increased susceptibility to development of new-onset asthma or exacerbations of existing disease with exposure to air pollution.”

“Because the pollutants of interest, including TRAP, can cause oxidative stress, the ability of antioxidant defences to handle the increased load of reactive oxygen species generated in the lungs after exposure is an important determinant of risk for subsequent adverse effects. Specific polymorphisms in antioxidant enzyme genes, such as glutathione S-transferase genes, GSTM1 and GSTP1, can modify risk of asthmatic responses to pollutants[34,35] and these variants (GSTM1 null and GSTP1 Ile105Val) might also interact with a tumour necrosis factor (TNF) promoter variant (G-308A) that affects expression of TNF and hence the early infl amatory response.36 Additionally, neonatal rats are more prone to oxidative stress from PM exposure at least in part due to relative defi ciency of nuclear factor-like 2 (Nrf2).[37]”

Particulate Matter:

“The composition and size distribution of PM varies according to the source, whether it is natural or anthropogenic, and whether it is derived from combustion or not.[50] Transition metals, polycyclic aromatic hydrocarbons, and environmentally persistent free radicals are constituents of PM of special interest because of their potential to cause oxidative stress and many of the phenotypic changes associated with asthma. Additionally, PM frequently contains various immunogenic substances, such as fungal spores and pollen, which have been independently associated with exacerbation of asthma symptoms.[51,52]”

“Experimental exposure to PM results in oxidative stress, airway hyper-responsiveness, and airway remodelling, either alone or in combination with allergic sensitisation.[53] Short-term exposure to ambient PM2.5 and PM of diameter 2.5–10 μm in prospective cohorts of asthmatic children and adults has been associated with asthma symptoms, especially in children with allergic sensitisation.[54,55] Long-term exposure to PM is associated with poorly controlled asthma and decrements in lung function in children and adults.[30,56]”

Gases:

“In view of the central role of oxidative stress in asthma morbidity associated with air pollutants, oxidising gases continue to be an area of substantial research.”

“Responses to controlled exposure of short-term ozone and sulphur dioxide at relevant concentrations have been studied extensively. Ozone exposure results in airway inflammation, airway hyper-responsiveness, and decrements in lung function in healthy and asthmatic adults,[23] whereas sulphur dioxide causes more prominent bronchoconstriction, especially in asthmatic individuals (table 1).[68]”

“By contrast with the inconsistent experimental data on nitrogen dioxide, the body of observational data supporting its role in the exacerbation of asthma and asthma incidence continues to grow in breadth and consistency. Studies of asthmatic children and adults in the past 5 years have identified associations between nitrogen dioxide and symptoms of asthma,[54,72] reduced response to bronchodilators,[73] decrements in lung function,30 and exacerbation of asthma.[57,60,62] Notable, several studies have identified an increase in asthma incidence or prevalence associated with exposure to nitrogen dioxide.[11–15].”

“Although short-term exposure to ozone has been well documented as a cause of asthma exacerbation in adults and children,[58,78] whether long-term exposure can lead to new-onset asthma is somewhat less clear. Studies of adult-onset asthma have identifi ed an increased risk associated with ozone exposure, although this effect was restricted to male individuals.[79,80] In children, ozone has been associated with incident allergic sensitisation, a known risk factor for subsequent asthma, and prevalence of wheeze and

asthma as diagnosed by a doctor.[65,81] Studies of asthma incidence in children have identified an association with ozone, although the risk might be confined to heavily exposed, physically active children.[15,82] Taken together, the available evidence suggests that ozone might be a cause of new-onset asthma in some subgroups of children."

"Notably, the phase 3 ISAAC study, representing over 500,000 children and adolescents across five continents, identified a dose-response association between symptoms of asthma (ever asthma, current wheeze, and severe asthma symptoms) and self-reported exposure to truck traffic.[6] Effects of short-term ambient exposure to PM2.5, nitrogen oxides, and carbon monoxide were increased by exposure to higher than median modelled traffi c exposure, showing the strength of considering both regional air pollution and long-term TRAP exposure in studies of health effects.[95] A study[72] of two communities in Southern California estimated that reductions in traffic-related nitrogen dioxide and ozone to background levels would reduce bronchitic episodes in asthmatics by 36–70%. The London Low Emission Zone provides an opportunity to study the impact of reduced TRAP on asthma morbidity.[96] Collectively, these data suggest that TRAP exposure, especially in urban areas, has a tremendous effect on disease morbidity in individuals with asthma."

Risk modefiers:
"Young children with asthma have long been regarded as a group who are very susceptible to adverse effects from air pollution because of their developing lungs, immature metabolic pathways, high ventilation rates per bodyweight, and increased time exercising outdoors.[99,100]"

"Dietary factors can play a part in susceptibility to pollutant effects independent of socioeconomic status. The body of evidence on the protective eff ects of a diet high in fruits and vegetables and of antioxidant vitamin supplements is sufficient to support an important role for oxidative stress in the pathways by which outdoor air pollution adversely affects asthma.[109–111] Obesity might also increase susceptibility to the adverse effects of air pollution.[112–114]".

Clinical implications:
"Patients with asthma should ideally live at least 300 m from major roadways, especially those with heavy truck traffic. TRAP can exacerbate asthma,[10,120] but concentrations of motor vehicle emissions such as ultrafine PM and black carbon particles decrease substantially by 300 m.[121] In-vehicle exposure during commuting with open windows can also be very high.[122]"

From: Cho, Arthur <ACho@mednet.ucla.edu>
Sent: Thursday, August 25, 2016 4:19 PM
To: Jo Kay Ghosh
Subject: Commentary
Attachments: 160825 Commentry by AKC.docx

Hi Jo Kay
John Froines has suggested I send you my comments in a more formal commentary. Let me know if you have questions.
Best regards
Art Cho

UCLA HEALTH SCIENCES IMPORTANT WARNING: This email (and any attachments) is only intended for the use of the person or entity to which it is addressed, and may contain information that is privileged and confidential. You, the recipient, are obligated to maintain it in a safe, secure and confidential manner. Unauthorized redisclosure or failure to maintain confidentiality may subject you to federal and state penalties. If you are not the intended recipient, please immediately notify us by return email, and delete this message from your computer.

Commentary by Arthur K. Cho

On the current status of air pollution research.

1. A recent review by Kelly and Fussell (1) summarized important issues in the status of current air pollution research. In it the authors indicated the following issues to be addressed in the future:
    a. Identify what it is in ambient PM that affects health—information that in turn will inform policy makers how best to legislate for cleaner air.
    b. A better understanding of exposure and health effects plus further progress in comparing and synthesizing data from existing studies is therefore needed before concluding that additional indicators (be they BC or UFPs) have a role in protecting public health more effectively than the targeting total PM mass
    c. To unravel the underlying biological basis of toxicity by identifying pathways that ultimately link pollution-induced pulmonary and systemic oxidative stress with an associated risk of cardiovascular and obstructive pulmonary diseases.
2. Comments:
    a. There have been many studies examining air pollution content which have demonstrated, for example, that metals and quinones are associated with the adverse effects attributed to PM. What is lacking is a methodical and quantitative assessment of the relationship between these measurements and biological effect. For example, the studies that have examined the toxicity of air samples have not "resynthesized" the toxic components, i.e., have not examined the toxicity of the proposed toxins in studies that used the concentrations of the proposed metal(s) found in PM and compared the effects with those of the actual PM sample.
    b. Perhaps a study with better coordination between experimental and epidemiological studies is needed, i.e., a study in which quantitative air pollutant data is collected in sites at which epidemiological studies were performed. The SC PM center performed such a study in collaboration with the Children's Health Study group at USC but the results were too preliminary and lacked a better evaluation of potential toxicity. This study needs to be repeated with different experimental measurements.
    c. Investigators are addressing this issue of the biological basis for the effects with in vivo and in vitro studies using experimental animals. Jesus Araujo at UCLA is one such investigator of whom I am aware, but there are many others.
3. Ovrevik et al., (2) have reviewed findings on the proinflammatory responses to PM and raise the very important point that the causal components may not be pro-oxidants but instead other chemical species that indirectly increase the oxidative state of cells.
    a. Comment: There is evidence that electrophiles can induce an oxidative stress state by depleting cellular reducing agents such as glutathione, hydrogen sulfide and other polysulfides. Electrophilic metals such as zinc as well as organics can affect cells in this way.
4. On Carbon monoxide (3)

a. Comment: Although commonly thought of as a hemoglobin binding toxin, carbon monoxide is also a so-called gasotransmitter, a term used to describe small molecules such as CO, NO and H_2S which are intracellular signaling molecules. The compound is generated by hemeoxygenase-1 in the degradation of heme to carbon monoxide, bilirubin and water. The CO generated is an effective antioxidant acting in part by binding to heme proteins such as cyclooxygenases that generate inflammatory cytokines. Thus, CO toxicity is clearly concentration dependent and at low concentrations is beneficial to the cell.

5. My thoughts on the current needs:
    a. As I stated in my report on quantitative measurements in air pollution research, a systematic collection and analysis of air samples is needed in which the results can be used to compare and assess the relationships between the chemical and biological findings. Such a study is needed in the Los Angeles Basin which has communities whose atmosphere could be distinct. For example, the importance of vanadium and nickel as components of ship engine exhaust and as exudates of oil refineries can be examined by collection of air samples near the Los Angeles Harbor, Carson and El Segundo as sources to be compared with air samples collected in San Bernardino as a photochemically generated pollutant mixture and Commerce as a vehicle exhaust source.
    b. In such a study, however, simple toxicity studies are not likely to be fruitful; a careful fractionation based study of the samples is needed to address the issue of the total particle as opposed to the individual metals. There is evidence to suggest that the metals have greater bioavailability because they are complexed with organic compounds; the resulting metal-organic complex may have greater intracellular access. Accordingly, studies examining the role of such complexes are needed.
    c. Finally, as we now understand that any concentration of air pollution has adverse health effects, we must also recognize that while controls may decrease pollutants in our atmosphere, they will be with us for the foreseeable future. Perhaps we should be thinking about ameliorating the exposure we know to exist by providing the general public with knowledge and sources of antioxidants such as flavonoids and garlic extracts, the latter being a source of the anti-inflammatory hydrogen sulfide.

References

1. Kelly FJ, Fussell JC. 2015. Air pollution and public health: emerging hazards and improved understanding of risk. *Environ Geochem Health* 37:631-49
2. Ovrevik J, Refsnes M, Lag M, Holme JA, Schwarze PE. 2015. Activation of Proinflammatory Responses in Cells of the Airway Mucosa by Particulate Matter: Oxidant- and Non-Oxidant-Mediated Triggering Mechanisms. *Biomolecules* 5:1399-440
3. Otterbein LE, Bach FH, Alam J, Soares M, Tao Lu H, et al. 2000. Carbon monoxide has anti-inflammatory effects involving the mitogen-activated protein kinase pathway. *Nat Med* 6:422-8

From: Bill <BillLaMarr@msn.com>
Sent: Friday, August 26, 2016 3:14 PM
To: Jo Kay Ghosh
Subject: COMMENT LETTER-2016 AQMP-APPENDIX I HEALTH EFFECTS
Attachments: comment Ltr-2016AQMP.APX-I-08262016.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dr. Ghosh –

Per your request, attached is my comment letter on Appendix I of the 2016 AQMP. If you have any questions regarding the, se comments, please do not hesitate to contact me to discuss.

I want to thank you, and the Home Rule Advisory Group, for selecting me once again to serve on this important council.

Sincerely,

Bill La Marr
Executive Director
California Small Business Alliance

CALIFORNIA Small Business Alliance
Dedicated to Environmental Progress and Economic Growth

August 26, 2016

Jo Kay Ghosh, PhD
Health Effects Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: Comments on Appendix I Draft 2016 A3ir Quality Management Plan

Dear Dr. Ghosh:

I appreciate the opportunity to represent the Home Rule Advisory Group (HRAG) on the Advisory Council and submitting comments on the draft Health Effects Appendix. My comments are focused primarily on Ozone (O_3, and $PM_{2.5}$, as they are set forth in Appendix I of the 2016 Draft Air Quality Management Plan (AQMP). Speaking on behalf of the HRAG, we understand that the AQMP promises to have significant impacts on all who are participating in the process applaud the time and effort required to produce a science-based and economically feasible plan.

Following are my comments:

Notwithstanding Staff's admonition for the Council to focus our review and comments solely on health effects, as reported in Appendix I, I found it too much of a challenge to ignore such important elements as the cost and practicality of basing the likelihood of meeting the emission reduction commitments in the AQMP based solely on the findings in the draft Appendix. Recognizing that the total implementation costs of the Draft 2016 AQMP are projected to be:

SCAQMD Stationary Source	$ 8.0	(billions of 2015 dollars)
SCAQMD Mobile Sources	$ 1.5	(billions of 2015 dollars)
CARB Mobile Source	$28.7	(billions of 2015 dollars)
Total:		$38.2 (billions of 2015 dollars)

20-1

and accepting the fact that the District and the sources it regulates will be held accountable for achieving the emission reductions commitments associated with these costs, I strongly urge Staff to seriously consider these constructive remarks and recommendations:

- **HEALTH EFFECTS OF AIR POLLUTION**

  - In the recent three AQMPs (2007, 2012, 2016), as well as the 1997 AQMP, Staff has asserted that ambient air pollution is a major cause of public health concern. And most would agree. It is confusing - to me at least - that while Staff has added

Table I-1 in the current Appendix I, to support the addition of a few more recent review articles discussing the health impacts of Ozone, $PM_{2.5}$, NO_2, and SO_2, on the Southern California population, that the weight of evidence descriptors for causal determination of [adverse] health effects seems to call in to question the reliability of the findings and conclusions reported in these research papers. For example, most of the determinations made by U.S. EPA regarding the causality of air pollution health effects, is that there is "**likely** to be a causal relationship," "**suggestive** of a causal relationship," "**not likely** to be a causal relationship" or "**inadequate to infer** a causal relationship." On its face, the degree to which important uncertainties seem to permeate the research cited in Appendix I, strongly suggests that **more definitive research is urgently needed, especially in an AQMP that is projected to cost regulated sources $38.2 billion dollars, reduce health impacts, and improve air quality.**

20-1 Con't

- **OZONE**

  - In the process of updating Appendix I, I commend the Staff for including EPA's lowering the 8-hour ozone standard to 0.070 ppm.
  - In reviewing Table I-2, Summary of Causal Determinations for Short-Term Exposures to Ozone, I observed similar uncertainty in the assignment of causal determinations for the following health categories:

    - ✓ Cardiovascular Effects – **Likely** to be a causal relationship
    - ✓ Central Nervous System Effects – **Suggestive** of a causal relationship
    - ✓ Effects on Liver and Xenobiotic Metabolism – **Inadequate** to infer a causal relationship
    - ✓ Effects on Cutaneous and Ocular Tissues – **Inadequate** to infer a causal relationship, and most important……
    - ✓ Mortality – **Likely** to be a causal relationship

    Again, it strongly suggests that **more research is urgently needed,** especially in an AQMP that is projected to cost regulated sources $38.2 billion dollars, reduce health impacts, and improve air quality.

    20-2

  - In reviewing Table I-3, Summary of Causal Determinations for Long-Term Exposures to Ozone, I observed even more **uncertainty in the assignment of causal determinations** for the following health categories:

    - ✓ Respiratory Effects – **Likely** to be a causal relationship
    - ✓ Cardiovascular Effects – **Suggestive** of a causal relationship
    - ✓ Reproductive and Developmental Effects – **Suggestive** of a causal relationship
    - ✓ Central Nervous System Effects – **Suggestive** of a causal relationship

Once again, it strongly suggests that **more research is urgently needed**, especially in an AQMP that is projected to cost regulated sources $38.2 billion dollars, reduce health impacts, and improve air quality.

20-2 Con't

- Finally, among the **scientific studies** cited in the paragraph entitled: Long-Term Effects of Ozone; many of which or all were **conducted at locations other than California/Southern California**, we were glad to see an almost imperceptible reference to smoking as one of a number of behavioral and demographic factors accounting for increased risk of all-cause, cardiovascular, and respiratory mortality. Curiously, **the causal relationship between smoking and morbidity and mortality are far more conclusive than the causal relationship between ozone and the health categories mentioned previously**.

  According to the CENTER FOR DISEASE CONTROL:

  - ✓ 16 million Americans are living with a disease caused by smoking.
  - ✓ For every person who dies because of smoking, at least 30 people live with a serious smoking-related illness.
  - ✓ Smoking causes cancer, heart disease, stroke, lung diseases, diabetes, and chronic obstructive pulmonary disease.
  - ✓ **Cigarettes are responsible for more than 480,000 deaths per year in the U.S.**
  - ✓ **42,000 people die annually from second-hand smoke.**
  - ✓ Smokers die, on average, 10 years earlier than non-smokers.

  (CDC Statistics as of 2015)

20-3

- **PARTICULATE MATTER**

  - I commend Staff for acknowledging that in spite of U.S. EPA setting standards for $PM_{2.5}$ in 1997, lowering them in 2006 to 35 ug/m3 for a 24-hour average and reaffirming 15 ug/m3 for annual average standard, and again revising the average annual standard in 2012 to 12.0 ug/m3, **there continues to be considerable controversy and debate surrounding the review of particulate matter health effects and the consideration of ambient air quality standards**. Staff also mentions that: "*numerous studies have been published and some of the key studies were closely scrutinized and the data reanalyzed by additional investigators*." Staff goes on to write: "*The reanalyses confirmed the original findings, and there are now additional data confirming and extending the range of the adverse health effects of* $PM_{2.5}$ *exposures.*"

20-4

- **SHORT-TERM EXPOSURE EFFECTS OF PM**

  - While we commend Staff for citing some recent epidemiological studies on morbidity and mortality, on Page I-19 of the Appendix, they appear to be on PM10, and involve populations in Europe, Asia, and South America. Apparently

there was also a study "*.... involving communities across the U.S.*," but **it isn't clear that any of these communities were located in Southern California, and that the findings are applicable to our local population**.

20-4 Con't

- On Pages I-20 – I-21 of the Appendix, Staff cites a National Morbidity, Mortality, and Air Pollution study of 20 of the largest U.S. cities. It is reported that the findings determined a combined risk estimate of about a 0.5% increase in total mortality for a 10 ug/m3 increase in PM10 (Samet et al 2000a). A further reading of the conclusions reached by Samet reveals that there were a number of confounding findings with regard to the extent by which PM10 contributes to mortality rates. Samet attributes some of the confusion to a software package with inappropriate default settings. Curiously, in a reanalysis of the 90 city study (Dominici et al 2002L Health Effects Institute 2003), where the estimates were recalculated, **the estimate changed from 0.41% increase in mortality for a 10 ug/m3 increase in PM10 to a 0.27% increase.**

20-5

- On Page I-23 of the Appendix, Staff writes that: "*The relative importance of both $PM_{2.5}$ and PM10-2.5 may vary in different regions depending on the relative concentrations and components, which can also vary by season.*" "*A major knowledge gap is the relative paucity of direct measurements of PM2.5-10.*" To their credit, Staff goes on to write: "***More research is needed better access the relative effects of coarse (PM10-2.5) fractions of particulate matter.***" This is exactly what we are advocating throughout these comments.
- Finally, on Page I-25 of the Appendix, Staff writes: "*Some studies have examined the health effects of short-term exposures to specific PM constituents and sources (Lippman 2014; Basagana et al 2015; Atkinson et al 2016). While there is some evidence suggesting possible links with specific constituents or sources, such as diesel exhaust, sulfates (related to coal combustion), and certain metals,* ***the U.S. EPA determined there were not enough studies evaluating the short-term constituents of source-specific exposures at the time of previous Integrated Science Assessment to be able to make a causal determination*** **(U.S. EPA 2009)."**

20-6

LONG-TERM PARTICULATE MATTER EXPOSURES AND MORTALITY

- Our review of this part of Appendix I revealed more controversy and debate over the association of and exposures to $PM_{2.5}$ (Page I-26). **While a number of studies are cited, and a few claim to include some Southern California cities, most studies seem to involve cohorts in other regions of the U.S, like the Harvard Six Cities Study, and there seems to be an abundance of strong scientific opinions that contradict each other.**

20-7

SUMMARY - PARTICULATE MATTER HEALTH EFFECTS

- Our reading of this segment of Appendix I (Page I-41), suggests that **Staff may be experiencing some of the frustration that those in the business community have long felt**. While **Staff seems to favor the body of epidemiological studies that point to PM as causing thousands of deaths per year, and thousands more hospitalizations for a variety of diseases, they do concede that**

20-8

coexisting pollutants contribute to increases in cases of morbidity and mortality in the community. This should be another clarion call for more and balanced research before the business community is presented with a bill for $38.2 billion dollars.which

20-8 Con't

At the meeting of the Advisory Council, Staff presented us with some materials from **Dr. James E. Enstrom, a renowned and respected epidemiologist. We also had the opportunity to hear some of his theories and conclusions about the health effects of PM which contradict those made by Staff.** And while his remarks were made in haste, due to time constraints imposed by the Staff, it was clear to me at least that **his research has been acknowledged by scores of reputable scientists across the U.S.** In view of the controversy that exists over the health effects of PM, and the **highly suspicious methodology that Staff insists on using to factor the value of a human life and the price that society is willing to pay to avoid cancer, I strongly recommend that an opportunity be given for all stakeholders to actually hear and evaluate the scientific findings by Dr. Enstrom and some other scientists before the 2016 AQMP is adopted.**

20-9

To add emphasis to this request**, I have attached a comment letter by Jonathan M. Samet, MD, MS - Professor and Flora L. Thornton Chair, Dept. of Preventive Medicine, Keck School of Medicine of USC, and Director, USC Institute for Global Health**. The letter was written in response to a request by Dr. Jean Ospital, former AQMD Health Effects Officer, wherein Dr. Samet was invited to critique Appendix I of the 2012 AQMP. To avoid any confusion, I have attached only the letter and transmittal form. Originally, Dr. Samet attached his comments on a complete copy of the Appendix. I have assumed that Staff has a copy of the complete document on file. If not, I will be happy to transmit it to you.

20-10

You will note that while **Dr. Samet agrees that coverage of criteria pollutants, ultrafine particulates, and toxic air contaminants are appropriate to the development of the AQMP, he questions the degree to which the District is able to act impartially when presenting ALL scientific conclusions.**

In closing, I want to express my sincere appreciation for inviting me to serve once again on the AQMP Advisory Council, and comment on this important Appendix to the 2016 AQMP

Sincerely,

Bill La Marr
Executive Director
California Small Business Alliance

Keck School of Medicine of USC

Department of Preventive Medicine
Jonathan M. Samet, MD, MS
Professor and Flora L. Thornton Chair
Director, USC Institute of Global Health

September 25, 2012

Jean Ospital, MPH, PhD
Health Effects Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Dear Jean,

As you requested, I attach comments concerning the Health Effects Appendix of the District's draft Air Quality Management Plan. Please do not hesitate to contact me if you have questions with regard to these comments.

Yours sincerely,

Jonathan M. Samet, MD, MS
Professor and Flora L. Thornton Chair
Department of Preventive Medicine
Director, USC Institute for Global Health

University of Southern California
2001 N. Soto St., SSB 330A, MC 9239, California 90089-9239 • Tel: 323 865 0803 • Fax: 323 865 0854

Review: Health Effects Appendix
South Coast Air Quality Management District
Jonathan M. Samet, MD, MS

General Comments:

This relatively brief document provides an overview of the health effects of various air pollutants, giving emphasis to pollution by airborne particulate matter. The document also covers other "criteria pollutants" as well as ultrafine particulate matter and toxic air contaminants. This range of topics is appropriate to the development of an Air Quality Management Plan.

As presented, the document represents a summary, and an apparent updating of an earlier report. It is necessarily selective in its coverage and relies to an extent on the review documents prepared by the US Environmental Protection Agency for the "criteria" pollutants. I have the following general comments:

- Preparation of reviews of the health effects of air pollution is a daunting task, given the extensive data available and its continuing and rapid accrual. The South Coast Air Quality Management District is not well positioned to prepare a comprehensive and up-to-date review. Consequently, there are deficiencies of this review related to its scope and timeliness. The basis for the document's development is provided in the last paragraph on page I-2. While the statement is clear, the methods are not fully transparent. In particular, several older reviews are mentioned, along with more recent documents from the US Environmental Protection Agency and several prepared by the California EPA. I suggest that more careful attention be given to describing the basis for this review and to consideration of its methodology. For example, given the complexity and scope of the literature, the developers of the review might rely solely on summary documents or to also summarize documents and research published based on studies in California. In the present version, I could not readily identify why particular studies were included.

- I understand that the South Coast Air Quality Management District is required to provide a review in support of its air quality management plan. As stated, the California Health and Safety Code Section 40471(b) requires the preparation of report on "the health impacts of particulate matter in the South Coast Air Basin (SCAB) in conjunction with the preparation of the Air Quality Management Plan revisions." This document does not directly address the health impacts, if some quantification of burden is implicit in the requirement. The identification of health effects and selected of examples of risks from the literature represents a starting point in estimating the health impact. As noted in my next comment, the review might have establishing the relevance of the broad body of evidence to the South Coast Air Quality Management District as one objective.

- There is an extensive literature on airborne particulate matter and health, as well as on the risks of various other air pollutants. One question that might be reasonably addressed in this report is the generalizability of findings from this broad literature to California. Here, a careful review of studies in California might be of benefit. Additionally, considerations might be given to the mixture of pollutants in the South Coast Air Basin to support conclusions about the generalizability of findings.

- The document needs further editing in part to improve clarity and in part to bring in some of the most recent and relevant references. Additionally, if the most recent US EPA documents are to be used as the basis of the report, some updating is needed.

Specific comments:

See attached.

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Bill La Marr
Executive Director
California Small Business Alliance

Keck School of Medicine of USC

Department of Preventive Medicine
Jonathan M. Samet, MD, MS
Professor and Flora L. Thornton Chair
Director, USC Institute of Global Health

September 25, 2012

Jean Ospital, MPH, PhD
Health Effects Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

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Yours sincerely,

Jonathan M. Samet, MD, MS
Professor and Flora L. Thornton Chair
Department of Preventive Medicine
Director, USC Institute for Global Health

University of Southern California
2001 N. Soto St., SSB 330A, MC 9239, California 90089-9239 • Tel: 323 865 0803 • Fax: 323 865 0854

Review: Health Effects Appendix
South Coast Air Quality Management District
Jonathan M. Samet, MD, MS

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Specific comments:

See attached.

Afif El-Hasan, MD
513 E. 1st St., Suite B
Tustin, CA 92780

August 26, 2016

Dear AQMP committee,

I am in full support of the data as presented in the 2016 AQMP, Appendix 1, and I agree with the conclusions reached based on the accrual of the different studies related to air pollution and its effects on human health. The data presented in this appendix confirms the need to comply with State and Federal guidelines for Air Quality.

Sincerely,

Afif El-Hasan, MD
State Board Member
American Lung Association of California

From: Froines, John <jfroines@ucla.edu>
Sent: Sunday, August 28, 2016 9:40 AM
To: Jo Kay Ghosh
Subject: FW: relevant references
Attachments: Ref summary_Lung Cancer.doc; PM_Lung Ca_Hamra GB-2014_highlighted.pdf; PM2.5 _Lung Ca_Eckel SP-2016.pdf; PM2.5_Lung Ca_Gharibvand L-2016.pdf; PM Ctr mouse asthma refs.doc; UCLA_Mobile lab_UFP_Asthma_Ning Li.pdf; UCLA_PM Ctr_UFP_adjuvant_Ning Li.pdf; UCLA_PM Ctr_UFP_adjuvant_Proteomics_Kang X.pdf

Dearr Jo: Attached are some additional references relevant to air pollution. I hope you find them useful.
John

The following attachment(s) were included with Comment Letter #23 submitted by Dr. John Froines. Due to copyrights held by publishing entities, SCAQMD cannot reproduce the following attachments, however, interested parties can obtain access at the links provided below:

Hamra, G. B., N. Guha, A. Cohen, F. Laden, O. Raaschou-Nielsen, J. M. Samet, P. Vineis, F. Forastiere, P. Saldiva, T. Yorifuji and D. Loomis (2014). "Outdoor particulate matter exposure and lung cancer: a systematic review and meta-analysis." Environ Health Perspect **122**(9): 906-911.

http://dx.doi.org/10.1289/ehp.1408092

Eckel, S. P., M. Cockburn, Y. H. Shu, H. Deng, F. W. Lurmann, L. Liu and F. D. Gilliland (2016). "Air pollution affects lung cancer survival." Thorax **71**(10): 891-898.

http://thorax.bmj.com/cgi/pmidlookup?view=long&pmid=27491839

Gharibvand, L., D. Shavlik, M. Ghamsary, W. L. Beeson, S. Soret, R. Knutsen and S. F. Knutsen (2016). "The Association between Ambient Fine Particulate Air Pollution and Lung Cancer Incidence: Results from the AHSMOG-2 Study." Environ Health Perspect.

http://dx.doi.org/10.1289/EHP124

Li, N., J. R. Harkema, R. P. Lewandowski, M. Wang, L. A. Bramble, G. R. Gookin, Z. Ning, M. T. Kleinman, C. Sioutas and A. E. Nel (2010). "Ambient ultrafine particles provide a strong adjuvant effect in the secondary immune response: implication for traffic-related asthma flares." Am J Physiol Lung Cell Mol Physiol **299**(3): L374-383.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2951067/

Li, N., M. Wang, L. A. Bramble, D. A. Schmitz, J. J. Schauer, C. Sioutas, J. R. Harkema and A. E. Nel (2009). "The adjuvant effect of ambient particulate matter is closely reflected by the particulate oxidant potential." Environ Health Perspect **117**(7): 1116-1123.

http://dx.doi.org/10.1289/ehp.0800319

Kang, X., N. Li, M. Wang, P. Boontheung, C. Sioutas, J. R. Harkema, L. A. Bramble, A. E. Nel and J. A. Loo (2010). "Adjuvant effects of ambient particulate matter monitored by proteomics of bronchoalveolar lavage fluid." Proteomics **10**(3): 520-531.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3021977/

A hard copy of copyrighted material, as provided by the submitter, is available for viewing by request and in person by contacting:

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Diamond Bar, CA 91765
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Animal studies on the adjuvant effect of ultrafine PM on asthma (from UCLA PM Center)

Kang X[1], Li N, Wang M, Boontheung P, Sioutas C, Harkema JR, Bramble LA, Nel AE, Loo JA. Adjuvant effects of ambient particulate matter monitored by proteomics of bronchoalveolar lavage fluid. Proteomics. 2010 Feb;10(3):520-31.

Ambient particulate matter (PM) from air pollution is associated with exacerbation of asthma. The immunological basis for the adjuvant effects of PM is still not well understood. The generation of ROS and the resulting oxidative stress has been identified as one of the major mechanisms. Using a new intranasal sensitization model in which ambient PM is used as an adjuvant to enhance allergic inflammation (Li et al., Environ. Health Perspect. 2009, 117, 1116-1123), a proteomics approach was applied to study the adjuvant effects of ambient PM. The enhanced in vivo adjuvant effect of ultrafine particles correlates with a higher in vitro oxidant potential and a higher content of redox-cycling organic chemicals. Bronchoalveolar lavage fluid proteins from normal and sensitized mice were resolved by 2-DE, and identified by MS. Polymeric immunoglobulin receptor, complement C3, neutrophil gelatinase-associated lipocalin, chitinase 3-like protein 3, chitinase 3-like protein 4, and acidic mammalian chitinase demonstrated significantly enhanced up-regulation by UFP with a polycyclic aromatic hydrocarbon content and a higher oxidant potential. These proteins may be the important specific elements targeted by PM in air pollution through the ability to generate ROS in the immune system, and may be involved in allergen sensitization and asthma pathogenesis.
PMID: 20029843

Li N[1], Wang M, Bramble LA, Schmitz DA, Schauer JJ, Sioutas C, Harkema JR, Nel AE. The adjuvant effect of ambient particulate matter is closely reflected by the particulate oxidant potential. Environ Health Perspect. 2009 Jul;117(7):1116-23.

BACKGROUND:
It has been demonstrated that ambient particulate matter (PM) can act as an adjuvant for allergic sensitization. Redox-active organic chemicals on the particle surface play an important role in PM adverse health effects and may determine the adjuvant effect of different particle types according to their potential to perturb redox equilibrium in the immune system.
OBJECTIVES:
We determined whether the adjuvant effect of ambient fine particles versus ultrafine particles (UFPs) is correlated to their prooxidant potential.
METHODS:
We have established an intranasal sensitization model that uses ambient PM as a potential adjuvant for sensitization to ovalbumin (OVA), which enhances the capacity for secondary OVA challenge to induce allergic airway inflammation.
RESULTS:
UFPs with a greater polycyclic aromatic hydrocarbon (PAH) content and higher oxidant potential enhanced OVA sensitization more readily than did fine particles. This manifests as enhanced allergic inflammation upon secondary OVA challenge, leading to eosinophilic inflammation and mucoid hyperplasia starting at the nasal turbinates all the way down to the small pulmonary airways. The thiol antioxidant N-acetyl cysteine was able to suppress some of these sensitization events.
CONCLUSIONS:
The adjuvant effects of ambient UFP is determined by their oxidant potential, which likely plays a role in changing the redox equilibrium in the mucosal immune system.
PMID: 19654922

Li N[1], Harkema JR, Lewandowski RP, Wang M, Bramble LA, Gookin GR, Ning Z, Kleinman MT, Sioutas C, Nel AE. Ambient ultrafine particles provide a strong adjuvant effect in the secondary immune response: implication for traffic-related asthma flares. Am J Physiol Lung Cell Mol Physiol. 2010 Sep;299(3):L374-83.

We have previously demonstrated that intranasal administration of ambient ultrafine particles (UFP) acts as an adjuvant for primary allergic sensitization to ovalbumin (OVA) in Balb/c mice. It is important to find out whether inhaled UFP exert the same effect on the secondary immune response as a way of explaining asthma flares in already-sensitized individuals due to traffic exposure near a freeway. The objective of this study is to determine whether inhalation exposure to ambient UFP near an urban freeway could enhance the secondary immune response to OVA in already-sensitized mice. Prior OVA-sensitized animals were exposed to concentrated ambient UFP at the time of secondary OVA challenge in our mobile animal laboratory in Los Angeles. OVA-specific antibody production, airway morphometry, allergic airway inflammation, cytokine gene expression, and oxidative stress marker were assessed. As few as five ambient UFP exposures were sufficient to promote the OVA recall immune response, including generating allergic airway inflammation in smaller and more distal airways compared with the adjuvant effect of intranasally instilled UFP on the primary immune response. The secondary immune response was characterized by the T helper 2 and IL-17 cytokine gene expression in the lung. In summary, our results demonstrated that inhalation of prooxidative ambient UFP could effectively boost the secondary immune response to an experimental allergen, indicating that vehicular traffic exposure could exacerbate allergic inflammation in already-sensitized subjects.
PMID: 20562226

Summary: Lung cancer

Ghassan B. Hamra et al, Outdoor Particulate Matter Exposure and Lung Cancer: A Systematic Review and Meta-Analysis, Environ Health Perspect, 122:906-911, 2014

"Outdoor air pollution is a complex mixture containing a number of known carcinogens and has been associated with increased lung cancer risk in many studies over the past 50 years. Past reviews of the body of evidence regarding outdoor and household air pollution indicated that both were associated with lung cancer risk; specifically, exposures to increased levels of particles, as well as other indices of air pollution, were associated with increased lung cancer risk."

"The International Agency for Research on Cancer (IARC) recently concluded that exposure to outdoor air pollution and to particulate matter (PM) in outdoor air is carcinogenic to humans (IARC Group 1) and causes lung cancer (IARC, in press; Loomis et al. 2013)."

"We conducted meta-analyses of the relationship between exposure to ambient PM and lung cancer incidence and mortality. Meta estimates combine incidence and mortality studies due to the high fatality rate among incident lung cancers. These quantitative analyses complement the qualitative classification of the evidence by the Monograph 109 Working Group (IARC, in press). Most of the data were obtained from cohort studies, and our analytical results are similar across diverse study populations, potential confounders considered, as well as exposure assessment methods; this consistency supports the IARC Working Group's conclusion that PM from outdoor air pollution is a Group 1 carcinogen and causes lung cancer. Air pollution is ubiquitous, and all populations are exposed to it at some level, albeit with considerable variation between the most and the least polluted areas (Brauer et al. 2012). Thus, these results are important for policy makers and public health practitioners across the world."

"In this analysis, we focused attention on PM2.5 and PM10, which are prominent components of the ambient air pollution mixture. Of course, PM10 includes the PM2.5 size fraction; however, these particle size groups are believed to differ in regard to human health effects. PM2.5 includes a higher proportion of mutagenic species (Buschini et al. 2001; Valavanidis et al. 2008), many of which are products of combustion (Brauer et al. 2001). Further, smaller particles penetrate more deeply into the lung and are more likely to be retained (Stuart 1976). On the other hand, the coarse fraction of the PM10-size group consists mainly of minerals and biologic materials (Valavanidis et al. 2008). Thus, PM2.5 is generally believed to be most relevant to health effects, including cancer."

"**Conclusion: "**The results of these analyses, and the decision of the IARC Working Group to classify outdoor air pollution as a Group 1 carcinogen, further justify efforts to reduce exposures to air pollutants, which can arise from many sources. The Global Burden of Disease collaboration estimated that approximately 3.22 million deaths were caused by exposure to air pollution in 2010, an increase from 2.91 million deaths attributed to air pollution in 1990 (Lim et al. 2012). Cancers of the trachea, bronchus, or lung represent approximately 7% of total mortality attributable to PM2.5 in 2010. The results of the meta analysis provided here could be useful for better quantifying the burden of lung cancer associated with air pollution. The Group I classification raises questions regarding individual components in the air pollution mixture regarding, for example, the carcinogenic potential of each component as well as through what pathways they may contribute to cancer risk."

Gharibvand L*[1], *Shavlik D*[2], *Ghamsary M*[3], *Beeson WL*[1,2], *Soret S*[3], *Knutsen R*[1,2], *Knutsen SF*[1,2]. ***The Association between Ambient Fine Particulate Air Pollution and Lung Cancer Incidence: Results from the AHSMOG-2 Study. Environ Health Perspect. 2016 Aug 12. [Epub ahead of print]

"**BACKGROUND:**
There is a positive association between ambient fine particulate matter ($PM_{2.5}$) and incidence and mortality of *lung cancer* (LC), but few studies have assessed the relationship between ambient $PM_{2.5}$ and LC among never smokers."

"**OBJECTIVES:**
To assess the association between $PM_{2.5}$ and risk of LC using the Adventist Health and Smog Study-2 (AHSMOG-2), a cohort of health conscious non-smokers where 81% have never smoked. **METHODS:** A total of ***80,285*** AHSMOG-2 subjects were followed for ***an average of 7.5 years*** with respect to incident LC identified through linkage with U.S. state cancer registries. Estimates of ambient air pollution levels at subjects' residences were obtained for 2000 and 2001, the years immediately prior to study start."

"**RESULTS:**
A total of 250 incident LC cases occurred during 598,927 person-years of follow-up. For each 10-$\mu g/m^3$ increment in $PM_{2.5}$, adjusted hazard ratio (HR) with 95% confidence interval (CI) for LC incidence was 1.43 (95% CI: 1.11, 1.84) in the two-pollutant multivariable model with O_3. Among those who spent more than 1 hr/day outdoors or who had lived 5 or more years at their enrollment address, the HR was 1.68 (95% CI: 1.28, 2.22) and 1.54 (95% CI: 1.17, 2.04), respectively."

"**CONCLUSION:**
Increased risk estimates of LC were observed for each 10-$\mu g/m^3$ increment in ambient $PM_{2.5}$ concentration. The estimate was higher among those with longer residence at enrollment address and those who spent more than 1 hr/day outdoors."
PMID: 27519054

Eckel SP*[1], *Cockburn M*[1], *Shu YH*[2], *Deng H*[1], *Lurmann FW*[3], *Liu L*[1], *Gilliland FD*[1]. ***Air pollution affects lung cancer survival. Thorax. 2016 Aug 4. pii: thoraxjnl-2015-207927.

"**RATIONALE**
Exposure to ambient air pollutants has been associated with increased lung cancer incidence and mortality, but due to the high case fatality rate, little is known about the impacts of air pollution exposures on survival after diagnosis. This study aimed to determine whether ambient air pollutant exposures are associated with the survival of patients with lung cancer."

"**METHODS**
Participants were 352,053 patients with newly diagnosed lung cancer during 1988-2009 in California, ascertained by the California Cancer Registry. Average residential ambient air pollutant concentrations were estimated for each participant's follow-up period. Cox proportional hazards models were used to estimate HRs relating air pollutant exposures to all-cause mortality overall and stratified by stage (localised only, regional and distant site) and histology (squamous cell carcinoma, adenocarcinoma, small cell carcinoma, large cell carcinoma and others) at diagnosis, adjusting for potential individual and area-level confounders."

"**RESULTS**
Adjusting for histology and other potential confounders, the HRs associated with 1 SD increases in NO_2, O_3, PM_{10}, $PM_{2.5}$ for patients with localised stage at diagnosis were 1.30 (95% CI 1.28 to 1.32), 1.04 (95%

CI 1.02 to 1.05), 1.26 (95% CI 1.25 to 1.28) and 1.38 (95% CI 1.35 to 1.41), respectively. Adjusted HRs were smaller in later stages and varied by histological type within stage ($p<0.01$, except O_3). The largest associations were for patients with early-stage non-small cell cancers, particularly adenocarcinomas."

"**CONCLUSIONS**
These epidemiological findings support the hypothesis that air pollution exposures after lung cancer diagnosis shorten survival. Future studies should evaluate the impacts of exposure reduction."
PMID: 27491839

From: StanYoung <genetree@bellsouth.net>
Sent: Tuesday, September 6, 2016 5:44 AM
To: avol@usc.edu; Rob Scot McConnell; Jo Kay Ghosh; alovera@aqmd.gov
Cc: Ben Benoit (GBM); Judith Mitchell (GBM); Duncan Campbell Thomas; Juliet Shaffer; heejung bang; Jessica Utts; dmrocke@ucdavis.edu; ywu@stat.ucla.edu; Robert Obenchain; Wyzga, Ron; Carlos Dobkin; Paddock, Susan
Subject: Air quality and mortality in South Coast Air Basin
Attachments: Young 2016 NAS Presentation Slides with Notes c.pdf; Young Short Bio 2016.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

All:

I find no association of acute mortality with either PM2.5 or ozone in the South Coast Air Basin. Literature supports no chronic association in all of California.

I am willing to work with others on analysis of the data set that I have. The mortality data is from a public source.

It seems premature to increase regulations in the air basin until the mortality question is resolved/agreed upon.

Stan

Short Bio 2016



Dr. S. Stanley Young worked at Eli Lilly, GlaxoSmithKline and the National Institute of Statistical Sciences on questions of applied statistics. His current mission is the evaluation of statistical claims particularly from observational studies. His research indicates that well over 50% of claims made fail to replicate when tested rigorously. His current interest is air pollution environmental epidemiology.

Dr. Young graduated from North Carolina State University, BS, MES and a PhD in Statistics and Genetics. He worked in the pharmaceutical industry on all phases of pre-clinical research. He has authored or co-authored over 60 papers including six “best paper” awards, and a highly cited book, Resampling-Based Multiple Testing. He has three issued patents. He is interested in all aspects of applied statistics, with special interest in chemical and biological informatics. He conducts research in the area of data mining.

Dr. Young is a Fellow of the American Statistical Association and the American Association for the Advancement of Science. He is an adjunct professor of statistics at North Carolina State University, the University of Waterloo, and the University of British Columbia where he has co-directed thesis work. He is also an adjunct professor of biostatistics at Georgia Southern University.

From: StanYoung [mailto:genetree@bellsouth.net]
Sent: Tuesday, September 20, 2016 12:55 PM
To: Jo Kay Ghosh <jghosh@aqmd.gov>
Cc: James E. Enstrom <jenstrom@ucla.edu>; kzu@gradientcorp.com; Anthony Oliver <aoliver@aqmd.gov>; Margarita Felix (Ben) <mafelix@rcbos.org>; Marie Patrick (Bur) <mwpatrick@aqmd.gov>; JudyM@ci.Rolling-Hills-Estates.ca.us
Subject: Zu Wildfires Mortality.docx

Dear Jo Kay Ghosh:

This paper, open access, is of interest. It is a so called Natural Experiment. Forest fires increase the levels of PM2.5 in NYC and Boston, yet deaths did not go up. They say, "We examined temporal patterns of natural-cause deaths and 24-h ambient $PM_{2.5}$ concentrations in July 2002 and did not observe any discernible increase in daily mortality subsequent to the dramatic elevation in ambient $PM_{2.5}$ levels."

I've seen the same no effect in LA multiple times during the years 2000-2012. Using satellite images and also ground based monitors, smoke is seen, PM2.5 increases, yet deaths do not.

Stan Young

The following attachments were also included with Comment Letter #24 submitted by Dr. Stan Young. Due to copyrights held by publishing entities, SCAQMD cannot reproduce the following attachment, however, interested parties can obtain access at the link provided below:

- Long-range fine particulate matter from the 2002 Quebec forest fires and daily mortality in Greater Boston and New York City
  http://link.springer.com/article/10.1007/s11869-015-0332-9

A hard copy of all materials included in the comment letters, as provided by the submitter, is available for viewing by request and in person by contacting:

Jo Kay Ghosh
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765
(909) 396-2582

From: StanYoung [mailto:genetree@bellsouth.net]
Sent: Thursday, October 20, 2016 10:53 AM
To: Jo Kay Ghosh <jghosh@aqmd.gov>
Cc: Anthony Oliver <aoliver@aqmd.gov>; har@indecon.com; Margarita Felix (Ben) <mafelix@rcbos.org>; Marie Patrick (Bur) <mwpatrick@aqmd.gov>
Subject: Another paper to enter into you deliberations on air quality and health effects

Dear Dr. Ghosh:

Here is a pdf showing no effect if air quality on mortality. The data is from Pope et al. NEJM 2009.

I'm happy to send you a copy of the data.

Sincerely,

S. Stanley Young, PhD, FASA, FAAS
genetree@bellsouth.net
919 782 2759

CC: Anthony Oliver aoliver@aqmd.gov
Henry A. Roman har@indecon.com
John Benoit mafelix@rcbos.org
William A. Burke mwpatrick@aqmd.gov

The following attachments were also included with Comment Letter #25 submitted by Dr. Stan Young. Due to copyrights held by publishing entities, SCAQMD cannot reproduce the following attachment, however, interested parties can obtain access at the link provided below:

- A publication of the American Council on Science and Health. Standing with Giants, A Collection of Public Health Essays in Memoriam to Dr. Elizabeth M. Whelan http://acsh.org/news/2016/08/23/standing-with-giants-a-collection-of-public-health-essays-in-memoriam-to-dr-elizabeth-m-whelan

A hard copy of all materials included in the comment letter, as provided by the submitter, is available for viewing by request and in person by contacting:

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Diamond Bar, CA 91765
(909) 396-2582

RESPONSES TO COMMENT LETTERS RECEIVED ON APPENDIX I

Responses to Comment Letter from Dr. Stanley Young (Comment Letter #1)

Response to Comment 1:

The roles for U.S. EPA, CARB, and SCAQMD in air pollution health effects science and air quality regulation have been clarified in the Health Effects of Air Pollution section. In summary, the U.S. EPA is tasked with assessing new and emerging air quality science, including health studies, as part of the process of setting the federal air quality standards. In other words, the U.S. EPA's role is to assess the causal relationships between the pollutants and the different types of health endpoints. It is then SCAQMD's role is to describe the public health impacts of poor air quality in our region, as well as to develop and implement an emission reduction strategy to attain the federal and state ambient air quality standards. Therefore, it is not the intention of this Appendix to assess whether there is or is not an effect of a specific air pollutant on any particular health endpoint, but rather to summarize the health effects and causal determinations as assessed by U.S. EPA and other scientific agencies, to discuss some recent studies published since the latest U.S. EPA reviews, to give some quantitative estimates of the health impacts of particulate matter air pollution in the South Coast Air Basin, and to present a "local perspective" by highlighting studies conducted in the South Coast Air Basin, Southern California, or California.

Responses to Comment Letter from Dr. Stanley Young (Comment Letter #2)

The Wang 2015 and Milojevic 2014 articles have been added as citations in the PM short-term effects section.

Responses to Comment Letter from Dr. John Froines (Comment Letter #3)

Text has been added to Appendix I to describe that ozone creates secondary oxidation products that are electrophilic, and certain genetic factors influence a person's ability to metabolize these electrophiles, which can affect respiratory function. Because cancer effects for ozone are lower on the causal determination scale, these were not discussed in Appendix I.

Responses to Comment Letter from Dr. Ed Avol (Comment Letter #4)

This comment letter has been superseded by the revised comment letter from the same Advisory Council member (see Comment Letter #13).

Responses to Comment Letter from Dr. John Dunn (Comment Letter #5)

See response to Comment Letter #1.

Responses to Comment Letter from Dr. Gordon Fulks (Comment Letter #6)

See response to Comment Letter #1.

Responses to Comment Letter from Dr. James Enstrom (Comment Letter #7)

See response to Comment Letter #1.

Responses to Comment Letter from Dr. Stanley Young (Comment Letter #8)

See response to Comment Letter #1.

Responses to Comment Letter from Dr. Michael Kleinman (Comment Letter #9)

The staff acknowledge that Appendix I summarizes the U.S. EPA's assessments of causality, and additionally summarizes some more recent literature published since the most recent Integrated Science Assessment for PM2.5, which was last published in 2009.

Responses to Comment Letter from Dr. John Froines (Comment Letter #10)

Text has been added to the PM section to note the cellular responses associated with the particle phase and vapor phase pollutants. The Cho final report to SCAQMD has been cited in Appendix I.

Responses to Comment Letter from Dr. John Froines (Comment Letter #11)

Text has been added to the PM section to note the cellular responses associated with the particle phase and vapor phase pollutants. The Eiguren-Fernandez 2015 paper has been cited in Appendix I.

Responses to Comment Letter from Dr. Emily Nelson (Comment Letter #12)

Response to Comment 12-1:

The purpose of Appendix I has been clarified in the introduction, including a statement clarifying important issues raised in the Advisory Council meeting that were addressed in other AQMP chapters and appendices or in the Socioeconomic Report, rather than in this Appendix.

Response to Comment 12-2:

A statement has been added to clarify that the causality conclusions are the result of U.S. EPA scientific evaluations of the research studies they have reviewed. A definition of FEV1 has been added.

Response to Comment 12-3:

The roles for U.S. EPA, CARB, and SCAQMD in air pollution health effects science and air quality regulation have been clarified in the Health Effects of Air Pollution section. Statements have also been added to distinguish the federal and California standards.

Responses to Comment Letter from Dr. Ed Avol (Comment Letter #13)

Response to Comment 13-1:

The purpose of Appendix I has been clarified in the introduction, and the categories of health effects which are discussed in more detail are defined in the Health Effects of Air Pollution section. The focus is on those health effects categorized as having a causal or likely causal relationship with the pollutant, while the other categories of health effects may be mentioned briefly. The sections describing the specific pollutant effects have also been modified to be consistent with this approach, acknowledging that greater detail is presented for ozone and PM, because of the non-attainment status in the SCAB.

Response to Comment 13-2:

The Ultrafine Particles section has been moved so that it is a sub-section within the PM section. However, PM2.5 and PM10 are still discussed together in the Short-Term and Long-Term effects sections, with the focus on PM2.5, since that is the the particle fraction with the most evidence linking it to health endpoints. Notably, the health impacts are estimated for PM2.5, since a large body of scientific evidence supports its link to premature deaths from cardiopulmonary causes.

Response to Comment 13-3:

The heading has been changed.

Response to Comment 13-4:

A description of the purpose of the Attachment has been added to the Introduction, and to the beginning of the Attachment.

Response to Comment 13-5:

Text has been added to the Toxics section of Appendix I to provide a high level description of some of the health effects of VOCs, particularly as assessed by the latest MATES study.

Response to Comment 13-6:

This list has been removed, and a more general sentence has been added to introduce the reader to the breadth of health effects that have been linked to air pollution.

Response to Comment 13-7:

The text has been modified so that toxicology studies are also included in this description.

Response to Comment 13-8:

The text has been modified accordingly.

Response to Comment 13-9:

The text has been modified to clarify that while multi-pollutant effects may be important, the air quality standards address each criteria pollutant separately, and this is reflected in the way Appendix I is organized.

Response to Comment 13-10:

The text has been added to the Health Effects of Air Pollution section.

Response to Comment 13-11:

The text has been modified accordingly.

Response to Comment 13-12:

The text has been modified to clarify that the depth of the breaths also increases, and that the ozone can reach deeper into the lungs.

Response to Comment 13-13:

This paragraph has been modified to clarify the focus on the health outcomes that have a causal or likely causal relationship with short-term ozone exposures, which are the respiratory effects, cardiovascular effects, and mortality.

Response to Comment 13-14:

The text has been modified accordingly.

Response to Comment 13-15:

The text has been modified accordingly.

Response to Comment 13-16:

The paragraph has been modified to clarify the attenuated response in some individuals.

Response to Comment 13-7:

The text has been modified accordingly.

Response to Comment 13-18:

The text has been modified accordingly.

Response to Comment 13-19:

The text has been modified accordingly.

Response to Comment 13-20:

The text has been modified accordingly.

Response to Comment 13-21:

Text has been added to quantify the ozone concentrations in the "high" versus "low" ozone communities studied.

Response to Comment 13-22:

This paragraph has been removed from the document.

Response to Comment 13-23:

This sentence has been removed from the document.

Response to Comment 13-24:

The paragraph has been condensed, and this sentence has been removed from the document.

Response to Comment 13-25:

The paragraph has been condensed, and this sentence has been removed from the document.

Response to Comment 13-26:

The section has been edited to reflect the evidence as presented in the 2013 ISA for Ozone, and a table was added to further detail the factors and the evidence classifications in the ISA document.

Response to Comment 13-27:

The summary section has been modified to strengthen the summary and clarify the health endpoints that were high on the causal determination scale.

Response to Comment 13-28:

More specific references and discussion of individual studies were added to the Ozone section, to make it more consistent with the PM section. The staff believe the discussion of the key studies in the PM section is quite relevant, since these studies are frequently referenced, and provide important evidence in the causal determination for PM health effects.

Response to Comment 13-29:

The sentence has been modified to provide further clarity on the wide range of particles and their properties.

Response to Comment 13-30:

This sentence has been modified accordingly.

Response to Comment 13-31:

This sentence has been modified accordingly.

Response to Comment 13-32:

This sentence has been modified accordingly.

Response to Comment 13-33:

This sentence has been modified accordingly.

Response to Comment 13-34:

This sentence has been modified accordingly.

Response to Comment 13-35:

The sentence has been modified to clarify that a PM10 standard remains in effect.

Response to Comment 13-36:

This sentence has been modified accordingly.

Response to Comment 13-37:

This sentence has been modified accordingly.

Response to Comment 13-38:

This sentence has been modified to say "these results suggest that the effects reported in the study are likely due to …"

Response to Comment 13-39:

This paragraph has been modified accordingly.

Response to Comment 13-40:

These sentences have been modified for clarity.

Response to Comment 13-41:

The notation has been standardized to "PM10-2.5".

Response to Comment 13-42:

This sentence has been modified accordingly.

Response to Comment 13-43:

This sentence has been modified accordingly.

Response to Comment 13-44:

This sentence has been modified accordingly.

Response to Comment 13-45:

These changes have been made to the paragraph.

Response to Comment 13-46:

The text has been standardized to use "new-onset asthma" and "term low birth weight" where appropriate, and the text on page I-40 has been corrected. The staff believe that "term low birth weight" is the correct term that is used to describe babies born at full term who weigh less than 2,500 grams at birth.

Response to Comment 13-47:

Sub-headings were added to this section, which has been reorganized and grouped with some other health endpoints in a section titled "Long-Term Particulate Matter Exposures and Emerging Areas of Interest". A definition of metabolic syndrome has been added to the text, and a clarification that these health endpoints are markers of metabolic syndrome rather than the syndrome itself.

Text has been added to this paragraph to discuss briefly the results of some of these recent human and animal studies that focused on PM and metabolic syndrome, including some studies evaluating PM and the development of metabolic syndrome, and other studies evaluating whether individuals with pre-existing metabolic syndrome may be more sensitive to the effects of PM. This section is intentionally brief, however, since it is describing health endpoints that are relatively newly studied. Since many of these studies were published after the 2009 ISA, they were not included in that review, and this health endpoint was not assessed to be high on the causal determination scale at the time of the 2009 ISA.

However, we are including a brief mention of these studies because this is an area of emerging interest in the study of the health effects of PM.

Response to Comment 13-48:

References to several of these studies have been added to the section discussing PM and neurological outcomes.

Response to Comment 13-49:

A table has been added to summarize the U.S. EPA's summary of susceptibility factors for PM health effects.

Response to Comment 13-50:

This section has been divided into a brief summary of the PM health effects, and a separate section where the estimates of the health burdens of PM are described.

Response to Comment 13-51:

The Ultrafine Particles section has been moved so that it is a sub-section within the PM section. However, PM2.5 and PM10 are still discussed together in the Short-Term and Long-Term effects sections, with the focus on PM2.5, since that is the particle fraction with the most evidence linking it to health endpoints. Notably, the health impacts are estimated for PM2.5, since a large body of scientific evidence supports its link to premature deaths from cardiopulmonary causes.

Response to Comment 13-52:

These lines were part of the figure caption, and staff have reformatted it so that the caption appears on the same page as the figure to minimize potential confusion.

Response to Comment 13-53:

The intent of this paragraph is to describe the effect of the change in the risk assessment methodology on the estimate of air toxic cancer risk, and also to put these estimates in the context of long-term trends in air toxics cancer risk. However, we agree this sentence may be confusing, and have deleted this sentence to avoid potential confusion.

Response to Comment 13-54:

Text has been added to expand this section. This section now touches on the types of effects most strongly associated with ozone and PM air pollution, the carcinogenic effects of some air pollutants, and the factors that may increase a population's susceptibility to the negative effects of air pollution. The conclusion also ties in how such research on the health effects of air pollution is informative in the development of air quality standards, such as the NAAQS, and in evaluating air toxics risk.

Response to Comment 13-55:

A description of the purpose of the Attachment has been added to the Introduction, and to the beginning of the Attachment.

Responses to Comment Letter from Dr. John Husing (Comment Letter #14)

The staff is well aware of the ACES study and its findings, but did not include it in the initial draft of Appendix I since the study relates to the carcinogenicity of a specific toxic air contaminant (diesel PM), and the primary focus of Appendix I is the health impacts of criteria pollutants (i.e. ozone and PM2.5). While there is obviously some overlap, the detailed discussion below explains the initial staff thinking regarding this study and its relevance, and common misinterpretations of its findings. Nevertheless, based on the comment received, the staff have added a brief discussion of this study to Appendix I, similar to what is provided below.

The study showed that the amount of diesel PM emissions from the newer engines were lower than the older engines, as required by recent regulations. Because of this, the rats breathing the lower emissions did not develop cancer, while the rats breathing the higher emissions (from previous studies) did develop cancer. However, the study did not evaluate whether the PM from the newer engines was any more or less toxic compared to the older engines on a gram per gram basis; the study was not designed to determine such differences. Therefore, without any additional data on the toxicity of PM from the newer diesel engines, the analysis done in the MATES-IV study used the same risk factor for both, applied to the mass of PM. For example, whether you are exposed to 10 micrograms per cubic meter (ug/m3) of particulate matter from a single old diesel engine or several new diesel engines, the cancer risk would be the same because it is calculated based on 10 ug/m3 of exposure.

Appendix I presents a summary of the health effects of key air pollutants, including particulate matter. The studies described in Appendix I evaluate the health effects of total PM2.5 exposures by mass, regardless of whether they were from newer diesel engines, older diesel engines, or other sources. While this new diesel technology is very effective in terms of reducing the amount of emissions from diesel trucks, what people are being exposed to is the total concentration of PM from many sources. It is that concentration that is then used in these health studies to analyze whether or not there is an effect on the specific health outcomes evaluated.

Additionally, it is important to distinguish the health effects associated with PM2.5 exposure in general (cardiovascular, respiratory, premature death, etc.) from the specific cancer risk associated with direct PM2.5 emissions from diesel engines. Direct PM2.5 emissions from diesel engines represent a small portion of overall PM2.5 exposure. NOx emissions from diesel engines that eventually lead to PM2.5 formation in the atmosphere, however, represent a larger component of PM2.5 exposure.

Responses to Comment Letter from Dr. John Froines (Comment Letter #15)

The staff agree that the Li 2016 article provides a discussion of some of the more recent studies on UFPs that have been conducted. The Li 2016 article, along with some studies that were discussed within this review article, has been added to Appendix I section on ultrafine particles.

Responses to Comment Letter from Dr. John Froines (Comment Letter #16)

Text has been added to the PM section to note the cellular responses associated with the particle phase and vapor phase pollutants. The Cho final report to SCAQMD has been cited.

Responses to Comment Letter from Dr. John Froines (Comment Letter #17)

The year when ARB listed diesel exhaust as a TAC has been corrected from 1989 to 1998, and the text has been clarified to note that this decision was based on the human carcinogenic properties. Additional text has been added to Appendix to describe how lead is stored in the bone and released into the blood, and that there is no established threshold for the health effects of lead.

Responses to Comment Letter from Dr. John Froines (Comment Letter #17)

The Alexis 2014 and Guarnieri 2014 references and some key findings from these studies have been added to Appendix I to clarify the effects of ozone and PM on asthma.

Responses to Comment Letter from Dr. Arthur Cho (Comment Letter #19)

Response to Comment 19-1:

The staff agree these are important issues that would increase the knowledge of the mechanisms of action for air pollution's health effects.

Response to Comment 19-2:

The report notes the potential action of electrophilic components of air pollution, including their ability to suppress inflammatory responses.

Response to Comment 19-3:

The report notes the endogenous COHb levels as summarized in the most recent ISA for CO. In other words, this is a naturally occurring level of CO (in the form of COHb) in healthy individuals. The focus of air pollution controls on CO is on ambient exposure, which is the focus of the discussion of CO health effects in this section.

Response to Comment 19-4:

The staff agree these are important issues that would increase the knowledge of the mechanisms of action for air pollution's health effects, and potential interventions that could be effective in preventing some adverse health effects.

Responses to Comment Letter from Bill La Marr (Comment Letter #20)

Response to Comment 20-1:

Appendix I is a summary of causal determinations as assessed by U.S. EPA and other scientific agencies tasked with assessing causality. The document acknowledges uncertainty where appropriate, while also describing the strength and consistency of the associations where appropriate.

Response to Comment 20-2:

The ozone section has been reorganized to focus on health endpoints that are high on the causal determination scale.

Response to Comment 20-3:

The staff agree that smoking is an important potential confounder in the studies of PM and mortality. In fact, the majority of these studies discussed in Appendix I adjusted for the potential confounding effect of smoking. Staff has added text to Appendix I to clarify when studies adjusted for smoking, particularly the studies of PM and mortality.

Response to Comment 20-4:

Some of the studies that are referred to in this paragraph were conducted in California, but it is critical to note the importance of assessing results from studies from many different locations. The repeatability and consistency of results across many locations strengthens the determination of causality. Text has been added to this paragraph to clarify this point.

Response to Comment 20-5:

The text in Appendix I describes the study results as reported.

Response to Comment 20-6:

Appendix I already describes the assessments of the evidence for coarse PM and constituent- or source-specific PM in the U.S. EPA's 2009 Integrated Science Assessment, noting that there were few studies available at the time to assess causality in these specific cases.

Response to Comment 20-7:

See response to Comment #20-4.

Response to Comment 20-8:

While copollutant exposures may contribute to increases in morbidity and mortality, such co-occurring exposures are often assessed and accounted for in epidemiologic studies. The possibility of co-occurring exposures contributing to the effects observed is assessed as a part of the U.S. EPA's Integrated Science Assessments.

Response to Comment 20-9:

See response to Comment Letter #1. Regarding the methodology used in estimating the VSL, the VSL range used in the Socioeconomic analysis is based on recommendations by expert consultants at Industrial Economics, Inc., as described in their memo titled, “Review of Mortality Risk Reduction Valuation Estimates for use in 2016 Socioeconomic Assessment”. This memo is available on the www.aqmd.gov website.

Response to Comment 20-10:

The staff acknowledges Dr. Samet's comments from the 2012 AQMP Appendix I, and note that, in fact, the draft 2016 AQMP Appendix I document includes a more detailed description of the methodology employed in drafting this summary, and the basis and rationale behind what is included in this document. Additional information has been added to the Health Effects of Air Pollution section to clarify the focus of this document, and the main review articles or literature searches from which the studies were drawn. Furthermore, Dr. Samet's statement that a quantification of burden should be included in the document has already been addressed with the inclusion of the estimates of the mortality and morbidity associated with PM2.5 exposure in the SCAB. These numbers are presented in the section now titled "Estimates of the Health Burden of Particulate Matter in the South Coast Air Basin".

Responses to Comment Letter from Dr. Afif El-Hasan (Comment Letter #21)

The staff thank Dr. El-Hasan for his comments and his participation on the Advisory Council.

Responses to Comment Letter from Dr. John Froines (Comment Letter #22)

The Hamra 2014 EHP article is already discussed in Appendix I, in the section describing long-term PM exposures and cancer. Descriptions of the Gharibvand 2016 EHP and Eckel 2016 Thorax studies have been added to Appendix I, in the discussion of PM and cancer.

The Li 2010 Am J Phyiol Lung Cell Mol Physiol article is already discussed in Appendix I, in the ultrafine particles section, which is now part of the Particulate Matter section. Brief descriptions of the Li 2009 EHP and Kang 2010 Proteomics studies have been added to Appendix I, in the discussion of UFP health effects.

Responses to Comment Letter from Dr. Stanley Young (Comment Letter #23)

See response to Comment Letter #1.

Responses to Comment Letter from Dr. Stanley Young (Comment Letter #24)

The Zu 2016 article has been added as a citation in the PM short-term effects section.

Responses to Comment Letter from Dr. Stanley Young (Comment Letter #25)

See response to Comment Letter #1.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Responses to Advisory Council Comments from August 2016 Meeting

2016 AIR QUALITY MANAGEMENT PLAN APPENDIX I



January 2017

Minutes for the 2016 AQMD Advisory Council Meeting
Thursday, August 18, 2016

1. Welcome, Self-Introductions and Opening Comments

Dr. Philip Fine, Deputy Executive Officer of SCAQMD's Planning, Rule Development & Area Sources Division, called the meeting to order at 10:05 a.m. and asked for self-introductions of the AQMD Advisory Council members and SCAQMD staff attending the meeting in person. On the conference line was Advisory Council member Dr. Judy Chow, as well as staff from the California Air Resources Board (CARB) and California Office of Environmental Health Hazard Assessment (OEHHA). CARB and OEHHA joined the meeting as co-developers of the 2016 AQMP, Appendix I. Two Advisory Council members, Dr. Greg Osterman and Dr. John Froines, joined the meeting as listen-only participants.

Dr. Fine explained that the purpose of the meeting was to provide an in-person peer review forum to discuss Advisory Council comments on the Appendix I of the draft 2016 Air Quality Management Plan (AQMP or Plan). The Health and Safety Code 40471(b) requires SCAQMD to prepare a report on the health impacts of particulate matter air pollution in the South Coast Air Basin (SCAB). The state law requires this report to be prepared by SCAQMD in conjunction with a public health organization or agency, such as CARB and/or OEHHA. SCAQMD will respond to the comments received and a Public Hearing will be held at a later time. The Appendix I Public Hearing will be held in conjunction with the Public Hearing for the 2016 AQMP.

While the Health and Safety Code requires a report on the health impacts of particulate matter, the SCAQMD has included the health impacts of some other key pollutants found in the South Coast Air Basin.

2. Draft 2016 AQMP, Appendix I

Dr. Jo Kay Ghosh, Health Effects Officer in SCAQMD's Planning, Rule Development & Area Sources Division, explained the purpose and contents of Appendix I. She expressed the importance to include the health effects of ozone, in addition to particulate matter, since the SCAB is in extreme non-attainment for ozone. Other pollutants are included too, but in a brief, high-level summary format. It was explained that Appendix I is intended to be a summary of U.S. EPA reviews and reports which link air pollution to health effects, and to highlight recent key studies, with an emphasis on studies that have been conducted in the SCAB or California.

To date, the SCAQMD has received four written comments from two of the Advisory Council members, as well as seven written public comments.

INTRODUCTION & HEALTH EFFECTS OF AIR POLLUTION

Comments/Questions from AQMD Advisory Council and Staff Response

- One Advisory Council member commented there appeared to be wordsmithing from the 2012 AQMP document, with substantial uncertainty.
- Another Advisory Council member indicated that the intent or purpose was not laid out clearly. For it to be a useful public document, it would be useful to explain the proposed format and criteria of what is discussed.
- An Advisory Council member wanted to know how the Appendix I research reviews were selected, since there are many documents available. Staff explained that U.S. EPA goes through an extensive lengthy process to assess whether a pollutant has a causal, likely causal, etc. relationship with a health outcome.
- One Advisory Council member suggested more numeric, statistical correlation be presented, for example, to present information from some of the larger studies, especially for those who might not be familiar with statistics.
- The same Advisory Council member inquired about autism studies and whether these studies were factored into the write-up, especially the near-freeway impacts. Staff commented that we do attempt to discuss the many impacts of air pollution and we can be clearer on this point about near-freeway impacts.
- Another Advisory Council member reflected about what was presented at the 2012 Advisory Council meeting and what was anticipated from the current meeting. The Advisory Council member referenced a comment letter dated September 25, 2012, from Dr. Jonathan Samet, which referenced several points that are still relevant to the current Appendix I. Concern was expressed about SCAQMD's ability to prepare a comprehensive and up-to-date health effects review, specifically in the areas of scope, basis of review, consideration of the methodology, minimization of health impacts and desired definitive conclusion. Staff commented that SCAQMD does look at the comments received and includes the information that we are required to include to make this Plan useful to the public and stakeholders.
- An Advisory Council member inquired about PM2.5 and the relation to where the SCAB stands in compliance to the national standards. This information is not indicated in Appendix I. Staff commented that this information is included in Chapter 2 and Appendix 2 of the draft 2016 AQMP, we could include a reference to those sections in Appendix I.
- The same Advisory Council member commented regarding the socioeconomic impact in the Inland Empire, which has high poverty rates. This Advisory Council member commented that one of the impacts of this plan would be to force more people into poverty by cutting off job growth that would otherwise allow them to get out of poverty. Staff commented that this is a topic for the Socioeconomic Report, not Appendix I.

- One Advisory Council member recommended a sentence or summary comparison between the California and national air pollution standards, since they are different.
- Another Advisory Council member inquired about the context of the Health and Safety Code 40471(b) reference in the introduction and whether there are any requirements for other pollutants. Staff commented that particulate matter is a significant portion of the health risk and was specified in the Health & Safety Code because it was felt that the public should be made aware of the health risks of PM.
- An Advisory Council member referenced page I-17, and noted that it mentions that there is currently no federal or California standard for PM2.5-10. Staff commented that when U.S. EPA initially identified PM2.5 as being a separate problem beyond PM10, there was discussion to set separate standard for $PM_{2.5}$ and $PM_{2.5\text{-}10}$. Eventually it was decided not to adopt a separate standard for $PM_{2.5\text{-}10}$.
- For consistency, one Advisory Council member suggested that the introduction could lay out thresholds from pollutant to pollutant, as to what matters and what this agency is going to provide in the report.

OZONE

Comments/Questions from AQMD Advisory Council and Staff Response

- An Advisory Council member requested clarification in Figure I-1 to what the line in the figure represented. Staff commented it is a summarization from the McDonnell 2007 paper, and a reference can be noted for clarity.
- One Advisory Council member noted on page I-4, in Table I-1, under weight of evidence there is a mention of limited or no human data available and noted this is iffy causality. Staff commented that definitions in the table are taken directly from U.S. EPA summaries as these are the definitions used in their causal determinations.
- The same Advisory Council member inquired if SCAQMD as a regulator is required, during the development of a plan or rule, to establish thresholds for inconclusive or suggestive data. Staff explained that as regulators we are required to adhere to the federal and state standards. When a regulatory program is formulated, it is designed to meet the federal and/or state standards. We can comment and weigh-in on the determination process, but once it becomes federal or state law we are obligated to meet the standards.
- Another Advisory Council member made the suggestion to not break up tables from page to page, this would make them easier to follow.
- An Advisory Council member suggested instead of using likely causal relationship, indicate significant enough to have caused impact on human health. Staff explained that these are the terms that U.S. EPA uses and defines, and we should use their definitions for consistency.

- The same Advisory Council member suggested including the definition of forced expiratory volume in one second (FEV1). Staff indicated that we could do this.
- An Advisory Council member noted that U.S. EPA is in midst of their review cycle for the new particulate matter (PM) document and perhaps the referenced material can be noted in the introduction. Staff commented that the outcome of this review is still a few years away.
- One Advisory Council member noted that the short-term and long-term exposures are primarily focused on respiratory effects and suggested that this should be noted in the introduction for continuity.
- An Advisory Council member inquired if Appendix I used studies relevant to Southern California. Staff indicated that the studies discussed were conducted in many different geographical areas, but the document highlights studies conducted in California or Southern California. However, studies conducted elsewhere, especially large scale studies, are still relevant to Appendix I.
- Another Advisory Council member noted that it might be helpful and informative to include studies from many geographical locations, especially those that include racial, ethnic or environmental justice areas that might not otherwise be explored, and not just limited to Southern California.
- The same Advisory Council member noted that there are areas throughout the document that reference highs and lows, not just in the ozone section. The Advisory Council member noted that these are squishy descriptors and it is better to be more descriptive and specific.
- An Advisory Council member commented that some of the charts are difficult to follow because they are created in color and printed in black and white. A suggestion was made to change color to shapes throughout the document.
- One Advisory Council member noted that it is important to have a section for sensitive populations for ozone-related health effects. People want to know who is sensitive, why might others be more sensitive and the potential factors contributing to sensitivity. The same Advisory Council member commented that the ozone section needs to be constructed so it is easy to understand and it might be useful to expand the section on sensitive populations, because people will want to know where this data comes from.
- The same Advisory Council member commented that the ozone summary should capture what is the state of knowledge, where we are at, identify the ranges of exposure, what are the outcomes, and how this has moved forward since the 2012 AQMP.
- Another Advisory Council suggested that in the beginning when ozone is introduced, provide a brief description of the sources of ozone in Southern California.

PARTICULATE MATTER

Comments/Questions from AQMD Advisory Council and Staff Response

- An Advisory Council member indicated that this section lists many different things that could be in PM2.5 and inquired if research has been done to determine which particulates are of less or of major importance in terms of causing the PM2.5 effects. Staff indicated U.S. EPA has dedicated a significant amount of resources researching this, with no clear conclusion.

- The same Advisory Council member indicated in the Inland Empire, where PM is often above the federal standard during Santa Ana wind conditions, what effect does this have on the measurements. Staff indicated that we measure particulate mass and we have sites that measure composition of particulate matter. This is further clarified in Chapter 2 of the draft 2016 AQMP.

- Another Advisory Council member inquired how much the composition varies from sub-region to sub-region. Staff commented it varies greatly, depending on the Western or Eastern Basin. This information can be found in Chapter 2 and Appendix II of the draft 2016 AQMP, but we can add a reference in Appendix I to this data. The same Advisory Council member indicated that this might be helpful to add this information to the sensitive populations for ozone-related health effects section as well, and include a reference to the spatial distribution of ozone impacts.

- One Advisory Council member noted that in listening to the comments there is an interest in what people have control over, versus what is completely out of their control. For example, what PM is coming from businesses versus what is coming out of the mountains. Maybe clarity is needed to distinguish the difference. Staff commented that this information is located in Chapters 2 and 3 of the draft 2016 AQMP.

- An Advisory Council member commented that there is a need to stay focused on what information the Appendix I is required to provide. It could be helpful to expand on the definition of health effects, further address the U.S. EPA requirements, and make it understandable so that it is clear to the average person reading the document.

- Another Advisory Council commented that when initially reading the document they thought it was a medical tool, which outlined the medical impacts. A suggestion would be to include a notation in the introduction that this is a medical or health reference, for information on exposure or other related information, and references can be made to the appropriate chapters.

- An Advisory Council member remarked that it is difficult to separate the health effects from the costs involved. Staff responded that we address the cost issue in other chapters. Appendix I addresses a particular purpose and requirement. The intent is not to argue the other issues of the AQMP in this Appendix.

- One Advisory Council member commented on the importance for the information to be presented accurately. This document should reflect what the current state of knowledge is on health effects from the referenced pollutants. Whether there is 100% certainty or absolute uncertainty, we are obligated to meet the federal standards. One can argue about the cost versus the health benefit, for example the cost of developing an approvable plan to attain the standards, versus the cost of not developing an approvable plan to meet the standards and what would happen to the region.

- Another Advisory Council member remarked that the Appendix I is intended to be a reference, and SCAQMD is trying to describe the state of literature as it exists. This document has attempted to capture the areas where the evidence in not well settled. U.S. EPA's terminology is at times highly cumbersome and not posed for a general audience. The information provided in this appendix is quantified and appropriate studies are referenced. We are trying to put some numbers to what the state of the research is, and we have an obligation to do the best job that we can.

- An Advisory Council member noted that for PM there is much more focus on direct references to specific studies, but the ozone information was more general. Either way of presenting of the information is fine, but a consistent approach would be better.

- The same Advisory Council member commented that in the PM section, page I-15 and in the first paragraph, a mention of toxicity should also be included.

- One Advisory Council member commented about U.S. EPA's ongoing PM review and indicated that the draft IRP is now available and will be finalized and available in Spring 2017. A reference to this could be included. Staff noted this is addressed in Chapter 8 of the draft 2016 AQMP.

- Another Advisory Council member inquired about the possibility of including a brief summary for Tables I-4, I-5 and I-6, to reflect that they show a range of impacts depending on the types of effects.

- Another Advisory Council member requested a definition of metabolic syndrome.

ULTRAFINE PARTICLES

Comments/Questions from AQMD Advisory Council and Staff Response

An Advisory Council member noted that the Integrated Review Plan (IRP) 2013 has information that could be relevant to include, as well as the PM Integrated Science Assessment (ISA) report. Staff commented that the ISA report is cited.

CARBON MONOXIDE

Comments/Questions from AQMD Advisory Council and Staff Response

- An Advisory Council member commented that even though the SCAB is in attainment for carbon monoxide, this pollutant is still relevant and should be included.

NITROGEN DIOXIDE

Comments/Questions from AQMD Advisory Council and Staff Response

- An Advisory Council member stressed the importance of this section because of the relation of nitrogen dioxide involvement in ozone and particulate formation, and suggested the possibility of switching the Carbon Monoxide and Nitrogen Dioxide sections.

SULFUR DIOXIDE

Comments/Questions from AQMD Advisory Council and Staff Response

No comments

LEAD

Comments/Questions from AQMD Advisory Council and Staff Response

- Staff noted that the SCAB is in attainment for lead, based on the measurements, but part of Los Angeles County is technically still in non-attainment until EPA officially recognizes attainment.

TOXIC AIR CONTAMINANTS

Comments/Questions from AQMD Advisory Council and Staff Response

- One Advisory Council member noted that it may be useful to include the MATES IV study. Staff commented that the last two paragraphs discuss the study and other MATES studies.

CONCLUSION

Comments/Questions from AQMD Advisory Council and Staff Response

- An Advisory Council member commented it was difficult to follow the logic of Figures I-15 and I-16, and why is this information included here. Staff explained that the figures reflect how these health studies lead to changes in standards, in a timeline format. Another Advisory Council member requested to have this staff explanation added to these figures.

REFERENCES

Comments/Questions from AQMD Advisory Council and Staff Response

No comments

ATTACHMENT – Publications from Health Related Research Projects Funded or Co-Funded by SCAQMD

Comments/Questions from AQMD Advisory Council and Staff Response

- An Advisory Council member inquired why it was necessary to include this information. Staff commented that this is historical information and to provide information on how these studies were funded and indicated a preface can be included to provide an explanation of how SCAQMD supports health research.

3. Other Business

Dr. Jo Kay Ghosh commented that Advisory Council members would be provided an extra week for written comments, with a new due date of August 26, 2016. An update was provided on how many comments have been received to date.

Dr. Philip Fine informed the council members that the comment period deadline for the draft 2016 AQMP is August 19th and a revised draft will be released in September 2016. There will be time provided for public comment and a draft final will be released in November 2016. The final 2016 AQMP will be presented to the Governing Board in December 2016.

4. Public Comment

Dr. James Enstrom expressed that he is one of approximately 40 scientists nationwide that are concerned about the Clean Air Act, how it has progressed (especially in California) and believes there is abuse that needs to be corrected. He brought a handout which was distributed to the Advisory Council members. The following areas of concern were noted by Dr. Enstrom.

- He expressed that there is abuse of the notion that fine PM causes premature death, and Dr. Shen's presentation on Tuesday was inappropriate in his mind.
- He commented that a clear explanation is needed on how it can be concluded that PM mortality can be translated into a calculation of premature deaths.
- He noted that the 2007 AQMP did not mention his research.
- He remarked the 2012 AQMP did not include his public comments, along with Dr. Jonathan Samet's comments.
- He noted that, since 2010, most of the studies referenced have been partially funded by AQMD and these reports need to be carefully examined.
- He stated that he has submitted for publication a document that undermines the entire Pope 1995 study, which did not use the best available fine PM evidence.
- He commented that California is the second lowest State for death rates. He further clarified that the SCAB has an even lower death rate than the State of California, and the city of Los Angeles is even lower.
- He expressed concern about the $38 billion price tag for the 2016 AQMP and the related economic impact it will have.
- He referenced a letter from Daniel Nebert (distributed as a handout).

- He disagreed with the linear no threshold assumption, and stated that the effects do not go down to zero.
- He expressed that even if the U.S. EPA states a nationwide effect, there is no effect in California.
- He indicated that there is attainment in many parts of the Basin and this needs to be accounted for.

Bill LaMarr, Advisory Council member, referenced his 2012 letter to Dr. Jean Ospital, where he cites the research by Dr. Enstrom and other researchers and inquired why this research was not included. Staff commented that SCAQMD is obligated to summarize the available scientific evidence and the related health impacts. The U.S. EPA's ISA document is invaluable information, since it already includes research assessments. Staff indicated that they welcome others to point to any peer-reviewed publications, which the SCAQMD staff will assess for relevance to this document.

Dr. John Husing, Advisory Council member, inquired if SCAQMD has ever pushed back against U.S. EPA. Staff commented that this type of action would need to be a decision or position taken by our Governing Board.

5. Next meeting: TBD

Dr. Fine commented that the members would be polled after the revised draft Appendix I is available and it would be determined then if another Advisory Council meeting is necessary. At this point, we have satisfied the requirements of the Health & Safety Code for comments and peer review. The meeting adjourned at 12:30 p.m.

MEMBERS PRESENT (11)

Paul Avila, Paul Avila & Associates
Professor Ed Avol, University of Southern California
Dr. Judy Chow, Desert Research Institute - *conference call*
Curt Coleman, Curt Coleman & Associates
Dr. Afif El-Hasan, Kaiser Permanente
Sue Gornick, Western States Petroleum Association
Dr. John Husing, Economics & Politics, Inc.
Dr. Cameron Kaiser, Riverside County Department of Public Health
William LaMarr, California Small Business Alliance
Mary Ann Lutz, Lutz and Company
Dr. Emily Nelson, Health & Environmental Risk Consultant

MEMBERS PRESENT / Call-In, Listen-Only (2)

Dr. John Froines, University of California, Los Angeles
Dr. Greg Osterman, Jet Propulsion Laboratory

MEMBERS NOT PRESENT (2)

Erbie Phillips, LDG Sports Academy
Dr. Rhodes Rigsby, Loma Linda University

CONFERENCE CALL PARTICIPANTS FROM CARB & OEHHA

Dr. Alvaro Alvarado, CARB
Dr. Rupa Basu, OEHHA
Rachel Broadwin, OEHHA
Dr. Keita Ebisu, OEHHA
Brian Malig, OEHHA
Dharshani Pearson, OEHHA

SCAQMD STAFF (13)

Sam Atwood, Media Manager
Barbara Baird, Chief Deputy Counsel
Teresa Barrera, Senior Deputy District Counsel
Dr. Shah Dabirian, Program Supervisor
Dr. Philip Fine, Deputy Executive Officer
Dr. Jo Kay Ghosh, Health Effects Officer
Priscilla Hamilton, Air Quality Specialist
Michael Krause, Planning and Rules Manager
Dr. Anthony Oliver, Air Quality Specialist
Ann Scagliola, Administrative Secretary
Dr. Elaine Shen, Program Supervisor
Jacob Steins, Governing Board Intern
Dr. Jillian Wong, Planning and Rules Manager

RESPONSES TO COMMENTS ON APPENDIX I RECEIVED DURING THE ADVISORY COUNCIL MEETING ON AUGUST 18, 2016

Response to Advisory Council Comments received during the August 18, 2016 Advisory Council Meeting

Response to Advisory Council Minutes Comment 1

Appendix I is written to provide a summary of the health effects of these air pollutants, using relatively non-technical language. The summary is consistent with the content in the references cited in Appendix I. It is important to note that the U.S. EPA uses a weight of evidence approach in their causal assessments, and only when the weight of evidence is sufficient do they conclude that a pollutant is causally related to a health outcome.

Response to Advisory Council Minutes Comment 2

The Introduction and Health Effects of Air Pollution sections have been expanded to clarify the purpose of the document.

Response to Advisory Council Minutes Comment 3

Appendix I summaries are primarily based on the most recent available U.S. EPA Integrated Science Assessment (ISA) on that pollutant. Because some of these ISAs are several years old, a supplemental literature search was conducted to identify more recently published scientific papers, and those papers provided additional information for Appendix I. Text has been added to Appendix I to clarify how these sources were selected.

Response to Advisory Council Minutes Comment 4

Numerical information is presented in the document, for example, when describing the percent increase or decrease in risk of a certain health outcome, or other health metric. The text in Appendix I has been clarified to include more numerical definitions where possible, and to add descriptions about the figures, which provide a visual representation of the studies' numerical results.

Response to Advisory Council Minutes Comment 5

Text has been added to clarify that NO2 studies could be a study of near-road impacts on health outcomes.

Response to Advisory Council Minutes Comment 6

Appendix I already describes the legal requirement for SCAQMD to provide this summary document. To clarify, the SCAQMD staff are not conducting scientific reviews to ascertain whether a pollutant causes or does not cause any health effects. Instead, Appendix I document is a summary of the U.S. EPA's causal determinations, and presents a summary of some of the studies reviewed by U.S. EPA in their assessments, as well as some more recent literature. In addition, Appendix I has changed substantially since the 2012 Appendix I; one of the changes is the expanded description of the methodology used to put together this summary.

Response to Advisory Council Minutes Comment 7

Text has been added to Appendix I to note that this information can be found in Chapter 2 and Appendix II.

Response to Advisory Council Minutes Comment 8

These topics are addressed in the Socioeconomic Report.

Response to Advisory Council Minutes Comment 9

A sentence has been added comparing the current California and federal PM2.5 standards.

Response to Advisory Council Minutes Comment 10

As discussed in the Advisory Council meeting, particulate matter is a significant portion of the health risk and was specified in the Health & Safety Code because it was felt that the public should be made aware of the health risks of PM.

Response to Advisory Council Minutes Comment 11

As discussed in the Advisory Council meeting, when U.S. EPA initially identified PM2.5 as being a separate problem beyond PM10, there was discussion to set separate standards for PM2.5 and PM2.5-10. Eventually it was decided not to adopt a separate standard for PM2.5-10. The PM standards are described briefly in Appendix I.

Response to Advisory Council Minutes Comment 12

Text has been added to the Health Effects of Air Pollution section clarifying that the focus will be on health endpoints that are high on the causal determination scale, while other health effects may be mentioned briefly.

Response to Advisory Council Minutes Comment 13

A sentence has been added in the caption to Figure I-1 to clarify this point.

Response to Advisory Council Minutes Comment 14

The definitions in this table are taken directly from the U.S. EPA summaries, as these are the definitions used in their causal determinations.

Response to Advisory Council Minutes Comment 15

The SCAQMD is required to adhere to the federal and state standards. When a regulatory program is formulated, it is designed to meet the federal and/or state standards. Staff can comment and weigh-in

on the determination process, but once it becomes federal or state regulation, we are obligated to meet the standards.

Response to Advisory Council Minutes Comment 16

All tables were formatted so that they are not split across pages.

Response to Advisory Council Minutes Comment 17

For consistency, Appendix I uses the U.S. EPA terminology for the causal determinations.

Response to Advisory Council Minutes Comment 18

Text has been added to clarify that FEV1 is defined as the forced expiratory volume in 1 second, which is a measure of lung function.

Response to Advisory Council Minutes Comment 19

The most recent U.S. EPA Integrated Science Assessment for Particulate Matter was conducted in 2009. While a new U.S. EPA review is underway, the final document from this review will likely not be available for several years, so Appendix I utilizes the 2009 review as the most recent review, and supplements this information with the results of a literature search used to identify more recently published studies.

Response to Advisory Council Minutes Comment 20

Text has been added to the introduction of the Ozone section to specify that short-term and long-term ozone exposures are linked to respiratory effects. Text has also been added to the beginning of the Short-Term Ozone Effects and Long-Term Ozone Effects sections to indicate that respiratory effects are high on the causal determination scale.

Response to Advisory Council Minutes Comment 21

Text has been added to the Health Effects of Air Pollution section clarifying that we are discussing the Southern California and California studies, as well as some key studies conducted in other locations.

Response to Advisory Council Minutes Comment 22

Text has been added to the Health Effects of Air Pollution section to indicate that studies conducted in other locations still provide critical information that is pertinent to advancing the scientific understanding of the health effects of air pollution, including effects on our local population.

Response to Advisory Council Minutes Comment 23

Text has been added to Appendix I to quantify these terms as appropriate.

Response to Advisory Council Minutes Comment 24

These figures are derived directly from the EPA documents and the staff is not able to alter the figures easily.

Response to Advisory Council Minutes Comment 25

The section has been edited to reflect the evidence as presented in the 2013 ISA for Ozone, and a table was added to further detail the factors and the evidence classifications in the ISA document.

Response to Advisory Council Minutes Comment 26

A summary of the updates in causal determinations for respiratory effects, cardiovascular effects, and mortality was added to the summary section. In addition, more detail about the specific types of respiratory and cardiovascular endpoints studied were added to this section.

Response to Advisory Council Minutes Comment 27

AQMP Chapter 3 discusses the emissions inventories and the relative contributions by source category for each criteria pollutant. A brief explanation has been added in Appendix I referring the reader to Chapter 3 of the draft 2016 AQMP for information on ozone precursor sources.

Response to Advisory Council Minutes Comment 28

The document already mentions some of the studies examining specific PM constituents and sources in the Short-Term PM Health Effects section, and text has been added in the Long-Term PM Health Effects section to briefly describe the findings in the most recent ISA for PM. Since the question of constituent-specific toxicity has been a focus of U.S. EPA's efforts in recent years, the ISA for PM that is currently in development will likely include a summary of the studies conducted recently addressing this question.

Response to Advisory Council Minutes Comment 29

The SCAQMD operates monitors that measure particle mass, and some monitors that measure composition of PM. This is further clarified in Chapter 2 of the draft 2016 AQMP.

Response to Advisory Council Minutes Comment 30

Text has been added to the PM section to state that the composition can vary across sub-regions, and refers the reader to Chapter 2 and Appendix II of the draft 2016 AQMP for additional information about the spatial differences in PM composition. Text has also been added to the Ozone section to refer the reader to the draft 2016 AQMP Chapter 2 for a description of the spatial distribution of ozone in the SCAB.

Response to Advisory Council Minutes Comment 31

This information is provided in the Chapters 2 and 3 of the draft 2016 AQMP.

Response to Advisory Council Minutes Comment 32

Text has been added to the Introduction and Health Effects of Air Pollution sections to further describe the purpose of Appendix I and the approach in summarizing the health effects.

Response to Advisory Council Minutes Comment 33

Text has been added to Appendix I to clarify the purpose of this document, and also to refer the reader to other chapters or appendices of the draft AQMP document regarding other aspects of air pollution exposure or distribution that are best described in those sections

Response to Advisory Council Minutes Comment 34

Appendix I document is a summary of the health effects of air pollution; it is not the purpose of this Appendix to discuss costs. The Socioeconomic Report provides an evaluation of the costs and benefits associated with the Plan.

Response to Advisory Council Minutes Comment 35

The document is written to accurately reflect the current state of knowledge of the health effects of these pollutants.

Response to Advisory Council Minutes Comment 36

The staff agree that Appendix I is a summary of the state of the literature as it exists, and the causal determinations as assessed by U.S. EPA.

Response to Advisory Council Minutes Comment 37

More specific references and discussion of individual studies were added to the Ozone section, to make it more consistent with the PM section. The staff believe the discussion of the key studies in the PM section is quite relevant, since these studies are frequently referenced, and provided important evidence in the causal determination for PM health effects.

Response to Advisory Council Minutes Comment 38

The sentence has been modified accordingly.

Response to Advisory Council Minutes Comment 39

Text has been added to note that U.S. EPA is preparing an ISA as part of the review of the federal PM standards, and that the process is described briefly in Chapter 9 of the draft 2016 AQMP.

Response to Advisory Council Minutes Comment 40

Text has been added to summarize what these figures show.

Response to Advisory Council Minutes Comment 41

A definition has been added to the text.

Response to Advisory Council Minutes Comment 42

Text has been added to note that U.S. EPA is preparing an ISA as part of the review of the federal PM standards, and that the process is described briefly in Chapter 9 of the draft 2016 AQMP.

Response to Advisory Council Minutes Comment 43

The staff have noted the comment and continue to include the summary of health effects of carbon monoxide in Appendix I.

Response to Advisory Council Minutes Comment 44

The sections have been reordered accordingly.

Response to Advisory Council Minutes Comment 45

Text has been added to refer the reader to the draft 2016 AQMP Chapter 2 for a description of the attainment status for lead.

Response to Advisory Council Minutes Comment 46

Appendix I already describes the MATES IV main study results in the Toxics section.

Response to Advisory Council Minutes Comment 47

Text has been added to this section to describe that the role of health studies in the process of setting federal air quality standards, and to refer the reader to Chapter 8 of the draft 2016 AQMP for a description of the NAAQS process

Response to Advisory Council Minutes Comment 48

A preface has been added to the attachment.

Response to Public Comment received during the August 18, 2016 Advisory Council Meeting

Response to Public Comment 1

See Response to Comment Letter #1

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix II

Current Air Quality

2016 AIR QUALITY MANAGEMENT PLAN



December 2016

DRAFT FINAL 2016 AQMP
APPENDIX II

CURRENT AIR QUALITY

DECEMBER 2016

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
GOVERNING BOARD

Chairman: DR. WILLIAM A. BURKE
Speaker of the Assembly Appointee

Vice Chairman: BEN BENOIT
Mayor Pro Tem, Wildomar
Cities of Riverside County

MEMBERS:

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County of Riverside

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County of Orange

DR. CLARK E. PARKER, SR.
Senate Rules Committee Appointee

DWIGHT ROBINSON
Councilmember, Lake Forest
Cities of Orange County

JANICE RUTHERFORD
Supervisor, Second District
County of San Bernardino

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Production

Arlene Martinez, Sr. Administrative Secretary

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SUMMARY

This appendix contains a detailed summary of air quality in 2015 and prior year trends for the South Coast Air Basin (Basin) and the Riverside County portion of Salton Sea Air Basin (SSAB), under the jurisdiction of the South Coast Air Quality Management District (SCAQMD or District). The Basin includes Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties. The Riverside County portion of the SSAB under the District's jurisdiction is the Coachella Valley Planning Area (Coachella Valley).

Chapter 1 of this appendix presents descriptions of the air quality setting for the SCAQMD jurisdiction, including the relevant boundaries, weather factors and emissions for both the Basin and the Coachella Valley. It also briefly describes the properties and health and welfare effects of the criteria pollutants, i.e., those pollutants that have an associated health-based National Ambient Air Quality Standard (NAAQS or federal standard). It also details the level and form of both the NAAQS and the California Ambient Air Quality Standards (CAAQS or State standards).

Chapters 2 and 3 present summaries of current air quality and trends for each of the criteria pollutants in the Basin and the Coachella Valley, respectively. These chapters include the 2015 peak concentrations and 2013–2015 3-year design values for comparison to federal and State standards, along with geographical, seasonal, and diurnal variations. Air quality statistics and trends presented in this appendix provide information on the recent history and current status and progress toward attainment of the NAAQS and CAAQS, providing a baseline for planning toward future attainment.

In the Basin, Ozone (O_3) and fine particulate matter (PM2.5, particles less than 2.5 microns in diameter) are the pollutants of primary concern. For these, the U.S. EPA has designated the Basin as a nonattainment area for the NAAQS. The Basin had the highest number of days exceeding the federal ozone NAAQS of any urban area nationwide in 2015. State standards for ozone, PM2.5, and PM10 are also not met in the Basin. The Basin is in attainment of the PM10 (particles less than 10 microns in diameter) NAAQS. Nitrogen dioxide (NO_2), carbon monoxide (CO), and sulfur dioxide (SO_2) levels are in attainment with both the federal and the State standards. The Basin is in attainment of the lead (Pb) NAAQS, with the final near-source monitoring location below the standard throughout the 2012 through 2015 time period. The District will request that U.S. EPA redesignate the Los Angeles County portion of the Basin as attainment for lead. The Basin is also in attainment of the State standards for lead, sulfates (SO_4^{2-}), and hydrogen sulfide (H_2S).

The Coachella Valley is a NAAQS nonattainment area for 8-hour ozone and 24-hour PM10 and also does not attain the California State standards for ozone and PM10. However, the Coachella Valley is now in attainment of the 1979 1-hour ozone NAAQS. All exceedances of the 24-hour PM10 NAAQS in the Coachella Valley are associated with high-wind natural events. PM2.5 concentrations remain below the federal and State standards in the Coachella Valley, along with the remainder of the criteria pollutants, except that the State hydrogen sulfide (H_2S) standard is exceeded due to naturally occurring emissions from the Salton Sea.

Detailed air quality statistics for each of the District's monitoring locations in the Basin and the SSAB are contained in the attachment to this appendix, for the years 1995 through 2015. Please refer to Appendix II from the 2003 AQMP[1] for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP[2] for 1990–2005 data.

[1] 2003 AQMP, Appendix II: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2003-air-quality-management-plan/2003-aqmp-appendix-ii.pdf?sfvrsn=2

[2] 2007 AQMP, Appendix II: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2007-air-quality-management-plan/2007-aqmp-appendix-ii.pdf?sfvrsn=2

CHAPTER 1

INTRODUCTION

Air Quality Setting

SCAQMD Jurisdiction and Air Quality Monitoring Network

Weather Factors

Emissions

Ambient Air Quality Standards

Design Values

Summary of Criteria Pollutants and Air Quality Standards

Air Quality Setting

SCAQMD Jurisdiction and Air Quality Monitoring Network

California's first local air pollution control agency, the Los Angeles County Air Pollution Control District (LAAPCD), was formed in 1947, and APCDs were formed in Orange, Riverside, and San Bernardino Counties soon afterward. These four agencies combined in 1976 to form the Southern California APCD, which was replaced by the South Coast Air Quality Management District (SCAQMD or District) by State legislation, effective February 1, 1977, with jurisdiction over the South Coast Air Basin (Basin). The Mojave Desert Air Quality Management District (MDAQMD) was also formed, which covers the Mojave Desert Air Basin (MDAB), except for a portion within SCAQMD jurisdiction in eastern Riverside County. Later, the Antelope Valley Air Pollution Control District (AVAPCD) was formed, which covers the Antelope Valley desert portion of Los Angeles County that is not within SCAQMD jurisdiction.

The Basin includes all of Orange County and the non-desert areas of Los Angeles, Riverside, and San Bernardino Counties. The District is also responsible for air quality in the Riverside County portion of the Salton Sea Air Basin (SSAB), which is primarily the Coachella Valley Planning Area (Coachella Valley). The region encompassed by the District is shown in Figure 1-1.

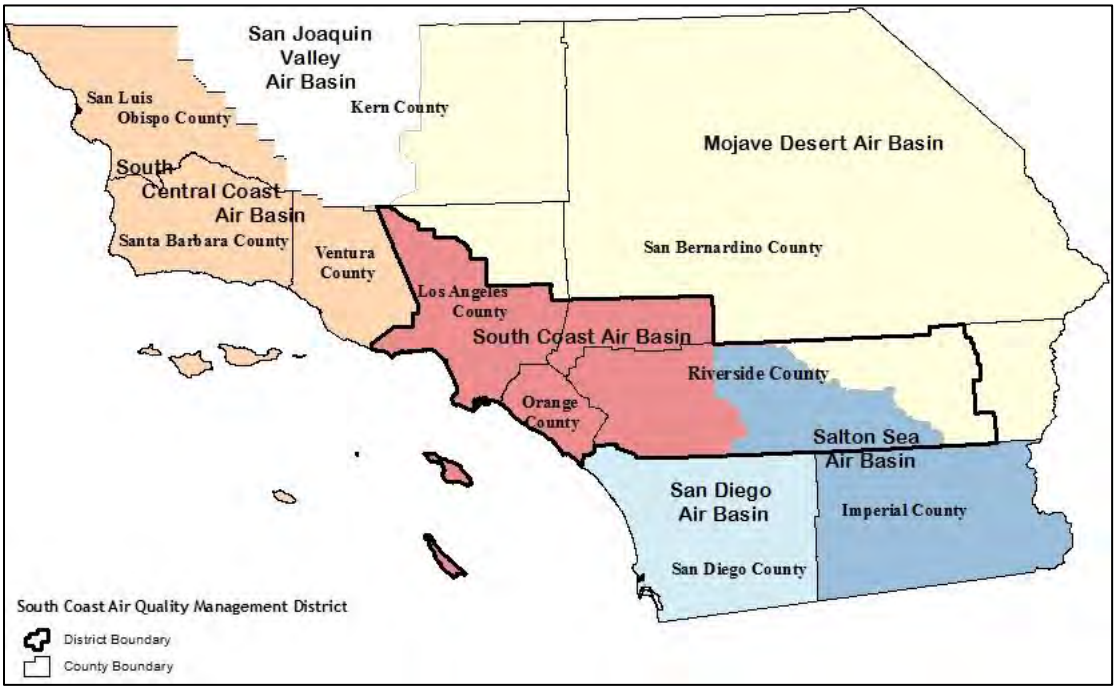

FIGURE 1-1

South Coast Air Quality Management District and Surrounding Jurisdictions

(The grey portion of Riverside County is the Coachella Valley Planning Area portion of the Salton Sea Air Basin)

The Basin has an area of 6,800 square miles with a population of approximately 16 million people in 2015. The Los Angeles urban area (the nation's second largest), the Anaheim-Fullerton urban area, and the Riverside-San Bernardino urban area lie within the Basin's boundaries. About two-thirds of the Basin's population lives within Los Angeles County.

The 2015 population in the Coachella Valley was approximately 465,000. SCAQMD also has jurisdiction over a small portion of the MDAB in Eastern Riverside County (see Figure 1-1). The area is sparsely populated desert and contains a portion of Joshua Tree National Park. The SSAB and the MDAB have a combined area of approximately 32,200 square miles. These two Basins include most of the desert portions of Los Angeles, Riverside, and San Bernardino Counties, as well as Imperial County and part of Kern County.

Table 1-1 summarizes the historic, current and future projections of the population of the Basin and the Coachella Valley.

TABLE 1-1

Historic and Projected Populations for South Coast Air Basin and Coachella Valley

AREA	Historic Population				Projected Population		
	1980	1990	2000	2010	2020	2031	2040
South Coast Air Basin	10,500,000	13,083,594	14,640,692	15,735,186	16,764,932	17,940,418	18,822,083
Coachella Valley	139,000	244,070	325,937	425,404	497,257	596,386	673,425

Source: Historic populations from Southern California Association of Governments, January 2016 CARB 2013 Almanac of Emissions and Air Quality, 2013 Edition, Appendix C [http://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm]; Population projections from Southern California Association of Governments (SCAG) [January 2016 update]

U.S. EPA has set National Air Quality Standards (NAAQS) for six principal pollutants, which are called "criteria" pollutants," including O_3, PM (including both PM10 and PM2.5), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). In 2015, SCAQMD measured concentrations of air pollutants at 34 routine ambient air monitoring stations in its jurisdiction, with primary focus on these criteria pollutants. In addition to the ambient monitoring, lead concentrations continued to be monitored at five source-oriented monitoring sites, immediately downwind of stationary lead sources. By the beginning of 2015, the SCAQMD also added four new near-road monitoring stations. The near-road measurements focus on carbon monoxide (CO), nitrogen dioxide (NO_2), and PM2.5 near some of the most heavily trafficked roadways in southern California. Additions to the SCAQMD ambient air monitoring network since the previous 2012 AQMP, which included air quality data summaries through the 2011, include a new monitoring station in the southeastern Coachella Valley in the community of Mecca to measure PM10 and hydrogen sulfide (H_2S) and a station close to the Salton Sea to measure H_2S.

Monitoring Network Status

U.S. EPA has set National Air Quality Standards (NAAQS) and monitoring requirements for six principal pollutants, which are called "criteria" pollutants," including O_3, PM (including both PM10 and PM2.5), carbon

monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). In 2015, SCAQMD measured concentrations of air pollutants at 34 routine ambient air monitoring stations in its jurisdiction, with primary focus on these criteria pollutants. In addition to the ambient monitoring, lead concentrations are monitored at five source-oriented monitoring sites, immediately downwind of stationary lead sources.

There have been several changes to the SCAQMD ambient air monitoring network since the previous AQMP, which was finalized in 2012 and summarized air quality through 2011. Long-term monitoring stations at North Long Beach and Burbank had to be closed in 2013 and 2014, respectively, due to lease decisions beyond the District's control; replacements for these two stations are being sought at this time. Filter-based PM2.5 measurements have continued at North Long Beach until a suitable replacement station can be obtained. The Ontario Fire Station monitoring station was closed in 2014, due to lack of sufficient space at the Ontario site measurements beyond the limited PM10 and PM2.5 sampling. The Riverside-Magnolia station was also closed, with those measurements (PM2.5, lead, CO and NO_2) consolidated at the nearby Riverside-Rubidoux station in 2015. Replacements for the Ontario Fire Station and Riverside-Magnolia air monitoring stations are not required by U.S. EPA and the measurements from these locations are well-represented by other SCAQMD stations.

A new special-purpose monitoring station was added, starting in January 2013, in the southeastern Coachella Valley in the community of Mecca to measure PM10 and hydrogen sulfide (H_2S). A second H_2S monitor was added on Torres-Martinez tribal property to measure naturally occurring odors from the Salton Sea close to the shoreline.

To implement recent U.S. EPA requirements to monitor NO_2, CO, and PM2.5 near major roadways in large urban areas, four new near-road monitoring stations were installed. The NO_2 measurements began on January 1, 2014 at a near-road site at Vernon Street in Anaheim, Orange County, adjacent to Interstate Highway 5. This was followed by a new near-road site near Etiwanda Avenue in San Bernardino County next to Interstate Highway 10 in July 2014. CO measurements began at both the I-5 and I-10 near-road sites in December 2014. These two sites represent high traffic volume routes. Near-road NO_2 and PM2.5 measurements began in 2015 next to California Highway 60, west of Vineyard Avenue near the San Bernardino/Riverside County border, and next to Interstate Highway 710, at Long Beach Blvd. in Los Angeles County. These two sites represent high traffic volumes with a high fraction of diesel truck traffic.

The near-road monitoring is source-specific, that is, the pollutant measurements are directly impacted by the close proximity of the traffic-related emissions from the roadways. As a result, higher measured air pollutant concentrations are generally expected at the near-road sites than those found further away from the freeways. The near-road measurements provide representative pollutant exposure information for people who live, work, or go to school adjacent to freeways or who spend significant time traveling on the busiest

southern California roadways. Once sufficient near-road data is collected for a full 3-year design value[3] calculation, it can be included in analyses for attainment of the NAAQS.

Figure 1-2 shows the locations of the regular ambient air monitoring stations along with the District boundaries. Table A-1 and Figure A-1 in the attachment to this appendix also show the District's current ambient air monitoring network.[4]

[3] A design value is a statistic that describes the air quality status of a given area relative to the level and form of the NAAQS. For most criteria pollutants, the design value is a 3-year average and takes into account the form of the short-term standard (e.g., 98th percentile, fourth high value, etc.). Design values can also be calculated for standards that are exceedance-based (e.g., 1-hour ozone and 24-hour PM10) so that they can be expressed as a concentration instead of an exceedance count, in order to allow a direct comparison to the level of the standard. Note that the modeling design values used for the AQMP attainment demonstration are based on a 5-year period, weighted toward the center year, as specified in U.S. EPA modeling guidelines.

[4] For more detailed current information and maps of the SCAQMD air monitoring network by pollutant measured and monitoring station details, please refer to SCAQMD's Annual Air Monitoring Network Plan, available on the web at http://www.aqmd.gov/home/library/clean-air-plans/monitoring-network-plan.

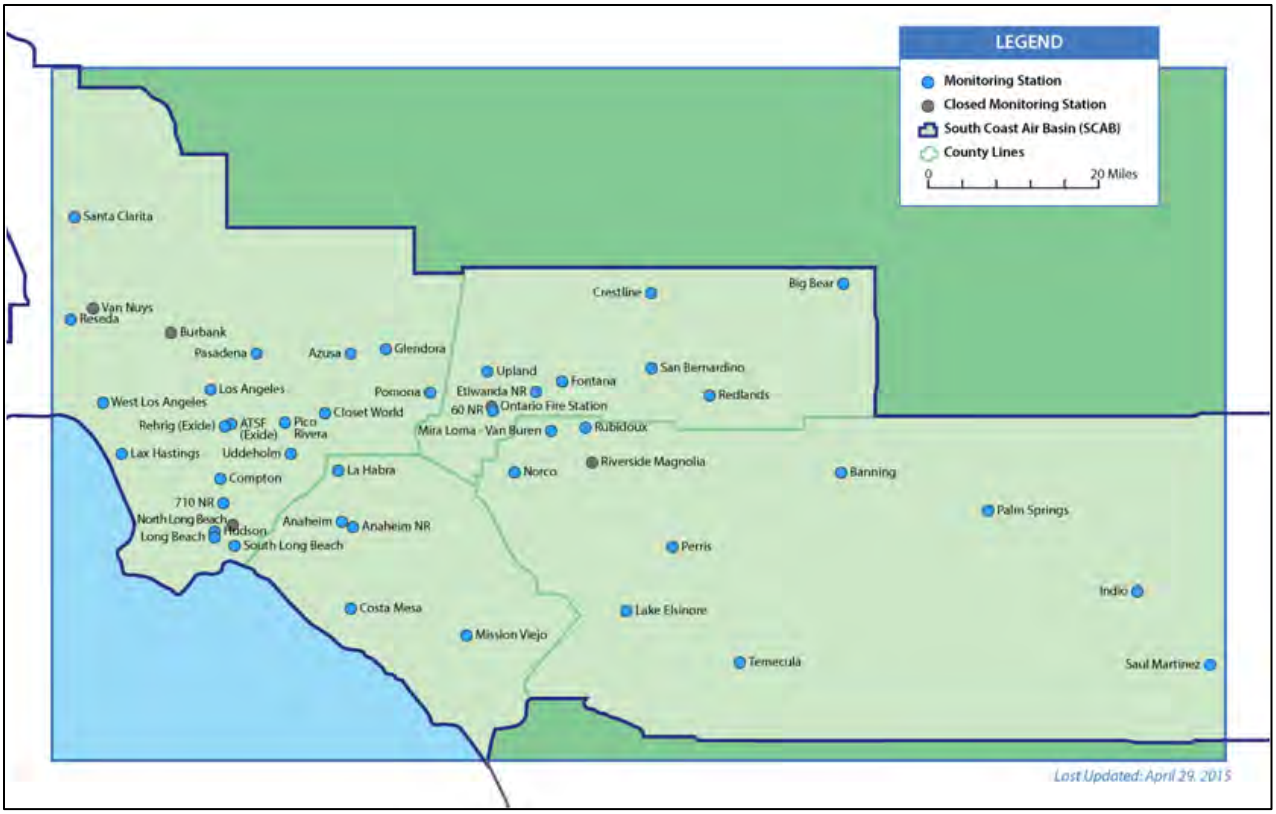

FIGURE 1-2

South Coast Air Quality Management District Ambient Air Monitoring Stations in 2015

[Note stations closed (grey dots): N. Long Beach in 2013 (FRM PM2.5 still operating), Burbank and Ontario Fire Station in 2014, Riverside-Magnolia in 2015, and Van Nuys Airport lead (Pb) monitor; Salton Sea Air Basin include: Palm Springs, Indio, and Mecca-Saul Martinez stations, in Riverside County's Coachella Valley; all other stations are in the South Coast Air Basin; I-710 (labeled 710 NR), CA-60 (60 NR), I-5 (Anaheim NR), and I-10 (Etiwanda NR) are near-road stations]

Weather Factors

The climate of the District varies considerably between the coastal zone, inland valleys, mountain areas, and deserts. Most of the Basin is relatively arid, with very little rainfall and abundant sunshine during the summer months. It has light winds and poor vertical mixing compared to most other large urban areas in the U.S. The combination of poor air dispersion and abundant sunshine provides conditions especially favorable to the formation of photochemical smog and the trapping of particulates and other pollutants. The Basin is bounded to the north and east by mountains with maximum elevations exceeding 10,000 feet. The unfavorable combination of meteorology, topography, and emissions from the nation's second largest urban area results in the Basin having some of the worst air quality in the U.S.

The prevailing daytime sea breeze tends to transport pollutants and precursor emissions from coastal areas into the Basin's inland valleys, and from there, still further inland into neighboring areas of the SSAB (especially the Coachella Valley) and the MDAB. Concentrations of primary pollutants (those emitted directly into the

air) are typically highest close to the sources which emit them. However, secondary pollutants (those formed in the air by chemical reactions, such as ozone and the majority of PM2.5) reach maximum concentrations some distance downwind of the sources that emit the precursors, due to the fact that the polluted air mass is moved inland by the prevailing winds many miles to areas where maximum concentrations are reached.

Emissions

The year 2012 emissions are the base year emissions used for the 2016 AQMP. In that year, the Basin's annual average daily emissions were approximately 2,123 tons of CO, 470 tons of volatile organic compounds (VOC), 540 tons of oxides of nitrogen (NOx), 18 tons of sulfur oxides (SOx), 152 tons of PM10, 66 tons of PM2.5, and 81 tons of ammonia (NH_3). The 2012 annual average daily emissions in the Coachella Valley are much lower than in the Basin: approximately 60 tons of CO, 14 tons of VOC, 27 tons of NOx, 0.2 tons of SOx, 15 tons of PM10, 3 tons of PM2.5, and 2.4 tons of NH_3. The difference in local emissions between these two areas under SCAQMD jurisdiction, along with the prevailing wind flows into the Coachella Valley from the Basin, illustrate the importance of pollutant transport to the Coachella Valley's air quality. Figure 1-3 shows the 2012 annual average daily emissions for the Basin and the Coachella Valley.

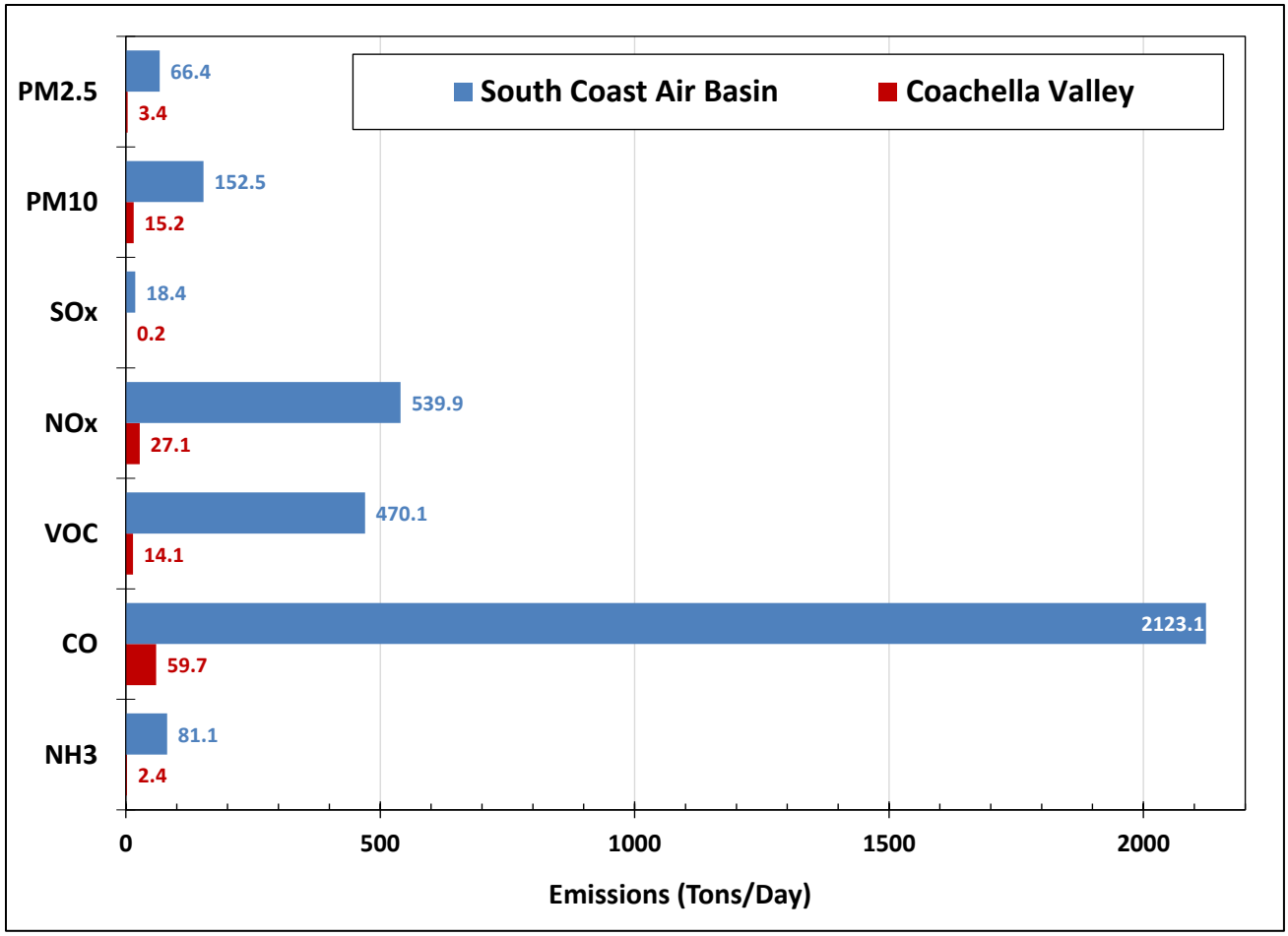

FIGURE 1-3
South Coast Air Basin and Coachella Valley 2012 Base Year Annual Average Daily Emissions
(Tons per Day)

Much of the directly emitted PM10 and PM2.5 is attributed to fugitive dust sources such as re-suspended road dust, construction activities, farming operations and wind-blown dust, but other directly-emitted substances such as diesel particulate are also significant. Additional PM10 and PM2.5 particles form in the atmosphere through secondary chemical reactions from gaseous precursor emissions. VOCs and NO_x are precursors of ozone, and they also react to form nitrates and solid organic compounds, which are a significant fraction of the ambient particulate matter. SO_2 reacts to form sulfates which are also significant contributors to the Basin's PM10 and PM2.5 levels. Most emissions vary relatively little by season, but there are large seasonal differences in the atmospheric concentrations of pollutants due to seasonal variations in the weather. Details of the 2012 base year and future-year projected emissions inventories are contained in Appendix III.

Ambient Air Quality Standards

Both the federal government and the State of California have adopted ambient air quality standards, which define the concentration below which long-term or short-term exposure to a pollutant is not expected to cause adverse effects to public health and welfare. The criteria pollutants, those that have federal health-based National Ambient Air Quality Standards (NAAQS or federal standards), are: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), coarse and fine particulate matter (PM10 and PM2.5, respectively), and lead. The State of California also has California Ambient Air Quality Standards (CAAQS or State standards) for these criteria pollutants, plus standards for, and sulfates (SO_4^{2-}), hydrogen sulfide (H_2S), and vinyl chloride, as well as a welfare-based standard for visibility-reducing particles.

For several of the NAAQS, there are both primary and secondary standards. Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. This document focuses mainly on the primary federal and State standards. The federal and State primary standards are summarized in Table 1-2, along with a brief summary of health and welfare effects. Further discussion of the health effects of air pollutants is presented in Chapter 2 and more detailed health information is presented in Appendix I: Health Effects.

TABLE 1-2

Ambient Air Quality Standards and Key Health and Welfare Effects

AIR POLLUTANT	FEDERAL STANDARD (NAAQS)	STATE STANDARD (CAAQS)	KEY HEALTH & WELFARE EFFECTS[#]
	Concentration, Averaging Time, Year of NAAQS Review	**Concentration, Averaging Time**	
Ozone (O_3)	**0.070 ppm, 8-Hour (2015)** 0.075 ppm, 8-Hour (2008) 0.08 ppm, 8-Hour (1997) 0.12 ppm, 1-Hour (1979)	**0.070 ppm, 8-Hour** **0.09 ppm, 1-Hour**	(a) Pulmonary function decrements and localized lung injury in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Increased respiratory related hospital admissions and emergency room visits; (e) Vegetation damage; (f) Property damage
Fine Particulate Matter (PM2.5)	**35 µg/m³, 24-Hour (2006)** **12.0 µg/m³, Annual (2012)** 15.0 µg/m³, Annual 1997)	**12 µg/m³, Annual**	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Decline in pulmonary function or growth in children; (c) Increased risk of premature death; (d) Increased risk of lung cancer; (e) increased asthma-related hospital admissions; (f) increased school absences and lost work days; (g) possible link to reproductive effects; (h) visibility reduction
Respirable Particulate Matter (PM10)	**150 µg/m³, 24-Hour (1997)**	**50 µg/m³, 24-Hour** **20 µg/m³, Annual**	
Carbon Monoxide (CO)	**35 ppm, 1-Hour (1971)** **9 ppm, 8-Hour (1971)**	**20 ppm, 1-Hour** **9.0 ppm, 8-Hour**	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Possible impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide (NO_2)	**100 ppb, 1-Hour (2010)** **0.053 ppm, Annual (1971)**	**0.18 ppm, 1-Hour** **0.030 ppm, Annual**	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in children with asthma; (b) Increased airway responsiveness in asthmatics; (c) Contribution to atmospheric discoloration
Sulfur Dioxide (SO_2)	**75 ppb, 1-Hour (2010)**	**0.25 ppm, 1-Hour** **0.04 ppm, 24-Hour**	Respiratory symptoms (bronchoconstriction, possible wheezing or shortness of breath) during exercise or physical activity in persons with asthma
Lead (Pb)	**0.15 µg/m³, rolling 3-month average (2008)**	**1.5 µg/m³, 30-day average**	(a) Learning disabilities; (b) Impairment of blood formation and nerve conduction; (c) cardiovascular effects, including coronary heart disease and hypertension
Sulfates-PM10 (SO_4^{2-})	**N/A**	**25 µg/m³, 24-Hour**	(a) Decrease in lung function; (b) Aggravation of asthmatic symptoms; (c) Vegetation damage; (d) Degradation of visibility; (e) Property damage
Hydrogen Sulfide (H_2S)	**N/A**	**0.03 ppm, 1-hour**	Exposure to lower ambient concentrations above the standard may result in objectionable odor and may be accompanied by symptoms such as headaches, nausea, dizziness, nasal irritation, cough, and shortness of breath

ppm – parts per million by volume; ppb – parts per billion by volume (0.01 ppm = 10 ppb)

Standards in bold are the current, most stringent standards; there may be continuing obligations for former standards

State standards are "not-to-exceed" values based on State designation value calculations

Federal standards follow the 3-year design value form of the NAAQS

[#] List of health and welfare effects is not comprehensive; detailed health effect information can be found in Appendix I: Health Effects or the U.S. EPA NAAQS documentation at http://www.epa.gov/ttn/naaqs/

Design Values

Air quality statistics are often presented in terms of the maximum concentrations measured at monitoring stations or in air basins, as well as for the number of days exceeding State or federal standards. These are instructive in regard to trends and the effectiveness of control programs. However, it should be noted that an exceedance of the concentration level of a federal standard does not necessarily lead to nonattainment designation. For NAAQS attainment/nonattainment decisions a *Design Value* for each station is calculated typically based on the most recent 3 years of data along with the form of the standard. For example, the design value for the 24-hour PM2.5 NAAQS is based on the annual 98th percentile measurement of all the 24-hour samples at each station, averaged over 3 years. The overall design value for an air basin is the highest design value of all the stations in that basin. U.S. EPA also allows certain data to be flagged and not considered for NAAQS attainment status, when that data is influenced by exceptional events, such as high wind events, wildfires, volcanoes, or some cultural events (e.g. Independence Day fireworks) that meet strict criteria. Table 1-3 shows the design value requirements utilizing the form of the federal standards for the federal criteria pollutants.

TABLE 1-3

National Ambient Air Quality Standards (NAAQS) and Design Value Requirements

Pollutant	Averaging Time**	NAAQS Level	Design Value Form of NAAQS*
Ozone (O_3)	1-Hour (1979) [revoked 2005]	0.12 ppm	Not to be exceeded more than once per year averaged over 3 years
	8-Hour (2015)	**0.070 ppm**	**Annual fourth highest 8-hour average concentration, averaged over 3 years**
	8-Hour(2008) [revised 2015]	0.075 ppm	
	8-Hour(1997) [revoked 2015]	0.08 ppm	
Fine Particulate Matter (PM2.5)	**24-Hour (2006)**	**35 µg/m³**	**3-year average of the annual 98th percentile of daily 24-hour concentration**
	Annual (2012)	**12.0 µg/m³**	**Annual average concentration, averaged over 3 years** *(annual averages based on average of 4 quarters)*
	Annual (1997) [revised 2012]	15.0 µg/m³	
Respirable Particulate Matter (PM10)	**24-Hour (1987)**	**150 µg/m³**	**Not to be exceeded more than once per year averaged over 3 years**
	Annual (1987) [revoked 2006]	50 µg/m³	Annual average concentration, averaged over 3 years
Carbon Monoxide (CO)	**1-Hour (1971)**	**35 ppm**	**Not to be exceeded more than once a year**
	8-Hour (1971)	**9 ppm**	
Nitrogen Dioxide (NO_2)	**1-Hour (2010)**	**100 ppb**	**3-year average of the annual 98th percentile of the daily maximum 1-hour average concentrations**
	Annual (1971)	**0.053 ppm**	**Annual average concentration, averaged over 3 years**
Sulfur Dioxide (SO_2)	**1-Hour (2010)**	**75 ppb**	**3-yer average of the 99th percentile of the daily maximum 1-hour average concentrations**
	24-Hour (1971)#	0.14 ppm	Not to be exceeded more than once per year
	Annual (1971)#	0.03 ppm	Annual arithmetic average
Lead (Pb)	**3-Month Rolling Average (2008)##**	**0.15 µg/m³**	**Highest rolling 3-month average of the 3 years**

Bold text denotes the current and most stringent NAAQS

* The NAAQS is attained when the design value (form of concentration listed) is equal to or less than the level of the NAAQS, assessed by station; for pollutants with the design values based on "exceedances" (1-hour O_3, 24-hour PM10, CO, and 24-hour SO_2), the NAAQS is attained when the concentration associated with the design value is less than or equal to the standard level:

- For 1-hour O_3 and 24-hour PM10, the NAAQS is attained when the 4th highest daily concentrations of the 3-year period is less than or equal to the standard level
- For CO and 24-hour SO_2, the standard is attained when the 2nd highest daily concentration of the most recent year is equal to or less than the standard level

** Year of U.S. EPA NAAQS update review shown in parenthesis and revoked or revised status in brackets; for revoked or revised NAAQS, areas may have continuing obligations until that standard is attained: for 1-hour O_3, the South Coast Air Basin has continuing obligations under the former 1979 standard; for 8-hour O_3, the NAAQS was lowered from 0.08 ppm to 0.075 ppm to 0.070 ppm, but the previous 8-hour O_3 NAAQS and most related implementation rules remain in place until that standard is attained

Annual and 24-hour SO_2 NAAQS are expected to be revoked 12/2021, one year from final attainment designations for the (2010) 1-hour SO_2 NAAQS expected 12/2020

3-month rolling averages of the first year (of the three year period) include November and December monthly averages of the prior year; the 3-month average is based on the average of "monthly" averages

Summary of Criteria Pollutants and Air Quality Standards

Ambient air quality standards are periodically reviewed by U.S. EPA and State agencies to incorporate the findings from the most current research available on the effects of pollutants. Alert and advisory levels for advising the public about unhealthful air quality are also recommended. The section below summarizes the pollutant properties and health information, along with the air quality standards, including the recently revised or newly established standards.

Ozone Properties

The Basin's unique air pollution problem was first recognized in the 1940's. The Los Angeles urban area smog was worse than other areas. Early research showed that ozone was being formed in the Basin's atmosphere from VOCs and NOx being emitted into the air in the presence of sunshine and trapped laterally by the mountainous terrain and vertically by strong low-altitude temperature inversions that act as a lid to vertical mixing of air. Regular monitoring of total oxidants was begun by the Los Angeles Air Pollution Control District (LAAPCD) in the 1950's, and annual maximum 1-hour ozone concentrations in excess of 0.60 ppm (600 ppb) were recorded at that time.

Ozone, a colorless gas with a sharp odor at very high concentrations, is a highly reactive form of oxygen. High ozone concentrations exist naturally high above the earth in the stratosphere. Some mixing of stratospheric ozone downward to the earth's surface does occur; however, the extent of ozone transport from aloft is limited. At the earth's surface in sites remote from urban areas, ozone concentrations are normally very low (0.03-0.05 ppm).

In urban areas, ozone is formed by a complicated series of chemical and photochemical reactions between VOCs, NOx, and the oxygen in the air. A decrease in ozone precursors may or may not result in a linear decrease in ozone. Ozone concentrations are dependent not only on overall precursor levels, but also on the ratio of the concentrations of VOCs to NOx , the reactivity of the specific VOCs present, the spatial and temporal distribution of emissions, the level of solar radiation, and other weather factors.

While ozone is beneficial in the stratosphere, where it blocks skin-cancer-causing ultraviolet radiation, it is a highly reactive oxidant. It is this reactivity which accounts for its damaging effects on materials, plants, and human health at the earth's surface.

The propensity of ozone to react with organic materials causes it to be damaging to living cells, and ambient ozone concentrations in the Basin are frequently sufficient to cause adverse health effects. Ozone enters the human body primarily through the respiratory tract and causes respiratory irritation and discomfort, makes breathing more difficult during exercise, and reduces the respiratory system's ability to remove inhaled particles and fight infection. People with respiratory diseases, children, the elderly, and people who exercise heavily are more susceptible to the effects of ozone.

Plants are sensitive to ozone at concentrations well below the health-based standards and ozone is responsible for significant crop damage and damage to forests and other ecosystems.

The adverse effects of ozone air pollution exposure on health have been studied for many years, as is documented by a significant body of peer-reviewed scientific research, including studies conducted in southern California. The 2013 U.S. EPA document, *Integrated Science Assessment of Ozone and Related*

Photochemical Oxidants,[5] describes these health effects and discusses the State of the scientific knowledge and research. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

Ozone Air Quality Standards

Studies have shown that even relatively low concentrations of ozone, if lasting for several hours, can significantly reduce lung function in normal healthy people. Effective September 16, 1997, the U.S. Environmental Protection Agency (U.S. EPA) adopted an 8-hour average federal ozone standard with a level of 0.08 ppm, intending to replace the 1-hour standard that was adopted in 1979 (0.12 ppm). This 1997 8-hour ozone standard was more stringent than the 1979 1-hour standard and provided greater protection to public health. The 8-hour standard is intended to help protect people who spend a significant amount of time working or playing outdoors, a group that is particularly vulnerable to the effects of ozone. (Due to the monitoring and reporting requirements of the older ozone standards, a level of 0.085 ppm or 85 ppb is required to exceed the 1997 8-hour standard and 0.125 ppm or 125 ppb is required to exceed the 1979 1-hour standard.)

The U.S. EPA eventually revoked the 1979 federal 1-hour ozone standard, effective June 15, 2005. However, the South Coast Air Basin and the former Southeast Desert Modified Air Quality Management Area (which included the Coachella Valley) had not attained the 1-hour federal ozone standard by the attainment date. On August 25, 2014, U.S. EPA proposed a clean data finding based on 2011–2013 data and a determination of attainment for the 1-hour ozone NAAQS for the Southeast Desert nonattainment area; this rule was finalized by U.S. EPA on April 15, 2015, effective May 15, 2015, including preliminary 2014 data. The Basin has not yet attained the 1-hour ozone NAAQS and has some continuing obligations under the former standard.

The 1997 8-hour standard was subsequently lowered from 0.08 to 0.075 ppm, effective May 27, 2008. On October 1, 2015, U.S. EPA finalized the new 2015 ozone NAAQS at 0.07 ppm, effective December 28, 2015. Nonattainment areas of the 1997 or the 2008 8-hour ozone standards, including the South Coast Air Basin and the Coachella Valley, still have continuing obligations to demonstrate attainment of that standard by the applicable attainment date. Statistics presented in this Appendix refer to the current 2015 8-hour ozone NAAQS, the revised 2008, and the revoked 1997 8-hour ozone NAAQS, as well as the revoked 1979 1-hour ozone NAAQS, for purposes of historical comparison and assessment of progress towards attainment of those standards.

The State of California Air Resources Board (CARB), established an 8-hour average State ozone standard (0.070 ppm), effective May 17, 2006. The earlier State 1-hour ozone standard (0.09 ppm) also continues to remain in effect.

While the 1-hour ozone episode levels and the related health warnings still exist, they are essentially replaced by the more protective health warnings associated with the current 8-hour ozone NAAQS, which includes the Air Quality Index (AQI)[6] scale for real-time reporting of air pollution levels and forecasts. The older 1-hour

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[5] U.S. EPA. (2013). Integrated Science Assessment of Ozone and Related Photochemical Oxidants (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/076F. [http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=247492]

[6] U.S. EPA Air Quality Index (AQI). [https://www.airnow.gov/index.cfm?action=aqibasics.aqi]

ozone episode warning levels include the State Health Advisory (0.15 ppm), Stage 1 (0.20 ppm), Stage 2 (0.35 ppm) and Stage 3 (0.50 ppm). The State 1-hour ozone Health Advisory was last exceeded in the Basin in 2013. The Basin's last 1-hour ozone Stage 1 episode occurred in 2003. The last 1-hour ozone Stage 2 episode occurred in 1988 and the last Stage 3 episode occurred in 1974.

Particulate Matter Properties

Particulate matter (PM) air pollution is a complex mixture of small particles and liquid droplets, made up of a number of components, including acids and salts (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Particles originate from a variety of anthropogenic mobile and stationary sources and from natural sources. These particles can be emitted directly or formed in the atmosphere by transformations of gaseous emissions, such as sulfur oxides (SOx), nitrogen oxides (NOx), ammonia (NH_3) and volatile organic compounds (VOC). Examples of secondary particle formation include: 1) conversion of SO_x and NOx to acid droplets or vapor that further react with ammonia to form ammonium sulfate and ammonium nitrate; and 2) reactions involving gaseous VOC, yielding organic compounds that condense on existing particles to form secondary organic aerosol (SOA) particles.

A significant body of peer-reviewed scientific research, including studies conducted in Southern California, points to adverse impacts of particulate matter air pollution on both increased illness (morbidity) and increased death rates (mortality). The 2009 U.S. EPA *Integrated Science Assessment for Particulate Matter*[7] describes these health effects and discusses the State of the scientific knowledge. A summary of health effects information and additional references can also be found in the 2016 AQMP, Appendix I: Health Effects.

The size of particles is directly linked to their potential for causing health problems. Particles that are 10 micrometers (µm) in diameter or smaller (PM10) are of more concern than larger particles because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. PM air pollution is typically grouped into two overlapping categories:

- *Inhalable particles* (PM10), such as those found near roadways and dusty industries, are smaller than 10 µm in diameter. PM10 includes all PM2.5 particles;
- *Fine particles* (PM2.5), such as those found in smoke and haze, are 2.5 µm in diameter and smaller. These particles can be directly emitted from combustion sources, such as from diesel exhaust (soot) or forest fire smoke, or they can form when gases emitted from power plants, industries and motor vehicles react in the air. PM2.5 is a subset of PM10 particles.

PM10 Properties

Respirable particles (particulate matter less than about 10 micrometers in diameter) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis, and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to PM10.

PM10 particles are both directly emitted and formed chemically in the atmosphere from diverse emission sources. Major sources of PM10 include re-suspended road dust or soil entrained into the atmosphere by

[7] U.S. EPA. (2009). Integrated Science Assessment for Particulate Matter (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546]

wind or activities such as construction and agriculture. These are mainly the coarser particles, in the PM10-2.5 coarse fraction range (often referred to as PM-Coarse, i.e., particles in the size range between 2.5 µm and 10 µm). Other components of PM10 form in the atmosphere (secondary PM10) from gaseous precursor emissions. These are mostly the smaller particles, mainly in the PM2.5 size range.

PM2.5 Properties

PM2.5, also known as fine particles, are the finer sized particles less than 2.5 µm in diameter; small enough to penetrate the defenses of the human respiratory system and lodge in the deepest recesses of the lung, causing potential adverse health impacts. The health effects include increased risks of heart attacks and strokes, aggravated asthma, acute bronchitis and chronic respiratory problems such as shortness of breath and painful breathing (in children, the elderly and sensitive people), and premature deaths (mainly in the elderly due to weaker immune systems). Sources of PM2.5 include diesel-powered vehicles such as buses and trucks, fuel combustion from automobiles, power plants, industrial processes, and wood burning.

In the Basin, much of the PM10 fraction is actually PM2.5 and smaller in size than 2.5 µm, a situation which has major implications for both health and atmospheric visibility. Reducing PM2.5 concentrations will therefore not only reduce the threat to the health of the Basin's population, but will also improve visibility in this region.

Total Suspended Particulate (TSP) Properties

Total suspended particulate (TSP) is the name applied to the complex mixture of particles suspended in the atmosphere, with no strict differentiation for particle size. TSP is collected on a glass fiber filter by means of a high volume sampler. Samples are collected for a 24-hour period every sixth day, and then returned to the laboratory to be weighed for mass and chemically analyzed to determine the concentrations of sulfate, nitrate, and lead. The federal and State standards for lead are based on the analysis of TSP samples. Other than the specific health effects of lead, the fine fraction of TSP has greater effects on health and visibility than the coarse fraction. Of greatest concern to public health are the particles small enough to be inhaled into the lungs (PM10) and especially the smaller fine particles that are inhaled more deeply into the lungs (PM2.5). As a result the federal standard for TSP mass has been replaced with the PM10 and PM2.5 standards.

Particulate Matter (PM) Air Quality Standards

PM10 Air Quality Standards

In 1987, U.S. EPA adopted PM10 standards, replacing the earlier TSP standard. The District began PM10 monitoring in late 1984. U.S. EPA promulgated both a short-term 24-hour average standard (150 µg/m^3)[8] and an annual standard (50 µg/m^3). Over the years, the forms and levels of the federal PM10 standards were reviewed by U.S. EPA. Changes to the federal standards for PM10 became effective on December 17, 2006. U.S. EPA first proposed to revise the 24-hour PM10 standard by establishing a new indicator for coarse particles (particles generally between 2.5 and 10 microns in diameter, PM10-2.5), to include PM10-2.5 that is mainly generated by resuspended dust from high-density traffic on paved roads, industrial sources, and construction sources; but specifically excluding PM10-2.5 that is generated by rural windblown dust and soils and by agricultural and mining sources. U.S. EPA proposed to set the PM10-2.5 standard at a level of 70 µg/m^3.

[8] µg/m^3 = micrograms per cubic meter

However, the coarse particle standard was not included as part of the final regulation which retained the 24-hour PM10 standard (150 µg/m^3).

U.S. EPA also revoked the annual PM10 standard due to a cited lack of evidence of adverse health effects linked to long-term exposure to coarse particles, beyond that already protected against by the PM2.5 annual standard. As part of the revision to the ambient air monitoring regulations in 2006, PM10-2.5 monitoring was required at National Core (NCore) multi-pollutant monitoring stations by January 1, 2011. Currently, the District measures PM10-2.5 at two NCore PM monitoring sites in the Basin (Central Los Angeles and Riverside-Rubidoux). In the most recent review of the PM standards completed in June of 2012, U.S. EPA did not propose changes to the PM10 standard and a PM10-2.5 standard has not been promulgated.

PM2.5 Air Quality Standards

In 1997, U.S. EPA adopted new federal air quality standards for the subset of fine particulate matter, PM2.5, to complement existing PM10 standards that target the full range of inhalable particulate matter. The District began monitoring PM2.5 concentrations in 1999. In 2006, U.S. EPA significantly lowered the level of the 24-hour PM2.5 standard, from 65 µg/m^3 to 35 µg/m^3, while retaining the level of the annual PM2.5 standard at 15.0 µg/m^3.

In the 2006 PM NAAQS review, U.S. EPA determined that individuals with pre-existing heart and lung diseases, older adults, and children are at greater risk from the effects associated with fine PM exposures. Based on the results of the previous studies and an extensive new body of scientific evidence that links the negative health impacts of PM2.5 exposure on these and possibly additional sensitive subpopulations, U.S. EPA strengthened the annual PM2.5 standard from 15.0 to 12.0 µg/m^3, effective March 18, 2013.[9] The current 24-hour standard of 35 µg/m^3 remained unchanged. In addition, U.S. EPA required near-roadway PM2.5 monitoring at two locations in the Basin, which have been implemented by the January 1, 2015 deadline. Adjustments were also made to the Air Quality Index (AQI), which is used to report current and forecasted pollutant levels, to be consistent with the current 24-hour and new proposed annual PM2.5 standards. Table 1-4 summarizes the history of the PM NAAQS to date.

[9] Since the revised annual PM2.5 NAAQS rule was proposed by U.S. EPA on June 14, 2012, it is often referred to as the 2012 annual PM2.5 federal standard.

TABLE 1-4

Summary of National Ambient Air Quality Standards (NAAQS) for Particulate Matter, 1971–Present

Year of NAAQS Rulemaking	PM Indicator	Averaging Time	Level ($\mu g/m^3$)
1971	TSP - Total Suspended Particles (≤ 25–45 µm)	24-hour	260
		Annual	75
1987	PM10	24-hour*	150
		Annual	50
1997	PM2.5	24-hour**	65
		Annual	15.0
	PM10	24-hour*	150
		Annual	50
2006	PM2.5	24-hour**	35
		Annual	15.0
	PM10	24-hour*	150
		Annual	(revoked)
2012	PM2.5	24-hour**	**35**
		Annual	**12.0**
	PM10	24-hour*	**150**

* The form of the PM10 24-hour NAAQS is *not to be exceeded more than once per year averaged over 3 years by station*

** The form of the PM2.5 24-hour NAAQS is based on the 98th percentile value by station

The 2013–2015 PM2.5 annual design values did not exceed the former (1997) annual PM2.5 standard (15 $\mu g/m^3$) at any Basin or Coachella Valley locations. Five out of 19 regular monitoring sites exceeded the current (2012) annual standard of 12 $\mu g/m^3$ for the period 2013–2015. Figure 1-4 shows the 2013-2015 annual PM2.5 design values by monitoring station for the Basin and the Coachella Valley, as compared to the current 2012 and former 1997 annual PM2.5 NAAQS.

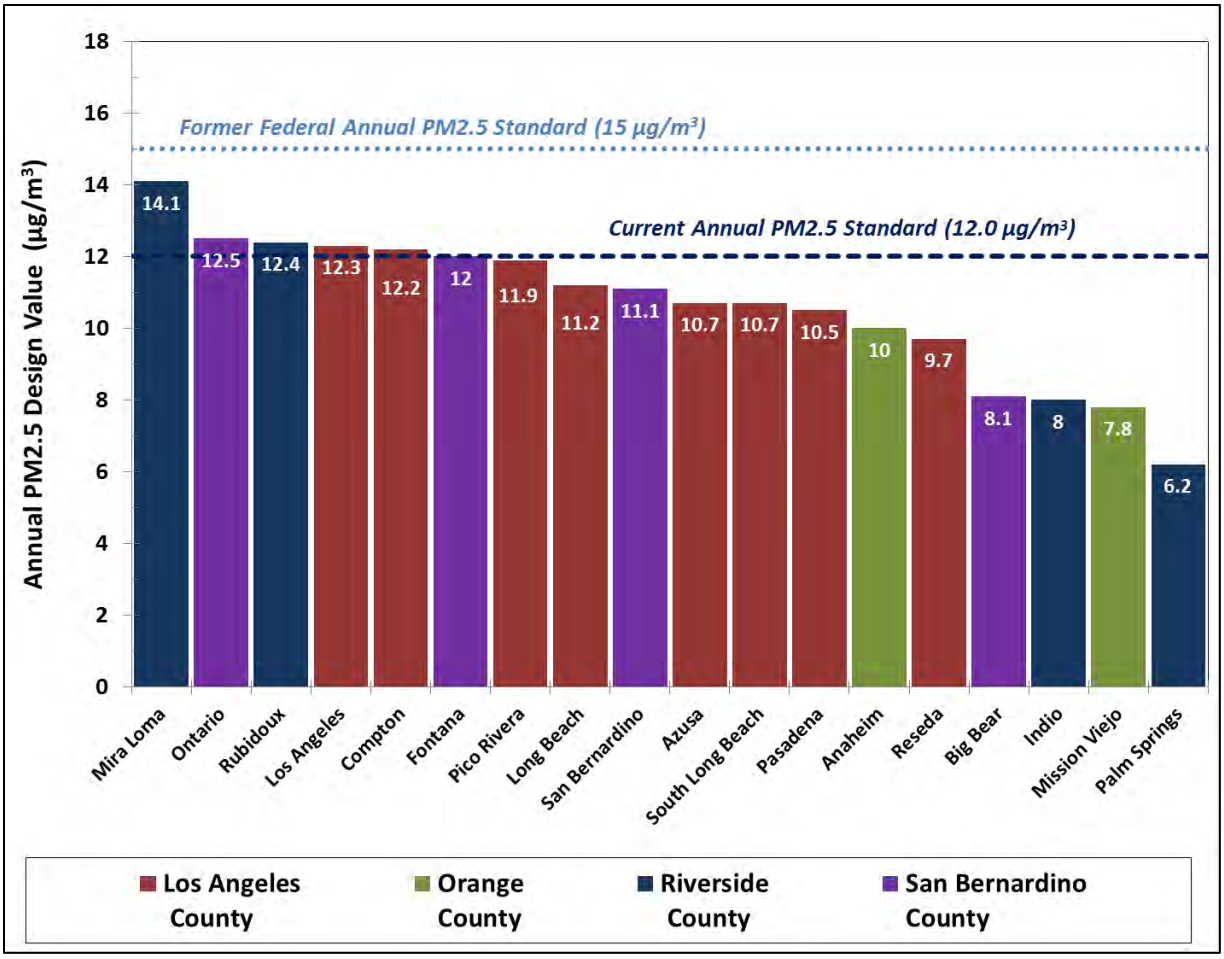

FIGURE 1-4

Annual PM2.5 3-Year (2013–2015) Design Values by Station, Compared to Current 2012 and Former 1997 Annual PM2.5 Federal Standards

CO Properties

Carbon monoxide (CO) is a colorless, odorless, relatively inert gas. It is a trace constituent in the unpolluted troposphere, and is produced by both natural processes and human activities. In remote areas far from human habitation, carbon monoxide occurs in air at an average background concentration of 0.04 ppm, primarily as a result of natural processes such as forest fires and the oxidation of methane. Global atmospheric mixing of CO from urban and industrial sources creates higher background concentrations (up to 0.20 ppm) near urban areas. The major source of CO in urban areas is incomplete combustion of carbon-containing fuels, mainly gasoline. In 2000, 98 percent of the CO emitted into the Basin's atmosphere was from mobile sources. Consequently, CO concentrations are generally highest in the vicinity of major concentrations of vehicular traffic. CO concentrations have continued to decrease due to reformulated fuels and more efficient combustion in newer vehicles.

As a primary pollutant, carbon monoxide is directly emitted into the air. Ambient concentrations of CO in the Basin exhibit large spatial and temporal variations, due to variations in the rate and locations at which CO is emitted, and in the meteorological conditions that govern transport and dilution. Unlike ozone, CO tends to

reach high concentrations in the fall and winter months. The highest concentrations frequently occur on weekdays at times consistent with rush hour traffic and late at night during the coolest, most atmospherically stable portion of the day.

The adverse effects of ambient carbon monoxide air pollution exposure on health have been recently reviewed in the 2010 U.S. EPA *Integrated Science Assessment for Carbon Monoxide.*[10] This document presents a detailed review of the available scientific studies and conclusions on the causal determination of the health effects of CO. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

When carbon monoxide is inhaled in sufficient concentration, it can displace oxygen and bind with the hemoglobin in the blood, reducing the capacity of the blood to carry oxygen. Individuals most at risk from the effects of CO include heart patients, fetuses (unborn babies), smokers, and people who exercise heavily. Normal healthy individuals are affected at higher concentrations, which may cause impairment of manual dexterity, vision, learning ability, and performance of work. The results of studies concerning the combined effects of CO and other pollutants in animals have shown a synergistic adverse effect after exposure to CO and ozone.

CO Air Quality Standards

The State and federal CO standards have been reviewed recently, with no changes recommended. The CO standards are based on both short-term (1-hour; 35 ppm federal and 20 ppm State) and longer-term (8-hour; 9 ppm federal and 9.0 ppm State) exposures.

NO_2 Properties

Nitrogen dioxide (NO_2) is a reddish-brown gas with a bleach-like odor. Nitric oxide (NO) is a colorless gas, formed from nitrogen (N_2) and oxygen (O_2) in air under conditions of high temperature and pressure which are generally present during combustion of fuels; NO reacts with the oxygen in air to give NO_2. NO_2 is largely responsible for the brownish tinge of polluted urban air. The two gases, NO and NO_2, are referred to collectively as oxides of nitrogen (NOx). In the presence of sunlight, NO_2 reacts to produce nitric oxide and an oxygen atom. The oxygen atom can react further to produce ozone, via a complex series of chemical reactions involving hydrocarbons (VOCs). NO_2 may also react to produce nitric acid (HNO_3) which reacts further to produce nitrates, which are a component of PM.

The adverse effects of ambient nitrogen dioxide air pollution exposure on health were reviewed in the 2008 U.S. EPA *Integrated Science Assessment for Oxides of Nitrogen – Health Criteria,*[11] and more recently in the

[10] U.S. EPA. (2010). Integrated Science Assessment for Carbon Monoxide (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-09/019F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=218686]

[11] U.S. EPA. (2008). Integrated Science Assessment for Oxides of Nitrogen – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/071. [http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=194645]

2016 U.S. EPA *Integrated Science Assessment for Oxides of Nitrogen – Health Criteria.*[12] These documents present detailed reviews of the available scientific studies and conclusions on the causal determination of the health effects of NO_2, including evidence supporting the short-term NO_2 standard (1-hour, 100 ppb), which was adopted in 2010. A summary of health effects information and additional references can also be found in Appendix I: Health Effects. NO_2 is a respiratory irritant and reduces resistance to respiratory infection. Children and people with respiratory disease are most susceptible to its effects.

NO_2 Air Quality Standards

Effective April 12, 2010, U.S. EPA established a primary NO_2 1-hour NAAQS, at 100 ppb (3-year average of the annual 98th percentile of 1-hour daily maximum concentrations for each station). The short-term standard supplements the existing (1971) annual NAAQS (0.053 ppm). In addition to the ambient NO_2 monitoring network, U.S. EPA also established requirements for near-road NO_2 monitoring in large metropolitan areas, within 50 meters of the most heavily trafficked roadways. Effective March 20, 2008, the California Air Resources Board (CARB) revised the State NO_2 1-hour standard from 0.25 ppm to 0.18 ppm and established a new annual State standard of 0.030 ppm.

SO_2 Properties

Sulfur dioxide (SO_2) is a colorless gas with a sharp odor. It reacts in the air to form sulfuric acid (H_2SO_4), which contributes to acid deposition, and sulfates, which is a component of PM10 and PM2.5. Most of the SO_2 emitted into the atmosphere is produced by the burning of sulfur-containing fuels.

The adverse effects of SO_2 air pollution exposure on health were reviewed in the 2008 U.S. EPA *Integrated Science Assessment (ISA) for Sulfur Oxides – Health Criteria*.[13] This document presents a detailed review of the available scientific studies and conclusions on the causal determination of the health effects of SO_2. A summary of health effects information and additional references can also be found in Appendix I: Health Effects.

At sufficiently high concentrations, sulfur dioxide affects breathing and the defenses of the lungs, and it can aggravate respiratory and cardiovascular diseases. Asthmatics and people with chronic lung disease or cardiovascular disease are most sensitive to its effects. Sulfur dioxide also causes plant damage, damage to materials, and acidification of lakes and streams.

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[12] U.S. EPA. (2016). Integrated Science Assessment for Oxides of Nitrogen – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-15/068. [https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=310879]

[13] U.S. EPA. (2008). Integrated Science Assessment (ISA) for Sulfur Oxides – Health Criteria (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/047F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=198843#Download]

SO_2 Air Quality Standards

Based on the review of the SO_2 standards, U.S. EPA has established the 1-hour SO_2 standard to protect the public health against short-term exposure. The 1-hour average NAAQS was set at 75 ppb and the annual (0.03 ppm) and 24-hour (0.14 ppm) federal standards were revoked, effective August 2, 2010.[14]

Sulfate Properties

Sulfates are chemical compounds which contain the sulfate ion (SO_4^{2-}) and are part of the mixture of solid materials which make up PM2.5, PM10 and TSP. Most of the sulfates in the atmosphere are produced by oxidation of sulfur dioxide. Oxidation of sulfur dioxide yields sulfur trioxide (SO_3) which reacts with water to produce sulfuric acid (H_2SO_4), which contributes to acid deposition. The reaction of sulfuric acid with basic substances such as ammonia yields sulfates, a component of PM.

In 2002, CARB reviewed and retained the State standard for sulfates, retaining the concentration level (25 $\mu g/m^3$) but changing the basis of the standard from a Total Suspended Particulate (TSP) measurement to a PM10 measurement. In their 2002 staff report,[15] CARB reviewed the health studies related to exposure to ambient sulfates, along with particulate matter, and found an association with mortality and the same range of morbidity effects as PM10 and PM2.5, although the associations were not as consistent as with PM10 and PM2.5. U.S. EPA has not promulgated a separate NAAQS for sulfates. The 2009 U.S. EPA *Integrated Science Assessment for Particulate Matter*[16] also contains a review of sulfate studies.

Lead (Pb) Properties

Lead in the atmosphere is present as a mixture of a number of lead compounds. Leaded gasoline and lead smelters had historically been the main Basin sources of lead emitted into the air. Due to the phasing out of leaded gasoline, there has been a dramatic reduction in atmospheric lead in the Basin over the past three decades. The primary source of lead is related to businesses that work with lead, such as lead battery recycling facilities. Another source is general aviation, since most small planes continue to use leaded fuels.

The adverse effects of ambient lead exposures on health have been reviewed in the 2013 U.S. EPA document, *Integrated Science Assessment for Lead: Final Report*.[17] This document presents a detailed assessment of the available scientific studies and presents conclusions on the causal determination of the health effects of lead,

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[14] The 1971 annual and 24-hour SO_2 NAAQS were revoked, effective August 23, 2010, however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour NAAQS. The final area designations are expected by January 31, 2020 due to new source-specific monitoring requirements.

[15] CARB. (2002). Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates. California Air Resources Board, Sacramento, CA. [http://www.arb.ca.gov/regact/aaqspm/isor.pdf]

[16] U.S. EPA. (2009). Integrated Science Assessment for Particulate Matter (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546]

[17] U.S. EPA. (2013). Integrated Science Assessment for Lead (Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/075F. [http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=255721#Download]

including the rationale to retain the current federal lead standard. A summary of health effects information and additional references can also be found in the 2016 AQMP, Appendix I: Health Effects.

Lead Air Quality Standards

The national standard for lead was revised on October 15, 2008 from a quarterly average of 1.5 $\mu g/m^3$ to a rolling 3-month average of 0.15 $\mu g/m^3$, with a maximum (not-to-be-exceeded) form, evaluated over a 3-year period (36 months). The current indicator of lead in total suspended particles (Pb-TSP) was retained. The revision became effective on January 12, 2009.

U.S. EPA also enhanced the lead monitoring requirements in its 2008 NAAQS revisions, requiring air monitoring near lead sources, those with the potential for 3-month average lead concentrations to exceed the revised standard of 0.15 $\mu g/m^3$. Lead monitoring is required in large urban areas with monitors located to measure lead concentrations in areas impacted by resuspended dust from roadways, nearby industrial sources identified as significant lead sources, hazardous waste sites, construction and demolition projects, or other fugitive dust sources of lead. Following a petition in 2009, U.S. EPA revised the monitoring requirements, lowering the emission threshold at which monitoring is required for both source-oriented and large urban area-based non-source oriented monitoring. The monitoring revision became effective in January 2011.

In 2015, the District's lead monitoring network included eight regular monitoring sites and an additional five source-specific sites. None of these locations exceeded the lead NAAQS in recent years and SCAQMD will request that U.S. EPA redesignate the Basin's remaining nonattainment area in Los Angeles County to attainment for the lead NAAQS.

CHAPTER 2

AIR QUALITY IN THE SOUTH COAST AIR BASIN

Overview of Air Quality in the Basin

- Current Air Quality Summary
- Attainment/Nonattainment Designations
- Air Quality Trends
- Spatial and Temporal Variability
- Air Quality Compared to Other U.S. Metropolitan Areas

Pollutant-Specific Air Quality Discussion

- Ozone (O_3)
- Particulate Matter (PM)
- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO_2)
- Sulfur Dioxide (SO_2)
- Sulfates (SO_4^{2-})
- Lead (Pb)

Overview of Air Quality in the Basin

Current Air Quality Summary

The maximum pollutant concentrations measured at SCAQMD monitoring stations in 2015 exceeded the levels of the federal and State standards for ozone, PM2.5, and nitrogen dioxide (NO_2). One or more stations in the Basin exceeded one or more of the most current federal standards in 2015 on a total of 146 days in 2015 (40 percent of the year), including 113 days over the 2015 ozone 8-hour NAAQS, 30 days over the 2006 24-hour PM2.5 NAAQS (including near-road sites, 25 days with just the ambient stations), 2 days over the 24-hour PM10 NAAQS (high-wind exceptional events), and 1 day over the 2010 1-hour NO_2 NAAQS. The Basin's maximum measured concentrations for ozone and PM2.5 in 2015 were among the highest in the country. In 2015, the Basin exceeded the revised 2008 and revoked 1997 8-hour ozone NAAQS on 81 and 47 days, respectively.

Both 24-hour and annual PM2.5 concentrations have improved significantly over the past 15 years and only two locations in the Basin (both in Metropolitan Riverside County) currently remain in violation of the 24-hour design value form of the PM2.5 NAAQS. However, both the 24-hour PM2.5 design values and number of days over the standard in the Basin have increased slightly each year since 2013, due in large part to the extreme drought conditions in Southern California and the associated lack of periodic rainout and increased dispersion normally associated with weather events in the winter months. While several stations in the Basin remain in violation of the current 2012 annual PM2.5 NAAQS (12.0 $\mu g/m^3$), no Basin stations have violated the former (1997) annual PM2.5 NAAQS (15.0 $\mu g/m^3$) in 2015 or since the 2011–2013 design value periods.

In 2015, NO_2 concentrations exceeded the level of the 1-hour NAAQS on one day at a single location. However, attainment of the NAAQS is measured with the three-year design value that takes into account the form of the federal standards and a multi-year average, as detailed previously in Table 1-3. The design value form of the NAAQS, based on the annual 98th percentile maximum daily 1-hour concentration at a station averaged over three years, did not violate the standard or affect the NO_2 NAAQS attainment designation. While the Basin also exceeded the PM10 24-hour NAAQS on two days at two different locations, this also does not jeopardize the Basin's clean design value, which allows for one exceedance per year averaged over three years, or the PM10 NAAQS attainment designation. Both PM10 exceedances were caused by high-wind events that would also qualify for exclusion under the U.S EPA Exceptional Event Rule.

The Basin exceeded the level of the State 1-hour and 8-hour ozone, annual and 24-hour PM10, and annual PM2.5 standards in 2015. The other criteria pollutants, sulfur dioxide (SO_2), carbon monoxide (CO), and sulfates (SO_4^{2-}), did not exceed federal or State standards. Figure 2-1 shows the Basin maximum pollutant concentrations for 2015, as a percentage of the federal and State standards.

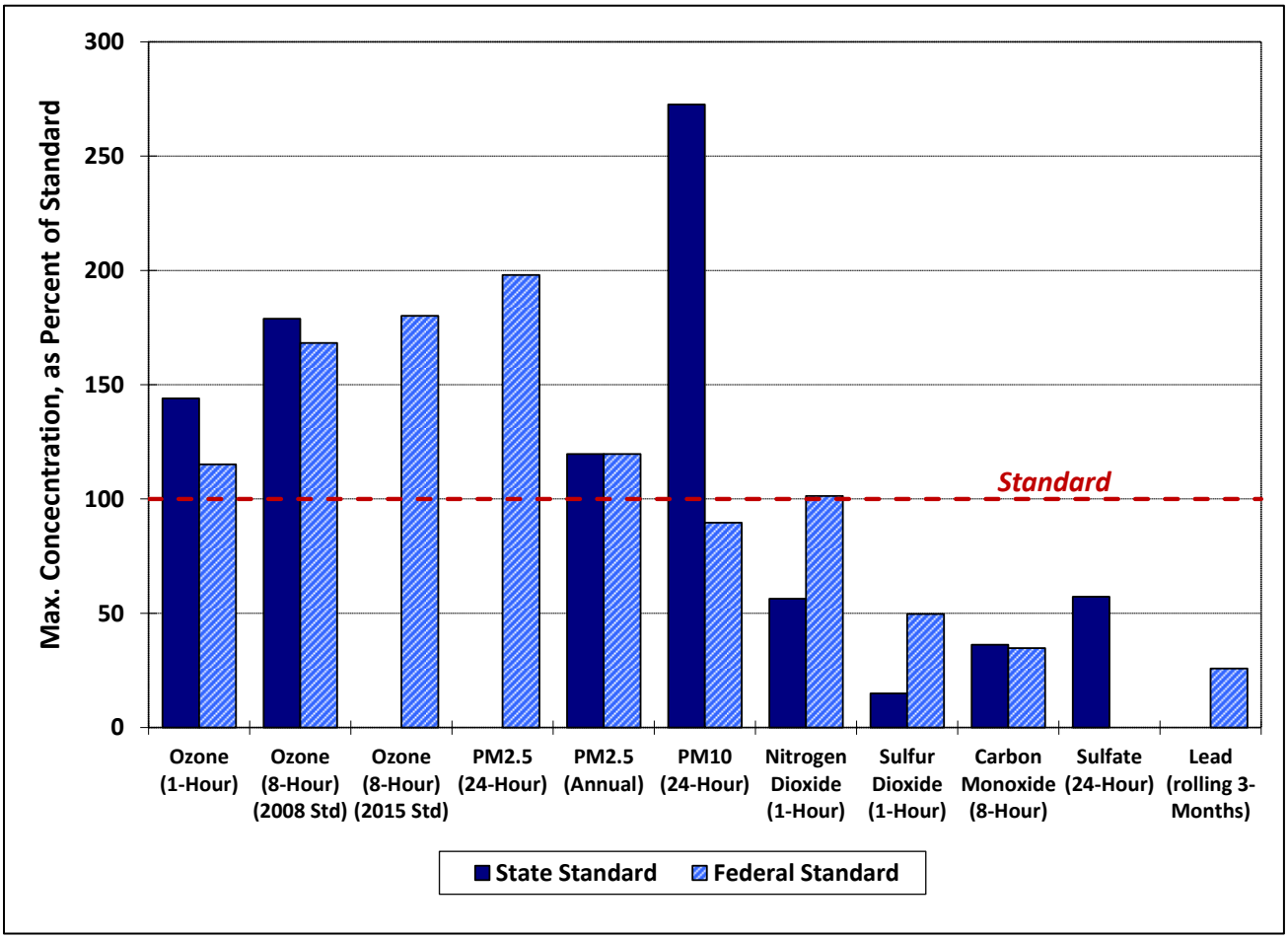

FIGURE 2-1
2015 South Coast Air Basin Maximum Pollutant Concentrations
(as Percent of State and Federal Standards)

Attainment/Nonattainment Designations

As discussed above, in 2015, the Basin exceeded the pollutant concentration levels defined by the National Ambient Air Quality Standards (NAAQS) for ozone, PM2.5, and NO_2. Attainment of the NAAQS is based on the design value level and form of the standard, which is typically averaged over a 3-year period. Figure 2-2 shows the current federal ozone and PM design value status for the Basin for the 2013–2015 3-year period, as compared to the current and former NAAQS. The current U.S. EPA NAAQS attainment designations for the Basin are presented in Table 2-1. The current attainment designation status of the State standards in the Basin is presented in Table 2-2.

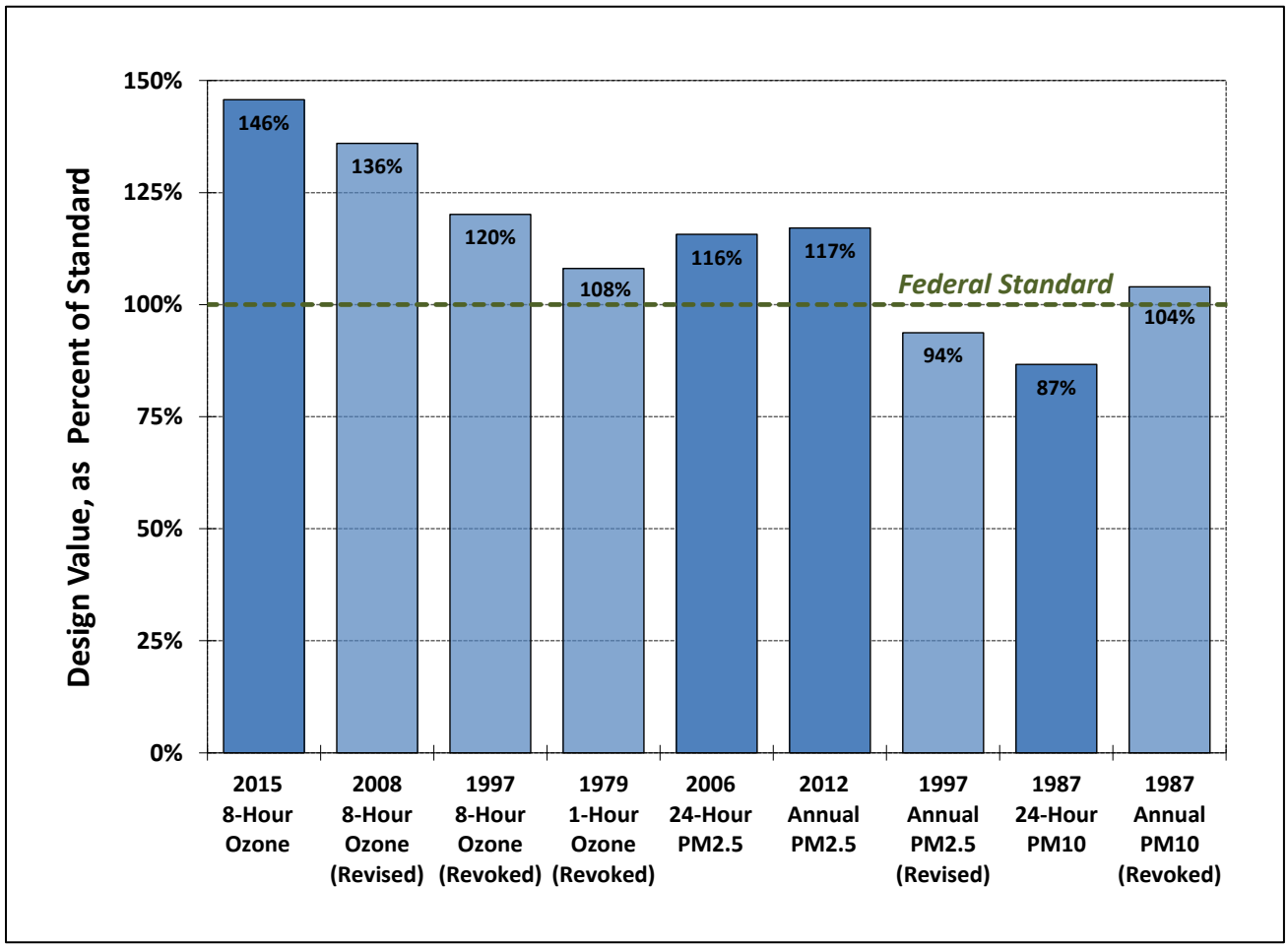

FIGURE 2-2

South Coast Air Basin and Coachella Valley 2013–2015 3-Year Design Values

(Percentage of current and former NAAQS; PM10 is combined FRM and FEM data; darker shade indicates current, most-stringent NAAQS)

TABLE 2-1

National Ambient Air Quality Standards (NAAQS) Attainment Status – *South Coast Air Basin*

Criteria Pollutant	Averaging Time	Designation[a]	Attainment Date[b]
Ozone (O_3)	(1979) **1-Hour** (0.12 ppm)[c]	Nonattainment ("extreme")	2/26/2023 (revised deadline)
	(2015) **8-Hour** (0.070 ppm)[d]	Pending – Expect Nonattainment ("extreme")	Pending (beyond 2032)
	(2008) **8-Hour** (0.075 ppm)[d]	Nonattainment ("extreme")	7/20/2032
	(1997) **8-Hour** (0.08 ppm)[d]	Nonattainment ("extreme")	6/15/2024
PM2.5[e]	(2006) **24-Hour** (35 µg/m^3)	Nonattainment ("serious")	12/31/2019
	(2012) **Annual** (12.0 µg/m^3)	Nonattainment ("moderate")	12/31/2021
	(1997) **Annual** (15.0 µg/m^3)	Attainment (final determination pending)	4/5/2015 (attained 2013)
PM10[f]	(1987) **24-hour** (150 µg/m^3)	Attainment (Maintenance)	7/26/2013 (attained)
Lead (Pb)[g]	(2008) **3-Months Rolling** (0.15 µg/m^3)	Nonattainment (Partial) (Attainment determination to be requested)	12/31/2015
CO	(1971) **1-Hour** (35 ppm)	Attainment (Maintenance)	6/11/2007 (attained)
	(1971) **8-Hour** (9 ppm)	Attainment (Maintenance)	6/11/2007 (attained)
NO_2[h]	(2010) **1-Hour** (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	(1971) **Annual** (0.053 ppm)	Attainment (Maintenance)	9/22/1998 (attained)
SO_2[i]	(2010) **1-Hour** (75 ppb)	Designations Pending (expect Unc./Attainment)	N/A (attained)
	(1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm)	Unclassifiable/Attainment	3/19/1979 (attained)

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration

c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05 ; however, the Basin has not attained this standard and therefore has some continuing obligations with respect to the revoked standard; original attainment date was 11/15/2010; the revised attainment date is 2/6/23

d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the revoked 1997 and revised 2008 ozone NAAQS until they are attained

e) The attainment deadline for the 2006 24-hour PM2.5 NAAQS was 12/31/15 for the former "moderate" classification; U.S.EPA approved reclassification to "serious," effective 2/12/16 with an attainment deadline of 12/31/2019; the 2012 (proposal year) annual PM2.5 NAAQS was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m^3; new annual designations were final 1/15/15, effective 4/15/15; U.S. EPA has proposed a clean data determination for the Basin for the 1997 annual (15.0 µg/m^3) and 24-hour PM2.5 (65 µg/m^3) standards – final action pending

f) The annual PM10 NAAQS was revoked, effective 12/18/06; the 24-hour PM10 NAAQS deadline was 12/31/2006; the Basin's Attainment Re-designation Request and PM10 Maintenance Plan was approved by U.S. EPA on 6/26/13, effective 7/26/13

g) Partial Nonattainment designation – Los Angeles County portion of the Basin only for near-source monitors; expect to remain in attainment based on current monitoring data; attainment re-designation request pending

h) New 1-hour NO_2 NAAQS became effective 8/2/10, with attainment designations 1/20/12; annual NO_2 NAAQS retained

i) The 1971 annual and 24-hour SO2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO2 1-hour NAAQS; final area designations expected by 12/31/20 due to new source-specific monitoring requirements; Basin expected to be in attainment due to ongoing clean data

TABLE 2-2

California Ambient Air Quality Standards (CAAQS) Attainment Status

South Coast Air Basin

Pollutant	Averaging Time and Level[b]	Designation[a]
		South Coast Air Basin
Ozone (O_3)	**1-Hour** (0.09 ppm)[c]	Nonattainment
	8-Hour (0.070 ppm)[d]	Nonattainment
PM2.5	**Annual** (12.0 µg/m^3)	Nonattainment
PM10	**24-Hour** (50 µg/m^3)	Nonattainment
	Annual (20 µg/m^3)	Nonattainment
Lead (Pb)	**30-Day Average** (1.5 µg/m^3)	Attainment
CO	**1-Hour** (20 ppm)	Attainment
	8-Hour (9.0 ppm)	Attainment
NO_2	**1-Hour** (0.18 ppm)	Attainment
	Annual (0.030 ppm)	Attainment
SO_2	**1-Hour** (0.25 ppm)	Attainment
	24-Hour (0.04 ppm)	Attainment
Sulfates	**24-Hour** (25 µg/m^3)	Attainment
H_2S[c]	**1-Hour** (0.03 ppm)	Unclassified

a) CA State designations shown were updated by CARB in 2016, based on the 2013–2015 3-year period; stated designations are based on a 3-year data period after consideration of outliers and exceptional events; Source: http://www.arb.ca.gov/desig/statedesig.htm#current

b) CA State standards, or CAAQS, for ozone, CO, SO_2, NO_2, PM10 and PM2.5 are values not to be exceeded; lead, sulfates, and H_2S standards are values not to be equaled or exceeded; CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations

c) SCAQMD began monitoring H_2S in the southeastern Coachella Valley in November 2013 due to odor events related to the Salton Sea; three full years of data are not yet available for a State designation

Air Quality Trends

There have been significant improvements in the Basin's air quality over the years since measurements began. Figure 2-3 shows the trends of *basin-days*[18] exceeding the federal standards for ozone, PM10, and PM2.5 for 1990 through 2015, as a percentage of annual days with monitoring data. PM2.5 shows the most dramatic improvement of these pollutants.

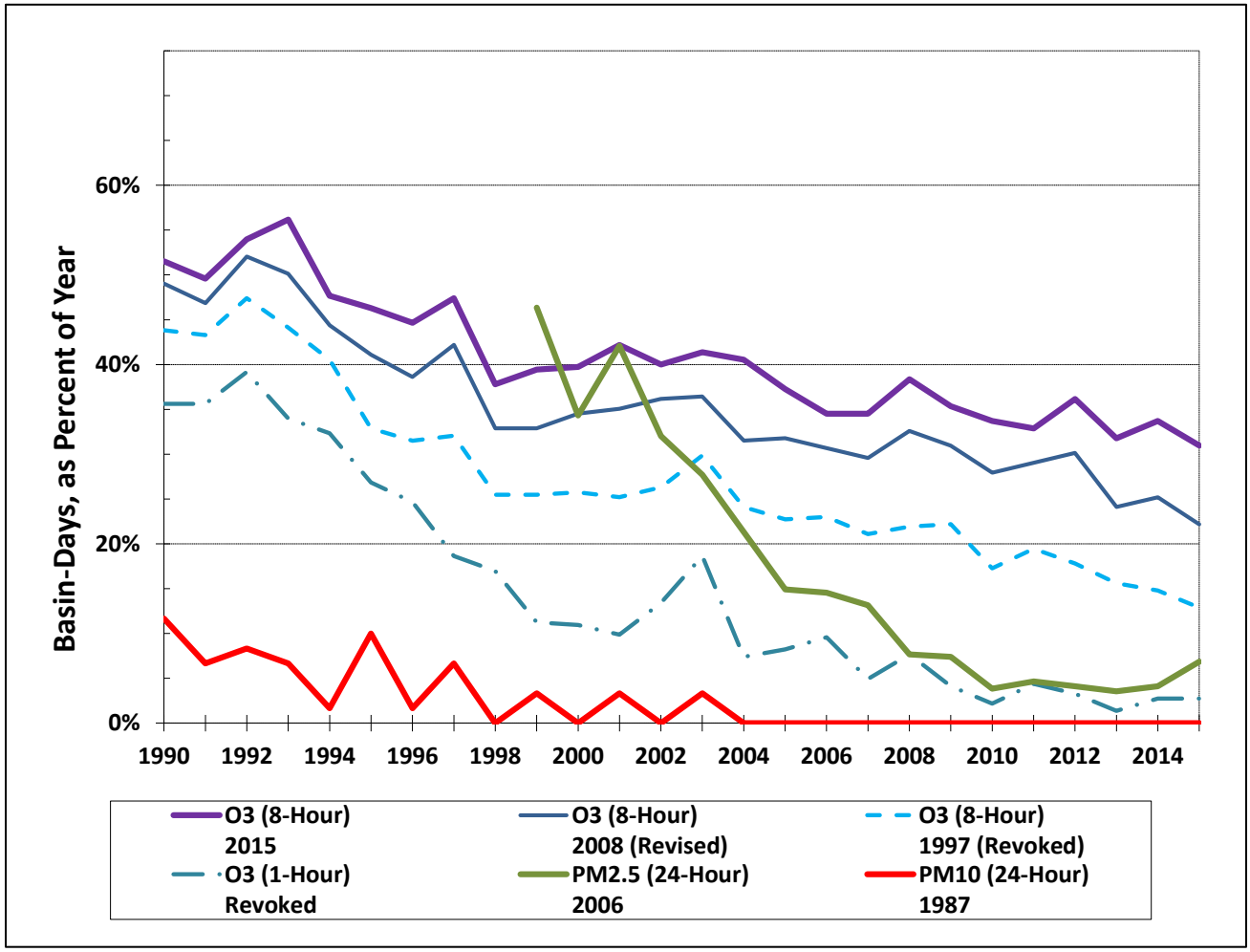

FIGURE 2-3

Trend of Basin-Days Exceeding Federal Standards, 1990–2015

(as percentages of the year; flagged PM10 exceptional events excluded)

[18] A "basin-day" is recorded if one or more locations in the air basin exceeded the level of the standard on that day. Multiple locations exceeding on the same day count as a single basin-day.

Figure 2-4 shows the trend from 1976 through 2015 of the annual number of Basin days exceeding various metrics for ozone, including: the 1-hour Stage 1[19] level (0.20 ppm); the 1-hour State Health Advisory level (0.15 ppm); the revoked 1979 1-hour NAAQS (0.125 ppm); the revoked 1997 8-hour NAAQS (0.08 ppm); the revised 2008 8-hour NAAQS (0.075 ppm); and the new 2015 8-hour NAAQS (0.070 ppm). All the ozone trends show the significant improvement achieved through the period. However, they also show the need for continued efforts in order to meet all the 8-hour ozone standards and the 1979 1-hour standard.

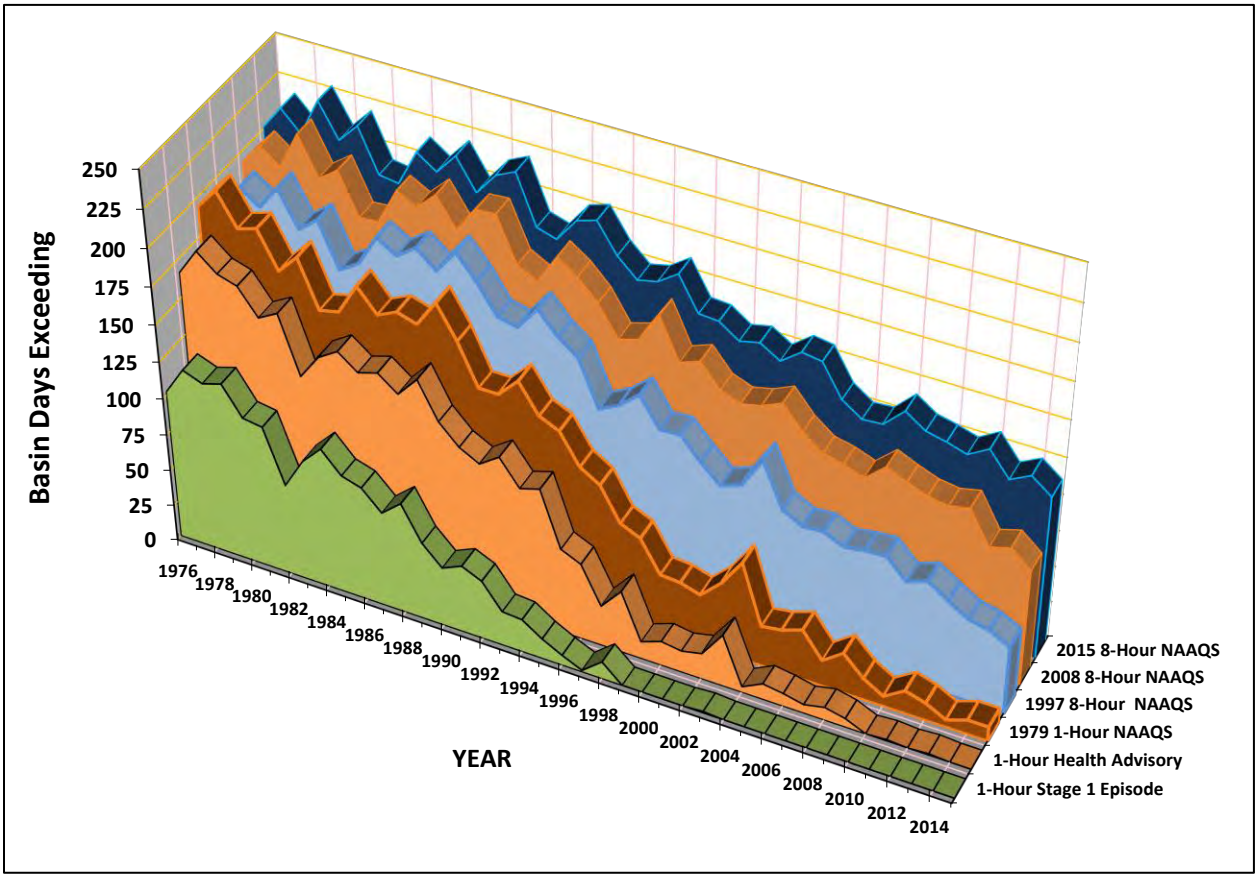

FIGURE 2-4

Trend of Number of Basin Days Exceeding Current and Former Ozone NAAQS and 1-Hour Ozone Episode Levels (Health Advisory and Stage-1), 1976 through 2015

Figure 2-5 shows the trend of design value concentrations for ozone and PM2.5 in the Basin for the past two decades, as percentages of the corresponding federal standards. The pollutant-specific sections of this chapter contain additional trends by pollutant.

[19] While the 1-hour ozone episode levels and the related 1-hour ozone health warnings still exist, they are essentially replaced by the more protective health warnings associated with the current 8-hour ozone NAAQS. The 1-hour ozone episode warning levels include the State Health Advisory (0.15 ppm), Stage 1 (0.20 ppm), Stage 2 (0.35 ppm) and Stage 3 (0.50 ppm). The State 1-hour ozone Health Advisory was last exceeded in the Basin in 2013. The Basin's last 1-hour ozone Stage 1 episode occurred in 2003. The last 1-hour ozone Stage 2 episode occurred in 1988 and the last Stage 3 episode occurred in 1974.

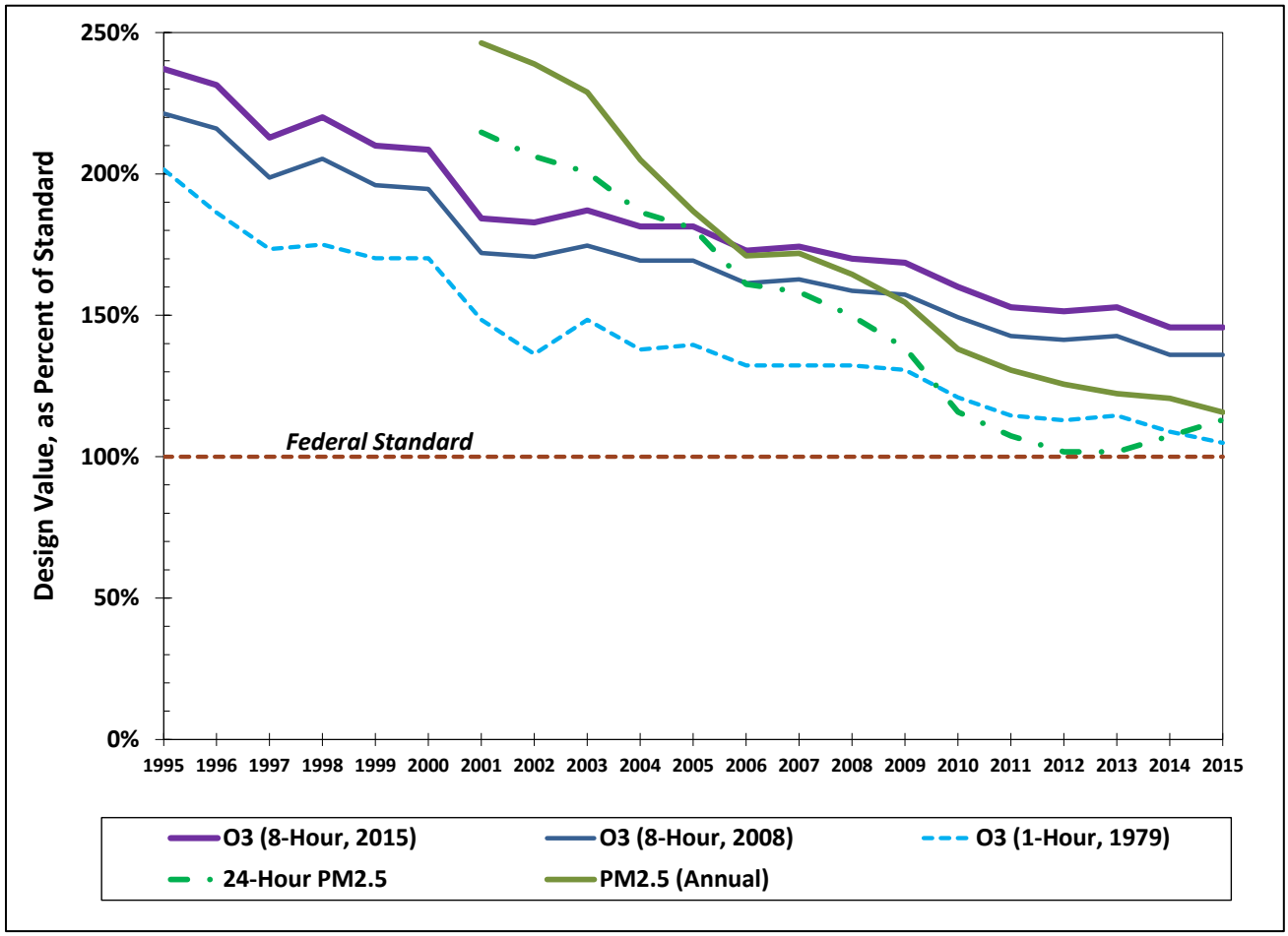

FIGURE 2-5

Trends of South Coast Air Basin Maximum 3-Year Design Values for Ozone (2015 8-hour, 2008 8-hour, and 1979 1-hour NAAQS) and PM2.5 (24-hour and Annual), 1995–2015

(as percentages of current and former federal standards)

Spatial and Temporal Variability

Air quality in the Basin varies widely by season and by area. The highest pollutant concentrations were all recorded in, or downwind of, the densely populated areas of the Basin. The Basin's air quality concentrations and the occurrence of exceedances vary with season due to seasonal differences in the weather, solar radiation intensity for photochemical reactions, and to a lesser extent, seasonal variations in emissions. Higher ozone concentrations are generally recorded during the May to October "smog season" and exceedances of the federal and State ozone standards are most frequent in July and August. However, the stricter 2015 ozone NAAQS is exceeded between late March and early November.

Particulate matter (PM10 and PM2.5) levels do not have as clear of a pattern as ozone, and elevated concentrations are sometimes recorded throughout the year. However, the highest PM10 and PM2.5 concentrations are typically measured during the late fall and winter months. Figure 2-6 shows the number of Basin-wide days per month when any of the federal standards were exceeded in the Basin in 2015.

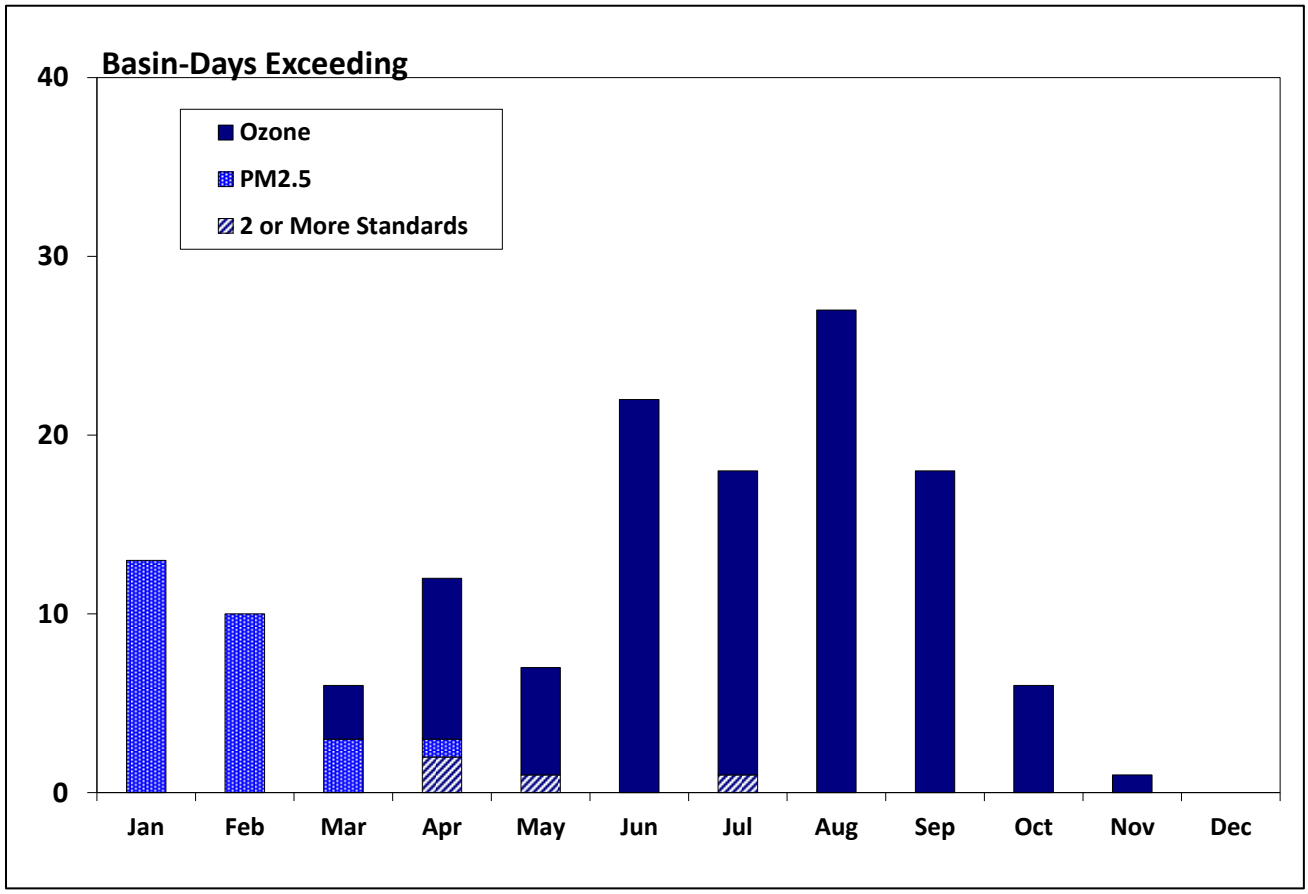

FIGURE 2-6
Number of Basin-Days per Month Exceeding the Federal Standards in 2015

The number of days exceeding the level of the new 2015 8-hour ozone NAAQS (0.070 ppm[20]) in 2015 varied widely by monitoring location, from 0 (zero) day to 86 days. Likewise, exceedances of the 2008 8-hour ozone NAAQS (0.075 ppm) also varied, from zero to 61 days. In both cases, ozone exceedances were fewest along the coast, and increased through the inland valleys to a maximum in the Basin's Central San Bernardino Mountains. Ozone concentrations tend to be higher on weekends than on weekdays, although this difference is slightly less distinct in recent years. The time of day with the highest average ozone concentrations is in the early to middle afternoon, although the inland areas of the Basin will often peak later in the afternoon or in the early evening.

While day-of-week and time-of-day PM2.5 concentrations varied considerably by location for 2013–2015 period, the day-of-week PM2.5 concentrations were slightly higher on Saturdays. The hourly PM2.5 diurnal peaks generally occurred in the morning, starting with the period of heaviest morning traffic. Additional spatial and temporal analyses are presented in the pollutant-specific sections later in this chapter.

[20] ppm = parts per million, by volume; ppb = parts per billion, by volume; 1 ppm = 1000 ppb

Air Quality Compared to Other U.S. Metropolitan Areas

In spite of significant improvement, the Basin still has some of the worst air quality in the nation. In 2015, seven of the country's top ten locations most frequently exceeding the 2015 8-hour ozone NAAQS were located within the Basin, including stations in San Bernardino, Riverside and Los Angeles Counties.[21] The location with the highest number of days over the 2015 8-hour ozone NAAQS was in the Basin's Central San Bernardino Mountains (86 days in the community of Crestline). The Basin exceeded the 2008 8-hour ozone NAAQS on 81 days, more days than any other areas in the country. The Basin exceeded the 2015 ozone NAAQS on 113 days. Similarly, seven out of the top ten locations with the highest maximum 8-hour average ozone concentrations in the nation were also located in the Basin. Of the top ten locations, only one area (Houston, Texas) was located outside of California. The highest maximum 8-hour average ozone concentration recorded was 0.127 ppm (in the Central San Bernardino Mountains area), almost 180 percent of the 2015 ozone NAAQS.

Figures 2-7 and 2-8 show the maximum pollutant concentrations in 2015 for the Basin compared to other major metropolitan areas in the U.S. and California air basins, respectively. Maximum concentrations in all of these areas exceeded both the 2015 and 2008 8-hour ozone NAAQS. The current annual PM2.5 standard was exceeded in the South Coast Air Basin, Houston, and Chicago metropolitan areas, as well as in California's San Joaquin Valley. The 24-hour PM2.5 standard, was exceeded in the Basin, Phoenix, and Chicago, as well as in all of the California air basins shown except San Diego.

The 24-hour PM10 standard was not exceeded in any of the U.S. areas and California air basins shown, once data flagged for exceptional events was excluded from the analysis. Of the areas shown for 2015, the level of the 1-hour NO_2 federal standard was exceeded in the Basin, Houston, and New York areas, as well as in the San Joaquin Valley. SO_2 concentrations were below the 1-hour federal standard in the Basin and in all of the urban areas shown in Figures 2-7 and 2-8. However, the SO_2 standard was exceeded in other U.S. urban and rural areas, with the highest 2015 concentrations recorded in the State of Arizona (Gila County). The CO standards were not exceeded in the U.S. in 2015 and are not shown in the figures. Nationwide, the federal lead standard (not shown) was exceeded at six locations in 2015, at source-oriented monitoring stations, in Pennsylvania and Arizona.

[21] The top 10 stations in the nation for number of exceedances in 2015 of the 2015 8-hour ozone NAAQS (0.070 ppm) include Basin stations in the areas of Central San Bernardino Mountains (in the Crestline-Lake Gregory community), Central San Bernardino Valley (San Bernardino and Fontana), East San Bernardino Valley (Redlands), Northwest San Bernardino Valley (Upland), San Gorgonio Pass (Banning), and Metropolitan Riverside County (Riverside-Rubidoux), as well as stations in the San Joaquin Valley Air Basin (Bakersfield and Fresno) and the Antelope Valley Air Basin (Lancaster).

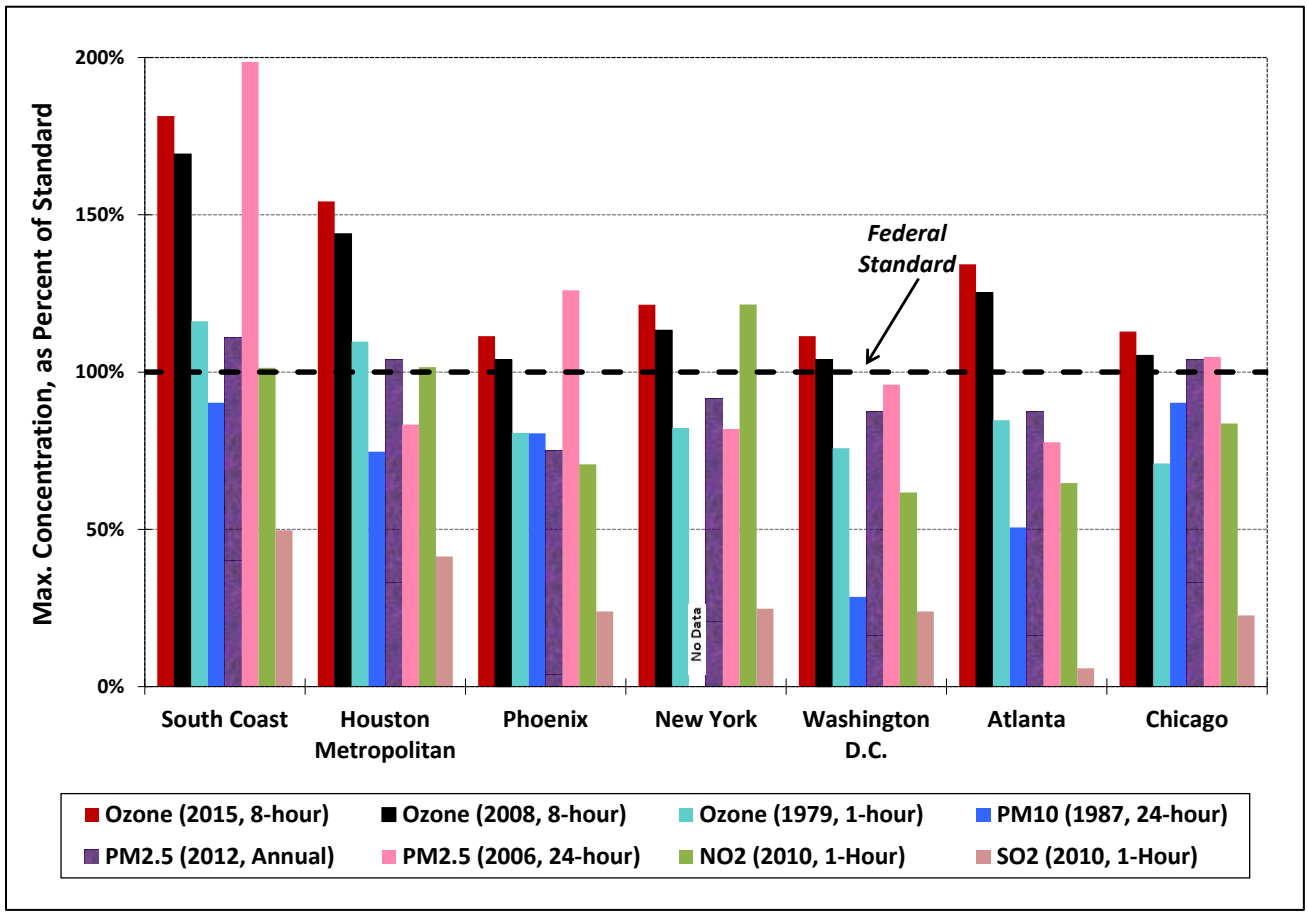

FIGURE 2-7

2015 South Coast Air Basin Air Quality Compared to Other U.S. Urban Areas

(maximum pollutant concentrations as percentages of the NAAQS, flagged exceptional events are excluded)

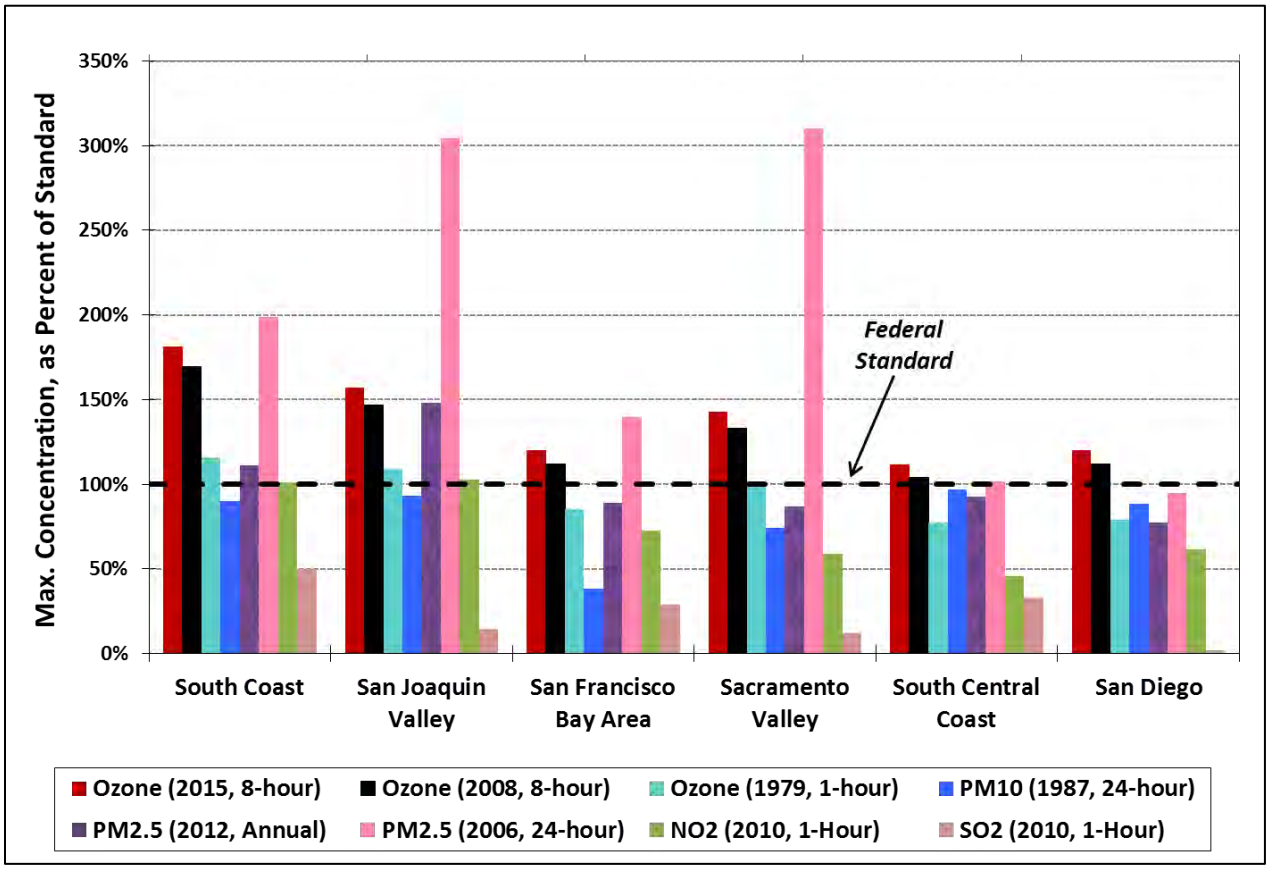

FIGURE 2-8

2015 South Coast Air Basin Air Quality Compared to Other California Air Basins

(maximum pollutant concentrations as percentages of the NAAQS, flagged exceptional events are excluded)

As noted previously, maximum pollutant concentrations do not necessarily indicate NAAQS violations and subsequent attainment/nonattainment designation changes, which is determined by the design value form of the NAAQS. Figures 2-9 and 2-10 show the 2013–2015 3-year design values for the Basin compared to other urban areas in the U.S. and California, respectively. While the 2015 maximum ozone concentrations for all the urban areas shown above in Figures 2-7 and 2-8 are over the 2015 and 2008 ozone NAAQS, 2013-2015 ozone design values in some of these urban areas shown in Figures 2-9 and 2-10 are not in violation of these 8-hour ozone NAAQS. For the revoked 1979 1-hour ozone NAAQS, only the Basin had 1-hour design values over the federal standard for the 2013–2015 period. The design values for annual averaged PM2.5 are over the 2012 annual PM2.5 NAAQS for the Basin, along with Houston, the San Joaquin Valley, and California's South Central Coast. The 24-hour PM2.5 design values are over the 24-hour PM2.5 NAAQS in the Basin and the San Joaquin Valley; no other urban areas shown exceeded that standard. PM10 design values are over the standard in Phoenix and the San Joaquin Valley, although some of these may have been influenced by pending exceptional events. The design values for NO_2, SO_2, and CO (not shown) did not violate the NAAQS for any of the urban areas shown for the 2013–2015 period.

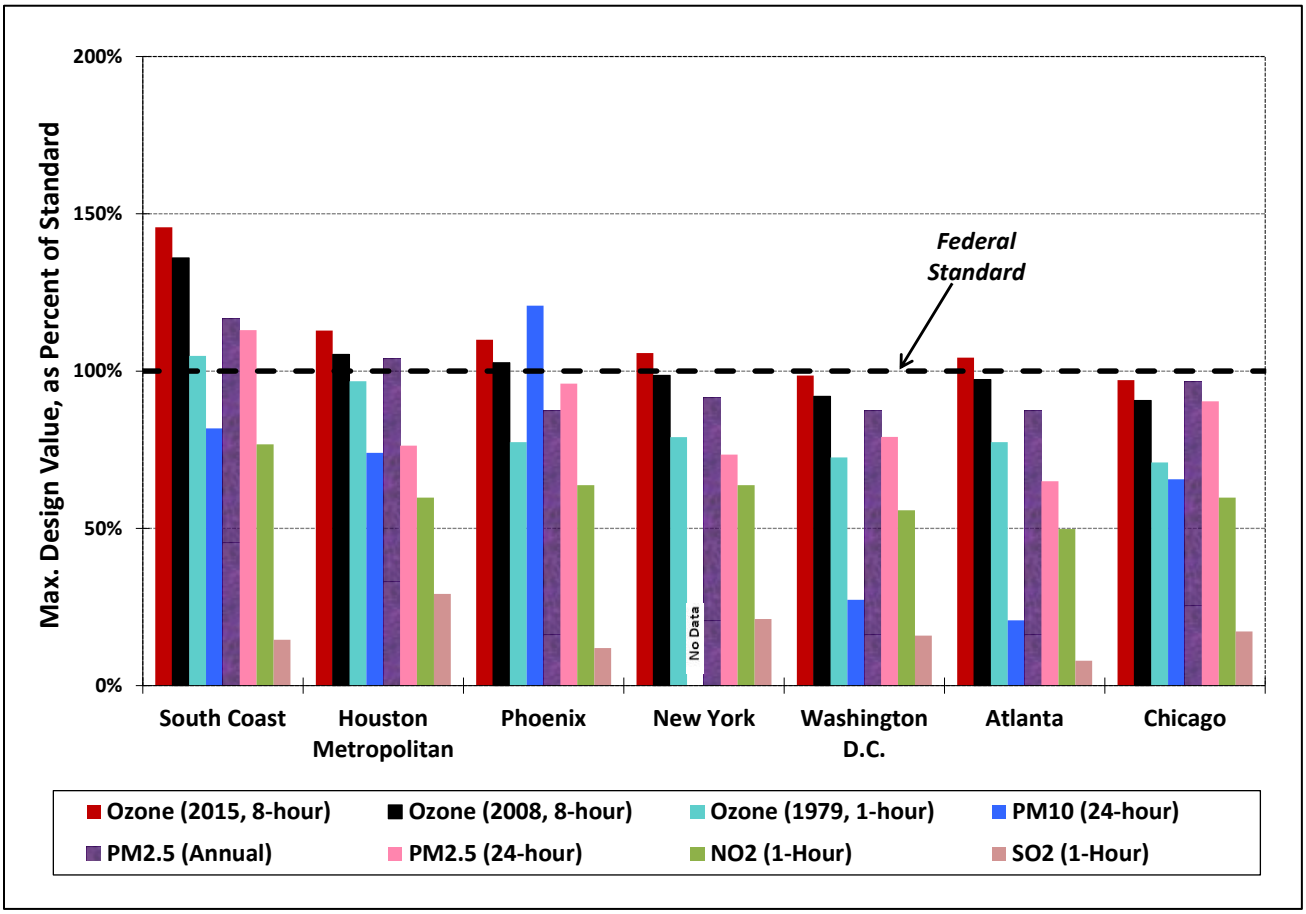

FIGURE 2-9

2015 South Coast Air Basin Air Quality Compared to Other U.S. Urban Areas

(maximum 3-year design value concentrations as percentages of the corresponding NAAQS; flagged exceptional events are excluded)

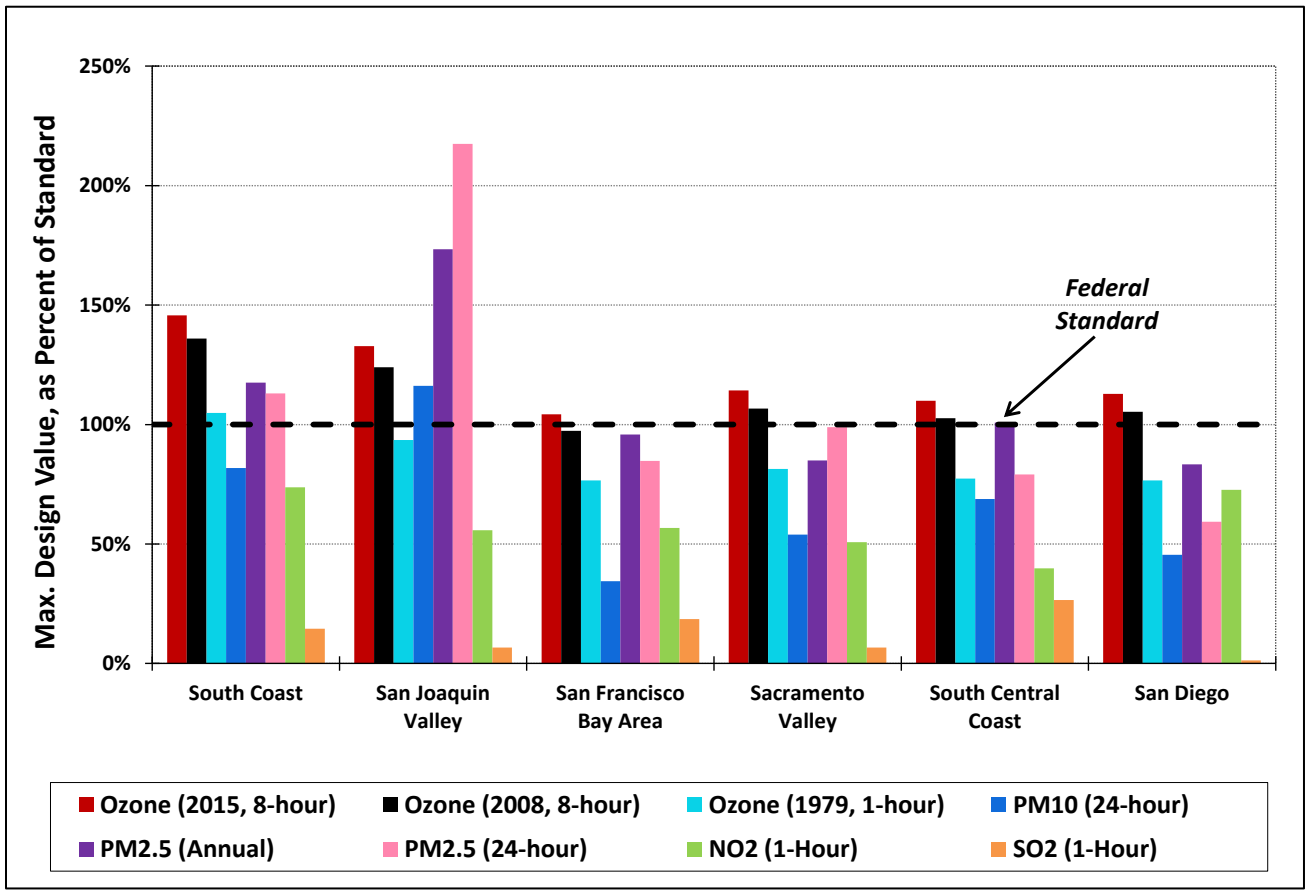

FIGURE 2-10

2015 South Coast Air Basin Air Quality Compared to Other California Air Basins

(maximum 3-year design value concentrations as percentages of the corresponding NAAQS; flagged exceptional events are excluded)

Pollutant-Specific Air Quality Summary

Ozone (O_3)

Current Ozone Air Quality

In 2015, SCAQMD monitored ozone concentrations at 29 locations in the Basin, including two locations in the Coachella Valley portion of the SSAB. The East San Fernando Valley (Burbank) station was closed in 2015, due to loss of the lease space. Installation of a new Burbank monitoring location is in progress. Figure 2-11 maps the locations of the SCAQMD ozone network.

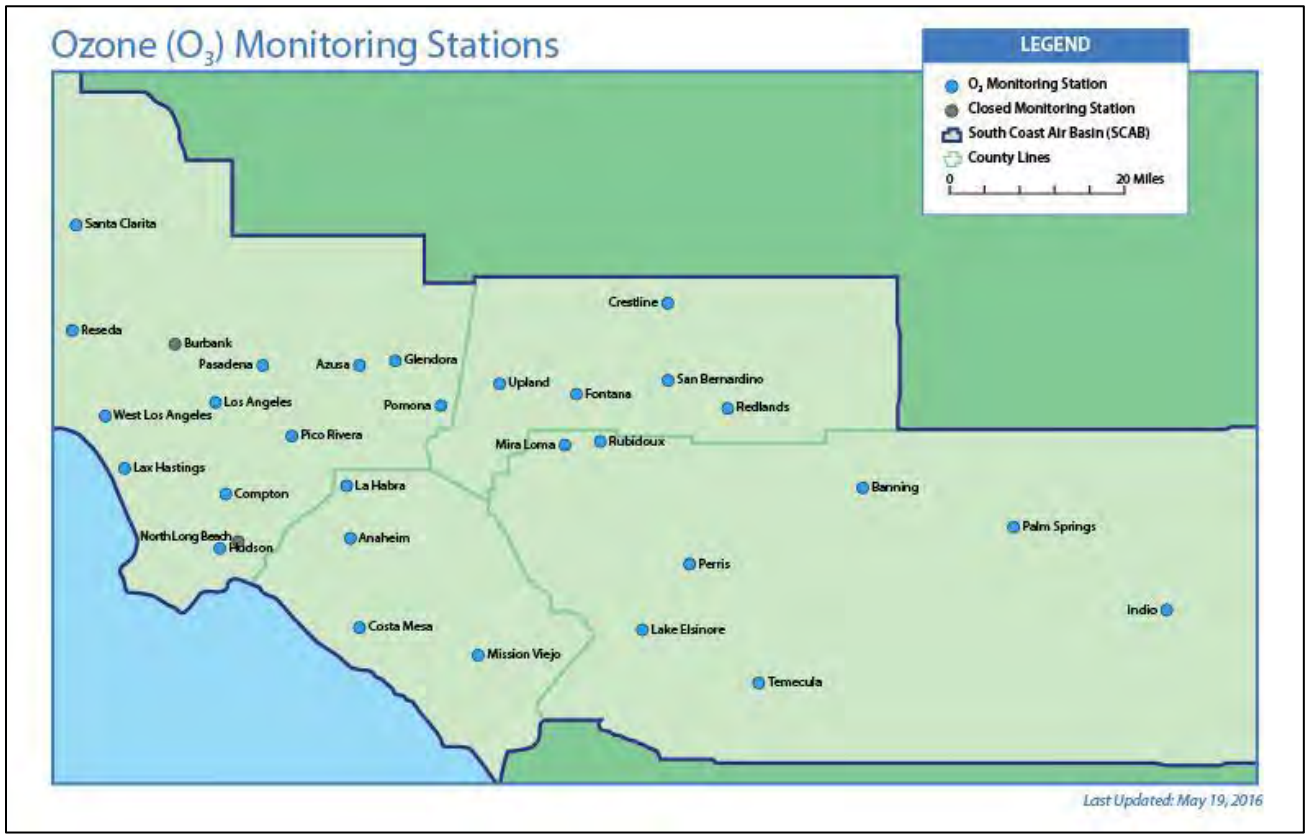

FIGURE 2-11

South Coast Air Quality Management District Ozone Air Monitoring Locations

(Note that ozone stations that were closed at N. Long Beach in 2013 and Burbank in 2014 are shown with grey dots, pending locating new stations; Palm Springs and Indio stations, in Riverside County's Coachella Valley are in the Salton Sea Air Basin; all other stations are in the South Coast Air Basin)

The 2015 Basin maximum ozone concentrations continued to exceed federal standards by wide margins, although the ozone trends have shown continuing improvements through the years. All four counties in the Basin, as well as the Coachella Valley portion of the SSAB, exceeded the level of the new 2015 (0.070 ppm) and the former 2008 (0.075 ppm) and 1997 (0.08 ppm) 8-hour ozone NAAQS in 2015. While not all stations had days exceeding the previous 8-hour federal standards, all SCAQMD monitoring stations except the one in Long Beach exceeded the 2015 federal standard.

Basin-wide, a total of 113 days exceeded the 2015 ozone federal standard (81 days over the 2008 standard and 47 days over the 1997 standard). The State 8-hour ozone standard was exceeded on 115 days. The highest number of days in 2015 over the 2015, 2008 and 1997 8-hour federal ozone standards (86, 61, and 30 days, respectively) occurred in the Central San Bernardino Mountains. The 2015 maximum 8-hour average ozone concentration of 0.127 ppm was also measured at this location.

When comparing to the design value form of the federal standard, all four of the Basin's counties were above the 2015 8-hour ozone NAAQS for the 2013–2015 design values. Three of the Basin's four counties (except Orange County) were above both the 2008 and 1997 8-hour ozone NAAQS for 2013–2015 design values. The Basin's highest 2013–2015 8-hour ozone design value (0.102 ppm, measured in the Central San Bernardino Mountains) was 146 percent of the 2015 8-hour ozone NAAQS (136 percent of the 2008 NAAQS and 121 percent of the 1997 NAAQS). Table 2-3 summarizes the number of days exceeding current and former federal and State 1-hour and 8-hour ozone standard levels by county in the Basin and the Coachella Valley in 2015. Table 2-4 shows the 2015 maximum 8-hour ozone concentrations and 3-year design values by air basin and county, for comparison to the current and former 8-hour ozone NAAQS, along with the State designation value, for comparison to the State ozone standards.

TABLE 2-3

2015 Number of Days Exceeding Current and Former Ozone Standards at the Peak Station by County and Basin

Basin/County	2015 # Days > New (2015) 8-Hour O_3 NAAQS (0.070 ppm)	Area of Maximum Exceedances of the 2015 Ozone NAAQS	2015 # Days > Former (2008) 8-Hour O_3 NAAQS (0.075 ppm)	2015 # Days > Former (1997) 8-Hour O_3 NAAQS (0.08 ppm)	2015 # Days > Former (1979) 1-Hour O_3 NAAQS (0.12 ppm)	2015 # Days > Current 8-Hour O_3 State Standard (0.07 ppm)	2015 # Days > Current 1-Hour O_3 State Standard (0.09 ppm)
South Coast Air Basin							
Los Angeles	74	Santa Clarita Valley	54	25	4	80	52
Orange	12	Saddleback Valley	4	0	0	14	5
Riverside	76	Metropolitan Riverside County	51	29	2	81	43
San Bernardino	**102**	**Central San Bernardino Mountains**	**75**	**42**	**8**	**102**	**65**
Salton Sea Air Basin							
Riverside	58	Coachella Valley (Palm Springs)	30	5	0	54	3

Bold text denotes the peak value

Note: The 2015 8-hour ozone NAAQS became effective on December 28, 2015; the 2008 ozone standard was still in effect during the 2014 and 2015 ozone seasons

TABLE 2-4

2015 Maximum 8-Hour Average Ozone Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum 8-Hour O_3 Average (ppm)	2013–2015 8-Hour O_3 Design Value (ppm)	Percent of New (2015) O_3 NAAQS (0.070 ppm)	Percent of Former (2008) O_3 NAAQS (0.075 ppm)	Percent of Former (1997) O_3 NAAQS (0.08 ppm)	Area of Design Value Maximum	2013–2015 8-Hour O_3 State Designation Value# (ppm)	Percent of State O_3 Standard (0.070 ppm)
South Coast Air Basin								
Los Angeles	0.108	0.094	134	125	112	Santa Clarita Valley	0.109	156
Orange	0.088	0.075	107	100*	89	Saddleback Valley	0.082	117
Riverside	0.105	0.093	133	124	111	Metropolitan Riverside County	0.106	151
San Bernardino	**0.127**	**0.102**	**146**	**136**	**121**	**Central San Bernardino Mountains**	**0.114**	**163**
Salton Sea Air Basin								
Riverside	0.092	0.088	126	117	105	Coachella Valley (Palm Springs)	0.093	133

Bold text denotes the peak value

* Note that 100 percent of the NAAQS is not violating the federal standard

\# The *State 8-Hour Designation Value* is the highest State 8-hour ozone average, rounded to three decimal places, during the last 3 years (State designation value source: https://www.arb.ca.gov/adam/select8/sc8start.php)

All monitored locations measured maximum 1-hour average ozone concentrations well below the Stage 1 episode level (0.20 ppm, 1-hour) and below the ozone health advisory level (0.15 ppm, 1-hour) in 2015. Except for one day in 2003 (at a special-purpose monitor in the San Bernardino Mountains), the Stage 1 ozone episode level has not been exceeded in the Basin since 1998. There have been no exceedances of the Stage 2 episode level (1-hour average ozone ≥ 0.35 ppm) since 1988 and the Stage 3 episode level (1-hour average ozone ≥ to 0.50 ppm) has not been exceeded since 1974.

The Basin exceeded the level of the former (1979) 1-hour federal ozone standard (0.12 ppm) on 10 days in 2015, with exceedances in Los Angeles, Riverside and San Bernardino Counties; Orange County did not exceed the 1979 standard. The State 1-hour standard (0.09 ppm) was exceeded on 71 days in the Basin. The most exceedances of the former 1-hour standard in 2015 (6 days) occurred in the Central San Bernardino Mountains (Crestline-Lake Gregory air monitoring station). The 2015 peak 1-hour ozone concentration in the Basin was 0.144 ppm, also measured in the Central San Bernardino Mountains area. This value was slightly higher than the 2014 peak of 0.141 ppm, which was the Basin's lowest annual peak 1-hour concentration since ozone measurements started in the mid-1950s.

The calculated peak 2013-2015 1-hour ozone design value[22] for the 2013-2015 period (0.130 ppm in the Central San Bernardino Mountains) was 104 percent of the former 1-hour NAAQS. Table 2-5 shows the 2015 maximum 1-hour ozone concentrations and calculated design value by air basin and county for comparison to the revoked NAAQS, along with the 1-hour State designation value for comparison State 1-hour ozone standard.

TABLE 2-5

2015 Maximum 1-Hour Average Ozone Concentrations and 2012–2014 Design Values by Basin and County

Basin/County	2015 Maximum 1-Hour O_3 Average (ppm)	2013–2015 1-Hour O_3 Design Value (ppm)	Percent of Former (1979) O_3 NAAQS (0.12 ppm)	Area of Design Value Max	2013–2015 1-Hour O_3 State Designation Value[#] (ppm)	Percent of State O_3 Standard (0.09 ppm)
South Coast Air Basin						
Los Angeles	0.136	0.127	102	East San Gabriel Valley	**0.13**	**144**
Orange	0.103	0.102	82	North Orange County & Saddleback Valley	0.10	111
Riverside	0.132	0.121	97	Metropolitan Riverside County	**0.13**	**144**
San Bernardino	**0.144**	**0.130**	**104**	**Central San Bernardino Mountains**	**0.13**	**144**
Salton Sea Air Basin						
Riverside	0.102	0.104	83	Coachella Valley(Palm Springs)	0.11	122

Bold text denotes the peak value

* Note that 100 percent of the NAAQS is not violating the federal standard

\# The *State 1-Hour Designation Value* is the highest hourly ozone measurement during the last 3 years, rounded to two decimal places. In practice, the designation value is the highest measured concentration in the 3 year period that remains, after excluding measurements identified as affected by highly irregular or infrequent events (State designation value source: https://www.arb.ca.gov/adam/select8/sc8start.php)

[22] The former 1979 1-hour ozone NAAQS allows for one exceedance per year on average when averaged over 3 years. The calculated design value is the 4th high value over a 3-year period, allowing the design value to be expressed in terms of a concentration. When shown in parts-per-million to 3 decimal places the design value is compared to 0.125 ppm, which would exceed the NAAQS.

Tables A-2 through A-10 in the attachment show the number of days exceeding the federal 8-hour and 1-hour ozone standards, as well as the annual fourth high 8-hour average, maximum 1-hour, and design value concentrations, at all routine SCAQMD air quality monitoring stations, for the period 1995–2015. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

Ozone Spatial Variation

The number of days exceeding the ozone standards in the Basin varies widely by area. Figures 2-12 through 2-14 map the number of days in 2015 exceeding the 2015 8-hour ozone NAAQS and the former 2008 and 1997 8-hour ozone NAAQS in different areas of the Basin. The number of exceedances of the federal 8-hour ozone standards was lowest in the coastal areas, due in large part to the prevailing sea breeze which transports emissions inland before high ozone concentrations are reached. The concentrations increased towards the Riverside County and San Bernardino County valleys and adjacent mountain areas, as well as in the area around Santa Clarita in Los Angeles County. The Central San Bernardino Mountains recorded the greatest number of exceedances of the current and former 8-hour federal ozone NAAQS (86 days for the 2015 ozone NAAQS, 61 days for the 2008 NAAQS, and 30 days for the 1997 NAAQS), as well as the 8-hour State ozone standard (86 days), in 2015.

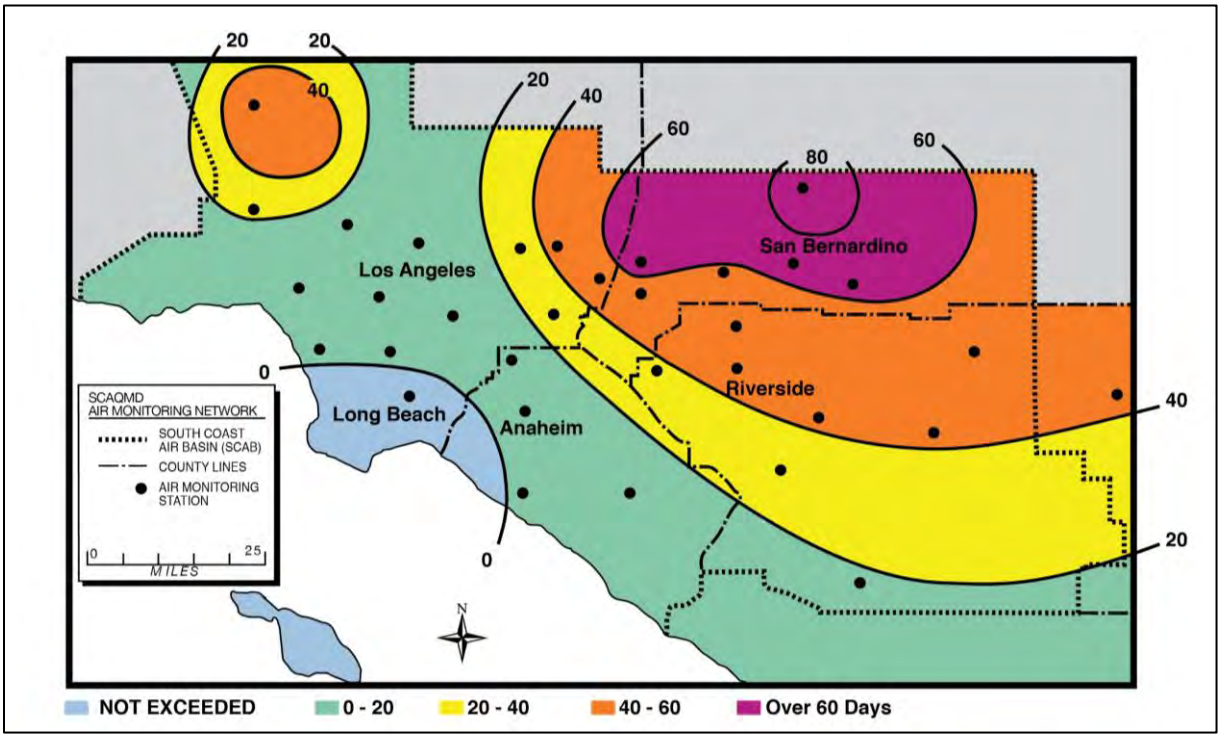

FIGURE 2-12

Number of Days in 2015 Exceeding the 2015 8-Hour Ozone Federal Standard

(8-hour average ozone > 0.070 ppm)

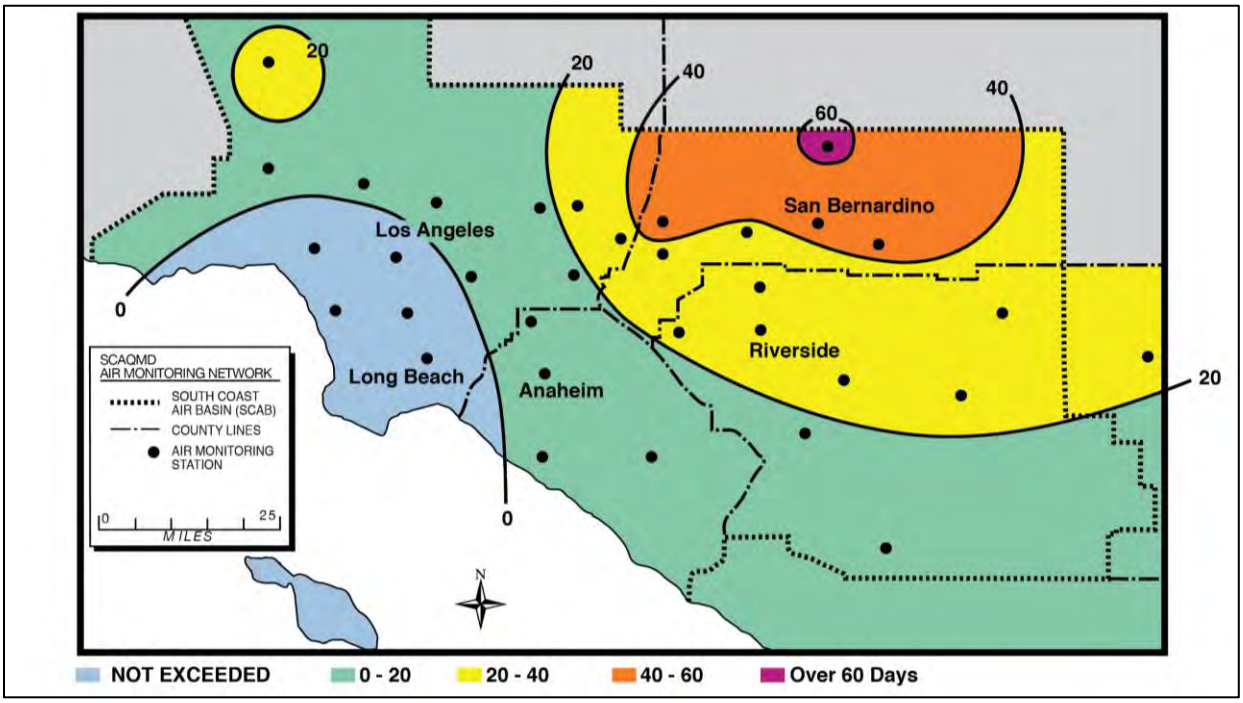

FIGURE 2-13

Number of Days in 2015 Exceeding the Revised 2008 8-Hour Ozone Federal Standard

(8-hour average ozone > 0.075 ppm)

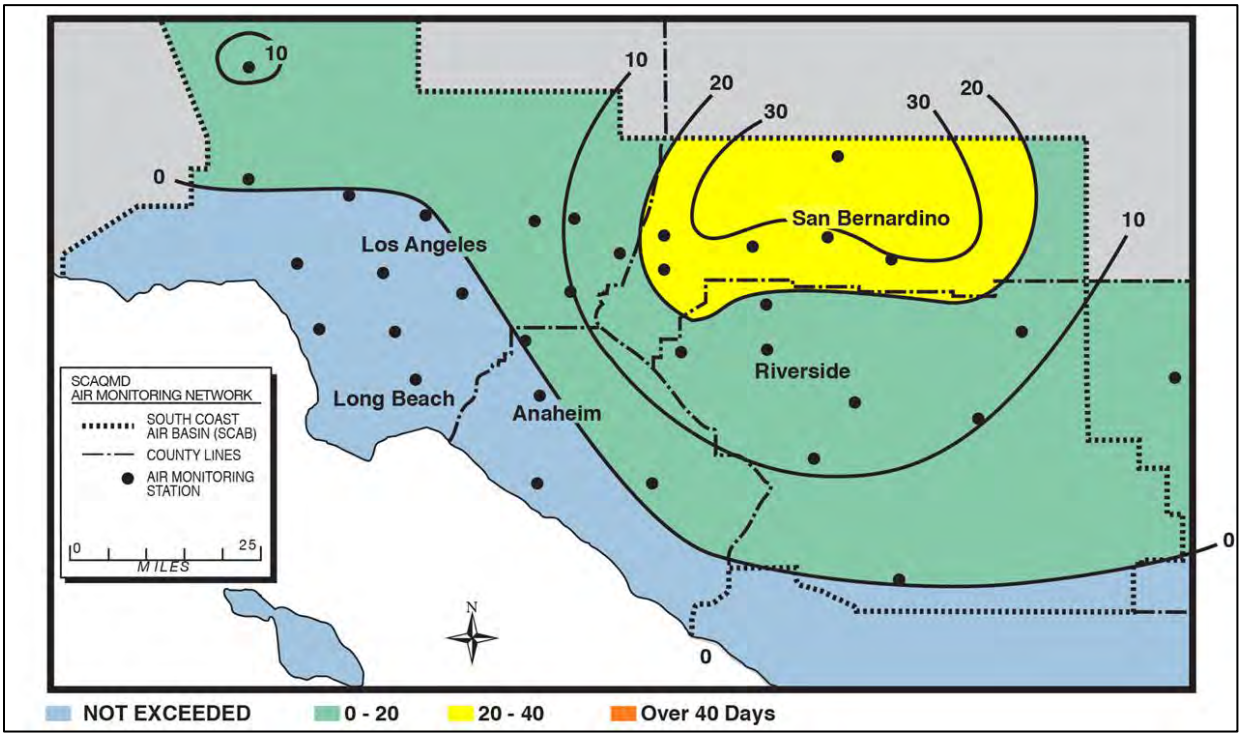

FIGURE 2-14

Number of Days in 2015 Exceeding the Revoked 1997 8-Hour Ozone Federal Standard

(8-hour average ozone > 0.08 ppm)

Figure 2-15 maps the number of days in 2015 exceeding the 1979 1-hour ozone NAAQS in different areas of the Basin. The former 1-hour federal standard was not exceeded in a large portion of the Basin. It was exceeded the most (6 days) in the inland Central San Bernardino Valley (San Bernardino monitoring station). Exceedances of the 1-hour ozone standard extended to all areas monitored in San Bernardino County and in Metropolitan Riverside County, as well as in Santa Clarita and the eastern San Gabriel Valley in Los Angeles County. The Coachella Valley did not exceed the former 1-hour ozone standard in 2015.

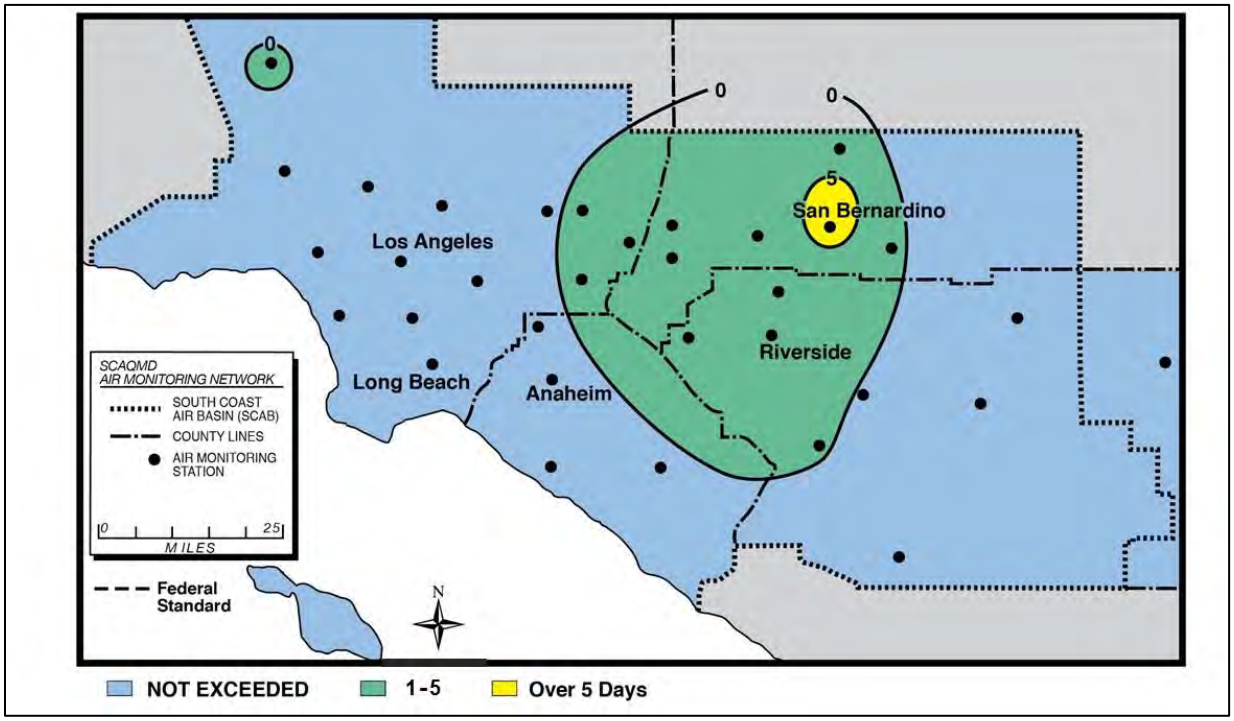

FIGURE 2-15

Number of Days in 2015 Exceeding the Revoked 1979 1-Hour Federal Ozone Standard

(1-hour average ozone > 0.12 ppm; green shaded area indicates areas with exceedances)

Ozone Trends

The rate of ozone air quality improvement has been dramatic since the concerted effort to manage air quality in the Basin began decades ago. Significant improvements were seen throughout the 1990s. While the rate of improvement in ozone has slowed somewhat since the year 2000, the overall trend, as well as the expectation for the future, is continuing gradual improvement. Figure 2-16 shows the Basin-wide trend (1990–2015) of number of days exceeding the 2015, 2008 and 1997 8-hour ozone standards and the former (1979) 1-hour ozone standard. Figure 2-17 shows the trend (1990–2015) of the 8-hour and 1-hour ozone 3-year design values for the Basin.

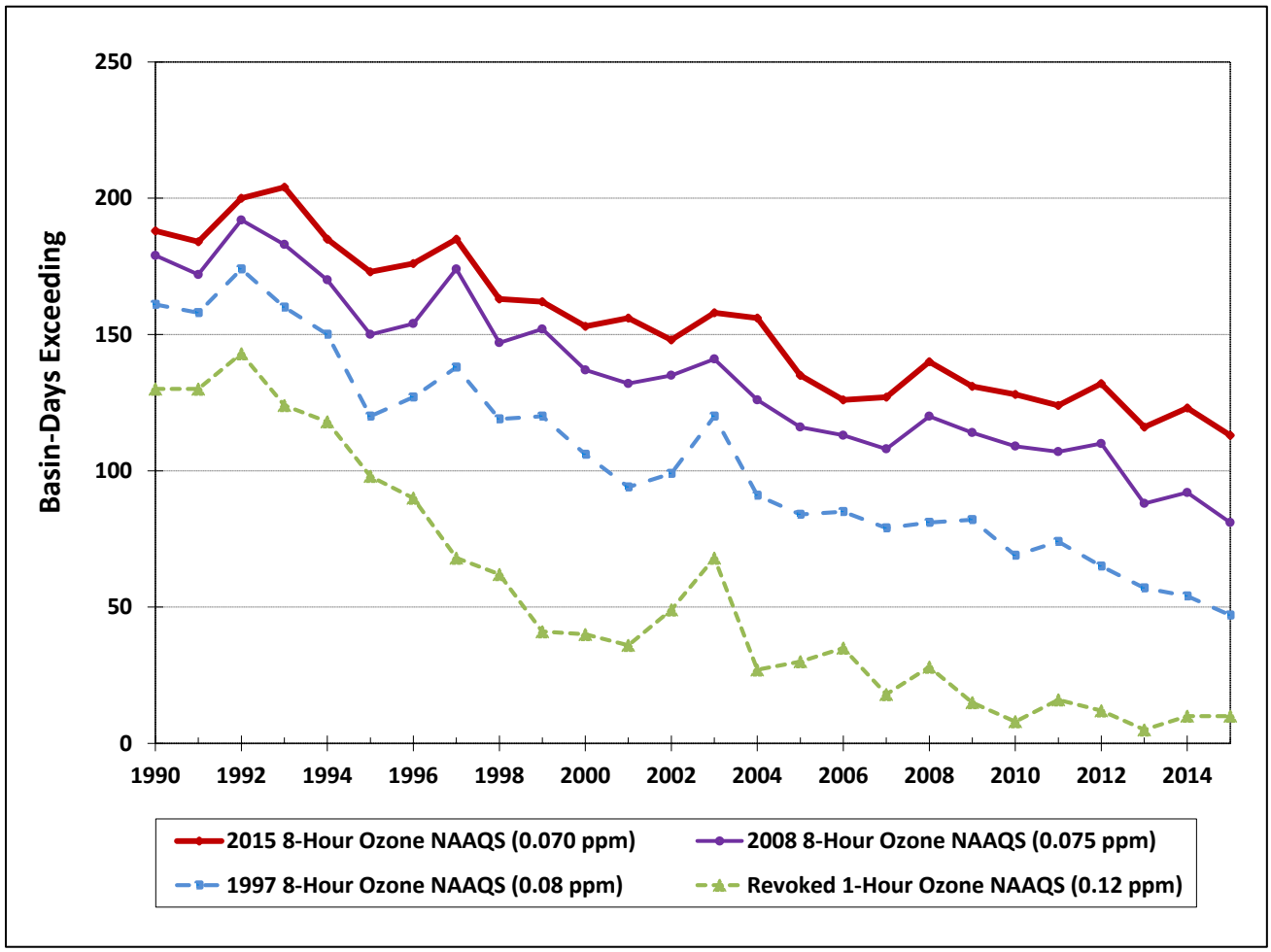

FIGURE 2-16

Trend of Annual Basin Days Exceeding 8-Hour and 1-hour Ozone NAAQS

(South Coast Air Basin; by year, 1990–2015)

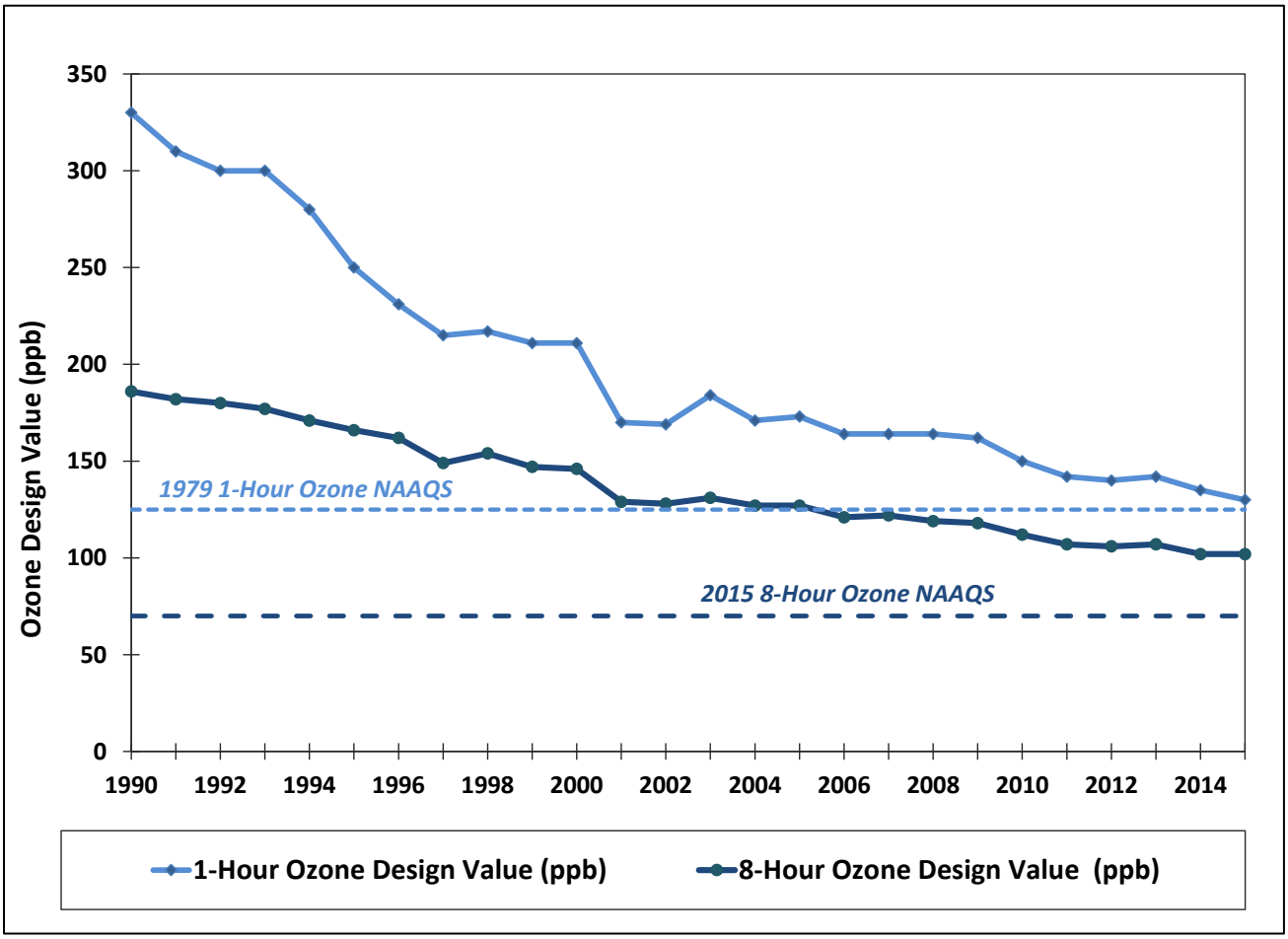

FIGURE 2-17
South Coast Air Basin Ozone Design Value Trends, 1990–2015

Ozone Temporal Variation

Because photochemical reactions require sunlight to proceed, ozone formation is favored by strong solar radiation. Solar radiation is more intense and of longer duration in summer than in winter and summertime temperature inversions are often strong and persistent, trapping pollutants in a shallow mixed layer. This causes ozone concentrations to be higher in summer than in winter. Peak ozone concentrations generally occur near the middle of the day during the period of May through September.

Figure 2-18 shows the number of days per month that one or more monitoring stations exceeded the 2008 federal 8-hour ozone standard level (0.075 ppm) for the period 1995-2015. May through October is typically considered to be the ozone "smog season" in Southern California and most exceedances occur in July and August, with most days in those months exceeding the standard. Up until the late 1980's it would have been common to have days exceeding the 2008 federal ozone standard for most of the year, had that standard been in place at that time. By the late 1990's there were very few exceedances in the months of November through February. There have been relatively few exceedances of the 2008 ozone NAAQS in March or October in more recent years. The frequency of exceedances in the spring (April–June) has continued to decline in recent years. A similar analysis based on the new 2015 ozone NAAQS would again show exceedances in more months for 2015, with exceedances starting in late March and ending in early November of that year.

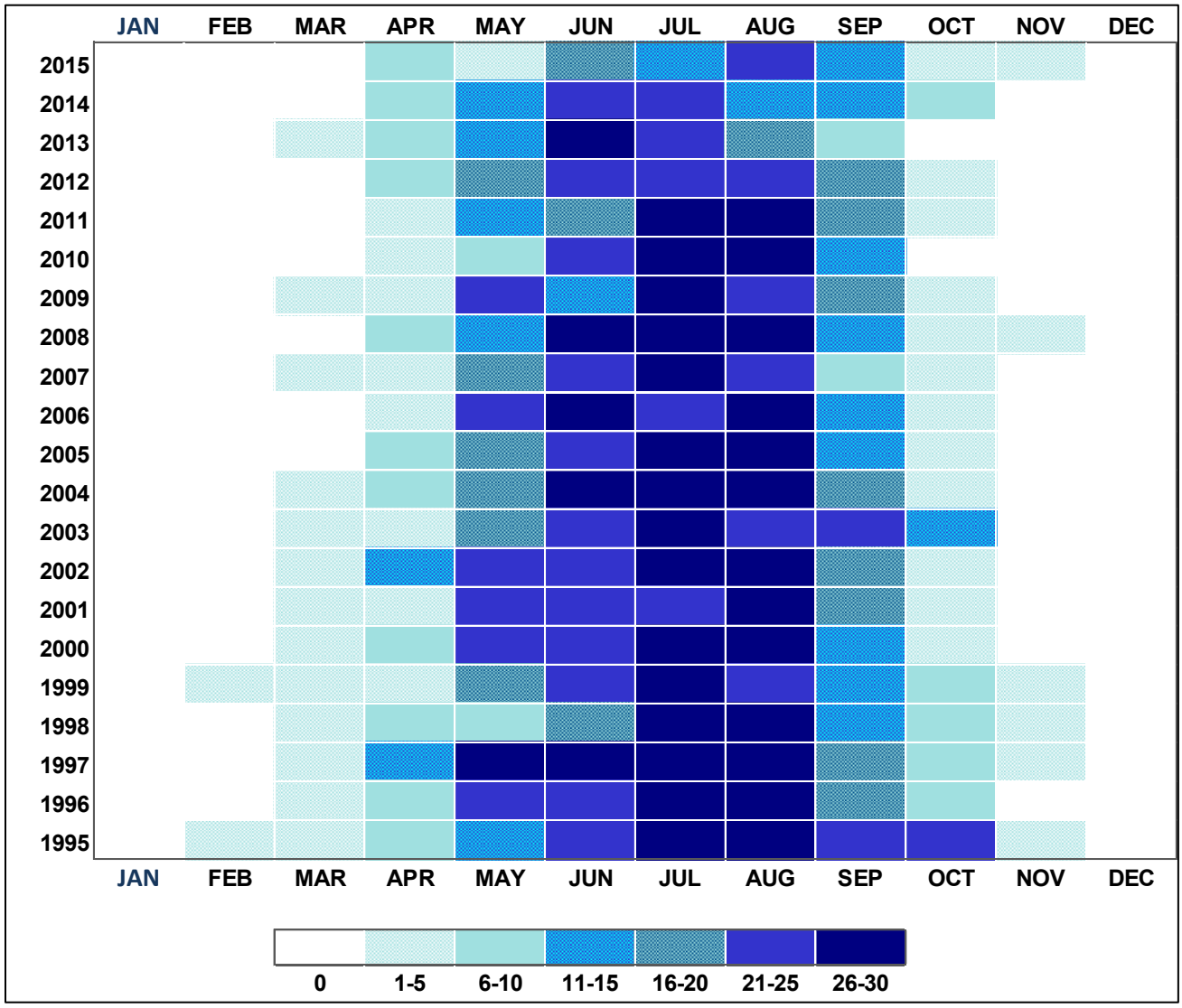

FIGURE 2-18

Monthly Distribution of Basin Days Exceeding the 2008 8-hour Ozone NAAQS

(South Coast Air Basin, for Years 1995–2015)

Since the mid-1970s, it has been documented that ozone concentrations in the Basin are more often higher on weekends than on weekdays, in spite of the fact that ozone precursors are lower on weekends than on weekdays. Similar effects have been observed in some other metropolitan areas in the nation such as San Francisco, Washington D.C., Philadelphia, and New York. This "weekend effect" was quite pronounced in previous years in the Basin. CARB has sponsored several research projects to study the causes of elevated ozone levels on weekends in the Basin. Changes in daily traffic patterns that impact the relative quantity and temporal loading of precursor VOC and NOx emissions have been suggested as strongly contributing to these observations. Carryover of matured precursors from weekdays to weekends is also suggested as a contributing factor. It is generally expected that this difference will decrease as ozone precursor emissions continue to decline.

Figure 2-19 shows the number of station-days[23] that the Basin exceeded the 2015 8-hour ozone federal standard for each day of the week for the 2013–2015 period. In that time period, the weekend days had more exceedances than the weekdays, with Sundays having slightly more than Saturdays. Averaged ozone concentrations by day-of-week (not shown) also indicate a similar pattern that seen in the number of exceedances, with weekends higher than weekdays.

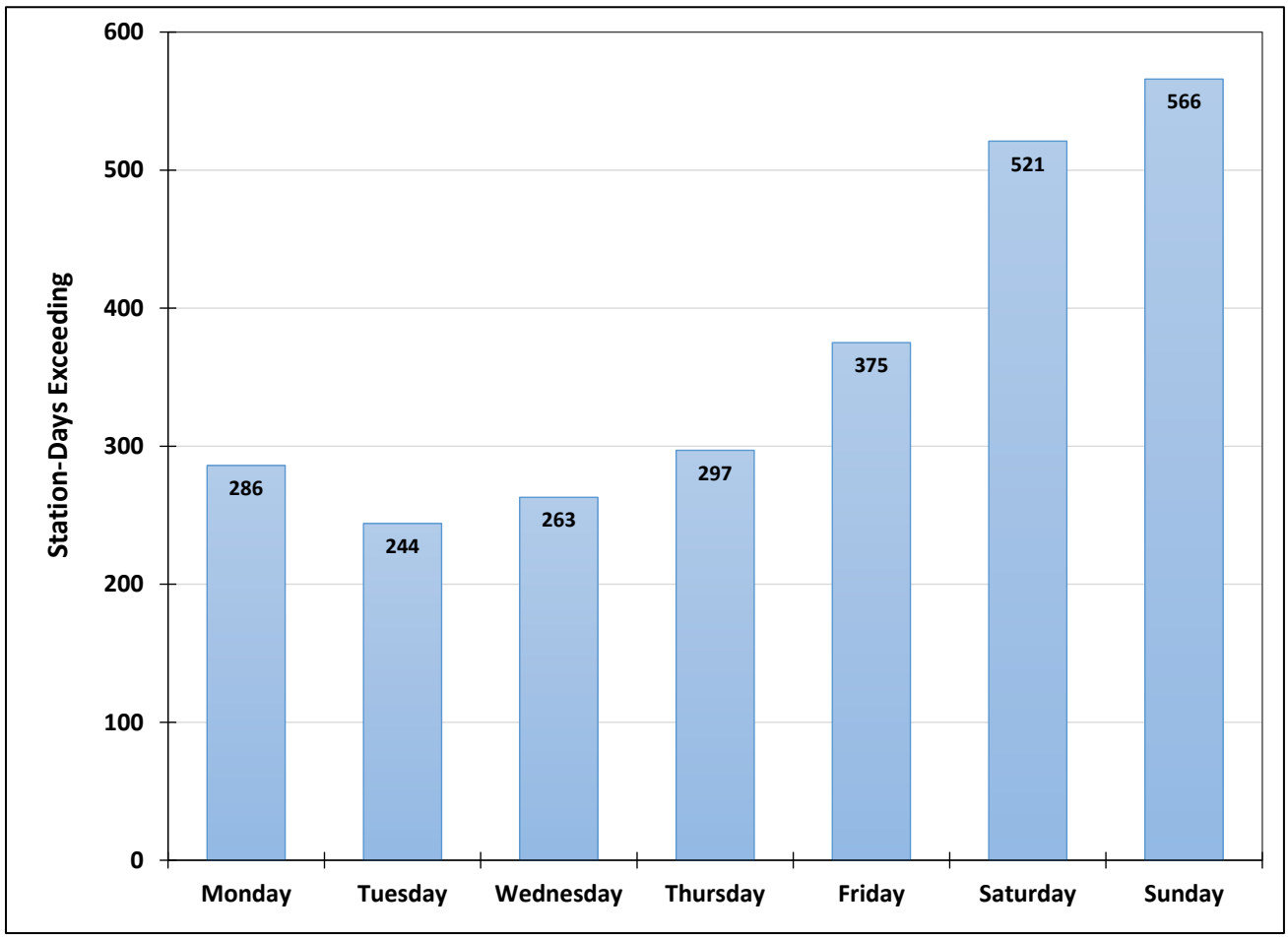

FIGURE 2-19
8-Hour Ozone Day-of-Week Variation, 2013–2015
(total station-days exceeding the 2015 8-hour ozone NAAQS over the 3-year period by day of week)

Because time and sunlight are required for precursor organic gases and nitrogen oxides to react to form ozone, the peak ozone concentrations usually occur between the early afternoon and early evening hours. By this time, the prevailing sea breeze has moved the polluted air mass miles inland from many of the major sources of precursor emissions. Ozone concentrations in the Basin are typically low during early morning hours, increasing rapidly after sunrise and peaking in the afternoon. Peak concentrations generally occur earlier in the day for coastal areas and later for locations further downwind. In the mountain and desert areas, ozone

[23] The term *station-days* represents the total number of days the standard was exceeded at individual monitoring stations summed for all stations in the Basin.

can remain elevated well into the night due to the lack of NOx emissions in those areas to help scavenge the ozone when the photochemistry ceases after dark.

Figure 2-20 illustrates the average of the smog season (May–October) 1-hour ozone concentrations for each hour of the day (shown in Pacific Standard Time), by station, for the years 2013–2015. The average peak occurs near 1 p.m. at the coastal stations (LAX) and most stations in the Basin reach their peak by 2 p.m. The far inland stations at Central San Bernardino Valley (San Bernardino) and Central San Bernardino Mountains (Crestline, where the highest concentrations have been measured in recent years) peak near 3 or 4 p.m., but the ozone at Crestline decreases at a slower rate in the evening, leading to higher 8-hour ozone values. On the worst smog days, this station can remain relatively high through the night.

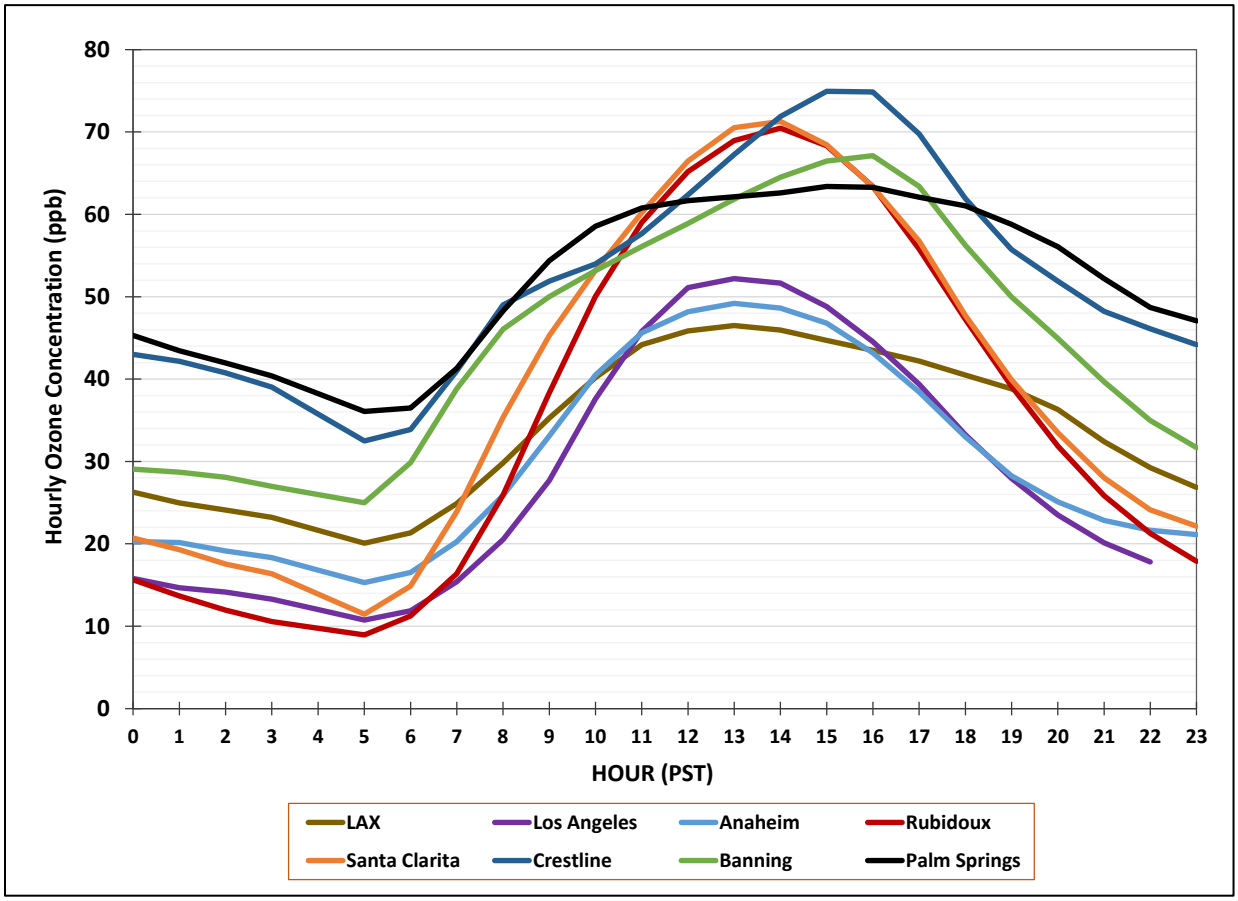

FIGURE 2-20

Diurnal Variation of Basin May–October 2013–2015 Averaged Hourly Ozone Concentrations

Particulate Matter (PM)

PM10 and PM2.5 concentrations are monitored throughout the District by samples collected on quartz or Teflon filters in samplers with size selective inlets. These are known as the Federal Reference Methods (FRMs). Some stations also have continuous PM10 and/or PM2.5 measurements, using either Beta Attenuation Monitor (BAM) or Tapered Element Oscillating Microbalance (TEOM) instrumentation. This data is available in real-time and is used for air quality forecasting and public reporting of current conditions. Where the continuous BAM or TEOM PM10 monitors have been certified by U.S. EPA to be Federal Equivalent Methods (FEM), the continuous PM10 data is averaged for the 24-hour period (midnight to midnight) and used for comparison to the standards on days when a valid FRM filter measurement was not collected.

For PM2.5, there can be significant differences between the FEM and FRM results that have been recognized by national assessments of the technologies. SCAQMD measures FRM PM2.5 on a daily basis at the critical stations in the Basin and does not use the continuous PM2.5 data to compare to the NAAQS for attainment purposes. This issue was further addressed in U.S. EPA's 2012 PM2.5 NAAQS revision, which allowed air districts to annually petition U.S. EPA for a waiver precluding the continuous measurements for use in NAAQS attainment consideration, when the continuous PM2.5 measurements do not meet performance requirements for equivalency to FRM measurements at specific locations. The continuous FEM PM2.5 monitors in the Basin do not meet the U.S. EPA equivalency requirements and are not used for NAAQS attainment comparison.[24]

PM2.5 Air Quality

SCAQMD began regular monitoring of PM2.5 in 1999 following the U.S. EPA's adoption of the first national PM2.5 standards in 1997. Figure 2-21 shows the PM2.5 monitoring sites within the SCAQMD jurisdiction, including the Coachella Valley, in 2015. PM2.5 concentrations were measured at 26 locations throughout the SCAQMD jurisdiction in 2015, including two stations in the SSAB in the Coachella Valley and two near-road sites. Two stations (Burbank and Ontario Fire Station) were closed during 2014. Nineteen stations had filter-based FRM monitoring and eight of these FRMs (including the two near-road sites) sampled daily to improve temporal coverage with the FRM measurements beyond the required 1-in-3 day sampling schedule. One station, in the Big Bear Lake area of the Eastern San Bernardino Mountains, has a 24-hour sample collected every six days. Fourteen stations, including one near-road site, employed continuous PM2.5 BAM monitors. As discussed above, the continuous PM2.5 monitors in the Basin are used for forecasting, real-time air quality alerts, and for evaluating diurnal patterns, but only FRM data is used for comparison to the NAAQS.

[24] The continuous PM2.5 monitors deployed by SCAQMD are FEM-designated Beta Attenuation Monitor (BAM) instruments, but in use they do not meet the correlation and bias requirements set by U.S. EPA for equivalency to FRM filter measurements. The U.S. EPA waiver from NAAQS comparison for the continuous samplers is re-evaluated annually as part of the SCAQMD Annual Air Quality Monitoring Network Plan. [http://www.aqmd.gov/home/library/clean-air-plans/monitoring-network-plan]



FIGURE 2-21

South Coast Air Quality Management District PM2.5 Air Monitoring Locations

(Note that while the station at N. Long Beach was closed in 2013, FRM PM2.5 monitoring was allowed to continue; some continuous monitors are not certified as FEM monitors, shown as Non-FEM; Reseda and Banning stations also have FRM measurements; Palm Springs and Indio stations are FRM samplers only and are in the Salton Sea Air Basin – Coachella Valley; the Route 710 and Route 60 Near Road PM2.5 monitoring started on January 1, 2015)

The 2015 FRM 24-hour PM2.5 concentrations are summarized in Table 2-6. The near-road data was not included in this analysis due to insufficient data to allow for calculation of design values (see the Near-Road PM2.5 section below for further information on these measurements). PM2.5 concentrations were higher in the inland valley areas of metropolitan Riverside County and San Bernardino County. The Basin 2015 PM2.5 maximum 24-hour average concentration of 70.3 µg/m^3 was measured in the East San Gabriel Valley area at the Azusa air monitoring station on July 5, associated with fireworks on Independence Day. The next highest 24-hour PM2.5 concentration in 2015 was 56.6 µg/m^3, measured in the Metropolitan Riverside County area at the Mira Loma air monitoring station. There is no State 24-hour PM2.5 standard.

Although maximum 24-hour concentrations exceed the standard, the 98th percentile form of the 2013–2015 design value only violated the standard at two Basin locations in Metropolitan Riverside County, at the Mira Loma and Rubidoux air monitoring stations, with design values of 41 µg/m^3 and 36 µg/m^3, respectively (117 percent and 103 percent of the 24-hour PM2.5 NAAQS). Mira Loma had been the only station with a design value violating the 24-hour PM2.5 NAAQS since the 2008–2010 design value period.

The higher PM2.5 concentrations in the Basin, particularly in the inland valley areas, are mainly due to the secondary formation of smaller particulates resulting from mobile, stationary and area source emissions of precursor gases (i.e., NOx, SOx, NH_3, and VOC) that are converted to PM in the atmosphere. Most of the 24-

hour PM2.5 exceedances in the Basin typically occur in the late fall and winter months (shown below in Figure 2-25). The lack of storm events and rainfall in the last four years has contributed to an increase in the PM2.5 concentrations and the number of days over the standard, as the precursor and particulates are not dispersed or washed out periodically.

TABLE 2-6

2015 Maximum 24-hour Average PM2.5 Concentrations and 2013–2015 Design Values by Basin and County[#]

Basin/County	2015 Maximum 24-Hour PM2.5 Average ($\mu g/m^3$)	2013–2015 24-Hour PM2.5 Design Value ($\mu g/m^3$)	Percent of 2006 PM2.5 NAAQS (35 $\mu g/m^3$)	Area of Design Value Max
South Coast Air Basin				
Los Angeles	**70.3**[**]	34	97	Central Los Angeles and South San Gabriel Valley
Orange	45.8	28	80	Central Orange County
Riverside	56.6	**41**	**117**	**Metropolitan Riverside County**
San Bernardino	50.5	35	100[*]	Central San Bernardino Valley
Salton Sea Air Basin				
Riverside	24.6	17	49	Coachella Valley

Bold text denotes the peak value

[#] Based on FRM filter data

[*] 100 percent of the NAAQS is not in violation of that standard

[**] Peak value associated with Independence Day fireworks – flagged as an exceptional event

The 2015 annual average PM2.5 concentrations are summarized in Table 2-7, based on the FRM measurements. The maximum annual average of 14.5 $\mu g/m^3$ was measured at the CA-60 Near-Road site, located west of Vineyard Avenue near the San Bernardino/Riverside County border (near the cities of Ontario, Mira Loma, and Upland). The second highest maximum annual average PM2.5 concentration (13.3 $\mu g/m^3$) was measured in the Metropolitan Riverside County area at the Mira Loma station. The Basin maximum 2013–2015 annual average design value was 14.1 $\mu g/m^3$ at the Mira Loma station (118 percent of the current 2012 annual average PM2.5 NAAQS, 12.0 $\mu g/m^3$). This design value is below the former 1997 annual average PM2.5 NAAQS of 15.0 $\mu g/m^3$, for which the Basin remains in attainment. This is the lowest PM2.5 Basin design value since these measurements began in 1999. Since the near-road PM2.5 sites only became operational in 2015, the data period is insufficient for design value calculations. The CA-60 freeway near-road station could potentially become the design value site for the Basin for the PM2.5 annual average NAAQS, once sufficient data is collected. The annual PM2.5 State standard is still violated in all counties of the Basin.

Tables A-11 through A-16 in the attachment show the annual PM2.5 arithmetic mean and annual design value concentrations, the percent of sampling days exceeding the 24-hour PM2.5 NAAQS, and the annual maximum, 98th percentile, and design value 24-hour PM2.5 concentrations at all routine ambient SCAQMD air quality monitoring stations, for the period 1999–2015.

TABLE 2-7

2015 Maximum Annual Average PM2.5 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Max. Annual Average (µg/m³)#	2013–2015 PM2.5 Annual Design Value (µg/m³)#	Percent of Current (2012) NAAQS (12.0 µg/m³)#	Percent of Former (1997) NAAQS (15.0 µg/m³)#	Area of Design Value Max	2013–2015 3-Year High State Annual PM2.5 Designation Value (µg/m³)##	Percent of State Annual PM2.5 Standard (12 µg/m³)
South Coast Air Basin							
Los Angeles	12.4	12.3	103	82	Central Los Angeles	**19**	**158**
Orange	9.4	10.0	83	67	Central Orange County	16	133
Riverside	**13.3**	**14.1**	**118**	94	**Metropolitan Riverside County**	**19**	**158**
San Bernardino	11.0	12.5	104	83	Southwest San Bernardino Valley	17	142
Salton Sea Air Basin							
Riverside	7.5	8.0	67	53	Coachella Valley	8	67

Bold text denotes the peak value

Based on FRM filter data, excluding near-road stations due to insufficient period of record for design value calculation; the federal design value is based on the average of the 3 annual averages in the period

Based on combined FRM filter and continuous FEM data (federal FEM waiver is not applied to State designation); data may include exceptional events; the State annual designation value is the highest year in the 3-year period (State designation value source: https://www.arb.ca.gov/adam/select8/sc8display.php)

PM2.5 Spatial Variation

In 2015 the 98th percentile concentration was exceeded at eight stations. These stations include Central Los Angeles (Downtown Los Angeles) and South San Gabriel Valley (Pico Rivera) in Los Angeles County; the Metropolitan Riverside County area (Mira Loma and Rubidoux) in Riverside County; and the Central San Bernardino Valley (Fontana) and East San Bernardino Mountains (Big Bear Lake) in San Bernardino County; as well as at both near-road sites. Generally, PM2.5 concentrations are higher in the inland valley areas of Metropolitan Riverside County and San Bernardino County. These higher PM2.5 concentrations are mainly due to the secondary formation of smaller particles resulting from mobile, stationary and area source emissions of precursor gases (NOx, SOx, NH_3, VOC) that are converted to particulate matter in the atmosphere. Secondary formation occurs due to chemical reaction in the atmosphere generally some distance downwind from the original emission sources and PM2.5 varies geographically and seasonally due to topography and weather conditions that affect atmospheric chemistry and dispersion. The locations of PM2.5 precursor emission sources play a large role in where the PM2.5 peaks occur.

Figure 2-22 maps the distribution of annual average PM2.5 concentrations in different areas of the Basin. This shows peak annual average concentrations in the Metropolitan Riverside area where transport and secondary

chemical processes are most important, as well as a secondary peak in the Central Los Angeles area due to the abundant motor vehicle sources.

Most of the exceedances of the PM2.5 24-hour NAAQS occurred during the first quarter of 2015, when the highest 24-hour PM2.5 concentrations are expected. However, this is also the time frame when the Basin typically sees the most rainfall and most frequent storm events. The first quarter of 2015 had the lowest number of rain days in the past decades, as is discussed further below in this appendix (see Impacts of Drought on PM2.5 Air Quality). This reduced frequency of unstable weather conditions and storms, significantly reduces the pollution dispersion resulting in longer episodes of stagnant air when particulate pollution can build to unhealthful levels.

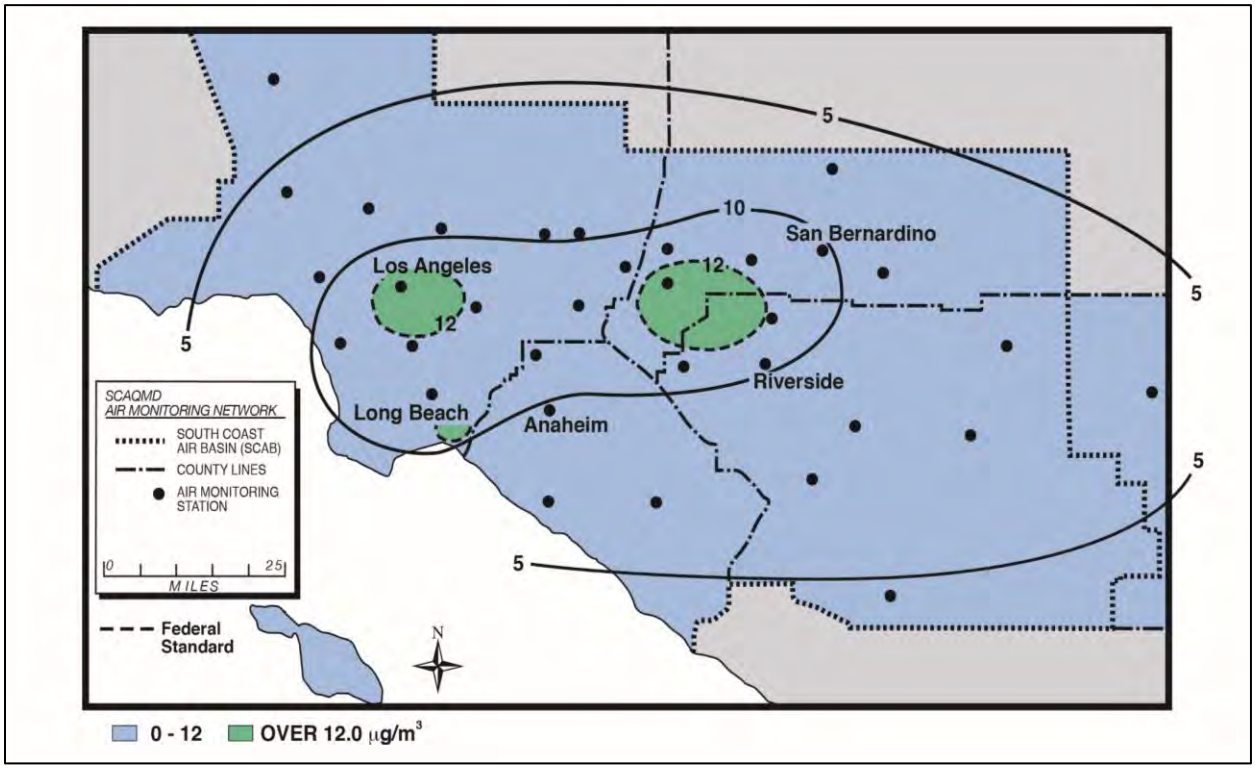

FIGURE 2-22

Spatial Distribution of the 2015 Annual Average PM2.5 Concentrations

(The 2012 annual PM2.5 NAAQS is 12 µg/m^3, annual arithmetic mean)

PM2.5 Trends

Figure 2-23 shows the trend of the Basin 3-year 24-hour and annual design values, compared to the current 2006 24-hour and 2012 annual PM2.5 standards, for the period of 2001 through 2015. This illustrates the significant progress toward attainment of the standards in the last 15 years. It also shows the reversal in trend of 24-hour PM2.5 for the 2014 and 2015 design values due to the impact of the drought. Programs and regulations aimed at reducing direct emissions of particles as well as those that reduce gaseous emissions that can form particles in the atmosphere have played an important role in reducing PM2.5 concentrations. These include the national, State, and regional programs designed to reduce ozone-forming emissions of VOCs and NOx, which also contribute to secondary PM2.5 formation.

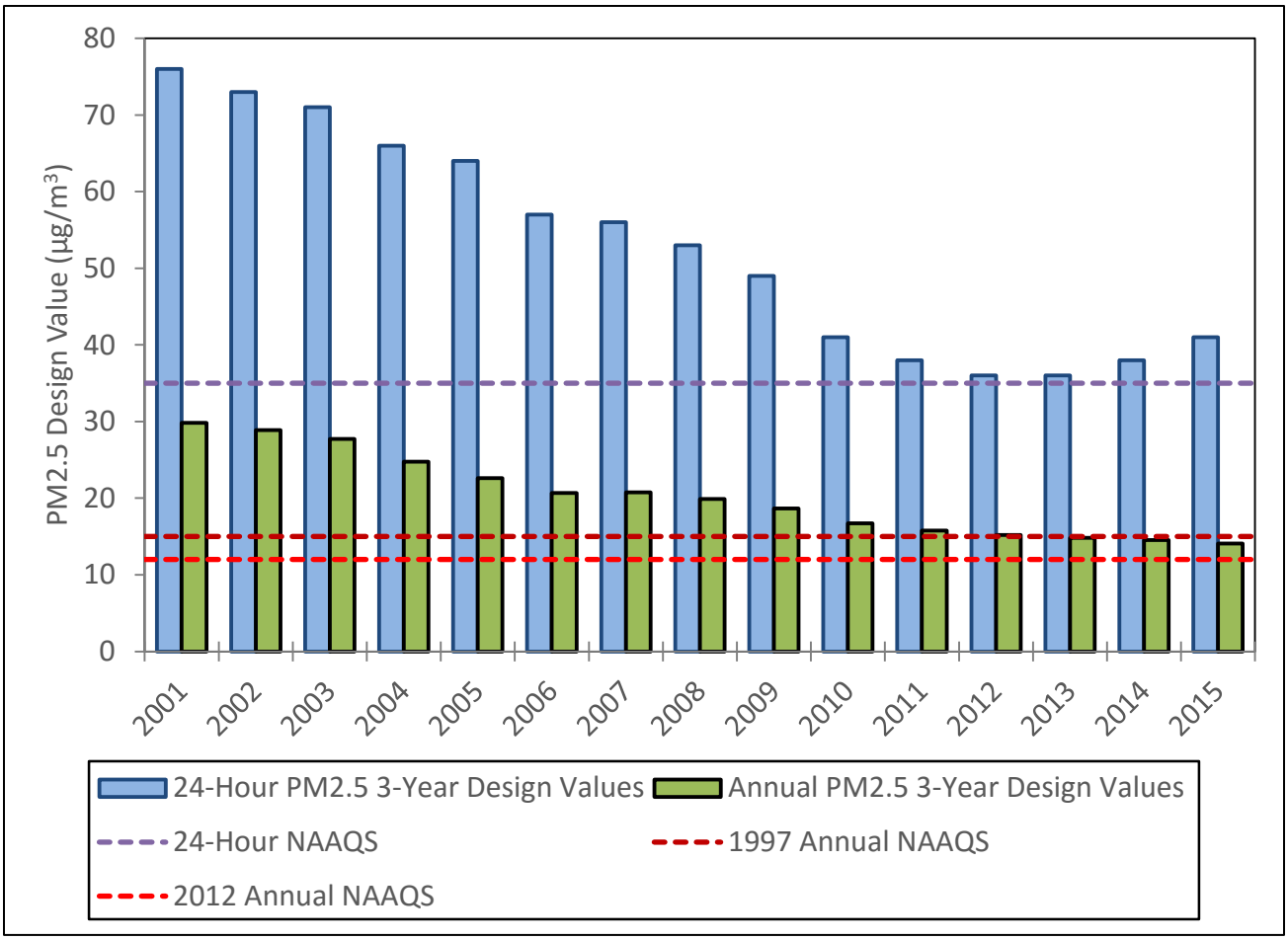

FIGURE 2-23

South Coast Air Basin Peak PM2.5 Design Value Trends, 2001–2015

PM2.5 Temporal Variation

Seasonal and day-of-week variations in PM2.5 concentrations are complex and location dependent, and may vary from year to year depending on meteorological conditions, the presence of large wildfires, residential wood burning, and other factors. Meteorological conditions such as wind direction and speed, mixing height and temperature play an important role in the formation and removal mechanisms of PM and its components. PM2.5 concentrations typically have a distinct seasonal pattern in the Basin, with higher concentrations in the first (January–March) and fourth (October–December) calendar quarters. This is, in part, because secondary PM precursors, such as particulate nitrates and carbonaceous particles, are more readily formed in cooler

weather. Wood stove and fireplace use in the cool months also increases direct emissions of carbon. Persistent trapping occurs in the cool months due to near-surface temperature inversions formed by the radiation of heat from the surface on the cool nights. Figure 2-24 shows the Basin-wide monthly averaged PM2.5 concentrations, by month for the years 2013–2015. The highest monthly PM2.5 averages were recorded in January and February, followed by December.

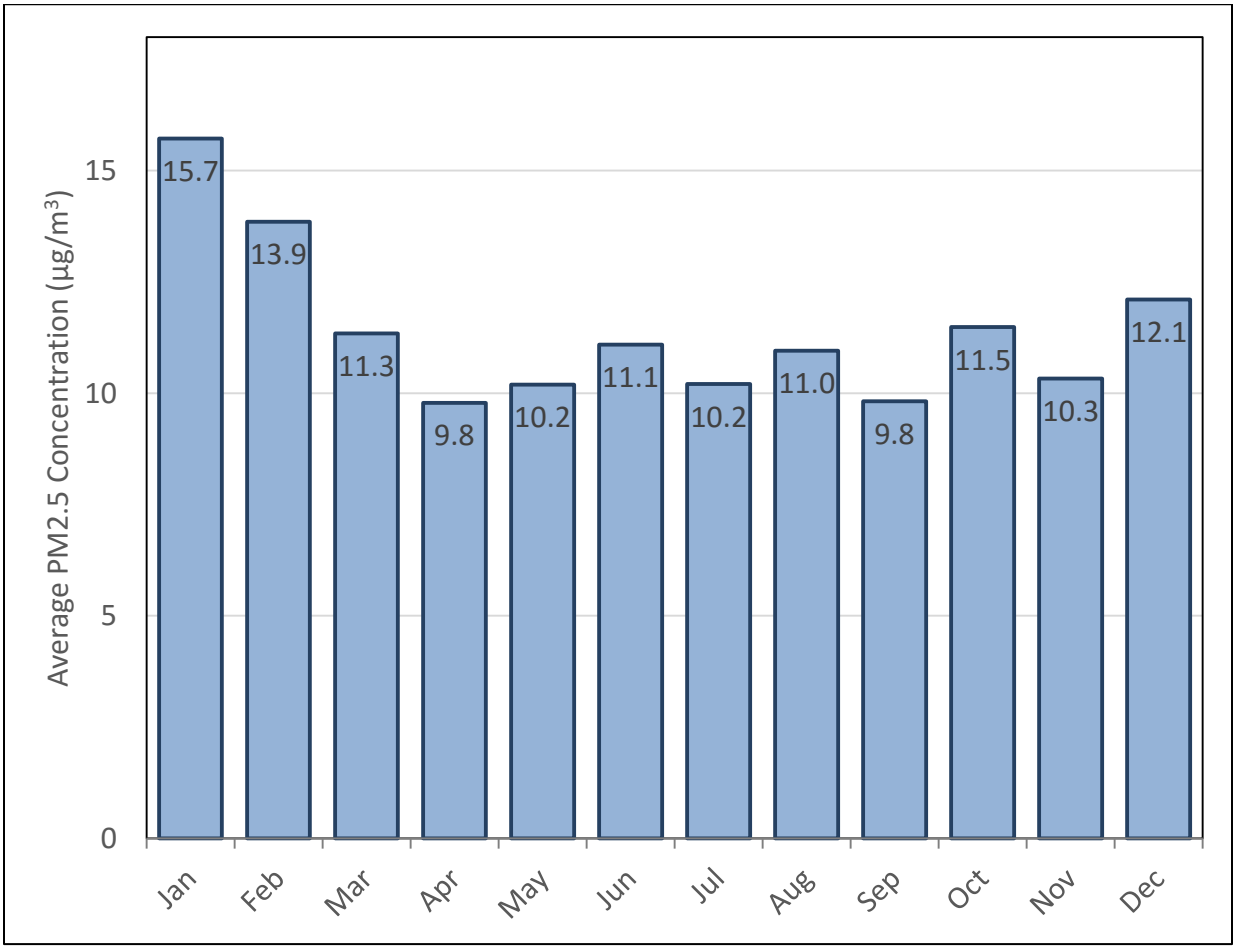

FIGURE 2-24
PM2.5 Variation of Basin-wide FRM Monthly Average Concentration, 2013–2015

As shown in Figure 2-25, the highest number of station-days when the PM2.5 concentration exceeds the 24-hour NAAQS in the most recent three years occurred during the fall and winter seasons. SCAQMD introduced the "*Check Before You Burn*" program to help improve wintertime air quality by issuing 24-hour no-burn alerts for residential fireplaces, outdoor fire pits, and wood stoves when air quality is forecasted to reach unhealthful levels. Alerts are issued only during winter wood-burning months (November 1 through the end of February) for specific areas or the entire South Coast Air Basin, depending on the forecasted concentrations. The wintertime program became mandatory on November 1, 2011 under the provisions of Rule 445 – Wood-Burning Devices, which was amended in May 2013 to lower the forecast threshold for wood burning curtailment.

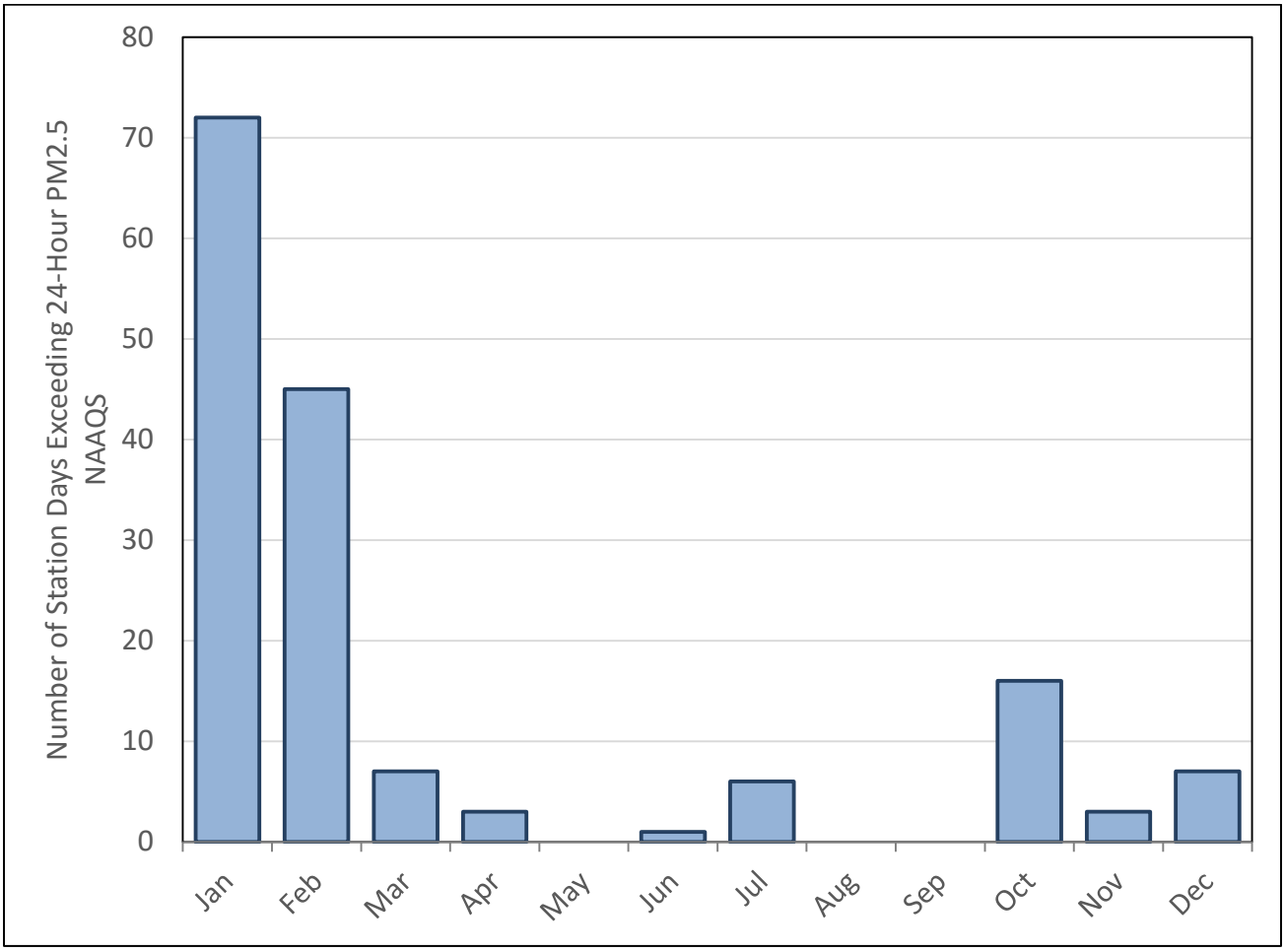

FIGURE 2-25
2013–2015 PM2.5 Monthly Variation of Station-Days Exceeding
the 2006 24-Hour PM2.5 NAAQS (35.0 µg/m^3)

Figure 2-26 shows an analysis of day-of-week variation in Basin-wide PM2.5 daily concentrations averaged for the years 2013-2015. This shows that Saturdays have slightly higher average PM2.5 concentrations, likely due to buildup of pollution over multiple weekdays, the change in traffic patterns, and increase in residential wood burning. Mondays had the lowest concentrations, likely due to Monday's decreased carryover from the traffic on weekends and reduced wood burning on the weekdays. However, the average difference from the lowest day of the week to the highest is only 0.4 µg/m^3. PM2.5 concentrations generally remain consistent between Tuesdays and Fridays.

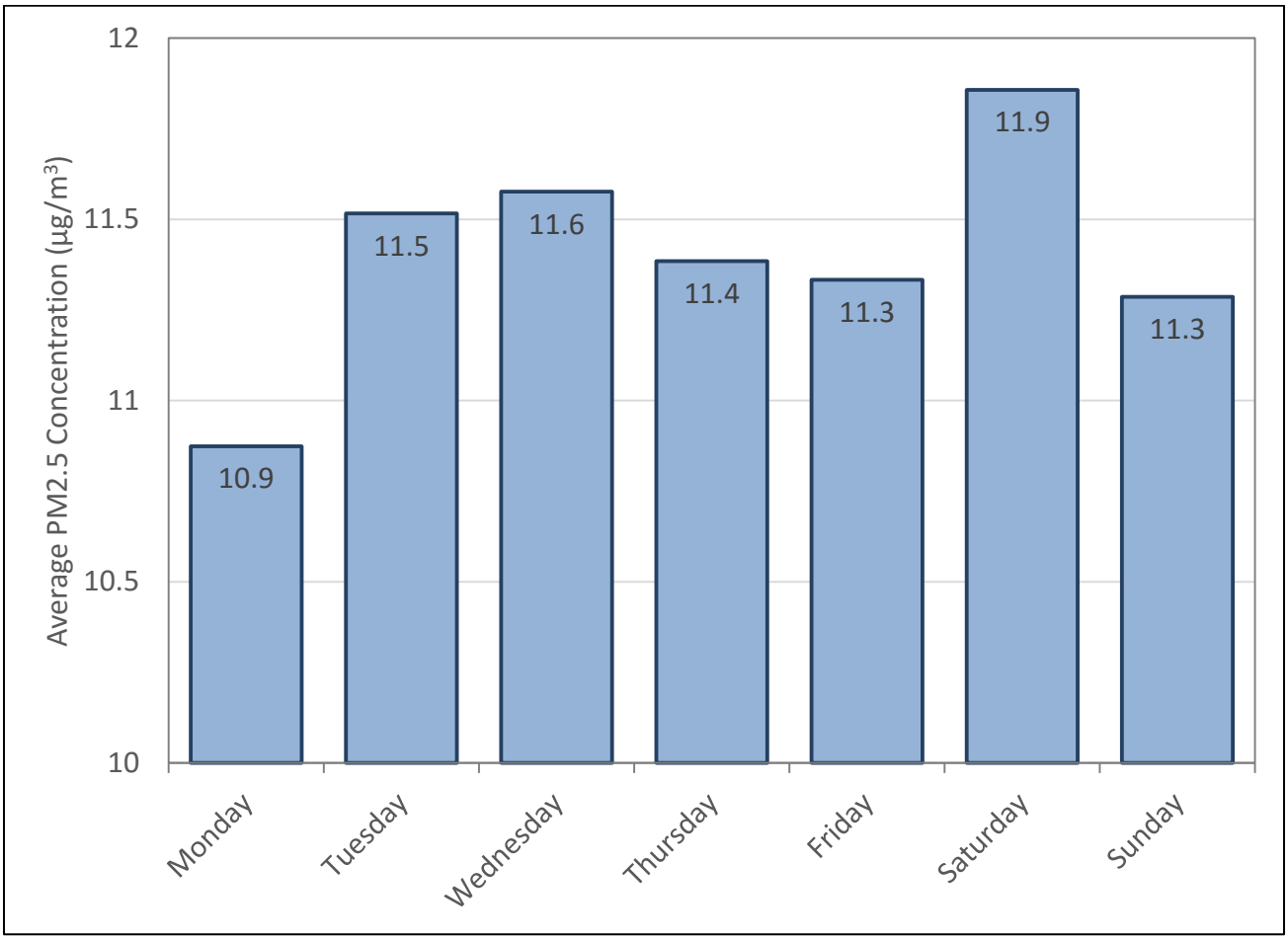

FIGURE 2-26
PM2.5 Basin-wide Day-of-Week Variation of 24-Hour Average FRM PM2.5 Concentrations, 2013–2015

Figure 2-27 shows average PM2.5 concentration by hour of the day for the 2013–2015 period, based on the continuous PM2.5 measurements using hourly FEM BAM sampler data. The diurnal plots are for the Basin maximum PM2.5 monitor at Metropolitan Riverside County (Mira Loma), as well as for Central Los Angeles (Downtown L.A.), Central Orange County (Anaheim), and for the average of several other sites throughout the Basin. In general, PM2.5 concentrations in urban environments have been shown to closely follow temporal variation in traffic density, with highest levels observed on weekdays during rush hours. As seen in Figure 2-27, PM2.5 concentrations peaked in the morning between 0600 and 0900 PST because of rush hour traffic and decreased throughout the day due to decreased traffic volume, increased wind speeds and subsequent dispersion of PM2.5 and precursor emissions. PM2.5 can also be formed by chemical reactions in the atmosphere, particularly in the photochemically active, warm seasons. This is often seen as a mid-day peak associated with secondary particle formation, seen in the plots between 0600 PST and 1400 PST. The PM2.5 concentrations reach a secondary peak in the evening hours, following evening traffic, and can remain elevated overnight when the lower nighttime temperature inversion (particularly in colder seasons) traps the pollutants in a shallower layer near the surface.

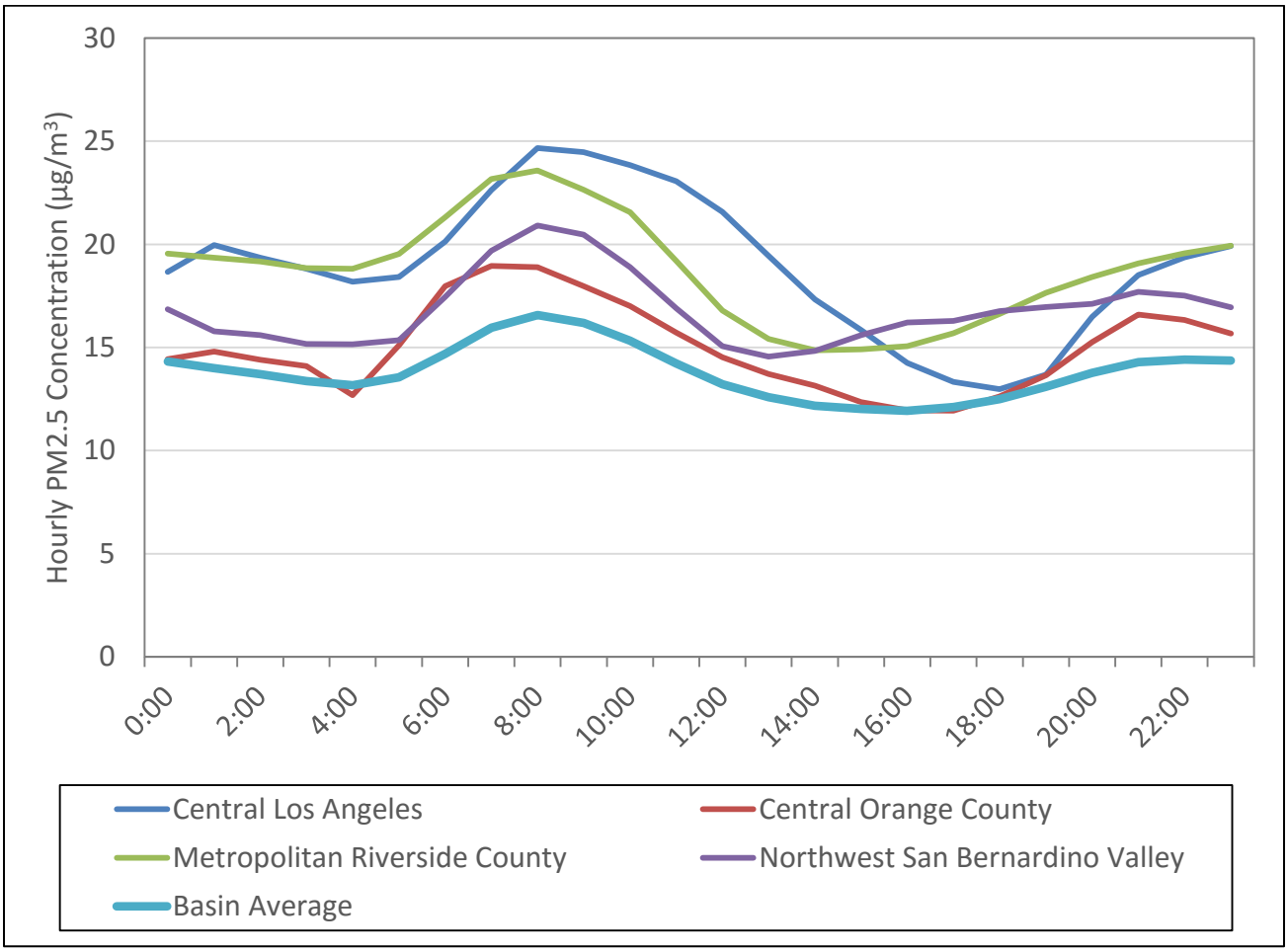

FIGURE 2-27

Diurnal Variation of Hourly FEM PM2.5, Averaged by Time of Day, 2013–2015

The effect of meteorology on PM2.5 concentration is more evident when comparing average diurnal patterns for different seasons (Figure 2-28). Several factors contribute to the seasonal variability of PM2.5. The winter season, characterized by lower temperatures and lower mixing heights, along with wood burning and heating-related emissions, result in elevated PM2.5 levels in the evenings. Summer months on the other hand, are typically characterized by distinctly higher mid-day levels, due to the increased photochemical activity, favoring particle formation. As a result, PM2.5 concentration remains elevated after the morning rush hour traffic and through much of the remainder of the day.

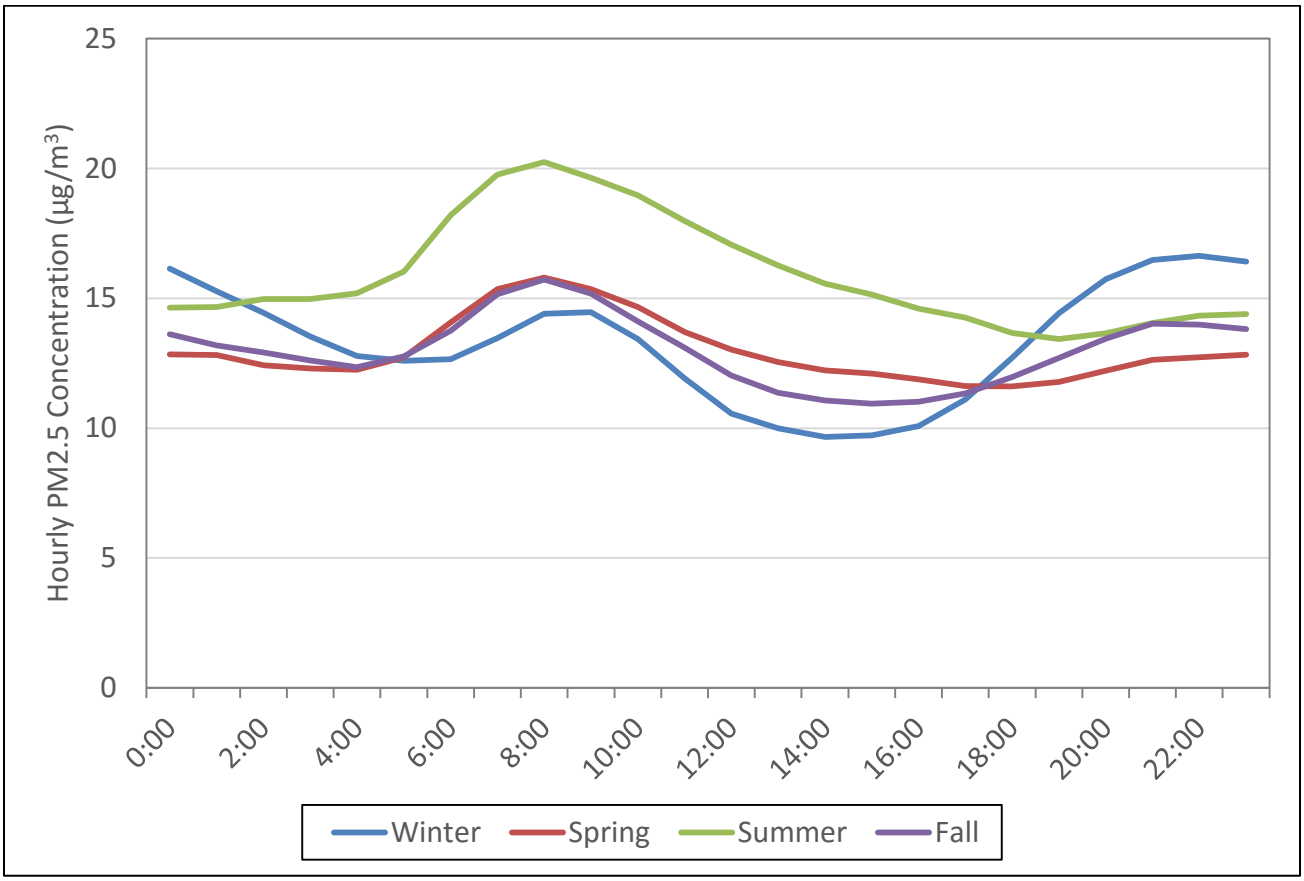

FIGURE 2-28

Seasonal Diurnal Variation of Hourly FEM PM2.5, Averaged by Time of Day for the Basin, 2013–2015

PM2.5 Speciation

Further insight into the sources of fine particulate matter requires an examination of particle composition, therefore PM2.5 speciation sampling, to determine the chemical components of PM2.5 is also a part of the District's PM2.5 measurement program. Currently, PM2.5 speciation samplers are deployed at four representative locations in each of the Basin's counties (Anaheim, Fontana, Los Angeles and Rubidoux). The 24-hour filter samples from the Speciation Air Sampling System (SASS) samplers in the SCAQMD ambient network are run every six days, with analysis conducted at the SCAQMD Laboratory. Figure 2-29 shows the trends of the annual concentration of six PM2.5 component species: Elemental Carbon (EC), Organic Carbon (Organics), Sulfate (SO_4), Nitrate (NO_3), Ammonium (NH_4), and Crustal Elements (soils). Most of the components show a downward trend in recent years. The largest decline is observed for NH_4, NO_3, SO_4 and EC. These reductions are attributed to the success of regulatory efforts, such as stringent regulations and a myriad of programs that target PM2.5, and NOx and diesel emissions. Concentrations of the crustal material have been more or less constant throughout the years, with a slight increase in the past three years, most likely attributable to the recent drought. The lack of rain leads to drier ground surfaces and less crusting of soil and washing of road surfaces. This can lead to enhanced resuspension of fugitive dust by moving vehicles and winds. Fugitive dust can boost concentrations of both PM10 and PM2.5, although the coarse portion of PM10 is usually more affected. Unlike other components of PM2.5, organics concentrations have been increasing since 2012, after a period of progressive decline.



FIGURE 2-29

South Coast Air Basin PM2.5 SASS Speciation Network Annual Trends, 2004–2014

[annual averaged PM2.5 mass of Ammonium (NH_4), Nitrate (NO_3), Sulfate (SO_4), Crustal Component Concentrations, Organics and Elemental Carbon (EC) for Anaheim, Fontana, Los Angeles and Rubidoux]

More information can be assessed from the relative contribution of each component species to total PM2.5 mass concentration, as is presented in Figure 2-30. The relative contributions of NH_4, NO_3, SO_4 and EC are decreasing with a higher rate, particularly since 2010, while the relative contribution of organics and crustal material have been increasing. Crustal material emissions are usually from sources like windblown soil and dust, brake lining abrasion, tire wear, and bioaerosols, all of which can be difficult to regulate. As a result, with little year to year variation and considering the declining PM2.5 concentrations, the relative contribution of these emissions to PM2.5 mass is on the rise. The organics are the other PM2.5 component with an increasing concentration and relative contribution, especially during the drought years.

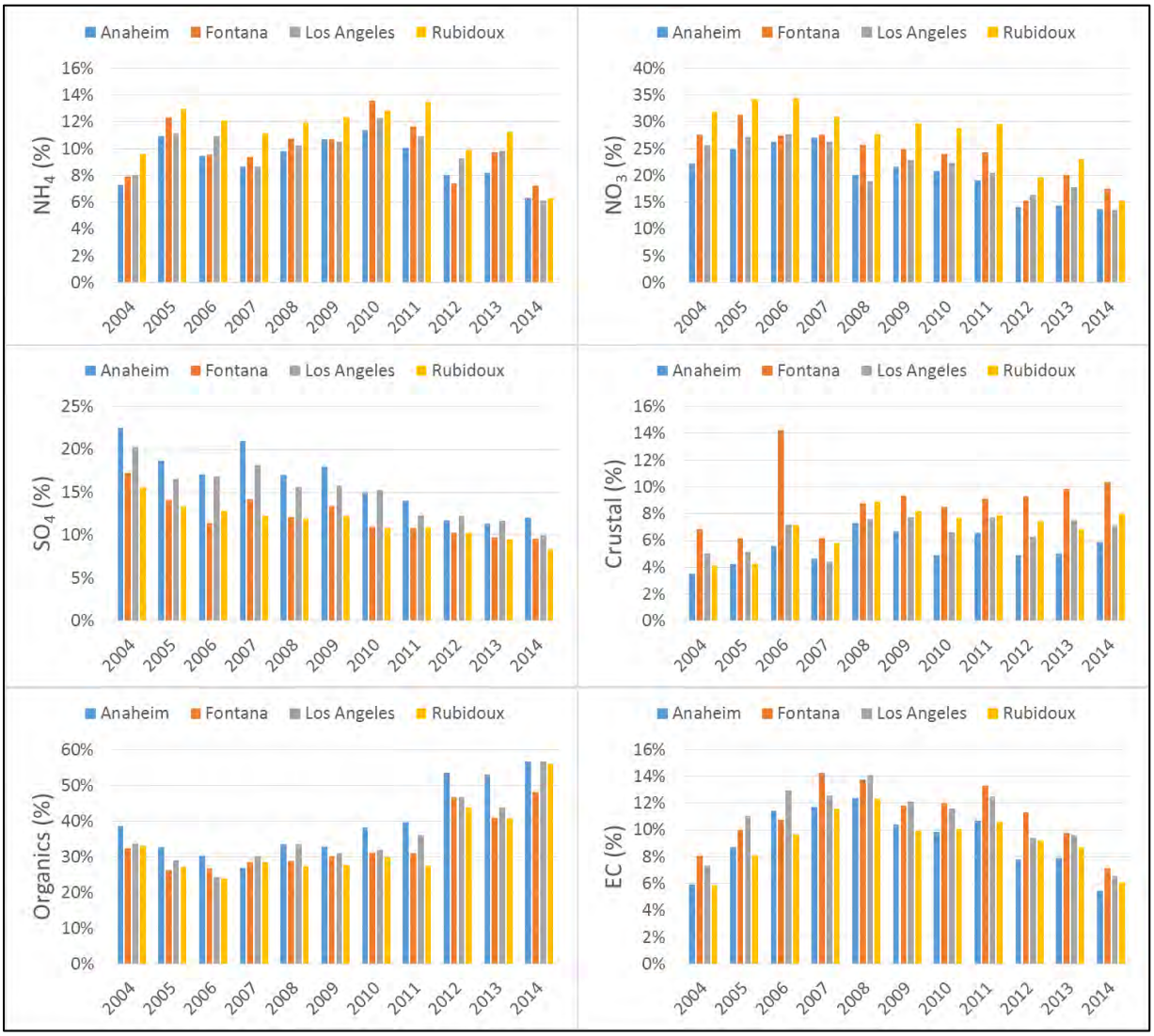

FIGURE 2-30

South Coast Air Basin PM2.5 Speciation Network Annual Trends
of Relative Contribution to Mass, 2004–2014

[annual averaged PM2.5 Ammonium (NH_4), Nitrate (NO_3), Sulfate (SO_4), Crustal Component Concentrations, Organics and Elemental Carbon (EC) for Anaheim, Fontana, Los Angeles and Rubidoux as percent of total mass]

The PM2.5 components have a strong seasonality, as is shown in Figure 2-31. The organics and SO_4 have a reverse seasonality compared to rest of components. The highest organics and SO_4 concentrations are measured in spring and summer, and they have the highest relative contribution in summer, likely due to higher fraction of particulate organic carbon due to a secondary origin in gas/particle conversion of volatile organic compounds. This fraction could be estimated from the minimum ratio between particulate organic and elemental carbon. Organic carbon is the largest contributor to the PM2.5 mass at all four of the speciation sites and in all seasons. The average contribution of elemental carbon to the PM2.5 mass concentration is 10% on average over all the sites.

The OC to EC ratio is often used to distinguish the relative importance of primary and secondary organics. It is generally assumed that EC, the main component of soot, is only emitted by primary combustion sources, and these primary emissions have some characteristic ratio of OC to EC. If observed ratios of OC/EC are higher

than those assumed to occur in primary emissions (a ratio between 2 and 5 is generally assumed for OC/EC in primary emissions), then the excess OC is assumed to be due to secondary organic aerosol formation.

Figure 2-32 shows the historical trend of OC/EC ratios at each of the speciation sites. In the period of 2004 through 2011, the OC/EC ratios at all four sites were within the values assumed for primary emissions (with exception of 2004 which is slightly above those values, particularly at Anaheim and Rubidoux). However the OC/EC ratio increased significantly between 2011 and 2014, with highest ratios at all four sites observed in 2014, suggesting that secondary OC is becoming an even more important component of PM2.5. It should be noted that the primary OC/EC ratio is highly dependent on the sampling and analysis methods and thus may not be consistent from study to study. In addition, the primary OC/EC ratio can vary throughout the 24-hour sample collection period and may also be highly variable from day to day.

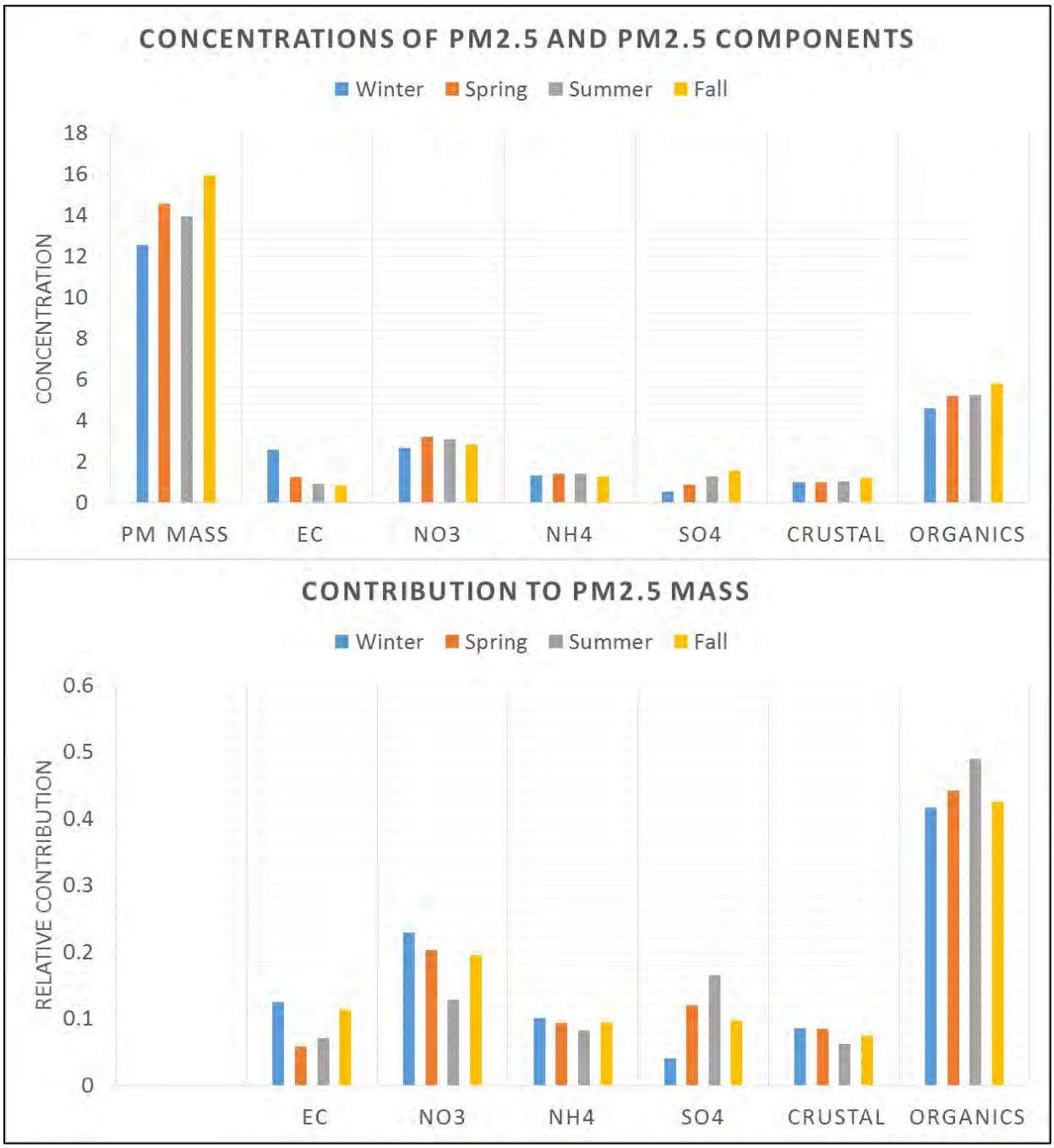

FIGURE 2-31

Seasonal Variations in relative contribution of PM2.5 Components to Total Mass and Concentrations of PM2.5 Components, 2011–2014

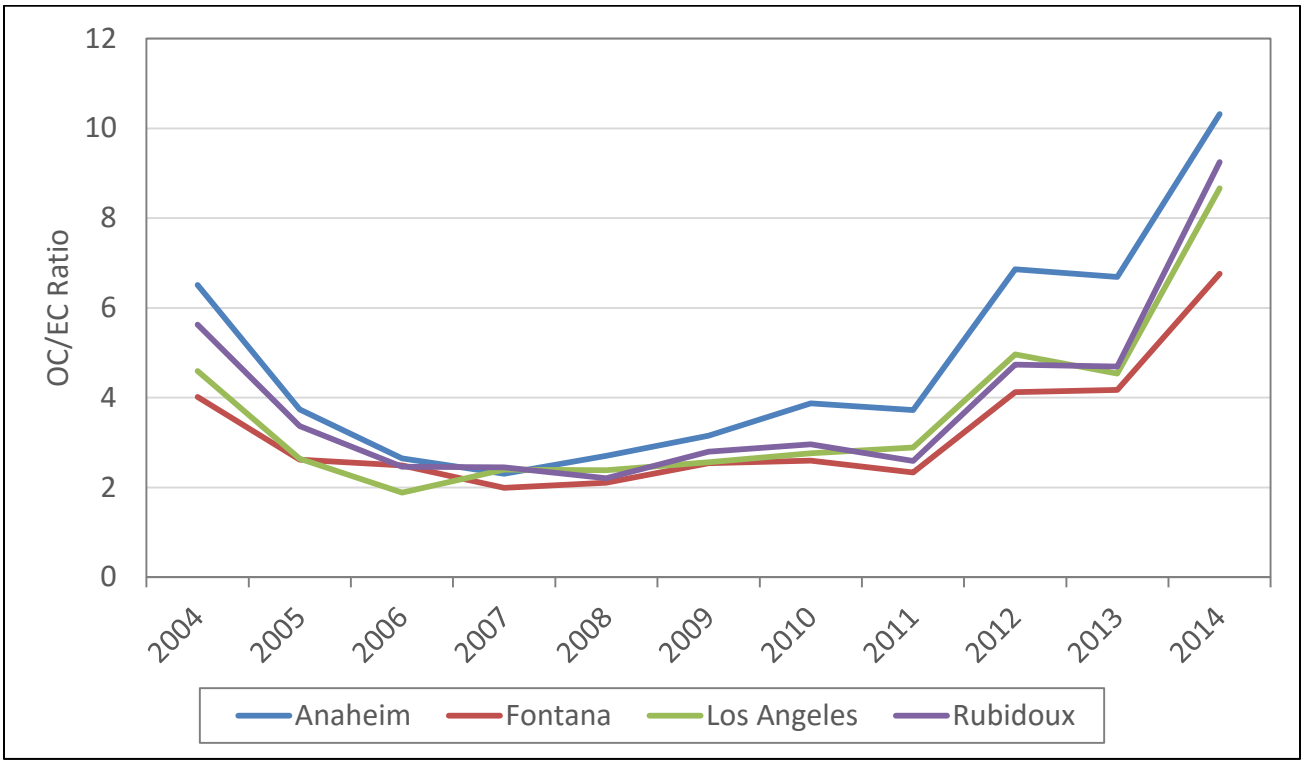

FIGURE 2-32
Trends of South Coast Air Basin PM2.5 Organic Carbon (OC)
to Elemental Carbon (EC) Ratio, 2011–2014

Figure 2-33 shows the composition from the speciation sampler at the Riverside-Rubidoux station, comparing the 2013 annual average to the 2013 peak 24-hour average sampled at this location. This is the closest PM2.5 speciation station to the Basin maximum PM2.5 station (Mira Loma) and it was the Basin maximum location before monitoring began at Mira Loma. On the high day, the nitrates become a larger fraction of the mass compared to the annual average, indicating the importance of secondary atmospheric processes to the PM2.5 composition in Riverside County.

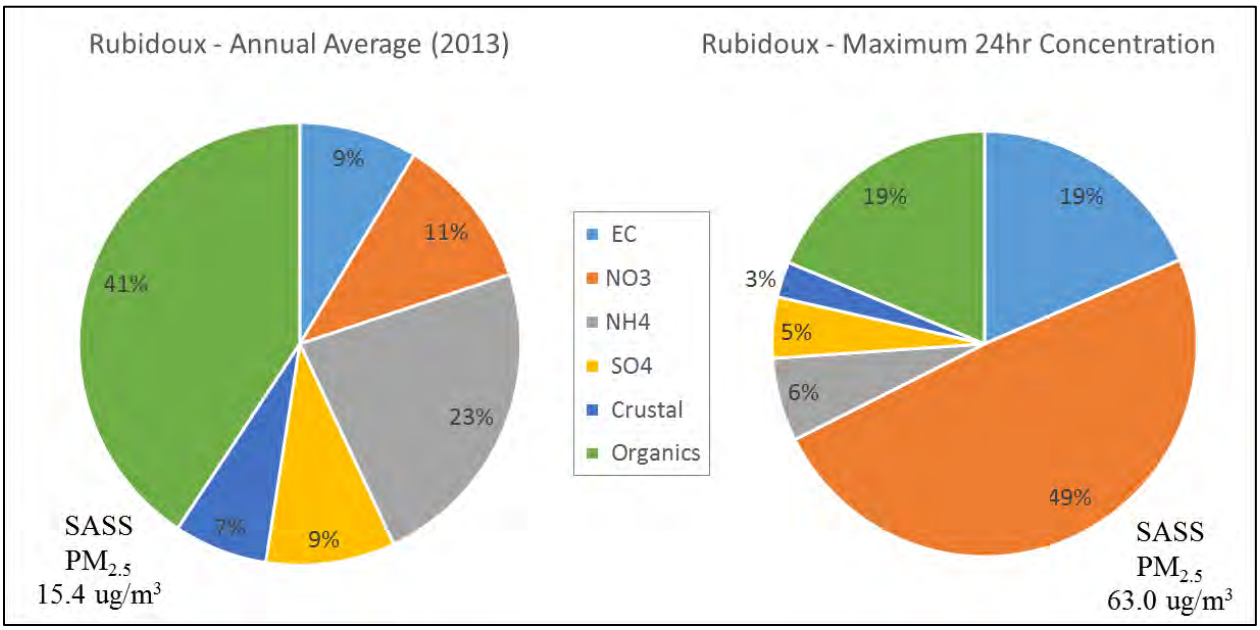

FIGURE 2-33
2013 PM2.5 Composition for Annual Average and Highest Day
(Riverside-Rubidoux SASS Speciation Sampler)

Near-Road PM2.5

On December 14, 2012, U.S. EPA strengthened the NAAQS for PM2.5 and, as part of the revisions, a requirement was added to monitor near the most heavily trafficked roadways in large urban areas. Particle pollution is expected to be higher along these roadways as a result of direct emissions from cars and heavy-duty diesel trucks and buses. SCAQMD has installed the two required PM2.5 monitors by January 1, 2015, at locations selected based upon the existing near-roadway NO_2 sites that were ranked higher for heavy-duty diesel traffic. The locations are: (1) I-710, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; and (2) CA-Route 60, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland. These near-road sites measure PM2.5 daily with FRM filter-based measurements.

Table 2-8 summarizes the 2015 annual and 24-hour PM2.5 data from the near-road sites and nearby ambient monitoring stations. The 2015 PM2.5 annual averages from the Route 710 and Route 60 Near-Road sites were 12. 9 and 14.5 µg/m^3, respectively. The nearby ambient stations in South Coastal Los Angeles County (North Long Beach Station) and in Metropolitan Riverside County (Mira Loma station) measured 10.8 and 13.3 µg/m^3, respectively, for the 2015 annual average. Thus, the annual PM2.5 measurements from these sites for 2015 indicate that the near-road sites do indeed measure higher than the nearby ambient stations, on average. If this pattern holds for the long term, the CA-60 near-road station could potentially become the 3-year design value site for the Basin for the PM2.5 annual average NAAQS, once sufficient data is collected.

While it reasonably could be expected that the highest near-road site would also become the basin-maximum design value site for the 24-hour PM2.5 NAAQS, this may not be the case for the Basin. The 2015 98th percentile 24-hour PM2.5 concentration is higher at the I-710 Near-Road than at the nearby N. Long Beach station. However, the 98th percentile 24-hour concentration remains higher at Mira Loma (43.2 µg/m^3) than at the CA-60 Near-Road site (39.9 µg/m^3). The number of days over the 24-hour PM2.5 NAAQS was also significantly higher at the Mira Loma station, with 17 days over the 24-hour NAAQS compared to 10 days at the CA-60 Near-Road site. PM2.5 24-hour concentrations at the Mira Loma station are likely higher than the

near-road site on the highest days, due to the influence of enhanced secondary particle formation at Mira Loma.

TABLE 2-8

2015 Annual Arithmetic Mean, Maximum and 98th Percentile 24-Hour PM2.5 Concentrations, and Number of Samples Exceeding the 24-Hour PM2.5 NAAQS at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road PM2.5					Nearby Ambient PM2.5				
	Annual Average PM2.5 (µg/m³)	Peak 24-Hour PM2.5 (µg/m³)	98th Pctl. 24-Hour PM2.5 (µg/m³)	No. Samples Exceeding 24-Hour PM2.5 NAAQS		Annual Average PM2.5 (µg/m³)	Peak 24-Hour PM2.5 (µg/m³)	98th Pctl. 24-Hour PM2.5 (µg/m³)	No. Samples Exceeding 24-Hour PM2.5 NAAQS
Near-Road Station	**2015**	**2015**	**2015**	**2015**	**Ambient Station**	**2015**	**2015**	**2015**	**2015**
Route 710 N. R. (at Long Beach Bl., Los Angeles County)	12.9	48.8	35.7	7	**North Long Beach**	10.8	54.6	32.1	3
Route 60 N. R. (West of Vineyard Av., San Bernardino/Riverside County)	**14.5**	52.7	39.9	10	**Mira Loma**	13.3	**56.6**	**43.2**	**17**

Bold text denotes the peak value

Filter-based FRM measurements shown

The annual PM2.5 NAAQS is 12.0 µg/m³; the 24-hour PM2.5 NAAQS is 35 µg/m³

Impacts of Drought on PM2.5 Air Quality

The drought conditions that have persisted in Southern California and the southwestern United States over the past few years have negatively affected air quality in many areas. The low amount and frequency of rainfall leads to less washing of road surfaces and drier ground surfaces, which reduces the natural crusting of soils that is improved by moisture. This can lead to enhanced resuspension of fugitive dust by moving vehicles and winds. Fugitive dust can raise concentrations of both PM10 and PM2.5. More importantly, the ongoing drought conditions have caused a reduction of the natural air pollution cleansing effect of precipitation due to washout – particulate matter and its precursors captured and removed by raindrops. The reduced frequency of storms also translates to fewer days of enhanced pollutant dispersion. Without the storm systems and related winds, there is less mixing of air pollutants with cleaner air in the atmosphere and less transport that moves pollutants out of the region. The lack of windy, unstable weather conditions during storms results in longer episodes of stagnant air when particulate pollution builds to unhealthful levels. The dry conditions have also contributed to increased frequency and intensity of wildfire events throughout the State, with resulting impacts to both particulate and ozone air quality. The net impact of the drought on air quality in the Basin over the past several years has been to disrupt the steady progress seen in prior years toward attainment of the 24-hour PM2.5 NAAQS, for which the design value is based on the 3-year average of the 98th percentile measurement.

Table 2-9 shows the rainfall statistics for the National Weather Service Downtown Los Angeles meteorological station, 2006–2015. Figure 2-34 shows the 2002–2015 trend of both 98th percentile 24-hour PM2.5 values and the 3-year design value, along with the trends of PM2.5-equivalent emissions[25] and the number of rainfall days during the first and fourth quarters of the year. The first and fourth quarters are the most important to consider, since the vast majority of the days that exceed the federal 24-hour standard in the Basin occur during this period. This is also the time period that the Basin typically experiences the most rainfall and more frequent storm events.

TABLE 2-9

Trends of Annual and Quarters 1 & 4 Rainfall Totals and Number of Rain Days for Downtown Los Angeles, 2006–2015

30-Year Average	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Annual Rainfall (inches)										
14.93	11.61	5.66	14.43	9.39	23.09	12.26	8.15	3.60	9.77	7.66
Quarter 1 (Jan., Feb., Mar.) Rainfall (inches)										
9.35	7.30	1.16	9.62	4.24	9.69	8.04	3.21	1.92	4.76	2.79
Quarter 4 (Oct., Nov., Dec.) Rainfall (inches)										
4.03	1.31	3.24	4.66	4.97	11.70	3.76	3.21	0.88	4.61	1.03
Quarter 1 & Quarter 4 (Jan., Feb., Mar., Oct., Nov., Dec.) Rainfall (inches)										
13.38	8.61	4.40	14.28	9.21	21.39	11.80	6.42	2.80	9.37	3.82
Annual Rain Days (≥ 0.01 inches)										
35.7	36	24	35	25	53	32	38	27	24	26
Quarter 1 (Jan., Feb., Mar.) Rain Days										
18.0	19	10	19	12	18	17	11	13	8	9
Quarter 4 (Oct., Nov., Dec.) Rain Days										
11.0	8	9	12	9	26	10	20	8	10	8
Quarter 1 & Quarter 4 Rain Days										
29.0	27	19	31	21	44	27	31	21	18	17

Rainfall data from National Weather Service, Downtown Los Angeles Meteorological Station (USC Campus);
Rainfall totals in inches; rain days defined as measured rainfall ≥ 0.01 inches;
30-year normal precipitation averages based on 1981–2010 data

[25] PM2.5 equivalent emissions are directly emitted PM2.5 emissions plus PM2.5 precursor emissions weighted by potential to create PM2.5 (see 2012 AQMP, Appendix V: Modeling and Attainment Demonstrations: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/appendix-v-final-2012.pdf).

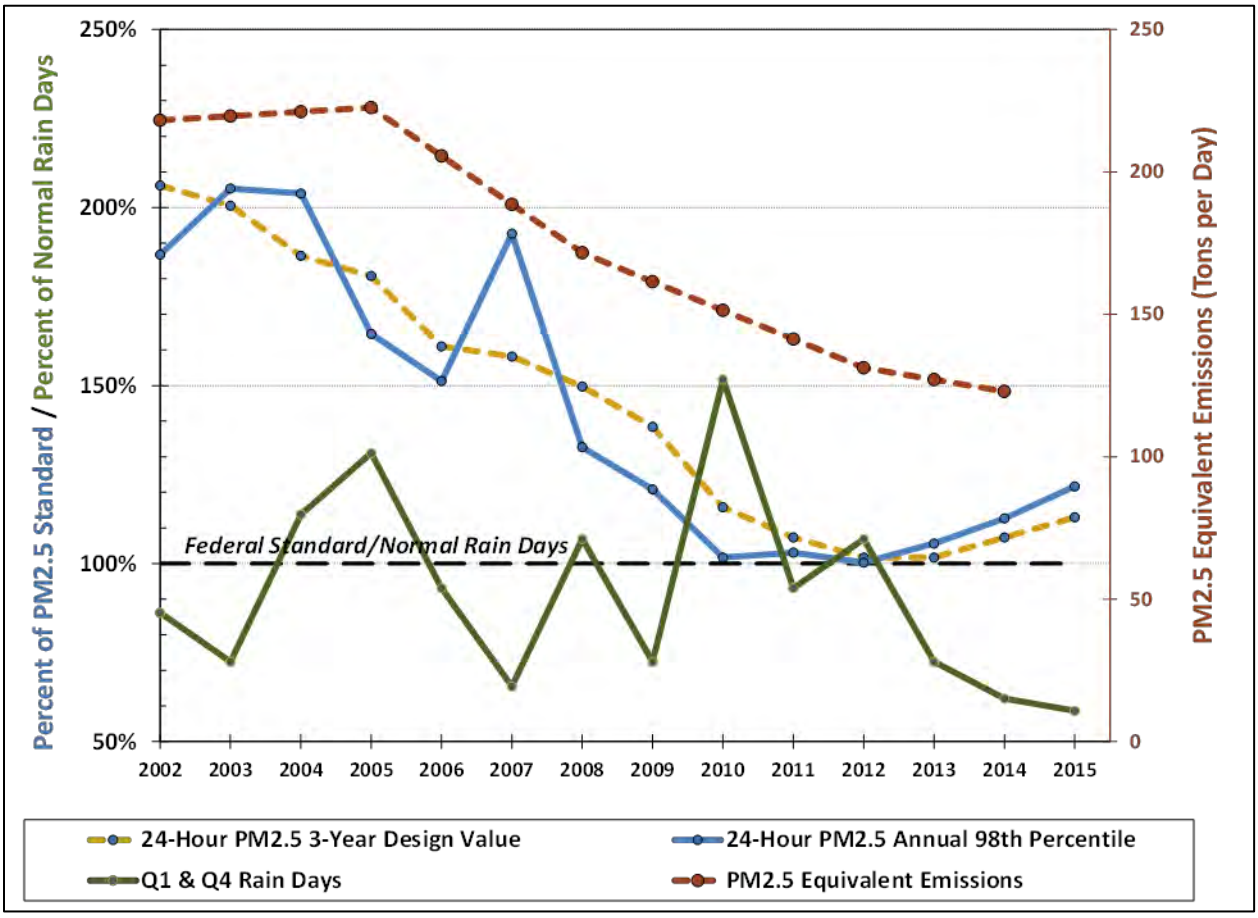

FIGURE 2-34

Trend of South Coast Air Basin Maximum 24-Hour PM2.5 3-Year Design Values and Corresponding Annual 98th Percentile Concentration as Percent of the 24-Hour PM2.5 NAAQS (35 µg/m^3), with Annual Trends of PM2.5 Equivalent Emissions and Percent of Normal Number of Rain Days for Quarters 1 (Jan.–Mar.) and 4 (Oct.–Dec.)

(Basin maximum PM2.5 from Riverside-Rubidoux air monitoring station through 2006, then Mira Loma after that station was installed)

Annual precipitation totals have been below the normal, or average, value of 14.93 inches (30-year average, 1981–2010) at Downtown Los Angeles from 2011 through most of 2015. Similar relative rainfall deficits were seen at stations throughout Southern California in this time period. After a very wet year in 2010, Downtown Los Angeles measured 82 percent of normal annual rainfall in 2011, with the number of rain days in the first and fourth quarters at 93 percent of the average of 29 days that typically occur during those months. Annual rainfall in 2012 was only 55 percent of normal, but the number of rain days in the first and fourth quarters was a little above normal. Although these initial signs of the emerging drought existed in 2011 and 2012, the cumulative effect of multiple dry years had not yet taken a significant toll on air quality and the amount of storm systems and rain events was not significantly below average. The 98th percentile 24-hour PM2.5 concentrations continued the steady decline in 2012, as had been seen in most years since the PM2.5 measurements started in 1999. This consistent trend of improving fine particulate air quality is associated with the continued implementation of PM2.5-related emission reductions in the Basin. In 2012, the Basin maximum annual 98th percentile 24-hour PM2.5 was at an all-time low of 35.1 µg/m^3 at Mira Loma, the Basin's

highest station, which was under the federal PM2.5 standard (35.5 µg/m^3 is needed to exceed the standard due to rounding conventions).

The 2013 annual rainfall total measured at Downtown Los Angeles was just 3.6 inches, 24 percent of normal. Rainfall events of 0.01 inches or more were 27 percent fewer in 2013 than the average of 29 days that typically occur during the first and fourth quarters of the year, when the Basin historically experiences its highest 24-hour PM2.5 concentrations. As the drought intensified, the impact on PM2.5 air quality became evident in 2013. The 2013 Mira Loma annual 98th percentile concentration increased to 37.5 µg/m^3. The Basin's PM2.5-related emissions continued to decrease, while the long-term trend of steady progress seen in prior years started to reverse due to the drought-related meteorological conditions.

By 2014 the rainfall deficit from the ongoing drought in Southern California had become severe, with annual rainfall totals at 65 percent of normal at Downtown Los Angeles. With only 62 percent of the normal number of rain days and the smaller rain amounts due to the weaker and less frequent storm systems in 2014 and that year's maximum 98th percentile PM2.5 concentration increased to 40.0 µg/m^3.

Southern California annual rainfall totals for 2015 were again quite low, with only 7.66 inches measured at Downtown Los Angeles, 51 percent of normal for the year. The first quarter of 2015 had very little rain, 2.79 inches, which is 30 percent of normal rainfall for that quarter. Only 50 percent of the normal number of rain days were recorded in the first quarter of 2015. A strong El Niño pattern developed by the end of 2015, but the rainfall increased only slightly in the fourth quarter. However, the storm track frequently reached Southern California. Even though there was little precipitation, the improved ventilation from the systems led to significantly improved PM2.5 concentrations in the fourth quarter of 2015. Unfortunately, the effect on the annual 98th percentile PM2.5 concentration was already significant due to the first quarter of 2015. That value for the year 2015 increased to 43.2 µg/m^3 at Mira Loma, the highest 98th percentile concentration measured in the Basin since 2008.

With daily measurements in the Basin for PM2.5, the 98th percentile concentration is typically the 8th highest measurement at the Mira Loma air monitoring station. In recent years, the 8th or 9th highest concentration at Mira Loma may still have been over the level of the federal standard, but with the ongoing effect of the long-term drought and lack of storm systems, the 17th highest concentration, in only the first quarter of 2015, was still over the level of the NAAQS at Mira Loma. This was the highest number of days over the standard at a single station since 2007. Basin-wide, 25 days exceeded the 24-hour standard in 2015, the most in a single year since 2009. Notably, there were no additional exceedances of the 24-hour PM2.5 standard occurring at Mira Loma through the remaining three quarters of 2015, including the fourth quarter which typically includes several days over the standard.

The preliminary PM2.5 data for the first quarter of 2016 indicates that only three days exceeded the 24-hour NAAQS at Mira Loma in that quarter, as compared to 17 days for the first quarter of 2015. Only four days Basin-wide had exceedances the NAAQS in the first quarter of 2016 at one or more stations, compared to 25 days in 2015. Likewise, the preliminary 2016 first quarter average at Mira Loma was 15.1 µg/m^3, compared to 18.4 µg/m^3 for the first quarter of 2015. As was seen in the fourth quarter of 2015, the Basin did not receive the anticipated high rainfall in the first quarter of 2016 with the El Niño conditions, but the amount of unsettled weather conditions was significantly greater than in 2014 and 2015, leading to fewer days with elevated PM2.5 levels.

While the 2012 AQMP PM2.5 attainment demonstration and the 2015 associated supplemental SIP submission indicated that attainment of the 24-hour standard was predicted to occur by the end of 2015, it could not anticipate the effect of the ongoing drought on the measured PM2.5. The 2006 to 2010 base period

used for the 2012 attainment demonstration had near-normal rainfall. While the trend of PM2.5-equivalent emission reductions continued through 2015, the severe drought conditions contributed to the PM2.5 increases observed after 2012. As a result of the disrupted progress toward attainment of the federal 24-hour PM2.5 standard, SCAQMD submitted a request and the U.S. EPA approved, in January 2016, a "bump up" to the nonattainment classification from "moderate" to "serious," with a new attainment deadline as soon as practicable, but not beyond December 31, 2019. Further discussion of drought effects on future air quality is contained in Appendix V: Modeling and Attainment Demonstrations.

PM10 Air Quality

In 2015, SCAQMD measured PM10 concentrations at 23 stations, including three in the Coachella Valley. Nineteen stations employed high-volume, filter-based FRM PM10 samplers with size-selective inlets. The 24-hour (midnight to midnight) samples are run on the federally required minimum 6-day sampling schedule, except that the Riverside-Rubidoux, Mira Loma (frequency increased in 2015), and Indio (Coachella Valley) stations sampled on a 3-day schedule for additional temporal resolution at these historic peak PM10 locations. Nine stations employed continuous PM10 monitors (4 BAM and 5 TEOM instruments). Five of these were collocated with FRM samplers, while the remaining four were not sited along with FRM monitors. The continuous monitors, for the most part, are clustered in the historic higher concentration areas. Unlike PM2.5 FEM measurements, there is no waiver for PM10 FEM instruments and those measurements are the official reading for attainment determination on the days with no FRM filter sample. At locations where both FRM samplers and FEM PM10 continuous analyzers are deployed together, the data is generally combined for attainment purposes, with the FRM data the primary data source when available. Figure 2-35 shows the routine ambient PM10 monitoring sites in the SCAQMD jurisdiction.

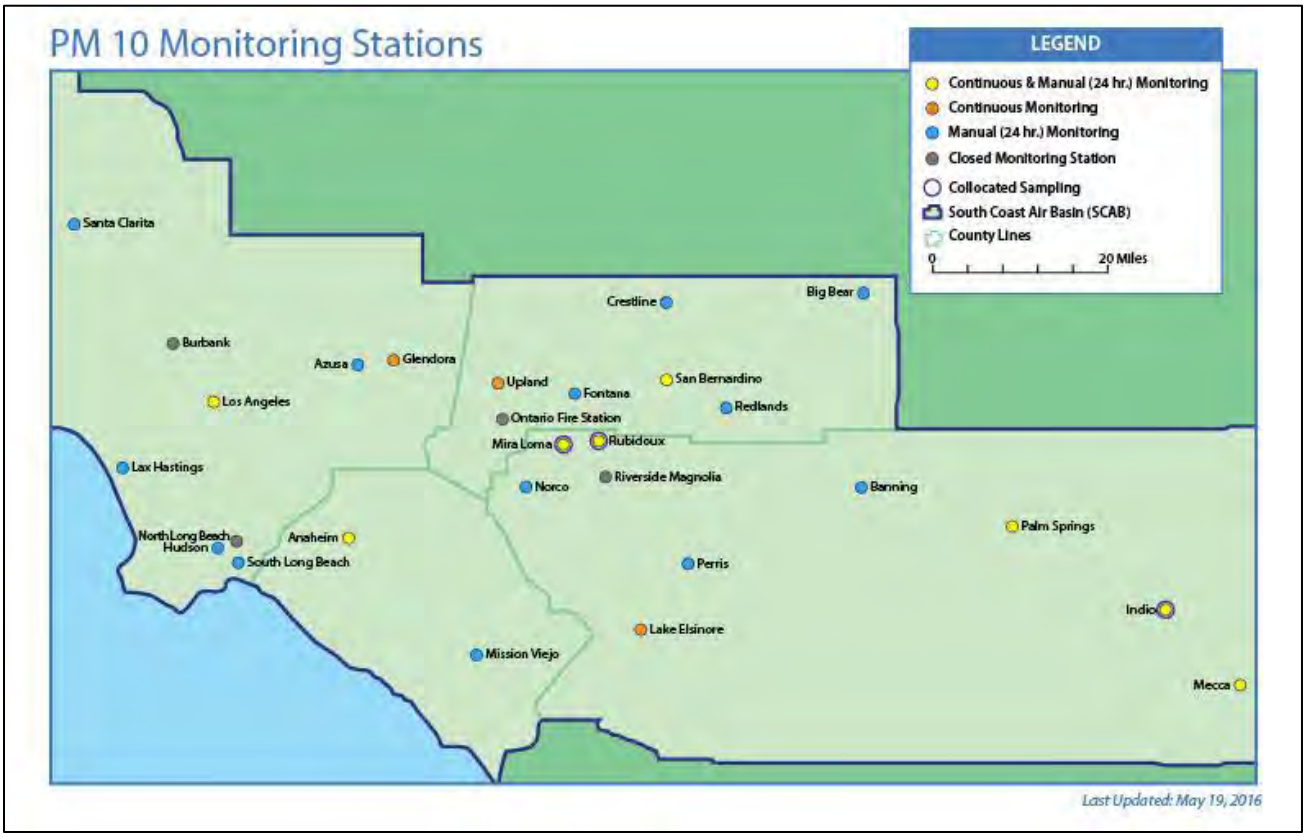

FIGURE 2-35

South Coast Air Quality Management District PM10 Monitoring Locations

(Note that PM10 stations were closed at N. Long Beach in 2013 and at Burbank and Ontario in 2014 are mapped with grey dots; the Big Bear station did not measure ambient PM10 in 2015; Palm Springs, Indio and Mecca-Saul Martinez stations are in the Salton Sea Air Basin – Coachella Valley; the manual FRM PM10 monitors also comprise the SCAQMD sulfates network)

The 2015 maximum 24-hour PM10 and 2013–2015 design values and state designation values are summarized by county and basin in Table 2-10. In that year, the federal 24-hour standard level (150 µg/m^3) was exceeded on two days in the Basin, at the Perris Valley station on September 9 (188 µg/m^3) and at the Central San Bernardino Valley station at in the City of San Bernardino on December 26 (187 µg/m^3). These high 24-hour averages were both associated with high-wind conditions and were flagged as exceptional events pending further documentation and U.S. EPA concurrence.[26] At this time, these two events also do not jeopardize the attainment design value, which allows for one exceedance per year at a station, averaged over three years. The PM10 standard was exceeded on eight days in the Coachella Valley at one or more of the three stations operating in 2015. These were all associated with high-winds and were flagged as exceptional events, pending further documentation and U.S. EPA concurrence.

[26] In this case, an exceptional event determination may not be pursued since the form of the PM10 standard allows for one exceedance per year at a station and the exceeding data may not affect attainment status or other regulatory decision. Exceptional event concurrence my not be pursued to if this data does not affect the attainment status or other regulatory decision.

The Basin has remained in attainment of the 24-hour PM10 NAAQS since 2006, with a 2013–2015 24-hour design value of 126 µg/m^3 in Metropolitan Riverside County at the Mira Loma station. The Coachella Valley 2013–2015 design value for PM10 is 150 µg/m^3 (100 percent of the NAAQS).[27] The much more stringent State 24-hour PM10 standard (50 µg/m^3) was exceeded at several stations in the Basin and in the Coachella Valley.

TABLE 2-10
2015 Maximum 24-hour Average PM10 Concentrations and 2013–2015 Design Values
by Basin and County

Basin/County	2015 Maximum 24-Hour PM10 Average (µg/m^3)*	2013–2015 24-Hour PM10 Design Value (µg/m^3)*	2013–2015 Percent of PM10 NAAQS (150 µg/m^3)#	Area of Design Value Max	2013–2015 High State 24-Hour PM10 Designation Value (µg/m^3)##	2013–2015 Percent of State 24-Hour PM10 Standard (50 µg/m^3)
South Coast Air Basin						
Los Angeles	101	93	60	East San Gabriel Valley	75.6	151
Orange	66	85	55	Central Orange County	12.1	24
Riverside	**139****	**126**	**81**	**Metropolitan Riverside County**	**123.8**	**248**
San Bernardino	96**	103	66	Central San Bernardino Valley	19.2	38
Salton Sea Air Basin						
Riverside	**152****	**150**	**100**	**Coachella Valley (Indio)**	**128.2**	**256**

* Based on the FRM data when available, otherwise daily averaged FEM data is included

** Higher concentrations in 2015 were measured in the Basin and Coachella Valley that were related to high-wind events and have been flagged for exclusion from NAAQS comparison in accordance with the U.S. EPA Exceptional Events Rule; U.S. EPA concurrence is required for exclusion of exceptional events after submittal of supporting documentation

155 µg/m^3 is needed to exceed the level of the PM10 NAAQS

The State 24-hour Expected Peak Day Concentration (EPDC) is a calculated 3-year value after accounting for statistical outliers; the State 24-hour Designation Value is the highest concentration at or below the EPDC over the 3-year period; State data may include exceptional events; State PM10 24-hour average designation value includes FRM and BAM FEM data, but not TEOM FEM instruments since the TEOM is not a California Approved Sampler (CAS) for standard compliance (most notably, SCAQMD uses TEOM instruments to supplement FEM measurements in the Coachella Valley)

The 2015 maximum annual average PM10 is summarized by basin and county in Table 2-11, along with the design values and state designation values. In 2015, the revoked annual average PM10 NAAQS (50 µg/m^3) was not exceeded in the Basin, with a maximum annual average PM10 concentration of 48.8 µg/m^3 in the Metropolitan Riverside County area at the Mira Loma station. The 3-year annual average for 2013–2015 however, exceeded the former NAAQS, with 51.8 µg/m^3 at Mira Loma. No other stations in the Basin or the Coachella Valley exceeded the former federal annual PM10 standard or the 2013–2015 annual average in

[27] After exclusion of flagged exceptional events, the Coachella Valley calculated design value is 152 µg/m^3, which rounds to 150 µg/m^3 per rounding requirements for comparison to the 24-hour PM10 NAAQS of 150 µg/m^3. This is equal to, but not exceeding the NAAQS.

2015. The much more stringent State annual PM10 standard (20 µg/m^3) was exceeded at most stations in each county in the Basin and in the Coachella Valley. The State standard was exceeded most frequently in the Basin's inland valleys, centered on Metropolitan Riverside County.

TABLE 2-11
2015 Maximum Annual Average PM10 Concentrations and 2013–2015 Design Values
by Basin and County

Basin/County	2015 Maximum Annual PM10 Average (µg/m^3)*	2013–2015 Annual PM10 Averages** (µg/m^3)	2013–2015 Percent of Former Annual PM10 NAAQS** (50 µg/m^3)	Area of Design Value Max	2013–2015 3-Yr. High State Annual Average PM10 Designation Value (µg/m^3)#	2013–2015 Percent of State PM10 Standard (20 µg/m^3)
South Coast Air Basin						
Los Angeles	37.1	38.0	76	East San Gabriel Valley	43	215
Orange	24.8	26.1	52	Central Orange County	27	135
Riverside	**48.8**	**51.8**	**104**	**Metropolitan Riverside County**	**45**	**225**
San Bernardino	37.8	39.4	79	Central San Bernardino Valley	39	195
Salton Sea Air Basin						
Riverside	36.5	37.2	74	Coachella Valley (Indio)	**45**	**225**

* Based on the FRM data when available, otherwise FEM data is used

** The federal annual PM10 standard was revoked in 2006

\# State data may include exceptional events; State PM10 annual average designation value includes FRM and BAM FEM data, but not TEOM FEM instruments since the TEOM is not a California Approved Sampler (CAS) for standard compliance (most notably, SCAQMD uses TEOM instruments to supplement FEM measurements in the Coachella Valley); State annual designation value is the highest year in the 3-year period

For each routine SCAQMD FRM ambient monitor, the annual arithmetic mean, percent of sampling days exceeding State and federal standards, and annual maximum 24-hour average PM10 concentrations are shown in Tables A-17 to A-19 in the attachment for the years 1995–2015. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

PM10 Spatial Variation

Figure 2-36 shows the contour map of the annual average (arithmetic mean) PM10 concentrations distribution in the Basin in 2015. The highest annual average PM10 concentration was recorded in the Metropolitan Riverside County area at the Mira Loma station with an annual averaged concentration of 48.8 µg/m^3, which did not exceed the revoked annual average PM10 NAAQS (50 µg/m^3). The areas with the highest annual average PM10 concentrations were generally recorded in and around the Metropolitan Riverside County area and in the San Bernardino Valley areas, as shown in Figure 2-36. Much of eastern Los Angeles County also saw elevated annual PM10, but still below the former NAAQS. The much more stringent State annual PM10 standard (20 µg/m^3) was exceeded in most stations in each county in the Basin and in the Coachella Valley.

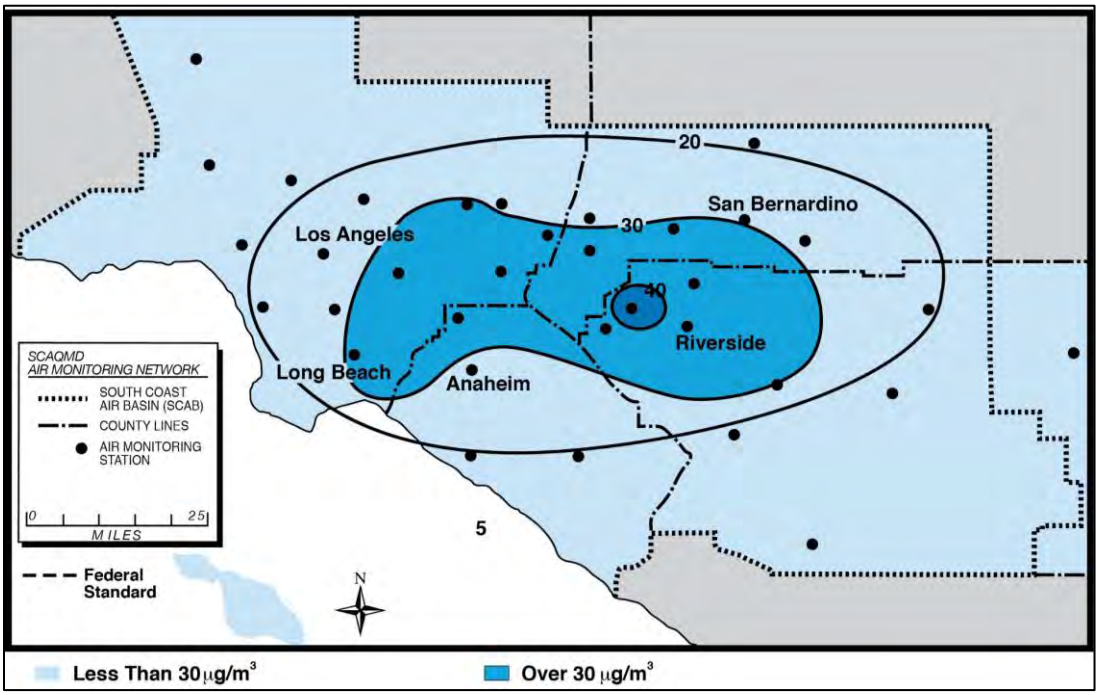

FIGURE 2-36

Annual Arithmetic Mean PM10 Particulate Matter (µg/m^3) in 2015

PM10 Trends

Figure 2-37 shows the trend for the period between 1995 and 2015 of the 3-year design value form of the 24-hour federal PM10 standard for the Basin (i.e., the fourth highest 24-hour average PM10 concentration in three years). The Basin's annual maximum 24-hour average concentration has remained below the federal PM10 standard (150 µg/m^3) since 2003, and U.S EPA finalized a clean data finding and attainment redesignation in 2013. Also shown is the trend for the design value form of the revoked annual federal PM10 standard (50 µg/m^3), that is, the 3-year average of the annual arithmetic mean concentrations. The Basin's annual average concentration had been reduced below the level of the revoked federal annual PM10 standard in 2011 and 2012, but was slightly over that standard at one location (Mira Loma) in the 2013, 2014, and 2015.

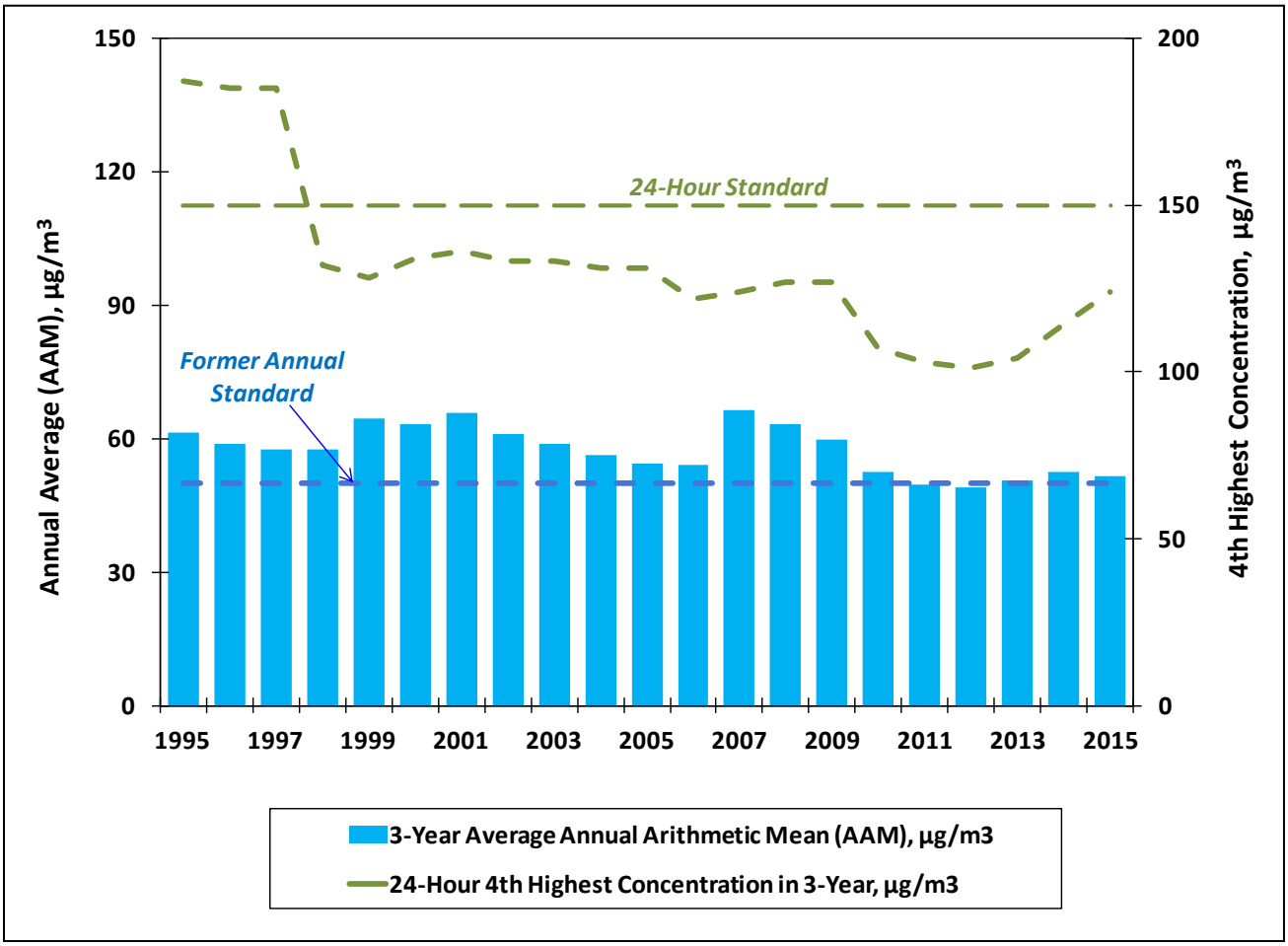

FIGURE 2-37

PM10 Particulate Matter Design Value Trend

(1995 through 2015 data, 3-Year Average of Annual Arithmetic Mean and 4th Highest 24-Hour PM10 Concentration in 3 Years, µg/m³)

PM10 Temporal Variation

Exceedances of the 24-hour PM10 federal standard in the Basin have become increasingly rare in recent years. In fact, the only exceedances in the Basin for the past decade have been associated with exceptional events, such as high-wind natural events or cultural events (Independence Day fireworks). As a consequence, variations in exceedances of the State 24-hour PM10 standard are considered here for the seasonal and day-of-week patterns in the Basin, using the FRM and FEM PM10 measurements combined.

Figure 2-38 shows the number of days in each month exceeding the State standard at one or more Basin locations in 2013–2015. Overall, the greatest number of exceedances of the State standard occurred in the summer months. This is consistent with previous analyses of seasonal variations in PM10 showing that the monthly average PM10 concentrations and the monthly average number of days exceeding the State standard tend to peak in summer and fall in the inland valley areas of the Basin where PM10 concentrations are highest. Higher summertime PM10 concentrations can be attributed to elevated wind speeds and lower relative humidity that both enhance wind induced re-suspended particles. Due to the higher number of exceedances in the inland valleys, the pattern for the Basin is more similar to those for individual sites in the inland valley areas. However, in the South Coastal Los Angeles County area (Long Beach), monthly average PM10

concentrations and the average number of days exceeding the State standard show different monthly trends with highest concentrations recorded in the late fall and winter months.

Figure 2-39 shows the monthly average concentration for stations in two areas, Metropolitan Riverside County (Riverside-Rubidoux) and Southwest Coastal Los Angeles County (LAX) with different seasonal characteristics. As was found in the previous analyses, PM10 concentrations tend to be higher in the summer and fall months in the inland valley areas, but higher in the late fall and winter months in the coastal areas. Most of the coastal high values occur at that time due to windblown dust from the strong, offshore Santa Ana winds that occur in the fall and winter. Moreover, higher port activity due to peak cargo traffic which typically occurs in the fall of each year coupled with the lower mixing height in the fall may also contribute to the higher PM10 concentrations during this time of year.

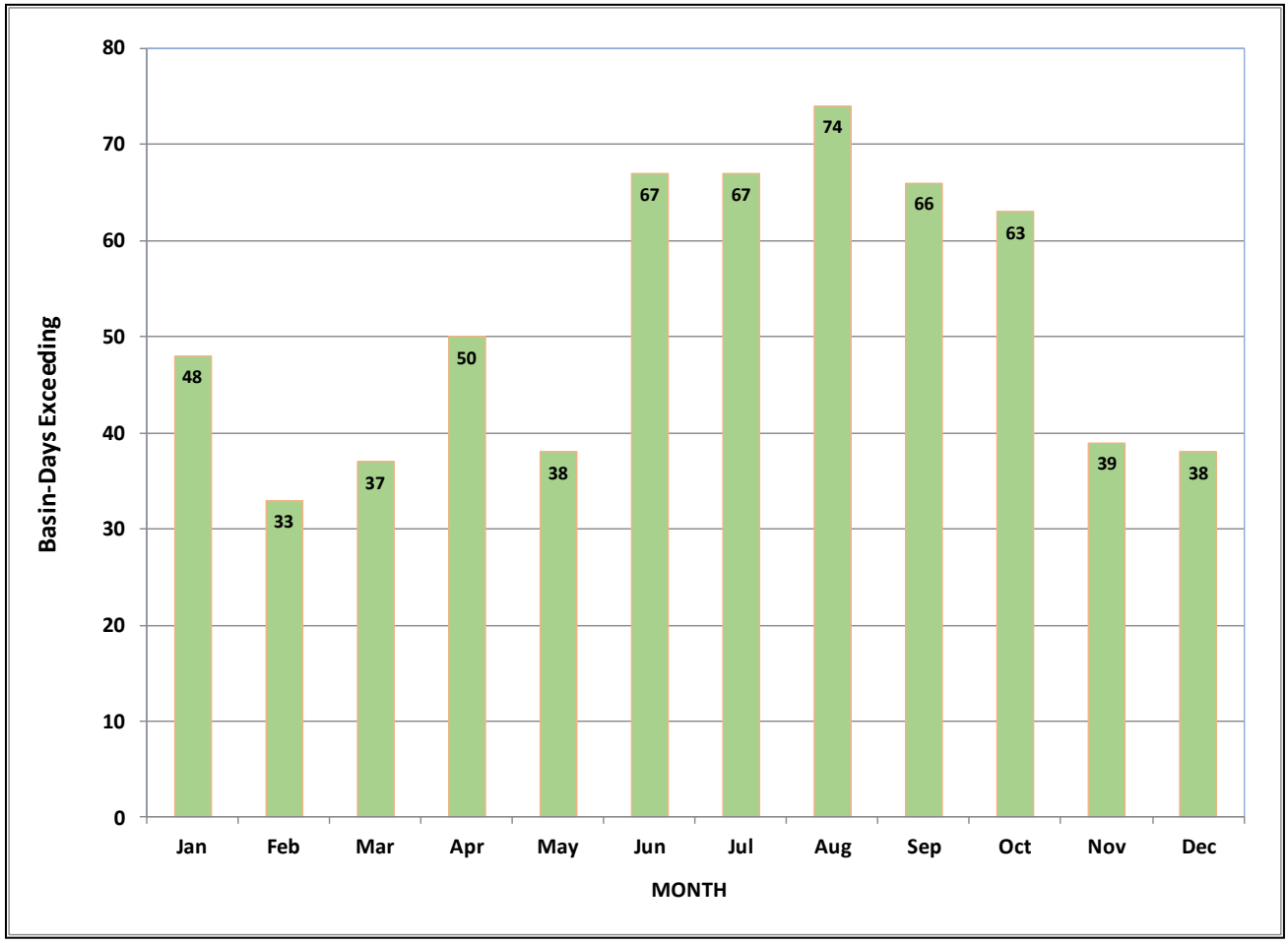

FIGURE 2-38

Basin-Days Exceeding the State PM10 Standard (50 µg/m^3) by Month, 2013–2015

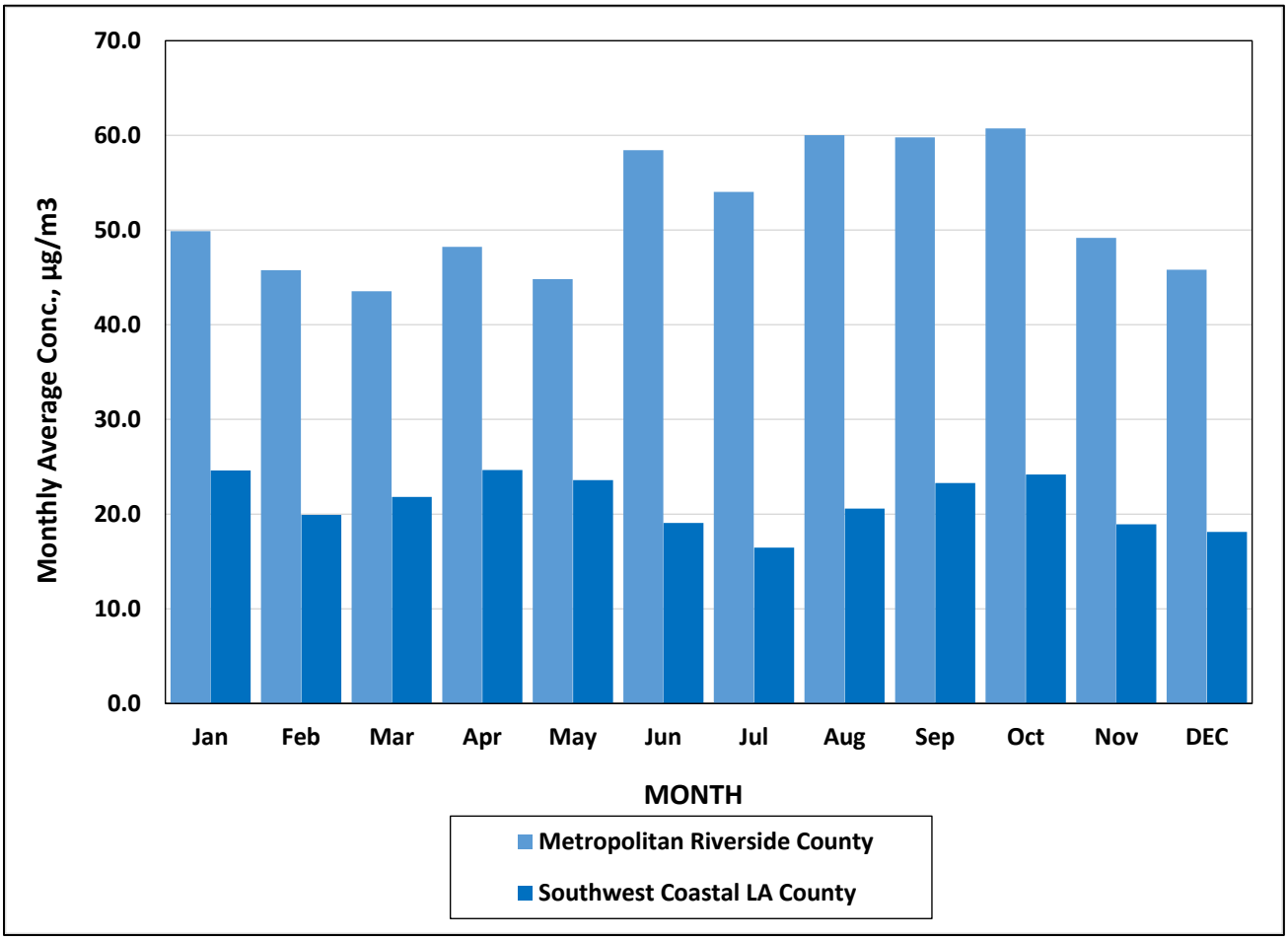

FIGURE 2-39

PM10 Monthly Average Concentration (µg/m^3), 2013–2015

Figure 2-40 shows averaged hourly PM10 concentrations for each hour of the day throughout 2015, including the entire Basin and averaged for select monitoring stations in each of the counties in the Basin. On average and for the Basin, PM10 concentrations show a peak between 0600 and 0900 PST during the morning rush-hour traffic, and as the day progresses and temperature increases, causing the temperature inversion base to rise and vertical mixing to increase, resulting in a decrease in PM10 concentrations between 1000 and 1600 PST. The morning peak is followed by the secondary PM10 peak associated with the evening rush hour traffic.

The diurnal variations in the PM10 concentrations can vary from one location to another, as well as seasonally. Since PM10 concentration are generally higher in the inland valleys, the diurnal trend for the Basin is more similar to those for individual sites in the inland valley areas. The Central Los Angeles site shows a different diurnal pattern, with concentrations remaining high between the morning and evening rush hour traffic. This site is located in downtown Los Angeles and in proximity to a network of major roadways and freeways, with persistent traffic throughout the day.

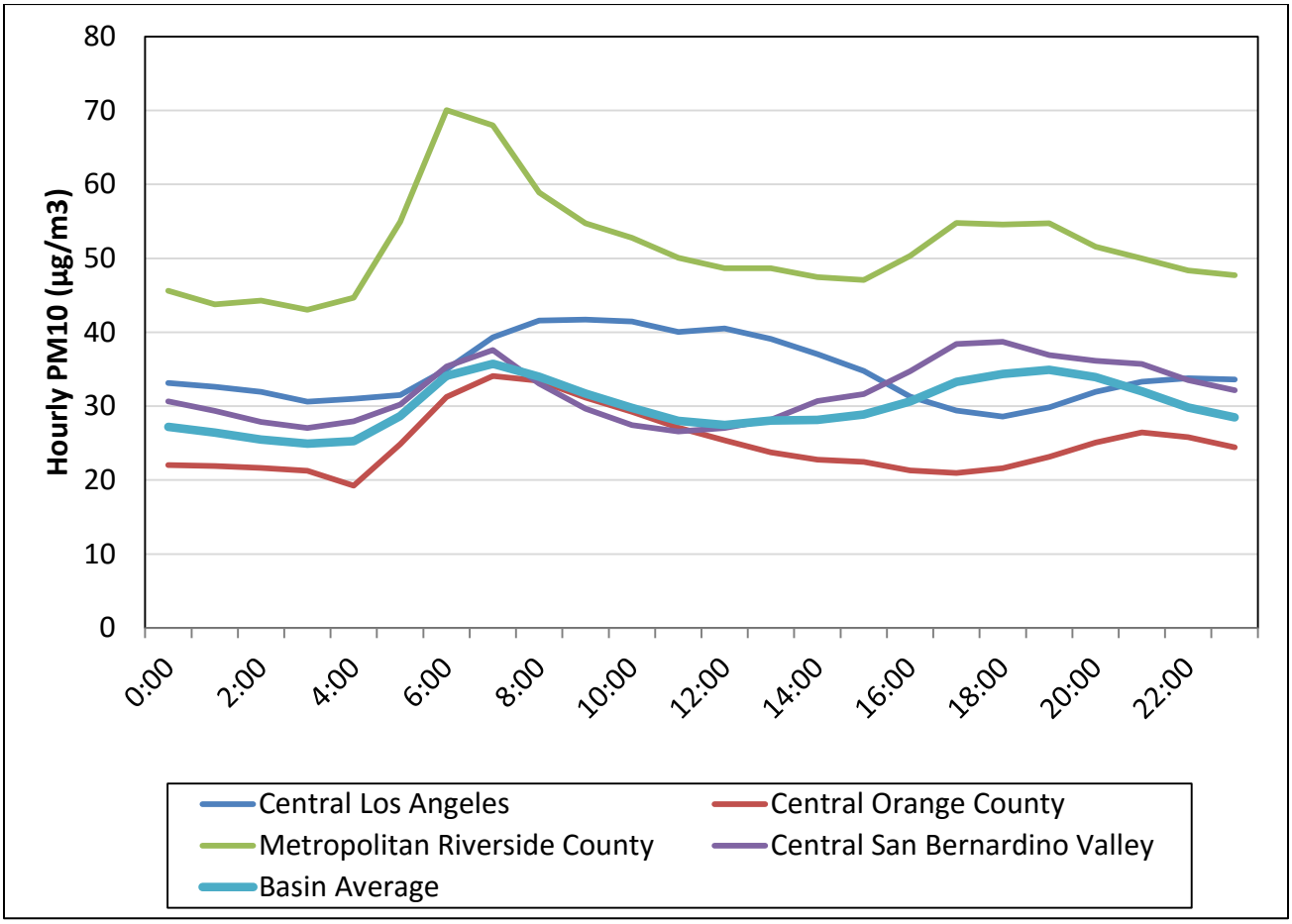

FIGURE 2-40

PM10 Diurnal Variation, 2015

(annual averaged FEM Hourly PM10 concentrations, by hour of the day; time in Pacific Standard Time)

Carbon Monoxide (CO)

CO Air Quality

In 2015, ambient CO concentrations were monitored at 25 locations throughout the SCAQMD jurisdiction, including one station in the Coachella Valley and two near-road monitors. The Burbank station in the East San Fernando Valley was closed during 2014, with relocation pending. The Riverside-Magnolia station in Metropolitan Riverside area was closed at the beginning of 2015. Relocation of that site is not planned, since nearby sites provide adequate coverage in that area. Figure 2-41 shows the routine ambient CO monitoring sites in the SCAQMD jurisdiction.

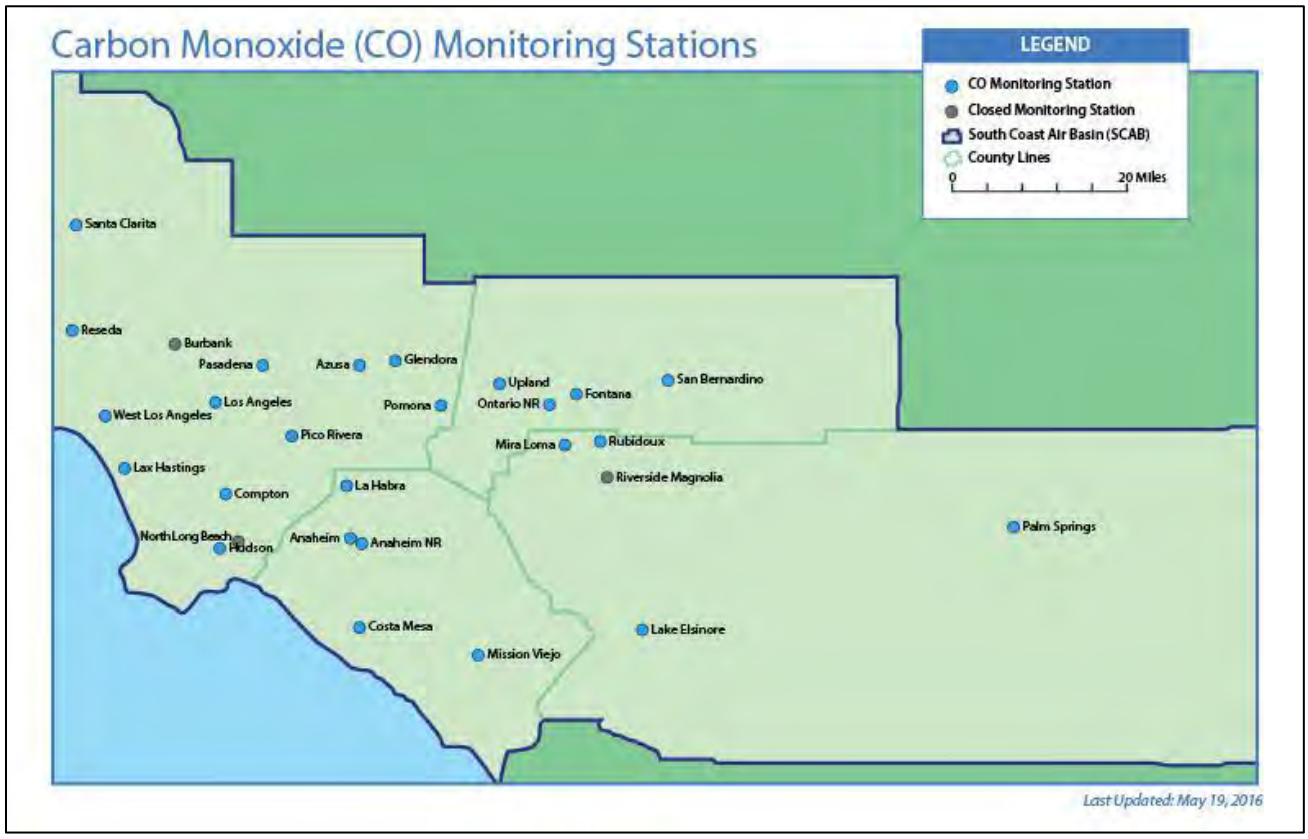

FIGURE 2-41

South Coast Air Quality Management District Carbon Monoxide Air Monitoring Locations

[Note that CO stations that were closed at N. Long Beach in 2013, Burbank in 2014, and Riverside-Magnolia in 2015 mapped with grey dots; near-road stations on the I-10 (labelled Ontario NR) and the I-5 (Anaheim NR) are shown]

Tables 2-12 and 2-13 summarize the 2015 1-hour and 8-hour average CO maximum concentrations and 2015 design values by air basin and county. In 2015, no areas exceeded the CO air quality standards, including the near-road stations. The highest ambient station concentrations of CO continued to be recorded in the areas of Los Angeles County, where vehicular traffic is dense and weak nighttime drainage flows transport CO from surrounding areas under relatively stagnant conditions. The Basin's 1-hour and 8-hour CO maximum concentrations (4.4 ppm and 3.3 ppm, respectively) and design values (4.3 ppm and 3.0 ppm, respectively)

were both recorded in the South Central Los Angeles County area. The new near-road monitors in Orange and San Bernardino counties did not increase the Basin's maximum CO values or design values in 2015 over that from Los Angeles County, although the near-road concentrations were often higher than the nearest ambient stations.

All areas of the Basin have continued to remain below the federal standard level since 2003. U.S. EPA redesignated the Basin to attainment of the federal CO standards, effective June 11, 2007. There have also been no exceedances of the Stage 1 episode (federal alert) level (8-hour average CO greater ≥ 15 ppm) since 1997. The CO concentrations are also well below the State standards.

The annual maximum 8-hour CO concentrations at all routine SCAQMD ambient air monitoring stations are shown in Table A-20 in the attachment to this appendix, for the period 1995–2015. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

TABLE 2-12

2015 Maximum 1-Hour CO Concentrations and 2015 Design Values by Basin and County

Basin/County	2015 Maximum 1-Hour CO Average (ppm)	2015 1-Hour CO Design Value* (ppm)	Percent of 1-Hour CO NAAQS (35 ppm)	Area of Design Value Max	Percent of 1-Hour CO State Standard (20 ppm)
South Coast Air Basin					
Los Angeles	**4.4**	**4.3**	**11**	**South Central L.A. County**	**22**
Orange	3.1 *(3.1 at I-5 N.R.)*	2.9 *(2.9 at I-5 N.R.)*	8 *(8)*	North Orange County	15 *(15)*
Riverside	2.5	2.2	6	Metropolitan Riverside County	11
San Bernardino	2.8 *(2.7 at I-10 N.R.)*	2.2 *(2.7 at I-10 N.R.)***	6 *(8)*	Central San Bernardino Valley	11 *(14)*
Salton Sea Air Basin					
Riverside	2.0	1.9	5	Coachella Valley	10

Bold text denotes Basin maximum; I-5 and I-10 near-road monitors are shown in parenthesis

* The 1-hour CO design value is the 2nd highest 1-hour average concentration at a station in a single year

** The 2015 1-hour CO design value maximum in San Bernardino County was at the I-10 near-road station

TABLE 2-13

2015 Maximum 8-Hour CO Concentrations and 2015 Design Values by Basin and County

Basin/County	2015 Maximum 8-Hour CO Average (ppm)	2015 8-Hour CO Design Value* (ppm)	Percent of 8-Hour CO NAAQS (9 ppm)	Area of Design Value Max	Percent of 8-Hour CO State Standard (9.0 ppm)
South Coast Air Basin					
Los Angeles	**3.3**	**3.0**	**33**	**South Central L.A. County**	**33**
Orange	2.2 *(2.3 at I-5 N.R.)*	2.0 *(2.3 at I-5 N.R.)*	22 *(26)*	Central Orange County	22 *(26)*
Riverside	1.7	1.5	17	Metropolitan Riverside County	17
San Bernardino	1.8 *(2.6 at I-10 N.R.)*	1.8 *(2.5 at I-10 N.R.)*	20 *(28)*	Central San Bernardino Valley	20 *(28)*
Salton Sea Air Basin					
Riverside	0.7	0.5	6	Coachella Valley	6

Bold text denotes Basin maximum; I-5 and I-10 near-road monitors are shown in parenthesis

* The 8-hour CO design value is the 2nd highest 8-hour average concentration at a station in a single year

Near-Road CO

On August 12, 2011 U.S. EPA issued a decision to retain the existing NAAQS for CO, determining that those standards provided the required level of public health protection. However, U.S. EPA added a monitoring requirement for near-road CO monitors in urban areas with population of 1 million or more, utilizing stations that would be implemented to meet the 2010 NO2 near-road monitoring requirements. The two new CO monitors are at the I-5 Near-Road site, located in Orange County near Anaheim, and the I-10 Near-Road site, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The near-road CO measurements began at these two locations in late December 2014. From that time to the end of 2015, the data shows that while the near-road measurements were often higher than the nearest ambient monitors, as would be expected in the near-road environment, they did not exceed the levels of the 1-hour or 8-hour CO NAAQS. Tables 2-14 and 2-15 compare the available near-road measurements for annual peak 1-hour and 8-hour CO, respectively, to the comparable measurements from the nearby ambient stations at Anaheim and Fontana. The form of the CO standard is that the peak concentration is not to be exceeded more than once per year. The tables include the design value, which is the second highest CO concentration in a single year.

The 2015 near-road peak 1-hour CO concentration measured was 3.1 ppm, measured at the I-5 Near-Road site, while the peak 8-hour CO concentration was 2.6 ppm at the I-10 Near-Road site, both well below the respective NAAQS levels (35 ppm and 9 ppm, respectively). The 2015 near-road CO design values were higher than that of the nearest ambient stations for both federal standards. Based on this limited period of data, it appears that the near-road CO design values will be very unlikely to affect the Basin's attainment status for the State and federal CO standards.

TABLE 2-14

2014 and 2015 Maximum and Second Highest 1-Hour CO Concentrations at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road CO						Nearby Ambient CO				
		Peak 1-Hour CO (ppm)		2nd Max. 1-Hour CO (ppm)			Peak 1-Hour CO (ppm)		2nd Max. 1-Hour CO (ppm)	
Near-Road Station	**Start Date**	**2014**	**2015**	**2014**	**2015**	**Ambient Station**	**2014**	**2015**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	12/18/2014	N/A	3.1	N/A	**2.9**	**Anaheim**	3.1	3.1	2.6	2.6
I-10 N. R. (at Etiwanda Av., San Bernardino County)	12/23/2014	N/A	2.7	N/A	**2.7**	**Fontana**	2.6	**2.8**	2.2	2.2

Bold text denotes maximum concentration between near-road and nearby ambient stations

N/A = complete data was not available for valid calculation

The 1-hour CO NAAQS is 35 ppm, not to be exceeded more than once at a station in a single year

TABLE 2-15

2014 and 2015 Maximum and Second Highest 8-Hour CO Concentrations at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road CO						Nearby Ambient CO				
		Peak 8-Hour CO (ppm)		2nd Max. 8-Hour CO (ppm)			Peak 8-Hour CO (ppm)		2nd Max. 8-Hour CO (ppm)	
Near-Road Station	**Start Date**	**2014**	**2015**	**2014**	**2015**	**Ambient Station**	**2014**	**2015**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	12/18/2014	N/A	**2.3**	N/A	**2.3**	**Anaheim**	2.1	2.2	2.1	2.0
I-10 N. R. (at Etiwanda Av., San Bernardino County)	12/23/2014	N/A	**2.6**	N/A	**2.5**	**Fontana**	1.2	1.2	1.1	1.1

Bold text maximum concentration between near-road and nearby ambient stations

N/A = complete data was not available for valid calculation

The 8-hour CO NAAQS is 9 ppm, not to be exceeded more than once at a station in a single year

Nitrogen Dioxide (NO_2)

NO_2 Air Quality

In 2015, ambient NO_2 concentrations were monitored at 27 locations throughout the SCAQMD jurisdiction, including one station in the Coachella Valley and four near-road monitoring stations. The Burbank station in the East San Fernando Valley was closed during 2014, with relocation pending. The Riverside-Magnolia station in Metropolitan Riverside area was closed at the beginning of 2015. Relocation of that site is not planned, since nearby sites provide adequate coverage in that area. Figure 2-42 shows the routine ambient NO_2 monitoring sites in the SCAQMD jurisdiction.

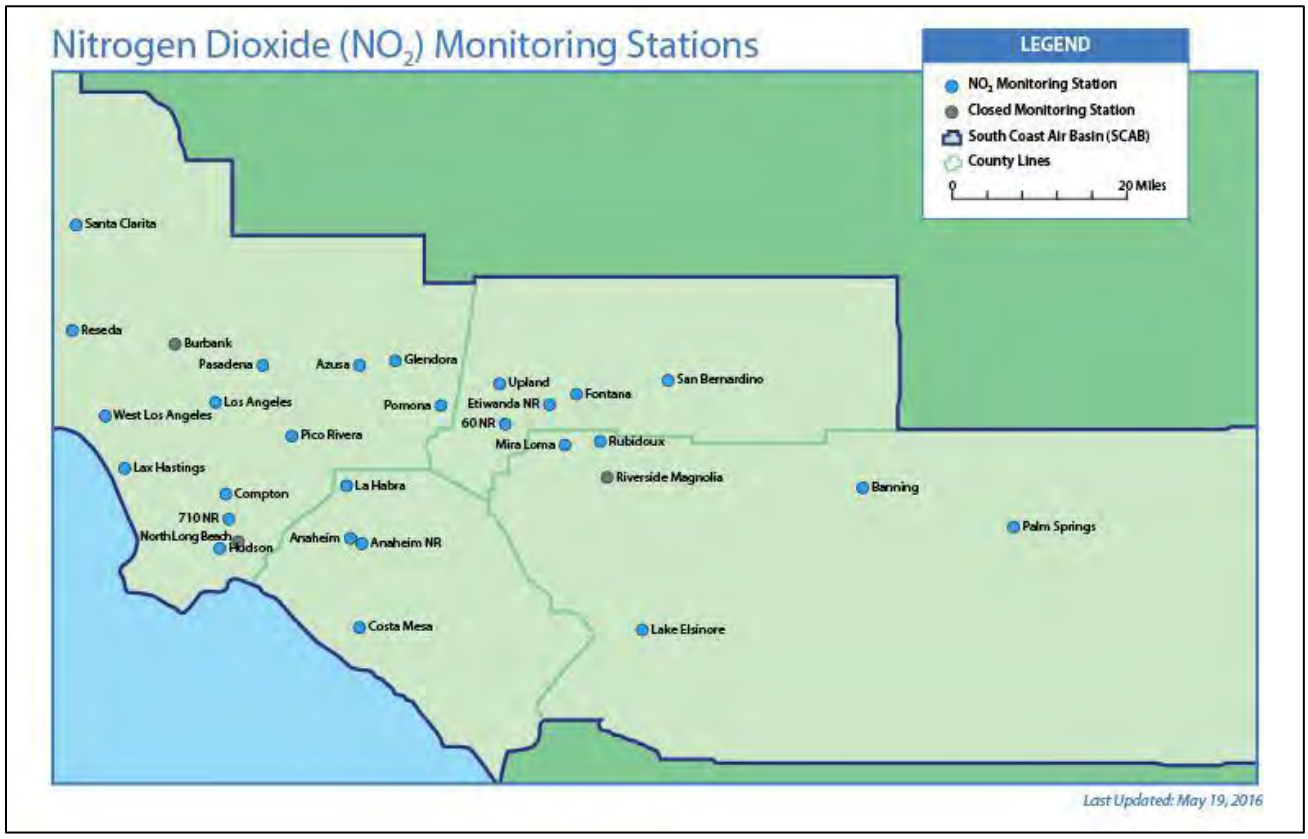

FIGURE 2-42

South Coast Air Quality Management District Nitrogen Dioxide Air Monitoring Locations

[Note that NO_2 stations that were closed at N. Long Beach in 2013, Burbank in 2014, and Riverside-Magnolia in 2015 are mapped with grey dots; near-road stations on the I-710 (710NR), CA-60 (60NR), I-5 (Anaheim NR), and I-10 (Etiwanda NR) are shown]

The current 1-hour average NO_2 NAAQS (100 ppb) was exceeded on one day in 2015 in the South Coastal Los Angeles County area at the Long Beach-Hudson air monitoring station (a location close to periodic diesel truck and bus activity). However, the 98th percentile form of the 1-hour NAAQS was not exceeded and the 2013–2015 design value is not in violation of the NAAQS. The higher relative concentrations in the Los Angeles area are indicative of the concentrated emission sources, especially motor vehicles. Although the Basin is in

attainment of the State and federal standards, NO_2 is still of concern, since oxides of nitrogen (NOx) are precursors to both ozone and particulate matter. Further control of NO_x will be required to attain the ozone and particulate standards.

The Basin has not exceeded the federal annual standard for NO_2 (0.053 ppm or 53 ppb) since 1991, when the Los Angeles County portion of the Basin recorded the last violation of that standard in the U.S. No State NO_2 standards were exceeded in 2015. Tables 2-16 and 2-17 summarize the 2015 ambient station maximum 1-hour and annual average concentrations of NO_2 by air basin and county, in comparison to federal and State standards. These tables do not include the new near-road stations, since the period of record is not yet sufficient to calculate the 3-year NO_2 design values. The near-road NO2 data is summarized further below.

TABLE 2-16

2015 Maximum 1-Hour NO_2 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum 1-Hour NO_2 Average (ppb)	2013–2015 1-Hour NO_2 Design Value (ppb)	Design Value Percent of 1-Hour NO_2 NAAQS (100 ppb)	Area of Design Value Max	2013–2015 1-Hour NO_2 State Designation Value (ppm)	Percent of 1-Hour NO_2 State Standard (0.18 ppm)
South Coast Air Basin						
Los Angeles	**101.8***	**74**	**74**	**South Coastal LA Co.**	**0.14**	**78**
Orange	59.1	58	58	Central Orange County	0.09	50
Riverside	68.1	54	54	Metropolitan Riverside County	0.07	39
San Bernardino	89.1	64	64	Central San Bernardino Valley	0.09	50
Salton Sea Air Basin						
Riverside	41.5	39	39	Coachella Valley	0.05	28

Bold text denotes the peak value

Table does not include near-road stations since data period is insufficient for 3-year design value calculation (see near-road NO_2 discussion below)

The 1-hour NO_2 design value is the annual 98th percentile daily maximum 1-hour concentration, averaged over 3 years at a station

* Although the maximum 1-hour concentration exceeded the standard on 1 day, the 98th percentile form of the design value did not violate the NAAQS

TABLE 2-17
2015 Maximum Annual Average NO_2 Concentrations and 2013–2015 Design Values
by Basin and County

Basin/County	2015 Maximum Annual NO_2 Average (ppm)	2013–2015 Annual NO_2 Design Value (ppm)	Percent of Annual NO_2 NAAQS (0.053 ppm)	Area of Design Value Max	2013–2015 Annual State NO_2 Designation Value# (ppm)	Percent of Annual State NO_2 Standard (0.030 ppm)
South Coast Air Basin						
Los Angeles	**0.0222**	**0.022**	**42**	**Central Los Angeles County**	**0.023**	**77**
Orange	0.0150	0.016	30	Central Orange County	0.018	60
Riverside	0.0144	0.016	30	Metropolitan Riverside County	0.017	57
San Bernardino	0.0187	0.020	38	Central San Bernardino Valley	0.021	70
Salton Sea Air Basin						
Riverside	0.0062	0.007	13	Coachella Valley	0.008	27

Bold text denotes the peak value
The annual NO_2 design value is the annual average of the quarterly averages, averaged over 3 years at a station
This table does not include near-road stations since data period is insufficient for 3-year design value calculation (see near-road NO_2 discussion below)

The annual average and annual maximum 1-hour average NO_2 concentrations, for each monitoring station in the SCAQMD jurisdiction for the years 1995–2015, are shown in Tables A-21 and A-22, respectively, in the attachment to this appendix. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

Near-Road NO_2

With the revised NO_2 NAAQS in 2010, near-road NO_2 measurements were required to be phased in for larger cities. The four near-road monitoring stations are: (1) I-5 Near-Road, located in Orange County near Anaheim; (2) I-710 Near-Road, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; (3) CA-60 Near-Road, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland; and (4) I-10 Near-Road, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The longest operating near-road station in the Basin, adjacent to I-5 in Orange County, has not exceeded the level of the 1-hour NO_2 NAAQS (100 ppb) since the measurements began on January 1, 2014. The peak 1-hour NO_2 concentration at that site in 2014 was 78.8 ppb and the peak concentration for 2015 was 70.2 ppb. This can be compared to the annual peak values measured at the nearest ambient monitoring station in Central Orange County (Anaheim station), where the 2014 and 2015 peaks were 75.8 and 59.1, respectively. In terms of the design value form of the NAAQS, the 98th percentile daily maximum 1-hour concentrations at the Anaheim near-road site were 66.0 ppb and 61.4 ppb, respectively, for 2014 and 2015, compared to 59.8 ppb and 54.6 ppb from the Anaheim ambient monitoring station. The annual average NO_2 NAAQS (0.053 ppm, or 53 ppb) was also not exceeded. Thus, while the Anaheim near-road NO_2 measurements are higher

than the ambient Orange County measurements, as would be expected close to traffic emissions sources, it does not appear that NO_2 design values will violate the NAAQS or CAAQS at this location.

Likewise, the shorter period of data available from the remaining three near-road stations indicates that these locations will also likely measure higher NO_2 than the nearest ambient stations, but they have not exceeded the level of the 1-hour or annual NO_2 NAAQS or CAAQS through the end of 2015. Tables 2-18 and 2-19 compare the available near-road NO_2 measurements for peak 1-hour and annual average NO_2, respectively, to the nearest ambient measurements. The 98th percentile concentration is included for comparison to the design value form of the 1-hour NO_2 NAAQS of 100 ppb. Based on this limited period of data, it appears that the near-road NO_2 measurements will be unlikely to affect the Basin's attainment status for the State and federal NO_2 standards.

TABLE 2-18

2014 and 2015 Maximum and 98th Percentile 1-Hour NO_2 Concentrations at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road NO_2						Nearby Ambient NO_2				
		Annual Peak 1-Hour NO_2 (ppb)		98th Percentile 1-Hour NO_2 (ppb)			Annual Peak 1-Hour NO_2 (ppb)		98th Percentile 1-Hour NO_2 (ppb)	
Near-Road Station	**Start Date**	**2014**	**2015***	**2014**	**2015***	**Ambient Station**	**2014**	**2015**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	1/1/2014	**78.8**	**70.2**	**66.0**	**61.4**	**Anaheim**	75.8	59.1	59.8	54.6
I-10 N. R. (at Long Beach Bl., Los Angeles County)	2/18/2015	N/A	**94.7**	N/A	**74.8**	**Compton**	68.2	73.6	59.2	58.7
CA-60 N. R. (West of Vineyard Av., San Bernardino/Riverside County)	7/9/2015	N/A	**79.2**	N/A	**77.2**	**Upland**	74.1	71.6	56.7	55.7
I-10 N. R. (at Etiwanda Av., San Bernardino County)	10/8/2014	**93.0**	87.2	**69.5**	**73.0**	**Fontana**	70.4	**89.1**	63.6	66.1

Bold text denotes maximum concentration between near-road and nearby ambient stations

N/A = complete data was not available for valid calculation

* 2015 NO_2 data is incomplete for I-710 and CA-60 Near-Road Sites

The 1-hour NO_2 NAAQS is 100 ppb

TABLE 2-19

2014 and 2015 Annual NO_2 Concentrations at South Coast Air Basin Near-Road Sites and Nearby Ambient Stations

Near-Road NO_2				Nearby Ambient NO_2		
		Annual Average NO_2 (ppb)			Annual Average NO_2 (ppb)	
Near-Road Station	**Start Date**	**2014**	**2015**	**Ambient Station**	**2014**	**2015**
I-5 N. R. (at Vernon St., Orange County)	1/1/2014	**27.2**	**25.4**	**Anaheim**	15.2	14.6
I-710 N. R. (at Long Beach Bl., Los Angeles County)	2/18/2015	N/A	**23.9**	**Compton**	15.6	16.9
CA-60 N. R. (West of Vineyard Av., San Bernardino/Riverside County)	7/9/2015	N/A	N/A	**Upland**	16.6	15.9
I-10 N. R. (at Etiwanda Av., San Bernardino County)	10/8/2014	N/A	**29.8**	**Fontana**	20.2	18.7

Bold text denotes maximum concentration between near-road and nearby ambient stations

N/A = complete data was not available for valid calculation

* 2015 is incomplete for I-710 and CA-60 Near-Road Sites

The annual average NO_2 NAAQS is 0.053 ppm, or 53 ppb

Sulfur Dioxide (SO_2)

SO_2 Air Quality

In 2015, ambient sulfur dioxide was measured at six Basin locations. The Burbank station was closed in 2014, pending relocation to a new location. Figure 2-43 shows the routine ambient SO_2 monitoring sites in the SCAQMD jurisdiction.

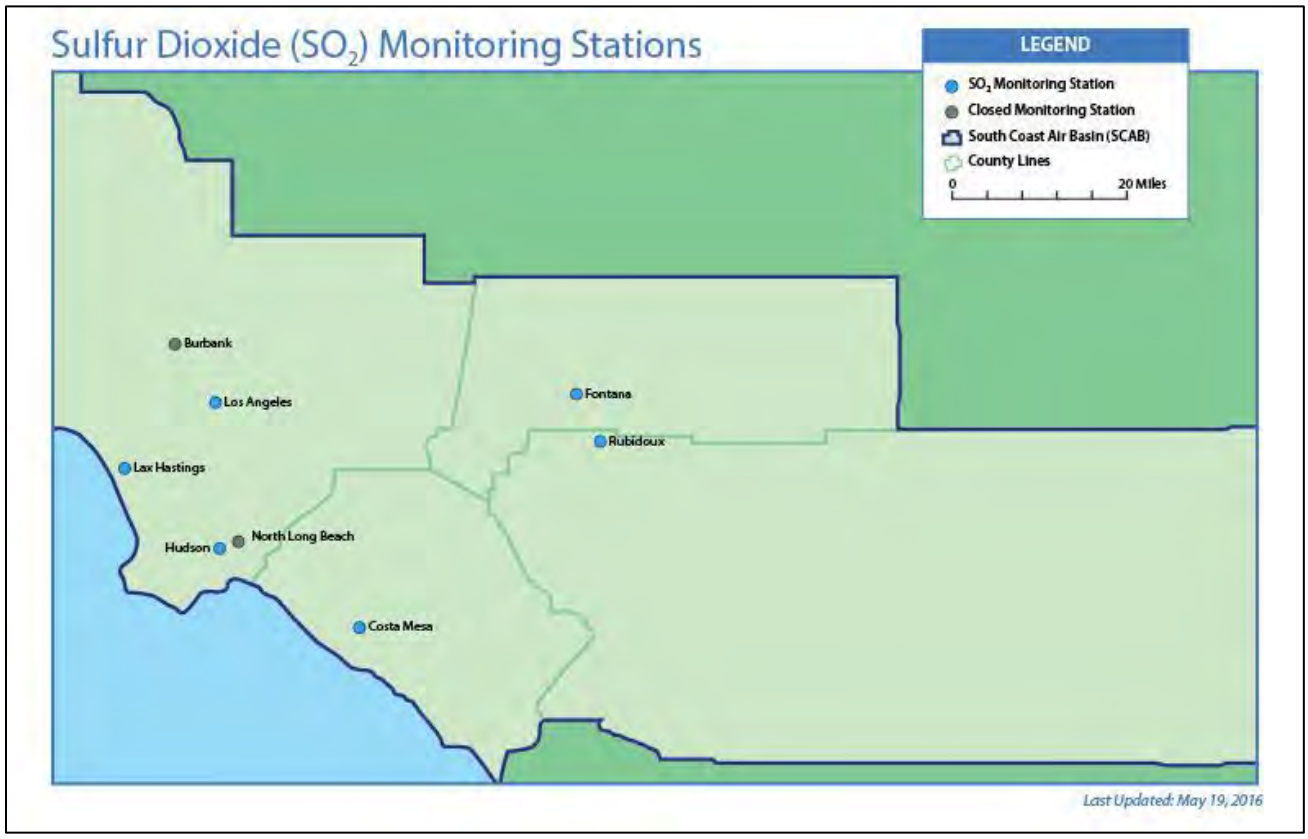

FIGURE 2-43

South Coast Air Quality Management District Sulfur Dioxide Air Monitoring Locations

(Note that SO_2 stations that were closed at N. Long Beach in 2013 and Burbank in 2014 are mapped with grey dots)

Based on the review of the SO_2 standards, U.S. EPA established the 1-hour SO_2 standard to protect the public health against short-term exposure. The level of the 1-hour average standard was set at 75 ppb, effective August 2, 2010, revoking the former annual (0.03 ppm) and 24-hour (0.14 ppm) federal standards. No violations have occurred of the current federal 1-hour standards, the former federal annual or 24-hour standards, or the State standards (0.25 ppm, 1-hour or 0.04 ppm, 24-hour) in 2015, or in recent years, in the Basin. The annual and 24-hour federal standards were last exceeded in the 1960's and the State standards were last exceeded in 1990. Though sulfur dioxide concentrations remain well below the standards, sulfur dioxide is a precursor to sulfate, which is a component of fine particulate matter. Tables 2-20 and 2-21 summarize the 2015 maximum and design value 1-hour and 24-hour average SO_2 concentrations, respectively, by county. The annual maximum 1-hour average SO_2 concentrations for each monitoring station in the SCAQMD jurisdiction are shown in Table A-23 in the attachment, for the years 1995–2015.

TABLE 2-20

2015 Maximum 1-Hour SO_2 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum 1-Hour SO_2 Average (ppb)	2013–2015 1-Hour SO_2 Design Value (ppb)	Percent of 1-Hour SO_2 NAAQS (75 ppb)	Area of Design Value Max	Percent of 1-Hour SO_2 State Standard (0.25 ppm or 250 ppb)
South Coast Air Basin					
Los Angeles	**37.5**	**11**	**15**	**South Coastal LA County**	**4**
Orange	4.5	3	4	North Coastal Orange County	1
Riverside	1.9	3	4	Metropolitan Riverside County	1
San Bernardino	4.0	3	4	Central San Bernardino Valley	1
Salton Sea Air Basin					
Riverside	N.D.	N.D.	N.D.	Coachella Valley	N.D.

Bold text denotes the peak value

N.D. = No Data. Historical analyses and lack of emissions sources indicate concentrations are well below standards

The 1-hour SO_2 design value is the annual 99th percentile 1-hour daily maximum concentration, averaged over 3 years at a station

TABLE 2-21

2015 Maximum 24-Hour Average SO_2 Concentrations and 2013–2015 Design Values by Basin and County

Basin/County	2015 Maximum 24-Hour SO_2 Average (ppm)	2013–2015 24-Hour SO_2 Design Value (ppm)	Percent of 24-Hour SO_2 former NAAQS (0.14 ppm)	Area of Design Value Max	Percent of 24-Hour SO_2 State Standard (0.04 ppm)
South Coast Air Basin					
Los Angeles	**0.005**	**0.003**	**2**	**South Coastal LA County**	**8**
Orange	0.001	0.001	1	North Coastal Orange County	3
Riverside	0.001	0.001	1	Metropolitan Riverside County	3
San Bernardino	0.001	0.001	1	Central San Bernardino Valley	3
Salton Sea Air Basin					
Riverside	N.D.	N.D.	N.D.	Coachella Valley	N.D.

Bold text denotes the peak value

N.D. = No Data. Historical analyses and lack of emissions sources indicate concentrations are well below standards

The 24-hour SO_2 design value is the 2nd highest 24-hour average concentration at a station in a single year

Sulfates (SO_4^{2-})

Sulfate Air Quality

Sulfates, as measured from FRM PM10 filters, was sampled at 18 stations in 2015 in the SCAQMD jurisdiction, including two locations in the Coachella Valley. Two stations were closed in 2014, Burbank and Ontario Fire Station, with only partial-year data available. The North Long Beach station was closed in 2013. New locations are pending for the Burbank and North Long Beach stations. Since the sulfate measurement is analyzed in the laboratory from the collected 24-hour PM10 filters, the sulfate network is identical to the FRM PM10 monitoring network. The measurements are done every sixth day, except that two stations in Metropolitan Riverside County (Rubidoux and Mira Loma) and one in the Coachella Valley (Indio) measure every third day. Figure 2-35, in the PM10 section above, maps the manual FRM PM10 stations that also comprise the SCAQMD sulfate network.

In 2015, the State 24-hour PM10-sulfate standard (25 µg/m^3) was not exceeded anywhere in the Basin or the Coachella Valley, nor has it been exceeded since 1990. The peak Basin sulfate concentration of 21.0 µg/m^3 (84 percent of the State standard) was measured in the East San Gabriel Valley. This was higher than the peaks in recent years, due to the impact of Independence Day fireworks on the July 5 measurement. Several other stations in the Basin also had annual peaks on this day and it is anticipated that these will not be included in the State designation value calculations for 2015. There is no corresponding federal standard for sulfates. Maximum 24-hour concentrations and anticipated maximum State designation values by air basin and county are summarized in Table 2-22. The annual maximum 24-hour average sulfate concentrations for each monitoring station in the SCAQMD jurisdiction are shown in Table A-24 in the attachment, for the years 1995–2015.

TABLE 2-22
2015 Maximum 24-Hour Average Sulfates (SO_4^{2-} from PM10) Concentrations
by Basin and County

Basin/County	2015 Maximum 24-Hour SO_4^{2-} Average (µg/m³)	2013–2015 24-Hour SO_4^{2-} State Designation Value (µg/m³)	2015 Percent of State SO_4^{2-} Standard (25 µg/m³)	Area of Max
South Coast Air Basin				
Los Angeles	**21.0***	**6.9***	**33**	**South Coastal Los Angeles County**
Orange	4.2	4.2	17	Central Orange County
Riverside	5.9*	4.2*	17	Metropolitan Riverside County
San Bernardino	14.7*	4.6*	18	Central San Bernardino Valley
Salton Sea Air Basin				
Riverside	4.6**	2.6**	10	Coachella Valley (Palm Springs)

Bold text denotes the peak value

* The 2015 Basin maximum sulfate concentration of 21.0 µg/m³ in Los Angeles County, as well as the peaks in Riverside and San Bernardino Counties, occurred on July 5, 2015, due to fireworks on Independence Day; it is anticipated that these may be excluded from the State designation value calculations for a peak 2015 Basin designation value of 6.9 µg/m³

** The 2015 Coachella Valley maximum sulfate concentration of 4.6 µg/m³ at the Palm Springs station was associated with a high-wind exceptional event; it is anticipated that this may be excluded from the State designation value calculations for a peak 2015 Basin designation value of 2.6 µg/m³

Lead (Pb)

Current Lead Air Quality

In 2015, SCAQMD's lead monitoring network included eight ambient monitoring locations and an additional five source-specific sites near major lead emissions sources. The North Long Beach station was closed in 2013 and the Riverside-Magnolia station was closed at the beginning of 2015. The source-specific station at Van Nuys Airport was closed in 2013, with no violation of the lead standards measured. A new source-specific lead monitor was installed in Fontana near a recycling facility, starting in January 2015. Figure 2-44 shows the ambient and source-specific lead monitoring sites in the SCAQMD jurisdiction.

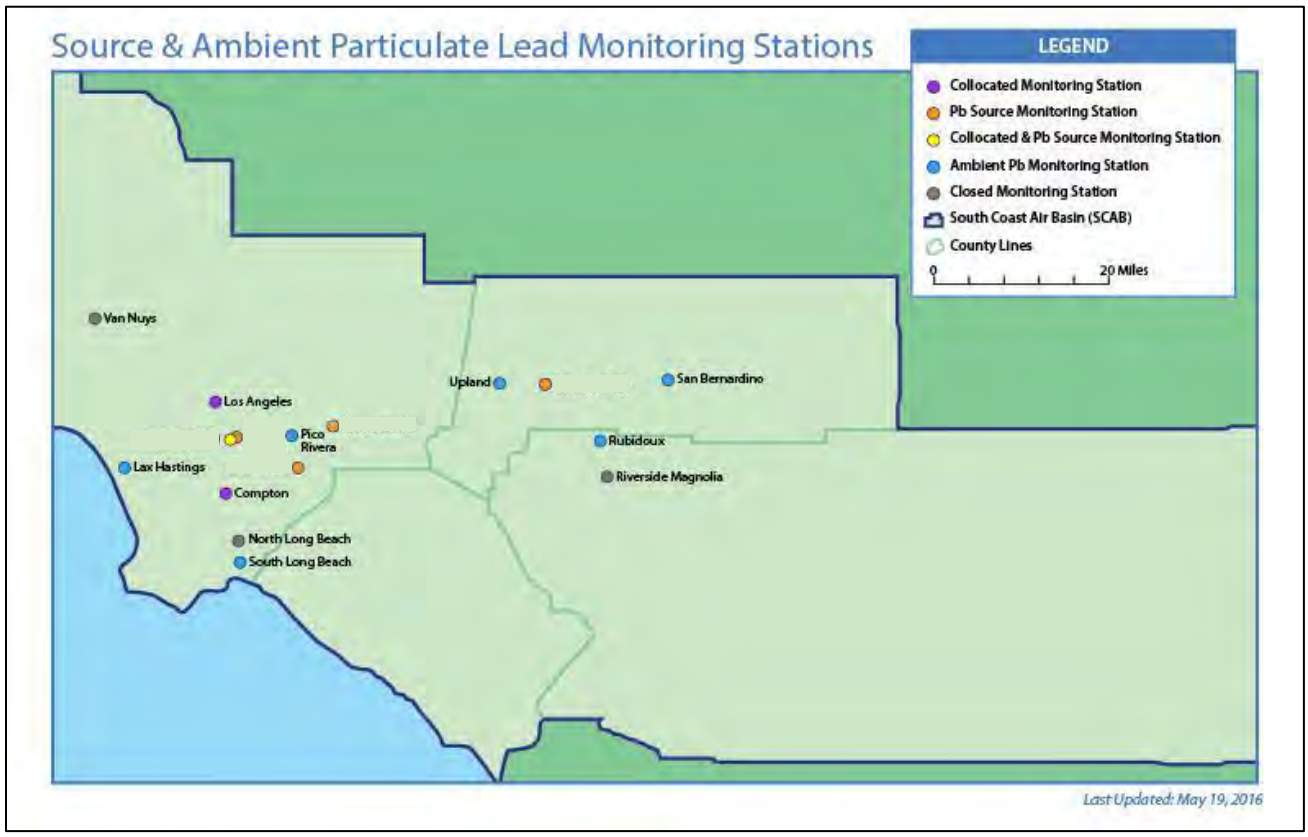

FIGURE 2-44

South Coast Air Quality Management District Ambient and Source-Specific Lead (Pb) Air Monitoring Locations

(Note that lead stations that were closed at N. Long Beach and Van Nuys in 2013 and at Riverside-Magnolia in January 2015 are mapped with grey dots)

Based on the review of the NAAQS for lead, U.S. EPA established the current standard of 0.15 µg/m^3 for a rolling 3-month average, effective October 15, 2008 (measured from total suspended particulates, TSP). There have been no violations of the lead standards at the District's regular ambient air monitoring stations since 1982, primarily as a result of removal of lead from gasoline. However, monitoring at two stations, immediately adjacent to stationary sources of lead, recorded exceedances of the standard in Los Angeles County for the 2007–2009 data period, which was used for designation under the revised standard that included the new requirements for near-source monitoring. As a result, a non-attainment designation was determined for the Los Angeles County portion of the Basin when the current standard was implemented. While near-source lead measurements in Los Angeles County had previously violated the current NAAQS, there have been no exceedances of the federal standard in the Basin as of either the 2012–2014 or the 2013–2015 3-year design value period.

Table 2-23 summarizes the Basin's maximum 3-month rolling average lead concentrations recorded in 2015 and in the 2013–2015 design value period, by county. The current lead concentrations in Los Angeles county are now well below the lead NAAQS (0.15 µg/m^3), including the monitoring at the source oriented locations (down to 27 percent of the NAAQS for the 2015 maximum 3-month rolling average). The lead data from both the ambient and source-specific locations throughout the Basin has remained well below the NAAQS since 2012, due mainly to the implementation of stricter SCAQMD rules for the lead sources. The new source-specific measurements in San Bernardino County in 2015 are generally higher than the ambient

measurements, but are well below the level of NAAQS. The less-stringent State 30-day standards for lead were not exceeded in any other area of the Basin in 2015, as is also shown in Table 2-23, or any recent year.

As a result of the 2012–2014 and 2013–2015 design value remaining well below the NAAQS, SCAQMD will be petitioning U.S. EPA for a redesignation to attainment for the federal lead standard for the Los Angeles County nonattainment area. Stringent SCAQMD rules governing lead-producing sources will protect from again exceeding the federal standard. Furthermore, the business that had been the largest single source of lead emissions in Los Angeles County has closed in recent months and is in the process of demolition and clean-up.

The maximum calendar annual maximum monthly average and 3-month rolling average lead concentrations at each monitoring site in the SCAQMD jurisdiction for the years 1995–2015 are provided in Tables A-25 and A-26, respectively, in the attachment.

TABLE 2-23

2015 Maximum 3-Month Rolling Average Lead Concentrations
and 2013–2015 Design Values by Basin and County

Basin/County	2015 Max 3-Month Rolling Average Design Value (µg/m³)	2013–2015 Max 3-Month Rolling Average Design Value (µg/m³)	Percent of Current NAAQS (0.15 µg/m³)	Area of Design Value Max	2015 Max 30-Day Average (µg/m³)	Percent of State Standard (1.5 µg/m³)
South Coast Air Basin						
Los Angeles*	**0.04**	**0.08**	**53**	**Southeast Los Angeles County**	**0.05**	**3**
Orange	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Riverside	0.01	0.01	7	Metropolitan Riverside County	0.01	1
San Bernardino*	0.03	0.03	20	Central San Bernardino Valley	0.04	3
Salton Sea Air Basin						
Riverside	N.D.	N.D.	N.D.	Coachella Valley	N.D.	N.D.

Bold text denotes the peak value

N.D. = No Data; historical analyses and emissions profiles indicate concentrations would be well below standards

The lead NAAQS design value is the highest rolling 3-month average over a 3-year period at a station

* The higher lead concentrations in Los Angeles and San Bernardino Counties were measured at sites immediately downwind lead sources; the maximum 3-month average design value was measured at a near-source station in Los Angeles County (Santa Fe Springs) for February through April of 2013; the single year of data from the San Bernardino County near-source lead monitor is insufficient for a complete 3-year design value calculation, but is included here

CHAPTER 3

AIR QUALITY IN THE SALTON SEA AIR BASIN, RIVERSIDE COUNTY (COACHELLA VALLEY)

Overview of Coachella Valley Air Quality

Current Air Quality Summary
Attainment/Nonattainment Designations

Pollutant-Specific Air Quality Discussion

Ozone (O_3)
Fine Particulate Matter (PM2.5)
Particulate Matter (PM10)
Carbon Monoxide (CO)
Nitrogen Dioxide (NO_2)
Sulfur Dioxide (SO_2)
Sulfate (SO_4^{2-})
Lead (Pb)
Hydrogen Sulfide (H_2S)

Overview of Coachella Valley Air Quality

In 2015, the SCAQMD monitored air quality at four routine locations in the Riverside County portion of the Salton Sea Desert Air Basin (SSAB), all within the Coachella Valley. Figure 3-1 shows a map of the area and topography. A long-term monitoring station (Palm Springs) is located immediately downwind of the densely populated South Coast Air Basin (Basin). A second long-term station (Indio) is located further downwind in the Coachella Valley. A relatively new monitoring station has also been operational in the community of Mecca at the Saul Martinez Elementary School to measure PM10, with a continuous TEOM instrument, and Hydrogen Sulfide (H_2S), a gas emitted naturally from the Salton Sea that causes strong odors at times. The Mecca station is in the southeastern Coachella Valley, a few miles from the northern shore of the Salton Sea. Additional continuous H_2S monitoring is now being conducted at the northern shore of the Salton Sea in a sparsely populated area. Since the end of May 2014, SCAQMD has also been measuring PM2.5 with a continuous, special-purpose monitor in Desert Hot Springs, predominantly downwind of the 800 megawatt CPV Sentinel natural gas-powered electric generation facility.

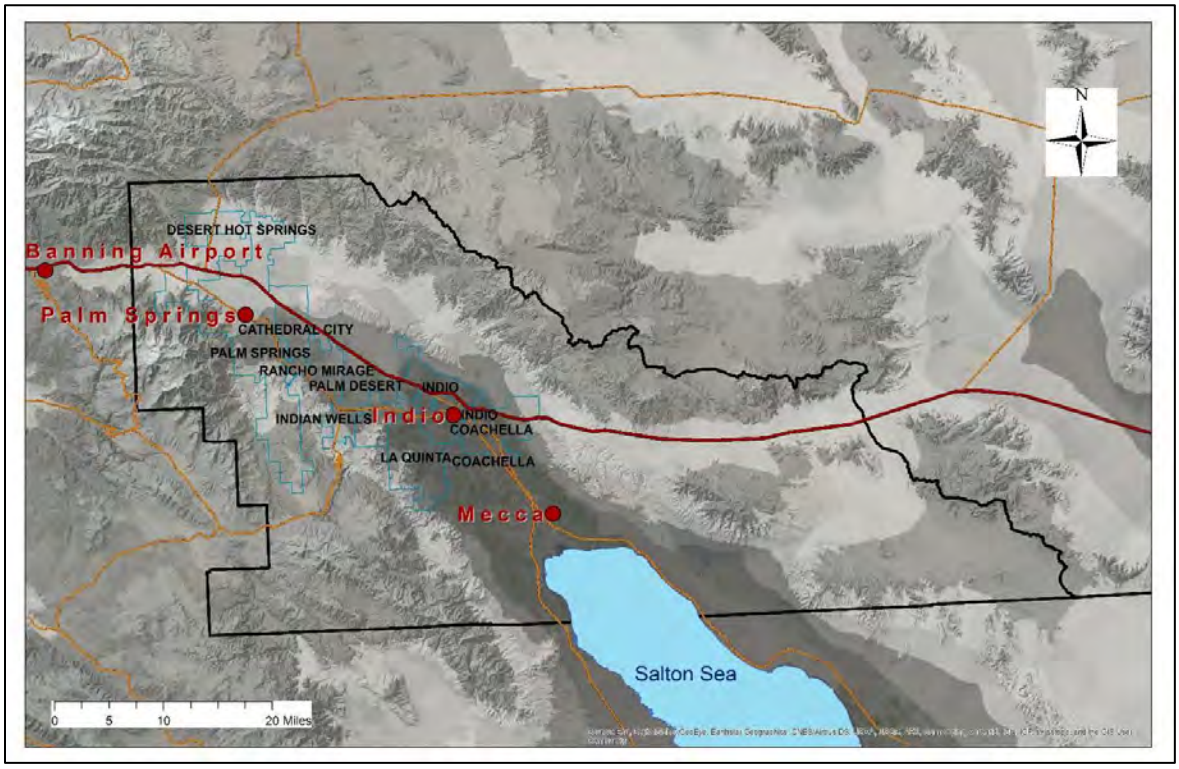

FIGURE 3-1

Location and Topography of the Coachella Valley Planning Area

[the San Gorgonio Pass (AKA Banning Pass) is the west-east pass between the mountains near the Banning Airport air monitoring station that leads from the South Coast Air Basin into the Coachella Valley; SCAQMD air monitoring stations at Palm Springs, Indio, and Mecca are shown within the Coachella Valley boundaries]

Current Air Quality Summary

Federal and State standards for PM2.5, carbon monoxide (CO), and nitrogen dioxide (NO_2) were not exceeded in the Coachella Valley in 2015, nor was the State standard for Sulfate (SO_4^{2-}, from PM10). However, the Coachella Valley exceeded State and federal standards for both ozone and PM10, although the NAAQS PM10 exceedances were due to high-wind exceptional events.

In 2015, the new 2015 8-hour ozone federal standard (0.070 ppm) was exceeded in the Coachella Valley on 47 days (13 percent of the year), while the revised 2008 (0.075 ppm) and revoked 1997 (0.08 ppm) 8-hour standards were exceeded on 26 and 5 days, respectively. The maximum 8-hour ozone concentration was 0.092 ppm (131, 123 and 109 percent of the 2015, 2008 and 1997 ozone standards, respectively). The former 1979 1-hour federal ozone standard level (0.12 ppm) was not exceeded in the Coachella Valley in 2015, with a maximum 1-hour concentration of 0.10 ppm. Ozone concentrations in the Coachella Valley, and the number of days exceeding the federal ozone standards, are greatest in the late spring and summer months, with no exceedances during the winter. The Palm Springs station consistently has more days above the federal and State ozone standards each year than the Indio station.

The 24-hour PM10 NAAQS was exceeded on eight days in 2014 and eight more in 2015. These were flagged by the District for consideration under the U.S. EPA Exceptional Events Rule,[28] due to high-wind natural windblown dust events. The stations at Palm Springs, Indio and Mecca were included in this summary. Pending preparation of supporting documentation and U.S. EPA concurrence with the flags, the Coachella Valley did not violate the 24-hour PM10 NAAQS in 2014 or 2015.

The maximum concentrations measured at the SCAQMD Coachella Valley air monitoring stations in 2015 are shown in Figure 3-2, as percentages of the State and federal standards. Figure 3-3 shows the Coachella Valley 3-year (2013–2015) design values, as percentages of the current and revoked federal standards.

[28]The U.S. EPA Exceptional Events Rule, *Treatment of Data Influence by Exceptional Events*, became effective May 21, 2007. The previous U.S. EPA *Natural Events Policy* for Particulate Matter was issued on May 30, 1996. On September 16, 2016, U.S. EPA promulgated revisions to the Exceptional Event Rule. Under the Exceptional Events Rule, U.S. EPA allows certain data to be flagged in the U.S. EPA Air Quality System (AQS) database and not considered for NAAQS attainment status when that data is influenced by exceptional events, such as high winds, wildfires, volcanoes, or some cultural events (Independence Day fireworks) that meet strict requirements.

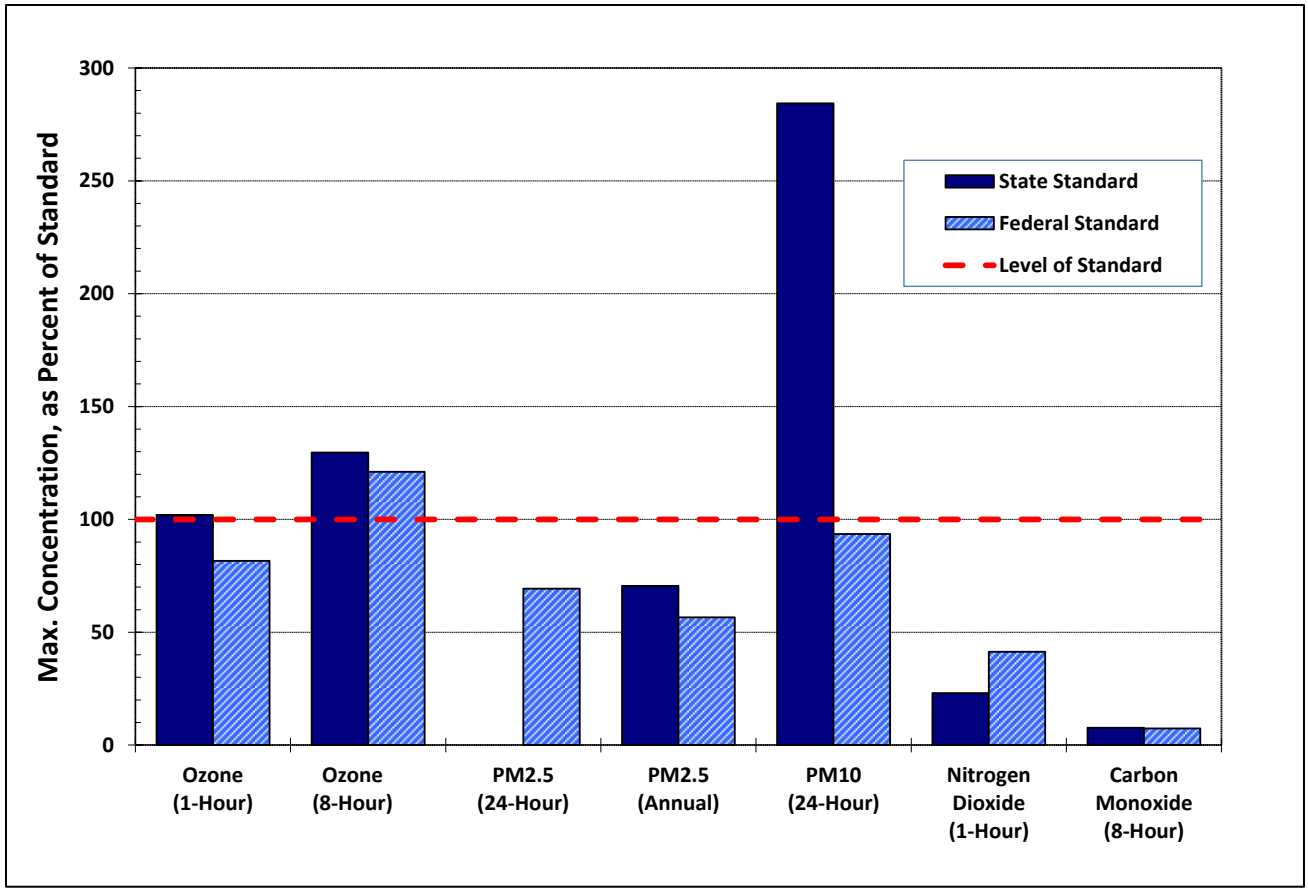

FIGURE 3-2

Coachella Valley 2015 Maximum Pollutant Concentrations
as Percent of State and Federal Standards

(the 2008 8-hour federal ozone standard is shown – note that the bar for the State 8-hour ozone standard is the nearly the same as for the new 2015 8-hour federal ozone standard, which is not shown; for PM10, flagged exceptional events are excluded, pending required event documentation and U.S. EPA concurrence; there is no State 24-hour PM2.5 standard)

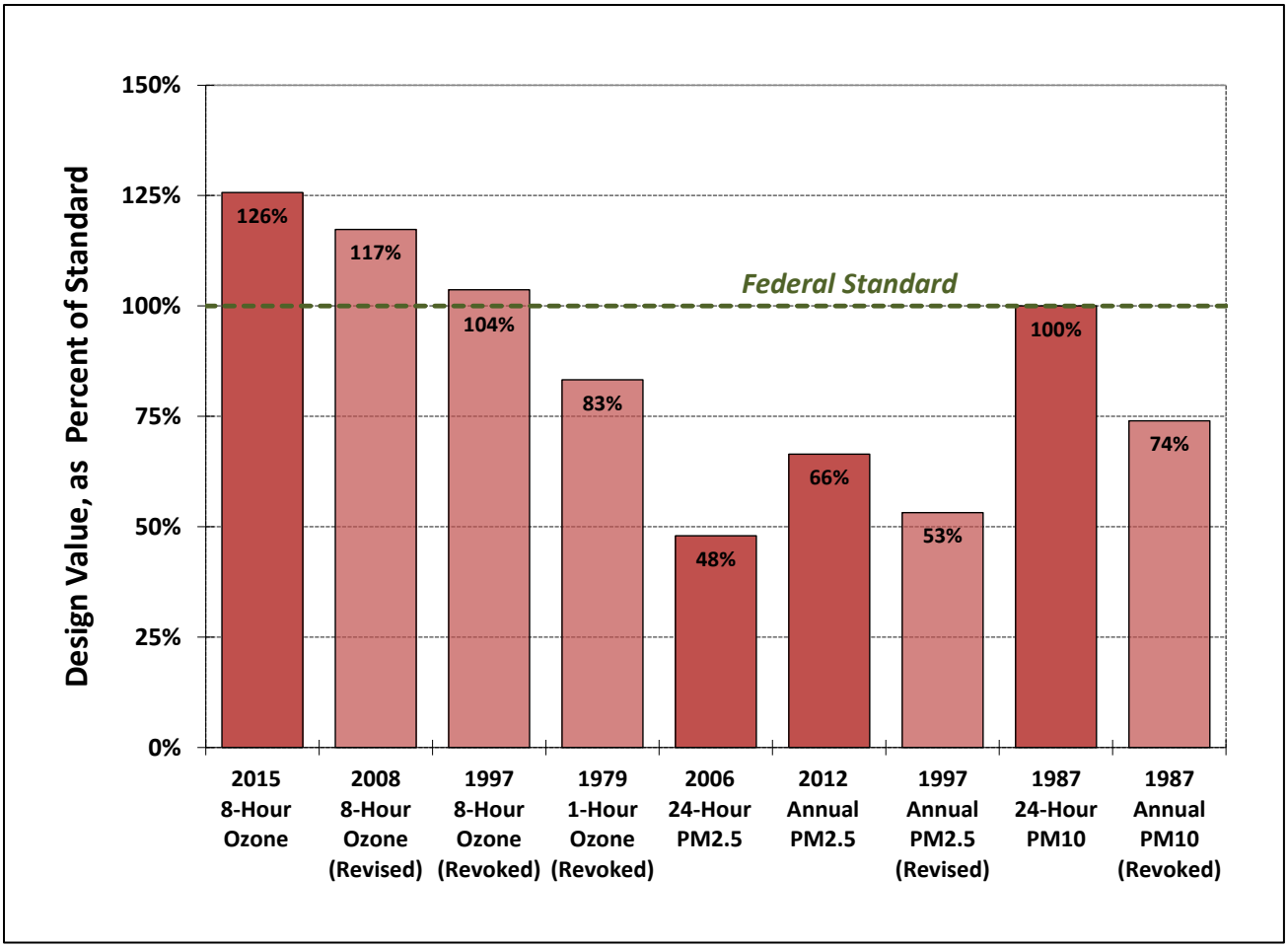

FIGURE 3-3

Coachella Valley 3-Year (2012–2014) Design Values as Percent of Federal Standard

(PM10 flagged exceptional events are excluded but supporting documentation and U.S. EPA concurrence is still needed; note that 100 percent of the Federal Standard is not exceeding that standard; darker shading indicates current, most-stringent NAAQS)

Attainment/Nonattainment Designations

The current NAAQS and CAAQS, with attainment designations for the Coachella Valley, are presented in Tables 3-1 and 3-2, respectively. Statistics for Coachella Valley ambient air monitoring data are included in the tables by pollutant for the years 1995–2014, which can be found along with the Basin monitoring data in the attachment to this appendix.

TABLE 3-1

National Ambient Air Quality Standards (NAAQS) Attainment Status

Coachella Valley Portion of the Salton Sea Air Basin

Criteria Pollutant	Averaging Time	Designation[a]	Attainment Date[b]
Ozone (O_3)	(1979) **1-Hour** (0.12 ppm)[c]	Attainment	11/15/2007 (attained 12/31/2013)
	(2015) **8-Hour** (0.070 ppm)[d]	Pending – Expect Nonattainment (Severe)	Pending
	(2008) **8-Hour** (0.075 ppm)[d]	Nonattainment (Severe-15)	7/20/2027
	(1997) **8-Hour** (0.08 ppm)[d]	Nonattainment (Severe-15)	6/15/2019
PM2.5[e]	(2006) **24-Hour** (35 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(2012) **Annual** (12.0 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
	(1997) **Annual** (15.0 µg/m^3)	Unclassifiable/Attainment	N/A (attained)
PM10[f]	(1987) **24-hour** (150 µg/m^3)	Nonattainment (Serious)	12/31/2006
Lead (Pb)	(2008) **3-Months Rolling** (0.15 µg/m^3)	Unclassifiable/Attainment	Unclassifiable/ Attainment
CO	(1971) **1-Hour** (35 ppm)	Unclassifiable/Attainment	N/A (attained)
	(1971) **8-Hour** (9 ppm)	Unclassifiable/Attainment	N/A (attained)
NO_2[g]	(2010) **1-Hour** (100 ppb)	Unclassifiable/Attainment	N/A (attained)
	(1971) **Annual** (0.053 ppm)	Unclassifiable/Attainment	N/A (attained)
SO_2[h]	(2010) **1-Hour** (75 ppb)	Designations Pending	N/A
	(1971) **24-Hour** (0.14 ppm) (1971) **Annual** (0.03 ppm)	Unclassifiable/Attainment	Unclassifiable/ Attainment

a) U.S. EPA often only declares Nonattainment areas; everywhere else is listed as Unclassifiable/Attainment or Unclassifiable

b) A design value below the NAAQS for data through the full year or smog season prior to the attainment date is typically required for an attainment demonstration

c) The 1979 1-hour ozone NAAQS (0.12 ppm) was revoked, effective 6/15/05; the Southeast Desert Modified Air Quality Management Area, including the Coachella Valley, had not timely attained this standard by the 11/15/07 "severe-17" deadline, based on 2005-2007 data; on 8/25/14, U.S. EPA proposed a clean data finding based on 2011-2013 data and a determination of attainment for the former 1-hour ozone NAAQS for the Southeast Desert nonattainment area; this rule was finalized by U.S. EPA on 4/15/15, effective 5/15/15, and included preliminary 2014 data

d) The 2008 8-hour ozone NAAQS (0.075 ppm) was revised to 0.070 ppm, effective 12/28/15 with classifications and implementation goals to be finalized by 10/1/17; the 1997 8-hour ozone NAAQS (0.08 ppm) was revoked in the 2008 ozone NAAQS implementation rule, effective 4/6/15; there are continuing obligations under the 1997 and 2008 ozone NAAQS until they are attained

e) The annual PM2.5 standard was revised on 1/15/13, effective 3/18/13, from 15 to 12 µg/m3

f) The annual PM10 standard was revoked, effective 12/18/06; the 24-hour PM10 NAAQS attainment deadline was 12/31/2006; the Coachella Valley Attainment Redesignation Request and PM10 Maintenance Plan was postponed by U.S. EPA pending additional monitoring and analysis in the southeastern Coachella Valley

g) New 1-hour NO_2 NAAQS became effective 8/2/10; attainment designations 1/20/12; annual NO_2 NAAQS retained

h) The 1971 Annual and 24-hour SO_2 NAAQS were revoked, effective 8/23/10; however, these 1971 standards will remain in effect until one year after U.S. EPA promulgates area designations for the 2010 SO_2 1-hour standard; final area designations expected by 12/31/2020 with SSAB expected to be designated Unclassifiable/Attainment

TABLE 3-2

California Ambient Air Quality Standards (CAAQS) Attainment Status

Coachella Valley portion of Salton Sea Air Basin

Pollutant	Averaging Time and Level[b]	Designation[a]
		Coachella Valley
Ozone (O_3)	**1-Hour** (0.09 ppm)[c]	Nonattainment
	8-Hour (0.070 ppm)[d]	Nonattainment
PM2.5	**Annual** (12.0 µg/m^3)	Attainment
PM10	**24-Hour** (50 µg/m^3)	Nonattainment
	Annual (20 µg/m^3)	Nonattainment
Lead (Pb)	**30-Day Average** (1.5 µg/m^3)	Attainment
CO	**1-Hour** (20 ppm)	Attainment
	8-Hour (9.0 ppm)	Attainment
NO_2	**1-Hour** (0.18 ppm)	Attainment
	Annual (0.030 ppm)	Attainment
SO_2	**1-Hour** (0.25 ppm)	Attainment
	24-Hour (0.04 ppm)	Attainment
Sulfates	**24-Hour** (25 µg/m^3)	Attainment
H_2S[c]	**1-Hour** (0.03 ppm)	Unclassified[c]

a) CA State designations shown were updated by CARB on January 5, 2016, based on the 2012-2014 3-year period; stated designations are based on a 3-year data period after consideration of outliers and exceptional events [Source: http://www.arb.ca.gov/desig/statedesig.htm#current]

b) CA State standards, or CAAQS, for ozone, CO, SO_2, NO_2, PM10 and PM2.5 are values not to be exceeded; lead, sulfates, and H_2S standards are values not to be equaled or exceeded; CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations

c) SCAQMD began monitoring H_2S in the southeastern Coachella Valley in November 2013 due to odor events related to the Salton Sea; three full years of data are not yet available for a designation, but nonattainment is anticipated for the H_2S CAAQS in at least part of the Coachella Valley

Pollutant-Specific Air Quality Summary

Ozone (O_3)

Atmospheric ozone in the Riverside county portion of SSAB is both directly transported from the Basin and formed photochemically from precursors emitted upwind. The precursors are emitted in greatest quantity in the coastal and central Los Angeles County areas of the Basin. The Basin's prevailing sea breeze causes polluted air to be transported inland. As the air is being transported inland, ozone is formed, with peak concentrations occurring in the inland valleys of the Basin, extending from eastern San Fernando Valley through the San Gabriel Valley into the Riverside-San Bernardino area and the adjacent mountains. As the air is transported still further inland into the Coachella Valley, through the San Gorgonio Pass, ozone concentrations typically decrease due to dilution, although ozone standards can still be exceeded.

Ozone is measured continuously at two locations in the Coachella Valley at the Palm Springs and Indio air monitoring stations. In 2015, the new 2015 8-hour ozone federal standard (0.070 ppm) was exceeded in the Coachella Valley on 47 days (13 percent of the year), while the previous 2008 (0.075 ppm) and 1997 (0.08 ppm) 8-hour standards were exceeded on 26 and 5 days, respectively. The maximum 8-hour ozone concentration was 0.092 ppm (131, 123 and 109 percent of the level of the 2015, 2008 and 1997 ozone standards, respectively). The former 1979 1-hour federal ozone standard level (0.12 ppm) was not exceeded in the Coachella Valley in 2014, with a maximum 1-hour concentration of 0.102 ppm. Ozone concentrations in the Coachella Valley, and the number of days exceeding the federal ozone standards, are greatest in the late spring and summer months, with no exceedances during the winter.

The 8-hour ozone design value for the Coachella Valley for the 3-year period of 2013–2015 was 0.088 ppm (126, 117, and 104 percent of the 2015, 2008, and 1997 ozone NAAQS, respectively). The 1-hour ozone design value was 0.104 ppm, which is 83 percent of the former 1979 1-hour ozone NAAQS. While the Coachella Valley remains in attainment of the former 1-hour federal standard, the 8-hour NAAQS are still violated. The Palm Springs station had higher ozone design values and significantly more days above the standards than the Indio station.

The 1-hour and 8-hour State ozone standards were exceeded on 3 days and 51 days, respectively, in the Coachella Valley in 2015. The 1-hour ozone health advisory level (≥ 0.15 ppm) has not been exceeded in the Coachella Valley area since 1998. No 1-hour Stage 1 episode levels (≥ 0.20 ppm) have been recorded in the Coachella Valley area since 1988.

Figure 3-4 shows the trend of the annual peak ozone concentrations (1-hour and 8-hour averages) measured in the Coachella Valley between 1990 and 2015. Figure 3-5 shows the trend of the annual number of days exceeding federal and State ozone standards at Coachella Valley monitoring sites for the years 1990–2015. Figure 3-6 shows the 3-year ozone design value trends from 1990 through 2015 (labeled as the end year of each 3-year design value period). As is illustrated, the Coachella Valley has experienced a trend of steady ozone improvements over the years. However, additional gains are needed to achieve the new and previous 8-hour ozone standards.

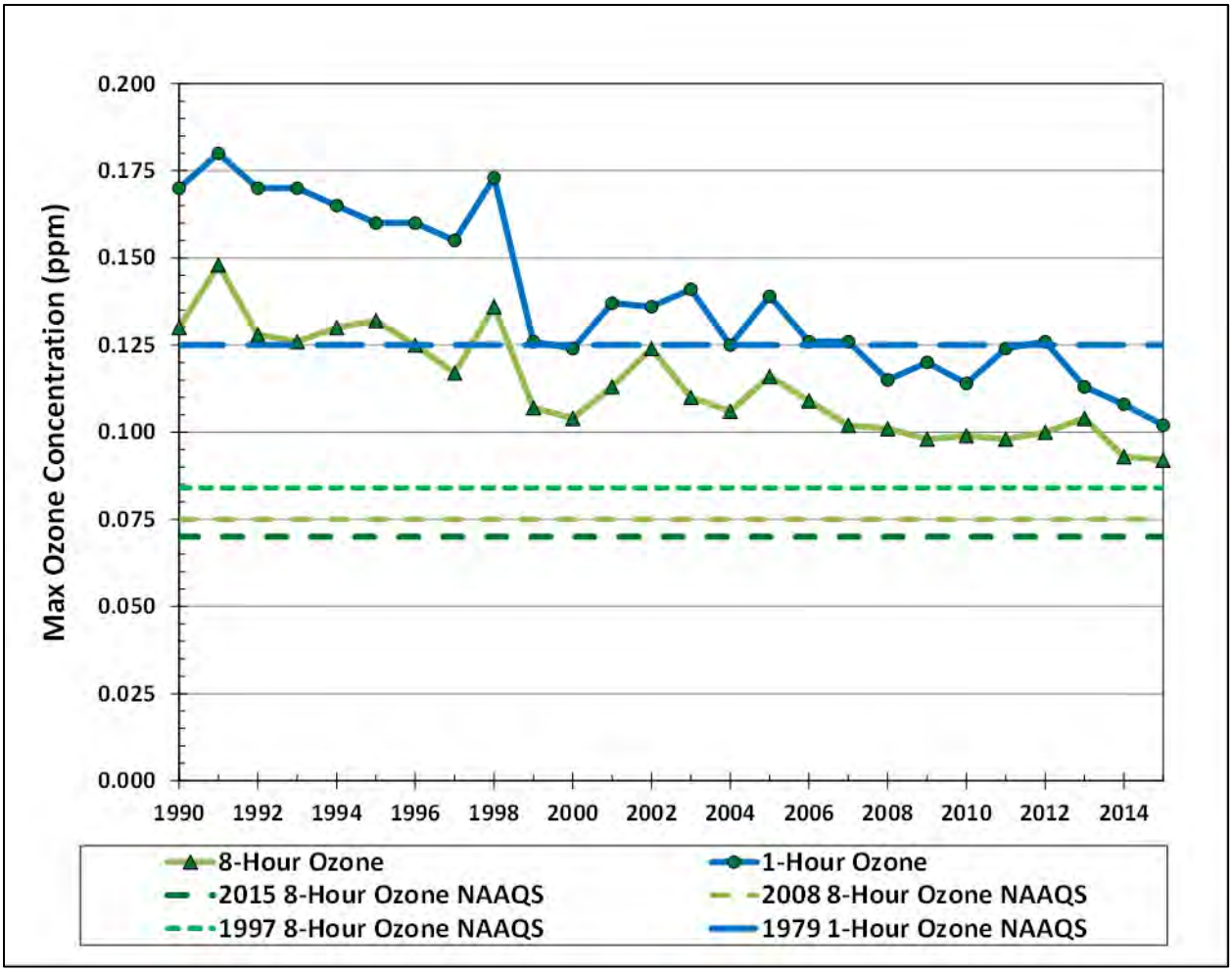

FIGURE 3-4

Trends of Coachella Valley Maximum 1-hour and 8-hour Ozone Concentrations, 1990–2015

(dashed lines depict the new 2015 8-hour and the previous 2008 and 2997 8-hour and 1979 1-hour federal ozone standards)

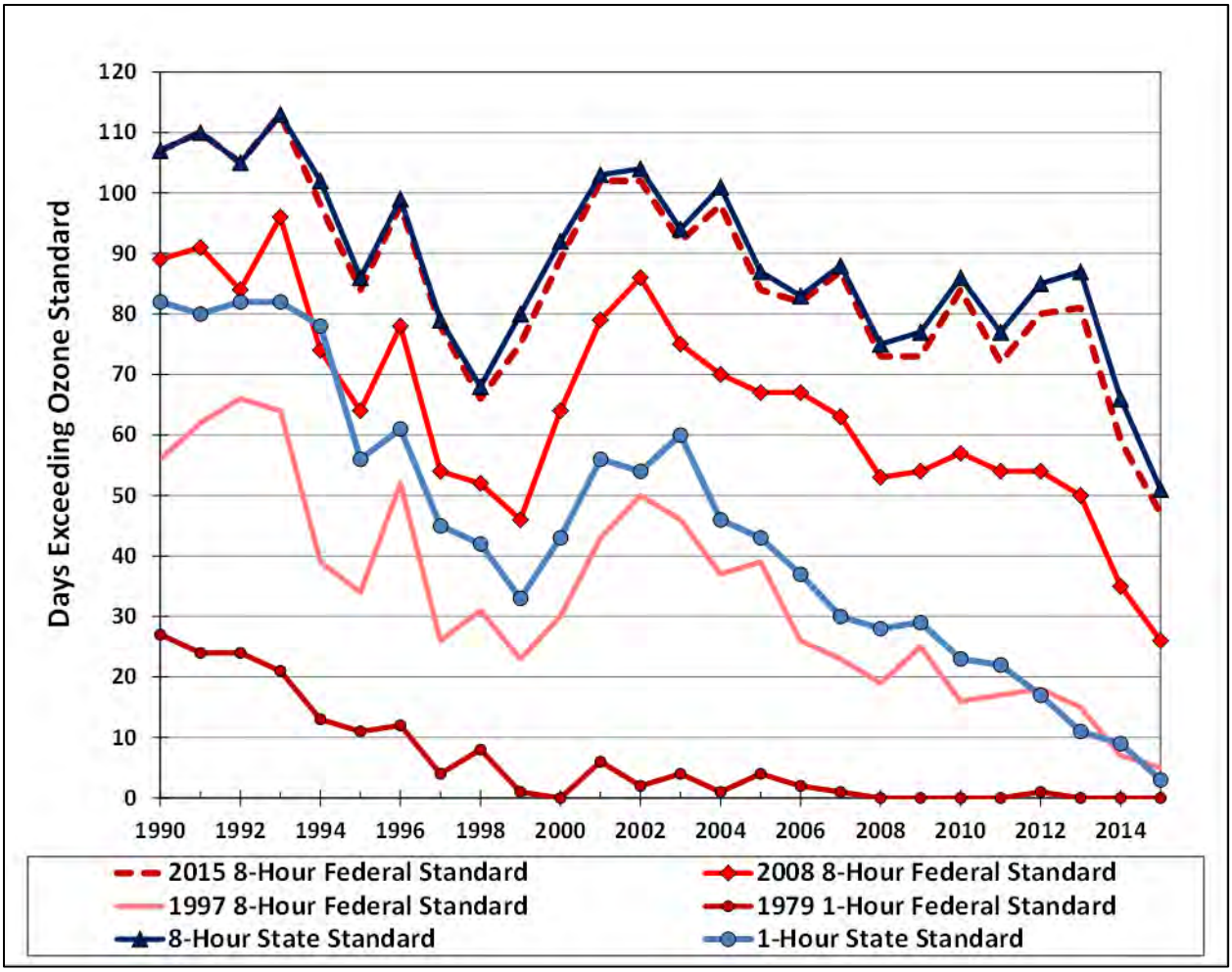

FIGURE 3-5

Number of Days Exceeding Federal and State Ozone Standards
in the Coachella Valley, 1990–2015

(the new 2015 8-hour federal standard is now the current ozone NAAQS, but commitments remain toward timely attainment of the former federal standards; the Coachella Valley has attained the former 1979 federal 1-hour ozone standard)

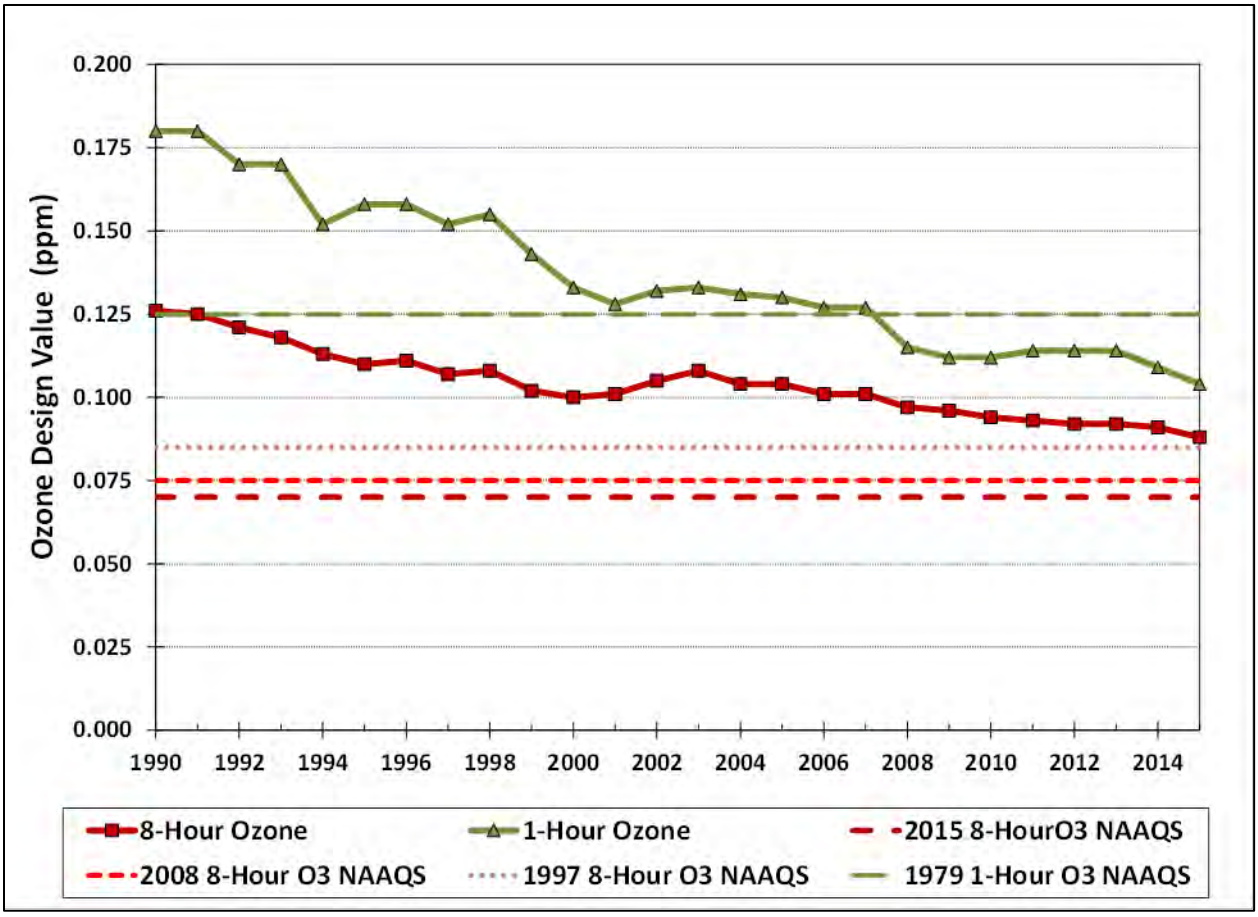

FIGURE 3-6

Coachella Valley Federal 8-Hour and 1-Hour Ozone 3-Year Design Value Trends, 1990–2015

[dashed lines indicate the current 2015, revised 2008, and revoked 1997 8-hour NAAQS and the revoked 1979 1-hour ozone NAAQS (attained); year plotted is the end year of the 3-year design value period]

Tables A-2 through A-10 in the attachment to this appendix show the number of days exceeding the federal 8-hour and 1-hour ozone standards, as well as the fourth highest 8-hour average and maximum 1-hour concentrations, at all routine SCAQMD air quality monitoring stations including the two Coachella Valley sites, for the period 1995–2014. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

Ozone and Ozone Precursor Transport

Pollutant transport from the South Coast Air Basin to the Salton Sea Air Basin occurs through the San Gorgonio Pass (sometimes referred to as the Banning Pass) to the Coachella Valley.[29] The transport pathway to the

[29] Keith, R.W. (1980). A Climatological Air Quality Profile: California's South Coast Air Basin. Staff Report, South Coast Air Quality Management District.

Coachella Valley has been well documented and studied in the past. An experiment in the early 1970s concluded that the South Coast Air Basin was the source of the observed high ozone levels in the Coachella Valley.[30] Transport from Anaheim to Palm Springs was directly identified with an inert sulfur hexafluoride tracer release.[31] A comprehensive study of transport from the South Coast Air Basin to the Salton Sea Air Basin also confirmed the ozone transport pathway to the Coachella Valley.[32]

Ozone pollutant transport to the Coachella Valley can be demonstrated by examining averaged ozone concentrations by time of day for various stations along the transport corridor from Los Angeles County into Riverside County and into the Coachella Valley. Figure 3-7 shows the diurnal distribution of averaged 1-hour ozone concentrations for the May–October smog season, by hour, for the 2012–2014 period. The Coachella Valley transport route is represented, starting at Central Los Angeles as the main emissions source region and passing through Riverside-Rubidoux and Banning and finally through the San Gorgonio Pass to Palm Springs in the Coachella Valley. Near the source regions, ozone peaks occur just after mid-day (1:00 to 2:00 p.m. Pacific Standard Time, PST), on average, during the peak of incoming solar radiation and therefore the peak of ozone production. Ozone peaks near the emissions source region are not as high as those further downwind, due to the photochemical reaction time needed for ozone to form from precursor gases. Downwind of the source region, ozone peaks occur later in the day and at generally higher concentrations as ozone and ozone precursors are transported downwind and photochemical reactions continue. At Palm Springs, ozone concentration peaks occur between 4:00 and 6:00 p.m. PST. If this peak were locally generated, it would be occurring closer to near mid-day, as is seen in the major source areas of the South Coast Air Basin, and not in the late afternoon or early evening, as is seen at Palm Springs.

[30] Kauper, E.K. (1971). Coachella Valley Air Quality Study. Final Report, Pollution Res. & Control Corp., Riverside County Contract & U.S. Public Health Service Grant No. 69-A-0610 RI.

[31] Drivas, P.J., and F.H. Shair. (1974). A Tracer Study of Pollutant Transport in the Los Angeles Area. *Atmos. Environ*. 8, 1155-1163.

[32] Smith, T.B., et al. (1983). The Impact of Transport from the South Coast Air Basin on Ozone Levels in the Southeast Desert Air Basin. CARB Research Library Report No. ARB-R-83-183. CARB Contract to MRI/Caltech. [http://www.arb.ca.gov/research/single-project.php?row_id=64953]

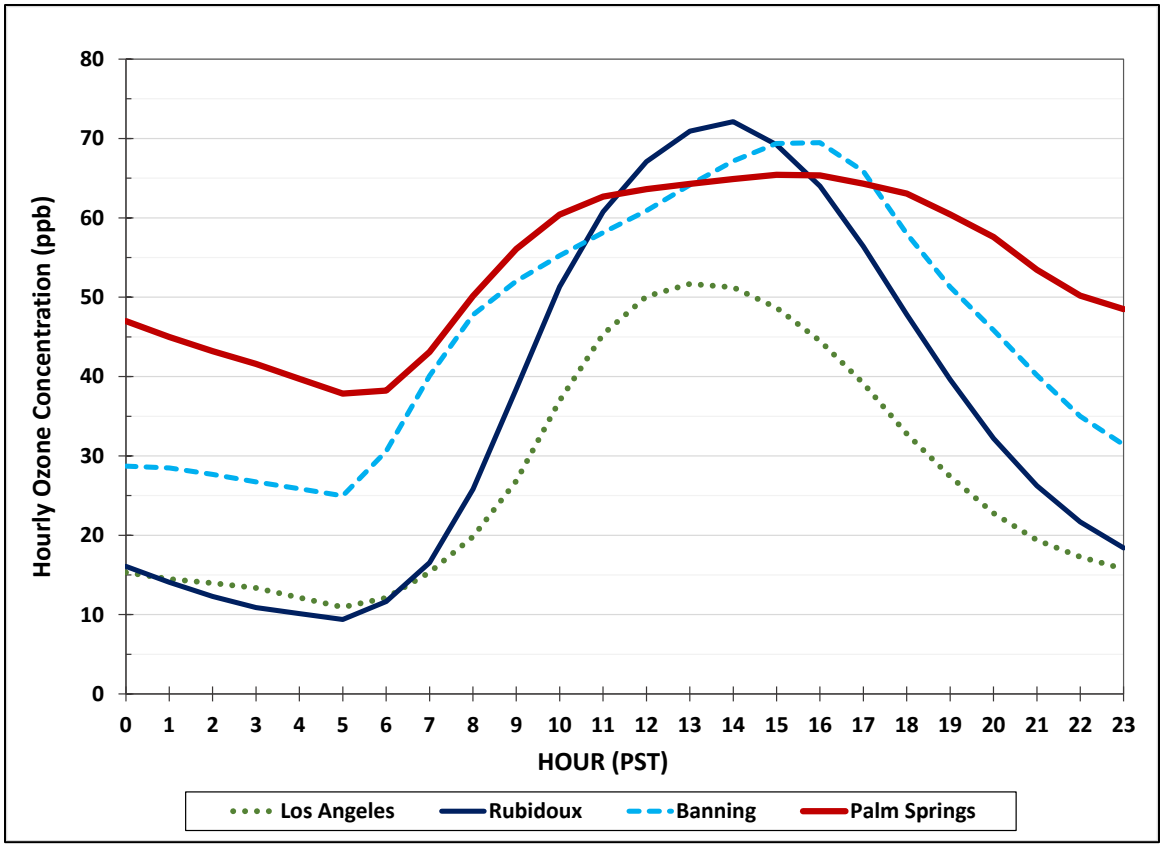

FIGURE 3-7

Diurnal Profile of 3-Year (2012–2014) Hourly Ozone Concentrations
Along the Transport Route into the Coachella Valley
[hours in Pacific Standard Time (PST); averaged for the May-October ozone season by hour]

Palm Springs also exhibits higher morning ozone concentrations, when compared to the concentrations in the morning in the South Coast Air Basin closer to the main emissions source areas (i.e., Los Angeles and Rubidoux). The stations in the South Coast have more local NOx emissions (mostly from mobile sources) that help scavenge[33] the ozone after dark when ozone photochemistry ceases. The Coachella Valley has limited local NOx emissions to help scavenge the ozone at night. This elevated overnight ozone contributes to an early morning start to the daily ozone increase in Coachella Valley, starting after sunrise (5-6 a.m. PST), with the ample sunlight and strong overnight temperature inversions in the desert. Ozone concentrations observed on high ozone days in the Coachella Valley can reach an initial peak before noon and then drop slightly with increased mixing in the early afternoon, before climbing to the daily peak, typically between 4 and 6 p.m., as the typical onshore flow reaches the Coachella Valley through the San Gorgonio Pass, transporting new ozone from the South Coast Air Basin.

[33] Freshly emitted NOx includes NO, which destroys ozone through a fast reaction colloquially termed 'scavenging.'

Fine Particulate Matter (PM2.5)

SCAQMD began PM2.5 fine particulate monitoring in both the Coachella Valley and the Basin in 1999. Two long-term, routine stations (Palm Springs and Indio) measure PM2.5 with 24-hour filter-based FRM measurements every third day, as required by U.S. EPA monitoring regulations. PM2.5 has remained relatively low, especially when compared to the South Coast Air Basin, due to fewer combustion-related emissions sources and less secondary aerosol formation in the atmosphere. There is also typically increased vertical mixing and horizontal dispersion in the desert areas. When looking at the 3-year design value for the 2013-2015 period, the Coachella Valley PM2.5 24-hour design value (17 $\mu g/m^3$) is 48 percent of the 24-hour NAAQS (35 $\mu g/m^3$) and the annual average design value (8.0 $\mu g/m^3$) is 66 percent of the current (2012) annual NAAQS (12.0 $\mu g/m^3$).

Figure 3-8 shows the trend of 3-year design values for annual average and 24-hour PM2.5 from 2001 through 2015. The stations in the Coachella Valley have not violated the 3-year design value form of the current standards since monitoring began. The annual average for the first year of measurements (1999) was just slightly above the level of the standard as can be seen in the trend of the annual average PM2.5 concentrations, as shown in Figure 3-9, along with annual trend of PM10. As was seen elsewhere in California, the increasing trend in the 24-hour design values in the Coachella Valley after 2012 is likely due, at least in part, to the ongoing drought conditions (see the PM2.5 section in Chapter 2 for additional drought discussion).

There are occasionally some individual days that exceeded the level of the 24-hour PM2.5 standard in the Coachella Valley, due to the PM2.5 fine particulate portion of windblown dust during very high PM10 events caused by high winds. Even though the PM2.5 standard can be exceeded during these exceptional events, the PM2.5 mass is a very small fraction of the total PM10 mass. These events are extreme and can be flagged as exceptional events, but they do not occur frequently enough to violate the 98th percentile form of the 24-hour PM2.5 standard.

The 2015 Coachella Valley maximum 24-hour average and the highest annual average concentrations (24.6 $\mu g/m^3$ and 7.5 $\mu g/m^3$, respectively, both at Indio) were 69 percent and 62 percent of the current federal 24-hour and annual standards. The annual PM2.5 State standard (12.0 $\mu g/m^3$), which is the same level as the federal annual standard, but with different rounding requirements, is also not exceeded in the Coachella Valley.

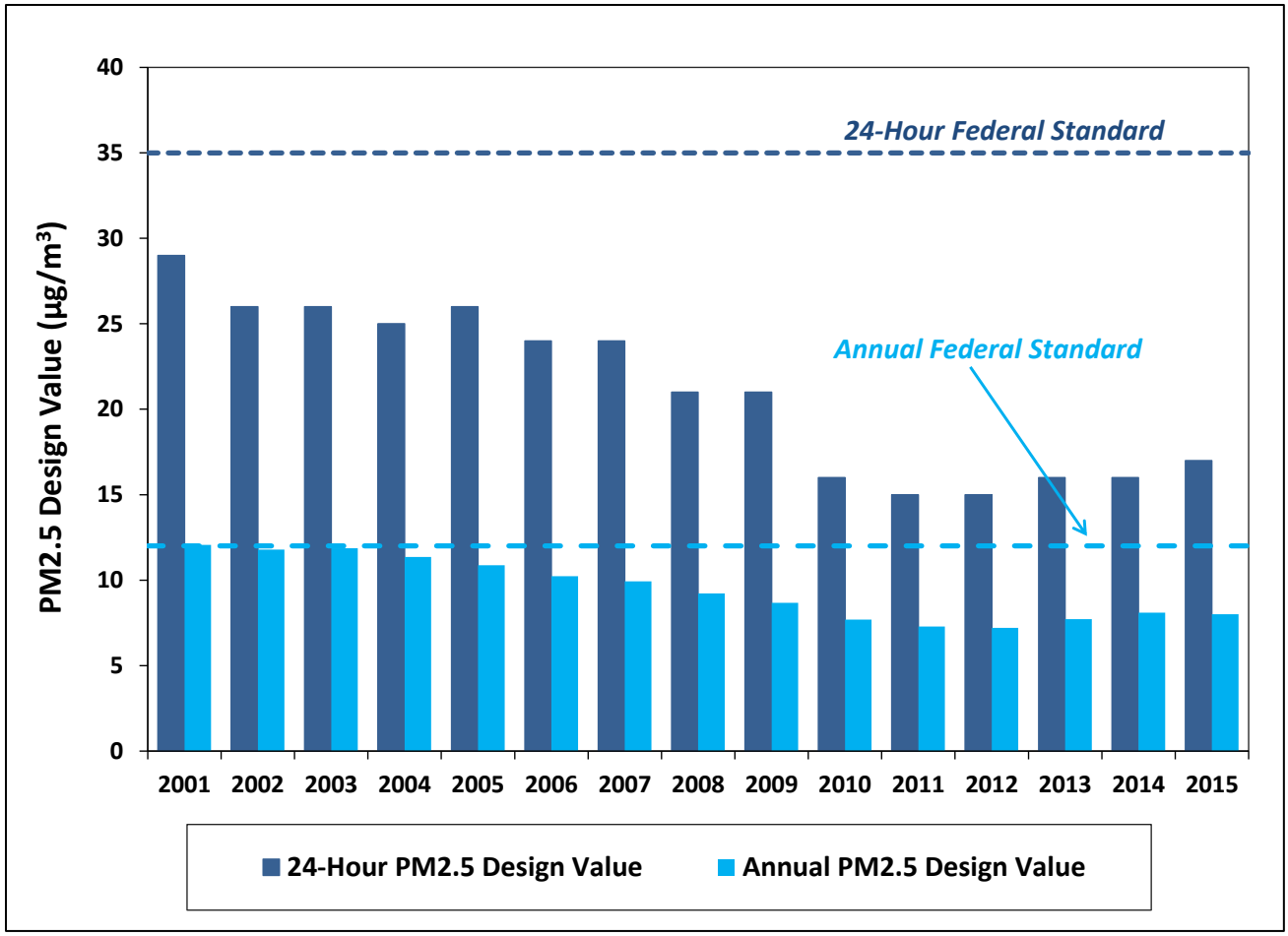

FIGURE 3-8

Coachella Valley Trend of 24-Hour and Annual Average PM2.5 Design Values, 2001–2015

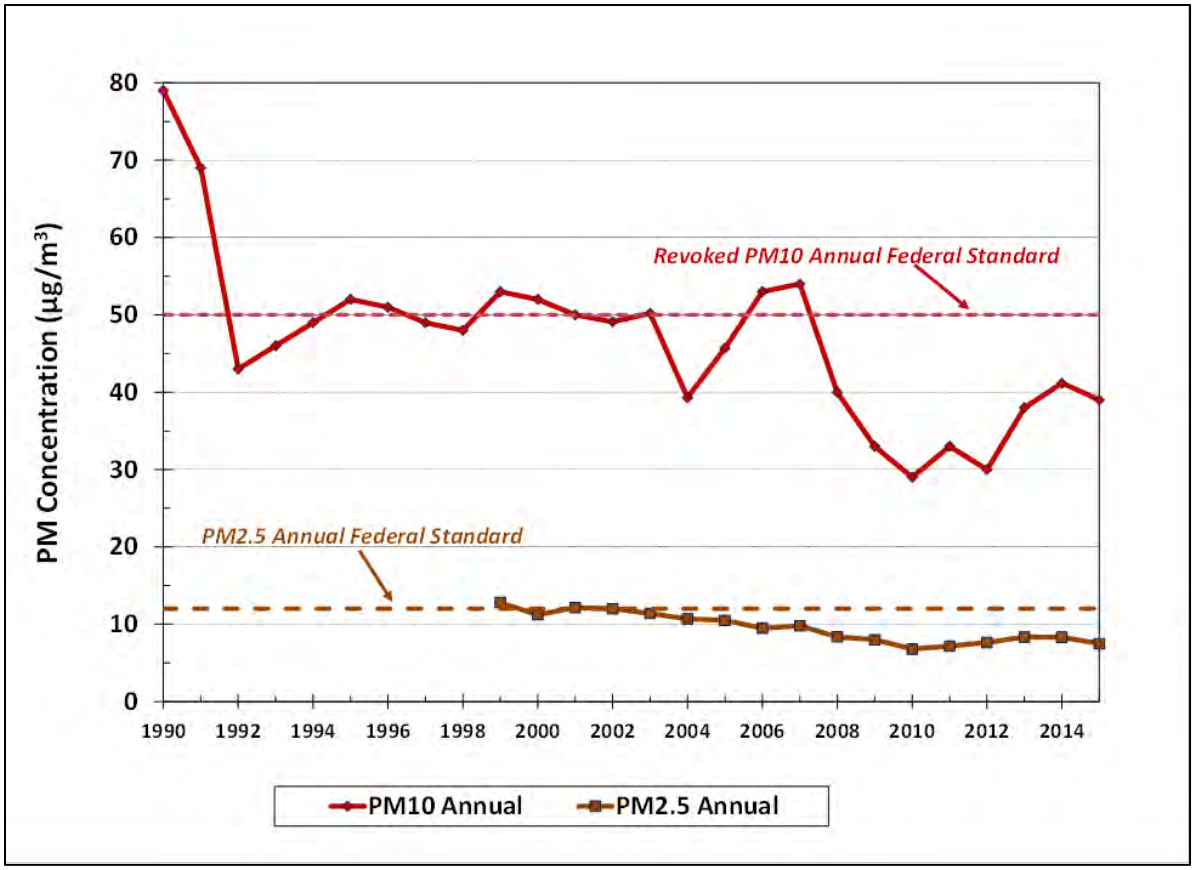

FIGURE 3-9
Coachella Valley Trend of Annual Average PM10 and PM2.5, 1990–2015

Desert Hot Springs PM2.5 Monitoring

In addition to the routine PM2.5 measurements, SCAQMD has been measuring PM2.5 since May 28, 2014 with a continuous FEM instrument in Desert Hot Springs. This station is in the predominantly downwind direction of the 800 megawatt CPV Sentinel natural gas-powered electric generation facility.[34] Through the end of 2015, only a single day, June 19, 2015, exceeded the level of the 24-hour federal standard with a concentration of 52.3 µg/m^3. That high day was associated with a strong windblown dust event that also had very high PM10 concentrations, due to outflows from thunderstorm activity over the desert southwest. Therefore this day would qualify for flagging as a high-wind exceptional event and this PM2.5 concentration was not correlated to power plant emissions. In addition, such occasional single high values over the level of the standard have not caused a violation of the 98th percentile, 3-year design value form of the PM2.5 NAAQS.

The Desert Hot Springs PM2.5 annual average for 2015, the first full year of measurements, was 6.66 µg/m3, well below the 12.0 µg/m3 annual federal standard in this northern Coachella Valley location. While the

[34] Current and historic preliminary data from the Desert Hot Springs temporary special purpose monitor near CPV Sentinel can be found on the SCAQMD website at:
[http://www.aqmd.gov/home/library/air-quality-data-studies/special-monitoring/cpv-sentinel-monitoring]

concentrations from the continuous PM2.5 instruments, such as that used at the Desert Hot Springs station, are typically biased higher than the filter-based FRM PM2.5 measurements, the annual average concentration of 6.7 µg/m3 is slightly above the 2015 FRM PM2.5 annual average measured at Palm Springs (5.8 µg/m3) and slightly below that measured at Indio (7.5 µg/m3).

Particulate Matter (PM10)

PM10 is measured daily at both Indio and Palm Springs by supplementing the (primary) 1-in-3-day Federal Reference Method (FRM) filter sampling at Indio and the 1-in-6-day FRM sampling at Palm Springs with (secondary) continuous hourly Federal Equivalent Method (FEM) measurements at both stations. In addition, a third station has been operational in the community of Mecca in the southeastern Coachella Valley since 2013, measuring PM10 with a real-time FEM sampler. This monitoring was started at the request of U.S. EPA Region IX to help evaluate windblown dust in that portion of the Coachella Valley, which is potentially impacted by high-wind natural events, agricultural activities, and fugitive dust from the exposed shoreline of the receding Salton Sea.

Although exceedances of the ozone standard in the Coachella Valley area are primarily due to the transport of ozone and its precursors from the densely populated areas of the upwind Basin to the west, PM10 in the Coachella Valley is largely due to locally generated sources of fugitive dust (e.g., construction activities, re-entrained dust from paved and unpaved road travel, and natural wind-blown sources). The Coachella Valley is subject to frequent high winds that generate wind-blown sand and dust, leading to high episodic PM10 concentrations, especially from disturbed soil and natural desert blowsand[35] areas. PM10 is the only pollutant which often reaches higher concentrations in the SSAB than in the Basin. All days in recent years that exceeded the 24-hour PM10 NAAQS at the Indio, Palm Springs, or Mecca stations would not have exceeded that standard except for the contribution of windblown dust and sand due to strong winds in the upwind source area (high-wind natural events).

On some of the Coachella Valley's high PM10 days, long-range transport of wind-generated dust and sand occurs with relatively light winds in the Coachella Valley, when entrained dust from desert thunderstorm outflows is transported to the Coachella Valley from the desert areas of southeastern California, Arizona, Nevada or northern Mexico. These events are typically seen in the summer months with southeasterly flows and thunderstorm activity related to the North American Monsoon.[36] In the more extreme cases seen in the southwestern U.S. deserts, a deep wall of dust entrained by the thunderstorm downdraft and outflow can advance long distances from the origin, creating dust storms that are often referred to as *haboobs*.

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[35] The blowsand process is a natural sand migration caused by the action of winds on the vast areas of sand in the Coachella Valley. The sand is supplied by weather erosion of the surrounding mountains and foothills. Although the sand migration is somewhat disrupted by urban growth in the Valley, the overall region of blowsand activity encompasses approximately 130 square miles, extending from near Cabazon in the San Gorgonio Pass to the Salton Sea.

[36] Adams, D.K., and A.C. Comrie. (1979). The North American Monsoon. *Bull. Amer. Meteor. Soc.,* 78, 2197-2213. [http://journals.ametsoc.org/doi/pdf/10.1175/1520-0477%281997%29078%3C2197%3ATNAM%3E2.0.CO%3B2]
_____. (2004). The North American Monsoon. Reports to the Nation on our Changing Planet. NOAA/National Weather Service. [http://www.cpc.noaa.gov/products/outreach/Report-to-the-Nation-Monsoon_aug04.pdf]

On other high PM10 days, local windblown dust and sand is generated from strong winds in the Coachella Valley. Air forced through the San Gorgonio Pass (also referred to as Banning Pass) can create strong northwesterly winds along the centerline of the Coachella Valley. This wind forcing is often related to a marine air mass with a deep marine layer and strong westerly onshore (sea-breeze) flows in the South Coast Air Basin pushing through the San Gorgonio Pass. On other days, storm systems with frontal passages create strong winds through the San Gorgonio Pass and along the Valley. Hourly averaged winds measured near Cathedral City, in the Whitewater River Wash near the centerline of the Coachella Valley, typically exceeded 25 mph for at least one hour on approximately one third of the days in each year.

In 2015, high-wind natural events occurred on eight days that caused high 24-hour PM10 concentrations over the federal standard at the monitors at Indio, Palm Springs, or Mecca. Eight days in 2015 were flagged as exceptional events due to high winds. The days for which PM10 data was flagged for high-wind exceptional events in 2014 and 2015 are summarized in Table 3-3. Seven high-wind events in 2014 and four more in 2015 were associated with strong onshore winds from the Basin through the San Gorgonio Pass and down the Coachella Valley. Two days in 2014 and four days in 2015 had high PM10 due to strong outflows from thunderstorms over Arizona and northern Mexico that entrained dust and sand that was transported into the Coachella Valley. Some of the highest PM10 concentrations measured in the Coachella Valley in 2014 and 2015 occurred because of these monsoonal thunderstorm events.

As was done for similar high-wind events in prior years, the 2014 and 2015 events in the Coachella Valley have been flagged in the U.S. EPA Air Quality System (AQS) database as high-wind exceptional events, in accordance with the U.S. EPA Exceptional Events Rule, with further documentation and U.S. EPA concurrence pending. After excluding days flagged due to high-wind natural events, the federal 24-hour and former annual PM10 standards were not exceeded at the Coachella Valley stations in 2014, nor in 2015. Therefore, the maximum 2015 24-hour PM10 concentration (152 $\mu g/m^3$) and annual average (39 $\mu g/m^3$) were 100 and 78 percent of the current 24-hour federal PM10 standard and the revoked annual federal standard (50 $\mu g/m^3$), respectively.[37]

[37] Technically, a 24-hour PM10 concentration ≥ 155 $\mu g/m^3$ is required to exceed the federal standard, due to rounding requirements. While Coachella Valley concentrations near, but below 155 $\mu g/m^3$, are also influenced by high winds, exceptional event flagging may only apply to data that exceeds a NAAQS. Likewise, the revoked federal annual PM10 standard required an annual PM10 concentration ≥ 50.1 $\mu g/m^3$ to exceed that standard.

TABLE 3-3

High-Wind Exceptional Event Days in the Coachella Valley in 2014 and 2015

Date	Palm Springs PM10 (µg/m³)	Indio PM10 (µg/m³)	Mecca PM10 (µg/m³)#	Event Description
03/26/2014	113*	**168**	123*	high winds
04/12/2014	57*	**243**	**183***	high winds
04/13/2014	32*	**168**	132*	high winds
04/25/2014	49*	52	**183***	high winds
05/10/2014	73*	**215**	**226***	high winds
06/13/2014	29*	101	**183***	high winds
06/27/2014	38*	**165**	130*	high winds
07/27/2014**	106*	152	152*	high winds – monsoonal thunderstorms
08/18/2014	**313***	**298**	**237***	high winds – monsoonal thunderstorms
05/07/2015	15*	ND	**209***	high winds
07/08/2015	23*	**174**	**180***	high winds – monsoonal thunderstorms
07/17/2015	**161**	**337**	**306***	high winds – monsoonal thunderstorms
08/19/2015	48*	**181**	147*	high winds – monsoonal thunderstorms
09/09/2015	**187**	**176**	128*	high winds – monsoonal thunderstorms
11/02/2015	ND	**182**	87*	high winds
12/14/2015	11*	55	**203***	high winds
12/26/2015	13*	100	**300***	high winds

ND = No Data

Bold text indicates concentrations in excess of the PM10 NAAQS

In 2014 Mecca PM10 monitor was considered special purpose for evaluation purposes and the data was not submitted to the U.S. EPA AQS database; the 2014 Mecca data considered preliminary and subject to change in validation; 2015 Mecca FEM PM10 data was submitted to the AQS database, including exceptional event flags

* Indicates measurement with continuous FEM (TEOM) instrument; FRM filter is primary measurement when available

** Peak measured concentrations on 7/27/14 did not technically exceed the federal PM10 standard, which requires a 24-hour average of 155 µg/m³, or above to exceed

When considering the form of the federal PM10 standards, after excluding the flagged high-wind exceptional events, the 3-year (2013–2015) design values for the Coachella Valley are 150 µg/m^3 for the 24-hour average and 38 µg/m^3 for the annual average (former standard). These are 100 and 70 percent of the 24-hour and former annual PM10 federal standards, respectively, and 304 and 190 percent of the California State 24-hour (50 µg/m^3) and annual average (20 µg/m^3) PM10 standards. Figure 3-9 (in the previous section) shows the trend of the annual average PM10 concentrations in the Coachella Valley for the station showing the highest PM10 measurements from 1990 through 2015, along with the annual PM2.5 trend.

For each routine District ambient air monitoring station, the annual arithmetic mean, percent of sampling days exceeding State and federal standards, and maximum 24-hour average PM concentrations are shown in Tables A-11 to A-19 in the attachment to this appendix for the years 1995-2015. Please refer to Appendix II from the 2003 AQMP for the 1976–1989 prior-year statistics and to Appendix II from the 2007 AQMP for 1990–2005 data.

Carbon Monoxide (CO)

Carbon monoxide was measured at one Coachella Valley air monitoring station (Palm Springs) in 2015. Neither the federal nor State standards were exceeded. The maximum 8-hour average CO concentration recorded in 2015 (0.7 ppm) was less than 8 percent of both the federal (9 ppm) and State (9.0 ppm) 8-hour standards. The maximum 1-hour CO concentration (2.0 ppm) was 6 percent of the federal (35 ppm) and 10 percent of the State (20 ppm) 1-hour CO standards. Historical carbon monoxide air quality data show that the Coachella Valley area has not exceeded the federal CO standards in nearly three decades.

For the 3-year period 2013–2015, the 1-hour and 8-hour design values were 1.9 ppm and 0.5, 5 and 6 percent, respectively, of the federal standards (10 percent of the State 1-hour standard and 6 percent of the State 8-hour standard).

The annual maximum 8-hour CO concentrations at all District air monitoring stations, including the Coachella Valley, are shown in Table A-20 in the attachment, for the period 1995-2015.

Nitrogen Dioxide (NO_2)

Nitrogen dioxide was measured at one station (Palm Springs) in the Coachella Valley in 2015. The maximum 1-hour average NO_2 concentration (41.5 ppb) was 42 percent of the 2010 federal 1-hour standard (100 ppb) and 23 percent of the State 1-hour standard (180 ppb). The maximum annual average NO_2 concentration (0.0062 ppm) was approximately 12 percent of the federal annual standard (0.0534 ppm) and 21 percent of the State annual standard (0.030 ppm).

For the 3-year of 2013–2015, the NO_2 design values for the Coachella Valley were 39 ppb for the 1-hour average and 0.0069 ppm for the annual average, 39 percent and 13 percent of those NAAQS, respectively.

The annual averages and annual maximum 1-hour average NO_2 concentrations for each monitoring station in the District (including the Coachella Valley) for the years 1995–2015 are shown in Tables A-21 and A-22, in the attachment to this appendix.

Sulfur Dioxide (SO_2)

Sulfur dioxide was not measured in the Coachella Valley in 2015. Historic analyses have shown SO_2 concentrations to be well below the State and federal standards and there are no significant emissions sources of SO_2 in the Coachella Valley.

Sulfates (SO_4^{2-})

Sulfate, from FRM PM10 filters, was measured at two stations (Palm Springs and Indio) in the Coachella Valley in 2015. The 2015 maximum 24-hour average sulfate concentration was 4.6 µg/m^3 and the 3-year maximum State designation value was 2.6 µg/m^3 (10 percent of the 25 µg/m^3 State sulfate standard). While still low, the 4.6 µg/m^3 peak value may not be the State designation value, since it was associated with a high-wind exceptional event that caused exceedances of the PM10 NAAQS at Indio at both the Palm Springs and Indio air monitoring stations. There is no federal sulfate standard.

The maximum 24-hour average concentrations at each SCAQMD air monitoring station, including the Coachella Valley, for the years 1995–2015 are shown in Table A-24 in the attachment.

Lead (Pb)

Lead concentrations were not measured in the Coachella Valley in 2015. Historic analyses have shown concentrations to be less than the State and federal standards and no major sources of lead emissions are located in the Coachella Valley.

Hydrogen Sulfide (H_2S)

SCAQMD started measuring H_2S near the Salton Sea at two locations in November 2013, in order to better understand odor events related to the Salton Sea and to better communicate these events to the community. One of the H_2S monitoring stations is located on Torres-Martinez tribal land that is close to the shore, in a sparsely populated area. The second monitor is located at the SCAQMD Mecca air monitoring station site (Saul Martinez Elementary School), a more populated community approximately four miles north of the Salton Sea.

A significant H_2S odor event occurred in September 2012, bringing sulfur or rotten-egg odors and widespread attention to this issue of H_2S odors from the Salton Sea. This event affected people in communities throughout the Coachella Valley, across many areas of the South Coast Air Basin, and into portions of the Mojave Desert Air Basin to the north. Over 235 complaints were registered with SCAQMD during this event, from as far west as the San Fernando Valley in Los Angeles County.

The H_2S produced in the Salton Sea is a product of anaerobic organic decay that is particularly active in the summer months, especially at the bottom of the shallow Sea with the abundant desert sunlight and heat. The 2012 event occurred during a period of moist southeasterly “monsoonal” flows in desert areas of southeastern California, along with desert thunderstorms. Strong outflow winds from thunderstorms to the south crossed the Salton Sea, causing mixing in the water layers that released and transported significant amounts of H_2S gas and the associated odors.

While strong events like that of September 2012 are uncommon, less extreme releases of H_2S can frequently cause odors in areas close to the Salton Sea. These events are more prevalent during the hot summer months, especially when the southeasterly "monsoonal" flow events occur, but they sometimes occur at other times of the year. Elevated H_2S concentrations are typically measured near the Salton Sea during wind shifts that bring flows from the south or east directions. These shifts occur most often in the early morning or the late afternoon/early evening hours in this area. The Salton Sea's receding shorelines and shallower waters may affect the number or severity of these odor events in the future.

While there is no federal standard for H_2S, the State of California has set a standard of 30 parts per billion (ppb), averaged over one hour as a level not to be reached or exceeded. The State standard was adopted in 1969, based on the thresholds for annoyance and unpleasant odors, with the purpose of decreasing odor annoyances.[38] Humans can detect H_2S odors at extremely low concentrations, down to a few ppb. Above the State standard, most individuals can smell the offensive odor and many may experience temporary symptoms such as headaches and nausea due to unpleasant odors. The CAAQS for H_2S was reviewed in 1984 and retained.

In 2014 and 2015, 24 and 27 days, respectively, had exceedances of the 1-hour State H_2S standard at the sparsely populated Torres-Martinez monitoring site at the Salton Sea. Of these, five days in 2014 and 12 days in 2015 had H_2S exceedances that lasted longer than one hour. The highest number of hourly exceedances in a day was 20, on September 9, 2015, while the next highest number of hours exceeding was six. The exceedances at this station occurred between the beginning of April and the end of October, with most occurring in August and September. The highest 1-hour concentration measured at the Torres-Martinez station in 2014 and 2015 was 183 ppb, on September 9, 2015.

Further north from the Salton Sea in Mecca, the State H_2S standard was exceeded on three days in 2014 and on 6 days in 2015, with a peak concentration of 129 ppb on September 3, 2015. The most hours in a day to exceed the standard at Mecca was six, on September 9, 2014. Most of the daily exceedances only lasted one or two hours. All the 2014 and 2015 Mecca exceedances occurred in the months of August and September. Figure 3-10 shows the 2014 and 2015 monthly number of days by station exceeding the State H_2S standard in the Coachella Valley.

[38] Collins, J., and D. Lewis. (2000). Hydrogen Sulfide: Evaluation of Current California Air Quality Standards with Respect to Children. California Office of Environmental Health Hazard Assessment document prepared for CARB. [http://www.arb.ca.gov/ch/ceh/001207/h2s_oehha.PDF]

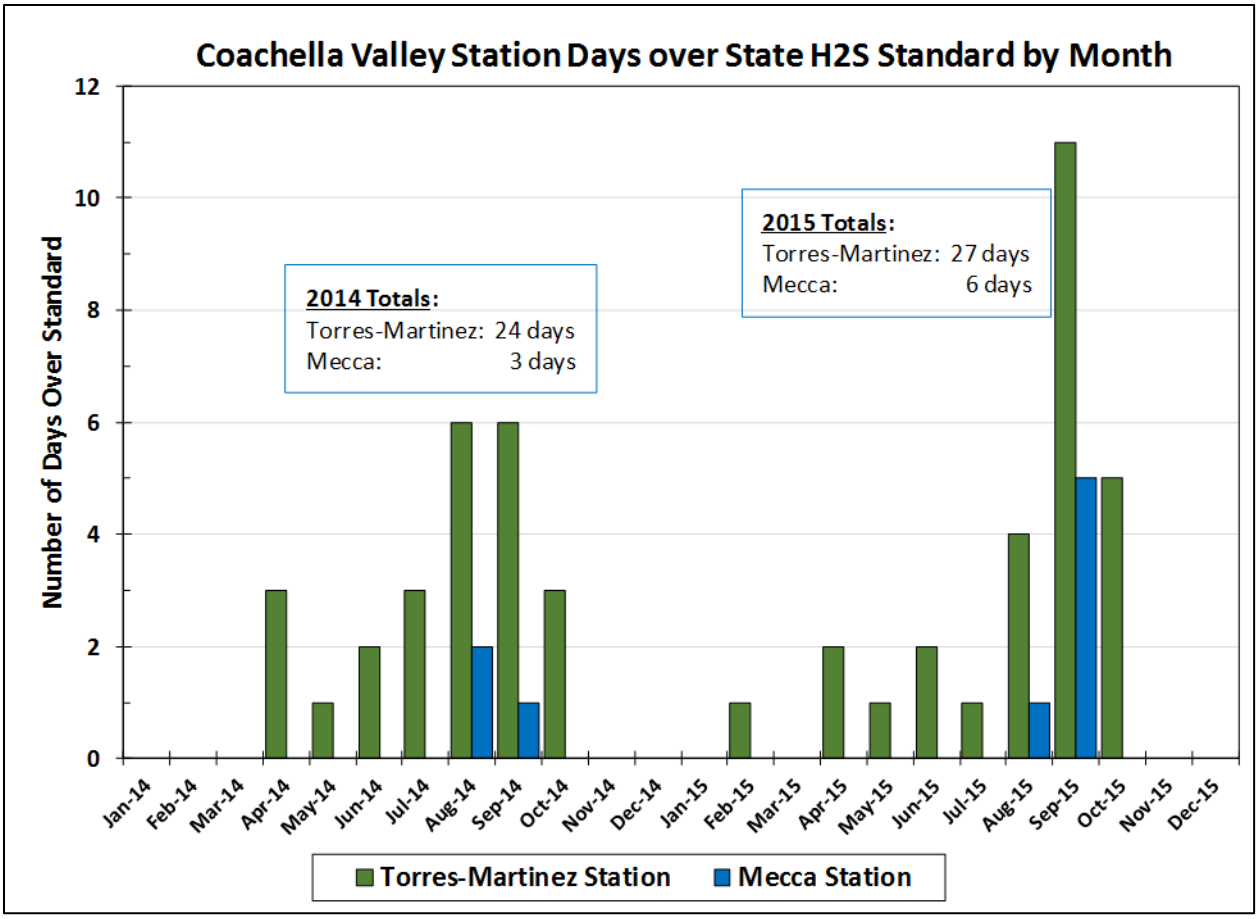

FIGURE 3-10

Number of Days in Each Month with 1-Hour Hydrogen Sulfide (H_2S) over the State Standard in 2014 and 2015 for Coachella Valley Monitoring Stations

(the Salton Sea near-shore site is labeled Torres-Martinez and the nearby community site is Mecca)

ATTACHMENT TO APPENDIX II

TABLE A-1
Air Monitoring Stations and Source/Receptor Areas*

AREA #	SOURCE/RECEPTOR AREA*	LOCATION	STN #
LOS ANGELES COUNTY			
1	Central LA	Los Angeles	087
2	Northwest Coastal LA County	West Los Angeles	091
3	Southwest Coastal LA County 1	Hawthorne (moved)	094
3	Southwest Coastal LA County 2	LAX-Hastings	820
4	South Coastal LA County 1	North Long Beach (closed in 2013)#	072
4	South Coastal LA County 2	South Long Beach	077
4	South Coastal LA County 3	Long Beach, Port	033
6	West San Fernando Valley	Reseda	074
7	East San Fernando Valley	Burbank (closed in 2014)	069
8	West San Gabriel Valley	Pasadena	088
9	East San Gabriel Valley 1	Azusa	060
9	East San Gabriel Valley 2	Glendora	591
10	Pomona/Walnut Valley	Pomona	075
11	South San Gabriel Valley	Pico Rivera	085
12	South Central LA County 1	Lynwood (moved)	084
12	South Central LA County 2	Compton	112
13	Santa Clarita Valley	Santa Clarita	090
ORANGE COUNTY			
16	North Orange County	La Habra	3177
17	Central Orange County	Anaheim	3176
18	North Coastal Orange County	Costa Mesa	3195
19	Saddleback Valley 1	El Toro (moved)	3186
19	Saddleback Valley 2	Mission Viejo	3812
RIVERSIDE COUNTY			
22	Norco/Corona	Norco	4155
23	Metropolitan Riverside County 1	Riverside – Rubidoux	4144
23	Metropolitan Riverside County 2	Riverside – Magnolia (closed in 2015)	4146
23	Metropolitan Riverside County 3	Mira Loma	4165
24	Perris Valley	Perris	4149
25	Elsinore Area	Lake Elsinore	4158
26	Temecula Valley	Temecula – Lake Skinner	4031
29	Banning Airport	Banning Airport	4164
30	Coachella Valley 1**	Palm Springs	4137
30	Coachella Valley 2**	Indio	4157
30	Coachella Valley 2**	Mecca (started PM10 in 2013)	4157
SAN BERNARDINO COUNTY			
32	Northwest San Bernardino Valley	Upland	5175
33	Southwest San Bernardino Valley	Ontario (closed in 2014)	5817
34	Central San Bernardino Valley 1	Fontana	5197
34	Central San Bernardino Valley 2	San Bernardino	5203
35	East San Bernardino Valley	Redlands	5204
37	Central San Bernardino Mountains	Crestline – Lake Gregory	5181
38	East San Bernardino Mountains	Big Bear Lake	5818

* Source/receptor areas and area numbers are mapped in Figure A-1
The four near-road monitoring sites started in 2014-2015 are not listed, please refer to Chapter 1 of this appendix for more information
** Salton Sea Air Basin
# Site continues to monitor filter based (FRM) PM2.5

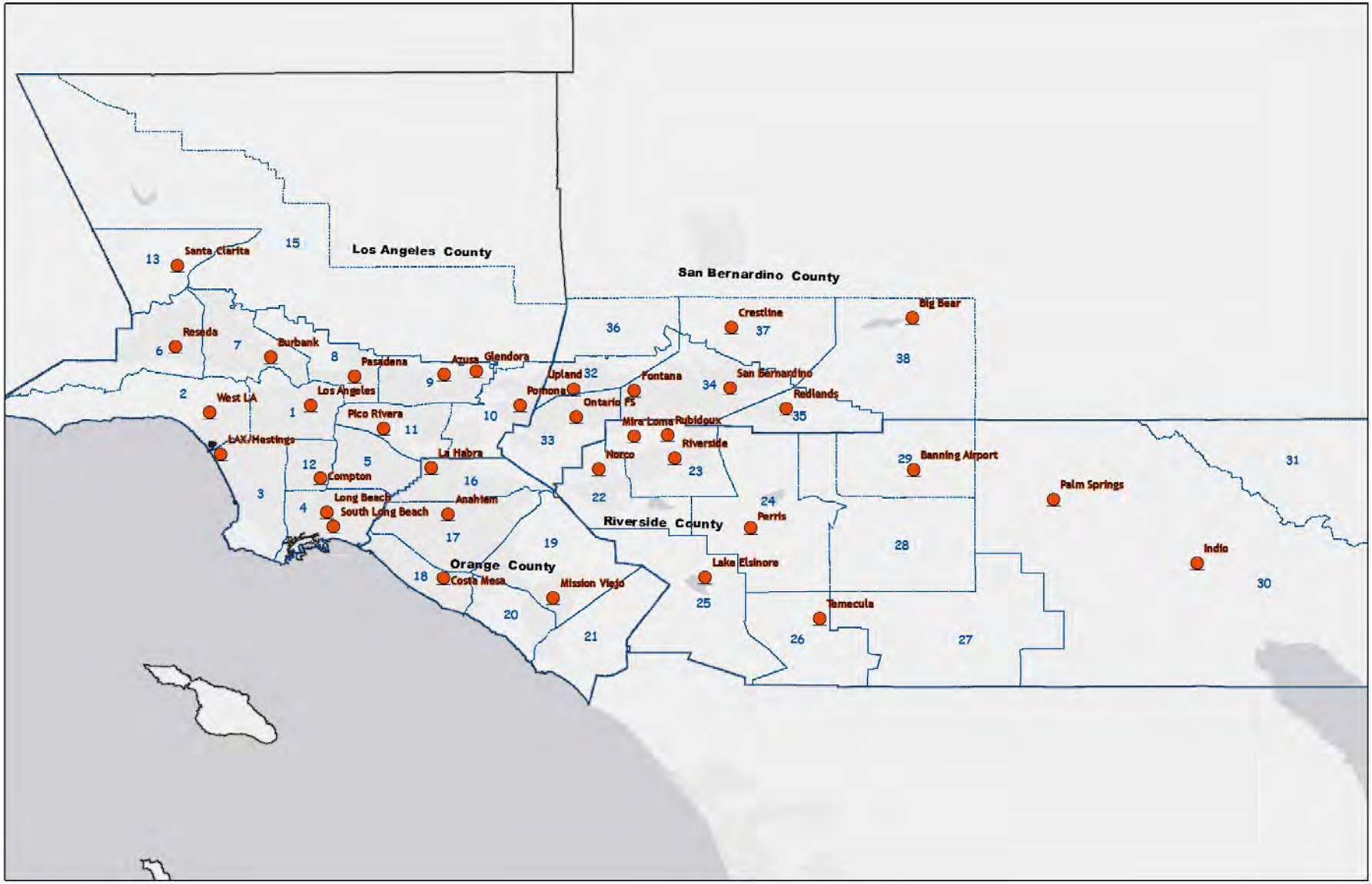

FIGURE A-1
South Coast Air Basin and Adjoining Areas of Salton Sea Air Basin
(with Source/Receptor Areas)

TABLE A-2
Ozone – Number of Days Exceeding the 2015 Federal Standard
(0.070 ppm, 8-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	104	65	41	40	26*	32	33	26	48	35	20	24	27	37	29	8	18	18	15	18	27
069	East San Fernando Valley	58	37	20	29	27	29	20	21	43	48	22	32	18	31	27	8	10	15	17	2	--
072	South Coastal Los Angeles County 1	4	5	1*	3	2	2	0	0	0	2	0	0	1	1	0	1	0	0	0	--	--
033	South Central Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	0	0	0	1	0
074	West San Fernando Valley	48	68	18	32	12	12	34	60	91	82	43	55	43	37	28	35	35	38	20	27	32
075	Pomona/Walnut Valley	84	41	20	34	18	19	13	32	46	36	30	40	26	46	36	10	23	28	22	53	53
084	South Central Los Angeles County 1															--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	0	0	0	1	4	1
085	South San Gabriel Valley	59	31	22	29	9	11	7	5	17	12	--	8*	8	12	5	1	1	6	1	7	11
087	Central Los Angeles	32	23	9	14	11	10	8	6	14	13	3	7	4	6	5	1	0	2	0	6	6
088	West San Gabriel Valley	83	54	26	33	18	36	32	28	52	46	19	34	17	26	19	5	13	20	2	13	18
090	Santa Clarita Valley	81	79	63	50	42	50	50	102	100	91	79	78	62	79	75	40	51	81	57	64	52
091	Northwest Coastal Los Angeles County	14	19	12	2	3	4	2	5	19	13	10	2	2	8	5	3	0	1	1	5	2
094	Southwest Coastal Los Angeles County 1	9	11	13	0	1	1	14	1	3	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	17	2	0	1	1	0	0	0	1	1	6	3
591	East San Gabriel Valley 2	117	88	67	61	29	48	65	47	67	49	36	41	41	60	62	41	40	57	40	58	48
ORANGE COUNTY:																						
3176	Central Orange County	15	10	1	10	1	8	0*	3	15	49	7	4	6	10	2	1	1	0	0	6	1
3177	North Orange County	27	23	9	14	8	11	5	4	12	11	2	11	9	14	8	4	3	3	2	6	7
3186	Saddleback Valley 1				--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	11	3	1	10	1	3	1	0	17	11	2	0	1	5	3	2	1	1	2	6	2
3812	Saddleback Valley 2	--	--	--	--	--	4	16	13	26	32	10	22	10	25	12	2	4	4	5	10	8
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	70	93	75*	63	64	87	98	99	88	86	75	78	81	68	71	76	66	76	76	55	47
4144	Metropolitan Riverside County	117	116	98*	84	64	69	64	89	98	87	79	73	66	85	54	74	90	70	36	66	55
4149	Perris Valley	118	119	78	52	28	89	102	90	81	58	2	97	87	92	88	76	75	64	58	59	49
4157	Coachella Valley 2**	61	55	11	39	49	22	62	63	59	67	56	41	48	43	39	45	40	43	35	24	11
4158	Lake Elsinore	104	24	1	75	90	87	101	90	78	76	68	69	52	88	63	40	43	29	24	13	31
4031	Temecula Valley			--	--	--	--	--	--	--	--	--	--	--	--	--	--					
4164	Banning Airport	40	51	176	93	88	80	94	100	107	89	86	90	58	94	89	75	57	71	65	58	46
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--			60	28	56	58	70	31	52	51
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	108	59	68	57	38	50	59	41	62	46	43	64	54	64	69	52	45	66	44	57	66
5181	Central San Bernardino Mountains	129	132	109	121	127	109	127	128	115	125	119	103	113	114	104	97	102	99	98	93	86
5197	Central San Bernardino Valley 1	96	84	64	64	38	45	54	42	69	68	61	65	55	79	63	49	53	85	66	52	57
5203	Central San Bernardino Valley 2	116	121	110	70	65	68	75	59	83	77	70	70	70	83	76	58	65	74	51	75	78
5204	East San Bernardino Valley	126	130	128	86	77	97	87*	90	109	101	53	78	79	100	90	82	96	98	90	79	76
	District Maximum	129	132	176	121	127	109	127	128	115	125	119	103	113	114	104	97	102	99	98	93	86

* Less than 12 full months of data

** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-3
Ozone – Number of Days Exceeding the 2008 Federal Standard
(0.075 ppm, 8-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	88	53	26	33	19*	27	25	17	35	21	14	17	20	28	17	4	12	10	6	11	17
069	East San Fernando Valley	49	25	15	24	15	23	7	14	38	36	10	23	13	17	14	5	6	8	6	1	--
072	South Coastal Los Angeles County 1	2	2	0*	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	--	--
033	South Central Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0
074	West San Fernando Valley	39	49	11	23	7	10	21	44	73	62	26	33	28	26	19	22	26	23	11	11	15
075	Pomona/Walnut Valley	73	36	16	28	14	10	5	24	38	22	17	27	18	35	23	7	16	15	15	33	36
084	South Central Los Angeles County 1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	0	0	0	1	2	0
085	South San Gabriel Valley	46	24	15	22	4	9	5	3	14	6	--	4*	5	5	3	1	0	0	0	5	2
087	Central Los Angeles	21	17	8	11	5	8	4	6	8	5	2	3	3	3	2	1	0	1	0	2	0
088	West San Gabriel Valley	70	45	21	26	10	25	23	19	40	25	12	23	11	16	12	3	5	9	0	7	7
090	Santa Clarita Valley	66	68	42	39	25	36	41	90	89	74	68	62	44	62	64	28	31	57	40	45	37
091	Northwest Coastal Los Angeles County	10	10	6	2	1	1	1	1	12	5	4	0	2	2	3	1	0	0	0	4	0
094	Southwest Coastal Los Angeles County 1	5	9	8	0	1	0	6	0	1	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	12	1	0	0	0	0	0	0	0	1	3	1
591	East San Gabriel Valley 2	105	69	45	49	19	30	49	33	58	33	26	29	26	45	42	24	30	45	24	38	34
ORANGE COUNTY:																						
3176	Central Orange County	8	7	1	7	1	3	0*	1	11	29	2	3	1	4	1	1	0	0	0	4	1
3177	North Orange County	18	13	8	6	4	7	2	2	7	3	0	7	8	5	3	1	0	2	1	2	2
3186	Saddleback Valley 1	8	11	5	14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	3	2	1	2	0	2	0	0	7	5	0	0	0	3	0	1	1	1	1	4	1
3812	Saddleback Valley 2	--	--	--	--	--	4	8	6	15	16	6	13	5	15	10	2	2	1	2	5	3
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	52	73	54*	47	38	61	77	82	70	55	61	61	58	51	53	55	49	51	46	35	26
4144	Metropolitan Riverside County	104	99	79*	69	46	50	50	64	86	70	55	57	46	64	35	50	68	47	26	41	39
4149	Perris Valley	101	93	67	41	17	71	85	72	72	44	16	83	73	77	67	53	54	46	34	38	31
4157	Coachella Valley 2**	44	46	3	22	30	18	40	45	40	50	34	28	29	27	24	22	19	24	18	10	4
4158	Lake Elsinore	82	18	1	63	64	65	77	67	57	43	41	54	35	69	37	23	28	17	12	6	19
4031	Temecula Valley	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14	4	3	4	6
4164	Banning Airport	--	--	127	63	63	64	72	86	84	64	64	74	43	74	70	62	41	53	41	38	25
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	44	23	47	22	40	36	47	21	29	36
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	97	52	52	47	24	32	52	32	46	28	30	51	35	50	49	42	36	45	27	42	53
5181	Central San Bernardino Mountains	113	120	89	111	104	94	103	112	107	92	98	96	93	97	92	75	84	86	72	68	61
5197	Central San Bernardino Valley 1	88	75	47	56	30	26	43	34	69	48	45	46	43	58	48	38	39	62	42	37	39
5203	Central San Bernardino Valley 2	109	105	89	60	54	50	62	42	62	55	56	56	51	63	62	47	39	54	36	51	57
5204	East San Bernardino Valley	118	111	105	72	68	76	73*	74	101	74	44	62	58	75	73	61	80	79	63	55	54
	District Maximum	118	120	127	111	104	94	103	112	107	92	98	96	93	97	92	75	84	86	72	68	61

* Less than 12 full months of data

** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-4
Ozone – Number of Days Exceeding the 1997 Federal Standard
(0.084 ppm, 8-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	68	36	17	22	7*	15	18	11	21	10	6	10	14	14	7	0	3	2	1	3	7
069	East San Fernando Valley	29	11	6	13	3	11	4	5	21	7	2	12	7	8	5	0	0	2	0	0	--
072	South Coastal Los Angeles County 1	0	0	0*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--
033	South Central Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0
074	West San Fernando Valley	20	28	2	12	0	0	7	27	49	30	12	17	9	14	8	5	7	10	3	2	4
075	Pomona/Walnut Valley	55	22	10	20	8	5	3	14	24	13	11	16	10	19	9	0	6	4	4	9	14
084	South Central Los Angeles County 1															--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	0	0	0	0	0	0
085	South San Gabriel Valley	24	11	7	12	2	4	2	0	2	0	--	3*	2	1	1	1	0	0	0	1	0
087	Central Los Angeles	9	7	3	9	2	4	1	0	2	1	1	0	2	1	1	0	0	0	0	1	0
088	West San Gabriel Valley	53	27	13	17	3	13	9	10	28	10	5	7	6	6	6	0	0	1	0	4	0
090	Santa Clarita Valley	48	42	25	34	11	12	25	52	69	52	47	40	17	35	33	7	18	29	18	16	15
091	Northwest Coastal Los Angeles County	1	4	0	0	0	0	0	0	1	1	1	0	1	1	1	0	0	0	0	2	0
094	Southwest Coastal Los Angeles County 1	3	4	2	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	4	0	0	0	0	0	0	0	0	0	0	0
591	East San Gabriel Valley 2	84	52	24	37	7	21	28	21	40	16	13	15	14	26	19	7	16	14	7	14	11
ORANGE COUNTY:																						
3176	Central Orange County	1	0	1	4	0	1*	0	0	1	8	0	1	1	1	0	1	0	0	0	0	0
3177	North Orange County	8	6	3	4	1	2	2	0	2	0	0	4	2	0	0	1	0	0	0	2	0
3186	Saddleback Valley 1					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
3812	Saddleback Valley 2	--	--	--	--	--	2	2	1	8	4	1	6	2	6	3	0	0	0	0	2	2
RIVERSIDE COUNTY:																						1
4137	Coachella Valley 1**	27	52	26*	30	20	28	39	46	43	32	35	23	21	17	22	14	14	16	11	7	5
4144	Metropolitan Riverside County	78	72	52*	57	22	26	33	35	62	35	32	30	17	38	11	21	35	17	7	12	17
4149	Perris Valley	73	63	36	28	6	39	56	39	46	20	0	53	38	41	29	23	21	11	8	7	12
4157	Coachella Valley 2**	17	23	1	12	7	7	15	15	19	18	18	7	6	8	5	3	6	5	5	2	1
4158	Lake Elsinore	51	10	1	44	33	26	46	41	36	21	15	24	19	32	16	6	12	5	1	1	12
4031	Temecula Valley			--	--	--	--	--	--	--	--	--	--	--	--	--	--					
4164	Banning Airport	18	18	102	39	31	34	47	48	62	41	39	43	16	45	41	21	22	24	11	11	11
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--			23	6	10	22	19	7	6	20
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	78	37	28	39	16	18	30	19	34	18	15	25	18	30	25	10	17	25	12	15	27
5181	Central San Bernardino Mountains	91	96	66	86	82	64	74	82	71	66	69	59	62	67	60	41	48	43	39	41	30
5197	Central San Bernardino Valley 1	72	60	30	42	15	16	31	21	43	29	23	29	19	35	27	7	22	35	21	14	20
5203	Central San Bernardino Valley 2	85	87	63	47	30	23	38	29	45	39	31	29	25	43	27	14	24	27	11	21	29
5204	East San Bernardino Valley	96	88	77	58	36	47	52*	44	72	56	24	36	25	50	43	24	41	43	27	27	30
	District Maximum	96	96	102	86	82	64	74	82	72	66	69	59	62	67	60	41	48	43	39	41	30

* Less than 12 full months of data

** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-5
Ozone – Number of Days Exceeding the Former (1979) 1-Hour Federal Standard
(0.12 ppm, 1-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	63	26	11	19	2*	11	9	5	11	2	4	7	3	7	4	0	0	1	0	0	0
069	East San Fernando Valley	20	6	2	7	0	3	2	1	4	2	2	6	0	1	1	0	0	0	0	0	--
072	South Coastal Los Angeles County 1	0	0	0*	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--	--
033	South Central Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0
074	West San Fernando Valley	8	11	0	7	0	0	2	9	14	2	2	6	1	0	1	0	3	1	0	0	0
075	Pomona/Walnut Valley	47	16	7	18	2	3	1	5	13	4	3	9	2	5	1	0	0	0	1	0	2
084	South Central Los Angeles County 1	0	1	0	0	0	0	0	0	0	0	0	0	0	0*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0	0	0
085	South San Gabriel Valley	20	32	6	10	0	2	1	0	1	0	--	1*	2	0	1	0	0	0	0	0	0
087	Central Los Angeles	5	24	0	5	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
088	West San Gabriel Valley	44	54	5	14	0	7	1	3	7	1	2	5	3	0	3	0	0	0	0	0	0
090	Santa Clarita Valley	26	68	13	16	0	1	9	32	35	13	11	20	2	8	5	1	3	6	2	2	1
091	Northwest Coastal Los Angeles County	1	13	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
094	Southwest Coastal Los Angeles County 1	0	1	0	0	1	0	0	0	0	0*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0*	0	0	0	0	0	0	0	0	0	0	0
591	East San Gabriel Valley 2	73	49	18	28	3	11	13	12	22	5	8	10	3	12	7	0	4	3	1	5	2
ORANGE COUNTY:																						
3176	Central Orange County	2	1	0	2	0*	1	0*	0	2	0	0	0	1	0	0	0	0	0	0	0	0
3177	North Orange County	4	5	1	5	0	1	0	0	1	0	0	3	1	0	0	0	0	0	0	0	0
3186	Saddleback Valley 1	1	2	2	2	0	1*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3812	Saddleback Valley 2	--	--	--	--	--	2*	1	2	4	0	1	0	0	0	0	0	0	0	0	0	0
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	9	12	4*	8	1	0	6	2	4	1	4	2	1	0	0	0	0	1	0	0	0
4144	Metropolitan Riverside County	52	36	13*	32	3	3	7	12	18	8	3	8	2	8	0	1	4	1	0	1	1
4149	Perris Valley	36	31	6	8	0	15	19	4	7	2	1	12	4	4	1	0	2	0	0	0	0
4157	Coachella Valley 2**	3	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4158	Lake Elsinore	23	17	4	22	5	1	12	6	7	2	3	3	3	6	1	0	1	0	0	0	1
4031	Temecula Valley	0	0*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0	0	0	0	0
4164	Banning Airport	--	--	--	25	5	4	16	13	27	7	10	8	1	10	1	0	3	0	0	0	0
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	4	0	4	0	0	1	0	0	1	1
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	67	35	12	30	4	10	14	5	15	3	8	14	7	9	3	1	5	4	3	1	2
5181	Central San Bernardino Mountains	65	62	29	57	30	17	26	22	34	9	18	9	13	16	7	6	8	2	0	1	3
5197	Central San Bernardino Valley 1	57	38	10	32	4	7	13	8	26	7	9	12	9	8	3	2	5	5	2	1	3
5203	Central San Bernardino Valley 2	61	63	32	39	14	7	18	6	19	6	9	10	8	11	2	1	2	0	2	0	6
5204	East San Bernardino Valley	69	65	35	43	12	11	21*	23	38	12	6	11	7	12	1	1	7	3	3	2	2
	District Maximum	73	68	35	57	30	17	26	32	38	13	18	20	13	16	7	6	8	6	3	5	6

* Less than 12 full months of data
** Salton Sea Air Basin
Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-6
Ozone – Annual Maximum 8-Hour Average (ppb)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	146	136	123	147	98	142	130	102	124	104	122	120	113	111	107	81	72	95	85	92	96
069	East San Fernando Valley	115	116	103	124	99	118	104	95	106	109	108	128	96	109	96	84	84	88	83	79	--
072	South Coastal Los Angeles County 1	78	83	73	75	81	81	70	64	68	74	69	58	73	74	67	84	61	67	70	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	63	66	69	72	94
074	West San Fernando Valley	112	124	94	118	84	84	116	121	127	115	113	109	105	103	100	91	103	98	92	92	66
075	Pomona/Walnut Valley	150	126	115	131	103	122	107	111	121	100	112	127	109	110	99	82	96	92	99	99	98
084	South Central Los Angeles County 1	83	86	56	64	67	57	55	64	62	52	63	69	81	--	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	78	60	65	70	80	81	72
085	South San Gabriel Valley	119	104	101	120	98	114	100	79	97	81	65	94	100	93	101	86	74	75	72	92	81
087	Central Los Angeles	107	95	92	111	108	103	99	79	88	91	98	79	102	90	100	80	65	77	69	94	74
088	West San Gabriel Valley	134	126	113	140	96	134	119	101	108	102	114	117	101	100	114	81	84	86	75	96	84
090	Santa Clarita Valley	150	129	129	147	98	110	128	144	152	133	141	120	110	131	122	105	122	112	104	110	108
091	Northwest Coastal Los Angeles County	85	95	84	79	82	79	80	77	104	89	90	74	87	96	94	78	68	73	75	94	72
094	Southwest Coastal Los Angeles County 1	101	93	89	69	84	75	79	72	77	60	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	76	66	75	75	70	70	67	75	81	80	77
591	East San Gabriel Valley 2	158	150	130	171	103	146	134	114	134	107	130	127	117	118	118	99	111	110	100	101	102
ORANGE COUNTY:		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3176	Central Orange County	86	84	87	104	76	97	70	78	87	97	77	88	99	86	77	88	92	67	70	81	80
3177	North Orange County	109	103	100	115	91	99	89	79	87	79	75	114	107	84	82	96	74	78	78	88	82
3186	Saddleback Valley 1	97	101	96	110	81	110	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	81	80	77	85	75	86	73	70	88	87	72	62	72	79	72	76	77	76	83	79	79
3812	Saddleback Valley 2	--	--	--	--	--	87	97	93	105	90	85	105	90	104	95	82	83	78	82	88	88
RIVERSIDE COUNTY:		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4137	Coachella Valley 1**	132	125	117	136	104	104	113	124	110	106	116	109	102	101	98	99	98	100	104	93	92
4144	Metropolitan Riverside County	146	162	129	169	110	112	119	124	140	114	129	117	111	116	100	98	115	102	103	104	105
4149	Perris Valley	161	133	112	129	97	126	135	117	121	104	78	122	116	114	108	107	112	93	90	94	102
4157	Coachella Valley 2**	111	100	94	115	107	96	98	110	105	99	95	90	95	92	90	87	90	89	87	91	85
4158	Lake Elsinore	142	123	85	143	123	104	120	114	137	113	119	109	109	118	105	91	106	89	89	86	98
4031	Temecula Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	85	82	78	100	87
4164	Banning Airport	127	117	148	134	123	112	128	130	146	116	132	116	114	120	104	107	111	98	103	97	97
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	119	104	107	90	94	104	102	96	102	104
SAN BERNARDINO COUNTY:		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5175	Northwest San Bernardino Valley	166	152	132	171	116	149	138	116	134	104	121	131	115	122	121	97	122	111	111	101	106
5181	Central San Bernardino Mountains	203	164	138	206	142	148	139	139	142	145	145	142	137	126	117	123	136	112	105	106	127
5197	Central San Bernardino Valley 1	156	162	133	172	105	138	135	123	148	123	128	123	122	124	128	100	124	110	122	105	111
5203	Central San Bernardino Valley 2	165	173	137	180	132	126	144	112	137	129	129	126	121	122	126	104	121	109	112	99	117
5204	East San Bernardino Valley	174	164	143	186	130	130	143	122	153	135	123	135	124	120	122	111	133	109	119	104	115
	District Maximum	203	173	148	206	142	149	144	144	153	145	145	142	137	131	128	123	136	112	122	110	127

+ Site relocated * Less than 12 full months of data ** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-7
Ozone – Annual Maximum 4th Highest 8-Hour Average (ppb)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	138	127	113	126	95	108	102	97	104	92	87	90	96	101	91	76	82	79	80	81	88
069	East San Fernando Valley	106	98	95	101	84	97	87	91	96	89	81	97	88	92	86	77	81	81	79	69	--
072	South Coastal Los Angeles County 1	71	73	67	65	68	66	60	59	63	70	59	56	56	64	64	57	60	60	60	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	57	54	57	61	87
074	West San Fernando Valley	101	110	83	100	81	80	89	111	119	101	98	103	92	95	93	87	91	95	84	83	56
075	Pomona/Walnut Valley	136	113	95	120	89	88	82	99	109	95	96	108	102	100	95	81	86	85	85	90	94
084	South Central Los Angeles County 1	51	57	53	51	41	50	54	49	57	65	63	64	56	55+	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	64	50	61	64	63	73	65
085	South San Gabriel Valley	105	93	97	102	80	86	81	74	82	78	51	78	79	77	72	59	63	71	70	79	75
087	Central Los Angeles	91	93	81	96	79	85	76	77	82	77	70	75	72	73	73	64	60	68	60	72	72
088	West San Gabriel Valley	130	117	100	117	86	104	90	95	101	93	85	96	89	91	95	75	77	80	70	86	82
090	Santa Clarita Valley	130	123	116	127	95	97	112+	131	137	107	118	112	101	108	103	88	101	102	94	97	91
091	Northwest Coastal Los Angeles County	81	88	78	70	69	71	64	73	83	76	76	67	67	73	75	70	62	65	59	77	69
094	Southwest Coastal Los Angeles County 1	78	86	83	63	66	65	79	64	70	56*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	86*	68	62	66	65	61	59	62	59	60	75	69
591	East San Gabriel Valley 2	148	140	121	142	96	112	110	110	123	95	97	106	104	112	108	91	95	95	88	96	95
ORANGE COUNTY:																						
3176	Central Orange County	82	81	68	87	61	74	66	69	80	88	75	70	73	76	68	64	67	65	63	76	65
3177	North Orange County	96	90	82	93	78	83	73	71	80	75	65	89	82	78	75	71	69	70	66	75	73
3186	Saddleback Valley 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	75	70	70	76	70	67	69	66	79	75	66	60	65	75	66	60	67	60	65	76	68
3812	Saddleback Valley 2	--	--	--	--	--	87	72	81	95	84	78	90	80	92	84	69	74	71	74	78	75
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	106	116	101	108	98	96	111	109	105	99	108	98	97	96	96	93	92	94	90	89	86
4144	Metropolitan Riverside County	142	130	118	136	104	106	109	109	120	111	105	111	99	111	89	94	107	96	94	91	96
4149	Perris Valley	132	122	105	115	91	111	124	107	116	95	82	113	103	106	101	100	94	90	88	89	94
4157	Coachella Valley 2**	96	98	82	97	89	87	93	97	100	94	92	85	87	88	85	84	85	85	85	84	79
4158	Lake Elsinore	126	108	111	128	106	98	111	104	112	102	97	101	97	108	96	88	92	87	81	79	93
4031	Temecula Valley	81	67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	73	77	75	77	79
4164	Banning Airport	101	107	93	81	114+	102	116	113	127	112	119	104	95	108	100	99	100	95	91	94	91
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	105	103	100	109	86	92	96	95	92	87	93
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	145	138	112	137	103	117	120	105	114	102	101	112	112	108	102	91	98	102	95	93	101
5181	Central San Bernardino Mountains	167	155	125	183	133	122	133	131	130	122	130	111	126	120	108	109	106	103	99	102	107
5197	Central San Bernardino Valley 1	143	137	115	132	98	100	123	114	132	111	113	114	112	110	100	94	105	106	100	93	100
5203	Central San Bernardino Valley 2	152	145	127	145	115	111	128	105	123	112	113	118	117	112	101	96	101	100	97	95	105
5204	East San Bernardino Valley	162	138	126	148	115	112	131	117	137	119	113	124	112	112	100	97	113	105	104	99	102
	District Maximum	167	155	127	183	133	122	133	131	137	122	130	124	126	120	108	109	113	106	104	102	107

+ Site relocated * Less than 12 full months of data ** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-8
Ozone – 3-Year 8-HourDesign Values (ppb)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	143	135	126	122	111	109	101	102	101	97	94	89	91	95	96	89	83	79	80	80	83
069	East San Fernando Valley	108	103	99	98	93	94	89	91	91	92	88	89	88	92	88	85	81	79	80	76	74
072	South Coastal Los Angeles County 1	74	73	70	68	66	66	64	61	60	64	64	61	57	58	61	61	60	58	59	60	60
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	58	56	56	57	58
074	West San Fernando Valley	114	106	98	97	88	87	83	93	106	110	106	100	97	96	93	91	90	91	90	87	84
075	Pomona/Walnut Valley	139	129	114	109	101	99	86	89	96	101	100	99	102	103	99	92	87	84	85	86	89
084	South Central Los Angeles County 1	60	56	54	57	48	47	48	51	53	57	61	64	61	58							
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	58	56	58	58	62	66	67
085	South San Gabriel Valley	114	108	98	97	93	89	82	80	79	78	70	69	69	78	76	69	64	63	67	73	74
087	Central Los Angeles	101	100	88	90	85	86	80	79	78	78	76	74	72	73	72	70	65	64	62	66	68
088	West San Gabriel Valley	132	126	115	111	101	102	93	96	95	96	93	91	90	92	91	87	82	77	75	78	77
090	Santa Clarita Valley	145	135	123	122	112	106	101	113	126	125	120	112	110	107	104	99	97	97	99	97	94
091	Northwest Coastal Los Angeles County	87	86	82	78	72	70	68	69	73	77	78	73	70	69	71	72	69	65	62	67	68
094	Southwest Coastal Los Angeles County 1	81	81	82	77	70	64	68	68	69	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	62	64	61	65	64	64	61	60	60	60	64	68
591	East San Gabriel Valley 2	157	146	136	134	119	116	106	110	114	109	105	99	102	107	108	103	98	93	92	93	93
ORANGE COUNTY:																						
3176	Central Orange County	91	88	77	78	72	74	67	69	71	79	81	77	72	73	72	69	65	64	64	68	68
3177	North Orange County	108	101	89	88	84	84	78	75	74	75	73	76	78	83	78	74	71	70	68	70	71
3186	Saddleback Valley 1	93	91	83	83	77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	75	72	71	72	72	71	68	67	71	73	73	67	63	66	68	67	63	60	62	66	70
3812	Saddleback Valley 2	--	--	--	--	--	--	79	80	82	86	85	84	82	87	85	81	74	70	72	74	76
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	110	111	107	108	102	100	101	105	108	104	104	101	101	97	96	95	93	93	92	91	88
4144	Metropolitan Riverside County	150	140	130	128	119	115	106	108	112	113	112	109	105	107	99	98	96	98	98	93	93
4149	Perris Valley	142	132	119	114	103	105	108	114	115	106	97	96	99	107	103	102	98	94	90	89	90
4157	Coachella Valley 2**	95	95	92	92	89	91	89	92	96	97	95	90	88	86	86	85	84	84	85	84	82
4158	Lake Elsinore	130	124	115	115	115	110	105	104	109	106	103	100	98	102	100	97	92	89	86	82	84
4031	Temecula Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	79	77	76	76
4164	Banning Airport	111	111	100	93	96	99	110	110	118	117	119	111	106	102	101	102	99	98	95	93	92
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	104	102	104	98	95	91	94	94	91	89
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	151	144	131	129	117	119	113	114	113	107	105	105	108	110	107	100	97	97	98	96	96
5181	Central San Bernardino Mountains	166	162	149	154	147	146	129	128	131	127	127	121	122	119	118	112	107	106	102	101	102
5197	Central San Bernardino Valley 1	149	143	131	128	115	110	107	112	123	119	118	112	113	112	107	101	99	101	103	99	97
5203	Central San Bernardino Valley 2	155	153	141	139	129	123	118	114	118	113	116	114	116	115	110	102	99	98	99	97	99
5204	East San Bernardino Valley	166	155	142	137	129	125	119	120	128	124	123	118	116	116	108	103	103	105	107	102	101
	District Maximum	166	162	149	154	147	146	129	128	131	127	127	121	122	119	118	112	107	106	107	102	102

+ Site relocated * Less than 12 full months of data ** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-9
Ozone – Annual Maximum 1-Hour Average (ppm)

	LOCATION	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
087	Central Los Angeles	.34	.21	.30	.31/	.29	.32	.40	.26	.29	.30	.22	.22	.21	.25
060	East San Gabriel Valley 1	.38	.32	.40	.45	.41	.35	.36	.39	.31	.36	.31	.30	.30	.33
069	East San Fernando Valley	.35	.31	.30	.39	.35	.27	.25	.31	.26	.30	.28	.23	.24	.20
091	Northwest Coastal Los Angeles County	.28	.18/	.24/	.26	.21	.23	.28	.23	.27/	.27	.20	.28	.24	.25
072	South Coastal Los Angeles County 1	.16	.15	.19	.21	.20	.23	.22	.30	.27	.23	.18	.17	.16	.16
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
074	West San Fernando Valley	.27	.34	.27	.33	.38	.25	.22	.26	.26	.25	.22	.22	.25	.23
075	Pomona/Walnut Valley	.36	.32	.41	.35	.37	.33	.31	.34	.31	.33	.27	.29	.29	.25
094	Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	--	.19	.20	.22	.19
820	Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	--	--	--	--	--
088	West San Gabriel Valley	.34	.32	.42	.44	.41	.33	.37/	.34	.30	.37	.26	.28	.29	.27
090	Santa Clarita Valley	.33	.33	.32	.32	.36	.29	.26/	.29	.27	.24	.24	.21	.30	.25
084	South Central Los Angeles County 1	.24	.24	.18	.29	.18	.21	.26	.23	.27	.21	.20	.24	.21	.14
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
085	South San Gabriel Valley	.35	.32	.43	.39	.39	.35	.39	.33	.27	.31	.24	.28	.30	.26
591	East San Gabriel Valley 2	--	--	--	--	.49	.39	.36	.38	.34	.39	.35	.33	.34	.34
3176	Central Orange County	.30	.19	.29	.33	.28	.26	.26	.30	.25	.25	.20	.22	.27	.24
3177	North Orange County	.30	.25	.35	.38	.31	.27	.32	.27	.32	.34	.25	.24	.29	.26
3195	North Coastal Orange County	.16	.18	.22	.21/	.16	.20	.18	.25	.25	.21	.17	.16	.13	--
3186	Saddleback Valley 1	.23	.20	.34	.32	.34	.33	.27	.29	.30	.28	.23	.20	.21	.23
3812	Saddleback Valley 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4137	Coachella Valley 1**	.22	.21	.20	.24	.21	.19	.19	.19	.20	.24	.18	.17	.20	.19
4157	Coachella Valley 2**	.16	.19	.17	.21	.11	.18	.17	.18	.19	.20	--	.16	--	.16
4155	Norco/Corona	.33	.36	.40	.33/	.34	.37	.35	.35	.30	.35	.27	.24	.25	.23
4141	Hemet/San Jacinto Valley	.19	.25	.27	--	--	--	--	--	.18*	.23	.18	.18	.18	.19
4144	Metropolitan Riverside County 1	.36	.35	.39	.34	.37	.30	.31	.36	.32	.35	.25	.29	.28	.27
4149	Perris Valley	.22	.28	.32	.25	.29	.24	.28	.26	.22	.29	.22	.20	.23	.21
4150	San Gorgonio Pass	.28	.27	.30	.27	.26	.23	.24	.26	.25	.29	.22	.21	.26	.23
4164	Banning Airport	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4163	Temecula Valley	.21	.17	.23	--	--	--	--	--	--	--	--	--	--	--
4158	Lake Elsinore	.20	.23	.30	--	--	--	--	--	--	--	--	--	--	.24
5203	Central San Bernardino Valley 2	.32	.37	.36	.34	.36	.36/	.30	.32	.30	.27/	.30	.25	.28	.30
5204	East San Bernardino Valley	.35	.33	.39	.34/	.32	.24	.29	.30	.29	.33/	.29	.24	.29	.27
5175	Northwest San Bernardino Valley	--	--	--	--	--	--	--	.36	.32	.33	.29	.28	.35	.32
5197	Central San Bernardino Valley 1	.38	.39	.42	.42	.42	.35/	.31	.32	.32	.34	.31	.29	.29	.32
5181	Central San Bernardino Mountains 1	.23	.32	.33	.40	.31	.35	.32	.28	.34	.30	.26	.29	.29	.27
	District Maximum	.38	.39	.43	.45	.49	.39	.40	.39	.34	.39	.35	.33	.35	.34

* Less than 12 full months of data
/ Station location change
** Salton Sea Air Basin
Refer to 2003 AQMP for 1955 to 1975 data

TABLE A-9 (CONTINUED)
Ozone – Annual Maximum 1-Hour Average (ppm)

	LOCATION	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
087	Central Los Angeles	.20	.19	.20	.16	.19	.17	.14	.12	.15	.13	.136	.116	.122
060	East San Gabriel Valley 1	.23	.28	.27	.24	.25	.21	.20	.16	.20	.14	.174	.189	.136
069	East San Fernando Valley	.20	.22	.22	.18	.17	.17	.14	.13	.18	.12	.152	.129	.128
091	Northwest Coastal Los Angeles County	.16	.18	.17	.18	.16	.14	.14	.11	.13	.12	.104	.099	.118
072	South Coastal Los Angeles County 1	.12	.11	.15	.14	.16	.11	.11	.10	.12	.13	.118	.091	.084
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--
074	West San Fernando Valley	.19	.22	.17	.19	.14	.15	.21	.12	.16	.10	.109	.140	.152
075	Pomona/Walnut Valley	.24	.24	.26	.21	.24	.22	.19	.16	.18	.14	.152	.144	.150
094	Southwest Coastal Los Angeles County	.10	.11	.15	.13	.11	.12	.13	.11	.09	.15	.095	.098	.088
820	Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	--	--	--	--
088	West San Gabriel Valley	.26	.23	.27	.22	.26	.21	.17	.14	.17	.12	.157	.160	.137
090	Santa Clarita Valley	.23	.24	.22	.22	.26	.21	.17	.16	.18	.12	.131/	.184	.169
084	South Central Los Angeles County 1	.15	.16	.17	.12	.12	.09	.10	.08	.09	.12	.089	.077	.072
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--
085	South San Gabriel Valley	.19	.26	.26	.19	.22	.18	.14	.13	.18	.12	.139	.132	.111
591	East San Gabriel Valley 2	.29	.32	.30	.28	.30	.22	.21	.17	.22	.14	.172	.190	.152
3176	Central Orange County	.18	.25	.22	.17	.21	.13	.13	.10	.11	.10*	.132	.114	.103
3177	North Orange County	.21	.21	.21	.19	.25	.16	.15	.13	.18	.12	.137	.107	.121
3195	North Coastal Orange County	.15	.17	.15	.13	.12	.11	.10	.10	.12	.10	.102	.098	.087
3186	Saddleback Valley 1	.19	.24	.16	.16	.18	.15	.14	.13	.16	.10	.129	--	--
3812	Saddleback Valley 2	--	--	--	--	--	--	--	--	--	--	.119	.125	.136
4137	Coachella Valley 1**	.17	.18	.15*	.17	.17	.16	.16	.16	.17	.13	.124	.137	.136
4157	Coachella Valley 2 **	.16	.18	.14	.16	.12	.14	.12	.11	.13	.13	.112	.114	.114
4155	Norco/Corona	.17	.22	.23	.16	.17	.19	.16	--	--	--	--	--	--
4141	Hemet/San Jacinto Valley	.22	.19	.15	.18	.16	.15	.12	--	--	--	--	--	--
4144	Metropolitan Riverside County	.29	.24	.26	.26	.25	.21	.20	.19	.20	.14	.140	.143	.155
4149	Perris Valley	.19	.20	.21	.20	.18	.20	.18	.14	.15	.11	.164	.152	.147
4150	San Gorgonio Pass	.22	.20	.16	.16	.20	.18	.19	.13	.12/	--	--	--	--
4164	Banning Airport	--	--	--	--	--	--	--	--	.17	.14	.138	.149	.160
4031	Temecula Valley	--	.17*	.13	.13	.10*	.11	.10	--	--	--	--	--	--
4158	Lake Elsinore	.19	.20	.17	.19	.19	.19	.15	.16	.17	.14	.128	.151	.139
5203	Central San Bernardino Valley 2	.29	.25	.28	.21	.25	.20	.24	.20	.21	.16	.149	.184	.147
5204	East San Bernardino Valley	.30	.25	.27	.27	.23	.24	.22	.20	.22	.15	.152	.167*	.158
5175	Northwest San Bernardino Valley	.29	.27	.28	.24	.25	.24	.22	.19	.21	.15	.184	.171	.139
5197	Central San Bernardino Valley 1	.27	.29	.28	.24	.25	.22	.22	.17	.20	.14	.169	.165	.159
5181	Central San Bernardino Mountains 1	.33	.27	.28	.24	.27	.26	.20	.21	.24	.17	.176	.171	.161
	District Maximum	.33	.32	.30	.28	.30	.26	.24	.21	.24	.17	.176	.190	.169

* Less than 12 full months of data / Station location change

** Salton Sea Air Basin

Refer to 2003 AQMP for 1955 to 1975 data

TABLE A-9 (CONCLUDED)
Ozone – Annual Maximum 1-Hour Average (ppm)

	LOCATION	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
087	Central Los Angeles	0.152	0.110	0.121	0.108	0.115	0.109	0.139	0.098	0.087	0.093	0.081	0.113	0.104
060	East San Gabriel Valley 1	0.150	0.134	0.145	0.165	0.158	0.135	0.15	0.104	0.111	0.134	0.115	0.123	0.122
069	East San Fernando Valley	0.134	0.137	0.142	0.166	0.116	0.133	0.145	0.111	0.120	0.117	0.110	0.091	--
091	Northwest Coastal Los Angeles County	0.134	0.107	0.114	0.099	0.117	0.110	0.131	0.099	0.098	0.093	0.088	0.116	0.102
072	South Coastal Los Angeles County 1	0.099	0.090	0.091	0.081	0.099	0.093	0.089	0.101	0.073	0.084	0.092	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	0.074	0.080	0.090	0.087	0.087
074	West San Fernando Valley	0.179	0.131	0.138	0.158	0.129	0.123	0.135	0.122	0.130	0.129	0.124	0.116	0.119
075	Pomona/Walnut Valley	0.161	0.131	0.140	0.151	0.153	0.141	0.138	0.115	0.119	0.117	0.125	0.123	0.136
094	Southwest Coastal Los Angeles County	0.110	0.069*	--	--	--	--	--	--	--				--
820	Southwest Coastal Los Angeles County	--	0.120*	0.086	0.084	0.087	0.086	0.077	0.089	0.078	0.106	0.105	0.114	0.096
088	West San Gabriel Valley	0.152	0.130	0.145	0.151	0.149	0.122	0.176	0.101	0.107	0.111	0.099	0.124	0.111
090	Santa Clarita Valley	0.194	0.158	0.173	0.156	0.135	0.16	0.14	0.126	0.144	0.134	0.134	0.137	0.126
084	South Central Los Angeles County 1	0.081	0.083	0.111	0.088	0.102	0.078*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	0.104	0.081	0.082	0.086	0.09	0.094	0.091
085	South San Gabriel Valley	0.128	0.104	0.077	--	0.135	0.107	0.131	0.112	0.096	0.106	0.101	0.121	0.107
591	East San Gabriel Valley 2	0.162	0.134	0.160	0.175	0.147	0.156	0.15	0.124	0.134	0.147	0.135	0.133	0.127
3176	Central Orange County	0.136	0.120	0.095	0.113	0.127	0.105	0.093	0.104	0.088	0.079	0.084	0.111	0.100
3177	North Orange County	0.165	0.099	0.094	0.146	0.152	0.104	0.115	0.118	0.095	0.100	0.104	0.119	0.103
3195	North Coastal Orange County	0.107	0.104	0.085	0.074	0.082	0.094	0.087	0.097	0.093	0.090	0.095	0.096	0.099
3186	Saddleback Valley 1	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	0.153	0.116	0.125	0.123	0.108	0.118	0.121	0.117	0.094	0.096	0.104	0.115	0.099
4137	Coachella Valley 1**	0.141	0.125	0.139	0.126	0.126	0.11	0.12	0.114	0.124	0.126	0.113	0.108	0.102
4157	Coachella Valley 2 **	0.123	0.111	0.114	0.103	0.106	0.12	0.097	0.100	0.099	0.102	0.105	0.095	0.093
4155	Norco/Corona	--	--	--	--	--	--	--	--	--	--	--	--	
4141	Hemet/San Jacinto Valley	--	--	--	--	--	--	--	--	--	--	--	--	
4144	Metropolitan Riverside County	0.169	0.141	0.144	0.151	0.131	0.146	0.116	0.128	0.128	0.126	0.123	0.141	0.132
4165	Mira Loma	--	--	--	--	--	--	--	--	--	0.124	0.118	0.138	0.127
4149	Perris Valley	0.155	0.128	0.088	0.169	0.139	0.142	0.125	0.122	0.125	0.111	0.108	0.117	0.124
4150	San Gorgonio Pass	--	--	--	--	--	--	--	--	--	--	--	--	
4164	Banning Airport	0.166	0.156	0.144	0.139	0.129	0.149	0.133	0.124	0.127	0.117	0.115	0.114	0.124
4031	Temecula Valley	--	--	--	--	--	--	--	--	0.105	0.104	0.093	0.119	0.100
4158	Lake Elsinore	0.154	0.130	0.149	0.142	0.130	0.139	0.128	0.107	0.133	0.111	0.102	0.104	0.131
5203	Central San Bernardino Valley 2	0.160	0.157	0.163	0.154	0.153	0.157	0.15	0.129	0.135	0.124	0.139	0.121	0.134
5204	East San Bernardino Valley	0.174	0.160	0.146	0.165	0.149	0.154	0.145	0.128	0.151	0.136	0.133	0.128	0.137
5175	Northwest San Bernardino Valley	0.155	0.138	0.149	0.166	0.145	0.155	0.146	0.131	0.145	0.136	0.143	0.126	0.136
5197	Central San Bernardino Valley 1	0.176	0.149	0.150	0.159	0.144	0.162	0.142	0.143	0.144	0.142	0.151	0.127	0.133
5181	Central San Bernardino Mountains 1	0.163	0.163	0.182	0.164	0.171	0.176	0.149	0.142	0.16	0.14	0.12	0.130	0.144
	District Maximum	0.194	0.163	0.182	0.175	0.171	0.176	0.176	0.143	0.160	0.147	0.151	0.141	0.144

* Less than 12 full months of data / Station location change

** Salton Sea Air Basin

Refer to 2003 AQMP for 1955 to 1975 data

TABLE A-10
Ozone – 3-Year 1-Hour Design Values (ppm)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	0.240	0.196	0.195	0.181	0.168	0.174	0.160	0.160	0.150	0.141	0.142	0.141	0.145	0.141	0.135	0.134	0.127	0.111	0.112	0.115	0.118
069	East San Fernando Valley	0.167	0.159	0.144	0.166	0.166	0.166	0.129	0.129	0.128	0.128	0.134	0.142	0.142	0.138	0.121	0.121	0.118	0.111	0.110	0.102	0.095
072	South Coastal Los Angeles County 1	0.120	0.120	0.108	0.105	0.104	0.105	0.103	0.091	0.085	0.088	0.089	0.088	0.083	0.087	0.089	0.089	0.080	0.079	0.084	0.083	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.079	0.074	0.079	0.083	0.085	0.085
074	West San Fernando Valley	0.170	0.146	0.146	0.158	0.139	0.139	0.120	0.138	0.146	0.146	0.145	0.138	0.138	0.130	0.123	0.121	0.128	0.128	0.128	0.119	0.111
075	Pomona/Walnut Valley	0.213	0.213	0.187	0.175	0.161	0.161	0.140	0.144	0.150	0.150	0.145	0.139	0.140	0.141	0.138	0.135	0.119	0.115	0.117	0.119	0.123
084	South Central Los Angeles County 1	0.100	0.089	0.085	0.085	0.079	0.085	0.077	0.072	0.077	0.080	0.081	0.082	0.088	0.082							
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.097	0.087	0.082	0.081	0.086	0.087	0.088
085	South San Gabriel Valley	0.190	0.180	0.144	0.149	0.149	0.149	0.119	0.118	0.118	0.111	0.118	0.128	0.132	0.128	0.108	0.107	0.102	0.097	0.097	0.106	0.107
087	Central Los Angeles	0.167	0.167	0.137	0.141	0.138	0.138	0.119	0.119	0.116	0.115	0.115	0.108	0.111	0.108	0.111	0.104	0.098	0.089	0.085	0.094	0.097
088	West San Gabriel Valley	0.220	0.191	0.182	0.166	0.166	0.166	0.136	0.137	0.134	0.133	0.134	0.141	0.141	0.141	0.126	0.124	0.124	0.101	0.105	0.111	0.111
090	Santa Clarita Valley	0.206	0.205	0.165	0.163	0.158	0.158	0.184	0.169	0.184	0.171	0.173	0.164	0.164	0.148	0.138	0.138	0.135	0.132	0.133	0.133	0.126
091	Northwest Coastal Los Angeles County	0.150	0.138	0.122	0.118	0.111	0.109	0.102	0.099	0.116	0.116	0.114	0.107	0.109	0.101	0.114	0.111	0.108	0.095	0.093	0.093	0.094
094	Southwest Coastal Los Angeles County 1	0.120	0.109	0.113	0.113	0.108	0.090	0.094	0.091	0.094	0.087	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	0.120	0.109	0.113	0.113	0.108	0.090	0.094	0.091	0.094	0.087	0.103	0.099	0.080	0.080	0.079	0.079	0.077	0.078	0.076	0.090	0.093
591	East San Gabriel Valley 2	0.250	0.223	0.209	0.200	0.188	0.188	0.169	0.169	0.159	0.156	0.157	0.155	0.155	0.152	0.150	0.150	0.141	0.132	0.133	0.132	0.127
ORANGE COUNTY:																						
3176	Central Orange County	0.160	0.148	0.117	0.121	0.121	0.132	0.107	0.103	0.111	0.115	0.115	0.109	0.101	0.105	0.095	0.094	0.088	0.085	0.084	0.089	0.089
3177	North Orange County	0.170	0.156	0.138	0.144	0.127	0.127	0.114	0.114	0.120	0.120	0.109	0.118	0.128	0.128	0.104	0.104	0.099	0.097	0.096	0.102	0.102
3186	Saddleback Valley 1	0.147	0.139	0.130	0.131	0.130	0.129	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	0.107	0.104	0.104	0.109	0.109	0.106	0.093	0.090	0.096	0.097	0.097	0.085	0.080	0.084	0.085	0.086	0.086	0.086	0.087	0.087	0.089
3812	Saddleback Valley 2	--	--	--	--	--	0.119	0.119	0.125	0.131	0.131	0.127	0.116	0.116	0.116	0.113	0.114	0.110	0.095	0.095	0.102	0.102
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	0.158	0.158	0.152	0.155	0.143	0.133	0.128	0.132	0.133	0.131	0.130	0.127	0.127	0.115	0.112	0.112	0.114	0.114	0.114	0.109	0.104
4144	Metropolitan Riverside County	0.220	0.200	0.187	0.187	0.166	0.166	0.140	0.143	0.157	0.157	0.157	0.141	0.134	0.140	0.135	0.135	0.126	0.126	0.126	0.121	0.121
4149	Perris Valley	0.200	0.180	0.173	0.156	0.137	0.147	0.149	0.149	0.149	0.136	0.136	0.152	0.152	0.142	0.135	0.126	0.122	0.121	0.115	0.108	0.116
4157	Coachella Valley 2**	0.130	0.124	0.124	0.118	0.121	0.121	0.112	0.112	0.114	0.113	0.113	0.108	0.106	0.106	0.106	0.104	0.099	0.099	0.098	0.095	0.095
4158	Lake Elsinore	0.185	0.185	0.180	0.166	0.162	0.160	0.136	0.137	0.140	0.139	0.140	0.130	0.130	0.135	0.132	0.132	0.122	0.111	0.111	0.103	0.114
4031	Temecula Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.094	0.094	0.094	0.090	0.093
4164	Banning Airport	--	--	0.180	0.180	0.170	0.155	0.143	0.146	0.151	0.152	0.150	0.139	0.138	0.139	0.138	0.138	0.126	0.124	0.126	0.114	0.113
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	--	--	0.131	0.128	0.128	0.118	0.121	0.119	0.119	0.117
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	0.234	0.231	0.208	0.189	0.181	0.181	0.169	0.169	0.155	0.146	0.148	0.148	0.148	0.150	0.146	0.146	0.134	0.134	0.136	0.135	0.128
5181	Central San Bernardino Mountains	0.230	0.227	0.215	0.217	0.211	0.211	0.170	0.166	0.163	0.162	0.163	0.163	0.164	0.164	0.162	0.149	0.142	0.140	0.134	0.124	0.130
5197	Central San Bernardino Valley 1	0.223	0.220	0.194	0.191	0.184	0.184	0.160	0.160	0.164	0.162	0.162	0.147	0.144	0.149	0.147	0.147	0.140	0.140	0.142	0.133	0.127
5203	Central San Bernardino Valley 2	0.219	0.221	0.197	0.196	0.188	0.182	0.158	0.151	0.158	0.151	0.157	0.154	0.153	0.153	0.150	0.147	0.129	0.124	0.125	0.122	0.129
5204	East San Bernardino Valley	0.220	0.216	0.202	0.190	0.190	0.190	0.152	0.154	0.167	0.163	0.163	0.159	0.157	0.157	0.146	0.145	0.134	0.134	0.134	0.132	0.128
	District Maximum	0.250	0.231	0.215	0.217	0.211	0.211	0.184	0.169	0.184	0.171	0.173	0.164	0.164	0.164	0.162	0.150	0.142	0.140	0.142	0.135	0.130

+ Site relocated * Less than 12 full months of data ** Salton Sea Air Basin

Refer to 2003 AQMP for 1976 to 1994 data

TABLE A-11
Fine Particulate Matter (PM2.5)# – Annual Arithmetic Mean (µg/m³)

STN#	LOCATION	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																		
060	East San Gabriel Valley	23.9	20.2	21.7	21.0	19.3	18.3	17.0	15.5	15.9	14.1	13.2	10.9	12.1	11.0	10.5	9.88	9.88
069	East San Fernando Valley	22.9	21.4	24.8	24.0	22.1	19.1	17.9	16.6	16.8	14.1	14.4	12.6	13.2	12.2	12.2	--	--
072	South Coastal Los Angeles County 1	20.7	19.6	21.2	19.5	18.0	17.9	16.0	14.2	14.6	14.2	13.0	10.6	11.0	10.4	11.3	10.81	10.81
074	West San Fernando Valley	17.3	18.0	18.4	18.9	16.5	15.6	13.9	12.9	13.1	11.9	11.4	10.3	10.2	10.5	9.7	8.84	8.84
077	South Coastal Los Angeles County 2	--	--	--	--	20.5	16.5	14.7	14.5	13.7	13.7	12.5	10.4	10.7	10.6	11.0	10.26	10.26
084	South Central Los Angeles County1	24.3	23.0	24.5	23.3	20.3	18.5	17.5	16.7	15.9	15.5	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	14.7	12.6	13.0	11.69	11.95	11.78	11.78
085	South San Gabriel Valley	25.7	24.0	25.4	24.0	20.6	20.0	17.0	16.7	16.7	15.1	14.8	12.6	12.5	11.85	11.56	11.52	11.52
087	Central Los Angeles	23.0	21.9	22.9	22.1	21.4	19.7	18.1	15.6	16.8	15.7	14.3	11.9	13.0	12.55	11.95	12.38	12.38
088	West San Gabriel Valley	19.9	19.4	20.9	20.3	18.6	16.6	15.1	13.4	14.3	12.9	12.3	10.4	10.9	10.12	10.13	9.85	9.85
ORANGE COUNTY:																		
3176	Central Orange County	26.0	20.3	22.0	18.6	17.3	17.0	14.7	14.1	14.5	13.6	11.7	10.2	11.0	10.8	10.09	9.38	9.38
3812	Saddleback Valley	16.6	14.7	15.8	15.5	13.1	12.0	10.7	11.0	11.3	10.3	9.4	8.0	8.5	7.9	8.1	7.05	7.05
RIVERSIDE COUNTY:																		
4137	Coachella Valley 1**	--	9.7	10.7	10.0	9.0	8.9	8.4	7.7	8.7	7.2	6.6	6.0	6.0	6.5	6.5	5.76	5.76
4144	Metropolitan Riverside County 1	30.2	28.3	31.0	27.4	24.8	22.1	21.0	19.0	19.1	16.5	15.3	13.2	13.6	13.5	12.5	11.89	11.89
4146	Metropolitan Riverside County 2	26.7	25.3	28.2	27.1	22.6	20.8	18.0	17.0	18.1	13.4	13.5	11.1	11.8	11.4	11.3	--	--
4157	Coachella Valley 2**	12.8	11.2	12.2	12.0	11.4	10.7	10.5	9.5	9.8	8.4	8.0	6.9	7.2	7.6	8.4	7.54	7.54
4165	Mira Loma	--	--	--	--	--	--	--	20.6	21	18.2	16.8	15.2	15.3	15.1	14.1	13.34	13.34
SAN BERNARDINO COUNTY:																		
5197	Central San Bernardino Valley 1	25.7	24.5	24.9	24.3	22.1	19.9	18.9	17.6	19	15.4	14.2	12.1	12.6	12.8	12.3	11.05	11.05
5203	Central San Bernardino Valley 2	25.6	25.9	26.1	25.8	22.2	21.9	17.4	17.8	18.3	13.5	12.9	11.3	12.2	11.76	11.4	10.74	10.74
5817	Southwest San Bernardino Valley	25.4	24.1	26.5	25.4	23.8	20.9	18.8	18.5	17.9	15.6	14.8	12.9	13.2	12.4	12.0	--	--
5818	East San Bernardino Mountains	10.3	10.2	11.2	11.5	10.6	9.7	12.1	11.2	10.4	9.2	9.9	8.5	8.4	8.0	9.7	7.59	7.59
	District Maximum	30.2	28.3	31.0	27.4	24.8	22.1	21.0	20.6	21.0	18.2	16.8	15.2	15.3	15.1	14.1	14.5	13.34

* Less than 12 full months of data
** Salton Sea Air Basin
# Federal Reference Method (FRM) filter data only

TABLE A-12

Fine Particulate Matter (PM2.5)# – Annual Design Values (µg/m^3)

STN#	LOCATION	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																
060	East San Gabriel Valley	21.9	21.0	20.7	19.5	18.2	16.9	16.1	15.1	14.3	12.7	11.8	11.1	11.0	11.1	10.7
069	East San Fernando Valley	23.0	23.4	23.6	21.7	19.7	17.9	17.1	15.9	15.1	13.6	13.3	12.6	12.5	12.1	12.1
072	South Coastal Los Angeles County 1	20.5	20.1	19.6	18.5	17.3	16.0	14.9	14.4	14.0	12.6	11.5	10.6	10.9	11.0	11.2
074	West San Fernando Valley	17.9	18.4	17.9	17.0	15.4	14.2	13.4	12.7	12.2	11.1	10.6	10.3	10.1	10.0	9.4
077	South Coastal Los Angeles County 2	--	--	--	18.5	17.3	15.2	14.3	14.0	13.3	12.2	11.2	10.6	10.8	10.8	10.7
084	South Central Los Angeles County1	23.9	23.6	22.7	20.7	18.7	17.5	16.6	15.7	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	17.1	16.7	16.0	15.4	14.2	13.4	12.4	12.2	12.1	12.1
085	South San Gabriel Valley	25.0	24.5	23.3	21.5	19.5	18.2	17.1	16.1	15.5	14.1	13.3	12.3	12.0	11.8	11.7
087	Central Los Angeles	22.6	22.3	22.2	21.1	19.7	17.7	16.7	16.1	15.6	14.0	13.1	12.5	12.5	12.3	12.2
088	West San Gabriel Valley	20.1	20.2	19.9	18.5	16.8	15.0	14.3	13.6	13.2	11.8	11.1	10.4	10.4	10.5	10.4
ORANGE COUNTY:																
3176	Central Orange County	22.7	20.3	19.3	17.6	16.4	15.3	14.4	14.1	13.3	11.9	11.0	10.6	10.6	10.5	10.0
3812	Saddleback Valley	15.7	15.4	14.8	13.5	11.9	11.2	10.9	10.9	10.4	9.3	8.7	8.1	8.2	8.0	7.7
RIVERSIDE COUNTY:																
4137	Coachella Valley 1**	10.2	10.1	9.9	9.3	8.8	8.3	8.2	7.8	7.5	6.6	6.2	6.2	6.4	6.5	6.2
4144	Metropolitan Riverside County 1	29.8	28.9	27.7	24.8	22.6	20.7	19.7	18.1	16.9	15.0	14.0	13.4	13.2	12.8	12.3
4146	Metropolitan Riverside County 2	26.7	26.9	26.0	23.5	20.5	18.6	17.6	16.1	14.9	12.6	12.1	11.4	11.5	11.2	11.1
4157	Coachella Valley 2**	12.1	11.8	11.9	11.4	10.9	10.2	9.9	9.2	8.7	7.7	7.3	7.2	7.7	8.1	8.1
4165	Mira Loma	--	--	--	--	--	--	20.8	19.9	18.7	16.7	15.8	15.2	14.8	14.6	13.97
SAN BERNARDINO COUNTY:																
5197	Central San Bernardino Valley 1	25.0	24.6	23.8	22.1	20.3	18.8	18.5	17.3	16.2	13.9	12.9	12.4	12.5	12.8	12.2
5203	Central San Bernardino Valley 2	25.8	25.9	24.7	23.3	20.5	19.0	17.7	16.4	14.8	12.5	12.1	11.7	11.8	11.6	11.3
5817	Southwest San Bernardino Valley	25.3	25.3	25.2	23.4	21.2	19.4	18.5	17.5	16.3	14.5	13.7	12.9	12.6	12.5	12.5
5818	East San Bernardino Mountains	10.6	11.0	11.1	10.6	10.8	11.0	11.2	10.3	9.8	9.2	8.9	8.3	8.7	8.2	8.1
	District Maximum	29.8	28.9	27.7	24.8	22.6	20.7	20.8	19.9	18.7	16.7	15.8	15.2	14.8	14.6	14.0

* Less than 12 full months of data

** Salton Sea Air Basin

Federal Reference Method (FRM) filter data only

TABLE A-13
Fine Particulate Matter (PM2.5)# – 24-Hour Design Values (µg/m³)

STN#	LOCATION	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																
060	East San Gabriel Valley	62	59	57	54	54	49	47	41	42	38	35	29	26	27	29
069	East San Fernando Valley	67	69	62	55	53	48	47	42	39	34	33	31	31	29	30
072	South Coastal Los Angeles County 1	55	54	48	46	45	41	39	38	38	34	30	28	27	28	30
074	West San Fernando Valley	49	51	49	48	45	40	34	31	29	28	27	28	26	25	24
077	South Coastal Los Angeles County 2	--	--	--	48	44	38	36	35	34	31	28	26	25	26	28
084	South Central Los Angeles County1	61	60	57	53	51	51	48	43	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	47	46	42	40	35	34	31	29	29	31
085	South San Gabriel Valley	66	65	58	53	52	50	49	44	41	35	33	31	30	29	34
087	Central Los Angeles	61	62	58	57	56	49	48	44	42	34	31	30	31	32	34
088	West San Gabriel Valley	56	53	51	48	46	41	40	37	38	31	30	26	25	24	26
ORANGE COUNTY:																
3176	Central Orange County	63	58	53	49	47	44	43	42	39	32	28	26	25	27	29
3812	Saddleback Valley	42	43	43	41	36	32	31	29	29	23	23	21	21	19	18
RIVERSIDE COUNTY:																
4137	Coachella Valley 1**	28	26	25	22	23	21	20	18	17	15	13	13	13	14	15
4144	Metropolitan Riverside County 1	76	73	71	66	64	57	55	50	45	38	34	32	33	34	36
4146	Metropolitan Riverside County 2	65	65	62	58	50	47	49	48	43	33	30	27	28	27	28
4157	Coachella Valley 2**	29	26	26	25	26	24	24	21	21	16	15	15	16	16	17
4165	Mira Loma	--	--	--	--	--	--	56	53	49	41	38	36	36	38	40
SAN BERNARDINO COUNTY:																
5197	Central San Bernardino Valley 1	67	64	60	58	55	52	52	52	48	37	31	32	32	34	35
5203	Central San Bernardino Valley 2	70	68	64	66	58	55	53	52	48	35	32	30	31	30	32
5817	Southwest San Bernardino Valley	72	62	63	61	59	50	48	47	45	37	34	32	30	30	31
5818	East San Bernardino Mountains	29	30	30	28	30	33	37	36	32	30	29	29	31	27	30
	District Maximum	76	73	71	66	64	57	56	53	49	41	38	36	36	38	40

* Less than 12 full months of data
** Salton Sea Air Basin
# Federal Reference Method (FRM) filter data only

TABLE A-14

Fine Particulate Matter (PM2.5)# – Percent of Sampling Days Exceeding the 24-Hour Federal Standard (35 µg/m^3)##

STN#	LOCATION	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																		
060	East San Gabriel Valley	17	9	14	12	9	8	6*	3*	7	2	4	1	2	1	0	0	0
069	East San Fernando Valley	18	14*	16	19	14	10	8	6	9	2	2	1	2	1	1	1	--
072	South Coastal Los Angeles County 1	9	11*	14	9	7	7	4	2*	4	2	2	0	0	1	1	1	--
074	West San Fernando Valley	8*	8	7	10	7	4	4	1	1	2	1	1	1	2	1	0	0
077	South Coastal Los Angeles County 2	--	--	--	--	10	5	2	2	2	2	1	0	1	1	0	1	1
084	South Central Los Angeles County 1	18	14	16	18	9	7	7	4	4	3	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	3	1	0	1	1	1	1
085	South San Gabriel Valley	20	13	22	19	9	9	9*	6	5	4	2	0	1	1	0	0	0
087	Central Los Angeles	15	13	15	13	14	7	7	3	6	3	2	1	1	1	0	2	2
088	West San Gabriel Valley	9*	6	8	11	10	6	4	1	3	2	3	0	1	0	0	1	1
ORANGE COUNTY:																		
3176	Central Orange County	17	14*	16*	9	7	6	4	2	4	4	1	0	1	1	0	2	2
3812	Saddleback Valley	4*	4	5	3	3	3	0	1	2	0	1	0	0	0	0	0	0
RIVERSIDE COUNTY:																		
4137	Coachella Valley 1**	--	0	1	1	0	0	0*	0	0	0	0	0	0	0	0	0	0
4144	Metropolitan Riverside County 1	30	26*	33	25	21	15	11	11	11	4	4	1	1	2	2	1	1
4146	Metropolitan Riverside County 2	25	22	23	24	19	13	5	9	8	3	2	2	2	0	1	0	0
4157	Coachella Valley 2**	0*	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
4165	Mira Loma	--	--	--	--	--	--	--	12	12	9	6	2	3	2	3	3	3
SAN BERNARDINO COUNTY:																		
5197	Central San Bernardino Valley 1	17	19	15	19	14	14	6	6	9	5	2	2	2	3	1	1	1
5203	Central San Bernardino Valley 2	21	21*	23	24	15	15	3	8	11	3	2	2	2	0	1	1	1
5817	Southwest San Bernardino Valley	22	14	21	18	17	13	7	7	6	5	3	1	2	0	1	2	--
5818	East San Bernardino Mountains	--	0	0	0	0	0	4	2*	2	2	2	0	0	2	2	0	0
	District Maximum	30	22	33	25	21	15	11	12	12	9	6	2	3	3	3	3	3

* Less than 12 full months of data

** Salton Sea Air Basin

Federal Reference Method (FRM) filter data only

Effective December 17, 2006, U.S. EPA has strengthen the standard level from 65 µg/m^3 to 35 µg/m^3

TABLE A-15

Fine Particulate Matter (PM2.5)# – Annual Maximum 24-Hour Average (µg/m³)

STN#	LOCATION	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																		
060	East San Gabriel Valley	81.3	92.5	79.7	72.4	121.2	75.6	132.7*	52.8*	63.8	53.1	72.1	44.4	49.5	39.6	29.6	32.4	70.3
069	East San Fernando Valley	79.5	84.4*	94.7	63.0	120.6	60.1	63.2	50.7	56.5	57.5	67.5	43.7	47.8	54.2	45.1	64.6	--
072	South Coastal Los Angeles County 1	66.9	81.5*	72.9	62.7	115.2	66.6	53.9	58.5*	82.9	57.2	63	35	39.7	49.8	47.2	51.5	54.6
074	West San Fernando Valley	79.0*	67.5	71.1	48.8	47.5	56.2	39.6	44.1	43.3	50.5	39.9	40.7	39.8	41.6	41.8	27.2	36.8
077	South Coastal Los Angeles County 2	--	--	--	--	--	59.7	50.8	53.6	68	60.9	55.8	33.7	42.0	46.7	42.9	52.2	48.3
084	South Central Los Angeles County 1	67.8	82.1	73.1	64.0	54.8	55.8	54.6	55	49	44.2	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	69.2	38.2	35.3	51.2	52.1	35.8	41.3
085	South San Gabriel Valley	85.6	89.5	77.3	61.0	90.3	60.7	58.2*	72.2	63.6	47.3	71.1	34.9	41.2	45.3	29.1	35.1	52.7
087	Central Los Angeles	69.3	87.8	73.4	66.3	83.7	75.0	73.7	56.2	64.2	78.3	61.7	39.2	49.3	58.7	43.1	59.9	56.4
088	West San Gabriel Valley	73.0*	66.3	78.1	57.8	89.0	59.4	62.9	45.9	68.9	66	52	35.2	43.8	30.5	25.7	38.8	48.5
ORANGE COUNTY:																		
3176	Central Orange County	68.7	113.9*	70.8*	68.6	115.5	58.9	54.7	56.2	79.4	67.9	64.6	31.7	39.2	50.1	37.8	56.2	45.8
3812	Saddleback Valley	56.6*	94.7	53.4	58.5	50.6	49.4	35.4	47	46.9	32.6	39.2	19.9	33.4	27.6	28	25.5	31.5
RIVERSIDE COUNTY:																		
4137	Coachella Valley 1**	--	28.5	44.7	42.3	21.2	27.1	26.2*	24.8	32.5	18.1	21.8	12.8	26.3	15.5	18.5	15.5	22.7
4144	Metropolitan Riverside County 1	111.2	119.6*	98.0	77.6	104.3	91.7	98.7	68.5	75.7	57.7	54.5	46.5	60.8	38.1	60.3	48.9	54.7
4146	Metropolitan Riverside County 2	90.0	79.3	74.9	75.5	73.3	93.8	95.0	55.3	68.6	43	42.2	43.7	51.6	30.2	53.7	30.9	--
4157	Coachella Valley 2**	29.6*	28.6	33.5	26.8	26.8	28.5	44.4	24.3	26.8	21.6	27.5	16.0	35.4	20	25.8	26.5	24.6
4165	Mira Loma	--	--	--	--	--	--	--	63.0	69.7	50.9	49.2	54.2	56.3	39.3	56.5	73.6	56.6
SAN BERNARDINO COUNTY:																		
5197	Central San Bernardino Valley 1	98.0	72.9	74.8	66.6	98.1	71.4	96.8	52.6	77.5	49	46.4	42.6	60.1	39.9	43.6	78.9	50.5
5203	Central San Bernardino Valley 2	121.5	89.8*	78.5	82.1	73.9	93.4	106.3	55	72.1	43.5	37.8	39.3	65.0	34.8	55.3	73.9	53.5
5817	Southwest San Bernardino Valley	85.8	73.4	71.2	64.8	88.9	86.1	87.8	53.7	72.8	54.2	46.9	46.1	52.9	35.2	49.3	38.4	--
5818	East San Bernardino Mountains	32.1	29.0	34.6	34.1	35.0	28.6	38.8	40.1*	45.4	36.8	40.8	35.4	30.6	36.4	35.5	24.2	39.4
	District Maximum	121.5	119.6	98.0	82.1	121.2	93.8	132.7	72.2	82.9	78.3	72.1	54.2	60.8	58.7	60.3	78.9	70.3

* Less than 12 full months of data

** Salton Sea Air Basin

Federal Reference Method (FRM) filter data only

TABLE A-16

Fine Particulate Matter (PM2.5)# – Annual 24-Hour Average 98th Percentile Concentration (µg/m³)

STN#	LOCATION	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																		
060	East San Gabriel Valley	64	62	61	51	56	54	53	39	49	35	43	35	31	26	26	30	30
069	East San Fernando Valley	50	83	69	55	60	49	51	43	48	35	34	33	34	28	30	29	--
072	South Coastal Los Angeles County 1	51	64	49	47	47	46	41	35	41	36	34	28	28	26	26	31	32
074	West San Fernando Valley	40	50	57	45	45	53	36	32	33	26	27	30	24	31	23	21	28
077	South Coastal Los Angeles County 2	--	--	--	--	53	42	38	35	34	35	30	27	27	25	25	27	31
084	South Central Los Angeles County1	53	63	66	53	52	53	48	45	46	37	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	38	32	32	30	24	31	37
085	South San Gabriel Valley	60	71	67	58	50	52	54	43	50	38	35	32	32	29	29	30	42
087	Central Los Angeles	52	73	58	55	61	50	53	39	51	40	34	27	32	32	29	35	38
088	West San Gabriel Valley	60	54	55	49	48	47	43	32	45	32	36	25	26	24	21	26	32
ORANGE COUNTY:																		
3176	Central Orange County	66	66	59	48	52	48	42	41	47	39	32	25	28	25	23	34	30
3812	Saddleback Valley	45	37	46	46	38	39	31	26	35	27	24	17	29	18	18	22	15
RIVERSIDE COUNTY:																		
4137	Coachella Valley 1**		23	33	23	20	23	25	16	21	17	15	13	13	14	14	15	17
4144	Metropolitan Riverside County 1	79	77	74	66	77	60	58	54	54	41	40	32	31	34	35	34	38
4146	Metropolitan Riverside County 2	62	67	66	64	56	54	41	48	57	39	34	27	28	27	29	26	--
4157	Coachella Valley 2**	30	26	30	22	25	27	25	19	27	19	17	12	16	16	16	17	20
4165	Mira Loma	--	--	--	--	--	--	--	53	60	47	41	36	37	35	38	40	43
SAN BERNARDINO COUNTY:																		
5197	Central San Bernardino Valley 1	66	65	70	57	54	63	48	44	65	47	33	31	28	36	33	35	38
5203	Central San Bernardino Valley 2	72	70	68	66	58	72	43	48	68	41	35	30	33	27	33	28	34
5817	Southwest San Bernardino Valley	86	65	65	57	67	60	50	42	53	45	36	31	35	29	27	35	--
5818	East San Bernardino Mountains	31	27	30	32	29	23	37	40	34	33	29	28	31	27	35	19	35
	District Maximum	86	83	74	66	77	72	58	54	68	47	43	36	37	36	38	40	43

* Less than 12 full months of data

** Salton Sea Air Basin

Federal Reference Method (FRM) filter data only

TABLE A-17
Particulate Matter (PM10)[#] – Annual Arithmetic Mean (µg/m^3)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	49	45	46	41	56	46	45	46	44	35	35	32	36+	35	32	30	33	30	33	44	37
069	East San Fernando Valley	42	42	45	36	44	39	41	38	38*	38	34	36	40	36	39	30	29	26	29	31*	--
072	South Coast Los Angeles County 1	39	35	41	32	39	38	37	36	33	33	30	31	30+	29	31	22	24	23	23*	--	--
077	South Coast Los Angeles County 2	--	--	--	--	--	--	--	--	--	38	43	45	41+	36	33	27	29	26	27	27	26
087	Central Los Angeles	43	41	43	37	45	40	44	39	35	33	30	30	33	31*	33	27	29	30	30	31	27
090	Santa Clarita Valley	37	33	33	30	38	33	32	33	32	28	26	--	30+	26	23	21	21	20	22	23	18
094	Southwest Coastal Los Angeles County 1	36	33	36	33	36	36	37	37	30	31*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	25	23	27	29	26	25	21	22	20	21	22	21
ORANGE COUNTY:																						
3176	Central Orange County	44	35	39	36	49	40	36	34	33	34	28	33	31+	29+	31	22	25	22	25	27	25
3186	Saddleback Valley 1	38	30	35	31	37	29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	--	--	--	--	29	28	26	31	27	24	19	23	23	23	24	18	19	17	19	20	19
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	27	29	26	26	29	24	27+	27	27	26	26	25+	31	23+*	23	19	19+	16	23	22	17
4144	Metropolitan Riverside County 1	69	61	65	56	72	60	63	59	57	56	52	54	55+	47	43	33	34	35	34	37	32
4149	Perris Valley	47	40	45	38	50	41	41	45	44	41	39	45	55+	38*	35	28	29	27	34	35	30
4150	San Gorgonio Pass	30	34	38	28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4155	Norco/Corona	54	44	50	47	55	49	--	45	41	38	32	37	40+	34	36	27	28	27	28	31	30
4157	Coachella Valley 2**	52+	51+	49+	48+	53	52+	50+	51+	50+	39+	46	53+	54+	40+	33+	29	33+	30	38	41+	39
4164	Banning Airport	--	--	--	27	35	29	35	28	29	29	27	31	33	26	26	22	20	19	21	21	22
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	64	69	57	53	42	41	40	41	43	43
SAN BERNARDINO COUNTY:																						
5171	Southwest San Bernardino Valley 1	54	51	51	47	55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5181	Central San Bernardino Mountains	20	24	24	25	27	24	--	37*	26*	26	26	26	26	24*	25	19	19	19	21	19	16
5197	Central San Bernardino Valley 1	61	55	54	50	60	53	51	50	47*	48	50	54	55+	40	40	34	32	34	41	40	38
5203	Central San Bernardino Valley 2	57	53	51	46	57	50	52	50	45	49	42	46	51+	43	42	32	32	29	31	34	30
5204	East San Bernardino Valley	48	46	43	41	47	46	47	41	37	39	33	36	40	29	30	26	26	23	27	26	25
5817	Southwest San Bernardino Valley 2	--	--	--	--	66	50	52	45	43	43	41	42	43+	39	36	32	31	31	33	33*	--
	District Maximum	69	61	65	56	72	60	63	59	57	56	52	64	69+	57	53	42	41	40	41	44	43

* Less than 12 full months of data
** Salton Sea Air Basin
\+ Excludes data flagged for exceptional events
\# Federal Reference Method (FRM) filter data only

Refer to 2003 AQMP for 1985–1994 data

TABLE A-18
Particulate Matter (PM10)# – Percent of Sampling Days Exceeding State (50 µg/m³) and Federal (150 µg/m³) 24-Hour Standards

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	40/2	41/0	40/0	28/0	58/0	42/0	38/0	40/0	35/0	15/0	22/0	12/0	20/0+	27/0	14/0	9/0	15/0	10/0	10/0	37/0	12/0
069	East San Fernando Valley	25/0	25/0	30/0	15/0	35/0	23/0	23/0	12/0	14/0*	12/0	8/0	19/0	19/0	13/0	18/0	2/0	4/0	2/0	2/0	3/0*	--
072	South Coast Los Angeles County 1	19/0	15/0	18/0	10/0	22/0	21/0	17/0	9/0	7/0	7/0	9/0	10/0	9/0+	2/0	5/0	0/0	0/0	0/0	0/0*	--	--
077	South Coast Los Angeles County 2	--	--	--	--	--	--	--	--	--	20/0	31/0	33/0	38/0+	16/0	9/0	3/0	0/0	2/0	2/0	3/0	2/0
087	Central Los Angeles	23/0	18/0	25/0	17/0	33/0	25/0	33/0	15/0	10/0	8/0	7/0	5/0	9/0	4/0	7/0	0/0	2/0	7/0	2/0	5/0	2/0
090	Santa Clarita Valley	14/0	9/0	9/0	6/0	21/0	7/0	7/0	12/0	16/0	3/0	2/0	2/0	9/0+	4/0	2/0	0/0	0/0	0/0	0/0	0/0	0/0
094	Southwest Coastal Los Angeles County 1	21/0	8/0	7/0	12/0	10/0	16/0	14/0	20/0	5/0	13/0*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0/0*	0/0	0/0	5/0	0/0	2/0	0/0	0/0	0/0	0/0	0/0	0/0
ORANGE COUNTY:																						
3176	Central Orange County	23/2	10/0	18/0	20/0	39/0	13/0	20/0	8/0	10/0	12/0	5/0	13/0	9/0+	5/0	2/0	0/0	3/0	0/0	2/0	3/0	2/0
3186	Saddleback Valley 1	18/0	7/0	7/0	10/0	10/0	3/0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	--	--	--	--	3/0	3/0	5/0	8/0	4/0	0/0	0/0	2/0	5/0	0/0	2/0	0/0	0/0	0/0	2/0	0/0	0/0
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	4/0	3/0	2/0	5/0	5/0	0/0	2/0+	5/0	7/0	3/0	3/0	4/0+	11/0	9/0+*	2/0	0/0	0/0+	0/0	5/0	4/0	0/0
4144	Metropolitan Riverside County 1	62/7	68/2	70/2	54/0	72/2	70/0	67/0	69/0	57/2	61/0	56/0	60/0	57/0+	41/0	29/0	6/0	13/0	16/0	8/0	15/0	9/0
4149	Perris Valley	38/0	33/0	32/0	26/0	50/0	22/0	27/0	39/0	33/0	25/0	32/0	35/0	56/0+	27/0*	16/0	2/0	5/0	2/0	18/0	13/0	3/0
4150	San Gorgonio Pass	12/0	19/0	25/0	9/0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4155	Norco/Corona	47/3	33/0	42/2	40/0	55/0	48/0	33/0	34/0	26/0	19/0	9/0	18/0	17/0+	15/0	12/0	0/0	3/0	2/0	4/0	5/0	3/0
4157	Coachella Valley 2**	44/2	50/0+	43/0+	40/0+	54/0	50/0+	45/0+	45/0+*	42/0+	20/0+*	34/0	50/0+	61/0+	22/0+	8/0+	5/0	2/0+	6/0	19/0+	20/0	18/0
4164	Banning Airport	--	--	--	4/0	12/0	8/0	13/2	11/0	15/0	12/0	3/0	15/0	15/0	2/0	2/0	2/0	2/0	0/0	2/0	0/0	2/0
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	70/0	75/0+	57/0	56/0	42/0	42/0	27/0	24/0	30/0	38/0
SAN BERNARDINO COUNTY:																						
5171	Southwest San Bernardino Valley 1	51/5	53/0	36/2	34/0	56/0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5181	Central San Bernardino Mountains	2/0	0/0	0/0	0/0	0/0	0/0	--	19/0	0/0*	2/0	0/0	2/0	4/0	0/0*	2/0	0/0	0/0	0/0	0/0	0/0	0/0
5197	Central San Bernardino Valley 1	57/3	57/0	48/0	47/0	61/0	52/0	57/0	53/0	54/0*	48/0	48/0	52/0	59/0+	23/0	22/0	17/0	7/0	15/0	31/0	22/0	13/0
5203	Central San Bernardino Valley 2	53/0	58/0	45/0	38/0	56/0	53/0	52/0	56/0	39/0	48/0	38/0	42/0	49/0+	32/0	21/0	5/0	5/0	2/0	5/0	7/0	3/0
5204	East San Bernardino Valley	41/2	42/0	38/0	32/0	40/0	44/0	45/0	32/0	26/0	33/0	21/0	20/0	32/0	7/0	3/0	2/0	3/0	0/0	3/0	3/0	2/0
5817	Southwest San Bernardino Valley 2	--	--	--	--	67/2	45/0	42/2	41/0	29/0	29/0	32/0	27/0	24/0+	24/0	15/0	5/0	5/0	7/0	5/0	13/0*	--

* Less than 12 full months of data
** Salton Sea Air Basin
\+ Excludes data flagged for exceptional events
# Federal Reference Method (FRM) filter data only
Refer to 2003 AQMP for 1985–1994 data

TABLE A-19
Particulate Matter (PM10)# – Annual Maximum 24-Hour Average (µg/m³)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	157	100	116	87	103	94	106	91	119	83	76	81	83+	98	74	70	65	78	76	96	101
069	East San Fernando Valley	135	110	92	75	82	74	86	71	81*	74	92	71	109	66	80	51	61	55	52	60*	--
072	South Coastal Los Angeles County 1	146	113	87	69	79	105	91	74	63	72	66	78	75+	62	62	44	43	45	37*	--	--
077	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	83	131	117	123+	81	83	76	50	54	54	59	62
087	Central Los Angeles	141	138	102	80	88	80	97	65	81	72	70	59	78	66*	72	42	53	80	57	66	73
090	Santa Clarita Valley	87	91	67	60	75	64	62	61	72	54	55	53	131+	91	56	40	45	37	43	47	41
094	Southwest Coastal Los Angeles County 1	136	107	79	66	69	74	75	121	58	52*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	47*	44	45	128	50	52	37	41	31	38	46	42
ORANGE COUNTY:																						
3176	Central Orange County	172	101	91	81	122	126	93	69	96	74	65	104	75+	61+	63	43	53	48	77	85	59
3186	Saddleback Valley 1	122	79	86	70	111	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	--	--	--	--	56	98	60	80	64	47	41	57	74	42	56	34	48	37	51	41	49
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	68	130	63	72	104	44	53+	75	108	79	66	73+	83	75+*	140	37	42+	37	129	57	33
4144	Metropolitan Riverside County 1	219	162	163	116	153	139	136	130	164	137	123	109	118+	115	77	75	82	67	135	100	69
4149	Perris Valley	145	87	139	98	112	87	86	100	142	83	80	125	120+	85*	80	51	65	62	70	87	74
4150	San Gorgonio Pass	138	122	227	76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4155	Norco/Corona	177	94	158	93	136	129	109+	78	116	76	79	74	93+	86	79	50	60	52	58	65	87
4157	Coachella Valley 2**	199	117+	144+	114+	119	114+	149+	139+	124+	83+	106	122+	146+	128+	132+	107	106+	124	129+	121	145
4164	Banning Airport	--	--	--	62	86	69	219	70	79	82	76	75	78	51	99	55	51	45	64	45	139
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	124	142	135	108	89	79	78	147	85	110
SAN BERNARDINO COUNTY:																						
5171	Southwest San Bernardino Valley 1	167	129	208	92	112	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5181	Central San Bernardino Mountains	53	45	47	45	47	49	--	52*	47*	52	49	63	89	41*	57	39	43	43	37	47	41
5197	Central San Bernardino Valley 1	178	130	122	101	116	108	106	102	101*	106	108	142	111+	75	75	62	84	67	90	68	96
5203	Central San Bernardino Valley 2	148	136	108	114	134	108	106	94	98	118	72	92	136+	76	66	63	56	53	102	136	78
5204	East San Bernardino Valley	172	128	103	97	92	109	102	83	92	88	61	103	97	58	52	57	71	48	72	62	95
5817	Southwest San Bernardino Valley 2	--	--	--	--	--	124	166	91	149	93	74	78	115+	90	70	87	70	57	115	67*	--
	District Maximum	219	162	227	116	153	139	219	139	164	137	131	142+	146+	135	140	107	106	124	147+	136	145

* Less than 12 full months of data

** Salton Sea Air Basin

\+ Excludes data flagged for exceptional events

Federal Reference Method (FRM) filter data only

Refer to 2003 AQMP for 1985–1994 data

TABLE A-20

Carbon Monoxide – Annual Maximum 8-Hour Average (ppm)

(To Be Compared to Federal Standard (9 ppm) and State Standard (9.0 ppm), 8-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	6.3	4.0	4.3	3.9	3.9	4.9	2.9	2.4	2.6	2	1.7	1.7	1.8	1.6	1.7	1.3	1.4	1.2	1.7	1.9	1.3
069	East San Fernando Valley	12.0	9.3	7.4	7.5	9.0	6.1	4.9	4.6	4.7*	3.7	3.4	3.5	2.8	2.6	2.9	2.4	2.4	2.4	2.4	3.0	--
072	South Coastal Los Angeles County 1	6.6	6.9	6.7	6.6	5.4	5.8	4.7	4.6	4.7	3.4	3.5	3.4	2.6	2.6	2.2	2.1	2.6	2.2	2.0	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.3	2.6	2.6	2.6	2.2
074	West San Fernando Valley	10.3	8.5	9.8	9.3	7.6	9.8	6.0	4.8	4.1	3.5	3.5	3.4	2.8	2.9	2.8	2.6	2.8	2.8	2.3	3.0	2.5
075	Pomona/Walnut Valley	6.1	5.0	5.0	7.3	6.7	4.9	3.4	3.3	4.4	3.1	2.5	2.1	2	2	1.8	1.8	1.6	1.5	1.6	1.6	1.6
084	South Central Los Angeles County 1	13.86	17.3	17.0	13.4	11.0	10.0	7.7	10.1	7.3	6.7	5.9	6.4	5.1	4.3*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.6	3.6	4.7	4.0	3.5	3.8	3.3
085	South San Gabriel Valley	7.86	8.1	6.2	6.1	5.6	5.3	4.0	4	4	3.6	2.4*	2.7*	2.9	2.1	2.1	1.9	2.4	2.2	2.0	2.5	1.7
087	Central Los Angeles	8.37	8.4	7.9	6.1	6.3	6.0	4.6	4	4.6	3.2	3.1	2.6	2.2	2.1	2.2	2.3	2.4	1.9	2.0	2.0	1.8
088	West San Gabriel Valley	9.12	7.1	6.0	6.3	6.6	7.4	5.0	4	3.8	3.4	2.8	2.8	2.3	2.1	2.1	2	2.2	1.6	1.7	1.8	1.6
090	Santa Clarita Valley	4.12	3.9	6.8	3.4	3.6	4.9	3.1	1.9	1.7	3.7	1.3	1.3	1.2	1.1	1.4	1.1	0.8	1.1	0.8	1.2	0.9
091	Northwest Coastal Los Angeles County	5.62	4.5	4.4	4.5	3.8	4.3	3.0	2.7	2.7	2.3	2.1	2	2	2	1.5	1.4	1.6	1.4	1.3	1.3	1.4
094	Southwest Coastal Los Angeles County 1	8.86	11.6	10.3	9.4	8.4	7.0	5.1	6.1	5	4.4*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	3.0*	2.1	2.3	2.4	2.5	1.9	2.2	1.8	2.5	2.5	1.9	1.4
591	East San Gabriel Valley 2	--	--	--	--	--	3.1	2.5--	2.3	2.1	2	1.9	2	2	3	2.1	1.3	1.1	1.1	0.8	0.7	1.0
ORANGE COUNTY:																						
3176	Central Orange County	8.00	7.5	5.8	5.3	5.3	6.8	4.7	5.4	3.9	4.1	3.3	3	2.9	3.6	2.7	2	2.1	2.3	2.6	2.1	2.2
3177	North Orange County	6.62	6.9	6.0	6.1	5.3	6.1	4.7	4.4	4.1	4	3.1	3	2.9	2.9	2.3	1.8	2.1	2.4	2.2	2.1	1.6
3186	Saddleback Valley 1	4.00	4.0	3.6	3.1	2.5	2.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	6.57	7.3	5.8	7.0	6.4	6.3	4.6	4.3	5.8	4.1	3.2	3	3.1	2	2.2	2.1	2.2	1.7	2.0	1.9	2.2
3812	Saddleback Valley 2	--	--	--	--	--	3.3	2.4	3.6	1.8	1.6	1.6	1.8	2.2	1.1	1	0.9	1	1.1	1.3	0.7	0.7
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	1.50	1.6	1.4	1.6	1.8	1.6	1.5	1.2	1.3*	1	0.8	1	0.8	0.6	0.7	0.5	0.6	0.5	1.5	0.9	0.7
4144	Metropolitan Riverside County 1	5.71	5.0	5.8	4.6	4.4	4.3	3.4	3	3.7	3	2.5	2.1	2.9	2	1.9	1.8	1.4	1.6	2.0	1.9	1.7
4146	Metropolitan Riverside County 2	6.50	5.4	5.0	4.6	4.1	4.3	4.5	3.9	3.4	2.1	2.4	2.3	2.1	2	1.8	1.7	1.5	1.5	1.6	1.4	--
4157	Coachella Valley 2**	--	--	--	--	--	2.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4158	Lake Elsinore	--	--	--	--	--	2.0	2.0	2	1.3*	0.9	1	1	1.4	1	0.7	0.6	0.7	0.7	0.6	1.4	0.6
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	2.7	2.1	1.9	2.4	1.9	1.9	1.9	1.9	2.4	1.6
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	--	--	--	--	--	2.6	1.8	1.6	2.9	2.1	1.8	1.8	1.7	1.6	1.5	1.8	1.3	1.1	1.7	1.2	1.3
5197	Central San Bernardino Valley 1	--	--	--	--	--	--	--	--	--	2.1*	2.1	2	1.8	1.9	1.5	1.4	1.1	1.1	1.3	1.2	1.2
5203	Central San Bernardino Valley 2	6.3	4.6	6.0	4.6	4.0	4.3	3.3	3.3	4.6	3.3	2.4	2.3	2.3	1.8	1.9	1.7	1.7	1.7	1.7	2.4	1.8
	District Maximum	13.9	17.3	17.0	13.5	11.7	10.0	7.7	10.1	7.3	6.7	5.9	6.4	5.1	4.3	4.6	3.6	4.7	4.0	3.5	3.8	3.3

* Less than 12 full months of data

** Salton Sea Air Basin

Refer to 2003 AQMP for 1976–1994 data

TABLE A-21
Nitrogen Dioxide – Annual Average (ppb)
(To Be Compared to Federal Standard (53.4 ppb) and State Standard (30 ppb), Annual Average of All Hours)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	46.4	41.5	33.8	36.4	39.0	36.6	33.1	33.6	29.6	20.4	25.1	25.8	25.3	23.0	19.4	18.5	19.0	19.5	17.7	17.8	15.4
069	East San Fernando Valley	45.4	46.1	42.4	41.6	45.6	41.5	41.9	40.2	35.6*	33.2	29.4	27.4	28.9	28.5	27.4	24.1	22.1*	21.9	20.2	21.8	--
072	South Coastal Los Angeles County 1	36.7	34.2	33.3	33.9	34.2	31.3	30.8	29.8	28.8*	28.0	24.1	21.5	20.7	20.8	21.2	19.8	17.7	20.8*	14.0*	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.2	25.3*	21.5	20.7	19.8
074	West San Fernando Valley	31.7	30.7	26.0	26.6	28.7	28.5	26.6	24.8	26.0*	21.4	20.2	17.4	18.6	18.0	17.1	16.7	14.9	14.9*	14.4*	11.7	13.5
075	Pomona/Walnut Valley	45.6	42.6	43.3	43.3	50.3	43.5	37.1	36.5	35.2	31.4	31.2	30.7	31.8	30.2	27.4	26.2	24.6	21.4	22.5	22.1	21.2
084	South Central Los Angeles County 1	46.3	41.2	42.8	39.3	42.8	38.6	36.9	35.7	31.2	30.1	--	30.6	29.1	30.1*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.4	17.9	18.6	17.2	17.6	15.6	16.9
085	South San Gabriel Valley	45.6	39.3	36.3	36.9	39.1	36.6	35.2	34.4	35.3	30.5	31.2	28.3*	24.9	26.3	25.9	22.9	23.7	20.4*	20.6	19.5	20.5
087	Central Los Angeles	45.0	43.6	43.0	39.8	39.1	40.4	37.8	32.7	33.8	32.8	30.8*	28.8	29.9	27.5	28.1	25.0	23.1	24.8*	21.8	22.2	22.2
088	West San Gabriel Valley	37.5	37.8	34.1	35.1	37.9	29.6	34.5	33.5	32.2	27.0	27.8	24.5	24.6	23.5	22.1	19.6	20.3*	17.2	19.1*	16.6	15.3
090	Santa Clarita Valley	30.5	--	--	--	28.4	24.6	23.9	20.0	22.1	20.4	24.1	18.4	19.6	16.5	15.1	14.3	13.3	13.6	14.4	12.7	11.8
091	Northwest Coastal Los Angeles County	27.8	28.9	28.5	27.1	29.1	27.3	25.1	24.9	23.1	19.8	19.0	17.3	20.0	18.4	17.0	15.6	13.9	13.7	14.5	13.3	11.7
094	Southwest Coastal Los Angeles County 1	30.5	28.5	28.0	29.5	29.5	27.5	25.0	24.4*	23.8	31.0*	17.8	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	13.6*	13.4	15.5	14.0	14.3	15.9	12.1	13.4	10.4*	11.8	11.9	10.9
591	East San Gabriel Valley 2	38.0	32.8	30.0	27.6	32.8	29.0	27.4	27.2	27.1	24.0	22.4	20.6	22.7	18.2	17.0	15.4	12.9	14.2*	13.0	13.1	11.2
ORANGE COUNTY:																						
3176	Central Orange County	37.1	31.9	33.2	33.6	32.7	30.0	29.3*	24.4	24.0	19.9	21.1	19.7	20.8	20.3	17.9	17.5	16.8	14.6	18	15.2	14.6
3177	North Orange County	39.1	35.4	32.9	34.4	35.1	30.4	27.5	25.6	28.4	25.2	24.9	22.4	21.9	20.6	20.6	20.1	17.7	18	14.8*	15.2	15.0
3195	North Coastal Orange County	23.9	20.6	19.9	20.0	20.9	20.5	18.2	18.7	19.9	15.1	13.1	14.5	13.2	13.2	13.0	11.3	10.0	10.4	11.6	10.8	11.6
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	22.3	21.0	15.8	17.0	19.5	17.8	17.5	17.2	17.3*	13.0	12.0	10.3	10.3	9.3	8.1	8.5	8.0	7.8	7.5	7.1	6.2
4144	Metropolitan Riverside County 1	30.6	29.4	26.2	22.5	22.5	23.6	24.7	23.7	21.7	17.2	22.2	19.9	20.6	19.2	17.1	16.8	16.6	15.5	17.3	15.1	14.4
4146	Metropolitan Riverside County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	25.8*	20.0	17.2	16.9	16.5*	15.8*	15.8	--
4158	Lake Elsinore	20.8	18.2	16.5	17.4	20.0	17.5	18.5	17.3	18.2*	15.1	14.2	15.1	17.4	12.9	12.9	10.1	9.6	10.2	8.4	8.2	8.7
4164	Banning Airport	--	--	--	21.5	24.3	23.7	21.1	19.9	19.3*	16.5	14.8	16.1	14.7	12.8	10.9	11.6	9.5	9.5	8.5	8.5	8.4
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	19.4	18.1	17.4	15.8	15.1	15.3	13.9	13.7	13.7	13.4
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	46.4	38.7	34.1	35.9	39.8	38.0	38.4	36.9	34.9	30.5	31.3	31.0	27.6	23.5	23.9	20.4	19.6	19.5	17.7*	16.6	15.9
5197	Central San Bernardino Valley 1	42.4	38.6	36.5	36.2	38.8	36.4	35.8	33.4*	30.7	27.3	31.0	27.0	23.9	20.7	23.5	23.1	21.1	22.1	20.6	20.2	18.7
5203	Central San Bernardino Valley 2	40.4	38.4	35.3	33.9	35.8	32.5	30.3	29.6	27.0	26.1	25.9	25.2	24.5	21.7	19.6	18.8	16.9	18.8	17.6	18.0	15.2
	District Maximum	46.4	46.1	43.3	43.3	50.3	43.5	41.9	40.2	35.6	33.2	31.3	31.0	31.8	30.2	28.1	26.2	24.6	25.3	22.5	22.2	22.2

* Less than 12 full months of data
** Salton Sea Air Basin
Refer to 2003 AQMP for 1976–1994 data

TABLE A-22

Nitrogen Dioxide – Annual Maximum 1-Hour Average (ppm)

(To Be Compared to Federal Standard (0.100 ppm) and State Standard (0.18 ppm), 1-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
060	East San Gabriel Valley 1	0.22	0.15	0.16	0.14	0.16	0.15	0.12	0.12	0.12	0.10	0.09	0.11	0.12	0.10	0.10	0.077	0.080	0.072	0.077	0.070	0.071
069	East San Fernando Valley	0.18	0.20	0.20	0.14	0.18	0.17	0.25	0.26	0.14*	0.12	0.09	0.10	0.09	0.11	0.09	0.082	0.068*	0.080	0.073	0.073	--
072	South Coastal Los Angeles County 1	0.21	0.17	0.20	0.16	0.15	0.14	0.13	0.13	0.14*	0.12	0.14	0.10	0.11	0.13	0.11	0.093	0.106	0.077*	0.067*	--	--
033	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.090	0.091*	0.081	0.136	0.102
074	West San Fernando Valley	0.14	0.16	0.20	0.14	0.12	0.11	0.09	0.09	0.13*	0.08	0.09	0.07	0.08	0.09	0.07	0.075	0.056	0.071*	0.058*	0.059	0.073
075	Pomona/Walnut Valley	0.18	0.18	0.15	0.15	0.16	0.14	0.13	0.11	0.12	0.11	0.08	0.10	0.10	0.11	0.10	0.097	0.087	0.082	0.079	0.089	0.072
084	South Central Los Angeles County 1	0.21	0.25	0.20	0.16	0.18	0.14	0.15	0.14	0.13	0.10	0.11	0.14	0.10	0.12*	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.077	0.075	0.079	0.070	0.068	0.074
085	South San Gabriel Valley	0.23	0.17	0.15	0.14	0.16	0.14	0.14	0.12	0.14	0.12	0.09	0.10*	0.11	0.10	0.10	0.079	0.091	0.081*	0.079	0.087	0.070
087	Central Los Angeles	0.24	0.25	0.20	0.17	0.21	0.16	0.14	0.14	0.16	0.16	0.13*	0.11	0.10	0.12	0.12	0.089	0.110	0.077*	0.090	0.082	0.079
088	West San Gabriel Valley	0.22	0.19	0.17	0.16	0.16	0.17	0.15	0.15	0.14	0.12	0.10	0.12	0.09	0.11	0.08	0.071	0.087*	0.071	0.067*	0.075	0.075
090	Santa Clarita Valley	0.16	--	--	--	0.10	0.10	0.10	0.10	0.12	0.09	0.09	0.08	0.08	0.07	0.06	0.059	0.060	0.066	0.065	0.058	0.065
091	Northwest Coastal Los Angeles County	0.20	0.18	0.14	0.13	0.13	0.16	0.11	0.11	0.12	0.09	0.08	0.08	0.08	0.09	0.08	0.071	0.081	0.061	0.051	0.064	0.068
094	Southwest Coastal Los Angeles County 1	0.18	0.15	0.17	0.15	0.13	0.13	0.11*	0.10	0.12*	0.08	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0.09*	0.09	0.10	0.08	0.09	0.08	0.076	0.098	0.062*	0.078	0.087	0.087
591	East San Gabriel Valley 2	0.20	0.14	0.13	0.13	0.14	0.13	0.12	0.10	0.12	0.12	0.09	0.10	0.11	0.10	0.09	0.079	0.078	0.060*	0.056	0.066	0.066
ORANGE COUNTY:																						
3176	Central Orange County	0.18	0.15	0.10	0.13	0.12	0.13	0.12*	0.10	0.13	0.12	0.09	0.11	0.10	0.09	0.07	0.073	0.074	0.067	0.082	0.076	0.059
3177	North Orange County	0.20	0.16	0.15	0.13	0.16	0.12	0.13	0.12	0.16	0.12	0.09	0.09	0.08	0.08	0.10	0.083	0.070	0.068	0.085*	0.084	0.058
3195	North Coastal Orange County	0.18	0.14	0.12	0.12	0.12	0.11	0.08	0.11	0.11	0.10	0.09	0.10	0.07	0.08	0.07	0.070	0.061	0.074	0.076	0.061	0.052
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	0.09	0.08	0.07	0.07	0.07	0.07	0.08	0.10	0.06*	0.07	0.10	0.09	0.06	0.05	0.05	0.046	0.045	0.045	0.052	0.046	0.042
4144	Metropolitan Riverside County 1	0.15	0.11	0.12	0.10	0.13	0.10	0.15	0.10	0.09	0.09	0.08	0.08	0.07	0.09	0.08	0.065	0.063	0.062	0.060	0.060	0.057
4146	Metropolitan Riverside County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	0.09*	0.08	0.061	0.057	0.060*	0.058*	0.056	--
4158	Lake Elsinore	0.21	0.10	0.11	0.09	0.11	0.08	0.09	0.07	0.08*	0.06	0.07	0.07	0.06	0.06	0.06	0.051	0.050	0.048	0.047	0.045	0.047
4164	Banning Airport	--	--	--	0.26	0.31	0.21	0.24	0.15	0.09*	0.08	0.07	0.11	0.08	0.08	0.06	0.066	0.061	0.072	0.052	0.052	0.050
4165	Mira Loma	--	--	--	--	--	--	--	--	--	--	--	0.08	0.07	0.10	0.08	0.062	0.059	0.061	0.054	0.058	0.068
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	0.20	0.15	0.15	0.14	0.13	0.15	0.13	0.12	0.11	0.11	0.10	0.10	0.10	0.09	0.11	0.079	0.069	0.067	0.062*	0.074	0.072
5197	Central San Bernardino Valley 1	0.17	0.17	0.14	0.15	0.15	0.12	0.13	0.12*	0.12	0.06	0.10	0.09	0.09	0.10	0.11	0.072	0.076	0.069	0.082	0.070	0.089
5203	Central San Bernardino Valley 2	0.16	0.15	0.14	0.11	0.14	0.10	0.11	0.11	0.10	0.12	0.08	0.09	0.08	0.09	0.08	0.069	0.062	0.067	0.072	0.073	0.071
	District Maximum	0.24	0.25	0.2	0.26	0.31	0.21	0.25	0.26	0.16	0.16	0.14	0.14	0.12	0.13	0.12	0.097	0.110	0.091	0.090	0.136	0.102

* Less than 12 full months of data ** Salton Sea Air Basin

Refer to 2003 AQMP for 1976–1994 data

TABLE A-23
Sulfur Dioxide – Annual Maximum 1-Hour Average (ppm)
(To Be Compared to Federal Standard (0.075 ppm) and State Standard (0.25 ppm), 1-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2021	2013	2014	
LOS ANGELES COUNTY:																						
60	East San Gabriel Valley 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
69	East San Fernando Valley	0.01	0.01	0.04	0.01	0.01	0.01	0.01	0.01	0.01*	0.02	0.01	0.01	0.01	0.01	0.01	0.015	0.009	0.007	0.011	0.005	--
72	South Coastal Los Angeles County 1	0.14	0.04	0.04	0.08	0.05	0.05	0.05	0.03	0.03	0.04	0.04	0.03	0.11	0.09	0.02	0.040	0.015	0.022	0.022	--	--
33	South Coastal Los Angeles County 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.043	0.023	0.015	0.015	0.038
74	West San Fernando Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
84	South Central Los Angeles County	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
85	South San Gabriel Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
87	Central Los Angeles	0.01	0.01	0.02	0.14	0.05	0.08	0.03	0.02	0.05*	0.08	0.07	0.03	0.01	0.01	0.01	0.010	0.020	0.005	0.006	0.005	0.013
88	West San Gabriel Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
90	Santa Clarita Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
91	Northwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
94	Southwest Coastal Los Angeles County 1	0.06	0.06	0.1	0.03	0.09	0.17	0.04	0.07	0.03	0.03*	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0.02*	0.04	0.02	0.02	0.02	0.02	0.026	0.012	0.005	0.010	0.015	0.015
ORANGE COUNTY:																						
3176	Central Orange County	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3177	North Orange County	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3195	North Coastal Orange County	0.02	0.01	0.03	0.02	0.02	0.02	0.01	0.03	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.010	0.008	0.006	0.004	0.009	0.005
RIVERSIDE COUNTY:																						
4144	Metropolitan Riverside County	0.01	0.01	0.04	0.03	0.03	0.11	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.018	0.051	0.004	0.008	0.006	0.002
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000
5197	Central San Bernardino Valley 1	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.03*	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.007	0.012	0.023	0.004	0.004	0.004
5203	Central San Bernardino Valley 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	District Maximum	0.14	0.06	0.1	0.14	0.09	0.17	0.05	0.07	0.05	0.08	0.07	0.03	0.11	0.09	0.02	0.04	0.051	0.023	0.022	0.015	0.038

* Less than 12 full months of data
** Salton Sea Air Basin
Refer to 2003 AQMP for 1976–1994 data

TABLE A-24

Sulfates (PM10) – Annual Maximum 24-Hour Average (µg/m³)

(To Be Compared to State Standard of 25 µg/m³, 24-Hour Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
60	East San Gabriel Valley 1	12.7	11.9	12.9	10.5	16.9	14.3	12.7	12.3	13.1	10.8	10.8	17.0	34.2	17.3	7.3	7.3	6.6	5.2	4.8	14.3	21.0+
69	East San Fernando Valley	14.9	12.0	14.7	9.8	11.4	15.7	14.6	12.2	15.3	11.0	11.8	13.3	10.2	10.8	8.8	8.0	7.4	6.2	5.4	4.0*	--
72	South Coastal Los Angeles County 1	18.2	14.9	11.3	12.8	13.1	11.9	15.0	14.4	15.6	14.7	10.8	16.5	10.3	9.7	9.5	10.0	6.1	5.2	4.5	--	--
77	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	15.0	15.9	13.5	17.9	8.4	11.0	7.3	12.6	5.9	4.9	4.8	4.5	6.3
87	Central Los Angeles	16.2	14.7	16.2	10.3	16.7	14.6	16.2	13.5	14.5	10.5	11.7	13.1	9.4	12.7	9.5	7.5	8.0	5.7	5.8	11	6.1
90	Santa Clarita Valley	11.2	8.4	10.4	7.2	17.3	--	9.2	9.2	11.2	8.9	9.3	8.8	9.2	6.7	6.0	6.9	6.1	4.9	3.7	4.3	5.3
94	Southwest Coastal Los Angeles County1	18.1	16.1	15.3	11.6	17.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	12.6	11.0	12.4	10.7	13.4	8.4	8.5	5.9	5.4	5.6	5.1	6.5
ORANGE COUNTY:																						
3176	Central Orange County	14.5	17.3	14.7	12.9	9.6	--	9.9	11.8	11.3	12.2	9.0	12.8	12.1	8.7	7.6	6.6	6.5	4.4	4.7	9.4	4.2
3186	Saddleback Valley 1	12.3	15.1	14.2	9.1	8.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3812	Saddleback Valley 2	--	--	--	--	8.6	12.3	10.1	10.9	10.5	9.2	9.2	9.4	8.8	6.8	6.1	7.4	4.8	4.2	4.4	4.0	3.3
RIVERSIDE COUNTY:																						
4137	Coachella Valley 1**	6.8	5.7	5.9	5.5	5.4	6.2	6.0	5.3	6.5	5.2	5.5	4.9	5.8	5.2	4.8	5.1	4.4	5.9	3.5	2.6	4.6
4144	Metropolitan Riverside County 1	22.3	14.9	14.8	10.0	11.1	10.7	11.3	10.5	12.4	24.8	10.5	10.9	13.7	7.3	8.3	7.2	5.3	7.7	4.2	4.1	5.9
4149	Perris Valley	13.5	8.0	9.1	7.9	8.7	7.4	8.3	7.9	6.9	7.8	7.7	9.0	10.1	6.5	6.3	5.8	4.4	3.8	3.4	3.5	3.6
4150	San Gorgonio Pass	7.3	8.5	8.7	6.5	2.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4155	Norco/Corona	13.6	11.3	13.1	9.8	10.1	11.0	10.2	10.5	9.9	10.1	7.1	10.7	18.9	13.4	10.7	7.0	5.1	4.4	4.2	3.8	3.8
4157	Coachella Valley 2**	10.4	6.7	5.8	5.4	4.9	6.9	7.5	7.2	6.2	6.7	6.1	5.4	5.2	5.6	5.1	4.8	5.7	7.6	3.9	3.2	4.1
4164	Banning Airport				6.1	4.6	6.9	6.4	8.0	5.8	6.7	7.1	7.5	6.2	6.3	5.4	5.5	4.4	5	2.9	2.7	3.8
4165	Mira Loma Van Buren	--	--	--	--	--	--	--	--	--	--	--	10.1	19.6	8.6	5.9	5.3	5.4	4.7	4.2	4.2	4.9
SAN BERNARDINO COUNTY:																						
5181	Central San Bernardino Mountains	4.8	5.2	4.7	4.5	3.0	5.1	5.2	4.0	3.7	4.7	5.9	4.2	3.9	4.4	3.9	4.7	4.0	3.7	3.6	2.9	4.2
5197	Central San Bernardino Valley 1	14.2	11.0	11.2	9.8	11.6	11.6	11.3	11.6	12.4	10.2	9.0	11.7	22.2	8.9	6.1	6.2	6.0	4.6	4.1	5.0	14.7+
5203	Central San Bernardino Valley 2	11.9	11.6	9.2	13.1	10.8	10.6	10.3	10.8	11.4	10.4	9.3	10.0	9.7	8.3	5.6	6.6	5.5	4.4	4.6	4.6	9.0
5204	East San Bernardino Valley	11.3	9.9	8.8	9.6	9.8	10.2	9.0	9.7	9.0	10.5	8.6	11.7	11.3	7.4	5.4	6.6	4.9	4.2	3.6	3.4	7.3
5817	Southwest San Bernardino Valley	--	--	--	4.6	10.1	10.2	11.4	10.7	11.0	11.1	9.3	11.2	22.8	12.4	7.0	7.3	5.5	5.1	4.8	3.9*	--
	District Maximum	22.3	17.3	16.2	13.1	17.6	15.7	16.2	14.4	15.6	24.8	13.5	17.9	34.2	17.3	10.7	12.6	8.0	7.7	5.8	14.3	21.0+

* Less than 12 full months of data

** Salton Sea Air Basin

+Higher concentrations recorded due to the 4th of July firework activities.

Refer to 2003 AQMP, Appendix II for 1976–1994 data

TABLE A-25
Lead (TSP) – Annual Maximum Monthly Average (µg/m³)
(To Be Compared to State Standard of 1.5 µg/m³, Monthly Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
LOS ANGELES COUNTY:																						
69	East San Fernando Valley	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
72	South Coastal Los Angeles County 1	0.05	0.09	0.05	0.07	0.06	0.05	0.05	0.03	0.10	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	--	--
77	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.010
84	South Central Los Angeles County 1	0.06	0.09	0.07	0.04	0.17	0.09	0.23	0.04	0.04	0.03	0.03	0.02	0.03	0.03	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.01	0.01	0.01	0.01	0.01	0.014
85	South San Gabriel Valley	0.07	0.09	0.08	0.07	0.21	0.09	0.07	0.06	0.05	0.03	0.03*	0.03	0.04	0.02	0.04	0.02	0.01	0.01	0.01	0.02	0.014
87	Central Los Angeles	0.07	0.08	0.07	0.06	0.13	0.06	0.06	0.05	0.15	0.03	0.03	0.02	0.04	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.013
94	Southwest Coastal Los Angeles County	0.04	0.04	0.06	0.06	0.05	0.08	0.04	0.02	0.17	0.01	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.008
LOS ANGELES COUNTY (Source-Specific):																						
	Van Nuys Airport, Van Nuys	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.06	0.13	0.09	--	--
	Trojan Battery, Santa Fe Springs	--	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.15	0.08	0.12	0.12	0.11	0.05	0.05
	Quemetco, City of Industry	--	--	--	--	0.28	0.44	0.46	0.15	0.18	0.13	0.38	0.10	--	0.06*	0.11	0.12	0.07	0.04	0.07	0.04	0.02
	Exide (Rehrig), Vernon	--	--	--	--	--	--	--	--	--	--	--	--	1.97*	2.88	0.80	0.48	0.54	0.13	0.12	0.10	0.03
	Exide (ATSF), Vernon	--	--	--	--	--	--	--	--	--	--	--	0.23	1.01	0.25	0.09	0.08	0.07	0.04	0.02	0.02	0.02
	Exide (Ayers St.), Vernon	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04*	0.03	0.02	--	--	--	--	--
ORANGE COUNTY:																						
3176	Central Orange County	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RIVERSIDE COUNTY:																						
4144	Metropolitan Riverside County 1	0.04	0.08	0.07	0.08	0.06	0.06	0.04	0.03	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.008
4146	Metropolitan Riverside County 2	0.05	0.05	0.07	0.10	0.05	0.04	0.03	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	--
SAN BERNARDINO COUNTY:		0.05	0.04	0.04	0.05	0.07	0.07	0.05	0.02	0.08	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	--	--	--	--
5175	Northwest San Bernardino Valley	0.06	0.04	0.04	0.05	0.07	0.07	0.05	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.010
5203	Central San Bernardino Valley	0.05	0.06	0.04	0.05	0.07	0.06	0.05	0.03	0.14	0.02	0.02	0.02	0.04	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.012
	District Maximum	0.07	0.09	0.08	0.1	0.28	0.44	0.46	0.15	0.18	0.13	0.38	0.23	1.97	2.88	0.8	0.48	0.12	0.13	0.12	0.10	0.014

* Less than 12 full months of data
Refer to 2003 AQMP for 1976–1994 data

TABLE A-26

Lead (TSP) – Annual Maximum 3-Month Rolling Average (µg/m^3)

(To Be Used for Comparison to Federal Standard of 0.15 µg/m^3, 3-Month Rolling Average)

STN#	LOCATION	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
LOS ANGELES COUNTY:																						
69	East San Fernando Valley	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
72	South Coastal Los Angeles County 1	0.04	0.04	0.04	0.04	0.05	0.05	0.04	0.03	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	--	--
77	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	0.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
84	South Central Los Angeles County 1	0.05	0.07	0.07	0.05	0.09	0.07	0.11	0.04	0.04	0.03	0.03	0.02	0.03	0.03	--	--	--	--	--	--	--
112	South Central Los Angeles County 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02	0.01	0.01	0.01	0.01	0.01	0.01
85	South San Gabriel Valley	0.06	0.06	0.07	0.06	0.10	0.08	0.05	0.05	0.03	0.03	0.02	0.02	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
87	Central Los Angeles	0.06	0.06	0.07	0.05	0.07	0.05	0.05	0.04	0.06	0.06	0.02	0.01	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
94	Southwest Coastal Los Angeles County	0.04	0.04	0.05	0.05	0.04	0.05	0.04	0.03	0.07	0.07	--	--	--	--	--	--	--	--	--	--	--
820	Southwest Coastal Los Angeles County	--	--	--	--	--	--	--	--	--	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01
LOS ANGELES COUNTY (Source-Specific):																						
	Van Nuys Airport, Van Nuys	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.04	0.08	0.08	--	--
	Trojan Battery, Santa Fe Springs	--	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.12	0.07	0.11	0.08	0.08	0.04	0.04
	Quemetco, City of Industry	--	--	--	--	0.22	0.37	0.33	0.12	0.15	0.11	0.22	0.09	--	--	0.10	0.10	0.06	0.03	0.04	0.03	0.01
	Exide (Rehrig), Vernon	--	--	--	--	--	--	--	--	--	--	--	--	--	2.49	0.66	0.39	0.46	0.15	0.10	0.07	0.02
	Exide (ATSF), Vernon	--	--	--	--	--	--	--	--	--	--	--	0.21	0.55	0.22	0.08	0.05	0.06	0.03	0.02	0.02	0.02
	Exide (Ayers St.), Vernon	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03	0.02	0.02	--	--	--	--	--
ORANGE COUNTY:																						
3176	Central Orange County	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RIVERSIDE COUNTY:																						
4144	Metropolitan Riverside County 1	0.04	0.05	0.04	0.05	0.05	0.05	0.05	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.03	0.01	0.01	0.01	0.01	0.01	0.01
4146	Metropolitan Riverside County 2	0.03	0.03	0.05	0.06	0.04	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	--
SAN BERNARDINO COUNTY:																						
5175	Northwest San Bernardino Valley	0.04	0.04	0.04	0.04	0.05	0.05	0.04	0.02	0.04	0.03	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
5203	Central San Bernardino Valley	0.04	0.05	0.03	0.04	0.05	0.05	0.05	0.03	0.08	0.07	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	District Maximum	0.06	0.07	0.07	0.06	0.22	0.37	0.33	0.12	0.15	0.11	0.22	0.21	0.55	2.49	0.66	0.39	0.46	0.15	0.10	0.07	0.01

* Less than 12 full months of data

Refer to 2003 AQMP for 1976–1994 data

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix III

Base and Future Year Emission Inventory

2016 AIR QUALITY MANAGEMENT PLAN



December 2016

DRAFT FINAL 2016 AQMP
APPENDIX III

BASE AND FUTURE YEAR EMISSION INVENTORY

DECEMBER 2016

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
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CHAPTER 1

INVENTORY DEVELOPMENT

Background

Air Contaminants

Inventory Source Categories

- **Stationary Sources**
- **Improved/Updated Methodologies**
- **Mobile Sources**

Inventory Type

- **Average Annual Day Inventory**
- **Planning Inventory**

BACKGROUND

Federal and State standards limit concentration levels of air contaminants in ambient air to protect public health and welfare. An emission inventory of air pollutants and their sources is essential to identify the major contributors of air contaminants and to identify the measures necessary to reduce air pollution. 2012 is the base year used to project future year emissions for the 2016 Air Quality Management Plan (AQMP).

This appendix includes five attachments: Attachment A – Average Annual Emissions Summary by Major Source Category; Attachment B – Summer Planning Emissions Summary by Major Source Category; Attachment C – Top South Coast Air Basin (SCAB) VOC and NOx producers which emitted equal to or greater than ten tons per year (TPY) in 2012; Attachment D – On-Road Emissions by Vehicle Category; and Attachment E – Emissions from Diesel Fuel Combustion by Major Source Category. The years of 2012, 2019, 2021, 2022, 2023, 2025, and 2031 are provided in Attachments A, B, D and E.

Information necessary to produce the emission inventory for the Basin is obtained from the District and other governmental agencies, including the California Air Resources Board (CARB), the California Department of Transportation (Caltrans), and the Southern California Association of Governments (SCAG). Each of these agencies is responsible for collecting data (e.g., industry growth factors, socio-economic projections, travel activity levels, emission factors, emission speciation profile, and emissions) and developing methodologies (e.g., model and demographic forecast improvements) required to generate a comprehensive emissions inventory. Entire Statewide emissions inventories are compiled and maintained by CARB in their emission-related databases termed the California Emission Inventory Development and Reporting System (CEIDARS), and the California Emission Forecasting and Planning Inventory System (CEFIS). CARB is the agency responsible for developing the emissions inventory for all mobile sources, except emissions from aircraft. CARB provides the tool for on-road inventories, the EMFAC2014 model, and off-road inventories using models specific to each off-road category[1]. Caltrans provides SCAG with information related to highway projects. SCAG incorporates these data into their Travel Demand Model for estimating/projecting vehicle miles traveled (VMT) and driving speeds. SCAG's socio-economic and transportation activities projections in their 2016 Regional Transportation Plan/Sustainable Communities

[1] More information about CARB's on-road and off-road models can be found at http://www.arb.ca.gov/msei/categories.htm

Strategy (RTP/SCS) are integrated in the 2016 AQMP. The EMFAC2014 was run with the SCAG custom activities to produce the on-road mobile source inventories.

AIR CONTAMINANTS

Currently, air quality standards exist for the following criteria pollutants: ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), fine suspended particulate less than 10 microns (PM10), fine particulate less than 2.5 microns (PM2.5), lead, and sulfate. This appendix presents emission levels in the Basin for the criteria pollutants and their precursors. Specifically, data are included for emissions of total organic gases (TOG), volatile organic compounds (VOC), oxides of nitrogen (NOx), oxides of sulfur (SOx), CO, particulate matter (PM), PM10, PM2.5, and ammonia (NH3).

Ozone is formed from photochemical reactions involving precursor emissions, so its emissions cannot be included in the inventories. Although air quality standards for NOx and SOx are based on NO_2 and SO_2, respectively, emissions of NOx and SOx are in the emissions inventory because multiple species of NOx and SOx contribute to the formation of particulate matter, and NOx and VOC react in the presence of sunlight to produce ozone.

TOG incorporates all gaseous compounds containing the element carbon with the exception of the inorganic compounds, CO, carbon dioxide (CO_2), carbonic acid, carbonates, and metallic carbides. VOC, a subset of TOG, includes all organic gases in TOG except acetone, ethane, methane, methylene chloride, methylchloroform, perchloroethylene, methyl acetate, parachlorobenzotrifluoride, and a number of Freon-type gases. The U.S. EPA definition of VOC is different from the one used by the CARB, which includes some compounds not considered as VOCs by the U.S. EPA. Table III-1-1 lists the compounds that are exempt in U.S. EPA's VOC list, but are included in CARB's VOC list. Certain CFCs are still included in CARB's VOC list. According to CARB, the total emission inventory difference between U.S. EPA VOC and CARB's VOC is very small.

PM represents all airborne particulate matter, also known as total suspended particles (TSP). Important subsets of PM are PM10 and PM2.5. In the 2016 AQMP, the amount of VOC in TOG and the amount of PM10 and PM2.5 in PM are calculated for each process primarily using speciation and size fraction profiles provided by CARB. Besides average annual day emissions that are reported for all criteria pollutants, summer planning inventories (VOC and NOx) are reported to specifically address the ozone season.

TABLE III-1-1

List of Compounds Exempt in U.S. EPA's Definition of VOC; Included in CARB's Definition of VOC

COMPOUND	CAS*
3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	422-56-0
1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	507-55-1
1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC 43-10mee)	138495-42-8
difluoromethane (HFC-32)	75-10-5
ethylfluoride (HFC-161)	353-36-6
1,1,1,3,3,3-hexafluoropropane (HFC-236fa)	690-39-1
1,1,2,2,3-pentafluoropropane (HFC-245ca)	679-86-7
1,1,2,3,3-pentafluoropropane (HFC-245ea)	24270-66-4
1,1,1,2,3-pentafluoropropane (HFC-245eb)	431-31-2
1,1,1,3,3-pentafluoropropane (HFC-245fa)	460-73-1
1,1,1,2,3,3-hexafluoropropane (HFC-236ea)	431-63-0
1,1,1,3,3-pentafluorobutane (HFC-365mfc)	406-58-6
chlorofluoromethane (HCFC-31)	593-70-4
1 chloro-1-fluoroethane (HCFC-151a)	1615-75-4
1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a)	354-23-4
1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane (C4F9OCH3 or HFE-7100)	163702-07-6
2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane ((CF3)2CFCF2OCH3)	163702-08-7
1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane (C4F9OC2H5 or HFE-7200)[(2)]	163702-05-4
2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane ((CF3)2CFCF2OC2H5)	163702-06-5
1,1,1,2,2,3,3-heptafluoro-3-methoxy-propane (n-C3F7OCH3, HFE-7000)	375-03-1
3-ethoxy- 1,1,1,2,3,4,4,5,5,6,6,6-dodecafluoro-2-(trifluoromethyl) hexane (HFE-7500)	297730-93-9
1,1,1,2,3,3,3-heptafluoropropane (HFC 227ea)	431-89-0
methyl formate (HCOOCH3)[(3)]	107-31-3

TABLE III-1-1 (Continued)

List of Compounds Exempt in U.S. EPA's Definition of VOC; Included in CARB's Definition of VOC

COMPOUND	CAS*
1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-trifluoromethyl-pentane (HFE-7300)(1)	132182-92-4
propylene carbonate(1)	108-32-7
dimethyl carbonate(1)	616-38-6
trans-1,3,3,3-tetrafluoropropene(1)	29118-24-9
HCF2OCF2H (HFE-134) (1)	1691-17-4
HCF2OCF2OCF2H (HFE-236cal2) (1)	78522-47-1
HCF2OCF2CF2OCF2H (HFE-338pcc13) (1)	188690-78-0
HCF2OCF2OCF2CF2OCF2H (H-Galden 1040x or H-Galden ZT 130 (or 150 or 180)) (1)	188690-77-9
trans 1-chloro-3,3,3-trifluoroprop-1-ene(1)	102687-65-0
2,3,3,3-tetrafluoropropene(1)	754-12-1
2-amino-2-methyl-1-propanol(1)	124-68-5
Tertiary butyl acetate	540-88-5

* Chemical Abstract Service (CAS) identification numbers have been included for convenience.
(1) Compounds are new since the 2012 AQMP.
(2) Exempt in the consumer product regulation not the architectural coatings suggested control measure.
(3) Recommend exemption for stationary source regulations under district control.

INVENTORY SOURCE CATEGORIES

Stationary Sources

Stationary sources of emissions are grouped into two categories - point sources and area sources. Point source emissions are from facilities having one or more pieces of equipment registered and permitted with the District. Therefore, the District is able to collect facility emission-related information from these facilities. Area source emissions are from numerous small facilities or pieces of equipment, such as gasoline-dispensing facilities, residential water heaters, consumer products and architectural coatings, for which locations may not be specifically identified. For modeling purposes, area source emissions are spatially allocated to grid cells using demographic data (e.g., population, housing, and land use).

Point Sources

The 2012 point source emission inventory is based on the emissions data reported by point source facilities in the calendar year 2012 Annual Emissions Reporting (AER)

Program. This program applies to facilities emitting 4 TPY or more of VOC, NOx, SOx, or PM or emitting more than 100 TPY of CO, as specified in Rule 301(e). Facilities subject to the AER Program calculate and report their emissions primarily based on their throughput data (e.g., fuel usage, material usage), appropriate emission factors or source tests, and control efficiency (if applicable). Under the calendar year 2012 AER Program, approximately, 1,715 facilities reported their annual emissions to the District. The smaller industrial facilities with emissions below reporting thresholds are not subject to the AER program. The emissions from those facilities are included as part of the area source inventory.

In order to prepare the point source inventory, emissions data for each facility were categorized based on U.S. EPA's Source Classification Codes (SCCs) for each emission source category. Since the AER program collects emissions data on an aggregate basis (i.e., similar equipment and processes with same emission factor are grouped and reported together), facility's equipment permit data were used in conjunction with the reported data to assign the appropriate SCC codes and develop the inventory at the SCC level. For modeling purposes, facility location (in latitude and longitude) is specified. Business operation activity profiles are also recorded. The facility business type is assigned to the facilities based on North American Industry Classification System (NAICS) Code according to their primary activity. The growth projections are assigned by NAICS.

Area Sources

The District and CARB shared the responsibility for developing the 2012 area source emissions inventory for approximately 400 area source categories. Specifically, the District is responsible for developing the area source inventory for about 150 categories whereas CARB developed the remaining area source categories (such as consumer products and degreasing). For each area source category, a specific methodology is used to estimate emissions. The 2012 area source inventory is the 2012 projected emissions based on its 2008 baseline emission inventory except in the following categories: prescribed burning, forest management, architectural coating, composting, natural gas and LPG combustion sources, and livestock for which the new updated inventories were developed based on 2012 data.

Changes in Point Sources

The point source inventory continued its downward trend primarily due to the implementation of existing stationary source regulations. As indicated in Figure III-1-1, point source emissions of VOC, NOx, SOx, and PM2.5 decreased between 2008 and 2012.

The decreases are from 34, 34, and 13 tons per day to 28, 29 and 9 tons per day for VOC, NOx and SOx respectively.

Changes in Area Sources

The area source inventory also decreased between 2008 and 2012 for all criteria pollutants, except SOx which remained the same. Figure III-1-2 shows VOC, NOx, SOx and PM2.5 changed from 231, 53, 1, 39 tons per day to 183, 36, 1 and 36 tons per day between 2008 and 2012.

Rule Implementation

A list of the District's VOC, NOx, PM2.5 and SOx emission reduction commitments since the 2012 State Implementation Plan (SIP) is provided by measure, adoption date, and pollutant in Table III-1-2.

TABLE III-1-2

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	COMMITMENT		ACHIEVED	
			2014	2023	2014	2023
PM2.5 EMISSIONS						
BCM-01	Further Reductions from Residential Wood Burning Devices (R445)	2013	7.1	--	7.1	--
BCM-02	Further Reductions from Open Burning (R444)	2013	4.6	--	4.6	--
BCM-03	Emission Reductions from Under-Fired Charbroilers	TBD	--	TBD	--	TBD
BCM-04	Further Ammonia Reductions from Livestock Waste	TBD	--	TBD	--	TBD
	TOTAL PM2.5 REDUCTIONS		**11.7**	**--**	**11.7**	**--**
NOx EMISSIONS						
OFFRD-01	Extension of the SOON Provision for Construction/Industrial Equipment	Ongoing	--	7.5	--	7.5
CMB-01	Further Reductions from RECLAIM [Regulation XX]	2015	2	3	0	12
CMB-02	NOx Reduction from Biogas Flares	Rulemaking Underway	--	TBD	--	TBD
CMB-03	Reductions from Commercial Space Heating	2016	--	0.18	--	TBD
	TOTAL NOx REDUCTIONS		**0**	**10.7**	**0**	**19.5**

TABLE III-1-2 (Continued)

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	COMMITMENT		ACHIEVED	
			2014	2023	2014	2023
VOC emissions						
CTS-01	Further VOC Reductions from Architectural Coatings [R1113]	2016	--	2	--	1
CTS-02	Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants	Rulemaking Underway	--	1	--	--
CTS-03	Further VOC Reduction from Mold Release Products [R1161]	Rulemaking Underway	--	0.8	--	--
FUG-01	VOC Reductions from Vacuum Trucks [R1188]	Rulemaking Underway	--	TBD (1)	--	--
FUG-02	Emission Reduction from LPG Transfer and Dispensing [R1177]	Rulemaking Underway	--	1	--	--
FUG-03	Emission Reduction from Fugitive VOC Emissions	2016	--	1	--	--
MCS-01	Application of All Feasible Measure Assessment [R1114]	Ongoing	TBD	TBD	0.4	1.4
	TOTAL VOC REDUCTIONS		**0**	**5.8**	**0.4**	**2.4**

TABLE III-1-2 (Concluded)

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	COMMITMENT		ACHIEVED	
			2014	2023	2014	2023
Multi-pollutant						
IND-01	Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities [PR4001]	Rulemaking Underway	N/A(1)	N/A (1)	N/A (1)	N/A (1)
MCS-02	Further Emission Reductions from Greenwaste Processing (Chipping and Grinding Operations not associated with composting)	Rulemaking Underway	--	TBD (1)	--	TBD
MCS-03	Improved Start-Up, Shutdown and Turnaround Procedures [R1123]	2014	--	TBD	--	TBD (2)
INC-01	Economic Incentive Programs to Adopt Zero and Near-Zero Technologies	Ongoing	--	--	--	--
INC-02	Expedited Permitting and CEQA Preparation Facilitating the Manufacturing of Zero and Near-Zero Technologies [All Pollutants]	Ongoing	--	--	--	--
EDU-01	Further Criteria Pollutant Reductions from Education, Outreach and Incentives [All Pollutants]	Ongoing	--	--	--	--

[1] Measure is designed to ensure reductions projected to occur are achieved

[2] Reductions to be determined once the technical assessment is complete and inventory and control approach are identified

COMPARISON OF 2008 BASE YEAR IN 2012 AQMP AND 2012 BASE YEAR IN 2016 AQMP

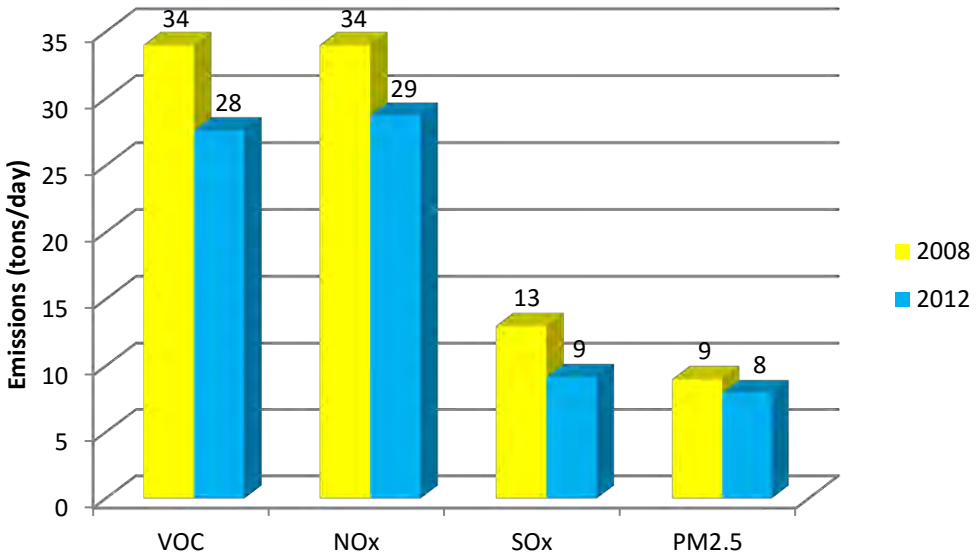


FIGURE III-1-1

Total Point Source Emissions

(VOC & NOx – Summer Planning; SOx & PM2.5 – Annual Average Inventory)

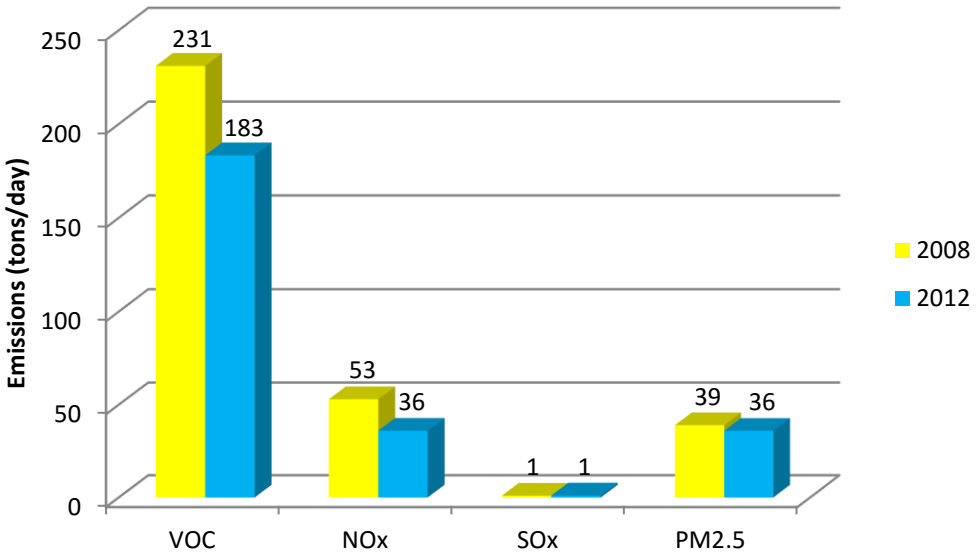


FIGURE III-1-2

Total Area Source Emissions

(VOC & NOx – Summer Planning; SOx & PM2.5 – Annual Average Inventory)

Improved/Updated Methodologies

LPG Combustion: Emissions from LPG combustion in the industrial sector were significantly revised for the 2016 AQMP. Table III-1-3 summarizes the methodology used for these emissions calculations. Total 2012 California LPG consumption and industrial LPG consumption were obtained from the Energy Information Administration. The fraction of California industrial LPG usage in the Basin was estimated from mandatory greenhouse gas emissions reporting at CARB allowing for the prediction of industrial LPG consumption within the SCAB. The agricultural sector is a significant consumer of LPG, and therefore, it was necessary to determine the fraction of industrial consumption that can be attributed to non-agricultural sources. The fraction of the California LPG market that is consumed in the agriculture sector was estimated with sales data from LP Gas Magazine. The agricultural LPG consumption within the Basin was estimated by weighting the total Statewide agricultural consumption by the fraction of California farmland within the 4-county region from the U.S. Department of Agriculture. The non-agricultural industrial LPG consumption in the SCAB could then be estimated. The revised LPG consumption figure is significantly less than the projected 2012 LPG industrial consumption figure used for the 2012 AQMP. The changes in NOx emissions associated with this update are summarized in Table III-1-4.

TABLE III-1-3

Summary of Industrial-Sector LPG Throughput Calculations

Description	Estimates
2012 CA Total LPG Consumption	652,008,000 gal
2012 CA Industrial Consumption	259,182,000 gal
2012 SCAB Fraction of CA Industrial Consumption	11.8%
2012 SCAB Industrial Consumption	30,531,000 gal
2012 Agricultural Consumption Fraction of Total CA Industrial Consumption	10.6%
2012 Agricultural Consumption in CA	69,334,000 gal
2012 CA Agriculture Consumption Fraction of CA Industrial Consumption	26.8%
2012 Non-Agriculture Industrial LPG use in SCAB	22,364,000 gal
2008 CA Industrial Consumption used for 2012 AQMP	76,111,000 gal
2008 SCAB Industrial Consumption used for 2012 AQMP	34,249,950 gal
Ratio of 2008 Industrial Consumption from 2012 AQMP to 2012 Industrial Consumption from 2012 AQMP	153.1%

TABLE III-1-4

2012 Emissions Associated with LPG Combustion in TPD

CES	Description	2012 AQMP		2016 AQMP	
		VOC	NOx	VOC	NOx
66795	INDUSTRIAL L.P.G. COMBUSTION	3.021	5.598	0.962	1.645
58727	COMMERCIAL L.P.G. COMBUSTION	0.173	0.794	0.173	0.704
47217	RESIDENTIAL L.P.G. COMBUSTION (UNSPECIFIED)	0.011	0.427	0.011	0.427
	Total	**3.205**	**6.819**	**1.146**	**2.776**

Natural Gas Combustion: 2012 actual natural gas consumption data were used instead of projected gas consumption data from the 2012 AQMP. Table III-1-5 presents a summary of natural gas consumption by county for 2008 and 2012. Industrial and commercial consumption of natural gas has grown considerably in Orange County. Conversely, 2012 industrial and commercial consumption is significantly less in Riverside and San Bernardino relative to 2008. Residential use in Los Angeles and Orange counties has slightly diminished between 2008 and 2012. The NOx and VOC emissions associated with the revised gas consumption data are summarized in Table III-1-6.

TABLE III-1-5

Natural Gas Consumption by Sector in Each County (therms). Consumption values are illustrated for 2008, the base-year of the 2012 AQMP, and 2012, the base-year of the 2016 AQMP

	Los Angeles	Orange	Riverside and San Bernardino	Four County Total
Residential				
2008	1,246,454,571	381,178,911	496,091,548	2,123,725,030
2012	1,168,431,972	361,726,419	507,851,746	2,038,010,137
Growth	-6.3 %	-5.1 %	2.4 %	-4.0 %
Commercial				
2008	474,170,397	147,507,958	177,476,256	799,154,611
2012	496,765,147	178,996,248	149,676,687	825,438,082
Growth	4.8 %	21.3 %	-15.7 %	3.3 %
Industrial				
2008	793,162,939	246,742,197	296,871,314	1,336,776,450
2012	798,903,287	287,863,776	240,711,729	1,327,478,792
Growth	0.7 %	16.7 %	-18.9 %	-0.7 %
Total Electric Generation and Co-Generation				
2008	-	-	-	3,050,909,675
2012	-	-	-	3,058,605,000
Growth	-	-	-	0.3%

TABLE III-1-6

2012 Annual Average Emissions Associated with Natural Gas Combustion in TPD

CES	Description	2012 AQMP		2016 AQMP	
		VOC	NOx	VOC	NOx
47142	INDUSTRIAL NATURAL GAS COMBUSTION (UNSPECIFIED)	0.39	5.86	0.46	6.64
66787	INDUSTRIAL STATIONARY I.C. ENGINES - NATURAL GAS	1.69	1.18	1.97	1.33
58735	COMMERCIAL NATURAL GAS COMBUSTION - SPACE HEATING	0.06	0.67	0.07	0.75
58743	COMMERCIAL NATURAL GAS COMBUSTION - WATER HEATING	0.06	0.26	0.07	0.27
95024	COMMERCIAL NATURAL GAS ICE	3.27	2.85	3.52	3.43
95025	COMMERCIAL NATURAL GAS EXTERNAL COMBUSTION – OTHER	0.25	3.61	0.26	3.23
47191	RESIDENTIAL NATURAL GAS COMBUSTION - OTHER	0.18	3.62	0.18	3.65
54569	RESIDENTIAL NATURAL GAS COMBUSTION - SPACE HEATING	0.46	9.40	0.47	9.51
54577	RESIDENTIAL NATURAL GAS COMBUSTION - WATER HEATING	0.47	4.10	0.48	4.18
54585	RESIDENTIAL NATURAL GAS COMBUSTION - COOKING	0.10	1.92	0.10	1.93
74682	COGENERATION	0.02	0.01	0.02	0.01
83055	RESOURCE RECOVERY	0.03	0.01	0.00	0.02
58685	PETROLEUM MARKETING - NATURAL GAS TRANSMISSION LOSSES	0.96	0.00	0.55	0.00
	Total	**7.94**	**33.49**	**8.16**	**34.95**

REgional CLean Air Incentives Market (RECLAIM) NOx emissions: The SCAQMD Governing Board approved the amendment of Regulation XX on December 4th, 2015. This will reduce NOx RECLAIM Trading Credits (RTCs) by 12 tons per day (TPD) by December 2022. The 2012 AQMP control measure CMB-01 calls for 3 TPD reduction by 2023 from the RECLAIM sources. The scheduled emission reductions from the RECLAIM program are shown in Table III-1-7.

TABLE III-1-7

2015 RECLAIM Accumulated Emission Reductions

Year	NOx (TPD)
2016	2
2017	2
2018	3
2019	4
2020	6
2021	8
2022+	12

Livestock Waste: The inventory for this category was updated to reflect the most recent population activity data provided by the Santa Ana Regional Water Quality Control Board. From 2008 to 2012, the cow population has decreased by approximately 19 percent from 208,000 to 169,000. In addition, double counting of large dairy facilities that were inadvertently included in both point and area source categories were revised correctly. As a result, the 2012 baseline VOC and NH3 emissions are 0.93 and 6.98 TPD, respectively, which represent an approximate 55 percent and 37 percent reduction, respectively, from the 2008 baseline emissions.

Gasoline Dispensing: CARB staff have developed an updated emissions inventory methodology to estimate the total organic gas (TOG) emissions resulting from fuel transfer and storage operations at gasoline dispensing facilities (GDFs) with underground storage tanks. The updated methodology reflects revised emission factors developed by CARB staff and approved by CAPCOA in 2013. The updated emission factors reflect more current in-use test data and include estimates for enhanced vapor recovery (EVR) systems. It also includes changes to the vehicle refueling emission factors to account for the emission reduction benefits of onboard refueling vapor recovery (ORVR) systems. The revised inventory adds a new category for GDF hose permeation. The emission estimates are based on the 2012 Statewide gasoline sales data from the California Board of Equalization (BOE). The Statewide total gasoline consumption was apportioned to

SCAQMD at the county level using fuel consumption estimates from EMFAC2014. Based on the new methodology, the 2012 emission inventory in the 'Petroleum Marketing' category for the SCAQMD was reduced from 33.2 tons per day in the 2012 projected value in the 2012 AQMP, to 21.0 tons per day, in the 2012 base year in the 2016 AQMP.

Architectural Coatings: The emission inventory for architectural coatings has been updated to reflect the most recent data available. The 2016 AQMP emission inventory for architectural coatings is based on quantity and emissions reports submitted annually by the architectural coating manufacturers, as required under Rule 314 – Fees for Architectural Coatings. The emissions inventory up to calendar year 2014 are based on the Rule 314 reports, subsequent year emissions are increased using population growth as a surrogate for increased sales. The emissions inventory from the 2012 AQMP was also derived from the Rule 314 data using 2008 as the baseline then growing those values based on population growth. The 2016 AQMP estimates VOC emissions from this category at 13.3 TPD for 2012 and 12.0 TPD for 2023. The corresponding VOC emissions from the 2012 AQMP are 18.8 TPD and 16.7 TPD for 2012 and 2023, respectively. The lower emission inventory in the 2016 AQMP reflects a reduced sales volume caused by the economic recession and the lower-VOC content of the coatings as the manufacturers' continue to formulate products that are well below the regulatory limits.

TABLE III-1-8

Comparison of 2016 AQMP and 2012 AQMP Annual Average VOC Emissions from Architectural Coatings (Tons per day)

Year	2012 AQMP	2016 AQMP*	314 Reported Data
2008	21.91	---	19.70
2010	---	---	16.10
2011	---	---	15.80
2012	18.83	13.31	13.70
2013	---	13.17	13.30
2014	15.46	11.06	11.30
2015	---	11.17	---
2016	---	11.31	---
2017	15.88	11.42	---
2018	---	11.54	---
2019	16.17	11.65	---
2023	16.71	12.02	---
2030	17.58	---	---
2031	---	12.68	---

* Based on California Emissions Projection Analysis Model (CEPAM) output v1.04.

Composting: The VOCs and ammonia emissions inventory for this category was updated to reflect the changes in throughput and emission factors. The composting inventory is based on the emissions from two categories, Composting Waste Disposal (Greenwaste Composting) and Composting – Ammonia (Co-Composting). The Greenwaste Composting and Co-Composting throughputs are based on the Rule 1133 Registration for the 2012 base year. The Greenwaste composting throughput was decreased by 34 percent compared to the throughput used for the 2012 AQMP, mostly due to a single

facility accepting less material. In addition, for the 2016 AQMP, due to the full implementation of Rule 1133.3, emissions from this category are estimated using the controlled emission factors, as opposed to the uncontrolled emission factors that were used in the 2012 AQMP inventory calculation. As a result, emission factors were lowered by 15 percent for ammonia and by 37 percent for VOCs. The Co-Composting throughput was reduced by 95 percent and the ammonia emission factor was reduced by 54 percent due to the presence of fewer co-composting facilities and an over estimation of projected throughput in the 2012 AQMP.

Oil and Gas Production: The emission estimation methodology for this area source category was revised to incorporate U.S. EPA's oil and gas production inventory model modified with California-specific emission factors and technologies.

Mobile Sources

On-Road Mobile Sources

The 2016 AQMP emission estimates for on-road motor vehicles come from applying the emission rates in CARB's EMFAC2014 model to the transportation activity data provided by the Southern California Association of Governments (SCAG) in its adopted 2016 RTP/SCS. The California Department of Transportation (Caltrans), the Department of Motor Vehicles (DMV), and SCAG supply CARB with data necessary to develop the on-road mobile source emissions inventory. The California DMV maintains a count of registered vehicles and Caltrans provides highway network, traffic counts and road capacity data. SCAG maintains the regional transportation model containing the temporal and spatial distribution of motor vehicle activity (travel time, travel speed, and volume of traffic for AM-peak, mid-day, PM-peak, evening and night hours). In addition, SCAG periodically conducts origin and destination surveys to validate the regional transportation model. SCAG also updates a demographic database for population, housing, employment and patterns of land use within its jurisdiction.

Emission rate data in EMFAC2014 are collected from various sources, such as individual vehicles in a laboratory setting, tunnel studies and certification data, etc. Vehicle activity data are obtained from regional planning agencies, such as SCAG. The EMFAC2014 model calculates exhaust and evaporative emission rates by vehicle type for different vehicle speeds and environmental conditions (temperature and relative humidity). Temperature

and humidity profiles are used to produce month specific, annual average, and episodic inventories.

Parameters accounted for by the EMFAC2014 include the following: type of emissions control technology, fuel type, distribution of operating speeds, speed and temperature correction factors, and the reduction in emissions resulting from the State's motor vehicle regulatory programs.

The EMFAC2014 Model includes the following mobile source data:

(1) Eight vehicle classes (light-duty passenger, light-duty trucks under 3,750 pounds, light- duty trucks between 3,750 pounds and 5,750 pounds, medium-duty trucks between 5,751 pounds and 8,500 pounds, light-heavy-duty trucks between 8,501 pounds and 10,000 pounds, light-heavy-duty trucks between 10,001 pounds and 14,000 pounds, medium-heavy-duty trucks between 14,001 pounds and 33,000 pounds , and heavy-heavy-duty-trucks for over 33,000 pounds)

(2) Three vehicle fuel types (gasoline, diesel, and natural gas)

(3) Truck types (ports, agriculture, construction, interstate, out-of-state, public fleet, utility fleet, power take off, tractor)

(4) In-state and out-of-state

(5) Fifty calendar years (2000-2050)

(6) Two vehicle exhaust processes (starts and running)

(7) Four evaporative processes (diurnal, hot soak, running loss, and resting loss)

(8) Seven pollutants (HC, CO, CO2, NOx, PM, SOx)

(9) Fuel consumption.

To develop the detailed emission inputs needed by air quality dispersion models such as the Community Multi-scale Air Quality model (CMAQ), emissions from on-road motor vehicles are estimated at the grid level using Caltrans' Direct Travel Impact Model (DTIM). DTIM calculates emissions based on detailed information regarding each link (roadway segment) in an area for each hour of the day. Traffic volume, traffic speed, vehicle fleet characteristics, ambient temperature, and emission factors of vehicle fleets are all implemented in DTIM.

EMFAC2014 includes more sub categories for some of the major vehicle class categories (i.e., medium-heavy-duty diesel trucks & heavy-heavy diesel trucks) based on their weights (heavy or small), types (agricultural, construction, CA international registration plan), road type (in-state or out-of-state), etc. However, the on-road mobile sources emissions in the Final 2016 AQMP are reported by major vehicle class categories to compare with previous inventory reporting.

The characteristics of DTIM include:

(1) Emissions calculations based on specific information, such as link speed, link volume, and temperature

(2) Spatial and temporal distribution of emissions to provide hourly gridded emissions

(3) Emission impacts of various types of transportation and regional planning alternatives (e.g., changes in roadway network configuration, or public transportation services).

DTIM reformats and sorts emission rates for all vehicle classes produced by the EMFAC2014 model. It then produces average emission rates for specific vehicle classes identified by the user. Finally, it produces regional mobile source emissions and hourly gridded mobile emissions. DTIM does this by combining emission rates with vehicle activity estimates derived from a transportation demand model and supplemental information on temperatures and temporal patterns.

There are differences in emissions calculated from DTIM and EMFAC2014. To account for the differences, scaling factors are developed to adjust DTIM emissions so that modeling emissions are consistent with EMFAC2014 emissions.

EMFAC2014 was the basis for on-road planning inventories, emission budgets, and rate-of-progress calculations. The EMFAC2014 model has undergone extensive revisions from the previous version (EMFAC2011) to make it more user friendly and flexible as well as to allow incorporation of larger amounts of data demanded by the current regulatory and planning processes. In addition to the model structural changes, other changes include:

- Revision of heavy-duty diesel (HD Diesel) truck emission rates. The emission factors for heavy heavy-duty diesel trucks were also updated using new testing data on newer (MY 2007 and newer) trucks that more accurately represents the effectiveness of the control equipment used to meet the more stringent 2007 and 2010 emission standards.

- Incorporation of natural gas vehicles for select vehicle classes. Emission factors for natural gas powered solid waste collection vehicles and urban buses are now included in EMFAC2014 as these classes of vehicles have sufficient penetration of natural gas engines to warrant separate treatment.
- Accounting for Federal and California regulations and standards adopted post-2010. The adopted regulations and standards include the State's Advanced Clean Car Program, the April 2014 amendment to the Truck and Bus Regulation, the Tractor-Trailer Greenhouse Gas Regulation and the federal HD Greenhouse Gas Regulation.
- Socio-econometric modeling of population and VMT. EMFAC2014 incorporates the use of socioeconomic regression model forecasting methods to predict new vehicle sales and VMT growth trends. This allows the use of State and national economic indicators, fuel prices, and regional human population and vehicle ownership characteristics as parameters to more accurately predict vehicle sales and VMT trends.

More detailed information on the changes incorporated in EMFAC2014 can be found at http://www.arb.ca.gov/msei/categories.htm.

Figure III-1-3 compares on-road baseline emissions estimated by EMFAC2011 and EMFAC2014 used in the 2012 AQMP and 2016 AQMP, respectively. The figure includes emissions for the years 2012, 2019, 2022, 2023 and 2031, which were simulated as milestone years in the 2012 AQMP. It should be noted that the comparison for 2012 reflects changes in methodology, but the comparison for the rest of the years also includes adopted rules and updated growth projections since the release of EMFAC2011.

In 2012, EMFAC2014's newer methodologies show higher emissions of NOx and VOCs. For the future years 2019 through 2031, in general, the emissions are lower in EMFAC2014 as compared to EMFAC2011 with the exception of the VOC category. The lower emissions can be attributed to additional rules and regulations, more stringent standards, and updates to the heavy-duty emission factors. The increased VOC emissions are the result of fewer cleaner evaporative control technologies entering the fleet than was assumed in EMFAC2011.

Also evident in Figure III-1-3 is the change in the rate of emission reductions. The rate of change in the emissions in the early years (2012 to 2023) is significantly larger than that shown further in the future (2023 – 2031). This is due to the implementation of rules and regulations, which, for the most part, will be fully implemented by 2023 (e.g., CARB's Truck and Bus rule requires all trucks to meet the 2010 standards by 2023). The effect of the rules and regulations are significant, showing a 70 percent reduction in NOx

emissions and close to 60 percent reduction in VOC emissions between 2012 and 2023 even with increases in fleet population. More modest reductions are predicted from continued fleet turnover and implementation of the last rules and regulations, but as seen in the case of PM2.5 emissions, fleet growth is beginning to outpace the emissions benefits of fleet turnover. Further emission reductions will require fleets to adopt the use of even cleaner equipment than the cleanest available today.

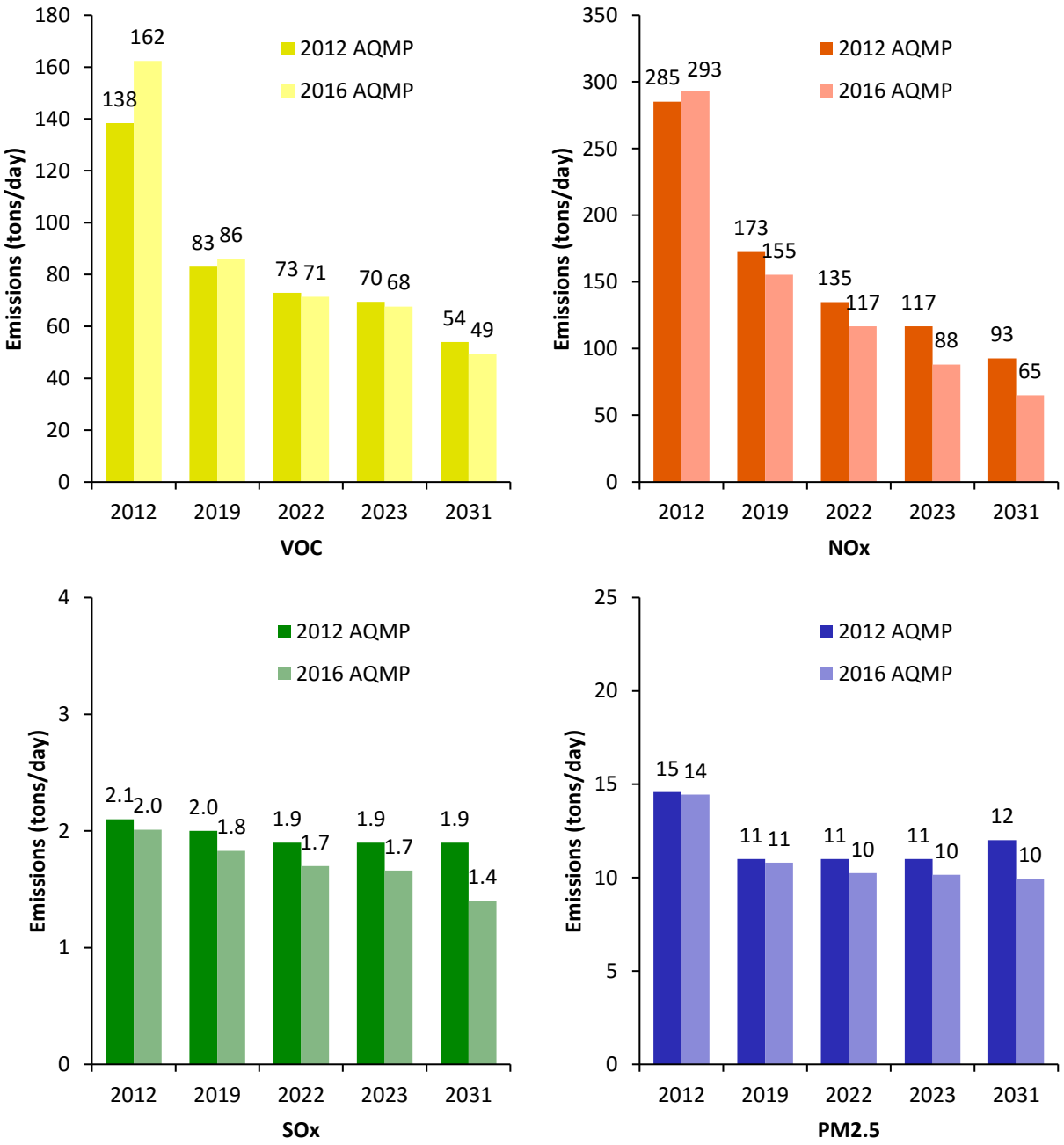


FIGURE III-1-3

Comparison of On-Road Emissions between EMFAC2011 (2012 AQMP)
and EMFAC2014 (2016 AQMP)

(VOC & NOx – Summer Planning; SOx & PM2.5 – Annual Average Inventory)

Off-Road Mobile Sources

Mobile sources not included in the on-road mobile source emissions inventory are classified as off-road mobile sources. CARB uses a number of models to estimate emissions for more than one hundred off-road equipment categories. The models account for the effects of various adopted regulations, technology types, and seasonal effects on emissions. The models combine population, equipment activity, horsepower, load factors, population growth, retirement factors, and emission factors to yield the annual emission by county, air basin or Statewide. Temporal usage profiles are used to develop seasonal emission estimates that are then spatially allocated to the county or air basin using surrogates such as population[1]. A brief description of these models and their updates since the 2012 AQMP as well as updates to other categories in the inventory not calculated using publically available models are presented as follows:

- **2011 In-Use Off-Road Fleet Inventory Model**: This is a Microsoft Access database model that gives emissions estimates as well as vehicle population data by type, model year, horsepower, and forecast year from the Off-Road Simulation Model (OSM). The Model was developed in 2010 to support the analysis for amendments to the In-Use Off-Road Diesel Fueled Fleets Regulation.
- **Cargo Handling Emission Inventory Model:** This is a Microsoft Access database model for diesel equipment subject to regulation for Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards. The model provides emission estimates, population and total activity by equipment type, age, horsepower, facility location, and forecast year. The model was updated to use growth factors consistent with those developed for ocean going vessels.
- **Transportation Refrigeration Unit (TRU) Model:** This is a Microsoft Access database model developed in 2011 for diesel engines subject to Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets and Facilities Where TRUs Operate (TRU Rule). The model reports activity, population, and emissions by year, age, and TRU category.
- **Ocean Going Vessel (OGV) Model**: This is a Microsoft Access database model for marine vessels and engines. The model provides criteria and greenhouse gas emissions and fuel usage by forecast year, engine type (main and auxiliary), and vessel type (container, bulk, tanker, etc.). New lower growth projections were developed

[1] More information about off-road models can be found at http://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles

and incorporated into the model using more recent information from the Federal Highway Administrations Freight Analysis Framework model and other forecasts performed for the San Pedro Bay Ports. The NOx control factor calculations were updated to more appropriately represent the engine Tier level.

- **Commercial Harbor Craft Emission Inventory Models**: Three Microsoft Access database models were recently developed for diesel-powered commercial harbor craft. These emission sources are subject to regulation to reduce emissions when operated within California Waters and within 24 nautical miles of the California shoreline (Harbor Craft Rule). One model was originally developed in 2007 to support the analysis for the Harbor Craft Rule. The other two models were developed to support analysis for the 2010 amendments to the rule which added additional vessel categories to the Harbor Craft Rule. The models report the criteria and greenhouse gas emissions and fuel usage by engine type (main and auxiliary) and forecast year. The vessel turnover rate methodology was improved to better reflect the observed age distribution. A more representative reduced turnover rate is used that improves consistency with other off-road emissions model methodologies (e.g., off-road fleet, cargo handling).

- **Aircraft:** The aircraft emissions inventory is updated for the 2012 base year based on the 2012 aircraft activity data and latest calculation methodologies. A total of 43 airports were identified as having aircraft operations within the District boundaries including commercial air carrier, air taxi, general aviation, and military aircraft operations. The sources of activity data included airport operators (for commercial and military airports) and Federal Aviation Administration's (FAA) databases (i.e., Bureau of Transportation Statistics, Air Traffic Activity Data System, Terminal Area Forecast). The emissions calculation methodology was based on the application of FAA's Emissions and Dispersion Modeling System (EDMS) model for commercial airports with detailed aircraft activity data (by aircraft make and model). For other airports and aircraft types (e.g., general aviation, air taxi, military), the total number of aircraft operations was used in conjunction with the U.S. EPA's latest average emission factors by major aircraft type (e.g., general aviation, air taxi, military). Staff is currently working with SCAG and airport operators to finalize the emissions forecast. For commercial air carrier operations, SCAG's 2040 aircraft operations forecasts, which are consistent with the forecast adopted for the 2016 Regional Transportation Plan/Sustainable Community Strategy (RTP/SCS), was used. The revised 2016 AQMP incorporated the 2040 emissions forecast (based on SCAG's latest forecasts) with interim years interpolated between 2012 and 2040.

- **Locomotives:** The locomotive inventories reflect the 2008 U.S. EPA locomotive regulations and adjustments due to the economic activity for passenger and switch locomotive categories. However for the largest category of locomotive emissions, line haul locomotives, the emissions model methodology was completely revised. In addition, activity was updated using data for the Surface Transportation Board and Federal Highway Administration's Freight Analysis Framework. Population information was derived from the Association of American Railroads' population data and the U.S. EPA's survival curve.

Figure III-1-4 shows a comparison of the off-road baseline emissions in the 2012 AQMP and 2016 AQMP. Overall, the emission estimates are lower than the 2012 AQMP estimates. This is consistent with the updates to the models which for most of the categories reduced emission estimates. All but the SOx emissions from the off-road sector decrease in the future years due to the continued implementation of existing regulations. The dominant sources of SOx emissions are aircraft and ocean-going vessels (OGV), and because there are no additional SOx requirements, the SOx emissions track the growth in the OGV and aircraft categories

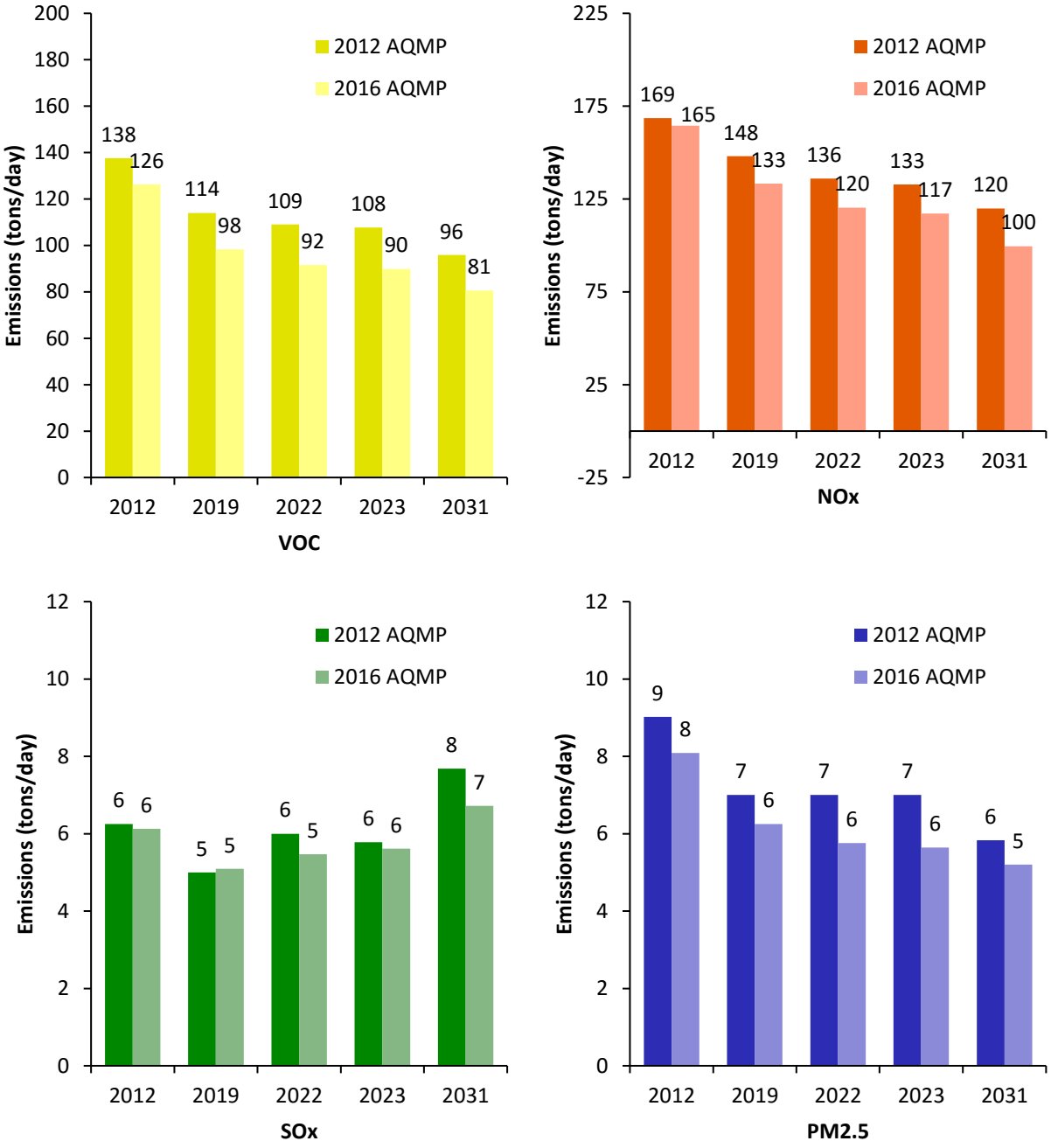


FIGURE III-1-4

Comparison of Off-Road Emissions - 2012 AQMP and 2016 AQMP

(VOC & NOx – Summer Planning; SOx & PM2.5 – Annual Average Inventory)

INVENTORY TYPE

Different inventories are prepared for the 2016 AQMP for regulatory and SIP performance tracking and transportation conformity. Two inventory types, annual average inventory and summer planning inventory, are included in the 2016 AQMP.

Average Annual Day Inventory

The average annual day emissions inventory was derived primarily by dividing the annual total emissions by 365, except for the emissions derived from CARB's EMFAC2014 (on-road mobile sources) and In-Use Off-Road Fleet Inventory (most off-road mobile sources) models. In addition, the average annual day inventory was developed for all criteria pollutants regardless of their attainment status. The average annual day emissions are used to estimate cost-effectiveness of proposed control measures and future tracking of AQMP implementation (e.g., annual progress report on rule adoption).

Planning Inventory

The summer planning inventory provides the basis for tracking emission reduction progress specified by the federal Clean Air Act (CAA) and the California Clean Air Act (CCAA). The CAA requires the District to produce a plan for reducing all nonattainment pollutants or their precursors by fifteen percent between 1990 and 1996, and three percent each year thereafter, averaged every consecutive three years until reaching the attainment date. The CCAA requires emission reductions by five percent or more per year, averaged every three consecutive years until 2000. In addition, the CAA specifies 1990 as the base year, whereas the CCAA specifies 1987 as the base year.

The SCAB is designated as an "extreme" nonattainment area for ozone for the federal air quality standards, and a nonattainment area for ozone for the State air quality standards. The intent of the summer planning inventory is to characterize emission levels that occur during the typical season of ozone air quality violations. The summer planning inventory, also known as the ozone planning inventory, contains emissions of ozone precursors (i.e. VOC and NOx) during the summertime, when ambient concentrations of ozone are typically at their highest (defined as May through October for planning purposes).

CARB has developed guidelines for the development of planning inventories. Point sources emission estimates represent an "average annual operating day." Emissions from point sources are calculated by dividing the total annual emissions produced by a source by the number of days the source was in operation. For example, if a company emitted 150 tons in a year and the production lines operated 5 days a week for 40 weeks,

then the average operating emissions from this facility are calculated to be 150 tons divided by 200 days or 0.75 tons per day.

For area and other mobile sources, planning emissions represent an "average seasonal operating day." As an example, VOC emissions produced by asphalt road-paving operations are calculated by taking into account the variation in monthly levels and weekly operating days for paving activity during the year. Road paving activities vary throughout the year, with maximum rates during the summer season. Paving activity varies throughout the week with, on average, five operating days in a week. The allocation of annual area source emissions among the seasons is based on estimated relative monthly and weekly emissions patterns.

CHAPTER 2

SUMMARY OF EMISSIONS

Baseline Emission Inventories

- **Base Year Emission Data**
- **Future Year Emission Data**
- **Emission Trend Analysis**
- **VOC Emissions**
- **NOx Emissions**
- **SOx Emissions**
- **PM2.5 Emissions**
- **Impact of Growth – Pre-Base Year Offsets**
- **General Conformity Budget**

Uncertainty in the Inventory

Controlled Emission Inventories

- **Emission Impacts of SCAQMD Programs**
- **SIP Set Aside Accounts**
- **Proposed Control Measures**
- **CEPA Emission Calculations**
- **CARB Emission Data Reports System**

BASELINE EMISSION INVENTORIES

Base Year Emissions

The 2012 emission inventory is used as the base year to project future year emissions. It represents the most recent and comprehensive inventory development. Attachment C lists SCAB top VOC and NOx producers which emitted equal to or greater than ten TPY in 2012. The total VOC emissions from these facilities represent 69.8 percent of the total point sources VOC emissions and 8.2 percent of the total stationary VOC emissions. The total NOx emissions from these facilities represent 85.1 percent of the total point sources NOx emissions and 33.4 percent of the total stationary sources NOx emissions. The stationary sources emissions result primarily from the combustion of fuels, evaporation of solvents or fuels, and processing of materials. Hence, stationary sources are grouped under fuel combustion, waste disposal, cleaning and surface coatings, petroleum production and marketing, industrial processes, solvent evaporation, and other miscellaneous processes.

Mobile sources are divided into two source categories: 1) on-road, and 2) other (off-road) mobile sources. On-road mobile sources include light-duty passenger vehicles, light-, medium-, and heavy- heavy duty trucks, motorcycles, urban buses, school buses and motor homes. Other mobile sources include aircraft, trains, ships and commercial boats, off-road recreational vehicles, off-road equipment, farm equipment, and fuel storage and cargo handling equipment.

Table III-2-1A compares the annual average emissions between the 2012 base year in the 2016 AQMP and the projected 2012 emissions in the 2012 AQMP by major source category for VOC and NOx, while Table III-2-1B compares the annual average emissions between the 2012 base year in the 2016 AQMP and the projected 2012 emissions in the 2012 AQMP for SOx and PM2.5.

TABLE III-2-1A

Comparison of VOC and NOx Emissions By Major Source Category of
2012 Base Year in 2016 AQMP and Projected 2012 in Final 2012 AQMP
Summer Planning Inventory (tpd[1])

SOURCE CATEGORY	2012 AQMP	2016 AQMP	% Change	2012 AQMP	2016 AQMP	% Change
	VOC			NOx		
STATIONARY SOURCES						
Fuel Combustion	12.9	11.4	-12%	29.4	27.9	-5%
Waste Disposal	12.1	14.1	17%	1.5	2.3	50%
Cleaning and Surface Coatings	41.7	35.6	-15%	0	0	0%
Petroleum Production and Marketing	40.2	29.2	-27%	0	0	0%
Industrial Processes	13.8	10.8	-21%	0	0	0%
Solvent Evaporation						
Consumer Products	86.6	86.5	0%	0	0	0%
Architectural Coatings	21.5	13.3	-38%	0	0	0%
Others	2.0	2.4	17%	0	0	0%
Misc. Processes	9.7	7.8	-20%	15.5	14.5	-6%
RECLAIM SOURCES	0	0	0%	27.2	19.6	-28%
Total Stationary Sources	**240**	**211**	**-12%**	**74**	**65**	**-13%**
MOBILE SOURCES						
On-Road Vehicles	138.4	162.4	17%	285.2	293.1	3%
Off-Road Vehicles	137.7	126.3	-8%	168.5	164.6	-2%
Total Mobile Sources	**276**	**289**	**5%**	**454**	**458**	**1%**
TOTAL	**516**	**500**	**-3%**	**528**	**522**	**-1%**

[1] Values are rounded to nearest integer.

Overall, there are minor increases in the 2012 emissions of VOC and NOx in the 2016 AQMP inventory as compared to the 2012 AQMP inventory with VOC down 3 percent and a small 1 percent decrease in total NOx emissions. Of note in the stationary source categories are the emission changes associated with architectural coatings and RECLAIM categories. Architectural coatings emissions were updated for the 2016 AQMP using information provided as part of SCAQMD Rule 314 – "Fees for Architectural Coatings" annual reports, resulting in the lower emission estimate. Use of actual reported information in lieu of projected emissions (used in the 2012 AQMP to estimate the 2012 emissions) explain the majority of the remaining emission differences. For example the RECLAIM emissions cap was used to project the NOx emissions in the 2012 AQMP inventory, while in 2012 the actual emissions were lower than the cap by 7 TPD.

For the mobile source category, the updates described earlier to the on-road emissions model EMFAC2014 resulted in the 17 percent and 3 percent increase in VOC and NOx emissions, respectively. The updates to several of the off-road category emission estimates resulted in a 8 percent reduction in VOC emissions and a modest 2 percent reduction in NOx emissions. Updates were completed for locomotives, ocean going vessels, cargo handling equipment, commercial harbor craft, farming equipment, pleasure craft, and off-highway recreational vehicles.

TABLE III-2-1B

Comparison of SOx and PM2.5 Emissions By Major Source Category of 2012 Base Year in 2016 AQMP and Projected 2012 in Final 2012 AQMP Annual Average (tpd[1])

SOURCE CATEGORY	2012 AQMP	2016 AQMP	% Change	2012 AQMP	2016 AQMP	% Change
	SOx			PM2.5		
STATIONARY SOURCES						
Fuel Combustion	1.9	1.9	0%	5.6	5.6	1%
Waste Disposal	0.4	0.5	20%	0.2	0.2	-13%
Cleaning and Surface Coatings	0.0	0.0	0%	1.5	1.4	-5%
Petroleum Production and Marketing	0.6	0.4	-26%	1.6	1.5	-6%
Industrial Processes	0.02	0.10	400%	6.7	6.4	-6%
Solvent Evaporation						
Consumer Products	0	0	0%	0	0	0%
Architectural Coatings	0	0	0%	0	0	0%
Others	0	0	0%	0	0	0%
Misc. Processes	1.0	0.5	-47%	32.5	28.8	-11%
RECLAIM SOURCES	11.8	6.9	-42%	0	0	0%
Total Stationary Sources	**16**	**10**	**-34%**	**48**	**44**	**-9%**
MOBILE SOURCES						
On-Road Vehicles	2.1	2.0	-2%	14.6	14.4	-1%
Off-Road Vehicles	6.3	6.1	-2%	9.0	8.1	-10%
Total Mobile Sources	**8**	**8**	**-2%**	**24**	**23**	**-5%**
TOTAL	**24**	**18**	**-23%**	**72**	**66**	**-7%**

[1] Values are rounded to nearest integer and may not sum due to rounding error.

Future Year Emissions

Future baseline emissions, assuming no additional air quality regulations are introduced beyond already adopted measures, are given in this appendix for the attainment target years; 2019, 2021, 2022, 2023, 2025, and 2031. In addition, Reasonable Further Progress (RFP) demonstration years are included in the Attachment. They are 2017, 2018, 2020, 2024, 2026, 2027, 2028, and 2030. These emissions are forecast from the 2012 base year by incorporating the controls implemented under SCAQMD rules adopted as of December, 2015, and CARB rules adopted by November, 2015, and a specific set of growth rates from SCAG for population, industry, and motor vehicle activity. Growth projections from SCAG were replaced for certain categories where more specific information is available to improve emission forecasts. For example, the 2014 California Gas Fuel Report's energy demand forecasts for natural gas, including the energy efficiency, were used to forecast the emissions of those source categories.

The impact of New Source Review and emissions budgeted for several District programs are addressed in the Controlled Emission Data section. Due to the adoption of the Regional Clean Air Incentive Market (RECLAIM) program in October 1993, emissions are divided into two categories, RECLAIM and non-RECLAIM. Future emissions from RECLAIM sources are estimated based on their allocations specified by District Rule 2002. The methodology used to forecast emissions for non-RECLAIM sources is described in the following sections. Baseline emissions for future years are obtained using the following equation:

$$\mathbf{FY_i = (BY_i)(CF_i)(GF_i)}$$

where FY_i is the forecasted emissions of an air pollutant in the Basin for a future year. BY_i refers to the base year (or 2012) emissions of the air pollutant. The control factor, CF_i, is an indicator of the level of control on a specific source category as a result of adopted State and local air quality regulations. The GF_i is a growth factor determined for different categories of industry with socioeconomic data.

Control Factors

The impact of SCAQMD rules adopted or amended with compliance dates after 2012 are included in the baseline emission forecasts with control factors. Control factors were developed in reference to 2012 and applied to source categories and/or specific industries affected by the adopted rules/amendments. For industrial sources, the standard industrial codes (SIC) system is used. The U.S. EPA's SCC system is used for

equipment. A control factor, CF_i, is calculated with the following equation for an individual source category:

$$\mathbf{CF_i = 1 - Control\ Efficiency}$$

Control efficiency is mostly based on estimates projected during rulemaking. Control factors represent the remaining emissions after a rule or regulation is implemented after 2012. Table III-2-2A lists control factors for the years 2023 and 2031 for District rules with post-2012 compliance dates.

Growth Factors

To quantify growth, a facility business type is assigned to the facilities based on North American Industry Classification System (NAICS) Code according to their primary activity. Growth projections by NAICS were developed by SCAG. The 2016 AQMP growth data is based on SCAG's 2016 RTP/SCS. The data was adjusted with the most recent data from Energy Information Administration (EIA), Southern California Gas Company, Bureau of Land Management (BLM), and SCAQMD rule compliance records.

Each emission inventory source grows based on its growth surrogate. Growth surrogates include industry output growth, employment growth, demographic growth and others. The selection of the surrogate by which emission growth is projected depends on the type of activity. For instance, manufacturing sectors use output growth as surrogate. Output growth is the product of employment and productivity. Employment growth is chosen for labor intensive sectors, such as construction and laundering. Certain emission sources use demographic data as their surrogate, such as architectural coatings (housing units as surrogate) and composting (population as surrogate). Some growth projections are from Southern California Gas Company 2014 Gas Fuel Report for natural gas combustion related categories.

TABLE III-2-2A

Control Factors by District Rules with Post-2012 Compliance Dates

		2023				2031			
RULES*	**DESCRIPTION**	**VOC**	**NOx**	**SOx**	**PM**	**VOC**	**NOx**	**SOx**	**PM**
1110.2	Gaseous & Liquid Fuel Engines	-	0.09	-	-	-	0.09	-	-
1111	Natural-Gas-Fired, Fan-Type Central Furnaces	-	0.73	-	-	-	0.48	-	-
1113	Architectural Coatings	0.96	-	-	-	0.96	-	-	-
1114	Petroleum Refinery Coking Operation	0.52	-	-	-	0.52	-	-	-
1121	Residential - Natural-Gas-Fired Water Heaters	-	0.58	-	-	-	0.58	-	-
1146	Large Ind/Comm Boilers, Steam Generator, & Process Heaters	-	0.46	-	-	-	0.46	-	-
1146.1	Small Ind/Comm Boilers, Steam Generators & Process Heaters	-	0.54	-	-	-	0.54	-	-
1146.2	Large Water Heaters & Small Boilers	-	0.77	-	-	-	0.77	-	-
1147	NOx Reductions from Miscellaneous Sources	-	0.59	-	-	-	0.59	-	-
1177	LPG Transfer and Dispensing	0.29	-	-	-	0.29	-	-	-
444	Open Burning	-	-	-	0.95	-	-	-	0.95
2005	Reclaim NOx	-	0.55	-	-	-	0.55	-	-

* Adopted or amended as of December 2015. Only rules with emissions impact after 2012 are listed.

Table III-2-2B lists the resulting future annual average emission reductions in 2023 and 2031.

TABLE III-2-2B

Annual Average Emission Reductions (Tons per Day) in the Baseline by District Rules

		2023				2031			
RULES*	**DESCRIPTION**	**VOC**	**NOx**	**SOx**	**PM2.5**	**VOC**	**NOx**	**Sox**	**PM2.5**
1110.2	Gaseous & Liquid Fuel Engines	-	0.88	-	-	-	0.93	-	-
1111	Natural-Gas-Fired, Fan-Type Central Furnaces	-	2.01	-	-	-	3.81	-	-
1113	Architectural Coatings	2.7	-	-	-	2.85	-	-	-
1114	Petroleum Refinery Coking Operation	0.06	-	-	-	0.06	-	-	-
1121	Residential - Natural-Gas-Fired Water Heaters	-	1.37	-	-	-	1.34	-	-
1146	Large Ind/Comm Boilers, Steam Generator, & Process Heaters	-	1.17	-	-	-	1.26	-	-
1146.1	Small Ind/Comm Boilers, Steam Generators & Process Heaters	-	0.46	-	-	-	0.49	-	-
1146.2	Large Water Heaters & Small Boilers	-	2.19	-	-	-	2.1	-	-
1147	NOx Reductions from Miscellaneous Sources	-	0.86	-	-	-	0.94	-	-
1177	LPG Transfer and Dispensing	6.7	-	-	-	7.06	-	-	-
444	Open Burning	-	-	-	0.25	-	-	-	0.25
2005	Reclaim NOx	-	12	-	-	-	12	-	-

* Adopted or amended as of December 2015. Only rules with emissions impact after 2012 are listed.

The demographic forecasts from the year 2012 through 2031 for population, housing, employment, and motor vehicle activity are shown in Table III-2-3.

TABLE III-2-3

Baseline Demographic Forecasts in the 2016 AQMP

CATEGORY		2012	2019	2021	2022	2023	2025	2031
Population	Millions	15.9	16.7	16.9	17.0	17.1	17.3	17.9
	Growth (%)		4%	6%	7%	7%	9%	12%
Housing Units	Millions	5.1	5.5	5.6	5.6	5.7	5.7	6.0
	Growth (%)		7%	9%	10%	10%	12%	16%
Total Employment	Millions	6.7	7.5	7.6	7.7	7.8	7.9	8.2
	Growth (%)		12%	14%	15%	16%	18%	23%
Daily VMT	Millions	380	400	401	404	407	403	409
	Growth (%)		5%	5%	6%	7%	6%	8%

Current forecasts indicate that this region will experience a population growth of 7 percent by the year 2023 with a 7 percent increase in vehicle miles traveled (VMT); and a population growth of 12 percent by the year 2031 with a 8 percent increase in VMT.

Demographic projections in the 2016 AQMP for the year 2031 differ slightly from the projection assumed in the 2012 AQMP. Population in 2031 is projected to be 200,000 inhabitants less than projected for 2030 in the 2012 AQMP, as a result of a slower population growth rate assumed in the 2016 AQMP. Similarly, the daily VMT forecast in the 2016 AQMP exhibits a slower rate of increase, with 409 million daily VMT forecasted for 2031, compared to the projected 421 million daily VMT for 2030 in the 2012 AQMP.

Table III-2-4 shows the relative distribution of population by county in the Basin for the years 1997, 2002, 2008, 2012, 2019, 2021, 2022, 2023, 2025, and 2031. By 2031 the population in Los Angeles County is projected to increase by 9 percent from 2012 levels, compared with increases for Orange, Riverside and San Bernardino counties of 11 percent, 26 percent, and 19 percent, respectively.

TABLE III-2-4

Population Distribution by County in SCAB (in Thousands)

YEAR	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO	BASIN TOTAL
1997	8,881	2,750	1,072	1,250	13,954
2002	9,486	2,931	1,278	1,410	15,105
2008	9,398	2,989	1,683	1,510	15,580
2012	9,541	3,071	1,787	1,549	15,948
2019	9,855	3,247	1,933	1,629	16,665
2021	9,948	3,287	1,981	1,659	16,876
2022	9,997	3,303	2,009	1,678	16,987
2023	10,045	3,319	2,036	1,697	17,097
2025	10,142	3,351	2,091	1,735	17,319
2031	10,433	3,404	2,256	1,847	17,940

Growth factors for specified ranges of NAICS categories were projected by SCAG, and are based on predictions of growth for different industrial sectors in each county. SCAG has provided growth factors for 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2025, 2026, 2031, 2035 and 2040. Table III-2-5 lists the point sources growth surrogate by NAICs. Table III-2-6 shows the area sources growth surrogate by source category. Tables III-2-7 to III-2-12 illustrate the growth factors for point sources by NAICS for years of 2019, 2021, 2022, 2023, 2025, and 2031 in the 2016 AQMP. Tables III-2-13 to III-2-18 contains the growth factors for years of 2019, 2021, 2022, 2023, 2025, and 2031 in the 2016 AQMP for the area sources by source category.

TABLE III-2-5

Point Sources Growth Surrogate by Source Category

NAICS	SOURCE DESCRIPTION	GROWTH SURROGATE
111	Crop Production	111-115 Output
112	Animal Production	111-115 Output
113	Forestry and Logging	111-115 Output
114	Fishing Hunting and Trapping	111-115 Output
115	Support Activities for Agriculture and Forestry	111-115 Output
211	Oil and Gas Extraction	211 Output
212	Mining (except Oil and Gas)	212-213 Output
213	Support Activities for Mining	212-213 Output
221111	Hydroelectric Power Generation	SCG-Electricity Power
221112	Fossil Fuel Electric Generation	SCG-Electricity Power
221113	Nuclear Electric Generation	SCG-Electricity Power
221119	Other Electric Generation	SCG-Electricity Power
221121	Electric Bulk Transmission and Control	SCG-Electricity Power
221122	Electric Power Distribution	SCG-Electricity Power
221	Utilities - Except Electricity	Total Employment
236	Construction of Buildings	236-238 Employment
237	Heavy and Civil Engineering Construction	236-238 Employment
238	Specialty Trade Contractors	236-238 Employment
311	Food Manufacturing	311 Output
312	Beverage and Tobacco Product Manufacturing	312 Output
313	Textile Mills	313 Output
314	Textile Product Mills	314 Output
315	Apparel Manufacturing	315 Output
316	Leather and Allied Product Manufacturing	316 Output
321	Wood Product Manufacturing	321 Output
322	Paper Manufacturing	322 Output
323	Printing and Related Support Activities	323 Output
324	Petroleum and Coal Products Manufacturing	No Growth
325	Chemical Manufacturing	325 Output
326	Plastics and Rubber Products Manufacturing	326 Output
327	Nonmetallic Mineral Product Manufacturing	327 Output
331	Primary Metal Manufacturing	331 Output
332	Fabricated Metal Product Manufacturing	332 Output

TABLE III-2-5 (Continued)

Point Sources Growth Surrogate by Source Category

NAICS	SOURCE DESCRIPTION	GROWTH SURROGATE
333	Machinery Manufacturing	333 Output
334	Computer and Electronic Product Manufacturing	334 Output
335	Electrical Equipment -Appliance-Component Manufacturing	335 Output
336	Transportation Equipment Manufacturing	336 Output
337	Furniture and Related Product Manufacturing	337 Output
339	Miscellaneous Manufacturing	339 Output
423	Merchant Wholesalers-Durable Goods	423 Employment
424	Merchant Wholesalers - Nondurable Goods	424 Employment
425	Wholesale Electronic Markets and Agents and Brokers	425 Employment
441	Motor Vehicle and Parts Dealers	441 Employment
442	Furniture and Home Furniture Stores	442 Employment
443	Electronics and Appliance Stores	443 Employment
444	Building Material-Garden Equipment-Supplies Dealers	444 Employment
445	Food and Beverage Stores	445-6 Employment
446	Health and Personal Care Stores	445-6 Employment
447	Gasoline Stations	447 Output
448	Clothing and Clothing Accessories Stores	448 Output
451	Sporting Goods-Hobby-Book- Music Stores	451-454 Output
452	General Merchandise Stores	451-454 Output
453	Miscellaneous Store Retailers	451-454 Output
454	Nonstore Retailers	451-454 Output
481	Air Transportation	481 Output
482	Rail Transportation	482 Output
483	Water Transportation	483 Output
484	Truck Transportation	484 Output
485	Transit and Ground Passenger Transportation	485 Output
486	Pipeline Transportation	486 Output
487	Scenic and Sightseeing Transportation	487 Output
488	Support Activities for Transportation	488 Output
491	Postal Service	491-493 Employment
492	Couriers and Messengers	491-493 Employment
493	Warehousing and Storage	491-493 Output
511	Publishing Industries (except Internet)	511-519 Output

TABLE III-2-5 (Continued)

Point Sources Growth Surrogate by Source Category

NAICS	SOURCE DESCRIPTION	GROWTH SURROGATE
512	Motion Picture and Sound Recording Industries	511-519 Output
515	Broadcasting (except Internet)	511-519 Output
517	Telecommunications	511-519 Output
518	Data Processing- Hosting and Related Services	511-519 Output
519	Other Information Services	511-519 Output
521	Monetary Authorities-Central Bank	521-525 Employment
522	Credit Intermediation and Related Activities	521-525 Employment
523	Securities-Commodity-Other Financial Investments	521-525 Employment
524	Insurance Carriers and Related Activities	521-525 Employment
525	Funds-Trusts-and Other Financial Vehicles	521-525 Employment
531	Real Estate	531-533 Employment
532	Rental and Leasing Services	531-533 Employment
533	Lessors of Nonfinancial Intangible Assets (no Copyright)	531-533 Employment
541	Professional-Scientific-and Technical Services	541 Employment
551	Management of Companies and Enterprises	551 Employment
561	Administrative and Support Services	561-562 Employment
562	Waste Management and Remediation Services	561-562 Employment
611	Educational Services	Pop 5 to 24
621	Ambulatory Health Care Services	Population
622	Hospitals	Pop 0 to 4 and 65 up
623	Nursing and Residential Care Facilities	Pop 65 up
624	Social Assistance	621-624 Employment
711	Performing Arts-Spectator Sports-and Related Industries	711-713 Output
712	Museums-Historical Sites-and Similar Institutions	711-713 Output
713	Amusement-Gambling-and Recreation Industries	711-713 Output
721	Accommodation	Total Employment
722	Food Services and Drinking Places	Total Employment
811	Repair and Maintenance	Total Employment
812	Personal and Laundry Services	Total Employment
813	Religious-Grant-Civic-Professional-and Similar Org	811-814 Employment
814	Private Households	811-814 Employment
921	Executive-Legislative-and Other General Govt Support	921-928 Employment
922	Justice-Public Order-and Safety Activities	921-928 Employment

TABLE III-2-5 (Concluded)

Point Sources Growth Surrogate by Source Category

NAICS	SOURCE DESCRIPTION	GROWTH SURROGATE
923	Administration of Human Resource Programs	921-928 Employment
924	Administration of Environmental Quality Programs	921-928 Employment
925	Admin of Housing Pgms-Urban-Community Development	921-928 Employment
926	Administration of Economic Programs	921-928 Employment
927	Space Research and Technology	921-928 Employment
928	National Security and International Affairs	921-928 Employment

TABLE III-2-6

Area Sources Growth Surrogate by Source Category

SOURCE DESCRIPTION	SURROGATE
Cogen	SCG-Cogen*
Gaseous Fuel	NAICS 211 Output
Ind. Stationary IC Engines - Natural Gas	SCG - Industrial Combustion*
Industrial Natural Gas (Unspecified)	SCG - Industrial Combustion*
Industrial LPG Combustion	Manufacturing Output
Industrial Distillate Oil Combustion	Manufacturing Output
Ind. Stationary IC Engines - Other Fuel	Manufacturing Output
Ag Irrigation IC Engines-Stationary	CARB Growth Data
Ag Irrigation IC Engines-Portable	CARB Growth Data
Commercial Space Heating	SCG - Commerical Space*
Commercial Water Heating	SCG - Commercial Water*
Commercial Combustion - Internal	SCG - Commercial Combustion*
Commercial Combustion - External	SCG - Commercial Combustion*
Commercial LPG Combustion	Service Output
Stationary Engines - Diesel	CARB Growth Data
Resource Recovery	SCG-Cogen*
Sewage Treatment Plants - POTWs - Ammonia	Population
Municipal Waste Disposal	Population
Composting - Ammonia	No Growth
Biological Waste - Composting	Population
Laundering	Total Employment
Degreasing	Manufacturing Output
Auto Refinishing	Misc. Services Employment
Marine Coating	Water Transportation Output
Paper Coating	Paper Manufacturing Output
Fabric Coatings	Textile Output
Can and Coil Coatings	Fabricated Metal Output
Metal Part and Products Coatings	Fabricated Metal Output
Wood and Fabricated Furniture Coatings	Furniture Output
Plastic Parts Coatings	Plastic Output
Semiconductor Coatings	Computer Output
Aircraft and Aerospace Coatings	Air Transportation Output
Thinning and Cleanup Solvent Use	Manufacturing Output

* These projections by SCG incorporate the energy efficiency programs/standards.

TABLE III-2-6 (Continued)

Area Sources Growth Surrogate by Source Category

SOURCE DESCRIPTION	SURROGATE
Printing	Printing Output
Adhesive and Sealants (Solvent Based)	Manufacturing Output
Adhesive and Sealants (Water Based)	Manufacturing Output
Miscellaneous Industrial Solvents	Manufacturing Output
Oil Production Fugitive	NAICS 211 Output
Natural Gas Transmission Losses	SCG - Total - Natural Gas*
LPG Transfer and Dispensing - Fugitive Losses	Households
Gasoline Dispersing Tank-Working Losses	Gasoline Consumption
Gasoline Dispensing Tank-Breathing Losses	Gasoline Consumption
Vehicle Refueling-Vapor Displacement Losses	Gasoline Consumption
Vehicle Refueling-Spillage	Gasoline Consumption
Storage Tank and Pipeline Cleaning	Gasoline Consumption
Tank Cargo-Pressure Related Fug. Losses	Gasoline Consumption
Tank Cargo-Vapor Hose Fugitive Losses	Gasoline Consumption
Tank Cargo-Product Hose Fugitive Losses	Gasoline Consumption
Bulk Gasoline Storage and Transfer (Unspec)	Gasoline Consumption
Rubber and Rubber Products	Plastic Output
Fiberglass and Fiberglass Products	Plastic Output
Plastic and Plastic Products	Plastic Output
Wine Fermentation	CARB Growth Data
Wine Aging	CARB Growth Data
Bakeries	Food Output
Agricultural Products Processing Losses	Agriculture Output
Agricultural Crop Processing Losses	Agriculture Output
Sand and Gravel Excavation	Mineral Product Output
Asphaltic Concrete Production	Construction Employment
Grinding/Crushing of Aggregates	Mineral Product Output
Surface Blasting	Mining Extraction Output
Cement Concrete Manufacturing and Fabrication	Mineral Product Output
Open Pile Storage	No Growth
Other Mineral Processes	Mineral Product Output
Secondary Metal Production	Primary Metal Output
Wood Product Losses	Furniture Output

* These projections by SCG incorporate the energy efficiency programs/standards.

TABLE III-2-6 (Continued)

Area Sources Growth Surrogate by Source Category

SOURCE DESCRIPTION	SURROGATE
Industrial Lubricant	Population
Industrial Process Losses (Unspecified)	No Growth
Consumer Products (Except Aerosol)	Population
Aerosol Consumer Product - Aerosol	No Growth
Architectural Coatings	Households
Ag Pesticides Methyl Bromide	CARB Growth Data
Ag Pesticides non-Methyl Bromide	CARB Growth Data
non-Ag Pesticides-Methyl Bromide	CARB Growth Data
non-Ag Pesticides-non-Methyl Bromide	CARB Growth Data
Agricultural Fertilizer - Ammonia	CARB Growth Data
Asphalt Paving	Construction Employment
Residential Wood Stoves	No Growth
Residential Wood Fireplaces	No Growth
Residential Natural Gas Space Heating	SCG - Residential Space*
Residential Distillate Oil Combustion	Households
Residential Natural Gas Water Heating	SCG - Residential Water*
Residential Natural Gas Cooking	SCG - Residential Cooking*
Residential Natural Gas Comb - Other	SCG - Residential Combustion*
Residential LPG Combustion	Households
Farming Operations	CARB Growth Data
Residential Building Construction - Dust	Construction Employment
Commercial Building Construction - Dust	Construction Employment
Industrial Building Construction - Dust	Construction Employment
Institutional Building Construction - Dust	Construction Employment
Road Construction - Dust	Construction Employment
Paved Road Travel - Freeways	VMT (freeway)
Paved Road Travel (Unspecified)	No Growth
Paved Road Travel-Major	VMT (major)
Paved Road Travel-Collector	VMT (other)
Paved Road Travel-Local	VMT (other)
Unpaved Road Travel -City and County Roads	No Growth
Unpaved Road Travel - US Forest and Park Roads	No Growth
Unpaved Road Travel -BLM Roads	No Growth

* These projections by SCG incorporate the energy efficiency programs/standards.

TABLE III-2-6 (Concluded)

Area Sources Growth Surrogate by Source Category

SOURCE DESCRIPTION	SURROGATE
Unpaved Road Travel -Farm Roads	CARB Growth Data
Unpaved Roads (Unspecified)	No Growth
Ag Land (Non-Pasture) - Wind Dust	CARB Growth Data
Ag Land (Pasture) - Wind Dust	CARB Growth Data
Unpaved Roads - Wind Dust	No Growth
Fires	No Growth
Ag Burning - Pruning	CARB Growth Data
Agricultural Burning - Field Crops	CARB Growth Data
Range Improvement	Agriculture Output
Forest Management	Forest Management Services Data**
Wildland Fire Use (WFU)	CARB Growth Data
Weed Abatement	No Growth
Waste Burning (Unspecified)	CARB Growth Data
Cooking	Total Employment
Domestic Activity - Ammonia	Population

* These projections by SCG incorporate the energy efficiency programs/standards.
** Forest Management Services provided actual 2012 emission data; Future emission grow flat from TAD2003.

TABLE III-2-7

NAIC Emission Growth Factors by County in the SCAB for the Year 2019

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Agriculture, Forestry, Animal, Fishing and Hunting	11	1.233	1.228	1.276	1.160
Oil and Gas Extraction	211	1.047	1.043	1.084	0.985
Mining (except Oil and Gas)	212	1.042	1.038	1.079	0.980
Support Activities for Mining	213	1.042	1.038	1.079	0.980
Utilities - Except Electricity	221	1.086	1.120	1.321	1.157
Utilities - Electricity*	221	0.793	0.793	0.793	0.793
Construction	23	1.301	1.288	1.783	1.415
Food Manufacturing	311	1.134	1.168	1.220	1.045
Beverage and Tobacco Product Manufacturing	312	1.086	1.118	1.168	1.001
Textile Mills	313	1.127	1.160	1.212	1.038
Textile Product Mills	314	1.127	1.160	1.212	1.038
Apparel Manufacturing	315	1.756	1.808	1.888	1.618
Leather and Allied Product Manufacturing	316	1.270	1.307	1.365	1.170
Wood Product Manufacturing	321	1.132	1.165	1.217	1.043
Paper Manufacturing	322	1.177	1.212	1.266	1.084
Printing and Related Support Activities	323	1.139	1.173	1.225	1.049
Petroleum and Coal Products Manufacturing	324	1.000	1.000	1.000	1.000
Chemical Manufacturing	325	1.285	1.323	1.382	1.184
Plastics and Rubber Products Manufacturing	326	1.223	1.259	1.315	1.126
Nonmetallic Mineral Product Manufacturing	327	1.164	1.198	1.251	1.072
Primary Metal Manufacturing	331	1.170	1.205	1.258	1.078
Fabricated Metal Product Manufacturing	332	1.148	1.182	1.234	1.057
Machinery Manufacturing	333	1.287	1.324	1.384	1.185
Computer and Electronic Product Manufacturing	334	1.485	1.528	1.597	1.368
Electrical Equipment -Appliance-Component Manufacturing	335	1.329	1.368	1.429	1.224
Transportation Equipment Manufacturing	336	1.209	1.245	1.300	1.114
Furniture and Related Product Manufacturing	337	1.210	1.246	1.301	1.115

TABLE III-2-7 (Continued)

NAIC Emission Growth Factors by County in the SCAB for the Year 2019

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Miscellaneous Manufacturing	339	1.353	1.393	1.455	1.246
Wholesale Trade	42	1.073	1.099	1.098	1.122
Motor Vehicle and Parts Dealers	441	1.055	1.228	1.194	1.166
Furniture and Home Furniture Stores	442	1.055	1.228	1.194	1.166
Electronics and Appliance Stores	443	1.055	1.228	1.194	1.166
Building Material-Garden Equipment-Supplies Dealers	444	1.055	1.228	1.194	1.166
Food and Beverage Stores	445	1.055	1.228	1.194	1.166
Health and Personal Care Stores	446	1.055	1.228	1.194	1.166
Gasoline Stations	447	1.255	1.461	1.419	1.387
Clothing and Clothing Accessories Stores	448	1.255	1.461	1.419	1.387
Sporting Goods-Hobby-Book- Music Stores	451	1.255	1.461	1.419	1.387
General Merchandise Stores	452	1.255	1.461	1.419	1.387
Miscellaneous Store Retailers	453	1.255	1.461	1.419	1.387
Nonstore Retailers	454	1.255	1.461	1.419	1.387
Air Transportation	481	1.362	1.451	1.830	1.444
Rail Transportation	482	1.261	1.344	1.000	1.337
Water Transportation	483	1.069	1.139	1.437	1.133
Truck Transportation	484	1.191	1.269	1.601	1.262
Transit and Ground Passenger Transportation	485	1.047	1.115	1.407	1.109
Pipeline Transportation	486	1.460	1.556	1.963	1.548
Scenic and Sightseeing Transportation	487	1.119	1.192	1.504	1.186
Support Activities for Transportation	488	1.119	1.192	1.504	1.186
Postal Service	491	1.033	1.101	1.389	1.095
Couriers and Messengers	492	1.033	1.101	1.389	1.095
Warehousing and Storage	493	1.262	1.345	1.697	1.338
Information	51	1.427	1.470	1.887	1.360
Finance and Insurance	52	1.099	1.040	1.296	1.071
Real Estate and Rental and Leasing	53	1.099	1.040	1.296	1.071
Professional-Scientific-and Technical Services	541	1.156	1.113	1.377	1.115
Management of Companies and Enterprises	551	1.156	1.113	1.377	1.115

TABLE III-2-7 (Concluded)

NAIC Emission Growth Factors by County in the SCAB for the Year 2019

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Administrative and Support Services	561	1.156	1.113	1.377	1.115
Waste Management and Remediation Services	562	1.156	1.113	1.377	1.115
Educational Services	611	0.961	0.996	0.995	1.013
Ambulatory Health Care Services	621	1.033	1.057	1.082	1.052
Hospitals	622	1.155	1.168	1.251	1.171
Nursing and Residential Care Facilities	623	1.227	1.221	1.431	1.308
Social Assistance	624	1.109	1.156	1.344	1.259
Arts, Entertainment, Museums, and Recreation	71	1.105	1.162	1.450	1.229
Accommodation and Food Services	72	1.086	1.120	1.321	1.157
Repair and Maintenance	811	1.086	1.120	1.321	1.157
Personal and Laundry Services	812	1.086	1.120	1.321	1.157
Religious-Grant-Civic-Professional-and Similar Org	813	1.064	1.129	1.474	1.263
Private Households	814	1.064	1.129	1.474	1.263
Public Administration	92	1.010	1.043	1.135	1.041

(Base year is 2012)

TABLE III-2-8

NAIC Emission Growth Factors by County in the SCAB for the Year 2021

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Agriculture, Forestry, Animal, Fishing and Hunting	11	1.317	1.300	1.361	1.212
Oil and Gas Extraction	211	1.068	1.054	1.103	0.983
Mining (except Oil and Gas)	212	1.061	1.047	1.097	0.977
Support Activities for Mining	213	1.061	1.047	1.097	0.977
Utilities - Except Electricity	221	1.104	1.142	1.394	1.198
Utilities - Electricity*	221	0.823	0.823	0.823	0.823
Construction	23	1.351	1.339	1.948	1.501
Food Manufacturing	311	1.173	1.208	1.277	1.069
Beverage and Tobacco Product Manufacturing	312	1.110	1.143	1.208	1.012
Textile Mills	313	1.164	1.198	1.266	1.061
Textile Product Mills	314	1.164	1.198	1.266	1.061
Apparel Manufacturing	315	2.058	2.119	2.239	1.876
Leather and Allied Product Manufacturing	316	1.356	1.396	1.476	1.236
Wood Product Manufacturing	321	1.170	1.205	1.274	1.067
Paper Manufacturing	322	1.230	1.267	1.339	1.121
Printing and Related Support Activities	323	1.180	1.215	1.284	1.075
Petroleum and Coal Products Manufacturing	324	1.000	1.000	1.000	1.000
Chemical Manufacturing	325	1.378	1.419	1.499	1.256
Plastics and Rubber Products Manufacturing	326	1.292	1.331	1.406	1.178
Nonmetallic Mineral Product Manufacturing	327	1.213	1.249	1.319	1.105
Primary Metal Manufacturing	331	1.221	1.257	1.329	1.113
Fabricated Metal Product Manufacturing	332	1.191	1.227	1.296	1.086
Machinery Manufacturing	333	1.380	1.420	1.501	1.257
Computer and Electronic Product Manufacturing	334	1.659	1.708	1.805	1.512
Electrical Equipment -Appliance-Component Manufacturing	335	1.438	1.480	1.564	1.310
Transportation Equipment Manufacturing	336	1.274	1.312	1.386	1.161
Furniture and Related Product Manufacturing	337	1.275	1.313	1.387	1.162

TABLE III-2-8 (Continued)

NAIC Emission Growth Factors by County in the SCAB for the Year 2021

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Miscellaneous Manufacturing	339	1.472	1.515	1.601	1.341
Wholesale Trade	42	1.089	1.120	1.122	1.158
Motor Vehicle and Parts Dealers	441	1.067	1.266	1.240	1.209
Furniture and Home Furniture Stores	442	1.067	1.266	1.240	1.209
Electronics and Appliance Stores	443	1.067	1.266	1.240	1.209
Building Material-Garden Equipment-Supplies Dealers	444	1.067	1.266	1.240	1.209
Food and Beverage Stores	445	1.067	1.266	1.240	1.209
Health and Personal Care Stores	446	1.067	1.266	1.240	1.209
Gasoline Stations	447	1.333	1.582	1.549	1.510
Clothing and Clothing Accessories Stores	448	1.333	1.582	1.549	1.510
Sporting Goods-Hobby-Book- Music Stores	451	1.333	1.582	1.549	1.510
General Merchandise Stores	452	1.333	1.582	1.549	1.510
Miscellaneous Store Retailers	453	1.333	1.582	1.549	1.510
Nonstore Retailers	454	1.333	1.582	1.549	1.510
Air Transportation	481	1.480	1.594	2.094	1.600
Rail Transportation	482	1.340	1.444	1.000	1.449
Water Transportation	483	1.084	1.168	1.534	1.172
Truck Transportation	484	1.245	1.342	1.762	1.346
Transit and Ground Passenger Transportation	485	1.055	1.136	1.493	1.140
Pipeline Transportation	486	1.619	1.744	2.291	1.750
Scenic and Sightseeing Transportation	487	1.149	1.238	1.627	1.243
Support Activities for Transportation	488	1.149	1.238	1.627	1.243
Postal Service	491	1.038	1.118	1.469	1.122
Couriers and Messengers	492	1.038	1.118	1.469	1.122
Warehousing and Storage	493	1.342	1.446	1.899	1.451
Information	51	1.559	1.607	2.147	1.485
Finance and Insurance	52	1.117	1.048	1.363	1.096
Real Estate and Rental and Leasing	53	1.117	1.048	1.363	1.096
Professional-Scientific-and Technical Services	541	1.189	1.137	1.465	1.150
Management of Companies and Enterprises	551	1.189	1.137	1.465	1.150

TABLE III-2-8 (Concluded)

NAIC Emission Growth Factors by County in the SCAB for the Year 2021

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Administrative and Support Services	561	1.189	1.137	1.465	1.150
Waste Management and Remediation Services	562	1.189	1.137	1.465	1.150
Educational Services	611	0.958	1.000	1.009	1.024
Ambulatory Health Care Services	621	1.043	1.070	1.109	1.071
Hospitals	622	1.200	1.216	1.320	1.225
Nursing and Residential Care Facilities	623	1.295	1.287	1.535	1.395
Social Assistance	624	1.136	1.189	1.430	1.323
Arts, Entertainment, Museums, and Recreation	71	1.138	1.206	1.574	1.299
Accommodation and Food Services	72	1.104	1.142	1.394	1.198
Repair and Maintenance	811	1.104	1.142	1.394	1.198
Personal and Laundry Services	812	1.104	1.142	1.394	1.198
Religious-Grant-Civic-Professional-and Similar Org	813	1.077	1.146	1.577	1.324
Private Households	814	1.077	1.146	1.577	1.324
Public Administration	92	1.012	1.050	1.166	1.058

(Base year is 2012)

TABLE III-2-9

NAIC Emission Growth Factors by County in the SCAB for the Year 2022

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Agriculture, Forestry, Animal, Fishing and Hunting	11	1.358	1.346	1.417	1.269
Oil and Gas Extraction	211	1.075	1.066	1.122	1.005
Mining (except Oil and Gas)	212	1.068	1.058	1.115	0.999
Support Activities for Mining	213	1.068	1.058	1.115	0.999
Utilities - Except Electricity	221	1.110	1.150	1.421	1.217
Utilities - Electricity*	221	0.844	0.844	0.844	0.844
Construction	23	1.363	1.355	2.000	1.532
Food Manufacturing	311	1.192	1.225	1.301	1.086
Beverage and Tobacco Product Manufacturing	312	1.121	1.152	1.224	1.021
Textile Mills	313	1.181	1.214	1.289	1.076
Textile Product Mills	314	1.181	1.214	1.289	1.076
Apparel Manufacturing	315	2.226	2.288	2.430	2.028
Leather and Allied Product Manufacturing	316	1.401	1.440	1.529	1.276
Wood Product Manufacturing	321	1.189	1.222	1.298	1.083
Paper Manufacturing	322	1.257	1.292	1.372	1.145
Printing and Related Support Activities	323	1.200	1.233	1.309	1.093
Petroleum and Coal Products Manufacturing	324	1.000	1.000	1.000	1.000
Chemical Manufacturing	325	1.425	1.465	1.556	1.299
Plastics and Rubber Products Manufacturing	326	1.327	1.364	1.449	1.209
Nonmetallic Mineral Product Manufacturing	327	1.237	1.271	1.350	1.127
Primary Metal Manufacturing	331	1.246	1.281	1.361	1.136
Fabricated Metal Product Manufacturing	332	1.213	1.247	1.324	1.105
Machinery Manufacturing	333	1.427	1.467	1.558	1.301
Computer and Electronic Product Manufacturing	334	1.752	1.800	1.912	1.596
Electrical Equipment -Appliance-Component Manufacturing	335	1.494	1.536	1.631	1.362
Transportation Equipment Manufacturing	336	1.306	1.343	1.426	1.190
Furniture and Related Product Manufacturing	337	1.307	1.344	1.427	1.191

TABLE III-2-9 (Continued)

NAIC Emission Growth Factors by County in the SCAB for the Year 2022

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Miscellaneous Manufacturing	339	1.534	1.576	1.674	1.397
Wholesale Trade	42	1.097	1.132	1.141	1.179
Motor Vehicle and Parts Dealers	441	1.069	1.281	1.254	1.225
Furniture and Home Furniture Stores	442	1.069	1.281	1.254	1.225
Electronics and Appliance Stores	443	1.069	1.281	1.254	1.225
Building Material-Garden Equipment-Supplies Dealers	444	1.069	1.281	1.254	1.225
Food and Beverage Stores	445	1.069	1.281	1.254	1.225
Health and Personal Care Stores	446	1.069	1.281	1.254	1.225
Gasoline Stations	447	1.369	1.641	1.606	1.569
Clothing and Clothing Accessories Stores	448	1.369	1.641	1.606	1.569
Sporting Goods-Hobby-Book- Music Stores	451	1.369	1.641	1.606	1.569
General Merchandise Stores	452	1.369	1.641	1.606	1.569
Miscellaneous Store Retailers	453	1.369	1.641	1.606	1.569
Nonstore Retailers	454	1.369	1.641	1.606	1.569
Air Transportation	481	1.541	1.668	2.223	1.684
Rail Transportation	482	1.381	1.494	1.000	1.509
Water Transportation	483	1.091	1.180	1.573	1.191
Truck Transportation	484	1.273	1.377	1.835	1.390
Transit and Ground Passenger Transportation	485	1.058	1.145	1.526	1.156
Pipeline Transportation	486	1.703	1.842	2.456	1.860
Scenic and Sightseeing Transportation	487	1.164	1.259	1.679	1.272
Support Activities for Transportation	488	1.164	1.259	1.679	1.272
Postal Service	491	1.039	1.124	1.498	1.135
Couriers and Messengers	492	1.039	1.124	1.498	1.135
Warehousing and Storage	493	1.383	1.496	1.994	1.511
Information	51	1.625	1.675	2.291	1.568
Finance and Insurance	52	1.124	1.053	1.392	1.116
Real Estate and Rental and Leasing	53	1.124	1.053	1.392	1.116
Professional-Scientific-and Technical Services	541	1.199	1.146	1.501	1.168
Management of Companies and Enterprises	551	1.199	1.146	1.501	1.168

TABLE III-2-9 (Concluded)

NAIC Emission Growth Factors by County in the SCAB for the Year 2022

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Administrative and Support Services	561	1.199	1.146	1.501	1.168
Waste Management and Remediation Services	562	1.199	1.146	1.501	1.168
Educational Services	611	0.959	1.003	1.018	1.034
Ambulatory Health Care Services	621	1.048	1.075	1.124	1.083
Hospitals	622	1.226	1.241	1.362	1.255
Nursing and Residential Care Facilities	623	1.334	1.324	1.599	1.443
Social Assistance	624	1.146	1.200	1.460	1.349
Arts, Entertainment, Museums, and Recreation	71	1.156	1.227	1.631	1.337
Accommodation and Food Services	72	1.110	1.150	1.421	1.217
Repair and Maintenance	811	1.110	1.150	1.421	1.217
Personal and Laundry Services	812	1.110	1.150	1.421	1.217
Religious-Grant-Civic-Professional-and Similar Org	813	1.081	1.151	1.619	1.352
Private Households	814	1.081	1.151	1.619	1.352
Public Administration	92	1.015	1.057	1.185	1.073

(Base year is 2012)

TABLE III-2-10

NAIC Emission Growth Factors by County in the SCAB for the Year 2023

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Agriculture, Forestry, Animal, Fishing and Hunting	11	1.378	1.364	1.439	1.287
Oil and Gas Extraction	211	1.079	1.069	1.127	1.008
Mining (except Oil and Gas)	212	1.072	1.061	1.120	1.001
Support Activities for Mining	213	1.072	1.061	1.120	1.001
Utilities - Except Electricity	221	1.115	1.158	1.449	1.236
Utilities - Electricity*	221	0.859	0.859	0.859	0.859
Construction	23	1.371	1.369	2.052	1.559
Food Manufacturing	311	1.198	1.230	1.310	1.092
Beverage and Tobacco Product Manufacturing	312	1.128	1.158	1.233	1.029
Textile Mills	313	1.188	1.220	1.299	1.083
Textile Product Mills	314	1.188	1.220	1.299	1.083
Apparel Manufacturing	315	2.298	2.360	2.513	2.096
Leather and Allied Product Manufacturing	316	1.412	1.451	1.544	1.288
Wood Product Manufacturing	321	1.196	1.228	1.307	1.091
Paper Manufacturing	322	1.267	1.301	1.385	1.156
Printing and Related Support Activities	323	1.207	1.240	1.320	1.101
Petroleum and Coal Products Manufacturing	324	1.000	1.000	1.000	1.000
Chemical Manufacturing	325	1.443	1.482	1.578	1.316
Plastics and Rubber Products Manufacturing	326	1.339	1.376	1.464	1.222
Nonmetallic Mineral Product Manufacturing	327	1.245	1.279	1.361	1.136
Primary Metal Manufacturing	331	1.260	1.294	1.378	1.149
Fabricated Metal Product Manufacturing	332	1.220	1.252	1.333	1.112
Machinery Manufacturing	333	1.448	1.487	1.583	1.320
Computer and Electronic Product Manufacturing	334	1.802	1.850	1.970	1.643
Electrical Equipment -Appliance-Component Manufacturing	335	1.516	1.557	1.658	1.383
Transportation Equipment Manufacturing	336	1.320	1.355	1.443	1.204
Furniture and Related Product Manufacturing	337	1.319	1.355	1.442	1.203

TABLE III-2-10 (Continued)

NAIC Emission Growth Factors by County in the SCAB for the Year 2023

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Miscellaneous Manufacturing	339	1.560	1.602	1.705	1.423
Wholesale Trade	42	1.103	1.141	1.151	1.196
Motor Vehicle and Parts Dealers	441	1.072	1.295	1.272	1.245
Furniture and Home Furniture Stores	442	1.072	1.295	1.272	1.245
Electronics and Appliance Stores	443	1.072	1.295	1.272	1.245
Building Material-Garden Equipment-Supplies Dealers	444	1.072	1.295	1.272	1.245
Food and Beverage Stores	445	1.072	1.295	1.272	1.245
Health and Personal Care Stores	446	1.072	1.295	1.272	1.245
Gasoline Stations	447	1.386	1.675	1.646	1.610
Clothing and Clothing Accessories Stores	448	1.386	1.675	1.646	1.610
Sporting Goods-Hobby-Book- Music Stores	451	1.386	1.675	1.646	1.610
General Merchandise Stores	452	1.386	1.675	1.646	1.610
Miscellaneous Store Retailers	453	1.386	1.675	1.646	1.610
Nonstore Retailers	454	1.386	1.675	1.646	1.610
Air Transportation	481	1.569	1.704	2.300	1.732
Rail Transportation	482	1.397	1.516	1.000	1.542
Water Transportation	483	1.092	1.185	1.600	1.205
Truck Transportation	484	1.282	1.392	1.879	1.415
Transit and Ground Passenger Transportation	485	1.058	1.149	1.551	1.168
Pipeline Transportation	486	1.729	1.878	2.535	1.909
Scenic and Sightseeing Transportation	487	1.169	1.269	1.714	1.290
Support Activities for Transportation	488	1.169	1.269	1.714	1.290
Postal Service	491	1.040	1.129	1.524	1.148
Couriers and Messengers	492	1.040	1.129	1.524	1.148
Warehousing and Storage	493	1.399	1.518	2.050	1.544
Information	51	1.657	1.708	2.358	1.602
Finance and Insurance	52	1.127	1.056	1.412	1.129
Real Estate and Rental and Leasing	53	1.127	1.056	1.412	1.129
Professional-Scientific-and Technical Services	541	1.210	1.155	1.533	1.186
Management of Companies and Enterprises	551	1.210	1.155	1.533	1.186

TABLE III-2-10 (Concluded)

NAIC Emission Growth Factors by County in the SCAB for the Year 2023

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Administrative and Support Services	561	1.210	1.155	1.533	1.186
Waste Management and Remediation Services	562	1.210	1.155	1.533	1.186
Educational Services	611	0.960	1.006	1.028	1.044
Ambulatory Health Care Services	621	1.053	1.080	1.140	1.095
Hospitals	622	1.251	1.265	1.401	1.284
Nursing and Residential Care Facilities	623	1.371	1.359	1.658	1.490
Social Assistance	624	1.157	1.214	1.499	1.379
Arts, Entertainment, Museums, and Recreation	71	1.165	1.238	1.672	1.364
Accommodation and Food Services	72	1.115	1.158	1.449	1.236
Repair and Maintenance	811	1.115	1.158	1.449	1.236
Personal and Laundry Services	812	1.115	1.158	1.449	1.236
Religious-Grant-Civic-Professional-and Similar Org	813	1.085	1.154	1.651	1.374
Private Households	814	1.085	1.154	1.651	1.374
Public Administration	92	1.015	1.061	1.197	1.083

(Base year is 2012)

TABLE III-2-11

NAIC Emission Growth Factors by County in the SCAB for the Year 2025

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Agriculture, Forestry, Animal, Fishing and Hunting	11	1.404	1.396	1.528	1.366
Oil and Gas Extraction	211	1.075	1.070	1.171	1.046
Mining (except Oil and Gas)	212	1.068	1.063	1.163	1.040
Support Activities for Mining	213	1.068	1.063	1.163	1.040
Utilities - Except Electricity	221	1.127	1.174	1.504	1.275
Utilities - Electricity*	221	0.876	0.876	0.876	0.876
Construction	23	1.394	1.400	2.156	1.619
Food Manufacturing	311	1.209	1.237	1.330	1.101
Beverage and Tobacco Product Manufacturing	312	1.142	1.168	1.256	1.040
Textile Mills	313	1.201	1.229	1.321	1.094
Textile Product Mills	314	1.201	1.229	1.321	1.094
Apparel Manufacturing	315	2.449	2.506	2.695	2.231
Leather and Allied Product Manufacturing	316	1.436	1.470	1.581	1.309
Wood Product Manufacturing	321	1.209	1.237	1.330	1.101
Paper Manufacturing	322	1.288	1.318	1.417	1.173
Printing and Related Support Activities	323	1.223	1.251	1.345	1.114
Petroleum and Coal Products Manufacturing	324	1.000	1.000	1.000	1.000
Chemical Manufacturing	325	1.480	1.514	1.628	1.348
Plastics and Rubber Products Manufacturing	326	1.364	1.395	1.501	1.242
Nonmetallic Mineral Product Manufacturing	327	1.262	1.291	1.388	1.149
Primary Metal Manufacturing	331	1.288	1.318	1.417	1.173
Fabricated Metal Product Manufacturing	332	1.233	1.262	1.357	1.123
Machinery Manufacturing	333	1.489	1.523	1.638	1.356
Computer and Electronic Product Manufacturing	334	1.906	1.950	2.097	1.736
Electrical Equipment -Appliance-Component Manufacturing	335	1.561	1.597	1.717	1.422
Transportation Equipment Manufacturing	336	1.346	1.377	1.481	1.226
Furniture and Related Product Manufacturing	337	1.342	1.373	1.477	1.223

TABLE III-2-11 (Continued)

NAIC Emission Growth Factors by County in the SCAB for the Year 2025

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Miscellaneous Manufacturing	339	1.613	1.651	1.775	1.470
Wholesale Trade	42	1.119	1.163	1.185	1.235
Motor Vehicle and Parts Dealers	441	1.076	1.324	1.302	1.279
Furniture and Home Furniture Stores	442	1.076	1.324	1.302	1.279
Electronics and Appliance Stores	443	1.076	1.324	1.302	1.279
Building Material-Garden Equipment-Supplies Dealers	444	1.076	1.324	1.302	1.279
Food and Beverage Stores	445	1.076	1.324	1.302	1.279
Health and Personal Care Stores	446	1.076	1.324	1.302	1.279
Gasoline Stations	447	1.419	1.747	1.718	1.687
Clothing and Clothing Accessories Stores	448	1.419	1.747	1.718	1.687
Sporting Goods-Hobby-Book- Music Stores	451	1.419	1.747	1.718	1.687
General Merchandise Stores	452	1.419	1.747	1.718	1.687
Miscellaneous Store Retailers	453	1.419	1.747	1.718	1.687
Nonstore Retailers	454	1.419	1.747	1.718	1.687
Air Transportation	481	1.630	1.780	2.471	1.834
Rail Transportation	482	1.432	1.564	1.000	1.611
Water Transportation	483	1.097	1.198	1.663	1.234
Truck Transportation	484	1.303	1.423	1.976	1.466
Transit and Ground Passenger Transportation	485	1.061	1.158	1.608	1.193
Pipeline Transportation	486	1.788	1.953	2.710	2.011
Scenic and Sightseeing Transportation	487	1.182	1.291	1.792	1.330
Support Activities for Transportation	488	1.182	1.291	1.792	1.330
Postal Service	491	1.044	1.140	1.582	1.174
Couriers and Messengers	492	1.044	1.140	1.582	1.174
Warehousing and Storage	493	1.434	1.566	2.174	1.613
Information	51	1.730	1.789	2.581	1.712
Finance and Insurance	52	1.140	1.064	1.465	1.163
Real Estate and Rental and Leasing	53	1.140	1.064	1.465	1.163
Professional-Scientific-and Technical Services	541	1.230	1.173	1.603	1.223
Management of Companies and Enterprises	551	1.230	1.173	1.603	1.223

TABLE III-2-11 (Concluded)

NAIC Emission Growth Factors by County in the SCAB for the Year 2025

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Administrative and Support Services	561	1.230	1.173	1.603	1.223
Waste Management and Remediation Services	562	1.230	1.173	1.603	1.223
Educational Services	611	0.962	1.012	1.048	1.064
Ambulatory Health Care Services	621	1.063	1.091	1.170	1.120
Hospitals	622	1.300	1.313	1.482	1.344
Nursing and Residential Care Facilities	623	1.446	1.430	1.781	1.586
Social Assistance	624	1.176	1.237	1.561	1.432
Arts, Entertainment, Museums, and Recreation	71	1.182	1.263	1.760	1.420
Accommodation and Food Services	72	1.127	1.174	1.504	1.275
Repair and Maintenance	811	1.127	1.174	1.504	1.275
Personal and Laundry Services	812	1.127	1.174	1.504	1.275
Religious-Grant-Civic-Professional-and Similar Org	813	1.092	1.164	1.729	1.428
Private Households	814	1.092	1.164	1.729	1.428
Public Administration	92	1.024	1.075	1.235	1.112

(Base year is 2012)

TABLE III-2-12

NAIC Emission Growth Factors by County in the SCAB for the Year 2031

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Agriculture, Forestry, Animal, Fishing and Hunting	11	1.515	1.501	1.694	1.524
Oil and Gas Extraction	211	1.086	1.076	1.214	1.093
Mining (except Oil and Gas)	212	1.080	1.070	1.208	1.087
Support Activities for Mining	213	1.080	1.070	1.208	1.087
Utilities - Except Electricity	221	1.163	1.208	1.669	1.389
Utilities - Electricity*	221	0.876	0.876	0.876	0.876
Construction	23	1.451	1.471	2.471	1.791
Food Manufacturing	311	1.241	1.243	1.386	1.133
Beverage and Tobacco Product Manufacturing	312	1.183	1.185	1.321	1.081
Textile Mills	313	1.239	1.241	1.383	1.131
Textile Product Mills	314	1.239	1.241	1.383	1.131
Apparel Manufacturing	315	2.961	2.967	3.307	2.705
Leather and Allied Product Manufacturing	316	1.508	1.511	1.685	1.378
Wood Product Manufacturing	321	1.248	1.250	1.394	1.140
Paper Manufacturing	322	1.350	1.352	1.507	1.233
Printing and Related Support Activities	323	1.268	1.270	1.416	1.158
Petroleum and Coal Products Manufacturing	324	1.000	1.000	1.000	1.000
Chemical Manufacturing	325	1.592	1.595	1.778	1.454
Plastics and Rubber Products Manufacturing	326	1.438	1.440	1.606	1.313
Nonmetallic Mineral Product Manufacturing	327	1.311	1.314	1.464	1.198
Primary Metal Manufacturing	331	1.372	1.375	1.532	1.253
Fabricated Metal Product Manufacturing	332	1.272	1.275	1.421	1.162
Machinery Manufacturing	333	1.616	1.620	1.805	1.476
Computer and Electronic Product Manufacturing	334	2.254	2.258	2.517	2.059
Electrical Equipment -Appliance-Component Manufacturing	335	1.700	1.703	1.898	1.552
Transportation Equipment Manufacturing	336	1.427	1.430	1.594	1.303
Furniture and Related Product Manufacturing	337	1.412	1.415	1.577	1.290

TABLE III-2-12 (Continued)

NAIC Emission Growth Factors by County in the SCAB for the Year 2031

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Miscellaneous Manufacturing	339	1.782	1.786	1.990	1.628
Wholesale Trade	42	1.159	1.211	1.268	1.347
Motor Vehicle and Parts Dealers	441	1.092	1.385	1.400	1.391
Furniture and Home Furniture Stores	442	1.092	1.385	1.400	1.391
Electronics and Appliance Stores	443	1.092	1.385	1.400	1.391
Building Material-Garden Equipment-Supplies Dealers	444	1.092	1.385	1.400	1.391
Food and Beverage Stores	445	1.092	1.385	1.400	1.391
Health and Personal Care Stores	446	1.092	1.385	1.400	1.391
Gasoline Stations	447	1.528	1.938	1.960	1.947
Clothing and Clothing Accessories Stores	448	1.528	1.938	1.960	1.947
Sporting Goods-Hobby-Book- Music Stores	451	1.528	1.938	1.960	1.947
General Merchandise Stores	452	1.528	1.938	1.960	1.947
Miscellaneous Store Retailers	453	1.528	1.938	1.960	1.947
Nonstore Retailers	454	1.528	1.938	1.960	1.947
Air Transportation	481	1.817	2.008	3.020	2.165
Rail Transportation	482	1.535	1.697	1.000	1.830
Water Transportation	483	1.106	1.223	1.839	1.318
Truck Transportation	484	1.363	1.506	2.265	1.624
Transit and Ground Passenger Transportation	485	1.062	1.174	1.765	1.266
Pipeline Transportation	486	1.965	2.171	3.266	2.341
Scenic and Sightseeing Transportation	487	1.215	1.343	2.020	1.448
Support Activities for Transportation	488	1.215	1.343	2.020	1.448
Postal Service	491	1.049	1.159	1.743	1.250
Couriers and Messengers	492	1.049	1.159	1.743	1.250
Warehousing and Storage	493	1.538	1.699	2.556	1.833
Information	51	1.956	2.004	3.164	2.005
Finance and Insurance	52	1.170	1.077	1.605	1.258
Real Estate and Rental and Leasing	53	1.170	1.077	1.605	1.258
Professional-Scientific-and Technical Services	541	1.292	1.215	1.807	1.332
Management of Companies and Enterprises	551	1.292	1.215	1.807	1.332

TABLE III-2-12 (Concluded)

NAIC Emission Growth Factors by County in the SCAB for the Year 2031

NAIC SECTOR	NAIC	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
Administrative and Support Services	561	1.292	1.215	1.807	1.332
Waste Management and Remediation Services	562	1.292	1.215	1.807	1.332
Educational Services	611	0.979	1.024	1.114	1.123
Ambulatory Health Care Services	621	1.093	1.108	1.263	1.193
Hospitals	622	1.430	1.420	1.697	1.500
Nursing and Residential Care Facilities	623	1.645	1.596	2.096	1.830
Social Assistance	624	1.239	1.296	1.772	1.598
Arts, Entertainment, Museums, and Recreation	71	1.238	1.322	2.029	1.590
Accommodation and Food Services	72	1.163	1.208	1.669	1.389
Repair and Maintenance	811	1.163	1.208	1.669	1.389
Personal and Laundry Services	812	1.163	1.208	1.669	1.389
Religious-Grant-Civic-Professional-and Similar Org	813	1.115	1.176	1.947	1.576
Private Households	814	1.115	1.176	1.947	1.576
Public Administration	92	1.035	1.096	1.326	1.189

(Base year is 2012)

TABLE III-2-13

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2019

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
020	Cogeneration	0.793	0.793	0.793	0.793
030	Petroleum Production Fuel Combustion - Gaseous Fuel	1.048	1.143	1.085	1.102
050	Industrial Stationary I.C. Engines - Natural Gas	1.033	1.033	1.033	1.033
050	Industrial Combustion - L.P.G./Distillate Oil/Other Fuel	1.248	1.343	1.335	1.149
060	Commercial Natural Gas Combustion - Space Heating	0.899	0.899	0.899	0.899
060	Commercial Natural Gas Combustion - Water Heating	0.899	0.899	0.899	0.899
060	Commercial Natural Gas Ice/Ext. Comb (Others)	0.899	0.899	0.899	0.899
060	Commercial L.P.G. Combustion	1.309	1.229	1.552	1.287
099	Resource Recovery	0.793	0.793	0.793	0.793
110	Sewage Treatment Plants-Potws - Ammonia	1.035	1.057	1.082	1.051
120	Landfills - Municipal Solid Waste Disposal (Biodegradation)	1.035	1.057	1.082	1.051
199	Composting - Ammonia	1.000	1.000	1.000	1.000
199	Composting Waste Disposal	1.184	1.191	1.259	1.227
210	Dry Cleaning	1.086	1.120	1.321	1.157
220	Degreasing	1.248	1.343	1.335	1.149
230	Auto Refinishing - Coatings	1.064	1.092	1.480	1.280
230	Marine Coatings	1.069	1.162	1.439	1.163
230	Paper Coatings	1.177	1.211	1.264	1.112
230	Can And Coil, Metal Parts And Products Coatings	1.148	1.182	1.233	1.085
230	Wood Furniture And Fabricated Products Coatings	1.210	1.245	1.300	1.143
230	Plastic Parts	1.223	1.259	1.313	1.155
230	Semiconductor Coatings	1.485	1.528	1.595	1.403
230	Aircraft And Aerospace Coatings	1.362	1.481	1.833	1.482
240	Printing	1.139	1.173	1.224	1.076
250	Adhesives And Sealants	1.248	1.343	1.335	1.149
299	Miscellaneous Industrial Solvent Uses	1.248	1.343	1.335	1.149
310	Oil & Gas Production	1.048	1.143	1.085	1.102

TABLE III-2-13 (Continued)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2019

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
330	Petroleum Marketing - Natural Gas Transmission Losses	0.890	0.897	0.875	0.875
330	LPG Transfer And Dispensing - Fugitive Losses	1.059	1.066	1.126	1.098
330	Gasoline Dispensing & Transfers/Storage/Cargo Tanks	0.846	0.839	0.879	0.861
330	Bulk Gasoline Storage & Transfer (Unspecified)	0.846	0.839	0.879	0.861
410	Chemical	1.223	1.259	1.313	1.155
420	Wine Fermentation / Aging	1.142	1.139	1.143	1.152
420	Bakeries	1.134	1.167	1.218	1.072
430	Asphaltic Concrete Production	1.302	1.300	1.782	1.448
430	Surface Blasting	1.043	1.137	1.079	1.096
430	Open Storage Piles	1.000	1.000	1.000	1.000
430	Mineral Processes - Sand/Gravel/Cement Concrete	1.164	1.198	1.250	1.100
440	Secondary Metal Production	1.170	1.205	1.257	1.106
450	Wood Processing Losses	1.210	1.245	1.300	1.143
499	Industrial Lubricant	1.035	1.057	1.082	1.051
499	Industrial Process Losses (Unspecified Material)	1.000	1.000	1.000	1.000
510	Consumer Products - Aerosol	1.000	1.000	1.000	1.000
510	Consumer Products - Non Aerosol	1.035	1.057	1.082	1.051
520	Architectural Coatings	1.059	1.066	1.126	1.098
540	Asphalt Paving And Roofing Operations	1.302	1.300	1.782	1.448
610	Residential Wood Combustion	1.000	1.000	1.000	1.000
610	Residential Distillate Oil Combustion - Space Heating	1.059	1.066	1.126	1.098
610	Residential Natural Gas Combustion - Space Heating	0.810	0.810	0.810	0.810
610	Residential Natural Gas Combustion - Water Heating	0.810	0.810	0.810	0.810
610	Residential Natural Gas Combustion - Cooking/Other	0.810	0.810	0.810	0.810
610	Residential L.P.G. Combustion (Unspecified)	1.059	1.066	1.126	1.098
620	Tilling/Harvest Operations - Dust	1.000	1.000	0.812	1.000

TABLE III-2-13 (Concluded)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2019

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
620	Livestock Husbandry - Dairy Cattle	1.000	1.000	0.617	0.617
620	Livestock Husbandry - Layers	1.000	1.000	0.975	0.975
620	Livestock Husbandry - Others	1.000	1.000	1.000	1.000
630	Building And Road Construction - Dust	1.302	1.300	1.782	1.448
640	Paved Road Travel - Freeways - Dust	1.027	1.046	1.120	1.071
640	Paved Road Travel - (Unspecified) - Dust	1.000	1.000	1.000	1.000
640	Paved Road Travel - Major Streets - Dust	1.027	1.039	1.138	1.071
640	Paved Road Travel - Collector/Local Streets - Dust	1.015	1.070	1.065	1.049
645	Unpaved Road Travel - Farm Roads - Dust	1.000	1.000	0.812	1.000
645	Unpaved Road Travel - Others - Dust	1.000	1.000	1.000	1.000
650	Agricultural Lands - Windblown Dust	0.701	0.692	0.849	0.742
650	Unpaved Roads And Associated Areas - Windblown Dust	1.000	1.000	1.000	1.000
660	Structural/Automobile Fires	1.000	1.000	1.000	1.000
670	Agricultural Burning - Prunings/Field Crops	1.000	1.000	0.812	1.000
670	Agricultural Burning - Forest Management*	----	----	----	----
670	Agricultural Burning - Weed Abatement	1.000	1.000	1.000	1.000
670	Wildland Fire Use And Waste Burning (Unspecified)	1.000	1.000	1.060	1.060
690	Cooking	1.086	1.120	1.321	1.157
699	Domestic Activity - Ammonia	1.035	1.057	1.082	1.051

* 2012 emissions based on information provided by Forest Management Services and special handling for future year emissions.

TABLE III-2-14

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2021

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
020	Cogeneration	0.823	0.823	0.823	0.823
030	Petroleum Production Fuel Combustion - Gaseous Fuel	1.066	1.181	1.103	1.136
050	Industrial Stationary I.C. Engines - Natural Gas	0.967	0.995	1.120	1.120
050	Industrial Combustion - L.P.G./Distillate Oil/Other Fuel	1.329	1.448	1.438	1.205
060	Commercial Natural Gas Combustion - Space Heating	0.853	0.877	0.988	0.988
060	Commercial Natural Gas Combustion - Water Heating	0.853	0.877	0.988	0.988
060	Commercial Natural Gas Ice/Ext. Comb (Others)	0.853	0.877	0.988	0.988
060	Commercial L.P.G. Combustion	1.397	1.293	1.706	1.375
099	Resource Recovery	0.823	0.823	0.823	0.823
110	Sewage Treatment Plants-Potws - Ammonia	1.043	1.070	1.109	1.070
120	Landfills - Municipal Solid Waste Disposal (Biodegradation)	1.043	1.070	1.109	1.070
199	Composting - Ammonia	1.000	1.000	1.000	1.000
199	Composting Waste Disposal	1.267	1.276	1.371	1.328
210	Dry Cleaning	1.104	1.142	1.394	1.198
220	Degreasing	1.329	1.448	1.438	1.205
230	Auto Refinishing - Coatings	1.077	1.104	1.577	1.344
230	Marine Coatings	1.084	1.194	1.535	1.207
230	Paper Coatings	1.230	1.266	1.339	1.154
230	Can And Coil, Metal Parts And Products Coatings	1.191	1.226	1.297	1.118
230	Wood Furniture And Fabricated Products Coatings	1.275	1.312	1.387	1.196
230	Plastic Parts	1.292	1.329	1.406	1.212
230	Semiconductor Coatings	1.659	1.706	1.805	1.556
230	Aircraft And Aerospace Coatings	1.480	1.630	2.096	1.647
240	Printing	1.180	1.214	1.284	1.107
250	Adhesives And Sealants	1.329	1.448	1.438	1.205
299	Miscellaneous Industrial Solvent Uses	1.329	1.448	1.438	1.205
310	Oil & Gas Production	1.066	1.181	1.103	1.136

TABLE III-2-14 (Continued)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2021

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
330	Petroleum Marketing - Natural Gas Transmission Losses	0.849	0.876	0.913	0.913
330	LPG Transfer And Dispensing - Fugitive Losses	1.074	1.082	1.162	1.126
330	Gasoline Dispensing & Transfers/Storage/Cargo Tanks	0.794	0.803	0.854	0.817
330	Bulk Gasoline Storage & Transfer (Unspecified)	0.794	0.803	0.854	0.817
410	Chemical	1.292	1.329	1.406	1.212
420	Wine Fermentation / Aging	1.176	1.171	1.180	1.188
420	Bakeries	1.173	1.207	1.277	1.100
430	Asphaltic Concrete Production	1.351	1.352	1.946	1.542
430	Surface Blasting	1.060	1.174	1.097	1.129
430	Open Storage Piles	1.000	1.000	1.000	1.000
430	Mineral Processes - Sand/Gravel/Cement Concrete	1.213	1.248	1.320	1.137
440	Secondary Metal Production	1.221	1.256	1.329	1.145
450	Wood Processing Losses	1.275	1.312	1.387	1.196
499	Industrial Lubricant	1.043	1.070	1.109	1.070
499	Industrial Process Losses (Unspecified Material)	1.000	1.000	1.000	1.000
510	Consumer Products - Aerosol	1.000	1.000	1.000	1.000
510	Consumer Products - Non Aerosol	1.043	1.070	1.109	1.070
520	Architectural Coatings	1.074	1.082	1.162	1.126
540	Asphalt Paving And Roofing Operations	1.351	1.352	1.946	1.542
610	Residential Wood Combustion	1.000	1.000	1.000	1.000
610	Residential Distillate Oil Combustion - Space Heating	1.074	1.082	1.162	1.126
610	Residential Natural Gas Combustion - Space Heating	0.783	0.801	0.816	0.816
610	Residential Natural Gas Combustion - Water Heating	0.783	0.801	0.816	0.816
610	Residential Natural Gas Combustion - Cooking/Other	0.783	0.801	0.816	0.816
610	Residential L.P.G. Combustion (Unspecified)	1.074	1.082	1.162	1.126
620	Tilling/Harvest Operations - Dust	1.000	1.000	0.776	1.000
620	Livestock Husbandry - Dairy Cattle	1.000	1.000	0.541	0.541

TABLE III-2-14 (Concluded)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2021

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
620	Livestock Husbandry - Layers	1.000	1.000	0.975	0.975
620	Livestock Husbandry - Others	1.000	1.000	1.000	1.000
630	Building And Road Construction - Dust	1.351	1.352	1.946	1.542
640	Paved Road Travel - Freeways - Dust	1.029	1.064	1.159	1.086
640	Paved Road Travel - (Unspecified) - Dust	1.000	1.000	1.000	1.000
640	Paved Road Travel - Major Streets - Dust	1.041	1.073	1.206	1.111
640	Paved Road Travel - Collector/Local Streets - Dust	1.024	1.109	1.116	1.077
645	Unpaved Road Travel - Farm Roads - Dust	1.000	1.000	0.776	1.000
645	Unpaved Road Travel - Others - Dust	1.000	1.000	1.000	1.000
650	Agricultural Lands - Windblown Dust	0.633	0.623	0.810	0.682
650	Unpaved Roads And Associated Areas - Windblown Dust	1.000	1.000	1.000	1.000
660	Structural/Automobile Fires	1.000	1.000	1.000	1.000
670	Agricultural Burning - Prunings/Field Crops	1.000	1.000	0.776	1.000
670	Agricultural Burning - Forest Management*	----	----	----	----
670	Agricultural Burning - Weed Abatement	1.000	1.000	1.000	1.000
670	Wildland Fire Use And Waste Burning (Unspecified)	1.000	1.000	1.086	1.087
690	Cooking	1.104	1.142	1.394	1.198
699	Domestic Activity - Ammonia	1.043	1.070	1.109	1.070

* 2012 emissions based on information provided by Forest Management Services and special handling for future year emissions.

TABLE III-2-15

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2022

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
020	Cogeneration	0.844	0.844	0.844	0.844
030	Petroleum Production Fuel Combustion - Gaseous Fuel	1.076	1.191	1.119	1.157
050	Industrial Stationary I.C. Engines - Natural Gas	0.958	0.985	1.109	1.109
050	Industrial Combustion - L.P.G./Distillate Oil/Other Fuel	1.372	1.501	1.486	1.238
060	Commercial Natural Gas Combustion - Space Heating	0.846	0.870	0.980	0.980
060	Commercial Natural Gas Combustion - Water Heating	0.846	0.870	0.980	0.980
060	Commercial Natural Gas Ice/Ext. Comb (Others)	0.846	0.870	0.980	0.980
060	Commercial L.P.G. Combustion	1.437	1.325	1.774	1.420
099	Resource Recovery	0.844	0.844	0.844	0.844
110	Sewage Treatment Plants-Potws - Ammonia	1.048	1.075	1.124	1.082
120	Landfills - Municipal Solid Waste Disposal (Biodegradation)	1.048	1.075	1.124	1.082
199	Composting - Ammonia	1.000	1.000	1.000	1.000
199	Composting Waste Disposal	1.323	1.333	1.446	1.396
210	Dry Cleaning	1.109	1.150	1.421	1.217
220	Degreasing	1.372	1.501	1.486	1.238
230	Auto Refinishing - Coatings	1.081	1.110	1.613	1.369
230	Marine Coatings	1.090	1.207	1.571	1.226
230	Paper Coatings	1.257	1.291	1.371	1.179
230	Can And Coil, Metal Parts And Products Coatings	1.213	1.246	1.323	1.138
230	Wood Furniture And Fabricated Products Coatings	1.308	1.343	1.426	1.227
230	Plastic Parts	1.328	1.364	1.448	1.245
230	Semiconductor Coatings	1.752	1.799	1.911	1.643
230	Aircraft And Aerospace Coatings	1.541	1.706	2.221	1.733
240	Printing	1.200	1.232	1.308	1.125
250	Adhesives And Sealants	1.372	1.501	1.486	1.238
299	Miscellaneous Industrial Solvent Uses	1.372	1.501	1.486	1.238
310	Oil & Gas Production	1.076	1.191	1.119	1.157

TABLE III-2-15 (Continued)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2022

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
330	Petroleum Marketing - Natural Gas Transmission Losses	0.842	0.869	0.906	0.906
330	LPG Transfer And Dispensing - Fugitive Losses	1.080	1.088	1.180	1.139
330	Gasoline Dispensing & Transfers/Storage/Cargo Tanks	0.779	0.770	0.827	0.801
330	Bulk Gasoline Storage & Transfer (Unspecified)	0.779	0.770	0.827	0.801
410	Chemical	1.328	1.364	1.448	1.245
420	Wine Fermentation / Aging	1.192	1.186	1.197	1.205
420	Bakeries	1.193	1.225	1.300	1.118
430	Asphaltic Concrete Production	1.361	1.368	2.000	1.572
430	Surface Blasting	1.069	1.183	1.111	1.149
430	Open Storage Piles	1.000	1.000	1.000	1.000
430	Mineral Processes - Sand/Gravel/Cement Concrete	1.237	1.271	1.349	1.160
440	Secondary Metal Production	1.247	1.281	1.360	1.169
450	Wood Processing Losses	1.308	1.343	1.426	1.227
499	Industrial Lubricant	1.048	1.075	1.124	1.082
499	Industrial Process Losses (Unspecified Material)	1.000	1.000	1.000	1.000
510	Consumer Products - Aerosol	1.000	1.000	1.000	1.000
510	Consumer Products - Non Aerosol	1.048	1.075	1.124	1.082
520	Architectural Coatings	1.080	1.088	1.180	1.139
540	Asphalt Paving And Roofing Operations	1.361	1.368	2.000	1.572
610	Residential Wood Combustion	1.000	1.000	1.000	1.000
610	Residential Distillate Oil Combustion - Space Heating	1.080	1.088	1.180	1.139
610	Residential Natural Gas Combustion - Space Heating	0.778	0.796	0.811	0.811
610	Residential Natural Gas Combustion - Water Heating	0.778	0.796	0.811	0.811
610	Residential Natural Gas Combustion - Cooking/Other	0.778	0.796	0.811	0.811
610	Residential L.P.G. Combustion (Unspecified)	1.080	1.088	1.180	1.139
620	Tilling/Harvest Operations - Dust	1.000	1.000	0.764	1.000

TABLE III-2-15 (Concluded)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2022

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
620	Livestock Husbandry - Dairy Cattle	1.000	1.000	0.507	0.507
620	Livestock Husbandry - Layers	1.000	1.000	0.975	0.975
620	Livestock Husbandry - Others	1.000	1.000	1.000	1.000
630	Building And Road Construction - Dust	1.361	1.368	2.000	1.572
640	Paved Road Travel - Freeways - Dust	1.039	1.082	1.163	1.111
640	Paved Road Travel - (Unspecified) - Dust	1.000	1.000	1.000	1.000
640	Paved Road Travel - Major Streets - Dust	1.046	1.044	1.203	1.120
640	Paved Road Travel - Collector/Local Streets - Dust	1.038	1.099	1.113	1.092
645	Unpaved Road Travel - Farm Roads - Dust	1.000	1.000	0.764	1.000
645	Unpaved Road Travel - Others - Dust	1.000	1.000	1.000	1.000
650	Agricultural Lands - Windblown Dust	0.603	0.593	0.792	0.655
650	Unpaved Roads And Associated Areas - Windblown Dust	1.000	1.000	1.000	1.000
660	Structural/Automobile Fires	1.000	1.000	1.000	1.000
670	Agricultural Burning - Prunings/Field Crops	1.000	1.000	0.764	1.000
670	Agricultural Burning - Forest Management*	----	----	----	----
670	Agricultural Burning - Weed Abatement	1.000	1.000	1.000	1.000
670	Wildland Fire Use And Waste Burning (Unspecified)	1.000	1.000	1.100	1.100
690	Cooking	1.109	1.150	1.421	1.217
699	Domestic Activity - Ammonia	1.048	1.075	1.124	1.082

* 2012 emissions based on information provided by Forest Management Services and special handling for future year emissions.

TABLE III-2-16

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2023

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
020	Cogeneration	0.859	0.859	0.859	0.859
030	Petroleum Production Fuel Combustion - Gaseous Fuel	1.078	1.198	1.126	1.170
050	Industrial Stationary I.C. Engines - Natural Gas	0.945	0.972	1.094	1.094
050	Industrial Combustion - L.P.G./Distillate Oil/Other Fuel	1.390	1.524	1.508	1.251
060	Commercial Natural Gas Combustion - Space Heating	0.839	0.863	0.971	0.971
060	Commercial Natural Gas Combustion - Water Heating	0.839	0.863	0.971	0.971
060	Commercial Natural Gas Ice/Ext. Comb (Others)	0.839	0.863	0.971	0.971
060	Commercial L.P.G. Combustion	1.459	1.342	1.821	1.449
099	Resource Recovery	0.859	0.859	0.859	0.859
110	Sewage Treatment Plants-Potws - Ammonia	1.053	1.081	1.138	1.093
120	Landfills - Municipal Solid Waste Disposal (Biodegradation)	1.053	1.081	1.138	1.093
199	Composting - Ammonia	1.000	1.000	1.000	1.000
199	Composting Waste Disposal	1.379	1.390	1.523	1.464
210	Dry Cleaning	1.115	1.158	1.449	1.236
220	Degreasing	1.390	1.524	1.508	1.251
230	Auto Refinishing - Coatings	1.085	1.112	1.648	1.394
230	Marine Coatings	1.092	1.212	1.601	1.241
230	Paper Coatings	1.268	1.299	1.385	1.188
230	Can And Coil, Metal Parts And Products Coatings	1.220	1.251	1.333	1.144
230	Wood Furniture And Fabricated Products Coatings	1.320	1.353	1.441	1.237
230	Plastic Parts	1.340	1.374	1.464	1.256
230	Semiconductor Coatings	1.802	1.848	1.969	1.690
230	Aircraft And Aerospace Coatings	1.569	1.742	2.301	1.783
240	Printing	1.208	1.238	1.319	1.132
250	Adhesives And Sealants	1.390	1.524	1.508	1.251
299	Miscellaneous Industrial Solvent Uses	1.390	1.524	1.508	1.251
310	Oil & Gas Production	1.078	1.198	1.126	1.170

TABLE III-2-16 (Continued)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2023

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
330	Petroleum Marketing - Natural Gas Transmission Losses	0.834	0.861	0.897	0.897
330	LPG Transfer And Dispensing - Fugitive Losses	1.085	1.094	1.197	1.152
330	Gasoline Dispensing & Transfers/Storage/Cargo Tanks	0.748	0.759	0.821	0.776
330	Bulk Gasoline Storage & Transfer (Unspecified)	0.748	0.759	0.821	0.776
410	Chemical	1.340	1.374	1.464	1.256
420	Wine Fermentation / Aging	1.208	1.202	1.214	1.221
420	Bakeries	1.198	1.228	1.309	1.123
430	Asphaltic Concrete Production	1.371	1.382	2.051	1.601
430	Surface Blasting	1.071	1.190	1.118	1.162
430	Open Storage Piles	1.000	1.000	1.000	1.000
430	Mineral Processes - Sand/Gravel/Cement Concrete	1.246	1.277	1.361	1.168
440	Secondary Metal Production	1.261	1.292	1.377	1.182
450	Wood Processing Losses	1.320	1.353	1.441	1.237
499	Industrial Lubricant	1.053	1.081	1.138	1.093
499	Industrial Process Losses (Unspecified Material)	1.000	1.000	1.000	1.000
510	Consumer Products - Aerosol	1.000	1.000	1.000	1.000
510	Consumer Products - Non Aerosol	1.053	1.081	1.138	1.093
520	Architectural Coatings	1.085	1.094	1.197	1.152
540	Asphalt Paving And Roofing Operations	1.371	1.382	2.051	1.601
610	Residential Wood Combustion	1.000	1.000	1.000	1.000
610	Residential Distillate Oil Combustion - Space Heating	1.085	1.094	1.197	1.152
610	Residential Natural Gas Combustion - Space Heating	0.772	0.790	0.805	0.805
610	Residential Natural Gas Combustion - Water Heating	0.772	0.790	0.805	0.805
610	Residential Natural Gas Combustion - Cooking/Other	0.772	0.790	0.805	0.805
610	Residential L.P.G. Combustion (Unspecified)	1.085	1.094	1.197	1.152
620	Tilling/Harvest Operations - Dust	1.000	1.000	0.752	1.000
620	Livestock Husbandry - Dairy Cattle	1.000	1.000	0.474	0.474

TABLE III-2-16 (Concluded)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2023

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
620	Livestock Husbandry - Layers	1.000	1.000	0.975	0.975
620	Livestock Husbandry - Others	1.000	1.000	1.000	1.000
630	Building And Road Construction - Dust	1.371	1.382	2.051	1.601
640	Paved Road Travel - Freeways - Dust	1.037	1.094	1.186	1.126
640	Paved Road Travel - (Unspecified) - Dust	1.000	1.000	1.000	1.000
640	Paved Road Travel - Major Streets - Dust	1.049	1.072	1.246	1.134
640	Paved Road Travel - Collector/Local Streets - Dust	1.033	1.136	1.156	1.093
645	Unpaved Road Travel - Farm Roads - Dust	1.000	1.000	0.752	1.000
645	Unpaved Road Travel - Others - Dust	1.000	1.000	1.000	1.000
650	Agricultural Lands - Windblown Dust	0.574	0.563	0.774	0.627
650	Unpaved Roads And Associated Areas - Windblown Dust	1.000	1.000	1.000	1.000
660	Structural/Automobile Fires	1.000	1.000	1.000	1.000
670	Agricultural Burning - Prunings/Field Crops	1.000	1.000	0.752	1.000
670	Agricultural Burning - Forest Management*	----	----	----	----
670	Agricultural Burning - Weed Abatement	1.000	1.000	1.000	1.000
670	Wildland Fire Use And Waste Burning (Unspecified)	1.000	1.000	1.115	1.114
690	Cooking	1.115	1.158	1.449	1.236
699	Domestic Activity - Ammonia	1.053	1.081	1.138	1.093

* 2012 emissions based on information provided by Forest Management Services and special handling for future year emissions.

TABLE III-2-17

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2025

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
020	Cogeneration	0.876	0.876	0.876	0.876
030	Petroleum Production Fuel Combustion - Gaseous Fuel	1.081	1.201	1.145	1.203
050	Industrial Stationary I.C. Engines - Natural Gas	0.927	0.953	1.073	1.073
050	Industrial Combustion - L.P.G./Distillate Oil/Other Fuel	1.426	1.570	1.557	1.277
060	Commercial Natural Gas Combustion - Space Heating	0.828	0.851	0.959	0.959
060	Commercial Natural Gas Combustion - Water Heating	0.828	0.851	0.959	0.959
060	Commercial Natural Gas Ice/Ext. Comb (Others)	0.828	0.851	0.959	0.959
060	Commercial L.P.G. Combustion	1.505	1.377	1.929	1.514
099	Resource Recovery	0.876	0.876	0.876	0.876
110	Sewage Treatment Plants-Potws - Ammonia	1.063	1.091	1.167	1.116
120	Landfills - Municipal Solid Waste Disposal (Biodegradation)	1.063	1.091	1.167	1.116
199	Composting - Ammonia	1.000	1.000	1.000	1.000
199	Composting Waste Disposal	1.494	1.506	1.681	1.605
210	Dry Cleaning	1.127	1.174	1.504	1.274
220	Degreasing	1.426	1.570	1.557	1.277
230	Auto Refinishing - Coatings	1.092	1.121	1.725	1.446
230	Marine Coatings	1.095	1.226	1.662	1.270
230	Paper Coatings	1.288	1.315	1.415	1.206
230	Can And Coil, Metal Parts And Products Coatings	1.233	1.259	1.355	1.155
230	Wood Furniture And Fabricated Products Coatings	1.342	1.371	1.475	1.257
230	Plastic Parts	1.364	1.393	1.499	1.277
230	Semiconductor Coatings	1.906	1.947	2.094	1.785
230	Aircraft And Aerospace Coatings	1.628	1.822	2.470	1.887
240	Printing	1.222	1.249	1.343	1.145
250	Adhesives And Sealants	1.426	1.570	1.557	1.277
299	Miscellaneous Industrial Solvent Uses	1.426	1.570	1.557	1.277
310	Oil & Gas Production	1.081	1.201	1.145	1.203

TABLE III-2-17 (Continued)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2025

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
330	Petroleum Marketing - Natural Gas Transmission Losses	0.822	0.849	0.885	0.885
330	LPG Transfer And Dispensing - Fugitive Losses	1.097	1.107	1.232	1.179
330	Gasoline Dispensing & Transfers/Storage/Cargo Tanks	0.711	0.702	0.770	0.740
330	Bulk Gasoline Storage & Transfer (Unspecified)	0.711	0.702	0.770	0.740
410	Chemical	1.364	1.393	1.499	1.277
420	Wine Fermentation / Aging	1.240	1.232	1.248	1.255
420	Bakeries	1.209	1.235	1.328	1.132
430	Asphaltic Concrete Production	1.392	1.412	2.157	1.662
430	Surface Blasting	1.074	1.194	1.138	1.196
430	Open Storage Piles	1.000	1.000	1.000	1.000
430	Mineral Processes - Sand/Gravel/Cement Concrete	1.262	1.289	1.386	1.182
440	Secondary Metal Production	1.288	1.315	1.415	1.206
450	Wood Processing Losses	1.342	1.371	1.475	1.257
499	Industrial Lubricant	1.063	1.091	1.167	1.116
499	Industrial Process Losses (Unspecified Material)	1.000	1.000	1.000	1.000
510	Consumer Products - Aerosol	1.000	1.000	1.000	1.000
510	Consumer Products - Non Aerosol	1.063	1.091	1.167	1.116
520	Architectural Coatings	1.097	1.107	1.232	1.179
540	Asphalt Paving And Roofing Operations	1.392	1.412	2.157	1.662
610	Residential Wood Combustion	1.000	1.000	1.000	1.000
610	Residential Distillate Oil Combustion - Space Heating	1.097	1.107	1.232	1.179
610	Residential Natural Gas Combustion - Space Heating	0.764	0.782	0.797	0.797
610	Residential Natural Gas Combustion - Water Heating	0.764	0.782	0.797	0.797
610	Residential Natural Gas Combustion - Cooking/Other	0.764	0.782	0.797	0.797
610	Residential L.P.G. Combustion (Unspecified)	1.097	1.107	1.232	1.179
620	Tilling/Harvest Operations - Dust	1.000	1.000	0.730	1.000

TABLE III-2-17 (Concluded)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2025

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
620	Livestock Husbandry - Dairy Cattle	1.000	1.000	0.474	0.474
620	Livestock Husbandry - Layers	1.000	1.000	0.975	0.975
620	Livestock Husbandry - Others	1.000	1.000	1.000	1.000
630	Building And Road Construction - Dust	1.392	1.412	2.157	1.662
640	Paved Road Travel - Freeways - Dust	1.041	1.094	1.186	1.130
640	Paved Road Travel - (Unspecified) - Dust	1.000	1.000	1.000	1.000
640	Paved Road Travel - Major Streets - Dust	1.048	1.042	1.253	1.164
640	Paved Road Travel - Collector/Local Streets - Dust	1.040	1.108	1.165	1.135
645	Unpaved Road Travel - Farm Roads - Dust	1.000	1.000	0.730	1.000
645	Unpaved Road Travel - Others - Dust	1.000	1.000	1.000	1.000
650	Agricultural Lands - Windblown Dust	0.515	0.503	0.737	0.573
650	Unpaved Roads And Associated Areas - Windblown Dust	1.000	1.000	1.000	1.000
660	Structural/Automobile Fires	1.000	1.000	1.000	1.000
670	Agricultural Burning - Prunings/Field Crops	1.000	1.000	0.730	1.000
670	Agricultural Burning - Forest Management*	----	----	----	----
670	Agricultural Burning - Weed Abatement	1.000	1.000	1.000	1.000
670	Wildland Fire Use And Waste Burning (Unspecified)	1.000	1.000	1.145	1.146
690	Cooking	1.127	1.174	1.504	1.274
699	Domestic Activity - Ammonia	1.063	1.091	1.167	1.116

* 2012 emissions based on information provided by Forest Management Services and special handling for future year emissions.

TABLE III-2-18

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2031

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
020	Cogeneration	0.876	0.876	0.876	0.876
030	Petroleum Production Fuel Combustion - Gaseous Fuel	1.090	1.211	1.201	1.292
050	Industrial Stationary I.C. Engines - Natural Gas	0.889	0.914	1.029	1.029
050	Industrial Combustion - L.P.G./Distillate Oil/Other Fuel	1.541	1.699	1.709	1.359
060	Commercial Natural Gas Combustion - Space Heating	0.825	0.848	0.955	0.955
060	Commercial Natural Gas Combustion - Water Heating	0.825	0.848	0.955	0.955
060	Commercial Natural Gas Ice/Ext. Comb (Others)	0.825	0.848	0.955	0.955
060	Commercial L.P.G. Combustion	1.650	1.472	2.258	1.712
099	Resource Recovery	0.876	0.876	0.876	0.876
110	Sewage Treatment Plants-Potws - Ammonia	1.094	1.108	1.257	1.188
120	Landfills - Municipal Solid Waste Disposal (Biodegradation)	1.094	1.108	1.257	1.188
199	Composting - Ammonia	1.000	1.000	1.000	1.000
199	Composting Waste Disposal	1.542	1.531	1.828	1.714
210	Dry Cleaning	1.163	1.208	1.669	1.389
220	Degreasing	1.541	1.699	1.709	1.359
230	Auto Refinishing - Coatings	1.115	1.135	1.945	1.599
230	Marine Coatings	1.105	1.254	1.840	1.356
230	Paper Coatings	1.350	1.347	1.505	1.261
230	Can And Coil, Metal Parts And Products Coatings	1.273	1.270	1.419	1.189
230	Wood Furniture And Fabricated Products Coatings	1.413	1.409	1.575	1.319
230	Plastic Parts	1.438	1.434	1.603	1.343
230	Semiconductor Coatings	2.254	2.249	2.514	2.105
230	Aircraft And Aerospace Coatings	1.816	2.059	3.022	2.228
240	Printing	1.268	1.265	1.414	1.184
250	Adhesives And Sealants	1.541	1.699	1.709	1.359
299	Miscellaneous Industrial Solvent Uses	1.541	1.699	1.709	1.359
310	Oil & Gas Production	1.090	1.211	1.201	1.292

TABLE III-2-18 (Continued)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2031

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
330	Petroleum Marketing - Natural Gas Transmission Losses	0.807	0.832	0.870	0.870
330	LPG Transfer And Dispensing - Fugitive Losses	1.133	1.125	1.338	1.259
330	Gasoline Dispensing & Transfers/Storage/Cargo Tanks	0.564	0.569	0.658	0.611
330	Bulk Gasoline Storage & Transfer (Unspecified)	0.564	0.569	0.658	0.611
410	Chemical	1.438	1.434	1.603	1.343
420	Wine Fermentation / Aging	1.350	1.339	1.361	1.365
420	Bakeries	1.241	1.238	1.384	1.159
430	Asphaltic Concrete Production	1.452	1.484	2.471	1.842
430	Surface Blasting	1.084	1.204	1.195	1.285
430	Open Storage Piles	1.000	1.000	1.000	1.000
430	Mineral Processes - Sand/Gravel/Cement Concrete	1.311	1.308	1.462	1.225
440	Secondary Metal Production	1.372	1.369	1.530	1.282
450	Wood Processing Losses	1.413	1.409	1.575	1.319
499	Industrial Lubricant	1.094	1.108	1.257	1.188
499	Industrial Process Losses (Unspecified Material)	1.000	1.000	1.000	1.000
510	Consumer Products - Aerosol	1.000	1.000	1.000	1.000
510	Consumer Products - Non Aerosol	1.094	1.108	1.257	1.188
520	Architectural Coatings	1.133	1.125	1.338	1.259
540	Asphalt Paving And Roofing Operations	1.452	1.484	2.471	1.842
610	Residential Wood Combustion	1.000	1.000	1.000	1.000
610	Residential Distillate Oil Combustion - Space Heating	1.133	1.125	1.338	1.259
610	Residential Natural Gas Combustion - Space Heating	0.757	0.774	0.789	0.789
610	Residential Natural Gas Combustion - Water Heating	0.757	0.774	0.789	0.789
610	Residential Natural Gas Combustion - Cooking/Other	0.757	0.774	0.789	0.789
610	Residential L.P.G. Combustion (Unspecified)	1.133	1.125	1.338	1.259
620	Tilling/Harvest Operations - Dust	1.000	1.000	0.672	1.000

TABLE III-2-18 (Concluded)

Stationary Area Source Emission Growth Factors in the SCAB for the Year 2031

EIC3	CATEGORY DESCRIPTION	LOS ANGELES	ORANGE	RIVERSIDE	SAN BERNARDINO
620	Livestock Husbandry - Dairy Cattle	1.000	1.000	0.474	0.474
620	Livestock Husbandry - Layers	1.000	1.000	0.975	0.975
620	Livestock Husbandry - Others	1.000	1.000	1.000	1.000
630	Building And Road Construction - Dust	1.452	1.484	2.471	1.842
640	Paved Road Travel - Freeways - Dust	1.023	1.065	1.223	1.141
640	Paved Road Travel - (Unspecified) - Dust	1.000	1.000	1.000	1.000
640	Paved Road Travel - Major Streets - Dust	1.019	1.061	1.353	1.226
640	Paved Road Travel - Collector/Local Streets - Dust	0.990	1.120	1.287	1.177
645	Unpaved Road Travel - Farm Roads - Dust	1.000	1.000	0.672	1.000
645	Unpaved Road Travel - Others - Dust	1.000	1.000	1.000	1.000
650	Agricultural Lands - Windblown Dust	0.400	0.387	0.656	0.464
650	Unpaved Roads And Associated Areas - Windblown Dust	1.000	1.000	1.000	1.000
660	Structural/Automobile Fires	1.000	1.000	1.000	1.000
670	Agricultural Burning - Prunings/Field Crops	1.000	1.000	0.672	1.000
670	Agricultural Burning - Forest Management*	----	----	----	----
670	Agricultural Burning - Weed Abatement	1.000	1.000	1.000	1.000
670	Wildland Fire Use And Waste Burning (Unspecified)	1.000	1.000	1.263	1.264
690	Cooking	1.163	1.208	1.669	1.389
699	Domestic Activity - Ammonia	1.094	1.108	1.257	1.188

* 2012 emissions based on information provided by Forest Management Services and special handling for future year emissions.

Emission Trend Analysis

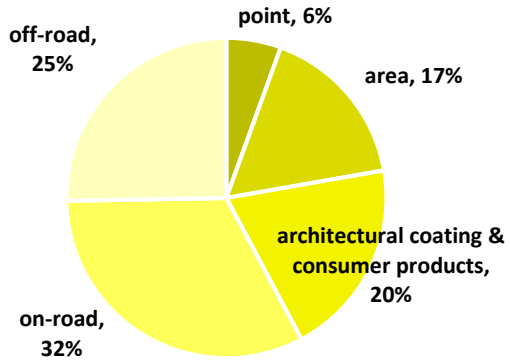
Figures II-2-1 through III-2-14 present the relative contributions by source categories (i.e., point, area, on-road, and off-road) and the primary responsible agency (the agency [U.S. EPA, CARB or SCAQMD] with authority to regulate emissions from the source category) for the years 2012, 2019, 2021, 2022, 2023, 2025, and 2031. These figures present total emission levels from the summer planning inventory for VOC and NOx, and emission levels from the annual average inventories for CO, SOx and PM2.5. Figures 2-15 through 2-18 illustrate the emission trends by pollutant (VOC, NOx, PM2.5, and SOx) for the same years: 2012, 2019, 2021, 2022, 2023, 2025, and 2031.

Significant reductions in NOx, VOC, and CO emissions are shown in the figures, particularly for the mobile source categories, with the on-road category showing the largest reductions for VOC and NOx emissions. Overall, VOC, NOx, and CO emissions are projected to be reduced by 28 percent, 59 percent, and 44 percent between 2012 and 2031. The magnitude of emission reductions through 2019 is greater than that magnitude of emission reductions from 2019 to 2031. This is consistent with the timing of the implementation of the mobile source regulations, which require fleets adopt cleaner equipment on an accelerated timeframe. By 2023, most fleets will be required to operate equipment meeting the most stringent emissions limits required by regulation. Turnover of the last remaining higher emitting equipment and vehicles beyond 2023 yields more modest reductions by 2031, which will not be sufficient to meet the ozone ambient air quality standard. Additional reductions will need to be identified and implemented to ensure attainment of the standard.

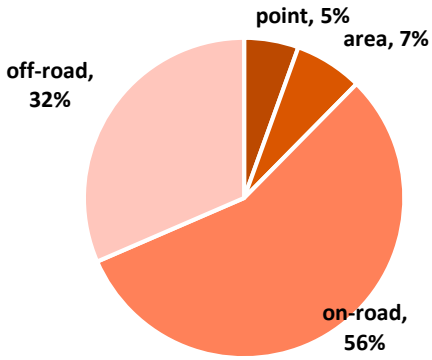
Little or no change in the emissions of PM2.5 and SOx are shown in the figures as expected since there are few new regulations being implemented beyond 2012 affecting the largest source categories of these pollutants. As shown in Figures 2-17 and 2-18, the emissions of SOx and PM2.5 are expected to increase from 2019 to 2031 as emissions growth overtakes the modest emission reductions benefits from fleet turnover to cleaner equipment.

Even-numbered figures from Figure III-2-2 to Figure III-2-14 show what fractions of the emissions are from sources under the primary regulatory purview of each of the three agencies – U.S. EPA, CARB, and SCAQMD – for all the years modeled. For ozone formation, the Basin's most difficult air quality attainment challenge, VOC and NOx emissions are the most important precursors; sources that are not under SCAQMD regulatory authority are the major contributors. In 2031, over 64 percent of the VOC emissions and 78 percent of the NOx emissions fall under U.S. EPA and CARB control. Conversely, the majority of the SOx and PM2.5 emissions are from sources under

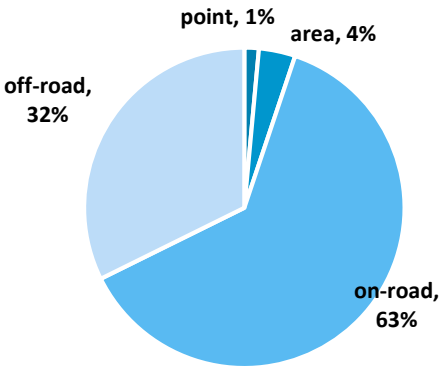
SCAQMD authority. This demonstrates that successfully meeting the districts ozone and PM2.5 attainment obligations will require collaboration and efforts from all three agencies.



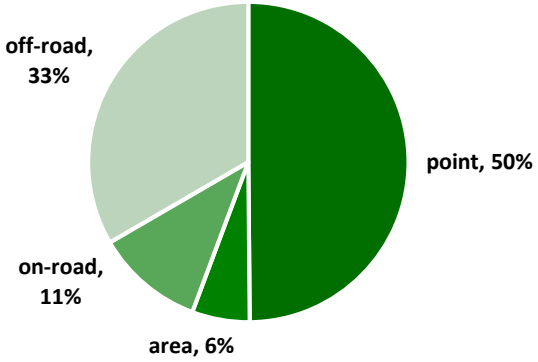
VOC Emissions: 500 tons/day



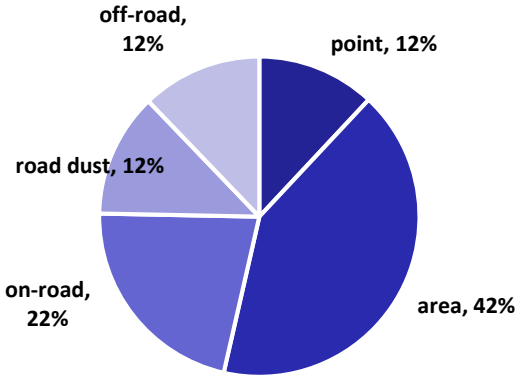
NOx Emissions: 522 tons/day



CO Emissions: 2123 tons/day



SOx Emissions: 18 tons/day

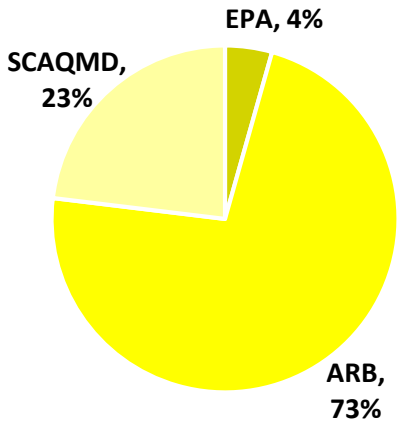


PM2.5 Emissions: 66 tons/day

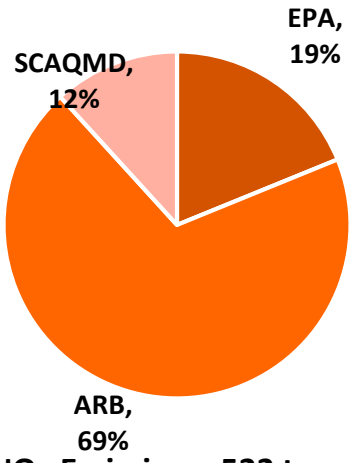
FIGURE III-2-1

Relative Contribution by Source Category to 2012 Emission Inventory

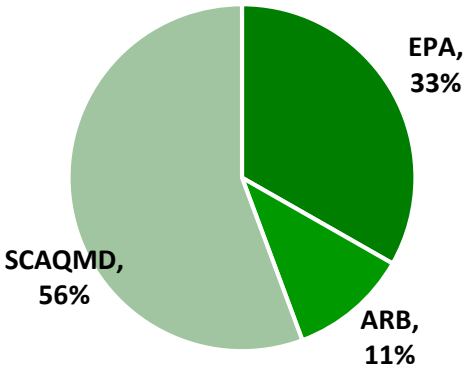
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)



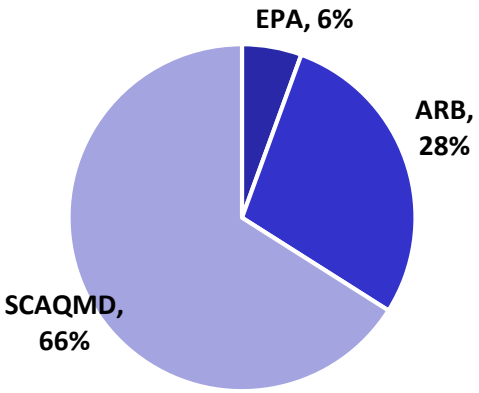
VOC Emissions: 500 tons/day



NOx Emissions: 522 tons/day



SOx Emissions: 18 tons/day

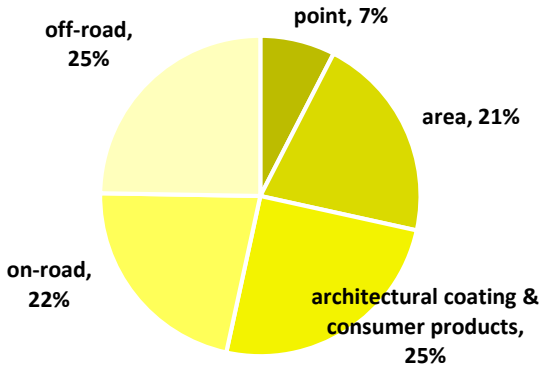


PM2.5 Emissions: 66 tons/day

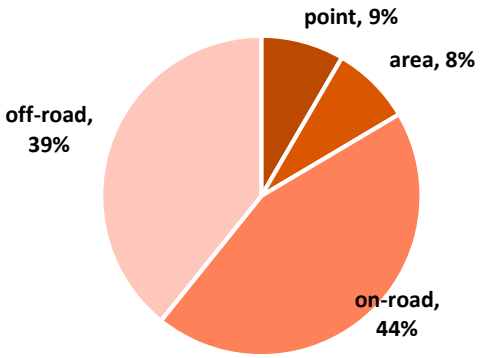
FIGURE III-2-2

2012 Emission Inventory Agency Responsibility

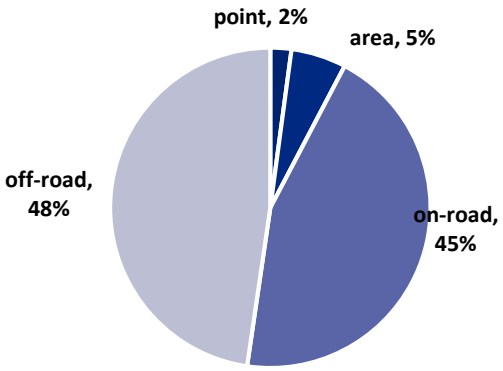
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



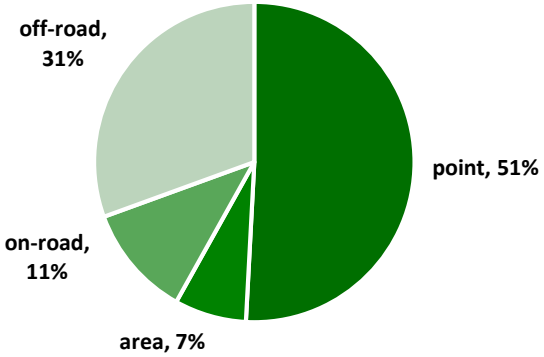
VOC Emissions: 398 tons/day



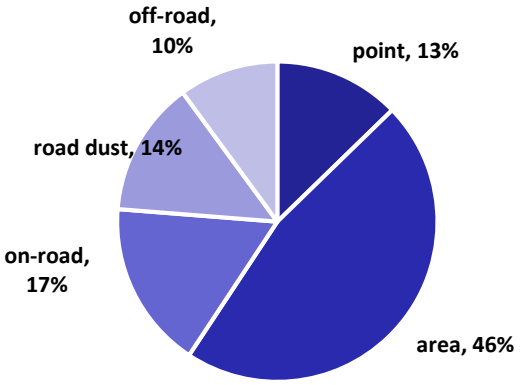
NOx Emissions: 348 tons/day



CO Emissions: 1447 tons/day



SOx Emissions: 17 tons/day

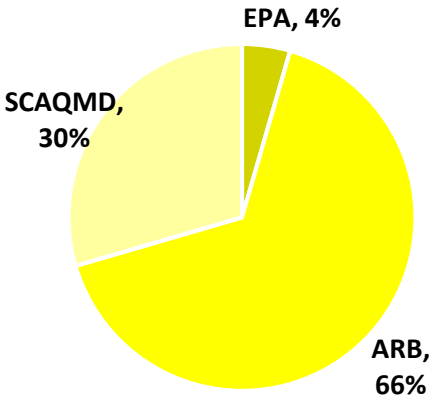


PM2.5 Emissions: 64 tons/day

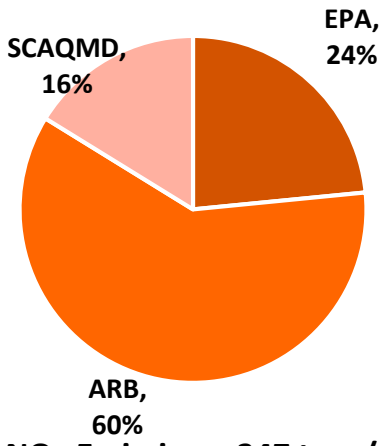
FIGURE III-2-3

Relative Contribution by Source Category to 2019 Emission Inventory

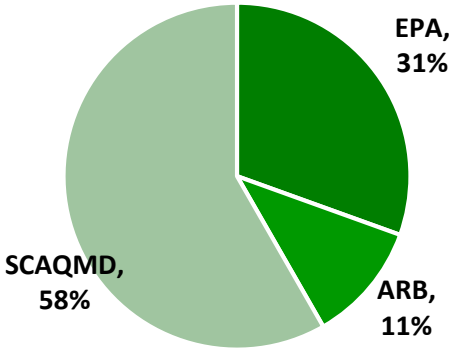
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)



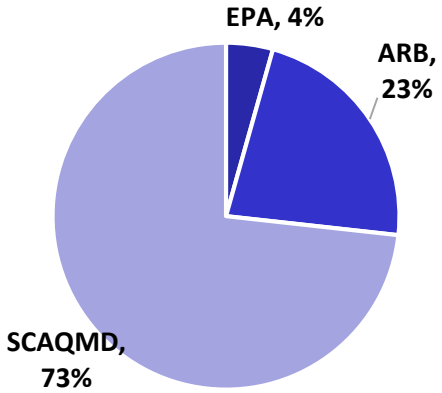
VOC Emissions: 398 tons/day



NOx Emissions: 347 tons/day



SOx Emissions: 17 tons/day

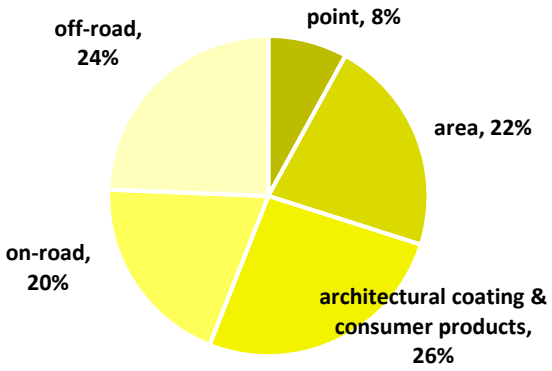


PM2.5 Emissions: 64 tons/day

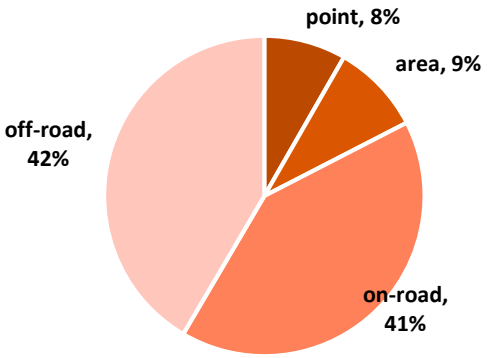
FIGURE III-2-4

2019 Emission Inventory Agency Responsibility

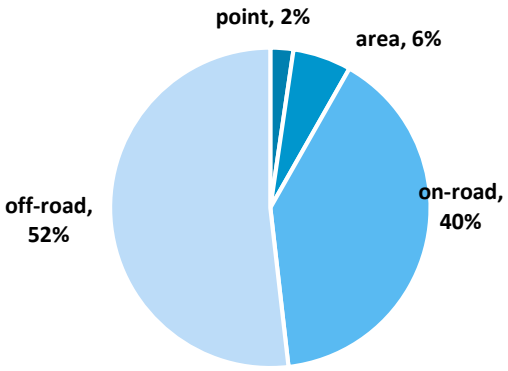
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



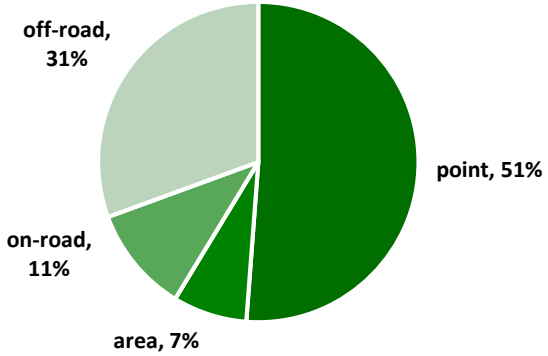
VOC Emissions: 386 tons/day



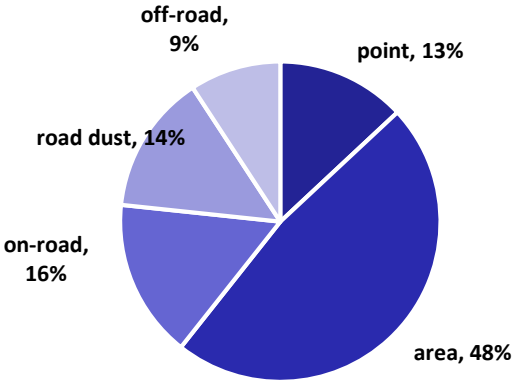
NOx Emissions: 305 tons/day



CO Emissions: 1357 tons/day



SOx Emissions: 17 tons/day

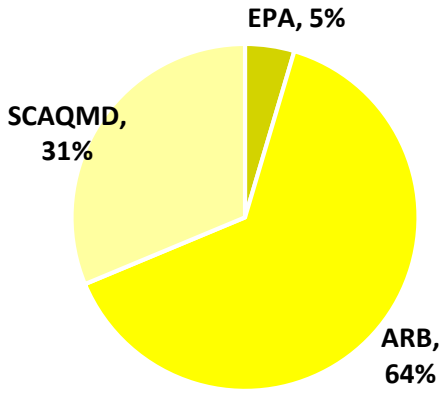


PM2.5 Emissions: 64 tons/day

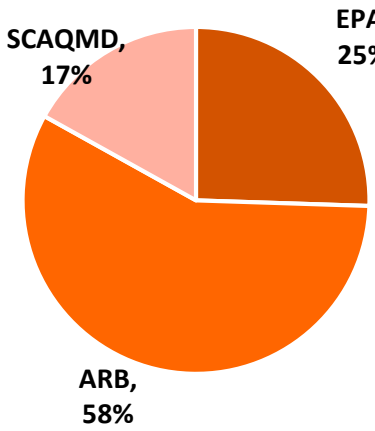
FIGURE III-2-5

Relative Contribution by Source Category to 2021 Emission Inventory

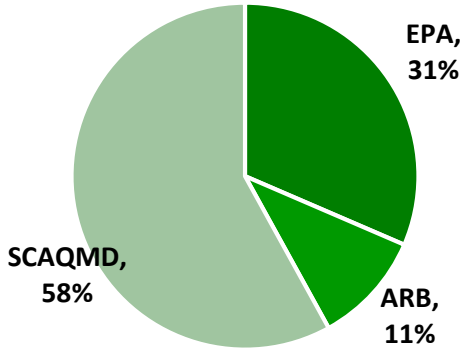
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)



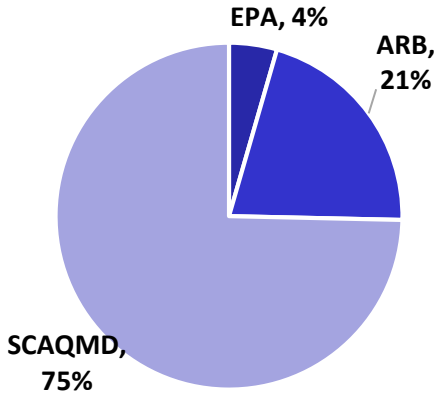
VOC Emissions: 386 tons/day



NOx Emissions: 305 tons/day



SOx Emissions: 17 tons/day

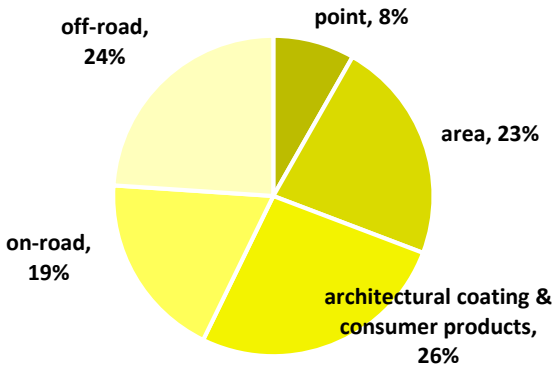


PM2.5 Emissions: 64 tons/day

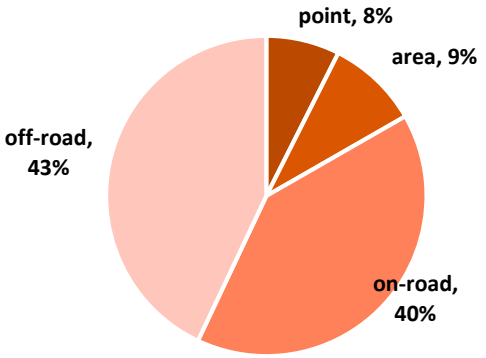
FIGURE III-2-6

2021 Emission Inventory Agency Responsibility

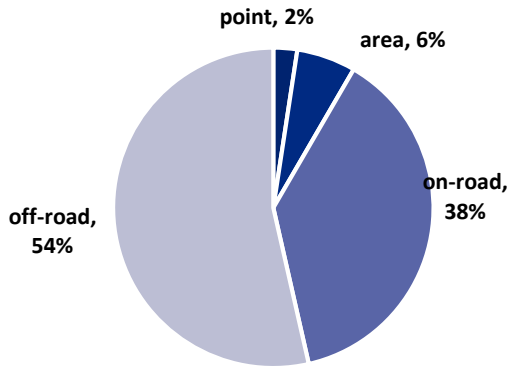
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



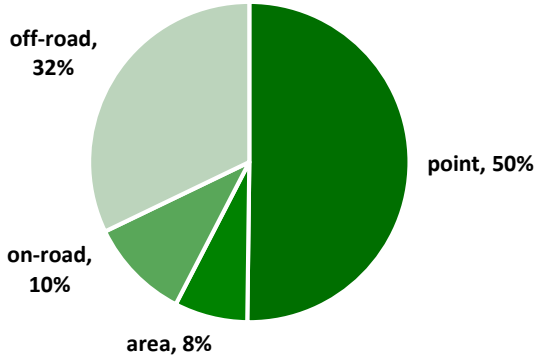
VOC Emissions: 383 tons/day



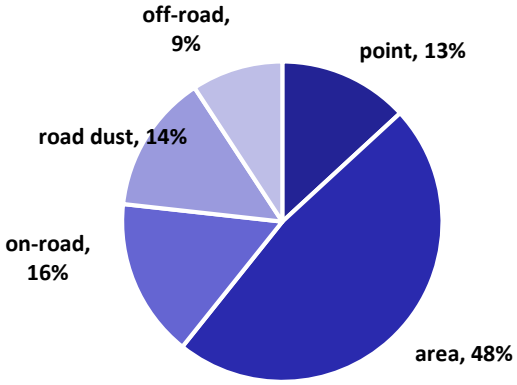
NOx Emissions: 287 tons/day



CO Emissions: 1325 tons/day



SOx Emissions: 17 tons/day

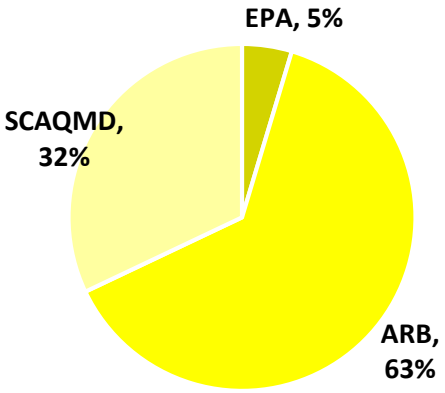


PM2.5 Emissions: 64 tons/day

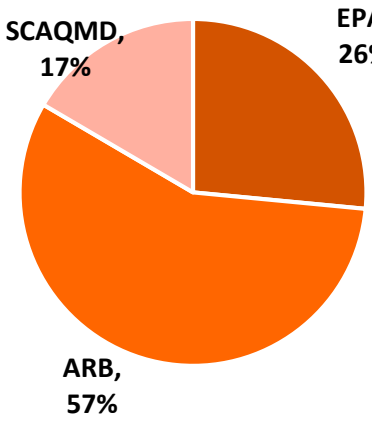
FIGURE III-2-7

Relative Contribution by Source Category to 2022 Emission Inventory

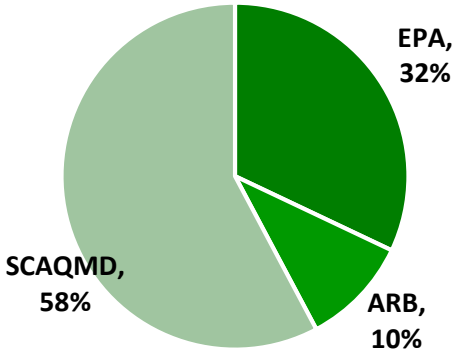
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)



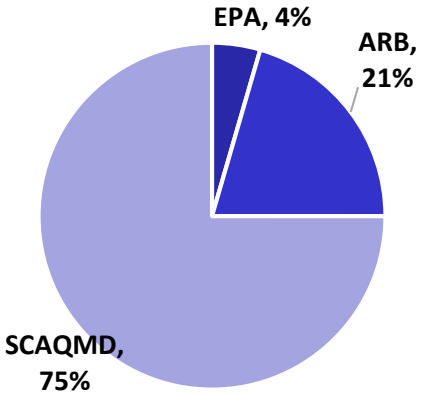
VOC Emissions: 383 tons/day



NOx Emissions: 287 tons/day



SOx Emissions: 17 tons/day

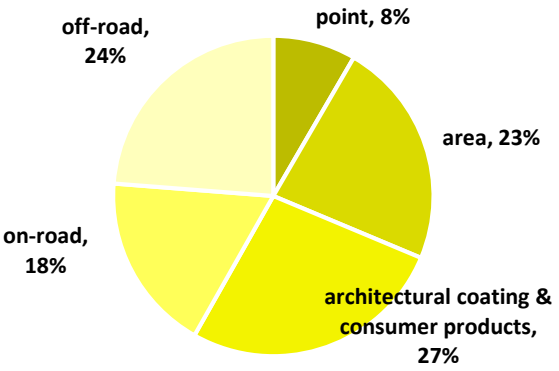


PM2.5 Emissions: 64 tons/day

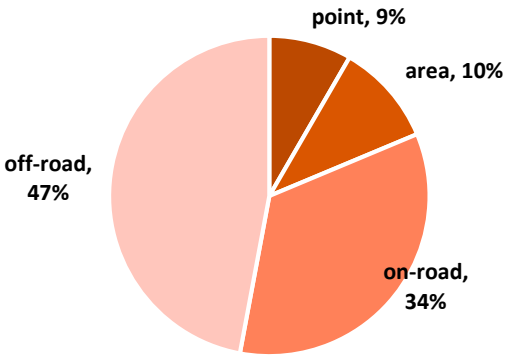
FIGURE III-2-8

2022 Emission Inventory Agency Responsibility

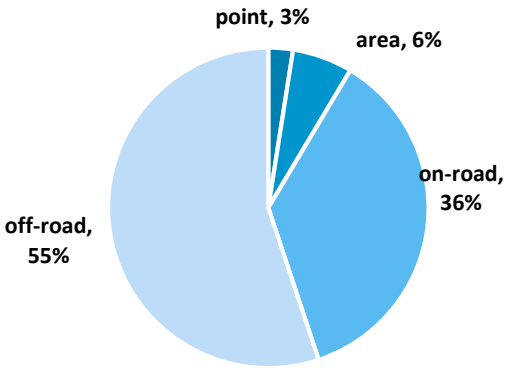
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



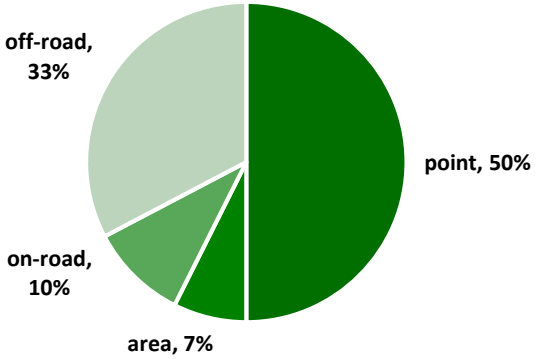
VOC Emissions: 379 tons/day



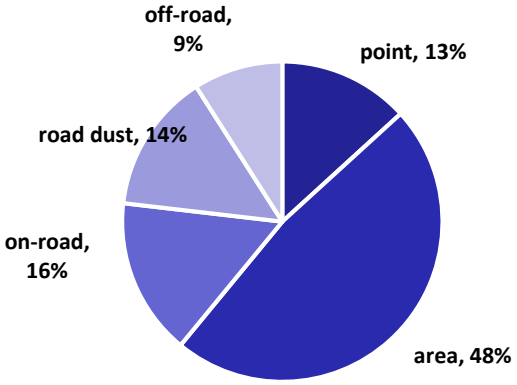
NOx Emissions: 255 tons/day



CO Emissions: 1298 tons/day



SOx Emissions: 17 tons/day



PM2.5 Emissions: 64 tons/day

FIGURE III-2-9

Relative Contribution by Source Category to 2023 Emission Inventory

(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)

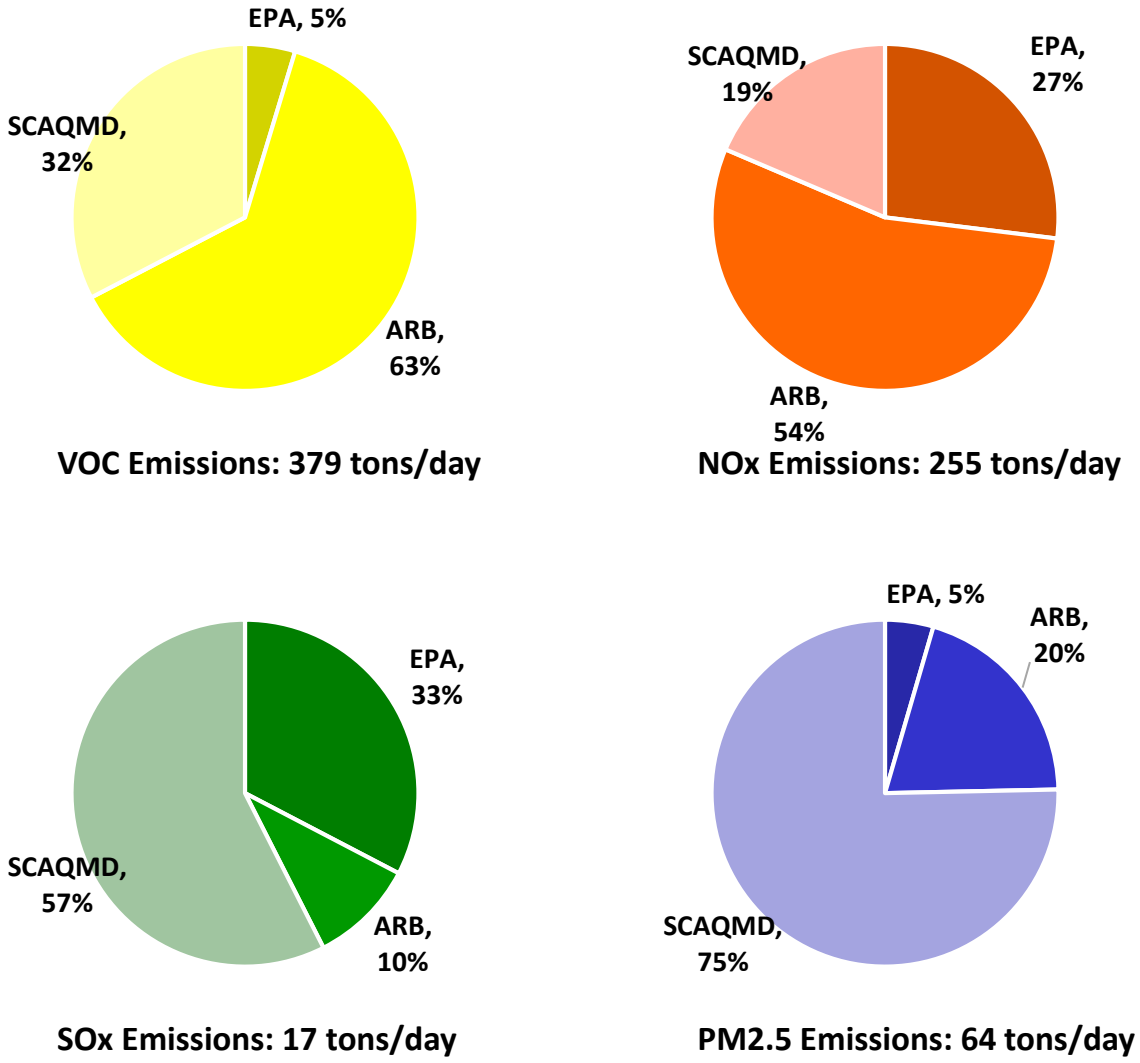
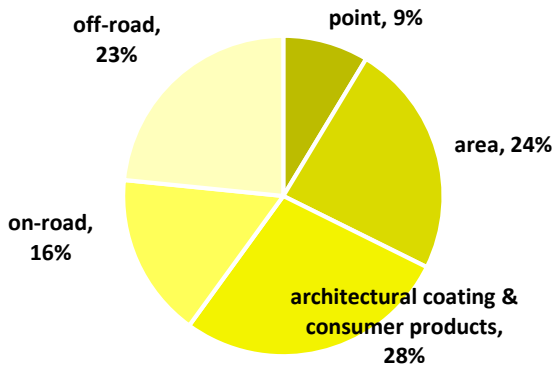


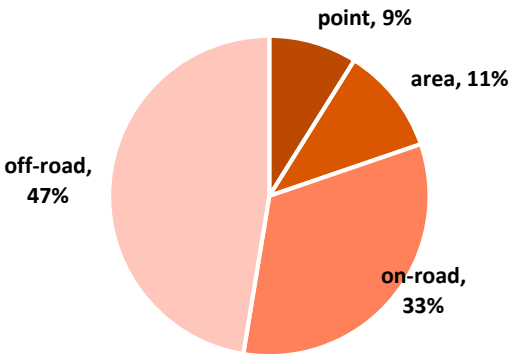
FIGURE III-2-10

2023 Emission Inventory Agency Responsibility

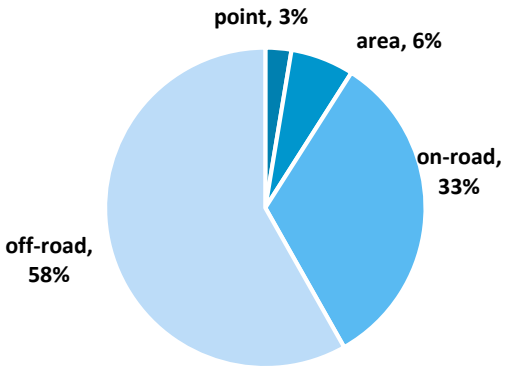
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



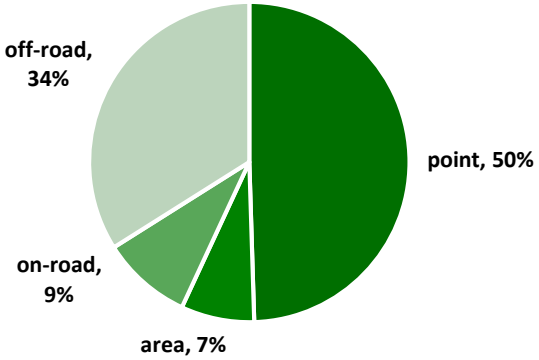
VOC Emissions: 372 tons/day



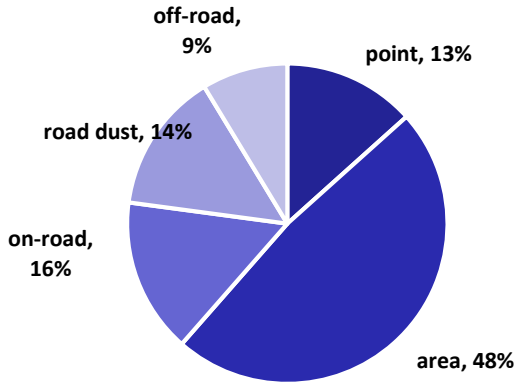
NOx Emissions: 239 tons/day



CO Emissions: 1247 tons/day



SOx Emissions: 17 tons/day

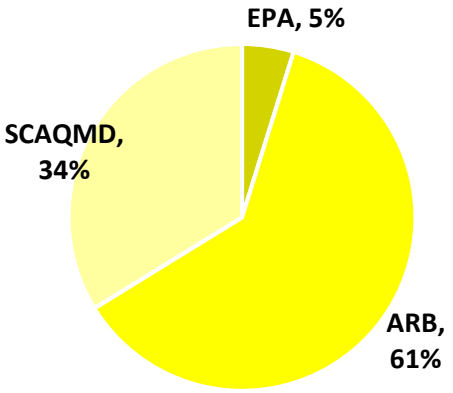


PM2.5 Emissions: 64 tons/day

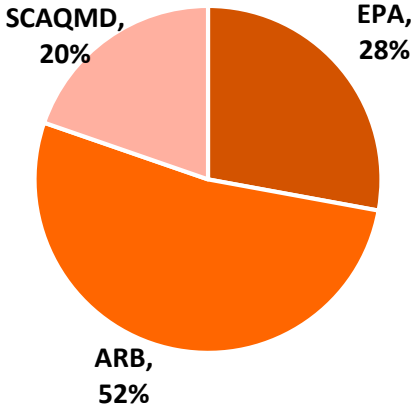
FIGURE III-2-11

Relative Contribution by Source Category to 2025 Emission Inventory

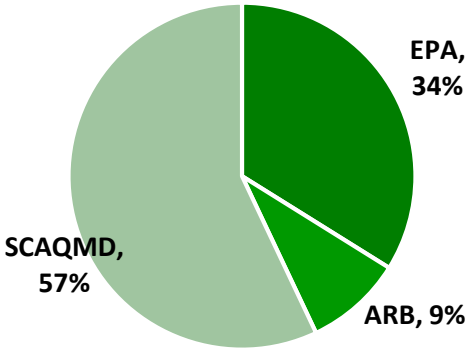
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)



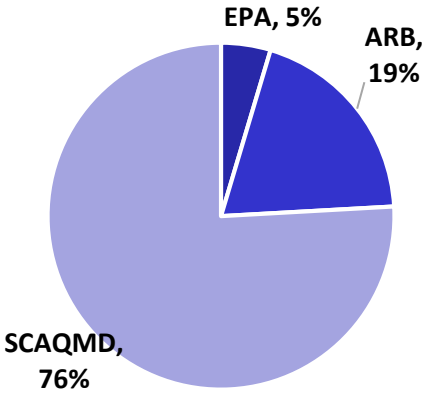
VOC Emissions: 372 tons/day



NOx Emissions: 239 tons/day



SOx Emissions: 17 tons/day

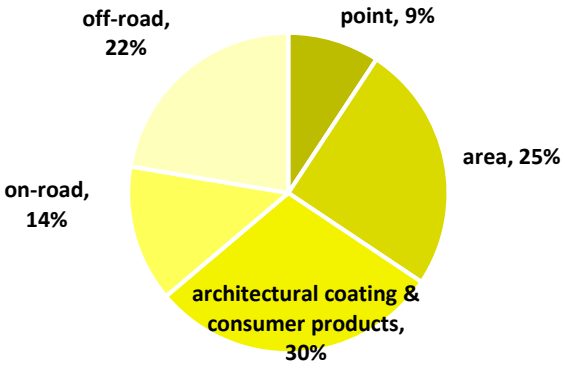


PM2.5 Emissions: 64 tons/day

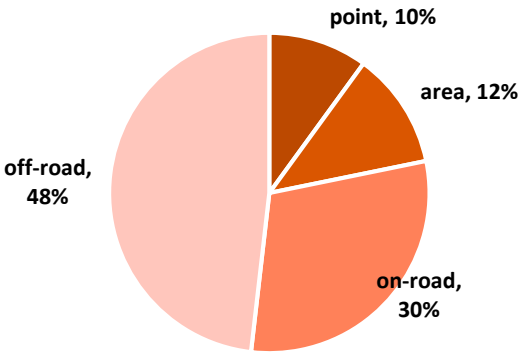
FIGURE III-2-12

2025 Emission Inventory Agency Responsibility

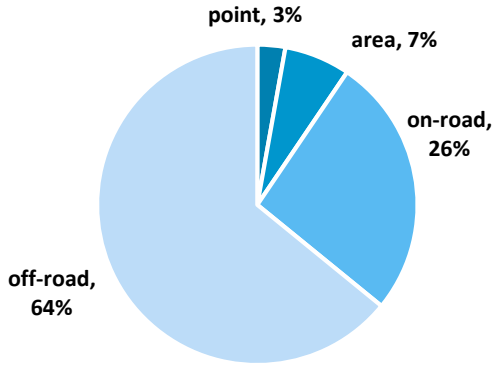
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



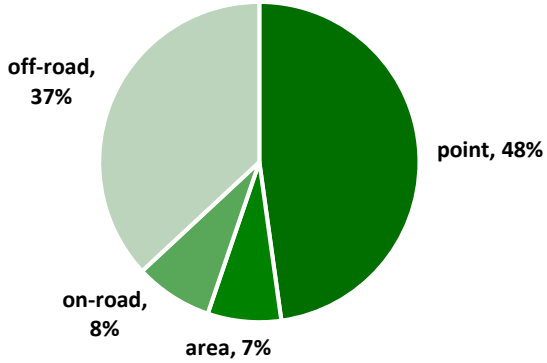
VOC Emissions: 362 tons/day



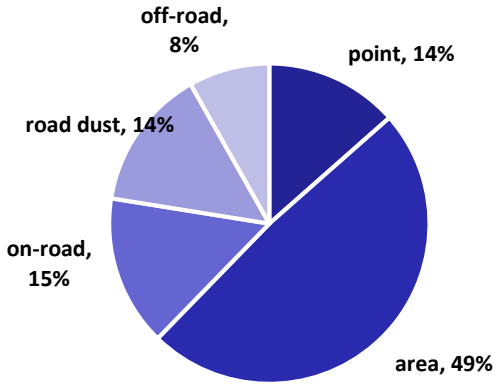
NOx Emissions: 214 tons/day



CO Emissions: 1188 tons/day



SOx Emissions: 18 tons/day



PM2.5 Emissions: 65 tons/day

FIGURE III-2-13

Relative Contribution by Source Category to 2031 Emission Inventory

(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)

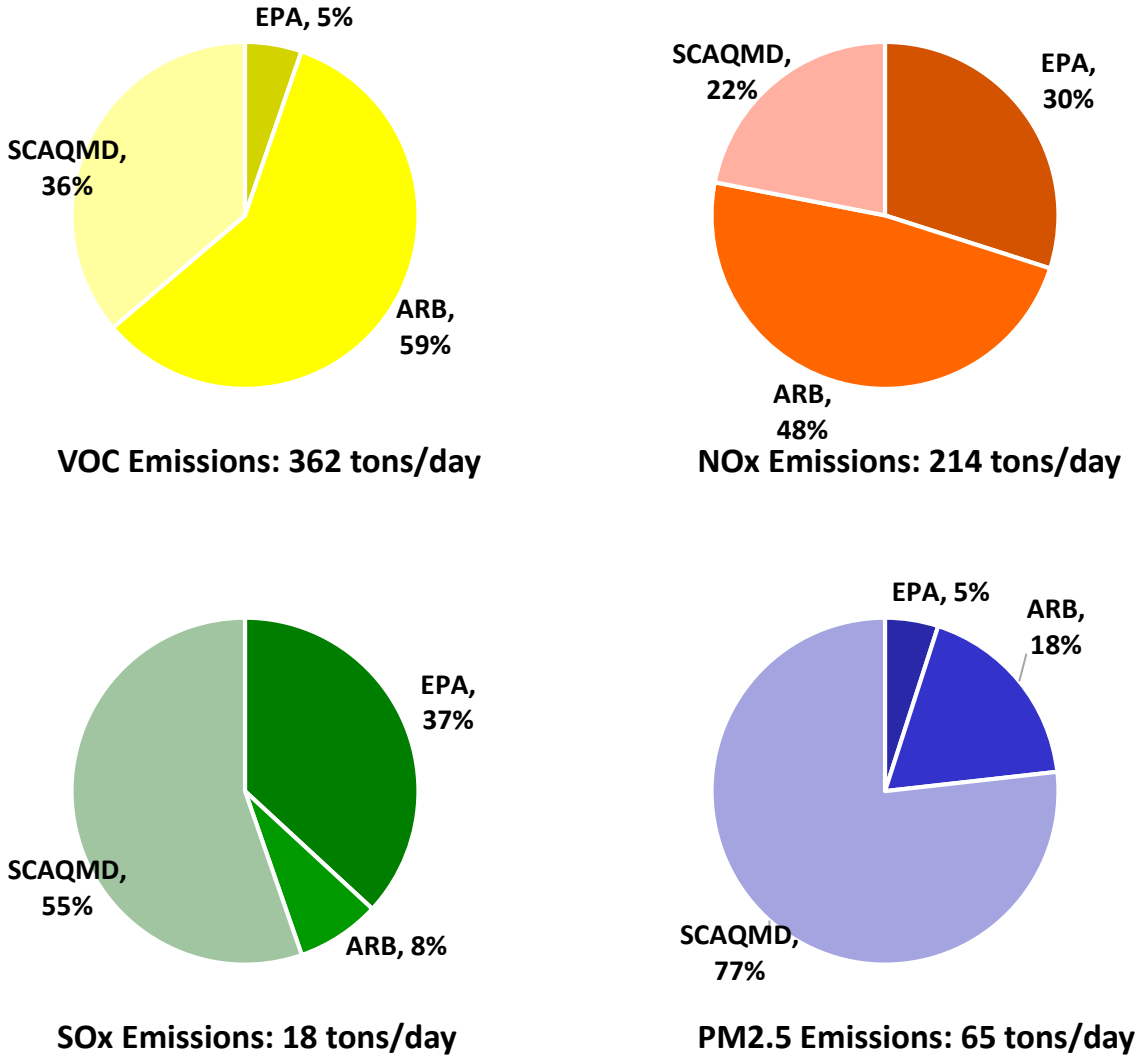


FIGURE III-2-14

2031 Emission Inventory Agency Responsibility

(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)

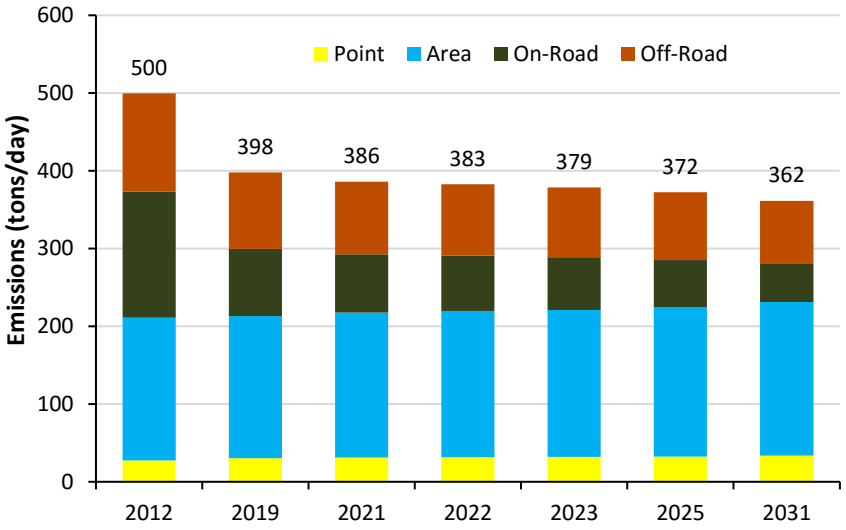


FIGURE III-2-15

VOC Emission Trend by Source Category – Summer Planning

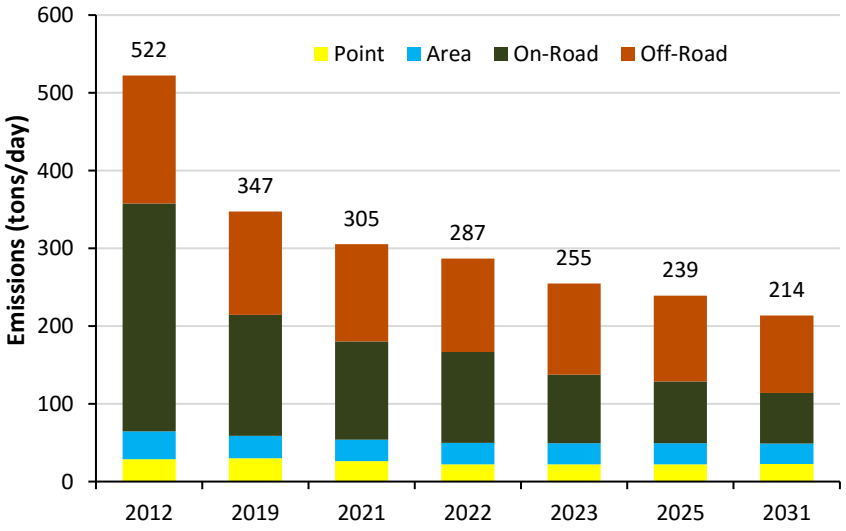


FIGURE III-2-16

NOx Emission Trend by Source Category – Summer Planning

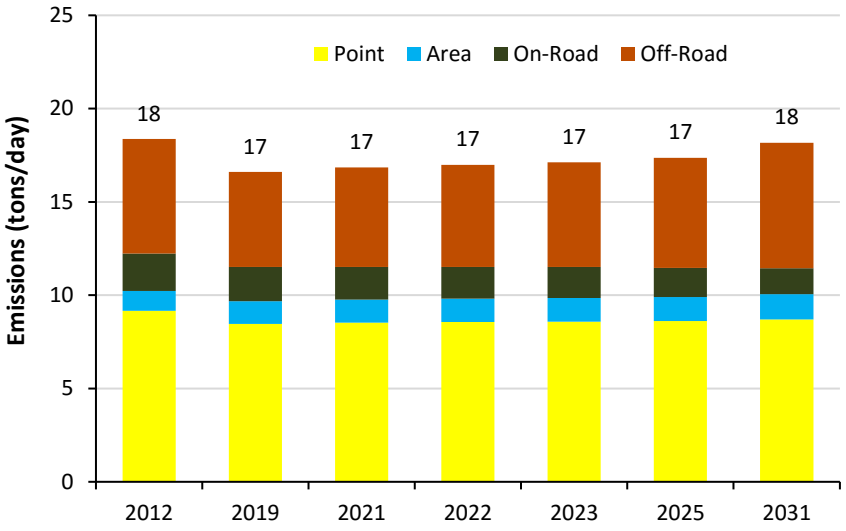


FIGURE III-2-17

SOx Emission Trend by Source Category – Average Annual Day

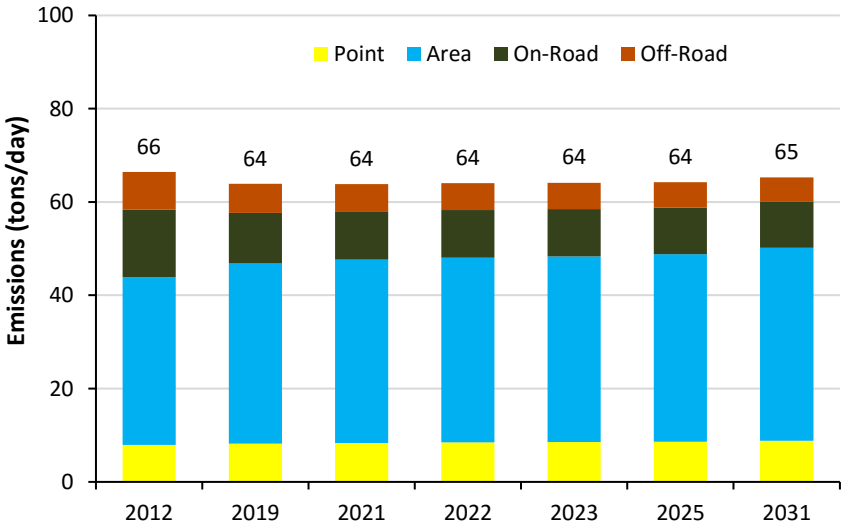


FIGURE III-2-18

PM2.5 Emission Trend by Source Category – Average Annual Day

VOC Emissions

As presented in Figure III-2-15, emissions from off-road and on-road mobile sources show a significant decrease over time, with the majority of the decrease occurring between 2012 and 2019. Between 2012 and 2019, VOC emissions from off-road mobile sources are expected to fall from 126 tons per day to 98 tons per day; from 2019 to 2031, off-road VOC emissions are projected to fall at a much more modest rate to 81 tons per day. On-road emissions show a similar trend, dropping from 162 tons per day to 86 tons per day from 2012 to 2019 and dropping to 49 tons per day by 2031. Off-road reductions will result primarily from turnover to cleaner off-road equipment such as pleasure craft and off-road recreational vehicles meeting more stringent emissions standards adopted by U.S. EPA and CARB over the past decade. On-road reductions will also be primarily achieved through turnover to cleaner vehicles required to meet more stringent emissions standards. Since 1990, California's Low Emission Vehicle programs has produced significant emission reductions from on-road passenger vehicles by relying on increasingly more stringent exhaust emission standards. Because of increased activity due to growth, both point and area sources are expected to increase from 28 and 183 tons per day in 2012 to 34 and 198 tons per day in 2031, respectively.

NOx Emissions

Figure III-2-16 illustrates the NOx emissions by major source category. NOx emissions are projected to decrease from both off-road mobile (165 tons per day to 100 tons per day) and on-road mobile (293 tons per day to 65 tons per day) sources from 2012 to 2031. As in the case of VOC emissions, most of the anticipated reductions will occur from 2012 to 2019 because most of the regulations affecting mobile sources will be fully implemented by 2023. The reductions for mobile sources largely reflect the vehicle fleet's turnover to newer vehicles meeting more stringent emissions standards. Point sources show a slight increase from 2012 to 2019 due to increase in activity from growth, and after 2019 they decrease slightly. Area sources decline slightly from the effect of regulation implementation.

SOx Emissions

Figure III-2-17 illustrates the SOx emissions trend. SOx emissions show a slight decrease from 2012 to 2019 and then increase through 2031 due to increased activity caused by growth of the major SOx emission source categories (off-road and point sources).

PM2.5 Emissions

Figure III-2-18 shows the PM2.5 emission trend. Point and area sources are projected to increase from 2012 to 2031 due to increased activity from growth. Mobile source tail pipe emissions decrease due to fleet turnover to cleaner vehicles. Overall PM2.5 emissions begin to increase slightly from 2021 to 2031 due to growth.

Impact of Growth – Pre-Base Year Offsets

EPA's implementing regulations at 40 CFR § 51.165(a)(3) provide details regarding the use of offsets. The shutdown or curtailment of existing emissions units that results in offsets must have occurred after the last day of the base year for SIP planning unless the projected emissions inventory used to develop the attainment demonstration explicitly includes the emissions from such previously shut down or curtailed emissions units. Specifically, 40 CFR § 51.165(a)(3)(C)(1) provides:

> Emissions reductions achieved by shutting down an existing emission unit or curtailing production or operating hours may be generally credited for offsets if they meet the requirements in paragraphs (a)(3)(ii)(C)(*1*)(*i*) through (*ii*) of this section.
>
> ***(i)*** Such reductions are surplus, permanent, quantifiable, and federally enforceable.
>
> ***(ii)*** The shutdown or curtailment occurred after the last day of the base year for the SIP planning process. For purposes of this paragraph, a reviewing authority may choose to consider a prior shutdown or curtailment to have occurred after the last day of the base year if the projected emissions inventory used to develop the attainment demonstration explicitly includes the emissions from such previously shutdown or curtailed emission units. However, in no event may credit be given for shutdowns that occurred before August 7, 1977.

The following analysis explains how shutdowns and curtailments that occurred prior to the last day of the base year are explicitly included in the projected emissions inventory as growth. The 2016 AQMP forecasts the 2031 emissions inventories ‘‘with growth’’ through a detailed consultation process with the Southern California Association of Governments (SCAG). SCAG provides extensive data on demographics and all emissions sources in the South Coast. It performs an exhaustive analysis of the growth in the inventory of sources that is likely to occur through the planning periods of 2031. The region is likely to see a 12 percent growth in population, 16 percent growth in housing units, 23 percent growth in employment, and 8 percent growth in vehicle miles traveled between 2012 and 2031. Emissions for the year 2031 are projected with growth and without growth, (in which case emissions were estimated by removing the growth factors from the 2031 baseline emissions). Per 40 CFR 51.165(a)(3)(i)(C)(1), the District’s growth projections (projected emissions inventories) include the emissions impact of pre-base year offsets. Table III-2-19 presents the comparison of the projected 2031 emissions inventory for all emissions sources for each criteria pollutant with and without growth. . The growth impacts to year 2031 for VOC, NOx, CO, SOx and PM2.5 are 48, 35, 262, 3, and 8 tons per day, respectively. The impact of growth increases emissions from all major categories of sources and pollutants, except for NOX emissions from area sources. The decrease in NOx from area sources is due to the projected decrease in residential fuel combustion due to efficiency gains over time, which offsets any other growth in population.

TABLE III-2-19

Growth Impact to 2031 Emissions* in Tons per Day

WITH GROWTH	VOC	NOx	CO	SOx	PM2.5
Point	30	21	34	9	9
Area	201	29	80	1	32
Road Dust	0	0	0	0	9
On-Road	47	69	309	1	10
Off-Road	66	94	766	7	5
Total	**344**	**213**	**1189**	**18**	**65**
NO GROWTH	**VOC**	**NOX**	**CO**	**SOX**	**PM2.5**
Point	24	20	31	8	8
Area	178	32	78	1	28
Road Dust	0	0	0	0	8
On-Road	46	51	299	1	9
Off-Road	49	76	519	5	4
Total	**297**	**179**	**927**	**15**	**57**
IMPACT OF GROWTH	**VOC**	**NOX**	**CO**	**SOX**	**PM2.5**
Point	6	1	3	1	1
Area	23	-3	2	0	4
Road Dust	0	0	0	0	1
On-Road	1	18	10	0	1
Off-Road	18	19	247	2	1
Total	**48**	**35**	**262**	**3**	**8**

*Annual Average Inventory

As shown in Table III-2-19, the District's growth projections include emissions from the pre-base year offsets, consistent with the requirements of 40 CFR 51.165(a)(3)(i)(C)(1). Each pollutant is discussed here. For PM2.5, the District added emissions into its future year 2031 inventory for growth of both point and area sources. For point sources of

PM2.5, the District added 1 tpd (from 8 tpd to 9 tpd); for area sources 4 tpd were added (from 28 tpd to 32 tpd) in its future year 2031 inventory. Therefore, the District added a total of 5 tpd of PM2.5 emissions to its future year 2031 inventory for all point and area sources. (On-road and off-road sources as well as road dust are not subject to offsets and are not relevant to this calculation.)

For VOC, the District added emissions into its future year 2031 inventory for growth of both point and area sources. For point sources of VOC, the District added 6 tpd (from 24 tpd to 30 tpd); for area sources 23 tpd were added (from 178 tpd to 201 tpd) in its future year 2031 inventory. See Table III-2-19. Therefore, the District added a total of 29 tpd of VOC emissions to its future year 2031 inventory for all point and area sources.

For NOx, the District added emissions into its future year 2031 inventory for growth of both point sources. The District added 1 tpd (from 20 tpd to 21 tpd) for point sources; for area sources 3 tpd were reduced (from 32 tpd to 29 tpd) in its future year 2031 inventory due to the projected decrease in residential fuel combustion caused by efficiency gains over time. See Table III-2-19. Therefore, the District reduced a net of 2 tpd of NOx emissions to its future year 2031 inventory for all point and area sources. However, for purposes of this analysis, it is the point source inventory of NOx that is relevant, since the reduction in emissions from area sources comes entirely from residential fuel combustion, a source category that is not subject to offsets. Therefore, the projected growth for sources that may use pre-base year NOx offsets is 1 tpd (i.e., the point source increase).

For CO, the District added emissions into its future year 2031 inventory for growth of both point and area sources. For point sources of CO, the District added 3 tpd (from 31 tpd to 34 tpd); for area sources 2 tpd were added (from 78 tpd to 80 tpd) in its future year 2031 inventory. See Table III-2-19. Therefore, the District added a total of 5 tpd of CO emissions to its future year 2031 inventory for all point and area sources. (CO is no longer subject to offsets because the Basin is in attainment for CO, but growth projections are still made.)

For SOx, the District added emissions into its future year 2031 inventory for growth of point sources. The District added 1 tpd (from 8 tpd to 9 tpd); for area sources there was no change in its future year 2031 inventory. See Table III-2-19. Therefore, the District added a total of 1 tpd of SOx emissions to its future year 2031 inventory for all point and area sources.

The detailed inventories in Attachment A and B of this Appendix separate the point and

area sources into specific source categories (e.g. refineries, electric utilities, coatings, cooking, paved road dust) so that the emissions with and without growth for each category is included in the base year and future year inventories for 2031.

However, not *all* point and area sources are subject to NSR permit requirements. The point and area sources subject to NSR are the only sources for which EPA's regulations require sufficient emissions to be added to the future year inventory to account for the use of pre-base year emissions reductions from shutdowns.

The growth of point and area sources subject to NSR offset requirements necessarily comes from pre-base year offsets that were shut down before the base year. This is because the emissions offsets derived from sources that shut down *after* the base year are accounted for in the baseline inventory (i.e., these emissions were "in the air" during the 2012 base year). When those sources shut down, the most their offsets can do is replace the emissions from that shut down source, thus keeping the base year inventory the same. Any growth above that base year, therefore, is necessarily supported from the offsets derived from pre-base year reductions. Thus, if a new source uses offsets based on emissions reductions that occur after the base year, the net result would be no increased emissions at all. Accordingly, as demonstrated in Table III-2-20, the growth projection for point and area sources subject to NSR consists of emissions from pre-base year shutdowns.

Table III-2-20 shows the difference between growth and no growth in the future year 2031 emission inventory for both point and area sources. The table also indicates what portion of the growth projections are attributed to the point and area sources subject to NSR offset requirements, which is a subset of the growth difference under "Impact of Growth." The table extracts from the 2016 AQMP's emission inventories those point and area sources subject to NSR based on whether the source category includes sources that are required to obtain permits, and excluding source categories, such as architectural coatings, that are not required to obtain permits and thus not subject to offsets.

TABLE III-2-20

Impact of Growth and Point and Area Sources Subject to NSR Offset Requirements (Tons per Day)

IMPACT OF GROWTH	VOC	NOX	CO	SOX	PM2.5
Point	6	1	3	1	1
Area	23	-3	2	0	4
SUBJECT TO NSR					
Point	6	1	3	1	1
Area	11	0	0	0	1
TOTAL Point and Area Sources	17	1	3	1	2

The data in Table III-2-20 shows that the District explicitly included 17 tpd of VOC in its future year 2031 inventory for point and area sources subject to the District's NSR program. The District explicitly included 1 tpd of NOx in its future year 2031 inventory for point sources subject to the District's NSR program. The District explicitly included 3 tpd of CO in its future year 2031 inventory for point sources subject to the District's NSR program. The District explicitly included 1 tpd of SOx in its future year 2031 inventory for point sources subject to the District's NSR program. And finally, the District explicitly included 2 tpd of PM2.5 in its future year 2031 inventory for point and area sources subject to the District's NSR program.

Table III-2-21a provides all the stationary source categories and the "no growth" VOC, CO, NOx, SOx and PM2.5 emissions from area and point sources that are subject to NSR. Table III-2-21b provides the total area and point source emissions from Table III-2-21a. Table III-2-22a provides all the stationary source categories and the "growth" VOC, CO, NOx, SOx and PM2.5 emissions from area and point sources that are subject to NSR. Table III-2-22b provides the total area and point source emissions from Table III-2-22a. Table III-2-23 shows the difference between "no growth" and "growth" VOC, CO, NOx, SOx and PM2.5 emissions from area and point sources that are subject to NSR taken from Tables III-2-21b and III-2-22b. In addition, these emissions match the totals provided in Table III-2-20 and Table III-2-24.

TABLE III-2-21a

2031 Stationary Source Categories for Area and Point Sources with No Growth (tons/day)

	AREA SOURCES					POINT SOURCES				
Source Category	**VOC**	**CO**	**NOx**	**SOx**	**PM2.5**	**VOC**	**CO**	**NOx**	**SOx**	**PM2.5**
Electric Utilities	0	0	0	0	0	1.06	8.28	0.15	0.32	1.2
Cogeneration	0.02	0.14	0.01	0	0.01	0.08	0.38	0	0.01	0.14
Oil and Gas Production (combustion)	0.03	0.16	0.61	0	0.01	0.07	0.59	0.06	0.01	0.09
Petroleum Refining (Combustion)	0	0	0	0	0	1.01	4.95	0	0	1.49
Manufacturing and Industrial	3.49	11.43	8.38	0.16	0.71	0.39	3.14	0.75	0.08	0.38
Food and Agricultural Processing	0	0.01	0.01	0	0	0.03	0.27	0.1	0	0.03
Service and Commercial	4.09	11.54	7.24	0.34	0.76	0.76	5.04	2.21	0.81	0.63
Other (Fuel Combustion)	0.09	0.61	1.95	0.01	0.04	0.13	1.76	0.25	0.12	0.13
Sewage Treatment	0	0	0	0	0	0.34	0.01	0.01	0.03	0
Landfills	8.3	0	0	0	0	0.08	0.47	0.59	0.32	0.13
Incineration	0	0	0	0	0	0.07	0.48	1.33	0.13	0.07
Soil Remediation	0	0	0	0	0	0	0	0	0	0
Other (Waste Disposal)	6.32	0	0	0	0	0	0	0	0	0
Laundering	0.13	0	0	0	0	0	0	0	0	0
Degreasing	8.67	0	0	0	0	1.44	0	0	0	0
Coatings and Related Processes	13.99	0	0	0	1.14	4.24	0.01	0.01	0	0.23
Printing	0.51	0	0	0	0	1	0	0	0	0
Adhesives and Sealants	3.37	0	0	0	0	0.06	0	0	0	0
Other (Cleaning and Surface Coatings)	0.48	0	0	0	0	0.21	0.05	0.02	0	0.04
Oil and Gas Production	1.31	0.02	0	0.06	0	1	0	0.01	0	0
Petroleum Refining	0	0	0	0	0	4.49	5.09	0.25	0.36	1.5
Petroleum Marketing	13.21	0	0	0	0	1.48	0.01	0.01	0	0
Other (Petroleum Production/Marketing)	0	0	0	0	0	0.08	0	0	0	0
Chemical	2.16	0	0	0	0.22	2.75	0.03	0.01	0.01	0.18
Food and Agriculture	0.39	0	0	0	0	0.76	0	0	0.01	0.1
Mineral Processes	0	0	0	0	1.98	0.65	0.15	0.01	0	0.73
Metal Processes	0	0	0	0	0.03	0.12	0.17	0.04	0.09	0.17
Wood and Paper	0	0	0	0	2.25	0.24	0	0	0	0.11
Glass and Related Products	0	0	0	0	0	0	0	0	0	0.1
Electronics	0	0	0	0	0	0.02	0	0	0	0.01
Other (Industrial Processes)	1.76	0	0	0	0	1.29	0.11	0.02	0	0.47
RECLAIM								14.51	6.08	
TOTAL (tons per day)	**68.32**	**23.91**	**18.2**	**0.57**	**7.15**	**23.85**	**30.99**	**20.34**	**8.38**	**7.93**

TABLE III-2-21b

2031 Stationary Source Categories for Total Area and Point Sources with No Growth (tons/day)

	TOTAL AREA AND POINT SOURCES				
Source Category	**VOC**	**CO**	**NOx**	**SOx**	**PM2.5**
Electric Utilities	1.06	8.28	0.15	0.32	1.2
Cogeneration	0.1	0.52	0.01	0.01	0.15
Oil and Gas Production (combustion)	0.1	0.75	0.67	0.01	0.1
Petroleum Refining (Combustion)	1.01	4.95	0	0	1.49
Manufacturing and Industrial	3.88	14.57	9.13	0.24	1.09
Food and Agricultural Processing	0.03	0.28	0.11	0	0.03
Service and Commercial	4.85	16.58	9.45	1.15	1.39
Other (Fuel Combustion)	0.22	2.37	2.2	0.13	0.17
Sewage Treatment	0.34	0.01	0.01	0.03	0
Landfills	8.38	0.47	0.59	0.32	0.13
Incineration	0.07	0.48	1.33	0.13	0.07
Soil Remediation	0	0	0	0	0
Other (Waste Disposal)	6.32	0	0	0	0
Laundering	0.13	0	0	0	0
Degreasing	10.11	0	0	0	0
Coatings and Related Processes	18.23	0.01	0.01	0	1.37
Printing	1.51	0	0	0	0
Adhesives and Sealants	3.43	0	0	0	0
Other (Cleaning and Surface Coatings)	0.69	0.05	0.02	0	0.04
Oil and Gas Production	2.31	0.02	0.01	0.06	0
Petroleum Refining	4.49	5.09	0.25	0.36	1.5
Petroleum Marketing	14.69	0.01	0.01	0	0
Other (Petroleum Production/Marketing)	0.08	0	0	0	0
Chemical	4.91	0.03	0.01	0.01	0.4
Food and Agriculture	1.15	0	0	0.01	0.1
Mineral Processes	0.65	0.15	0.01	0	2.71
Metal Processes	0.12	0.17	0.04	0.09	0.2
Wood and Paper	0.24	0	0	0	2.36
Glass and Related Products	0	0	0	0	0.1
Electronics	0.02	0	0	0	0.01
Other (Industrial Processes)	3.05	0.11	0.02	0	0.47
RECLAIM	0	0	14.51	6.08	0
TOTAL (tons per day)	**92.17**	**54.9**	**38.54**	**8.95**	**15.08**

TABLE III-2-22a

2031 Stationary Source Categories for Area and Point Sources with Growth (tons/day)

	AREA SOURCES					POINT SOURCES				
Source Category	**VOC**	**CO**	**NOx**	**SOx**	**PM2.5**	**VOC**	**CO**	**NOx**	**SOx**	**PM2.5**
Electric Utilities	0	0	0	0	0	0.94	7.26	0.13	0.28	1.07
Cogeneration	0.02	0.12	0.01	0	0.01	0.09	0.59	0	0.02	0.15
Oil and Gas Production (combustion)	0.04	0.17	0.66	0	0.01	0.08	0.64	0.07	0.01	0.09
Petroleum Refining (Combustion)	0	0	0	0	0	1.01	4.95	0	0	1.49
Manufacturing and Industrial	3.85	12.98	8.73	0.22	0.68	0.5	4.05	0.95	0.11	0.5
Food and Agricultural Processing	0	0.01	0.01	0	0	0.04	0.33	0.14	0	0.04
Service and Commercial	3.61	10.15	6.56	0.53	0.67	0.97	6.55	2.47	0.96	0.81
Other (Fuel Combustion)	0.09	0.6	1.95	0.01	0.04	0.16	2.17	0.3	0.16	0.14
Sewage Treatment	0	0	0	0	0	0.47	0.01	0.01	0.04	0.01
Landfills	9.45	0	0	0	0	0.1	0.58	0.73	0.39	0.16
Incineration	0	0	0	0	0	0.09	0.66	1.76	0.16	0.09
Soil Remediation	0	0	0	0	0	0	0	0	0	0
Other (Waste Disposal)	6.32	0	0	0	0	0	0	0	0	0
Laundering	0.16	0	0	0	0	0.01	0	0	0	0
Degreasing	13.61	0	0	0	0	2.19	0	0	0	0
Coatings and Related Processes	19.47	0	0	0	1.47	5.84	0.01	0.02	0	0.32
Printing	0.65	0	0	0	0	1.38	0	0	0	0
Adhesives and Sealants	5.29	0	0	0	0	0.1	0	0	0	0
Other (Cleaning and Surface Coatings)	0.75	0	0	0	0	0.29	0.07	0.03	0	0.05
Oil and Gas Production	1.42	0.02	0	0.06	0	1.1	0	0.03	0	0
Petroleum Refining	0	0	0	0	0	4.58	5.27	0.25	0.36	1.54
Petroleum Marketing	9.24	0	0	0	0	1.77	0.01	0.01	0	0
Other (Petroleum Production/Marketing)	0	0	0	0	0	0.12	0	0	0	0
Chemical	3.1	0	0	0	0.32	3.94	0.04	0.01	0.01	0.28
Food and Agriculture	0.49	0	0	0	0	0.93	0	0	0.01	0.13
Mineral Processes	0	0	0	0	2.03	0.88	0.18	0.01	0	0.85
Metal Processes	0	0	0	0	0.04	0.16	0.21	0.05	0.11	0.23
Wood and Paper	0	0	0	0	3.17	0.31	0	0	0	0.14
Glass and Related Products	0	0	0	0	0	0	0	0	0	0.13
Electronics	0	0	0	0	0	0.04	0	0	0	0.02
Other (Industrial Processes)	1.97	0	0	0	0	1.61	0.15	0.03	0	0.57
RECLAIM								14.51	6.08	
TOTAL (tons per day)	**79.53**	**24.05**	**17.92**	**0.82**	**8.44**	**29.7**	**33.73**	**21.51**	**8.7**	**8.81**

TABLE III-2-22b

2031 Stationary Source Categories for Total Area and Point Sources with Growth (tons/day)

	TOTAL AREA AND POINT SOURCES				
Source Category	**VOC**	**CO**	**NOx**	**SOx**	**PM2.5**
Electric Utilities	0.94	7.26	0.13	0.28	1.07
Cogeneration	0.11	0.71	0.01	0.02	0.16
Oil and Gas Production (combustion)	0.12	0.81	0.73	0.01	0.1
Petroleum Refining (Combustion)	1.01	4.95	0	0	1.49
Manufacturing and Industrial	4.35	17.03	9.68	0.33	1.18
Food and Agricultural Processing	0.04	0.34	0.15	0	0.04
Service and Commercial	4.58	16.7	9.03	1.49	1.48
Other (Fuel Combustion)	0.25	2.77	2.25	0.17	0.18
Sewage Treatment	0.47	0.01	0.01	0.04	0.01
Landfills	9.55	0.58	0.73	0.39	0.16
Incineration	0.09	0.66	1.76	0.16	0.09
Soil Remediation	0	0	0	0	0
Other (Waste Disposal)	6.32	0	0	0	0
Laundering	0.17	0	0	0	0
Degreasing	15.8	0	0	0	0
Coatings and Related Processes	25.31	0.01	0.02	0	1.79
Printing	2.03	0	0	0	0
Adhesives and Sealants	5.39	0	0	0	0
Other (Cleaning and Surface Coatings)	1.04	0.07	0.03	0	0.05
Oil and Gas Production	2.52	0.02	0.03	0.06	0
Petroleum Refining	4.58	5.27	0.25	0.36	1.54
Petroleum Marketing	11.01	0.01	0.01	0	0
Other (Petroleum Production/Marketing)	0.12	0	0	0	0
Chemical	7.04	0.04	0.01	0.01	0.6
Food and Agriculture	1.42	0	0	0.01	0.13
Mineral Processes	0.88	0.18	0.01	0	2.88
Metal Processes	0.16	0.21	0.05	0.11	0.27
Wood and Paper	0.31	0	0	0	3.31
Glass and Related Products	0	0	0	0	0.13
Electronics	0.04	0	0	0	0.02
Other (Industrial Processes)	3.58	0.15	0.03	0	0.57
RECLAIM	0	0	14.51	6.08	0
TOTAL (tons per day)	**109.23**	**57.78**	**39.43**	**9.52**	**17.25**

TABLE III-2-23

Difference in Growth for Total Area and Point Sources Subject to NSR (tons/day)

	TOTAL AREA AND POINT SOURCES				
	VOC	**CO**	**NOx**	**SOx**	**PM2.5**
TOTAL with Growth (tpd)	109.23	57.78	39.43	9.52	17.25
TOTAL with No Growth (tpd)	92.17	54.9	38.54	8.95	15.08
Difference in Growth (tpd)	**17**	**3**	**1**	**1**	**2**

A simple check was also conducted to ensure the growth estimate is sufficient to account for the projected demand for offsets. Offsets are obtained either from the open market or the SCAQMD internal accounts that provide offsets to small emission sources. The annual average emission reduction credits (ERCs) actually used by sources and obtained from the private market in the past 14 years, rather than the District's internal bank, was used as an estimate of what could be used annually from the private market in the future. The issuance of offsets from the SCAQMD internal banks however are capped based on a maximum cumulative net limit pursuant to Rule 1315 (NSR Tracking System). Since the annual incremental has historically been close to fully used, it was assumed that the maximum annual usage is the incremental change each year capped in Rule 1315[1]. To be conservative, it was assumed that all offsets used in the future, whether from the internal bank or private market ERCs, could have originated before the base year 2012.

Since this exercise is based on the annual increases in inventory due to the potential introduction of pre-base year credits, the annual average was used. Table III-2-24 provides the estimated future demand for each criteria pollutant based on issuance of offsets from the SCAQMD internal banks and from the projected annual usage from non-SCAQMD providers. Table III-2-24 demonstrates the point source growth estimate is sufficient to account for the projected demand.

[1] Incremental annual was determined by Rule 1315 Cumulative Net divided by the number of program years. For example, by 2030, the VOC cumulative net = 25.24 tpd/20 years = 1.26 tpd VOC annual average. For NOx, 1.96 tpd/20 years = 0.10 tpd NOx annual average. For SOx, 0.61 tpd/20 years = 0.03 tpd SOx annual average. For PM, 3.83 tpd/20 years = 0.19 tpd PM annual average.

TABLE III-2-24

Projected Annual Offset Demand (tons per day)

	VOC	NOx	SOx	PM2.5
SCAQMD Internal Banks	1.26	0.10	0.03	0.19
Open Market ERC Use	0.359	0.026	0.007	0.021
TOTAL Projected Annual Demand	1.62	0.12	0.04	0.21
TOTAL AREA AND POINT SOURCES SUBJECT TO NSR	17	1	1	2

General Conformity Budget

U.S. EPA's General Conformity rule (40 CFR part 93, subpart B, and 40 CFR Part 51, Subpart W, as adopted by reference in SCAQMD Rule 1901, September 1994) establishes an applicability test for determining which Federal actions are subject to the conformity requirement for the nonattainment or maintenance areas. If a proposed action results in emissions increases which are less than the de minimis thresholds for the relevant pollutants or precursors, then no conformity determination needs to be made. If the emissions from a proposed action exceed the de minimis threshold for any given pollutant (or precursor) for which the area is designated as maintenance or in nonattainment, then the Federal agency must make a positive conformity determination for that pollutant(s) on the basis of one of the criteria listed in 40 CFR 93.158 before the project can proceed. The conformity determination must demonstrate that the emissions from the proposed project are accounted for in the most recently approved SIP. The Basin is designated as an extreme nonattainment area for ozone and as a nonattainment area for PM2.5. The general conformity de minimis threshold is 10 tons per year of VOC and 10 tons per year of NOx for extreme ozone nonattainment areas; and 100 tons per year of PM2.5 for PM2.5 nonattainment areas.

Based on historical records none of the projects requiring general conformity determinations received by the District exceeded the PM2.5 threshold. Rather, NOx is the main pollutant of concern, with emissions occurring primarily during the two to three year construction phase of projects. To streamline the review process and to facilitate the conformity determination, two separate VOC and NOx general conformity budgets were established in the 2012 AQMP. They were 1 TPD of NOx and 0.2 TPD of VOC set aside for every year, starting in 2013 until 2030.

The District set up a tracking system for projects requiring conformity determinations on a first come first serve basis. The projects that were accommodated under the set-aside general conformity account were Los Angeles International Airport (LAX) Landside Access Modernization Projects (LAMP) and general aviation improvement program by John Wayne Airport (JAW). The LAX LAMP will have construction phase of the project from 2017 to 2023. The NOx and VOC emissions from the project will be above the de minimis threshold thus subject to the general conformity determination. The amount of NOx and VOC emissions proposed by the LAX are listed in Tables III-2-25 and III-2-26.

TABLE III-2-25

Summary of LAX LAMP Construction NOx Emissions

	NOx Emissions, tons per year						
Emission Source	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Off-Road, On-Site Equipment [a.]	56	94	105	124	82	37	30
On-Road, On-Site Trucks [b.]	8	18	21	16	11	7	6
On-Road, Off-Site Haul & Deliveries [b.]	16	45	59	51	22	15	13
On-Road, Off-Site Worker Trips	2	7	8	6	7	4	4
Total	**82**	**164**	**194**	**198**	**122**	**63**	**53**

a. Assumes the fleet average emissions from off-road construction equipment meets the Tier 3 NOx Standards.
b. Assumes the fleet average emissions from on-road trucks meets the phased-in 2007 model year NOx standard (~1.2 g/mile).

TABLE III-2-26

Summary of LAX LAMP Construction VOC Emissions

	VOC Emissions, tons per year						
Emission Source	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Off-Road, On-Site Equipment [a.]	3	5	6	7	4	2	2
On-Road, On-Site Trucks [b.]	2	8	13	18	16	10	9
On-Road, Off-Site Haul & Deliveries [b.]	1	2	3	3	1	1	1
On-Road, Off-Site Worker Trips	4	17	19	15	16	11	9
Total	**10**	**32**	**41**	**42**	**37**	**23**	**21**

a. Assumes the fleet average emissions from off-road construction equipment meets the Tier 3 VOC Standards.
b. Assumes the fleet average emissions from on-road trucks meets the phased-in 2007 model year VOC standard (0.14 g/mile).

The County of Orange, John Wayne Airport (JWA) submitted a request to accommodate a project, 'General Aviation Improvement Program', which will begin in 2018 and end in 2020. All but the NOx emissions were below the general conformity de minimis levels. The summary of emissions associated with the project is summarized in Table III-2-27.

TABLE III-2-27

Estimated Emissions (TPD) from the JWA General Aviation Improvement Program

Calendar Year	Category	VOC	CO	NO_X	PM_{10}	$PM_{2.5}$
2018	Off-Road	1.58	10.68	16.99	0.72	0.66
	On-Road Vehicles	0.14	1.30	2.97	0.13	0.07
	Fugitives[1]	0.00	--	--	22.94	9.27
	Total	***1.73***	***11.98***	***19.96***	***23.79***	***10.01***
2019	Off-Road	2.57	19.00	26.25	1.21	1.12
	On-Road Vehicles	0.19	3.93	2.81	0.23	0.12
	Fugitives[1]	0.82	--	--	22.23	9.30
	Total	***3.58***	***22.93***	***29.05***	***23.67***	***10.54***
2020	Off-Road	0.98	7.47	9.74	0.39	0.36
	On-Road Vehicles	0.06	1.14	0.90	0.08	0.04
	Fugitives[1]	0.39	--	--	7.31	2.63
	Total	***1.43***	***8.62***	***10.64***	***7.78***	***3.03***
De Minimis Threshold[2]		**10**	**100**	**10**	**70**	**100**
Above threshold?		**NO**	**NO**	**YES**	**NO**	**NO**

Notes:

[1] Fugitive PM_{10} and $PM_{2.5}$ emissions are based on controlled emission factors which assume watering the construction site twice daily.

[2] Conformity threshold values are defined by the USEPA. Available at: http://www.epa.gov/oar/genconform/deminimis.html. Accessed: June 2015. Listed thresholds based on Current Attainment Status for All Criteria Pollutants for Orange County, California: http://www.epa.gov/oaqps001/greenbk/ancl.html. Accessed: June 2015.

The emissions from these two projects have been accounted for in the general conformity set-aside account.

The set-aside account was re-evaluated in the 2016 AQMP based on expected growth and the number of projects that are planned to take place in near future years. They are 2.0 TPD of NOx and 0.5 TPD of VOC each year starting from 2017 to 2030 and changed to 0.5 TPD of NOx and 0.2 TPD of VOC each year in 2031. These set-aside emissions in the 2016 AQMP represent approximately 2.0 percent and 4.5 percent of projected mobile source growth in emissions shown in Table 2-19 for VOC and NOx, respectively.

The District debit the project emissions from the applicable set aside accounts until it is depleted. The unused portion cannot be carried forward to the following year. For those projects that come in after the conformity budget is exhausted, the corresponding federal agency will have to go through the regular general conformity determination process to demonstrate that these emissions are accounted for in the SIP. The set aside accounts will be revised and updated via AQMP/SIP revisions.

While economic growth for the region is desirable, it presents a challenge to our air quality improvement efforts since the projected growth could offset the impressive progress made in reducing VOC, NOx, and PM2.5 emissions through adopted regulations. Meeting the U.S. EPA's current and more-stringent future air quality standards will require the continuation of emission reduction efforts from all levels of government.

UNCERTAINTY IN THE INVENTORY

An effective AQMP relies on an adequate emission inventory. Over the years, significant improvements have been made to quantify emission sources for which control measures are developed. Increased use of continuous monitoring and source tests has contributed to the improvement in point source inventories. Technical assistance to facilities and auditing of reported emissions by the District also have improved the accuracy of the emissions inventory. Area source inventories that rely on average emission factors and regional activities have inherent uncertainty. Industry-specific surveys and source-specific studies during rule development have provided much-needed refinement to the emissions estimates. As described earlier, many improvements are included in the on-road mobile source model EMFAC2014 which estimate emissions from trucks, automobiles and buses. Improvements and updates are included in the off-road models for locomotives, ocean going vessels, commercial harbor craft, pleasure craft and off-highway recreational vehicles, cargo handling equipment, and farm equipment. Many sectors in area sources were revised extensively as well. Overall, the 2016 AQMP inventory is based on the most current information and estimation methodologies, resulting in the most accurate inventory available. However, it should be acknowledged that there are still areas that could be improved if better data were available. Technology change and improvement in the area of electric, hybrid, flexible fuel, and fuel cell vehicles, or the change in future gasoline prices, all add uncertainty to the future on-road emissions inventory.

Relative to future growth, there are many challenges with making accurate projections, such as where vehicle trips will occur, the distribution between various modes of

transportation (such as trucks and trains), as well as estimates for population growth and changes to the number and type of jobs. Forecasts are made with the best information available; nevertheless, they contribute to the overall uncertainty in emission projections. Fortunately, AQMP updates are generally performed every three to four years; thereby allowing for frequent improvements and adjustments to the inventories.

CONTROLLED EMISSION INVENTORIES

This section describes the methodology used to estimate the controlled and remaining emissions after the proposed control measures in the 2016 AQMP are implemented for the years 2023 and 2031. Emission reductions are derived by applying the control efficiency of a control measure to the projected baseline inventories. In addition to the proposed control measures, the impacts of phase-out VOC and SIP Reserve set aside tracking and other budgeted emissions for various District programs are also discussed in this section.

To project emission reductions and remaining emissions from the implementation of the proposed control measures, a mathematical algorithm called Controlled Emissions Projection Algorithm (CEPA) is used. CEPA is developed to calculate projected remaining emissions and/or emission reductions for specified control scenarios. CEPA is briefly discussed in this section. A more comprehensive and extensive discussion of CEPA is presented in Technical Report III-A of the 1991 AQMP.

Since 1998, the District has been implementing several funding incentive programs for the replacement or retrofit of heavy-duty diesel vehicles, including the Carl Moyer and Lower Emission School Bus programs, Proposition 1B Goods Movement program, and the SOON off-road equipment program. Over the years, thousands of diesel engines in the on-road and off-road sectors have been converted to natural gas, repowered, or retrofitted with particulate traps to achieve significant emission reductions.

Emission benefits from these incentive programs were estimated based on contracts awarded and executed to-date and have remaining project life in 2023 and 2031. In addition, funding from the Carl Moyer Program will continue through 2024. As such, estimated emission reductions associated with future funded projects are identified. The reductions that were projected to achieve beyond the baseline emissions of 2023 and 2031 are summarized in Table III-2-28 (see Appendix IV for details). These contracts continue to be closely tracked and the resulting level of emission reductions will be confirmed once achieved. The District has dedicated staff performing field audits to ensure that the agreed upon protocols are followed. Based on past contract

performance, emission reductions from these awarded contracts were discounted by 30 percent to reflect the fact that occasionally, contract awards are not completed and monies are returned.

It should be noted that these surplus reductions, attributable to accelerated fleet turnover or early compliance with State regulations, will diminish over time given that the baseline emissions inventory already incorporates normal fleet turnover and rule compliance deadlines.

TABLE III-2-28

Summary of Emission Reductions from Mobile Source Incentive Programs*
(Tons per Day)

Year	NOx	PM2.5
2023	9.47	0.21
2031	5.62	0.11
Total	15.09	0.32

*Emission reductions were estimated based on Annual Average inventory

Emission Impacts of SCAQMD Programs

There are several District regulatory programs that have specific impacts on future emissions through certain "set-aside" or exemption provisions. As a result, special emission accounts were created for the 2016 AQMP to track these emissions. For air quality modeling purposes, these emissions (except RECLAIM allocations) are distributed across the entire non-RECLAIM point source.

SIP Set Aside Accounts

Background

The 2016 AQMP includes a few accounts to track growth from emission trade-offs from regulatory programs, and a SIP Reserve for potential technology assessments (Table III-2-29). The methodology and assumptions used to develop these tracking accounts for

the 2016 AQMP are discussed in detail below. It should be noted that emission increases or decreases discussed herein are in reference to the projected AQMP baseline.

VOC Emissions from Phase-Out of Toxics

Due to an increasing focus on air toxic exposure, a certain amount of conversion from toxics to VOCs may be inevitable in the future. In some situations, to reduce toxic exposure, toxics that do not contribute to ozone formation will be replaced with less toxic VOC compounds that form ozone. Therefore, three tons per day are included for potential VOC emission increases inherent in the reduction of toxics, such as control of methylene chloride in coating stripping applications.

SIP Reserve for Potential Technology Assessments

To achieve air quality goals, adopted and amended rules and regulations that rely on technology forcing emission limits are often needed. Technology forcing emission limits are designed to provide ample time for the development and implementation of new air pollution technologies. In the event, however, that the new air pollution control technology does not come to fruition by the implementation date of the adopted or amended rule, there may be a need to delay or relax the future emission limits. The SIP Reserve is designed to ensure that delaying or relaxing future emission limits for technology forcing rules will not interfere with the Basin's attainment demonstration. In addition, the SIP Reserve allows the District to adopt and amend rules with technology forcing limits, while maintaining SIP approvability if a rule relaxation or delay is needed.

The potential delay of R1110.2 biogas engine reductions beyond 2023 was included in the estimates for 2031.

TABLE III-2-29

Summary of SIP Set-Aside Accounts for the 2016 AQMP
(2023/2031 Tons per Day)

	VOC	NOx
VOC Emissions from Phase-out of Toxics	3/3	N/A
SIP Reserve (Technology Assessment)	1/1	1/0.5
General Conformity	0.5/0.2	2.0/0.5
Total	4.5/4.2	3.0/1.0

Proposed Control Measures

In order to assess emission reduction potential and remaining emissions from proposed control measures, a control factor profile needs to be developed identifying source category targeted by a measure, its control efficiency, and the implementation schedule.

Control Efficiency/Control Factor

One factor that determines the effectiveness of a control measure is its control efficiency (CE), expressed in percentage. Control efficiency is dependent on the specific control technologies proposed, and each control measure may have one or more technology options available. If there is only one feasible control technology in a control measure, its control efficiency is primarily based on an engineering evaluation of the proposed technology. However, if several control technologies are available to control an emission source, the average control efficiency is used. If multiple control technologies are proposed to reduce emissions from various steps of an operation, a weighted average control efficiency is developed to represent an overall control of the emission sources. Once the control efficiency of a control measure is determined, it is used to estimate emission reductions of the proposed measure. Control efficiencies for the proposed control measures are identified and discussed in detail in Appendix IV of the 2016 AQMP.

The control factor (CF) is used to estimate remaining emissions once a proposed control measure is implemented. A control factor equal to 0 indicates complete emission control or 100 percent efficiency. A control factor equal to 1 indicates no emission control or emissions remain unchanged. A high control factor value indicates a low control

efficiency. As the control efficiency goes up, the control factor value goes down. The equation to calculate a control factor follows:

$$\mathbf{CF = 1 - (CE/100)}$$

And, the remaining emissions can be calculated as:

$$\mathbf{REM = BE * CF}$$

Where REM is Remaining Emissions, and BE is Baseline Emissions

The Final 2012 AQMP has many milestones for which emission reduction progress needs to be projected. As a result, control factors for each milestone year were developed. The control factor profile for each measure is developed considering the following factors:

- proposed adoption date;
- implementation lead time; and
- phase-in period, if any.

The adoption date as proposed in the 2016 AQMP is the date the District or other agency is expected to adopt the control measure as a rule. The implementation lead time reflects the time allowed for the emission sources to install controls. When a rule is implemented, it is not unusual that it may have multiple interim implementation dates prior to full implementation. This is because the requirements in a rule may require two or three phases to reach the final emission target (e.g., a technology-forcing regulation). Or, a rule may regulate such a large population of equipment that it is impractical to implement it all at once, and it becomes administratively necessary to phase in its implementation. In either case, a control profile would indicate an initial implementation date and an ending implementation date. The adoption and implementation schedule of the proposed control measures is presented in Chapter 4 of the 2016 AQMP.

Impact Factors

Each proposed control measure describes specific emission sources subject to potential controls. Based on the description of these sources, corresponding sources as tracked in the emission inventory are identified. In general, emission sources are grouped by major source category, which can be further subcategorized into point sources denoted by Source Classification Codes (SCC) and area sources denoted by Category Emission Source

(CES) Codes. To track emission reductions more accurately, the control factors at the SCC/CES level become necessary.

An SCC, an 8-digit EPA code, is used to identify emissions from a point source at the equipment level. A CES, a 5-digit CARB code, is used to describe an area source for which emissions are distributed across the region with no specific locations.

For some measures the controls apply not only to the type of equipment, but also to the industries engaged in a particular activity. In those cases, control factors will be developed by pairing SCCs and Standard Industrial Classification (SIC) Codes to clearly and specifically point out the emission sources in the inventory that the measure is designed to reduce. Such SCC/SIC pairs significantly enhance the ability to quantify emissions closely following the intent of a proposed control measure.

There are instances where an SCC or CES category is not fully impacted by a control measure. As a result, an impact factor (IF) is developed as a weighing factor for such an adjustment. The following equation illustrates how the impact factor (IF) is included in the CF calculation.

$$\mathbf{CF = 1 - ((CE /100) \times IF)}$$

Impact factors will accurately track the measure's baseline emissions, and calculate more accurate reductions from the proposed control measures.

CEPA Emission Calculations

The District uses the CEPA program to calculate emission projections for the proposed AQMP control measures. Based on the control factor profile and projected baseline emissions, CEPA estimates emission reductions and remaining emissions for future years by pollutant (i.e., summer VOC and NOx; winter CO and NO_2; and average annual day for VOC, NOx, CO, SOx and PM10).

CEPA allows interaction of multiple control measures affecting a specific emission source, avoiding double counting of emission reductions from additional measures. It also provides flexibility in analyzing various scenarios and improves accuracy by standardizing calculation methodologies.

To run CEPA, the program requires four data input files. These input files are as follows:

1. Master Measure File - This file contains all the measures proposed in the AQMP. There is one master measure file in the CEPA program.

2. Scenario File - This file is a listing of selected measures to characterize emission reductions, and is a subset of the master measure file. For example, it can contain a group of control measures for mobile sources only, or a group of measures to be implemented by U.S. EPA.

3. Control Factor File - This file shows control factor by pollutant by SCC/SIC (or CES/CES) pairs for each control measure in a specified year.

4. Baseline Emission File - This file contains projected emission data (tons per day) for future years based on the 2012 emissions inventory. There are different types of baseline emission data available for CEPA runs. These are the average annual day emissions inventory with pollutants VOC, NOx, CO, SOx, PM10; and PM2.5; and the planning inventory with pollutants VOC and NOx during summer, and CO and NO_2 during winter.

CEPA calculates the remaining emissions at the SCC/SIC level. It can generate many types of emission summary reports or electronic files. For example, the program can provide composite control factors for on-road mobile sources in sixteen categories used in the air quality modeling analysis or composite control factors from all the proposed control measures in the scenario file. It can also provide remaining emissions by SCC/SIC or CES/SIC pairs; by major source category; or by SIC. It can present emission reductions by each control measure in the absence of other competing measures; or reductions for each control measure following a pre-determined implementation sequence. The result of CEPA runs is presented in Appendix V of the 2016 AQMP.

CARB Emission Data Reports System

As mentioned in Chapter 1 of this Appendix, the entire emission inventories are compiled and maintained by CARB in its statewide emission related information databases named California Emission Inventory Development and Reporting System (CEIDARS), and California Emission Forecasting and Planning Inventory System (CEFIS).

In both systems, emissions are tracked by CARB's coding method called Emission Inventory Codes (EIC code). The EIC code is a 14-digit number arranged into four fields: major category, source category, material description and emission sub-category. For example, EIC 210-200-3300-0000 is for dry cleaning using perchloroethylene. 210 indicate that this source is under laundering group. 200 means the source category is dry cleaning. 3300 refers to the material perchloroethylene. 0000 implies there is no

sub-category for this particular source. EIC codes separate emission sources into four major divisions: stationary, area, non-anthropogenic, and mobile source. This coding system allows flexibility in how sources are selected, sorted and grouped to fit users' needs. EIC codes link area sources and point sources together to allow a computer program to automatically reconcile point and area source emissions. In the 2016 AQMP, all the emission summary reports are based on CARB's EIC codes. Because only the anthropogenic sources are included in this document, all summary reports in the appendices include three major divisions: stationary, area, and mobile sources.

REFERENCES

REFERENCES

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Attachment A:

Annual Average Emissions by Source Category in South Coast Air Basin

2012 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	6.72	1.06	0.44	8.29	0.32	1.21	1.20	1.20	1.99
20	Cogeneration	0.93	0.11	0.01	0.52	0.01	0.16	0.15	0.14	0.32
30	Oil and Gas Production (Combustion)	0.87	0.11	0.68	0.74	0.01	0.10	0.10	0.10	0.22
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.02	3.88	11.31	14.58	0.24	1.10	1.10	1.09	2.19
52	Food and Agricultural Processing	0.08	0.03	0.16	0.28	0.00	0.03	0.03	0.03	0.04
60	Service and Commercial	14.25	4.85	11.79	16.58	1.16	1.40	1.39	1.39	3.28
99	Other (Fuel Combustion)	1.32	0.29	3.28	2.65	0.13	0.35	0.27	0.19	0.02
Total Fuel Combustion		**52.55**	**11.34**	**27.67**	**48.59**	**1.87**	**5.91**	**5.75**	**5.63**	**8.97**
Waste Disposal										
110	Sewage Treatment	0.61	0.34	0.01	0.01	0.03	0.01	0.00	0.00	0.23
120	Landfills	596.15	8.38	0.59	0.47	0.32	0.14	0.13	0.13	3.79
130	Incineration	0.35	0.07	1.42	0.48	0.13	0.17	0.08	0.07	0.31
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	49.13	3.93	0.00	0.00	0.00	0.00	0.00	0.00	0.95
Total Waste Disposal		**646.24**	**12.72**	**2.02**	**0.96**	**0.48**	**0.32**	**0.21**	**0.20**	**5.28**
Cleaning and Surface Coatings										
210	Laundering	3.09	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	54.28	10.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	18.87	18.23	0.02	0.01	0.00	1.48	1.42	1.37	0.12
240	Printing	1.51	1.51	0.00	0.00	0.00	0.00	0.00	0.00	0.04
250	Adhesives and Sealants	3.93	3.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.69	0.69	0.04	0.05	0.00	0.04	0.04	0.04	0.26
Total Cleaning and Surface Coatings		**82.37**	**34.10**	**0.06**	**0.06**	**0.00**	**1.52**	**1.46**	**1.41**	**0.42**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.00	2.31	0.02	0.02	0.06	0.00	0.00	0.00	0.00
320	Petroleum Refining	6.86	4.55	0.25	5.09	0.36	2.63	1.71	1.50	0.23
330	Petroleum Marketing	67.92	22.10	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.09	0.08	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**79.87**	**29.04**	**0.28**	**5.12**	**0.42**	**2.64**	**1.72**	**1.50**	**0.23**
Industrial Processes										
410	Chemical	6.10	4.91	0.01	0.03	0.01	0.64	0.50	0.40	0.02
420	Food and Agriculture	1.18	1.15	0.00	0.00	0.01	0.39	0.22	0.10	0.02
430	Mineral Processes	0.78	0.65	0.01	0.15	0.00	7.51	4.94	2.70	0.12
440	Metal Processes	0.16	0.12	0.04	0.17	0.09	0.48	0.31	0.20	0.01
450	Wood and Paper	0.24	0.24	0.00	0.00	0.00	5.52	3.87	2.35	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.12	0.11	0.10	0.00
470	Electronics	0.02	0.02	0.00	0.00	0.00	0.02	0.01	0.01	0.00
499	Other (Industrial Processes)	3.39	3.04	0.02	0.11	0.00	1.19	0.80	0.47	8.57
Total Industrial Processes		**11.87**	**10.13**	**0.08**	**0.46**	**0.11**	**15.87**	**10.76**	**6.33**	**8.74**
Solvent Evaporation										
510	Consumer Products	103.79	86.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	14.00	13.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.32	1.32	0.00	0.00	0.00	0.00	0.00	0.00	1.34
540	Asphalt Paving/Roofing	0.78	0.71	0.00	0.00	0.00	0.02	0.02	0.02	0.00
Total Solvent Evaporation		**119.89**	**101.85**	**0.00**	**0.00**	**0.00**	**0.02**	**0.02**	**0.02**	**1.34**

(Continued)

2012 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.82	8.65	20.43	48.69	0.50	7.79	7.42	7.22	0.11
620	Farming Operations	30.25	2.46	0.00	0.00	0.00	2.49	1.20	0.21	12.69
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	34.72	16.98	1.70	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	112.00	51.18	7.73	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.91	5.89	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.70	1.85	0.26	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.41	0.22	0.10	2.34	0.01	0.31	0.31	0.29	0.03
690	Cooking	2.48	1.73	0.00	0.00	0.00	10.39	10.39	10.39	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.03
	RECLAIM			19.06		6.87				
Total Miscellaneous Processes		**53.30**	**13.29**	**39.67**	**54.05**	**7.38**	**181.76**	**95.66**	**28.79**	**37.86**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	70.13	65.00	47.49	539.39	0.82	11.10	10.86	4.71	7.68
722	Light Duty Trucks 1 (T1)	19.03	17.78	11.83	133.50	0.09	1.19	1.15	0.55	0.96
723	Light Duty Trucks 2 (T2)	27.75	25.52	29.83	241.69	0.40	3.97	3.88	1.67	4.12
724	Medium Duty Trucks (T3)	23.63	21.20	30.49	234.70	0.39	3.00	2.94	1.26	4.34
732	Light Heavy Duty Gas Trucks 1 (T4)	5.86	5.43	7.66	34.10	0.04	0.50	0.49	0.21	0.42
733	Light Heavy Duty Gas Trucks 2 (T5)	0.83	0.77	1.18	4.57	0.01	0.10	0.09	0.04	0.07
734	Medium Heavy Duty Gas Trucks (T6)	1.76	1.58	2.60	18.48	0.01	0.13	0.13	0.06	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.37	0.32	0.57	7.28	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.46	0.40	16.13	2.79	0.01	0.33	0.33	0.19	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.16	0.14	5.46	0.95	0.01	0.14	0.13	0.07	0.00
744	Medium Heavy Duty Diesels Truck (T6)	2.30	2.02	37.01	6.41	0.05	2.14	2.12	1.66	0.13
746	Heavy Heavy Duty Diesel Trucks (HHD)	6.81	5.47	96.36	20.42	0.14	3.74	3.72	3.09	0.22
750	Motorcycles (MCY)	10.31	9.35	2.31	52.54	0.00	0.04	0.03	0.02	0.01
760	Diesel Urban Buses (UB)	5.25	1.20	19.64	14.48	0.01	1.03	1.02	0.58	0.02
762	Gas Urban Buses (UB)	0.60	0.44	0.78	4.98	0.00	0.03	0.03	0.01	0.01
771	Gas School Buses (SB)	0.13	0.11	0.12	1.76	0.00	0.05	0.05	0.02	0.00
772	Diesel School Buses (SB)	0.18	0.16	2.25	0.43	0.00	0.21	0.21	0.13	0.00
777	Gas Other Buses (OB)	0.24	0.20	0.58	2.96	0.00	0.05	0.05	0.02	0.02
778	Motor Coaches	0.10	0.09	1.56	0.32	0.00	0.06	0.06	0.04	0.00
779	Diesel Other Buses (OB)	0.11	0.10	1.63	0.28	0.00	0.08	0.08	0.06	0.01
780	Motor Homes (MH)	0.29	0.24	1.15	5.96	0.01	0.09	0.09	0.05	0.02
Total On-Road Motor Vehicles		**176.30**	**157.52**	**316.63**	**1327.99**	**1.99**	**27.99**	**27.47**	**14.44**	**18.08**
Other Mobile Sources										
810	Aircraft	3.35	3.30	13.78	33.64	1.47	0.69	0.67	0.60	0.00
820	Trains	1.47	1.23	19.72	3.86	0.01	0.43	0.43	0.39	0.01
833	Ocean Going Vessels	1.96	1.75	30.14	3.43	4.57	0.96	0.96	0.92	0.03
835	Commercial Harbor Crafts	1.37	1.15	15.84	5.43	0.00	0.74	0.74	0.68	0.00
840	Recreational Boats	35.42	30.44	5.69	97.20	0.01	2.09	1.88	1.42	0.01
850	Off-Road Recreation Vehicles	2.71	2.60	0.05	3.32	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	58.44	51.47	65.63	533.79	0.07	4.71	4.54	3.93	0.09
870	Farm Equipment	0.78	0.69	2.59	5.22	0.00	0.17	0.17	0.15	0.00
890	Fuel Storage and Handling	7.53	7.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**113.03**	**100.13**	**153.44**	**685.89**	**6.13**	**9.80**	**9.40**	**8.10**	**0.14**
Total Stationary and Area Sources		1046.09	212.47	69.78	109.24	10.26	208.04	115.58	43.88	62.84
Total On-Road Vehicles		176.30	157.52	316.63	1327.99	1.99	27.99	27.47	14.44	18.08
Total Other Mobile		113.03	100.13	153.44	685.89	6.13	9.80	9.40	8.10	0.14
Total		**1335.42**	**470.12**	**539.85**	**2123.12**	**18.38**	**245.83**	**152.45**	**66.42**	**81.06**

2017 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.35	0.84	0.12	6.54	0.25	0.97	0.96	0.96	1.59
20	Cogeneration	0.94	0.10	0.01	0.56	0.01	0.16	0.15	0.15	0.28
30	Oil and Gas Production (Combustion)	0.89	0.11	0.69	0.77	0.01	0.10	0.10	0.10	0.22
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	26.52	4.22	10.04	15.96	0.27	1.19	1.18	1.18	2.33
52	Food and Agricultural Processing	0.09	0.03	0.12	0.30	0.00	0.04	0.04	0.04	0.04
60	Service and Commercial	13.82	4.58	9.04	16.04	1.24	1.39	1.38	1.38	3.09
99	Other (Fuel Combustion)	1.39	0.26	2.63	2.61	0.14	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.36**	**11.15**	**22.65**	**47.73**	**1.92**	**5.74**	**5.57**	**5.48**	**8.48**
Waste Disposal										
110	Sewage Treatment	0.69	0.39	0.01	0.01	0.04	0.01	0.00	0.00	0.24
120	Landfills	618.69	8.70	0.64	0.51	0.34	0.15	0.14	0.14	3.90
130	Incineration	0.40	0.08	1.50	0.55	0.14	0.19	0.09	0.08	0.35
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	56.05	4.49	0.00	0.00	0.00	0.00	0.00	0.00	1.03
Total Waste Disposal		**675.83**	**13.66**	**2.15**	**1.07**	**0.52**	**0.35**	**0.23**	**0.22**	**5.52**
Cleaning and Surface Coatings										
210	Laundering	3.36	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	64.37	11.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	21.53	20.79	0.01	0.01	0.00	1.65	1.59	1.53	0.14
240	Printing	1.70	1.70	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	4.65	4.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.80	0.80	0.03	0.06	0.00	0.05	0.04	0.04	0.27
Total Cleaning and Surface Coatings		**96.41**	**39.42**	**0.04**	**0.07**	**0.00**	**1.70**	**1.63**	**1.57**	**0.46**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.18	2.39	0.02	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.90	4.53	0.25	5.15	0.36	2.64	1.72	1.51	0.23
330	Petroleum Marketing	55.54	14.32	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.11	0.10	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**67.73**	**21.34**	**0.28**	**5.18**	**0.42**	**2.66**	**1.73**	**1.51**	**0.23**
Industrial Processes										
410	Chemical	7.06	5.67	0.01	0.03	0.01	0.76	0.59	0.47	0.03
420	Food and Agriculture	1.28	1.25	0.00	0.00	0.01	0.43	0.24	0.11	0.02
430	Mineral Processes	0.87	0.72	0.01	0.16	0.00	7.68	5.05	2.76	0.13
440	Metal Processes	0.18	0.13	0.04	0.18	0.09	0.53	0.34	0.22	0.01
450	Wood and Paper	0.26	0.26	0.00	0.00	0.00	6.35	4.45	2.70	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.14	0.12	0.11	0.00
470	Electronics	0.02	0.02	0.00	0.00	0.00	0.02	0.02	0.01	0.00
499	Other (Industrial Processes)	3.57	3.20	0.02	0.12	0.00	1.22	0.82	0.48	8.58
Total Industrial Processes		**13.24**	**11.25**	**0.08**	**0.49**	**0.11**	**17.13**	**11.63**	**6.86**	**8.77**
Solvent Evaporation										
510	Consumer Products	104.80	87.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.11	11.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.34	1.34	0.00	0.00	0.00	0.00	0.00	0.00	1.23
540	Asphalt Paving/Roofing	1.02	0.93	0.00	0.00	0.00	0.02	0.02	0.02	0.00
Total Solvent Evaporation		**119.27**	**100.80**	**0.00**	**0.00**	**0.00**	**0.02**	**0.02**	**0.02**	**1.23**

(Continued)

2017 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.30	8.43	14.83	46.78	0.47	7.16	6.80	6.61	0.11
620	Farming Operations	23.70	1.94	0.00	0.00	0.00	2.09	1.01	0.18	9.81
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	44.39	21.71	2.18	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	116.90	53.42	8.07	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.88	5.87	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.28	1.66	0.24	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.69	1.88	0.00	0.00	0.00	11.28	11.28	11.28	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.84
	RECLAIM			24.51		6.78				
Total Miscellaneous Processes		**46.84**	**12.95**	**39.61**	**56.11**	**7.30**	**196.15**	**102.89**	**30.18**	**35.79**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	38.72	35.99	26.27	304.55	0.79	11.70	11.46	4.85	6.44
722	Light Duty Trucks 1 (T1)	10.60	9.97	5.97	66.84	0.08	1.03	1.00	0.45	0.68
723	Light Duty Trucks 2 (T2)	17.59	16.32	15.88	142.10	0.39	4.24	4.15	1.75	3.45
724	Medium Duty Trucks (T3)	18.27	16.69	18.78	160.31	0.33	2.80	2.74	1.16	3.40
732	Light Heavy Duty Gas Trucks 1 (T4)	4.38	4.12	5.36	19.24	0.03	0.36	0.35	0.15	0.27
733	Light Heavy Duty Gas Trucks 2 (T5)	0.59	0.56	0.86	2.58	0.01	0.09	0.08	0.04	0.05
734	Medium Heavy Duty Gas Trucks (T6)	0.83	0.74	1.57	9.31	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.11	0.09	0.37	3.49	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.40	0.35	11.54	2.38	0.01	0.35	0.35	0.19	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.14	0.12	3.54	0.76	0.01	0.16	0.16	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	1.20	1.05	23.82	3.63	0.07	1.60	1.58	1.04	0.17
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.86	1.76	62.79	8.47	0.17	1.44	1.42	0.77	0.28
750	Motorcycles (MCY)	10.42	9.23	2.49	48.64	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	3.72	0.77	11.93	10.25	0.01	0.75	0.74	0.40	0.02
762	Gas Urban Buses (UB)	0.44	0.32	0.59	3.31	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.05	0.07	0.59	0.00	0.06	0.06	0.03	0.00
772	Diesel School Buses (SB)	0.05	0.04	2.16	0.13	0.00	0.18	0.18	0.09	0.01
777	Gas Other Buses (OB)	0.18	0.16	0.40	2.08	0.00	0.06	0.06	0.02	0.02
778	Motor Coaches	0.04	0.03	1.09	0.11	0.00	0.03	0.03	0.02	0.00
779	Diesel Other Buses (OB)	0.03	0.03	1.09	0.09	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.15	0.12	0.77	2.67	0.01	0.08	0.08	0.04	0.02
Total On-Road Motor Vehicles		**110.78**	**98.51**	**197.34**	**791.53**	**1.92**	**25.20**	**24.71**	**11.19**	**14.90**
Other Mobile Sources										
810	Aircraft	3.58	3.53	15.09	36.75	1.71	0.73	0.71	0.65	0.00
820	Trains	1.09	0.92	18.42	3.94	0.01	0.35	0.35	0.32	0.01
833	Ocean Going Vessels	2.35	2.10	29.38	3.99	3.04	0.88	0.88	0.84	0.03
835	Commercial Harbor Crafts	1.27	1.07	11.74	6.34	0.00	0.50	0.50	0.46	0.00
840	Recreational Boats	27.39	23.61	4.99	87.59	0.01	1.62	1.46	1.10	0.01
850	Off-Road Recreation Vehicles	2.63	2.54	0.07	3.56	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	48.94	43.10	53.83	540.53	0.08	3.98	3.80	3.24	0.10
870	Farm Equipment	0.59	0.51	2.15	4.94	0.00	0.14	0.14	0.13	0.00
890	Fuel Storage and Handling	5.70	5.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**93.54**	**83.06**	**135.67**	**687.64**	**4.85**	**8.21**	**7.85**	**6.75**	**0.15**
Total Stationary and Area Sources		1071.68	210.57	64.81	110.65	10.27	223.75	123.70	45.84	60.48
Total On-Road Vehicles		110.78	98.51	197.34	791.53	1.92	25.20	24.71	11.19	14.90
Total Other Mobile		93.54	83.06	135.67	687.64	4.85	8.21	7.85	6.75	0.15
Total		**1276.00**	**392.14**	**397.82**	**1589.82**	**17.04**	**257.16**	**156.26**	**63.78**	**75.53**

2018 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.39	0.85	0.12	6.59	0.25	0.97	0.97	0.97	1.60
20	Cogeneration	0.95	0.10	0.01	0.57	0.01	0.16	0.15	0.15	0.29
30	Oil and Gas Production (Combustion)	0.90	0.11	0.70	0.78	0.01	0.10	0.10	0.10	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	26.51	4.26	10.04	16.15	0.28	1.20	1.19	1.18	2.34
52	Food and Agricultural Processing	0.09	0.03	0.13	0.31	0.00	0.04	0.04	0.04	0.04
60	Service and Commercial	13.93	4.59	9.04	16.15	1.27	1.40	1.40	1.39	3.10
99	Other (Fuel Combustion)	1.42	0.26	2.63	2.64	0.15	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.55**	**11.21**	**22.67**	**48.14**	**1.97**	**5.76**	**5.61**	**5.50**	**8.53**
Waste Disposal										
110	Sewage Treatment	0.70	0.40	0.01	0.01	0.04	0.01	0.00	0.00	0.24
120	Landfills	622.83	8.76	0.65	0.52	0.35	0.15	0.15	0.14	3.92
130	Incineration	0.41	0.08	1.53	0.56	0.15	0.20	0.09	0.08	0.36
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	57.50	4.60	0.00	0.00	0.00	0.00	0.00	0.00	1.05
Total Waste Disposal		**681.44**	**13.84**	**2.19**	**1.09**	**0.54**	**0.36**	**0.24**	**0.22**	**5.57**
Cleaning and Surface Coatings										
210	Laundering	3.42	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	66.55	12.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	22.08	21.33	0.01	0.01	0.00	1.69	1.62	1.56	0.14
240	Printing	1.74	1.74	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	4.80	4.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.83	0.83	0.03	0.06	0.00	0.05	0.04	0.04	0.28
Total Cleaning and Surface Coatings		**99.42**	**40.56**	**0.04**	**0.07**	**0.00**	**1.74**	**1.66**	**1.60**	**0.47**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.22	2.41	0.02	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.91	4.53	0.25	5.16	0.36	2.65	1.72	1.51	0.23
330	Petroleum Marketing	55.04	13.96	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.11	0.10	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**67.28**	**21.00**	**0.28**	**5.19**	**0.42**	**2.67**	**1.73**	**1.51**	**0.23**
Industrial Processes										
410	Chemical	7.27	5.83	0.01	0.03	0.01	0.78	0.61	0.49	0.03
420	Food and Agriculture	1.30	1.27	0.00	0.00	0.01	0.43	0.24	0.12	0.02
430	Mineral Processes	0.89	0.74	0.01	0.16	0.00	7.72	5.08	2.78	0.13
440	Metal Processes	0.18	0.14	0.04	0.19	0.10	0.54	0.35	0.23	0.01
450	Wood and Paper	0.27	0.27	0.00	0.00	0.00	6.52	4.57	2.78	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.12	0.00
470	Electronics	0.02	0.02	0.00	0.00	0.00	0.02	0.02	0.01	0.00
499	Other (Industrial Processes)	3.61	3.24	0.02	0.13	0.00	1.24	0.84	0.49	8.58
Total Industrial Processes		**13.54**	**11.51**	**0.08**	**0.51**	**0.12**	**17.39**	**11.84**	**7.02**	**8.77**
Solvent Evaporation										
510	Consumer Products	105.32	87.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.23	11.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.34	1.34	0.00	0.00	0.00	0.00	0.00	0.00	1.20
540	Asphalt Paving/Roofing	1.06	0.98	0.00	0.00	0.00	0.03	0.02	0.02	0.00
Total Solvent Evaporation		**119.95**	**101.42**	**0.00**	**0.00**	**0.00**	**0.03**	**0.02**	**0.02**	**1.20**

(Continued)

2018 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.29	8.43	14.56	46.75	0.48	7.15	6.79	6.60	0.11
620	Farming Operations	22.72	1.86	0.00	0.00	0.00	2.02	0.98	0.18	9.38
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	46.32	22.65	2.27	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	117.88	53.87	8.13	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.87	5.86	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.20	1.62	0.23	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.73	1.91	0.00	0.00	0.00	11.44	11.44	11.44	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.98
	RECLAIM			23.51		6.78				
Total Miscellaneous Processes		**45.89**	**12.90**	**38.34**	**56.08**	**7.31**	**199.05**	**104.35**	**30.47**	**35.50**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	33.95	31.60	22.90	267.54	0.76	11.67	11.42	4.84	6.16
722	Light Duty Trucks 1 (T1)	9.26	8.73	5.10	56.57	0.07	1.00	0.97	0.43	0.63
723	Light Duty Trucks 2 (T2)	15.72	14.62	13.55	124.15	0.37	4.22	4.13	1.74	3.29
724	Medium Duty Trucks (T3)	16.92	15.53	16.53	144.32	0.32	2.72	2.66	1.13	3.19
732	Light Heavy Duty Gas Trucks 1 (T4)	4.15	3.92	5.00	17.33	0.03	0.34	0.33	0.14	0.25
733	Light Heavy Duty Gas Trucks 2 (T5)	0.54	0.51	0.80	2.28	0.01	0.08	0.08	0.03	0.05
734	Medium Heavy Duty Gas Trucks (T6)	0.75	0.67	1.42	8.29	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.10	0.08	0.36	3.37	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.39	0.34	10.66	2.27	0.01	0.36	0.35	0.19	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.13	0.11	3.19	0.72	0.01	0.17	0.16	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	1.09	0.95	22.35	3.34	0.07	1.57	1.55	0.98	0.17
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.71	1.57	59.49	8.18	0.17	1.35	1.34	0.65	0.29
750	Motorcycles (MCY)	10.35	9.14	2.50	47.75	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	3.39	0.68	10.23	9.28	0.00	0.68	0.67	0.36	0.02
762	Gas Urban Buses (UB)	0.40	0.29	0.55	2.98	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.07	0.56	0.00	0.06	0.06	0.03	0.00
772	Diesel School Buses (SB)	0.04	0.03	2.01	0.10	0.00	0.18	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.17	0.15	0.37	1.94	0.00	0.06	0.06	0.02	0.02
778	Motor Coaches	0.03	0.03	0.98	0.10	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	1.02	0.07	0.00	0.05	0.04	0.02	0.01
780	Motor Homes (MH)	0.12	0.10	0.70	2.09	0.00	0.08	0.08	0.04	0.02
Total On-Road Motor Vehicles		**100.29**	**89.11**	**179.78**	**703.23**	**1.83**	**24.84**	**24.32**	**10.86**	**14.19**
Other Mobile Sources										
810	Aircraft	3.68	3.63	15.51	37.66	1.77	0.75	0.73	0.66	0.00
820	Trains	1.02	0.85	17.66	3.98	0.01	0.32	0.32	0.30	0.01
833	Ocean Going Vessels	2.42	2.16	27.76	4.08	3.10	0.90	0.90	0.86	0.03
835	Commercial Harbor Crafts	1.27	1.07	11.45	6.47	0.00	0.48	0.48	0.44	0.00
840	Recreational Boats	26.02	22.45	4.88	86.44	0.01	1.54	1.39	1.05	0.01
850	Off-Road Recreation Vehicles	2.63	2.54	0.07	3.68	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	47.83	42.09	49.95	544.65	0.09	3.75	3.57	3.03	0.11
870	Farm Equipment	0.56	0.48	2.07	4.92	0.00	0.14	0.14	0.12	0.00
890	Fuel Storage and Handling	5.48	5.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**90.91**	**80.73**	**129.35**	**691.88**	**4.98**	**7.89**	**7.54**	**6.47**	**0.16**
Total Stationary and Area Sources		1080.07	212.44	63.60	111.08	10.36	227.00	125.45	46.34	60.27
Total On-Road Vehicles		100.29	89.11	179.78	703.23	1.83	24.84	24.32	10.86	14.19
Total Other Mobile		90.91	80.73	129.35	691.88	4.98	7.89	7.54	6.47	0.16
Total		**1271.27**	**382.28**	**372.73**	**1506.19**	**17.17**	**259.73**	**157.31**	**63.67**	**74.62**

2019 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.37	0.85	0.12	6.57	0.25	0.97	0.97	0.96	1.59
20	Cogeneration	0.95	0.10	0.01	0.59	0.01	0.16	0.16	0.15	0.29
30	Oil and Gas Production (Combustion)	0.91	0.11	0.70	0.78	0.01	0.10	0.10	0.10	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	26.34	4.29	9.98	16.29	0.28	1.20	1.19	1.19	2.33
52	Food and Agricultural Processing	0.09	0.03	0.13	0.31	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.01	4.59	9.00	16.21	1.29	1.41	1.41	1.40	3.09
99	Other (Fuel Combustion)	1.44	0.26	2.63	2.67	0.15	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.47**	**11.24**	**22.57**	**48.37**	**1.99**	**5.77**	**5.63**	**5.51**	**8.51**
Waste Disposal										
110	Sewage Treatment	0.72	0.40	0.01	0.01	0.04	0.01	0.00	0.00	0.24
120	Landfills	627.16	8.82	0.66	0.53	0.35	0.15	0.15	0.14	3.94
130	Incineration	0.42	0.08	1.56	0.58	0.15	0.20	0.10	0.08	0.36
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	58.95	4.72	0.00	0.00	0.00	0.00	0.00	0.00	1.07
Total Waste Disposal		**687.25**	**14.02**	**2.23**	**1.12**	**0.54**	**0.36**	**0.25**	**0.22**	**5.61**
Cleaning and Surface Coatings										
210	Laundering	3.47	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	68.85	12.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	22.63	21.86	0.01	0.01	0.00	1.72	1.65	1.59	0.14
240	Printing	1.78	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	4.97	4.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.86	0.86	0.03	0.06	0.00	0.05	0.05	0.04	0.28
Total Cleaning and Surface Coatings		**102.56**	**41.72**	**0.04**	**0.07**	**0.00**	**1.77**	**1.70**	**1.63**	**0.47**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.25	2.42	0.02	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.94	4.53	0.25	5.18	0.36	2.65	1.73	1.52	0.23
330	Petroleum Marketing	54.42	13.68	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.11	0.10	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**66.72**	**20.73**	**0.28**	**5.21**	**0.42**	**2.67**	**1.74**	**1.52**	**0.23**
Industrial Processes										
410	Chemical	7.48	6.00	0.01	0.03	0.01	0.81	0.63	0.50	0.03
420	Food and Agriculture	1.32	1.29	0.00	0.00	0.01	0.44	0.25	0.12	0.02
430	Mineral Processes	0.91	0.76	0.01	0.17	0.00	7.75	5.09	2.79	0.13
440	Metal Processes	0.18	0.14	0.04	0.19	0.10	0.55	0.35	0.23	0.01
450	Wood and Paper	0.27	0.27	0.00	0.00	0.00	6.70	4.69	2.85	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.12	0.00
470	Electronics	0.03	0.02	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.65	3.27	0.02	0.13	0.00	1.26	0.85	0.50	8.58
Total Industrial Processes		**13.84**	**11.75**	**0.08**	**0.52**	**0.12**	**17.68**	**12.01**	**7.12**	**8.77**
Solvent Evaporation										
510	Consumer Products	105.90	88.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.35	11.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.35	1.35	0.00	0.00	0.00	0.00	0.00	0.00	1.18
540	Asphalt Paving/Roofing	1.11	1.02	0.00	0.00	0.00	0.03	0.03	0.02	0.00
Total Solvent Evaporation		**120.71**	**102.07**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.02**	**1.18**

(Continued)

2019 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.27	8.42	14.23	46.69	0.48	7.14	6.78	6.59	0.11
620	Farming Operations	21.81	1.79	0.00	0.00	0.00	1.96	0.96	0.17	8.98
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	48.19	23.56	2.36	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	118.85	54.32	8.20	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.87	5.86	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.13	1.59	0.23	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.77	1.94	0.00	0.00	0.00	11.62	11.62	11.62	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.15
	RECLAIM			22.51		6.08				
Total Miscellaneous Processes		**45.00**	**12.85**	**37.01**	**56.02**	**6.61**	**201.93**	**105.83**	**30.79**	**35.27**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	30.64	28.56	20.37	241.27	0.74	11.78	11.53	4.88	6.00
722	Light Duty Trucks 1 (T1)	8.44	7.98	4.52	50.35	0.07	0.98	0.96	0.42	0.60
723	Light Duty Trucks 2 (T2)	14.34	13.37	11.77	111.16	0.36	4.26	4.17	1.76	3.21
724	Medium Duty Trucks (T3)	15.73	14.48	14.64	130.50	0.31	2.68	2.62	1.12	3.04
732	Light Heavy Duty Gas Trucks 1 (T4)	3.88	3.67	4.63	15.37	0.03	0.31	0.31	0.13	0.22
733	Light Heavy Duty Gas Trucks 2 (T5)	0.49	0.46	0.73	2.01	0.01	0.08	0.08	0.03	0.04
734	Medium Heavy Duty Gas Trucks (T6)	0.68	0.61	1.26	7.35	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.09	0.07	0.35	3.31	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.37	0.32	9.69	2.14	0.01	0.36	0.35	0.18	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.12	0.11	2.82	0.67	0.01	0.17	0.17	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.96	0.85	20.48	3.03	0.07	1.52	1.50	0.92	0.18
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.76	1.58	58.17	8.58	0.18	1.38	1.37	0.66	0.30
750	Motorcycles (MCY)	10.46	9.21	2.55	47.68	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	3.09	0.60	9.12	8.56	0.00	0.64	0.63	0.33	0.02
762	Gas Urban Buses (UB)	0.38	0.28	0.51	2.70	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.07	0.55	0.00	0.07	0.07	0.03	0.00
772	Diesel School Buses (SB)	0.04	0.03	1.90	0.10	0.00	0.18	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.16	0.14	0.35	1.81	0.00	0.06	0.06	0.02	0.02
778	Motor Coaches	0.03	0.03	0.93	0.10	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	1.02	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.10	0.08	0.64	1.72	0.00	0.07	0.07	0.04	0.01
Total On-Road Motor Vehicles		**92.84**	**82.49**	**166.52**	**639.03**	**1.80**	**24.84**	**24.35**	**10.80**	**13.74**
Other Mobile Sources										
810	Aircraft	3.75	3.70	15.84	38.43	1.83	0.76	0.74	0.67	0.00
820	Trains	0.94	0.79	16.88	4.01	0.01	0.30	0.30	0.27	0.01
833	Ocean Going Vessels	2.49	2.22	26.18	4.17	3.15	0.91	0.91	0.87	0.04
835	Commercial Harbor Crafts	1.27	1.06	11.15	6.60	0.00	0.46	0.46	0.43	0.00
840	Recreational Boats	24.69	21.32	4.77	85.29	0.01	1.47	1.32	1.00	0.01
850	Off-Road Recreation Vehicles	2.60	2.52	0.08	3.77	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	47.11	41.43	47.46	549.78	0.09	3.60	3.42	2.89	0.11
870	Farm Equipment	0.53	0.46	2.00	4.91	0.00	0.13	0.13	0.12	0.00
890	Fuel Storage and Handling	5.28	5.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**88.66**	**78.76**	**124.36**	**696.96**	**5.09**	**7.64**	**7.29**	**6.26**	**0.17**
Total Stationary and Area Sources		1088.55	214.38	62.21	111.31	9.68	230.21	127.19	46.81	60.04
Total On-Road Vehicles		92.84	82.49	166.52	639.03	1.80	24.84	24.35	10.80	13.74
Total Other Mobile		88.66	78.76	124.36	696.96	5.09	7.64	7.29	6.26	0.17
Total		**1270.05**	**375.63**	**353.09**	**1447.30**	**16.57**	**262.69**	**158.83**	**63.87**	**73.95**

2020 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.37	0.85	0.12	6.57	0.25	0.97	0.97	0.96	1.59
20	Cogeneration	0.96	0.10	0.01	0.61	0.01	0.16	0.16	0.15	0.29
30	Oil and Gas Production (Combustion)	0.91	0.11	0.70	0.78	0.01	0.11	0.10	0.10	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.63	4.25	9.77	16.25	0.29	1.19	1.18	1.18	2.35
52	Food and Agricultural Processing	0.09	0.04	0.13	0.32	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.02	4.56	8.92	16.19	1.32	1.42	1.41	1.41	3.04
99	Other (Fuel Combustion)	1.42	0.24	2.23	2.59	0.15	0.32	0.24	0.17	0.02
Total Fuel Combustion		**51.76**	**11.16**	**21.88**	**48.26**	**2.03**	**5.77**	**5.61**	**5.50**	**8.48**
Waste Disposal										
110	Sewage Treatment	0.73	0.41	0.01	0.01	0.04	0.01	0.00	0.00	0.25
120	Landfills	631.62	8.89	0.67	0.53	0.36	0.16	0.15	0.15	3.97
130	Incineration	0.43	0.08	1.59	0.59	0.15	0.20	0.10	0.08	0.37
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	60.44	4.84	0.00	0.00	0.00	0.00	0.00	0.00	1.09
Total Waste Disposal		**693.22**	**14.22**	**2.27**	**1.13**	**0.55**	**0.37**	**0.25**	**0.23**	**5.68**
Cleaning and Surface Coatings										
210	Laundering	3.52	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	71.21	13.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	23.18	22.38	0.02	0.01	0.00	1.76	1.69	1.63	0.15
240	Printing	1.82	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.13	4.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.88	0.88	0.03	0.06	0.00	0.05	0.05	0.05	0.28
Total Cleaning and Surface Coatings		**105.74**	**42.88**	**0.05**	**0.07**	**0.00**	**1.81**	**1.74**	**1.68**	**0.48**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.30	2.44	0.03	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.96	4.54	0.25	5.19	0.36	2.65	1.73	1.52	0.24
330	Petroleum Marketing	53.41	13.45	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.12	0.10	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**65.79**	**20.53**	**0.29**	**5.22**	**0.42**	**2.67**	**1.74**	**1.52**	**0.24**
Industrial Processes										
410	Chemical	7.70	6.17	0.01	0.03	0.01	0.83	0.65	0.52	0.03
420	Food and Agriculture	1.34	1.31	0.00	0.00	0.01	0.45	0.25	0.12	0.02
430	Mineral Processes	0.93	0.77	0.01	0.17	0.00	7.78	5.11	2.80	0.14
440	Metal Processes	0.19	0.14	0.04	0.19	0.10	0.56	0.36	0.24	0.01
450	Wood and Paper	0.28	0.28	0.00	0.00	0.00	6.88	4.82	2.93	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.12	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.69	3.31	0.02	0.13	0.00	1.28	0.86	0.50	8.58
Total Industrial Processes		**14.16**	**12.01**	**0.08**	**0.52**	**0.12**	**17.95**	**12.20**	**7.24**	**8.78**
Solvent Evaporation										
510	Consumer Products	106.49	88.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.47	11.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.35	1.35	0.00	0.00	0.00	0.00	0.00	0.00	1.16
540	Asphalt Paving/Roofing	1.16	1.06	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**121.47**	**102.72**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.16**

(Continued)

2020 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.24	8.41	13.84	46.58	0.48	7.12	6.76	6.57	0.11
620	Farming Operations	20.95	1.72	0.00	0.00	0.00	1.91	0.93	0.17	8.60
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	50.04	24.47	2.45	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	119.81	54.75	8.27	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.86	5.86	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.05	1.55	0.22	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.81	1.97	0.00	0.00	0.00	11.78	11.78	11.78	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.31
	RECLAIM			20.51		6.08				
Total Miscellaneous Processes		**44.15**	**12.80**	**34.62**	**55.91**	**6.61**	**204.74**	**107.24**	**31.08**	**35.05**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	27.92	26.09	18.09	218.58	0.71	11.73	11.49	4.85	5.78
722	Light Duty Trucks 1 (T1)	7.68	7.27	3.99	44.63	0.07	0.96	0.94	0.41	0.56
723	Light Duty Trucks 2 (T2)	13.14	12.28	10.26	99.68	0.35	4.24	4.16	1.75	3.10
724	Medium Duty Trucks (T3)	14.51	13.40	12.85	116.89	0.29	2.62	2.56	1.09	2.88
732	Light Heavy Duty Gas Trucks 1 (T4)	3.63	3.44	4.28	13.67	0.03	0.29	0.29	0.12	0.20
733	Light Heavy Duty Gas Trucks 2 (T5)	0.44	0.41	0.68	1.79	0.01	0.08	0.08	0.03	0.04
734	Medium Heavy Duty Gas Trucks (T6)	0.62	0.56	1.13	6.57	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.08	0.06	0.34	3.26	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.35	0.30	8.81	2.02	0.01	0.35	0.35	0.18	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.12	0.10	2.49	0.63	0.01	0.17	0.17	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.65	0.57	16.01	2.20	0.08	1.38	1.36	0.76	0.19
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.71	1.50	55.51	8.66	0.18	1.38	1.36	0.63	0.31
750	Motorcycles (MCY)	10.47	9.21	2.57	47.42	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	2.82	0.54	8.04	7.87	0.00	0.60	0.59	0.31	0.02
762	Gas Urban Buses (UB)	0.35	0.25	0.48	2.31	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.06	0.54	0.00	0.07	0.07	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.80	0.09	0.00	0.18	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.16	0.14	0.32	1.69	0.00	0.06	0.06	0.02	0.02
778	Motor Coaches	0.03	0.03	0.87	0.10	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	0.95	0.08	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.09	0.07	0.59	1.38	0.00	0.07	0.07	0.04	0.01
Total On-Road Motor Vehicles		**85.88**	**76.31**	**150.12**	**580.06**	**1.75**	**24.48**	**24.01**	**10.50**	**13.21**
Other Mobile Sources										
810	Aircraft	3.82	3.78	16.16	39.21	1.88	0.77	0.75	0.68	0.00
820	Trains	0.89	0.75	16.52	4.07	0.01	0.29	0.29	0.26	0.01
833	Ocean Going Vessels	2.55	2.28	24.80	4.26	3.20	0.93	0.93	0.89	0.04
835	Commercial Harbor Crafts	1.26	1.06	10.92	6.66	0.00	0.45	0.45	0.42	0.00
840	Recreational Boats	23.38	20.21	4.67	84.14	0.01	1.39	1.25	0.95	0.01
850	Off-Road Recreation Vehicles	2.58	2.49	0.08	3.87	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	46.54	40.89	45.30	555.80	0.09	3.46	3.28	2.76	0.11
870	Farm Equipment	0.50	0.43	1.89	4.89	0.00	0.13	0.13	0.11	0.00
890	Fuel Storage and Handling	5.09	5.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**86.61**	**76.96**	**120.34**	**702.90**	**5.19**	**7.43**	**7.09**	**6.08**	**0.17**
Total Stationary and Area Sources		1096.29	216.32	59.19	111.11	9.73	233.34	128.81	47.28	59.87
Total On-Road Vehicles		85.88	76.31	150.12	580.06	1.75	24.48	24.01	10.50	13.21
Total Other Mobile		86.61	76.96	120.34	702.90	5.19	7.43	7.09	6.08	0.17
Total		**1268.78**	**369.59**	**329.65**	**1394.07**	**16.67**	**265.25**	**159.91**	**63.86**	**73.25**

2021 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.58	0.88	0.12	6.82	0.26	1.01	1.00	1.00	1.65
20	Cogeneration	0.96	0.11	0.01	0.63	0.01	0.16	0.16	0.15	0.30
30	Oil and Gas Production (Combustion)	0.92	0.11	0.71	0.79	0.01	0.11	0.11	0.10	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.39	4.27	9.76	16.38	0.29	1.19	1.18	1.18	2.34
52	Food and Agricultural Processing	0.09	0.04	0.13	0.32	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.09	4.55	8.91	16.23	1.34	1.42	1.42	1.41	3.03
99	Other (Fuel Combustion)	1.44	0.24	2.23	2.61	0.15	0.32	0.24	0.17	0.02
Total Fuel Combustion		**51.83**	**11.21**	**21.87**	**48.73**	**2.06**	**5.81**	**5.66**	**5.54**	**8.53**
Waste Disposal										
110	Sewage Treatment	0.74	0.42	0.01	0.01	0.04	0.01	0.00	0.00	0.25
120	Landfills	636.10	8.95	0.67	0.54	0.36	0.16	0.15	0.15	3.99
130	Incineration	0.44	0.08	1.61	0.60	0.15	0.21	0.10	0.09	0.37
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	63.31	5.07	0.00	0.00	0.00	0.00	0.00	0.00	1.12
Total Waste Disposal		**700.59**	**14.52**	**2.29**	**1.15**	**0.55**	**0.38**	**0.25**	**0.24**	**5.73**
Cleaning and Surface Coatings										
210	Laundering	3.55	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	73.57	13.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	23.61	22.80	0.02	0.01	0.00	1.79	1.72	1.65	0.15
240	Printing	1.86	1.86	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.30	4.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.91	0.91	0.03	0.06	0.00	0.05	0.05	0.05	0.28
Total Cleaning and Surface Coatings		**108.80**	**43.95**	**0.05**	**0.07**	**0.00**	**1.84**	**1.77**	**1.70**	**0.48**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.36	2.47	0.03	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.99	4.55	0.25	5.20	0.36	2.66	1.73	1.52	0.24
330	Petroleum Marketing	52.78	13.22	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.12	0.11	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**65.25**	**20.35**	**0.29**	**5.23**	**0.42**	**2.68**	**1.74**	**1.52**	**0.24**
Industrial Processes										
410	Chemical	7.90	6.33	0.01	0.03	0.01	0.86	0.67	0.54	0.03
420	Food and Agriculture	1.36	1.33	0.00	0.00	0.01	0.45	0.25	0.12	0.02
430	Mineral Processes	0.95	0.79	0.01	0.17	0.00	7.82	5.14	2.81	0.14
440	Metal Processes	0.19	0.15	0.04	0.19	0.10	0.57	0.37	0.24	0.01
450	Wood and Paper	0.28	0.28	0.00	0.00	0.00	7.06	4.94	3.00	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.12	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.73	3.34	0.03	0.14	0.00	1.31	0.88	0.52	8.58
Total Industrial Processes		**14.44**	**12.25**	**0.09**	**0.53**	**0.12**	**18.25**	**12.41**	**7.36**	**8.78**
Solvent Evaporation										
510	Consumer Products	107.10	89.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.56	11.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.36	1.36	0.00	0.00	0.00	0.00	0.00	0.00	1.15
540	Asphalt Paving/Roofing	1.17	1.08	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**122.19**	**103.35**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.15**

(Continued)

2021 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.22	8.40	13.52	46.51	0.48	7.10	6.75	6.55	0.11
620	Farming Operations	20.15	1.66	0.00	0.00	0.00	1.87	0.91	0.17	8.25
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	50.70	24.79	2.48	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	120.98	55.29	8.35	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.86	5.86	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.99	1.53	0.22	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.84	1.98	0.00	0.00	0.00	11.88	11.88	11.88	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.48
	RECLAIM			18.51		6.08				
Total Miscellaneous Processes		**43.36**	**12.74**	**32.30**	**55.84**	**6.61**	**206.55**	**108.15**	**31.27**	**34.87**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	26.05	24.39	16.41	203.73	0.69	11.83	11.58	4.89	5.66
722	Light Duty Trucks 1 (T1)	7.12	6.76	3.59	40.42	0.07	0.95	0.93	0.41	0.54
723	Light Duty Trucks 2 (T2)	12.42	11.63	9.22	92.80	0.34	4.29	4.20	1.77	3.06
724	Medium Duty Trucks (T3)	13.44	12.46	11.25	103.39	0.28	2.59	2.53	1.07	2.77
732	Light Heavy Duty Gas Trucks 1 (T4)	3.39	3.22	3.94	12.17	0.02	0.27	0.27	0.11	0.18
733	Light Heavy Duty Gas Trucks 2 (T5)	0.39	0.37	0.62	1.60	0.01	0.08	0.08	0.03	0.04
734	Medium Heavy Duty Gas Trucks (T6)	0.57	0.52	1.01	5.90	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.08	0.06	0.34	3.25	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.33	0.29	7.96	1.89	0.01	0.35	0.35	0.18	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.11	0.10	2.19	0.59	0.01	0.17	0.17	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.30	0.26	11.51	1.15	0.08	1.09	1.07	0.47	0.19
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.75	1.49	52.62	9.01	0.19	1.41	1.39	0.63	0.33
750	Motorcycles (MCY)	10.50	9.22	2.59	47.08	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	2.57	0.48	7.22	7.30	0.00	0.56	0.55	0.29	0.01
762	Gas Urban Buses (UB)	0.33	0.24	0.46	2.18	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.06	0.53	0.00	0.07	0.07	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.70	0.09	0.00	0.18	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.15	0.14	0.30	1.60	0.00	0.06	0.06	0.03	0.02
778	Motor Coaches	0.03	0.02	0.79	0.10	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	0.82	0.08	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.07	0.06	0.54	1.10	0.00	0.07	0.07	0.03	0.01
Total On-Road Motor Vehicles		**80.71**	**71.80**	**135.14**	**535.96**	**1.71**	**24.27**	**23.78**	**10.22**	**12.91**
Other Mobile Sources										
810	Aircraft	3.90	3.85	16.57	39.82	1.93	0.78	0.76	0.69	0.00
820	Trains	0.89	0.74	16.25	4.12	0.01	0.28	0.28	0.26	0.01
833	Ocean Going Vessels	2.66	2.38	24.21	4.44	3.28	0.96	0.96	0.92	0.04
835	Commercial Harbor Crafts	1.26	1.06	10.70	6.72	0.00	0.44	0.44	0.41	0.00
840	Recreational Boats	22.11	19.13	4.58	83.02	0.01	1.32	1.19	0.90	0.01
850	Off-Road Recreation Vehicles	2.54	2.45	0.08	3.95	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	45.91	40.30	42.88	562.82	0.09	3.34	3.16	2.64	0.11
870	Farm Equipment	0.48	0.41	1.79	4.93	0.00	0.12	0.12	0.11	0.00
890	Fuel Storage and Handling	4.92	4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**84.67**	**75.22**	**117.06**	**709.82**	**5.32**	**7.25**	**6.92**	**5.94**	**0.17**
Total Stationary and Area Sources		1106.46	218.37	56.89	111.55	9.76	235.54	130.01	47.66	59.78
Total On-Road Vehicles		80.71	71.80	135.14	535.96	1.71	24.27	23.78	10.22	12.91
Total Other Mobile		84.67	75.22	117.06	709.82	5.32	7.25	6.92	5.94	0.17
Total		**1271.84**	**365.39**	**309.09**	**1357.33**	**16.79**	**267.06**	**160.71**	**63.82**	**72.86**

2022 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.72	0.90	0.13	7.00	0.27	1.03	1.03	1.03	1.70
20	Cogeneration	0.97	0.11	0.01	0.65	0.01	0.17	0.16	0.15	0.31
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.28	4.30	9.78	16.55	0.30	1.20	1.19	1.18	2.33
52	Food and Agricultural Processing	0.09	0.04	0.13	0.33	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.16	4.55	8.91	16.28	1.36	1.43	1.42	1.42	3.03
99	Other (Fuel Combustion)	1.45	0.24	2.23	2.63	0.15	0.32	0.24	0.17	0.02
Total Fuel Combustion		**51.96**	**11.26**	**21.91**	**49.19**	**2.10**	**5.86**	**5.70**	**5.59**	**8.58**
Waste Disposal										
110	Sewage Treatment	0.76	0.43	0.01	0.01	0.04	0.01	0.00	0.00	0.25
120	Landfills	640.59	9.01	0.68	0.54	0.37	0.16	0.15	0.15	4.01
130	Incineration	0.45	0.08	1.63	0.61	0.15	0.21	0.10	0.09	0.38
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	66.25	5.30	0.00	0.00	0.00	0.00	0.00	0.00	1.16
Total Waste Disposal		**708.05**	**14.82**	**2.32**	**1.16**	**0.56**	**0.38**	**0.25**	**0.24**	**5.80**
Cleaning and Surface Coatings										
210	Laundering	3.58	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	75.94	14.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	24.06	23.24	0.02	0.01	0.00	1.82	1.75	1.68	0.15
240	Printing	1.90	1.90	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.47	4.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.93	0.93	0.03	0.07	0.00	0.05	0.05	0.05	0.28
Total Cleaning and Surface Coatings		**111.88**	**45.03**	**0.05**	**0.08**	**0.00**	**1.87**	**1.80**	**1.73**	**0.48**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.40	2.49	0.03	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	7.01	4.56	0.25	5.22	0.36	2.66	1.74	1.53	0.24
330	Petroleum Marketing	52.24	13.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.12	0.11	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**64.77**	**20.16**	**0.29**	**5.25**	**0.42**	**2.68**	**1.75**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	8.11	6.49	0.01	0.04	0.01	0.88	0.69	0.55	0.03
420	Food and Agriculture	1.38	1.35	0.00	0.00	0.01	0.46	0.26	0.12	0.02
430	Mineral Processes	0.97	0.80	0.01	0.17	0.00	7.87	5.16	2.82	0.14
440	Metal Processes	0.20	0.15	0.05	0.20	0.10	0.58	0.38	0.25	0.01
450	Wood and Paper	0.29	0.29	0.00	0.00	0.00	7.24	5.07	3.08	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.77	3.38	0.03	0.14	0.00	1.34	0.90	0.53	8.58
Total Industrial Processes		**14.75**	**12.49**	**0.10**	**0.55**	**0.12**	**18.55**	**12.62**	**7.49**	**8.78**
Solvent Evaporation										
510	Consumer Products	107.71	89.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.66	11.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.36	1.36	0.00	0.00	0.00	0.00	0.00	0.00	1.14
540	Asphalt Paving/Roofing	1.19	1.10	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**122.92**	**103.98**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.14**

(Continued)

2022 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.21	8.39	13.22	46.46	0.48	7.09	6.74	6.54	0.11
620	Farming Operations	19.41	1.60	0.00	0.00	0.00	1.83	0.89	0.17	7.93
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	51.43	25.15	2.52	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	122.15	55.82	8.43	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.85	5.85	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.93	1.50	0.21	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.86	2.00	0.00	0.00	0.00	11.98	11.98	11.98	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.65
	RECLAIM			14.51		6.08				
Total Miscellaneous Processes		**42.63**	**12.69**	**28.00**	**55.79**	**6.61**	**208.43**	**109.07**	**31.47**	**34.72**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	24.50	23.00	14.95	191.02	0.66	11.92	11.67	4.92	5.56
722	Light Duty Trucks 1 (T1)	6.64	6.32	3.23	36.71	0.06	0.95	0.93	0.40	0.52
723	Light Duty Trucks 2 (T2)	11.88	11.15	8.38	87.56	0.34	4.34	4.25	1.79	3.04
724	Medium Duty Trucks (T3)	12.38	11.51	9.74	89.43	0.27	2.56	2.51	1.06	2.68
732	Light Heavy Duty Gas Trucks 1 (T4)	3.15	3.01	3.60	10.81	0.02	0.26	0.25	0.11	0.17
733	Light Heavy Duty Gas Trucks 2 (T5)	0.35	0.33	0.57	1.45	0.01	0.08	0.08	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.53	0.48	0.90	5.29	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.06	0.34	3.28	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.31	0.27	7.17	1.77	0.01	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.10	0.09	1.91	0.55	0.01	0.18	0.17	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.30	0.26	11.26	1.18	0.08	1.12	1.10	0.48	0.20
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.76	1.47	49.33	9.27	0.19	1.43	1.41	0.63	0.34
750	Motorcycles (MCY)	10.61	9.29	2.62	47.15	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	2.36	0.43	6.56	6.82	0.00	0.54	0.53	0.27	0.01
762	Gas Urban Buses (UB)	0.31	0.23	0.43	2.03	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.06	0.52	0.00	0.08	0.07	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.60	0.09	0.00	0.17	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.15	0.13	0.28	1.51	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.03	0.02	0.70	0.10	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	0.80	0.08	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.06	0.05	0.49	0.89	0.00	0.07	0.07	0.03	0.01
Total On-Road Motor Vehicles		**76.60**	**68.19**	**124.92**	**497.51**	**1.68**	**24.41**	**23.91**	**10.23**	**12.68**
Other Mobile Sources										
810	Aircraft	3.97	3.92	16.91	40.54	1.99	0.79	0.77	0.70	0.00
820	Trains	0.86	0.72	15.74	4.16	0.01	0.28	0.28	0.25	0.01
833	Ocean Going Vessels	2.78	2.48	23.60	4.61	3.37	1.00	1.00	0.95	0.04
835	Commercial Harbor Crafts	1.25	1.05	10.49	6.78	0.00	0.43	0.43	0.40	0.00
840	Recreational Boats	20.91	18.10	4.49	81.98	0.01	1.25	1.13	0.85	0.01
850	Off-Road Recreation Vehicles	2.50	2.41	0.08	4.04	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	45.47	39.88	39.87	568.17	0.09	3.18	3.00	2.49	0.11
870	Farm Equipment	0.46	0.39	1.69	4.93	0.00	0.11	0.11	0.10	0.00
890	Fuel Storage and Handling	4.76	4.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**82.96**	**73.69**	**112.87**	**715.21**	**5.47**	**7.05**	**6.73**	**5.75**	**0.17**
Total Stationary and Area Sources		1116.96	220.43	52.67	112.02	9.81	237.80	131.22	48.08	59.74
Total On-Road Vehicles		76.60	68.19	124.92	497.51	1.68	24.41	23.91	10.23	12.68
Total Other Mobile		82.96	73.69	112.87	715.21	5.47	7.05	6.73	5.75	0.17
Total		**1276.52**	**362.31**	**290.46**	**1324.74**	**16.96**	**269.26**	**161.86**	**64.06**	**72.59**

2023 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.82	0.92	0.13	7.12	0.27	1.05	1.05	1.04	1.73
20	Cogeneration	0.97	0.11	0.01	0.66	0.01	0.17	0.16	0.16	0.31
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.02	4.29	9.73	16.56	0.30	1.19	1.18	1.18	2.32
52	Food and Agricultural Processing	0.10	0.04	0.14	0.33	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.17	4.54	8.89	16.28	1.38	1.43	1.43	1.42	3.01
99	Other (Fuel Combustion)	1.46	0.24	2.23	2.64	0.15	0.32	0.24	0.17	0.02
Total Fuel Combustion		**51.83**	**11.26**	**21.85**	**49.34**	**2.12**	**5.87**	**5.72**	**5.61**	**8.58**
Waste Disposal										
110	Sewage Treatment	0.76	0.43	0.01	0.01	0.04	0.01	0.00	0.00	0.25
120	Landfills	645.17	9.08	0.69	0.55	0.37	0.16	0.16	0.15	4.04
130	Incineration	0.45	0.09	1.64	0.61	0.15	0.21	0.10	0.09	0.38
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	69.20	5.54	0.00	0.00	0.00	0.00	0.00	0.00	1.19
Total Waste Disposal		**715.58**	**15.14**	**2.34**	**1.17**	**0.56**	**0.38**	**0.26**	**0.24**	**5.86**
Cleaning and Surface Coatings										
210	Laundering	3.61	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	77.00	14.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	24.29	23.46	0.02	0.01	0.00	1.83	1.76	1.70	0.15
240	Printing	1.91	1.91	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.55	4.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.95	0.95	0.03	0.07	0.00	0.05	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**113.31**	**45.53**	**0.05**	**0.08**	**0.00**	**1.88**	**1.81**	**1.75**	**0.49**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.42	2.50	0.03	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	7.02	4.56	0.25	5.22	0.36	2.66	1.74	1.53	0.24
330	Petroleum Marketing	51.64	12.76	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.12	0.11	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**64.20**	**19.93**	**0.29**	**5.25**	**0.42**	**2.68**	**1.75**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	8.18	6.55	0.01	0.04	0.01	0.89	0.70	0.56	0.03
420	Food and Agriculture	1.39	1.35	0.00	0.00	0.01	0.46	0.26	0.12	0.02
430	Mineral Processes	0.98	0.81	0.01	0.17	0.00	7.89	5.18	2.83	0.14
440	Metal Processes	0.20	0.15	0.05	0.20	0.10	0.59	0.38	0.25	0.01
450	Wood and Paper	0.29	0.29	0.00	0.00	0.00	7.30	5.11	3.11	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.79	3.40	0.03	0.14	0.00	1.36	0.91	0.53	8.58
Total Industrial Processes		**14.86**	**12.58**	**0.10**	**0.55**	**0.12**	**18.67**	**12.70**	**7.54**	**8.78**
Solvent Evaporation										
510	Consumer Products	108.33	90.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.75	12.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.37	1.37	0.00	0.00	0.00	0.00	0.00	0.00	1.13
540	Asphalt Paving/Roofing	1.21	1.11	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**123.66**	**104.61**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.13**

(Continued)

2023 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.19	8.38	12.91	46.40	0.48	7.08	6.72	6.53	0.11
620	Farming Operations	18.69	1.54	0.00	0.00	0.00	1.79	0.87	0.16	7.61
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	52.06	25.46	2.55	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	123.29	56.34	8.51	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.85	5.85	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.87	1.47	0.21	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.88	2.01	0.00	0.00	0.00	12.07	12.07	12.07	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.82
	RECLAIM			14.51		6.08				
Total Miscellaneous Processes		**41.91**	**12.63**	**27.69**	**55.73**	**6.61**	**210.18**	**109.92**	**31.65**	**34.57**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	23.10	21.74	13.69	179.12	0.64	12.00	11.75	4.95	5.48
722	Light Duty Trucks 1 (T1)	6.20	5.90	2.91	33.11	0.06	0.95	0.92	0.40	0.51
723	Light Duty Trucks 2 (T2)	11.43	10.75	7.65	83.06	0.33	4.39	4.29	1.81	3.03
724	Medium Duty Trucks (T3)	11.64	10.87	8.63	80.68	0.26	2.54	2.49	1.05	2.60
732	Light Heavy Duty Gas Trucks 1 (T4)	2.95	2.82	3.30	9.67	0.02	0.24	0.24	0.10	0.15
733	Light Heavy Duty Gas Trucks 2 (T5)	0.31	0.30	0.52	1.34	0.01	0.08	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.49	0.45	0.81	4.81	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.34	3.33	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.29	0.26	6.43	1.66	0.01	0.35	0.34	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.10	0.09	1.65	0.51	0.01	0.18	0.18	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.24	0.21	8.52	1.10	0.08	1.14	1.12	0.47	0.21
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.22	0.96	27.85	8.49	0.19	1.36	1.34	0.53	0.35
750	Motorcycles (MCY)	10.67	9.33	2.65	47.17	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	2.15	0.39	5.97	6.37	0.00	0.52	0.51	0.26	0.01
762	Gas Urban Buses (UB)	0.29	0.21	0.41	1.90	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.05	0.52	0.00	0.08	0.08	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.50	0.09	0.00	0.17	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.14	0.13	0.27	1.44	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.02	0.01	0.33	0.08	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.01	0.01	0.43	0.06	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.05	0.04	0.44	0.71	0.00	0.07	0.06	0.03	0.01
Total On-Road Motor Vehicles		**72.46**	**64.59**	**94.35**	**465.22**	**1.64**	**24.43**	**23.91**	**10.14**	**12.50**
Other Mobile Sources										
810	Aircraft	4.05	4.01	17.31	41.33	2.04	0.80	0.78	0.71	0.00
820	Trains	0.84	0.70	15.27	4.20	0.01	0.27	0.27	0.25	0.01
833	Ocean Going Vessels	2.90	2.59	22.97	4.79	3.45	1.03	1.03	0.99	0.04
835	Commercial Harbor Crafts	1.25	1.05	10.33	6.85	0.00	0.42	0.42	0.39	0.00
840	Recreational Boats	19.75	17.12	4.41	81.02	0.01	1.19	1.07	0.81	0.01
850	Off-Road Recreation Vehicles	2.46	2.37	0.09	4.12	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	45.30	39.71	38.03	573.47	0.09	3.08	2.89	2.40	0.12
870	Farm Equipment	0.44	0.38	1.60	4.94	0.00	0.11	0.11	0.10	0.00
890	Fuel Storage and Handling	4.62	4.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**81.61**	**72.53**	**110.01**	**720.72**	**5.60**	**6.91**	**6.58**	**5.66**	**0.18**
Total Stationary and Area Sources		1125.35	221.68	52.32	112.12	9.83	239.69	132.19	48.35	59.65
Total On-Road Vehicles		72.46	64.59	94.35	465.22	1.64	24.43	23.91	10.14	12.50
Total Other Mobile		81.61	72.53	110.01	720.72	5.60	6.91	6.58	5.66	0.18
Total		**1279.42**	**358.80**	**256.68**	**1298.06**	**17.07**	**271.03**	**162.68**	**64.15**	**72.33**

2024 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.88	0.93	0.13	7.20	0.28	1.06	1.06	1.05	1.75
20	Cogeneration	0.97	0.11	0.01	0.66	0.01	0.17	0.16	0.16	0.31
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.88	4.30	9.71	16.61	0.31	1.19	1.18	1.18	2.31
52	Food and Agricultural Processing	0.10	0.04	0.14	0.33	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.19	4.52	8.88	16.28	1.39	1.44	1.43	1.43	3.01
99	Other (Fuel Combustion)	1.48	0.24	2.24	2.66	0.16	0.32	0.24	0.17	0.02
Total Fuel Combustion		**51.79**	**11.26**	**21.83**	**49.49**	**2.16**	**5.89**	**5.73**	**5.63**	**8.59**
Waste Disposal										
110	Sewage Treatment	0.77	0.44	0.01	0.01	0.04	0.01	0.01	0.00	0.25
120	Landfills	649.92	9.14	0.69	0.55	0.37	0.16	0.16	0.15	4.06
130	Incineration	0.45	0.09	1.65	0.62	0.16	0.21	0.10	0.09	0.39
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	72.25	5.78	0.00	0.00	0.00	0.00	0.00	0.00	1.23
Total Waste Disposal		**723.39**	**15.45**	**2.35**	**1.18**	**0.57**	**0.38**	**0.27**	**0.24**	**5.93**
Cleaning and Surface Coatings										
210	Laundering	3.64	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	78.09	14.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	24.55	23.71	0.02	0.01	0.00	1.85	1.77	1.71	0.16
240	Printing	1.93	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.63	4.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.96	0.96	0.03	0.07	0.00	0.05	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**114.80**	**46.09**	**0.05**	**0.08**	**0.00**	**1.90**	**1.82**	**1.76**	**0.50**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.42	2.50	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.03	4.56	0.25	5.23	0.36	2.66	1.74	1.53	0.24
330	Petroleum Marketing	51.14	12.53	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.11	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**63.72**	**19.70**	**0.29**	**5.26**	**0.42**	**2.68**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	8.27	6.62	0.01	0.04	0.01	0.90	0.71	0.56	0.03
420	Food and Agriculture	1.40	1.36	0.00	0.00	0.01	0.47	0.26	0.12	0.02
430	Mineral Processes	0.99	0.82	0.01	0.17	0.00	7.91	5.19	2.83	0.14
440	Metal Processes	0.20	0.15	0.05	0.20	0.10	0.60	0.39	0.25	0.01
450	Wood and Paper	0.29	0.29	0.00	0.00	0.00	7.36	5.16	3.13	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.82	3.42	0.03	0.14	0.00	1.37	0.93	0.54	8.58
Total Industrial Processes		**15.00**	**12.69**	**0.10**	**0.55**	**0.12**	**18.79**	**12.80**	**7.57**	**8.78**
Solvent Evaporation										
510	Consumer Products	108.97	90.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.84	12.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.37	1.37	0.00	0.00	0.00	0.00	0.00	0.00	1.12
540	Asphalt Paving/Roofing	1.23	1.13	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**124.41**	**105.26**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.12**

(Continued)

2024 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.18	8.38	12.61	46.36	0.48	7.07	6.72	6.52	0.11
620	Farming Operations	18.69	1.55	0.00	0.00	0.00	1.78	0.87	0.16	7.62
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	52.79	25.82	2.59	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	123.78	56.57	8.54	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.85	5.85	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.81	1.44	0.20	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.90	2.03	0.00	0.00	0.00	12.17	12.17	12.17	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.00
	RECLAIM			14.51		6.08				
Total Miscellaneous Processes		**41.92**	**12.66**	**27.39**	**55.69**	**6.61**	**211.42**	**110.58**	**31.80**	**34.76**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	21.74	20.51	12.49	165.99	0.61	11.93	11.68	4.91	5.34
722	Light Duty Trucks 1 (T1)	5.76	5.50	2.62	30.03	0.06	0.93	0.91	0.39	0.49
723	Light Duty Trucks 2 (T2)	10.94	10.32	6.99	78.42	0.32	4.38	4.28	1.81	3.00
724	Medium Duty Trucks (T3)	10.90	10.22	7.66	72.80	0.24	2.50	2.44	1.03	2.53
732	Light Heavy Duty Gas Trucks 1 (T4)	2.78	2.67	3.05	8.77	0.02	0.23	0.23	0.10	0.14
733	Light Heavy Duty Gas Trucks 2 (T5)	0.29	0.28	0.48	1.27	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.47	0.43	0.75	4.47	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.35	3.40	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.28	0.24	5.82	1.56	0.01	0.35	0.34	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.09	0.08	1.44	0.48	0.01	0.18	0.18	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.24	0.21	8.70	1.12	0.08	1.17	1.14	0.49	0.21
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.29	0.98	28.07	8.85	0.20	1.40	1.39	0.55	0.36
750	Motorcycles (MCY)	10.56	9.23	2.63	46.62	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.97	0.35	5.26	5.92	0.00	0.49	0.48	0.24	0.01
762	Gas Urban Buses (UB)	0.26	0.19	0.38	1.72	0.01	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.05	0.51	0.00	0.08	0.08	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.40	0.09	0.00	0.17	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.14	0.13	0.26	1.38	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.02	0.01	0.34	0.08	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.01	0.01	0.45	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.05	0.04	0.41	0.61	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**68.95**	**61.52**	**89.60**	**434.16**	**1.60**	**24.30**	**23.80**	**10.09**	**12.24**
Other Mobile Sources										
810	Aircraft	4.13	4.09	17.68	42.08	2.10	0.81	0.79	0.72	0.00
820	Trains	0.81	0.68	14.59	4.24	0.02	0.26	0.26	0.24	0.01
833	Ocean Going Vessels	3.02	2.69	22.10	4.97	3.54	1.07	1.07	1.02	0.04
835	Commercial Harbor Crafts	1.26	1.05	10.21	6.91	0.00	0.42	0.42	0.38	0.00
840	Recreational Boats	18.63	16.17	4.34	80.11	0.01	1.12	1.01	0.76	0.01
850	Off-Road Recreation Vehicles	2.42	2.33	0.09	4.19	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	45.28	39.68	36.74	578.77	0.10	3.01	2.82	2.33	0.12
870	Farm Equipment	0.42	0.36	1.51	4.95	0.00	0.10	0.10	0.09	0.00
890	Fuel Storage and Handling	4.49	4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**80.46**	**71.52**	**107.26**	**726.22**	**5.77**	**6.80**	**6.48**	**5.55**	**0.18**
Total Stationary and Area Sources		1135.03	223.11	52.01	112.25	9.88	241.09	132.99	48.56	59.92
Total On-Road Vehicles		68.95	61.52	89.60	434.16	1.60	24.30	23.80	10.09	12.24
Total Other Mobile		80.46	71.52	107.26	726.22	5.77	6.80	6.48	5.55	0.18
Total		**1284.44**	**356.15**	**248.87**	**1272.63**	**17.25**	**272.19**	**163.27**	**64.20**	**72.34**

2025 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.93	0.94	0.13	7.26	0.28	1.07	1.07	1.06	1.76
20	Cogeneration	0.97	0.11	0.01	0.67	0.01	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.70	4.30	9.69	16.64	0.31	1.19	1.18	1.18	2.30
52	Food and Agricultural Processing	0.10	0.04	0.14	0.33	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.22	4.52	8.88	16.30	1.41	1.44	1.44	1.43	3.00
99	Other (Fuel Combustion)	1.49	0.24	2.24	2.68	0.16	0.32	0.24	0.17	0.02
Total Fuel Combustion		**51.70**	**11.27**	**21.81**	**49.63**	**2.18**	**5.90**	**5.75**	**5.64**	**8.59**
Waste Disposal										
110	Sewage Treatment	0.78	0.44	0.01	0.01	0.04	0.01	0.01	0.00	0.25
120	Landfills	654.40	9.21	0.70	0.56	0.37	0.17	0.16	0.15	4.08
130	Incineration	0.46	0.09	1.67	0.62	0.16	0.21	0.11	0.09	0.39
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	75.27	6.02	0.00	0.00	0.00	0.00	0.00	0.00	1.27
Total Waste Disposal		**730.91**	**15.76**	**2.38**	**1.19**	**0.57**	**0.39**	**0.28**	**0.24**	**5.99**
Cleaning and Surface Coatings										
210	Laundering	3.67	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	79.14	14.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	24.79	23.94	0.02	0.01	0.00	1.86	1.78	1.72	0.16
240	Printing	1.95	1.95	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.70	4.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.97	0.97	0.03	0.07	0.00	0.05	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**116.22**	**46.61**	**0.05**	**0.08**	**0.00**	**1.91**	**1.83**	**1.77**	**0.50**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.41	2.49	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.04	4.56	0.25	5.24	0.36	2.66	1.74	1.53	0.24
330	Petroleum Marketing	50.64	12.31	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.11	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**63.22**	**19.47**	**0.29**	**5.27**	**0.42**	**2.68**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	8.34	6.68	0.01	0.04	0.01	0.91	0.71	0.57	0.03
420	Food and Agriculture	1.41	1.37	0.00	0.00	0.01	0.47	0.26	0.12	0.02
430	Mineral Processes	1.00	0.83	0.01	0.18	0.00	7.94	5.21	2.84	0.15
440	Metal Processes	0.20	0.15	0.05	0.20	0.11	0.60	0.39	0.26	0.01
450	Wood and Paper	0.29	0.29	0.00	0.00	0.00	7.42	5.20	3.16	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.85	3.45	0.03	0.14	0.00	1.39	0.93	0.54	8.58
Total Industrial Processes		**15.12**	**12.80**	**0.10**	**0.56**	**0.13**	**18.91**	**12.86**	**7.63**	**8.79**
Solvent Evaporation										
510	Consumer Products	109.58	91.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.93	12.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.38	1.38	0.00	0.00	0.00	0.00	0.00	0.00	1.12
540	Asphalt Paving/Roofing	1.25	1.15	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**125.14**	**105.88**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.12**

(Continued)

2025 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.17	8.38	12.33	46.32	0.48	7.07	6.71	6.52	0.11
620	Farming Operations	18.69	1.55	0.00	0.00	0.00	1.77	0.86	0.16	7.62
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	53.49	26.16	2.62	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	124.30	56.80	8.58	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.85	5.85	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.75	1.42	0.20	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.93	2.05	0.00	0.00	0.00	12.26	12.26	12.26	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.17
	RECLAIM			14.51		6.08				
Total Miscellaneous Processes		**41.94**	**12.68**	**27.11**	**55.65**	**6.61**	**212.66**	**111.20**	**31.96**	**34.93**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	20.38	19.28	11.30	152.86	0.58	11.85	11.61	4.88	5.20
722	Light Duty Trucks 1 (T1)	5.33	5.10	2.33	26.95	0.06	0.92	0.90	0.39	0.47
723	Light Duty Trucks 2 (T2)	10.45	9.88	6.33	73.78	0.30	4.37	4.28	1.80	2.96
724	Medium Duty Trucks (T3)	10.15	9.56	6.70	64.92	0.23	2.45	2.40	1.01	2.45
732	Light Heavy Duty Gas Trucks 1 (T4)	2.61	2.51	2.81	7.88	0.02	0.22	0.21	0.09	0.13
733	Light Heavy Duty Gas Trucks 2 (T5)	0.27	0.25	0.45	1.20	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.44	0.41	0.69	4.14	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.35	3.47	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.26	0.23	5.21	1.47	0.01	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.09	0.08	1.22	0.45	0.01	0.18	0.18	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.24	0.22	8.89	1.13	0.08	1.19	1.17	0.50	0.22
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.36	1.00	28.28	9.22	0.20	1.45	1.43	0.57	0.37
750	Motorcycles (MCY)	10.46	9.13	2.62	46.07	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.80	0.30	4.55	5.47	0.00	0.46	0.45	0.22	0.01
762	Gas Urban Buses (UB)	0.22	0.17	0.36	1.53	0.01	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.05	0.05	0.50	0.00	0.08	0.08	0.04	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.30	0.09	0.00	0.17	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.14	0.12	0.24	1.33	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.02	0.02	0.36	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.47	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.04	0.03	0.38	0.50	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**65.44**	**58.43**	**84.89**	**403.12**	**1.54**	**24.18**	**23.72**	**10.04**	**11.98**
Other Mobile Sources										
810	Aircraft	4.19	4.15	18.17	42.75	2.16	0.83	0.80	0.73	0.00
820	Trains	0.78	0.65	13.93	4.28	0.02	0.25	0.25	0.23	0.01
833	Ocean Going Vessels	3.13	2.80	21.37	5.15	3.63	1.10	1.10	1.05	0.04
835	Commercial Harbor Crafts	1.26	1.05	10.08	6.96	0.00	0.41	0.41	0.38	0.00
840	Recreational Boats	17.58	15.27	4.26	79.31	0.01	1.06	0.96	0.72	0.01
850	Off-Road Recreation Vehicles	2.38	2.30	0.09	4.25	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	45.22	39.62	34.65	583.67	0.10	2.90	2.71	2.22	0.12
870	Farm Equipment	0.41	0.35	1.44	4.96	0.00	0.10	0.10	0.09	0.00
890	Fuel Storage and Handling	4.37	4.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**79.32**	**70.55**	**103.99**	**731.33**	**5.92**	**6.66**	**6.34**	**5.43**	**0.18**
Total Stationary and Area Sources		1144.25	224.47	51.74	112.38	9.91	242.48	133.71	48.80	60.16
Total On-Road Vehicles		65.44	58.43	84.89	403.12	1.54	24.18	23.72	10.04	11.98
Total Other Mobile		79.32	70.55	103.99	731.33	5.92	6.66	6.34	5.43	0.18
Total		**1289.01**	**353.45**	**240.62**	**1246.83**	**17.37**	**273.32**	**163.77**	**64.27**	**72.32**

2026 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.93	0.94	0.13	7.26	0.28	1.07	1.07	1.06	1.76
20	Cogeneration	0.98	0.11	0.01	0.68	0.01	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.54	4.30	9.66	16.68	0.31	1.19	1.18	1.18	2.29
52	Food and Agricultural Processing	0.10	0.04	0.14	0.33	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.26	4.52	8.88	16.33	1.42	1.45	1.44	1.44	3.00
99	Other (Fuel Combustion)	1.50	0.24	2.24	2.69	0.16	0.32	0.24	0.17	0.02
Total Fuel Combustion		**51.60**	**11.27**	**21.78**	**49.72**	**2.19**	**5.91**	**5.75**	**5.65**	**8.58**
Waste Disposal										
110	Sewage Treatment	0.79	0.45	0.01	0.01	0.04	0.01	0.01	0.00	0.26
120	Landfills	658.59	9.27	0.70	0.56	0.38	0.17	0.16	0.16	4.11
130	Incineration	0.46	0.09	1.68	0.63	0.16	0.22	0.11	0.09	0.39
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	75.89	6.07	0.00	0.00	0.00	0.00	0.00	0.00	1.27
Total Waste Disposal		**735.73**	**15.88**	**2.39**	**1.20**	**0.58**	**0.40**	**0.28**	**0.25**	**6.03**
Cleaning and Surface Coatings										
210	Laundering	3.70	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	80.17	14.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	25.03	24.17	0.02	0.01	0.00	1.87	1.80	1.73	0.16
240	Printing	1.96	1.96	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.78	5.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.98	0.98	0.03	0.07	0.00	0.05	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**117.62**	**47.11**	**0.05**	**0.08**	**0.00**	**1.92**	**1.85**	**1.78**	**0.50**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.41	2.50	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.05	4.57	0.25	5.24	0.36	2.67	1.74	1.53	0.24
330	Petroleum Marketing	50.23	12.08	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**62.82**	**19.27**	**0.29**	**5.27**	**0.42**	**2.69**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	8.42	6.74	0.01	0.04	0.01	0.92	0.72	0.57	0.03
420	Food and Agriculture	1.41	1.38	0.00	0.00	0.01	0.47	0.26	0.13	0.02
430	Mineral Processes	1.01	0.84	0.01	0.18	0.00	7.96	5.22	2.85	0.15
440	Metal Processes	0.20	0.15	0.05	0.20	0.11	0.61	0.39	0.26	0.01
450	Wood and Paper	0.30	0.30	0.00	0.00	0.00	7.49	5.24	3.19	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.87	3.47	0.03	0.15	0.00	1.40	0.94	0.55	8.58
Total Industrial Processes		**15.24**	**12.91**	**0.10**	**0.57**	**0.13**	**19.03**	**12.93**	**7.69**	**8.79**
Solvent Evaporation										
510	Consumer Products	110.16	91.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.02	12.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.38	1.38	0.00	0.00	0.00	0.00	0.00	0.00	1.11
540	Asphalt Paving/Roofing	1.27	1.16	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**125.83**	**106.47**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.11**

(Continued)

2026 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.16	8.37	12.06	46.29	0.48	7.06	6.70	6.51	0.11
620	Farming Operations	18.69	1.55	0.00	0.00	0.00	1.76	0.86	0.16	7.62
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	54.13	26.47	2.65	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	124.79	57.03	8.61	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.84	5.85	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.70	1.39	0.20	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.81	0.47	0.19	6.31	0.05	0.72	0.70	0.63	0.03
690	Cooking	2.95	2.06	0.00	0.00	0.00	12.35	12.35	12.35	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.34
	RECLAIM			14.51		6.08				
Total Miscellaneous Processes		**41.95**	**12.68**	**26.84**	**55.62**	**6.61**	**213.80**	**111.79**	**32.10**	**35.10**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	19.56	18.54	10.47	144.18	0.56	11.86	11.62	4.87	5.11
722	Light Duty Trucks 1 (T1)	5.02	4.81	2.13	24.71	0.05	0.91	0.89	0.38	0.46
723	Light Duty Trucks 2 (T2)	10.14	9.61	5.88	70.62	0.29	4.39	4.29	1.81	2.95
724	Medium Duty Trucks (T3)	9.66	9.13	6.04	60.07	0.22	2.43	2.38	1.00	2.41
732	Light Heavy Duty Gas Trucks 1 (T4)	2.46	2.37	2.58	7.14	0.02	0.21	0.21	0.09	0.12
733	Light Heavy Duty Gas Trucks 2 (T5)	0.25	0.23	0.41	1.15	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.43	0.39	0.64	3.90	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.36	3.57	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.25	0.22	4.65	1.37	0.01	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.09	0.08	1.04	0.42	0.01	0.19	0.18	0.08	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.25	0.22	9.06	1.16	0.09	1.22	1.20	0.51	0.22
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.43	1.02	28.46	9.58	0.21	1.49	1.47	0.58	0.38
750	Motorcycles (MCY)	10.47	9.14	2.63	46.01	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.64	0.26	3.80	5.03	0.00	0.43	0.42	0.21	0.01
762	Gas Urban Buses (UB)	0.13	0.10	0.31	1.17	0.01	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.05	0.05	0.50	0.00	0.09	0.09	0.04	0.01
772	Diesel School Buses (SB)	0.03	0.02	1.20	0.09	0.00	0.17	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.14	0.12	0.23	1.29	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.02	0.02	0.37	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.49	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.04	0.03	0.35	0.43	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**63.16**	**56.42**	**81.15**	**382.55**	**1.51**	**24.23**	**23.76**	**10.03**	**11.85**
Other Mobile Sources										
810	Aircraft	4.26	4.22	18.60	43.46	2.22	0.84	0.81	0.74	0.00
820	Trains	0.75	0.63	13.30	4.33	0.02	0.24	0.24	0.22	0.01
833	Ocean Going Vessels	3.26	2.92	20.74	5.35	3.71	1.14	1.14	1.09	0.05
835	Commercial Harbor Crafts	1.25	1.05	9.96	6.97	0.00	0.41	0.41	0.37	0.00
840	Recreational Boats	16.61	14.44	4.19	78.61	0.01	1.01	0.91	0.68	0.01
850	Off-Road Recreation Vehicles	2.34	2.26	0.09	4.32	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	45.29	39.67	33.37	588.80	0.10	2.83	2.64	2.16	0.12
870	Farm Equipment	0.39	0.34	1.36	4.98	0.00	0.09	0.09	0.08	0.00
890	Fuel Storage and Handling	4.27	4.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**78.42**	**69.78**	**101.61**	**736.82**	**6.06**	**6.57**	**6.25**	**5.35**	**0.19**
Total Stationary and Area Sources		1150.79	225.59	51.45	112.46	9.93	243.78	134.39	49.03	60.35
Total On-Road Vehicles		63.16	56.42	81.15	382.55	1.51	24.23	23.76	10.03	11.85
Total Other Mobile		78.42	69.78	101.61	736.82	6.06	6.57	6.25	5.35	0.19
Total		**1292.37**	**351.79**	**234.21**	**1231.83**	**17.50**	**274.58**	**164.40**	**64.41**	**72.39**

2027 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.93	0.94	0.13	7.26	0.28	1.07	1.07	1.06	1.76
20	Cogeneration	0.98	0.11	0.01	0.69	0.01	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.38	4.30	9.65	16.73	0.31	1.19	1.18	1.17	2.28
52	Food and Agricultural Processing	0.10	0.04	0.14	0.34	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.30	4.52	8.89	16.37	1.44	1.45	1.45	1.44	3.00
99	Other (Fuel Combustion)	1.51	0.25	2.24	2.71	0.16	0.32	0.24	0.17	0.02
Total Fuel Combustion		**51.49**	**11.28**	**21.78**	**49.85**	**2.21**	**5.91**	**5.76**	**5.64**	**8.57**
Waste Disposal										
110	Sewage Treatment	0.80	0.45	0.01	0.01	0.04	0.01	0.01	0.00	0.26
120	Landfills	662.68	9.32	0.71	0.57	0.38	0.17	0.16	0.16	4.13
130	Incineration	0.47	0.09	1.70	0.64	0.16	0.22	0.11	0.09	0.40
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	76.52	6.12	0.00	0.00	0.00	0.00	0.00	0.00	1.28
Total Waste Disposal		**740.47**	**15.98**	**2.42**	**1.22**	**0.58**	**0.40**	**0.28**	**0.25**	**6.07**
Cleaning and Surface Coatings										
210	Laundering	3.73	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	81.24	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	25.26	24.40	0.02	0.01	0.00	1.88	1.81	1.74	0.16
240	Printing	1.98	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.86	5.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.99	0.99	0.03	0.07	0.00	0.05	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**119.06**	**47.64**	**0.05**	**0.08**	**0.00**	**1.93**	**1.86**	**1.79**	**0.50**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.43	2.50	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.06	4.57	0.25	5.25	0.36	2.67	1.74	1.53	0.24
330	Petroleum Marketing	49.79	11.86	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**62.41**	**19.05**	**0.29**	**5.28**	**0.42**	**2.69**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	8.50	6.80	0.01	0.04	0.01	0.93	0.73	0.58	0.03
420	Food and Agriculture	1.42	1.39	0.00	0.00	0.01	0.47	0.26	0.13	0.02
430	Mineral Processes	1.02	0.85	0.01	0.18	0.00	7.97	5.23	2.85	0.15
440	Metal Processes	0.21	0.16	0.05	0.21	0.11	0.62	0.40	0.26	0.01
450	Wood and Paper	0.30	0.30	0.00	0.00	0.00	7.55	5.29	3.21	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.16	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.90	3.49	0.03	0.15	0.00	1.41	0.95	0.55	8.58
Total Industrial Processes		**15.38**	**13.02**	**0.10**	**0.58**	**0.13**	**19.14**	**13.02**	**7.72**	**8.79**
Solvent Evaporation										
510	Consumer Products	110.74	92.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.10	12.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.39	1.39	0.00	0.00	0.00	0.00	0.00	0.00	1.10
540	Asphalt Paving/Roofing	1.29	1.18	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**126.52**	**107.06**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.10**

(Continued)

2027 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.15	8.37	11.80	46.26	0.48	7.06	6.70	6.51	0.11
620	Farming Operations	18.69	1.55	0.00	0.00	0.00	1.75	0.85	0.16	7.62
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	54.79	26.79	2.68	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	125.30	57.26	8.65	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.84	5.85	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.65	1.37	0.19	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.82	0.47	0.19	6.31	0.05	0.72	0.70	0.64	0.03
690	Cooking	2.97	2.08	0.00	0.00	0.00	12.45	12.45	12.45	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.50
	RECLAIM			14.51		6.08				
Total Miscellaneous Processes		**41.97**	**12.70**	**26.58**	**55.59**	**6.61**	**215.01**	**112.41**	**32.27**	**35.26**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	18.82	17.86	9.87	137.64	0.55	11.85	11.61	4.85	5.07
722	Light Duty Trucks 1 (T1)	4.67	4.48	1.95	22.90	0.05	0.91	0.89	0.38	0.45
723	Light Duty Trucks 2 (T2)	9.78	9.28	5.55	68.23	0.29	4.39	4.30	1.80	2.95
724	Medium Duty Trucks (T3)	9.26	8.76	5.62	56.82	0.22	2.42	2.37	1.00	2.39
732	Light Heavy Duty Gas Trucks 1 (T4)	2.31	2.23	2.41	6.62	0.02	0.20	0.20	0.08	0.12
733	Light Heavy Duty Gas Trucks 2 (T5)	0.23	0.22	0.39	1.13	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.42	0.38	0.61	3.76	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.37	3.67	0.00	0.01	0.01	0.00	0.01
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.24	0.21	4.24	1.31	0.02	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.08	0.07	0.92	0.41	0.01	0.19	0.19	0.09	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.25	0.22	9.20	1.18	0.09	1.25	1.22	0.52	0.23
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.50	1.05	28.62	9.90	0.21	1.53	1.51	0.60	0.39
750	Motorcycles (MCY)	10.47	9.13	2.63	45.93	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.53	0.23	3.43	4.78	0.00	0.42	0.41	0.20	0.01
762	Gas Urban Buses (UB)	0.12	0.10	0.30	1.10	0.01	0.05	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.05	0.04	0.50	0.00	0.09	0.09	0.04	0.01
772	Diesel School Buses (SB)	0.03	0.02	1.12	0.09	0.00	0.17	0.17	0.07	0.01
777	Gas Other Buses (OB)	0.14	0.12	0.23	1.27	0.01	0.07	0.06	0.03	0.02
778	Motor Coaches	0.02	0.02	0.37	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.49	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.03	0.03	0.33	0.37	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**61.05**	**54.52**	**78.69**	**367.77**	**1.51**	**24.28**	**23.80**	**10.01**	**11.81**
Other Mobile Sources										
810	Aircraft	4.33	4.28	18.99	44.26	2.28	0.85	0.83	0.76	0.00
820	Trains	0.73	0.61	12.74	4.37	0.02	0.23	0.23	0.21	0.01
833	Ocean Going Vessels	3.40	3.04	20.33	5.55	3.80	1.18	1.18	1.13	0.05
835	Commercial Harbor Crafts	1.24	1.04	9.84	6.97	0.00	0.40	0.40	0.37	0.00
840	Recreational Boats	15.70	13.66	4.13	78.02	0.01	0.95	0.86	0.65	0.01
850	Off-Road Recreation Vehicles	2.30	2.22	0.09	4.38	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	45.39	39.76	32.20	593.88	0.10	2.77	2.58	2.10	0.12
870	Farm Equipment	0.38	0.32	1.29	4.99	0.00	0.09	0.09	0.08	0.00
890	Fuel Storage and Handling	4.17	4.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**77.64**	**69.09**	**99.61**	**742.42**	**6.21**	**6.48**	**6.18**	**5.31**	**0.19**
Total Stationary and Area Sources		1157.30	226.73	51.22	112.60	9.95	245.11	135.12	49.23	60.53
Total On-Road Vehicles		61.05	54.52	78.69	367.77	1.51	24.28	23.80	10.01	11.81
Total Other Mobile		77.64	69.09	99.61	742.42	6.21	6.48	6.18	5.31	0.19
Total		**1295.99**	**350.34**	**229.52**	**1222.79**	**17.67**	**275.87**	**165.10**	**64.55**	**72.53**

2028 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.93	0.94	0.13	7.26	0.28	1.07	1.07	1.06	1.76
20	Cogeneration	0.98	0.11	0.01	0.69	0.01	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.24	4.31	9.63	16.78	0.32	1.19	1.18	1.17	2.27
52	Food and Agricultural Processing	0.10	0.04	0.14	0.34	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.35	4.52	8.90	16.42	1.45	1.46	1.45	1.45	3.00
99	Other (Fuel Combustion)	1.52	0.25	2.24	2.72	0.16	0.32	0.25	0.17	0.02
Total Fuel Combustion		**51.41**	**11.29**	**21.77**	**49.96**	**2.23**	**5.92**	**5.77**	**5.65**	**8.56**
Waste Disposal										
110	Sewage Treatment	0.81	0.46	0.01	0.01	0.04	0.01	0.01	0.01	0.26
120	Landfills	666.87	9.38	0.71	0.57	0.38	0.17	0.16	0.16	4.15
130	Incineration	0.47	0.09	1.71	0.64	0.16	0.22	0.11	0.09	0.40
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	77.14	6.17	0.00	0.00	0.00	0.00	0.00	0.00	1.29
Total Waste Disposal		**745.29**	**16.10**	**2.43**	**1.22**	**0.58**	**0.40**	**0.28**	**0.26**	**6.10**
Cleaning and Surface Coatings										
210	Laundering	3.76	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	82.33	15.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	25.50	24.63	0.02	0.01	0.00	1.90	1.82	1.75	0.16
240	Printing	1.99	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.94	5.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	1.01	1.01	0.03	0.07	0.00	0.06	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**120.53**	**48.17**	**0.05**	**0.08**	**0.00**	**1.96**	**1.87**	**1.80**	**0.50**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.44	2.51	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.07	4.57	0.25	5.25	0.36	2.67	1.74	1.53	0.24
330	Petroleum Marketing	49.39	11.64	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**62.03**	**18.84**	**0.29**	**5.28**	**0.42**	**2.69**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	8.57	6.86	0.01	0.04	0.01	0.94	0.73	0.59	0.03
420	Food and Agriculture	1.43	1.40	0.00	0.00	0.01	0.48	0.27	0.13	0.02
430	Mineral Processes	1.03	0.85	0.01	0.18	0.00	7.99	5.24	2.86	0.15
440	Metal Processes	0.21	0.16	0.05	0.21	0.11	0.62	0.40	0.26	0.01
450	Wood and Paper	0.30	0.30	0.00	0.00	0.00	7.61	5.33	3.24	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.16	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.92	3.51	0.03	0.15	0.00	1.42	0.96	0.56	8.58
Total Industrial Processes		**15.49**	**13.11**	**0.10**	**0.58**	**0.13**	**19.25**	**13.09**	**7.78**	**8.79**
Solvent Evaporation										
510	Consumer Products	111.32	92.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.19	12.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.39	1.39	0.00	0.00	0.00	0.00	0.00	0.00	1.09
540	Asphalt Paving/Roofing	1.30	1.20	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**127.20**	**107.66**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.09**

(Continued)

2028 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.14	8.37	11.54	46.23	0.48	7.05	6.69	6.50	0.11
620	Farming Operations	18.70	1.55	0.00	0.00	0.00	1.74	0.85	0.16	7.63
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	55.43	27.11	2.72	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	125.77	57.48	8.68	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.84	5.84	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.60	1.35	0.19	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.82	0.47	0.19	6.31	0.05	0.72	0.70	0.64	0.03
690	Cooking	2.99	2.09	0.00	0.00	0.00	12.54	12.54	12.54	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.66
	RECLAIM			14.51		6.08				
Total Miscellaneous Processes		**41.99**	**12.71**	**26.32**	**55.56**	**6.61**	**216.14**	**113.00**	**32.42**	**35.43**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	18.07	17.18	9.26	131.10	0.53	11.83	11.59	4.84	5.02
722	Light Duty Trucks 1 (T1)	4.33	4.15	1.77	21.09	0.05	0.90	0.88	0.37	0.45
723	Light Duty Trucks 2 (T2)	9.42	8.95	5.23	65.85	0.28	4.39	4.30	1.80	2.94
724	Medium Duty Trucks (T3)	8.86	8.40	5.20	53.58	0.21	2.40	2.35	0.99	2.37
732	Light Heavy Duty Gas Trucks 1 (T4)	2.17	2.10	2.24	6.09	0.02	0.20	0.19	0.08	0.11
733	Light Heavy Duty Gas Trucks 2 (T5)	0.22	0.21	0.37	1.10	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.41	0.37	0.59	3.62	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.38	3.76	0.00	0.01	0.01	0.00	0.01
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.23	0.20	3.84	1.24	0.02	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.08	0.07	0.81	0.39	0.01	0.19	0.19	0.09	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.26	0.23	9.35	1.20	0.09	1.27	1.25	0.53	0.23
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.56	1.07	28.78	10.23	0.22	1.57	1.55	0.61	0.41
750	Motorcycles (MCY)	10.47	9.13	2.64	45.86	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.43	0.21	3.05	4.53	0.00	0.40	0.40	0.19	0.01
762	Gas Urban Buses (UB)	0.11	0.09	0.29	1.03	0.01	0.05	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.05	0.04	0.49	0.00	0.09	0.09	0.04	0.01
772	Diesel School Buses (SB)	0.03	0.02	1.03	0.08	0.00	0.17	0.17	0.07	0.01
777	Gas Other Buses (OB)	0.14	0.12	0.23	1.25	0.01	0.07	0.06	0.03	0.02
778	Motor Coaches	0.02	0.02	0.37	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.49	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.03	0.03	0.31	0.32	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**58.99**	**52.66**	**76.27**	**352.97**	**1.48**	**24.27**	**23.80**	**9.99**	**11.74**
Other Mobile Sources										
810	Aircraft	4.41	4.36	19.42	45.06	2.34	0.86	0.84	0.77	0.00
820	Trains	0.71	0.60	12.16	4.42	0.02	0.22	0.22	0.20	0.01
833	Ocean Going Vessels	3.53	3.16	20.11	5.75	3.89	1.22	1.22	1.16	0.05
835	Commercial Harbor Crafts	1.22	1.03	9.72	6.96	0.00	0.39	0.39	0.36	0.00
840	Recreational Boats	14.85	12.94	4.06	77.54	0.01	0.90	0.81	0.61	0.01
850	Off-Road Recreation Vehicles	2.27	2.19	0.10	4.44	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	45.56	39.90	31.26	598.96	0.10	2.74	2.54	2.06	0.12
870	Farm Equipment	0.36	0.31	1.23	5.01	0.00	0.08	0.08	0.07	0.00
890	Fuel Storage and Handling	4.09	4.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**77.00**	**68.57**	**98.06**	**748.14**	**6.36**	**6.42**	**6.11**	**5.24**	**0.19**
Total Stationary and Area Sources		1163.94	227.88	50.96	112.68	9.97	246.39	135.80	49.47	60.71
Total On-Road Vehicles		58.99	52.66	76.27	352.97	1.48	24.27	23.80	9.99	11.74
Total Other Mobile		77.00	68.57	98.06	748.14	6.36	6.42	6.11	5.24	0.19
Total		**1299.93**	**349.11**	**225.29**	**1213.79**	**17.81**	**277.08**	**165.71**	**64.70**	**72.64**

2030 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.94	0.94	0.13	7.26	0.28	1.07	1.07	1.07	1.76
20	Cogeneration	0.98	0.11	0.01	0.71	0.02	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.94	0.11	0.73	0.80	0.01	0.11	0.11	0.11	0.24
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.12	4.33	9.66	16.94	0.32	1.20	1.18	1.18	2.27
52	Food and Agricultural Processing	0.10	0.04	0.15	0.34	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.52	4.56	8.99	16.61	1.48	1.48	1.47	1.47	3.02
99	Other (Fuel Combustion)	1.54	0.25	2.24	2.75	0.16	0.32	0.25	0.17	0.02
Total Fuel Combustion		**51.50**	**11.35**	**21.91**	**50.36**	**2.27**	**5.95**	**5.79**	**5.69**	**8.59**
Waste Disposal										
110	Sewage Treatment	0.83	0.47	0.01	0.01	0.04	0.01	0.01	0.01	0.26
120	Landfills	675.01	9.50	0.72	0.58	0.39	0.17	0.17	0.16	4.19
130	Incineration	0.48	0.09	1.74	0.65	0.16	0.22	0.11	0.09	0.41
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	78.42	6.28	0.00	0.00	0.00	0.00	0.00	0.00	1.30
Total Waste Disposal		**754.74**	**16.34**	**2.47**	**1.24**	**0.59**	**0.40**	**0.29**	**0.26**	**6.16**
Cleaning and Surface Coatings										
210	Laundering	3.82	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	84.51	15.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	25.98	25.09	0.02	0.01	0.00	1.92	1.84	1.78	0.16
240	Printing	2.02	2.02	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	6.09	5.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	1.03	1.03	0.03	0.07	0.00	0.06	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**123.45**	**49.22**	**0.05**	**0.08**	**0.00**	**1.98**	**1.89**	**1.83**	**0.51**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.46	2.52	0.04	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.09	4.58	0.25	5.27	0.36	2.67	1.75	1.54	0.24
330	Petroleum Marketing	48.92	11.22	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.14	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**61.61**	**18.44**	**0.30**	**5.30**	**0.42**	**2.69**	**1.77**	**1.54**	**0.24**
Industrial Processes										
410	Chemical	8.73	6.98	0.01	0.04	0.01	0.96	0.75	0.60	0.03
420	Food and Agriculture	1.45	1.41	0.00	0.00	0.01	0.48	0.27	0.13	0.02
430	Mineral Processes	1.06	0.87	0.01	0.18	0.00	8.03	5.27	2.87	0.15
440	Metal Processes	0.21	0.16	0.05	0.21	0.11	0.63	0.41	0.27	0.01
450	Wood and Paper	0.31	0.31	0.00	0.00	0.00	7.72	5.41	3.29	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.16	0.15	0.13	0.00
470	Electronics	0.04	0.04	0.00	0.00	0.00	0.03	0.02	0.02	0.00
499	Other (Industrial Processes)	3.97	3.56	0.03	0.15	0.00	1.44	0.97	0.56	8.58
Total Industrial Processes		**15.77**	**13.33**	**0.10**	**0.58**	**0.13**	**19.45**	**13.25**	**7.87**	**8.79**
Solvent Evaporation										
510	Consumer Products	112.47	93.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.36	12.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.40	1.40	0.00	0.00	0.00	0.00	0.00	0.00	1.07
540	Asphalt Paving/Roofing	1.34	1.23	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**128.57**	**108.83**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.07**

(Continued)

2030 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.15	8.37	11.09	46.24	0.48	7.05	6.69	6.50	0.11
620	Farming Operations	18.70	1.55	0.00	0.00	0.00	1.72	0.84	0.16	7.63
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	56.74	27.74	2.78	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	126.78	57.94	8.75	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.83	5.84	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.49	1.30	0.18	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.82	0.47	0.19	6.31	0.05	0.72	0.70	0.64	0.03
690	Cooking	3.04	2.12	0.00	0.00	0.00	12.72	12.72	12.72	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.99
	RECLAIM			14.51		6.08				
Total Miscellaneous Processes		**42.05**	**12.74**	**25.87**	**55.57**	**6.61**	**218.50**	**114.21**	**32.72**	**35.76**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	16.58	15.82	8.06	118.03	0.50	11.80	11.57	4.80	4.93
722	Light Duty Trucks 1 (T1)	3.63	3.50	1.41	17.48	0.05	0.89	0.87	0.37	0.43
723	Light Duty Trucks 2 (T2)	8.70	8.28	4.58	61.09	0.27	4.39	4.30	1.79	2.94
724	Medium Duty Trucks (T3)	8.07	7.68	4.35	47.09	0.20	2.38	2.33	0.97	2.33
732	Light Heavy Duty Gas Trucks 1 (T4)	1.88	1.82	1.90	5.03	0.02	0.19	0.18	0.08	0.10
733	Light Heavy Duty Gas Trucks 2 (T5)	0.19	0.19	0.33	1.06	0.01	0.08	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.39	0.36	0.53	3.34	0.01	0.14	0.13	0.06	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.40	3.95	0.00	0.01	0.01	0.00	0.01
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.21	0.19	3.03	1.11	0.02	0.36	0.35	0.16	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.08	0.07	0.58	0.36	0.01	0.20	0.19	0.09	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.27	0.23	9.63	1.24	0.09	1.32	1.30	0.55	0.24
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.68	1.11	29.09	10.87	0.23	1.66	1.64	0.65	0.43
750	Motorcycles (MCY)	10.47	9.11	2.64	45.70	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.23	0.16	2.31	4.04	0.00	0.37	0.37	0.17	0.01
762	Gas Urban Buses (UB)	0.10	0.08	0.27	0.90	0.01	0.05	0.05	0.02	0.01
771	Gas School Buses (SB)	0.07	0.05	0.04	0.49	0.00	0.10	0.09	0.04	0.01
772	Diesel School Buses (SB)	0.02	0.02	0.86	0.08	0.00	0.17	0.17	0.07	0.01
777	Gas Other Buses (OB)	0.14	0.13	0.22	1.21	0.01	0.07	0.07	0.03	0.02
778	Motor Coaches	0.02	0.02	0.37	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.50	0.08	0.00	0.06	0.06	0.02	0.01
780	Motor Homes (MH)	0.02	0.02	0.27	0.20	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**54.84**	**48.90**	**71.37**	**323.44**	**1.44**	**24.37**	**23.88**	**9.96**	**11.61**
Other Mobile Sources										
810	Aircraft	4.55	4.50	20.27	46.62	2.45	0.88	0.86	0.79	0.00
820	Trains	0.68	0.57	11.07	4.51	0.02	0.20	0.20	0.19	0.01
833	Ocean Going Vessels	3.80	3.40	19.78	6.16	4.07	1.30	1.30	1.24	0.05
835	Commercial Harbor Crafts	1.20	1.01	9.48	6.95	0.00	0.38	0.38	0.35	0.00
840	Recreational Boats	13.35	11.66	3.95	76.80	0.01	0.82	0.73	0.55	0.01
850	Off-Road Recreation Vehicles	2.23	2.15	0.10	4.56	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	46.08	40.35	29.91	609.67	0.10	2.69	2.50	2.02	0.12
870	Farm Equipment	0.34	0.29	1.12	5.06	0.00	0.08	0.08	0.07	0.00
890	Fuel Storage and Handling	3.96	3.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**76.19**	**67.88**	**95.68**	**760.33**	**6.65**	**6.36**	**6.06**	**5.22**	**0.19**
Total Stationary and Area Sources		1177.69	230.25	50.70	113.13	10.02	249.00	137.23	49.94	61.12
Total On-Road Vehicles		54.84	48.90	71.37	323.44	1.44	24.37	23.88	9.96	11.61
Total Other Mobile		76.19	67.88	95.68	760.33	6.65	6.36	6.06	5.22	0.19
Total		**1308.72**	**347.03**	**217.75**	**1196.90**	**18.11**	**279.73**	**167.17**	**65.12**	**72.92**

2031 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.94	0.94	0.13	7.26	0.28	1.07	1.07	1.07	1.76
20	Cogeneration	0.99	0.11	0.01	0.72	0.02	0.17	0.17	0.16	0.32
30	Oil and Gas Production (Combustion)	0.94	0.11	0.73	0.81	0.01	0.11	0.11	0.11	0.24
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.09	4.35	9.68	17.03	0.33	1.20	1.19	1.18	2.27
52	Food and Agricultural Processing	0.10	0.04	0.15	0.34	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.60	4.58	9.03	16.70	1.49	1.49	1.48	1.48	3.03
99	Other (Fuel Combustion)	1.55	0.25	2.25	2.77	0.16	0.32	0.25	0.17	0.02
Total Fuel Combustion		**51.57**	**11.39**	**21.98**	**50.58**	**2.29**	**5.96**	**5.82**	**5.70**	**8.60**
Waste Disposal										
110	Sewage Treatment	0.83	0.47	0.01	0.01	0.04	0.01	0.01	0.01	0.26
120	Landfills	679.10	9.55	0.73	0.58	0.39	0.17	0.17	0.16	4.22
130	Incineration	0.48	0.09	1.76	0.66	0.16	0.23	0.11	0.09	0.41
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	79.05	6.33	0.00	0.00	0.00	0.00	0.00	0.00	1.31
Total Waste Disposal		**759.46**	**16.44**	**2.50**	**1.25**	**0.59**	**0.41**	**0.29**	**0.26**	**6.20**
Cleaning and Surface Coatings										
210	Laundering	3.85	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	85.59	15.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	26.22	25.32	0.02	0.01	0.00	1.93	1.86	1.79	0.16
240	Printing	2.03	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	6.17	5.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	1.04	1.04	0.03	0.07	0.00	0.06	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**124.90**	**49.74**	**0.05**	**0.08**	**0.00**	**1.99**	**1.91**	**1.84**	**0.51**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.47	2.52	0.04	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.10	4.58	0.25	5.27	0.36	2.67	1.75	1.54	0.24
330	Petroleum Marketing	48.67	11.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.14	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**61.38**	**18.23**	**0.30**	**5.30**	**0.42**	**2.69**	**1.77**	**1.54**	**0.24**
Industrial Processes										
410	Chemical	8.80	7.04	0.01	0.04	0.01	0.97	0.76	0.60	0.03
420	Food and Agriculture	1.46	1.42	0.00	0.00	0.01	0.48	0.27	0.13	0.02
430	Mineral Processes	1.07	0.88	0.01	0.18	0.00	8.05	5.28	2.88	0.15
440	Metal Processes	0.22	0.16	0.05	0.21	0.11	0.64	0.41	0.27	0.01
450	Wood and Paper	0.31	0.31	0.00	0.00	0.00	7.78	5.45	3.31	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.16	0.15	0.13	0.00
470	Electronics	0.04	0.04	0.00	0.00	0.00	0.04	0.02	0.02	0.00
499	Other (Industrial Processes)	3.99	3.58	0.03	0.15	0.00	1.45	0.98	0.57	8.58
Total Industrial Processes		**15.89**	**13.43**	**0.10**	**0.58**	**0.13**	**19.57**	**13.32**	**7.91**	**8.79**
Solvent Evaporation										
510	Consumer Products	113.05	94.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.45	12.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.41	1.41	0.00	0.00	0.00	0.00	0.00	0.00	1.07
540	Asphalt Paving/Roofing	1.36	1.25	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**129.27**	**109.44**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.07**

(Continued)

2031 Annual Average Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	19.15	8.37	10.87	46.24	0.48	7.05	6.69	6.50	0.11
620	Farming Operations	18.70	1.55	0.00	0.00	0.00	1.71	0.84	0.16	7.63
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	57.40	28.07	2.81	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	127.26	58.16	8.78	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	9.83	5.84	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	2.49	1.30	0.18	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.82	0.47	0.19	6.31	0.05	0.72	0.70	0.64	0.03
690	Cooking	3.06	2.14	0.00	0.00	0.00	12.81	12.81	12.81	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.15
	RECLAIM			14.51		6.08				
Total Miscellaneous Processes		**42.07**	**12.76**	**25.65**	**55.57**	**6.61**	**219.72**	**114.85**	**32.87**	**35.92**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	15.84	15.14	7.46	111.49	0.49	11.79	11.56	4.78	4.88
722	Light Duty Trucks 1 (T1)	3.29	3.17	1.23	15.67	0.05	0.89	0.87	0.36	0.42
723	Light Duty Trucks 2 (T2)	8.34	7.95	4.25	58.71	0.26	4.39	4.30	1.79	2.94
724	Medium Duty Trucks (T3)	7.67	7.32	3.92	43.85	0.19	2.36	2.31	0.96	2.30
732	Light Heavy Duty Gas Trucks 1 (T4)	1.74	1.69	1.73	4.50	0.02	0.18	0.18	0.07	0.09
733	Light Heavy Duty Gas Trucks 2 (T5)	0.18	0.17	0.31	1.04	0.01	0.08	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.38	0.35	0.50	3.20	0.01	0.14	0.13	0.06	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.06	0.41	4.05	0.00	0.01	0.01	0.00	0.01
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.20	0.18	2.63	1.05	0.02	0.36	0.35	0.16	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.08	0.07	0.46	0.35	0.01	0.20	0.20	0.09	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.27	0.24	9.78	1.26	0.09	1.35	1.32	0.56	0.25
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.75	1.13	29.25	11.19	0.23	1.70	1.68	0.66	0.44
750	Motorcycles (MCY)	10.46	9.11	2.65	45.62	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.13	0.14	1.93	3.79	0.00	0.36	0.35	0.16	0.01
762	Gas Urban Buses (UB)	0.09	0.07	0.26	0.83	0.01	0.05	0.05	0.02	0.01
771	Gas School Buses (SB)	0.07	0.05	0.03	0.48	0.00	0.10	0.10	0.04	0.01
772	Diesel School Buses (SB)	0.02	0.02	0.78	0.08	0.00	0.17	0.17	0.07	0.01
777	Gas Other Buses (OB)	0.14	0.13	0.21	1.20	0.01	0.07	0.07	0.03	0.02
778	Motor Coaches	0.02	0.02	0.37	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.50	0.08	0.00	0.06	0.06	0.02	0.01
780	Motor Homes (MH)	0.02	0.02	0.25	0.14	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**52.78**	**47.04**	**68.91**	**308.67**	**1.41**	**24.39**	**23.91**	**9.92**	**11.53**
Other Mobile Sources										
810	Aircraft	4.55	4.50	20.19	46.49	2.44	0.89	0.86	0.79	0.00
820	Trains	0.67	0.56	10.66	4.57	0.02	0.20	0.20	0.18	0.01
833	Ocean Going Vessels	3.91	3.50	19.58	6.34	4.16	1.33	1.33	1.27	0.05
835	Commercial Harbor Crafts	1.19	1.00	9.35	6.94	0.00	0.37	0.37	0.34	0.00
840	Recreational Boats	12.72	11.12	3.90	76.59	0.01	0.78	0.70	0.53	0.01
850	Off-Road Recreation Vehicles	2.21	2.13	0.10	4.62	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	46.44	40.66	29.51	615.15	0.10	2.69	2.49	2.01	0.13
870	Farm Equipment	0.33	0.29	1.06	5.08	0.00	0.07	0.07	0.06	0.00
890	Fuel Storage and Handling	3.91	2.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**75.93**	**66.49**	**94.35**	**765.78**	**6.73**	**6.34**	**6.03**	**5.19**	**0.20**
Total Stationary and Area Sources		1184.54	231.43	50.58	113.36	10.04	250.37	137.99	50.15	61.33
Total On-Road Vehicles		52.78	47.04	68.91	308.67	1.41	24.39	23.91	9.92	11.53
Total Other Mobile		75.93	66.49	94.35	765.78	6.73	6.34	6.03	5.19	0.20
Total		**1313.25**	**344.96**	**213.84**	**1187.81**	**18.18**	**281.10**	**167.93**	**65.26**	**73.06**

Attachment B:

Summer Planning Emissions by Source Category in South Coast Air Basin

2012 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	6.91	1.09	0.48	8.44	0.32	1.24	1.23	1.23	2.02
20	Cogeneration	0.93	0.11	0.01	0.52	0.01	0.16	0.15	0.14	0.32
30	Oil and Gas Production (Combustion)	0.87	0.11	0.68	0.74	0.01	0.10	0.10	0.10	0.22
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.14	3.92	11.57	15.05	0.25	1.14	1.14	1.13	2.25
52	Food and Agricultural Processing	0.09	0.03	0.18	0.29	0.00	0.04	0.04	0.04	0.04
60	Service and Commercial	14.24	4.82	11.35	16.62	1.15	1.35	1.35	1.35	3.31
99	Other (Fuel Combustion)	1.39	0.31	3.64	2.78	0.16	0.36	0.28	0.20	0.02
Total Fuel Combustion		**52.93**	**11.40**	**27.91**	**49.39**	**1.90**	**5.95**	**5.80**	**5.68**	**9.09**
Waste Disposal										
110	Sewage Treatment	0.61	0.34	0.01	0.01	0.04	0.01	0.00	0.00	0.23
120	Landfills	596.48	8.39	0.66	0.53	0.35	0.15	0.15	0.14	3.79
130	Incineration	0.39	0.07	1.59	0.54	0.14	0.18	0.09	0.08	0.32
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	65.86	5.27	0.00	0.00	0.00	0.00	0.00	0.00	1.27
Total Waste Disposal		**663.34**	**14.07**	**2.26**	**1.08**	**0.53**	**0.34**	**0.24**	**0.22**	**5.61**
Cleaning and Surface Coatings										
210	Laundering	3.11	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	54.66	10.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	20.01	19.31	0.02	0.01	0.00	1.57	1.51	1.46	0.16
240	Printing	1.64	1.64	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	3.96	3.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.70	0.70	0.04	0.05	0.00	0.05	0.04	0.04	0.27
Total Cleaning and Surface Coatings		**84.08**	**35.59**	**0.06**	**0.06**	**0.00**	**1.62**	**1.55**	**1.50**	**0.48**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.00	2.31	0.02	0.02	0.06	0.00	0.00	0.00	0.00
320	Petroleum Refining	6.86	4.55	0.25	5.09	0.36	2.63	1.71	1.50	0.23
330	Petroleum Marketing	68.02	22.20	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.10	0.09	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**79.98**	**29.15**	**0.28**	**5.12**	**0.42**	**2.64**	**1.72**	**1.50**	**0.23**
Industrial Processes										
410	Chemical	6.69	5.41	0.01	0.03	0.01	0.71	0.55	0.44	0.02
420	Food and Agriculture	1.22	1.19	0.00	0.00	0.01	0.46	0.26	0.13	0.02
430	Mineral Processes	0.89	0.75	0.02	0.17	0.00	8.22	5.36	2.88	0.14
440	Metal Processes	0.19	0.14	0.05	0.17	0.09	0.55	0.35	0.23	0.01
450	Wood and Paper	0.24	0.24	0.00	0.00	0.00	5.56	3.89	2.37	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.12	0.11	0.10	0.00
470	Electronics	0.02	0.02	0.00	0.00	0.00	0.02	0.01	0.01	0.00
499	Other (Industrial Processes)	3.44	3.08	0.02	0.11	0.00	1.29	0.87	0.51	8.57
Total Industrial Processes		**12.69**	**10.83**	**0.10**	**0.48**	**0.11**	**16.93**	**11.40**	**6.67**	**8.76**
Solvent Evaporation										
510	Consumer Products	103.79	86.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	14.00	13.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.47	1.47	0.00	0.00	0.00	0.00	0.00	0.00	1.34
540	Asphalt Paving/Roofing	0.96	0.88	0.00	0.00	0.00	0.02	0.02	0.02	0.00
Total Solvent Evaporation		**120.22**	**102.18**	**0.00**	**0.00**	**0.00**	**0.02**	**0.02**	**0.02**	**1.34**

(Continued)

2012 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	5.35	2.31	14.39	15.25	0.31	2.63	2.56	2.52	0.02
620	Farming Operations	40.59	3.32	0.00	0.00	0.00	2.66	1.31	0.23	17.13
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	54.09	26.45	2.65	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	119.09	54.42	8.22	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.19	6.06	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	5.43	2.64	0.38	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.30	0.16	0.07	1.72	0.00	0.23	0.23	0.21	0.03
690	Cooking	2.48	1.73	0.00	0.00	0.00	10.39	10.39	10.39	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.03
	RECLAIM			19.58		6.89				
Total Miscellaneous Processes		**49.06**	**7.75**	**34.12**	**19.99**	**7.20**	**205.16**	**104.50**	**25.61**	**42.21**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	73.41	68.21	42.47	551.89	0.86	11.10	10.86	4.71	7.68
722	Light Duty Trucks 1 (T1)	19.55	18.30	10.48	135.34	0.10	1.19	1.15	0.55	0.96
723	Light Duty Trucks 2 (T2)	28.39	26.11	26.60	248.10	0.42	3.97	3.88	1.67	4.12
724	Medium Duty Trucks (T3)	24.05	21.57	27.22	240.58	0.40	3.00	2.94	1.26	4.34
732	Light Heavy Duty Gas Trucks 1 (T4)	5.79	5.36	7.09	33.54	0.04	0.50	0.49	0.21	0.42
733	Light Heavy Duty Gas Trucks 2 (T5)	0.82	0.76	1.10	4.49	0.01	0.10	0.09	0.04	0.07
734	Medium Heavy Duty Gas Trucks (T6)	1.72	1.54	2.36	18.04	0.01	0.13	0.13	0.06	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.36	0.32	0.50	7.16	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.46	0.40	15.29	2.79	0.01	0.33	0.33	0.19	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.16	0.14	5.18	0.95	0.01	0.14	0.13	0.07	0.00
744	Medium Heavy Duty Diesels Truck (T6)	2.30	2.02	35.06	6.34	0.05	2.14	2.12	1.66	0.13
746	Heavy Heavy Duty Diesel Trucks (HHD)	6.78	5.46	91.65	20.09	0.14	3.74	3.71	3.08	0.22
750	Motorcycles (MCY)	10.61	9.70	2.02	50.35	0.00	0.04	0.03	0.02	0.01
760	Diesel Urban Buses (UB)	5.25	1.20	18.57	14.48	0.01	1.03	1.02	0.58	0.02
762	Gas Urban Buses (UB)	0.61	0.45	0.69	4.95	0.00	0.03	0.03	0.01	0.01
771	Gas School Buses (SB)	0.13	0.11	0.11	1.67	0.00	0.05	0.05	0.02	0.00
772	Diesel School Buses (SB)	0.18	0.16	2.15	0.41	0.00	0.21	0.21	0.13	0.00
777	Gas Other Buses (OB)	0.23	0.20	0.53	2.89	0.00	0.05	0.05	0.02	0.02
778	Motor Coaches	0.10	0.09	1.49	0.30	0.00	0.06	0.06	0.04	0.00
779	Diesel Other Buses (OB)	0.11	0.10	1.55	0.28	0.00	0.08	0.08	0.06	0.01
780	Motor Homes (MH)	0.30	0.25	1.05	5.90	0.01	0.09	0.09	0.05	0.02
Total On-Road Motor Vehicles		**181.31**	**162.45**	**293.16**	**1350.54**	**2.07**	**27.99**	**27.46**	**14.43**	**18.08**
Other Mobile Sources										
810	Aircraft	3.35	3.30	13.78	33.66	1.47	0.69	0.67	0.60	0.00
820	Trains	1.47	1.23	19.72	3.86	0.01	0.43	0.43	0.39	0.01
833	Ocean Going Vessels	1.96	1.75	30.14	3.43	4.57	0.96	0.96	0.92	0.03
835	Commercial Harbor Crafts	1.43	1.20	16.56	5.67	0.00	0.77	0.77	0.71	0.00
840	Recreational Boats	49.60	42.62	7.97	136.09	0.01	2.92	2.63	1.99	0.02
850	Off-Road Recreation Vehicles	4.09	3.96	0.05	3.19	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	67.50	59.92	73.19	603.85	0.08	5.30	5.10	4.42	0.10
870	Farm Equipment	0.99	0.87	3.15	7.46	0.00	0.20	0.20	0.18	0.00
890	Fuel Storage and Handling	11.47	11.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**141.86**	**126.27**	**164.56**	**797.21**	**6.14**	**11.28**	**10.77**	**9.22**	**0.16**
Total Stationary and Area Sources		1062.30	210.97	64.73	76.12	10.16	232.66	125.23	41.20	67.72
Total On-Road Vehicles		181.31	162.45	293.16	1350.54	2.07	27.99	27.46	14.43	18.08
Total Other Mobile		141.86	126.27	164.56	797.21	6.14	11.28	10.77	9.22	0.16
Total		**1385.47**	**499.69**	**522.45**	**2223.87**	**18.37**	**271.93**	**163.46**	**64.85**	**85.96**

2017 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.50	0.86	0.15	6.66	0.26	0.99	0.98	0.98	1.61
20	Cogeneration	0.94	0.10	0.01	0.56	0.01	0.16	0.15	0.15	0.28
30	Oil and Gas Production (Combustion)	0.89	0.11	0.69	0.77	0.01	0.10	0.10	0.10	0.22
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	26.64	4.27	10.19	16.48	0.29	1.23	1.22	1.22	2.39
52	Food and Agricultural Processing	0.09	0.04	0.13	0.32	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	13.84	4.55	8.71	16.13	1.24	1.36	1.35	1.35	3.13
99	Other (Fuel Combustion)	1.47	0.28	2.91	2.74	0.17	0.34	0.26	0.19	0.02
Total Fuel Combustion		**52.73**	**11.22**	**22.79**	**48.61**	**1.98**	**5.78**	**5.61**	**5.52**	**8.61**
Waste Disposal										
110	Sewage Treatment	0.69	0.39	0.01	0.01	0.04	0.01	0.00	0.00	0.24
120	Landfills	619.04	8.71	0.72	0.58	0.38	0.17	0.16	0.16	3.90
130	Incineration	0.44	0.08	1.68	0.61	0.16	0.20	0.10	0.09	0.35
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	75.14	6.01	0.00	0.00	0.00	0.00	0.00	0.00	1.39
Total Waste Disposal		**695.31**	**15.19**	**2.41**	**1.20**	**0.58**	**0.38**	**0.26**	**0.25**	**5.88**
Cleaning and Surface Coatings										
210	Laundering	3.39	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	64.82	12.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	22.81	22.01	0.02	0.01	0.00	1.76	1.69	1.63	0.18
240	Printing	1.85	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	4.68	4.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.82	0.82	0.03	0.06	0.00	0.05	0.05	0.05	0.28
Total Cleaning and Surface Coatings		**98.37**	**41.12**	**0.05**	**0.07**	**0.00**	**1.81**	**1.74**	**1.68**	**0.51**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.18	2.39	0.02	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.90	4.53	0.25	5.15	0.36	2.64	1.72	1.51	0.23
330	Petroleum Marketing	55.63	14.40	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.11	0.10	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**67.82**	**21.42**	**0.28**	**5.18**	**0.42**	**2.66**	**1.73**	**1.51**	**0.23**
Industrial Processes										
410	Chemical	7.76	6.25	0.01	0.03	0.01	0.83	0.65	0.52	0.03
420	Food and Agriculture	1.33	1.29	0.00	0.00	0.01	0.50	0.28	0.14	0.02
430	Mineral Processes	0.99	0.83	0.02	0.19	0.00	8.42	5.48	2.95	0.15
440	Metal Processes	0.21	0.16	0.06	0.18	0.10	0.62	0.39	0.26	0.02
450	Wood and Paper	0.27	0.27	0.00	0.00	0.00	6.39	4.47	2.73	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.14	0.12	0.11	0.00
470	Electronics	0.02	0.02	0.00	0.00	0.00	0.02	0.02	0.01	0.00
499	Other (Industrial Processes)	3.63	3.25	0.02	0.12	0.00	1.33	0.89	0.51	8.58
Total Industrial Processes		**14.21**	**12.07**	**0.11**	**0.52**	**0.12**	**18.25**	**12.30**	**7.23**	**8.80**
Solvent Evaporation										
510	Consumer Products	104.80	87.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.11	11.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.48	1.48	0.00	0.00	0.00	0.00	0.00	0.00	1.23
540	Asphalt Paving/Roofing	1.25	1.15	0.00	0.00	0.00	0.03	0.03	0.02	0.00
Total Solvent Evaporation		**119.64**	**101.17**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.02**	**1.23**

(Continued)

2017 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.94	2.14	10.25	13.77	0.30	2.30	2.23	2.20	0.02
620	Farming Operations	31.80	2.61	0.00	0.00	0.00	2.21	1.09	0.20	13.23
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	69.15	33.81	3.39	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	124.29	56.80	8.58	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.16	6.04	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	4.72	2.32	0.34	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.78	0.03	0.44	0.43	0.39	0.03
690	Cooking	2.69	1.88	0.00	0.00	0.00	11.28	11.28	11.28	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.84
	RECLAIM			25.18		6.80				
Total Miscellaneous Processes		**40.28**	**7.15**	**35.62**	**20.57**	**7.13**	**225.00**	**114.44**	**27.39**	**39.12**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	40.97	38.18	23.51	315.81	0.83	11.70	11.46	4.85	6.44
722	Light Duty Trucks 1 (T1)	11.02	10.38	5.30	68.37	0.08	1.03	1.00	0.45	0.68
723	Light Duty Trucks 2 (T2)	18.22	16.92	14.17	147.48	0.40	4.24	4.15	1.75	3.45
724	Medium Duty Trucks (T3)	18.77	17.16	16.78	164.66	0.35	2.80	2.74	1.16	3.40
732	Light Heavy Duty Gas Trucks 1 (T4)	4.32	4.07	5.00	18.85	0.03	0.36	0.35	0.15	0.27
733	Light Heavy Duty Gas Trucks 2 (T5)	0.58	0.55	0.80	2.52	0.01	0.09	0.08	0.04	0.05
734	Medium Heavy Duty Gas Trucks (T6)	0.82	0.72	1.44	9.03	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.11	0.09	0.33	3.51	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.40	0.35	10.95	2.38	0.01	0.35	0.35	0.19	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.14	0.12	3.36	0.76	0.01	0.16	0.16	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	1.20	1.05	22.65	3.60	0.07	1.60	1.58	1.04	0.17
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.85	1.75	59.96	8.28	0.17	1.44	1.42	0.76	0.28
750	Motorcycles (MCY)	10.87	9.72	2.19	46.73	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	3.72	0.77	11.28	10.25	0.01	0.75	0.74	0.40	0.02
762	Gas Urban Buses (UB)	0.45	0.33	0.52	3.30	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.07	0.56	0.00	0.06	0.06	0.03	0.00
772	Diesel School Buses (SB)	0.05	0.04	2.07	0.12	0.00	0.18	0.18	0.09	0.01
777	Gas Other Buses (OB)	0.18	0.15	0.37	2.02	0.00	0.06	0.06	0.02	0.02
778	Motor Coaches	0.04	0.03	1.05	0.11	0.00	0.03	0.03	0.02	0.00
779	Diesel Other Buses (OB)	0.03	0.03	1.04	0.09	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.16	0.13	0.71	2.67	0.01	0.08	0.08	0.04	0.02
Total On-Road Motor Vehicles		**114.96**	**102.58**	**183.55**	**811.10**	**1.99**	**25.20**	**24.71**	**11.18**	**14.90**
Other Mobile Sources										
810	Aircraft	3.58	3.53	15.09	36.77	1.71	0.73	0.71	0.65	0.00
820	Trains	1.09	0.92	18.42	3.94	0.01	0.35	0.35	0.32	0.01
833	Ocean Going Vessels	2.35	2.10	29.38	3.99	3.04	0.88	0.88	0.84	0.03
835	Commercial Harbor Crafts	1.34	1.12	12.28	6.63	0.00	0.52	0.52	0.48	0.00
840	Recreational Boats	38.34	33.06	6.98	122.62	0.01	2.27	2.05	1.55	0.01
850	Off-Road Recreation Vehicles	4.02	3.92	0.06	3.17	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	56.41	49.98	60.78	613.13	0.09	4.52	4.32	3.69	0.11
870	Farm Equipment	0.74	0.65	2.61	7.06	0.00	0.17	0.17	0.16	0.00
890	Fuel Storage and Handling	8.82	8.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**116.69**	**104.07**	**145.60**	**797.31**	**4.86**	**9.45**	**9.01**	**7.70**	**0.16**
Total Stationary and Area Sources		1088.36	209.34	61.26	76.15	10.23	253.91	136.11	43.60	64.38
Total On-Road Vehicles		114.96	102.58	183.55	811.10	1.99	25.20	24.71	11.18	14.90
Total Other Mobile		116.69	104.07	145.60	797.31	4.86	9.45	9.01	7.70	0.16
Total		**1320.01**	**415.99**	**390.41**	**1684.56**	**17.08**	**288.56**	**169.83**	**62.48**	**79.44**

2018 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.54	0.87	0.15	6.71	0.26	1.00	0.99	0.99	1.62
20	Cogeneration	0.95	0.10	0.01	0.57	0.01	0.16	0.15	0.15	0.29
30	Oil and Gas Production (Combustion)	0.90	0.11	0.70	0.78	0.01	0.10	0.10	0.10	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	26.64	4.31	10.19	16.68	0.29	1.24	1.23	1.23	2.40
52	Food and Agricultural Processing	0.10	0.04	0.14	0.32	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	13.95	4.57	8.72	16.25	1.26	1.37	1.36	1.36	3.13
99	Other (Fuel Combustion)	1.49	0.28	2.91	2.77	0.18	0.34	0.26	0.19	0.02
Total Fuel Combustion		**52.93**	**11.29**	**22.82**	**49.03**	**2.01**	**5.81**	**5.64**	**5.55**	**8.65**
Waste Disposal										
110	Sewage Treatment	0.70	0.40	0.01	0.01	0.04	0.01	0.00	0.00	0.24
120	Landfills	623.18	8.77	0.73	0.59	0.39	0.17	0.17	0.16	3.92
130	Incineration	0.45	0.09	1.71	0.62	0.16	0.21	0.10	0.09	0.36
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	77.09	6.17	0.00	0.00	0.00	0.00	0.00	0.00	1.41
Total Waste Disposal		**701.42**	**15.43**	**2.45**	**1.22**	**0.59**	**0.39**	**0.27**	**0.25**	**5.93**
Cleaning and Surface Coatings										
210	Laundering	3.44	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	67.02	12.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	23.40	22.58	0.02	0.01	0.00	1.80	1.73	1.67	0.18
240	Printing	1.89	1.89	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	4.84	4.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.85	0.85	0.03	0.06	0.00	0.05	0.05	0.05	0.28
Total Cleaning and Surface Coatings		**101.44**	**42.30**	**0.05**	**0.07**	**0.00**	**1.85**	**1.78**	**1.72**	**0.51**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.22	2.41	0.02	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.91	4.53	0.25	5.16	0.36	2.65	1.72	1.51	0.23
330	Petroleum Marketing	55.12	14.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.11	0.10	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**67.36**	**21.07**	**0.28**	**5.19**	**0.42**	**2.67**	**1.73**	**1.51**	**0.23**
Industrial Processes										
410	Chemical	7.99	6.43	0.01	0.03	0.01	0.86	0.67	0.54	0.03
420	Food and Agriculture	1.35	1.31	0.00	0.00	0.01	0.51	0.29	0.14	0.02
430	Mineral Processes	1.01	0.85	0.02	0.19	0.00	8.47	5.51	2.97	0.15
440	Metal Processes	0.22	0.16	0.06	0.19	0.10	0.63	0.40	0.26	0.02
450	Wood and Paper	0.27	0.27	0.00	0.00	0.00	6.56	4.60	2.80	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.12	0.00
470	Electronics	0.02	0.02	0.00	0.00	0.00	0.02	0.02	0.01	0.00
499	Other (Industrial Processes)	3.67	3.28	0.02	0.13	0.00	1.35	0.91	0.52	8.58
Total Industrial Processes		**14.53**	**12.32**	**0.11**	**0.54**	**0.12**	**18.54**	**12.53**	**7.36**	**8.80**
Solvent Evaporation										
510	Consumer Products	105.32	87.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.24	11.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.49	1.49	0.00	0.00	0.00	0.00	0.00	0.00	1.20
540	Asphalt Paving/Roofing	1.30	1.20	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**120.35**	**101.79**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.20**

(Continued)

2018 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.94	2.14	10.14	13.75	0.30	2.29	2.23	2.19	0.02
620	Farming Operations	30.49	2.51	0.00	0.00	0.00	2.14	1.06	0.20	12.65
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	72.15	35.28	3.54	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	125.33	57.28	8.65	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.16	6.03	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	4.60	2.27	0.33	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.78	0.03	0.44	0.43	0.39	0.03
690	Cooking	2.73	1.91	0.00	0.00	0.00	11.44	11.44	11.44	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.98
	RECLAIM			24.15		6.80				
Total Miscellaneous Processes		**39.01**	**7.08**	**34.48**	**20.55**	**7.13**	**229.00**	**116.46**	**27.75**	**38.68**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	35.99	33.57	20.49	278.17	0.79	11.67	11.42	4.84	6.16
722	Light Duty Trucks 1 (T1)	9.65	9.11	4.52	58.03	0.08	1.00	0.97	0.43	0.63
723	Light Duty Trucks 2 (T2)	16.32	15.20	12.09	129.19	0.39	4.22	4.13	1.74	3.29
724	Medium Duty Trucks (T3)	17.42	16.00	14.77	148.22	0.33	2.72	2.66	1.13	3.19
732	Light Heavy Duty Gas Trucks 1 (T4)	4.09	3.86	4.68	16.97	0.03	0.34	0.33	0.14	0.25
733	Light Heavy Duty Gas Trucks 2 (T5)	0.53	0.50	0.75	2.23	0.01	0.08	0.08	0.03	0.05
734	Medium Heavy Duty Gas Trucks (T6)	0.74	0.66	1.30	8.01	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.10	0.08	0.32	3.38	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.39	0.34	10.11	2.27	0.01	0.36	0.35	0.19	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.13	0.11	3.02	0.72	0.01	0.17	0.16	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	1.09	0.95	21.27	3.31	0.07	1.57	1.55	0.98	0.17
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.69	1.56	56.85	8.00	0.18	1.35	1.33	0.65	0.29
750	Motorcycles (MCY)	10.82	9.65	2.20	45.90	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	3.39	0.68	9.68	9.28	0.00	0.68	0.67	0.36	0.02
762	Gas Urban Buses (UB)	0.41	0.30	0.49	2.97	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.06	0.53	0.00	0.06	0.06	0.03	0.00
772	Diesel School Buses (SB)	0.04	0.03	1.92	0.09	0.00	0.18	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.17	0.15	0.34	1.88	0.00	0.06	0.06	0.02	0.02
778	Motor Coaches	0.03	0.03	0.94	0.09	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	0.97	0.07	0.00	0.05	0.04	0.02	0.01
780	Motor Homes (MH)	0.13	0.10	0.65	2.10	0.00	0.08	0.08	0.04	0.02
Total On-Road Motor Vehicles		**104.21**	**92.94**	**167.42**	**721.41**	**1.91**	**24.84**	**24.31**	**10.86**	**14.19**
Other Mobile Sources										
810	Aircraft	3.68	3.63	15.51	37.68	1.77	0.75	0.73	0.66	0.00
820	Trains	1.02	0.85	17.66	3.98	0.01	0.32	0.32	0.30	0.01
833	Ocean Going Vessels	2.42	2.16	27.76	4.08	3.10	0.90	0.90	0.86	0.03
835	Commercial Harbor Crafts	1.33	1.12	11.98	6.76	0.00	0.50	0.50	0.46	0.00
840	Recreational Boats	36.43	31.43	6.83	121.02	0.01	2.16	1.95	1.47	0.01
850	Off-Road Recreation Vehicles	4.01	3.92	0.06	3.24	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	55.13	48.81	56.32	617.85	0.10	4.26	4.06	3.44	0.12
870	Farm Equipment	0.70	0.61	2.52	7.04	0.00	0.17	0.17	0.15	0.00
890	Fuel Storage and Handling	8.48	8.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**113.20**	**100.98**	**138.64**	**801.65**	**4.99**	**9.07**	**8.64**	**7.35**	**0.17**
Total Stationary and Area Sources		1097.04	211.28	60.19	76.60	10.27	258.29	138.44	44.17	64.00
Total On-Road Vehicles		104.21	92.94	167.42	721.41	1.91	24.84	24.31	10.86	14.19
Total Other Mobile		113.20	100.98	138.64	801.65	4.99	9.07	8.64	7.35	0.17
Total		**1314.45**	**405.20**	**366.25**	**1599.66**	**17.17**	**292.20**	**171.39**	**62.38**	**78.36**

2019 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.53	0.87	0.15	6.69	0.26	0.99	0.99	0.99	1.62
20	Cogeneration	0.95	0.10	0.01	0.59	0.01	0.16	0.16	0.15	0.29
30	Oil and Gas Production (Combustion)	0.91	0.11	0.70	0.78	0.01	0.10	0.10	0.10	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	26.47	4.33	10.14	16.83	0.30	1.25	1.24	1.23	2.40
52	Food and Agricultural Processing	0.10	0.04	0.14	0.33	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.03	4.57	8.69	16.32	1.29	1.38	1.37	1.37	3.13
99	Other (Fuel Combustion)	1.51	0.28	2.91	2.80	0.18	0.34	0.26	0.19	0.02
Total Fuel Combustion		**52.86**	**11.31**	**22.74**	**49.29**	**2.05**	**5.82**	**5.67**	**5.56**	**8.65**
Waste Disposal										
110	Sewage Treatment	0.72	0.40	0.01	0.01	0.04	0.01	0.01	0.00	0.24
120	Landfills	627.51	8.83	0.74	0.59	0.39	0.18	0.17	0.16	3.94
130	Incineration	0.47	0.09	1.74	0.64	0.16	0.21	0.10	0.09	0.37
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	79.03	6.32	0.00	0.00	0.00	0.00	0.00	0.00	1.43
Total Waste Disposal		**707.73**	**15.64**	**2.49**	**1.24**	**0.59**	**0.40**	**0.28**	**0.25**	**5.98**
Cleaning and Surface Coatings										
210	Laundering	3.49	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	69.33	13.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	23.98	23.14	0.02	0.01	0.00	1.84	1.77	1.70	0.18
240	Printing	1.94	1.94	0.00	0.00	0.00	0.00	0.00	0.00	0.05
250	Adhesives and Sealants	5.00	4.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.87	0.87	0.03	0.06	0.00	0.06	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**104.61**	**43.49**	**0.05**	**0.07**	**0.00**	**1.90**	**1.82**	**1.75**	**0.52**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.25	2.42	0.02	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.94	4.53	0.25	5.18	0.36	2.65	1.73	1.52	0.23
330	Petroleum Marketing	54.49	13.75	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.12	0.10	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**66.80**	**20.80**	**0.28**	**5.21**	**0.42**	**2.67**	**1.74**	**1.52**	**0.23**
Industrial Processes										
410	Chemical	8.23	6.62	0.01	0.03	0.01	0.89	0.69	0.55	0.03
420	Food and Agriculture	1.37	1.33	0.00	0.00	0.01	0.52	0.29	0.14	0.02
430	Mineral Processes	1.04	0.86	0.02	0.19	0.00	8.50	5.53	2.98	0.16
440	Metal Processes	0.22	0.17	0.06	0.19	0.10	0.64	0.41	0.27	0.02
450	Wood and Paper	0.28	0.28	0.00	0.00	0.00	6.74	4.72	2.88	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.12	0.00
470	Electronics	0.03	0.02	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.71	3.32	0.02	0.13	0.00	1.38	0.92	0.53	8.58
Total Industrial Processes		**14.88**	**12.60**	**0.11**	**0.54**	**0.12**	**18.84**	**12.71**	**7.48**	**8.81**
Solvent Evaporation										
510	Consumer Products	105.90	88.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.35	11.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.49	1.49	0.00	0.00	0.00	0.00	0.00	0.00	1.18
540	Asphalt Paving/Roofing	1.36	1.26	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**121.10**	**102.45**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.18**

(Continued)

2019 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.92	2.13	9.99	13.70	0.30	2.28	2.22	2.18	0.02
620	Farming Operations	29.25	2.41	0.00	0.00	0.00	2.08	1.03	0.19	12.10
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	75.07	36.71	3.68	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	126.36	57.75	8.72	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.15	6.03	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	4.47	2.21	0.32	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.78	0.03	0.44	0.43	0.39	0.03
690	Cooking	2.77	1.94	0.00	0.00	0.00	11.62	11.62	11.62	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.15
	RECLAIM			23.12		6.10				
Total Miscellaneous Processes		**37.79**	**7.00**	**33.30**	**20.50**	**6.43**	**232.92**	**118.44**	**28.11**	**38.30**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	32.50	30.36	18.23	251.53	0.77	11.78	11.53	4.88	6.00
722	Light Duty Trucks 1 (T1)	8.81	8.33	4.01	51.71	0.07	0.98	0.96	0.42	0.60
723	Light Duty Trucks 2 (T2)	14.93	13.92	10.51	115.98	0.38	4.26	4.17	1.76	3.21
724	Medium Duty Trucks (T3)	16.23	14.96	13.09	134.11	0.32	2.68	2.62	1.12	3.04
732	Light Heavy Duty Gas Trucks 1 (T4)	3.83	3.62	4.33	15.04	0.03	0.31	0.31	0.13	0.22
733	Light Heavy Duty Gas Trucks 2 (T5)	0.48	0.45	0.69	1.96	0.01	0.08	0.08	0.03	0.04
734	Medium Heavy Duty Gas Trucks (T6)	0.67	0.59	1.16	7.10	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.09	0.07	0.31	3.32	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.37	0.32	9.19	2.14	0.01	0.36	0.35	0.18	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.12	0.11	2.67	0.67	0.01	0.17	0.17	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.96	0.85	19.52	3.01	0.07	1.52	1.50	0.92	0.18
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.75	1.57	55.60	8.40	0.18	1.38	1.36	0.66	0.30
750	Motorcycles (MCY)	10.95	9.74	2.24	45.83	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	3.09	0.60	8.63	8.56	0.00	0.64	0.63	0.33	0.02
762	Gas Urban Buses (UB)	0.39	0.28	0.45	2.69	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.06	0.51	0.00	0.07	0.07	0.03	0.00
772	Diesel School Buses (SB)	0.04	0.03	1.82	0.09	0.00	0.18	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.16	0.14	0.32	1.75	0.00	0.06	0.06	0.02	0.02
778	Motor Coaches	0.03	0.03	0.89	0.09	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	0.97	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.11	0.09	0.59	1.74	0.00	0.07	0.07	0.04	0.01
Total On-Road Motor Vehicles		**96.59**	**86.12**	**155.28**	**656.30**	**1.86**	**24.84**	**24.34**	**10.80**	**13.74**
Other Mobile Sources										
810	Aircraft	3.75	3.70	15.84	38.46	1.83	0.76	0.74	0.67	0.00
820	Trains	0.94	0.79	16.88	4.01	0.01	0.30	0.30	0.27	0.01
833	Ocean Going Vessels	2.49	2.22	26.18	4.17	3.15	0.91	0.91	0.87	0.04
835	Commercial Harbor Crafts	1.33	1.11	11.67	6.90	0.00	0.48	0.48	0.45	0.00
840	Recreational Boats	34.57	29.85	6.68	119.40	0.01	2.06	1.85	1.40	0.01
850	Off-Road Recreation Vehicles	3.98	3.89	0.07	3.29	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	54.32	48.06	53.50	623.67	0.10	4.09	3.88	3.28	0.12
870	Farm Equipment	0.66	0.58	2.43	7.02	0.00	0.16	0.16	0.15	0.00
890	Fuel Storage and Handling	8.17	8.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**110.21**	**98.34**	**133.25**	**806.92**	**5.10**	**8.77**	**8.33**	**7.10**	**0.18**
Total Stationary and Area Sources		1105.77	213.29	58.97	76.85	9.61	262.58	140.69	44.70	63.67
Total On-Road Vehicles		96.59	86.12	155.28	656.30	1.86	24.84	24.34	10.80	13.74
Total Other Mobile		110.21	98.34	133.25	806.92	5.10	8.77	8.33	7.10	0.18
Total		**1312.57**	**397.75**	**347.50**	**1540.07**	**16.57**	**296.19**	**173.36**	**62.60**	**77.59**

2020 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.52	0.87	0.15	6.69	0.26	0.99	0.99	0.98	1.62
20	Cogeneration	0.96	0.10	0.01	0.61	0.01	0.16	0.16	0.15	0.29
30	Oil and Gas Production (Combustion)	0.91	0.11	0.70	0.78	0.01	0.11	0.10	0.10	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.77	4.30	9.94	16.81	0.30	1.24	1.23	1.22	2.41
52	Food and Agricultural Processing	0.10	0.04	0.14	0.33	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.05	4.54	8.62	16.31	1.32	1.38	1.38	1.38	3.08
99	Other (Fuel Combustion)	1.50	0.25	2.46	2.71	0.18	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.17**	**11.22**	**22.02**	**49.19**	**2.08**	**5.81**	**5.66**	**5.54**	**8.61**
Waste Disposal										
110	Sewage Treatment	0.73	0.41	0.01	0.01	0.04	0.01	0.01	0.00	0.25
120	Landfills	631.98	8.90	0.75	0.60	0.40	0.18	0.17	0.16	3.97
130	Incineration	0.48	0.09	1.78	0.65	0.17	0.22	0.11	0.09	0.38
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	81.02	6.48	0.00	0.00	0.00	0.00	0.00	0.00	1.46
Total Waste Disposal		**714.21**	**15.88**	**2.54**	**1.26**	**0.61**	**0.41**	**0.29**	**0.25**	**6.06**
Cleaning and Surface Coatings										
210	Laundering	3.55	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	71.71	13.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	24.56	23.70	0.02	0.01	0.00	1.88	1.80	1.74	0.19
240	Printing	1.98	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	5.17	4.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.90	0.90	0.03	0.06	0.00	0.06	0.05	0.05	0.29
Total Cleaning and Surface Coatings		**107.87**	**44.72**	**0.05**	**0.07**	**0.00**	**1.94**	**1.85**	**1.79**	**0.54**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.30	2.44	0.03	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.96	4.54	0.25	5.19	0.36	2.65	1.73	1.52	0.24
330	Petroleum Marketing	53.48	13.52	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.12	0.11	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**65.86**	**20.61**	**0.29**	**5.22**	**0.42**	**2.67**	**1.74**	**1.52**	**0.24**
Industrial Processes										
410	Chemical	8.46	6.80	0.01	0.03	0.01	0.92	0.71	0.57	0.03
420	Food and Agriculture	1.39	1.35	0.00	0.00	0.01	0.52	0.30	0.15	0.02
430	Mineral Processes	1.06	0.88	0.02	0.20	0.00	8.54	5.56	2.99	0.16
440	Metal Processes	0.23	0.17	0.06	0.19	0.10	0.65	0.42	0.28	0.02
450	Wood and Paper	0.28	0.28	0.00	0.00	0.00	6.92	4.85	2.95	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.14	0.13	0.12	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.75	3.36	0.02	0.13	0.00	1.40	0.94	0.54	8.58
Total Industrial Processes		**15.20**	**12.87**	**0.11**	**0.55**	**0.12**	**19.12**	**12.93**	**7.61**	**8.81**
Solvent Evaporation										
510	Consumer Products	106.49	88.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.48	11.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.50	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.16
540	Asphalt Paving/Roofing	1.42	1.31	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**121.89**	**103.13**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.16**

(Continued)

2020 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.90	2.12	9.80	13.61	0.30	2.27	2.20	2.17	0.02
620	Farming Operations	28.11	2.32	0.00	0.00	0.00	2.01	1.00	0.19	11.60
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	77.95	38.12	3.82	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	127.38	58.21	8.79	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.14	6.03	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	4.35	2.15	0.31	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.78	0.03	0.44	0.43	0.39	0.03
690	Cooking	2.81	1.97	0.00	0.00	0.00	11.78	11.78	11.78	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.31
	RECLAIM			21.07		6.10				
Total Miscellaneous Processes		**36.67**	**6.93**	**31.06**	**20.41**	**6.43**	**236.77**	**120.36**	**28.46**	**37.96**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	29.61	27.72	16.19	228.27	0.74	11.73	11.49	4.85	5.78
722	Light Duty Trucks 1 (T1)	8.02	7.61	3.54	45.87	0.07	0.96	0.94	0.41	0.56
723	Light Duty Trucks 2 (T2)	13.69	12.81	9.16	104.22	0.37	4.24	4.16	1.75	3.10
724	Medium Duty Trucks (T3)	15.00	13.88	11.49	120.19	0.31	2.62	2.56	1.09	2.88
732	Light Heavy Duty Gas Trucks 1 (T4)	3.58	3.39	4.01	13.37	0.03	0.29	0.29	0.12	0.20
733	Light Heavy Duty Gas Trucks 2 (T5)	0.43	0.41	0.64	1.74	0.01	0.08	0.08	0.03	0.04
734	Medium Heavy Duty Gas Trucks (T6)	0.61	0.55	1.04	6.32	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.08	0.06	0.30	3.28	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.35	0.30	8.36	2.02	0.01	0.35	0.35	0.18	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.12	0.10	2.36	0.63	0.01	0.17	0.17	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.65	0.57	15.31	2.18	0.08	1.38	1.36	0.76	0.19
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.70	1.49	53.08	8.50	0.18	1.38	1.36	0.63	0.31
750	Motorcycles (MCY)	10.98	9.75	2.26	45.60	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	2.82	0.54	7.60	7.87	0.00	0.60	0.59	0.31	0.02
762	Gas Urban Buses (UB)	0.35	0.25	0.42	2.32	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.06	0.50	0.00	0.07	0.07	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.73	0.09	0.00	0.18	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.15	0.14	0.30	1.63	0.00	0.06	0.06	0.02	0.02
778	Motor Coaches	0.03	0.02	0.83	0.10	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	0.91	0.08	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.09	0.08	0.54	1.41	0.00	0.07	0.07	0.04	0.01
Total On-Road Motor Vehicles		**89.37**	**79.76**	**140.13**	**596.19**	**1.82**	**24.48**	**24.01**	**10.50**	**13.21**
Other Mobile Sources										
810	Aircraft	3.82	3.78	16.16	39.23	1.88	0.77	0.75	0.68	0.00
820	Trains	0.89	0.75	16.52	4.07	0.01	0.29	0.29	0.26	0.01
833	Ocean Going Vessels	2.55	2.28	24.80	4.26	3.20	0.93	0.93	0.89	0.04
835	Commercial Harbor Crafts	1.32	1.11	11.42	6.96	0.00	0.47	0.47	0.43	0.00
840	Recreational Boats	32.74	28.29	6.54	117.79	0.01	1.95	1.76	1.33	0.01
850	Off-Road Recreation Vehicles	3.94	3.86	0.07	3.34	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	53.69	47.47	51.09	630.49	0.10	3.93	3.73	3.14	0.12
870	Farm Equipment	0.63	0.54	2.30	7.00	0.00	0.15	0.15	0.14	0.00
890	Fuel Storage and Handling	7.89	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**107.47**	**95.93**	**128.90**	**813.14**	**5.20**	**8.50**	**8.09**	**6.88**	**0.18**
Total Stationary and Area Sources		1113.87	215.36	56.07	76.70	9.66	266.75	142.86	45.20	63.38
Total On-Road Vehicles		89.37	79.76	140.13	596.19	1.82	24.48	24.01	10.50	13.21
Total Other Mobile		107.47	95.93	128.90	813.14	5.20	8.50	8.09	6.88	0.18
Total		**1310.71**	**391.05**	**325.10**	**1486.03**	**16.68**	**299.73**	**174.96**	**62.58**	**76.77**

2021 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.73	0.90	0.16	6.95	0.27	1.03	1.03	1.02	1.68
20	Cogeneration	0.96	0.11	0.01	0.63	0.01	0.16	0.16	0.15	0.30
30	Oil and Gas Production (Combustion)	0.92	0.11	0.71	0.79	0.01	0.11	0.11	0.10	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.53	4.32	9.92	16.94	0.31	1.24	1.23	1.22	2.40
52	Food and Agricultural Processing	0.10	0.04	0.14	0.34	0.00	0.04	0.04	0.04	0.05
60	Service and Commercial	14.11	4.53	8.62	16.35	1.34	1.39	1.39	1.38	3.07
99	Other (Fuel Combustion)	1.51	0.25	2.46	2.73	0.18	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.22**	**11.27**	**22.02**	**49.68**	**2.12**	**5.86**	**5.72**	**5.58**	**8.66**
Waste Disposal										
110	Sewage Treatment	0.74	0.42	0.01	0.01	0.04	0.01	0.01	0.01	0.25
120	Landfills	636.47	8.96	0.76	0.61	0.40	0.18	0.17	0.17	3.99
130	Incineration	0.48	0.09	1.80	0.66	0.17	0.22	0.11	0.09	0.38
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	84.88	6.79	0.00	0.00	0.00	0.00	0.00	0.00	1.50
Total Waste Disposal		**722.57**	**16.26**	**2.57**	**1.28**	**0.61**	**0.41**	**0.29**	**0.27**	**6.12**
Cleaning and Surface Coatings										
210	Laundering	3.58	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	74.07	13.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	25.02	24.15	0.02	0.01	0.00	1.91	1.84	1.77	0.19
240	Printing	2.02	2.02	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	5.34	4.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.93	0.93	0.03	0.07	0.00	0.06	0.06	0.05	0.29
Total Cleaning and Surface Coatings		**110.96**	**45.83**	**0.05**	**0.08**	**0.00**	**1.97**	**1.90**	**1.82**	**0.54**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.36	2.47	0.03	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	6.99	4.55	0.25	5.20	0.36	2.66	1.73	1.52	0.24
330	Petroleum Marketing	52.85	13.29	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.12	0.11	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**65.32**	**20.42**	**0.29**	**5.23**	**0.42**	**2.68**	**1.74**	**1.52**	**0.24**
Industrial Processes										
410	Chemical	8.69	6.98	0.01	0.03	0.01	0.95	0.74	0.59	0.03
420	Food and Agriculture	1.41	1.37	0.00	0.00	0.01	0.53	0.30	0.15	0.02
430	Mineral Processes	1.08	0.90	0.02	0.20	0.00	8.58	5.58	3.01	0.16
440	Metal Processes	0.23	0.18	0.06	0.19	0.10	0.67	0.43	0.28	0.02
450	Wood and Paper	0.29	0.29	0.00	0.00	0.00	7.10	4.97	3.03	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.12	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.79	3.39	0.03	0.14	0.00	1.43	0.96	0.55	8.58
Total Industrial Processes		**15.52**	**13.14**	**0.12**	**0.56**	**0.12**	**19.44**	**13.14**	**7.74**	**8.81**
Solvent Evaporation										
510	Consumer Products	107.10	89.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.57	11.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.51	1.51	0.00	0.00	0.00	0.00	0.00	0.00	1.15
540	Asphalt Paving/Roofing	1.44	1.33	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**122.62**	**103.76**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.15**

(Continued)

2021 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.89	2.12	9.65	13.56	0.30	2.26	2.19	2.16	0.02
620	Farming Operations	27.03	2.23	0.00	0.00	0.00	1.96	0.97	0.19	11.12
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	78.98	38.62	3.87	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	128.62	58.78	8.87	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.14	6.02	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	4.25	2.11	0.30	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.78	0.03	0.44	0.43	0.39	0.03
690	Cooking	2.84	1.98	0.00	0.00	0.00	11.88	11.88	11.88	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.48
	RECLAIM			19.01		6.10				
Total Miscellaneous Processes		**35.61**	**6.85**	**28.85**	**20.36**	**6.43**	**238.98**	**121.44**	**28.67**	**37.65**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	27.62	25.90	14.68	213.17	0.72	11.83	11.58	4.89	5.66
722	Light Duty Trucks 1 (T1)	7.44	7.07	3.18	41.59	0.07	0.95	0.93	0.41	0.54
723	Light Duty Trucks 2 (T2)	12.95	12.14	8.23	97.23	0.36	4.29	4.20	1.77	3.06
724	Medium Duty Trucks (T3)	13.95	12.94	10.06	106.59	0.29	2.59	2.53	1.07	2.77
732	Light Heavy Duty Gas Trucks 1 (T4)	3.34	3.18	3.70	11.90	0.02	0.27	0.27	0.11	0.18
733	Light Heavy Duty Gas Trucks 2 (T5)	0.38	0.36	0.59	1.56	0.01	0.08	0.08	0.03	0.04
734	Medium Heavy Duty Gas Trucks (T6)	0.56	0.50	0.93	5.66	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.08	0.06	0.30	3.27	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.33	0.29	7.55	1.89	0.01	0.35	0.35	0.18	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.11	0.10	2.08	0.59	0.01	0.17	0.17	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.30	0.26	11.06	1.14	0.08	1.09	1.07	0.47	0.19
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.74	1.49	50.34	8.85	0.19	1.41	1.39	0.63	0.33
750	Motorcycles (MCY)	11.03	9.78	2.27	45.28	0.00	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	2.57	0.48	6.83	7.30	0.00	0.56	0.55	0.29	0.01
762	Gas Urban Buses (UB)	0.33	0.24	0.40	2.19	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.05	0.50	0.00	0.07	0.07	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.63	0.09	0.00	0.18	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.15	0.13	0.28	1.54	0.00	0.06	0.06	0.03	0.02
778	Motor Coaches	0.03	0.02	0.76	0.10	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	0.78	0.08	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.08	0.06	0.49	1.13	0.00	0.07	0.07	0.03	0.01
Total On-Road Motor Vehicles		**84.10**	**75.09**	**126.19**	**551.65**	**1.77**	**24.27**	**23.78**	**10.22**	**12.91**
Other Mobile Sources										
810	Aircraft	3.90	3.85	16.57	39.85	1.93	0.78	0.76	0.69	0.00
820	Trains	0.89	0.74	16.25	4.12	0.01	0.28	0.28	0.26	0.01
833	Ocean Going Vessels	2.66	2.38	24.21	4.44	3.28	0.96	0.96	0.92	0.04
835	Commercial Harbor Crafts	1.32	1.11	11.18	7.03	0.00	0.46	0.46	0.42	0.00
840	Recreational Boats	30.96	26.78	6.41	116.23	0.01	1.85	1.66	1.26	0.01
850	Off-Road Recreation Vehicles	3.88	3.79	0.07	3.39	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	53.00	46.82	48.26	638.75	0.10	3.79	3.59	3.00	0.12
870	Farm Equipment	0.59	0.51	2.17	7.06	0.00	0.15	0.14	0.13	0.00
890	Fuel Storage and Handling	7.62	7.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**104.82**	**93.57**	**125.12**	**820.87**	**5.33**	**8.28**	**7.86**	**6.69**	**0.18**
Total Stationary and Area Sources		1124.82	217.53	53.90	77.19	9.70	269.37	144.26	45.63	63.17
Total On-Road Vehicles		84.10	75.09	126.19	551.65	1.77	24.27	23.78	10.22	12.91
Total Other Mobile		104.82	93.57	125.12	820.87	5.33	8.28	7.86	6.69	0.18
Total		**1313.74**	**386.19**	**305.21**	**1449.71**	**16.80**	**301.92**	**175.90**	**62.54**	**76.26**

2022 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.88	0.92	0.16	7.12	0.27	1.06	1.05	1.05	1.72
20	Cogeneration	0.97	0.11	0.01	0.65	0.01	0.17	0.16	0.15	0.31
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.42	4.35	9.95	17.12	0.32	1.25	1.24	1.23	2.40
52	Food and Agricultural Processing	0.10	0.04	0.14	0.34	0.00	0.05	0.04	0.04	0.05
60	Service and Commercial	14.20	4.53	8.62	16.41	1.36	1.40	1.39	1.39	3.06
99	Other (Fuel Combustion)	1.53	0.26	2.46	2.75	0.19	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.39**	**11.33**	**22.06**	**50.14**	**2.16**	**5.93**	**5.75**	**5.64**	**8.70**
Waste Disposal										
110	Sewage Treatment	0.76	0.43	0.01	0.01	0.04	0.01	0.01	0.01	0.25
120	Landfills	640.95	9.02	0.77	0.62	0.41	0.18	0.17	0.17	4.01
130	Incineration	0.49	0.09	1.82	0.67	0.17	0.22	0.11	0.09	0.39
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	88.82	7.11	0.00	0.00	0.00	0.00	0.00	0.00	1.55
Total Waste Disposal		**731.02**	**16.65**	**2.60**	**1.30**	**0.62**	**0.41**	**0.29**	**0.27**	**6.20**
Cleaning and Surface Coatings										
210	Laundering	3.61	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	76.47	14.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	25.51	24.62	0.02	0.01	0.00	1.95	1.87	1.80	0.20
240	Printing	2.06	2.06	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	5.51	4.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.95	0.95	0.03	0.07	0.00	0.06	0.06	0.06	0.29
Total Cleaning and Surface Coatings		**114.11**	**46.95**	**0.05**	**0.08**	**0.00**	**2.01**	**1.93**	**1.86**	**0.55**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.40	2.49	0.03	0.02	0.06	0.01	0.00	0.00	0.00
320	Petroleum Refining	7.01	4.56	0.25	5.22	0.36	2.66	1.74	1.53	0.24
330	Petroleum Marketing	52.31	13.07	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.11	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**64.85**	**20.23**	**0.29**	**5.25**	**0.42**	**2.68**	**1.75**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	8.92	7.16	0.01	0.04	0.01	0.97	0.76	0.61	0.03
420	Food and Agriculture	1.43	1.39	0.00	0.00	0.01	0.54	0.31	0.15	0.02
430	Mineral Processes	1.10	0.92	0.02	0.20	0.00	8.64	5.62	3.02	0.16
440	Metal Processes	0.24	0.18	0.06	0.20	0.10	0.68	0.44	0.29	0.02
450	Wood and Paper	0.29	0.29	0.00	0.00	0.00	7.28	5.10	3.10	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.83	3.43	0.03	0.14	0.00	1.46	0.98	0.57	8.58
Total Industrial Processes		**15.84**	**13.40**	**0.12**	**0.58**	**0.12**	**19.75**	**13.37**	**7.88**	**8.81**
Solvent Evaporation										
510	Consumer Products	107.71	89.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.66	11.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.51	1.51	0.00	0.00	0.00	0.00	0.00	0.00	1.14
540	Asphalt Paving/Roofing	1.46	1.35	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**123.34**	**104.39**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.14**

(Continued)

2022 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.87	2.11	9.52	13.52	0.30	2.25	2.18	2.15	0.02
620	Farming Operations	26.04	2.16	0.00	0.00	0.00	1.92	0.95	0.19	10.69
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	80.12	39.18	3.93	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	129.86	59.35	8.96	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.14	6.02	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	4.15	2.06	0.30	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.78	0.03	0.44	0.43	0.39	0.03
690	Cooking	2.86	2.00	0.00	0.00	0.00	11.98	11.98	11.98	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.65
	RECLAIM			14.90		6.10				
Total Miscellaneous Processes		**34.62**	**6.79**	**24.61**	**20.32**	**6.43**	**241.31**	**122.59**	**28.91**	**37.39**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	25.96	24.41	13.38	200.19	0.70	11.92	11.67	4.92	5.56
722	Light Duty Trucks 1 (T1)	6.94	6.61	2.87	37.81	0.07	0.95	0.93	0.40	0.52
723	Light Duty Trucks 2 (T2)	12.40	11.64	7.48	91.90	0.35	4.34	4.25	1.79	3.04
724	Medium Duty Trucks (T3)	12.89	12.00	8.71	92.59	0.28	2.56	2.51	1.06	2.68
732	Light Heavy Duty Gas Trucks 1 (T4)	3.11	2.97	3.38	10.56	0.02	0.26	0.25	0.11	0.17
733	Light Heavy Duty Gas Trucks 2 (T5)	0.34	0.33	0.54	1.41	0.01	0.08	0.08	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.51	0.46	0.83	5.06	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.06	0.30	3.30	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.31	0.27	6.80	1.77	0.01	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.10	0.09	1.81	0.55	0.01	0.18	0.17	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.30	0.26	10.83	1.17	0.08	1.12	1.10	0.48	0.20
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.75	1.46	47.23	9.12	0.19	1.43	1.41	0.63	0.34
750	Motorcycles (MCY)	11.16	9.88	2.30	45.35	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	2.36	0.43	6.21	6.82	0.00	0.54	0.53	0.27	0.01
762	Gas Urban Buses (UB)	0.32	0.23	0.38	2.03	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.05	0.49	0.00	0.08	0.07	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.54	0.09	0.00	0.17	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.14	0.13	0.26	1.45	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.03	0.02	0.67	0.10	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.02	0.02	0.76	0.08	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.07	0.05	0.45	0.92	0.00	0.07	0.07	0.03	0.01
Total On-Road Motor Vehicles		**79.87**	**71.39**	**116.78**	**512.76**	**1.75**	**24.41**	**23.91**	**10.23**	**12.68**
Other Mobile Sources										
810	Aircraft	3.97	3.92	16.91	40.56	1.99	0.79	0.77	0.70	0.00
820	Trains	0.86	0.72	15.74	4.16	0.01	0.28	0.28	0.25	0.01
833	Ocean Going Vessels	2.78	2.48	23.60	4.61	3.37	1.00	1.00	0.95	0.04
835	Commercial Harbor Crafts	1.31	1.10	10.95	7.09	0.00	0.45	0.45	0.41	0.00
840	Recreational Boats	29.27	25.34	6.29	114.78	0.01	1.75	1.58	1.19	0.01
850	Off-Road Recreation Vehicles	3.81	3.73	0.07	3.45	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	52.54	46.38	44.71	644.86	0.10	3.61	3.40	2.83	0.13
870	Farm Equipment	0.57	0.49	2.05	7.07	0.00	0.14	0.14	0.12	0.00
890	Fuel Storage and Handling	7.38	7.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**102.49**	**91.51**	**120.32**	**826.58**	**5.48**	**8.03**	**7.63**	**6.46**	**0.19**
Total Stationary and Area Sources		1136.17	219.74	49.73	77.67	9.75	272.12	145.71	46.12	63.03
Total On-Road Vehicles		79.87	71.39	116.78	512.76	1.75	24.41	23.91	10.23	12.68
Total Other Mobile		102.49	91.51	120.32	826.58	5.48	8.03	7.63	6.46	0.19
Total		**1318.53**	**382.64**	**286.83**	**1417.01**	**16.98**	**304.56**	**177.25**	**62.81**	**75.90**

2023 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	5.98	0.94	0.17	7.25	0.28	1.07	1.07	1.07	1.75
20	Cogeneration	0.97	0.11	0.01	0.66	0.01	0.17	0.16	0.16	0.31
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.17	4.34	9.89	17.14	0.32	1.24	1.23	1.23	2.38
52	Food and Agricultural Processing	0.10	0.04	0.14	0.35	0.00	0.05	0.04	0.04	0.05
60	Service and Commercial	14.21	4.51	8.60	16.41	1.38	1.40	1.40	1.40	3.05
99	Other (Fuel Combustion)	1.54	0.26	2.47	2.77	0.19	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.26**	**11.32**	**22.00**	**50.33**	**2.19**	**5.93**	**5.77**	**5.68**	**8.70**
Waste Disposal										
110	Sewage Treatment	0.76	0.43	0.01	0.01	0.04	0.01	0.01	0.01	0.25
120	Landfills	645.54	9.09	0.77	0.62	0.41	0.18	0.18	0.17	4.04
130	Incineration	0.50	0.09	1.83	0.68	0.17	0.22	0.11	0.10	0.39
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	92.77	7.42	0.00	0.00	0.00	0.00	0.00	0.00	1.60
Total Waste Disposal		**739.57**	**17.03**	**2.61**	**1.31**	**0.62**	**0.41**	**0.30**	**0.28**	**6.28**
Cleaning and Surface Coatings										
210	Laundering	3.64	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	77.53	14.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	25.75	24.85	0.02	0.01	0.00	1.96	1.88	1.81	0.20
240	Printing	2.08	2.08	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	5.59	4.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.96	0.96	0.03	0.07	0.00	0.06	0.06	0.06	0.30
Total Cleaning and Surface Coatings		**115.55**	**47.47**	**0.05**	**0.08**	**0.00**	**2.02**	**1.94**	**1.87**	**0.56**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.42	2.50	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.02	4.56	0.25	5.22	0.36	2.66	1.74	1.53	0.24
330	Petroleum Marketing	51.71	12.83	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.11	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**64.28**	**20.00**	**0.29**	**5.25**	**0.42**	**2.68**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	9.00	7.23	0.01	0.04	0.01	0.99	0.77	0.61	0.03
420	Food and Agriculture	1.44	1.40	0.00	0.00	0.01	0.54	0.31	0.15	0.02
430	Mineral Processes	1.11	0.92	0.02	0.20	0.00	8.66	5.63	3.03	0.17
440	Metal Processes	0.24	0.18	0.06	0.20	0.10	0.69	0.44	0.29	0.02
450	Wood and Paper	0.30	0.30	0.00	0.00	0.00	7.34	5.14	3.13	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.86	3.45	0.03	0.14	0.00	1.48	0.99	0.57	8.58
Total Industrial Processes		**15.98**	**13.51**	**0.12**	**0.58**	**0.12**	**19.88**	**13.44**	**7.92**	**8.82**
Solvent Evaporation										
510	Consumer Products	108.33	90.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.76	12.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.52	1.52	0.00	0.00	0.00	0.00	0.00	0.00	1.13
540	Asphalt Paving/Roofing	1.48	1.37	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**124.09**	**105.02**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.13**

(Continued)

2023 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.86	2.11	9.38	13.47	0.30	2.24	2.18	2.14	0.02
620	Farming Operations	25.07	2.08	0.00	0.00	0.00	1.87	0.93	0.18	10.26
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	81.10	39.66	3.97	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	131.07	59.90	9.04	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.14	6.02	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	4.04	2.01	0.29	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.78	0.03	0.44	0.43	0.39	0.03
690	Cooking	2.88	2.01	0.00	0.00	0.00	12.07	12.07	12.07	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.82
	RECLAIM			14.90		6.10				
Total Miscellaneous Processes		**33.66**	**6.72**	**24.47**	**20.27**	**6.43**	**243.42**	**123.64**	**29.09**	**37.13**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	24.47	23.06	12.25	188.00	0.67	12.00	11.75	4.95	5.48
722	Light Duty Trucks 1 (T1)	6.47	6.18	2.58	34.16	0.07	0.95	0.92	0.40	0.51
723	Light Duty Trucks 2 (T2)	11.92	11.22	6.83	87.32	0.34	4.39	4.29	1.81	3.03
724	Medium Duty Trucks (T3)	12.14	11.35	7.72	83.66	0.27	2.54	2.49	1.05	2.60
732	Light Heavy Duty Gas Trucks 1 (T4)	2.91	2.78	3.11	9.43	0.02	0.24	0.24	0.10	0.15
733	Light Heavy Duty Gas Trucks 2 (T5)	0.31	0.29	0.49	1.30	0.01	0.08	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.48	0.43	0.75	4.59	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.30	3.36	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.29	0.26	6.10	1.66	0.01	0.35	0.34	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.10	0.09	1.57	0.51	0.01	0.18	0.18	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.24	0.21	8.26	1.10	0.08	1.14	1.12	0.47	0.21
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.21	0.95	26.84	8.38	0.19	1.36	1.34	0.53	0.35
750	Motorcycles (MCY)	11.23	9.94	2.33	45.37	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	2.15	0.39	5.65	6.37	0.00	0.52	0.51	0.26	0.01
762	Gas Urban Buses (UB)	0.30	0.22	0.36	1.91	0.00	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.05	0.48	0.00	0.08	0.08	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.44	0.09	0.00	0.17	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.14	0.13	0.25	1.39	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.02	0.01	0.31	0.08	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.01	0.01	0.41	0.06	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.06	0.05	0.41	0.73	0.00	0.07	0.06	0.03	0.01
Total On-Road Motor Vehicles		**75.61**	**67.69**	**88.01**	**479.95**	**1.70**	**24.43**	**23.91**	**10.14**	**12.50**
Other Mobile Sources										
810	Aircraft	4.06	4.01	17.31	41.35	2.04	0.80	0.78	0.71	0.00
820	Trains	0.84	0.70	15.27	4.20	0.01	0.27	0.27	0.25	0.01
833	Ocean Going Vessels	2.90	2.59	22.97	4.79	3.45	1.03	1.03	0.99	0.04
835	Commercial Harbor Crafts	1.31	1.10	10.78	7.16	0.00	0.44	0.44	0.40	0.00
840	Recreational Boats	27.65	23.96	6.18	113.43	0.01	1.66	1.50	1.13	0.01
850	Off-Road Recreation Vehicles	3.75	3.67	0.08	3.50	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	52.38	46.22	42.57	651.02	0.11	3.49	3.28	2.71	0.13
870	Farm Equipment	0.55	0.47	1.94	7.08	0.00	0.13	0.13	0.12	0.00
890	Fuel Storage and Handling	7.17	7.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**100.61**	**89.86**	**117.10**	**832.53**	**5.62**	**7.83**	**7.44**	**6.32**	**0.19**
Total Stationary and Area Sources		1145.39	221.07	49.54	77.82	9.78	274.37	146.88	46.40	62.86
Total On-Road Vehicles		75.61	67.69	88.01	479.95	1.70	24.43	23.91	10.14	12.50
Total Other Mobile		100.61	89.86	117.10	832.53	5.62	7.83	7.44	6.32	0.19
Total		**1321.61**	**378.62**	**254.65**	**1390.30**	**17.10**	**306.63**	**178.23**	**62.86**	**75.55**

2024 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	6.05	0.95	0.17	7.33	0.28	1.09	1.08	1.08	1.77
20	Cogeneration	0.97	0.11	0.01	0.66	0.01	0.17	0.16	0.16	0.31
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	25.03	4.35	9.88	17.20	0.32	1.24	1.23	1.23	2.38
52	Food and Agricultural Processing	0.10	0.04	0.15	0.35	0.00	0.05	0.05	0.05	0.05
60	Service and Commercial	14.23	4.50	8.60	16.42	1.39	1.41	1.40	1.40	3.04
99	Other (Fuel Combustion)	1.55	0.26	2.47	2.79	0.19	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.22**	**11.33**	**22.00**	**50.50**	**2.20**	**5.96**	**5.79**	**5.70**	**8.71**
Waste Disposal										
110	Sewage Treatment	0.77	0.44	0.01	0.01	0.04	0.01	0.01	0.01	0.25
120	Landfills	650.29	9.15	0.78	0.63	0.41	0.19	0.18	0.17	4.06
130	Incineration	0.50	0.09	1.85	0.69	0.17	0.23	0.11	0.10	0.39
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	96.86	7.75	0.00	0.00	0.00	0.00	0.00	0.00	1.65
Total Waste Disposal		**748.42**	**17.43**	**2.64**	**1.33**	**0.62**	**0.43**	**0.30**	**0.28**	**6.35**
Cleaning and Surface Coatings										
210	Laundering	3.67	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	78.63	14.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	26.03	25.11	0.02	0.01	0.00	1.97	1.90	1.83	0.20
240	Printing	2.10	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	5.67	4.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.98	0.98	0.03	0.07	0.00	0.06	0.06	0.06	0.30
Total Cleaning and Surface Coatings		**117.08**	**48.05**	**0.05**	**0.08**	**0.00**	**2.03**	**1.96**	**1.89**	**0.56**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.42	2.50	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.03	4.56	0.25	5.23	0.36	2.66	1.74	1.53	0.24
330	Petroleum Marketing	51.21	12.60	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**63.79**	**19.78**	**0.29**	**5.26**	**0.42**	**2.68**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	9.10	7.31	0.01	0.04	0.01	1.00	0.78	0.62	0.03
420	Food and Agriculture	1.45	1.41	0.00	0.00	0.01	0.55	0.31	0.15	0.02
430	Mineral Processes	1.12	0.93	0.02	0.20	0.00	8.69	5.65	3.04	0.17
440	Metal Processes	0.24	0.18	0.06	0.20	0.11	0.70	0.45	0.30	0.02
450	Wood and Paper	0.30	0.30	0.00	0.00	0.00	7.41	5.19	3.16	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.89	3.48	0.03	0.14	0.00	1.50	1.00	0.58	8.58
Total Industrial Processes		**16.13**	**13.64**	**0.12**	**0.58**	**0.13**	**20.03**	**13.54**	**7.99**	**8.82**
Solvent Evaporation										
510	Consumer Products	108.97	90.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.85	12.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.53	1.53	0.00	0.00	0.00	0.00	0.00	0.00	1.12
540	Asphalt Paving/Roofing	1.51	1.39	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**124.86**	**105.68**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.12**

(Continued)

2024 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.85	2.10	9.26	13.44	0.30	2.23	2.17	2.13	0.02
620	Farming Operations	25.07	2.08	0.00	0.00	0.00	1.87	0.93	0.18	10.26
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	82.23	40.21	4.03	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	131.59	60.14	9.08	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.13	6.02	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.94	1.97	0.28	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.78	0.03	0.44	0.43	0.39	0.03
690	Cooking	2.90	2.03	0.00	0.00	0.00	12.17	12.17	12.17	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.00
	RECLAIM			14.90		6.10				
Total Miscellaneous Processes		**33.67**	**6.73**	**24.35**	**20.24**	**6.43**	**245.05**	**124.48**	**29.27**	**37.31**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	23.02	21.74	11.18	174.32	0.64	11.93	11.68	4.91	5.34
722	Light Duty Trucks 1 (T1)	6.02	5.75	2.33	31.00	0.06	0.93	0.91	0.39	0.49
723	Light Duty Trucks 2 (T2)	11.41	10.77	6.24	82.52	0.33	4.38	4.28	1.81	3.00
724	Medium Duty Trucks (T3)	11.38	10.68	6.86	75.58	0.26	2.50	2.44	1.03	2.53
732	Light Heavy Duty Gas Trucks 1 (T4)	2.74	2.63	2.87	8.55	0.02	0.23	0.23	0.10	0.14
733	Light Heavy Duty Gas Trucks 2 (T5)	0.29	0.27	0.46	1.23	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.46	0.41	0.70	4.26	0.01	0.13	0.12	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.31	3.42	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.28	0.24	5.52	1.56	0.01	0.35	0.34	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.09	0.08	1.36	0.48	0.01	0.18	0.18	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.24	0.21	8.45	1.11	0.08	1.17	1.14	0.49	0.21
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.28	0.97	27.05	8.75	0.20	1.40	1.39	0.55	0.36
750	Motorcycles (MCY)	11.14	9.84	2.31	44.85	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.97	0.35	4.97	5.92	0.00	0.49	0.48	0.24	0.01
762	Gas Urban Buses (UB)	0.26	0.19	0.34	1.72	0.01	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.05	0.48	0.00	0.08	0.08	0.03	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.35	0.09	0.00	0.17	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.14	0.12	0.24	1.33	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.02	0.01	0.33	0.08	0.00	0.03	0.03	0.01	0.00
779	Diesel Other Buses (OB)	0.01	0.01	0.43	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.05	0.04	0.38	0.62	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**71.96**	**64.43**	**83.73**	**447.94**	**1.66**	**24.30**	**23.80**	**10.09**	**12.24**
Other Mobile Sources										
810	Aircraft	4.13	4.09	17.68	42.10	2.10	0.81	0.79	0.72	0.00
820	Trains	0.81	0.68	14.59	4.24	0.02	0.26	0.26	0.24	0.01
833	Ocean Going Vessels	3.02	2.69	22.10	4.97	3.54	1.07	1.07	1.02	0.04
835	Commercial Harbor Crafts	1.31	1.10	10.65	7.23	0.00	0.43	0.43	0.40	0.00
840	Recreational Boats	26.09	22.63	6.07	112.15	0.01	1.57	1.42	1.07	0.01
850	Off-Road Recreation Vehicles	3.69	3.61	0.08	3.54	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	52.39	46.22	41.07	657.23	0.11	3.41	3.19	2.64	0.13
870	Farm Equipment	0.52	0.45	1.84	7.10	0.00	0.13	0.12	0.11	0.00
890	Fuel Storage and Handling	6.97	6.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**98.93**	**88.41**	**114.08**	**838.56**	**5.78**	**7.69**	**7.29**	**6.21**	**0.19**
Total Stationary and Area Sources		1156.17	222.64	49.45	77.99	9.80	276.21	147.86	46.69	63.11
Total On-Road Vehicles		71.96	64.43	83.73	447.94	1.66	24.30	23.80	10.09	12.24
Total Other Mobile		98.93	88.41	114.08	838.56	5.78	7.69	7.29	6.21	0.19
Total		**1327.06**	**375.48**	**247.26**	**1364.49**	**17.24**	**308.20**	**178.95**	**62.99**	**75.54**

2025 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	6.09	0.96	0.17	7.39	0.29	1.10	1.09	1.09	1.79
20	Cogeneration	0.97	0.11	0.01	0.67	0.01	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.84	4.35	9.85	17.23	0.33	1.24	1.23	1.23	2.37
52	Food and Agricultural Processing	0.10	0.04	0.15	0.35	0.00	0.05	0.05	0.05	0.05
60	Service and Commercial	14.26	4.50	8.60	16.45	1.41	1.41	1.41	1.41	3.04
99	Other (Fuel Combustion)	1.57	0.26	2.47	2.81	0.19	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.12**	**11.34**	**21.97**	**50.65**	**2.24**	**5.97**	**5.81**	**5.72**	**8.73**
Waste Disposal										
110	Sewage Treatment	0.78	0.44	0.01	0.01	0.04	0.01	0.01	0.01	0.25
120	Landfills	654.77	9.22	0.79	0.63	0.42	0.19	0.18	0.17	4.08
130	Incineration	0.51	0.10	1.86	0.69	0.17	0.23	0.11	0.10	0.40
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	100.91	8.07	0.00	0.00	0.00	0.00	0.00	0.00	1.70
Total Waste Disposal		**756.97**	**17.83**	**2.66**	**1.33**	**0.63**	**0.43**	**0.30**	**0.28**	**6.43**
Cleaning and Surface Coatings										
210	Laundering	3.70	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	79.68	14.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	26.29	25.36	0.02	0.01	0.00	1.99	1.91	1.84	0.20
240	Printing	2.11	2.11	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	5.74	5.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.99	0.99	0.03	0.07	0.00	0.06	0.06	0.06	0.30
Total Cleaning and Surface Coatings		**118.51**	**48.58**	**0.05**	**0.08**	**0.00**	**2.05**	**1.97**	**1.90**	**0.56**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.41	2.49	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.04	4.56	0.25	5.24	0.36	2.66	1.74	1.53	0.24
330	Petroleum Marketing	50.71	12.37	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**63.29**	**19.54**	**0.29**	**5.27**	**0.42**	**2.68**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	9.18	7.37	0.01	0.04	0.01	1.01	0.78	0.63	0.03
420	Food and Agriculture	1.46	1.42	0.00	0.00	0.01	0.55	0.31	0.15	0.02
430	Mineral Processes	1.13	0.94	0.02	0.21	0.00	8.72	5.67	3.05	0.17
440	Metal Processes	0.24	0.19	0.06	0.20	0.11	0.70	0.45	0.30	0.02
450	Wood and Paper	0.30	0.30	0.00	0.00	0.00	7.47	5.23	3.19	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.91	3.50	0.03	0.14	0.00	1.51	1.01	0.58	8.58
Total Industrial Processes		**16.25**	**13.75**	**0.12**	**0.59**	**0.13**	**20.14**	**13.61**	**8.04**	**8.82**
Solvent Evaporation										
510	Consumer Products	109.58	91.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	12.94	12.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.53	1.53	0.00	0.00	0.00	0.00	0.00	0.00	1.12
540	Asphalt Paving/Roofing	1.53	1.42	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**125.58**	**106.31**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.12**

(Continued)

2025 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.84	2.10	9.14	13.41	0.30	2.23	2.16	2.13	0.02
620	Farming Operations	25.08	2.09	0.00	0.00	0.00	1.86	0.93	0.18	10.27
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	83.33	40.75	4.08	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	132.14	60.39	9.12	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.13	6.02	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.84	1.92	0.27	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.79	0.03	0.44	0.43	0.39	0.03
690	Cooking	2.93	2.05	0.00	0.00	0.00	12.26	12.26	12.26	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.17
	RECLAIM			14.90		6.10				
Total Miscellaneous Processes		**33.70**	**6.76**	**24.23**	**20.22**	**6.43**	**246.68**	**125.30**	**29.44**	**37.49**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	21.57	20.43	10.11	160.63	0.61	11.85	11.61	4.88	5.20
722	Light Duty Trucks 1 (T1)	5.57	5.33	2.07	27.84	0.06	0.92	0.90	0.39	0.47
723	Light Duty Trucks 2 (T2)	10.91	10.32	5.65	77.71	0.32	4.37	4.28	1.80	2.96
724	Medium Duty Trucks (T3)	10.63	10.01	5.99	67.49	0.24	2.45	2.40	1.01	2.45
732	Light Heavy Duty Gas Trucks 1 (T4)	2.57	2.47	2.64	7.67	0.02	0.22	0.21	0.09	0.13
733	Light Heavy Duty Gas Trucks 2 (T5)	0.26	0.25	0.43	1.17	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.43	0.39	0.64	3.93	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.31	3.49	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.26	0.23	4.95	1.47	0.01	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.09	0.08	1.16	0.45	0.01	0.18	0.18	0.08	0.00
744	Medium Heavy Duty Diesels Truck (T6)	0.24	0.21	8.64	1.13	0.08	1.19	1.17	0.50	0.22
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.36	0.99	27.27	9.11	0.20	1.45	1.43	0.57	0.37
750	Motorcycles (MCY)	11.04	9.75	2.30	44.32	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.80	0.30	4.30	5.47	0.00	0.46	0.45	0.22	0.01
762	Gas Urban Buses (UB)	0.23	0.17	0.32	1.53	0.01	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.04	0.47	0.00	0.08	0.08	0.04	0.00
772	Diesel School Buses (SB)	0.03	0.03	1.25	0.09	0.00	0.17	0.17	0.08	0.01
777	Gas Other Buses (OB)	0.13	0.12	0.23	1.27	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.02	0.02	0.35	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.45	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.05	0.04	0.35	0.52	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**68.34**	**61.24**	**79.45**	**415.92**	**1.60**	**24.18**	**23.72**	**10.04**	**11.98**
Other Mobile Sources										
810	Aircraft	4.19	4.15	18.17	42.78	2.16	0.83	0.80	0.73	0.00
820	Trains	0.78	0.65	13.93	4.28	0.02	0.25	0.25	0.23	0.01
833	Ocean Going Vessels	3.13	2.80	21.37	5.15	3.63	1.10	1.10	1.05	0.04
835	Commercial Harbor Crafts	1.31	1.10	10.51	7.28	0.00	0.43	0.43	0.39	0.00
840	Recreational Boats	24.62	21.38	5.97	111.03	0.01	1.49	1.34	1.01	0.01
850	Off-Road Recreation Vehicles	3.63	3.55	0.08	3.59	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	52.35	46.18	38.59	662.98	0.11	3.28	3.06	2.51	0.13
870	Farm Equipment	0.50	0.43	1.74	7.12	0.00	0.12	0.12	0.11	0.00
890	Fuel Storage and Handling	6.80	6.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**97.31**	**87.01**	**110.36**	**844.21**	**5.93**	**7.51**	**7.11**	**6.04**	**0.19**
Total Stationary and Area Sources		1166.42	224.11	49.32	78.14	9.85	277.98	148.78	46.94	63.39
Total On-Road Vehicles		68.34	61.24	79.45	415.92	1.60	24.18	23.72	10.04	11.98
Total Other Mobile		97.31	87.01	110.36	844.21	5.93	7.51	7.11	6.04	0.19
Total		**1332.07**	**372.36**	**239.13**	**1338.27**	**17.38**	**309.67**	**179.61**	**63.02**	**75.56**

2026 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	6.10	0.96	0.17	7.39	0.29	1.10	1.09	1.09	1.79
20	Cogeneration	0.98	0.11	0.01	0.68	0.01	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.68	4.35	9.83	17.28	0.33	1.24	1.23	1.22	2.36
52	Food and Agricultural Processing	0.10	0.04	0.15	0.35	0.00	0.05	0.05	0.05	0.05
60	Service and Commercial	14.30	4.50	8.61	16.48	1.42	1.42	1.41	1.41	3.03
99	Other (Fuel Combustion)	1.58	0.26	2.47	2.82	0.19	0.33	0.25	0.18	0.02
Total Fuel Combustion		**52.03**	**11.34**	**21.96**	**50.75**	**2.25**	**5.98**	**5.81**	**5.71**	**8.71**
Waste Disposal										
110	Sewage Treatment	0.79	0.45	0.01	0.01	0.04	0.01	0.01	0.01	0.26
120	Landfills	658.97	9.28	0.79	0.64	0.42	0.19	0.18	0.17	4.11
130	Incineration	0.51	0.10	1.88	0.70	0.17	0.23	0.11	0.10	0.40
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	101.74	8.14	0.00	0.00	0.00	0.00	0.00	0.00	1.71
Total Waste Disposal		**762.01**	**17.97**	**2.68**	**1.35**	**0.63**	**0.43**	**0.30**	**0.28**	**6.48**
Cleaning and Surface Coatings										
210	Laundering	3.73	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	80.72	15.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	26.53	25.60	0.02	0.01	0.00	2.00	1.92	1.85	0.20
240	Printing	2.13	2.13	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	5.82	5.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	1.00	1.00	0.03	0.07	0.00	0.06	0.06	0.06	0.30
Total Cleaning and Surface Coatings		**119.93**	**49.12**	**0.05**	**0.08**	**0.00**	**2.06**	**1.98**	**1.91**	**0.56**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.41	2.50	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.05	4.57	0.25	5.24	0.36	2.67	1.74	1.53	0.24
330	Petroleum Marketing	50.29	12.14	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**62.88**	**19.33**	**0.29**	**5.27**	**0.42**	**2.69**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	9.27	7.44	0.01	0.04	0.01	1.02	0.79	0.63	0.03
420	Food and Agriculture	1.47	1.43	0.00	0.00	0.01	0.55	0.32	0.15	0.02
430	Mineral Processes	1.14	0.95	0.02	0.21	0.00	8.74	5.68	3.06	0.17
440	Metal Processes	0.25	0.19	0.06	0.20	0.11	0.71	0.46	0.30	0.02
450	Wood and Paper	0.30	0.30	0.00	0.00	0.00	7.53	5.27	3.21	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.15	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.94	3.52	0.03	0.15	0.00	1.53	1.02	0.59	8.58
Total Industrial Processes		**16.40**	**13.86**	**0.12**	**0.60**	**0.13**	**20.26**	**13.70**	**8.08**	**8.82**
Solvent Evaporation										
510	Consumer Products	110.16	91.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.02	12.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.54	1.54	0.00	0.00	0.00	0.00	0.00	0.00	1.11
540	Asphalt Paving/Roofing	1.55	1.44	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**126.27**	**106.92**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.11**

(Continued)

2026 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.84	2.10	9.03	13.39	0.30	2.22	2.16	2.12	0.02
620	Farming Operations	25.08	2.09	0.00	0.00	0.00	1.85	0.92	0.18	10.27
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	84.32	41.23	4.13	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	132.66	60.63	9.15	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.13	6.02	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.75	1.88	0.27	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.79	0.03	0.44	0.43	0.40	0.03
690	Cooking	2.95	2.06	0.00	0.00	0.00	12.35	12.35	12.35	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.34
	RECLAIM			14.90		6.10				
Total Miscellaneous Processes		**33.72**	**6.77**	**24.12**	**20.20**	**6.43**	**248.17**	**126.06**	**29.61**	**37.66**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	20.69	19.64	9.37	151.57	0.59	11.86	11.62	4.87	5.11
722	Light Duty Trucks 1 (T1)	5.24	5.03	1.89	25.54	0.06	0.91	0.89	0.38	0.46
723	Light Duty Trucks 2 (T2)	10.58	10.03	5.25	74.43	0.31	4.39	4.29	1.81	2.95
724	Medium Duty Trucks (T3)	10.13	9.58	5.41	62.49	0.23	2.43	2.38	1.00	2.41
732	Light Heavy Duty Gas Trucks 1 (T4)	2.42	2.33	2.43	6.95	0.02	0.21	0.21	0.09	0.12
733	Light Heavy Duty Gas Trucks 2 (T5)	0.24	0.23	0.40	1.11	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.41	0.38	0.60	3.70	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.32	3.59	0.00	0.01	0.01	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.25	0.22	4.41	1.37	0.01	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.09	0.08	0.99	0.42	0.01	0.19	0.18	0.08	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.25	0.22	8.81	1.15	0.09	1.22	1.20	0.51	0.22
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.43	1.02	27.45	9.47	0.21	1.49	1.47	0.58	0.38
750	Motorcycles (MCY)	11.08	9.77	2.31	44.26	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.64	0.26	3.59	5.03	0.00	0.43	0.42	0.21	0.01
762	Gas Urban Buses (UB)	0.13	0.10	0.27	1.16	0.01	0.04	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.04	0.04	0.47	0.00	0.09	0.09	0.04	0.01
772	Diesel School Buses (SB)	0.03	0.02	1.15	0.08	0.00	0.17	0.17	0.07	0.01
777	Gas Other Buses (OB)	0.13	0.12	0.22	1.24	0.01	0.06	0.06	0.03	0.02
778	Motor Coaches	0.02	0.02	0.36	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.47	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.04	0.03	0.32	0.44	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**65.95**	**59.18**	**76.06**	**394.63**	**1.58**	**24.23**	**23.76**	**10.02**	**11.85**
Other Mobile Sources										
810	Aircraft	4.26	4.22	18.60	43.49	2.22	0.84	0.81	0.74	0.00
820	Trains	0.75	0.63	13.30	4.33	0.02	0.24	0.24	0.22	0.01
833	Ocean Going Vessels	3.26	2.92	20.74	5.35	3.71	1.14	1.14	1.09	0.05
835	Commercial Harbor Crafts	1.31	1.10	10.38	7.29	0.00	0.42	0.42	0.39	0.00
840	Recreational Boats	23.25	20.21	5.87	110.06	0.01	1.41	1.27	0.96	0.01
850	Off-Road Recreation Vehicles	3.56	3.48	0.08	3.63	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	52.47	46.28	37.10	669.04	0.11	3.20	2.98	2.44	0.13
870	Farm Equipment	0.49	0.42	1.65	7.15	0.00	0.11	0.11	0.10	0.00
890	Fuel Storage and Handling	6.64	6.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**95.99**	**85.87**	**107.72**	**850.34**	**6.07**	**7.37**	**6.98**	**5.95**	**0.20**
Total Stationary and Area Sources		1173.24	225.31	49.22	78.25	9.86	279.62	149.64	47.15	63.58
Total On-Road Vehicles		65.95	59.18	76.06	394.63	1.58	24.23	23.76	10.02	11.85
Total Other Mobile		95.99	85.87	107.72	850.34	6.07	7.37	6.98	5.95	0.20
Total		**1335.18**	**370.36**	**233.00**	**1323.22**	**17.51**	**311.22**	**180.38**	**63.12**	**75.63**

2027 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	6.10	0.96	0.17	7.39	0.29	1.10	1.09	1.09	1.79
20	Cogeneration	0.98	0.11	0.01	0.69	0.01	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.52	4.35	9.82	17.32	0.33	1.24	1.23	1.22	2.35
52	Food and Agricultural Processing	0.11	0.04	0.15	0.35	0.00	0.05	0.05	0.05	0.05
60	Service and Commercial	14.34	4.50	8.62	16.52	1.43	1.43	1.42	1.42	3.03
99	Other (Fuel Combustion)	1.59	0.26	2.47	2.84	0.19	0.33	0.25	0.18	0.02
Total Fuel Combustion		**51.93**	**11.34**	**21.96**	**50.86**	**2.26**	**5.99**	**5.82**	**5.72**	**8.70**
Waste Disposal										
110	Sewage Treatment	0.80	0.45	0.01	0.01	0.04	0.01	0.01	0.01	0.26
120	Landfills	663.06	9.33	0.80	0.64	0.42	0.19	0.18	0.18	4.13
130	Incineration	0.51	0.10	1.89	0.70	0.17	0.23	0.11	0.10	0.40
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	102.59	8.21	0.00	0.00	0.00	0.00	0.00	0.00	1.72
Total Waste Disposal		**766.96**	**18.09**	**2.70**	**1.35**	**0.63**	**0.43**	**0.30**	**0.29**	**6.51**
Cleaning and Surface Coatings										
210	Laundering	3.76	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	81.80	15.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	26.78	25.84	0.02	0.01	0.00	2.02	1.94	1.87	0.20
240	Printing	2.15	2.15	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	5.90	5.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	1.01	1.01	0.03	0.07	0.00	0.06	0.06	0.06	0.30
Total Cleaning and Surface Coatings		**121.40**	**49.66**	**0.05**	**0.08**	**0.00**	**2.08**	**2.00**	**1.93**	**0.56**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.43	2.50	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.06	4.57	0.25	5.25	0.36	2.67	1.74	1.53	0.24
330	Petroleum Marketing	49.85	11.92	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.13	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**62.47**	**19.11**	**0.29**	**5.28**	**0.42**	**2.69**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	9.35	7.51	0.01	0.04	0.01	1.03	0.80	0.64	0.03
420	Food and Agriculture	1.48	1.43	0.00	0.00	0.01	0.56	0.32	0.15	0.02
430	Mineral Processes	1.16	0.96	0.02	0.21	0.00	8.76	5.70	3.06	0.17
440	Metal Processes	0.25	0.19	0.06	0.21	0.11	0.72	0.46	0.30	0.02
450	Wood and Paper	0.31	0.31	0.00	0.00	0.00	7.59	5.32	3.24	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.16	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.96	3.55	0.03	0.15	0.00	1.54	1.03	0.59	8.58
Total Industrial Processes		**16.54**	**13.98**	**0.12**	**0.61**	**0.13**	**20.39**	**13.79**	**8.12**	**8.82**
Solvent Evaporation										
510	Consumer Products	110.74	92.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.11	12.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.54	1.54	0.00	0.00	0.00	0.00	0.00	0.00	1.10
540	Asphalt Paving/Roofing	1.57	1.46	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**126.96**	**107.50**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.10**

(Continued)

2027 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.83	2.10	8.93	13.37	0.30	2.22	2.15	2.12	0.02
620	Farming Operations	25.08	2.09	0.00	0.00	0.00	1.84	0.92	0.18	10.27
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	85.36	41.74	4.18	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	133.19	60.87	9.19	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.12	6.01	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.67	1.85	0.26	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.79	0.03	0.44	0.43	0.40	0.03
690	Cooking	2.97	2.08	0.00	0.00	0.00	12.45	12.45	12.45	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.50
	RECLAIM			14.90		6.10				
Total Miscellaneous Processes		**33.73**	**6.79**	**24.02**	**20.18**	**6.43**	**249.74**	**126.86**	**29.79**	**37.82**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	19.90	18.90	8.83	144.76	0.57	11.85	11.61	4.85	5.07
722	Light Duty Trucks 1 (T1)	4.88	4.68	1.73	23.69	0.06	0.91	0.89	0.38	0.45
723	Light Duty Trucks 2 (T2)	10.21	9.69	4.96	71.98	0.30	4.39	4.30	1.80	2.95
724	Medium Duty Trucks (T3)	9.73	9.22	5.03	59.17	0.23	2.42	2.37	1.00	2.39
732	Light Heavy Duty Gas Trucks 1 (T4)	2.28	2.20	2.27	6.43	0.02	0.20	0.20	0.08	0.12
733	Light Heavy Duty Gas Trucks 2 (T5)	0.23	0.22	0.38	1.09	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.40	0.37	0.57	3.56	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.33	3.69	0.00	0.01	0.01	0.00	0.01
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.24	0.21	4.03	1.31	0.02	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.08	0.07	0.88	0.41	0.01	0.19	0.19	0.09	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.25	0.22	8.96	1.17	0.09	1.25	1.22	0.52	0.23
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.49	1.04	27.61	9.79	0.21	1.53	1.51	0.60	0.39
750	Motorcycles (MCY)	11.09	9.78	2.32	44.19	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.53	0.23	3.24	4.78	0.00	0.42	0.41	0.20	0.01
762	Gas Urban Buses (UB)	0.12	0.09	0.27	1.09	0.01	0.05	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.05	0.04	0.46	0.00	0.09	0.09	0.04	0.01
772	Diesel School Buses (SB)	0.03	0.02	1.07	0.08	0.00	0.17	0.17	0.07	0.01
777	Gas Other Buses (OB)	0.13	0.12	0.22	1.22	0.01	0.07	0.06	0.03	0.02
778	Motor Coaches	0.02	0.02	0.36	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.47	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.04	0.03	0.31	0.38	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**63.80**	**57.22**	**73.88**	**379.41**	**1.56**	**24.28**	**23.80**	**10.01**	**11.81**
Other Mobile Sources										
810	Aircraft	4.33	4.28	18.99	44.28	2.28	0.85	0.83	0.76	0.00
820	Trains	0.73	0.61	12.74	4.37	0.02	0.23	0.23	0.21	0.01
833	Ocean Going Vessels	3.40	3.04	20.33	5.55	3.80	1.18	1.18	1.13	0.05
835	Commercial Harbor Crafts	1.29	1.09	10.26	7.29	0.00	0.41	0.41	0.38	0.00
840	Recreational Boats	21.97	19.13	5.78	109.23	0.01	1.34	1.20	0.91	0.01
850	Off-Road Recreation Vehicles	3.49	3.42	0.08	3.67	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	52.62	46.41	35.73	675.08	0.11	3.13	2.91	2.37	0.13
870	Farm Equipment	0.47	0.40	1.57	7.18	0.00	0.11	0.11	0.10	0.00
890	Fuel Storage and Handling	6.50	6.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**94.80**	**84.85**	**105.48**	**856.65**	**6.22**	**7.26**	**6.88**	**5.87**	**0.20**
Total Stationary and Area Sources		1179.99	226.47	49.14	78.36	9.87	281.35	150.56	47.41	63.75
Total On-Road Vehicles		63.80	57.22	73.88	379.41	1.56	24.28	23.80	10.01	11.81
Total Other Mobile		94.80	84.85	105.48	856.65	6.22	7.26	6.88	5.87	0.20
Total		**1338.59**	**368.54**	**228.50**	**1314.42**	**17.65**	**312.89**	**181.24**	**63.29**	**75.76**

2028 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	6.10	0.96	0.17	7.39	0.29	1.10	1.09	1.09	1.79
20	Cogeneration	0.98	0.11	0.01	0.69	0.01	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.93	0.11	0.72	0.80	0.01	0.11	0.11	0.11	0.23
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.39	4.36	9.81	17.38	0.33	1.24	1.23	1.22	2.34
52	Food and Agricultural Processing	0.11	0.04	0.15	0.36	0.00	0.05	0.05	0.05	0.05
60	Service and Commercial	14.39	4.50	8.63	16.57	1.45	1.43	1.43	1.42	3.04
99	Other (Fuel Combustion)	1.60	0.26	2.48	2.85	0.19	0.33	0.25	0.18	0.02
Total Fuel Combustion		**51.86**	**11.35**	**21.97**	**50.99**	**2.28**	**5.99**	**5.83**	**5.72**	**8.70**
Waste Disposal										
110	Sewage Treatment	0.81	0.46	0.01	0.01	0.04	0.01	0.01	0.01	0.26
120	Landfills	667.25	9.39	0.80	0.65	0.42	0.19	0.18	0.18	4.15
130	Incineration	0.52	0.10	1.91	0.71	0.18	0.23	0.12	0.10	0.41
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	103.42	8.28	0.00	0.00	0.00	0.00	0.00	0.00	1.73
Total Waste Disposal		**772.00**	**18.23**	**2.72**	**1.37**	**0.64**	**0.43**	**0.31**	**0.29**	**6.55**
Cleaning and Surface Coatings										
210	Laundering	3.79	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	82.90	15.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	27.04	26.09	0.02	0.01	0.00	2.03	1.95	1.88	0.21
240	Printing	2.16	2.16	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	5.97	5.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	1.03	1.03	0.03	0.07	0.00	0.06	0.06	0.06	0.30
Total Cleaning and Surface Coatings		**122.89**	**50.22**	**0.05**	**0.08**	**0.00**	**2.09**	**2.01**	**1.94**	**0.57**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.44	2.51	0.03	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.07	4.57	0.25	5.25	0.36	2.67	1.74	1.53	0.24
330	Petroleum Marketing	49.45	11.70	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.14	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**62.10**	**18.90**	**0.29**	**5.28**	**0.42**	**2.69**	**1.76**	**1.53**	**0.24**
Industrial Processes										
410	Chemical	9.44	7.58	0.01	0.04	0.01	1.04	0.81	0.64	0.03
420	Food and Agriculture	1.49	1.44	0.00	0.00	0.01	0.56	0.32	0.16	0.02
430	Mineral Processes	1.17	0.97	0.02	0.21	0.00	8.79	5.71	3.07	0.17
440	Metal Processes	0.25	0.19	0.06	0.21	0.11	0.73	0.47	0.31	0.02
450	Wood and Paper	0.31	0.31	0.00	0.00	0.00	7.65	5.36	3.26	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.16	0.14	0.13	0.00
470	Electronics	0.03	0.03	0.00	0.00	0.00	0.03	0.02	0.01	0.00
499	Other (Industrial Processes)	3.99	3.57	0.03	0.15	0.00	1.55	1.04	0.60	8.58
Total Industrial Processes		**16.68**	**14.09**	**0.12**	**0.61**	**0.13**	**20.51**	**13.87**	**8.18**	**8.82**
Solvent Evaporation										
510	Consumer Products	111.32	92.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.20	12.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.55	1.55	0.00	0.00	0.00	0.00	0.00	0.00	1.09
540	Asphalt Paving/Roofing	1.60	1.48	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**127.67**	**108.11**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.09**

(Continued)

2028 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.83	2.09	8.83	13.35	0.30	2.22	2.15	2.12	0.02
620	Farming Operations	25.08	2.09	0.00	0.00	0.00	1.84	0.92	0.18	10.28
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	86.35	42.22	4.23	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	133.69	61.10	9.22	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.12	6.01	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.59	1.81	0.26	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.51	0.29	0.11	3.79	0.03	0.44	0.43	0.40	0.03
690	Cooking	2.99	2.09	0.00	0.00	0.00	12.54	12.54	12.54	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.66
	RECLAIM			14.90		6.10				
Total Miscellaneous Processes		**33.75**	**6.79**	**23.92**	**20.16**	**6.43**	**251.24**	**127.62**	**29.96**	**37.99**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	19.10	18.17	8.29	137.96	0.56	11.83	11.59	4.84	5.02
722	Light Duty Trucks 1 (T1)	4.52	4.34	1.57	21.84	0.05	0.90	0.88	0.37	0.45
723	Light Duty Trucks 2 (T2)	9.84	9.35	4.67	69.53	0.29	4.39	4.30	1.80	2.94
724	Medium Duty Trucks (T3)	9.33	8.86	4.65	55.85	0.22	2.40	2.35	0.99	2.37
732	Light Heavy Duty Gas Trucks 1 (T4)	2.14	2.07	2.11	5.91	0.02	0.20	0.19	0.08	0.11
733	Light Heavy Duty Gas Trucks 2 (T5)	0.22	0.21	0.36	1.07	0.01	0.07	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.39	0.36	0.55	3.42	0.01	0.13	0.13	0.05	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.34	3.78	0.00	0.01	0.01	0.00	0.01
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.23	0.20	3.65	1.24	0.02	0.35	0.35	0.17	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.08	0.07	0.77	0.39	0.01	0.19	0.19	0.09	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.26	0.23	9.10	1.19	0.09	1.27	1.25	0.53	0.23
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.55	1.06	27.77	10.11	0.22	1.57	1.55	0.61	0.41
750	Motorcycles (MCY)	11.10	9.79	2.32	44.11	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.43	0.21	2.89	4.53	0.00	0.40	0.40	0.19	0.01
762	Gas Urban Buses (UB)	0.11	0.09	0.26	1.02	0.01	0.05	0.04	0.02	0.01
771	Gas School Buses (SB)	0.06	0.05	0.04	0.46	0.00	0.09	0.09	0.04	0.01
772	Diesel School Buses (SB)	0.03	0.02	0.99	0.08	0.00	0.17	0.17	0.07	0.01
777	Gas Other Buses (OB)	0.13	0.12	0.21	1.20	0.01	0.07	0.06	0.03	0.02
778	Motor Coaches	0.02	0.02	0.36	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.48	0.07	0.00	0.05	0.05	0.02	0.01
780	Motor Homes (MH)	0.03	0.03	0.29	0.32	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**61.66**	**55.31**	**71.67**	**364.17**	**1.53**	**24.27**	**23.80**	**9.99**	**11.74**
Other Mobile Sources										
810	Aircraft	4.41	4.36	19.42	45.08	2.34	0.86	0.84	0.77	0.00
820	Trains	0.71	0.60	12.16	4.42	0.02	0.22	0.22	0.20	0.01
833	Ocean Going Vessels	3.53	3.16	20.11	5.75	3.89	1.22	1.22	1.16	0.05
835	Commercial Harbor Crafts	1.28	1.08	10.14	7.28	0.00	0.41	0.41	0.37	0.00
840	Recreational Boats	20.80	18.12	5.69	108.55	0.01	1.27	1.14	0.86	0.01
850	Off-Road Recreation Vehicles	3.44	3.37	0.08	3.71	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	52.84	46.61	34.64	681.15	0.11	3.08	2.86	2.33	0.13
870	Farm Equipment	0.45	0.39	1.49	7.21	0.00	0.10	0.10	0.09	0.00
890	Fuel Storage and Handling	6.38	6.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**93.84**	**84.04**	**103.73**	**863.15**	**6.37**	**7.17**	**6.80**	**5.79**	**0.20**
Total Stationary and Area Sources		1186.95	227.69	49.07	78.49	9.90	282.98	151.43	47.65	63.96
Total On-Road Vehicles		61.66	55.31	71.67	364.17	1.53	24.27	23.80	9.99	11.74
Total Other Mobile		93.84	84.04	103.73	863.15	6.37	7.17	6.80	5.79	0.20
Total		**1342.45**	**367.04**	**224.47**	**1305.81**	**17.80**	**314.42**	**182.03**	**63.43**	**75.90**

2030 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	6.10	0.96	0.17	7.39	0.29	1.10	1.09	1.09	1.79
20	Cogeneration	0.98	0.11	0.01	0.71	0.02	0.17	0.16	0.16	0.32
30	Oil and Gas Production (Combustion)	0.94	0.11	0.73	0.80	0.01	0.11	0.11	0.11	0.24
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.27	4.39	9.83	17.55	0.34	1.25	1.24	1.23	2.34
52	Food and Agricultural Processing	0.11	0.04	0.16	0.36	0.00	0.05	0.05	0.05	0.05
60	Service and Commercial	14.57	4.54	8.72	16.77	1.48	1.45	1.45	1.44	3.06
99	Other (Fuel Combustion)	1.63	0.27	2.48	2.88	0.20	0.33	0.25	0.18	0.02
Total Fuel Combustion		**51.96**	**11.43**	**22.10**	**51.41**	**2.34**	**6.02**	**5.86**	**5.75**	**8.73**
Waste Disposal										
110	Sewage Treatment	0.83	0.47	0.01	0.01	0.04	0.01	0.01	0.01	0.26
120	Landfills	675.39	9.51	0.81	0.65	0.43	0.20	0.19	0.18	4.19
130	Incineration	0.53	0.10	1.94	0.72	0.18	0.24	0.12	0.10	0.41
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	105.14	8.41	0.00	0.00	0.00	0.00	0.00	0.00	1.75
Total Waste Disposal		**781.89**	**18.49**	**2.76**	**1.38**	**0.65**	**0.45**	**0.32**	**0.29**	**6.61**
Cleaning and Surface Coatings										
210	Laundering	3.85	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	85.10	15.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	27.54	26.57	0.02	0.01	0.00	2.06	1.97	1.90	0.21
240	Printing	2.19	2.19	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	6.13	5.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	1.05	1.05	0.03	0.07	0.00	0.07	0.06	0.06	0.30
Total Cleaning and Surface Coatings		**125.86**	**51.30**	**0.05**	**0.08**	**0.00**	**2.13**	**2.03**	**1.96**	**0.57**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.46	2.52	0.04	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.09	4.58	0.25	5.27	0.36	2.67	1.75	1.54	0.24
330	Petroleum Marketing	48.97	11.27	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.14	0.12	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**61.66**	**18.49**	**0.30**	**5.30**	**0.42**	**2.69**	**1.77**	**1.54**	**0.24**
Industrial Processes										
410	Chemical	9.61	7.71	0.01	0.04	0.01	1.06	0.82	0.66	0.03
420	Food and Agriculture	1.50	1.46	0.00	0.00	0.01	0.57	0.32	0.16	0.02
430	Mineral Processes	1.19	0.99	0.02	0.21	0.00	8.83	5.74	3.08	0.18
440	Metal Processes	0.26	0.20	0.06	0.21	0.11	0.74	0.48	0.32	0.02
450	Wood and Paper	0.31	0.31	0.00	0.00	0.00	7.77	5.44	3.31	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.16	0.15	0.13	0.00
470	Electronics	0.04	0.04	0.00	0.00	0.00	0.04	0.02	0.02	0.00
499	Other (Industrial Processes)	4.04	3.61	0.03	0.15	0.00	1.58	1.05	0.61	8.58
Total Industrial Processes		**16.95**	**14.32**	**0.12**	**0.61**	**0.13**	**20.75**	**14.02**	**8.29**	**8.83**
Solvent Evaporation										
510	Consumer Products	112.47	93.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.37	12.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.56	1.56	0.00	0.00	0.00	0.00	0.00	0.00	1.07
540	Asphalt Paving/Roofing	1.64	1.52	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**129.04**	**109.29**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.07**

(Continued)

2030 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.83	2.09	8.68	13.35	0.31	2.22	2.15	2.12	0.02
620	Farming Operations	25.09	2.09	0.00	0.00	0.00	1.82	0.91	0.18	10.28
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	88.38	43.22	4.33	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	134.76	61.59	9.30	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.12	6.01	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.42	1.73	0.25	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.52	0.29	0.12	3.79	0.03	0.44	0.43	0.40	0.03
690	Cooking	3.04	2.12	0.00	0.00	0.00	12.72	12.72	12.72	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.99
	RECLAIM			14.90		6.10				
Total Miscellaneous Processes		**33.82**	**6.82**	**23.78**	**20.16**	**6.44**	**254.33**	**129.20**	**30.31**	**38.32**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	17.50	16.71	7.21	124.36	0.53	11.80	11.57	4.80	4.93
722	Light Duty Trucks 1 (T1)	3.80	3.65	1.25	18.14	0.05	0.89	0.87	0.37	0.43
723	Light Duty Trucks 2 (T2)	9.10	8.67	4.09	64.63	0.28	4.39	4.30	1.79	2.94
724	Medium Duty Trucks (T3)	8.53	8.14	3.89	49.20	0.21	2.38	2.33	0.97	2.33
732	Light Heavy Duty Gas Trucks 1 (T4)	1.85	1.80	1.79	4.87	0.02	0.19	0.18	0.08	0.10
733	Light Heavy Duty Gas Trucks 2 (T5)	0.19	0.18	0.31	1.02	0.01	0.08	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.38	0.35	0.50	3.14	0.01	0.14	0.13	0.06	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.05	0.36	3.98	0.00	0.01	0.01	0.00	0.01
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.21	0.19	2.88	1.11	0.02	0.36	0.35	0.16	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.08	0.07	0.55	0.36	0.01	0.20	0.19	0.09	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.27	0.23	9.39	1.23	0.09	1.32	1.30	0.55	0.24
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.68	1.11	28.08	10.76	0.23	1.66	1.64	0.65	0.43
750	Motorcycles (MCY)	11.12	9.80	2.33	43.95	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.23	0.16	2.18	4.04	0.00	0.37	0.37	0.17	0.01
762	Gas Urban Buses (UB)	0.09	0.07	0.24	0.88	0.01	0.05	0.05	0.02	0.01
771	Gas School Buses (SB)	0.06	0.05	0.03	0.45	0.00	0.10	0.09	0.04	0.01
772	Diesel School Buses (SB)	0.02	0.02	0.83	0.08	0.00	0.17	0.17	0.07	0.01
777	Gas Other Buses (OB)	0.13	0.12	0.20	1.16	0.01	0.07	0.07	0.03	0.02
778	Motor Coaches	0.02	0.02	0.36	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.48	0.08	0.00	0.06	0.06	0.02	0.01
780	Motor Homes (MH)	0.03	0.02	0.25	0.20	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**57.38**	**51.42**	**67.20**	**333.73**	**1.49**	**24.37**	**23.88**	**9.96**	**11.61**
Other Mobile Sources										
810	Aircraft	4.55	4.50	20.27	46.64	2.45	0.88	0.86	0.79	0.00
820	Trains	0.68	0.57	11.07	4.51	0.02	0.20	0.20	0.19	0.01
833	Ocean Going Vessels	3.80	3.40	19.78	6.16	4.07	1.30	1.30	1.24	0.05
835	Commercial Harbor Crafts	1.26	1.06	9.87	7.26	0.00	0.39	0.39	0.36	0.00
840	Recreational Boats	18.69	16.33	5.53	107.53	0.01	1.14	1.03	0.78	0.01
850	Off-Road Recreation Vehicles	3.37	3.29	0.09	3.80	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	53.51	47.19	33.06	693.90	0.11	3.03	2.81	2.27	0.14
870	Farm Equipment	0.43	0.37	1.36	7.28	0.00	0.09	0.09	0.08	0.00
890	Fuel Storage and Handling	6.19	6.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**92.48**	**82.87**	**101.03**	**877.08**	**6.66**	**7.04**	**6.69**	**5.72**	**0.21**
Total Stationary and Area Sources		1201.18	230.14	49.11	78.94	9.98	286.40	153.23	48.17	64.37
Total On-Road Vehicles		57.38	51.42	67.20	333.73	1.49	24.37	23.88	9.96	11.61
Total Other Mobile		92.48	82.87	101.03	877.08	6.66	7.04	6.69	5.72	0.21
Total		**1351.04**	**364.43**	**217.34**	**1289.75**	**18.13**	**317.81**	**183.80**	**63.85**	**76.19**

2031 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

MSC	Source Category (tmf0316)	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Fuel Combustion										
10	Electric Utilities	6.10	0.96	0.17	7.39	0.29	1.10	1.09	1.09	1.79
20	Cogeneration	0.99	0.11	0.01	0.72	0.02	0.17	0.17	0.16	0.32
30	Oil and Gas Production (Combustion)	0.94	0.11	0.73	0.81	0.01	0.11	0.11	0.11	0.24
40	Petroleum Refining (Combustion)	3.36	1.01	0.00	4.95	0.00	1.56	1.51	1.49	0.91
50	Manufacturing and Industrial	24.24	4.41	9.85	17.64	0.34	1.25	1.24	1.23	2.34
52	Food and Agricultural Processing	0.11	0.04	0.16	0.36	0.00	0.05	0.05	0.05	0.05
60	Service and Commercial	14.65	4.56	8.76	16.86	1.49	1.46	1.46	1.45	3.07
99	Other (Fuel Combustion)	1.64	0.27	2.48	2.90	0.20	0.33	0.26	0.18	0.02
Total Fuel Combustion		**52.03**	**11.47**	**22.16**	**51.63**	**2.35**	**6.03**	**5.89**	**5.76**	**8.74**
Waste Disposal										
110	Sewage Treatment	0.84	0.47	0.01	0.01	0.05	0.01	0.01	0.01	0.26
120	Landfills	679.48	9.57	0.82	0.66	0.43	0.20	0.19	0.18	4.22
130	Incineration	0.53	0.10	1.96	0.73	0.18	0.24	0.12	0.10	0.42
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	105.98	8.48	0.00	0.00	0.00	0.00	0.00	0.00	1.76
Total Waste Disposal		**786.83**	**18.62**	**2.79**	**1.40**	**0.66**	**0.45**	**0.32**	**0.29**	**6.66**
Cleaning and Surface Coatings										
210	Laundering	3.88	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
220	Degreasing	86.18	16.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	27.79	26.81	0.02	0.01	0.00	2.07	1.99	1.92	0.21
240	Printing	2.21	2.21	0.00	0.00	0.00	0.00	0.00	0.00	0.06
250	Adhesives and Sealants	6.21	5.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	1.06	1.06	0.03	0.07	0.00	0.07	0.06	0.06	0.30
Total Cleaning and Surface Coatings		**127.33**	**51.84**	**0.05**	**0.08**	**0.00**	**2.14**	**2.05**	**1.98**	**0.57**
Petroleum Production and Marketing										
310	Oil and Gas Production	5.47	2.52	0.04	0.02	0.06	0.01	0.01	0.00	0.00
320	Petroleum Refining	7.10	4.58	0.25	5.27	0.36	2.67	1.75	1.54	0.24
330	Petroleum Marketing	48.73	11.06	0.01	0.01	0.00	0.00	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.14	0.13	0.00	0.00	0.00	0.01	0.01	0.00	0.00
Total Petroleum Production and Marketing		**61.44**	**18.29**	**0.30**	**5.30**	**0.42**	**2.69**	**1.77**	**1.54**	**0.24**
Industrial Processes										
410	Chemical	9.70	7.78	0.01	0.04	0.01	1.07	0.83	0.66	0.03
420	Food and Agriculture	1.51	1.47	0.00	0.00	0.01	0.57	0.32	0.16	0.02
430	Mineral Processes	1.20	1.00	0.02	0.21	0.00	8.86	5.75	3.09	0.18
440	Metal Processes	0.26	0.20	0.06	0.22	0.11	0.75	0.48	0.32	0.02
450	Wood and Paper	0.32	0.32	0.00	0.00	0.00	7.83	5.48	3.34	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.00	0.00	0.16	0.15	0.13	0.00
470	Electronics	0.04	0.04	0.00	0.00	0.00	0.04	0.02	0.02	0.00
499	Other (Industrial Processes)	4.06	3.64	0.03	0.15	0.00	1.59	1.06	0.61	8.58
Total Industrial Processes		**17.09**	**14.45**	**0.12**	**0.62**	**0.13**	**20.87**	**14.09**	**8.33**	**8.83**
Solvent Evaporation										
510	Consumer Products	113.05	94.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.45	12.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.57	1.57	0.00	0.00	0.00	0.00	0.00	0.00	1.07
540	Asphalt Paving/Roofing	1.66	1.54	0.00	0.00	0.00	0.03	0.03	0.03	0.00
Total Solvent Evaporation		**129.73**	**109.89**	**0.00**	**0.00**	**0.00**	**0.03**	**0.03**	**0.03**	**1.07**

(Continued)

2031 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day)

CODE	Source Category	TOG	VOC	NOx	CO	SOx	TSP	PM10	PM2.5	NH3
Miscellaneous Processes										
610	Residential Fuel Combustion	4.83	2.09	8.61	13.35	0.31	2.22	2.15	2.12	0.02
620	Farming Operations	25.09	2.10	0.00	0.00	0.00	1.82	0.91	0.18	10.28
630	Construction and Demolition	0.00	0.00	0.00	0.00	0.00	89.42	43.73	4.38	0.00
640	Paved Road Dust	0.00	0.00	0.00	0.00	0.00	135.26	61.81	9.33	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.00	0.00	10.12	6.01	0.60	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.00	0.00	3.42	1.73	0.25	0.00
660	Fires	0.34	0.23	0.08	3.02	0.00	0.45	0.44	0.41	0.00
670	Waste Burning and Disposal	0.52	0.29	0.12	3.79	0.03	0.44	0.43	0.40	0.03
690	Cooking	3.06	2.14	0.00	0.00	0.00	12.81	12.81	12.81	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.15
	RECLAIM			14.90		6.10				
Total Miscellaneous Processes		**33.84**	**6.85**	**23.71**	**20.16**	**6.44**	**255.96**	**130.02**	**30.48**	**38.48**
On-Road Motor Vehicles										
710	Light Duty Passenger Auto (LDA)	16.70	15.98	6.67	117.55	0.51	11.79	11.56	4.78	4.88
722	Light Duty Trucks 1 (T1)	3.43	3.31	1.09	16.29	0.05	0.89	0.87	0.36	0.42
723	Light Duty Trucks 2 (T2)	8.73	8.33	3.80	62.18	0.27	4.39	4.30	1.79	2.94
724	Medium Duty Trucks (T3)	8.13	7.77	3.51	45.88	0.20	2.36	2.31	0.96	2.30
732	Light Heavy Duty Gas Trucks 1 (T4)	1.71	1.66	1.63	4.35	0.02	0.18	0.18	0.07	0.09
733	Light Heavy Duty Gas Trucks 2 (T5)	0.18	0.17	0.29	1.00	0.01	0.08	0.07	0.03	0.03
734	Medium Heavy Duty Gas Trucks (T6)	0.37	0.34	0.47	3.00	0.01	0.14	0.13	0.06	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.07	0.06	0.37	4.07	0.00	0.01	0.01	0.00	0.01
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.20	0.18	2.50	1.05	0.02	0.36	0.35	0.16	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.08	0.07	0.44	0.35	0.01	0.20	0.20	0.09	0.01
744	Medium Heavy Duty Diesels Truck (T6)	0.27	0.24	9.53	1.25	0.09	1.35	1.32	0.56	0.25
746	Heavy Heavy Duty Diesel Trucks (HHD)	2.74	1.13	28.23	11.08	0.23	1.70	1.68	0.66	0.44
750	Motorcycles (MCY)	11.13	9.81	2.33	43.87	0.01	0.04	0.04	0.02	0.02
760	Diesel Urban Buses (UB)	1.13	0.14	1.83	3.79	0.00	0.36	0.35	0.16	0.01
762	Gas Urban Buses (UB)	0.08	0.07	0.23	0.81	0.01	0.05	0.05	0.02	0.01
771	Gas School Buses (SB)	0.06	0.05	0.03	0.45	0.00	0.10	0.10	0.04	0.01
772	Diesel School Buses (SB)	0.02	0.02	0.75	0.08	0.00	0.17	0.17	0.07	0.01
777	Gas Other Buses (OB)	0.13	0.12	0.20	1.14	0.01	0.07	0.07	0.03	0.02
778	Motor Coaches	0.02	0.02	0.36	0.09	0.00	0.03	0.03	0.01	0.01
779	Diesel Other Buses (OB)	0.02	0.01	0.49	0.08	0.00	0.06	0.06	0.02	0.01
780	Motor Homes (MH)	0.02	0.02	0.24	0.14	0.00	0.06	0.06	0.03	0.01
Total On-Road Motor Vehicles		**55.22**	**49.50**	**64.99**	**318.50**	**1.45**	**24.39**	**23.91**	**9.92**	**11.53**
Other Mobile Sources										
810	Aircraft	4.55	4.50	20.19	46.51	2.44	0.89	0.86	0.79	0.00
820	Trains	0.67	0.56	10.66	4.57	0.02	0.20	0.20	0.18	0.01
833	Ocean Going Vessels	3.91	3.50	19.58	6.34	4.16	1.33	1.33	1.27	0.05
835	Commercial Harbor Crafts	1.24	1.04	9.74	7.25	0.00	0.39	0.39	0.36	0.00
840	Recreational Boats	17.80	15.57	5.46	107.23	0.01	1.09	0.98	0.74	0.01
850	Off-Road Recreation Vehicles	3.34	3.26	0.09	3.84	0.00	0.01	0.01	0.01	0.00
860	Off-Road Equipment	53.95	47.58	32.58	700.47	0.11	3.02	2.80	2.26	0.14
870	Farm Equipment	0.41	0.36	1.29	7.32	0.00	0.09	0.09	0.08	0.00
890	Fuel Storage and Handling	6.12	4.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Other Mobile Sources		**91.99**	**80.65**	**99.59**	**883.53**	**6.74**	**7.02**	**6.66**	**5.69**	**0.21**
Total Stationary and Area Sources		1208.29	231.41	49.13	79.19	10.00	288.17	154.17	48.41	64.59
Total On-Road Vehicles		55.22	49.50	64.99	318.50	1.45	24.39	23.91	9.92	11.53
Total Other Mobile		91.99	80.65	99.59	883.53	6.74	7.02	6.66	5.69	0.21
Total		**1355.50**	**361.56**	**213.71**	**1281.22**	**18.19**	**319.58**	**184.74**	**64.02**	**76.33**

Attachment C:

VOC and NOx Stationary Sources in 2012

Emitting 10 Tons/Year and Higher

Attachment C

VOC and NOX Stationary Sources in 2012 Emitting 10 Tons/Year and Higher

(D12r082114)

SCAB VOC EMISSION PRODUCERS

	AB	FACID	FNAME	FCITY	ROG
1	SC	800089	EXXONMOBIL OIL CORPORATION	TORRANCE	562
2	SC	800030	CHEVRON PRODUCTS CO.	EL SEGUNDO	505
3	SC	131003	BP WEST COAST PROD.LLC BP CARSON REF.	CARSON	500
4	SC	171107	PHILLIPS 66 CO/LA REFINERY WILMINGTON PL	WILMINGTON	242
5	SC	800436	TESORO REFINING AND MARKETING CO, LLC	WILMINGTON	200
6	SC	16642	ANHEUSER-BUSCH LLC., (LA BREWERY)	VAN NUYS	178
7	SC	800026	ULTRAMAR INC	WILMINGTON	163
8	SC	3721	DART CONTAINER CORP OF CALIFORNIA	CORONA	131
9	SC	800372	EQUILON ENTER. LLC, SHELL OIL PROD. US	CARSON	113
10	SC	69081	BAXTER HEALTHCARE CORP., HYLAND DIV	LOS ANGELES	107
11	SC	171109	PHILLIPS 66 COMPANY/LOS ANGELES REFINERY	CARSON	103
12	SC	155877	MILLERCOORS, LLC	IRWINDALE	102
13	SC	70021	XERXES CORP (A DELAWARE CORP)	ANAHEIM	94
14	SC	800129	SFPP, L.P.	BLOOMINGTON	91
15	SC	94872	METAL CONTAINER CORP	MIRA LOMA	89
16	SC	800183	PARAMOUNT PETR CORP	PARAMOUNT	85
17	SC	5973	SO CAL GAS CO	VALENCIA	84
18	SC	800057	KINDER MORGAN LIQUIDS TERMINALS, LLC	CARSON	80
19	SC	82657	QUEST DIAGNOSTICS INC	SAN JUAN CAPISTRANO	70
20	SC	119907	BERRY PETROLEUM COMPANY	SANTA CLARITA	66
21	SC	151843	INSULFOAM	CHINO	66
22	SC	800128	SO CAL GAS CO	NORTHRIDGE	65
23	SC	800074	LA CITY, DWP HAYNES GENERATING STATION	LONG BEACH	63
24	SC	52517	REXAM BEVERAGE CAN COMPANY	CHATSWORTH	62
25	SC	160437	SOUTHERN CALIFORNIA EDISON	REDLANDS	58
26	SC	143723	LOVIN OVEN, LLC	AZUSA	55
27	SC	4477	SO CAL EDISON CO	AVALON	52
28	SC	800240	TIN INC. TEMPLE INLAND, DBA	ONTARIO	50
29	SC	12155	ARMSTRONG WORLD INDUSTRIES INC	SOUTH GATE	50
30	SC	800075	LA CITY, DWP SCATTERGOOD GENERATING STN	PLAYA DEL REY	44
31	SC	7949	CUSTOM FIBREGLASS MFG CO.,DBA,SNUGTOP	LONG BEACH	42
32	SC	800330	THUMS LONG BEACH	LONG BEACH	40
33	SC	115130	VERTIS, INC	RIVERSIDE	39
34	SS	125355	PLAZA MOTORS INC, JESSUP AUTO PLAZA, DBA	CATHEDRAL CITY	36
35	SC	37881	VERTIS, INC.	POMONA	36
36	SC	167066	ARLON GRAPHICS L.L.C.	SANTA ANA	31
37	SC	800278	SFPP, L.P. (NSR USE)	CARSON	31
38	SC	14871	SONOCO PRODUCTS CO	CITY OF INDUSTRY	31
39	SC	29110	ORANGE COUNTY SANITATION DISTRICT	HUNTINGTON BEACH	31
40	SC	49805	LA CITY, BUREAU OF SANIT(LOPEZ CANYON)	LAKE VIEW TERRACE	31
41	SC	132368	QG PRINTING CORP	RIVERSIDE	29
42	SC	800171	EXXONMOBIL OIL CORPORATION	VERNON	29
43	SC	151798	TESORO REFINING AND MARKETING CO, LLC	CARSON	29
44	SC	144455	LIFOAM INDUSTRIES, LLC	VERNON	28
45	SC	101656	AIR PRODUCTS AND CHEMICALS, INC.	WILMINGTON	27
46	SC	18294	NORTHROP GRUMMAN CORP, AIRCRAFT DIV	EL SEGUNDO	27
47	SC	53729	TREND OFFSET PRINTING SERVICES, INC	LOS ALAMITOS	26
48	SC	126964	EDWARDS LIFESCIENCES LLC	IRVINE	26
49	SC	139808	INLAND EMPIRE REGIONAL COMPOSTING AUTHOR	RANCHO CUCAMONGA	25
50	SC	171326	PHILLIPS 66 PIPELINE LLC	LOS ANGELES	25

SCAB NOX EMISSION PRODUCERS

	AB	FACID	FNAME	FCITY	NOX
1	SC	800089	EXXONMOBIL OIL CORPORATION	TORRANCE	781
2	SC	800030	CHEVRON PRODUCTS CO.	EL SEGUNDO	735
3	SC	131003	BP WEST COAST PROD.LLC BP CARSON REF.	CARSON	650
4	SC	800436	TESORO REFINING AND MARKETING CO, LLC	WILMINGTON	576
5	SC	171107	PHILLIPS 66 CO/LA REFINERY WILMINGTON PL	WILMINGTON	498
6	SC	171109	PHILLIPS 66 COMPANY/LOS ANGELES REFINERY	CARSON	329
7	SC	44577	LONG BEACH CITY, SERRF PROJECT	LONG BEACH	305
8	SC	800026	ULTRAMAR INC	WILMINGTON	257
9	SC	131249	BP WEST COAST PRODUCTS LLC,BP WILMINGTON	WILMINGTON	223
10	SC	166073	BETA OFFSHORE	HUNTINGTON BEACH	220
11	SC	100154	DESERT VIEW POWER	MECCA	194
12	SC	800128	SO CAL GAS CO	NORTHRIDGE	174
13	SC	800240	TIN INC. TEMPLE INLAND, DBA	ONTARIO	165
14	SC	800263	U.S. GOVT, DEPT OF NAVY	SAN CLEMENTE	150
15	SC	46268	CALIFORNIA STEEL INDUSTRIES INC	FONTANA	139
16	SC	160437	SOUTHERN CALIFORNIA EDISON	REDLANDS	132
17	SC	37336	COMMERCE REFUSE TO ENERGY FACILITY	COMMERCE	119
18	SC	4242	SAN DIEGO GAS & ELECTRIC	MORENO VALLEY	111
19	SC	25070	LA CNTY SANITATION DISTRICT-PUENTE HILLS	CITY OF INDUSTRY	104
20	SC	18931	TAMCO	RANCHO CUCAMONGA	102
21	SC	800193	LA CITY, DWP VALLEY GENERATING STATION	SUN VALLEY	92
22	SC	800236	LA CO. SANITATION DIST	CARSON	91
23	SC	800074	LA CITY, DWP HAYNES GENERATING STATION	LONG BEACH	80
24	SC	7427	OWENS-BROCKWAY GLASS CONTAINER INC	VERNON	70
25	SC	119907	BERRY PETROLEUM COMPANY	SANTA CLARITA	67
26	SC	800183	PARAMOUNT PETR CORP	PARAMOUNT	61
27	SC	4477	SO CAL EDISON CO	AVALON	58
28	SC	115389	AES HUNTINGTON BEACH, LLC	HUNTINGTON BEACH	56
29	SC	129816	INLAND EMPIRE ENERGY CENTER, LLC	MENIFEE	51
30	SC	115394	AES ALAMITOS, LLC	LONG BEACH	49
31	SC	49111	SUNSHINE CANYON LANDFILL	SYLMAR	49
32	SC	800335	LA CITY, DEPT OF AIRPORTS	LOS ANGELES	49
33	SC	69646	OC WASTE & RECYCLING, FRB	IRVINE	47
34	SC	5973	SO CAL GAS CO	VALENCIA	46
35	SC	151798	TESORO REFINING AND MARKETING CO, LLC	CARSON	44
36	SC	50418	O C WASTE & RECYCLING, OLINDA ALPHA	BREA	39
37	SC	51620	WHEELABRATOR NORWALK ENERGY CO INC	NORWALK	39
38	SC	800234	LOMA LINDA UNIV	LOMA LINDA	38
39	SC	11435	PQ CORPORATION	SOUTH GATE	37
40	SC	18452	UNIVERSITY OF CALIFORNIA, LOS ANGELES	LOS ANGELES	37
41	SC	800327	GLENDALE CITY, GLENDALE WATER & POWER	GLENDALE	37
42	SC	800075	LA CITY, DWP SCATTERGOOD GENERATING STN	PLAYA DEL REY	36
43	SC	29110	ORANGE COUNTY SANITATION DISTRICT	HUNTINGTON BEACH	34
44	SC	117297	MM PRIMA DESHECHA ENERGY, LLC	SAN JUAN CAPISTRANO	33
45	SC	50310	WASTE MGMT DISP &RECY SERVS INC (BRADLEY	SUN VALLEY	32
46	SC	124838	EXIDE TECHNOLOGIES	VERNON	32
47	SC	13854	EAST LOS ANGELES COLLEGE	MONTEREY PARK	32
48	SC	126498	STEELSCAPE, INC	RANCHO CUCAMONGA	30
49	SC	115536	AES REDONDO BEACH, LLC	REDONDO BEACH	30
50	SC	104806	MM LOPEZ ENERGY LLC	SYLMAR	29

Attachment C

VOC and NOX Stationary Sources in 2012 Emitting 10 Tons/Year and Higher

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SCAB VOC EMISSION PRODUCERS

51	SC	800236	LA CO. SANITATION DIST	CARSON	25
52	SC	800193	LA CITY, DWP VALLEY GENERATING STATION	SUN VALLEY	25
53	SC	129816	INLAND EMPIRE ENERGY CENTER, LLC	MENIFEE	23
54	SC	17301	ORANGE COUNTY SANITATION DISTRICT	FOUNTAIN VALLEY	22
55	SC	14492	JOHNSON LAMINATING & COATING INC	CARSON	22
56	SC	167981	TESORO LOGISTICS OPERATIONS LLC	WILMINGTON	22
57	SC	800272	CHEMOIL TERMINALS CORPORATION	CARSON	22
58	SC	88228	VORTEX WHIRLPOOL SYSTEMS, INC	PERRIS	22
59	SC	76915	ST. JAMES OIL CORP.	LOS ANGELES	22
60	SC	45489	ABBOTT CARDIOVASCULAR SYSTEMS, INC.	TEMECULA	22
61	SC	2825	MCP FOODS INC	ANAHEIM	21
62	SC	167499	CSM BAKERY PRODUCTS NA, INC	COLTON	21
63	SC	800386	LA CO., SHERIFF DEPT	SAUGUS	20
64	SC	800214	LA CITY, SANITATION BUREAU (HTP)	PLAYA DEL REY	20
65	SC	2044	G B MFG INC/CALIF ACRYLIC, DBA CAL SPAS	POMONA	20
66	SC	119940	BUILDING MATERIALS MANUFACTURING CORP	FONTANA	19
67	SC	157259	GRAPHIC PACKAGING INTERNATIONAL, INC	IRVINE	19
68	SC	800052	ARCO TERMINAL SERVICES CORP., TERMINAL 2	LONG BEACH	19
69	SC	145100	P & D DAIRY	CHINO	19
70	SC	800113	ROHR, INC.	RIVERSIDE	19
71	SC	115663	EL SEGUNDO POWER, LLC	EL SEGUNDO	19
72	SC	8582	SO CAL GAS CO/PLAYA DEL REY STORAGE FACI	PLAYA DEL REY	18
73	SC	3585	R. R. DONNELLEY & SONS CO, LA MFG DIv	TORRANCE	18
74	SC	800092	EXXONMOBIL OIL CORP	TERMINAL ISLAND	18
75	SC	150201	BREITBURN OPERATING LP	SANTA FE SPRINGS	17
76	SC	126536	CONSOLIDATED FOUNDRIES - POMONA	POMONA	17
77	SC	20197	LAC/USC MEDICAL CENTER	LOS ANGELES	17
78	SC	800038	THE BOEING COMPANY - C17 PROGRAM	LONG BEACH	17
79	SC	124619	ARDAGH METAL PACKAGING USA INC.	TERMINAL ISLAND	17
80	SC	800022	CALNEV PIPE LINE, LLC	BLOOMINGTON	17
81	SC	101977	SIGNAL HILL PETROLEUM INC	SIGNAL HILL	17
82	SC	45086	SIGNAL HILL PETROLEUM INC	LONG BEACH	17
83	SC	115962	BEST CONTRACTING SERVICES INC	GARDENA	17
84	SC	800051	ARCO TERMINAL SERVICES CORPORATION	LONG BEACH	16
85	SC	16389	CEDARS-SINAI MEDICAL CTR	LOS ANGELES	16
86	SC	159492	WOODWARD HRT- VALENCIA	VALENCIA	16
87	SC	800286	ARCO TERMINAL SERVICES CORP	SIGNAL HILL	16
88	SC	62548	NEWARK PACIFIC PAPERBOARD CORP.	COMMERCE	16
89	SC	115536	AES REDONDO BEACH, LLC	REDONDO BEACH	16
90	SC	153095	SA RECYCLING LLC, ADAMS STEEL DBA	ANAHEIM	16
91	SC	800032	CHEVRON USA INC	MONTEBELLO	15
92	SC	800327	GLENDALE CITY, GLENDALE WATER & POWER	GLENDALE	15
93	SC	144826	PASTIME LAKES DAIRY	LAKEVIEW	15
94	SC	3417	AIR PROD & CHEM INC	CARSON	15
95	SC	800263	U.S. GOVT, DEPT OF NAVY	SAN CLEMENTE	15
96	SC	25070	LA CNTY SANITATION DISTRICT-PUENTE HILLS	CITY OF INDUSTRY	15
97	SC	139799	LITHOGRAPHIX INC	HAWTHORNE	14
98	SC	145211	R & J HARINGA DAIRY	SAN JACINTO	14
99	SC	124838	EXIDE TECHNOLOGIES	VERNON	14
100	SC	148236	AIR LIQUIDE LARGE INDUSTRIES U.S., LP	EL SEGUNDO	14
101	SC	98715	TECHNO COATINGS INC	ANAHEIM	14

SCAB NOX EMISSION PRODUCERS

51	SC	129497	THUMS LONG BEACH CO	LONG BEACH	29
52	SC	800386	LA CO., SHERIFF DEPT	SAUGUS	29
53	SC	800168	PASADENA CITY, DWP	PASADENA	29
54	SC	114801	RHODIA INC.	CARSON	28
55	SC	113518	BREA PARENT 2007,LLC	BREA	28
56	SC	128243	BURBANK CITY,BURBANK WATER & POWER,SCPPA	BURBANK	28
57	SC	115663	EL SEGUNDO POWER, LLC	EL SEGUNDO	27
58	SC	101656	AIR PRODUCTS AND CHEMICALS, INC.	WILMINGTON	27
59	SC	8582	SO CAL GAS CO/PLAYA DEL REY STORAGE FACI	PLAYA DEL REY	27
60	SC	16978	CLOUGHERTY PACKING LLC/HORMEL FOODS CORP	VERNON	26
61	SC	15504	SCHLOSSER FORGE COMPANY	RANCHO CUCAMONGA	26
62	SC	17301	ORANGE COUNTY SANITATION DISTRICT	FOUNTAIN VALLEY	26
63	SC	22911	CARLTON FORGE WORKS	PARAMOUNT	26
64	SC	45063	BIG BEAR AREA REGIONAL WASTEWATER	BIG BEAR CITY	25
65	SS	62862	IMPERIAL IRRIGATION DISTRICT/ COACHELLA	COACHELLA	23
66	SC	8547	QUEMETCO INC	CITY OF INDUSTRY	22
67	SC	113674	U S A WASTE OF CAL(EL SOBRANTE LANDFILL)	CORONA	21
68	SC	105903	PRIME WHEEL	CARSON	21
69	SC	94872	METAL CONTAINER CORP	MIRA LOMA	20
70	SC	155474	BICENT (CALIFORNIA) MALBURG LLC	VERNON	20
71	SC	3417	AIR PROD & CHEM INC	CARSON	19
72	SC	10966	WEBER METALS INC	PARAMOUNT	19
73	SC	800080	LUNDAY-THAGARD COMPANY	SOUTH GATE	19
74	SC	7411	DAVIS WIRE CORP	IRWINDALE	18
75	SC	43436	TST, INC.	FONTANA	17
76	SS	42218	PALM SPRINGS CITY (MUNICIPAL)	PALM SPRINGS	17
77	SC	800330	THUMS LONG BEACH	LONG BEACH	17
78	SC	800265	UNIV OF SO CAL (EIS & NSR USE ONLY)	LOS ANGELES	16
79	SC	16389	CEDARS-SINAI MEDICAL CTR	LOS ANGELES	16
80	SC	14495	VISTA METALS CORPORATION	FONTANA	16
81	SC	16639	SHULTZ STEEL CO	SOUTH GATE	16
82	SC	148236	AIR LIQUIDE LARGE INDUSTRIES U.S., LP	EL SEGUNDO	16
83	SC	42514	LA COUNTY SANITATION DIST (CALABASAS)	AGOURA	16
84	SC	800037	DEMENNO/KERDOON	COMPTON	15
85	SC	47781	OLS ENERGY-CHINO	CHINO	15
86	SC	139010	RIPON COGENERATION LLC	POMONA	15
87	SC	118406	CARSON COGENERATION COMPANY	CARSON	15
88	SC	800325	TIDELANDS OIL PRODUCTION CO	LONG BEACH	15
89	SC	16642	ANHEUSER-BUSCH LLC., (LA BREWERY)	VAN NUYS	14
90	SC	129660	NM MID VALLEY GENCO LLC	RIALTO	14
91	SC	45448	GAS RECOVERY SYST LLC (COYOTE CANYON)	NEWPORT COAST	14
92	SC	9755	UNITED AIRLINES INC	LOS ANGELES	14
93	SC	800288	UNIV CAL IRVINE (NSR USE ONLY)	IRVINE	13
94	SC	94677	YORBA LINDA WATER DISTRICT	YORBA LINDA	13
95	SC	550	LA CO., INTERNAL SERVICE DEPT	LOS ANGELES	13
96	SC	129661	NM MILLIKEN GENCO, LLC	ONTARIO	13
97	SC	115315	NRG CALIFORNIA SOUTH LP, ETIWANDA GEN ST	ETIWANDA	12
98	SC	150351	SAMUEL P LEWIS DBA CHINO WELDING & ASSEM	MIRA LOMA	12
99	SC	155877	MILLERCOORS, LLC	IRWINDALE	12
100	SC	145061	TADEMA CATTLE CO	CHINO	12
101	SC	3704	ALL AMERICAN ASPHALT, UNIT NO.01	CORONA	12

Attachment C
VOC and NOX Stationary Sources in 2012 Emitting 10 Tons/Year and Higher

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SCAB VOC EMISSION PRODUCERS

102	SC	800267	TRIUMPH PROCESSING, INC.	LYNWOOD	14
103	SC	800279	SFPP, L.P. (NSR USE ONLY)	ORANGE	13
104	SC	47708	HELLMAN PROPERTIES LLC	SEAL BEACH	13
105	SC	124904	LOS ANGELES TIMES COMMUNICATIONS LLC	LOS ANGELES	13
106	SC	800056	KINDER MORGAN LIQUIDS TERMINALS, LLC	WILMINGTON	13
107	SC	134590	FLEISCHMANN'S VINEGAR CO, INC	MONTEBELLO	13
108	SC	800335	LA CITY, DEPT OF AIRPORTS	LOS ANGELES	13
109	SC	145351	LEGEND DAIRY FARMS	ONTARIO	13
110	SC	800264	EDGINGTON OIL COMPANY	LONG BEACH	13
111	SC	800393	VALERO WILMINGTON ASPHALT PLANT	WILMINGTON	13
112	SC	1744	KIRKHILL - TA COMPANY	BREA	13
113	SC	800369	EQUILON ENTER.LLC , SHELL OIL PROD. U S	VAN NUYS	13
114	SC	117290	B BRAUN MEDICAL, INC	IRVINE	13
115	SC	124808	INEOS POLYPROPYLENE LLC	CARSON	13
116	SC	140811	DUCOMMUN AEROSTRUCTURES INC	MONROVIA	13
117	SC	103609	ST. JUDE MEDICAL CRMD	SYLMAR	13
118	SC	18931	TAMCO	RANCHO CUCAMONGA	13
119	SC	25501	FABRI-COTE,DIV A & S GLASS FABRICS CO IN	LOS ANGELES	13
120	SC	21887	KIMBERLY-CLARK WORLDWIDE INC.-FULT. MILL	FULLERTON	12
121	SC	8820	REULAND ELECTRIC CO, H.BRITTON LEES	CITY OF INDUSTRY	12
122	SC	171988	ACCURATE METAL SOLUTIONS ANAHEIM, LLC	ANAHEIM	12
123	SC	145415	GERBEN HETTINGA/HETTINGA DAIRY	SAN JACINTO	12
124	SC	166073	BETA OFFSHORE	HUNTINGTON BEACH	12
125	SC	145061	TADEMA CATTLE CO	CHINO	12
126	SC	18452	UNIVERSITY OF CALIFORNIA, LOS ANGELES	LOS ANGELES	12
127	SC	772	DEFT INC	IRVINE	12
128	SC	800396	BP WEST COAST PROD/ARCO VINVALE TERMINAL	SOUTH GATE	12
129	SC	171327	PHILLIPS 66 PIPELINE LLC	TORRANCE	12
130	SC	52742	STOROPACK INC	DOWNEY	11
131	SC	58563	MERCURY PLASTICS INC	CITY OF INDUSTRY	11
132	SC	119741	JENSEN PRECAST	FONTANA	11
133	SC	133987	PLAINS EXPLORATION & PRODUCTION CO, LP	LOS ANGELES	11
134	SC	47901	PARKER HANNIFIN CORP, CONTROL SYS DIV	IRVINE	11
135	SC	800397	BP WEST COAST PROD.,ARCO COLTON	BLOOMINGTON	11
136	SC	40915	FREUND BAKING CO	GLENDALE	11
137	SC	8309	CAMBRO MANUFACTURING CO	HUNTINGTON BEACH	11
138	SC	169990	SPS TECHNOLOGIES, LLC	GARDENA	11
139	SC	13011	M.C. GILL CORP	EL MONTE	11
140	SC	16213	EXXONMOBIL OIL CORP	TORRANCE	11
141	SC	143870	ABACHERLI DAIRY, RONALD ABACHERLI	MENIFEE	11
142	SC	39855	MIZKAN AMERICAS, INC	RANCHO CUCAMONGA	10
143	SC	128243	BURBANK CITY,BURBANK WATER & POWER,SCPPA	BURBANK	10
144	SC	132124	BP WEST COAST PRODUCTS, LLC/CARSON TERMI	CARSON	10
145	SC	10245	LA CITY, TERMINAL ISLAND TREATMENT PLANT	SAN PEDRO	10
146	SC	12630	FLINT GROUP NORTH AMERICA CORP	CITY OF INDUSTRY	10
147	SC	106897	AG-FUME SERVICES INC	SAN PEDRO	10
148	SC	144144	JIM BOOTSMA, JR., DAIRY	LAKEVIEW	10
149	SC	100145	HARBOR FUMIGATION INC	SAN PEDRO	10
150	SC	1703	EASTERN MUNICIPAL WATER DISTRICT	TEMECULA	10
151	SC	800234	LOMA LINDA UNIV	LOMA LINDA	10
152	SC	57094	GS ROOFING PRODUCTS CO, INC/CERTAINTEED	WILMINGTON	10

SCAB NOX EMISSION PRODUCERS

102	SC	136	PRESS FORGE CO	PARAMOUNT	12
103	SC	119133	EOP - 10960 WILSHIRE LLC	LOS ANGELES	12
104	SC	800170	LA CITY, DWP HARBOR GENERATING STATION	WILMINGTON	12
105	SC	800202	UNIVERSAL CITY STUDIOS, LLC.	UNIVERSAL CITY	12
106	SC	35302	OWENS CORNING ROOFING AND ASPHALT, LLC	COMPTON	11
107	SC	800409	NORTHROP GRUMMAN SYSTEMS CORPORATION	REDONDO BEACH	11
108	SC	143829	TIVA DAIRY	ONTARIO	11
109	SC	346	FRITO-LAY, INC.	RANCHO CUCAMONGA	11
110	SC	150397	RF MAC DONALD CO	SANTA FE SPRINGS	10
111	SC	113873	MM WEST COVINA LLC	WEST COVINA	10
112	SC	16338	KAISER ALUMINUM FABRICATED PRODUCTS, LLC	LOS ANGELES	10
113	SC	68042	CORONA ENERGY PARTNERS, LTD	CORONA	10
114	SC	11887	NASA JET PROPULSION LAB	PASADENA	10
115	SC	115172	RAYTHEON COMPANY	EL SEGUNDO	10

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VOC and NOX Stationary Sources in 2012 Emitting 10 Tons/Year and Higher

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SCAB VOC EMISSION PRODUCERS

153	SC	91157	FOOD FOR LIFE BAKING CO INC	CORONA	10
154	SC	1379	MADISON-GRAHAM COLORGRAPHICS INC	LOS ANGELES	10
155	SC	44655	REINHOLD INDUSTRIES INC	SANTA FE SPRINGS	10
156	SC	800417	PLAINS WEST COAST TERMINALS LLC	COMPTON	10
157	SC	116931	EQUILON ENT LLC, SHELL OIL PROD. U S	SIGNAL HILL	10
158	SC	146947	EAGLE LIVESTOCK INC	ONTARIO	10
159	SC	84273	TEVA PARENTERAL MEDICINES, INC	IRVINE	10
160	SC	115394	AES ALAMITOS, LLC	LONG BEACH	10
161	SC	104004	MICROMETALS, INC	ANAHEIM	10
162	SC	800080	LUNDAY-THAGARD COMPANY	SOUTH GATE	10

SCAB NOX EMISSION PRODUCERS

Attachment D:

Annual Average On-Road Mobile Source Emissions

Table D-1
2012 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10573318	36555	175922	87373	17531	83747	898	64531	6468	4175	1793	6774	1545	4549	47123	9377	10824598	297081	11121679
VMT/1000	354702	1270	5900	3272	803	4317	69	7476	312	296	209	782	60	160	377	86	362432	17659	380091
Reactive Organic Gas Emissions																			
Run Exh	31.68	0.12	0.68	0.53	0.30	1.99	0.13	4.97	0.05	0.17	0.38	1.21	0.06	0.14	0.19	0.01	33.47	9.14	42.60
Idle Exh	0.00	0.00	0.07	0.01	0.02	0.03	0.00	0.51	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.11	0.58	0.68
Start Ex	27.93	0.00	1.81	0.00	0.75	0.00	0.12	0.00	0.11	0.00	0.03	0.00	0.02	0.00	0.01	0.00	30.77	0.00	30.77
Total Ex	59.62	0.12	2.56	0.54	1.06	2.02	0.25	5.48	0.16	0.19	0.41	1.21	0.09	0.16	0.20	0.01	64.35	9.71	74.06
Diurnal	8.48	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	8.49	0.01	8.50
Hot Soak	16.90	0.00	0.46	0.00	0.10	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.49	0.00	17.49
Running	47.63	0.00	3.15	0.00	0.41	0.00	0.06	0.00	0.04	0.00	0.03	0.00	0.02	0.00	0.02	0.00	51.35	0.00	51.35
Resting	6.11	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.12	0.00	6.12
Total	138.73	0.12	6.18	0.54	1.58	2.03	0.33	5.48	0.20	0.19	0.44	1.21	0.11	0.16	0.23	0.01	147.80	9.72	157.52
Carbon Monoxide Emissions																			
Run Exh	881.94	0.83	17.83	3.66	8.22	6.15	4.96	18.89	1.29	0.54	4.55	14.48	1.35	0.36	5.83	0.05	925.96	44.96	970.92
Idle Exh	0.00	0.00	0.63	0.09	0.24	0.25	0.00	1.53	0.04	0.06	0.00	0.00	0.12	0.07	0.00	0.00	1.02	2.00	3.03
Start Ex	319.06	0.00	20.21	0.00	10.03	0.00	2.32	0.00	1.63	0.00	0.43	0.00	0.28	0.00	0.08	0.00	354.06	0.00	354.06
Total Ex	1200.99	0.83	38.67	3.75	18.48	6.41	7.28	20.42	2.96	0.60	4.99	14.48	1.76	0.43	5.91	0.05	1281.04	46.97	1328.01
Oxides of Nitrogen Emissions																			
Run Exh	94.74	0.73	3.56	21.34	1.50	35.82	0.46	90.38	0.32	3.00	0.73	19.64	0.11	1.95	0.54	0.60	101.96	173.46	275.42
Idle Exh	0.00	0.00	0.01	0.25	0.00	1.00	0.00	5.57	0.00	0.18	0.00	0.00	0.00	0.29	0.00	0.00	0.01	7.29	7.30
Start Ex	26.48	0.00	5.28	0.00	1.10	0.18	0.11	0.42	0.25	0.01	0.05	0.00	0.02	0.00	0.01	0.00	33.29	0.62	33.90
Total Ex	121.22	0.73	8.84	21.59	2.60	37.00	0.57	96.36	0.57	3.20	0.78	19.64	0.12	2.24	0.55	0.60	135.26	181.37	316.62
PM2.5 Emissions																			
Run Exh	0.94	0.09	0.01	0.12	0.00	1.37	0.00	2.72	0.00	0.09	0.00	0.27	0.00	0.07	0.00	0.02	0.95	4.74	5.69
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08
Start Ex	0.24	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25
Total Ex	1.18	0.09	0.02	0.12	0.00	1.37	0.00	2.80	0.00	0.09	0.00	0.27	0.00	0.07	0.00	0.02	1.20	4.82	6.02
TireWear	0.78	0.00	0.01	0.01	0.00	0.01	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.10	0.89
BrakeWear	6.14	0.02	0.22	0.13	0.05	0.27	0.00	0.22	0.02	0.02	0.01	0.31	0.02	0.06	0.02	0.01	6.48	1.02	7.50
Total	8.10	0.11	0.25	0.26	0.06	1.65	0.00	3.08	0.02	0.11	0.01	0.58	0.02	0.13	0.03	0.02	8.48	5.93	14.41
Fuel Consumption (1000 gallons) and SO2																			
Fuel	18065.97	49.63	551.06	171.20	118.25	485.02	16.68	1384.63	45.74	41.86	43.57	177.57	5.68	22.36	52.99	8.52	18899.94	2340.79	21240.73
SOx	1.69	0.01	0.05	0.02	0.01	0.05	0.00	0.14	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	1.77	0.24	2.01

Table D-2
2012 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10573318	36555	175922	87373	17531	83747	898	64531	6468	4175	1793	6774	1545	4549	47123	9377	10824598	297081	11121679
VMT/1000	354702	1270	5900	3272	803	4317	69	7476	312	296	209	782	60	160	377	86	362432	17659	380091
Reactive Organic Gas Emissions																			
Run Exh	32.06	0.12	0.69	0.53	0.30	1.99	0.13	4.97	0.05	0.17	0.39	1.21	0.06	0.14	0.19	0.01	33.86	9.14	42.99
Idle Exh	0.00	0.00	0.07	0.01	0.01	0.03	0.00	0.49	0.00	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.11	0.55	0.66
Start Ex	24.68	0.00	1.74	0.00	0.71	0.00	0.11	0.00	0.10	0.00	0.03	0.00	0.02	0.00	0.01	0.00	27.40	0.00	27.40
Total Ex	56.74	0.12	2.50	0.54	1.03	2.01	0.24	5.46	0.16	0.19	0.42	1.21	0.09	0.15	0.19	0.01	61.37	9.69	71.06
Diurnal	13.82	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	13.84	0.01	13.85
Hot Soak	18.32	0.00	0.50	0.00	0.10	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.95	0.00	18.95
Running	45.01	0.00	3.08	0.00	0.41	0.00	0.06	0.00	0.04	0.00	0.03	0.00	0.01	0.00	0.02	0.00	48.65	0.00	48.65
Resting	9.87	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	9.89	0.00	9.89
Total	143.77	0.12	6.09	0.54	1.54	2.02	0.31	5.46	0.20	0.19	0.45	1.21	0.10	0.15	0.24	0.01	152.69	9.70	162.39
Carbon Monoxide Emissions																			
Run Exh	950.81	0.83	18.13	3.66	8.22	6.15	4.88	18.89	1.30	0.54	4.58	14.48	1.32	0.36	5.77	0.05	995.02	44.96	1039.98
Idle Exh	0.00	0.00	0.63	0.09	0.17	0.19	0.00	1.19	0.04	0.04	0.00	0.00	0.12	0.05	0.00	0.00	0.96	1.56	2.52
Start Ex	274.61	0.00	19.27	0.00	9.64	0.00	2.28	0.00	1.55	0.00	0.38	0.00	0.23	0.00	0.08	0.00	308.04	0.00	308.04
Total Ex	1225.42	0.83	38.03	3.75	18.04	6.34	7.16	20.09	2.89	0.58	4.95	14.48	1.67	0.42	5.86	0.05	1304.02	46.53	1350.54
Oxides of Nitrogen Emissions																			
Run Exh	83.51	0.69	3.13	20.22	1.31	33.84	0.40	85.51	0.29	2.84	0.64	18.57	0.09	1.85	0.47	0.57	89.84	164.08	253.92
Idle Exh	0.00	0.00	0.01	0.25	0.00	1.03	0.00	5.72	0.00	0.19	0.00	0.00	0.00	0.30	0.00	0.00	0.01	7.49	7.50
Start Ex	24.58	0.00	5.06	0.00	1.05	0.18	0.10	0.42	0.24	0.01	0.05	0.00	0.02	0.00	0.01	0.00	31.11	0.62	31.72
Total Ex	108.09	0.69	8.19	20.47	2.36	35.06	0.50	91.65	0.53	3.04	0.69	18.57	0.11	2.15	0.48	0.57	120.95	172.19	293.14
PM2.5 Emissions																			
Run Exh	0.94	0.09	0.01	0.12	0.00	1.37	0.00	2.72	0.00	0.09	0.00	0.27	0.00	0.07	0.00	0.02	0.95	4.74	5.69
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07
Start Ex	0.24	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25
Total Ex	1.18	0.09	0.02	0.12	0.00	1.37	0.00	2.79	0.00	0.09	0.00	0.27	0.00	0.07	0.00	0.02	1.20	4.81	6.01
TireWear	0.78	0.00	0.01	0.01	0.00	0.01	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.10	0.89
BrakeWear	6.14	0.02	0.22	0.13	0.05	0.27	0.00	0.22	0.02	0.02	0.01	0.31	0.02	0.06	0.02	0.01	6.48	1.02	7.50
Total	8.10	0.11	0.25	0.26	0.06	1.65	0.00	3.08	0.02	0.11	0.01	0.58	0.02	0.13	0.03	0.02	8.48	5.93	14.41
Fuel Consumption (1000 gallons) and SO2																			
Fuel	18942.97	49.63	550.94	171.20	118.22	485.37	16.66	1387.50	45.73	41.93	43.57	177.57	5.66	22.46	52.98	8.52	19776.73	2344.18	22120.90
SOx	1.78	0.01	0.05	0.02	0.01	0.05	0.00	0.14	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	1.85	0.24	2.09

Table D-3
2017 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10596601	66032	142449	104147	15942	100772	648	71389	7499	4482	2065	5193	1855	5131	39865	9448	10806924	366594	11173518
VMT/1000	370583	2638	4439	3917	786	5555	79	9468	357	376	242	610	72	196	327	82	376885	22842	399727
Reactive Organic Gas Emissions																			
Run Exh	17.68	0.09	0.33	0.46	0.12	1.04	0.05	1.58	0.03	0.06	0.27	0.77	0.01	0.04	0.09	0.01	18.58	4.04	22.62
Idle Exh	0.00	0.00	0.06	0.01	0.01	0.01	0.00	0.18	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.21	0.30
Start Ex	15.09	0.00	1.27	0.00	0.37	0.00	0.03	0.00	0.08	0.00	0.03	0.00	0.01	0.00	0.00	0.00	16.88	0.00	16.88
Total Ex	32.77	0.09	1.66	0.47	0.50	1.05	0.08	1.76	0.11	0.06	0.30	0.77	0.04	0.04	0.09	0.01	35.55	4.25	39.81
Diurnal	5.93	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	5.93	0.01	5.94
Hot Soak	12.62	0.00	0.39	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.06	0.00	13.06
Running	31.93	0.00	2.61	0.00	0.20	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	34.82	0.00	34.82
Resting	4.89	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.90	0.00	4.90
Total	88.13	0.09	4.67	0.47	0.74	1.06	0.09	1.76	0.15	0.06	0.32	0.77	0.04	0.04	0.11	0.01	94.26	4.26	98.52
Carbon Monoxide Emissions																			
Run Exh	534.16	0.83	8.64	3.04	3.28	3.51	2.70	7.76	0.70	0.19	2.96	10.24	0.26	0.11	2.59	0.04	555.28	25.72	581.00
Idle Exh	0.00	0.00	0.50	0.10	0.22	0.12	0.00	0.71	0.04	0.02	0.00	0.00	0.15	0.02	0.00	0.00	0.90	0.96	1.86
Start Ex	187.45	0.00	12.68	0.00	5.82	0.00	0.80	0.00	1.33	0.00	0.35	0.00	0.18	0.00	0.05	0.00	208.66	0.00	208.66
Total Ex	721.61	0.83	21.82	3.14	9.31	3.63	3.49	8.47	2.08	0.20	3.31	10.24	0.59	0.13	2.63	0.04	764.85	26.68	791.52
Oxides of Nitrogen Emissions																			
Run Exh	54.05	0.44	1.97	14.79	0.77	21.68	0.31	55.62	0.19	1.99	0.55	11.94	0.06	1.85	0.29	0.48	58.18	108.79	166.97
Idle Exh	0.00	0.00	0.01	0.29	0.00	0.79	0.00	5.45	0.00	0.13	0.00	0.00	0.00	0.28	0.00	0.00	0.01	6.95	6.95
Start Ex	14.90	0.00	4.24	0.00	0.80	1.35	0.06	1.71	0.22	0.07	0.04	0.00	0.01	0.03	0.01	0.00	20.29	3.15	23.44
Total Ex	68.95	0.44	6.21	15.09	1.57	23.82	0.37	62.78	0.40	2.18	0.59	11.94	0.07	2.16	0.30	0.48	78.47	118.89	197.36
PM2.5 Emissions																			
Run Exh	0.73	0.05	0.01	0.10	0.00	0.67	0.00	0.39	0.00	0.02	0.00	0.16	0.00	0.02	0.00	0.01	0.74	1.42	2.16
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Start Ex	0.17	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Total Ex	0.90	0.05	0.01	0.10	0.00	0.67	0.00	0.40	0.00	0.02	0.00	0.16	0.00	0.02	0.00	0.01	0.91	1.43	2.34
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.13	0.96
BrakeWear	6.41	0.04	0.17	0.15	0.05	0.34	0.00	0.27	0.02	0.02	0.01	0.24	0.03	0.07	0.02	0.01	6.71	1.14	7.85
Total	8.12	0.10	0.19	0.26	0.05	1.03	0.00	0.76	0.02	0.04	0.02	0.40	0.03	0.09	0.02	0.02	8.45	2.70	11.15
Fuel Consumption (1000 gallons) and SO2																			
Fuel	16833.52	90.96	413.67	202.51	111.37	631.46	16.91	1645.04	51.16	53.11	49.39	132.39	6.45	27.37	45.16	8.25	17527.63	2791.09	20318.71
SOx	1.58	0.01	0.04	0.02	0.01	0.07	0.00	0.17	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	1.64	0.28	1.93

Table D-4
2017 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10596601	66032	142449	104147	15942	100772	648	71389	7499	4482	2065	5193	1855	5131	39865	9448	10806924	366594	11173518
VMT/1000	370583	2638	4439	3917	786	5555	79	9468	357	376	242	610	72	196	327	82	376885	22842	399727
Reactive Organic Gas Emissions																			
Run Exh	18.08	0.09	0.34	0.46	0.12	1.04	0.05	1.58	0.03	0.06	0.28	0.77	0.01	0.04	0.09	0.01	18.99	4.04	23.03
Idle Exh	0.00	0.00	0.06	0.01	0.01	0.01	0.00	0.17	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.20	0.29
Start Ex	13.34	0.00	1.22	0.00	0.35	0.00	0.03	0.00	0.08	0.00	0.02	0.00	0.01	0.00	0.00	0.00	15.05	0.00	15.05
Total Ex	31.41	0.09	1.62	0.47	0.49	1.05	0.08	1.75	0.11	0.06	0.30	0.77	0.04	0.04	0.09	0.01	34.14	4.24	38.38
Diurnal	9.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	9.62	0.00	9.62
Hot Soak	13.45	0.00	0.41	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.91	0.00	13.91
Running	30.24	0.00	2.55	0.00	0.19	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	33.06	0.00	33.06
Resting	7.57	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	7.59	0.00	7.59
Total	92.27	0.09	4.60	0.47	0.72	1.05	0.09	1.75	0.15	0.06	0.32	0.77	0.04	0.04	0.12	0.01	98.31	4.24	102.56
Carbon Monoxide Emissions																			
Run Exh	581.39	0.83	8.78	3.04	3.33	3.51	2.75	7.76	0.71	0.19	3.00	10.24	0.26	0.11	2.59	0.04	602.82	25.72	628.53
Idle Exh	0.00	0.00	0.50	0.10	0.16	0.08	0.00	0.52	0.04	0.01	0.00	0.00	0.15	0.01	0.00	0.00	0.84	0.73	1.57
Start Ex	160.82	0.00	12.09	0.00	5.53	0.00	0.76	0.00	1.26	0.00	0.30	0.00	0.15	0.00	0.05	0.00	180.96	0.00	180.96
Total Ex	742.21	0.83	21.37	3.14	9.03	3.60	3.51	8.27	2.02	0.20	3.30	10.24	0.56	0.12	2.63	0.04	784.62	26.45	811.07
Oxides of Nitrogen Emissions																			
Run Exh	47.68	0.42	1.73	14.02	0.68	20.49	0.27	52.63	0.16	1.88	0.48	11.29	0.05	1.75	0.25	0.45	51.31	102.90	154.22
Idle Exh	0.00	0.00	0.01	0.29	0.00	0.81	0.00	5.63	0.00	0.13	0.00	0.00	0.00	0.29	0.00	0.00	0.01	7.15	7.16
Start Ex	13.84	0.00	4.07	0.00	0.76	1.35	0.06	1.71	0.21	0.07	0.04	0.00	0.01	0.03	0.01	0.00	19.00	3.15	22.15
Total Ex	61.52	0.42	5.80	14.31	1.44	22.65	0.33	59.96	0.37	2.08	0.52	11.29	0.07	2.07	0.26	0.45	70.32	113.21	183.53
PM2.5 Emissions																			
Run Exh	0.73	0.05	0.01	0.10	0.00	0.67	0.00	0.39	0.00	0.02	0.00	0.16	0.00	0.02	0.00	0.01	0.74	1.42	2.16
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Start Ex	0.17	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Total Ex	0.90	0.05	0.01	0.10	0.00	0.67	0.00	0.40	0.00	0.02	0.00	0.16	0.00	0.02	0.00	0.01	0.91	1.43	2.34
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.13	0.96
BrakeWear	6.41	0.04	0.17	0.15	0.05	0.34	0.00	0.27	0.02	0.02	0.01	0.24	0.03	0.07	0.02	0.01	6.71	1.14	7.85
Total	8.12	0.10	0.19	0.26	0.05	1.03	0.00	0.76	0.02	0.04	0.02	0.40	0.03	0.09	0.02	0.02	8.45	2.70	11.15
Fuel Consumption (1000 gallons) and SO2																			
Fuel	17666.93	90.96	413.59	202.51	111.38	631.88	16.91	1650.00	51.15	53.19	49.39	132.39	6.44	27.48	45.16	8.25	18360.95	2796.65	21157.60
SOx	1.66	0.01	0.04	0.02	0.01	0.07	0.00	0.17	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	1.72	0.28	2.00

Table D-5
2018 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10561345	71858	137507	108403	16048	106075	655	73387	7760	4635	2127	4889	1966	5118	38588	9463	10765996	383828	11149824
VMT/1000	367748	2828	4202	4029	788	5834	83	9934	364	391	246	567	75	196	315	83	373821	23862	397683
Reactive Organic Gas Emissions																			
Run Exh	15.31	0.08	0.29	0.44	0.10	0.94	0.04	1.41	0.02	0.04	0.25	0.67	0.01	0.03	0.07	0.01	16.08	3.63	19.71
Idle Exh	0.00	0.00	0.06	0.01	0.01	0.01	0.00	0.17	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.20	0.29
Start Ex	13.15	0.00	1.18	0.00	0.33	0.00	0.03	0.00	0.08	0.00	0.02	0.00	0.01	0.00	0.00	0.00	14.81	0.00	14.81
Total Ex	28.46	0.08	1.52	0.45	0.45	0.95	0.07	1.58	0.11	0.05	0.27	0.67	0.04	0.03	0.07	0.01	30.98	3.83	34.81
Diurnal	5.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	5.49	0.00	5.49
Hot Soak	11.62	0.00	0.38	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.04	0.00	12.04
Running	29.38	0.00	2.51	0.00	0.18	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	32.16	0.00	32.16
Resting	4.61	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.61	0.00	4.61
Total	79.54	0.08	4.42	0.45	0.67	0.96	0.08	1.58	0.15	0.05	0.29	0.67	0.04	0.03	0.09	0.01	85.28	3.83	89.11
Carbon Monoxide Emissions																			
Run Exh	473.28	0.83	7.44	2.88	2.71	3.23	2.63	7.51	0.61	0.16	2.64	9.28	0.23	0.09	2.01	0.04	491.54	24.01	515.55
Idle Exh	0.00	0.00	0.48	0.11	0.22	0.11	0.00	0.67	0.04	0.01	0.00	0.00	0.15	0.01	0.00	0.00	0.89	0.91	1.81
Start Ex	166.22	0.00	11.69	0.00	5.36	0.00	0.74	0.00	1.29	0.00	0.34	0.00	0.18	0.00	0.04	0.00	185.88	0.00	185.88
Total Ex	639.51	0.83	19.61	2.99	8.29	3.34	3.37	8.18	1.94	0.17	2.98	9.28	0.56	0.10	2.05	0.04	678.30	24.93	703.23
Oxides of Nitrogen Emissions																			
Run Exh	47.24	0.40	1.74	13.55	0.66	19.99	0.30	52.16	0.16	1.80	0.51	10.23	0.06	1.70	0.25	0.45	50.92	100.28	151.20
Idle Exh	0.00	0.00	0.01	0.30	0.00	0.76	0.00	5.35	0.00	0.12	0.00	0.00	0.00	0.27	0.00	0.00	0.01	6.79	6.80
Start Ex	12.94	0.00	4.06	0.00	0.75	1.60	0.06	1.98	0.21	0.08	0.04	0.00	0.01	0.04	0.01	0.00	18.08	3.70	21.78
Total Ex	60.18	0.40	5.80	13.84	1.41	22.35	0.36	59.49	0.37	2.00	0.55	10.23	0.07	2.01	0.26	0.45	69.00	110.77	179.77
PM2.5 Emissions																			
Run Exh	0.71	0.05	0.01	0.10	0.00	0.60	0.00	0.26	0.00	0.01	0.00	0.13	0.00	0.01	0.00	0.01	0.72	1.17	1.89
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Start Ex	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Total Ex	0.88	0.05	0.01	0.10	0.00	0.60	0.00	0.27	0.00	0.01	0.00	0.13	0.00	0.01	0.00	0.01	0.89	1.18	2.06
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.14	0.96
BrakeWear	6.36	0.05	0.16	0.15	0.05	0.36	0.00	0.28	0.02	0.02	0.01	0.23	0.03	0.07	0.02	0.01	6.65	1.17	7.82
Total	8.05	0.10	0.18	0.26	0.05	0.98	0.00	0.65	0.02	0.03	0.02	0.36	0.03	0.08	0.02	0.02	8.36	2.48	10.84
Fuel Consumption (1000 gallons) and SO2																			
Fuel	16145.49	94.85	390.22	205.73	110.21	660.41	17.14	1704.43	51.81	54.93	49.93	121.39	6.72	27.31	43.36	8.12	16814.86	2877.18	19692.04
SOx	1.51	0.01	0.04	0.02	0.01	0.07	0.00	0.17	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.58	0.29	1.87

Table D-6
2018 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10561345	71858	137507	108403	16048	106075	655	73387	7760	4635	2127	4889	1966	5118	38588	9463	10765996	383828	11149824
VMT/1000	367748	2828	4202	4029	788	5834	83	9934	364	391	246	567	75	196	315	83	373821	23862	397683
Reactive Organic Gas Emissions																			
Run Exh	15.70	0.08	0.29	0.44	0.10	0.94	0.04	1.41	0.02	0.04	0.25	0.67	0.01	0.03	0.07	0.01	16.49	3.63	20.12
Idle Exh	0.00	0.00	0.06	0.01	0.01	0.01	0.00	0.16	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.18	0.28
Start Ex	11.62	0.00	1.14	0.00	0.32	0.00	0.02	0.00	0.08	0.00	0.02	0.00	0.01	0.00	0.00	0.00	13.21	0.00	13.21
Total Ex	27.31	0.08	1.48	0.45	0.43	0.95	0.07	1.57	0.11	0.05	0.27	0.67	0.04	0.03	0.07	0.01	29.79	3.81	33.60
Diurnal	8.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	8.88	0.00	8.88
Hot Soak	12.36	0.00	0.40	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.80	0.00	12.80
Running	27.83	0.00	2.45	0.00	0.18	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	30.54	0.00	30.54
Resting	7.08	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	7.10	0.00	7.10
Total	83.45	0.08	4.35	0.45	0.65	0.95	0.08	1.57	0.15	0.05	0.30	0.67	0.04	0.03	0.10	0.01	89.11	3.82	92.93
Carbon Monoxide Emissions																			
Run Exh	516.18	0.83	7.57	2.88	2.76	3.23	2.68	7.51	0.62	0.16	2.68	9.28	0.23	0.09	2.02	0.04	534.73	24.01	558.75
Idle Exh	0.00	0.00	0.48	0.11	0.16	0.08	0.00	0.49	0.04	0.01	0.00	0.00	0.15	0.01	0.00	0.00	0.83	0.69	1.52
Start Ex	142.48	0.00	11.15	0.00	5.10	0.00	0.71	0.00	1.22	0.00	0.29	0.00	0.15	0.00	0.04	0.00	161.13	0.00	161.13
Total Ex	658.66	0.83	19.19	2.99	8.02	3.31	3.39	7.99	1.88	0.17	2.97	9.28	0.53	0.09	2.06	0.04	696.70	24.70	721.40
Oxides of Nitrogen Emissions																			
Run Exh	41.68	0.38	1.53	12.83	0.58	18.89	0.26	49.35	0.14	1.70	0.45	9.68	0.05	1.60	0.22	0.42	44.91	94.85	139.76
Idle Exh	0.00	0.00	0.01	0.30	0.00	0.78	0.00	5.52	0.00	0.12	0.00	0.00	0.00	0.28	0.00	0.00	0.01	7.00	7.01
Start Ex	12.01	0.00	3.89	0.00	0.72	1.60	0.06	1.98	0.20	0.08	0.04	0.00	0.01	0.04	0.01	0.00	16.94	3.70	20.64
Total Ex	53.69	0.38	5.43	13.13	1.30	21.26	0.32	56.85	0.34	1.90	0.49	9.68	0.06	1.92	0.23	0.42	61.85	105.55	167.40
PM2.5 Emissions																			
Run Exh	0.71	0.05	0.01	0.10	0.00	0.60	0.00	0.26	0.00	0.01	0.00	0.13	0.00	0.01	0.00	0.01	0.72	1.17	1.89
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Start Ex	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Total Ex	0.88	0.05	0.01	0.10	0.00	0.60	0.00	0.27	0.00	0.01	0.00	0.13	0.00	0.01	0.00	0.01	0.89	1.17	2.06
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.14	0.96
BrakeWear	6.36	0.05	0.16	0.15	0.05	0.36	0.00	0.28	0.02	0.02	0.01	0.23	0.03	0.07	0.02	0.01	6.65	1.17	7.82
Total	8.05	0.10	0.18	0.26	0.05	0.98	0.00	0.65	0.02	0.03	0.02	0.36	0.03	0.08	0.02	0.02	8.36	2.48	10.84
Fuel Consumption (1000 gallons) and SO2																			
Fuel	16947.07	94.85	390.13	205.73	110.21	660.85	17.14	1709.65	51.80	55.01	49.93	121.39	6.72	27.43	43.36	8.12	17616.35	2883.03	20499.38
SOx	1.59	0.01	0.04	0.02	0.01	0.07	0.00	0.18	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.65	0.29	1.94

Table D-7
2019 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10667042	78482	131325	111397	16029	110665	662	75696	7989	4912	2193	4690	2081	5133	37612	9459	10864933	400434	11265367
VMT/1000	369571	3030	3947	4090	785	6087	84	10345	371	410	252	539	79	197	306	81	375395	24779	400174
Reactive Organic Gas Emissions																			
Run Exh	13.75	0.08	0.24	0.42	0.08	0.83	0.04	1.41	0.02	0.04	0.23	0.60	0.01	0.03	0.05	0.01	14.42	3.43	17.86
Idle Exh	0.00	0.00	0.05	0.01	0.01	0.01	0.00	0.16	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.19	0.28
Start Ex	11.66	0.00	1.08	0.00	0.30	0.00	0.02	0.00	0.08	0.00	0.02	0.00	0.01	0.00	0.00	0.00	13.17	0.00	13.17
Total Ex	25.41	0.08	1.37	0.43	0.40	0.84	0.06	1.58	0.10	0.05	0.25	0.60	0.04	0.03	0.05	0.01	27.69	3.62	31.31
Diurnal	5.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	5.15	0.00	5.16
Hot Soak	10.84	0.00	0.36	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.23	0.00	11.23
Running	27.75	0.00	2.38	0.00	0.17	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	30.39	0.00	30.39
Resting	4.38	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.39	0.00	4.39
Total	73.52	0.08	4.12	0.43	0.60	0.85	0.07	1.58	0.14	0.05	0.27	0.60	0.04	0.03	0.07	0.01	78.85	3.63	82.48
Carbon Monoxide Emissions																			
Run Exh	430.31	0.86	6.27	2.70	2.22	2.94	2.60	7.93	0.52	0.16	2.37	8.56	0.20	0.09	1.64	0.03	446.13	23.26	469.38
Idle Exh	0.00	0.00	0.45	0.11	0.22	0.10	0.00	0.66	0.04	0.01	0.00	0.00	0.16	0.01	0.00	0.00	0.88	0.89	1.76
Start Ex	149.79	0.00	10.65	0.00	4.92	0.00	0.71	0.00	1.25	0.00	0.32	0.00	0.18	0.00	0.04	0.00	167.86	0.00	167.86
Total Ex	580.10	0.86	17.37	2.81	7.36	3.03	3.30	8.58	1.81	0.17	2.69	8.56	0.55	0.10	1.68	0.03	614.86	24.15	639.01
Oxides of Nitrogen Emissions																			
Run Exh	42.14	0.37	1.52	12.21	0.56	17.91	0.29	50.75	0.14	1.74	0.47	9.12	0.05	1.60	0.22	0.42	45.40	94.12	139.52
Idle Exh	0.00	0.00	0.00	0.30	0.00	0.71	0.00	5.23	0.00	0.12	0.00	0.00	0.00	0.26	0.00	0.00	0.01	6.62	6.63
Start Ex	11.35	0.00	3.84	0.00	0.70	1.86	0.06	2.18	0.20	0.09	0.04	0.00	0.01	0.05	0.01	0.00	16.20	4.18	20.39
Total Ex	53.49	0.37	5.36	12.51	1.26	20.48	0.35	58.17	0.35	1.95	0.51	9.12	0.07	1.90	0.23	0.42	61.61	104.92	166.53
PM2.5 Emissions																			
Run Exh	0.71	0.05	0.01	0.09	0.00	0.52	0.00	0.25	0.00	0.01	0.00	0.12	0.00	0.01	0.00	0.01	0.72	1.05	1.77
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Start Ex	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Total Ex	0.88	0.05	0.01	0.09	0.00	0.52	0.00	0.26	0.00	0.01	0.00	0.12	0.00	0.01	0.00	0.01	0.89	1.06	1.94
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.14	0.97
BrakeWear	6.39	0.05	0.15	0.16	0.05	0.38	0.00	0.30	0.02	0.03	0.02	0.21	0.03	0.07	0.02	0.01	6.67	1.19	7.86
Total	8.08	0.10	0.16	0.26	0.05	0.92	0.00	0.65	0.02	0.03	0.02	0.33	0.03	0.08	0.02	0.02	8.38	2.39	10.77
Fuel Consumption (1000 gallons) and SO2																			
Fuel	15710.31	99.40	365.29	206.48	108.80	686.96	17.26	1755.60	51.99	56.87	50.54	114.05	7.01	27.26	41.69	7.98	16352.89	2954.60	19307.49
SOx	1.47	0.01	0.03	0.02	0.01	0.07	0.00	0.18	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.53	0.30	1.83

Table D-8
2019 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10667042	78482	131325	111397	16029	110665	662	75696	7989	4912	2193	4690	2081	5133	37612	9459	10864933	400434	11265367
VMT/1000	369571	3030	3947	4090	785	6087	84	10345	371	410	252	539	79	197	306	81	375395	24779	400174
Reactive Organic Gas Emissions																			
Run Exh	14.13	0.08	0.25	0.42	0.08	0.83	0.04	1.41	0.02	0.04	0.23	0.60	0.01	0.03	0.06	0.01	14.82	3.43	18.25
Idle Exh	0.00	0.00	0.05	0.01	0.01	0.01	0.00	0.15	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.18	0.27
Start Ex	10.30	0.00	1.04	0.00	0.29	0.00	0.02	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	11.76	0.00	11.76
Total Ex	24.43	0.08	1.34	0.43	0.39	0.84	0.06	1.57	0.10	0.05	0.26	0.60	0.04	0.03	0.06	0.01	26.66	3.61	30.28
Diurnal	8.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	8.34	0.00	8.34
Hot Soak	11.50	0.00	0.38	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.92	0.00	11.92
Running	26.26	0.00	2.33	0.00	0.17	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	28.84	0.00	28.84
Resting	6.70	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.72	0.00	6.72
Total	77.23	0.08	4.06	0.43	0.59	0.84	0.07	1.57	0.14	0.05	0.28	0.60	0.04	0.03	0.08	0.01	82.49	3.61	86.10
Carbon Monoxide Emissions																			
Run Exh	470.00	0.86	6.39	2.70	2.27	2.94	2.65	7.93	0.53	0.16	2.41	8.56	0.20	0.09	1.67	0.03	486.11	23.26	509.37
Idle Exh	0.00	0.00	0.45	0.11	0.16	0.07	0.00	0.48	0.04	0.01	0.00	0.00	0.16	0.01	0.00	0.00	0.82	0.67	1.49
Start Ex	128.31	0.00	10.15	0.00	4.67	0.00	0.67	0.00	1.18	0.00	0.28	0.00	0.15	0.00	0.04	0.00	145.44	0.00	145.44
Total Ex	598.30	0.86	16.99	2.81	7.10	3.01	3.32	8.40	1.75	0.17	2.69	8.56	0.51	0.09	1.70	0.03	632.37	23.93	656.30
Oxides of Nitrogen Emissions																			
Run Exh	37.18	0.35	1.34	11.57	0.49	16.92	0.25	48.01	0.13	1.65	0.41	8.62	0.05	1.51	0.19	0.39	40.04	89.03	129.07
Idle Exh	0.00	0.00	0.00	0.30	0.00	0.74	0.00	5.40	0.00	0.12	0.00	0.00	0.00	0.27	0.00	0.00	0.01	6.83	6.83
Start Ex	10.54	0.00	3.68	0.00	0.67	1.86	0.05	2.18	0.19	0.09	0.04	0.00	0.01	0.05	0.01	0.00	15.19	4.18	19.37
Total Ex	47.72	0.35	5.03	11.87	1.16	19.52	0.31	55.60	0.32	1.86	0.45	8.62	0.06	1.82	0.20	0.39	55.24	100.03	155.27
PM2.5 Emissions																			
Run Exh	0.71	0.05	0.01	0.09	0.00	0.52	0.00	0.25	0.00	0.01	0.00	0.12	0.00	0.01	0.00	0.01	0.72	1.05	1.77
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Total Ex	0.88	0.05	0.01	0.09	0.00	0.52	0.00	0.26	0.00	0.01	0.00	0.12	0.00	0.01	0.00	0.01	0.89	1.06	1.94
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.14	0.97
BrakeWear	6.39	0.05	0.15	0.16	0.05	0.38	0.00	0.30	0.02	0.03	0.02	0.21	0.03	0.07	0.02	0.01	6.67	1.19	7.86
Total	8.08	0.10	0.16	0.26	0.05	0.92	0.00	0.65	0.02	0.03	0.02	0.33	0.03	0.08	0.02	0.02	8.38	2.39	10.77
Fuel Consumption (1000 gallons) and SO2																			
Fuel	16491.08	99.40	365.21	206.48	108.81	687.42	17.27	1760.97	51.97	56.95	50.54	114.05	7.00	27.37	41.70	7.98	17133.59	2960.63	20094.22
SOx	1.55	0.01	0.03	0.02	0.01	0.07	0.00	0.18	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.30	1.91

Table D-9
2020 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10664111	83690	125210	114218	16011	113604	672	77809	8228	5191	2258	4491	2196	5150	36717	9445	10855403	413598	11269001
VMT/1000	367082	3173	3709	4141	779	6317	85	10739	377	427	256	510	83	197	299	80	372670	25584	398254
Reactive Organic Gas Emissions																			
Run Exh	12.59	0.08	0.21	0.39	0.07	0.56	0.04	1.35	0.02	0.04	0.20	0.54	0.01	0.03	0.04	0.01	13.17	3.00	16.17
Idle Exh	0.00	0.00	0.05	0.01	0.01	0.01	0.00	0.15	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.18	0.27
Start Ex	10.34	0.00	0.98	0.00	0.28	0.00	0.02	0.00	0.08	0.00	0.02	0.00	0.01	0.00	0.00	0.00	11.73	0.00	11.73
Total Ex	22.93	0.08	1.24	0.40	0.36	0.57	0.06	1.50	0.10	0.05	0.22	0.54	0.04	0.03	0.04	0.01	24.99	3.17	28.16
Diurnal	4.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.84	0.00	4.85
Hot Soak	10.07	0.00	0.34	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.45	0.00	10.45
Running	26.19	0.00	2.26	0.00	0.17	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	28.70	0.00	28.70
Resting	4.15	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.16	0.00	4.16
Total	68.18	0.08	3.85	0.41	0.56	0.57	0.07	1.50	0.14	0.05	0.25	0.54	0.04	0.03	0.06	0.01	73.14	3.17	76.32
Carbon Monoxide Emissions																			
Run Exh	391.93	0.86	5.30	2.53	1.82	2.14	2.57	8.05	0.44	0.17	2.00	7.87	0.18	0.08	1.32	0.03	405.56	21.73	427.30
Idle Exh	0.00	0.00	0.43	0.11	0.22	0.07	0.00	0.61	0.05	0.01	0.00	0.00	0.17	0.01	0.00	0.00	0.87	0.81	1.68
Start Ex	134.41	0.00	9.73	0.00	4.53	0.00	0.69	0.00	1.21	0.00	0.31	0.00	0.18	0.00	0.04	0.00	151.09	0.00	151.09
Total Ex	526.34	0.86	15.46	2.65	6.57	2.20	3.26	8.66	1.69	0.18	2.31	7.87	0.54	0.09	1.35	0.03	557.52	22.55	580.06
Oxides of Nitrogen Emissions																			
Run Exh	37.54	0.33	1.34	11.00	0.48	13.16	0.28	47.95	0.12	1.60	0.44	8.04	0.05	1.50	0.19	0.39	40.44	83.98	124.42
Idle Exh	0.00	0.00	0.00	0.30	0.00	0.60	0.00	5.04	0.00	0.11	0.00	0.00	0.00	0.25	0.00	0.00	0.01	6.30	6.31
Start Ex	9.90	0.00	3.61	0.00	0.65	2.25	0.06	2.52	0.19	0.11	0.04	0.00	0.01	0.05	0.01	0.00	14.47	4.93	19.40
Total Ex	47.43	0.33	4.95	11.30	1.13	16.01	0.34	55.51	0.32	1.82	0.48	8.04	0.06	1.81	0.20	0.39	54.91	95.21	150.12
PM2.5 Emissions																			
Run Exh	0.70	0.04	0.01	0.09	0.00	0.35	0.00	0.21	0.00	0.01	0.00	0.10	0.00	0.01	0.00	0.01	0.70	0.82	1.52
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Total Ex	0.86	0.04	0.01	0.09	0.00	0.35	0.00	0.22	0.00	0.01	0.00	0.10	0.00	0.01	0.00	0.01	0.87	0.82	1.69
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.15	0.97
BrakeWear	6.35	0.05	0.14	0.16	0.05	0.39	0.00	0.31	0.02	0.03	0.02	0.20	0.03	0.07	0.02	0.01	6.62	1.21	7.83
Total	8.02	0.10	0.15	0.26	0.05	0.76	0.00	0.63	0.03	0.03	0.02	0.30	0.03	0.08	0.02	0.02	8.31	2.18	10.49
Fuel Consumption (1000 gallons) and SO2																			
Fuel	15072.79	101.56	342.12	206.85	106.85	708.82	17.35	1798.43	52.51	58.85	51.10	106.84	7.29	27.20	40.38	7.86	15690.41	3016.42	18706.83
SOx	1.41	0.01	0.03	0.02	0.01	0.08	0.00	0.18	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.47	0.31	1.78

Table D-10
2020 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10664111	83690	125210	114218	16011	113604	672	77809	8228	5191	2258	4491	2196	5150	36717	9445	10855403	413598	11269001
VMT/1000	367082	3173	3709	4141	779	6317	85	10739	377	427	256	510	83	197	299	80	372670	25584	398254
Reactive Organic Gas Emissions																			
Run Exh	12.93	0.08	0.21	0.39	0.07	0.56	0.04	1.35	0.02	0.04	0.21	0.54	0.01	0.03	0.04	0.01	13.52	3.00	16.52
Idle Exh	0.00	0.00	0.05	0.01	0.01	0.01	0.00	0.14	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.17	0.26
Start Ex	9.13	0.00	0.94	0.00	0.27	0.00	0.02	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	10.47	0.00	10.47
Total Ex	22.06	0.08	1.21	0.40	0.35	0.57	0.06	1.49	0.09	0.05	0.23	0.54	0.04	0.03	0.04	0.01	24.08	3.16	27.24
Diurnal	7.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	7.84	0.00	7.84
Hot Soak	10.67	0.00	0.36	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.07	0.00	11.07
Running	24.79	0.00	2.21	0.00	0.16	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.01	0.00	27.24	0.00	27.24
Resting	6.34	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.35	0.00	6.35
Total	71.69	0.08	3.79	0.41	0.54	0.57	0.06	1.49	0.13	0.05	0.25	0.54	0.04	0.03	0.07	0.01	76.58	3.16	79.74
Carbon Monoxide Emissions																			
Run Exh	428.13	0.86	5.41	2.53	1.86	2.14	2.62	8.05	0.45	0.17	2.05	7.87	0.19	0.08	1.34	0.03	442.06	21.73	463.80
Idle Exh	0.00	0.00	0.43	0.11	0.16	0.05	0.00	0.44	0.05	0.01	0.00	0.00	0.17	0.01	0.00	0.00	0.81	0.62	1.43
Start Ex	115.17	0.00	9.27	0.00	4.30	0.00	0.65	0.00	1.14	0.00	0.27	0.00	0.14	0.00	0.03	0.00	130.98	0.00	130.98
Total Ex	543.31	0.86	15.11	2.65	6.32	2.18	3.28	8.50	1.63	0.17	2.32	7.87	0.50	0.09	1.38	0.03	573.85	22.35	596.20
Oxides of Nitrogen Emissions																			
Run Exh	33.13	0.32	1.17	10.42	0.42	12.44	0.25	45.36	0.11	1.51	0.38	7.61	0.04	1.42	0.17	0.37	35.68	79.44	115.12
Idle Exh	0.00	0.00	0.00	0.30	0.00	0.61	0.00	5.20	0.00	0.12	0.00	0.00	0.00	0.26	0.00	0.00	0.01	6.49	6.50
Start Ex	9.19	0.00	3.47	0.00	0.62	2.25	0.05	2.52	0.19	0.11	0.04	0.00	0.01	0.05	0.00	0.00	13.57	4.93	18.50
Total Ex	42.32	0.32	4.64	10.72	1.04	15.30	0.30	53.09	0.30	1.73	0.42	7.61	0.06	1.73	0.17	0.37	49.25	90.86	140.11
PM2.5 Emissions																			
Run Exh	0.70	0.04	0.01	0.09	0.00	0.35	0.00	0.21	0.00	0.01	0.00	0.10	0.00	0.01	0.00	0.01	0.70	0.82	1.52
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Total Ex	0.86	0.04	0.01	0.09	0.00	0.35	0.00	0.22	0.00	0.01	0.00	0.10	0.00	0.01	0.00	0.01	0.87	0.82	1.69
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.15	0.97
BrakeWear	6.35	0.05	0.14	0.16	0.05	0.39	0.00	0.31	0.02	0.03	0.02	0.20	0.03	0.07	0.02	0.01	6.62	1.21	7.83
Total	8.02	0.10	0.15	0.26	0.05	0.76	0.00	0.63	0.03	0.03	0.02	0.30	0.03	0.08	0.02	0.02	8.31	2.18	10.49
Fuel Consumption (1000 gallons) and SO2																			
Fuel	15823.40	101.56	342.05	206.85	106.87	709.28	17.35	1803.99	52.50	58.94	51.11	106.84	7.29	27.32	40.39	7.86	16440.95	3022.64	19463.59
SOx	1.48	0.01	0.03	0.02	0.01	0.08	0.00	0.18	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.54	0.31	1.85

Table D-11
2021 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10803736	89889	119810	117203	16085	115011	689	80040	8462	5407	2325	4336	2315	5166	35925	9420	10989347	426472	11415819
VMT/1000	369291	3340	3506	4200	778	6552	87	11170	382	444	260	488	86	197	291	79	374681	26470	401151
Reactive Organic Gas Emissions																			
Run Exh	11.74	0.07	0.17	0.37	0.06	0.26	0.03	1.35	0.02	0.04	0.19	0.48	0.01	0.03	0.03	0.01	12.24	2.60	14.85
Idle Exh	0.00	0.00	0.05	0.02	0.01	0.00	0.00	0.15	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.17	0.26
Start Ex	9.33	0.00	0.88	0.00	0.26	0.00	0.02	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	10.59	0.00	10.59
Total Ex	21.06	0.07	1.10	0.38	0.33	0.26	0.05	1.49	0.09	0.04	0.21	0.48	0.04	0.03	0.04	0.01	22.92	2.77	25.69
Diurnal	4.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.63	0.00	4.63
Hot Soak	9.51	0.00	0.32	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.87	0.00	9.87
Running	25.19	0.00	2.15	0.00	0.16	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	27.58	0.00	27.58
Resting	3.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	4.00
Total	64.39	0.07	3.58	0.39	0.51	0.26	0.06	1.49	0.13	0.04	0.24	0.48	0.05	0.03	0.05	0.01	69.00	2.77	71.77
Carbon Monoxide Emissions																			
Run Exh	363.67	0.86	4.47	2.37	1.50	1.12	2.58	8.42	0.38	0.17	1.88	7.30	0.17	0.08	1.04	0.03	375.69	20.34	396.03
Idle Exh	0.00	0.00	0.41	0.12	0.22	0.03	0.00	0.59	0.05	0.01	0.00	0.00	0.18	0.01	0.00	0.00	0.85	0.76	1.61
Start Ex	122.90	0.00	8.89	0.00	4.18	0.00	0.68	0.00	1.17	0.00	0.31	0.00	0.18	0.00	0.03	0.00	138.33	0.00	138.33
Total Ex	486.57	0.86	13.77	2.49	5.90	1.15	3.25	9.01	1.60	0.18	2.18	7.30	0.53	0.09	1.07	0.03	514.87	21.10	535.97
Oxides of Nitrogen Emissions																			
Run Exh	33.98	0.30	1.17	9.86	0.40	8.32	0.28	44.98	0.11	1.38	0.41	7.22	0.05	1.41	0.17	0.37	36.58	73.83	110.41
Idle Exh	0.00	0.00	0.00	0.29	0.00	0.37	0.00	4.90	0.00	0.10	0.00	0.00	0.00	0.24	0.00	0.00	0.01	5.90	5.91
Start Ex	8.77	0.00	3.39	0.00	0.60	2.81	0.06	2.74	0.19	0.13	0.04	0.00	0.01	0.06	0.00	0.00	13.06	5.74	18.80
Total Ex	42.75	0.30	4.57	10.15	1.00	11.51	0.34	52.62	0.30	1.61	0.46	7.22	0.06	1.70	0.17	0.37	49.65	85.48	135.12
PM2.5 Emissions																			
Run Exh	0.69	0.04	0.00	0.08	0.00	0.04	0.00	0.20	0.00	0.01	0.00	0.09	0.00	0.01	0.00	0.01	0.69	0.48	1.17
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.85	0.04	0.01	0.08	0.00	0.04	0.00	0.20	0.00	0.01	0.00	0.09	0.00	0.01	0.00	0.01	0.85	0.48	1.33
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.15	0.98
BrakeWear	6.39	0.06	0.13	0.16	0.05	0.40	0.00	0.32	0.03	0.03	0.02	0.19	0.03	0.07	0.02	0.01	6.65	1.23	7.88
Total	8.05	0.10	0.14	0.26	0.05	0.47	0.00	0.63	0.03	0.03	0.02	0.28	0.03	0.08	0.02	0.01	8.33	1.86	10.19
Fuel Consumption (1000 gallons) and SO2																			
Fuel	14621.43	104.30	322.35	207.87	106.18	733.63	17.61	1848.61	53.09	60.66	51.78	101.19	7.58	27.16	39.31	7.74	15219.33	3091.16	18310.49
SOx	1.37	0.01	0.03	0.02	0.01	0.08	0.00	0.19	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.43	0.31	1.74

Table D-12
2021 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10803736	89889	119810	117203	16085	115011	689	80040	8462	5407	2325	4336	2315	5166	35925	9420	10989347	426472	11415819
VMT/1000	369291	3340	3506	4200	778	6552	87	11170	382	444	260	488	86	197	291	79	374681	26470	401151
Reactive Organic Gas Emissions																			
Run Exh	12.05	0.07	0.18	0.37	0.06	0.26	0.04	1.35	0.02	0.04	0.20	0.48	0.01	0.03	0.04	0.01	12.57	2.60	15.18
Idle Exh	0.00	0.00	0.05	0.02	0.01	0.00	0.00	0.14	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.09	0.16	0.25
Start Ex	8.25	0.00	0.85	0.00	0.25	0.00	0.02	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	9.46	0.00	9.46
Total Ex	20.29	0.07	1.08	0.38	0.31	0.26	0.05	1.48	0.09	0.04	0.22	0.48	0.04	0.03	0.04	0.01	22.13	2.76	24.89
Diurnal	7.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	7.49	0.00	7.49
Hot Soak	10.07	0.00	0.34	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.45	0.00	10.45
Running	23.83	0.00	2.10	0.00	0.15	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.01	0.00	26.16	0.00	26.16
Resting	6.08	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.10	0.00	6.10
Total	67.77	0.07	3.53	0.39	0.50	0.26	0.06	1.48	0.13	0.04	0.24	0.48	0.04	0.03	0.06	0.01	72.33	2.76	75.09
Carbon Monoxide Emissions																			
Run Exh	397.70	0.86	4.58	2.37	1.54	1.12	2.63	8.42	0.39	0.17	1.92	7.30	0.17	0.08	1.07	0.03	410.00	20.34	430.34
Idle Exh	0.00	0.00	0.41	0.12	0.16	0.02	0.00	0.43	0.05	0.01	0.00	0.00	0.18	0.01	0.00	0.00	0.79	0.58	1.37
Start Ex	105.31	0.00	8.47	0.00	3.97	0.00	0.64	0.00	1.10	0.00	0.27	0.00	0.15	0.00	0.03	0.00	119.93	0.00	119.93
Total Ex	503.01	0.86	13.45	2.49	5.66	1.14	3.28	8.85	1.54	0.17	2.19	7.30	0.50	0.09	1.10	0.03	530.73	20.92	551.65
Oxides of Nitrogen Emissions																			
Run Exh	29.99	0.28	1.03	9.34	0.35	7.86	0.25	42.55	0.10	1.31	0.37	6.83	0.04	1.33	0.15	0.34	32.27	69.84	102.11
Idle Exh	0.00	0.00	0.00	0.29	0.00	0.38	0.00	5.05	0.00	0.11	0.00	0.00	0.00	0.25	0.00	0.00	0.01	6.09	6.09
Start Ex	8.14	0.00	3.25	0.00	0.58	2.81	0.05	2.74	0.18	0.13	0.04	0.00	0.01	0.06	0.00	0.00	12.26	5.74	17.99
Total Ex	38.13	0.28	4.28	9.63	0.93	11.06	0.30	50.34	0.28	1.54	0.40	6.83	0.05	1.63	0.15	0.34	44.53	81.66	126.19
PM2.5 Emissions																			
Run Exh	0.69	0.04	0.00	0.08	0.00	0.04	0.00	0.20	0.00	0.01	0.00	0.09	0.00	0.01	0.00	0.01	0.69	0.48	1.17
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.85	0.04	0.01	0.08	0.00	0.04	0.00	0.20	0.00	0.01	0.00	0.09	0.00	0.01	0.00	0.01	0.85	0.48	1.33
TireWear	0.81	0.01	0.01	0.01	0.00	0.02	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.15	0.98
BrakeWear	6.39	0.06	0.13	0.16	0.05	0.40	0.00	0.32	0.03	0.03	0.02	0.19	0.03	0.07	0.02	0.01	6.65	1.23	7.88
Total	8.05	0.10	0.14	0.26	0.05	0.47	0.00	0.63	0.03	0.03	0.02	0.28	0.03	0.08	0.02	0.01	8.33	1.86	10.19
Fuel Consumption (1000 gallons) and SO2																			
Fuel	15349.87	104.30	322.28	207.87	106.19	734.08	17.61	1854.29	53.08	60.75	51.79	101.19	7.58	27.27	39.32	7.74	15947.72	3097.50	19045.21
SOx	1.44	0.01	0.03	0.02	0.01	0.08	0.00	0.19	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.31	1.81

Table D-13
2022 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10978201	95841	114633	120082	16176	120899	709	81954	8678	5630	2392	4226	2433	5179	35131	9388	11158353	443199	11601552
VMT/1000	371584	3488	3324	4253	779	6762	90	11575	387	457	265	469	90	197	284	79	376803	27280	404083
Reactive Organic Gas Emissions																			
Run Exh	10.92	0.07	0.14	0.35	0.04	0.26	0.03	1.33	0.01	0.04	0.18	0.43	0.01	0.03	0.03	0.01	11.37	2.51	13.88
Idle Exh	0.00	0.00	0.04	0.02	0.01	0.00	0.00	0.14	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.08	0.16	0.25
Start Ex	8.48	0.00	0.79	0.00	0.23	0.00	0.02	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	9.63	0.00	9.63
Total Ex	19.40	0.07	0.98	0.37	0.29	0.26	0.05	1.47	0.09	0.04	0.20	0.43	0.04	0.03	0.03	0.01	21.08	2.67	23.75
Diurnal	4.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.46	0.00	4.46
Hot Soak	9.06	0.00	0.31	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.40	0.00	9.40
Running	24.44	0.00	2.04	0.00	0.15	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	26.71	0.00	26.71
Resting	3.86	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.87	0.00	3.87
Total	61.21	0.07	3.33	0.37	0.47	0.26	0.06	1.47	0.13	0.04	0.22	0.43	0.05	0.03	0.04	0.01	65.51	2.67	68.19
Carbon Monoxide Emissions																			
Run Exh	337.71	0.85	3.79	2.20	1.23	1.15	2.61	8.70	0.33	0.17	1.73	6.82	0.15	0.08	0.84	0.03	348.37	20.00	368.37
Idle Exh	0.00	0.00	0.39	0.12	0.21	0.02	0.00	0.57	0.05	0.01	0.00	0.00	0.19	0.01	0.00	0.00	0.84	0.74	1.58
Start Ex	113.31	0.00	8.08	0.00	3.85	0.00	0.68	0.00	1.13	0.00	0.30	0.00	0.18	0.00	0.03	0.00	127.56	0.00	127.56
Total Ex	451.02	0.85	12.26	2.33	5.29	1.18	3.28	9.27	1.51	0.18	2.03	6.82	0.52	0.09	0.86	0.03	476.77	20.74	497.51
Oxides of Nitrogen Emissions																			
Run Exh	30.83	0.27	1.02	8.80	0.34	7.85	0.28	41.63	0.10	1.26	0.39	6.56	0.04	1.31	0.14	0.34	33.14	68.03	101.16
Idle Exh	0.00	0.00	0.00	0.29	0.00	0.36	0.00	4.72	0.00	0.09	0.00	0.00	0.00	0.23	0.00	0.00	0.01	5.70	5.70
Start Ex	7.82	0.00	3.15	0.00	0.56	3.04	0.05	2.97	0.18	0.14	0.04	0.00	0.01	0.06	0.00	0.00	11.83	6.21	18.04
Total Ex	38.65	0.27	4.17	9.08	0.90	11.25	0.34	49.33	0.28	1.50	0.43	6.56	0.06	1.60	0.15	0.34	44.97	79.93	124.90
PM2.5 Emissions																			
Run Exh	0.68	0.04	0.00	0.08	0.00	0.04	0.00	0.18	0.00	0.01	0.00	0.08	0.00	0.01	0.00	0.01	0.68	0.44	1.12
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.84	0.04	0.00	0.08	0.00	0.04	0.00	0.18	0.00	0.01	0.00	0.08	0.00	0.01	0.00	0.01	0.85	0.44	1.29
TireWear	0.82	0.01	0.01	0.02	0.00	0.02	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.16	0.99
BrakeWear	6.43	0.06	0.12	0.16	0.05	0.42	0.00	0.33	0.03	0.03	0.02	0.19	0.03	0.07	0.02	0.01	6.69	1.26	7.95
Total	8.09	0.11	0.13	0.25	0.05	0.48	0.00	0.63	0.03	0.03	0.02	0.27	0.03	0.08	0.02	0.01	8.36	1.86	10.22
Fuel Consumption (1000 gallons) and SO2																			
Fuel	14158.34	105.95	304.33	208.68	105.47	753.99	17.88	1890.91	53.47	62.21	52.46	96.81	7.86	27.11	38.21	7.62	14738.02	3153.27	17891.29
SOx	1.33	0.01	0.03	0.02	0.01	0.08	0.00	0.19	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.38	0.32	1.70

Table D-14
2022 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	10978201	95841	114633	120082	16176	120899	709	81954	8678	5630	2392	4226	2433	5179	35131	9388	11158353	443199	11601552
VMT/1000	371584	3488	3324	4253	779	6762	90	11575	387	457	265	469	90	197	284	79	376803	27280	404083
Reactive Organic Gas Emissions																			
Run Exh	11.21	0.07	0.15	0.35	0.05	0.26	0.03	1.33	0.01	0.04	0.19	0.43	0.01	0.03	0.03	0.01	11.67	2.51	14.18
Idle Exh	0.00	0.00	0.04	0.02	0.01	0.00	0.00	0.13	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.08	0.15	0.24
Start Ex	7.50	0.00	0.76	0.00	0.22	0.00	0.02	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	8.60	0.00	8.60
Total Ex	18.71	0.07	0.95	0.37	0.28	0.26	0.05	1.46	0.09	0.04	0.21	0.43	0.04	0.03	0.03	0.01	20.36	2.67	23.03
Diurnal	7.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	7.21	0.00	7.21
Hot Soak	9.59	0.00	0.32	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.94	0.00	9.94
Running	23.10	0.00	2.00	0.00	0.15	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.01	0.00	25.32	0.00	25.32
Resting	5.87	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	0.00	5.88
Total	64.47	0.07	3.28	0.37	0.46	0.26	0.06	1.46	0.13	0.04	0.23	0.43	0.04	0.03	0.05	0.01	68.72	2.67	71.38
Carbon Monoxide Emissions																			
Run Exh	369.92	0.85	3.88	2.20	1.26	1.15	2.66	8.70	0.34	0.17	1.77	6.82	0.16	0.08	0.86	0.03	380.84	20.00	400.83
Idle Exh	0.00	0.00	0.39	0.12	0.16	0.02	0.00	0.42	0.05	0.01	0.00	0.00	0.19	0.01	0.00	0.00	0.78	0.57	1.35
Start Ex	97.08	0.00	7.70	0.00	3.65	0.00	0.64	0.00	1.07	0.00	0.26	0.00	0.14	0.00	0.03	0.00	110.58	0.00	110.58
Total Ex	467.00	0.85	11.97	2.33	5.06	1.17	3.30	9.11	1.45	0.17	2.03	6.82	0.49	0.09	0.89	0.03	492.19	20.57	512.76
Oxides of Nitrogen Emissions																			
Run Exh	27.21	0.26	0.90	8.33	0.30	7.42	0.25	39.38	0.08	1.20	0.34	6.21	0.04	1.24	0.12	0.32	29.24	64.35	93.59
Idle Exh	0.00	0.00	0.00	0.29	0.00	0.37	0.00	4.88	0.00	0.09	0.00	0.00	0.00	0.24	0.00	0.00	0.01	5.87	5.87
Start Ex	7.27	0.00	3.02	0.00	0.53	3.04	0.05	2.97	0.18	0.14	0.04	0.00	0.01	0.06	0.00	0.00	11.11	6.21	17.32
Total Ex	34.48	0.26	3.92	8.62	0.83	10.83	0.30	47.23	0.26	1.43	0.38	6.21	0.05	1.54	0.13	0.32	40.35	76.43	116.78
PM2.5 Emissions																			
Run Exh	0.68	0.04	0.00	0.08	0.00	0.04	0.00	0.18	0.00	0.01	0.00	0.08	0.00	0.01	0.00	0.01	0.68	0.44	1.12
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.84	0.04	0.00	0.08	0.00	0.04	0.00	0.18	0.00	0.01	0.00	0.08	0.00	0.01	0.00	0.01	0.85	0.44	1.29
TireWear	0.82	0.01	0.01	0.02	0.00	0.02	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.16	0.99
BrakeWear	6.43	0.06	0.12	0.16	0.05	0.42	0.00	0.33	0.03	0.03	0.02	0.19	0.03	0.07	0.02	0.01	6.69	1.26	7.95
Total	8.09	0.11	0.13	0.25	0.05	0.48	0.00	0.63	0.03	0.03	0.02	0.27	0.03	0.08	0.02	0.01	8.36	1.86	10.22
Fuel Consumption (1000 gallons) and SO2																			
Fuel	14863.90	105.95	304.28	208.68	105.49	754.46	17.88	1896.71	53.46	62.30	52.46	96.81	7.86	27.22	38.21	7.62	15443.53	3159.75	18603.28
SOx	1.39	0.01	0.03	0.02	0.01	0.08	0.00	0.19	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.45	0.32	1.77

Table D-15
2023 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	11142993	101233	109707	122760	16290	123930	731	82328	8905	5609	2456	4121	2550	5193	34403	9346	11318035	454520	11772555
VMT/1000	373722	3614	3159	4297	778	6966	91	11969	391	470	270	453	94	197	277	77	378782	28043	406825
Reactive Organic Gas Emissions																			
Run Exh	10.38	0.06	0.12	0.33	0.04	0.21	0.03	0.86	0.01	0.03	0.17	0.39	0.01	0.03	0.02	0.01	10.78	1.90	12.68
Idle Exh	0.00	0.00	0.04	0.02	0.01	0.00	0.00	0.10	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.08	0.11	0.20
Start Ex	7.75	0.00	0.72	0.00	0.22	0.00	0.02	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	8.81	0.00	8.81
Total Ex	18.13	0.06	0.88	0.35	0.27	0.21	0.05	0.96	0.09	0.03	0.19	0.39	0.04	0.03	0.02	0.01	19.66	2.02	21.68
Diurnal	4.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	4.30	0.00	4.30
Hot Soak	8.65	0.00	0.29	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.97	0.00	8.97
Running	23.74	0.00	1.94	0.00	0.14	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	25.89	0.00	25.89
Resting	3.74	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.74	0.00	3.74
Total	58.54	0.06	3.11	0.35	0.44	0.21	0.05	0.96	0.13	0.03	0.21	0.39	0.04	0.03	0.04	0.01	62.57	2.02	64.59
Carbon Monoxide Emissions																			
Run Exh	317.43	0.84	3.23	2.05	1.01	1.08	2.65	8.11	0.29	0.14	1.61	6.37	0.14	0.08	0.66	0.03	327.02	18.70	345.72
Idle Exh	0.00	0.00	0.37	0.12	0.21	0.02	0.00	0.38	0.05	0.00	0.00	0.00	0.19	0.01	0.00	0.00	0.82	0.53	1.36
Start Ex	104.86	0.00	7.41	0.00	3.58	0.00	0.69	0.00	1.11	0.00	0.29	0.00	0.18	0.00	0.03	0.00	118.14	0.00	118.14
Total Ex	422.29	0.84	11.00	2.17	4.81	1.10	3.33	8.49	1.44	0.14	1.90	6.37	0.52	0.09	0.68	0.03	445.98	19.23	465.22
Oxides of Nitrogen Emissions																			
Run Exh	28.25	0.24	0.89	7.80	0.29	4.73	0.29	20.65	0.09	0.52	0.37	5.97	0.04	1.21	0.12	0.32	30.33	41.44	71.77
Idle Exh	0.00	0.00	0.00	0.28	0.00	0.26	0.00	3.31	0.00	0.04	0.00	0.00	0.00	0.22	0.00	0.00	0.00	4.10	4.11
Start Ex	7.03	0.00	2.93	0.00	0.52	3.53	0.05	3.89	0.18	0.19	0.04	0.00	0.01	0.07	0.00	0.00	10.77	7.69	18.46
Total Ex	35.28	0.24	3.82	8.08	0.81	8.52	0.34	27.85	0.27	0.75	0.41	5.97	0.05	1.50	0.13	0.32	41.11	53.23	94.34
PM2.5 Emissions																			
Run Exh	0.67	0.03	0.00	0.08	0.00	0.02	0.00	0.07	0.00	0.00	0.00	0.08	0.00	0.01	0.00	0.01	0.68	0.29	0.97
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.83	0.03	0.00	0.08	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.08	0.00	0.01	0.00	0.01	0.84	0.30	1.13
TireWear	0.82	0.01	0.01	0.02	0.00	0.02	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.16	1.00
BrakeWear	6.46	0.06	0.12	0.16	0.05	0.43	0.00	0.34	0.03	0.03	0.02	0.18	0.03	0.07	0.02	0.01	6.72	1.29	8.01
Total	8.12	0.10	0.13	0.25	0.05	0.47	0.00	0.53	0.03	0.03	0.02	0.26	0.03	0.08	0.02	0.01	8.39	1.74	10.14
Fuel Consumption (1000 gallons) and SO2																			
Fuel	13699.72	106.91	288.03	209.24	105.01	769.68	18.17	1875.80	53.89	62.83	53.04	92.70	8.14	27.06	37.20	7.50	14263.20	3151.72	17414.92
SOx	1.28	0.01	0.03	0.02	0.01	0.08	0.00	0.19	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.34	0.32	1.66

Table D-16
2023 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	11142993	101233	109707	122760	16290	123930	731	82328	8905	5609	2456	4121	2550	5193	34403	9346	11318035	454520	11772555
VMT/1000	373722	3614	3159	4297	778	6966	91	11969	391	470	270	453	94	197	277	77	378782	28043	406825
Reactive Organic Gas Emissions																			
Run Exh	10.64	0.06	0.12	0.33	0.04	0.21	0.03	0.86	0.01	0.03	0.17	0.39	0.01	0.03	0.02	0.01	11.05	1.90	12.96
Idle Exh	0.00	0.00	0.04	0.02	0.01	0.00	0.00	0.09	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.08	0.11	0.19
Start Ex	6.86	0.00	0.69	0.00	0.21	0.00	0.02	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	7.87	0.00	7.87
Total Ex	17.51	0.06	0.85	0.35	0.26	0.21	0.05	0.95	0.08	0.03	0.19	0.39	0.04	0.03	0.02	0.01	19.01	2.01	21.02
Diurnal	6.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.95	0.00	6.95
Hot Soak	9.14	0.00	0.30	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.48	0.00	9.48
Running	22.42	0.00	1.90	0.00	0.14	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.01	0.00	24.53	0.00	24.53
Resting	5.67	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.68	0.00	5.68
Total	61.68	0.06	3.06	0.35	0.43	0.21	0.05	0.95	0.12	0.03	0.21	0.39	0.04	0.03	0.04	0.01	65.65	2.01	67.66
Carbon Monoxide Emissions																			
Run Exh	347.74	0.84	3.30	2.05	1.03	1.08	2.71	8.11	0.29	0.14	1.65	6.37	0.15	0.08	0.68	0.03	357.54	18.70	376.24
Idle Exh	0.00	0.00	0.37	0.12	0.16	0.01	0.00	0.28	0.05	0.00	0.00	0.00	0.19	0.01	0.00	0.00	0.77	0.42	1.19
Start Ex	89.93	0.00	7.06	0.00	3.40	0.00	0.65	0.00	1.05	0.00	0.25	0.00	0.14	0.00	0.02	0.00	102.51	0.00	102.51
Total Ex	437.67	0.84	10.73	2.17	4.59	1.10	3.36	8.38	1.39	0.14	1.91	6.37	0.48	0.09	0.70	0.03	460.82	19.12	479.94
Oxides of Nitrogen Emissions																			
Run Exh	24.95	0.23	0.78	7.39	0.25	4.46	0.25	19.54	0.08	0.49	0.32	5.65	0.03	1.15	0.11	0.30	26.77	39.20	65.97
Idle Exh	0.00	0.00	0.00	0.28	0.00	0.27	0.00	3.41	0.00	0.04	0.00	0.00	0.00	0.22	0.00	0.00	0.00	4.22	4.23
Start Ex	6.52	0.00	2.82	0.00	0.50	3.53	0.05	3.89	0.17	0.19	0.04	0.00	0.01	0.07	0.00	0.00	10.12	7.69	17.81
Total Ex	31.47	0.23	3.60	7.67	0.75	8.26	0.30	26.84	0.25	0.73	0.36	5.65	0.05	1.44	0.11	0.30	36.89	51.11	88.00
PM2.5 Emissions																			
Run Exh	0.67	0.03	0.00	0.08	0.00	0.02	0.00	0.07	0.00	0.00	0.00	0.08	0.00	0.01	0.00	0.01	0.68	0.29	0.97
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.83	0.03	0.00	0.08	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.08	0.00	0.01	0.00	0.01	0.84	0.30	1.13
TireWear	0.82	0.01	0.01	0.02	0.00	0.02	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.16	1.00
BrakeWear	6.46	0.06	0.12	0.16	0.05	0.43	0.00	0.34	0.03	0.03	0.02	0.18	0.03	0.07	0.02	0.01	6.72	1.29	8.01
Total	8.12	0.10	0.13	0.25	0.05	0.47	0.00	0.53	0.03	0.03	0.02	0.26	0.03	0.08	0.02	0.01	8.39	1.74	10.14
Fuel Consumption (1000 gallons) and SO2																			
Fuel	14382.28	106.91	287.98	209.24	105.03	770.15	18.18	1881.36	53.88	62.92	53.04	92.70	8.13	27.17	37.20	7.50	14945.72	3157.95	18103.67
SOx	1.35	0.01	0.03	0.02	0.01	0.08	0.00	0.19	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.32	1.72

Table D-17
2025 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	11216166	107798	102510	129900	16852	137859	793	88337	9320	5987	2568	3876	2780	5210	33541	9250	11384530	488217	11872747
VMT/1000	368734	3725	2923	4442	794	7325	98	12748	400	487	276	417	100	197	268	76	373593	29417	403010
Reactive Organic Gas Emissions																			
Run Exh	9.19	0.05	0.09	0.29	0.03	0.21	0.03	0.90	0.01	0.03	0.12	0.30	0.00	0.02	0.02	0.01	9.49	1.81	11.31
Idle Exh	0.00	0.00	0.04	0.02	0.01	0.00	0.00	0.10	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.08	0.12	0.20
Start Ex	6.44	0.00	0.59	0.00	0.20	0.00	0.01	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	7.34	0.00	7.34
Total Ex	15.63	0.05	0.71	0.31	0.24	0.22	0.05	1.00	0.08	0.03	0.15	0.30	0.04	0.03	0.02	0.01	16.91	1.94	18.85
Diurnal	3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	3.95	0.00	3.95
Hot Soak	7.79	0.00	0.26	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.09	0.00	8.09
Running	22.09	0.00	1.77	0.00	0.14	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	24.08	0.00	24.08
Resting	3.44	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.45	0.00	3.45
Total	52.90	0.05	2.76	0.31	0.41	0.22	0.05	1.00	0.12	0.03	0.17	0.30	0.04	0.03	0.03	0.01	56.48	1.94	58.42
Carbon Monoxide Emissions																			
Run Exh	274.52	0.78	2.36	1.79	0.70	1.12	2.74	8.83	0.22	0.15	1.26	5.47	0.11	0.08	0.46	0.02	282.38	18.24	300.62
Idle Exh	0.00	0.00	0.34	0.13	0.22	0.02	0.00	0.39	0.05	0.01	0.00	0.00	0.21	0.01	0.00	0.00	0.82	0.55	1.38
Start Ex	89.27	0.00	6.37	0.00	3.21	0.00	0.72	0.00	1.06	0.00	0.28	0.00	0.18	0.00	0.02	0.00	101.12	0.00	101.12
Total Ex	363.80	0.78	9.08	1.92	4.14	1.13	3.47	9.22	1.33	0.16	1.54	5.47	0.50	0.09	0.48	0.02	384.32	18.80	403.12
Oxides of Nitrogen Emissions																			
Run Exh	23.49	0.18	0.68	6.16	0.22	4.65	0.30	20.67	0.07	0.58	0.32	4.55	0.03	1.02	0.09	0.28	25.20	38.10	63.30
Idle Exh	0.00	0.00	0.00	0.27	0.00	0.28	0.00	3.40	0.00	0.04	0.00	0.00	0.00	0.19	0.00	0.00	0.00	4.18	4.18
Start Ex	5.62	0.00	2.57	0.00	0.47	3.95	0.05	4.21	0.17	0.21	0.04	0.00	0.01	0.09	0.00	0.00	8.94	8.45	17.39
Total Ex	29.10	0.18	3.25	6.43	0.69	8.89	0.35	28.28	0.24	0.83	0.35	4.55	0.05	1.30	0.10	0.28	34.14	50.74	84.88
PM2.5 Emissions																			
Run Exh	0.65	0.02	0.00	0.07	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.06	0.00	0.01	0.00	0.01	0.65	0.26	0.91
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.81	0.02	0.00	0.07	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.06	0.00	0.01	0.00	0.01	0.81	0.26	1.07
TireWear	0.81	0.01	0.01	0.02	0.00	0.02	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.17	0.99
BrakeWear	6.38	0.06	0.11	0.17	0.05	0.45	0.00	0.37	0.03	0.03	0.02	0.17	0.03	0.07	0.02	0.01	6.63	1.32	7.95
Total	7.99	0.09	0.12	0.25	0.05	0.50	0.00	0.57	0.03	0.03	0.02	0.22	0.03	0.08	0.02	0.01	8.26	1.75	10.01
Fuel Consumption (1000 gallons) and SO2																			
Fuel	12436.89	103.83	264.69	213.24	105.23	801.13	18.93	1973.57	54.84	64.96	53.83	83.28	8.65	26.95	35.97	7.29	12979.04	3274.24	16253.28
SOx	1.17	0.01	0.02	0.02	0.01	0.08	0.00	0.20	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	1.22	0.33	1.55

Table D-18
2025 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	11216166	107798	102510	129900	16852	137859	793	88337	9320	5987	2568	3876	2780	5210	33541	9250	11384530	488217	11872747
VMT/1000	368734	3725	2923	4442	794	7325	98	12748	400	487	276	417	100	197	268	76	373593	29417	403010
Reactive Organic Gas Emissions																			
Run Exh	9.40	0.05	0.09	0.29	0.03	0.21	0.03	0.90	0.01	0.03	0.13	0.30	0.01	0.02	0.02	0.01	9.70	1.81	11.52
Idle Exh	0.00	0.00	0.04	0.02	0.01	0.00	0.00	0.09	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.08	0.11	0.19
Start Ex	5.71	0.00	0.57	0.00	0.19	0.00	0.01	0.00	0.06	0.00	0.02	0.00	0.01	0.00	0.00	0.00	6.58	0.00	6.58
Total Ex	15.11	0.05	0.70	0.31	0.23	0.22	0.05	0.99	0.08	0.03	0.15	0.30	0.04	0.03	0.02	0.01	16.36	1.93	18.29
Diurnal	6.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.39	0.00	6.40
Hot Soak	8.23	0.00	0.27	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.54	0.00	8.54
Running	20.85	0.00	1.74	0.00	0.13	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.01	0.00	22.78	0.00	22.78
Resting	5.22	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.23	0.00	5.23
Total	55.80	0.05	2.71	0.31	0.39	0.22	0.05	0.99	0.12	0.03	0.17	0.30	0.04	0.03	0.03	0.01	59.31	1.93	61.24
Carbon Monoxide Emissions																			
Run Exh	300.47	0.78	2.41	1.79	0.72	1.12	2.80	8.83	0.22	0.15	1.29	5.47	0.12	0.08	0.47	0.02	308.51	18.24	326.75
Idle Exh	0.00	0.00	0.34	0.13	0.16	0.01	0.00	0.28	0.05	0.00	0.00	0.00	0.21	0.01	0.00	0.00	0.76	0.44	1.20
Start Ex	76.72	0.00	6.08	0.00	3.05	0.00	0.69	0.00	1.00	0.00	0.24	0.00	0.14	0.00	0.02	0.00	87.94	0.00	87.94
Total Ex	377.20	0.78	8.83	1.92	3.93	1.13	3.49	9.11	1.28	0.16	1.53	5.47	0.47	0.09	0.49	0.02	397.21	18.68	415.90
Oxides of Nitrogen Emissions																			
Run Exh	20.74	0.17	0.60	5.84	0.19	4.39	0.26	19.56	0.06	0.55	0.28	4.30	0.03	0.97	0.08	0.26	22.25	36.04	58.29
Idle Exh	0.00	0.00	0.00	0.27	0.00	0.29	0.00	3.51	0.00	0.05	0.00	0.00	0.00	0.20	0.00	0.00	0.00	4.31	4.31
Start Ex	5.22	0.00	2.46	0.00	0.45	3.95	0.05	4.21	0.16	0.21	0.04	0.00	0.01	0.09	0.00	0.00	8.40	8.45	16.86
Total Ex	25.96	0.17	3.07	6.11	0.64	8.64	0.31	27.28	0.23	0.80	0.31	4.30	0.04	1.25	0.09	0.26	30.65	48.81	79.46
PM2.5 Emissions																			
Run Exh	0.65	0.02	0.00	0.07	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.06	0.00	0.01	0.00	0.01	0.65	0.26	0.91
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.81	0.02	0.00	0.07	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.06	0.00	0.01	0.00	0.01	0.81	0.26	1.07
TireWear	0.81	0.01	0.01	0.02	0.00	0.02	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.17	0.99
BrakeWear	6.38	0.06	0.11	0.17	0.05	0.45	0.00	0.37	0.03	0.03	0.02	0.17	0.03	0.07	0.02	0.01	6.63	1.32	7.95
Total	7.99	0.09	0.12	0.25	0.05	0.50	0.00	0.56	0.03	0.03	0.02	0.22	0.03	0.08	0.02	0.01	8.26	1.75	10.01
Fuel Consumption (1000 gallons) and SO2																			
Fuel	13057.01	103.83	264.64	213.24	105.25	801.66	18.93	1979.39	54.83	65.05	53.83	83.28	8.65	27.07	35.97	7.29	13599.12	3280.79	16879.91
SOx	1.22	0.01	0.02	0.02	0.01	0.08	0.00	0.20	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	1.27	0.33	1.61

Table D-19
2026 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	11378377	111427	99230	133163	17123	144029	824	90885	9521	6330	2602	3741	2891	5214	33256	9206	11543824	503995	12047819
VMT/1000	369198	3784	2826	4504	801	7486	100	13136	401	495	276	398	103	197	265	75	373970	30075	404045
Reactive Organic Gas Emissions																			
Run Exh	8.85	0.04	0.07	0.28	0.02	0.22	0.03	0.92	0.01	0.03	0.06	0.26	0.00	0.02	0.01	0.01	9.06	1.78	10.84
Idle Exh	0.00	0.00	0.03	0.02	0.01	0.00	0.00	0.10	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.08	0.12	0.20
Start Ex	5.98	0.00	0.54	0.00	0.19	0.00	0.01	0.00	0.06	0.00	0.02	0.00	0.01	0.00	0.00	0.00	6.83	0.00	6.83
Total Ex	14.83	0.04	0.65	0.30	0.23	0.22	0.05	1.02	0.08	0.03	0.09	0.26	0.04	0.03	0.02	0.01	15.97	1.90	17.88
Diurnal	3.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.86	0.00	3.86
Hot Soak	7.51	0.00	0.25	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.79	0.00	7.79
Running	21.63	0.00	1.70	0.00	0.14	0.00	0.01	0.00	0.04	0.00	0.02	0.00	0.01	0.00	0.01	0.00	23.53	0.00	23.53
Resting	3.36	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.37	0.00	3.37
Total	51.18	0.04	2.60	0.30	0.39	0.22	0.05	1.02	0.12	0.03	0.10	0.26	0.04	0.03	0.03	0.01	54.52	1.91	56.42
Carbon Monoxide Emissions																			
Run Exh	260.65	0.77	2.01	1.67	0.60	1.14	2.82	9.19	0.19	0.16	0.91	5.03	0.10	0.08	0.39	0.02	267.68	18.04	285.72
Idle Exh	0.00	0.00	0.33	0.13	0.22	0.02	0.00	0.40	0.05	0.01	0.00	0.00	0.22	0.01	0.00	0.00	0.82	0.56	1.39
Start Ex	84.17	0.00	5.95	0.00	3.08	0.00	0.75	0.00	1.05	0.00	0.25	0.00	0.18	0.00	0.02	0.00	95.44	0.00	95.44
Total Ex	344.81	0.77	8.29	1.80	3.90	1.16	3.57	9.58	1.29	0.16	1.17	5.03	0.50	0.09	0.41	0.02	363.94	18.60	382.55
Oxides of Nitrogen Emissions																			
Run Exh	21.88	0.15	0.60	5.43	0.19	4.63	0.31	20.69	0.07	0.59	0.27	3.80	0.03	0.93	0.08	0.26	23.42	36.48	59.90
Idle Exh	0.00	0.00	0.00	0.26	0.00	0.29	0.00	3.43	0.00	0.05	0.00	0.00	0.00	0.18	0.00	0.00	0.00	4.20	4.21
Start Ex	5.12	0.00	2.39	0.00	0.45	4.14	0.06	4.35	0.17	0.22	0.04	0.00	0.01	0.09	0.00	0.00	8.24	8.80	17.04
Total Ex	27.00	0.15	2.99	5.69	0.64	9.06	0.36	28.46	0.23	0.86	0.31	3.80	0.04	1.20	0.09	0.26	31.67	49.48	81.15
PM2.5 Emissions																			
Run Exh	0.63	0.02	0.00	0.06	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.05	0.00	0.01	0.00	0.01	0.63	0.24	0.87
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.79	0.02	0.00	0.06	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.05	0.00	0.01	0.00	0.01	0.79	0.24	1.04
TireWear	0.81	0.01	0.01	0.02	0.00	0.03	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.18	1.00
BrakeWear	6.39	0.06	0.11	0.17	0.05	0.46	0.00	0.38	0.03	0.03	0.02	0.16	0.04	0.07	0.02	0.01	6.64	1.34	7.98
Total	7.99	0.09	0.12	0.25	0.05	0.51	0.00	0.58	0.03	0.03	0.02	0.20	0.04	0.08	0.02	0.01	8.25	1.76	10.01
Fuel Consumption (1000 gallons) and SO2																			
Fuel	12000.72	102.78	254.59	214.81	105.68	816.13	19.30	2023.26	55.11	65.88	53.66	78.36	8.89	26.90	35.39	7.18	12533.34	3335.30	15868.64
SOx	1.13	0.01	0.02	0.02	0.01	0.09	0.00	0.21	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	1.18	0.34	1.51

Table D-20
2026 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	11378377	111427	99230	133163	17123	144029	824	90885	9521	6330	2602	3741	2891	5214	33256	9206	11543824	503995	12047819
VMT/1000	369198	3784	2826	4504	801	7486	100	13136	401	495	276	398	103	197	265	75	373970	30075	404045
Reactive Organic Gas Emissions																			
Run Exh	9.03	0.04	0.07	0.28	0.02	0.22	0.03	0.92	0.01	0.03	0.06	0.26	0.00	0.02	0.01	0.01	9.25	1.78	11.03
Idle Exh	0.00	0.00	0.03	0.02	0.01	0.00	0.00	0.10	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.08	0.12	0.19
Start Ex	5.31	0.00	0.52	0.00	0.18	0.00	0.01	0.00	0.06	0.00	0.02	0.00	0.01	0.00	0.00	0.00	6.12	0.00	6.12
Total Ex	14.34	0.04	0.63	0.30	0.22	0.22	0.05	1.02	0.08	0.03	0.08	0.26	0.04	0.02	0.02	0.01	15.45	1.90	17.35
Diurnal	6.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	6.24	0.00	6.24
Hot Soak	7.94	0.00	0.26	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.23	0.00	8.23
Running	20.39	0.00	1.66	0.00	0.13	0.00	0.01	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.01	0.00	22.25	0.00	22.25
Resting	5.10	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.11	0.00	5.11
Total	54.00	0.04	2.56	0.30	0.38	0.22	0.05	1.02	0.12	0.03	0.10	0.26	0.04	0.02	0.03	0.01	57.28	1.90	59.18
Carbon Monoxide Emissions																			
Run Exh	285.12	0.77	2.05	1.67	0.61	1.14	2.88	9.19	0.20	0.16	0.93	5.03	0.10	0.08	0.40	0.02	292.30	18.04	310.34
Idle Exh	0.00	0.00	0.33	0.13	0.16	0.01	0.00	0.29	0.05	0.00	0.00	0.00	0.22	0.01	0.00	0.00	0.76	0.45	1.21
Start Ex	72.42	0.00	5.67	0.00	2.92	0.00	0.71	0.00	0.99	0.00	0.22	0.00	0.14	0.00	0.02	0.00	83.09	0.00	83.09
Total Ex	357.53	0.77	8.06	1.80	3.70	1.15	3.59	9.48	1.24	0.16	1.15	5.03	0.47	0.09	0.42	0.02	376.16	18.49	394.64
Oxides of Nitrogen Emissions																			
Run Exh	19.33	0.14	0.53	5.14	0.16	4.37	0.27	19.57	0.06	0.56	0.24	3.59	0.03	0.88	0.07	0.25	20.68	34.50	55.18
Idle Exh	0.00	0.00	0.00	0.26	0.00	0.30	0.00	3.54	0.00	0.05	0.00	0.00	0.00	0.18	0.00	0.00	0.00	4.33	4.33
Start Ex	4.76	0.00	2.30	0.00	0.43	4.14	0.05	4.35	0.16	0.22	0.04	0.00	0.01	0.09	0.00	0.00	7.75	8.80	16.56
Total Ex	24.08	0.14	2.83	5.40	0.60	8.81	0.32	27.46	0.22	0.83	0.27	3.59	0.04	1.15	0.08	0.25	28.43	47.63	76.07
PM2.5 Emissions																			
Run Exh	0.63	0.02	0.00	0.06	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.05	0.00	0.01	0.00	0.01	0.63	0.24	0.87
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Total Ex	0.79	0.02	0.00	0.06	0.00	0.02	0.00	0.08	0.00	0.00	0.00	0.05	0.00	0.01	0.00	0.01	0.79	0.24	1.04
TireWear	0.81	0.01	0.01	0.02	0.00	0.03	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.18	1.00
BrakeWear	6.39	0.06	0.11	0.17	0.05	0.46	0.00	0.38	0.03	0.03	0.02	0.16	0.04	0.07	0.02	0.01	6.64	1.34	7.98
Total	7.99	0.09	0.12	0.25	0.05	0.51	0.00	0.58	0.03	0.03	0.02	0.20	0.04	0.08	0.02	0.01	8.25	1.76	10.01
Fuel Consumption (1000 gallons) and SO2																			
Fuel	12599.29	102.78	254.55	214.81	105.70	816.67	19.31	2029.19	55.10	65.98	53.66	78.36	8.89	27.01	35.39	7.18	13131.88	3341.99	16473.87
SOx	1.18	0.01	0.02	0.02	0.01	0.09	0.00	0.21	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	1.23	0.34	1.57

Table D-21
2031 Annual Average Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	12015546	123900	88415	150255	18694	167877	977	99670	10455	7581	2869	3469	3384	5243	32644	9160	12172984	567155	12740139
VMT/1000	370864	3961	2533	4831	842	8264	111	15055	415	532	290	353	114	198	255	72	375424	33266	408690
Reactive Organic Gas Emissions																			
Run Exh	7.53	0.03	0.03	0.23	0.01	0.23	0.03	1.03	0.01	0.03	0.03	0.14	0.00	0.02	0.01	0.00	7.65	1.71	9.36
Idle Exh	0.00	0.00	0.03	0.02	0.02	0.00	0.00	0.11	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.08	0.13	0.21
Start Ex	4.35	0.00	0.34	0.00	0.17	0.00	0.02	0.00	0.07	0.00	0.02	0.00	0.01	0.00	0.00	0.00	4.98	0.00	4.98
Total Ex	11.89	0.03	0.40	0.25	0.20	0.24	0.05	1.14	0.08	0.03	0.05	0.14	0.04	0.02	0.01	0.00	12.71	1.84	14.55
Diurnal	3.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.34	0.00	3.34
Hot Soak	6.09	0.00	0.19	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.31	0.00	6.31
Running	18.46	0.00	1.27	0.00	0.12	0.00	0.01	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	19.92	0.00	19.92
Resting	2.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.90	0.00	2.90
Total	42.67	0.03	1.85	0.25	0.35	0.24	0.06	1.14	0.13	0.03	0.07	0.14	0.05	0.02	0.01	0.00	45.18	1.84	47.02
Carbon Monoxide Emissions																			
Run Exh	209.71	0.68	0.81	1.24	0.30	1.24	3.16	10.77	0.12	0.16	0.58	3.79	0.05	0.07	0.11	0.02	214.85	17.97	232.82
Idle Exh	0.00	0.00	0.30	0.15	0.25	0.02	0.00	0.41	0.06	0.01	0.00	0.00	0.25	0.01	0.00	0.00	0.86	0.60	1.45
Start Ex	64.95	0.00	4.43	0.00	2.65	0.00	0.89	0.00	1.02	0.00	0.25	0.00	0.18	0.00	0.02	0.00	74.37	0.00	74.37
Total Ex	274.66	0.68	5.54	1.39	3.20	1.26	4.05	11.19	1.20	0.16	0.83	3.79	0.48	0.08	0.13	0.02	290.08	18.57	308.65
Oxides of Nitrogen Emissions																			
Run Exh	16.08	0.07	0.31	2.86	0.12	4.58	0.35	20.88	0.05	0.55	0.22	1.93	0.02	0.54	0.05	0.20	17.19	31.62	48.80
Idle Exh	0.00	0.00	0.00	0.23	0.00	0.33	0.00	3.52	0.00	0.06	0.00	0.00	0.00	0.11	0.00	0.00	0.00	4.25	4.26
Start Ex	3.36	0.00	1.72	0.00	0.38	4.87	0.07	4.85	0.16	0.26	0.04	0.00	0.01	0.12	0.00	0.00	5.75	10.11	15.85
Total Ex	19.44	0.07	2.03	3.09	0.50	9.78	0.41	29.25	0.21	0.87	0.26	1.93	0.03	0.78	0.05	0.20	22.94	45.98	68.92
PM2.5 Emissions																			
Run Exh	0.46	0.01	0.00	0.05	0.00	0.03	0.00	0.08	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.46	0.19	0.65
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.14
Total Ex	0.60	0.01	0.00	0.05	0.00	0.03	0.00	0.08	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.60	0.19	0.79
TireWear	0.81	0.01	0.01	0.02	0.00	0.03	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.20	1.02
BrakeWear	6.41	0.07	0.10	0.18	0.05	0.51	0.00	0.43	0.03	0.03	0.02	0.14	0.04	0.07	0.02	0.00	6.66	1.44	8.10
Total	7.82	0.08	0.10	0.25	0.06	0.56	0.00	0.66	0.03	0.04	0.02	0.16	0.04	0.07	0.02	0.01	8.08	1.83	9.91
Fuel Consumption (1000 gallons) and SO2																			
Fuel	10474.56	97.47	223.99	225.06	109.46	889.84	20.95	2271.31	56.57	69.98	55.81	66.22	9.88	26.60	33.70	6.88	10984.93	3653.36	14638.30
SOx	0.98	0.01	0.02	0.02	0.01	0.09	0.00	0.23	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	1.03	0.37	1.40

Table D-22
2031 Summer Planning Emissions(tons per day)in the South Coast Air Basin

	Light and Medium		Light Heavy		Medium Heavy		Heavy Heavy		Other Buses		Urban Buses		School Buses		Motor Homes		All Vehicles		Grand
	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Gas	Diesel	Total
vehicles	12015546	123900	88415	150255	18694	167877	977	99670	10455	7581	2869	3469	3384	5243	32644	9160	12172984	567155	12740139
VMT/1000	370864	3961	2533	4831	842	8264	111	15055	415	532	290	353	114	198	255	72	375424	33266	408690
Reactive Organic Gas Emissions																			
Run Exh	7.64	0.03	0.03	0.23	0.01	0.23	0.04	1.03	0.01	0.03	0.03	0.14	0.00	0.02	0.01	0.00	7.76	1.71	9.47
Idle Exh	0.00	0.00	0.03	0.02	0.02	0.00	0.00	0.10	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.08	0.12	0.20
Start Ex	3.88	0.00	0.33	0.00	0.16	0.00	0.02	0.00	0.06	0.00	0.02	0.00	0.01	0.00	0.00	0.00	4.48	0.00	4.48
Total Ex	11.52	0.03	0.38	0.25	0.19	0.24	0.05	1.13	0.07	0.03	0.05	0.14	0.04	0.02	0.01	0.00	12.32	1.83	14.15
Diurnal	5.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	5.43	0.00	5.43
Hot Soak	6.45	0.00	0.19	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.68	0.00	6.68
Running	17.36	0.00	1.24	0.00	0.12	0.00	0.01	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.00	0.00	18.79	0.00	18.79
Resting	4.41	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.42	0.00	4.42
Total	45.17	0.03	1.82	0.25	0.34	0.24	0.06	1.13	0.12	0.03	0.07	0.14	0.05	0.02	0.02	0.00	47.64	1.83	49.47
Carbon Monoxide Emissions																			
Run Exh	228.83	0.68	0.83	1.24	0.30	1.24	3.23	10.77	0.12	0.16	0.60	3.79	0.05	0.07	0.11	0.02	234.07	17.97	252.04
Idle Exh	0.00	0.00	0.30	0.15	0.18	0.02	0.00	0.30	0.06	0.00	0.00	0.00	0.25	0.01	0.00	0.00	0.79	0.48	1.27
Start Ex	56.27	0.00	4.22	0.00	2.52	0.00	0.84	0.00	0.96	0.00	0.22	0.00	0.15	0.00	0.02	0.00	65.20	0.00	65.20
Total Ex	285.10	0.68	5.35	1.39	3.00	1.25	4.07	11.07	1.14	0.16	0.81	3.79	0.45	0.08	0.13	0.02	300.06	18.45	318.51
Oxides of Nitrogen Emissions																			
Run Exh	14.21	0.06	0.28	2.71	0.10	4.32	0.30	19.75	0.04	0.52	0.19	1.83	0.02	0.51	0.04	0.19	15.18	29.90	45.08
Idle Exh	0.00	0.00	0.00	0.23	0.00	0.34	0.00	3.63	0.00	0.06	0.00	0.00	0.00	0.12	0.00	0.00	0.00	4.38	4.39
Start Ex	3.13	0.00	1.65	0.00	0.37	4.87	0.06	4.85	0.16	0.26	0.04	0.00	0.01	0.12	0.00	0.00	5.42	10.11	15.53
Total Ex	17.34	0.06	1.93	2.94	0.47	9.53	0.37	28.23	0.20	0.84	0.23	1.83	0.03	0.75	0.04	0.19	20.61	44.39	64.99
PM2.5 Emissions																			
Run Exh	0.46	0.01	0.00	0.05	0.00	0.03	0.00	0.08	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.46	0.19	0.65
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.14
Total Ex	0.60	0.01	0.00	0.05	0.00	0.03	0.00	0.08	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.60	0.19	0.79
TireWear	0.81	0.01	0.01	0.02	0.00	0.03	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.20	1.02
BrakeWear	6.41	0.07	0.10	0.18	0.05	0.51	0.00	0.43	0.03	0.03	0.02	0.14	0.04	0.07	0.02	0.00	6.66	1.44	8.10
Total	7.82	0.08	0.10	0.25	0.06	0.56	0.00	0.66	0.03	0.04	0.02	0.16	0.04	0.07	0.02	0.01	8.08	1.83	9.91
Fuel Consumption (1000 gallons) and SO2																			
Fuel	11000.02	97.47	223.96	225.06	109.49	890.47	20.95	2277.62	56.56	70.10	55.81	66.22	9.88	26.71	33.70	6.88	11510.37	3660.53	15170.89
SOx	1.03	0.01	0.02	0.02	0.01	0.09	0.00	0.23	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	1.08	0.37	1.45

Attachment E:

Diesel Emissions in South Coast Air Basin

TABLE E-1
2012 Baseline Diesel Emissions (Tons/Day)
in South Coast Air Basin

MSC		Annual Average Inventory									Summer Planning	
Code	Major Source Category (MSC)	TOG	VOC	NOX	CO	SOX	TSP	PM10	PM2.5	NH3	VOC	NOX
010	Electric Utilities	0.124	0.104	0.000	0.282	0.001	0.004	0.004	0.004	0.008	0.104	0.000
030	Oil and Gas Production (Combustion)	0.013	0.011	0.000	0.030	0.000	0.015	0.014	0.014	0.003	0.011	0.000
050	Manufacturing and Industrial	0.061	0.051	0.183	0.139	0.001	0.032	0.031	0.031	0.003	0.054	0.212
052	Food and Agricultural Processing	0.010	0.008	0.096	0.025	0.000	0.006	0.006	0.006	0.000	0.009	0.106
060	Service and Commercial	0.090	0.076	0.819	0.207	0.002	0.065	0.064	0.063	0.003	0.079	0.842
099	Other (Fuel Combustion)	0.196	0.164	3.019	0.842	0.000	0.055	0.054	0.052	0.001	0.182	3.359
110	Sewage Treatment	0.004	0.001	0.005	0.004	0.019	0.001	0.001	0.001	0.000	0.001	0.006
130	Incinerators	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
310	Oil and Gas Production	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000
320	Petroleum Refining	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
330	Petroleum Marketing	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000
610	Residential Fuel Combustion	0.000	0.000	0.082	0.011	0.001	0.009	0.009	0.009	0.000	0.000	0.082
710	Light Duty Passenger	0.115	0.101	0.611	0.679	0.003	0.074	0.073	0.070	0.003	0.101	0.577
722	Light Duty Trucks-1 (up to 3750 lb.)	0.009	0.008	0.046	0.046	0.000	0.006	0.006	0.006	0.000	0.008	0.043
723	Light Duty Trucks-2 (3751 to 5750 lb.)	0.002	0.002	0.010	0.013	0.000	0.001	0.001	0.001	0.000	0.002	0.010
724	Medium Duty Trucks (5751-8500 lb.)	0.013	0.011	0.059	0.095	0.002	0.008	0.008	0.007	0.001	0.011	0.055
742	Light Heavy Duty Diesel Trucks-1 (8501-10000 lb.)	0.457	0.402	16.133	2.794	0.013	0.097	0.096	0.092	0.008	0.402	15.295
743	Light Heavy Duty Diesel Trucks-2 (10001-14000 lb.)	0.159	0.139	5.460	0.953	0.005	0.035	0.035	0.033	0.003	0.139	5.177
744	Medium Heavy Duty Diesel Trucks (14001-33000 lb.)	2.298	2.017	37.005	6.406	0.051	1.451	1.442	1.380	0.128	2.016	35.057
746	Heavy Heavy Duty Diesel Trucks (>33001 lb.)	6.805	5.474	96.356	20.423	0.144	2.944	2.926	2.799	0.219	5.456	91.652
760	Heavy Duty Diesel Urban Buses	5.247	1.205	19.637	14.478	0.009	0.283	0.281	0.269	0.023	1.205	18.566
772	School Buses - Diesel	0.178	0.156	2.248	0.435	0.002	0.075	0.074	0.071	0.005	0.155	2.149
778	Other Buses - Motor Coach - Diesel	0.101	0.089	1.564	0.317	0.002	0.039	0.039	0.037	0.003	0.088	1.494
779	All Other Buses - Diesel	0.109	0.096	1.633	0.282	0.002	0.054	0.054	0.052	0.006	0.096	1.547
780	Motor Homes	0.011	0.010	0.603	0.046	0.001	0.017	0.017	0.017	0.000	0.010	0.569
820	Trains	1.472	1.235	19.722	3.860	0.014	0.434	0.434	0.390	0.009	1.235	19.722
833	Ocean Going Vessels	1.964	1.751	30.140	3.430	4.567	0.959	0.959	0.918	0.028	1.751	30.140
835	Commercial Harbor Craft	1.366	1.147	15.844	5.432	0.001	0.735	0.735	0.677	0.000	1.202	16.563
840	Recreational Boats	0.015	0.014	0.004	0.063	0.000	0.004	0.004	0.003	0.000	0.020	0.006
860	Commercial/Industrial Mobile Equipment	7.184	6.035	51.171	31.034	0.037	2.865	2.865	2.635	0.036	6.749	58.152
870	Farm Equipment	0.469	0.394	2.489	1.294	0.000	0.157	0.157	0.144	0.000	0.479	3.027
	RECLAIM			0.710		0.067						0.729
	Total Diesel	**28.484**	**20.712**	**305.648**	**93.619**	**4.946**	**10.423**	**10.389**	**9.781**	**0.491**	**21.574**	**305.135**

Notes:
(1) Emission from line items not included.
(2) Ships and Commercial Boats in 2016 AQMP inventory do not use residual oil.

TABLE E-2
2019 Baseline Diesel Emissions (Tons/Day)
in South Coast Air Basin

MSC		Annual Average Inventory									Summer Planning	
Code	Major Source Category (MSC)	TOG	VOC	NOX	CO	SOX	TSP	PM10	PM2.5	NH3	VOC	NOX
010	Electric Utilities	0.098	0.082	0.000	0.224	0.001	0.003	0.003	0.003	0.006	0.082	0.000
030	Oil and Gas Production (Combustion)	0.013	0.011	0.000	0.032	0.000	0.015	0.015	0.015	0.003	0.011	0.000
050	Manufacturing and Industrial	0.064	0.053	0.204	0.144	0.001	0.034	0.033	0.033	0.003	0.057	0.238
052	Food and Agricultural Processing	0.011	0.009	0.095	0.027	0.000	0.008	0.007	0.007	0.001	0.010	0.101
060	Service and Commercial	0.099	0.083	0.875	0.226	0.002	0.071	0.070	0.069	0.003	0.086	0.900
099	Other (Fuel Combustion)	0.146	0.122	2.459	0.670	0.000	0.041	0.041	0.039	0.001	0.136	2.736
110	Sewage Treatment	0.004	0.001	0.006	0.005	0.022	0.002	0.002	0.002	0.000	0.001	0.007
130	Incinerators	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
310	Oil and Gas Production	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000
320	Petroleum Refining	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
330	Petroleum Marketing	0.009	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000
610	Residential Fuel Combustion	0.000	0.000	0.088	0.012	0.001	0.010	0.009	0.009	0.000	0.000	0.088
710	Light Duty Passenger	0.071	0.062	0.290	0.615	0.006	0.038	0.038	0.037	0.007	0.062	0.274
722	Light Duty Trucks-1 (up to 3750 lb.)	0.004	0.003	0.020	0.020	0.000	0.003	0.002	0.002	0.000	0.003	0.019
723	Light Duty Trucks-2 (3751 to 5750 lb.)	0.003	0.003	0.008	0.022	0.001	0.001	0.001	0.001	0.001	0.003	0.008
724	Medium Duty Trucks (5751-8500 lb.)	0.016	0.014	0.048	0.198	0.004	0.007	0.007	0.006	0.003	0.014	0.046
742	Light Heavy Duty Diesel Trucks-1 (8501-10000 lb.)	0.367	0.322	9.693	2.140	0.015	0.075	0.075	0.071	0.010	0.322	9.195
743	Light Heavy Duty Diesel Trucks-2 (10001-14000 lb.)	0.123	0.108	2.817	0.673	0.007	0.026	0.026	0.025	0.004	0.108	2.674
744	Medium Heavy Duty Diesel Trucks (14001-33000 lb.)	0.964	0.846	20.485	3.033	0.073	0.551	0.547	0.524	0.181	0.846	19.518
746	Heavy Heavy Duty Diesel Trucks (>33001 lb.)	2.758	1.578	58.171	8.582	0.180	0.274	0.272	0.261	0.302	1.569	55.598
760	Heavy Duty Diesel Urban Buses	3.090	0.603	9.123	8.556	0.004	0.121	0.121	0.115	0.016	0.603	8.625
772	School Buses - Diesel	0.036	0.031	1.903	0.096	0.003	0.010	0.010	0.009	0.006	0.031	1.823
778	Other Buses - Motor Coach - Diesel	0.029	0.026	0.932	0.098	0.003	0.004	0.004	0.004	0.004	0.026	0.892
779	All Other Buses - Diesel	0.025	0.022	1.019	0.075	0.003	0.005	0.005	0.005	0.008	0.022	0.968
780	Motor Homes	0.009	0.008	0.417	0.034	0.001	0.012	0.012	0.011	0.000	0.008	0.394
820	Trains	0.938	0.786	16.879	4.014	0.014	0.296	0.296	0.271	0.010	0.786	16.879
833	Ocean Going Vessels	2.486	2.220	26.175	4.173	3.149	0.912	0.912	0.872	0.035	2.220	26.175
835	Commercial Harbor Craft	1.265	1.063	11.151	6.601	0.001	0.464	0.464	0.428	0.000	1.115	11.667
840	Recreational Boats	0.012	0.011	0.003	0.047	0.000	0.003	0.003	0.002	0.000	0.016	0.004
860	Commercial/Industrial Mobile Equipment	5.027	4.223	38.235	32.580	0.047	1.674	1.673	1.539	0.046	4.800	43.761
870	Farm Equipment	0.351	0.295	1.935	1.144	0.000	0.122	0.122	0.113	0.000	0.359	2.354
	RECLAIM			0.660		0.088						0.678
	Total Diesel	**18.023**	**12.599**	**203.692**	**74.038**	**3.626**	**4.781**	**4.770**	**4.472**	**0.650**	**13.309**	**205.622**

Notes:
(1) Emission from line items not included.
(2) Ships and Commercial Boats in 2016 AQMP inventory do not use residual oil.

TABLE E-3
2021 Baseline Diesel Emissions (Tons/Day)
in South Coast Air Basin

MSC		Annual Average Inventory									Summer Planning	
Code	Major Source Category (MSC)	TOG	VOC	NOX	CO	SOX	TSP	PM10	PM2.5	NH3	VOC	NOX
010	Electric Utilities	0.102	0.085	0.000	0.232	0.001	0.003	0.003	0.003	0.007	0.085	0.000
030	Oil and Gas Production (Combustion)	0.014	0.011	0.000	0.032	0.000	0.015	0.015	0.015	0.003	0.011	0.000
050	Manufacturing and Industrial	0.064	0.054	0.209	0.146	0.001	0.035	0.034	0.034	0.003	0.058	0.245
052	Food and Agricultural Processing	0.011	0.009	0.098	0.028	0.000	0.008	0.008	0.007	0.001	0.010	0.104
060	Service and Commercial	0.101	0.085	0.889	0.231	0.002	0.073	0.071	0.071	0.003	0.089	0.916
099	Other (Fuel Combustion)	0.112	0.094	2.051	0.564	0.000	0.029	0.029	0.028	0.001	0.104	2.281
110	Sewage Treatment	0.004	0.001	0.007	0.005	0.023	0.002	0.002	0.002	0.000	0.001	0.007
130	Incinerators	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
310	Oil and Gas Production	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000
320	Petroleum Refining	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
330	Petroleum Marketing	0.009	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000
610	Residential Fuel Combustion	0.000	0.000	0.089	0.012	0.001	0.010	0.009	0.009	0.000	0.000	0.089
710	Light Duty Passenger	0.062	0.054	0.232	0.597	0.006	0.032	0.032	0.031	0.008	0.054	0.219
722	Light Duty Trucks-1 (up to 3750 lb.)	0.003	0.003	0.016	0.016	0.000	0.002	0.002	0.002	0.000	0.003	0.015
723	Light Duty Trucks-2 (3751 to 5750 lb.)	0.003	0.003	0.007	0.024	0.001	0.001	0.001	0.001	0.001	0.003	0.007
724	Medium Duty Trucks (5751-8500 lb.)	0.016	0.014	0.045	0.217	0.004	0.006	0.006	0.006	0.003	0.014	0.043
742	Light Heavy Duty Diesel Trucks-1 (8501-10000 lb.)	0.328	0.288	7.961	1.895	0.015	0.067	0.067	0.064	0.010	0.288	7.553
743	Light Heavy Duty Diesel Trucks-2 (10001-14000 lb.)	0.110	0.097	2.188	0.590	0.007	0.024	0.024	0.022	0.005	0.097	2.078
744	Medium Heavy Duty Diesel Trucks (14001-33000 lb.)	0.295	0.260	11.509	1.148	0.078	0.044	0.044	0.042	0.195	0.259	11.061
746	Heavy Heavy Duty Diesel Trucks (>33001 lb.)	2.749	1.494	52.616	9.007	0.189	0.216	0.214	0.205	0.326	1.485	50.344
760	Heavy Duty Diesel Urban Buses	2.572	0.480	7.220	7.299	0.003	0.095	0.095	0.091	0.015	0.480	6.826
772	School Buses - Diesel	0.033	0.029	1.705	0.093	0.003	0.008	0.008	0.008	0.006	0.029	1.635
778	Other Buses - Motor Coach - Diesel	0.028	0.024	0.789	0.099	0.003	0.003	0.003	0.003	0.005	0.024	0.756
779	All Other Buses - Diesel	0.023	0.021	0.820	0.076	0.004	0.004	0.004	0.004	0.009	0.021	0.781
780	Motor Homes	0.008	0.007	0.365	0.030	0.001	0.010	0.010	0.010	0.000	0.007	0.345
820	Trains	0.886	0.742	16.250	4.121	0.015	0.284	0.284	0.261	0.010	0.742	16.250
833	Ocean Going Vessels	2.665	2.381	24.209	4.435	3.284	0.962	0.962	0.920	0.038	2.381	24.209
835	Commercial Harbor Craft	1.257	1.056	10.696	6.724	0.001	0.441	0.441	0.406	0.000	1.107	11.179
840	Recreational Boats	0.011	0.011	0.003	0.043	0.000	0.003	0.003	0.002	0.000	0.015	0.004
860	Commercial/Industrial Mobile Equipment	4.653	3.910	34.030	33.594	0.049	1.377	1.377	1.267	0.049	4.436	38.905
870	Farm Equipment	0.322	0.270	1.722	1.113	0.000	0.109	0.109	0.101	0.000	0.329	2.094
	RECLAIM			0.540		0.088						0.555
	Total Diesel	**16.449**	**11.496**	**176.265**	**72.371**	**3.778**	**3.863**	**3.856**	**3.612**	**0.695**	**12.146**	**178.499**

Notes:
(1) Emission from line items not included.
(2) Ships and Commercial Boats in 2016 AQMP inventory do not use residual oil.

TABLE E-4
2022 Baseline Diesel Emissions (Tons/Day)
in South Coast Air Basin

MSC		Annual Average Inventory									Summer Planning	
Code	Major Source Category (MSC)	TOG	VOC	NOX	CO	SOX	TSP	PM10	PM2.5	NH3	VOC	NOX
010	Electric Utilities	0.105	0.088	0.000	0.238	0.001	0.004	0.003	0.003	0.007	0.088	0.000
030	Oil and Gas Production (Combustion)	0.014	0.012	0.000	0.032	0.000	0.016	0.015	0.015	0.003	0.012	0.000
050	Manufacturing and Industrial	0.065	0.054	0.212	0.147	0.001	0.035	0.034	0.034	0.003	0.058	0.248
052	Food and Agricultural Processing	0.011	0.009	0.101	0.029	0.000	0.008	0.008	0.008	0.001	0.010	0.107
060	Service and Commercial	0.102	0.086	0.898	0.234	0.002	0.074	0.072	0.072	0.004	0.090	0.925
099	Other (Fuel Combustion)	0.112	0.094	2.051	0.564	0.000	0.029	0.029	0.028	0.001	0.104	2.282
110	Sewage Treatment	0.004	0.001	0.007	0.005	0.023	0.002	0.002	0.002	0.000	0.001	0.008
130	Incinerators	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
310	Oil and Gas Production	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000
320	Petroleum Refining	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
330	Petroleum Marketing	0.010	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000
610	Residential Fuel Combustion	0.000	0.000	0.090	0.012	0.001	0.010	0.010	0.009	0.000	0.000	0.090
710	Light Duty Passenger	0.057	0.050	0.206	0.585	0.006	0.029	0.029	0.028	0.008	0.050	0.195
722	Light Duty Trucks-1 (up to 3750 lb.)	0.003	0.002	0.014	0.015	0.000	0.002	0.002	0.002	0.000	0.002	0.013
723	Light Duty Trucks-2 (3751 to 5750 lb.)	0.003	0.003	0.007	0.025	0.001	0.001	0.001	0.001	0.001	0.003	0.007
724	Medium Duty Trucks (5751-8500 lb.)	0.016	0.014	0.043	0.223	0.004	0.006	0.006	0.006	0.003	0.014	0.041
742	Light Heavy Duty Diesel Trucks-1 (8501-10000 lb.)	0.310	0.272	7.171	1.773	0.015	0.064	0.063	0.061	0.010	0.272	6.804
743	Light Heavy Duty Diesel Trucks-2 (10001-14000 lb.)	0.104	0.092	1.910	0.552	0.008	0.022	0.022	0.021	0.005	0.092	1.813
744	Medium Heavy Duty Diesel Trucks (14001-33000 lb.)	0.296	0.260	11.255	1.176	0.080	0.041	0.041	0.039	0.201	0.260	10.832
746	Heavy Heavy Duty Diesel Trucks (>33001 lb.)	2.765	1.470	49.327	9.272	0.193	0.192	0.190	0.182	0.338	1.462	47.231
760	Heavy Duty Diesel Urban Buses	2.355	0.433	6.565	6.818	0.003	0.087	0.087	0.083	0.014	0.433	6.207
772	School Buses - Diesel	0.032	0.029	1.604	0.092	0.003	0.008	0.008	0.007	0.006	0.028	1.539
778	Other Buses - Motor Coach - Diesel	0.027	0.024	0.699	0.099	0.003	0.003	0.003	0.003	0.005	0.023	0.670
779	All Other Buses - Diesel	0.024	0.021	0.797	0.078	0.004	0.003	0.003	0.003	0.009	0.021	0.760
780	Motor Homes	0.007	0.007	0.341	0.028	0.001	0.009	0.009	0.009	0.000	0.007	0.322
820	Trains	0.860	0.721	15.744	4.161	0.015	0.275	0.275	0.252	0.010	0.721	15.744
833	Ocean Going Vessels	2.781	2.485	23.595	4.613	3.369	0.996	0.996	0.953	0.039	2.485	23.595
835	Commercial Harbor Craft	1.253	1.053	10.488	6.780	0.001	0.431	0.431	0.397	0.000	1.104	10.952
840	Recreational Boats	0.011	0.010	0.003	0.041	0.000	0.003	0.003	0.002	0.000	0.015	0.004
860	Commercial/Industrial Mobile Equipment	4.410	3.705	31.178	34.030	0.050	1.205	1.205	1.109	0.051	4.191	35.513
870	Farm Equipment	0.308	0.259	1.625	1.098	0.000	0.103	0.103	0.095	0.000	0.315	1.977
	RECLAIM			0.420		0.088						0.430
	Total Diesel	**16.051**	**11.267**	**166.350**	**72.722**	**3.871**	**3.656**	**3.649**	**3.421**	**0.717**	**11.873**	**168.307**

Notes:
(1) Emission from line items not included.
(2) Ships and Commercial Boats in 2016 AQMP inventory do not use residual oil.

TABLE E-5
2023 Baseline Diesel Emissions (Tons/Day)
in South Coast Air Basin

MSC		Annual Average Inventory									Summer Planning	
Code	Major Source Category (MSC)	TOG	VOC	NOX	CO	SOX	TSP	PM10	PM2.5	NH3	VOC	NOX
010	Electric Utilities	0.106	0.089	0.000	0.242	0.001	0.004	0.004	0.003	0.007	0.089	0.000
030	Oil and Gas Production (Combustion)	0.014	0.012	0.000	0.032	0.000	0.016	0.015	0.015	0.003	0.012	0.000
050	Manufacturing and Industrial	0.065	0.054	0.213	0.147	0.001	0.035	0.034	0.034	0.003	0.058	0.250
052	Food and Agricultural Processing	0.011	0.009	0.102	0.029	0.000	0.008	0.008	0.008	0.001	0.010	0.108
060	Service and Commercial	0.103	0.087	0.904	0.236	0.002	0.075	0.073	0.072	0.004	0.091	0.931
099	Other (Fuel Combustion)	0.112	0.094	2.052	0.564	0.000	0.029	0.029	0.028	0.001	0.104	2.283
110	Sewage Treatment	0.004	0.001	0.007	0.005	0.023	0.002	0.002	0.002	0.000	0.001	0.008
130	Incinerators	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
310	Oil and Gas Production	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000
320	Petroleum Refining	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
330	Petroleum Marketing	0.010	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000
610	Residential Fuel Combustion	0.000	0.000	0.091	0.013	0.001	0.010	0.010	0.009	0.000	0.000	0.091
710	Light Duty Passenger	0.052	0.045	0.182	0.573	0.006	0.026	0.026	0.025	0.008	0.045	0.172
722	Light Duty Trucks-1 (up to 3750 lb.)	0.002	0.002	0.012	0.013	0.000	0.002	0.002	0.002	0.000	0.002	0.012
723	Light Duty Trucks-2 (3751 to 5750 lb.)	0.003	0.003	0.007	0.026	0.001	0.001	0.001	0.001	0.001	0.003	0.007
724	Medium Duty Trucks (5751-8500 lb.)	0.015	0.013	0.040	0.228	0.005	0.006	0.006	0.006	0.004	0.013	0.038
742	Light Heavy Duty Diesel Trucks-1 (8501-10000 lb.)	0.293	0.257	6.427	1.658	0.015	0.060	0.060	0.057	0.010	0.257	6.100
743	Light Heavy Duty Diesel Trucks-2 (10001-14000 lb.)	0.099	0.087	1.649	0.515	0.008	0.021	0.021	0.020	0.005	0.087	1.566
744	Medium Heavy Duty Diesel Trucks (14001-33000 lb.)	0.238	0.209	8.516	1.101	0.082	0.023	0.022	0.022	0.207	0.209	8.262
746	Heavy Heavy Duty Diesel Trucks (>33001 lb.)	2.218	0.956	27.850	8.488	0.191	0.079	0.079	0.075	0.349	0.951	26.838
760	Heavy Duty Diesel Urban Buses	2.151	0.391	5.973	6.372	0.003	0.080	0.080	0.076	0.014	0.391	5.647
772	School Buses - Diesel	0.032	0.028	1.502	0.091	0.003	0.007	0.007	0.007	0.006	0.028	1.442
778	Other Buses - Motor Coach - Diesel	0.016	0.014	0.326	0.079	0.003	0.001	0.001	0.001	0.005	0.014	0.315
779	All Other Buses - Diesel	0.014	0.012	0.428	0.064	0.004	0.001	0.001	0.001	0.009	0.012	0.412
780	Motor Homes	0.007	0.006	0.318	0.026	0.001	0.008	0.008	0.008	0.000	0.006	0.301
820	Trains	0.840	0.704	15.272	4.202	0.015	0.268	0.268	0.246	0.010	0.704	15.272
833	Ocean Going Vessels	2.898	2.590	22.967	4.791	3.454	1.031	1.031	0.986	0.041	2.590	22.967
835	Commercial Harbor Craft	1.254	1.053	10.332	6.849	0.001	0.423	0.423	0.389	0.000	1.103	10.781
840	Recreational Boats	0.010	0.010	0.003	0.039	0.000	0.003	0.002	0.002	0.000	0.014	0.004
860	Commercial/Industrial Mobile Equipment	4.284	3.599	29.495	34.690	0.051	1.091	1.091	1.004	0.052	4.063	33.530
870	Farm Equipment	0.296	0.249	1.536	1.086	0.000	0.097	0.097	0.089	0.000	0.302	1.868
	RECLAIM			0.420		0.088						0.430
	Total Diesel	**15.153**	**10.589**	**136.621**	**72.160**	**3.957**	**3.405**	**3.400**	**3.186**	**0.738**	**11.173**	**139.630**

Notes:
(1) Emission from line items not included.
(2) Ships and Commercial Boats in 2016 AQMP inventory do not use residual oil.

TABLE E-6
2025 Baseline Diesel Emissions (Tons/Day)
in South Coast Air Basin

MSC		Annual Average Inventory									Summer Planning	
Code	Major Source Category (MSC)	TOG	VOC	NOX	CO	SOX	TSP	PM10	PM2.5	NH3	VOC	NOX
010	Electric Utilities	0.109	0.091	0.000	0.247	0.001	0.004	0.004	0.004	0.007	0.091	0.000
030	Oil and Gas Production (Combustion)	0.014	0.012	0.000	0.032	0.000	0.016	0.015	0.015	0.003	0.012	0.000
050	Manufacturing and Industrial	0.065	0.055	0.215	0.148	0.001	0.035	0.034	0.034	0.003	0.058	0.253
052	Food and Agricultural Processing	0.012	0.010	0.107	0.030	0.000	0.009	0.008	0.008	0.001	0.010	0.112
060	Service and Commercial	0.105	0.088	0.918	0.240	0.002	0.076	0.074	0.073	0.004	0.092	0.946
099	Other (Fuel Combustion)	0.112	0.094	2.053	0.565	0.000	0.029	0.029	0.028	0.001	0.104	2.283
110	Sewage Treatment	0.004	0.001	0.007	0.005	0.024	0.002	0.002	0.002	0.000	0.001	0.008
130	Incinerators	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
310	Oil and Gas Production	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000
320	Petroleum Refining	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
330	Petroleum Marketing	0.010	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000
610	Residential Fuel Combustion	0.000	0.000	0.092	0.013	0.001	0.010	0.010	0.010	0.000	0.000	0.092
710	Light Duty Passenger	0.039	0.034	0.130	0.522	0.006	0.018	0.018	0.017	0.008	0.034	0.123
722	Light Duty Trucks-1 (up to 3750 lb.)	0.002	0.002	0.009	0.010	0.000	0.001	0.001	0.001	0.000	0.002	0.009
723	Light Duty Trucks-2 (3751 to 5750 lb.)	0.003	0.003	0.007	0.027	0.001	0.001	0.001	0.001	0.001	0.003	0.006
724	Medium Duty Trucks (5751-8500 lb.)	0.013	0.011	0.033	0.224	0.004	0.005	0.005	0.004	0.004	0.011	0.031
742	Light Heavy Duty Diesel Trucks-1 (8501-10000 lb.)	0.263	0.231	5.211	1.467	0.015	0.054	0.053	0.051	0.010	0.231	4.947
743	Light Heavy Duty Diesel Trucks-2 (10001-14000 lb.)	0.090	0.079	1.222	0.452	0.008	0.020	0.019	0.019	0.005	0.079	1.162
744	Medium Heavy Duty Diesel Trucks (14001-33000 lb.)	0.245	0.215	8.886	1.133	0.085	0.024	0.024	0.022	0.218	0.215	8.637
746	Heavy Heavy Duty Diesel Trucks (>33001 lb.)	2.362	0.999	28.281	9.218	0.201	0.082	0.082	0.078	0.372	0.994	27.272
760	Heavy Duty Diesel Urban Buses	1.798	0.302	4.549	5.473	0.002	0.060	0.059	0.057	0.012	0.302	4.301
772	School Buses - Diesel	0.029	0.026	1.300	0.089	0.003	0.006	0.006	0.006	0.006	0.026	1.249
778	Other Buses - Motor Coach - Diesel	0.017	0.015	0.363	0.087	0.003	0.001	0.001	0.001	0.005	0.015	0.350
779	All Other Buses - Diesel	0.015	0.013	0.471	0.071	0.004	0.001	0.001	0.001	0.009	0.013	0.453
780	Motor Homes	0.006	0.006	0.280	0.023	0.001	0.007	0.007	0.007	0.000	0.006	0.264
820	Trains	0.776	0.651	13.931	4.283	0.015	0.246	0.246	0.226	0.011	0.651	13.931
833	Ocean Going Vessels	3.133	2.800	21.371	5.151	3.626	1.101	1.101	1.053	0.044	2.800	21.371
835	Commercial Harbor Craft	1.255	1.055	10.078	6.963	0.001	0.412	0.412	0.379	0.000	1.105	10.510
840	Recreational Boats	0.010	0.009	0.002	0.036	0.000	0.002	0.002	0.002	0.000	0.013	0.003
860	Commercial/Industrial Mobile Equipment	4.054	3.406	26.380	35.615	0.051	0.884	0.884	0.813	0.053	3.828	29.817
870	Farm Equipment	0.272	0.228	1.374	1.063	0.000	0.086	0.086	0.079	0.000	0.278	1.671
	RECLAIM			0.420		0.088						0.430
	Total Diesel	**14.820**	**10.449**	**127.688**	**73.186**	**4.143**	**3.190**	**3.184**	**2.990**	**0.776**	**10.987**	**130.230**

Notes:
(1) Emission from line items not included.
(2) Ships and Commercial Boats in 2016 AQMP inventory do not use residual oil.

TABLE E-7
2031 Baseline Diesel Emissions (Tons/Day)
in South Coast Air Basin

MSC		Annual Average Inventory									Summer Planning	
Code	Major Source Category (MSC)	TOG	VOC	NOX	CO	SOX	TSP	PM10	PM2.5	NH3	VOC	NOX
010	Electric Utilities	0.109	0.091	0.000	0.247	0.001	0.004	0.004	0.004	0.007	0.091	0.000
030	Oil and Gas Production (Combustion)	0.014	0.012	0.000	0.033	0.000	0.016	0.015	0.015	0.003	0.012	0.000
050	Manufacturing and Industrial	0.067	0.055	0.223	0.151	0.001	0.036	0.035	0.035	0.003	0.059	0.264
052	Food and Agricultural Processing	0.012	0.010	0.115	0.032	0.000	0.010	0.010	0.009	0.001	0.011	0.120
060	Service and Commercial	0.110	0.092	0.954	0.252	0.002	0.080	0.078	0.077	0.004	0.096	0.983
099	Other (Fuel Combustion)	0.113	0.094	2.055	0.565	0.000	0.029	0.029	0.028	0.001	0.104	2.286
110	Sewage Treatment	0.005	0.001	0.007	0.005	0.025	0.002	0.002	0.002	0.000	0.001	0.008
130	Incinerators	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
310	Oil and Gas Production	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000
320	Petroleum Refining	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
330	Petroleum Marketing	0.010	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000
610	Residential Fuel Combustion	0.000	0.000	0.096	0.013	0.001	0.010	0.010	0.010	0.000	0.000	0.096
710	Light Duty Passenger	0.019	0.017	0.041	0.429	0.006	0.005	0.005	0.005	0.009	0.017	0.039
722	Light Duty Trucks-1 (up to 3750 lb.)	0.000	0.000	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.002
723	Light Duty Trucks-2 (3751 to 5750 lb.)	0.003	0.003	0.006	0.028	0.001	0.001	0.001	0.001	0.001	0.003	0.006
724	Medium Duty Trucks (5751-8500 lb.)	0.010	0.009	0.019	0.222	0.004	0.002	0.002	0.002	0.004	0.009	0.018
742	Light Heavy Duty Diesel Trucks-1 (8501-10000 lb.)	0.203	0.178	2.631	1.046	0.015	0.038	0.038	0.037	0.011	0.178	2.501
743	Light Heavy Duty Diesel Trucks-2 (10001-14000 lb.)	0.077	0.067	0.461	0.347	0.008	0.016	0.016	0.015	0.006	0.067	0.440
744	Medium Heavy Duty Diesel Trucks (14001-33000 lb.)	0.271	0.238	9.776	1.259	0.094	0.026	0.026	0.025	0.246	0.238	9.533
746	Heavy Heavy Duty Diesel Trucks (>33001 lb.)	2.746	1.134	29.252	11.189	0.230	0.089	0.089	0.085	0.439	1.128	28.235
760	Heavy Duty Diesel Urban Buses	1.127	0.138	1.934	3.792	0.001	0.023	0.023	0.022	0.011	0.138	1.829
772	School Buses - Diesel	0.022	0.019	0.778	0.079	0.003	0.003	0.003	0.002	0.006	0.019	0.752
778	Other Buses - Motor Coach - Diesel	0.018	0.016	0.370	0.090	0.003	0.001	0.001	0.001	0.006	0.016	0.359
779	All Other Buses - Diesel	0.016	0.014	0.503	0.076	0.004	0.001	0.001	0.001	0.010	0.014	0.486
780	Motor Homes	0.005	0.004	0.205	0.015	0.001	0.004	0.004	0.003	0.000	0.004	0.194
820	Trains	0.668	0.559	10.665	4.569	0.016	0.197	0.197	0.181	0.011	0.559	10.665
833	Ocean Going Vessels	3.914	3.501	19.577	6.344	4.156	1.330	1.330	1.272	0.054	3.501	19.577
835	Commercial Harbor Craft	1.187	0.997	9.350	6.936	0.001	0.374	0.374	0.344	0.000	1.044	9.744
840	Recreational Boats	0.008	0.007	0.002	0.028	0.000	0.002	0.002	0.001	0.000	0.011	0.003
860	Commercial/Industrial Mobile Equipment	3.709	3.115	21.663	37.611	0.053	0.585	0.585	0.538	0.058	3.476	24.224
870	Farm Equipment	0.212	0.179	1.005	1.009	0.000	0.061	0.061	0.056	0.000	0.217	1.222
	RECLAIM			0.420		0.088						0.430
	Total Diesel	**14.661**	**10.566**	**112.108**	**76.368**	**4.716**	**2.943**	**2.938**	**2.770**	**0.889**	**11.029**	**114.011**

Notes:
(1) Emission from line items not included.
(2) Ships and Commercial Boats in 2016 AQMP inventory do not use residual oil.

Attachment F:

Road Construction Dust Emissions

in South Coast Air Basin

Attachment F

TABLE F-1
Emissions of Road Construction Dust (Tons/Day) in South Coast Air Basin, Annual Average Inventory

Year	Emission, Tons/Day
2012	0.1825
2016	0.2235
2017	0.2332
2018	0.2431
2019	0.2526
2020	0.2622
2021	0.2658
2022	0.2698
2023	0.2733
2024	0.2773
2025	0.2811
2026	0.2844
2027	0.2879
2028	0.2914
2030	0.2983
2031	0.3018

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix IV-A

SCAQMD's Stationary and Mobile Source Control Measures

2016 AIR QUALITY MANAGEMENT PLAN



December 2016

DRAFT FINAL 2016 AQMP
APPENDIX IV-A

SCAQMD'S STATIONARY AND MOBILE SOURCE CONTROL MEASURES

DECEMBER 2016

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INTRODUCTION

This Appendix describes the South Coast Air Quality Management District (SCAQMD or District) staff's proposed stationary and mobile source control measures to be included in the Draft 2016 AQMP. Control measures presented in this appendix are 8-hour ozone control measures and PM2.5 control measures designed to achieve the ozone and PM2.5 National Ambient Air Quality Standards (NAAQS) by statutory deadlines. The proposed 8-hour ozone control measures are further divided into stationary source ozone measures and mobile source ozone measures that are designed to reduce the reliance on long-term federal Clean Air Act (CAA) Section 182(e)(5) emission reductions in the 2007 AQMP. The measures are based on a variety of incentive programs and control strategies that are at or near commercial availability and/or are deemed technologically feasible in the next few years. The SCAQMD will prioritize distribution of incentive funding in Environmental Justice (EJ) areas and seek opportunities to expand funding to benefit the most disadvantaged communities.

8-HOUR OZONE CONTROL MEASURES

Fifteen stationary source measures and 15 mobile source measures, anticipated to be adopted and implemented within the next 10 to 15 years will assist in attainment of the 8-hour ozone standard by 2031 together with CARB's measures and reductions from federal sources. Twelve stationary source measures target NOx reductions that are further grouped into measure types: stationary source regulatory measures, co-benefits from climate programs, incentive measures, and other measures. Three stationary source measures focus on limited, strategic VOC reductions and four additional measures have corresponding VOC reductions from other ozone or PM measures. SCAQMD's mobile source measures include one emission growth management measure and 14 mobile source measures that are further grouped into four facility-based mobile source measures, five on-road and four off-road source measures, and one incentive program measure. Section 182(e)(5) of the CAA allows "extreme" ozone areas to include measures in their Plan that rely on the development of new technology or advancement of existing technology. These are sometimes referred to as "black box" measures. The 8-hour ozone measures in the 2016 AQMP specify current opportunities for emission reductions and thus are designed to reduce the reliance on the Section 182(e)(5) commitments in the 2007 AQMP.

The 30 proposed 8-hour ozone control measures (15 stationary and 15 mobile) are either new measures or revised measures from previous AQMPs. Tables IV-A-1 and IV-A-2 provide the expected adoption and implementation period, implementing agency, and expected emission reductions achieved for SCAQMD proposed stationary source and mobile source 8-hour ozone measures.

TABLE IV-A-1

SCAQMD Proposed Stationary Source 8-Hour Ozone Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2023/2031)
SCAQMD Stationary Source NOx Measures:					
Stationary Source Regulatory Measures:					
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	N/A	Ongoing	SCAQMD	2.5 / 6
CMB-02	Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications [NOx]	2018	2020–2031	SCAQMD	1.1 / 2.8
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	2018	2020	SCAQMD	1.4 / 1.5
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking [NOx]	2018	2022	SCAQMD	0.8 / 1.6
CMB-05	Further NOx Reductions from RECLAIM Assessment [NOx]	2022	2031	SCAQMD	0 / 5
Recognition of Co-Benefits:					
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives [All Pollutants]	N/A	Ongoing	Various Agencies	TBD [a]
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	N/A	Ongoing	SCAQMD, CEC	0.3 / 1.1
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology [All Pollutants]	N/A	Ongoing	SCAQMD, CEC	TBD [a]
Incentive-Based Measure:					
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	N/A	Ongoing	SCAQMD	1.2 / 2.1

TABLE IV-A-1 (CONCLUDED)

SCAQMD Proposed Stationary Source 8-Hour Ozone Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2023/2031)
SCAQMD Stationary Source NOx Measures *(continued)*:					
Other Measures:					
FLX-01	Improved Education and Public Outreach [All Pollutants]	N/A	Ongoing	SCAQMD, Other Parties	N/A [b]
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	TBD	TBD	SCAQMD	N/A [b]
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD	TBD	SCAQMD	TBD [a]
SCAQMD Stationary Source VOC Measures:					
Corresponding VOC Reductions from NOx and PM Measures:					
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	N/A	Ongoing	SCAQMD	0.07 / 0.29
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [All Pollutants]	N/A	Ongoing	SCAQMD	0.2 / 0.3
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	N/A	Ongoing	SCAQMD	1.2 / 2.8
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	2018	2020	SCAQMD	0.4 / 0.4
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	2019	2020	SCAQMD	1.5 / 1.8
Limited, Strategic VOC Control:					
FUG-01	Improved Leak Detection and Repair [VOC]	2019	2022	SCAQMD	2 / 2
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	2017/2021	2020–2031	SCAQMD	1 / 2
FLX-02	Stationary Source VOC Incentives [VOC]	N/A	Ongoing	SCAQMD	TBD [a]

[a] TBD are reductions to be determined once the measure is further evaluated, the technical assessment is complete, and inventories and cost-effective control approaches are identified, and are not relied upon for attainment demonstration purposes

[b] N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur

TABLE IV-A-2

SCAQMD Proposed Mobile Source 8-Hour Ozone Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2023/2031)
Emission Growth Management Measure:					
EGM-01	Emission Reductions from New Development and Redevelopment Projects [All Pollutants]	2018	2019–2031	SCAQMD	TBD [a]
Facility-Based Mobile Source Measures:					
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]	2018	2019–2031	SCAQMD	TBD [b]
MOB-02	Emission Reduction at Rail Yards and Intermodal Facilities [NOx, PM]	2018	2019–2031	SCAQMD	TBD [a]
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	2018	2019–2031	SCAQMD	TBD [a]
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	2018	2019–2031	SCAQMD	TBD [b]
On-Road Mobile Source Measures:					
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	N/A	Ongoing	CARB, SCAQMD	TBD [a]
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	N/A	Ongoing	CARB, Bureau of Automotive Repair, SCAQMD	TBD [a]
MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	N/A	Ongoing	CARB, SCAQMD	TBD [a]
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	2018	2019–2031	CARB, SCAQMD	TBD [a]
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	2018	2019–2027	CARB, SCAQMD	TBD [a]

TABLE IV-A-2 (CONCLUDED)

SCAQMD Proposed Mobile Source 8-Hour Ozone Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2023/2031)
Off-Road Mobile Source Measures:					
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	N/A	Ongoing	SCAQMD	2.0 / 2.0
MOB-11	Extended Exchange Program [VOC, NOx, CO]	N/A	Ongoing	SCAQMD	2.9 / 1.0 [NOx]
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	Ongoing	2017–2023	SoCal Regional Rail Authority	TBD [b]
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	2018	2019–2027	SCAQMD	TBD [a]
Incentive Programs Measure:					
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	N/A	2016–2024	SCAQMD	11 / 7.8 [NOx]

[a] Emission reductions will be determined after projects are identified and implemented

[b] Submitted into the SIP as part of Rate-of-Progress reporting or in baseline inventories for future AQMP/SIP Revisions

The following sections provide a brief overview of the measure categories for the 8-hour ozone control measures. Detailed descriptions of each measure can be found in Section 1 of this Appendix.

Stationary Source Ozone Measures

Stationary Source Regulatory Measures

There are five proposed stationary source regulatory measures for NOx reductions. The first measure is to reduce NOx emissions from traditional combustion sources, such as diesel back-up generators, by replacing older, high-emitting equipment with new, lower or zero-emitting equipment. The second measure seeks NOx emission reductions from unregulated commercial space heating furnaces and from regulations and incentives to replace existing older boilers, water heaters, and space heating furnaces and other natural gas or liquefied petroleum gas (LPG) equipment with zero emitting or lower NOx technologies. The third measure seeks to utilize excess gas from non-refinery flares in renewable applications. The fourth measure is to seek reductions from commercial restaurant burners and residential cooking appliances, and the last measure would seek NOx reductions from RECLAIM program assessments and amendments. These measures call for a priority on maximizing emission reductions utilizing zero-emission technologies where feasible and cost-effective, and near-zero technologies in other applications. Where appropriate, these measures also include the use of incentive funding to complement regulations and accelerate deployment of clean technologies.

Recognition of Co-Benefits

This category includes three co-benefit emission reduction measures from energy and climate change related programs. The first measure seeks emission reductions from existing and further GHG reduction programs and the second measure seeks co-benefits from the improvement of energy efficiency for existing residential and commercial buildings. The third measure seeks reduced ozone formation and emission reductions from cool roof technology.

Incentive-Based Measure

This category includes one proposed incentive-based measure that would seek NOx reductions through additional enhancements in reducing existing residential building energy use.

Other Measures

There are three proposed "other" measures. One measure would seek improved education, public outreach, and incentives for consumers to contribute to clean air efforts. The second measure proposes breakdown limitations that comply with U.S. EPA policy. The third measure would require all feasible measures for stationary sources on an ongoing basis.

Corresponding VOC Reductions from NOx and PM Measures

There are a total of four 8-hour ozone measures in this category. These measures are co-benefits from four NOx measures (ECC-02: Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures, ECC-03: Additional Enhancements in Reducing Existing Residential Building Energy Use, CMB-01: Transition to Zero and Near-Zero Emission Technologies for Stationary Sources, and CMB-03: Emission Reductions from Non-Refinery Flares) and one PM2.5 measure (BCM-10: Emission Reductions from Greenwaste Composting).

Limited, Strategic VOC Control Measures

Three VOC control measures are proposed in this category. One control measure targets fugitive VOC emissions with improved leak detection and repair. Another focuses on reducing VOC emissions from VOC-containing products such as coatings, solvents, adhesives, and sealants. A final measure involves incentives to lower VOC emissions from stationary sources.

Mobile Source Ozone Measures

SCAQMD staff analyzed the need to accelerate the penetration of cleaner engine technologies and assist in implementing CARB's proposed mobile source strategy. Specifically, there are several measures under the proposed State SIP Strategy that are titled "Further Deployment of Cleaner Technologies" (see Appendix IV-B), which identify the SCAQMD as an implementing agency along with CARB and U.S. EPA. CARB indicated that the implementation of the "Further Deployment" measures is based on a combination of incentive funding, development of regulations, and quantification of emission reduction benefits from operational efficiency actions and deployment of autonomous vehicles, connected vehicles, and intelligent transportation systems. As such, the SCAQMD mobile source measures proposed in this Appendix will help implement the "Further Development" measures. In addition, the SCAQMD is implementing several incentives funding programs that have resulted in

early emission reductions (e.g., the Carl Moyer Memorial Air Quality Standards Attainment Program, the Surplus Off-Road Opt-In for NOx (SOON) program, and Proposition 1B – Goods Movement Emissions Reduction Program). The emission reduction benefits of the funding programs are quantified and are proposed to be included as part of the overall emission reductions for attainment of the NAAQS.

The proposed SCAQMD mobile source measures are based on a variety of control technologies that are commercially available and/or technologically feasible to implement in the next several years. The focus of these measures includes accelerated retrofits or replacement of existing vehicles or equipment, acceleration of vehicle turnover through voluntary vehicle retirement programs, and greater use of cleaner fuels in the near-term. The measures will encourage greater deployment of commercially-available zero-emission vehicle and equipment technologies such as plug-in hybrids, battery-electric, and fuel cells to the maximum extent feasible as such technologies are commercialized, and near-zero emission technologies everywhere else. In the longer-term, there is a need to significantly increase the penetration and deployment of near-zero and zero-emission vehicles, greater use of cleaner, renewable fuels (either alternative fuels or new formulations of gasoline and diesel fuels), and additional emission reductions from federal and international sources such as locomotives, ocean-going vessels, and aircraft.

In implementing the SCAQMD mobile source measures, the SCAQMD will focus on collaborative approaches to achieve additional emission reductions to help implement the proposed State "Further Deployment" measures. During the public process (which is, for all intents and purposes, the same SCAQMD process to develop rules to implement the AQMP control measures), SCAQMD staff will assess progress in identifying actions (voluntary and regulatory) that will result in additional emission reductions. SCAQMD staff will report to the Governing Board on the progress on a routine basis, but no later than six months after the adoption of the Final 2016 AQMP. If progress is not made in identifying specific actions within one year from adoption of the Final 2016 AQMP, the SCAQMD staff will recommend whether the Governing Board consider proceeding with the development of rules within its existing legal authority or seek additional authority to adopt and implement measures to cost-effectively reduce mobile source emissions. Such authority includes development of new or expanded clean vehicle fleet rules or indirect source regulations. Table IV-A-3 provides a schedule for the public process, which includes periodic progress reports to the SCAQMD Mobile Source Committee, convening working groups, and milestones to achieve during the one year period.

TABLE IV-A-3

Schedule and Milestones for the Mobile Source Measure Public Process

Public Process Activity	Time from Final Approval of the 2016 AQMP
Report to SCAQMD Mobile Source Committee on Process to Move Forward	• Within One Month
Convene Working Groups for MOB-01 through MOB-05 and EGM-01	• Within One Month
Working Group Meeting • **Define Objectives** • **Seek initial input on the types of actions with potential criteria pollutant reductions** • **Identify existing actions with potential emission reductions** • **Identify future actions with potential emission reductions** • **Develop model quantification methodologies for emission reductions associated with identified actions** • **Quantify potential emission reductions** • **Develop mechanisms to ensure reductions are real, surplus, and enforceable**	• Ongoing on a Monthly Basis
Report to SCAQMD Mobile Source Committee on progress	• Six Months
Report to SCAQMD Mobile Source Committee/Governing Board on progress and whether to continue with process or recommend formal rule development	• 12 Months

Emission Growth Management Measure

There is one proposed control measure within this category. A provision under state law requires the SCAQMD to implement "all feasible measures" including evaluating rules and regulations adopted by other agencies. The San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted Rule 9510 – Indirect Source Review. As such, the measure proposed in this category will evaluate the applicability of Rule 9510 in the South Coast Air Basin and Coachella Valley. The proposed measure addresses emission reductions (as compared to emission increases that would otherwise occur) from new or redevelopment projects. The SCAQMD will encourage or require developers and local agencies to participate in a mitigation program and potentially further reduce criteria pollutant emissions. If necessary, the SCAQMD may adopt a rule similar to SJVAPCD Rule 9510 or a similar rule.

Facility-Based Mobile Source Measures

With economic growth projected out to 2040 by SCAG, there may be potential increases in emissions associated with mobile sources in the goods movement sector even with the deployment of newer, cleaner vehicles and equipment. As such, four facility-based mobile source control measures are proposed. The first measure focuses on commercial marine ports in the South Coast Air Basin (Basin). Port-related emission sources include on-road heavy-duty trucks, locomotives, ocean-going vessels, commercial harbor craft, and cargo handling equipment. The Ports of Los Angeles and Long Beach (Ports) have been implementing the San Pedro Bay Ports Clean Air Action Plan (CAAP) since 2006. Implementation of strategies under the CAAP has led to early emission reductions as State, federal, and international regulations are developed. The Ports are in the process of updating the CAAP to implement long-term sustainable strategies that potentially could result in criteria pollutant and greenhouse gas emission reductions, while improving operational efficiencies and reducing dependence on fossil-based fuels. To the extent that criteria pollutant emission reductions associated with such actions can be quantified, a mechanism will be developed that recognizes the actions and credits the associated emission reductions into the SIP. To the extent that the reductions are SIP creditable, enforceable commitments must be made to ensure that the reductions are real, surplus, and enforceable (as defined by U.S. EPA). Such commitments may take the form of a regulation or other enforceable mechanisms that will be approvable by U.S. EPA.

The second measure focuses on mobile source related vehicles and equipment operating in rail yards and intermodal facilities in the Basin. Such vehicles and equipment include cargo handling equipment, locomotives, on-road heavy-duty trucks, and passenger cars. The third and fourth measures focus on warehouse distribution centers and commercial airports. An approach similar to the marine ports measure will be taken to quantify criteria pollutant emission reductions associated with activities occurring at these facilities.

As part of the public process in implementing the four measures, the SCAQMD staff will be assessing the progress in identifying and quantifying emission reductions that occur at the various facilities. If after one year from the date of adoption of the 2016 AQMP, voluntary actions or actions from CARB (since these measures are to help implement CARB's "Further Development" measures) or U.S. EPA are not identified to any significant extent or the identified actions are not implemented in a timely manner to help meet federal air quality standards, the SCAQMD staff may recommend that the SCAQMD Governing Board consider regulatory approaches or other enforceable mechanisms to achieve the emission reductions from the mobile source sectors associated with the various facilities.

On-Road Mobile Source Measures

Five on-road mobile source control measures are proposed. The first two measures focus on on-road light- and medium-duty vehicles operating in the Basin. The first measure would implement programs to accelerate the penetration and deployment of partial zero-emission and zero-emission vehicles in the light- and medium-duty vehicles categories. The second control measure would seek to accelerate retirement of older gasoline and diesel powered vehicles up to 8,500 pounds gross vehicle weight rating (GVWR). These vehicles include passenger cars, sports utility vehicles, vans, and light-duty pick-up trucks.

The remaining three measures focus on heavy-duty vehicles. The first of these measures seeks additional emission reductions from the early deployment of partial zero-emission and zero-emission light- and medium-heavy-duty vehicles with gross vehicle weights between 8,501 pounds to 33,000 pounds. The second control measure for heavy-duty vehicles seeks additional emission reductions from older, pre-2010 heavy-duty vehicles beyond the

emission reductions targeted in CARB's Truck and Bus Regulation. Additional emission reductions beyond the compliance requirements of the Truck and Bus Regulation could be achieved as affected fleets purchase trucks with engines that meet an optional NOx emissions standard to replace their existing heavy-duty vehicles. In addition, fleets or trucks that are not subject to the Truck and Bus Regulation would be targeted through incentives or through regulatory actions that are within the SCAQMD's legal authority such as the SCAQMD's Rule 1190 series clean vehicle fleet rules, to purchase trucks with engines meeting an optional NOx emissions standard. The third measure will seek to accelerate the introduction of zero and near-zero emission on-road heavy-duty trucks through mobile source emission reduction credits generating programs. SCAQMD Credit Rules 1612 and 1612.1 have been in place since 1995 and 2001, respectively. However, the current versions of the rules must be revised to reflect heavy-duty vehicle technologies available today and the near-future. Mobile source emission reduction credits generated under these rules would only be available to help facilities affected by the facility-based measures (MOB-01 through MOB-04 and EGM-01). The credits are proposed to not be eligible for offset stationary source emissions.

Off-Road Mobile Source Measures

Four control measures are proposed to seek further emission reductions from off-road mobile sources and industrial equipment. The first measure calls for the continuation of the SOON provision of the Statewide In-Use Off-Road Diesel Fleet Regulation beyond 2023. The SOON provision implemented to-date has realized additional NOx reductions beyond the Statewide regulation. The second measure seeks to continue the successful lawnmower and leaf blower exchange programs and expand the programs to include a greater variety of zero-emission equipment into the commercial lawn and garden maintenance activities. A significant portion of the NOx emissions from lawn and garden equipment are attributed to larger equipment operating on diesel fuel. The extended exchange program will focus on replacing these equipment with newer equipment. The third measure calls for additional emission reductions from passenger locomotives. The Southern California Regional Rail Authority (SCRRA or Metrolink), the region's commuter rail service, is in the process of procuring 40 Tier 4 passenger locomotives. This measure will recognize these efforts and continue the purchase of Tier 4 cleaner locomotives. The fourth measure seeks to accelerate the introduction of zero and near-zero emission off-road equipment through mobile source emission reduction credits generating programs. SCAQMD Rule 1620 has been in place since 1995. However, the current version of the rule needs to be revised to reflect current off-road equipment technologies available today and the near-future. Mobile source emission reduction credits generated under these rules would only be available to help facilities affected by the facility-based measures (MOB-01 through MOB-04 and EGM-01). The credits are proposed to not be eligible for offset stationary source emissions.

Incentive Programs Measure

A measure is proposed to recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B. The San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted Rule 9610 to recognize the emission reduction benefits of incentive programs in their region. A similar action is proposed under the current measure. The SCAQMD staff has been working with U.S. EPA and CARB to identify the information and supporting documentation needed in order for U.S. EPA to consider approval of the emission reduction benefits into the SIP. The proposed measure describes six general elements initially identified by U.S. EPA that need to be addressed in order for such benefits to be accounted for in the SIP. Additional documentation and commitments to ensure that the reductions will be maintained may need to be developed as U.S. EPA considers the approvability of the emission reduction benefits.

PM2.5 CONTROL MEASURES

The Draft 2016 AQMP includes 10 stationary source control measures designed to reduce PM2.5 levels that are to be adopted and implemented in the next several years. Table IV-A-4 provides the expected adoption and implementation period, implementing agency, and expected emission reductions achieved. There are two measures that were carried over from the 2012 AQMP. The remaining eight control measures are new ideas or strengthening of existing rules or measures in previous Plans.

These measures involve Best Available Control Measures (BACM) as required. The first measure would seek PM reductions from restaurant under-fired charbroiling operations and the second measure would seek PM reductions from industrial cooling towers. The third measure seeks further PM emission reductions from paved road dust sources. The fourth measure would seek to reduce ammonia emissions from livestock waste, especially dairies and the fifth measure would seek reductions of ammonia slip from NOx control devices. The sixth measure would seek potential PM reductions from abrasive blasting through voluntary applications aided with incentives, and the seventh measure would seek PM emission reductions from stone fabricating operations. The eighth measure considers further emission reductions from Basin-wide curtailment of wood-burning devices and the ninth measure seeks further emission reductions from open burning. The last measure would propose reductions of VOC and ammonia emissions from chipped and ground but uncomposted greenwaste composting.

It should be noted that the emission reduction targets for the proposed control measures (those with quantified reductions) are established based on available or anticipated control methods or technologies. Once the SIP commitment is accepted, should there be emission reduction shortfalls in any given year, the SCAQMD would identify and adopt other measures to make up the shortfall. Similarly, if excess emission reductions are achieved in a year, they can be used in that year or carried over to subsequent years if necessary to meet reduction goals. More detailed discussion on the SCAQMD's SIP commitment is included in Chapter 4 of the Draft 2016 AQMP.

TABLE IV-A-4

SCAQMD Proposed Stationary Source PM2.5 Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tpd) (2021/2025)
BCM-01 [1]	Further Emission Reductions from Commercial Cooking [PM]	2018	2025	SCAQMD	0 / 3.3*
BCM-02	Emission Reductions from Cooling Towers [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-04 [2]	Emission Reductions from Manure Management Strategies [NH3]	2019	2020	SCAQMD	0.26 / 0.2 [NH3]
BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD	TBD	SCAQMD	TBD [a]
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-08	Further Emission Reductions from Agricultural, Prescribed and Training Burning [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	2019	2020	SCAQMD	0.1 / 0.1 [NH3]

* Contingency measure

[a] TBD are reductions to be determined once the measure is further evaluated, the technical assessment is complete, and inventories and cost-effective control approaches are identified, and are not relied upon for attainment demonstration purposes

[1] Formerly BCM-03 in the 2012 AQMP and BCM-05 in the 2007 AQMP.

[2] Formerly BCM-04 in the 2012 AQMP.

RULE EFFECTIVENESS

The 1990 federal Clean Air Act requires that emissions inventories be adjusted to reflect the rule effectiveness. As defined by U.S. EPA, rule effectiveness reflects how emission reductions, due to implementation of a regulatory program, are estimated. It describes a method to account for the reality that not all facilities covered by a rule are reasonably in compliance with the rule 100 percent of the time. In 1992, U.S. EPA suggested a default value of 80 percent[3] if emission reductions are estimated based on projected control device efficiencies. If a higher rule effectiveness value is used, the SCAQMD needs to demonstrate how these emission reductions will be achieved. In 2005, U.S. EPA revised its policy[4] in recognition that rule effectiveness can vary widely between different types of industries. So, instead of assuming a broad 80 percent default value for rule effectiveness, a list of factors should be considered that are most likely to affect rule effectiveness when developing emission inventories and attainment demonstrations. According to the U.S. EPA[5], it is not necessary to adjust the rule effectiveness when emissions can be calculated by means of a direct determination because the emissions estimate is not contingent on the effectiveness of controls. A direct determination is one in which emissions are calculated directly (e.g., based on explicit records of coating or solvent types used) rather than from estimates of uncontrolled emissions and level of control. In a recent U.S. EPA response[6] to a comment on this issue, requiring stringent compliance monitoring and reporting requirements also supports the use of the highest range of rule effectiveness factors in projecting emissions.

As described below under Rule Compliance and Test Methods, the compliance demonstration for each proposed control measure, where the SCAQMD accounted for emission reductions, identifies the compliance mechanisms such as recordkeeping, inspection and maintenance activities, etc., and test methods such as SCAQMD, CARB, and U.S. EPA approved test methods. In some cases, such as emission reductions from architectural coatings, the emissions are calculated by means of direct determination. The SCAQMD's ongoing source testing and on-site inspection programs also strengthen the status of compliance verification. In addition, the SCAQMD conducts workshops, and compliance education programs to inform facility operators of rule requirements and assist them in performing recordkeeping and self-inspections. These compliance tools are designed to ensure that rule compliance would be achieved on a continued basis. As a result, the majority of control measures proposed in this appendix with quantifiable emission reductions are based on a rule effectiveness of 100 percent. With respect to implementation of existing rules, emissions reported through the SCAQMD's Annual Emission Reporting (AER) program are based on actual emissions, substantiated by source testing or other processing data. Any upset conditions or emissions under variance are also included in the AER. Where there is potential non-compliance, emissions are adjusted to reflect that knowledge. For example, a 75 percent compliance rate is assumed for residential wood burning curtailments.

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[3] "Guidelines for Estimating and Applying Rule Effectiveness for Ozone/CP State Implementation Plan Base Year Inventories." EPA-452/R-92-010, November 1992.

[4] "Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations," EPA-454/R-05-001, August 2005, Appendix B.

[5] "Rule Effectiveness Guidance: Integration of Inventory, Compliance and Assessment Applications," EPA 452/R-94-001, January 2004.

[6] "Approval of Air Quality Implementation Plans; California; South Coast; Attainment Plan for 1997 8-Hour Ozone Standards," EPA-R09-OAR-2011-0622, Final Rule, March 1, 2012.

SIP APPROVABILITY FOR INCENTIVE-BASED MEASURES

The 2016 AQMP includes voluntary incentive measures that are part of the overall Plan to satisfy the CAA emission reduction requirements needed to achieve attainment of the federal ozone standards by 2023 and 2031. Prior AQMPs relied primarily on the adoption of rules to implement the measures provided in those AQMPs. Such regulations involve mandatory requirements and result in generally straightforward and enforceable reductions. With heavy reliance on voluntary incentive measures to achieve attainment of the federal air quality standards and for those measures to be SIP approved, the SCAQMD must design programs such that the emission reductions from these incentive measures are proven to be real, quantifiable, surplus, enforceable, and permanent.

There are key components required of a SIP submittal in order to rely on discretionary incentive programs to satisfy the CAA emission reduction requirements. The components include a demonstration addressing the "integrity elements (the five requirements listed above)," federally enforceable "backstop" commitments, technical support, funding, legal authority, public disclosure and provisions to track results that are common among the various voluntary incentive programs (VIPs). The "backstop" commitments are required to monitor emission reductions achieved by the voluntary incentive measures and to rectify any shortfalls of the commitment in the future, no later than the statutory implementation deadline. SCAQMD is committed to developing detailed guidelines for VIPs for individual incentive measures in accordance with the U.S. EPA's economic incentive programs (EIP) guidelines.[7] The following describes the necessary criteria that will be included in each of the incentive measures:

Integrity Elements

Emission reductions that are projected to be achieved from voluntary incentive measures must be real, quantifiable, surplus, enforceable, and permanent. This demonstration must include project type(s); project life; applicable incentive program guidelines by title and year; and analysis of applicable incentive program guidelines for consistency with the integrity elements. For the purposes of this demonstration, the following defines and provides examples of the key elements:

***Quantifiable*:** Emission reductions are quantitatively measureable, supported by existing and acceptable technical data. The quantification should use well-established, publicly available, and approved emission factors and accepted calculation methodology. There must be procedures to evaluate and verify over time the level of emission reductions actually achieved.

[7] References:

- "Guidance on Incorporating Voluntary Mobile Source Emission Reduction Programs in State Implementation Plans (SIPs)," October 24, 1997.
- "Improving Air Quality with Economic Incentive Programs," January 2001.
- "Guidance on SIP Credits for Emission Reductions from Electric-Sector Energy Efficiency and Renewable Energy Measures," August 5, 2004.
- "Incorporating Emerging and Voluntary Measure in a State Implementation Plan (SIP)," October 4, 2004.
- "Guidance on Incorporating Bundled Measures in a State Implementation Plan," August 16, 2005.
- "Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs into State and Tribal Implementation Plans," July 2012.
- "Diesel Retrofits: Quantifying and Using Their Emission Benefits in SIPs and Conformity: Guidance for State and Local Air and Transportation Agencies," February 2014.

Example (1): Affected equipment in industrial sector buildings currently in use have *X* tons of NOx emissions from centralized heating and power sources with usage rate *R*. If these affected units are replaced with new equipment (e.g., fuel cells) providing combined heat and power that are *Y* percent more efficient overall than the original units, overall emission reductions are calculated to be $\sum_{i,j}^{n,m}(X_i \times R \times Y_j)$, where *i = 1, …, n* and *j = 1, …, m*.

Example (2): Within a project there are *X* number of affected units (e.g., equipment, processes, homes, etc.) currently in use. If they are replaced with higher efficiency units (e.g., new equipment, controls, weatherization) with *Y* dollars of incentives per unit, resulting in *Z* tons of emission reductions per day during the "project life," the overall cost-effectiveness is calculated to be $(X \times Y)/Z$.

***Surplus*:** Emission reductions must be above and beyond all current and known future District, State, or federal regulations already included in the SIP. Annual tracking will account for any potential overlapping future regulations that could be in conflict with the surplus reductions. Emission reductions used to meet air quality attainment requirements are surplus as long as they are not otherwise relied on in the SIP, SIP-related requirements, and other State air quality programs adopted but not in the SIP, a consent decree, or federal rules that focus on reducing criteria pollutants or their precursors. In the event that a VIP's emission reductions are already relied on to meet air quality-related program requirements, they are no longer surplus. In addition, the emission reductions are available only for the remaining useful life of the equipment being replaced (e.g., if the equipment being replaced had a remaining useful life of five years, the additional emission reductions from the new equipment are available for SIP or conformity purposes under this guidance only for five years).

Example (1): Co-benefits beyond existing federal, State, or local regulations (e.g., regional greenhouse gas targets) already included in SIP baseline (e.g., ECC-03), as well as co-benefits from regulations not in the baseline (e.g., ECC-02).

Example (2): Targeting older, high polluting permitted equipment exempt from existing regulation or no legal mandate to be replaced or retrofitted.

Example (3): Sources the SCAQMD has not regulated or may not have authority to regulate, such as residential equipment.

***Enforceable*:** The SCAQMD will be responsible for assuring that the emission reductions credited in the SIP will occur. Emission reductions and other required actions are enforceable if:

- They are independently verifiable.
- Program violations are defined.
- Those liable can be identified.
- SCAQMD and U.S. EPA maintain the ability to apply penalties and secure appropriate corrective action where applicable.
- The general public has access to the emissions-related information obtained from the source.
- The general public can file suits against sources for violations (with the exception of those owned and operated by Tribes).
- They are practically enforceable in accordance with other U.S. EPA guidance on practicable enforceability.

Actual emission reductions, for example, can be assured through replacement equipment registration, recordkeeping and reporting, and inspections (initial inspection after installation and subsequent inspections on a

regular basis thereafter, if needed) throughout the term of project. Specific enforcement mechanisms will be addressed in the guidelines for the individual incentive measures.

***Permanent*:** The measure has to be permanent throughout the term for which the reduction is generated. The emission reductions are permanent if these reductions are ensured to occur over the duration of the VIP, and for as long as they are relied on in the SIP. For example, those awarded incentives would need to ensure the projects are properly implemented and the reductions are occurring and will continue to occur. Thus, recipients of the incentive awards would agree to contract provisions, such as recordkeeping and reporting to track reductions and agreements that newly installed equipment would not be removed without concurrence of SCAQMD (i.e., permanent placement) and the proof that the replaced equipment would be destroyed or at least not be operated any more in the Basin (e.g., pictures, certification). Detailed procedures to ensure permanent reductions will be described in the guidelines for the individual incentive measures.

Commitment (Federal Enforceability)

Federally enforceable commitments will be written in the Resolution of the SCAQMD Governing Board approval for the Final 2016 AQMP. These commitments will "backstop" any shortfalls in the committed reductions, and/or the incentive funding no later than the statutory implementation deadlines. The enforceable commitment must include: (1) a commitment to monitor, assess, and regularly report on emission reductions achieved; and (2) a commitment to adopt and submit substitute measures to U.S. EPA by specific dates if necessary to remedy any emission reduction shortfall. Federally enforceable commitments would include:

- The Governing Board's direction to develop guidelines for each of the source-specific VIPs that would include: integrity elements; enforceable commitment; technical analyses/support; demonstration of funding and legal authority; procedures for public disclosure of information; provisions to measure and track programmatic results, and the Governing Board's approval of the adoption of the guidelines.
- The Governing Board's approval of the adoption of VIPs as an implementation tool for the incentive measures as part of the 2016 AQMP.
- Committing to spend incentive moneys to implement projects in accordance with corresponding VIP guidelines.
- Identifying the source and the amount of incentive funding for projects.
- Adjusting program implementation and updating programs if there are any changes in the proposed source of funding, such that reduction commitments are still met and any shortfall is fulfilled.
- Quantification of emission reductions by project through implementation of these projects or substitute measures.
- Reporting to the U.S. EPA via an annual demonstration including all the supporting documentation and data.
- The Governing Board's adoption and submission of substitute rules and/or measures to address any shortfall as expeditiously as practicable in case the information the SCAQMD submitted is determined to be insufficient to demonstrate that the required reductions will occur on schedule.

Technical Analyses

Appropriate documentation supports the emission inventory of the affected sources, the estimated reductions, and projected costs to achieve reductions. Quantifying emissions and estimated reductions can rely upon a variety of data sources, including, but not limited to, SCAQMD's AER program, approved AQMP emissions inventory (Chapter 3 and Appendix III of 2016 AQMP), approved CARB's GHG reporting/inventory program emissions database, archived equipment statistics obtained from the SCAQMD's past rulemaking, and data libraries of public energy policy and planning agencies and utility businesses (e.g., CPUC, CEC, SCE, etc.). SCAQMD can use, and has used in the past, internal audit procedures to verify emissions and reductions.

Funding

Adequate funding for the project needs to be shown that the funds are committed already or are reasonably expected to be available to generate committed reductions. The funding may originate from one or more of the following sources including, but not limited to: emission reduction mitigation fees (e.g., existing Rule 1304.1 offset fees, Rule 1111, etc.), penalty fees and settlement, California Department of Motor Vehicle fees, the greenhouse gas reduction fund (GGRF) as part of AB 32's Cap-and-Trade program, national funding grants from Diesel Emission Reduction Program (DERA), and any committed State or federal funding (e.g., budget line item). The amount of funding available for the project should be estimated and reported to the U.S. EPA in the form of annual average dollars.

Resources

The SCAQMD can adequately demonstrate that staff (personnel) resources from a variety of existing departments—Planning, Technology Advancement Office (TAO), and Legislative and Public Affairs (LPA)—are sufficient to prepare guidelines, conduct outreach, process/award applications, issue contracts, perform inspection, track programs, and report to the U.S. EPA.

Outreach

Outreach is critical to the success of the program to educate the public and persuade potential participants. Outreach can be conducted in a number of forms including emails, brochures, TV and radio ads, and announcements at meetings. Modern methods can also be employed via social media. In addition, the administrator of the VIP must commit to disclosing information to the public demonstrating the emission reductions achieved. The SCAQMD has many well established routes for disseminating information including the SCAQMD website and Subscribers lists. The public process could involve working groups, public workshops, and Governing Board adoption of guidelines for the programs.

Legal Authority

The SCAQMD has authority under State law to carry out incentive programs in order to satisfy the CAA emission reduction requirements. Section 40701(f) of the California Health and Safety Code provides that a district shall have power to *"cooperate and contract with any federal, state, or local governmental agencies, private industries, or civic groups necessary or proper to the accomplishment of the purposes of this division."* In addition, pursuant

to Section 40702 of the California Health and Safety Code, the SCAQMD *"shall adopt rules and regulations and do such acts as may be necessary or proper to execute the powers and duties granted to, and imposed upon"* the SCAQMD. Moreover, the SCAQMD is not prohibited by any provision of Federal or State law from carrying out the incentive measures that are contained in the SIP. In fact, the CAA recognizes that an economic incentive programs can be used in combination with other elements of a SIP to achieve the applicable emission reduction milestone [CAA Section 182(g)(4)].

Guidelines for Measure-Specific Voluntary Incentive Programs

Each VIP needs to have detailed and comprehensive guidelines that are approved by the SCAQMD Governing Board. The guidelines will be the protocol to implement the program, to ensure SIP applicability, and to maintain SIP approvability. The guidelines will have the following specifications:

Specifications:

- ☑ Demonstrate compliance with the four key elements of the VIP: quantifiable emissions plus incentive costs, surplus reductions, enforceable compliance and permanent reductions.
- ☑ Working groups will be established to solicit public input and feedback during VIP guideline development.
- ☑ Processes and procedures to apply for incentives should be clearly explained in the guideline.
- ☑ Clearly describe how incentives would be awarded. Public working groups or workshops will take place to discuss the guidelines and incentives. Facilities or individuals qualifying for incentives shall submit applications during an open enrollment period. Projects shall be evaluated on, but not limited by, high emission reductions, incentive effectiveness, age of equipment, remaining useful life of existing equipment, Environmental Justice (EJ) area priority, and small business status.
- ☑ Conditions for contracts including tracking to ensure permanent reductions. The following forms should be prepared:
    - ☑ Application Forms (samples are required).
    - ☑ Contracts with Conditions (samples are required).
    - ☑ Product Example.
- ☑ Tracking mechanism is required to ensure overall effectiveness of program and procedures to verify and correct emission projections, such as reductions by the committed target date (e.g., 2023, 2031) and submittal to U.S. EPA annually. Tracking checklist should, at a minimum, include:
    - ☑ Project Title.
    - ☑ Product (e.g., equipment type, size, fuel use, hours operated, emissions, source test reports).
    - ☑ Annual Emission Reductions (e.g., from 2017 to 2027, incremented by one year).
    - ☑ Life of project (e.g., 10 years).
    - ☑ Installation dates (e.g., fixed year 2017 or multiple installation years 2017 and 2018).
- ☑ Recordkeeping, reporting, and monitoring requirements. These requirements need to be addressed.
- ☑ Individual outreach efforts (e.g., social media, email blasts) to promote the program, announcement(s) of application deadlines, and announcement(s) of public workshops.
- ☑ SCAQMD Governing Board approval of program guidelines and made publicly available.

FORMAT OF CONTROL MEASURES

Included in each control measure description is the title, a summary table, a description of the source category (including background and regulatory history), the proposed method of control, estimated emission reductions, rule compliance, test methods, cost-effectiveness, and references. The information that can be found under each of these subheadings is described below.

Control Measure Number

Each control measure is identified by a control measure number such as "CM # CTS-01" located at the upper right hand corner of every page. "CM #" signifies "control measure number" and is immediately followed a three-letter designation, such as "CTS," which represents the abbreviation for a source category or specific programs. For example "CTS" is an abbreviation for "Coatings and Solvents." The following provides a description of the abbreviations for each of the measures.

- ECC Energy and Climate Change Sources
- CMB Combustion Sources
- BCM Best Available Control Measures
- FUG Fugitive VOC Emissions
- CTS Coatings and Solvents
- MCS Multiple Component Sources
- FLX Compliance Flexibility Sources
- MOB Mobile Sources
- EGM Emission Growth Management Sources

If the measure is based on a control measure from the previous AQMPs, the former control measure number is footnoted.

Title

The title contains the control measure name and the major pollutant(s) controlled by the measure. Titles that state "Control of Emissions from..." indicate that the measure is regulating a new source category, not presently regulated by an existing source- specific SCAQMD rule. Titles that state "Further Emission Reductions of" imply that the measure would likely result in an amendment to an existing SCAQMD rule.

Summary Table

Each measure contains a table that summarizes the measure and is designed to identify the key components of the control measure. The table contains a brief explanation of the source category, control method, baseline emissions, emission reductions, control costs, and implementing agency.

Some measures in the summary table are listed as "TBD" (to be determined) for emission inventory, emission reductions and/or cost control. The "TBD" measures require further technical and feasibility evaluations to determine the emission reduction potential and thus, the attainment demonstration is not dependent on these

measures. However, they are included in the AQMP as part of a comprehensive plan with all feasible measures. These measures will require further development after the approval of the Plan, but could be proposed for rule or program development at a later date. Emission reductions achieved and quantified by these measures can be applied toward contingency requirements, make up for any shortfalls in reductions from other quantified measures, be credited towards rate-of-progress reporting, and/or be incorporated into future Plan revisions.

Description of Source Category

This section provides an overall description of the source category and the intent of the control measure. The source category is presented in two sections, background and regulatory history. The background has basic information about the source category such as the number of sources in the Basin, description of emission sources, and pollutants.

The regulatory history contains information regarding existing regulatory control of the source category such as applicable SCAQMD rules or regulations and whether the source category was identified in prior AQMPs.

Proposed Method of Control

The purpose of this section is to identify potential control options an emission source can use to achieve emission reductions. If an expected performance level for a control option is provided, it is intended for informational purposes only and should not be interpreted as the targeted overall control efficiency for the proposed control measure. To the extent feasible, the overall control efficiency for a control measure should take into account achievable controls in the field by various subcategories within the control measure. A more detailed type of this analysis is typically conducted during rulemaking, not in the planning stage. It has been the SCAQMD's long standing policy not to exclude any control technology and to intentionally identify as many control options as possible to spur further technology development.

In addition to the proposed control methods discussed in each control measure, affected sources may have the option of partially satisfying the emission reduction requirements of each control measure with incentive programs that will become available in the future from the implementation of control measure CM # FLX-01. Examples of incentive programs currently available and future enhancements to those incentive programs would be described in this section.

Emission Reductions

The emission reductions are estimated based on the baseline inventories prepared for the 2016 AQMP and are provided in the Control Measure Summary Table. For PM2.5 measures, the emissions data are based on the annual average inventory. For ozone measures, the summer planning inventories are used. The emissions section of the control measure summary table includes the 2012 base year inventory and the 2021 and 2025 projected inventories for PM2.5 control measures. For 8-hour ozone control measures, the 2012 base year and 2022, 2023, and 2031 future year inventories are included (2022 is the attainment year of the revoked but unattained previous 1-hour ozone NAAQS). The 2021, 2022, 2023, 2025, and 2031 inventory projections reflect implementation of existing adopted rules.

The emission reductions listed in the control measure summary table represent the current best estimates, which are subject to change during rule development. As demonstrated in previous rulemakings, the SCAQMD is always seeking maximum emission reductions when proven technically feasible and cost-effective. For emission accounting purposes, a weighted average control efficiency is calculated based on the targeted controls. The concept of a weighted average acknowledges the fact that a control measure or rule may consist of several subcategories, and the emission reduction potential for each subcategory is a function of proposed emission limitation and the associated emission inventory. Therefore, the use of control efficiency to estimate emission reductions does not represent a commitment by the SCAQMD to require emission reductions uniformly across source categories. In addition, due to the current structure of emission inventory reporting system, a control measure may partially affect an inventory source category (e.g., certain size of equipment or certain level of material usage). In this case, an impact factor is incorporated into the calculation of a control efficiency to account for the fraction of inventory affected. During the rule development, the most current inventory will be used. However, for tracking rate-of-progress for the SIP emission reduction commitment, the approved AQMP inventory will be used. More specifically, emission reductions due to mandatory or voluntary, but enforceable, actions will be credited towards SIP obligations.

Rule Compliance

This section addresses requirements in the 1990 Clean Air Act by which U.S. EPA has indicated that it is necessary to have a discussion of rule compliance with each control measure. This section discusses the recordkeeping and monitoring requirements envisioned for the control measure. In general the SCAQMD would continue to verify rule compliance through site inspections, recordkeeping, and submittal of compliance plans (when applicable).

Test Methods

In addition to requiring recordkeeping and monitoring requirements, U.S. EPA has stated that "An enforceable regulation must also contain test procedures in order to determine whether sources are in compliance." This section identifies appropriate approved SCAQMD, CARB, and U.S. EPA source test methods.

Cost-Effectiveness

Discounted Cash Flow (DCF) is a Governing Board approved method used to calculate the cost-effectiveness of each control measure. Having been used over the past decades, it provides an effective tool to compare cost-effectiveness with past regulatory actions. As control measures undergo the rule making process, more detailed control costs will be developed.

The cost-effectiveness values contained herein represent the best available information at this time. As additional information regarding technology, affected facilities, and existing processes becomes available, the cost-effectiveness will be revised and analyzed during rulemaking.

Implementing Agency

This section identifies the agency(ies) responsible for implementing the control measure. Also included in this section is a description of any legal or jurisdictional issues that may affect the control measure's implementation.

References

This section identifies directly cited references, or those references used for general background information.

SECTION 1

8-HOUR OZONE CONTROL MEASURES

GROUP 1

STATIONARY SOURCE CONTROL MEASURES

CMB-01: TRANSITION TO ZERO AND NEAR-ZERO EMISSION TECHNOLOGIES FOR STATIONARY SOURCES [NOx, VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	COMBUSTION SOURCES SUCH AS ENGINES, TURBINES, MICROTURBINES, BOILERS, AND FLARES AT COMMERCIAL, INDUSTRIAL AND TRANSPORTATION SOURCES			
CONTROL METHODS:	ZERO AND NEAR-ZERO EMISSION TECHNOLOGIES AND FINANCIAL INCENTIVE PROGRAMS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	21.6	17.5	17.5	17.6
NOX REDUCTION			2.4	5.8
NOX REMAINING			15.1	11.8
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	22.3	18.6	18.1	18.1
NOX REDUCTION			2.5	6
NOX REMAINING			15.6	12.1
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	8.3	8.3	8.3	8.4
VOC REDUCTION			1.1	2.8
VOC REMAINING			7.2	5.6
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	8.4	8.4	8.4	8.5
VOC REDUCTION			1.2	2.8
VOC REMAINING			7.2	5.7
INCENTIVE COST:	APPROXIMATELY $54,000/TON			
TOTAL INCENTIVE:	$450,000,000			
IMPLEMENTING AGENCY:	SCAQMD			

Description of Source Category

This proposed control measure reduces emissions of NOx and VOCs from traditional combustion sources by replacement or retrofits with zero and near-zero emission technologies. Facility modernization efforts will also be

aligned with other targets, such as, increasing renewable fuels for power and transportation sources. Many businesses and facilities have opportunities to update and modernize their facilities using cleaner, lower emission, less toxic alternative technologies, processes, and materials along with increasing energy efficiency. However, since many of these cleaner options may not have affordable upfront costs, the installation and use of these cleaner and more efficient choices may need to be incentivized and, when possible, combined with existing credit based programs to provide additional sources of revenue. Regulations combined with incentive-based approaches will require lower emission technologies and encourage businesses to invest in cleaner equipment sooner while minimizing cost impacts. Zero-emission technology will be utilized to maximize emission reductions whenever and wherever technically feasible and cost-effective, otherwise near-zero technology will be required.

A Business Case for Clean Air Strategies White Paper was developed to discuss principles and concepts for control measures and related programs to be included in the 2016 AQMP that, to the extent possible, create a business case for deployment of needed technologies and efficiency measures towards attaining upcoming federal air quality standards. A business case exists where a technology, fuel, or other strategy reduces emissions and also improves energy efficiency, reduces fuel or maintenance costs, creates new job opportunities, or has other economic benefits. In addition to seeking to minimize potential adverse impacts, the SCAQMD staff will explore means to maximize emission control strategies that have a business case for implementation.

Although large utilities are currently subject to the RECLAIM program and not an intended source for this control measure, it should be noted that in the industrial and commercial sectors, natural gas-fired engines, turbines, microturbines, and boilers are widely utilized for the production of facility power, heating, and steam production. Further, landfills and wastewater treatment facilities that flare biogas may be able to utilize alternative technologies as lower emissions alternatives to flare combustion, including beneficial use of gas or producing electricity for their operations through microturbines and boilers (as noted in CMB-03 – Non-Refinery Flares). Incentives may help provide the funds needed to implement gas cleanup technologies to better utilize waste gas for zero and near-zero emission technologies such as sale and injection into the natural gas (NG) pipeline or as a renewable transportation fuel.

Incorporating newer technologies such as energy storage along with biogas development, distributed energy resources, and improved efficiencies can reduce the need for redundant energy infrastructures, provide for greater grid reliability (less possibility for blackouts), and reduce the need for new fossil-based generation. Better utilizing waste streams will provide sources of energy such as biogas that can help supply near-zero emission transportation technologies, improve the Basin's NG infrastructure, and provide carbon neutral fuels.

Background

The SCAQMD has adopted a series of regulations to promote clean, lower emission technologies while encouraging economic growth and providing compliance flexibility. In addition, the SCAQMD implements incentive programs to help promote efficient, clean equipment purchases, efficiency projects, and conservation techniques that provide toxic and criteria pollutant emissions benefits, as well as greenhouse gas (GHG) emission reductions. The manufacturing and deployment of zero and near-zero emission technologies will help reduce criteria pollutant emissions in the region, accelerate removal of higher-emitting equipment that can otherwise last for many decades, and advance economic development and job opportunities in the region. In addition, this equipment is often located in or near environmental justice (EJ) communities and sensitive receptors.

Over the anticipated timeline of the Plan, as emerging technologies become more widely available and costs decline, the SCAQMD will undertake rulemaking to maximize emission reductions utilizing zero emission equipment where technically feasible and cost-effective, and near-zero emission technologies in all other applications.

Zero and Near-Zero Emission Technologies

For existing sources, replacing older higher-emitting equipment with newer zero and near-zero emitting equipment can apply to a single source or an entire facility. New businesses can be required to install and operate zero-emission equipment, technology and processes to meet the current BACT requirements. Fuel cells, efficiency improvements, electrification, along with better utilization of waste gases are ways to shift away from combustion sources generating NOx emissions wherever feasible. Combustion equipment includes engines, turbines, boilers, ovens/kilns, flares, microturbines, etc. located at industrial and commercial facilities. The modification of residential and commercial equipment for space/water heating and for energy conservation is addressed by Control Measures CMB-02 and ECC-03.

Fuel cells are capable of producing power with very low pollutant emissions while producing electricity much more efficiently (between 45–50 percent efficiency) than single-cycle combustion-based engines and turbines (between 25–35 percent efficiency). There are many installations of fuel cells across many source categories as an alternative to traditional combustion methods, resulting in a reduction of NOx emissions with co-benefit of reducing other criteria air pollutants and greenhouse gases (GHG). Current combustion units, such as some boilers, might be suitable for this application because fuel cells are capable of producing high pressure steam that can serve the demands of the facility, in addition to producing electricity that can be used by the facility. Many buildings have hot water boilers along with high electricity usage. The addition of a fuel cell can provide waste heat for hot water, generate electricity, and, in some applications, also provide building cooling with absorption chillers. These applications help reduce electrical utility load charges and can reduce the need for backup generation during outages. This type of project is currently in operation and demonstration at the University of California, Irvine Medical Center in Orange, CA.

Fuel cells have also been used to replace smaller emergency diesel engines for telecommunication companies or cellular communications sites. Some fuel cells units are modular; therefore, providing greater flexibility for a facility's power demands to be increased or decreased as needed. This type of technology has been used at the California Institute of Technology in Pasadena, CA.

An example of another technology, tri-generation (heat, power, and hydrogen), is being demonstrated at the Orange County Sanitation District showing that the gas cleanup system is capable of removing contaminants such as siloxanes, sulfur, and hydrocarbons while also providing transportation fuels.

As energy storage technologies become more widely available and less costly there will be applications in the near future in which storage technologies can replace and/or complement backup generation systems. These applications may combine onsite renewable power generation, fuel cells, and/or smaller onsite backup generation resources. Additionally, onsite storage systems will play other roles such as helping reduce electrical utility rates, integrating other onsite renewable generation sources, and help with utility grid services. Some essential back-up power applications (hospitals, communications, transportation, essential public services, etc.) may require capabilities for long-term power and fuel storage or delivery under extreme emergency conditions (earthquakes, long-term power outages, natural gas pipeline disruption, etc.). Other applications are more conducive to battery

storage or fuel cell solutions if short-term back-up power is sufficient to smoothly halt commercial or industrial operations.

Energy Sector

The electrical utility grid maintains stability by matching generation with demand. Maintaining grid stability is becoming difficult with increasingly higher percentages of power generation coming from intermittent renewable generation sources along with increasingly higher electrical load demands from electric transportation. These new variables on the grid require dispatchable and flexible resources that add load and provide power when needed. Peaking generation units typically provide these resources but have low utilization factors, are less efficient than base load plants, can be difficult to site, and are emission sources. The use of energy storage provides a flexible and dispatchable resource with zero emissions. Grid based storage systems can replace the need for new peaking generation, be coupled with renewable generation, and reduce the need for additional energy infrastructure. Although the applications for using energy storage are vast, some of the most valuable uses include reducing demand charges, providing backup power, reducing infrastructure needs to incorporate electric transportation, demand response capabilities, and short-term dispatchability. Additionally, implementing new hardware such as renewable generation and storage along with other energy resources increasingly requires implementation of smarter grid control technologies.

Under SB 350 (Clean Energy Pollution Reduction Act of 2015), California has increased the renewable portfolio standard from 33 percent by 2020 to 50 percent by 2030. Due to the large amounts of solar generation already providing power on the electrical grid, there are periods of over generation that later lead to high power ramp rates for fossil powered generation sources. Rather than curtail renewable power generation, the use of storage provides a flexible and dispatchable grid resource. California adopted AB 2514 (Energy Storage Systems) to start the integration and development of at least 1.3 gigawatts (GW) of energy storage within the State's investor owned utilities.

Several different technologies are being utilized for energy storage systems which include: batteries, fuel production, flywheels, pumped hydro, and compressed air. Currently, the most widely used storage systems utilize different battery chemistries along with using second life electric vehicle batteries. Grid scale energy storage systems are starting to be implemented that replace the need for new peaking generation plants and can minimize the need for additional transmission lines along with other electrical utility infrastructure. Additionally, the California Independent System Operator (CAISO) is developing a distributed energy resource program (DERP) that allows the aggregation of several smart grid systems to bid into the wholesale electricity power market. This will provide an additional market and incentive for the installation of these systems. To ensure storage technology projects are effective and successful, all affected entities could participate in and complete an in-depth analysis that will meet California Public Utilities Commission (CPUC) regulations.

Further development and utilization of biogas is being targeted by State agencies to help achieve the State's GHG targets and waste diversion goals. Biogas is included as an energy source to help achieve the renewable portfolio targets, is incentivized as a transportation fuel under the Low Carbon Fuel Standard (LCFS) and federal Renewable Fuel Standard (RFS), can help reduce the need for large NG storage facilities, and provides resiliency towards fluctuating fossil energy markets.

Combined heat and power (CHP), also known as cogeneration, is the production of electricity or power and thermal energy (heating/cooling) from a single source of energy. This can include technology such as fuel cells, gas turbines,

microturbines, reciprocating engines, and steam turbines. Incentivizing towards lower emitting CHP, with certain technology applications, can produce high efficiency power and thermal energy (often at 65–75 percent efficiency). Providing facilities with incentives towards CHP can help meet environmental policy goals for CHP targets, such as President Obama's Executive Order to add 40 GW by 2020, CARB's target to add 4 GW by 2020, and Governor Brown's Clean Energy Jobs Plan to add 6.5 GW by 2030. CHP can provide facility operators lower operating costs, enhanced energy security, greater energy efficiency, and reduce GHGs along with other criteria pollutants. Newer CHP systems being tested include a micro-CHP internal combustion (IC), organic rankine cycles (ORC), and an engine based CHP system coupled with thermal energy storage to provide electricity or heat. Additionally there are renewable energy technologies that are being developed that have both power and thermal energy outputs. Incentives are expected to make new CHP systems more cost-effective and as technology evolves, the costs are expected to decrease.

Incentive and Regulatory History

Incentives

SCAQMD currently offers a number of funding/grant resources to encourage the immediate use of clean, lower emission technologies. The incentive programs, which include incremental funding or subsidies, are designed to promote voluntary introduction of alternative improved practices and new technologies on an accelerated schedule. Examples of such funding programs, in part, include:

- Financial Assistance for Alternative Dry Cleaning Equipment Purchases;
- Wood Stove & Fireplace Change-Out Incentive Program;
- Carl Moyer Memorial Air Quality Standards Attainment Program for vehicle retrofit and replacement;
- Proposition 1B – Goods Movement Emission Reduction Program;
- Residential and Commercial electric vehicle charger incentives; and
- Enhanced Fleet Modernization Program (EFMP) for retirement of older higher polluting vehicles.

Additionally, regulatory relief incentives have been incorporated into several SCAQMD rules including:

- Reduced recordkeeping for Super-Compliant coatings, adhesives and solvents in Rule 109 – Recordkeeping for Volatile Organic Compound Emissions;
- Exemption from fees for ultra-low VOC architectural coatings in Rule 314 – Fees for Architectural Coatings;
- Less frequent source testing for low-emitting point sources in Rule 1420.2 – Emission Standards for Lead from Metal Melting Facilities; and
- Less frequent inspection schedules for high-compliance facilities in Rule 1173 – Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants.

Regulations

This control measure can create new regulations or lead to changes in existing regulations, including the following:

- Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines

- Rules 1146 and 1146.1 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters
- Rule 1146.2 – Emissions of Oxides Of Nitrogen from Large Water Heaters and Small Boilers And Process Heaters
- Rule 1147 – NOx Reductions from Miscellaneous Sources
- Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines

Incentivizing the use of much cleaner, less polluting, products and equipment will require additional efforts to broaden the scope of stationary source incentives.

Proposed Method of Control

CMB-01 is designed to maximize emission reductions utilizing zero emission technologies where and when technically feasible and cost-effective, and near-zero emission technologies in all other applications. In assessing the cost-effectiveness of these technologies, the life-cycle in-Basin emissions under current and future energy productions and transmission portfolios must be considered. As the energy supply and distribution system change over time, certain technologies may become more or less effective at reducing emissions. GHG emissions and toxic impacts must also be considered. This measure will achieve the committed NOx emission reductions through a combination of regulations and incentives. Regulations will set standards for new equipment installations in some applications, and incentives will accelerate the change out of existing equipment before regulatory compliance deadlines. The SCAQMD strives to remain fuel neutral and this control measure is not intended to incentivize one technology over another. Incentives will also help develop and reduce costs for technologies that currently may not be cost-effective, but could become more attractive with lower costs or with a different energy portfolio. For these emerging technologies, regulatory requirements can become feasible in the future. As regulations are amended to include new or more stringent standards for equipment installations, certain zero or near-zero technologies may not yet be cost-effective to be included as part of the regulatory requirements. Thus incentives will encourage and/or play a significant role in making it cost-effective for facilities or equipment owners to lean towards zero or near-zero technologies or replace equipment earlier. For example, this measure anticipates regulatory requirements for facilities applying for new permits for diesel backup generators such that the facility will have to demonstrate why zero or near-zero emitting alternatives are not technically feasible or cost-effective prior to approving a new permit. Incentives can be applied to encourage the replacement of existing diesel backup generators to battery storage for example, in applications where longer-term back-up power is not required, or may be used for new equipment at facilities that go above and beyond regulatory requirements to use zero and near-zero technologies that may not otherwise be cost-effective. The incentives will be targeted to EJ areas and near sensitive receptors such as schools, hospital, etc.

This measure of control addresses non-power plant combustion sources such as engines, turbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production, and replacing these stationary sources with zero or near-zero emission technologies. Some specific sources include industrial and commercial facilities operating NG, diesel and liquid petroleum gas (LPG) stationary and emergency engines, as well as NOx point sources from the service/commercial and manufacturing/industrial sectors. The combustion units currently installed have been in operation for many years and most have already undergone post-

combustion retrofits in order to meet current emission standards. An implementation schedule based on equipment age can be adopted to ensure that the existing units serve their useful equipment life or provide incentives to allow early retirement and advanced replacement or retrofits with zero or near-zero emission technologies, that go beyond current emissions standards. Incentivizing the replacement of higher-emitting equipment with lower-emitting technology or equipment that goes beyond current emission standards can allow facilities to be more efficient and lessen grid dependence. Facility modernization will include equipment replacement or infrastructure improvements to utilize zero and near-zero technology. As regulations are being developed, incentive programs will be implemented to encourage implementation of zero or near-zero technologies where they are not technically and economically feasible.

The SCAQMD will work with agencies, utilities, businesses and other stakeholders to implement smart grid systems, energy storage, and integration of electric transportation by establishing working group meetings. As an example, the SCAQMD could help facilitate dialogue between businesses that want to replace equipment or modernize their facilities with utility companies or agencies that may need to provide infrastructure. Working group meetings could help affected or interested stakeholders address potential concerns that may arise from new technology and equipment replacement. An example could be the coordination of a landfill facility with a city to provide biogas as a transportation fuel. In some cases, however, conversion of back-up power supplies for some sources, such as essential public services like hospitals, water and wastewater facilities, hazardous operations and transportation sources, that rely on constant power to avoid potential life-threatening consequences will need to be ensured of an available supply of electricity in case the primary source of power is compromised. For all others, energy storage and smart grid will prove beneficial. High value grid and rate reduction applications are being developed and demonstrated to provide emission reductions.

SCAQMD's tool for the annual emission reporting (AER) program requires reporting emissions at permit unit/equipment/device levels. The reporting tool classifies the type of emission source (e.g., external combustion, IC, coatings, tanks, etc.) and requires fuel type, throughput, pollutant and emission factors.

Staff used a bottom up approach to compile an emissions inventory from combustion sources in the AER program, excluding facilities subject to the RECLAIM program. The emissions inventory identified older, higher-emitting categories including ICEs, afterburners, boilers, dryers/ovens/furnaces, and flares. Table 1 identifies the largest sources of NOx emissions based on aggregating the combustion equipment that have been permitted from 1978 to 2015.

TABLE 1

Permitted NOx Combustion Sources

Equipment Type	NOx Emissions (tpd)	# of Units
Afterburners	0.5	372
Boilers	8.3	2,511
Dryers	0.2	218
Flares	0.7	175
Furnaces	0.5	753
Heaters	0.2	770
Incinerators	1.7	192
Ovens	1.0	2,174
Stationary Emergency ICEs	3.3	11,814
Stationary Non-Emergency ICEs	2.2	544
Turbines	2.4	215

Staff conducted a further evaluation of the permitted ICEs based on age and fuel type, which is shown in Table 2.

TABLE 2

Breakdown of Permitted ICEs

Category	Pieces of Equipment	Total NOx Emissions (tpd)
All ICEs	12,358	5.5
Older ICEs (permit dates ≤2010)	8,669	3.3
Older ICEs with permit modifications*	1,476	0.90
Newer ICEs (permit dates >2010)*	2,213	1.3
Older ICEs	10,145	4.2
Non-Diesel Engines	1,430	2.0
Diesel Engines	8,715	2.2
Tier I or unknown	3,570	0.9
Tier II	2,144	0.5

* Pieces of equipment and emissions were further refined. The previously categorized newer ICEs revealed that 60 percent of the new (>2010) permits represented new pieces of equipment and 40 percent primarily represented old ICEs with administrative changes to the permit.

In addition to the SCAQMD permitted ICEs, staff estimates the following emissions for permit exempt ICEs (25–50 bhp units) and ICEs in the Statewide Portable Equipment Registration Program (PERP) as shown in Table 3.

TABLE 3

ICEs not Permitted by SCAQMD

Equipment Type	Pieces of Equipment	Total NOx Emissions (tpd)
Permit Exempt (25–50 bhp)[1]	2,565	0.1
PERP[2]	11,026	12.0[3]
Total	13,591	12.1

1. CARB's Off-Road 2007 inventory model.
2. Emissions estimated of 200 hours per year.
3. Current emissions are 12.0 tpd, with projections of 6.5 tpd in 2023 and 4 tpd in 2031.

Equipment Replacement or Retrofits

Engines

Internal combustion engines (ICEs) are typically used to power generators or fire pumps and used for emergency back-up or non-emergency purposes. Engines use a variety of different fuel types such as diesel, NG, or LPG. ICEs currently permitted in the Basin are greater than 50 bhp and stationary. Staff has identified approximately 13,000 ICEs in the permitting system and of this 5,800 are diesel fired ICEs meeting Tier 1 (or unknown) or Tier 2 requirements. These are older (permitted before 2010) and higher-emitting pieces of equipment that will be replaced with cleaner technology. Based on this analysis, staff expects a number of older diesel ICEs to be replaced with zero or near-zero technology, but meeting at a minimum Tier 4 emission standards. The majority of the permitted stationary ICEs are diesel emergency backup generators and emissions per piece of equipment is primarily from testing and maintenance; however, due to the large quantity of ICEs in the Basin, the cumulative emissions from the ICE category is a large source of NOx emissions. Non-diesel ICEs can be replaced by powering equipment with near-zero emissions CHP systems with catalyst, electrical energy, fuel cells, or backup battery storage units. In addition to the permitted stationary ICEs, there are also portable ICEs in the PERP program and permit exempt ICEs (greater than 25 bhp and less than 50 bhp) that operate within the Basin. These ICEs can be used as emergency backup generators but are also used for prime power generation at construction sites, large scale lighting at festivals, sporting events, concerts, and parking lots along with other applications. They are available at rental yards and unlike emergency backup generators may run five to 12 hours a day and be combined with other similar sized units. Since these ICEs are portable, if incentive funding is provided, a registration for the replacement of equipment could be required to ensure the equipment remains within the SCAQMD. During development of the incentive program, staff will refine the emissions inventory and a regulatory measure may be implemented in the future for the 25–50 bhp units after the implementation of the incentive programs and the cost of technologies decline. Emission reductions from ICEs are expected to be 1.3 tpd for 2023. It is anticipated the costs will decrease and as market acceptance increases for fuel cells and/or backup battery storage units, units running on alternative fuels, and improved emission control devices, and thus greater emission reductions will be achieved by 2031.

Regulations will be developed to ensure new installations of emergency back-up ICEs use the cleanest technology possible. In some applications, zero-emission technologies are available, meet the demand profile of a facility, and will be required to be installed. For existing equipment, a business or facility can be provided incentives for replacement or retrofits. Incentives can include the reduced cost of back-up generator testing and SCAQMD permitting fees. Examples of lower NOx emitting replacement or retrofit technologies for diesel ICEs are fuel cells, battery storage systems, NG fired engines, and the usage of renewable fuels. Battery storage will allow electricity to be stored at off-peak hours and utilized when needed. These types of systems not only provide uninterrupted energy supply for a period of time, they can be used to reduce peak demand utility charges and provide grid stability. Smaller engines such as those located at cellular towers may be viable options for batteries. Another example of near-zero technology that ICEs can be replaced with are fuel cells. This technology works well for smaller engines (less than 134 brake horsepower (bhp)) at cellular communication sites. This type of equipment is modular; therefore, it is convenient if a facility would like to increase or decrease their power usage. Approximately 400 diesel ICEs have been identified at communications facilities. A more in-depth analysis will be required to identify which ICEs are at cellular communication towers and if they are less than 134 bhp. Another type of technology includes retrofitting

diesel engines with a bi-fuel system and substituting diesel usage with NG. This engine conversion currently works best with engines that are Tier 3 or lower. Sites that do not have NG pipeline readily available, or are concerned about pipeline supply disruption during an emergency, can bring in NG trailers similar to diesel fuel tanks. These NG trailers can be connected to form a virtual pipeline to meet a facility's ICE fuel demand. After conversion, these bi-fuel systems are expected to reduce the existing diesel ICEs NOx emission levels by 30 percent. If these technologies prove impractical for a particular application, a lower Tier diesel fired ICE can be replaced with a diesel-fired ICE meeting, at a minimum, Tier 4 standards. There are also opportunities for these unavoidable reaming back-up diesel generators to utilize 100 percent bio-diesel fuel for their periodic testing. The use of these fuels has been shown to reduce direct PM emissions, and may have some nominal NOx reductions benefits as well.

Although fewer NG fired engines were identified in the permitting system than diesel engines, many older NG engines still represent a large portion of NOx emissions because they are often run for non-emergency purposes. Wherever technically feasible and cost-effective, engines in this population can be replaced with zero or near-zero technology such as fuel cell or battery storage technology. For NG fired engines, there is a potential for further NOx reductions, based on existing technology that has been achieved in practice. The current NOx emission limit established in Rule 1110.2, which applies to stationary engines above 50 bhp is 11 ppm at 15 percent oxygen. There are more stringent emission limits in the rule for new electrical generators that are based on California Air Resources Board (CARB's) Distributed Generation standards. The NOx levels for these units are about 80 percent less than the 11 ppm NOx emission limit (less than 2 ppm). This further reduction can be achieved for rich-burn engines by using catalyst technology that employs a multi-step approach to achieve lower emissions that are comparable to those of fuel cells. Two facilities have already installed this technology in the SCAQMD region and permit applications have been submitted at another location. For engines that are operated for CHP, existing systems up to 500 kW (670 bhp) can be replaced with a new engine and emission control system to achieve near-zero emissions. For non-CHP applications such as pumps, compressors, etc., a retrofit application can be installed which can be advantageous because the basic equipment can be retained, thereby lowering the costs substantially compared to the replacement of an existing engine and accompanying control system with a fuel cell. This would apply to engines of varying sizes. Since this technology has been achieved in practice, these emission levels can be established in future regulations. Engine operators will be encouraged to participate in the incentive program towards zero and near-zero technology and become early adopters of these technologies before regulatory compliance deadlines.

Staff will target commercial engines and will work closely with stakeholders during the rule making process. In certain applications, technology assessments may need to be completed to ensure a viable solution for replacements or retrofits of older existing ICEs. Given the complexity of each facility and ICE usage; different technologies are available to be implemented and not one solution is appropriate for all ICE replacements or retrofits.

Boilers

Boilers are used to produce steam for various processes, for electricity or heat generation. The SCAQMD regulates boilers greater than 5 million British thermal units (MMBtu) under Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters. During the 2008 amendment for Rule 1146, approximately 133 low fuel usage NG boilers (operating at a heat input of less than or equal to 90,000 therms per calendar year) were identified. These boilers are between 5

and 75 MMBtu per hour. These boilers are expected to meet the NOx limit of 30 ppm by January 1, 2015 or during burner replacement, whichever is later, through the use of low NOx burners. However, these older boilers can be upgraded to advanced boilers meeting 9 ppm or install selective catalytic reduction (SCR) to reach greater NOx emissions that are above and beyond the current regulatory requirements. Emissions as low as 5 ppm can be achieved with ultra-low NOx burner technology in some steady state applications where there are no substantial load changes. For the December 2015 amendments to the NOx RECLAIM regulation, a Best Available Retrofit Control Technology (BARCT) emission factor of 2 ppm was established for refinery boilers and heaters above 40 MMBtu/hr, with SCR as the primary technology. There are also other emerging technologies that can achieve the same emission level without the use of catalytic after-treatment. One of the technologies includes a flameless heater that has been achieved-in-practice, is commercially available, and can be designed to reach two ppmv NOx (at 3 percent oxygen) without the use of a SCR. Another technology has been demonstrated with SJVAPCD and can be used without the need for flue gas recirculation, SCR, or high excess air operation. If regulatory changes are not cost-effective at the time they are proposed, incentives will help facilities change out older higher-emitting equipment to newer lower-emitting equipment prior to the establishment of new regulatory limits.

Ovens/Furnaces/Kilns

Staff estimates there are 1,000 permit exempt ovens/furnaces/kilns at permitted facilities throughout the Basin. Small, permit exempt pieces of equipment may have relatively low NOx emissions; however, the relatively low replacement cost may make replacement very cost-effective if incentives for small businesses are applied appropriately.

Facility Modernization by Sector

Facility modernization can result in substantial emission reductions, especially if the cleaner equipment is at zero or near-zero emission levels. Efforts to encourage clean facilities to site and operate in the Basin can result in emission reduction benefits as well as other co-benefits to the local economy, particularly to the surrounding community. Consistent with this effort, there are three objectives:

1. Establish regulatory requirements that call for a priority on maximizing emission reductions utilizing zero emission technology, where technically feasible and cost-effective, and near-zero technologies in other applications.

2. Provide incentives for existing businesses to maximize emission reductions by accelerating replacement of older equipment with zero emission technologies, where technically feasible and cost-effective, and near-zero emission technologies in other applications.

3. Encourage new businesses that use and/or manufacture zero and near-zero emission technologies to site in the Basin.

In the past, a variety of incentive programs have been implemented, such as exempting electric equipment from permitting, implementing measures to streamline permit processing for cleaner equipment, using short-term mobile source credits, mitigation fee programs, the Air Quality Investment Program (AQIP), and emissions averaging provisions in rules.

Incentivizing emission reductions from various stationary and area sources through incentive programs through the use of zero and near-zero emission technologies is an effective approach in achieving immediate NOx reduction in the short term. Facilities will be able to qualify for incentive funding if they utilize equipment and/or accept permit conditions, which result in cost-effective emission reductions that are beyond existing requirements. The program will establish procedures for quantifying emissions benefits from clean technology implementation and develop cost-effectiveness thresholds for funding eligibility. Mechanisms will be explored to incentivize businesses and facilities to choose the cleanest technologies, as they replace or retrofit equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these technologies sooner. This will include creating a guideline for equipment that ranks technology or equipment with lower emissions with lesser incentive amounts. This can be a top-down approach, where a facility has to demonstrate why other lower-emitting technologies are not feasible, before receiving incentives for an equipment replacement with higher emissions. Although replacement or retrofitting of older, higher-emitting sources is expected to have the greatest potential for emission reductions, providing incentives and eliminating barriers for new sources to manufacture and use ultra clean technologies is also important. It is be advantageous for facilities to use the incentive program to modernize facilities towards zero and near-zero technologies before regulations come into effect.

Using AER, staff identified the largest non-RECLAIM NOx emitting facilities. Sixty six facilities were identified consisting of municipal solid waste (MSW) incinerators, landfill gas, and wastewater treatment facilities, and together these facilities emit 2.3 tons per day (tpd) of NOx. Waste streams from MSW facilities and landfills are anticipated to be reduced as the State strives to meet the 75 percent recycling goal by 2020 under AB 341 (Chesbro, Chapter 476, Statutes of 2011). These facilities can be analyzed to determine where the greatest emission reductions can be achieved and replaced with zero or near-zero equipment or emission technology including the diversion of waste streams to be cleaned up or processed, or biogas to be routed to pipelines or used for transportation fuels. Facilities will be identified that are closer to pipelines with corresponding lower costs for pipeline injection infrastructure. Pipeline infrastructure and biogas cleanup play a large factor in the costs for pipeline injection. Depending on the type of technology or equipment receiving biogas, biogas cleanup can be removal of nitrogen, siloxanes, hydrogen sulfides, high levels of oxygen, and other trace constituents.

Incentives for infrastructure and biogas cleanup will help these sources find beneficial uses with co-benefits for these waste streams. Given uncertainties in the current markets, reductions are targeted for the long-term (2031). It is expected advancements in technology will continue and become more cost-effective once established. A facility that has a low level of biogas output may be able to work together with other facilities by combining multiple throughputs or outputs together to create more cost-effective systems, such as coupling pipelines for reinjection or for transportation fuel. These facilities working together may be able to more effectively qualify for incentives and other market based renewable fuel credits. Staff also anticipates technology will evolve to address waste streams for facilities that produce low levels of biogas, making it easier to utilize biogas for other beneficial usage instead of flaring.

Municipal Solid Waste (MSW) Facilities

Two MSW facilities in the Basin were designed in the 1980s to demonstrate that waste can be converted to energy as a method to manage solid waste. Although these facilities have some NOx controls with existing selective non-catalytic reduction (SNCR), they have been identified in the SCAQMD's permitting system as being among the top emitters of NOx. These facilities have existing thirty-year contracts with energy companies that make their business model profitable; however, those contracts will expire over the next few years and burning MSW may no longer be profitable. If these types of facilities continue operation, there is a potential for NOx emission reductions up to

80 percent by installing of a back-end low temperature SCR. However, other waste diversion and digestion options can lower emissions even more.

Landfills and Wastewater Facilities

Anaerobic digestion of organic material from wastewater treatment facilities and the decomposition of waste at landfills are sources of biogas. Often the biogas is routed to engines or flares and burned. Integrated planning between the SCAQMD and other agencies can determine other uses for the biomethane generated that will result in lower NOx emissions. A top-down analysis of the top emitting facilities can determine whether or not waste streams can be cleaned up or processed, and routed to pipelines or used for transportation fuels. A working group will be formed that will strive to overcome obstacles and include interested parties, such as The Gas Company, the sanitation districts, landfill operators, and the CPUC. Costs from pipeline infrastructure and biogas cleanup are one of the barriers for pipeline injection; however, these costs can be reduced through incentive programs. Waste gas that would otherwise be flared, can also be directed to microturbines or boilers that use ORC to provide some power to the facility. New power producing technologies, such as the ORC, shows the ability to consume gas that would otherwise be flared and provides a co-benefit by producing power. This technology utilizes heat recovery from gas combustion to operate the ORC loop to make power. Landfills and wastewater facilities investing in zero and near-zero technology may qualify for incentives for biogas cleanup or pipeline infrastructure costs.

Potential Incentives

The SCAQMD staff has compiled a list of potential incentives for stationary sources to encourage businesses to use zero or near-zero emission technologies or enhancements to the SCAQMD's existing programs to reduce or eliminate barriers to implement state of the art technologies. The list below represents an initial list of potential concepts. It is expected that as the SCAQMD staff and stakeholders further explore incentive approaches, additional concepts may be identified while others may be removed. Further, the SCAQMD staff is committed to further investigating all concepts.

- ☑ **Incentive Funding:** Incentive funding involves the creation of economic incentives to reduce the cost and encourage businesses to replace their existing high emitting equipment with equipment that is zero or near-zero emitting. It includes mechanisms such as loans and grants. Funding for these programs can derive from mitigation fees, penalty or settlement fees, or federal or State grants and programs.
- ☑ **Permitting and Fee Incentives and Enhancements:** Permitting and fee incentives and enhancements would include the expansion of the existing equipment certification program and pre-approved permit program to include additional equipment categories. Incentives involving reduced permitting fee programs for advanced technologies which significantly reduce emissions as well as other permitting enhancements identified as part of the 2012/2013 priority projects are also discussed in this incentive approach.
- ☑ **NSR Incentives and Enhancements:** The mechanism of credit offsets and NSR incentives includes expanding the number of exemptions under Rule 1304 – Exemptions and expanding the use of the priority reserve under Rule 1309.1 – Priority Reserve. In addition this mechanism includes the adoption of a Clean Air Investment Fund and potential short-term leasing of offset credits.
- ☑ **CEQA Incentives:** CEQA incentives will focus on mechanisms the SCAQMD staff can provide in the CEQA process such as expedited review.

- ☑ **Branding Incentives:** Branding incentives can recognize businesses or equipment that reach a superior level of air quality excellence. Branding incentives can vary from recognition awards to specific labeling or certification.
- ☑ **Recordkeeping and Reporting Incentives:** Recordkeeping and reporting incentives can reduce the recordkeeping and reporting requirements for specific zero and near-zero emission technologies.

  An example of a recordkeeping and reporting incentive can come from replacing a diesel ICE with a fuel cell or battery storage. This diesel ICE may currently be required to keep fuel usage records, operation and weekly maintenance logs, and/or a fuel meter; however, if the facility changed to a fuel cell or battery storage they may need to only maintain maintenance records. Fuel usage records, hour meter records, and operation logs would no longer be needed to be maintained and reported to enforcement to ensure compliance.

- ☑ **Emission Reduction Credit Incentives:** An alternative incentive can be the generation of area or point source emission reduction credits that can be used by other entities for compliance with other SCAQMD rules. The emission reduction credits can be discounted to provide additional emission reductions to help meet air quality standards.

  In 1997, the SCAQMD adopted an area source credit rule for NOx and SOx (Rule 2506) to encourage emission reductions and technology advancement for unpermitted sources, provide incentives for the accelerated turnover of old, higher-emitting equipment, and generate low-cost NOx and SOx emission credits. Emission credits created under Rule 2506 may be used as an alternate means of compliance with specified District regulations. In addition, Rule 2507 provides opportunities to generate NOx area source credits for use in RECLAIM through the voluntary electrification of agricultural pumps.

Incentives Implementation

Emission reductions credits that are projected to be achieved from incentive programs must be demonstrated to be real, quantifiable, surplus, enforceable, and permanent as defined by the U.S. EPA. Compliance will be based on tracking, recordkeeping, and reporting requirements that will be established in the guidelines protocol for the incentive measure. In addition, compliance can be verified through inspections and other recordkeeping and reporting requirements. These demonstrations must include project type(s); project life; applicable incentive program guidelines by title, year, chapter; and analysis of applicable incentive program guidelines for consistency with integrity elements. The following describes the key elements of such a demonstration:

- Quantifiable: Emission reductions are quantitatively measureable, supported by existing and acceptable technical data. The quantification should use well-established, publicly available, and approved emission factors and accepted calculation methodology. There must be procedures to evaluate and verify over time the level of emission reductions actually achieved.

- Surplus: Emission reductions must be above and beyond any district, State, or federal regulation already included in the SIP. Emission reductions used to meet air quality attainment requirements are surplus as long as they are not otherwise relied on in the SIP, SIP-related requirements, and other State air quality programs adopted but not in the SIP, a consent decree, or federal rules that focus on reducing criteria pollutants or their precursors. In the event that an incentive program's emission reductions are already relied on to meet air quality-related program requirements, they are no longer surplus. In addition, the emission reductions are

available only for the remaining useful life of the equipment being replaced (e.g., if the equipment being replaced has a remaining useful life of five years, the additional emission reductions from the new equipment are available for SIP purposes under this guidance for only five years).

Targeting older, higher polluting permitted equipment, such as ovens, furnaces, dryers, and low fuel usage NG boilers, that are exempt from existing regulation or under no legal mandate to be replaced or retrofitted with newer more efficient and lower polluting equipment. Older ICEs with remaining usable life can be replaced with zero and near-zero technologies, while taking advantage of incentives before regulations are adopted. The SCAQMD will be able to use the reductions for SIP purposes and reach attainment earlier.

- Enforceable: The SCAQMD will be responsible for assuring that the emission reductions credited in the SIP will occur. Emission reductions and other required actions are enforceable if:
    - They are independently verifiable;
    - Program violations are defined;
    - Those liable can be identified;
    - SCAQMD, CARB and U.S. EPA maintain the ability to apply penalties and secure appropriate corrective action where applicable;
    - The general public has access to all the emissions-related information obtained from the source;
    - The general public can file suits against sources for violations (with the exception of those owned and operated by Tribes); and
    - They are practically enforceable in accordance with other U.S. EPA guidance on practicable enforceability.

  Actual emission reductions, for example, can be assured through replacement or retrofit equipment registration, recordkeeping and reporting, and inspections (initial after installation and subsequent on a regular basis thereafter, if needed) throughout the term. Specific enforcement mechanisms will be addressed in the guidelines for the individual incentive measures.

- Permanent: The emission reductions need to be permanent throughout the term for which the credit is generated. The emission reductions are permanent if these reductions are ensured to occur over the duration of the incentive program, and for as long as they are relied on in the SIP.

  For example, those awarded incentives will need to ensure the projects are properly implemented and the reductions are occurring and will continue to occur. Thus, recipients of the incentive awards will agree to contract provisions, such as recordkeeping and reporting to track reductions and agreements that newly installed equipment will not be removed without concurrence with SCAQMD (i.e., permanent placement) and the proof that the replaced equipment will be destroyed or at least not be operated any more in the Basin (e.g., pictures, certification). Detailed procedures to ensure permanent reductions will be described in the guidelines for the individual incentive measures.

Guidelines

The incentive program needs to develop detailed and comprehensive guidelines that are approved by the SCAQMD Governing Board. The guidelines will be the protocol to implement the program, to ensure SIP applicability, and to maintain SIP approvability. The guidelines will have the following:

- ☑ Demonstrate compliance with the four key elements of the incentive program: quantifiable emissions plus incentive costs, surplus reductions, enforceable compliance and permanent reductions.
- ☑ Working groups will be established to solicit public input and feedback during the incentive program guideline development.
- ☑ Processes and procedures to apply for incentives will be clearly explained in the guidelines.
- ☑ Clearly describe how incentives will be awarded. Public working groups or workshops will take place to discuss the guidelines and incentives. Facilities qualifying for incentives shall submit applications during an open enrollment period. Projects shall be evaluated on criteria, including but not limited to, emission reductions, incentive effectiveness, age of equipment, remaining useful life of existing equipment, EJ area priority, local business, and small business status.
- ☑ Conditions for contracts including tracking to ensure permanent reductions. The following forms will be prepared:
  - ☑ Application Forms (samples are required);
  - ☑ Contracts with Conditions (samples are required); and
  - ☑ Product Example.
- ☑ Tracking mechanism to ensure overall effectiveness of program and procedures to verify and correct emission projections, such as reductions by the committed target date (e.g., 2023, 2031) and submittal to U.S. EPA annually. Tracking checklist will at a minimum include:
  - ☑ Project Title;
  - ☑ Product (e.g. equipment type, size, fuel use, hours operated, emissions, source test reports);
  - ☑ Annual Emission Reductions (e.g., from 2017 to 2027, incremented by one year);
  - ☑ Life of project (e.g., 10 years); and
  - ☑ Installation dates (e.g., fixed year 2017 or multiple installation years 2017 and 2018).
- ☑ Recordkeeping, reporting, and monitoring requirements. These requirements need to be addressed.
- ☑ Individual outreach efforts (e.g., social media, email blasts) to promote the program, announcement(s) of application deadlines, and announcement(s) of public workshops.
- ☑ SCAQMD Governing Board approval of program guidelines and made publicly available.
- ☑ Facilities must provide documentation (i.e., Permits, operating and maintenance records, inspection reports, etc.) to validate equipment qualifying for the incentive program has been operating within the SCAQMD jurisdiction for a minimum of five years.
- ☑ Demonstrate that existing equipment qualifying for the incentive program has at least five years of remaining useful life.
- ☑ Replacement or control equipment incentivized through the incentive program must comply with applicable permitting requirements (e.g., BACT, NSR, modeling) to ensure equipment meets all federal, State, and SCAQMD regulations and has enforceable conditions.

- ☑ New equipment can be source tested after initial operation to ensure equipment has been installed correctly. Periodic testing and parametric monitoring can be conducted to ensure the equipment continues to operate effectively and efficiently.
- ☑ The incentive program shall take into consideration any additional operating and maintenance costs or efficiency improvements associated with the new equipment in the incentive effectiveness.
- ☑ Facilities operating new or modified equipment shall continue to pay an annual permitting fee to ensure the equipment maintains a permit. The annual permitting fee shall be similar to the equipment being replaced.
- ☑ New or modified equipment will result in less NOx and/or VOC emissions than the equipment being replaced. In many cases, this will result in lower annual emissions fees.
- ☑ New equipment will undergo a CEQA analysis to ensure significant health risks and environmental hazards are not created.
- ☑ Old equipment will be removed and destroyed to prevent additional emissions.

Emission Reductions

Facility modernization can take place in the both the short- and long-term. The feasibility of regulations and the amount of available incentives will directly affect the level of emission reductions achieved. At a minimum, an estimated 14 percent NOx reduction from the baseline will be achieved by 2023 from converting some existing stationary combustion sources to zero and near-zero emission technologies. An effort to modernize with a combination of regulatory and incentive-based approaches will result in at least a 27 percent NOx emission reduction from the baseline by 2031. As new technologies become more established, the cost of the technology is expected to decrease; therefore providing more opportunities to transition to zero and near-zero technologies by 2031 and for regulations to also be established. Emission benefits from incentives will be quantified based on program participation, technology penetration, and other assessment and inventory methods. Implementing additional incentive programs will include a means to quantify these benefits as they are developed. Updated emission reductions achieved from these activities will be incorporated into the subsequent SIP revisions as projects are implemented.

The following potential emission reductions have been identified through an analysis of AER and permitting systems:

TABLE 4

Emission Categories Identified for Potential Reductions

Category	# Units/ Facilities	Current Emissions	2023 Reductions (tpd)	2031 Reductions (tpd)
ICEs (<2010) – (Permitted)	10,145	4.2	0.6	1.4
ICEs – (Permit exempt and PERP)	13,591	12.1	0.7	1.5
Ovens/Furnaces/Kilns – (Permit exempt)	1,000	0.8	0.4	0.4
Boilers (Low fuel usage NG)	133	TBD	0.1	0.1
Landfills	29	0.7	0.1	0.6
Wastewater Treatment Facilities	35	0.5	0.1	0.3
Municipal Solid Waste Facilities	<5	1.1	-	0.6
Total	**24,937**	**19.4**	**2.0**	**4.9**

The emission reductions identified in Table 4 are based on the annual average emissions and not the summer planning inventory because the emissions were quantified using annual emission data from the AER and permitting systems.

Rule Compliance and Test Methods

Local

Source test methods vary depending on the type of source and quality of emissions (e.g. criteria pollutant and toxic emissions). Source test methods may include, but are not limited to SCAQMD Methods 5.1, 25.1 25.3, 100.1, 207.1 or other SCAQMD-approved test methods.

Energy Sector

Mandates for increasing the renewable power generation and fuel sources, energy storage, and smart grid implementation are being implemented through the California Energy Commission (CEC), CalRecycle, CPUC, CARB and California Independent System Operator (CAISO). The SCAQMD will work with these agencies along with businesses and facilities in identifying applications that provide emission reductions. As the technologies evolve, there may be applications that warrant SCAQMD to enact regulations and/or require their use.

Cost-Effectiveness

The decision regarding when to replace existing equipment can vary; some operators may replace equipment when it is no longer operable, while other operators may replace equipment well before it reaches that point. An operator's decision to replace older equipment or purchase new controls may also include anticipation of regulatory changes or cost savings from increased process efficiency. Regardless, equipment replacement and/or installation of pollution controls can represent a significant financial decision where the operator must assess the capital cost to purchase new equipment, installation, operating and maintenance costs.

The SCAQMD has implemented several funding incentive programs to help facilitate specific technologies and compliance with SCAQMD rules. As an example the Rule 1470 Risk Reduction Fund was established in May 2012. This fund was adopted by the SCAQMD Governing Board to set aside $2.5 million to offset the cost of purchasing diesel particulate filters for new diesel emergency standby engines as required under Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines. Another program is the Dry Cleaner Financial Incentive Grant Program which was designed to assist local dry cleaners to switch to non-perchloroethylene dry cleaning systems to comply with Rule 1421 – Control of Perchloroethylene Emissions from Dry Cleaning Systems. Up to $20,000 was available for CO_2 machines and $10,000 for water-base system machines. For a limited time, $5,000 was available for hydrocarbon machines. Since 2008, the program has provided approximately $265,000 to local dry cleaners in order to upgrade their systems. In addition, there are several existing incentive programs which help promote higher efficiency and lower-emitting technologies such as the: Lawn Mower and Leaf Blower Exchange; SOON Program; Carl Moyer Memorial Air Quality Standards Attainment Program; Mobile Source Emission Reduction Credits (MSERC) Programs; and Voucher Incentive Program. Fuel cell technology may qualify for State funding incentives for self-generation of power.

Given the potential variety of regulations, programs and projects that will be developed, the incentive effectiveness is only an estimate based on the specific equipment and facilities identified. Once a working group is established, staff expects additional types of equipment and processes improvements to be identified for facility modernization. The equipment/industries identified are only an example of a pathway to the 4.9 tpd (6 tpd based on the summer planning inventory) reductions based on the data in the AER, permitting systems, and assumptions on the number of permit exempt combustion sources in the SCAQMD. Upon implementation, the incentives will be allocated based on pre-defined criteria developed by the working group (e.g., incentive effectiveness, funding partnership opportunities, capital cost of equipment, maximum NOx reductions, location in or near EJ areas, small business, etc.). The incentive effectiveness for specific incentive programs will be determined as they are developed and implemented by the SCAQMD. It is anticipated that $450 million dollars will be allocated to achieve 4.9 tpd (6 tpd based on the summer planning inventory) of NOx emission reductions from this incentive programs. Incentives for facilities are based on biogas cleanup costs and do not include infrastructure costs. Incentives may include grants for the new purchase of equipment as well as loan programs in areas where capital costs are high, but long-term cost savings from increased efficiency are achieved. Public funding or public-private partnerships can be used to tip the balance towards a business case for investments when equipment upgrades do not offer sufficient returns for private investment. The purpose of incentives is to create opportunities or make it more cost-effective to replace equipment or transition to zero or near-zero technology or encourage earlier change-out of higher-emitting equipment and drive technology development and cost reductions. The SCAQMD will work together with businesses, other government agencies, public utilities, the public, and other interested stakeholders to implement incentive programs that will reduce the most emissions with the least amount of cost.

Table 5 is a demonstration of the incentive effectiveness for the identified sources of emissions. The cost-effective analysis is only a demonstration of source categories staff identified for potential emission reductions through incentive funding and costs for replacement or control equipment currently available. Upon implementation and formation of a working group, new zero and near-zero emitting technologies can be identified as well as other sources for potential NOx reductions. Staff anticipates many facilities and stakeholders will come forth and participate once a working group is established and it will be determined the most cost-effective means for distribution of funds to achieve emission reductions. The replacement equipment or control technology identified in Table 5 demonstrates the type(s) of available zero or near-zero technology to reduce NOx emissions from the stationary combustion source categories. Staff acknowledges that for each category, other solutions or technology can exist to help achieve NOx emissions reductions. References to specific lower-emitting technologies is not to favor one technology over another as the SCAQMD strives to maintain a fuel neutral policy.

TABLE 5

Incentive Effectiveness by Category

Category	Replacement Equipment Identified	$/Unit or Facility	# Units/Facilities Identified for Incentive	Average $/tpy Reduction
Diesel ICE	Meet Tier 4 or Higher	$155,000	1,750	$54,000
	Fuel Cell (to replace smaller ICEs)	$180,000	1,750	$23,000
	Retrofit to NG ICE (Bi-fuel)	$38,000	50	$42,000
Natural Gas ICE	Fuel Cell	$3,200,000	10	$80,000
	Near-Zero Replacement	$3,800,000	10	$120,000
	Control Equipment	$180,000	220	$6,000
Ovens/furnaces/kilns	New Lower-Emitting Equipment	$40,000	1,000	$12,000
Boilers (15 MMBtu/hr)	New Lower-Emitting Equipment	$270,000	130	$53,000
(50 MMBtu/hr)	New Lower-Emitting Equipment	$790,000	6	
Landfills	Biogas Cleanup	$21,000,000	29	$110,000
Wastewater Treatment Facilities	Biogas Cleanup	$6,700,000	35	$86,000
Municipal Solid Waste Facilities	Control Equipment	$3,700,000	4	$3,000
			Average	**$54,000/ton**

Implementing Agency

The SCAQMD has the authority to regulate emissions from stationary sources and will implement the transition of existing combustion sources into operating zero and near-zero emission technologies in cooperation with other local governments, agencies, businesses, technology manufacturers and distributors, and community groups, through incentive programs and potential regulations if required.

To develop, demonstrate, and implement energy storage or smart grid systems to assist in powering electrified sources, the SCAQMD will work with the California Energy Commission, local utilities, and other stakeholders.

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CMB-02: EMISSION REDUCTIONS FROM REPLACEMENT WITH ZERO OR NEAR-ZERO NOx APPLIANCES IN COMMERCIAL AND RESIDENTIAL APPLICATIONS [NOx]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	COMMERCIAL/RESIDENTIAL NOX APPLIANCES			
CONTROL METHODS:	ZERO AND NEAR-ZERO EMISSION BURNERS AND INCENTIVES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	15.7	9.6	14.7	10.3
NOX REDUCTION		TBD	1.8	3.98
NOX REMAINING		TBD	12.9	6.3
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	9.4	5.8	10.2	9.5
NOX REDUCTION		TBD	1.1	2.84
NOX REMAINING		TBD	9.1	6.7
CONTROL COST:	$15,000 to $30,000 PER TON NOx REDUCED			
TOTAL INCENTIVE (% OF COST)	$520,000,000 (17% TO 22%)			
IMPLEMENTING AGENCY:	SCAQMD			

Description of Source Category

Background

Currently the SCAQMD regulates boilers and small residential and commercial furnaces used for space and water heating. Boilers, depending on size, are subject to Rule 1146, 1146.1 or 1146.2. Residential and small commercial fan-type central furnaces are regulated by SCAQMD Rule 1111. Residential tank type water heaters are regulated by SCAQMD Rule 1121. Large commercial space heating furnaces are not currently regulated by the SCAQMD unless they have a heat input rating of more than 2 million BTU per hour. Units with a rating of more than 2 million BTU per hour require a SCAQMD permit and are subject to a NOx BACT limit of 30 ppm (at a reference level of 3 percent oxygen). This control measure seeks emission reductions from unregulated commercial space heating furnaces and reductions through regulations and incentive programs to replace older boilers, water heaters and space heating furnaces with a priority on maximizing emission reductions utilizing zero emission technologies where cost-effective and feasible, and near-zero emission technologies in all other applications. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of residential and commercial

water heaters, boilers and heating furnaces used for water or space heating. The primary focus of this control measure is on commercial and residential water and space heating appliances, but the SCAQMD will consider regulations for other appliances such as clothes dryers, pool heaters, etc. This control measure has evaluated an incentive program for replacing old pool heaters with new lower emission units, which is reflected in emission reduction potential found in the table on page IV-A-53.

Regulatory History

Large commercial space heating furnaces are not currently regulated by the SCAQMD unless they have a heat input rating of more than 2 million BTU per hour. Units with a rating of more than 2 million BTU per hour require a SCAQMD permit and are subject to new source review and a NOx BACT limit of 30 ppm (at a reference level of 3 percent oxygen). The smallest commercial boilers and larger water heaters subject to Rule 1146.2 must comply with a NOx emission limit of 20 ppm. Larger boilers meet more stringent emission limits. Residential tank type water heaters are regulated by SCAQMD Rule 1121 and single family residence space heating units are subject to SCAQMD Rule 1111.

Proposed Method of Control

This control measure seeks annual average NOx emission reductions of about 1.1 tons per day by 2023 and 2.8 tons per day by 2031 from: (1) regulations for currently unregulated commercial furnaces used for space heating; and (2) a combination of long-term regulation and shorter-term incentives to replace existing commercial and residential NOx appliances such as boilers, water heaters and space heating furnaces with new zero or near-zero emission units. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial boilers, water heaters and furnaces used for space heating. The focus of this control measure is on commercial and residential water and space heating appliances. This measure will focus on maximizing emission reductions utilizing cost effective zero emission technologies wherever and whenever feasible and near-zero technologies in other applications. In assessing the cost-effectiveness of these technologies, the life-cycle in-basin emissions under current and future energy productions and transmission portfolios will be considered. As the energy supply and distribution system change over time, certain technologies may become more or less effective at reducing emissions. GHG emissions and toxic impacts must also be considered.

During the development of future regulations and incentives, staff will consider technical, economical, and legal feasibility, of requiring new developments to install cost effective zero emission technologies (e.g., solar or electric water heaters, zero emission space heaters, and smaller scale fuel cells).

Implementation of this measure could occur through direct SCAQMD regulation and/or through other regulatory paths including building codes, EGM-01, or energy regulations, such as California's Title 24 standards. Title 24 targets include achieving Zero Net Energy consumption for new residential housing by 2020 and new commercial construction by 2030. Implementation, incentivizing, and any potential future regulations in this measure would be coordinated with utilities and other agencies to leverage and enhance existing programs, maximize energy savings, and emission reductions.

If zero-emission technologies are not cost-effective or feasible, one component of this control measure may be to require residential water heaters to meet the heat input based emission limit in Rules 1121 and 1146.2 (pounds per million BTU of heat input or parts per million [ppm] NOx). This would ensure that energy efficiency incentive programs for these residential appliances also achieve NOx emission reductions. While higher efficiency units will

emit less carbon dioxide, SCAQMD rules allow manufacturers of water heaters the option of meeting a heat input based emission limit or a heat output based emission limit (nanograms of NOx per Joule [ng/J] of useful heat output). The heat output option of the emission standard allows high efficiency water heaters to emit the same amount of NOx as standard units heating the same amount of water because high efficiency units are allowed to emit higher concentrations of NOx. This results in the same amount of NOx emitted over time regardless of the efficiency of a unit. All manufacturers have chosen to use the heat output based NOx limit of 10 ng/J. The emissions test data available to the SCAQMD for these types of units does not indicate that high efficiency units emit less NOx. Because manufacturers use the output based emission limit, replacement of standard efficiency water heaters with high efficiency units does reduce carbon dioxide emissions, but apparently does not currently result in lower NOx emissions.

Another component of this control measure is to continue to implement the Rule 1111 emission limit of NOx for residential space heaters, which is 14 ng/J (20 ppm) starting in 2014. In addition, the technology to reduce emissions from commercial space heating equipment is transferrable from residential space heating furnaces and other heating and drying equipment. Currently, most commercial space heaters are unregulated and have NOx emissions in the range of 90 to 110 ppm. The SCAQMD has required residential space heaters to meet a limit of 40 ng/J of heat output (55 ppm) since 1984 under Rule 1111. The original rule passed in 1978 included regulation of commercial sized units. Starting in 2014, the Rule 1111 emission limit for residential space heaters is 14 ng/J (20 ppm). Low NOx burners are also available for a variety of commercial and industrial heating and drying applications and achieve NOx emission levels of 10 to 30 ppm. There are also burner technologies available in the near future that can achieve NOx emissions of 5 to 10 ppm. Assuming a future NOx emission limit of between 20 ppm to 30 ppm, emissions from a commercial heating unit can be reduced by 60 to 80 percent. The emission reduction targets in the control measure summary above can be achieved in part by a rule implemented starting in 2020–2022 with rule adoption in 2017–2018.

A significant component of this control measure is to incentivize the early replacement of older boilers, water heaters and space heaters with zero-emitting alternative technology, or new lower emission and more efficient low NOx boilers, water heaters and space heaters. Incentivizing replacement of old equipment will be voluntary and result in emission reductions that are real, quantifiable, surplus, enforceable and permanent as described in the Incentives Implementation section. The new boilers and water heaters will comply with SCAQMD rule emission limits and new commercial space heaters would need to meet a specified emission limit. An alternative incentive could be the generation of area source emission reduction credits that can be used by other entities for compliance with other SCAQMD rules. The emission reduction credits will be discounted to provide additional emission reductions to help meet air quality standards.

One readily available option is to use electric water and space heaters. The initial purchase price of these units is typically less than gas water heaters and furnaces. In addition, there are other alternatives for water and space heating. Air to air and ground to air heat pump systems are used to produce hot water and heat buildings. Air to air heat pump water heaters are reasonably priced and are a cost-effective option for reducing NOx and heating water for residences and small commercial properties. A typical price at a hardware supply store is $1,000 to $1,800 for a residential or small unit with warranties longer than for the average gas water heater. A 50 gallon residential heat pump water heater can be purchased for about $1,000. These units are energy efficient and are direct replacements for both gas and standard electric water heaters. These water heaters can also be used for comfort heating by using a hot water to air heat exchanger instead of a gas furnace. Moreover, ground to air and air to air heat pump based space heaters have been available for many decades and are produced by a large

number of manufacturers. In assessing the cost-effectiveness of these technologies, the life-cycle in-basin emissions under current and future energy productions and transmission portfolios will be considered. As the energy supply and distribution system change over time, certain technologies may become more or less effective at reducing emissions. GHG emissions and toxic impacts will be evaluated.

There are a variety of zero and near-zero options that are or will become available in the future including solar, heat pumps, and ultra-low NOx burners. The SCAQMD will develop both regulatory and incentive programs to support replacement of older higher emitting water and space heating units with zero and near-zero and lower emission technologies. The SCAQMD is proposing to incentivize replacement of older units with these low emission technologies. However, to achieve reductions in the near future, the SCAQMD also proposes replacement of older water and space heating systems with new lower emission units that would result in significant emission reductions.

For swimming pool heaters, early reductions for 2023 can be achieved by incentivizing replacement of working pool heaters manufactured prior to the year 2001 (less than 25 years old), which do not meet the current NOx emission limit. This program would replace working pool heaters at single and multifamily residences. Based on gas utility data, staff estimates there are approximately 200,000 to 240,000 residential swimming pools in the SCAQMD (4 to 6 percent of single family residences). Replacing 50,000 working noncompliant pool heaters by 2023 with new units will result in an early reduction of NOx for 2023 of 0.1 ton per day. The average installed cost for a pool heater is about $2,500. An incentive of $1,000 will pay for the installation cost and a portion of the equipment cost. The cost of replacing 50,000 non-compliant working pool heaters with an incentive of at least $1,000 is $50,000,000 or more. The cost-effectiveness for this program, assuming a 25 year equipment life, is $55,000 per ton or more depending upon the incentive.

For commercial water heaters and small boilers, a number of options can be used. One option is to incentivize early replacement of small Rule 1146.2 Type 1 units (≤ 0.4 mmBtu/hour) manufactured since January 1, 2001 and less than 15 years old that meet the original rule NOx emission limit of 55 ppm. New replacement units will meet the current rule limit of 20 ppm NOx. This will result in early NOx reductions for the year 2023. Staff estimates that there are about 64,000 Type 1 units in the SCAQMD. Early replacement of 20,000 working units manufactured after January 1, 2001 and prior to 2012 with new units meeting the current emission limit of 20 ppm NOx will result in 0.42 ton per day of early reductions by 2023. An average size Type 1 unit (0.175 to 0.200 mmBtu/hour) costs about $5,500 to $6,000. An average incentive of about 25–30 percent of the cost ($2,000 for an average sized unit of 0.2 mmBtu/hour) or more could be used to stimulate early replacement of units meeting the old NOx emission limit. The cost for early replacement of 20,000 units is $40,000,000 or more. The cost-effectiveness of the incentive, assuming an average 15 year equipment life, is $17,400 per ton or higher depending upon the incentive.

In addition, 40,000 Type 1 existing units meeting the current NOx emission limit of 20 ppm can also be replaced with lower emission units achieving 12 ppm. Alternatively the previous 20,000 Type 1 units can be further incentivized to purchase units with NOx emissions of 12 ppm or less instead of those meeting the current rule limit of 20 ppm. Assuming an incentive of at least $1,000 per unit and a cost of $40,000,000 or more, an additional emission reduction of 0.62 tons per day can be achieved for 2031 for incentivizing the purchase of 40,000 units with emission levels of 12 ppm. Assuming a 15 year equipment life, the cost-effectiveness of the incentive for this component is $36,500 per ton or greater depending upon incentive.

An additional 0.07 tons per day can be reduced for 2023 by replacing 2,000 Type 1 units (with certified emissions of 55 ppm) with solar thermal, electric, or heat pump water heaters powered with renewable energy using a partial incentive of at least $10,000 per unit. This replacement will also result in 0.024 ton per day reduction for 2031 (the difference between 20 ppm and fuel cell, solar or green electric). The cost to replace 2,000 units is $20,000,000 or more depending upon the incentive. The cost-effectiveness of this level of incentive is about $55,000 per ton over the lifetime of the equipment.

For further reductions in 2031, the 20,000 Type 1 units with starting emissions of 55 ppm and replaced with 20 ppm units discussed previously can be replaced with fuel cell, solar thermal, electric or heat pump water heaters powered by renewable energy. For an incentive of at least $2,000 (or $4,000 for direct conversion from a 55 ppm unit) an additional 0.24 ton per day reduction can be achieved for a cost of $40,000,000 or more depending upon incentive. This partial funding incentive has a cost-effectiveness of about $30,400 per ton.

In addition, for 2031 40,000 Type 1 units with starting NOx emissions of 20 ppm that are replaced with units achieving 12 ppm can be replaced with fuel cell, solar thermal, electric or heat pump water heaters powered by green energy. For an incentive of at least $1,000 (or $2,000 for direct conversion from a 20 ppm unit) an additional 0.29 tons per day reduction can be achieved in 2031 for an additional cost of $40,000,000 or more depending upon incentive. The cost-effectiveness for this conversion at $1,000 per unit is about $25,400 per ton.

For larger Rule 1146.2 commercial water heaters and boilers > 0.4 mmBtu/hour (Type 2 units), the SCAQMD can incentivize the early replacement of units meeting the original rule limit of 30 ppm NOx with units whose certified NOx emissions are 12 ppm NOx. Units achieving this emission level are currently available. This emission rate is less than the current rule limit of 20 ppm. Staff estimates there are about 32,000 larger Type 2 Rule 1146.2 units in the SCAQMD. Early replacement of 10,000 Type 2 units less than 20 years old with units achieving an emission rate of 12 ppm NOx will result in early NOx reductions for 2023 of about 0.5 ton per day based on an average sized unit (0.900 mmBtu/hour). The cost difference between an average sized 20 ppm Type 2 unit and a 12 ppm unit is about $10,000. An average incentive of at least $5,000 per unit with replacement of 10,000 units results in a cost for this component of $50,000,000 or more. The cost will be higher for a greater incentive. The cost-effectiveness for the incentive, assuming an average equipment life of 25 years, is $18,200 per ton or more for 2023. In addition, approximately 0.22 ton per day of these reductions (the difference between 20 ppm and 12 ppm) are beyond current rule limits. This 0.22 ton per day reduction for 2031 has a cost-effectiveness of about $24,600.

An additional 0.45 tons per day of NOx reductions can be achieved for 2031 by incentivizing the early replacement of an additional 20,0000 Type 2 units meeting the current rule limit (20 ppm) with units achieving certified NOx emissions of 12 ppm or replacing very old working units manufactured prior to January 1, 2000 with 12 ppm units. The cost of this program at an average incentive of at least $5,000 per unit for a 0.9 mmBtu per hour average sized unit is $100,000,000 or more. The cost-effectiveness of the incentive, based on an average equipment life of 25 years, is about $24,600 per ton.

For 2031, an additional 1 ton per day can be achieved by replacing 30,000 large Type 2 Rule 1146.2 units at emission levels of 12 ppm NOx with fuel cell, solar and/or electric systems powered by renewable energy sources. An incentive with an average cost of about $10,000 could be used to promote this switch in technology at the end of a unit's useful life. The total cost would be about $300,000,000 with a cost-effectiveness for the incentive of about $32,900 per ton. The cost-effectiveness is lower if units meeting the current rule limit of 55 ppm NOx are converted at the same total cost.

These various incentives result in approximately 1.1 tons of early NOx reductions in 2023 and about 2.8 tons per day of permanent reductions in 2031. Many of the emission reductions for 2023 are not permanent because Rule 1146.2 is expected to be fully implemented by 2031. However, additional reductions can be achieved for 2031 by replacement with existing lower NOx and alternative technologies.

The SCAQMD will evaluate the need to amend existing rules regulating these sources or develop a new rule for regulation of NOx emissions from commercial and residential space heating furnaces. The SCAQMD will propose regulatory requirements based on maximizing emission reductions utilizing zero emission technologies where feasible and cost effective, and near-zero emission technologies in other applications. Based on previous rule development projects staff estimates the cost-effectiveness for a heating furnace rule for equipment not regulated under Rule 1121 to be about $15,000 to $30,000 per ton. The SCAQMD will also need to continue to implement the Rule 1111 NOx emission limit for residential space heaters of 14 ng/J (20 ppm) and will evaluate revising the emission limits for residential water and space heating units to achieve further emission reductions from these sources.

Incentives Implementation

Integrity Elements

Emission reductions that are projected to be achieved from the voluntary incentive measures must be demonstrated to be quantifiable, surplus, enforceable, and permanent. This demonstration must include project type(s); project life; applicable incentive program guideline(s), by title, year, chapter(s); and analysis of applicable incentive program guideline(s) for consistency with integrity elements. The following describes the definitions and provides examples of the key elements of such a demonstration:

- Quantifiable**:** Emission reductions are quantitatively measureable—supported by existing and acceptable technical data. The quantification should use well-established, publicly available, and approved emission factors and accepted calculation methodology. There must be procedures to evaluate and verify over time the level of emission reductions actually achieved.

  Potential emission reductions associated with various equipment types are discussed in the Proposed Method of Control section. The following table provides an overview of the sources, emission reductions, and proposed incentives for targeted sources.

Emission Reduction Potential and Incentives for CMB-02 Components

Emission Reduction Component of CMB-02	Number of units	2023 Reduction (T/d)	Avg Size Unit Cost ($)	Average Incentive ($)	Incentive Cost (mm$)	2031 Reduction (T/d)	Average Incentive ($)	Incentive Cost (mm$)
1146.2 Type 1 (< 0.4 mmBtu/hr)								
Replace post Jan 1, 2001 units < 15 years old. (55 to 20 ppm)	20,000	0.42	$6,000	$2,000	40			
Replace Type 1 20 ppm units with 12 ppm units (20 to 12 ppm)	40,000		$6,000			0.62	$1,000	40
(Also replaces pre rule 2001 with 12 ppm))								
1146.2 Type 2 (> 0.4 mmBtu/hr)								
Replace Type 2 30 ppm with 12 ppm (Current limit is 20 ppm)	10,000	0.50	$18,000 to $28,000	$5,000	50	0.22		
Replace Type 2 20 ppm with 12 ppm (& replace pre 2000 with 12 ppm	20,000					0.45	$5,000	100
1146.2 Type 1 (< 0.4 mmBtu/hr)								
Rule 11146.2 replace Type 1 with Solar or Heat Pump	2,000	0.07	$16,000	$10,000	20	0.02		
(55 ppm to green for 2023, 20 ppm to green for 2031)								
1146.2 Pool Heaters (< 0.4 mmBtu/hr) (uncontrolled units prior to 2001)	50,000	0.10	$1,500 to $2,500	$1,000	50			
Replace 1146.2 Type 1 20 ppm units with Solar/Heat Pump	20,000		$16,000			0.24	$2,000	40
(20 ppm to green) (Units in first component above)							($4,000 if direct)	
Replace 1146.2 Type 1 12 ppm units with Solar/Heat Pump	40,000		$16,000			0.29	$1,000	40
(12 ppm to green) (Units in second component above)							($2,000 if direct)	
1146.2 Type 2 (> 0.4 mmBtu/hr)								
Convert 1146.2 Type 2 to Fuel Cell/Solar/Heat Pump/Electric	30,000		$28,000			1.00	$10,000	300
(12 ppm to green) (From both groups above or dirct)							($15,000 direct)	
Total		1.1			160	2.84		520
		T/d			**mm$**	**T/d**		**mm$**

Reductions Based on calculations for average sized units.
Assumes a daily capacity factor for 1146.2 units of 21.5% based on Rule 1146.2 survey/analysis and CEC and Gas Company reports.
Rule 1146.2 units --> ~64,000 small Type 1 units and ~ 32,000 larger Type 2 units
Rule 1146.2 pool heaters --> ~200,000 to 240,000 units

- Surplus**:** Emission reductions must be above and beyond any district, State, or federal regulation. Emission reductions used to meet air quality attainment requirements are surplus as long as they are not otherwise relied on in the SIP, SIP-related requirement, other State air quality programs adopted but not in the SIP, a consent decree, or federal rules that focus on reducing criteria pollutants or their precursors. In the event that VIP emission reductions are relied on to meet air quality-related program requirements, they are no longer surplus. In addition, the emission reductions are available only for the remaining useful life of the equipment being replaced (e.g., if the equipment being replaced had a remaining useful life of five years, the additional emission reductions from the new equipment are available for SIP or conformity purposes under this guidance for only five years).

- Enforceable**:** The SCAQMD will be responsible for assuring that the emission reductions credited in the SIP will occur. Emission reductions and other required actions are enforceable if:

    - They are independently verifiable.
    - Program violations are defined.
    - Those liable can be identified.
    - SCAQMD and U.S. EPA maintain the ability to apply penalties and secure appropriate corrective action where applicable.
    - The general public have access to all the emissions-related information obtained from the source.

- The general public can file suits against sources for violations (with the exception of those owned and operated by Tribes).
- They are practically enforceable in accordance with other U.S. EPA guidance on practicable enforceability

Actual emission reductions, for example, can be assured through the replacement equipment registration, recordkeeping and reporting, and inspections (initial inspection after installation and subsequent on a regular basis thereafter, if needed) throughout the term. Specific enforcement mechanisms will be addressed in the guidelines for the individual incentive measures.

- Permanent**:** The emission reductions need to be permanent throughout the term for which the credit is generated. The emission reductions are permanent if these reductions are ensured to occur over the duration of the VIP program, and for as long as they are relied on in the SIP.

  For example, those awarded incentives would need to ensure the projects are properly implemented and the reductions are occurring and will continue to occur. Thus, recipients of the incentive awards would agree to contract provisions, such as recordkeeping and reporting to track reductions and agreements that newly installed equipment would not be removed without concurrence with SCAQMD (i.e., permanent placement) and the proof that the replaced equipment would be destructed or at least not be operated any more in the Basin (e.g., pictures, certification). Detailed procedures to ensure permanent reductions will be described in the guidelines for the individual incentive measures.

Guidelines

Each VIP needs to have detailed and comprehensive guidelines that are approved by the SCAQMD Governing Board. The guidelines will be the protocol to implement the program, to ensure SIP applicability, and to maintain SIP approvability:

- ☑ VIP should demonstrate compliance with the four key elements of the VIP: quantifiable emissions plus incentive costs, surplus reductions, enforceable compliance and permanent reductions.
- ☑ Working group should be established to solicit public input and feedback during VIP guideline development.
- ☑ Process and procedures to apply for incentives should be clearly explained in the guideline.
- ☑ It needs to clearly describe how incentives would be awarded (e.g., priority to high emitters and/or age of equipment, tiered process, first come first serve, or EJ area priority).
- ☑ It should have conditions of some form for agreement (e.g., contracts) including tracking and ensuring permanent reductions. The following forms should be prepared:
  - ☑ Application Forms (samples are required).
  - ☑ Contracts with Conditions (samples are required).
  - ☑ Product Example.
- ☑ Tracking mechanism is required to ensure overall effectiveness of program and procedures to correct emission projections, such as reductions by the committed target date (e.g., 2023, 2031) and submittal to U.S. EPA annually. Tracking checklist should include:
  - ☑ Project Title.
  - ☑ Product.

- ☑ Annual Emission Reductions (e.g., from 2017 to 2027, incremented by one year).
- ☑ Life of project (e.g., 10 years).
- ☑ Installation dates (e.g., fixed year 2017 or multiple installation years 2017 and 2018).

☑ Possible recordkeeping, reporting, and monitoring requirements need to be addressed.

☑ Individual outreach efforts (e.g., social media, email blasts) to promote the program, make aware of deadlines to apply, and provide timing locations of workshops.

☑ Program guidelines should be approved by the SCAQMD Governing Board and published online.

Emission Reductions

This control measure seeks 20 percent NOx emission reductions of 1.1 tons per day[8] by 2023 and 30 percent NOx emission reductions of 1.5 tons per day by 2031 from early replacement of space heating furnaces, boilers and water heaters with new lower or zero emission and higher efficiency units through incentives with new rule for commercial space heating units and amendments to the residential water and space heating rules (Rules 1121 and 1111). The potential emission reductions from incentive programs are discussed in the preceding section on proposed methods of control. Emission benefits expected from actions going beyond SB 350 and Title 24 building energy standards are not yet within the 2016 AQMP future year emission inventory.

Another important component is to continue to implement the Rule 1111 emission limit of NOx for residential space heaters which is 14 ng/J (20 ppm) starting in 2014. Growth and energy efficiency programs will affect the anticipated reduction from this control measure. For instance, equipment may be replaced on an accelerated schedule due to regulations or incentives to increase the efficiency of these units. Reduced fuel use due to increased efficiency may also lower NOx emissions. For development of a commercial space heater rule, the commercial space heating inventory must be refined in order to clarify the amount of natural gas used by commercial space heaters compared to hydronic (boiler-based) space heating. However, based on national estimates of floor space for different types of buildings and uses, staff estimates that 45 to 60 percent of all commercial, light manufacturing, warehouse, office, school and government building floor space is heated by commercial forced air and radiant heating units. In addition, approximately half of the residences in the SCAQMD are in multi-unit buildings and are not heated by units subject to Rule 1111.

Rule Compliance and Test Methods

SCAQMD Method 100.1

Cost-Effectiveness

Based on the cost-effectiveness of rules for other heating equipment (Rules 1111, 1121, 1146.2 and 1147), staff estimates the cost-effectiveness for a rule regulating commercial and multiunit residential space heaters at $15,000 to $30,000 per ton. The cost and cost effectiveness for incentive programs will vary depending upon the incentives required for replacement of equipment with lower emission technologies. Amendment of Rules 1111 and 1121 to

[8] Summer planning inventory.

require manufacturers meet the optional heat input based emission limits is expected to be significantly less than $20,000 per ton.

Implementing Agency

The SCAQMD has the authority to regulate emissions from these stationary sources.

References

SCAQMD Rule 1111 – Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces

SCAQMD Rule 1121 – Control of Nitrogen Oxides from Residential Type, Natural Gas-Fired Water Heaters

SCAQMD Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters

U.S. Department of Energy (April 2012). INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990–2010, Table 3.2.2 – Principal Commercial Building Types, as of 2003 (Percent of Total Floorspace)

AB-1257 Energy: State Energy Resources Conservation and Development Commission: natural gas (2013-2014): http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB1257

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U.S. EPA, "Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies into State and Tribal Implementation Plans," 2012.

SCAQMD, Residential and Commercial Energy, 2016 AQMP White Paper

SB350 Clean Energy and Pollution Reduction Act of 2015: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350

California's Existing Buildings Energy Efficiency Action Plan: http://www.energy.ca.gov/ab758/

2015 Draft Integrated Energy Policy Report (CEC-100-2015-001-CMD): http://www.energy.ca.gov/2015_energypolicy/

2015-2025 California Energy Demand Updated Forecast (CEC-200-2014-009-CMF): http://www.energy.ca.gov/2014publications/CEC-200-2014-009/CEC-200-2014-009-CMF.pdf

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High Efficiency Water Heater Ready: 2013 California Building Energy Efficiency Standards, California Utilities Statewide Codes and Standards Team, October 2011.

Energy Efficiency Design Options for Residential Water Heaters: Economic Impacts on Consumers: presented at 2011 ASHRAE Winter Conference, Lawrence Berkeley National Laboratory, January, 2011.

CMB-03: EMISSION REDUCTIONS FROM NON-REFINERY FLARES [NOx, VOC]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: LANDFILLS, WASTEWATER TREATMENT PLANTS, OIL AND GAS FACILITIES

CONTROL METHODS: VARIOUS PATHWAYS WITH INITIAL EFFORTS FOR BENEFICIAL GAS USE SUCH AS TRANSPORTATION FUEL, MICROTURBINES, BOILERS, FUEL CELLS, GAS CLEANUP FOR SALE, AND/OR GAS CLEANUP FOR PIPELINE INJECTION. IF ABOVE IS NOT FEASIBLE, REQUIRE THE INSTALLATION AND OPERATION OF BACT CLEAN ENCLOSED BURNERS

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	2.1	2.4	2.4	2.6
NOX REDUCTION		N/A	1.2	1.3
NOX REMAINING		N/A	1.2	1.3
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	2.3	2.7	2.7	2.9
NOX REDUCTION		N/A	1.4	1.5
NOX REMAINING		N/A	1.4	1.5
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	0.6	0.7	0.7	0.7
VOC REDUCTION		N/A	0.4	0.4
VOC REMAINING		N/A	0.3	0.3
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	0.6	0.7	0.7	0.8
VOC REDUCTION		N/A	0.4	0.4
VOC REMAINING		N/A	0.3	0.4

CONTROL COST: < $20,000 PER TON NOX REDUCED

IMPLEMENTING AGENCY: SCAQMD

Description of Source Category

This proposed control measure will seek reductions of NOx and VOC from gas handling at non-refinery sources such as organic liquid loading stations, tank farms, oil and gas production facilities, landfills, and wastewater treatment facilities.

Background

A survey of permits for landfill and wastewater treatment plant flares indicates NOx emissions range from 0.12 to 0.025 pounds per million British Thermal Units (BTU) (Best Available Control Technology (BACT) since 2006) depending on the age of the flare used to handle gas. Flare NOx emissions, as well as VOC, CO and PM emissions, are currently regulated through the BACT determination process in SCAQMD Rules 1303 and 1701, but there are currently no source-specific rules regulating NOx emissions from non-refinery flares. During the rulemaking for the 2012 amendments to Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines, biogas facility operators suggested that biogas-powered internal combustion (IC) engines that cannot be retrofitted to meet the January 1, 2017 emission standards could revert to burning biogas through flaring. Additionally other cost effective technology options, policies, and rule changes may result in an increase in non-refinery flare emissions. Even without a potential increase in flaring, flares have been identified as significant emission sources of NOx and other pollutants. These industries are also often located in or near environmental justice (EJ) communities; the emission reductions have direct benefits for the EJ communities surrounding these types of industries.

Waste streams from landfills are anticipated to be reduced as the State strives to meet the 75 percent recycling, composting, or source reduction of waste goal by 2020 under AB 341 (Chesbro, Chapter 476, Statutes of 2011). These waste diversion efforts may eventually decrease landfill gas, but lead to additional biogas from wastewater treatment plants and other facilities organic waste may be diverted towards. Lastly, efforts and technologies identified under the Zero Routine Flaring by 2030 initiative being undertaken by the World Bank (for oil and gas facilities) will be taken into consideration during rule development. The Governor's office has endorsed this initiative and more details of the program are provided online at http://www.worldbank.org/en/programs/gasflaringreduction#5.

Regulatory History

There are no source specific rules regulating NOx emissions from the handling of gas with non-refinery flares. It should be noted SCAQMD Rule 1150.1 (*Control Of Gaseous Emissions From Municipal Solid Waste Landfills*) regulates organic compound and toxic air contaminant emissions from municipal solid waste landfills during gas collection and handling.

Proposed Method of Control

This control measure will create a source specific rule for non-refinery flares, specifically those used for, but not limited to, oil and gas facilities, landfills, and wastewater treatment plants. Industries that can be potentially affected include sewage treatment, incineration, soil remediation, waste disposal, and industries that utilize portable flares. For the purposes of this control measure, oil and gas facilities that operate non-refinery flares are those that are not on the same property as the petroleum refining facilities that are in the SCAQMD's RECLAIM program. The proposed method of control will consist of two levels:

1) Cleaning the gas that would typically be flared and using it as follows:

    a. Using it as a transportation fuel directly or through gas to liquid conversion, and/or injection into a pipeline as a renewable energy source (biogas facilities) or, if not feasible,

    b. Directing it to equipment that can be converted to power and/or heat.

2) If all other options are infeasible, requiring the installation of newer flares implementing the best available control technology.

Certain applications may warrant both approaches. Staff acknowledges that there are different technology options and challenges with the different source categories included in this control measure (oil and gas, landfill, and wastewater treatment). Each source category may require a different approach with the overall goal of reducing NOx and other emissions from non-refinery flares. A technology assessment may be required to validate the feasibility of the technology for different source categories and exemptions may be considered during the rule making process.

Waste gas from sites with consistent waste streams can be harnessed and conditioned for a variety of uses, but generally requires gas clean up. Alternatives to flaring include utilizing fuel cells to create electricity and hydrogen; using microturbines and boilers to create power for the facility; using boilers for heat in anaerobic digesters; selling the gas to be used in transportation; converting the gas to liquids for transportation; and/ or natural gas pipeline injection. Sites such as oil and gas facilities that do not produce enough gas or are not located near appropriate pipelines for injection could route the gas towards power generation, such as microturbines, and/or capture for use in transportation. Use of microturbines has been demonstrated at the West Newport Oil facility, in Orange County.

Utilization of waste gas as a transportation fuel can be both economically and environmentally beneficial. The gas will be required to undergo treatment to remove any impurities, such as sulfurous compounds, siloxanes, carbon dioxide, and nitrogen (landfill gas), and to raise the heating value to specification. For example, the gas from landfills and wastewater treatment plants is often about half the heating value of pipeline quality natural gas. Federal and State market based programs provide revenue sources from selling biogas as a transportation fuel. These programs include the Low Carbon Fuel Standard (LCFS) in California and the federal Renewable Fuel Standard (RFS) Program. Under these programs, credits are generated for the sale of renewable transportation fuels and, dependent on market prices, have provided funding for equipment and lower fuel costs. In addition, AB 2773 or results from other future legislation(s), such as SB 840, may change the minimum higher heating value or maximum siloxane requirements for pipeline injection making it easier for facilities to use biogas for transportation fuels.

If a site owner or operator would like to modernize their facility towards zero and near-zero emission technology, such as pipeline reinjection or fuel cell technology, but it is not cost effective; they may qualify for incentives from the SCAQMD as described in CMB-01 – Transition to Zero and Near-Zero Emission Technologies for Stationary Sources. Biogas cleanup technology has been used to prevent engines or turbines from fouling; therefore, the same technology can be utilized to clean the gas before it is reinjected into a pipeline. Interconnection costs are expected to be higher than for biogas cleanup. Incentives and credits may help offset the costs for biogas cleanup and implementation of pipeline infrastructure.

Wastewater treatment plants may have lower waste streams and the options for pipeline injection may be limited; however, this category has been identified as a source of possible emission reductions. Other lower emitting options are available such as boilers, microturbines, or fuel cells. In addition, SJVAPCD has a source specific rule for flares that includes wastewater treatment plants, oil and gas production, combustion, incinerators, petroleum refining, and VOC control. Although the SJVAPCD flare rule emission limit requirements for NOx are less stringent than SCAQMD's 2006 BACT requirements, their rule primarily targets VOC emission reductions. Thus, a regulatory measure is necessary to address existing flares at non-refinery sources and meet limits at least as stringent as other air districts. Wastewater treatment plants inventory will be examined to determine the scope of applicable regulatory requirements during rule making. Current inventory estimates indicate that flaring at sewage treatment plants accounts for only 0.01 tpd of NOx. While each potential category experiences growth over time, sewage treatment is estimated to remain at 0.01 tpd of NOx for 2023 and 2031. The emissions inventory will be further refined during the rulemaking process, rules are expected to focus on the most cost-effective emission reduction and feasible alternatives. The intent of rulemaking is not just to regulate current equipment, but also address new facilities and modifications at existing facilities.

Other alternative methods of harnessing waste gas that would otherwise be flared are: cleaning the gas and utilizing fuel cells to create electricity and hydrogen; using microturbines to create electricity; cleaning the gas to utility specifications and selling the gas, or injecting the gas into a natural gas pipeline.

New power producing technologies, such as the organic rankine cycle (ORC), has shown the ability to consume the gas that would otherwise be flared and provide a co-benefit by producing power. This technology utilizes heat recovery from gas combustion to operate the ORC loop to make power. For an oil and gas facility, for example, this is accomplished by installing a skid-mounted boiler on site to combust the gas and provide hot water for the ORC. The amount of power generated is not a high enough quantity to sell to the grid, but will be able to meet some of the facility's power needs and/or heat needs. These boilers emit either 9 ppm (at 3 percent oxygen) or 5 ppm (at 3 percent oxygen with selective catalytic reduction), depending on the size, which will result in 40 to 67 percent less NOx emissions than a clean enclosed burner (CEB) flare. For a wastewater treatment facility that currently utilizes boilers for providing heat to the anaerobic digesters, the same boiler can be utilized to process any excess gas that would otherwise be flared. In addition, a landfill can potentially utilize this technology to use the landfill gas that would otherwise be flared.

Microturbine technology with regenerative thermal oxidation can be used to produce power without the necessity of biogas cleanup. This type of technology can be used at landfills with low methane gas. Toyon Landfill in Los Angeles is currently in the permitting phase using this approach. The Toyon landfill previously utilized internal combustion (IC) engines to make power, but the methane content of the gas was below the operability limit for the engines. This newer technology will take the low quality landfill gas and make power with ultra-low criteria pollutant emissions and without expensive biogas cleanup.

If there is no option for a facility to employ any of the above mentioned methods of waste gas utilization, the gas will need to be combusted through flares. However, many existing flares are older and higher emitting than new technologies. An equipment survey of existing non-refinery flares in the Basin showed a typical emission rate of 0.025 pounds of NOx per million BTU is achievable by non-refinery flares. There are new flaring units with cleaner combustion capable of achieving emissions of 0.011 pounds of NOx per million BTU, and concentrations of 6.69 ppm NOx at 3 percent oxygen, when firing on biogas from a wastewater facility or process gas from oil and gas production facilities. These emission rates were verified through District-approved source testing procedures. These devices utilize a CEB system that premixes the gas and combustion air prior to injection onto a permeable

metal mesh, where it is ignited. These units have been installed across a range of applications, including the source categories targeted by this control measure. These devices achieve the VOC destruction of the fuel stream, while producing lower NOx emissions. These units are currently guaranteed at emitting at 0.018 pounds of NOx per million BTU (or 15 ppm NOx at 3 percent oxygen). These units have demonstrated VOC and methane destruction efficiencies of 99.8–99.9 percent, and VOC mass emissions (as methane) of 0.006 pounds per million BTU.

This control measure proposes that, consistent with all feasible control measures, all non-refinery flares meet current NOx emissions levels and thermal oxidation of VOC efficiencies that have been achieved in practice. Consideration will need to be given for any circumstances whereby there is a need for an emergency or backup handling of the gas.

Emission Reductions

Based on facility reported emissions in 2010, the annual average emissions for non-refinery flares are about 2 tons per day of NOx. The average emission factor for biogas flares at facilities within the Basin is 0.056 pounds per million BTU (unweighted average), higher than the most stringent emission rate for biogas. Emissions vary by season and are affected by other operations at landfills and wastewater treatment plants. Staff estimates an average emission reduction of about 50 percent is achievable if all flares meet the most stringent current permitted limit of 0.025 pounds NOx per million BTU of biogas, and 0.023 pounds NOx per million BTU of oil and gas production process gas. Lower emission levels are estimated based on the installation of CEBs, microturbines, or boilers. CEBs are designed to accommodate varying gas compositions and feed rates while maintaining emissions at low levels. Fuel cells can achieve substantially lower level emissions than combustion based methods, and cleaning up waste gas for sale or for pipeline injection will produce near-zero emissions. This NOx reduction will also be achievable for source categories such as oil and gas production wells, tank farms, and even with the replacement of traditional thermal oxidizers.

Rule Compliance and Test Methods

SCAQMD Methods 25.1, 25.3 and 100.1, or other SCAQMD-approved equivalent test methods.

Cost-Effectiveness

Based on cost information used for the 2006 SCAQMD BACT determination for biogas flares, the average cost-effectiveness for meeting an emission limit of 0.025 pounds per million BTU of biogas is less than $20,000 per ton of NOx reduced. It is estimated that a similar cost-effectiveness would pertain to other non-refinery sources.

Implementing Agency

The SCAQMD has the authority to regulate emissions from these sources.

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CMB-04: EMISSION REDUCTIONS FROM RESTAURANT BURNERS AND RESIDENTIAL COOKING
[NOx]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	COMMERCIAL AND RESIDENTIAL COOKING APPLIANCES			
CONTROL METHODS:	EFFICIENCY METHODS, LOW NOX EMISSION BURNERS, AND INCENTIVES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	4.3	3.1	3.0	3.0
NOX REDUCTION		TBD	0.8	1.5
NOX REMAINING		TBD	2.2	1.5
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	4.4	3.3	3.2	3.1
NOX REDUCTION		TBD	0.8	1.6
NOX REMAINING		TBD	2.3	1.5
CONTROL COST:	$15,000 TO $30,000 PER TON NOX REDUCED			
TOTAL INCENTIVE (% OF COST)	$250,000,000 (10% TO 20%)			
IMPLEMENTING AGENCY:	SCAQMD			

Description of Source Category

Background

The SCAQMD does not currently regulate NOx emissions from restaurant and residential charbroilers, fryers, ranges and ovens. This proposed control measure would seek NOx reductions from residences, retail restaurants and quick service establishments utilizing cooking ovens, ranges, fryers and charbroilers.

Regulatory History

NOx emissions from residential and restaurant fryers, ranges and ovens are not currently regulated by the SCAQMD. However, charbroilers are required to be registered with the SCAQMD and PM emissions from chain driven charbroilers are regulated by SCAQMD Rule 1138.

Proposed Method of Control

This proposed control measure would seek NOx reductions from residences, retail restaurants and quick service establishments utilizing commercial cooking ovens, ranges, fryers and charbroilers by funding development of, and promoting and incentivizing the use and installation of low NOx burner technologies. The reductions could be achieved through regulatory approaches, incentives and/or efficiency standards. Partnerships with other entities who have energy efficiency incentive programs could have benefits once the emission reductions from the efficiency efforts are quantified. Additional research and technical assessment is warranted to determine the current NOx emission level of various appliance types in each of the equipment categories. The initial focus of this control measure is on commercial cooking equipment. However, a program to incentivize higher efficiency or lower emission residential appliances will also be considered. In addition, the SCAQMD will also evaluate options for rules regulating NOx emissions from new commercial and residential cooking units including requirements for new construction of commercial and residential buildings. It should be noted that direct PM emissions from meat cooking on under-fired charbroilers are sought for control under control measure BCM-01 – Further Emission Reductions from Commercial Cooking.

Based on a California Energy Commission analysis of commercial and institutional cooking equipment and energy efficiency across the State, up to about 44 million therms of natural gas could potentially be saved annually in the SCAQMD with currently available high efficiency cooking equipment. Based on this energy savings, replacement of all standard units with high efficiency units could result in annual NOx emission reductions from commercial and institutional cooking of up to 300 tons annually or 0.8 tons/day. This is approximately half of the reductions the SCAQMD is proposing for this category of equipment. However, the gas utilities have already included some energy efficiency reductions in the AQMP inventory from their energy efficiency programs so the reductions available for SCAQMD funded programs may be less than this amount.

However, an alternative approach is to fund replacement with currently available lower emission technology in order to reduce NOx emissions from fuel fired cooking equipment. Current technology could reduce emissions from cooking units by 40 to 70 percent depending upon the type of equipment. In addition, there are electrically heated units with no direct NOx emissions. The currently available lower NOx burner technologies include: ribbon burners with NOx emissions of 25 to 60 ppm, in-shot burner technology with emissions less than 55 ppm NOx, radiant burners with emissions of 15 to 30 ppm, and modern power burners with NOx emissions of 25 to 60 ppm. These technologies can be used in ovens, broilers, fryers, and griddles which constitute the majority of the equipment in use. In addition, the larger units with power burners can be retrofit with lower NOx burners. There are some types of equipment which could not be readily replaced by these types of burners, but the SCAQMD could support development of low NOx burner technologies for these systems.

Emission Reductions

The 2016 AQMP inventory identifies NOx emissions from fuel combustion in residential, service and commercial operations. A significant portion of those emissions are from cooking operations. The NOx emissions from residential and commercial cooking operations resulted in daily emissions of about 4.3 tons of NOx in 2012. The emission reduction targeted by this control measure is 1.5 tons per day by 2031, which is a 50 percent NOx reduction goal with half of the reductions by 2023 and the remainder continuing through 2031. SCAQMD Staff will also seek to develop a more refined baseline inventory and conduct technology assessment of the latest affected equipment.

Replacing existing burner technology with currently available lower emission burners could reduce NOx emissions from this category by an average of 50 percent or more. This would result in emission reductions of about 1.5 tons per day by 2031 and would achieve the reductions targeted for this source of NOx emissions.

Rule Compliance and Test Methods

SCAQMD Method 100.1

Cost-Effectiveness

Based on cost-effectiveness for other SCAQMD rules regulating NOx emissions from small combustion sources such as water heaters, space heating furnaces and small boilers, staff estimates the cost-effectiveness for a rule limiting NOx emissions based on this control measure will be in the range of $15,000 to $30,000 per ton. The cost for an incentive based program will vary depending upon the incentive and the number and type of equipment replaced. An incentive program to reduce emissions by 1.5 tons per day by funding low NOx technology incentives for $250,000,000 has a cost-effectiveness over the lifetime of the equipment of about $30,400 per ton for the incentive. The cost effectiveness of the difference in cost between a standard unit and a lower emission, zero or near-zero technology will vary and may be higher depending upon the cost of standard equipment and units with lower emission technology. In addition, the cost of replacing existing equipment early (e.g., at about two thirds of a unit's useful life) would have a cost impact.

Implementing Agency

The SCAQMD has the authority to regulate emissions from these stationary sources.

References

California Energy Commission, "Characterizing the Energy Efficiency Potential of Gas-Fired Commercial Foodservice Equipment" [CEC-500-2014-095] (2014).

CMB-05: FURTHER NOX REDUCTIONS FROM RECLAIM ASSESSMENT [NOx]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	VARIOUS RECLAIM NOX SOURCES			
CONTROL METHODS:	VARIOUS CONTROL TECHNOLOGIES AND METHODS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	26.51	15.6*	14.51*	14.51*
NOX REDUCTION				5
NOX REMAINING				9.51
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	26.51	15.6	14.51	14.51
NOX REDUCTION				5
NOX REMAINING				9.51
CONTROL COST:	$13,500–$21,000 PER TON NOX REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

* Up to 0.71 tons/day of NOx inventory will be used to fund the Regional NSR Holding Account and therefore not included as part of the SIP submittal.

Description of Source Category

There were approximately 275 facilities in the REgional CLean Air Incentives Market (RECLAIM) program as of the end of compliance year 2013. The RECLAIM program includes facilities with NOx or SOx emissions greater than or equal to 4 tons per year in 1990 or any subsequent year. A wide range of equipment such as fluid catalytic cracking units, boilers, heaters, furnaces, ovens, kilns, coke calciner, internal combustion engines, and turbines are major sources of NOx or SOx emissions at the RECLAIM facilities. This control measure identifies a series of approaches that can be explored to make the program more effective in ensuring equivalency with command and control regulations implementing BARCT, and to potentially generate further NOx emission reductions at RECLAIM facilities. One approach under serious consideration is a long-term transition to a traditional command-and-control regulatory structure. As many of the program's original advantages appear to be diminishing, an orderly sunset of the RECLAIM program may be the best way to create more regulatory certainty and reduce compliance burdens for RECLAIM facilities, while also achieving more actual and SIP creditable emissions reductions. A NOx RECLAIM re-assessment working group will be convened in the spring of 2017 to examine the functionality, benefits, and challenges of the RECLAIM program and options for an orderly transition to command and control.

Background

On October 15, 1993, the SCAQMD's Governing Board adopted Regulation XX – RECLAIM. Regulation XX includes rules that specify the applicability and procedures for determining NOx and SOx facility emissions allocations, program requirements, as well as monitoring, reporting, and recordkeeping requirements for sources located at RECLAIM facilities. RECLAIM was designed to provide Best Available Control Retrofit Technology (BARCT)-equivalent emission reductions in the aggregate for the facilities in the program, with flexibility for each facility to find the most cost-effective approach. At the beginning of this program, facilities were issued NOx and SOx allocations, also known as RECLAIM Trading Credits (RTCs) or facility emission caps, which declined over time. To meet the declining annual facility caps, RECLAIM facilities have the option of installing pollution control equipment, changing operations, or purchasing RTCs from other facilities on the RECLAIM market. The program requires robust monitoring to ensure compliance. Over the past more than 20 years, the program has resulted in significant emission reductions.

The RECLAIM program is subject to several legal mandates. The Health and Safety Code requires the SCAQMD to monitor the advancement in BARCT, and if BARCT advances, the SCAQMD is required to periodically re-assess the overall facility caps, and to reduce the RTC holdings to a level equivalent to command-and-control BARCT levels. The emission reductions resulting from the programmatic RTC reductions will help the basin attain the National Ambient Air Quality Standards (NAAQS) for ozone and PM2.5 as expeditiously as practicable. The periodic BARCT evaluations must include an evaluation of the maximum degree of reduction achievable with advanced control technologies taking into account the environmental, energy, and economic impacts for each class or category of source.

The 2013 audited actual emissions were 20 tons per day (tpd) from RECLAIM facilities (59 percent from the refineries and 41 percent from the non-refinery sector). The RTC holdings for the RECLAIM universe in 2013 were 26.6 tpd, for which the refinery sector held 51 percent of the RTCs, electricity generating facilities (EGF) 16 percent, investors 5 percent and other RECLAIM facilities 20 percent.

Regulatory History

On October 15, 1993, the SCAQMD's Governing Board adopted Regulation XX – RECLAIM. The RECLAIM program at its inception included 392 NOx facilities. RECLAIM Regulation XX includes 15 rules that specify the applicability, definitions, allocations, trading and operational requirements, as well as monitoring, reporting, and recordkeeping requirements. The NOx RECLAIM regulation has been revised several times, and two significant amendments (2005 and 2015) reflected a BARCT re-assessment. SOx RECLAIM allocations were re-assessed in 2010 based on BARCT. The January 2005 amendment resulted in a NOx RTC reduction target of 7.7 tons per day (tpd), approximately a 22.5 percent reduction of the RTC holdings, which was implemented in five phases: 4 tpd by 2007 and an additional 0.925 tpd in each of the following four years.

The December 2015 NOx amendments included a total RTC reduction of 12 tpd, including a Regional RTC Holding account for EGFs to meet their NSR holding obligations. The intent of the December 2015 amendments was to ensure the RECLAIM program would maintain programmatic equivalency with BARCT-based command and control regulations as required by State law. The amendments also contained an optional off-ramp from RECLAIM for EGFs at BACT or BARCT. A Governing Board adopted resolution directed staff to further examine the issue of equipment shut-downs at RECLAIM facilities and the fate of the associated RTCs. This led to amendments in October 2016 that significantly reduced NOx RTC holdings upon facility shutdowns.

Proposed Method of Control

Several potential actions and analyses can help to address this issue and other issues that arose during recent NOx RECLAIM amendments, including a sunset of the NOx RECLAIM program. The measures listed below are designed to achieve additional actual and/or SIP creditable emission reductions from the RECLAIM Program and ensure future equivalency with command-and-control regulations:

- Assess whether more SIP creditable and/or actual emission reductions could be achieved without the RECLAIM program, and if so, explore how the program could be sunset in an orderly and equitable fashion. The cost-effectiveness benefits that the RECLAIM market was intended to provide may cease to exist given the need for all feasible NOx reductions and the potential lack of lower-cost control options. As many of the program's original advantages appear to be diminishing, an orderly sunset of the RECLAIM program may be the best way to maximize emissions reductions, and create more regulatory certainty while potentially reducing compliance burdens for RECLAIM facilities. Many of the approaches listed below, alone or in combination, may serve as interim steps in a long-term elimination of the program.

- Consider options for facilities at BACT or BARCT and/or facilities with no allocations (structural buyers) to exit the program and be subject to command and control regulations. The most recent NOx amendment allowed EGFs to voluntarily opt-out of RECLAIM. Such an option could be extended to other facilities, and potentially lead to more AQMP creditable emission reductions.

- Consider command-and-control regulation overlays to certain RECLAIM facilities. For some RECLAIM facilities a command-and-control overlay may be the best way to reduce NOx emissions while maintaining the required equivalency with command and control.

- Consider BARCT-based individual facility emission caps for some or all RECLAIM facilities. For some RECLAIM facilities, an emissions cap may be the best way to ensure BARCT equivalency while affording some intra-facility flexibility and technological innovation.

- Assess the need for and the size of the differential between RTC holdings and actual emissions. The size of this unused RTC margin is affected by the possible need for a compliance margin, uncertainties in the growth projections for existing and new businesses, facility and equipment shutdowns, and holdings by investors. A full assessment may allow for an optimization of the size of the margin that could allow for further RTC reductions.

- Perform additional or more frequent BARCT assessments and adjust allocations as control technologies improve and are implemented in practice. Based on past experience, a maximum of five years between BARCT assessments is appropriate to reflect the latest technological advances and ensure equivalency with command and control. Given that RECLAIM shaves have tended to be implemented over five to seven years, it is likely that facilities may experience a moving target, facing new RTC reductions as they are implementing controls to meet the previous shave. This lack of regulatory certainty could be addressed through command-and-control regulations, where previous investments can be more readily considered.

- Re-examination of the RECLAIM program if RTC prices hit the upper or lower threshold amounts. The current NOx RECLAIM regulation has a lower price threshold of $200,000 per ton (infinite year block) and upper price thresholds of $22,500 and $35,000 per ton (discrete year; annual and 3-month average, respectively). The

levels of these thresholds or additional thresholds could be modified commensurate with future BARCT assessments and attainment needs.

- Assess the impacts of investors holding RTCs. Investors have historically played an important role in the RECLAIM program. However, their holding of RTCs have posed problems with the trading and identification of reductions because they are not RECLAIM facilities that have an initial allocation or a potential to reduce NOx emissions.

A NOx RECLAIM working group will be convened in the spring of 2017 to develop options for the future of the RECLAIM program. Members will include RECLAIM facilities, RECLAIM investors and brokers, environmental organizations, the California Air Resources Board, U.S. EPA, and other interested members of the public. Input will be sought from economists and market analysts regarding the functionality of the NOx RECLAIM market, the benefits and challenges to facilities and regulators, and options and timing for orderly transitions to command-and-control regulatory structures. The emissions, RTC holdings, and control technology status of as many individual facilities as practical will be analyzed. The working group, analyses, and public process is anticipated to be completed in one year, at which time a report to the Governing Board with findings and recommendations for the future of RECLAIM will be made.

Emission Reductions

Projected creditable emission reductions from the implementation of the NOx RECLAIM assessment efforts is targeted to generate 5 tons per day of NOx emission reductions by 2031.

Rule Compliance and Test Methods

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in either the RECLAIM program or existing source specific rules and regulations. Compliance would be verified through inspections and other recordkeeping and reporting requirements.

Cost-Effectiveness

The overall average cost-effectiveness for the December 4, 2015 amendment was $9,000 to $14,000 per ton of NOx reduced. Assuming further reductions from already controlled equipment, it is expected that the cost-effectiveness for this control measure would be about 50 percent higher or $13,500–$21,000 per ton.

Implementing Agency

The SCAQMD has the authority to regulate emissions from RECLAIM facilities.

References

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ECC-01: CO-BENEFIT EMISSION REDUCTIONS FROM GHG PROGRAMS, POLICIES, AND INCENTIVES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	GHG PROGRAMS, POLICIES AND INCENTIVES			
CONTROL METHODS:	REDUCTIONS FROM PROGRAMS THAT REDUCE GHGS ALSO REDUCE CRITERIA POLLUTANTS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
POLLUTANT INVENTORY	N/A	N/A	N/A	N/A
POLLUTANT REDUCTION		TBD	TBD	TBD
POLLUTANT REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
POLLUTANT INVENTORY	N/A	N/A	N/A	N/A
POLLUTANT REDUCTION		TBD	TBD	TBD
POLLUTANT REMAINING		TBD	TBD	TBD
CONTROL COST:	N/A			
IMPLEMENTING AGENCY:	VARIOUS AGENCIES			

Description of Source Category

Sources of greenhouse gases (GHG) also are typically emission sources of criteria pollutants. Federal, State, and local mandates and programs to reduce GHG emissions will provide co-benefit criteria pollutant reductions.

Background

Significant efforts are currently being undertaken and planned to reduce GHGs under the State's 2020, 2030 and 2050 targets. Under the 2006 California Global Warming Solutions Act (AB 32) the State established a 2020 GHG target to reduce emissions 20 percent from 1990 levels. Additionally, in 2006, Governor Arnold Schwarzenegger set a course towards reducing California's GHG emissions 80 percent below 1990 levels by 2050 through executive order S-3-05. The 2050 target was established based on the emissions limits needed to prevent catastrophic warming and limit earth's warming to below two degrees Celsius. To help achieve the 2050 target, a midterm 2030 GHG target of 40 percent below 1990 levels was set by Governor Jerry Brown in 2015.

In 2006, the passage of AB 32 also authorized establishing a Cap and Trade program in California. Under the Cap and Trade program, an emissions limit is placed on the largest stationary sources of GHGs, fuel providers, and imports of electricity. The emissions cap on these sources is lowered over time and entities under the cap may choose to reduce their emissions or purchase allowances from the market to cover their emissions.

At the federal level, the U.S. EPA is establishing regulations to limit the emissions of GHGs from stationary and transportation sources. Most recently the U.S. EPA enacted the Clean Power Plan which, calls upon states to adopt plans to limits GHG emissions from power generation in each state.

To help achieve GHG reductions, many different regulations, market mechanisms, and incentive programs are being implemented in California. As these GHG reduction efforts are undertaken across all sectors, the co-benefit reductions of criteria pollutants will be accounted for under this control measure.

Regulatory History

The State of California adopted the Global Warming Solutions Act of 2006 (AB 32) to develop regulations and programs that reduce California's GHG emissions 20 percent below 1990 levels by 2020 along with authorizing a Cap and Trade program. Under AB 32, CARB must develop a Scoping Plan every five years that describes the approach to meeting the State's GHG reduction targets. Since the adoption of AB 32 several regulations and programs have been implemented along with executive orders to reduce GHG levels in California 80 percent by 2050 and a midterm target of 40 percent by 2030 below 1990 levels. Prior to the adoption of AB 32, California established a 20 percent renewable portfolio standard (RPS) mandate for investor owned utilities in 2010. The RPS mandate was then expanded in 2011 to include municipal owned utilities along with establishing a new mandate of 33 percent by 2020. Recently, as part of SB 350, the RPS mandate was expanded to be 50 percent by 2030 along with increasing efficiency of existing buildings (see ECC-02).

In 2009, the U.S. EPA issued a declaration known as the "endangerment finding", that GHG emissions cause and contribute to adverse impacts on public health and welfare under Section 202(a) of the Clean Air Act. Under this declaration the U.S. EPA has enacted several regulations that seek to limit GHG emissions from facilities, power plants (e.g. Clean Power Plan), and the transportation sector (e.g. proposed Tier II standards, light-duty CAFE standards, and heavy-duty vehicle standards).

Additional regulations, policies, and programs currently being implemented and possible future programs can be found within the 2016 AQMP white papers.

Proposed Method of Control

GHG reductions being implemented through federal, State, and local programs are being implemented across multiple energy sectors and are generally mandated by law. The GHG emission reductions are being implemented through several mechanisms such as market programs, renewable energy targets, incentive and rebate programs, and promoting implementation and development of new technologies.

Within California, market mechanisms such as the Cap and Trade program provide GHG emissions monitoring, emissions caps, and emissions trading for required entities. Revenues generated from the Cap and Trade program are mandated to be further invested in GHG reductions. Other programs such as the Renewable Portfolio Standards require the procurement of renewable power onto the electrical grid. While many regulations are already in place, more regulations will likely be implemented at the State and federal levels along with new mechanisms for GHG emission reductions.

Under this control measure, the criteria pollutant co-benefits associated with GHG reductions will be quantified and utilized towards attainment of federal ozone and PM2.5 standards. Existing and future incentives, programs, and partnerships will be evaluated for reduction of emissions of both GHGs and criteria pollutants. SCAQMD will also work closely with other agencies and stakeholders to focus GHG reduction programs within the South Coast Basin to maximize emission reductions across all pollutants.

Emission Reductions

TBD.

Rule Compliance and Test Methods

Performance of GHG reductions and criteria pollutant co-benefits will be measured through the relevant agencies' enforcement of GHG requirements as well as the SCAQMD and State agencies emission inventories along with reductions achieved through specific programs.

Cost-Effectiveness

Cost-effectiveness has been or will be assessed in each regulation or program. Because this control measure relies on other programs, no additional costs other than relatively minor administrative costs are anticipated as a direct result of this control measure.

Implementing Agency

The SCAQMD has the authority to regulate emissions from stationary sources and will work with other regulatory agencies, businesses, and other stakeholders in implementation and program enhancements for the both the transportation and stationary sectors.

References

Fifth Assessment Report (AR5) Intergovernmental Panel on Climate Change: https://www.ipcc.ch/report/ar5/.

California Global Warming Solutions Act of 2006 (AB 32): http://www.arb.ca.gov/cc/ab32/ab32.htm.

AB 32 Scoping Plans (first and second updates): http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm.

EPA Endangerment Findings for Greenhouse Gases: http://www3.epa.gov/climatechange/endangerment/.

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ECC-02: CO-BENEFITS FROM EXISTING RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES

[NOx, VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	EXISTING RESIDENTIAL AND COMMERCIAL POWER AND FUEL USE			
CONTROL METHODS:	REDUCED ENERGY USE			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	21.7	14.2	13.5	11.9
NOX REDUCTION			0.4	1.3
NOX REMAINING			13.1	10.6
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	15.6	10.8	10.3	9.7
NOX REDUCTION			0.3	1.1
NOX REMAINING			10.0	8.6
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	9.1	8.9	8.9	8.9
VOC REDUCTION			0.23	1.0
VOC REMAINING			8.7	7.9
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	2.8	2.64	2.63	2.65
VOC REDUCTION			0.07	0.29
VOC REMAINING			2.56	2.36
CONTROL COST:	N/A			
IMPLEMENTING AGENCY:	SCAQMD			

Description of Source Category

Energy consumption in existing residential and commercial buildings results in direct and indirect emissions of criteria pollutants, toxics, and greenhouse gases. Direct emissions result from combustion of fuels such as natural gas, propane, and wood. Indirect emissions are a result of energy use requiring electricity production from power sources, many of which burn fossil fuels. Improvements in residential weatherization and other efficiency measures provide emission reductions through reduced energy use for heating, cooling, lighting, cooking, and other needs.

Background

Weatherization and other demand side energy measures, to date, have proven to reduce the need for new power plants and additional energy infrastructure. In 1978, California adopted the Title 24 building energy standards. The building energy standards adopted within Title 24 have been routinely made stronger and by 2020 the target for Title 24 standards will be to achieve zero net energy consumption for new residential buildings. The strengthening of Title 24 standards along with new building materials and more efficient appliances has resulted in newly constructed residences and commercial buildings being more efficient than previous construction.

In addition to the Title 24 building energy standards, there are multiple programs that provide incentives, rebates, and loans for efficiency projects on residential and commercial structures. These assistance programs are largely administered through servicing utilities for the property and are voluntary. Despite the availability of multiple assistance programs and the many benefits from undertaking energy savings measures, there remain many barriers to overcome. One of the challenges is increasing energy efficiency within rental and leased properties where tenants are often responsible for utility costs. Within the Basin it is estimated that 48 percent of the residential properties are occupied by tenants. Other barriers to undertaking these projects are identifying the most worthwhile and cost-effective projects, finding suited contractors, and capital to fund the projects.

In California and the Basin there is significant potential to achieve large energy reductions from retrofitting existing buildings. Within the Basin, 64 percent of the residential structures were constructed before 1979 when the California Title 24 building energy standard was first implemented. Additionally, energy efficiency measures provide cumulative benefits when implemented. Increased deployment and accelerating the rate of implementation of existing programs provides benefits in reduced energy costs, energy infrastructure needs, and emissions of greenhouse gases, toxics, and criteria pollutants. To further realize these benefits the State of California passed the Clean Energy Pollution Reduction Act of 2015 (SB 350) that sets a path to double the energy efficiency savings for electricity and natural gas use by retail customers and increase renewable energy sources from 33 to 50 percent by 2030. The bill establishes a legal mandate by requiring the State Energy Resources Conservation and Development Commission (California Energy Commission or CEC) to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030. The bill would require the Public Utilities Commission to establish efficiency targets for electrical and gas corporations consistent with this goal. The bill would also require local publicly owned electric utilities to establish annual targets for energy efficiency savings and demand reduction consistent with this goal.

Regulatory History

The U.S. EPA has recognized the importance of efficiency and renewable energy efforts in reducing emissions. In July 2012, the U.S. EPA released the *Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies into State and Tribal Implementation Plans*. Under the guidance of this document, the emissions benefits not yet accounted for within the baseline inventory from efficiency measures set into action can be accounted for within State Implementation Plans as control measures. Emission reductions from efficiency efforts beyond the baseline inventory will primarily be gained from new efforts under the requirements of SB 350.

Proposed Method of Control

Implementing and achieving the goals of SB 350 is expected to be administered through State agencies and implemented, in part, through electrical and natural gas utilities. The SCAQMD has worked with the local utilities and implemented weatherization programs within the Environmental Justice Communities of Coachella Valley, Boyle Heights, and San Bernardino areas.

The SCAQMD staff will work with agencies, utilities, and other stakeholders to further implement weatherization and other measures that provide energy savings along with emission reductions within the Basin. The SCAQMD staff will also assist in developing new tools that help effectively implement efficiency measures along with quantifying energy savings and criteria pollutant emissions benefits.

To allow emission reductions resulting from the SB 350 legislation to be credited in the SIP, the following integrity elements required by the U.S. EPA must be satisfied as described below.

Integrity Elements

Emission reductions that are projected to be achieved from the implementation of SB 350 must be quantifiable, surplus, enforceable, and permanent. As part of its support of the State's renewable energy goals and policies including SB 350 targets, the California Energy Commission provides a regular update of statewide progress toward renewable energy goals. The latest report was released in December 2015 (http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf).

- **Quantifiable:** Emission reductions are quantitatively measureable in the CEC Tracking Progress report and are supported by existing and acceptable technical data. The quantification is well-established, publicly available, and based on approved emission factors and accepted calculation methodology. The ongoing tracking progress reports evaluate and verify, over time, the programs being proposed, and implemented, resulting in corresponding electricity and natural gas savings, which can be directly related to emission reductions.

- **Surplus:** While corresponding emission reductions are the result of the State regulation, these emission reductions are not part of the baseline emissions inventory in the SIP. Thus, these emission reductions are part of the control strategy and surplus to the baseline emissions.

- **Enforceable:** The State agencies are responsible for assuring that the goals of SB 350 are achieved and the SCAQMD is responsible to properly track that the corresponding emission reductions are occurring in parallel to the efficiency programs. In general, emission reductions and other required actions are enforceable if:

    - They are independently verifiable;
    - Program violations are defined;
    - Those liable can be identified;
    - SCAQMD and U.S. EPA maintain the ability to apply penalties and secure appropriate corrective action where applicable;
    - The general public have access to all the emissions-related information obtained from the source;
    - The general public can file suits against sources for violations (with the exception of those owned and operated by Tribes); and

- They are practically enforceable in accordance with other U.S. EPA guidance on practicable enforceability.

- **Permanent:** The measure has to be permanent throughout the term for which the credit is generated. Unless the State legislature overturns SB 350, then the renewable energy goals will be met and the corresponding emission reductions will be achieved and permanent.

Emission Reductions

Weatherization and other efficiency measures are typically permanent measures that provide cumulative benefits. The existing energy efficiency programs are having impacts on emission reductions and are generally taken into account within the baseline emissions inventory. The recent passage of SB 350 significantly enhances the State's renewable energy and efficiency targets. Emission benefits expected from the implementation of SB 350 are not yet within the 2016 AQMP future year emission inventory. The emission benefits from implementing SB 350 through accelerated deployment, additional programs, and tools within the Basin are expected to achieve approximately 2–3 percent reduction by 2023 and 11 percent reduction in NOx emissions by 2031. The reduction in NOx emissions would be the result of less natural gas usage. The emission reductions were generated from the following source categories whose baseline emissions can be found in Appendix III (Base and Future Year Emission Inventory). Some categories have been grouped together for simplicity:

- Residential Natural Gas Combustion – *Space and Water Heating*
- Commercial Natural Gas Combustion – *Space and Water Heating*
- Residential LPG Combustion - *Space and Water Heating*
- Commercial LPG Combustion - *Space and Water Heating*
- Residential Natural Gas Combustion – *Other (e.g., Dryers, Pools, Fireplaces)*
- Residential Wood Combustion – *Wood Stoves and Fireplaces*
- Residential LPG Combustion - *Other (e.g., Dryers, Cooking)*
- Commercial LPG Combustion - *Other (e.g., Dryers, Cooking)*
- Commercial Natural Gas External Combustion – *Other*
- Residential Distillate Oil Combustion – *Space Heating*

Rule Compliance and Test Methods

N/A

Cost-Effectiveness

No additional costs are anticipated beyond those that would otherwise be allocated to reduce GHG emissions through State programs. This measure seeks merely to quantify criteria pollutant reductions from these GHG programs. Furthermore, weatherization and efficiency measures, when appropriately applied, can realize short payback periods from reduced energy costs (two–seven years).

Implementing Agency

The SCAQMD has the authority to regulate emissions from stationary sources and will work with other regulatory agencies to help implement this control measure.

References

California's 2030 Climate Commitment: Double Energy Savings in Existing Buildings & Develop Cleaner Heating Fuels by 2030: http://www.arb.ca.gov/html/fact_sheets/2030_energyefficiency.pdf

U.S. EPA, "Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies into State and Tribal Implementation Plans," 2012.

SB350 Clean Energy and Pollution Reduction Act of 2015:
http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350

California's Existing Buildings Energy Efficiency Action Plan: http://www.energy.ca.gov/ab758/

2015 Draft Integrated Energy Policy Report (CEC-100-2015-001-CMD):
http://www.energy.ca.gov/2015_energypolicy/

2015-2025 California Energy Demand Updated Forecast (CEC-200-2014-009-CMF):
http://www.energy.ca.gov/2014publications/CEC-200-2014-009/CEC-200-2014-009-CMF.pdf

ECC-03: ADDITIONAL ENHANCEMENTS IN REDUCING EXISTING RESIDENTIAL BUILDING ENERGY USE

[NOx, VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	EXISTING RESIDENTIAL POWER AND FUEL USE			
CONTROL METHODS:	REDUCED ENERGY USE BEYOND EXISTING REGULATIONS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	18.2	11.6	11.0	9.0
NOX REDUCTION			1.7	2.7
NOX REMAINING			9.4	6.3
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	12.4	8.2	7.8	7.0
NOX REDUCTION			1.2	2.1
NOX REMAINING			6.6	4.9
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	3.2	3.0	2.9	2.93
VOC REDUCTION			0.4	0.9
VOC REMAINING			2.5	2.1
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	1.2	1.1	1.0	1.0
VOC REDUCTION			0.2	0.3
VOC REMAINING			0.9	0.7
CONTROL COST:	$45,000 TO $50,000 PER TON			
INCENTIVE COST:	$230 TO $860 MILLION PER TPD NOX (BY 2031)			
IMPLEMENTING AGENCY:	SCAQMD			

Description of Source Category

Energy consumption in existing residential and commercial buildings results in direct and indirect emissions of criteria pollutants, toxics, and greenhouse gases. Direct emissions result from combustion of fuels such as natural gas, propane, and wood. Indirect emissions largely result from energy use causing emissions associated with electricity production. Efficiency improvements within the residential sector provide emission reductions along with reducing energy costs and help alleviate the need for additional energy infrastructure. Efforts in the residential sector under this control measure include weatherization, improvements in appliance efficiency and

addition of solar thermal and solar photovoltaic systems. This control measure is focused upon existing residences and goes beyond existing regulations. Co-benefit reductions from current building codes with targets established in SB 350 (Clean Energy Pollution Reduction Act of 2015) are accounted for in control measure ECC-02 (Co-benefits from Existing Residential and Commercial Building Energy Efficiency Measures).

Emission reductions from ECC-03 set a path to maximize emission reductions by implementing advanced highly efficient zero-emission appliance technologies and efficiency measures when cost effective and feasible, including weatherization along with renewable energy sources, and near-zero emission technologies, such as renewable gas, in all other applications. Targets in this measure are planned to achieve increases in efficiency along with increased renewable energy sources within the residential sectors to achieve category emissions reductions of 15 percent by 2023 and 30 percent by 2031. This measure is designed to reduce end use energy consumption and provide emission reductions within existing residences along with SCAQMD participating in the Title 24 2020 Zero Net Energy (ZNE) efficiency development process for new residential construction. Implementation and incentivizing in this measure will be coordinated with utilities and other agencies to leverage and enhance existing programs, and maximize energy savings and emission reductions.

Background

Improved appliance efficiencies, declining renewable energy prices, weatherization and other demand side energy measures, have recently been shown to reduce the need for new energy infrastructure such as power plants. The building energy standards adopted within California's Title 24, along with Title 20 appliance efficiency standards have routinely become more efficient with targets toward achieving zero net energy consumption for new residential housing by 2020 and new commercial construction by 2030. Achieving these ambitious targets is being made possible with new building materials, more efficient appliances, new technologies, and declining renewable energy costs. In California the strengthening of these building energy and appliance codes has resulted in newly constructed residences and buildings being more efficient than previous construction. Within the Basin, there is extremely high potential to reduce end use residential and commercial energy usage. Over 64 percent of the residential structures in Southern California were built before 1979 when the California Title 24 building energy standard was first implemented.

There are multiple programs that provide incentives, rebates, and loans for efficiency projects on residential and commercial structures that can assist in going beyond current regulations and enhance existing programs. One such opportunity could be targeting increasing energy efficiency within rental and leased properties (approximately 48 percent in the region) where tenants are often responsible for utility costs. In California and the Basin, there is significant potential to achieve large energy reductions from retrofitting existing buildings. Additionally, energy efficiency measures provide cumulative long term benefits once implemented. Increased deployment and accelerating the rate of implementation beyond existing programs provides additional benefits in reduced energy costs, energy infrastructure needs, and reductions of emissions of greenhouse gases, toxics, and criteria pollutants.

Combustion appliances within residences account for the majority of direct emissions within the residential sector. Appliances are considered durable goods and most appliances last one or two decades before needing replacement. The SCAQMD has several regulations which include Rules 1121, 1146.2, and 1111, which, in part, established limits on NOx emissions from combustion sources such as water heaters, pool heaters, and furnaces. Other residential combustion sources include cook stoves, and fireplaces. While the SCAQMD regulations established NOx emission thresholds, there are more efficient appliances with zero and near-zero emitting applications that can provide significant emission reductions and efficiency benefits beyond most existing

appliances and those implemented as a typical appliance replacement. This is especially true when appliances are coupled with renewable resources such as solar panel and/or solar thermal systems. Payback periods from these actions with small incentives can be as short as 2 to 3 years depending on the cost of the equipment, available incentives, efficiency gains, and energy prices.

Many appliances such as water heaters are now available with energy factors (EF) greater than 0.8 for natural gas pilotless storage and EF levels over 2.4 for heat pump storage systems. While these highly efficient water heaters have higher upfront costs, their present value savings from efficiency gains often make them attractive options. These longer term benefits from higher efficiency appliances are often not apparent to consumers who generally look at upfront purchase prices. Therefore the voluntary incentive program will encourage the purchase of these higher efficiency appliances in the Basin. High efficiency appliances are also available for pool heaters, furnaces, and cook stoves.

Declining costs in renewable energy and solar thermal heating sources can be coupled with existing appliances and/or be implemented with new appliances along with weatherization efforts. In the residential sector, solar thermal heating can help offset heating energy needs from water heaters, pool heaters, and, in some instances, clothes dryers. Solar thermal energy sources can range from rooftop heating systems to pool covers.

Traditionally adding solar photovoltaics was done after load reductions occurred through weatherization and appliance upgrades. However, rapidly declining costs in solar photovoltaics provides an inexpensive technology to add electrical generation that can be coupled with highly efficient appliances such as heat pump furnaces and water heaters along with helping reduce electricity costs. Review of a households' potential for improving appliance efficiency along with weatherization potential could be coupled with conventional evaluation of solar opportunities when solar contractors review residences for solar panel additions. Sizing of the solar panel installations could then be adjusted for efficiency gains or increased electrical loads resulting from appliance replacements. A similar approach can be taken with solar thermal hot water heaters.

The increased appliance efficiencies and emission reductions within this measure will incentivize equipment beyond current SCAQMD regulations and existing efficiency programs. This measure will be implemented in conjunction with State agencies and local utilities to develop collaborative incentive efforts. Additionally, other technologies and market programs, such as energy storage and smart grid measures like grid connected electric water heaters will become less costly and more widely incentivized by utilities. These technologies and use of appliances as grid resources will be evaluated and considered during the development and implementation phases of this measure. Other residential combustion types will also be evaluated for energy efficiency such as fireplaces, furnaces, space heaters, outdoor heaters, etc. Staff will also evaluate potential incentives to encourage any identified additional energy efficiency. As shown in Chapter 10 the energy infrastructure in the Basin is changing rapidly, resulting from single point failures such as San Onofre and Aliso Canyon along with new policies, such as, moving towards a 50 percent renewable portfolio standard by 2030. This is expected to change the utility rate structures. Electricity rate pricing will likely more closely reflect real time generation and demand to reflect periods of over generation from renewables or high end use demand.

The Building Energy Title 24 standards currently being developed for 2020 are being established to require new residential construction have ZNE usage based on time dependent valuations (TDV). The SCAQMD will participate in the Title 24 residential ZNE rulemaking to advocate for criteria pollutant and GHG emissions consideration.

Note that control measure CMB-01 focuses specifically on NOx reduction opportunities, rather than the fuel savings and efficiency gains considered in this measure. However, all regulations, actions, and incentive programs directed at residential appliances will need to consider both energy efficiency and NOx emissions. Zero emission and high efficiency applications will be prioritized to the extent they are feasible and cost-effective at the time of implementation. The SCAQMD will be convening a workgroup to better understand the in-Basin lifecycle criteria pollutant emissions from different energy choices and technologies in current and future years. Assessments from this workgroup will help focus the implementation of incentives. Lastly, the SCAQMD will collaborate with utilities, agencies, and other organizations to help leverage funding and coordinate incentives with similar existing programs.

Regulatory History

The U.S. EPA has provided guidance documents allowing emissions benefits not yet accounted for within the baseline inventory from efficiency and renewable energy measures set into action can be accounted for within State Implementation Plans (SIPs) as control measures. Emission reductions from efficiency efforts beyond the current requirements and use of smart grid technology will primarily be gained from ambitious incentives and outreach.

Proposed Method of Control

The SCAQMD has worked with the local utilities and implemented weatherization, renewable energy, and smart grid programs, in part, within the Coachella Valley, Boyle Heights, and San Bernardino areas. Implementation of weatherization and smart grid programs has helped lower the barrier to implementing weatherization and smart grid efforts within Environmental Justice Communities.

The SCAQMD staff will work with agencies, utilities, and other stakeholders to further implement weatherization and other measures that provide energy savings focused on emission reductions within the Basin. The SCAQMD staff will also assist in developing new tools that help effectively implement efficiency measures along with quantifying energy savings, emissions benefits along with educating consumers about short payback periods and cost savings opportunities.

Implementation of smart grid technology and other energy efficiency weatherization measures at affected residential buildings would be incentivized through voluntary public participation. To obtain credit in the SIP with emission reductions resulting from this implementation, the integrity elements must be satisfied that are described in detail in the Incentives Implementation of this control measure.

Incentives Implementation

The proposed weatherization, smart grid and efficiency measures would be implemented through voluntary incentive programs (VIPs) and resulting emission reductions must satisfy the following certain *Integrity Elements* criteria for SIP credit to be given for emission reductions. In addition, individual VIPs should be developed according to specific guidelines.

Integrity Elements

Emission reductions that are projected to be achieved from the voluntary incentive measures must be demonstrated to be quantifiable, surplus, enforceable, and permanent. This demonstration must include project type(s); project life; applicable incentive program guideline(s), by title, year, chapter(s); and analysis of applicable incentive program guideline(s) for consistency with integrity elements. For the purposes of this demonstration, the following provides examples of the key elements:

- **Quantifiable:** Emission reductions are quantitatively measureable—supported by existing and acceptable technical data. The quantification should use well-established, publicly available, and approved emission factors and accepted calculation methodology. In developing the quantification methodologies, the guidance provided within the *EPA Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies into State and Tribal Implementation Plans* will be followed. There must be procedures to evaluate and verify over time the level of emission reductions actually achieved.

  Example (1): A residence is having solar panels installed and has an older gas storage water heater. The SCAQMD, through outreach and/or partnerships with solar panel installation companies, is incentivizing the replacement of older inefficient water heaters. The panel installers while installing panels can also provide a quote for a new water heater and/or pool heater then install if the homeowner agrees with the appropriate contractor. Knowing the make and model of the existing water heater along with the efficiency and any emissions of the new high efficiency water heater provides a basis for calculating the reductions.

  Example (2): Within an area, there are older existing residences that are in need of weatherization along with other efficiency efforts and have rooftops conducive for solar panels and/or solar thermal systems. Undertaking this control measure within large residential areas can be quantified before and after implementation from aggregated utility data.

- **Surplus:** Emission reductions must be above and beyond any existing district, State, or federal regulation and not included in the baseline inventory. Emission reductions used to meet air quality attainment requirements are surplus as long as they are not otherwise relied on in the SIP, SIP-related requirement, other State air quality programs adopted but not in the SIP, a consent decree, or federal rules that focus on reducing criteria pollutants or their precursors. In the event that a VIP's emission reductions are relied on to meet air quality-related program requirements, they are no longer surplus. In addition, the emission reductions are available only for the remaining useful life of the equipment being replaced (e.g., if the equipment being replaced had a remaining useful life of five years, the additional emission reductions from the new equipment are available for SIP purposes under this guidance only for five years).

- **Enforceable:** The SCAQMD will be responsible for assuring that the emission reductions credited in the SIP will occur. Emission reductions and other required actions are enforceable if:

  - They are independently verifiable;
  - Program violations are defined;
  - Those liable can be identified;
  - SCAQMD and U.S. EPA maintain the ability to apply penalties and secure appropriate corrective action where applicable;

- The general public have access to all the emissions-related information obtained from the source;
- The general public can file suits against sources for violations (with the exception of those owned and operated by Tribes); and
- They are practically enforceable in accordance with other U.S. EPA guidance on practicable enforceability.

Actual emission reductions, for example, can be assured through replacement equipment registration, recordkeeping and reporting, and inspections (initial inspection after installation and subsequent on a regular basis thereafter, if needed) throughout the term. Specific enforcement mechanisms will be addressed in the guidelines for the individual incentive measures.

- **Permanent:** The emission reductions need to be permanent throughout the term for which the credit is generated. The emission reductions are permanent if these reductions are ensured to occur over the duration of the VIP, and for as long as they are relied upon in the SIP.

  For example, those awarded incentives will ensure the projects are properly implemented and the reductions are occurring and will continue to occur. Thus, recipients of the incentive awards would agree to a third party inspection along with contract provisions, such as recordkeeping and reporting to track reductions and agreements that newly installed equipment would not be removed without concurrence with SCAQMD (i.e., permanent placement) and the proof that the replaced equipment would be destroyed or at least not be operated in the Basin (e.g., pictures, certification). Detailed procedures to ensure permanent reductions will be described in the guidelines for the Individual Incentive Program.

Guidelines

Each VIP needs to have detailed and comprehensive guidelines that are approved by the SCAQMD Governing Board. The guidelines will include the protocol to implement the program, to ensure SIP approvability:

- ☑ VIP should demonstrate compliance with the four key elements of the VIP: quantifiable emission reductions plus incentive costs, surplus reductions, enforceable compliance and permanent reductions.
- ☑ Working group should be established to solicit public input and feedback during VIP guideline development.
- ☑ Process and procedures to apply for incentives should be clearly explained in the guideline.
- ☑ It needs to clearly describe how incentives would be awarded (e.g., priority to high emitters and/or age of equipment, tiered process, first come first serve, or EJ area priority).
- ☑ It should have conditions of some form for agreement (e.g., contracts) including tracking and ensuring permanent reductions. The following forms should be prepared:
  - ☑ Application Forms (samples are required).
  - ☑ Contracts with Conditions (samples are required).
  - ☑ Product Example.
- ☑ Tracking mechanism is required to ensure overall effectiveness of program and procedures to correct emission projections, such as reductions by the committed target date (e.g., 2023, 2031) and submittal to U.S. EPA annually. Tracking checklist should include:
  - ☑ Project Title.
  - ☑ Product.

- ☑ Annual Emission Reductions (e.g., from 2017 to 2027, incremented by one year).
- ☑ Life of project (e.g., 10 years).
- ☑ Installation dates (e.g., fixed year 2017 or multiple installation years 2017 and 2018).

☑ Possible recordkeeping, reporting, and monitoring requirements need to be addressed.

☑ Individual outreach efforts (e.g., social media, email blasts) to promote the program, make aware of deadlines to apply, and provide timing locations of workshops.

☑ Program guidelines should be approved by the SCAQMD Governing Board and published online.

Emission Reductions

Weatherization, high efficiency appliances, renewable energy and smart grid measures are typically long term and permanent measures that provide cumulative benefits. Existing energy efficiency programs are having impacts on emission reductions and are generally taken into account within the baseline emissions inventory. Emission benefits expected from actions going beyond SB 350 and Title 24 building energy standards are not yet within the 2016 AQMP future year emission inventory. Accelerated focused deployment, additional programs, and additional incentives within the Basin can achieve an additional 15 percent reduction in NOx emissions by 2023 and 30 percent reduction by 2031 beyond existing efficiency programs and regulations. The reduction in NOx emissions would largely be the result of less natural gas and electricity usage.

Rule Compliance and Test Methods

N/A

Cost-Effectiveness

Weatherization, renewable energy, appliance efficiency and smart grid measures when appropriately applied can realize short payback periods from reduced energy costs. Staff estimates costs for a residential energy efficiency incentive program at about $230 to $860 million to reduce emissions by 2.1 tons per day by 2031. The incentive program range is dependent on the type of equipment replacements. Types of equipment identified for this measure include: water heaters, heat pump storage systems, pool heater and covers, weatherization and clothes dryers. Incentivizing the purchase of a pool cover is the most cost-effective option at the lower end of the incentive cost range while weatherizing an entire existing home or installing a solar thermal pool heating system is at the higher end of the incentive cost range. The average cost-effectiveness over the lifetime of the equipment is between $45,000 and $50,000 per ton. For some technologies the payback period can be as short as two to three years depending on the cost of the equipment, available incentives, efficiency gains, and energy prices.

Implementing Agency

The SCAQMD has the authority to regulate emissions from stationary sources and will work with other regulatory agencies, utilities, industry groups, and stakeholders to help develop and implement incentives under this control measure.

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California Energy Commission, 2015 Integrated Energy Policy Report: http://www.energy.ca.gov/2015_energypolicy/index.html

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Energy Efficiency Design Options for Residential Water Heaters: Economic Impacts on Consumers: presented at 2011 ASHRAE Winter Conference, Lawrence Berkeley National Laboratory, January 2011.

ECC-04: REDUCED OZONE FORMATION AND EMISSION REDUCTIONS FROM COOL ROOF TECHNOLOGY [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ELECTRIC UTILITIES			
CONTROL METHODS:	EXPANSION OF STATE STANDARDS, SUBSIDY PROGRAM			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
POLLUTANT INVENTORY	TBD	TBD	TBD	TBD
POLLUTANT REDUCTION		TBD	TBD	TBD
POLLUTANT REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
POLLUTANT INVENTORY	TBD	TBD	TBD	TBD
POLLUTANT REDUCTION		TBD	TBD	TBD
POLLUTANT REMAINING		TBD	TBD	TBD
CONTROL COST:	TBD			
IMPLEMENTING AGENCY:	SCAQMD AND CEC			

Description of Source Category

Background

Cool roofs reflect a higher fraction of incident sunlight than traditional roofing materials. Widespread adoption of cool roofs can mitigate the urban heat island effect and lower daytime ambient temperatures, thus slowing the rate of ozone formation. In addition, buildings equipped with cool roofs require less energy for cooling, leading to reduced emissions from the power generation sector. However, installation of some cool roof surfaces can increase the fraction of reflected UV light and potentially increase ozone formation rates. This control measure is designed to leverage the air quality benefits of cool roof technology, while minimizing potential ozone increases when installing cool roof materials. This control measure has the potential to reduce ambient ozone concentrations directly along with NOx, CO, PM, and CO2 emissions from the power generation sector. Evaporative emissions of VOCs will also be reduced under lower ambient temperatures.

Regulatory History

Title 24, part of California's Energy Efficiency Standards for Residential and Nonresidential Buildings (2013) requires that new or replacement roofs are cool roofs. The standards are based on the minimum three-year aged solar reflectance, the thermal emittance, and the minimum solar reflectance index for the roofing materials. The specific requirements are dependent on the roof slope (high-slope vs. low slope), the climate zone, and the building use

(non-residential, residential, high-rise residential, hotel/motel). The Cool Roof Rating Council has developed methods to measure the radiative properties of roofing products. Test data is readily available for different roofing materials. Several municipalities within the Basin such as Glendale, Los Angeles, and Pasadena have ordinances that expand Title 24 requirements.

Proposed Method of Control

There are three possible aspects of this control measure. Each aspect will be investigated in the technical modeling analysis to quantify the impact on air quality.

1) Solar Reflectance: In order to qualify as a cool roof, roofing materials must meet certain radiative property requirements. Solar reflectance is an important property that quantifies the fraction of solar energy that is radiated back into space. A roof with a large solar reflectance can keep a building cool. However, ultra-violet solar energy can also be reflected, leading to increased ozone formation in the air column above the building. Therefore, to minimize inadvertent ozone formation, a rooftop with a minimal ultra-violet solar reflectance and a large reflectance of visible and infra-red light is preferable. This control measure would require that ultra-violet solar reflectance is also considered when selecting roofing materials that meet Title 24 cool roof standards.

2) Radiative Properties: Title 24 mandates that new or replacement residential roofs meet prescribed radiative properties in select climate zones within California. Depending on the resulting air quality benefits, the expansion of residential Title 24 requirements to climate zones within the Basin that are currently exempt may be an effective method to reduce air pollution. Low-slope high-rise residential and hotel/motel rooftops within the Basin in climate zones 6 and 8 are currently unregulated.[9] Low-slope residential rooftops are not regulated in climate zones 6, 8, 9 and 10 while high-slope residential rooftops are not regulated in climate zones 6, 8, and 9.[10]

3) Roof Replacements: Since Title 24 does not cover existing rooftops, full implementation is not expected until it is necessary to replace all existing rooftops. If the technical modeling analysis shows significant improvements in ambient ozone concentrations if all rooftops meet Title 24 standards, subsidies for the replacement of roofs not meeting Title 24 standards could be a cost-effective method to accelerate air quality benefits.

Emission Reductions

The meteorological and air quality effects of the proposed methods of control are complicated and non-linear. A technical modeling analysis to quantify the effects of this control measure is currently being conducted. This measure has the potential to reduce ozone directly by slowing the rate of ozone formation in the Basin. Reduced

[9] Climate zone 6 covers all of coastal Los Angeles and Orange Counties. Climate zone 8 covers inland Orange County and the southern portion of inland Los Angeles County.

[10] Climate zone 9 encompasses the majority of inland Los Angeles County and climate zone 10 covers portions of south western San Bernardino County and western Riverside County.

energy consumption for building cooling will lead to reductions in NOx, PM2.5, CO, CO_2, and air toxics emissions from the power generation sector. Evaporative VOC emissions will be reduced due to lower ambient temperatures in the urban areas of the Basin.

Rule Compliance and Test Methods

Local building enforcement agencies are primarily responsible for compliance and enforcement of Title 24. (See Title 24 Residential and Nonresidential compliance manuals). The Cool Roof Rating Council develops test methods for measuring the radiative properties of roofing products. It may be possible to expand American National Standard Institutes/Cool Roof Rating Council (ANSI/CRRC) S100 – Standard Test Methods for Determining Radiative Properties of Materials so that it covers the testing of ultra-violet solar reflectance.

Cost-Effectiveness

Determination of the cost-effectiveness of this control measure will require a complete technical modeling analysis of the meteorological, air quality, and energy use changes. However, the costs of many cool roof materials are comparable to traditional roofing materials. The added energy savings over the lifetime of the cool roof can lead to significant cost savings to the building owner.

Implementing Agency

SCAQMD will seek to influence Title 24 Standards and/or to develop incentive mechanisms to encourage implementing cool roofs, in conjunction with other stakeholders.

References

2013 Nonresidential Compliance Manual, California Energy Commission.

2013 California Energy Efficiency Standards Nonresidential Compliance Manual

2013 Residential Compliance Manual, California Energy Commission.

2013 California Energy Efficiency Standards Residential Compliance Manual

"Cool Roof Rating Council." from http://coolroofs.org/.

(2012). 2013 Building Energy Efficiency Standards for Residential and Nonresidential Buildings, California Energy Commission. CEC-400-2012-004-CMF-REV2.

(2015). "Energy Maps of California." from http://www.energy.ca.gov/maps/renewable/building_climate_zones.html.

Council, C. R. R. (2008). Standard Test Methods for Determining Radiative Properties of Materials. ANSI/CRRC S100.

FUG-01: IMPROVED LEAK DETECTION AND REPAIR
[VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	FUGITIVE EMISSION SOURCES			
CONTROL METHODS:	IMPROVED/EXPANDED LEAK DETECTION PROGRAMS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY*	14	7.7	7.1	6.2
VOC REDUCTION		N/A	2	2
VOC REMAINING		7.7	5.1	4.2
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY*	14	7.7	7.1	6.2
VOC REDUCTION		N/A	2	2
VOC REMAINING		7.7	5.1	4.2
CONTROL COST:	$4,000 TO $5,000 PER TON VOC REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

* Inventory will be re-assessed as part of rulemaking process.

Description of Source Category

This proposed control measure would reduce emissions from a variety of VOC emissions sources including, but not limited to, oil and gas production facilities, petroleum refining and chemical products processing, storage and transfer facilities, marine terminals, and other sources, where VOC emissions occur from fugitive leaks in piping components, wastewater system components, and process and storage equipment. Most of these facilities are already required under SCAQMD and federal rules to maintain a leak detection and repair (LDAR) program that involves individual screening of all of their piping components and periodic inspection programs of equipment to control and minimize VOC emissions. This measure would utilize more efficient and effective leak detection systems known as advanced remote sensing techniques (Smart LDAR), such as Fourier transform infrared spectroscopy (FTIR), Ultraviolet Differential Optical Absorption Spectroscopy (UV-DOAS), Solar Occultation Flux (SOF) and infrared cameras, that can identify, quantify, and locate VOC leaks in real time, allowing for faster repair in a manner that is less time consuming and labor intensive than traditional LDAR.

Background

Fugitive VOC leaks have been the subject of control measures in previous AQMPs since VOCs are ozone and PM2.5 precursors and some VOCs have toxic properties. Several SCAQMD rules that affect petroleum and chemical-related industries, such as oil refineries, oil and gas production fields, natural gas processing plants, pipeline transfer stations and chemical plants have requirements involving the periodic inspection of piping components

and the detection and repair of leaks. These industries are often located in or near EJ communities, and the reduction of toxic VOCs has direct benefits for the communities surrounding them.

Fugitive leaks are generally detected with a handheld organic vapor analyzer (OVA) that measures the leak rate for each component, using U.S. EPA Reference Method 21. In the early 1970s, U.S. EPA initiated the Petroleum Refinery Assessment Study, which developed average emission factors for each type of piping component (valve, flange, pump, etc.) and concluded that mass emission rates are dependent on the phase of the process stream (gas/vapor, light liquid and heavy liquid) and the relative volatility of the liquid stream. Mass emissions from fugitive leaks can be calculated based on correlation equations developed by the U.S. EPA based on data from the 1994 Refinery Equipment Leak Report, which are specific to each type of component, such as valve, flange, pump, compressor, etc. The current LDAR program has been successful in significantly reducing fugitive VOC emissions from a variety of sources. However, the latest technology provides opportunities for further improvements in the efficiency of the conventional LDAR program and for further emissions and cost reductions.

In the past few years, SCAQMD staff performed two pilot studies to ascertain feasibility of different optical remote sensing (ORS) techniques for air quality and emissions monitoring from large refinery complexes in the Basin. Overall, these projects have demonstrated that ORS techniques can be successfully used to accurately characterize and quantify emissions from refineries. It was also concluded that longer term measurements (e.g. one month to a year), combined with more detailed wind profile information are needed in order to increase robustness of emissions estimates.

In September 2014, U.S. EPA finalized a rule imposing more stringent fugitive emission control requirements of hazardous air pollutants (HAPs) for flares, coking units and catalytic reforming unit vents of petroleum refineries (http://www.epa.gov/ttn/atw/petref.html). To ensure that proposed standards are being met, and to protect the public from exposure to HAPs, no later than three years after the effective date of the final rule, U.S. EPA will require monitoring of benzene concentrations at the fenceline of refineries using passive sensors networks, collecting 2-week rolling averaged benzene concentrations. The not to exceed two-week rolling average benzene concentration at the refinery fenceline is set at 9 $\mu g/m^3$ (equivalent to approximately 3 ppb). In recognition of recent advances in ORS technology, the new rule also allows facilities to use alternative test methods in order to satisfy the benzene monitoring requirements.

Based on experience gained from previous remote sensing fenceline monitoring studies and a pressing need for early detection capabilities and improved estimates of fugitive emissions, it is prudent to continue to expand SCAQMD remote sensing capabilities. To accomplish this goal, in September – October 2015 SCAQMD conducted a comprehensive measurement campaign aimed to fully characterize technologies that quantify fugitive and stack emissions from large refineries and other important VOC sources in the Basin such as oil wells and gas stations. The analysis of collected data is in progress.

Regulatory History

Fugitive emissions are currently regulated under various SCAQMD rules that range from a simple inspection/maintenance program, to self-inspection programs or an LDAR program. The following rules address fugitive emissions in this manner: Rules 462 – Organic Liquid Loading, 463 – Storage of Organic Liquids, 1142 – Marine Vessel Tank Operations, 1148.1 Oil Well Enhanced Drilling, 1173 – Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum and Chemical Plants, 1176 – Sumps and Wastewater Separators, and 1178 – Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities.

Proposed Method of Control

There are numerous U.S. EPA air pollution standards as well as SCAQMD rules that require specific work practices for equipment LDAR. The current work practice requires the use of a monitor which meets required performance specifications. This work practice is based on 30-year-old technology. While such work practices have been extremely successful in reducing fugitive emissions, recent developments in optical gas imaging provide opportunities for further improvements in efficiency, cost, and effectiveness of the leak detection systems.

This control measure will pursue two goals. The first, as described below, is to upgrade inspection/maintenance rules to require, at a minimum, a self-inspection program, or utilization of an optical gas imaging-assisted LDAR program where feasible. Second, to explore the use of new technologies to detect VOC fugitive emissions in order to supplement existing programs and achieve additional emission reductions. Both goals will be pursued in a public process allowing interested stakeholders to participate in pilot projects and the rule development process.

Rules 462 – Organic Liquid Loading, and 1142 – Marine Vessel Tank Operations and 1148.1 – Oil Well Enhanced Drilling require owner/operators to inspect and to repair and maintain equipment in good operating order when the equipment is operating. Under this control measure, the work practices for these rules would be upgraded to require repairs and maintenance to be documented with records and, where appropriate, reported. Some of these programs could be enhanced by adding some or all of the requirements of an LDAR program.

Rule 463 – Storage of Organic Liquids and 1178 – Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities are two rules that utilize a self-inspection program. Rules 1173 – Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum and Chemical Plants and 1176 – Sumps and Wastewater Separators incorporate an LDAR program. Under this control measure, these rules would be candidates for further improvements in current work practices through the use of new detection technology.

For new detection technology this control measure will be implemented in two phases: Phase I will be a pilot Smart LDAR program to demonstrate feasibility with the new technology and to establish implementation protocols. The completion of Phase I will result in the identification of facilities/industries currently subject to LDAR programs and identification of those where the new Smart LDAR technology is not yet ready to be utilized. Based on the results of Phase I, fugitive VOC rules will be amended as appropriate under the subsequent phase (Phase II) to enhance their applicability and effectiveness, and to further achieve emission reductions. Consideration will be made, where appropriate, for the use of Smart LDAR as a substitute for existing LDAR programs. Some smart LDAR technologies are qualitative only and the lack of quantitative information would require the continued use of existing LDAR programs in those situations.

Emission Reductions

Implementing an LDAR program to source categories that are currently not subject to such programs and/or revising existing LDAR programs with the optical gas imaging capabilities could reduce fugitive emissions by improving operators' ability to detect leaking components and accelerate repairs. The current VOC inventory for applicable sites is 7.1 tons per day (4.5 tons per day at petroleum refineries and 2.6 tons per day at oil and gas production sites). Emission reductions are estimated at 2 tons per day with 1 ton per day being reduced at petroleum refineries (22 percent reduction) and 1 ton per day from oil and gas production sites (38 percent reduction). Emission reduction estimates are preliminary and are based on earlier detection and repair of larger

leaks (≥ 10,000 ppm). As noted earlier, many of the VOCs emitted by these industries are toxic as well. Therefore, the VOC reductions realized by this measure will also decrease exposure to toxic VOCs in nearby EJ communities.

Rule Compliance

Rule compliance would be similar to compliance requirements under existing Rules 462, 463, 1142, 1148.1 1173, 1176, and 1178. Recordkeeping and monitoring requirements would be similar to Rule 109.

Test Methods

Test methods include the following:

U.S. EPA Reference Method 21 - Determination of Volatile Organic Compounds Leaks.

Federal Register Vol. 71, No. 66 April 6, 2006 - Alternative Work Practice to Detect Leaks from Equipment.

Cost-Effectiveness

Smart LDAR technology would be deployed at six refineries and 27 oil and gas production sites. Using SOF technology for cost estimates, each unit would cost approximately $300,000 and require $75,075 in annual labor, maintenance and electrical costs. Cost-effectiveness for this control measure is approximately $4,000 to $5,000 per ton VOC reduced.

Implementing Agency

The SCAQMD has authority to regulate fugitive VOC emissions sources from non-vehicular sources.

References

SCAQMD – VOC Controls White Paper, 2015

U.S. EPA – Protocol for Equipment Leak Emission Estimates, November 1995.

Federal Register/Vol. 71, No. 66/April 6, 2006, Alternative Work Practice to Detect Leaks from Equipment.

CTS-01: FURTHER EMISSION REDUCTIONS FROM COATINGS, SOLVENTS, ADHESIVES, AND SEALANTS [VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	MISCELLANEOUS COATINGS, SOLVENTS, ADHESIVES AND SEALANTS			
CONTROL METHODS:	REDUCE THE ALLOWABLE VOC CONTENT IN PRODUCT FORMULATIONS OR PROVIDE INCENTIVES FOR VOLUNTARY REDUCTIONS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	47	56	57	62
VOC REDUCTION		N/A	1	2
VOC REMAINING		56	56	60
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	49	58	59	64
VOC REDUCTION		N/A	1	2
VOC REMAINING		58	58	62
CONTROL COST:	$8,000 TO $12,000 PER TON VOC REDUCED			
IMPLEMENTING AGENCY:	SCAQMD			

Description of Source Category

This proposed control measure seeks volatile organic compound (VOC) emission reductions by focusing on select coating, adhesive, solvent and sealant categories by further limiting the allowable VOC content in formulations or incentivizing the use of super-compliant technologies. Examples of the categories to be considered include but are not limited to, coatings used in aerospace applications; adhesives used in a variety of sealing applications; and solvents for graffiti abatement activities. Reductions could be achieved by lowering the VOC content of the coatings, solvents, adhesives and sealants where possible, but reductions could also be achieved by promoting the use of alternative low-VOC products or non-VOC product/equipment at industrial facilities.

Background

Use of super-compliant zero and near-zero VOC materials, such as some ultraviolet light, electron beam, and light emitting diode cured coatings, eliminate or substantially reduce emissions compared to similar products that are not zero or near-zero products. There are several product categories where these materials perform as well as traditional products and are widely available in the market.

Over the years, the SCAQMD Governing Board has adopted numerous rules to reduce the VOC emissions from the use of coatings, solvents, adhesives, and sealants in commercial and industrial applications. Subsequent amendments to these rules achieved further VOC emission reductions primarily through product reformulations using low-VOC technologies including alternative resin chemistries, aqueous and bio-based products, and exempt solvents.

Recent sales and emissions reporting programs have led to improved understanding of the VOC inventory, incentivized clean technology through fee structures, and better-focused future enforcement and regulatory actions. These approaches not only ensure that the reductions assumed in the AQMP are actually occurring, but also allow analysis of market trends and compliance margins that go beyond the regulatory requirements.

The 2016 AQMP control strategy continues to focus on NOx reductions, with additional strategic and cost-effective VOC reductions, as the best way to minimize the general public's exposure to unhealthy ozone pollution not only in the target attainment year, but also during the course of the control effort. The analysis in the VOC Controls White Paper (SCAQMD, 2015) indicates that a NOx-heavy strategy accompanied by more modest VOC reductions will help to avoid temporary increases in ozone concentrations in the western side of the Basin. This finding reaffirms the previous NOx-heavy State Implementation Plan (SIP) strategies to meet both PM2.5 and ozone standards. A strategic VOC control program is recommended for the 2016 AQMP to first maximize co-benefits of NOx, greenhouse gases (GHGs), and air toxic controls, followed by controls that could create a "win-win" "business case" for the affected entities, incentives for super-compliant products, while ensuring and capturing benefits from implementation of existing rules. Particular VOC reductions that lead to the increased use of chemicals that are known or suspected to be toxic should be avoided until it can be demonstrated that these replacement products do not lead to increased toxic risk for workers or the general public. When additional VOC controls are still needed, it is recommended to prioritize controls that will produce co-benefits for air toxics and GHGs, with a focus on VOC species that are most reactive in ozone and/or PM2.5 formation.

Regulatory History

The majority of the VOC emission reductions are projected to come from continuing the Rule 1168 amendment that was suspended in 2014. In addition, the following VOC rules may be affected by this control measure due to toxicity concerns, reasonably available control technology (RACT) evaluations and potential loophole elimination:

- **Rules 1106 – Marine Coating Operations and 1106.1 – Pleasure Craft Coating Operations**
  The Governing Board did not adopt proposed amendments in 2015 due to proposed recordkeeping requirements, but staff still intends to combine the rules to promote clarity and evaluate whether the rules satisfy RACT requirements.
- **Rule 1124 – Aerospace Assembly and Component Manufacturing Operations**
  Evaluate whether the rule satisfies RACT requirements.
- **Rule 1128 – Paper, Fabric, and Film Coating Operations**
  Evaluate applicability of spray booths or non-coating line processes used in paper, fabric, and film coating operations.
- **Rules 1107 – Coating of Metal Parts and 1168 – Adhesive and Sealant Applications**
  Amendments to both rules were suspended until the Heath Risk Assessment (HRA) on tertiary-Butyl Acetate (tBAc) is finalized. Once the HRA is finalized, the amendments will resume.

- **Rule 1136 – Wood Product Coatings**
  Consider restriction or elimination of potential loopholes and evaluate toxic emissions resulting from furniture stripping.
- **Rules 314 – Fees for Architectural Coatings, 1113 – Architectural Coatings, 1143 – Consumer Paint Thinners and Multi-Purpose Solvents, and 1171 – Solvent Cleaning Operations**
  Assess the potential to achieve SIP reductions through certification programs (e.g. Clean Air Solvent, Clean Air Choices Cleaner Product Certification, or a coatings certification program) or reporting programs.

Proposed Method of Control

Reductions would be achieved by tightening regulatory exemptions that may be used as loopholes and lowering the VOC content for a select few categories where most products are already meeting lower VOC limits. SIP credit may also be achieved through contractual agreements with manufacturers of near-zero VOC SCAQMD certified products. The proposal is anticipated to be accomplished with a multi-phase adoption and implementation schedule. Enhanced enforcement can also lead to reduced emissions.

Emission Reductions

Current estimates are that there is a potential VOC emission reduction of 2 tons per day by 2031.

Rule Compliance and Test Methods

Rule compliance would be achieved by amending select SCAQMD rules on coatings, adhesives, solvents, and sealants.

Cost-Effectiveness

The cost-effectiveness of this control measure is estimated at $8,000 to $12,000 per ton of VOC reduced.

Implementing Agency

The SCAQMD has the authority to regulate emissions from area sources and stationary point sources.

References

VOC Controls White Paper (2015)

SCAQMD Staff Reports for Coatings, Solvents, Adhesive and Sealant Rules

Material Safety Data Sheets

Product and Technical Data Sheets

BCM-10: EMISSION REDUCTIONS FROM GREENWASTE COMPOSTING [VOC, NH3]

CONTROL MEASURE SUMMARY					
SOURCE CATEGORY:	GREENWASTE AND/OR FOODWASTE COMPOSTING EMISSION REDUCTIONS				
CONTROL METHODS:	INCREASED ANAEROBIC DIGESTION, ORGANIC WASTE PROCESSING TECHNOLOGY, AND RESTRICTION ON THE USE OF UNCOMPOSTED GREENWASTE				
EMISSIONS (TONS/DAY):					
ANNUAL AVERAGE	**2012**	**2021**	**2023**	**2025**	**2031**
VOC INVENTORY*	2.94	3.86	4.23	4.63	4.89
VOC REDUCTION		1.40	1.54	1.68	1.78
VOC REMAINING		2.46	2.69	2.95	3.11
NH3 INVENTORY*	0.42	0.54	0.60	0.65	0.69
NH3 REDUCTION		0.08	0.08	0.09	0.10
NH3 REMAINING		0.46	0.52	0.56	0.59
CONTROL COST:	$3,400 PER TON OF VOC REDUCED $61,500 PER TON OF NH3 REDUCED				
IMPLEMENTING AGENCY:	SCAQMD				

* Inventory is based on a subset of the existing emission source category.

Description of Source Category

Greenwaste, once collected and screened, is chipped and ground to produce multiple products, including, but not limited to, composting feedstock, biomass, alternative daily cover (ADC), and mulch. Mulch is compostable and when used as a ground cover, it may produce VOC and NH3 emissions over time due to microbial decomposition activity. Compostable mulch is typically not well managed or controlled once applied to land and therefore, could become a potential source of emissions. Composting is a controlled process to convert greenwaste and foodwaste into beneficial soil amendments. Precursor VOC and NH3 gases are emitted from greenwaste and foodwaste composting and these emissions are addressed by SCAQMD Rule 1133.3 – Greenwaste Composting Operations. Although Rule 1133.3 covers foodwaste composting, the level of emissions from foodwaste composting has not been fully characterized, mainly due to the lack of related emissions test data.

This control measure proposes (1) potential emission reductions through increased diversion to anaerobic digestion, (2) potential emission minimization through organic waste processing technology and (3) potential emission reductions through the restricted use of chipped and ground uncomposted greenwaste.

Background

The California Integrated Waste Management Act of 1989 (Assembly Bill [AB] 939) established a new direction for waste management in the State of California and set up a new mandate for local jurisdictions to meet a solid waste diversion goal of 50 percent by 2000 to conserve resources and extend landfill capacity. California's Statewide landfill diversion rate has steadily increased to 54 percent in 2006 and to 65 percent in 2011.

With the enactment of the California Mandatory Commercial Recycling Law (AB 341, Chesbro) in 2011, CalRecycle developed a discussion paper, "California's New Goal: 75 percent Recycling" in May 2012 that requires the State and CalRecycle to take a Statewide approach to achieving a 75 percent recycling, composting or source reduction of solid waste by 2020 to decrease California's reliance on landfills. Along with adoption of the Solid Waste per Capita Disposal Measurement Act (Senate Bill [SB] 1016) in 2008, a "diversion rate equivalent" of disposal reduction, expressed as pounds of solid waste disposed per person per day, is presently employed to measure the achievement toward the 75 percent Statewide recycling goal established by AB 341.

Two pieces of legislation, AB 1826 (Chesbro) and AB 1594 (Williams), signed in 2014, are expected to lead to significant increases in the amount of organic waste available for composting and anaerobic digestion. AB 1826 requires the State's commercial sector to recycle their organic waste (food scraps and yard trimmings) on and after April 1, 2016, depending on the amount of waste they generate per week. The minimum threshold of organic waste generation by businesses will decrease over time. On and after January 1, 2016, this law also requires local jurisdictions to have an organic waste recycling program in place to divert organic waste generated by businesses. Under AB 1594, commencing January 1, 2020, use of green material as an ADC at landfills no longer would constitute diversion, and would be considered to be disposal for purposes of compliance with the State's mandated 50 percent diversion from disposal required by AB 939. Commencing August 1, 2018, local jurisdictions are required to include information in an annual report to CalRecycle on how the local jurisdiction intends to address these diversion requirements and divert green material that is being used as ADC. In addition to these bills, CARB Short-Lived Climate Pollutant (SLCP) Reduction Strategy outlines a goal of 90 percent organic waste diversion by 2025, which includes foodwaste prevention and rescue programs with a target of 10 percent and 20 percent foodwaste diversion by 2020 and 2025, respectively, with rulemaking to be completed by 2018. To help achieve this goal, the SLCP Reduction Strategy proposes that CARB and CalRecycle consider developing a regulation by 2018 for waste management agencies to effectively eliminate the disposal of organic waste in landfills by 2025.

Currently, an estimated 35 million tons of waste are disposed of in California's landfills annually, of which 32 percent is compostable organic materials, 29 percent is construction and demolition debris, and 17 percent is paper. Among the organic materials disposed of, about 20 percent is food scraps and green materials, such as grass, leaves, prunings, and trimmings. With the State's 75 percent organic recycling goal by 2020 and AB 1826, and also with the CARB SLCP Reduction Strategy, processing of food scraps and greenwaste is expected to grow via composting or anaerobic digestion. Greenwaste chipping and grinding activities are expected to grow concurrently.

Regulatory History

Under SCAQMD Rule 1133 – Composting and Related Operations-General Administrative Requirements, greenwaste disposal facilities, including, but not limited to, composting facilities, chipping and grinding facilities, and material recovery facilities (MRF), are required to register once and update annually thereafter their material processing activities with incoming throughput and outgoing products tonnage. According to Rule 1133 registration of chipping and grinding activities for the 2012 reporting year, an average of 32 percent (Basin-wide) is compostable mulch, 31 percent is ADC, 21 percent is composting feedstock, 12 percent is biomass, and 4 percent is "others" for which woodchips, palm, land application, or other residual material constitutes.

SCAQMD Rule 1133.3 – Greenwaste Composting Operations, established best management practices (BMPs) and VOC and NH3 emission reduction requirements for greenwaste composting operations that process greenwaste and foodwaste. Rule 1133.3 requires BMPs for composting of greenwaste only and greenwaste mixed with foodwaste for a facility receiving foodwaste up to 5,000 tons/year. The required BMPs are to use at least 6 inches of finished compost layer on top of the composting pile and watering the pile, as needed, for the first 15 days of the active phase composting. These BMPs are equivalent to 40 percent control of VOCs and 20 percent control of NH3. An add-on emission control is required for a facility receiving foodwaste greater than 5,000 tons/year and on an active phase composting windrow containing greater than 10 percent foodwaste, by weight. The required control efficiency of an add-on control device is 80 percent for VOC and NH3.

While providing the obvious environmental benefits, the potential negative environmental impacts of composting food scraps have not been fully researched. Foodwaste composting is known to emit more VOCs than greenwaste-only composting; however there are limited emissions data from composting of food materials. Thus, emission inventories and emission factors should be developed to improve emissions characterization of foodwaste composting. Foodwaste composting emissions may vary depending on the recipes of foodwaste and greenwaste mix and the composition of foodwaste. When more emissions data become available by different foodwaste recipes, different levels of emission control requirements could be developed for composting of foodwaste mixed with greenwaste, if necessary. Foodwaste is odorous and anaerobic digestion may increase as foodwaste diversion increases.

Proposed Method of Control

This proposed control measure would seek reductions in VOC and NH3 emissions through increased anaerobic digestion, using emerging organic waste processing technology, and via restrictions on the use of chipped and ground uncomposted greenwaste, such as mulch, used for direct land application (DLA).

- Increased Anaerobic Digestion: Capacity at existing digestion facilities at Sanitation Districts could lower emissions of NH3 and VOC for certain waste streams, and no NOx emissions would occur if the biogas produced is used in pipeline or as transportation fuel.

- Emerging Organic Waste Processing Technology: An emerging organic waste processing technology (e.g., Regreen Technologies) is in the process of becoming commercially available to process foodwaste, greenwaste, and palm fronds into beneficial soil amendments, fuels for power generation, and animal feeds. This technology is able to process these waste materials without going through the microbial decomposition of organic materials, concurrently killing harmful pathogens in the waste materials and thereby minimizing VOC

and ammonia generation from the process. Diverting organic waste materials from landfills also contributes to emission reductions of methane, a potent SLCP. This technology, if implemented, can be leveraged as a co-benefit measure of the CARB's statewide efforts to reduce methane emissions by 90 percent in 2025 from California's landfills. Estimated equipment costs for this technology is expected to range between $300,000 for smaller application (0.5 tons/hour) and up to $3.6 million for larger, full scale application (5 tons/hour).

- Restrictions on the Use of Chipped and Ground Uncomposted Greenwaste: Curbside and non-curbside greenwaste is chipped and ground to produce mulch that is used as a ground cover material on public land (e.g., for erosion control or soil reclamation). There is high potential to emit air pollutants from land applied mulch as the material may undergo microbial decomposition over time because it would not be well managed or controlled once being spread. If uncomposted and untreated, mulched greenwaste may cause not only airborne emissions, but also threaten the environment and public health from possible pathogen contamination. A recent study showed that DLA of chipped and screened but uncomposted greenwaste had significant VOC emissions occurring from greenwaste applied on soil surface. In addition, uncontrolled mulch application piles may go through anaerobic decomposition stages, potentially resulting in methane emissions. This control method proposes controlled aerobic decomposition of chipped and ground mulch, therefore contributing to a reduction in methane emissions from land applied greenwaste.

  This proposed control method would seek restrictions on the use of compostable (both curbside and non-curbside) chipped and ground mulch on public land. Potential restrictions include, but are not limited to, requiring minimum composting BMPs for chipped and ground uncomposted mulch before DLA, such as six inches of finished compost cover and watering, as needed, for the first 15 days of the active phase composting, as established in Rule 1133.3. About 40 percent of VOC and 20 percent of NH3 reductions are estimated from implementing the proposed composting BMPs. This proposed time period is equivalent to a pathogen reduction period for windrow composting that is required in California Code of Regulations (CCR) Title 14, Chapter 3.1,11 and is shorter than the full composting process of at least 62 days. The proposed control method would require pseudo-biofilter cover material (e.g., compost overs or finished compost) and watering, as necessary, for the first 15 days of the active composting period. This does not conflict with or duplicate Title 14 pathogen reduction requirements. This proposed control method also supports the Statewide SLCP Reduction Strategy developing appropriate standards to guide the DLA of organic materials.

  Another potential control method is to incorporate chipped and ground uncomposted greenwaste into soil from which emission reductions resulted compared to surface application in the recent study. This study result would need thorough examination to see if this is a viable option to reduce air emissions from land applied uncomposted greenwaste.

Emission Reductions

- Increased Diversion to Anaerobic Digestion: Increased use of anaerobic digestion could help lower VOC and ammonia emissions from treatment of organic waste, such as foodwaste, biosolids, or manure where feasible.

[11] The 14 CCR, Chapter 3.1, section 17852(a)(24.5) has specific requirements that on and after January 1, 2018, the compostable material meet certain pathogen density limits, as specified in section 17868.3(b)(1). To meet pathogen concentration limits, active composting is required for 3 days (for aerated static pile composting with 6–12 inches of insulating cover material) or 15 days (for windrow composting).

The biogas produced can be used to fuel a combined heat and power (CHP) system to produce electrical energy, recover thermal energy, and fuel transportation.

- Emerging Organic Waste Processing Technology: This technology does not go through composting process and thus, if implemented, forgoes possible future emissions of air pollutants (VOCs and ammonia) or odorous gases. Although waste diversion would result in an emissions benefit, the actual reductions are not quantifiable at this time.

- Restrictions on the Use of Uncomposted Greenwaste: Baseline VOC and NH3 inventories are estimated using the 2012 base year throughput of mulch as a product of greenwaste chipping and grinding and baseline greenwaste composting emission factors. Projected VOC and NH3 inventories are estimated by considering the 2012 base year throughput, baseline emission factors, and growth factors, including the anticipated mulch throughput growth due to the Statewide landfill diversion goals (75 percent by 2020 and 90 percent by 2025) and the countywide household growth. Mulch is part of the greenwaste chipping/grinding products. Therefore, to make the estimates more realistic, staff factored the incremental organic waste diversion rates from 2011 to 2020 (i.e., 1.11 percent increase each year) and from 2021 to 2025 (i.e., 3 percent increase each year) in the calculation of the overall mulch throughput growth. By implementing the proposed composting BMPs, 40 percent of VOC and 20 percent of NH3 reductions are estimated from the active phase composting of chipped and ground mulch. To fully assess this item, an additional emission source test may be needed to improve emissions characterization from chipped and ground uncomposted mulch. An industry survey may also be needed to obtain how much material is processed through what means to better characterize material disposal methods.

Rule Compliance and Test Methods

A SCAQMD regulation or other enforceable instrument will be considered to ensure emission reductions. The most effective regulatory tool will be selected. Implementation of this control measure will not conflict with efforts under AB 939. SCAQMD staff will work with CalRecycle and CARB to develop appropriate test methods based on the methods of control.

Cost-Effectiveness

Cost-effectiveness for this control measure is estimated based on the proposed BMPs (i.e., compost cover and watering) in which greenwaste mulch producers would do mulch composting to achieve pathogen reduction for the first 15 days. Among 21 facilities likely subject to this proposed control, eight facilities are greenwaste composting facilities that already produce finished compost on-site and 13 facilities are greenwaste chipping and grinding facilities that do not produce finished compost on-site. Estimating compliance costs and cost effectiveness of the proposed control measure is based on these 21 facilities.

Thirteen chipping and grinding facilities would need to purchase cover material (finished compost or compost overs) from local composting facilities. To reduce the cover material purchasing cost, which could be high depending on the size of mulch throughput, it is assumed that they would purchase it only for the first year and then would produce finished compost on-site in the following years. Therefore, material cost is considered a one-time cost, annualized over 15 years of a facility's lifetime. In addition to the cover material cost, watering, covering, and recordkeeping costs are also included.

Eight composting facilities would also need to do mulch composting to achieve pathogen reduction for the first 15 days using the proposed BMPs. However, since the cover material is readily available on-site, the cover material purchasing is not needed. Recordkeeping is not considered because it is not a new requirement.

Cost effectiveness is, on average, estimated to be $3,400 per ton of VOC reduced and $61,500 per ton of NH3 reduced as a co-benefit. Note that cost-effectiveness figure for NH3 is high because emission reductions are low. However because the reductions are derived from the same control method targeted for VOC reductions, the concurrent co-benefit would not result in a net increase in overall cost for control.

Due to the increased statewide diversion requirements, it is currently unknown how many new facilities will be created, particularly because it is unknown how many facilities may process material through digesters to generate biomethane energy. Therefore, cost considerations do not include these factors which could raise overall cost.

Implementing Agency

The SCAQMD has the authority to regulate emissions from stationary sources.

References

1. Edgar & Associates, 2013. Beyond Waste – A Regulatory and Market Report by Edgar & Associates, Inc. A Comment Letter to CalReycle's 75 Percent Initiatives, April 2013.

2. CARB, 2015. Draft Short-Lived Climate Pollutant Reduction Strategy, September 2015.

3. California, 2008. Statewide Waste Characterization Study, Contractor's Report to the Board, CalRecycle, IWMB-2009-0023, August 2009.

4. SCAQMD, Rule 1133 – Composting and Related Operations-General Administrative Requirements, Adopted January 10, 2003.

5. SCAQMD, Final Staff Report for Proposed Amended Rule 1133.1 and Proposed Rule 1133.3, July 2011.

6. Burger et al., 2015. Research to Evaluate Environmental Impacts of Direct Land Application of Uncomposted Green and Woody Waste on Air and Water Quality, Contractor's Report, CalRecycle, DRRR-2015-1531, March 30, 2015.

MCS-01: IMPROVED BREAKDOWN PROCEDURES AND PROCESS RE-DESIGN [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ALL SOURCE CATEGORIES			
CONTROL METHODS:	REVISED PROCEDURES FOR BREAKDOWNS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE*	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	N/A	N/A	N/A	N/A
NOX REDUCTION		N/A	N/A	N/A
NOX REMAINING		N/A	N/A	N/A
SUMMER PLANNING*	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	N/A	N/A	N/A	N/A
NOX REDUCTION		N/A	N/A	N/A
NOX REMAINING		N/A	N/A	N/A
CONTROL COST*:	NONE			
IMPLEMENTING AGENCY:	SCAQMD			

** Emission reductions and cost-effectiveness cannot be determined due to the nature of the measure (breakdown procedures)*

Description of Source Category

The purpose of this control measure is to revise the current breakdown procedures in Rule 430 – Breakdown Provisions, which would result in a process re-design that would apply to breakdowns from all emission sources.

Background

SCAQMD Rule 430 – Breakdown Provisions, applies to breakdowns that result in a violation of any rule or permit conditions, with some exceptions, and stipulates reporting requirements. The rule provides relief from violations from breakdowns under specific criteria. Breakdown events that are not caused by operator error, neglect, improper operation or maintenance procedures are not considered rule violations.

The period covered under this relief is limited to a maximum of 24 hours from the time the owner or operator knew or reasonably should have known of the breakdown, or to the end of the operating cycle, whichever is sooner. The operator is required to submit a written follow-up report, and SCAQMD staff promptly investigates the site to determine whether the occurrence meets all SCAQMD criteria to qualify as a breakdown.

Regulatory History

SCAQMD Rule 430 was originally adopted by the Governing Board in May 1976 to provide relief from violations of Regulation IV – Prohibitions, (except Rule 402 – Nuisance, or Rule 430), and Regulation XI – Source Specific Standards, for breakdowns that meet certain criteria. This rule was subsequently amended in October 1976, December 1977, May 1978, and July 1996 to improve its enforceability. However, Rule 430 is not approved for inclusion in the State Implementation Plan (SIP) because it does not meet U.S. EPA's policy for startups, shutdowns, and malfunctions (SSM). U.S. EPA's May 2015 final action on SSM stipulates that exemptions from excess emissions during periods of breakdown are not allowed. A piece of equipment may experience a breakdown repeatedly and still comply under Rule 430, but each breakdown event may have associated excess emissions, which have no cap or incidence limit under the current rule.

Proposed Method of Control

U.S. EPA is currently addressing rule-specific breakdown provisions on a rule-by-rule basis when they are considered for SIP approval. This control measure would introduce improved breakdown procedures and/or process re-designs that would apply to breakdowns from all emission sources, providing pollutant concentration and/or incidence limits to comply with U.S. EPA's SSM policy.

For each equipment category, an incidence limit could be applied for a given time period (e.g. per calendar year or calendar quarter). In addition, pollutant concentration limits will be introduced that signify when a breakdown condition occurs. This would apply for combustion equipment that can be tested readily with a portable analyzer such as boilers, engines, and some ovens and furnaces, along with associated control equipment such as Selective Catalytic Reduction (SCR).

Emission Reductions

There are no SIP-creditable reductions from this control measure. This control measure is designed to mitigate excess emissions outside of normal operation.

Rule Compliance and Test Methods

Combustion Gas Periodic Monitoring Protocol for the Periodic Monitoring of Nitrogen Oxides, Carbon Monoxide, and Oxygen from Combustion Sources Subject to Rules 1110.2, 1146, and 1146.1.

Cost-Effectiveness

Due to the nature of this control measure, cost-effectiveness cannot be calculated.

Implementing Agency

The SCAQMD has the authority to regulate emissions from stationary sources.

References

SCAQMD Rule 430 – Breakdown Provisions, Amended July 12, 1996.

MCS-02: APPLICATION OF ALL FEASIBLE MEASURES [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ALL SOURCE CATEGORIES			
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE*	**2012**	**2021**	**2023**	**2031**
POLLUTANT INVENTORY	TBD	TBD	TBD	TBD
POLLUTANT REDUCTION		TBD	TBD	TBD
POLLUTANT REMAINING		TBD	TBD	TBD
SUMMER PLANNING*	**2012**	**2021**	**2023**	**2031**
POLLUTANT INVENTORY	TBD	TBD	TBD	TBD
POLLUTANT REDUCTION		TBD	TBD	TBD
POLLUTANT REMAINING		TBD	TBD	TBD
CONTROL COST*:	NOT DETERMINED			
IMPLEMENTING AGENCY:	SCAQMD			

** Emission reductions and cost-effectiveness will be determined after a source category and feasible controls are identified.*

Description of Source Category

This control measure is to address the State law requirement for all feasible measures for ozone. Existing rules and regulations for pollutants such as VOC, NOx, SOx and PM reflect current best available retrofit control technology (BARCT). However, BARCT continually evolves as new technology becomes available that is feasible and cost-effective. SCAQMD staff would continue to review actions taken by other air districts for applicability in our region. Through this proposed control measure, the SCAQMD would commit to consider the adoption and implementation of the new retrofit control technology standards, as well as new controls or limits on existing operations.

Background

This control measure serves as a placeholder for any future control measures that may become feasible, prior to subsequent State Implementation Plan (SIP) revisions, through technology advances and/or cost decreases. The SCAQMD staff continually monitors evolving control technologies, price changes, and the actions of other air quality agencies to determine the feasibility of implementing additional controls to achieve emission reductions. For example, almost all processes (pulping machines, press and dryers to convert waste-paper (newspaper, cardboard, etc.) back into cardboard paper) in the pulp and recycled paper mills are sources of fugitive VOC

emissions, yet currently there is no known feasible control potentially available for fugitive VOC emissions generated by these type of sources. Very high air flow of vent gases makes it impractical and not cost-effective to vent the exhaust gas to a control device. Similarly, breweries, wineries, distillers and other similar operations that store and process grains, ferment, age, store and package the spirits (beer, wine, whiskey, etc.,) and treat the wastewater on site generate VOC and PM emissions. Known feasible methods of control are not cost-effective based on the current emissions inventory. However, in the future, industry growth and affordable cost-effective control could make these sources viable future control measures.

Regulatory History

The California Clean Air Act (CCAA) requires air districts to achieve and maintain State standards by the earliest practicable date and for extreme nonattainment areas, to include all feasible measures in the California Health and Safety Code (H&SC) §§40913, 40914, and 40920.5. While this statute is not applicable to PM, the federal Clean Air Act requires attainment of the NAAQS as early as "practicable" and, as a serious nonattainment area for PM2.5, implementation of Best Available Control Measures (BACM). The term "feasible" is defined in the 14 California Code of Regulations, section 15364, as a measure "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." CARB guidance states that this definition, found in the CEQA Guidelines, applies to the requirements under air pollution laws. The required use of BARCT for existing stationary sources is one of the specified feasible measures. H&SC §40440 (b)(1) requires the SCAQMD to adopt rules requiring best available retrofit control technology for existing sources. H&SC §40406 specifically defines BARCT as "…best available retrofit technology means an emission limitation that is based on the maximum degree of reduction achievable taking into account environmental, energy, and economic impacts by each class or category of source."

Existing rules and regulations on VOC coatings and solvents as well as regulations for pollutants such as NOx, SOx and PM reflect current BARCT. However, BARCT evolves as new control methods become available that are feasible and cost-effective. Through this control measure, the SCAQMD commits to consider the adoption and implementation of new retrofit control technology standards as technology develops.

Proposed Method of Control

The SCAQMD staff will continue to review new emission limits or controls introduced through federal, State or local regulations to determine if SCAQMD regulations remain equivalent or more stringent than rules in other regions. If not, a rulemaking process will be initiated to perform a BARCT analysis with potential rule amendments if deemed feasible. In addition, the SCAQMD will consider adopting and implementing new retrofit technology control standards, based on research and development and other information, that are feasible and cost-effective.

Emission Reductions

Further emission reductions would be sought from the adoption of new rules or amendment of existing rules and regulations to reflect new BARCT standards that may become available in the future prior to subsequent AQMP revisions.

Rule Compliance and Test Methods

Compliance with this measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing source specific rules and regulations. In addition, compliance would be verified through inspections and recordkeeping and reporting requirements.

Cost-Effectiveness

Cost-effectives for this control measure cannot be determined because the future set of "all feasible" measures are not known. The SCAQMD will continue to analyze the potential cost impact associated with implementing this control measure, conduct research on new control technologies, and provide cost-effectiveness information during any future rule making processes.

Implementing Agency

The SCAQMD has the authority to regulate emissions from stationary sources.

References

California Health and Safety Code: Sections 40913, 40914, 40920.5, 40406, and 40440 (b)(1)

14 California Code of Regulations, Section 15364

FLX-01: IMPROVED EDUCATION AND PUBLIC OUTREACH [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	RESIDENTIAL, COMMERCIAL, INDUSTRIAL, AND TRANSPORTATION SOURCES			
CONTROL METHODS:	INCREASED AWARENESS, INCENTIVE PROGRAMS, AND TECHNICAL ASSISTANCE IN MAKING LOW EMITTING PURCHASES, IMPLEMENTING EFFICIENCY PROJECTS, AND CONSERVATION TECHNIQUES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE*	**2012**	**2022**	**2023**	**2031**
POLLUTANT INVENTORY	N/A	N/A	N/A	N/A
POLLUTANT REDUCTION		N/A	N/A	N/A
POLLUTANT REMAINING		N/A	N/A	N/A
SUMMER PLANNING*	**2012**	**2022**	**2023**	**2031**
POLLUTANT INVENTORY	N/A	N/A	N/A	N/A
POLLUTANT REDUCTION		N/A	N/A	N/A
POLLUTANT REMAINING		N/A	N/A	N/A
CONTROL COST:		N/A		
IMPLEMENTING AGENCY:		SCAQMD & OTHER PARTIES		

* Emissions inventory and reductions cannot be quantified due to the nature of the measure (e.g., outreach).

Description of Source Category

This proposed control measure seeks to provide education, outreach, and incentives for consumers to contribute to clean air efforts. Examples include consumer choices such as the use of energy efficient products, new lighting technology, "super-compliant" coatings, tree planting, transportation choices, and the use of lighter colored roofing and paving materials which reduce energy usage by lowering the ambient temperature. In addition, this proposed measure intends to increase the effectiveness of energy conservation programs through public education and awareness as to the environmental and economic benefits of conservation. Educational and incentive tools to be used include social comparison applications (comparing your personal environmental impacts with other individuals), social media, and public/private partnerships. Further improvement of outreach allows the public to alert staff of any environmental problems that need attention.

Background

Energy efficiency and conservation have been included in the SCAQMD's Air Quality Management Plans since 1991. The SCAQMD continues to implement incentive and education programs to help promote clean air purchases, efficiency projects, and conservation techniques that provide criteria pollutant emissions benefits. The SCAQMD has since adopted policies such as the Air Quality Related Energy Policy, Climate Change Policy, and Green Policy that help further define the SCAQMD's efforts in these areas.

This measure seeks to increase awareness of the benefits of purchasing low emitting products and promote further implementation of efficiency and conservation projects**.** When making purchases such as new cars, yard equipment, or household products, there are several factors consumers consider, but emissions and health benefits are typically not considerations. To help make emissions an important factor in purchasers' decision-making process, the SCAQMD has several existing outreach and education programs in place such as Clean Air Choices,[12] educational materials, conferences, and outreach to specific communities throughout the Basin. Providing additional outreach and education regarding clean air choices will help consumers consider the emission benefits of their purchases. In some instances, these purchases include efficiency gains that will decrease longer term operating costs, and thus provide a built-in financial incentive. Providing specific outreach and education on these potential cost savings will help increase penetration of such low emitting technologies and practices.

Furthermore, there are several existing incentive programs to help promote higher efficiency and lower emitting technologies such as the utility administered rebate programs for purchases of high efficiency appliances. Some of these existing programs are established for reasons other than emissions benefits. For instance, the electric utility rebate program was established to reduce electricity demand to help decrease the need for additional generation plants. However, this program also provides emission benefits that might be implemented faster with further education and outreach by the SCAQMD.

The outreach and education regarding these existing programs will include information on co-benefits such as emission reductions and cost savings to promote accelerated implementation of these existing programs. The SCAQMD will also offer additional incentive programs to complement existing programs or promote specific efficient low emitting technologies. For instance, the SCAQMD's Lawn Mower and Leaf Blower Exchange program provides a good example of the significant impacts incentive programs can have. To date, SCAQMD has scrapped more than 55,000 highly polluting gasoline mowers, removing almost 114 tons of smog-forming pollutants from the Southland's air. Similarly, the total number of old, polluting leaf blowers that have been scrapped exceeds 10,000.[13]

The SCAQMD will also help to promote potential efficiency benefits for existing equipment and structures. There are several reasons why many efficiency projects are not undertaken. In many instances tools, incentive programs, and loan programs for efficiency upgrades are not adequately described, advertised, or consolidated. Certain projects require high initial capital costs, despite relatively fast payback periods, which serves as a barrier to implementation. In addition, technical barriers prevent many system operators, home owners, and building maintenance crews from utilizing existing tools and implementing efficiency projects. The SCAQMD staff will help

[12] http://www.cleanairchoices.org/.

[13] http://www.aqmd.gov/home/programs/community/community-detail?title=lawn-equipment.

develop technical outreach to residents and businesses to help implement projects that have emission benefits and short payback periods. The SCAQMD staff may also examine ways to provide assistance through additional incentive programs and/or loan products to defray or amortize capital costs on certain efficiency projects.

Regulatory History

As this measure is not a regulatory item that will be implemented via rulemaking, there is no relevant regulatory history in this area. However, as mentioned above, the SCAQMD has developed and implemented a wide array of education, outreach, technical assistance, and incentive programs designed to achieve emission reductions on a voluntary basis. A discretionary economic incentive program (EIP) could be established that provides funding for outreach and incentives to promote the use of efficient low emitting technologies. In order to get emission reduction credit as part of the State Implementation Plan (SIP) submittal, guidelines would be required that demonstrate the emission reductions from the EIP are quantifiable, surplus, enforceable, and permanent.

Proposed Method of Control

This control measure is a voluntary program that provides education and outreach to consumers, business owners, and residences regarding the benefits of making clean air choices in purchases, conducting efficiency upgrades, installing clean energy sources, and approaches to conservation. These efforts will be complemented with helping implement currently available incentive programs and developing additional incentive programs. Lastly, the SCAQMD staff may develop an EIP to offer technical and financial assistance to help implement efficiency measures and other low emission technologies.

Emission Reductions

Predicting emission reductions from these activities is not possible at this time due to the voluntary nature of the control measure. Outreach and education components will have emission benefits that can perhaps be quantified later based on program evaluation, technology penetration, and other assessment and inventory methods. Implementing additional incentive programs will provide a means to quantify these benefits as they are developed. Emission reductions achieved from these activities will be incorporated into the subsequent SIP revisions once projects are implemented.

Rule Compliance and Test Methods

Not applicable.

Cost-Effectiveness

The cost-effectiveness of this measure cannot be determined, given the variety of programs and projects that will be developed. The SCAQMD staff will continually analyze costs associated for with education and outreach, and where possible quantify resulting emission reductions. The cost-effectiveness for specific incentive programs can be determined as they are developed and implemented by the SCAQMD.

Implementing Agency

The implementing agency will be the SCAQMD, in cooperation with other local governments, agencies, technology manufacturers and distributors, and utility service providers.

References

South Coast Air Quality Management, Air Quality Related Energy Policy, Sept. 2011.

South Coast Air Quality Management, Climate Change Policy, Sept. 2008.

South Coast Air Quality Management, Green Policy, Oct, 2009.

National Academy of Sciences, Real Prospects for Energy Efficiency in the United States, 2010.

American Council for an Energy-Efficient Economy (ACEE), Energy-Efficiency: The Slip Switch to a New Track Toward Compliance with Federal Air Regulations, January 2012, Report # E122.

McKinsey and Co., Unlocking Energy Efficiency in the U.S. Economy, July 2009.

FLX-02: STATIONARY SOURCE VOC INCENTIVES
[VOC]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	RESIDENTIAL, COMMERCIAL, INDUSTRIAL, AND TRANSPORTATION SOURCES			
CONTROL METHODS:	FINANCIAL INCENTIVE PROGRAMS			
EMISSIONS (TONS/DAY):	TBD			
ANNUAL AVERAGE*	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	213	223	224	230
VOC REDUCTION		N/A	TBD	TBD
VOC REMAINING		N/A	TBD	TBD
SUMMER PLANNING*	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	209	220	221	227
VOC REDUCTION		N/A	TBD	TBD
VOC REMAINING		N/A	TBD	TBD
CONTROL COST:	NOT DETERMINED			
IMPLEMENTING AGENCY:	SCAQMD			

* Emissions inventory and reductions cannot be quantified at this time due to the nature of the measure as it is uncertain exactly what programs will be implemented.

Description of Source Category

Many existing homes and businesses will, in the future, update and improve their facilities and many have the option to modernize using cleaner, lower emission, less toxic alternative processes and materials. However, since many of these cleaner options may not be the lowest-cost option, their use may need to be incentivized.

The focus of the measure is to incentivize lower polluting and less toxic alternative processes and materials for existing residential, commercial, and industrial modernization. Using an incentives-based approach will encourage businesses to make choices that will reduce emissions while minimizing cost impacts. An incentive-based approach is also consistent with business retention efforts, particularly in regards to replacing older higher-emitting equipment or material with new lower-emitting equipment or material.

Background

In the past, the SCAQMD has adopted a series of programs to promote clean, low emission technologies while encouraging economic growth and providing compliance flexibility. The SCAQMD continues to implement incentive programs to help promote efficient clean equipment purchases, efficiency projects, and conservation techniques that provide toxic and criteria pollutant emissions benefits, as well as greenhouse gas emission reductions. The manufacturing and deployment of zero and near-zero emission technologies will help reduce

criteria pollutant emissions in the region, accelerate removal of equipment that can last for many decades, and advance economic development and job opportunities in the region.

Regulatory History

SCAQMD currently offers a number of funding/grant resources to encourage the immediate use of clean, low emission technologies. The incentive programs, which include incremental funding or subsidies, are designed to promote voluntary introduction of alternative improved practices and new technologies on an accelerated schedule. Examples of such funding programs include:

- Financial Assistance for Alternative Dry Cleaning Equipment Purchases;
- Wood Stove & Fireplace Change-Out Incentive Program; and
- Carl Moyer Memorial Air Quality Standards Attainment Program for vehicle retrofit and replacement.

Additionally, regulatory relief incentives have been incorporated into several SCAQMD rules including:

- Reduced recordkeeping for Super-Compliant coatings, adhesives and solvents in Rule 109 – Recordkeeping for Volatile Organic Compound Emissions;
- Reduced fees for ultra-low VOC architectural coatings in Rule 314 – Fees for Architectural Coatings;
- Less frequent source testing for low-emitting point sources in Rule 1420.2 – Emission Standards for Lead from Metal Melting Facilities; and
- Less frequent inspection schedules for high-compliance facilities in Rule 1173 – Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants.

However, incentivizing the use of cleaner, less polluting, products and equipment requires additional efforts to broaden the scope of stationary source incentives.

Proposed Method of Control

This control measure would seek to incentivize VOC emission reductions from various stationary and area sources through incentive programs for the use of clean, low emission materials or processes. Facilities would be able to qualify for incentive funding if they utilize equipment or material, or accept permit conditions which result in cost-effective emission reductions that are beyond existing requirements. The program would establish procedures for quantifying emissions benefits from clean technology implementation and develop cost-effectiveness thresholds for funding eligibility.

Mechanisms will be explored to incentivize residences and businesses to choose the cleanest technologies as they replace equipment or material and upgrade facilities, and to provide incentives to encourage businesses to move into these technologies sooner. Although replacement of older, higher emitting sources is expected to have the greatest potential for emission reductions, providing incentives and eliminating barriers for new sources to manufacture and use ultra clean technologies is also important.

Industrial Facility Modernization can result in substantial emission reductions, especially if the cleaner equipment or material is at zero or near-zero emission levels. Efforts to encourage clean manufacturing facilities to site and operate in the Basin can result in emission reduction benefits as well as other co-benefits to the local economy, particularly to the surrounding community. Consistent with this effort, there are two primary objectives:

1. Provide incentives to replace older higher-emitting equipment or material with newer lower emitting equipment or material for area and stationary sources,.

2. Encourage new businesses that use and/or manufacture near-zero and zero emission technologies to site in the Basin.

Through the years, a variety of incentives have been implemented, such as exempting cleaner sources from permitting, implementing measures to streamline permit processing for cleaner sources, use of short-term mobile source credits, mitigation fee programs, the Air Quality Investment Program (AQIP), and emissions averaging provisions in rules. The incentive programs, which include incremental funding or subsidies, are designed to promote voluntary introduction of new technologies on an accelerated schedule. These programs may also provide manufacturers with incentives to accelerate the deployment of cleaner technologies. Such an example is the use of energy-curing technologies which includes ultraviolet light (UV), electron beam (EB), heat and light emitting diode (LED) cured coatings. Some radiation cured inks and coatings are near-zero VOC, 100 percent solid products that do not cure by solvent evaporation but are cured through exposure to radiation which causes a polymerization reaction to convert the liquid coating into a solid film. Another example is powder coatings, which are dry, free-flowing powders containing no solvents that are applied electrostatically and cured with heat. One barrier to more wide spread adoption of these near-zero VOC technologies is the upfront cost of the application and curing equipment, making these technologies attractive candidates for incentive measures.

For stationary sources, the SCAQMD staff has compiled a list of potential incentives to encourage businesses to use zero or near-zero technologies or enhancements to the SCAQMD's existing programs to reduce or eliminate barriers to implement state of the art technologies. The list below represents an "initial list" of potential concepts. It is expected that as the SCAQMD staff and stakeholders further explore incentives approaches, additional concepts may be identified. The SCAQMD staff is committed to further investigating the concepts listed below and others.

☑ **Incentive Funding:** Incentive funding involves the creation of economic incentives to reduce the cost and encourage businesses to replace their existing high emitting equipment or material with equipment or material that is zero or near-zero emitting. It includes mechanisms such as loans and grants. Funding for these programs could derive from mitigation fees, penalty or settlement fees, or federal or State grants and programs.

☑ **Permitting and Fee Incentives and Enhancements:** Permitting and fee incentives and enhancements would include the expansion of the existing certification program and pre-approved permit program to include additional qualified categories. Incentives involving reduced permitting fee programs for advanced technologies which significantly reduce emissions as well as other permitting enhancements identified as priority projects are also discussed and require less District's effort to permit or enforce in this incentive approach.

☑ **NSR Incentives and Enhancements:** The mechanism of credit offsets and NSR incentives includes expanding the number of exemptions under Rule 1304 – Exemptions and expanding the use of the priority reserve

under Rule 1309.1 – Priority Reserve for businesses using or providing advanced clean technologies. In addition this mechanism includes the adoption of a Clean Air Investment Fund and potential short-term leasing of offset credits.

- ☑ **CEQA Incentives:** CEQA incentives will focus on mechanisms the SCAQMD staff can provide in the CEQA process such as expedited review.
- ☑ **Branding Incentives:** Branding incentives can recognize businesses or equipment for reach a superior level of air quality excellence. Branding incentives can vary from recognition awards to specific labeling or certification.
- ☑ **Recordkeeping and Reporting Incentives:** Recordkeeping and reporting incentives can reduce the recordkeeping and reporting requirements for specific zero and near-zero emission technologies.

Emission Reductions

Predicting VOC emission reductions from these voluntary activities is challenging. The availability and amount of incentives would directly affect the level of VOC emission reductions achieved. Emission benefits from incentives can be quantified based on program participation, technology/material penetration, and other assessment and inventory methods. Implementing additional incentive programs will include a means to quantify these benefits as they are developed. Updated emission reductions achieved from these activities will be incorporated into the subsequent SIP revisions as projects are implemented.

Rule Compliance and Test Methods

Not applicable.

Cost-Effectiveness

The decision regarding when to replace existing equipment can vary; some facilities may replace equipment or reformulate material when it is no longer operable or outdated, while other facilities may replace equipment or material well before it reaches that point. Regardless, equipment/material replacement and/or installation of pollution controls can represent a significant financial decision where the operator must assess for the capital cost to purchase new equipment, installation, operating and maintenance costs.

The SCAQMD has implemented several funding programs to help facilitate specific technologies and compliance with SCAQMD rules. One such example involved the establishment of the Rule 1470 Risk Reduction Fund in May 2012. This fund was adopted by the SCAQMD Governing Board to set aside $2.5 million to offset the cost of purchasing diesel particulate filters for new diesel emergency standby engines as required under Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines. Another program is the Dry Cleaner Financial Incentive Grant Program which was designed to assist local dry cleaners to switch to non-perchloroethylene dry cleaning systems to comply with Rule 1421 – Control of Perchloroethylene Emissions from Dry Cleaning Systems. Up to $20,000 was available for CO_2 machines and $10,000 for water-base system machines. For a limited time, $5,000 was available for hydrocarbon machines. Since 2008, the program has provided approximately $265,000 to local dry cleaners in order to upgrade their systems. In addition, there are several existing incentive programs which help promote higher efficiency and lower emitting technologies such

as the: Lawn Mower and Leaf Blower Exchange; SOON Program; Carl Moyer Memorial Air Quality Standards Attainment Program; MSERC Credit Programs; and Voucher Incentive Program.

The cost-effectiveness of this measure cannot be determined, given the potential variety of programs and projects that will be developed. The cost-effectiveness for specific incentive programs can be determined as they are developed and implemented by the SCAQMD.

Implementing Agency

The implementing agency will be the SCAQMD, in potential cooperation with other local governments, agencies, businesses, technology manufacturers and distributors, and community groups.

References

2016 AQMP White Paper – Industrial Facility Modernization (November 2015)

GROUP 2

MOBILE SOURCE CONTROL MEASURES

EGM-01: EMISSION REDUCTIONS FROM NEW DEVELOPMENT AND REDEVELOPMENT PROJECTS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	NEW DEVELOPMENT OR REDEVELOPMENT PROJECTS			
CONTROL METHODS:	MOBILE SOURCE EMISSION REDUCTION ACTIONS WHICH MAY INCLUDE MITIGATION FEE OPTIONS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	TBD	TBD	TBD	TBD
VOC REDUCTION	TBD	TBD	TBD	TBD
VOC REMAINING	TBD	TBD	TBD	TBD
NOX INVENTORY	TBD	TBD	TBD	TBD
NOX REDUCTION	TBD	TBD	TBD	TBD
NOX REMAINING	TBD	TBD	TBD	TBD
CO INVENTORY	TBD	TBD	TBD	TBD
CO REDUCTION	TBD	TBD	TBD	TBD
CO REMAINING	TBD	TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	TBD	TBD	TBD	TBD
VOC REDUCTION	TBD	TBD	TBD	TBD
VOC REMAINING	TBD	TBD	TBD	TBD
NOX INVENTORY	TBD	TBD	TBD	TBD
NOX REDUCTION	TBD	TBD	TBD	TBD
NOX REMAINING	TBD	TBD	TBD	TBD
CO INVENTORY	TBD	TBD	TBD	TBD
CO REDUCTION	TBD	TBD	TBD	TBD
CO REMAINING	TBD	TBD	TBD	TBD
CONTROL COST:	TO BE DETERMINED			
IMPLEMENTING AGENCY:	SCAQMD/LOCAL OR REGIONAL AGENCIES			

Description of Source Category

The purpose of this measure is to mitigate and, where appropriate, reduce emissions from new development and redevelopment projects. The measure is designed to reduce emissions related to new residential, commercial, industrial and institutional development, including redevelopment, required to meet the needs of the Basin's future residents and economy. These projects are considered indirect sources. An indirect source is any facility, building, structure, or installation, or combination thereof, which generates or attracts mobile source activity that results in emissions of any pollutant (or precursor) for which there is a State Ambient Air Quality Standard. Examples of indirect sources include residential housing, entertainment centers, shopping malls, historical tourist attractions, amusement parks, parking lots, commercial office facilities, airports, ports, warehouse/distribution centers, schools, etc.

For the purposes of this measure, indirect sources include all facilities not covered by another 2016 AQMP Control Measure; specifically, control measures MOB-01 through MOB-04 to the extent that these control measures are part of the adoption of the Final 2016 AQMP. In addition, during the rule development process, additional indirect sources may be included or excluded. The District will work with affected stakeholders and other regulatory agencies to ensure that duplication of efforts and regulations that have the same emission reduction benefits will be avoided in any proposed District rule to the maximum extent possible. In addition, as part of the public process, discussion on potential strategies to mitigate or reduce emissions from new development and redevelopment projects will take into consideration evolving development patterns and other existing regulations aimed at new development within the Basin.

Background

New development projects produce new sources or relocate existing sources of air pollution in the form of new vehicle trips, use of consumer products, landscape maintenance, new stationary source processes such as fuel combustion, as well as emissions generated during construction activities. Each day millions of vehicles travel the roads in the Basin and the length of vehicle trips is expected to increase as outlying areas continue to be developed. In addition, older residential, commercial and industrial areas may undergo major redevelopment involving construction activities, with emissions comparable to new development projects. Redevelopment projects may also generate additional vehicular traffic compared to the projects they replace because redevelopment projects often involve increasing population density compared to the previous use. Redevelopment includes demolishing existing buildings, increasing overall floor area or building additional capacity on an existing property. For example, the conversion of an industrial warehouse to an office building could create as much emissions as constructing a new building because it would involve a complete remodel. Greater use of alternative fuels and deployment of cleaner near-zero and zero-emission technologies in on-road vehicles will further reduce the emissions impacts accounted by vehicle trips alone.

Lead agencies for projects subject to the California Environmental Quality Act (CEQA) currently prepare an air quality analysis as part of their environmental documents, including emissions during construction and operations. Typical emissions during the construction phase of development projects include, but are not limited to, fugitive dust emissions, combustion emissions from off-road mobile sources (construction equipment) and on-road mobile sources, and coating and asphalt evaporative emissions. Operational emissions include, but are not limited to: area sources (e.g., water heater emissions), on-road mobile source emissions (worker commute trips, delivery truck trips, etc.), consumer products and other emissions sources depending on the specific type of land use. The District

is a commenting agency on air quality analyses for new development and redevelopment projects that are subject to CEQA in the Basin and Coachella Valley.

Regulatory History

California Health and Safety Code (H&SC) Section 40716 states that "a District may adopt and implement regulations to reduce or mitigate emissions from indirect and areawide sources of air pollution". As an example, a 1993 California Attorney General opinion states that "a District's regulations may require the developer of an indirect source to submit the plans to the District for review and comment prior to the issuance of a permit for construction by a city or county. A District may also require the owner of an indirect source to adopt reasonable post-construction measures to mitigate particular indirect effects of the facility's operation [as a stationary source]. Such regulations could be enforced through an action for civil penalties…" (Cal. Attorney General Opinion 92-519.) While other types of indirect source measures could be developed, the same attorney general's opinion concluded that the District may not impose a permitting system upon indirect sources per se, given the primacy of local land use control. H&SC Section 40716 also states that "nothing in the section constitutes an infringement on the existing authority of counties and cities to plan or control land use, and nothing in the section provides or transfers new authority over such land use to a district" when an air district adopts and implement regulations to reduce or mitigate emissions from indirect and areawide sources of air pollution or encourage or require the use of measures that reduce the number or length of vehicle trips.

New residential, commercial, industrial and institutional development, including redevelopment, are required to meet the needs of the Basin's future residents and economy. The Basin population will grow 12 percent by 2031, resulting in new homes and job-generating development, according to the Southern California Association of Governments (SCAG). The majority of that growth will occur as infill to existing urbanized areas. By 2040, SCAG's 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) expects 46 percent of housing and 55 percent of jobs to be located in areas served by high quality transit. As a result of the changing distribution and density of development, SCAG reports a significant decrease in vehicle miles traveled per capita in the Basin between 2012 and 2040: daily per capita VMT is projected to decrease in 2040 by 7.4 percent, from 22.1 miles to 20.5 miles. New development and redevelopment projects will also be constructed in compliance with Title 24 green building requirements that greatly reduce construction and operational emissions compared with existing development.

A number of air districts in California have already adopted and implemented indirect source rules, policies, and/or the collection of mitigation fees. These examples are provided for reference only, and do not necessarily reflect a model of what an applicable rule that may be developed by District would entail. Given the uniqueness and severity of the air quality problem in the Basin in comparison to other regions in California and the United States, unique considerations will be given in developing regulations or other enforceable mechanisms in order to meet federal air emissions standards.

In December 2005, the SJVAPCD adopted Rule 9510 – Indirect Source Review, which was recently approved by U.S. EPA. The purpose of the rule is to reduce emissions of NOx and PM10 from new development projects that seek to gain a discretionary approval (*upon full build-out*) of any one of the following: minimum 50 residential units, 2,000 square feet (SF) of commercial space, 25,000 SF of industrial space, 20,000 SF of medical office space, 39,000 SF of general office space, 9,000 SF of educational space, 10,000 SF of government space, 20,000 SF of recreational space, or 9,000 SF of uncategorized space. The rule also applies to transportation projects whose construction exhaust emissions will result in a total of 2 tons/year of NOx and PM10 combined. The rule is designed to reduce

the impact of the development projects to the extent needed for the SJVAPCD region to reach attainment of ozone and PM standards by determining the level of reduction needed on a per-project basis that would achieve the emission reduction committed in the PM and ozone attainment plans.

The rule requires applicants of new development projects to provide documents necessary to perform an emissions generation analysis. The SJVAPCD calculates a required emission reduction amount based on total emissions and identifies credits for specific on-site emission reduction measures included in the project. Required reductions not achieved by voluntary on-site measures would be achieved off-site through a mitigation fee. Offsite reductions are subject to criteria including, but not limited to, being quantifiable and surplus. Such offsite reductions are analyzed annually to ensure their effectiveness.

Sacramento Metropolitan Air Quality Management District is working on proposed Rule 1051 – "Indirect Source Rule for New Land Use Projects" requiring new residential, commercial and industrial land uses to mitigate construction NOx emissions by 20 percent and operational emissions to a percentage of the project's NOx emissions. Mitigation fees to fund an offsite mitigation account and a fee rate have yet to be determined.

Proposed Method of Control

The District is required by State law to consider all feasible control measures (H&SC Sections 40913, 40914 40920.5), which would include consideration of a measure that is at least equivalent to the programs implemented by other air districts. In response to this requirement, the District will consider whether a rule similar to SJVAPCD Rule 9510 or other mechanisms that will result in mitigating or help mitigate and potentially further reduce emissions associated with new development or redevelopment projects could apply in the Basin and Coachella Valley.

An EGM-01 working group consisting of affected stakeholders from local governments, the building industry, developers, realtors, other business representatives, environmental/community organizations, and other stakeholders, was established as part of the 2007 AQMP. The District will re-convene the working group to explore potential actions and innovative approaches to mitigate and potentially reduce emissions from new or redevelopment projects. As part of the working group process, discussions and review will include, but are not limited to, changes in the indirect source emissions inventory as a result of economic slowdown and forecasted future economic growth; the latest Title 24 green building standards that affect project emissions; and a regionwide shift toward compact development and active transportation with implications for trip generation, as documented in SCAG's 2016 RTP/SCS pursuant to SB 375. Through the working group process, the District will examine the effectiveness of the SJCAPCD rule framework in the context of the Basin, including cost-effective operational, construction or mobile source emission reductions given development density trends, Title 24 building requirements, clean vehicle penetration, and other South Coast-specific factors. Further, the District and the working group will examine possible incentive programs and other methods to create demand for cleaner technologies and materials, and designs that accommodate new technology deployment (such as including footprints for vehicle charging stations) in new developments that will help make substantive and reasonable strides to emission reductions. If emission mitigation actions cannot be readily achieved by the project proponent, District staff will consider (with input from stakeholders) the potential and effectiveness of an alternative mitigation fee, which will be used to identify emission reduction projects in the vicinity of the proposed project. The inclusion of industry stakeholders early on in the planning process will help to spur innovative market and cost sensitive solutions.

In addressing indirect sources, the District will develop implementation and compliance methods that will not unduly restrict local or regional jurisdictions' prerogatives respecting land use approvals.

During rule development, special consideration will be given to the need to assure that any rule adopted will integrate with and enhance the CEQA process and not impede the project approval process in light of CEQA timelines. To this end, the District may consider a local delegation option in which a local or regional jurisdiction may elect to implement a program equal to or more stringent than the District's for mitigating or reducing emissions associated with new development or redevelopment projects. Coachella Valley Association of Government's PM10 mitigation measures in Rule 403 – Fugitive Dust are good examples of how local ordinances can be implemented in a District rule. This delegation will include technical training and field auditing to be conducted by the District.

Emission Reductions

The amount of emission reductions that can be achieved from this measure will be determined dependent on the type and number of new and redevelopment projects affected by the measure and the method of control to be implemented to reduce VOC, NOx, and PM2.5 emissions. The reliance merely on VMT as an applicable metric will be avoided to the maximum extent possible due to the advances in fleet change and emission control technology discussed earlier.

Rule Compliance

Compliance will be verified via District outreach and field inspection.

Test Methods

Approved emission quantification protocols by federal, State or local agencies will be used to track and report emission reductions for SIP purposes. If a protocol does not exist for a specific project, a protocol will be developed for the District Governing Board's consideration for adoption.

Cost-Effectiveness

The cost-effectiveness will be developed during the control measure implementation process based on the mitigation measures included in the menu of options.

Implementing Agency

California Health and Safety Code (H&SC) Section 40716 states that "a District may adopt and implement regulations to reduce or mitigate emissions from indirect and areawide sources of air pollution" provided, however, that the District may not "infringe on the existing authority of counties and cities to plan or control land use."

References

Control Strategy Symposium, SCAQMD, June 2015

SCAQMD, 2012 Air Quality Management Plan, Appendix IV-A, December 2012

SCAQMD, 2007 Air Quality Management Plan, Appendix IV-A, June 2007

MOB-01: EMISSION REDUCTIONS AT COMMERCIAL MARINE PORTS [NOx, SOx, PM]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: PORTS AND PORT-RELATED SOURCES (I.E., OCEAN-GOING VESSELS, ON-ROAD HEAVY-DUTY TRUCKS, LOCOMOTIVES, HARBOR CRAFT, AND CARGO HANDLING EQUIPMENT)

CONTROL METHODS: EMISSION REDUCTION METHODS WOULD BE PROPOSED BY THE PORTS POTENTIALLY COULD INCLUDE CLEAN TECHNOLOGY FUNDING PROGRAMS, INCREASED EFFICIENCIES, AIR QUALITY IMPROVEMENT PROJECT OPTIONS, LEASE PROVISIONS, PORT TARIFFS, OR INCENTIVES/DISINCENTIVES TO IMPLEMENT MEASURES, TO THE EXTENT COST-EFFECTIVE AND FEASIBLE STRATEGIES ARE AVAILABLE

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	41.95	47.80	46.35	42.03
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
SOX INVENTORY	3.90	0.81	0.82	0.91
SOX REDUCTION		TBD	TBD	TBD
SOX REMAINING		TBD	TBD	TBD
PM2.5 INVENTORY	1.03	0.83	0.84	0.93
PM2.5 REDUCTION		TBD	TBD	TBD
PM2.5 REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	39.37	TBD	42.39	35.60
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD

CONTROL COST: TO BE DETERMINED

IMPLEMENTING AGENCY: SCAQMD, PORTS OF LOS ANGELES AND LONG BEACH

NOTE: This control measure replaces CM #2007MOB-03 (2007 AQMP) and CM #2012IND-01 (2012 AQMP).

Description of Source Category

The goal of this measure is to assist in implementing the State SIP Strategy "Further Deployment of Clean Technologies" measures related to on-road heavy-duty vehicles, off-road equipment, and federal and international sources that operate in and out of the Port of Los Angeles and the Port of Long Beach (San Pedro Bay Ports or Ports). It is not expected for this measure to achieve the full emission reductions associated with the "Further Deployment" measures. But rather, this measure seeks to identify emission reductions of NOx, SOx, and PM2.5 from port-related sources through voluntary actions identified in the San Pedro Ports Clean Air Action Plan (CAAP) that are considered real, surplus, quantifiable, and enforceable. To the extent that these actions are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. Affected sources would be proposed by the Ports and could include some or all port-related sources (on-road heavy-duty trucks, cargo handling equipment, harbor craft, marine vessels, locomotives, and stationary equipment), to the extent that cost-effective and feasible strategies are available.

Other sources—i.e. sources that are unrelated to the Ports—would not be in any way subject to emission reductions under this measure (including through funding of emission reduction measures, or purchase of emission credits, by the Ports or port tenants).

Background

Emissions and Progress. The Ports of Los Angeles and Long Beach are the largest in the nation in terms of container throughput, and collectively are the single largest fixed source of air pollution in Southern California. Emissions from port-related sources have been reduced significantly since 2006 through efforts by the Ports and a wide range of stakeholders. In large part, these emission reductions have resulted from programs developed and implemented by the Ports in collaboration with port tenants, marine carriers, trucking interests and railroads. Regulatory agencies, including U.S.EPA, CARB and SCAQMD, have participated in these collaborative efforts from the outset, and some measures adopted by the Ports have led the way for adoption of analogous regulatory requirements that are now applicable Statewide as well as at the Ports. These port measures include the Clean Truck Program and actions to deploy shore-power and low emission cargo handling equipment. The Ports have also established incentive programs, which have not subsequently been adopted as regulations. These include incentives for routing of vessels meeting the International Maritime Organization (IMO) Tier 2 and 3 NOx standards, and vessel speed reduction. In addition, the Ports are, in collaboration with the regulatory agencies, implementing a Technology Advancement Program to develop and deploy clean technologies of the future.

Port-related sources such as marine vessels, locomotives, trucks, harbor craft and cargo handling equipment, continue to be among the largest sources of NOx in the region. Given the large magnitude of emissions from port-related sources, the substantial efforts described above play a critical part in the ability of the Basin to attain the national ozone and PM2.5 ambient air standards by federal deadlines. This measure provides assurance that emissions from the Basin's largest fixed emission source will continue to support attainment of the federal 8-hour ozone and the 24-hour and annual PM2.5 standards. In addition, reductions in PM2.5 emissions will also reduce cancer risks from diesel particulate matter.

Clean Air Action Plan. The emission control efforts described above largely began in 2006 when the Ports of Los Angeles and Long Beach, with the participation and cooperation of the staff of the SCAQMD, CARB, and U.S. EPA,

adopted the San Pedro Bay Ports CAAP. The CAAP was further amended in 2010, updating many of the goals and implementation strategies to reduce air emissions and health risks associated with port operations while allowing port development to continue. In addition to addressing health risks from port-related sources, the CAAP sought the reduction of criteria pollutant emissions to the levels that assure port-related sources decrease their "fair share" of regional emissions to enable the Basin to attain State and federal ambient air quality standards.

The CAAP focuses primarily on reducing diesel particulate matter (DPM), along with NOx and SOx. The CAAP includes proposed strategies on port-related sources that are implemented through new leases or port-wide tariffs, Memoranda of Understanding (MOU), voluntary action, grants or incentive programs.

In addition to the CAAP, the Ports have completed annual inventories of port-related sources since 2005. These inventories have been completed in conjunction with a technical working group composed of the SCAQMD, CARB, and U.S. EPA. Based on the latest inventories, emissions from port-related sources are continuing to decrease from 2005 emission levels. However, additional emission reductions will be need to help the region meet the ozone and PM2.5 ambient air quality standards by their applicable dates.

While many of the emission reduction targets in the CAAP result from implementation of federal and State regulations (either adopted prior to or after the CAAP), some are contingent upon the Ports taking and maintaining actions which are not required by air quality regulations. These actions include the Expanded Vessel Speed Reduction Incentive Program, lower-emission switching locomotives, and incentives for lower emission marine vessels. This AQMP measure is designed to provide an ability for the Ports' actions to be credited in the State Implementation Plan after the emission reductions have occurred. If the actions are to be credited in the SIP, assurance must be provided that, if emissions do not continue to meet projections, the Ports working with affected stakeholders will develop and implement actions to get back on track, to the extent that cost-effective and feasible strategies are available. A demonstration to U.S. EPA will need to be made that the actions meet U.S. EPA's guidance in order to be credited into the SIP.

The Ports are in the process of updating the CAAP. Commonly termed "CAAP 3.0", the Ports are seeking to develop strategies to improve operational efficiencies, while meeting long term sustainability goals through the deployment of zero and near-zero emission technologies to the greatest extent feasible. As part of this effort, the Ports have developed roadmaps for the deployment of zero-emission technologies. SCAQMD staff, CARB, and U.S. EPA have been in discussions with Port staff on the 2016 AQMP/SIP process.

Regulatory History

The CAAP sets out the emission control programs and plans that will help mitigate air quality impacts from port-related sources. The CAAP relies on a combination of regulatory requirements and voluntary control strategies that go beyond U.S. EPA or CARB requirements, or are implemented earlier than the requirements of applicable regulatory rules. The regulations that the CAAP relies on include international, federal and State requirements controlling port-related sources such as marine vessels, harbor craft, cargo handling equipment, locomotives, and trucks. Key regulatory and other actions taken to date are as follows:

- *International Maritime Organization (IMO) Emissions and Fuel Standards.* The IMO MARPOL Annex VI, which came into force in May 2005, set new international NOx emission limits on Category 3 (>30 liters per cylinder displacement) marine engines installed on new vessels retroactive to the year 2000. In October 2008, the IMO adopted an amendment which places a global limit on marine fuel sulfur content of 0.1 percent by 2015 for

specific areas known as Emission Control Areas (ECA). The ECA extends 200 nautical miles from the U.S. coast. The Basin off-coast waters are included in the ECA and ships calling at the Ports have to meet this new fuel standard. In addition, the 2008 IMO amendment required new ships built after January 1, 2016 that enter an ECA to meet a Tier III NOx emission standard which is 80 percent lower than the Tier I emission standard.

- *U.S. EPA Marine Vessel Regulations.* In 2010, U.S. EPA adopted standards that apply to Category 3 (C3) engines installed on U.S. vessels and to marine diesel fuels produced and distributed in the United States. That rule added two new tiers of engine standards for C3 engines consistent with the IMO standards described above. It also includes a regulatory program to implement IMO MARPOL Annex VI in the United States, including engine and fuel sulfur limits, and extends the ECA engine and fuel requirements to U.S. internal waters (i.e., rivers, lakes, etc.). U.S. EPA is also a participating member of IMO and provided input to the fuel sulfur and NOx emission standards adopted by IMO and works within international organizations to establish global engine and fuel standards.

- *U.S. EPA Emission Standards for Locomotives.* To reduce emissions from switch and line-haul locomotives, the U.S. EPA in 2008 established a series of increasingly strict emission standards for new or remanufactured locomotive engines. The emission standards are implemented by "Tier" with Tier 0 as the least stringent and Tier 4 being the most stringent. U.S. EPA also established remanufacture standards for both line haul and switch engines. For Tiers 0, 1, and 2, the remanufacture standards are more stringent than the new manufacture standards for those engines for some pollutants.

- *U.S. EPA and CARB Emission Standards for New Trucks.* To reduce emissions from on-road, heavy-duty diesel trucks, U.S. EPA established a series of cleaner emission standards for new engines, starting in 1988. The U.S. EPA promulgated the final and cleanest standards with the 2007 Heavy-Duty Highway Rule. Starting with model year 2010, all new heavy-duty trucks have to meet the final emission standards specified in the rule.

- *CARB In-use Fleet Rules.* Between 2005 and 2010, CARB adopted several rules that reduce emissions at the Ports by requiring accelerated modernization of equipment by replacing or repowering old equipment with new equipment. These rules include: In-Use Truck and Bus Rule, In-use Off-road Equipment Rule, Cargo Handling Rule, Drayage Truck Rule, Commercial Harbor Craft Rule, and the At-Berth Auxiliary Engine (Shore power) Rule. The majority of marine vessel emissions are created by main propulsion engines during transiting and maneuvering, but auxiliary engines emissions are often times nearly equivalent to or higher than the emissions from main propulsion engines and occur primarily while the vessel is at berth.

- *CARB Marine Fuel Rule.* In December 2005, the CARB Board voted to adopt fuel sulfur standards for marine auxiliary engines, including those on foreign flag vessels, in waters out to 24 nautical miles. The rule limited sulfur content in marine diesel fuel to 5,000 to 15,000 ppm depending on fuel type beginning in 2009, decreasing to 5,000 to 10,000 ppm beginning in August 2012 and to 1,000 ppm sulfur content in January 1, 2014.

- *MOUs.* In 1998, CARB entered into an MOU with the Union Pacific and Burlington Northern Santa Fe railroads which established a fleet average emissions limit for locomotives operating in the Basin. The intended effect of this MOU is to accelerate introduction of Tier 2 or cleaner locomotives (achieving an approximate 57 percent level of NOx control) in this region. In June 2005, CARB entered into a second MOU with the same two railroads that is intended to reduce health risks near railyards and identify actions to achieve a projected 20 percent

reduction in DPM emissions. Finally, several years ago, the ports, shipping interests, and regulatory agencies entered into a MOU seeking voluntary reductions in vessel speed to reduce NOx emissions.

- *SCAQMD Rules Governing Locomotive Idling and Risk Assessment.* In 2005 and 2006, the SCAQMD adopted rules requiring railroads to minimize unnecessary locomotive idling, and to develop emissions inventories and health risk assessments and notify the public of health risks. A federal District Court decision prevents these rules from being implemented until they become federally enforceable through inclusion into the SIP. The SCAQMD has submitted the idling rules to the U.S. EPA for approval into the SIP.

Areas where the CAAP went beyond existing regulatory requirements or accelerated the implementation of current IMO, U.S. EPA, or CARB rules include emission reductions from ocean-going vessels through lowering vessel speeds, accelerating the introduction of 2007/2010 on-road heavy-duty drayage trucks prior to the implementation of the CARB Drayage Truck Regulation, maximizing the use of shore-side power for ocean-going vessels while at berth, early use of low-sulfur fuel in ocean-going vessels, and the restriction of high-emitting locomotives on port property. In addition, the Ports have established policies for greater use of cleaner equipment such as construction equipment operating on port property and improving operational efficiencies that have potential co-benefits in reducing emissions.

The CAAP has included emission reduction targets similar to the emission reduction targets provided in the AQMP. Specifically, the CAAP included emission reduction targets associated with the short- and near-term measures provided in the 2007 AQMP to help the region meet air quality standards.

Proposed Method of Control

This measure seeks to implement the State SIP Strategy "Further Deployment of Clean Technologies" measures related to on-road heavy-duty vehicles, off-road equipment, and federal and international sources that operate in and out of the San Pedro Bay Ports. It is not expected for this measure to achieve the full emission reductions associated with the "Further Deployment" measures. But rather, this measure seeks to recognize port-related emission reductions that are the result of voluntary actions and may be considered surplus to the emission reduction commitments of the State SIP Strategy "Further Deployment" measures provided in Appendix IV-B of the 2016 AQMP. Examples of voluntary actions include greater deployment of zero or near-zero emission technologies, greater use of renewable fuels that may have the potential to reduce criteria pollutant emissions, and strategies that result in improved operational efficiencies with criteria pollutant and greenhouse gas emission reduction benefits. In addition, actions that potentially accelerate earlier emission reduction that help meet the overall AQMP percentage emission reduction targets in 2023 and 2031 (to be established with the final adoption of the 2016 AQMP) will be recognized to the extent that such actions meet U.S. EPA guidance for such actions to be approved into the SIP. The "Further Deployment" measures emission reductions associated with port-related sources will be used as a starting point for discussion on what level of emission reductions could be achieved through voluntary actions. The voluntary actions could occur port-wide or occur at individual port facilities (i.e., marine terminals and rail yards). The Ports through its CAAP update can decide the most effective approaches to achieve the overall emission reductions. Emission reductions (to the extent that they are real, surplus, and quantifiable) that occurred through the identified actions as reported by the Ports on an annual basis will be incorporated in the revised baseline emissions as part of the SIP revision process (either as part of the Rate-of-Progress reporting requirements of the Clean Air Act or reflected in new baseline emissions inventory for future AQMP/SIP revisions). Since many of these actions are voluntary in nature, any emission reductions credited

towards attainment of the federal air quality standards must contain an enforceable commitment that the emission reductions remain real and permanent (as defined by U.S. EPA) if for some reason the emission reductions are not maintained after they are reported into the SIP. To ensure that the emission reductions are approvable by U.S. EPA, there may be a need to develop a rule (or an enforceable mechanism) as a commitment that the emission reductions are long-term and considered permanent and to commit to additional actions should the emission reductions not be realized in a given year.

The discussions of potential enforceable mechanisms will be through a public process. Through this process, the District staff will establish a working group, hold a series of working group meetings, and hold public workshops. The purpose of the public process is to allow the District staff to work with a variety of stakeholders such as the Ports, potentially affected industries, other agencies, and environmental and community groups to provide input and comments. It is envisioned that through the public process, there will be discussions on the types of voluntary actions that could lead to additional emission reductions. To the extent that such actions can be quantified and are determined to be surplus (i.e., the emission reduction benefits are not the result of a regulation), the emission reductions will be recognized into the SIP.

Table IV-A-3 provides a schedule for the public process. The public process will begin immediately after the adoption of the Final 2016 AQMP by the SCAQMD Governing Board. Within six months of the public process, SCAQMD staff will report to the SCAQMD Governing Board (either through the Governing Board's Mobile Source Committee or to the full Board), the progress in identifying voluntary actions (which may be actions identified in the CAAP or other actions that affect port-related sources) and whether the emission reductions associated with the identified actions can be quantified. If steps are not taken to implement the voluntary actions, SCAQMD staff will recommend to the Board whether to consider development of rules that are within the SCAQMD's legal authority or other enforceable mechanisms to achieve emission reductions to help attain federal air quality standards. A recommendation whether to proceed with formal rulemaking shall be made no later than one year after the adoption of the Final 2016 AQMP.

Emission Reductions

The amount of emission reductions that can be achieved from this control measure will be dependent on the type and number of sources, pieces of equipment, and vehicles affected by the measure and the method of control to be implemented to reduce NOx, SOX, and PM2.5 emissions primarily from mobile sources. As emission reductions are realized, the emission reductions will be attributed to the State SIP Strategy "Further Development of Clean Technologies" measures and reductions will be taken as part of future Rate-of-Progress reporting and future AQMP revisions.

Rule Compliance

Compliance with this control measure will depend on the type of control strategy implemented. Compliance will be verified through actual emissions reported, and enforced through submittal and review of records, reports, and emission inventories. Enforcement provisions will be discussed as part of the public process to develop enforceable mechanisms to ensure that the emission reductions remain permanent. If other enforceable mechanisms are established outside of the SCAQMD public process, or the State or federal government implement regulatory actions, that achieve equivalent emission reductions, compliance will be enforced through the provisions of those actions.

Test Methods

Approved emission quantification protocols by federal, State or local agencies will be used to track and report emission reductions for SIP purposes.

Cost-Effectiveness and Feasibility

The cost-effectiveness of this measure will be based on the strategies identified through the public process.

Implementing Agency

The Ports are listed as an implementing agency to the extent that the Ports will be implementing the CAAP, which will contain many of the voluntary actions to be considered under this measure. The SCAQMD will seek to work in a collaborative manner with the Ports and other stakeholders to identify strategies that result in emission reductions from port-related sources to assist in meeting the emission reductions associated with State SIP Strategy "Further Deployment of Clean Technologies" measures related to on-road heavy-duty vehicles, off-road equipment, and federal and international emission sources operating at the Ports and minimize to the greatest extent feasible public exposure to emissions from port-related sources. The SCAQMD staff and the Ports through a public process will develop an enforceable mechanism to recognize the voluntary actions that are beyond regulatory requirements and can be credited in the SIP in a timely manner. The enforceable mechanism whether it be a rule adopted by the District or other enforceable means such as Memorandum of Understanding or Agreement will contain provisions to ensure that the emission reductions continue for the region to achieve and maintain federal air quality standards. The District and Ports will work with CARB to develop such provisions for approval by U.S. EPA.

References

San Pedro Bay Ports (2010). San Pedro Bay Ports Clean Air Action Plan, 2010 Update, October 2010.

SCAQMD (2007). Air Quality Management Plan, Appendix IV-A, June 2007

SCAQMD (2012). Air Quality Management Plan, Appendix IV-A, December 2012

SCAQMD (2015). SCAQMD 2016 AQMP Control Strategy Symposium, June 2015

MOB-02: EMISSION REDUCTIONS AT RAIL YARDS AND INTERMODAL FACILITIES [NOx, PM]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	RAILYARDS AND INTERMODAL FACILITIES			
CONTROL METHODS:	MOBILE SOURCE EMISSION REDUCTION EFFORTS INCLUDING DEPLOYMENT OF CLEANER TECHNOLOGIES, INCREASED EFFICIENCIES, OR AIR QUALITY IMPROVEMENT PROJECT OPTION			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	TBD	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
PM2.5 INVENTORY	TBD	TBD	TBD	TBD
PM2.5 REDUCTION		TBD	TBD	TBD
PM2.5 REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	TBD	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
PM2.5 INVENTORY	TBD	TBD	TBD	TBD
PM2.5 REDUCTION		TBD	TBD	TBD
PM2.5 REMAINING		TBD	TBD	TBD
CONTROL COST:	TO BE DETERMINED			
IMPLEMENTING AGENCY:	SCAQMD			

This measure seeks to further reduce emissions associated with railyard operations to help achieve federal ambient air quality standards.

Description of Source Category

There are 15 freight railyards and intermodal facilities (of which nine are considered major railyards) located within the jurisdiction of the SCAQMD. In addition, the South California Regional Rail Authority (SCRRA or Metrolink) and Amtrak provide commuter rail transportation in the SCAQMD. SCRRA maintains their passenger locomotives at two locations in the Basin. There are a variety of emission sources related to railyard and intermodal facility operations including locomotives, on-road heavy-duty trucks, cargo-handling equipment, transportation refrigeration units (TRUs), and maintenance shops. The goal of this measure is to assist in implementing the State SIP Strategy "Further Deployment of Clean Technologies" measures related to on-road heavy-duty vehicles, off-road equipment, and federal sources that operate in and out of railyards and intermodal yards. It is not expected for this measure to achieve the full emission reductions associated with the "Further Deployment" measures. But rather, this measure seeks to identify emission reductions of NOx, and PM2.5 from these sources through voluntary actions identified through a public process. Through the public process, the District will assess and identify potential actions that could result in further emission reductions at rail yards and intermodal facilities. To the extent that these actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP.

Background

As mentioned above, there are nine major freight rail yards and intermodal facilities and two commuter rail maintenance facilities in the SCAQMD. Residential communities are located adjacent to many of these rail yards. The District has received complaints from residents living near railyards of emissions from locomotives, on-road trucks, and cargo handling equipment that operate at railyards. During periods of routine locomotive maintenance, there have been concerns raised regarding excessive emissions from idling locomotives or during periods of routine locomotive maintenance. Due to projected economic and population growth, it is projected that freight and passenger locomotive activities will increase and potentially result in increased emissions.

Regulatory History

U.S. EPA Emission Standards for Locomotives

To reduce emissions from switch and line-haul locomotives, the U.S. EPA in 2008 established a series of increasingly strict emission standards for new or remanufactured locomotive engines. The emission standards are implemented by "Tier" with Tier 0 as the least stringent and Tier 4 being the most stringent. U.S. EPA also established remanufacture standards for both line-haul and switch engines. For Tiers 0, 1, and 2, the remanufacture standards are more stringent than the new manufacture standards for those engines for some pollutants.

In 1998, the railroads and CARB entered into an MOU to accelerate the introduction of Tier 2 locomotives into the Basin. The MOU includes provisions for a fleet average in the Basin, equivalent to U.S. EPA's Tier 2 locomotive standard by 2010. The MOU addressed NOx emissions from locomotives. Under the MOU, NOx levels from locomotives are reduced by 57 percent.

On June 30, 2005, Union Pacific Railroad (UP) and Burlington Northern Santa Fe Railroad (BNSF) entered into a Statewide Rail Yard Agreement to Reduce Diesel PM at California Rail Yards with the CARB. The railroads

committed to implementing certain actions from rail operations throughout the State. In addition, the railroads prepared equipment inventories and conducted dispersion modeling for diesel PM at a number of rail yards.

U.S. EPA and CARB Emission Standards for On-Road Heavy-Duty Engines and Trucks

To reduce emissions from on-road, heavy-duty diesel trucks, U.S. EPA established a series of cleaner emission standards for new engines, starting in 1988. The U.S. EPA promulgated the final and cleanest standards with the 2007 Heavy-Duty Highway Rule. Starting with model year 2010, all new heavy-duty trucks have to meet the final emission standards specified in the rule.

In December 2007, CARB adopted regulation that applies to heavy-duty diesel trucks operating at California ports and intermodal rail yards. This regulation eventually required that all drayage trucks meet 2007 on-road emission standards by 2014.

CARB Cargo Handling Equipment Regulation

On December 8, 2005, CARB approved the Regulation for Mobile Cargo-Handling Equipment (CHE) at Ports and Intermodal Rail Yards (Title 13, CCR, Section 2479), which is designed to use Best Available Control Technology (BACT) to reduce diesel PM and NO_X emissions from mobile cargo-handling equipment at ports and intermodal rail yards. The regulation became effective December 31, 2006. Since January 1, 2007, the regulation imposes emission performance standards on new and in-use terminal equipment that vary by equipment type.

SCAQMD Regulation XXXV – Railroads and Railroad Operations

The SCAQMD adopted Regulation XXXV – Railroads and Railroad Operations, which consists of three rules that address emissions from locomotives and rail yards. Rule 3501 – Recordkeeping for Locomotive Idling, requires recordkeeping of idling events in order to identify opportunities for reducing idling emissions and to assist in quantifying idling emissions. Rule 3502 – Minimization of Emissions from Locomotive Idling, requires railroads to minimize unnecessary locomotive idling. Rule 3503 – Emissions Inventory and Health Risk Assessment for Railyards, requires operators of railroads and rail yards to develop emissions inventories, prepare health risk assessments and notify the public of health risks. A federal District Court decision prevents these rule from being implemented until they become federally enforceable through inclusion in the SIP. Rules 3501 and 3502 have been submitted to U.S. EPA for inclusion into the State implementation plan (SIP). However, U.S. EPA has not made a decision on the approval of the rules.

Proposed Method of Control

To implement this measure, District staff will convene a stakeholders working group consisting of the railroads, marine ports (to the extent that they own or oversee the rail operations at their facilities), industry stakeholders, environmental and community organizations, and other affected stakeholders to discuss and identify actions or approaches that can be implemented to further reduce emissions at rail and intermodal yards. The identified actions can be voluntary or can be regulations or other enforceable mechanisms promulgated by a local, state, or federal agency. Voluntary actions include, but not limited to, greater deployment of zero and near-zero emission technologies, greater use of renewable fuels that may have the potential to reduce criteria pollutant emissions, and strategies that result in improved operational efficiencies with criteria pollutant and greenhouse gas emission reduction benefits.

Since many of the identified actions are most likely voluntary in nature, the District staff seeks to work collaboratively with railyard operators and affected stakeholders to develop methods to quantify the emission reductions associated with the identified actions. To the extent that these actions are considered surplus to the emission reductions identified in the AQMP and the State SIP Strategy, they may be credited into the SIP as part of future Rate-of-Progress Reporting or part of future AQMP revisions. To be credited into the SIP, the emission reductions must be approved by U.S. EPA and meet U.S. EPA guidelines for approvability of voluntary measures. As such, the commitment to maintain emission reductions and remedy any shortfalls in emissions reductions associated with the identified actions may be in the form of a regulation adopted by the District within its legal authority or through other enforceable mechanisms.

Table IV-A-3 provides a schedule for the public process. The public process will begin immediately after the adoption of the Final 2016 AQMP by the SCAQMD Governing Board. Within six months of the public process, SCAQMD staff will report to the SCAQMD Governing Board (either through the Governing Board's Mobile Source Committee or to the full Board), the progress in identifying actions that result in emission reductions and whether the emission reductions associated with the identified actions can be quantified. If steps are not taken to implement the identified actions, SCAQMD staff will recommend to the Governing Board whether to consider proceeding with the development of rules that are within the SCAQMD's legal authority or other enforceable mechanisms to achieve emission reductions to help attain federal air quality standards. A recommendation whether to proceed with formal rulemaking process shall be made no later than one year after the adoption of the Final 2016 AQMP.

Emission Reductions

The actual amount of emission reductions achieved from this measure will be dependent on the type and number of rail yards and intermodal facilities affected by the measure and the method of control to be implemented to reduce NOx and PM2.5 emissions primarily from mobile sources operating at affected rail yards and intermodal facilities. To the extent that a rail yard is located on marine port property, the rail yard may be considered as part of the efforts to reduce emissions at commercial marine ports (2016 AQMP Control Measure MOB-01) and not be affected by this control measure. Quantified emission reductions that are real, surplus, permanent, and enforceable will be reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or in baseline emissions inventories as part of future AQMP revisions.

Rule Compliance

Compliance with either a rule or other enforceable mechanisms will be verified via field inspection. If an enforceable mechanism is established as a result of the public process or if the State or federal government implement actions that achieve equivalent emission reductions, compliance will be enforced through the provisions of those actions.

Test Methods

Approved emission quantification protocols by federal, State or local agencies will be used to track and report emission reductions for SIP purposes.

Cost-Effectiveness

The cost-effectiveness of this measure will be based on the type and number of rail yards and intermodal facilities affected by the measure and the strategies identified through the public process.

Implementing Agency

The District will work with affected parties, the public, and other stakeholders to identify potential actions to help meet the emission reductions associated with the State SIP Strategy "Further Deployment of Clean Technologies" measures for on-road heavy-duty vehicles, off-road equipment, and federal sources.

References

SCAQMD (2006). Regulation 35 – Railroads and Railroad Operations (2006)

SCAQMD (2015). SCAQMD 2016 AQMP Control Strategy Symposium, June 2015

U.S. EPA (2008). Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression-Ignition Engines Less Than 30 Liters per Cylinder; Republication, June 30, 2008 (73FR37096).

MOB-03: EMISSION REDUCTIONS AT WAREHOUSE DISTRIBUTION CENTERS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: WAREHOUSE DISTRIBUTION CENTERS

CONTROL METHODS: MOBILE SOURCE EMISSION REDUCTION EFFORTS INCLUDING DEPLOYMENT OF CLEANER TECHNOLOGIES, INCREASED EFFICIENCIES, OR AIR QUALITY IMPROVEMENT PROJECT OPTION

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	2012	2022	2023	2031
VOC INVENTORY	TBD	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	TBD	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	TBD	TBD	TBD	TBD
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD
SUMMER PLANNING	2012	2022	2023	2031
VOC INVENTORY	TBD	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	TBD	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	TBD	TBD	TBD	TBD
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD

CONTROL COST: TO BE DETERMINED

IMPLEMENTING AGENCY: SCAQMD

Description of Source Category

The goal of this measure is to assist in implementing the State SIP Strategy "Further Deployment of Clean Technologies" measures related to on-road heavy-duty vehicles, off-road equipment, and federal sources that operate in and out of warehouse distribution centers. It is not expected for this measure to achieve the full emission reductions associated with the "Further Deployment" measures. But rather, this measure seeks to identify emission reductions of NOx, and PM2.5 from these sources through voluntary actions identified through a public process. Innovative methods to achieve emission reductions would need to be implemented in order to allow continued development of warehouses in the region to meet the demands of economic and population growth. This measure could include reduction of emissions from high-cube warehouses that attract a large number of heavy-duty diesel trucks on a daily basis. Emissions from these trucks produce local and regional air quality impacts. Through a public process, the District will assess and identify potential actions that could result in further emission reductions at warehouse distribution centers. To the extent that these actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP.

Background

Over the past decade, warehouse and distribution centers have been steadily increasing in size and number throughout the region. The greatest growth in warehouses/distribution centers has been in the Riverside and San Bernardino areas. Based on the Southern California Association of Governments, by 2035 over one billion square feet of warehousing will be needed in the Southern California area to support goods movement activities (SCAG, 2010).

Distribution centers and/or warehouses are facilities that serve as a distribution point for the transfer of goods. A warehouse/distribution center can be comprised of multiple centers or warehouse/distribution centers within an area. The size can range from 100,000 square feet to well over a million square feet. As an example, the District has reviewed at least eight new projects for warehouse projects totaling 17.75 million square feet since late 2008 in the vicinity of the city of Perris in Riverside County and more are currently being proposed. The proposed World Logistics Center in Moreno Valley is over 40 million square feet. Such facilities include cold storage warehouses, goods transfer facilities, and transloading facilities, where imported goods are sorted, tagged, repackaged and prepared for retail distributions. These operations involve trucks, trailers, shipping containers, and other equipment with diesel engines. Depending on the size and type, a warehouse/distribution center may have hundreds of diesel trucks a day that deliver, load, and/or unload goods, generally operating seven days a week. To the extent that these trucks are transporting perishable goods, they are equipped with diesel-powered transport refrigeration units (TRUs) or TRU generator sets. The activities associated with delivering, storing, and loading freight produces NOx and PM emissions, including DPM. Within the warehouse, there may be stationary source equipment such as refrigeration units. In addition, cargo handling equipment such as forklifts and yard tractors are used to move goods at warehouses. Lastly, warehouse employee commute trips contribute to the overall emissions associated with warehouse distribution activities.

Regulatory History

California Health and Safety (H&S) Code Section 40716 states that "a district may adopt and implement regulations to reduce or mitigate emissions from indirect and areawide sources of air pollution". As examples of this authority,

a 1993 California Attorney General opinion states that "a district's regulations may require the developer of an indirect source to submit the plans to the district for review and comment prior to the issuance of a permit for construction by a city or county. A district may also require the owner of an indirect source to adopt reasonable post-construction measures to mitigate particular indirect effects of the facility's operation. Such regulations could be enforced through an action for civil penalties…" H&S Code Section 40716 also states that the authority of an air district to reduce or mitigate emissions from indirect and areawide sources of air pollution does not constitute an infringement on the existing authority of counties and cities to plan or control land use. While other types of indirect source rules are also possible, according to the Attorney General, an indirect source rule could not require the source to obtain a permit from an air district prior to construction.

Proposed Method of Control

The District is currently working with industry stakeholders on conducting in-use truck trip and emissions information at various warehouse distribution types. This information along with emissions occurring in and around individual warehouse distribution centers will serve as the basis for developing actions that will seek opportunities to mitigate and potentially reduce emissions beyond existing levels. A stakeholders working group will be convened to discuss warehouse emissions related issues and provide input in the development of mechanisms to implement this measure. The District's desire is to develop enforceable mechanisms that demonstrates the commitment to implement actions that will result in additional emission reductions that will either enable the deployment of zero and near-zero emission technologies or result in surplus emission reductions. Some example actions include incentivizing cleaner trucks that are zero or near-zero emissions to operate at warehouse centers, encouraging employees to increase rideshare activities or purchase zero-emission and plug-in hybrid vehicles, using zero and near-zero equipment in and around the warehouse center such as zero-emission or alternative fueled yard tractors and forklifts. Reducing vehicle emissions may require the space and infrastructure to allow for the operation of electric or alternative fueled vehicles such as electric vehicle charging stations and refueling units. Other voluntary actions include strategies that result in improved operational efficiencies with criteria pollutant and greenhouse gas emission reduction benefits.

The identified actions can be voluntary or can be regulations or other enforceable mechanisms promulgated by a local, state, or federal agency. To the extent that these actions are considered surplus to the emission reductions identified in the AQMP and the State SIP Strategy, they may be credited into the SIP as part of future Rate-of-Progress Reporting or part of future AQMP revisions. To be credited into the SIP, the emission reductions must be approved by U.S. EPA and meet U.S. EPA guidelines for approvability of voluntary measures. As such, the commitment to maintain emission reductions and remedy any shortfalls in emissions reductions associated with the identified actions may be in the form of a regulation adopted by the District within its legal authority or through other enforceable mechanisms.

Table IV-A-3 provides a schedule for the public process. The public process will begin immediately after the adoption of the Final 2016 AQMP by the SCAQMD Governing Board. Within six months of the public process, SCAQMD staff will report to the SCAQMD Governing Board (either through the Governing Board's Mobile Source Committee or to the full Board), the progress in identifying actions that result in emission reductions and whether the emission reductions associated with the identified actions can be quantified. If steps are not taken to implement the identified actions, SCAQMD staff will recommend to the Governing Board whether to consider proceeding with the development of rules that are within the SCAQMD's legal authority or other enforceable mechanisms to achieve emission reductions to help attain federal air quality standards. A recommendation

whether to proceed with formal rulemaking process shall be made no later than one year after the adoption of the Final 2016 AQMP.

Emission Reductions

As mentioned above, this proposed measure is to help implement the State SIP Strategy "Further Deployment of Clean Technologies" measures for on-road heavy-duty vehicles, off-road equipment, and federal sources to help the region meet federal ambient air quality standards. The amount of emission reductions that can be achieved from this control measure will be dependent on the type and number of warehouse distribution centers affected by the measure and the actions or strategies identified through the public process. Any emission reductions that can be quantified and considered surplus to the region's overall emission reduction targets will be attributed towards the emission reduction commitment associated with the "Further Deployment" measures and could be recognized in the SIP as part of the Rate-of-Progress reporting or in future AQMP revisions as long as the reductions meet U.S. EPA determination that such reductions are approvable as part of the SIP.

Rule Compliance

Compliance with either an adopted rule or other enforceable mechanism will be verified via field inspection. Enforcement provisions will be discussed as part of the public process to develop enforceable mechanisms to ensure that the emission reductions remain permanent. If other enforceable mechanisms are established outside of the SCAQMD public process, or the state or federal government implement regulatory actions, that achieve equivalent emission reductions, compliance will be enforced through the provisions of those actions.

Test Methods

Approved emission quantification protocols by federal, State or local agencies will be used to track and report emission reductions for SIP purposes.

Cost-Effectiveness

The cost-effectiveness of this measure will be based on the type and number of warehouse distribution centers affected by the measure and the strategies identified through the public process.

Implementing Agency

The SCAQMD will work with affected parties, the public, and other stakeholders to identify potential actions to help meet the emission reductions associated with the State SIP Strategy "Further Deployment of Clean Technologies" measures for on-road heavy-duty vehicles, off-road equipment, and federal sources.

References

SCAQMD (2015). SCAQMD 2016 AQMP Control Strategy Symposium, June 2015.

MOB-04: EMISSION REDUCTIONS AT COMMERCIAL AIRPORTS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: COMMERCIAL AIRPORTS

CONTROL METHODS: MOBILE SOURCE EMISSION REDUCTION EFFORTS INCLUDING DEPLOYMENT OF CLEANER TECHNOLOGIES, INCREASED EFFICIENCIES, OR AIR QUALITY IMPROVEMENT PROJECT OPTION

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	TBD	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	TBD	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	TBD	TBD	TBD	TBD
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	TBD	TBD	TBD	TBD
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	TBD	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	TBD	TBD	TBD	TBD
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD

CONTROL COST: TO BE DETERMINED

IMPLEMENTING AGENCY: SCAQMD

Description of Source Category

There are six major commercial airports located in the Basin and Coachella Valley. Due to projected increases in airline passenger transportation and expansion of operations at various commercial airports, potential increases in emissions may result unless the increased emissions are fully mitigated. Several airport authorities are implementing emissions mitigation measures as a result of environmental impact findings, while other airports have initiated actions that can lead to additional emission reductions. The goal of this measure is to assist in implementing the State SIP Strategy "Further Deployment of Clean Technologies" measures related to on-road vehicles, off-road equipment, and federal and international sources that operate in and around commercial airports and identify additional actions that can lead to reduction in local exposure to air toxic emissions. It is not expected for this measure to achieve the full emission reductions associated with the "Further Deployment" measures. But rather, this measure seeks to identify emission reductions of NOx, and PM2.5 from these sources through voluntary actions identified through a public process.

Background

There are a variety of emission sources related to commercial airport operations. In addition to aircraft emissions, emissions from ground service equipment such as baggage handling equipment, food service trucks, fuel trucks, and aircraft tugs are contributors to airport related emissions. Emissions associated with passenger transportation to and from the airport, delivery of goods for aircraft transport, and stationary equipment contribute to the overall emissions at airports. Emissions as a result of new construction or expansion of runways and terminal construction and renovations, are associated with short-term air quality impacts in the communities surrounding airports.

Historically, airport authorities have mitigated airport-related emissions to some extent and a large number of airport ground service equipment and on-road vehicles are regulated by CARB. However, aircraft emissions are primarily regulated by the federal government or by the International Civil Aviation Organization (ICAO). ICAO establishes new aircraft engine emission standards internationally, while the U.S. EPA establishes aircraft emission standards nationally.

Regulatory History

Aircraft

In 1973, the U.S. EPA published emissions standards and test procedures to regulate gaseous emissions, smoke, and fuel venting from aircraft engines. In 1997, the standards were revised to be more consistent with those of the ICAO Committee of Aviation Environmental Protection (CAEP) for turbo engines used in commercial aircraft. These standards (CAEP/2) included new CO, HC, and NOx emissions standards of 118 grams per kilonewtons (g/kN), 19.6 g/kN, and 40 g/kN, respectively. In 2005, the standards were harmonized with ICAO CAEP/4 requirements which tightened the CAEP/2 NOx standards by 32 percent for newly-certified commercial aircraft engines.

On June 1, 2012, the U.S. EPA Administrator signed a final rule to further revise the standards to be consistent with the current ICAO CAEP/6 and CAEP/8 requirements to further reduce NOx emissions. The first set of standards require all new engines meet the ICAO CAEP/6 standards. The CAEP/6 standards represent

approximately 12 percent emission reduction from the ICAO Tier 4 levels. The second set of standards, Tier 8, took effect in 2014 and represents approximately a 15 percent from Tier 6 levels.

Ground Service Equipment

Ground service equipment (GSE) move and load baggage, tow aircraft, and provide electrical power, engine starting, air conditioning, fuel, food, and lavatory service for aircraft at airports. Due to their specialized design and use, GSEs have long useful lives. Most GSEs can be electrified to operate in battery electric configurations. In addition, new GSEs are available in diesel, propane, and natural gas configurations meeting Tier 4 emissions standards. Ground service equipment generally runs for short periods under load and is then shut off. GSEs are typically owned by individual airlines and may move from airport to airport depending on the service needs of individual airlines.

Ground service equipment is regulated by CARB under two separate regulations. GSEs that operate on gasoline are subject to CARB's Large Spark Ignition Engine Regulation, while diesel-powered GSEs are subject to CARB's In-Use Off-Road Diesel Fleet Regulation. In addition, the SCAQMD has authority to implement the SOON (Surplus Off-Road Opt-In for NOx) provision of the In-Use Off-Road Diesel Fleet Regulation to provide funding for cleaner ground service equipment.

Passenger Transportation

Beside ground service equipment, passenger shuttle services are generally provided by the airport authority either through their own fleet of shuttles or through outside contracts with a independent shuttle service providers. In addition, taxicab pickup service is typically regulated by the airport authority. Airport shuttle services are subject to SCAQMD Rule 1194, which requires the purchase of alternative fuel shuttle buses. Almost every airport has been providing alternative fuel shuttle bus service.

Environmental-Related Activities at Commercial Airports

There have been various levels of actions to further reduce emissions from airport related sources. The Los Angeles World Airport Authority (LAWA) has been implementing actions to further reduce landside emissions including greater use of alternative fuel passenger shuttles and airport fleet vehicles. LAWA has adopted green construction policies calling for the use of the cleanest construction equipment for projects at Los Angeles International Airport (LAX). More recently, LAWA adopted a requirement for their airline tenants to meet the Statewide fleet average provisions of the CARB Large Spark Ignition (LSI) Regulation for ground support equipment specifically at LAX. John Wayne Airport has a requirement for alternative fueled taxicab services and have ensured that John Wayne Airport comply with various State and local air quality regulations. Both airports are evaluating approaches to improve operational efficiencies that could lead to addition emission reductions. Similar actions have been taken at other commercial airports located in the Basin and Coachella Valley. However, there is a general recognition that each commercial airport may have unique operating conditions and authority. Depending on the size and types of operations, each airport may or may not implement the same types of actions or to the same level as other commercial airports.

Proposed Method of Control

In order to quantify emission reductions resulting from environmental actions at various commercial airports, a methodology needs to be developed that addresses both the unique characteristics (legal and operational) and available infrastructure (existing and planned) at each of the airports in the Basin. This is important in light of the different airport elements at the six major commercial airports located in the Basin and Coachella Valley, including aircraft operations and movements, passenger and cargo handling, airport infrastructure available and planned, and surface vehicle traffic volumes. As such, the District would convene a working group made up of affected stakeholders from the airline industry, airport authorities, local governments, community representatives, and other affected stakeholders to discussion airport emissions related issues and provide input in the development of mechanisms to implement this measure.

There are several emission reduction approaches that could be implemented to mitigate and potentially further reduce emissions at airports. Such approaches can be incentive based or regulatory based, or a combination of the two. Airport authorities may use their authority to implement strategies to further reduce emissions through the deployment of cleaner combustion or zero and near-zero emission technologies during construction activities or develop mechanisms for the use of cleaner equipment. Airlines are constantly evaluating ways to improve passenger transportation and overall system efficiencies. Such strategies have the potential to further reduce criteria pollutant emissions. Any strategy that is considered for implementation will be evaluated for feasibility and authority to implement such strategy.

Since many of the identified actions are most likely voluntary in nature, the District staff seeks to work collaboratively with commercial airport operators, commercial airlines, environmental and community organizations, and other affected stakeholders to develop methods to quantify the emission reductions associated with the identified actions. To the extent that these actions are considered surplus to the emission reductions identified in the AQMP and the State SIP Strategy, they may be credited into the SIP as part of future Rate-of-Progress Reporting or part of future AQMP revisions. To be credited into the SIP, the emission reductions must be approved by U.S. EPA and meet U.S. EPA guidelines for approvability of voluntary measures. As such, the commitment to maintain emission reductions and remedy any shortfalls in emissions reductions associated with the identified actions may be in the form of a regulation adopted by the District within its legal authority or through other enforceable mechanisms.

Table IV-A-3 provides a schedule for the public process. The public process will begin immediately after the adoption of the Final 2016 AQMP by the SCAQMD Governing Board. Within six months of the public process, SCAQMD staff will report to the SCAQMD Governing Board (either through the Governing Board's Mobile Source Committee or to the full Board), the progress in identifying actions that result in emission reductions and whether the emission reductions associated with the identified actions can be quantified. If steps are not taken to implement the identified actions, SCAQMD staff will recommend to the Governing Board whether to consider proceeding with the development of rules that are within the SCAQMD's legal authority or develop other enforceable mechanisms to achieve emission reductions to help achieve the emission reductions associated with the State SIP Strategy "Further Deployment" measures. A recommendation whether to proceed with formal rulemaking shall be made no later than one year after the adoption of the Final 2016 AQMP.

Emission Reductions

As mentioned above, this proposed measure is to help implement the State SIP Strategy "Further Deployment of Clean Technologies" measures for on-road heavy-duty vehicles, off-road equipment, and federal sources. The amount of emission reductions that can be achieved from this control measure will be dependent on the type and number of commercial airports affected by the measure and the actions or strategies identified through the public process. Quantified emission reductions that are real, surplus, permanent, and enforceable will be attributed towards the emission reduction commitment associated with the "Further Deployment" measures and reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or in baseline emissions inventories as part of future AQMP/SIP development as long as the reductions meet U.S. EPA determination that such reductions are approvable as part of the SIP.

Rule Compliance

Compliance with either an adopted rule or other enforceable mechanism will be verified via field inspection. Enforcement provisions will be discussed as part of the public process to develop enforceable mechanisms to ensure that the emission reductions remain permanent. If other enforceable mechanisms are established outside of the SCAQMD public process, or the state or federal government implement regulatory actions, that achieve equivalent emission reductions, compliance will be enforced through the provisions of those actions.

Test Methods

Approved emission quantification protocols by federal, State or local agencies will be used to track and report emission reductions for SIP purposes.

Cost-Effectiveness

The cost-effectiveness of this measure will be based on the type and number of commercial airports affected by the measure and the strategies identified through the public process.

Implementing Agency

The District will work with affected parties, the public, and other stakeholders to identify potential actions to help meet the emission reductions associated with the State SIP Strategy "Further Deployment of Clean Technologies" measures for on-road vehicles, off-road equipment, and federal and international sources.

References

SCAQMD (2015). SCAQMD 2016 AQMP Control Strategy Symposium, June 2015.

MOB-05: ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION VEHICLES [VOC, NOX, CO]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: GASOLINE- AND DIESEL-POWERED ON-ROAD VEHICLES WITH GROSS VEHICLE WEIGHT RATING UP TO 8,500 LBS

CONTROL METHODS: INCENTIVES FOR PARTIAL ZERO EMISSIONS VEHICLES AND ZERO EMISSIONS VEHICLES

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	2012	2022	2023	2031
VOC INVENTORY	131.18	52.79	50.05	33.77
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	120.79	37.02	33.56	17.08
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	1,173.46	417.78	388.43	235.78
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	135.92	55.52	52.64	35.57
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	107.77	33.07	29.97	15.27
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	1,156.31	409.88	380.96	230.92
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD

CONTROL COST: TBD. MINIMUM INCENTIVES FUNDING - $75,000,000/YEAR

IMPLEMENTING AGENCY: CARB, SCAQMD

Description of Source Category

The purpose of this early action measure is to seek emission reductions from existing passenger cars, sports utility vehicles, and other light- and medium-duty vehicles through the increased use of partial zero-emission and zero-emission vehicles that would provide substantial improvements in emissions performance beyond current conventional gasoline and diesel vehicle technologies. This measure would continue the use of voluntary incentive programs that would facilitate the commercial deployment of plug-in hybrid-electric, battery electric, and fuel cell vehicles.

Background

Emissions from passenger vehicles continue to represent a significant portion of the emissions inventory in the Basin in, adversely affecting regional air quality. The intent of this measure is to specifically mitigate impacts associated with passenger car emissions through early deployment of partial zero- and zero-emission vehicles that are currently available commercially or expected to be offered commercially in the coming years.

Regulatory History

To address California's acute air quality problems, the federal Clean Air Act provides California the authority to adopt and enforce rules to control mobile source emissions within California with a waiver of preemption from U.S. EPA. The California Air Resources Board (CARB) is the responsible agency to adopt emissions standards that are as stringent as or more stringent than federal requirements.

Significant strides have been made in reducing emissions from motor vehicles through CARB's mobile source regulations that apply predominately to new vehicles. As a result, a "new" vehicle today is approximately 99 percent less polluting compared to a vehicle manufactured a couple of decades ago. However, on-road and off-road mobile sources account for about 70 percent of ozone precursor emissions in the State. Because of the large emissions contribution, requiring the use of advanced technology such as plug-in hybrid electric vehicle technology capable of zero-emission transportation is essential if clean air standards are to be realized, especially for in-use vehicles. In January 2012, the CARB adopted amendments to the Low Emission Vehicle (LEV) program and the Zero-Emission Vehicle (ZEV) regulation.

In addition, CARB implements a "Clean Vehicle Rebate Project" (CVRP) that provides individual vehicle incentives of up to $5,000 for fuel cell vehicles, $2,500 for full zero-emission vehicles, $1,500 for plug-in hybrid vehicles, $900 for neighborhood electric vehicles, and $900 for zero-emission motorcycles. An additional $1,500 may be available to eligible lower income residents who purchase a fuel cell, full zero-emission, or plug-in hybrid vehicle. For the 2016/2017 fiscal year, a total of $133 million was appropriated by the state legislature for the statewide program.

Proposed Method of Control

This measure proposes to continue the CVRP through 2023 with a minimum number of 15,000 vehicles per year to be incentivized through the CVRP. The proposed incentives would be up to $5,000 per vehicle. As part of this action, additional funding opportunities will be sought.

Emission Reductions

This measure implements the CVRP. Emission reductions are not estimated since production of zero-emission and plug-in hybrid electric vehicles are accounted as part of the Advanced Clean Car Program, and the vehicles are accounted in the EMFAC model.

Rule Compliance and Test Methods

Not applicable.

Cost-Effectiveness

This proposed control measure will affect light- and medium-duty vehicles with gross vehicle weight ratings up to 8,500 lbs. The estimated funding level is $75 million per year to incentivize a minimum of 15,000 vehicles per year.

The cost-effectiveness of this control measure has not been estimated at this time. The cost-effectiveness will be affected by any changes to the per vehicle incentive levels or if total funding levels are not realized.

Implementing Agency

CARB is currently implementing the AB 118 CVRP. This early action measure would continue the implementation of the CVRP.

References

CARB (2012). Advanced Clean Cars Regulation, January 2012.

CARB (2014). Implementation Manual for the FY 2014-15 Clean Vehicle Rebate Project (CVRP), December 2014.

MOB-06: ACCELERATED RETIREMENT OF OLDER LIGHT-DUTY AND MEDIUM-DUTY VEHICLES
[VOC, NOx, CO]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	GASOLINE- AND DIESEL-POWERED LIGHT- AND MEDIUM-DUTY VEHICLES UP TO 8,500 LBS GROSS VEHICLE WEIGHT			
CONTROL METHODS:	INCENTIVES PROGRAM FOR THE VOLUNTARY EARLY RETIREMENT OF OLDER LIGHT- AND MEDIUM-DUTY VEHICLES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	131.18	52.79	50.05	33.77
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	120.79	32.04	33.56	17.08
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	1,173.46	417.78	388.43	235.78
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	135.92	55.52	52.64	35.57
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	107.77	33.07	29.97	15.27
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	1156.31	409.88	380.96	230.92
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD
CONTROL COST:	UP TO $9,500 PER VEHICLE RETIRED INCLUDING INCENTIVE REPLACEMENT VOUCHER. ESTIMATED PUBLIC FUNDING – UP TO $20,000,000/YEAR			
IMPLEMENTING AGENCY:	CARB, BUREAU OF AUTOMOTIVE REPAIR, SCAQMD			

Description of Source Category

The purpose of this control measure is to implement a strategy to accelerate retirement of older gasoline- and diesel-powered vehicles up to 8,500 lbs. gross vehicle weight (GVW). These vehicles include passenger cars, sports utility vehicles, vans, and light-duty pick-up trucks.

Background

Light-duty vehicles are major contributors of air pollutants in the Basin. While vehicle miles traveled increased more than 50 percent over the last 20 years, vehicle emissions have dropped by a factor of almost three due to increasingly stringent vehicle emission standards. Yet, the light- and medium-duty vehicle fleet continues to contribute more than a third of the Basin's total emissions of ozone and particulate matter forming pollutants in part due to high emitting vehicles.

Motor vehicle emissions progressively increase as vehicles age and accumulate mileage. The causes of these emissions increases are numerous, but can be broadly categorized in terms of normal deterioration of properly functioning on-board emission control system components, emission control system malfunctions due to design flaws and/or lack of proper maintenance, and tampering. In recognition that emission reductions could occur through regular emission testing of vehicles and repair of those vehicles with high in-use emissions, Smog Check programs have been established in an attempt to ensure that vehicles stay clean as they age, but room for improvements in such programs exist. In addition, through the Bureau of Automotive Repairs (BAR) High Emitter profile, certain model year vehicles are considered inherently high emitters despite passing Smog Check.

Regulatory History

On September 23, 2004, the Governor signed AB 923 (Firebaugh) which resulted in a significant increase in incentive funding for programs that achieve emission reductions from vehicular sources and off-road engines. The legislation identified and emphasized that in-use higher emitting vehicles are sources that need additional scrutiny and control in part because of their large contribution to the fleet's total emissions. To address this, the District is implementing, under the AB 923 program, pilot programs to identify and retire high emitting on-road vehicles. In addition, based on cost-effectiveness guidelines, model year 1992 and older vehicles would be considered for early retirement.

CARB adopted the EFMP Regulation in June 2009. The regulation implements the voluntary vehicle scrap and replacement voucher provisions of AB 118 (Nunez). The legislation includes $30 million annually statewide for an EFMP. The EFMP augments the State's existing voluntary accelerated vehicle retirement program, referred to as the Consumer Assistance Program (CAP). The focus of the EFMP is to augment existing retirement programs and provide funding through vehicle replacement vouchers to retire the highest polluting vehicles in the areas with the greatest air quality problems.

In 2014, the State Legislature passed two bills (SB 459 – Pavley and AB 1365 – De Leon) that placed an emphasis on increasing the efficacy of the EFMP and encouraged opportunities for low and moderate-income residents to purchase cleaner, more fuel efficient combustion vehicles and advanced technology vehicles such as full battery-electric and plug-in hybrid electric vehicles. The EFMP Regulation was revised by CARB in 2014 to reflect the legislative desire and a one-year pilot program was initiated in the Basin and Coachella Valley. The EFMP provided up to $4,500 to eligible low- and moderate-income residents for the replacement of older vehicles with newer or

new vehicles. Under separate actions, CARB allocated funding under the Greenhouse Gas Reduction Funds to augment the EFMP for eligible low- and moderate-income residents living in disadvantaged communities for the purchase of cleaner, more fuel efficient combustion vehicles and advanced technology vehicles. Eligible residents may receive additional funding assistance of up to $5,000 augmenting the EFMP. The District has been implementing the EFMP since July 2015. For the 2016/2017 fiscal year, a total of $60 million was appropriated by the state legislature for statewide implementation of the EFMP and EFMP Plus-Up.

Proposed Methods of Control

This action is to retire at a minimum, 2,000 light- and medium-duty vehicles per year. The proposed incentives would be up to $9,500 which includes a replacement voucher under the AB 118 EFMP program and Greenhouse Gas Reduction Fund.

Emission Reductions

Emission reductions are not estimated at this time and will depend on the actual number of vehicles participating in the program.

Cost-Effectiveness

Since the EFMP guidelines are developed based on funding appropriated by the State Legislature with the desire to provide sufficient funding for low- and moderate-income residents to access newer, cleaner, and more fuel efficient combustion vehicles and advanced technology vehicles, no cost-effectiveness threshold has been established. After the completion of the initial pilot program, CARB will reassess the program efficacy and may report on the program's cost-effectiveness.

Implementing Agency

The implementing agencies would be the District under guidelines set forth by CARB for the EFMP. Funding would be available from CARB and BAR for the EFMP with the District's administration of the replacement voucher provisions of the EFMP regulation.

References

CARB (2014). AB118 Enhanced Fleet Modernization Program Regulation, November 2014.

MOB-07: ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION LIGHT-HEAVY- AND MEDIUM-HEAVY-DUTY VEHICLES [NOx, PM]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ON-ROAD LIGHT-HEAVY- AND MEDIUM-HEAVY-DUTY VEHICLES (8,501 TO 33,000 LBS GVWR)			
CONTROL METHODS:	ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION LIGHT-HEAVY- AND MEDIUM-HEAVY-DUTY VEHICLES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	10.52	4.49	4.18	2.74
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	70.38	26.01	21.88	16.18
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	67.77	21.28	19.33	11.63
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	10.41	4.44	4.12	2.70
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	66.39	24.77	20.90	15.60
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CO INVENTORY	67.94	21.40	19.44	11.75
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD
CONTROL COST:	TBD. ESTIMATED PUBLIC FUNDING – $18 MILLION PER YEAR			
IMPLEMENTING AGENCY:	CARB AND SCAQMD			

Description of Source Category

The intent of this measure is to seek greater emission reduction benefits through the early deployment of near-zero, partial zero-emission and zero-emission light-heavy- and medium-heavy-duty vehicles with gross vehicle weight ratings (GVWR) from 8,501 lbs to 33,000 lbs.

Background

Emissions from heavy-duty diesel mobile sources continue to represent a significant and increasing portion of the emissions inventory in the Basin, adversely affecting regional air quality. The two primary pollutants resulting from diesel fuel combustion are particulate matter (PM) and oxides of nitrogen (NOx). PM typically constitutes the visible emissions from diesel engine exhaust, and it contains over 40 known cancer-causing substances. In 1998, California identified diesel PM as a toxic air contaminant based on its potential to cause cancer. In May 2015, the District released a report titled, "The Multiple Air Toxic Exposure Study in the Basin." This report, the fourth in a series of such studies beginning in 1987, concluded that around 68 percent of the carcinogenic risk associated with breathing ambient air can be attributed to diesel particulate emissions. Diesel engines also emit significant quantities of NOx, which is a precursor to ozone and secondary particulate matter formation. Additional control on diesel engine emissions is essential for attainment of ozone and PM ambient air quality standards, as well as mitigating its toxic air quality impact.

Regulatory History

Setting emission standards for heavy-duty diesel mobile emission sources is the responsibility of CARB and U.S. EPA. Specifically, heavy-duty vehicle engines are subject to specific emission standards pursuant to State and/or federal requirements. Emission standards for new diesel engines powering heavy-duty vehicles were first established for the 1973 model-year and have gradually increased in stringency over time. The current set of heavy-duty engine emission standards has been established by CARB and U.S. EPA for 2010 and subsequent model-years, which includes a 0.2 g/bhp-hr NOx emission standard. In 2013, CARB established optional heavy-duty engine exhaust standards for NOx that are up to 90 percent cleaner than the 2010 standard.

In December 2010, CARB amended the Truck and Bus Regulation which applies to a significant number of heavy-duty vehicles with gross vehicle weight ratings of 14,001 lbs and greater. Heavier trucks (26,001 lbs and greater) must meet regulatory requirements beginning January 1, 2012. Lighter trucks (14,001 lbs to 26,000 lbs) must meet regulatory requirements beginning January 1, 2015.

In 2013, CARB adopted a new set of optional NOx emission standards for on-road heavy-duty engines. Engines certified to one of the optional NOx emission standards (0.1, 0.05, and 0.02 g/bhp-hr) not only provide greater emission reductions than engines simply meeting the current mandatory standard but also the ability to access incentives funding.

The Carl Moyer Memorial Air Quality Standards Attainment Program is in its 16th year. The Carl Moyer Program was placed into State law and is the enabling mechanism to fund the cleanup of older diesel vehicles and equipment. At its initial inception, the Carl Moyer Program was funded annually through a State budget line item that must be approved by the State legislature. In 2004, the State Legislature approved Senate Bill (SB) 1107, which allowed for the funding of the Carl Moyer Program.

The SB 1107 funds are generated from new vehicle sales. In lieu of having Smog Check inspections in the first four years, new vehicles are now subject to their first Smog Check inspection after six years. A fee of $48 is assessed at the time of vehicle purchase, which is typically less expensive than the Smog Check inspection and certificate. Half of the $48 is directed to CARB, who distributes the funds among local air districts for implementation of the Carl Moyer Program.

In addition, the State legislature passed Assembly Bill (AB) 923, which provides funding until 2015 and allowed California local air districts to opt into a local Moyer Program. The AB 923 program has two components. One is a tire disposal fee which generates about $10 million a year and is distributed by CARB among the local air districts. The other is a $2 Department of Motor Vehicle registration fee that each local air district's Board has the authority to approve independently and generate funds from vehicles registered within their respective district boundaries. Fees generated are used for both the Carl Moyer and the School Bus Programs.

The California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007 (AB 118, Statutes of 2007, Chapter 750), established two key programs administered by the California Energy Commission (CEC) and CARB. CEC has been administering the Alternative and Renewable Fuel and Vehicle Technology Program, to provide to specified entities, upon appropriation by the Legislature, grants, loans, loan guarantees, revolving loans, or other appropriate measures, for the development and deployment of innovative technologies that would transform California's fuel and vehicle types to help attain the State's climate change goals. Many of the innovative technologies provide criteria pollutant reduction co-benefits. CARB administers the Air Quality Investment Program, which is a voluntary incentive program to fund clean vehicle and equipment projects, research of biofuels production and the air quality impacts of alternative fuels, and workforce training.

In 2013, the State Legislature approved AB 8 and SB 11, which extended the Carl Moyer Memorial Air Quality Standards Attainment Program, AB 923, and the AB 118 Alternative and Renewable Fuel and Vehicle Technology Program and Air Quality Investment Program to January 1, 2024.

In 2000 and 2001, the District adopted a series of clean fleet vehicle rules which require public fleets and certain private fleets under contract or exclusive franchise to a public agency, to purchase alternative fuel powered vehicles at the time the fleet is expanding or replacing existing vehicles in its fleet. Rules 1192, 1193, 1194, 1195, and 1196 affect transit buses, waste collection vehicles, heavy-duty vehicles operating at commercial airports, school buses, and heavy-duty vehicles operated by public entities.

More recently, the state legislature appropriated $150 million from the Greenhouse Gas Reduction Fund for heavy-duty vehicle and off-road equipment investments for zero and near-zero emission projects.

Currently, heavy-duty diesel engine manufacturers are introducing electric-hybrid systems in medium-heavy-duty on-road vehicle applications. Such systems in conjunction with a 2010-compliant conventionally-fueled or alternative-fueled engine can potentially result in additional NOx emissions benefits. Many of the hybrid systems introduced to-date are for lighter vehicles with gross vehicle weight ratings from 8,501 to 26,000 lbs. There are also commercially available models with gross vehicle weight ratings about 26,000 lbs.

In addition to hybrid systems, there is currently one natural gas engine certified to the 0.02 g/bhp-hr optional NOx exhaust emissions standard. (For purposes of this measure, the term "near-zero" is used for engines meeting the 0.02 g/bhp-hr level.) The integration of combustion engines at such a level with hybrid systems provides greater certainty that criteria pollutant emissions will be lowered when the vehicle is not utilizing the hybrid system.

In its final rulemaking on the Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2, U.S. EPA indicated that it will begin a process to develop new on-road heavy-duty engine NOx emission standards that will be significantly cleaner than the current on-road heavy-duty engine emission standards.

Proposed Method of Control

This measure seeks additional emission reductions through the early introduction of electric hybrid vehicles where feasible and near-zero emission heavy-duty vehicles everywhere else. The proposed actions would continue the State hybrid truck and bus voucher incentive project (HVIP) which accelerates the deployment of hybrid and zero-emission medium-heavy-duty vehicles in the Basin. In addition, fleets will be encouraged to acquire near-zero emission medium-heavy-duty vehicles in the near-term to help meet federal air quality standards by 2023 where there are no commercially available zero-emission medium-heavy-duty vehicles or zero-emission vehicles that are commercially available, but cannot be used in certain vocations.

The 2016 HVIP implementation manual includes trucks and buses that are equipped with low NOx engines. Incentives of up to $60,000 per vehicle to help fund hybrid and zero-emission vehicles. For trucks with low NOx engines, the funding is at $15,000 per vehicle. In implementing this measure, the funding would place the highest priority towards zero-emission vehicles and hybrid vehicles with a portion of their operation in an “all-electric range” mode. In the near-term, funding for low NOx engines will be encouraged for vocations where zero-emission technologies are not available or could not be used in certain applications.

Emission Reductions

Emission reductions are not estimated at this time and will depend on the actual number of vehicles participating in the program.

Rule Compliance and Test Methods

Vehicles funded under the HVIP must meet the provisions of CARB’s HVIP implementation manual.

Cost-Effectiveness

This proposed control measure will affect heavy-duty engine manufacturers, heavy-duty diesel truck owners, and heavy-duty diesel fleet operators. Costs of replacement engines vary depending on the specific model and vehicle application, and an evaluation would need to be conducted to determine the specific types of trucks and engine models that would be primarily affected by this measure, as well as prioritizing vehicle applications on a cost-effectiveness basis for engine or vehicle replacement. For Fiscal Year 2016/2017, the State legislature appropriated $150 million from the Greenhouse Gas Reduction Fund to fund near-zero and zero emission on-road heavy-duty vehicles. The proposed incentives of up to $60,000 per vehicle will help offset the capital cost of the vehicles.

Implementing Agency

CARB, District or U.S. EPA could jointly or separately implement incentive programs that would help offset the costs associated with new hybrid or zero-emission truck purchase, engine repower, and/or retrofit kit installation.

References

SCAQMD (2015). Multiple Air Toxic Exposure Study, MATES-IV.

CARB (2016a). Implementation Manual for the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project. Effective Date: June 1, 2016.

CARB (2016b). Proposed Fiscal Year 2016-17 Funding Plan for Low Carbon Transportation and Fuels Investments and the Air Quality Improvement Program.

MOB-08: ACCELERATED RETIREMENT OF OLDER ON-ROAD HEAVY-DUTY VEHICLES [NOx, PM]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ON-ROAD HEAVY-DUTY VEHICLES (33,001 LBS AND GREATER GVWR)			
CONTROL METHODS:	ACCELERATED REPLACEMENT OF EXISTING HEAVY-DUTY VEHICLES WITH VEHICLES MEETING OPTIONAL NOX EMISSION STANDARDS AND RETROFITTING/REPOWERING EXISTING HEAVY-DUTY VEHICLES TO ACHIEVE LOWER EMISSION LEVELS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	99.75	51.81	30.00	31.58
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
PM2.5 INVENTORY	3.17	0.64	0.54	0.68
PM2.5 REDUCTION		TBD	TBD	TBD
PM2.5 REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	94.83	49.57	28.86	30.41
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CONTROL COST:	TBD. ESTIMATED PUBLIC FUNDING – $200 MILLION PER YEAR			
IMPLEMENTING AGENCY:	SCAQMD			

Description of Source Category

The intent of this control measure is to seek additional emission reductions from existing heavy heavy-duty vehicles with gross vehicle weight ratings (GVWR) greater than 33,000 lbs to help achieve the emission reductions associated with the State SIP Strategy "Further Deployment of Clean Technologies" measure for on-road heavy-duty vehicles. Additional emission reductions could be achieved through an accelerated vehicle replacement program with new engines that meet the cleanest optional NOx emissions standard or through regulatory actions. In addition, for heavy-duty vehicles not replaced with new models, existing vehicle engines would be repowered with commercially available engines meeting one of the optional NOx exhaust emission standards established by CARB or modified with retrofit kits to achieve lowest possible emission levels.

Background

Emissions from heavy-duty diesel mobile sources continue to represent a significant portion of the emissions inventory in the Basin, adversely affecting regional air quality. The two primary pollutants resulting from diesel fuel combustion are PM and oxides of nitrogen (NOx). PM typically constitutes the visible emissions from diesel engine exhaust, and it contains over 40 known cancer-causing substances. In 1998, California identified diesel PM as a toxic air contaminant based on its potential to cause cancer. In March 2015, the District released a report titled, "The Multiple Air Toxic Exposure Study in the Basin." This report, the fourth in a series of such studies beginning in 1987, concluded that around 68 percent of the carcinogenic risk associated with breathing ambient air can be attributed to diesel particulate emissions. Diesel engines also emit significant quantities of NOx, which is a precursor to ozone and secondary particulate matter formation. Additional control of diesel engine emissions is essential for attainment of ozone and PM ambient air quality standards, as well as mitigating its toxic air quality impact.

Regulatory History

The regulation of emissions from heavy-duty diesel mobile emission sources is the primary responsibility of CARB and U.S. EPA. Specifically, heavy-duty vehicle engines are subject to specific emission standards pursuant to State and/or federal requirements. Emission standards for new diesel engines powering heavy-duty vehicles were first established for the 1973 model-year and have gradually increased in stringency over time. The current most stringent set of heavy-duty engine emission standards has been established by CARB and U.S. EPA for 2010 and subsequent model-years, which includes a 0.2 g/bhp-hr NOx emission standard.

In December 2008, CARB adopted the Truck and Bus Regulation which applies to a significant number of heavy-duty vehicles with gross vehicle weight ratings of 14,001 lbs and greater. Heavier trucks (26,001 lbs and greater) must meet regulatory requirements beginning January 1, 2014. Lighter heavy-duty trucks (14,001 lbs to 26,000 lbs) must meet regulatory requirements beginning January 1, 2015.

In 2013, CARB adopted a new set of optional NOx emission standards for on-road heavy-duty engines. Engines certified to one of the optional NOx emission standards (0.1, 0.05, and 0.02 g/bhp-hr) not only provide greater emission reductions than engines simply meeting the current mandatory standard but also the ability to access incentives funding.

The Carl Moyer Memorial Air Quality Standards Attainment Program is in its 16th year. The Carl Moyer Program was placed into State law and is the enabling mechanism to fund the cleanup of older diesel vehicles and

equipment. At its initial inception, the Carl Moyer Program was funded annually through a State budget line item that must be approved by the State legislature. In 2004, the State Legislature approved Senate Bill (SB) 1107, which allowed for the funding of the Carl Moyer Program.

The SB 1107 funds are generated from new vehicle sales. In lieu of having Smog Check inspections in the first four years, new vehicles are now subject to their first Smog Check inspection after six years. A fee of $48 is assessed at the time of vehicle purchase, which is typically less expensive than the Smog Check inspection and certificate. Half of the $48 is directed to CARB, who distributes the funds among local air districts for implementation of the Carl Moyer Program.

In addition, the State legislature passed Assembly Bill (AB) 923, which provides funding until 2015 and allowed California local air districts to opt into a local Moyer Program. The AB 923 program has two components. One is a tire disposal fee which generates about $10 million a year and is distributed by CARB among the local air districts. The other is a $2 Department of Motor Vehicle registration fee that each local air district's Board has the authority to approve independently and generate funds from vehicles registered within their respective district boundaries. Fees generated are used for both the Carl Moyer and the School Bus Programs.

The California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007 (AB 118, Statutes of 2007, Chapter 750), established two key programs administered by the California Energy Commission (CEC) and CARB. CEC has been administering the Alternative and Renewable Fuel and Vehicle Technology Program, to provide to specified entities, upon appropriation by the Legislature, grants, loans, loan guarantees, revolving loans, or other appropriate measures, for the development and deployment of innovative technologies that would transform California's fuel and vehicle types to help attain the State's climate change goals. Many of the innovative technologies provide criteria pollutant reduction co-benefits. CARB administers the Air Quality Investment Program, which is a voluntary incentive program to fund clean vehicle and equipment projects, research of biofuels production and the air quality impacts of alternative fuels, and workforce training.

In 2013, the State Legislature approved AB 8 and SB 11, which extended the Carl Moyer Memorial Air Quality Standards Attainment Program, AB 923, and the AB 118 Alternative and Renewable Fuel and Vehicle Technology Program and Air Quality Investment Program to January 1, 2024.

In 2006, California voters approved a bond measure called Proposition 1B. The bond measure would generate $19 billion of which $2 billion would go towards improving California's freight transportation infrastructure, $1 billion towards the cleaning up older diesel vehicles, and $200 million to school bus retrofits. The funding is predicated on bond sales. To-date, over 6,000 older diesel trucks have been replaced with either newer diesel trucks or alternative fuel trucks.

More recently, the state legislature appropriated $150 million from the Greenhouse Gas Reduction Fund for heavy-duty vehicle and off-road equipment investments for zero and near-zero emission projects.

In 2000 and 2001, the District adopted a series of clean fleet vehicle rules which require public fleets and certain private fleets under contract or exclusive franchise to a public agency, to purchase alternative fuel powered vehicles at the time the fleet is expanding or replacing existing vehicles in its fleet. Rules 1192, 1193, 1194, 1195, and 1196 affect transit buses, waste collection vehicles, heavy-duty vehicles operating at commercial airports, school buses and heavy-duty vehicles operated by public entities. The District Clean Fleet Vehicle Rules have been successfully implemented since their adoption with a significant number of alternative fuel vehicles now in service

in a majority of public fleets and certain private fleets under exclusive franchise to a public entity such as refuse collection fleets and private school bus providers.

California Health and Safety Code Section 40447.5 allows the District to require operators of public and commercial fleets, consisting of 15 or more vehicles, to purchase vehicles powered by methanol or other equivalently clean burning alternative fuel, when adding or replacing vehicle(s) to their fleet. Section 40447.5 specifically authorizes the District to regulate fleets of 15 or more vehicles, operating substantially in the SCAQMD. Development of fleet rules is also based on California Health and Safety Code Section 40919, which allows certain nonattainment air districts (those that are designated serious or above for ozone) to adopt measures requiring fleets to use a significant number of low-emission vehicles. The state provisions do not require that fleets purchase alternative fuel vehicles on a specified schedule, but rather, at the time a fleet is adding or replacing vehicles in its fleet. Section 40447.5 covers public and commercial (private) fleets. In 2004, the U.S. Supreme Court ruled that the fleet rules are "emission standards." In later litigation, the Ninth Circuit held that the District has the authority to implement the fleet vehicle rules to public fleets and certain private fleets under exclusive arrangement with government entities. However, the fleet rules do not apply to private fleets that do not have contractual arrangements with a governmental entity. Moreover, fleet rules may be adopted by the District that directly affects private fleet if the fleet rules are submitted by the state to U.S. EPA for approval and U.S. EPA grants a waiver.

In its final rulemaking on the Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2, U.S. EPA indicated that they will begin a process to develop new on-road heavy-duty engine NOx emission standards that will be significantly cleaner than the current on-road heavy-duty engine emission standards.

Proposed Method of Control

While the Truck and Bus Regulation will ultimately require a majority of the heavy-duty trucks to meet 2010 heavy-duty exhaust emission standards by 2023, there is a need to deploy on-road heavy-duty trucks that have engines that are considered "near-zero" or have "zero-emission mile" capability. For the purposes of this control measure, "near-zero" is defined as 0.02 g/bhp-hr NOx emissions. This measure seeks additional emission reductions from on-road heavy-duty vehicles beyond the emission reductions targeted in CARB's Truck and Bus Regulation. In addition, the proposed action is to direct a portion of available public funding to assist in replacing older diesel trucks serving the Port of Los Angeles and Port of Long Beach, railyards and intermodal yards, and warehouse distribution centers to a truck with an engine meeting one of the optional NOx heavy-duty exhaust emission standards. The incentive programs will place the highest priority on on-road vehicles that meet the cleanest optional NOx emission standard and provide their service to the above facilities in the region and have gross vehicle weight ratings of 26,001 lbs or greater. As private fleets affected by the Truck and Bus Regulation begin compliance with the Regulation, those fleets will be encouraged to procure new vehicles with engines meeting the cleanest optional NOx emissions standard. Incentives funding could potentially be available for the procurement of the vehicles.

A priority will be placed on voluntary incentives funding to achieve the emission reductions identified in the State SIP Strategy "Feasible Deployment of Clean Technologies" measure for heavy-duty vehicles. However, given the significant NOx emissions associated with the heavy heavy-duty vehicle sector, there is a need to consider actions other than voluntary incentive programs for this emissions source sector. These actions could include the identification of non-monetary incentive programs such as preferential access at marine ports and warehouse

distribution centers for near-zero and zero-emission trucks or creation of dedicated truck lanes. In addition, operational efficiency improvements that result in lower emissions, if quantifiable and meet U.S. EPA guidance for SIP approval, could be recognized in future SIP Rate-of-Progress reporting and future AQMP revisions. Other actions that could be considered include: the development of a provision from the State for the District to implement a SOON-like (Surplus Off-Road Option for NOx) provision for the largest on-road truck fleets operating in the Basin; or any enforceable mechanism to accelerate deployment of on-road heavy-duty trucks with engines meeting one of the optional NOx emission standards or have some "zero-emission" mile or "all electric range" capability, which may include consideration of the development of a clean fuel vehicle rule that is within the District's legal authority to implement such as the District's Rule 1190 series clean fleet vehicle rules. Relative to the development of a private fleet vehicle rule, District staff will work closely with CARB and U.S. EPA to ensure that any rule developed under this process will be approvable by U.S. EPA. In addition, District staff will consider the various types of on-road heavy-duty vocations to craft a rule that recognizes the commercial availability and performance capabilities of alternative fuel and zero-emission vehicles such that affected fleets may transition to the cleanest heavy-duty vehicles possible and minimize economic impacts on the fleets. Lastly, the District staff will explore the potential to increase the deployment of zero-emission vehicles wherever feasible and near-zero emission vehicles everywhere else. To this end, the District will work with affected stakeholders to develop provisions that will allow for NOx and PM emissions equivalency if an alternative fuel or zero-emission heavy-duty vehicle is not commercially-available or cannot be used in a specific application. In addition, District staff will evaluate the need to expand the existing clean fleet vehicle rules for public and certain private fleets to further the deployment of zero-emission vehicles wherever possible and near-zero emission vehicles everywhere else, including any necessary amendments to State law.

Other local actions, State or federal government actions that achieve equivalent or greater emission reductions needed to meet the State SIP Strategy for on-road heavy-duty vehicles can be considered in lieu of this measure.

The District staff will convene a stakeholders working group consisting of trucking industry representatives, environmental and community organizations, and other affected parties to further discuss the above potential actions or approaches that can be implemented to further reduce emissions from on-road heavy-duty trucks as part of a public process. The identified actions will be prioritized by the District staff. Reports will be provided to the District Governing Board on the progress in identifying actions on a routine basis, but no later than six months after the adoption of the Final 2016 AQMP by the District Governing Board. Since the primary approach is predicated on voluntary actions and incentives funding, if steps are not taken to implement identified voluntary actions or significant increases in funding for on-road heavy-duty vehicles are not realized one year after the adoption of the Final 2016 AQMP, District staff will provide to the District Governing Board recommendations whether to proceed with the development of rules similar to the District's clean fleet vehicle rules or development of other enforceable mechanisms for the Board's consideration and direction. Since many of the actions discussed above may affect facilities identified in Control Measures MOB-01 through MOB-04, the schedule for the public process is similar to the schedule provided in Table IV-A-3.

Emission Reductions

Emission reductions are not estimated at this time and will depend on the actual number of vehicles participating in the incentives program and the actions or strategies identified through the public process. Depending on the types of implementation actions identified for this measure, additional emission reductions will be quantified. Quantified emission reductions that are real, surplus, permanent, and enforceable will be attributed towards the

emission reduction commitment associated with the "Further Deployment" measures and reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or in baseline emissions inventories as part of future AQMP/SIP development as long as the reductions meet U.S. EPA determination that such reductions are approvable as part of the SIP

Rule Compliance and Test Methods

Compliance with requirements of an incentive program(s) used to offset the costs of new heavy-duty vehicles, engines, or retrofit kits could be jointly or separately administered by District or CARB. If a District rule is adopted, the District would enforce through field inspections and reporting requirement provisions of the rule.

Cost-Effectiveness

The cost-effectiveness of the proposed action is not estimated. Recent funding for goods movement related vehicles under the Proposition 1B Air Quality Improvement Funds provided at least $50,000 per truck replaced. There are diesel-powered engines currently certified at levels below 0.1 g/bhp-hr and close to 0.05 g/bhp-hr. The Manufacturers of Engine Control Association estimated that the estimated incremental cost of the control technologies to reach 0.02 g/bhp-hr is around $500 on average. Funding levels may potentially be up to $25,000 or more for such engines to incentivize early deployment. However, for trucks with engines that have zero-emission mile capability, greater funding incentives may be needed in the near-term.

Implementing Agency

CARB, District or U.S. EPA could jointly or separately implement incentive programs that would help offset the costs associated with new truck purchase, engine repower, and/or retrofit kit installation. In particular, there is a need to incentivize emission reductions from interstate trucks registered outside of California, but operating substantially within California. The District has certain authority to implement clean fleet vehicle rules under State law.

References

CARB (2010). Amendments to the On-Road Truck and Bus Regulation.

CARB (2010). Proposition 1B Goods Movement Emissions Reduction Program: Final Guidelines for Implementation.

CARB (2015). Draft Technology Assessment: Lower NOx Heavy-Duty Diesel Engines.

MOB-09: ON-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM [NOx, PM]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	ON-ROAD HEAVY -DUTY VEHICLES (14,001 LBS AND GREATER GVWR)			
CONTROL METHODS:	ACCELERATED DEPLOYMENT OF NEAR-ZERO AND ZERO-EMISSION TRUCKS			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	139.92	64.63	40.03	42.65
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
PM2.5 INVENTORY	4.91	1.17	1.06	1.3
PM2.5 REDUCTION		TBD	TBD	TBD
PM2.5 REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	132.78	61.87	38.54	41.16
NOX REDUCTION		TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD
CONTROL COST:	TBD			
IMPLEMENTING AGENCY:	SCAQMD			

Description of Source Category

This measure seeks to develop mechanisms to incentivize the early deployment of zero and near-zero emission trucks through the generation of mobile source emission reduction credits that can be used only by entities affected under the 2016 AQMP control measures MOB-01 through MOB-04, MOB-08, and EGM-01. Any mobile source emission reduction credits generated cannot be used to offset emissions from stationary sources. The mobile source emission reduction credits will be discounted to provide additional emission reductions to help meet air quality standards.

Background

Mobile source emission reduction credit generation programs have been developed by the District to provide an incentive to deploy cleaner, advanced technologies that are not otherwise required to comply with existing air regulations. Generation of such credits may be considered surplus and have been used to comply with other District regulations. The District continues to work with affected stakeholders on the development of mobile source emission reduction credit generation rules and the U.S. EPA to define an approach that can be approved into the SIP. This proposed measure provides a forum to continue such discussions with interested stakeholders and U.S. EPA.

Regulatory History

In 1995, the District adopted Rule 1612 – Credits for Clean On-Road Vehicles, which provides a quantification protocol for entities to generate mobile source emission reduction credits that could be used for compliance with other District rules. Rule 1612 establishes a mechanism for the quantification of emission benefits as a result of implementation of projects that deployed on-road vehicles meeting optional NOx emission standards or are not otherwise required by a regulation or other enforceable mechanism. Mobile source emission reductions associated with the project are converted to credits that could be used by the project proponent or sold to other entities to meet other District rules as allowed by those regulations.

In March 2001, the District adopted Rule 1612.1 – Mobile Source Credit Generation Pilot Program, which sets forth credit generating mechanisms for mobile sources to generate mobile source emission reduction credits (MSERCs) through the voluntary replacement of specific categories of diesel-fueled heavy-duty vehicles or yard hostlers with clean technologies. NOx MSERCs would then be available for use in the District's RECLAIM. Rule 1612.1 could provide local air quality benefits to community members who live in and around areas where participating vehicles operate. These benefits include reductions in particulates, carbon monoxide (CO), and toxic air contaminant emissions associated with the use of heavy-duty diesel engines. Regional air quality benefits would accrue from: 1) the rule provision that automatically retires nine percent of MSERCs generated for the benefit of the environment, 2) the non-credited reduction of diesel emissions components other than NOx, and 3) the accelerated and increased replacement of heavy-duty diesel vehicles with alternative clean fuel vehicles. Rule 1612.1 was approved by U.S. EPA into the SIP. However, given the time since approval, the rule needs to be updated.

PROPOSED METHOD OF CONTROL

This measure seeks to amend Rule 1612.1 and/or 1612 to provide greater flexibility for entities to initiate projects to accelerate the deployment of zero and near-zero emission trucks in the Basin and Coachella Valley. The focus of the amendment will be to encourage the deployment of commercially available zero and near-zero emission trucks that do not receive or cannot receive public funding assistance. Mobile source emission reduction credits must be real, surplus, quantifiable, permanent, and enforceable as defined by U.S. EPA. As such, any project considered for generation of emission reduction credits must go beyond regulatory requirements such as the provisions of the Truck and Bus Regulation or mandatory engine exhaust emission standards.

For the purposes of this measure, a near-zero emission engine is one that meets the CARB optional NOx emissions standard of 0.02 g/bhp-hr. Zero-emission trucks include, but are not limited to, commercially available battery-electric trucks, fuel cell trucks, hybrid-electric trucks with all-electric range (AER) and zero-emission hybrid or battery-electric trucks with "wayside" power (such as electricity from overhead wires). Zero-emission trucks can be powered by grid electricity stored in a battery, by electricity produced onboard the vehicle through a fuel cell, or by "wayside" electricity from outside sources such as overhead catenary wires, as is currently used for transit buses and heavy mining trucks. All technologies eliminate fuel combustion and utilize electric drive as the means to achieve zero-emission and higher system efficiency compared to conventional fossil fuel combustion technology. Hybrid-electric trucks with all electric range can provide zero emission in certain corridors and flexibility to travel extended distances (e.g. outside the region) powered by alternative fuels, conventional fuels, or fuel cells.

EMISSION REDUCTIONS

Emission reductions are not estimated at this time and will depend on the actual number of vehicles participating in the program.

Rule Compliance and Test Methods

Compliance would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST-EFFECTIVENESS

Not determined.

IMPLEMENTING AGENCY

SCAQMD

References

SCAQMD (1998). SCAQMD Rule 1612 – Clean On-Road Vehicles

SCAQMD (2001). SCAQMD Rule 1612.1 – Mobile Source Credit Generation Pilot Program

MOB-10: EXTENSION OF THE SOON PROVISION FOR CONSTRUCTION/INDUSTRIAL EQUIPMENT [NOx]

CONTROL MEASURE SUMMARY				
SOURCE CATEGORY:	OFF-ROAD DIESEL-FUELED CONSTRUCTION, INDUSTRIAL EQUIPMENT, AIRPORT GROUND SUPPORT EQUIPMENT, AND DRILLING EQUIPMENT			
CONTROL METHODS:	ACCELERATED TURNOVER OR RETROFIT OF OLDER EQUIPMENT AND ENGINES			
EMISSIONS (TONS/DAY):				
ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	29.61	18.42	17.01	10.20
NOX REDUCTION		2.00	2.00	2.00
NOX REMAINING		16.42	15.01	8.20
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
NOX INVENTORY	35.07	21.88	20.22	12.08
NOX REDUCTION		2.00	2.00	2.00
NOX REMAINING		19.88	18.22	10.08
CONTROL COST:	TBD. FUNDING FROM SOON – UP TO $30 MILLION PER YEAR			
IMPLEMENTING AGENCY:	SCAQMD			

Description of Source Category

The purpose of this measure is to promote faster turnover of older in-use construction and industrial diesel engines.

Background

In 2023 and 2031, off-road equipment is projected to be the second largest source category of NOx emissions and accounts for 14 percent of the total NO_x emissions in the Basin. Heavy-duty construction, industrial, airport ground support (GSE), and drilling equipment are eligible for participation in the District's Surplus Off-road Opt-in for NOx (SOON) program and represent almost 40 percent of the off-road equipment category NOx emissions. In 2007, CARB adopted the In-Use Off-Road Diesel-Fueled Fleets Regulation that reduces primarily PM and secondarily NOx

emissions through retrofit controls, engine repowers, equipment replacement and fleet reduction. NOx emission reduction of about 17 percent is expected to be achieved with full implementation of the regulation by 2023.

Regulatory History

The Federal Clean Air Act prohibits States from regulating emissions from new engines used in construction and farming equipment less than 175 horsepower. Diesel engines greater than 175 horsepower are regulated by CARB. In September 1996, CARB, U.S. EPA, and the diesel engine manufacturers signed a statement of principles, which called for a cooperative effort to reduce NOx, VOC, and PM emissions by more than 60 percent. In August 1998, U.S. EPA adopted new emission standards pertaining to off-road diesel engines. Subsequently, in January 2000 and in December 2004, CARB adopted amendments to existing California emission standards to harmonize with the federal requirement. These amendments included a tiered approach starting from 1996 for Tier 1 and concluding in 2015 with all new engines required to meet Tier 4 standards.

In order to accelerate the introduction of new low emission equipment, CARB adopted the In-Use Off-Road Diesel-Fueled Fleets Regulation (Off-Road rule) in 2007. The rule applies to diesel fueled construction, mining, industrial, airport ground support equipment, and mobile oil drilling equipment and established annual fleet average emission targets. Fleets that do not meet the fleet average in any year are required to "turnover," (i.e., retire, replace, retrofit, or repower) a specified percentage of their horsepower. The Off-Road rule was amended in 2011, which relaxed the target emission reductions and set the initial date for large fleet compliance to 2014.

As part of the Statewide regulation, CARB adopted the SOON provision that allows air districts to opt-in to additional NOx emission reductions from the largest off-road fleets subject to the regulation. The SCAQMD has been implementing the SOON provision since 2008. The SCAQMD Governing Board set aside up to $30 million per year to implement the SOON provision.

Proposed Method of Control

New off-road diesel engines are now required to meet Tier 4 emission standards. Tier 4 includes optional phase-in provisions (Interim Tier 4 standards) with relaxed standards from 2008 to 2014, depending on horsepower category. Beginning in 2015, all new off-road diesel engines between 75 hp and 750 hp, which represent most off-road construction equipment, are required to meet exhaust emissions standards of 0.3 g/bhp-hr NOx and 0.015 g/bhp-hr PM. To comply with these standards, advanced fuel injection, air induction, and after-treatment technologies are required. The emission reductions from Tier 4 engines compared to Tier 0 engines is at least 95 percent for NOx and PM.

The long life of off-road equipment means that older, high emitting engines will remain in the off-road equipment population beyond 2020. District staff believes that using incentive programs, such as the Carl Moyer Program and the SOON Provision of the Off-Road rule, significant emission reductions could be realized by accelerating fleet turnover through equipment replacement and engine repowers.

During the last eight years, the SOON program has funded 476 engine repowers or vehicle replacements at an average cost-effectiveness of approximately $11,300/ton NOx reduction. Historically, the District Governing Board has allocated up to $30 million per year for the program. However, more recently, the Governing Board has allocated up to $10 million per year to extend the program beyond 2023. This measure proposes to extend the

current SOON Program beyond 2023 to 2031 with a minimum allocation of $10 million and potentially higher levels upon the Governing Board's approval.

Emission Reductions

While the NOx emissions from the off-road category are projected to be around 38 tpd in 2023 and 33 tpd in 2031, emissions from vehicles eligible to participate in the SOON program are around 17 and 10 tpd in 2023 and 2031, respectively. Reductions from this proposed measure are estimated to be 1 tpd for NOx assuming $30 million per year is available. Assuming that level funding is available, cumulative emission reductions will be approximately 5 tpd by 2023 and 12 tpd by 2031.

Cost-Effectiveness

The SOON program has funded 476 engine repowers or vehicle replacements during the last eight years at an average cost-effectiveness of approximately $11,300/ton NOx reduced. Most projects have been engine repowers from Tier 0 to Tier 3. Tier 4 engine repowers have been technically infeasible in most cases and most repowers will continue to be with Tier 3 engines. To achieve Tier 4 emission goals, equipment replacement will be required resulting in significantly higher cost-effectiveness and cost per equipment than experienced with repowers. This measure proposes to extend the SOON program with proposed funding of at least $10 million per year. Historically, the District Governing Board has allocated up to $30 million per year, which resulted in around 2 tpd of NOx reductions.

Implementing Agency and Issues

The District would continue implementation of the SOON provision of the In-Use Off-Road Diesel-Fueled Fleets Regulation. The implementation follows the District's SOON Program Administrative Guidelines and CARB's Carl Moyer Program Guidelines to ensure that emission reductions are quantifiable, surplus, enforceable and permanent.

- Quantifiable: Emission reductions are based on established calculations and records supporting the underlying data including historical usage, emission factors from engine certification data, rated horsepower, average load factors, and contracted years of operation.

- Surplus: Fleets must provide evidence of compliance with the regulation (the DOORS Compliance Snapshot) and planned future commitments for fleet turnover if needed to meet future compliance requirements.

- Enforceable: Contract language provides several methods for ensuring that contracted emission reductions are obtained or SOON funding is recovered in the event contracts are not fulfilled.

- Permanent: Emission reductions are permanent during the contract period because the old equipment is destroyed. The new equipment continues operating at the lower emission level after the contract ends.

References

CARB (2010). Emissions Inventory Model for Baseline and Final Proposal (Access database) – OSM vehicle scenario table; total population adjusted for 2012 Growth Factor of 1.046. Database available at http://www.arb.ca.gov/msprog/ordiesel/offroad_1085.htm

CARB (2010). Initial Statement of Reasons – Proposed Amendments to the Regulation for In-Use Off-road Diesel Fueled Fleets.

CARB (2011). Final Regulation Order Dec 2011- Regulation for In-Use Off-Road Diesel-Fueled Fleets.

CARB (2015). Carl Moyer Program Guidelines, Chapter 7 – Off-Road Compression Equipment and Chapter 9 – Off-Road Equipment Replacement

SCAQMD (2008). Rule 2449 – Control of Oxides of Nitrogen Emissions from Off-Road Diesel Vehicles.

SCAQMD (2008). Rule 2449 – SOON Program Administrative Guidelines.

SCAQMD (2014). Rule 2449.1 - Control of Oxides of Nitrogen Emissions from Off-Road Diesel Vehicles.

SCAQMD (2014). Rule 2449 – SOON Program Administrative Guidelines.

MOB-11: EXTENDED EXCHANGE PROGRAM
[VOC, NOx, CO]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: SMALL OFF-ROAD ENGINES (SORE) AND LARGER DIESEL-POWERED LAWN AND GARDEN EQUIPMENT

CONTROL METHODS: EXCHANGE EXISTING IN-USE SORE FOR ELECTRICAL EQUIPMENT, OR NEW LOW-EMITTING ENGINES

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	9.28	7.25	7.22	7.47
VOC REDUCTION		TBD	TBD	TBD
VOC REMAINING		TBD	TBD	TBD
NOX INVENTORY	3.48	3.81	3.88	4.10
NOX REDUCTION		2.8	2.91	1.00
NOX REMAINING		1.01	0.97	3.10
CO INVENTORY	87.4	88.42	87.2	89.3
CO REDUCTION		TBD	TBD	TBD
CO REMAINING		TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2022**	**2023**	**2031**
VOC INVENTORY	10.14	8.16	8.92	8.6
VOC REDUCTION		5.0	5.8	TBD
VOC REMAINING		3.16	3.12	TBD
NOX INVENTORY	3.92	4.29	4.49	4.63
NOX REDUCTION		2.5	2.91	1.00
NOX REMAINING		1.79	1.58	3.63
CO INVENTORY	77.7	76.5	80.0	79.7
CO REDUCTION		44.7	52	TBD
CO REMAINING		31.8	28	TBD

CONTROL COST: THE COST-EFFECTIVENESS OF THIS CONTROL MEASURE WILL VARY DEPENDING ON THE TYPE OF EQUIPMENT BUT HAS RANGED FROM $800/TON FOR LEAF BLOWERS TO $10,000/TON FOR LAWN MOWER EQUIPMENT

IMPLEMENTING AGENCY: SCAQMD

Description of Source Category

The purpose of this control measure is to promote accelerated turn-over of in-use small off-road engines (SORE) and other engines such as larger diesel-powered lawn and garden equipment through expanded voluntary exchange programs.

Background

The SORE category consists of spark ignition engines that run on gasoline or alternative fuel such as liquefied petroleum gas (LPG) or compressed natural gas (CNG), and are rated below 25 horsepower (19 kW). The SORE equipment category includes handheld and non-handheld lawn and garden equipment such as string trimmers, leaf blowers, lawn mowers, generators, and lawn tractors, as well as other commercial/industrial equipment. The SORE category does not include compression ignition engines or recreational vehicles. The vast majority of candidate equipment eligible for exchange under this measure use gasoline. A sector of lawn and garden equipment operate on diesel fuel. These equipment include diesel-powered riding lawn mowers, stump grinders, and other commercial turf equipment.

Since 2003, the District has sponsored lawn mower buyback programs for residential users of old lawn mowers. This program has resulted in over 55,000 high polluting gasoline-powered lawn mowers taken out of service from 2003 to the present. The program is designed so that an individual turns in their old lawn mower in exchange for paying up to $250 towards a new electric-powered lawn mower. In addition to the lawn mower exchange program, the District has recently sponsored a gasoline-powered leaf blower exchange program targeted at commercial operators. In this program, an individual turns in their old gasoline-powered two-stroke leaf blower in exchange for paying $200 towards a new four-stroke gasoline-powered leaf blower certified to the CARB new engine emission standards. The new four-stroke units are less polluting than the two-stroke units. The leaf blower buyback program has resulted in over 12,000 older leaf blowers being exchanged for cleaner combustion leaf blowers.

While the residential lawnmower and commercial hand-held leaf blower exchange programs are important programs, additional emission reductions will be needed from larger commercial lawn and garden equipment such as riding lawnmowers. Zero-emission commercial lawn and garden equipment are currently commercially available from a number of vendors. The District is currently sponsoring a zero-emission commercial lawn and garden equipment loaner program to test and evaluate equipment performance in a various commercial applications.

Regulatory History

Since September 2003, CARB has established emission standards (exhaust and evaporative) for new SORE engines. However, CARB regulations do not impact existing equipment. As part of its commitment in the 2003 AQMP, in September 2003, the CARB Board also directed CARB staff to conduct research for potential increased use of electric equipment for small off-road engines. In April 2004, CARB staff reported to the Governing Board that there is a high possibility of increasing the penetration for electric equipment through voluntary measures, incentive programs, and other consumer awareness programs.

CARB's SORE is undergoing review with potential amendments that may result in additional emission reductions. Larger diesel-powered lawn and garden equipment may or may not be subject to the In-Use Off-Road Diesel Fleet Regulation depending if the equipment is federally preempted.

Proposed Method of Control

In order to increase the penetration of new low emission and zero-emission equipment, this measure is proposing to expand the District's existing lawn mower and leaf blower exchange program to cover larger commercial lawn and garden equipment that are subject to federal preemption or may not be required to turnover to newer equipment. This expansion will be accomplished by increasing the number of exchange events and available funding for these programs. In addition, other SORE equipment may also be considered for exchange programs for accelerating the turnover of existing engines.

Emission Reductions

This control measure promotes faster turnover rate of in-use engines to electric versions of the same equipment type or engines that meet the new low-emission standards. The expected emission reductions for this control measure would depend on the number and types of engines participating in the program. It is estimated that around 32,000 existing larger commercial lawn and garden equipment could be replaced with zero-emission or cleaner low-emission gasoline-powered or alternative fuel-powered equipment resulting in around 2.9 tons/day of NOx reduction in 2023. The estimates for other type of equipment targeted in an exchange program would vary and are not estimated for this control measure.

Cost-Effectiveness

The cost-effectiveness will depend on the types of engines or equipment participating in the exchange program. In the District's leaf blower exchange program, low emission units were offered at a cost of $200 instead of a typical retail price of $460. The total cost of this program was $225,000 funded through the District's Air Quality Investment Program (AQIP). The cost-effectiveness of this leaf blower exchange program is reported to be $1,060 per ton.

Implementing Agency

The District has successfully implemented voluntary exchange programs for leaf blowers and lawn mowers since 2003. The extended exchange program is expected to be implemented by the District taking into consideration requirements that emission reductions are quantifiable, surplus, enforceable and permanent.

References

CARB (2003). Staff Report – Initial Statement of Reasons for Proposed Rulemaking Public Hearing to Consider the Adoption of Exhaust and Evaporative Emission Control Requirements for Small Off-Road Equipment and Engines Less Than or Equal to 19 Kilowatts, August 8, 2003.

CARB (2004). Staff Report – Potential Electrification Programs for Small Off-Road Engines, April 2, 2004.

MOB-12: FURTHER EMISSION REDUCTIONS FROM PASSENGER LOCOMOTIVES [NOx, PM]

CONTROL MEASURE SUMMARY					
SOURCE CATEGORY:	LOCOMOTIVE ENGINES (PASSENGER)				
CONTROL METHODS:	ACCELERATED REPLACEMENT OF EXISTING LOCOMOTIVE ENGINES MEETING TIER 4 OR CLEANER EXHAUST STANDARDS				
EMISSIONS (TONS/DAY):					
ANNUAL AVERAGE	**2012**	**2019**	**2022**	**2023**	**2031**
NOX INVENTORY	2.95	3.11	3.43	3.46	3.86
NOX REDUCTION		TBD	TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD	TBD
PM2.5 INVENTORY	0.057	0.060	0.066	0.067	0.075
PM2.5 REDUCTION		TBD	TBD	TBD	TBD
PM2.5 REMAINING		TBD	TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2019**	**2022**	**2023**	**2031**
NOX INVENTORY	2.95	3.11	3.46	3.16	3.86
NOX REDUCTION		TBD	TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD	TBD
CONTROL COST:	THE COST-EFFECTIVENESS OF THIS MEASURE WILL VARY DEPENDING ON THE TYPE OF CONTROL EQUIPMENT. THE AVERAGE COST-EFFECTIVENESS IS ESTIMATED TO BE AROUND $15,000/TON.				
IMPLEMENTING AGENCY:	SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY (METROLINK)				

Description of Source Category

The purpose of this control measure is to promote earlier and cleaner replacement or upgrade of existing passenger locomotives to meet Tier 4 locomotive emission standards by 2023. If new locomotive engine emission standards beyond the current Tier 4 standards are established, this measure will seek the procurement of cleaner locomotives as the older locomotives are replaced or remanufactured.

Background

Diesel-electric locomotives have a large diesel engine (main traction engine) for generating electric power which in turn drives electric motors in each axle. Passenger locomotives have engines with about 3,800 horsepower and four drive axles. U.S. EPA locomotive emission standards apply to 1973 and newer locomotives upon engine rebuild and new 2002 and later locomotives. Locomotives remain in commercial service from 25 to 40 years.

Two passenger railroads, Metrolink and Amtrak, operate passenger train service in the Basin and the surrounding counties. Metrolink operates seven service lines, 57 stations, and moves approximately 40,000 passengers daily over a 512 track-mile network located almost exclusively within the Basin. Amtrak operates three interstate routes and one intrastate route that travel through the Basin. Metrolink locomotives contribute approximately 77 percent of passenger locomotive emissions of NOx and PM2.5, with Amtrak locomotives responsible for the remainder. Metrolink's fleet of 52 locomotives consists of 30 older Tier 0 locomotives and 22 Tier 2 locomotives. Metrolink is in the process of upgrading their fleet so that all locomotives will meet the cleanest (Tier 4) locomotive emission standards by 2023, which will result in a fleet with at least 85 percent lower emissions than the current fleet. Amtrak's fleet that travels in the Basin is almost exclusively locomotives meeting the Tier 0 emission standards and plans are being made to upgrade them to Tier 0+ emission standards since there is no requirement to purchase new locomotives that meet the current Tier 4 emission standard.

Regulatory History

U.S. EPA promulgated regulations for the control of emission from locomotives in 1998 and 2008. The regulations require locomotives to meet increasingly more stringent emission levels (Tier 0 thru Tier 4) when they are manufactured and in some cases additional emissions improvements when they are remanufactured at the end of their useful life. For newly manufactured passenger locomotives the cleanest emission standard (Tier 4) is required beginning in 2015 and will result in emissions that are over 90 percent cleaner than those from unregulated locomotive engines. For passenger locomotives manufactured before 2012 (i.e., meeting Tier 0, 1 or 2 emission standards), modest emissions improvements (referred to as "plus" standards) are required at the date of remanufacture which usually occurs seven to 10 years after the new locomotive is put into service.

Locomotives by design remain in operation for a long time (typically over 30 years). As such, emission reductions from natural turnover of the passenger locomotive fleet will take many years to be realized. Additionally, as most of the passenger locomotives operating in the Basin meet the Tier 0 or Tier 2 standards, they are only required to meet the more modest Tier 0 plus and Tier 2 plus standards on remanufacture unless they are replaced with new locomotives.

Proposed Method of Control

Metrolink's Board (Southern California Regional Rail Authority) has adopted a locomotive replacement plan which includes the procurement of Tier 4 locomotive engines to replace its 30 Tier 0 locomotives over the next five years. Metrolink has ordered 20 new Tier 4 locomotives with partial funding by the District from the Carl Moyer Program. In 2015, Metrolink received an additional award by the District from the Carl Moyer Program partially funding replacement of an additional 10 Tier 0 locomotives. The 2015 award included an additional locomotive to expand the fleet and a requirement that Metrolink repower nine Tier 2 locomotives with Tier 4 engines. The remaining 13

Tier 2 locomotives will be repowered with Tier 4 engines. These actions will result in 100% Tier 4 Metrolink passenger locomotives by 2023.

In addition, the District will encourage Amtrak to replace or repower their Tier 0 locomotives to meet Tier 4 locomotive emission standards rather than remanufacturing these engines.

Emission Reductions

Emission reductions from repowering the last 13 Tier 2 Metrolink locomotives to Tier 4 are estimated to be 0.32 ton/day for NO_x and 0.01 ton/day PM2.5 in 2023.

Cost-Effectiveness

Metrolink staff estimates that replacing their Tier 0 locomotives with new Tier 4 locomotives will cost approximately $6.2 million per locomotive, and repowering their Tier 2 locomotives, approximately $2.4 million each. Total cost to upgrade the fleet will be $245 million. Assuming a 20-year locomotive life, the cost-effectiveness of the upgrades will be in the range of $15,000 per ton of emissions reduced.

Implementing Agency

The Southern California Regional Rail Authority will be considering the procurement of additional Tier 4 locomotive engines. The implementation follows established CARB Carl Moyer Program Guidelines to ensure that emission reductions are quantifiable, surplus, enforceable and permanent.

- Quantifiable: Emission reductions are based on established calculations and records including historical usage, emission factors from engine certification data, and contracted years of operation.
- Surplus: Emission reductions are surplus to the federal locomotive regulations for rebuilding in-service locomotives and no State or local requirements regarding accelerated replacement or engine upgrade have been established.
- Enforceable: Emission reductions are enforceable through a written contract with Metrolink. Contract language provides several methods for ensuring that contracted emission reductions are obtained or District funding is recovered in the event contracts are not fulfilled.
- Permanent: Emission reductions are permanent because the old engines are destroyed.

References

CARB (2015). Carl Moyer Program Guidelines, Chapter 11 – Locomotives.

Southern California Regional Rail Authority (2012). Adoption of Locomotive and Equipment Fleet Plan.

MOB-13: OFF-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM [NOx, SOx, PM]

CONTROL MEASURE SUMMARY					
SOURCE CATEGORY:	OFF-ROAD DIESEL-FUELED CONSTRUCTION, INDUSTRIAL EQUIPMENT, AIRPORT GROUND SUPPORT EQUIPMENT, AND DRILLING EQUIPMENT				
CONTROL METHODS:	ACCELERATED DEPLOYMENT OF TIER 4 EQUIPMENT AND NEAR-ZERO AND ZERO-EMISSION EQUIPMENT WHERE APPLICABLE				
EMISSIONS (TONS/DAY):					
ANNUAL AVERAGE	**2012**	**2019**	**2022**	**2023**	**2031**
NOX INVENTORY	29.61	23.98	18.42	17.01	10.20
NOX REDUCTION		TBD	TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD	TBD
PM2.5 INVENTORY	1.41	1.06	0.76	0.68	0.32
PM2.5 REDUCTION		TBD	TBD	TBD	TBD
PM2.5 REMAINING		TBD	TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2019**	**2022**	**2023**	**2031**
NOX INVENTORY	35.07	28.50	21.88	20.22	12.08
NOX REDUCTION		TBD	TBD	TBD	TBD
NOX REMAINING		TBD	TBD	TBD	TBD
CONTROL COST:	TBD				
IMPLEMENTING AGENCY:	SCAQMD				

Description of Source Category

This measure seeks to develop mechanisms to incentivize the early deployment of zero and near-zero emission off-road mobile equipment where applicable or the early deployment of Tier 4 or cleaner combustion equipment where applicable through the generation of mobile source emission reduction credits that can be used only by entities affected by the 2016 AQMP control measures MOB-01 through MOB-04 and EGM-01. Any mobile source emission reduction credits generated cannot be used to offset emissions from stationary sources. The mobile

source emission reduction credits will be discounted to provide additional emission reductions to help meet air quality standards.

Background

Mobile source emission reduction credit generation programs have been developed by the District to provide an incentive to deploy cleaner, advanced technologies that are not otherwise required to comply with existing air regulations. Generation of such credits may be considered surplus and have been used to comply with other District regulations. The District continues to work with affected stakeholders on the development of mobile source emission reduction credit generation rules and the U.S. EPA to define an approach that can be approved into the SIP. This proposed measure provides a forum to continue such discussions with interested stakeholders and U.S. EPA.

Regulatory History

In 1995, the District adopted Rule 1620 – Credits for Clean Off-Road Mobile Equipment, which provides a protocol for entities to generate mobile source emission reduction credits that could be used for compliance with other District rules. Rule 1620 established a mechanism for the quantification of emission benefits as a result of implementation of projects that deployed cleaner off-road mobile equipment meeting the cleanest NOx emission standards (currently Tier 4) or were not otherwise required by a regulation or other enforceable mechanism. Mobile source emission reductions associated with the project are converted to credits that could be used by the project proponent or sold to other entities to meet other District rules as allowed by those regulations.

In May 1996, the District adopted an emission reductions credit generation rule for lawn and garden equipment. Rule 1623 – Credits for Clean Lawn and Garden Equipment focused on projects that replaced older gasoline powered lawn and garden equipment with new zero-emission models. Similar to Rule 1620, emission reduction credits generated under Rule 1623 can be used for compliance with other District rules if allowed by those rules.

Proposed Method of Control

This measure seeks to amend Rule 1620 to provide greater flexibility for entities to initiate projects to accelerate the deployment of zero and near-zero emission off-road mobile equipment in the Basin and Coachella Valley. The focus of the amendment will be to encourage the deployment of commercially available zero and near-zero emission off-road mobile equipment that do not receive or cannot receive public funding assistance. Mobile source emission reduction credits must be real, surplus, quantifiable, permanent, and enforceable as defined by U.S. EPA. As such, any project considered for generation of emission reduction credits must go beyond regulatory requirements.

For the purposes of this measure, a near-zero emission engine is one that is certified to be at least 90 percent cleaner than the current Tier 4 off-road emission standard for the horsepower specification of the off-road engine or meets the lowest optional NOx emission standard for on-road heavy-duty engines if the on-road engine is used in an off-road application. Zero-emission mobile equipment include, but are not limited to, commercially available battery-electric or fuel cell operated equipment.

Emission Reductions

Emission reductions are not estimated at this time and will depend on the actual type and number of off-road vehicles participating in the program.

Rule Compliance and Test Methods

Compliance would be based on monitoring, recordkeeping, and reporting requirements that have been established in existing regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

Cost-Effectiveness

Not determined.

Implementing Agency

SCAQMD

References

SCAQMD (1995). SCAQMD Rule 1620 – Clean Off-Road Mobile Equipment

SCAQMD (1996). SCAQMD Rule 1623 – Credits for Clean Lawn and Garden Equipment

MOB-14: EMISSION REDUCTIONS FROM INCENTIVE PROGRAMS [NOx, PM]

CONTROL MEASURE SUMMARY					
SOURCE CATEGORY:	ON-ROAD AND OFF-ROAD MOBILE SOURCE VEHICLES AND EQUIPMENT				
CONTROL METHODS:	IMPLEMENTATION OF FUNDING INCENTIVE PROGRAMS SUCH AS CARL MOYER MEMORIAL AIR QUALITY STANDARDS ATTAINMENT PROGRAM, PROPOSITION 1B, ETC.				
EMISSIONS (TONS/DAY):					
ANNUAL AVERAGE	**2012**	**2019**	**2022**	**2023**	**2031**
NOX INVENTORY	169.53	104.38	83.05	74.05	52.85
NOX REDUCTION		TBD*	TBD*	9.47*	5.62*
NOX REMAINING		TBD	TBD	TBD	TBD
PM2.5 INVENTORY	6.32	2.71	1.93	1.74	3.03
PM2.5 REDUCTION		TBD*	TBD*	0.25*	0.17*
PM2.5 REMAINING		TBD	TBD	TBD	TBD
SUMMER PLANNING	**2012**	**2019**	**2022**	**2023**	**2031**
NOX INVENTORY	167.85	108.07	83.75	58.76	53.24
NOX REDUCTION		TBD*	TBD*	10.97*	7.82*
NOX REMAINING		TBD	TBD	TBD	TBD
CONTROL COST:	$18,262 PER TON (BASED ON THE MOST CURRENT CARL MOYER GUIDELINES)				
IMPLEMENTING AGENCY:	SCAQMD				

* Emission reductions reflect reductions associated with existing projects and future projects based on anticipated funding under the Carl Moyer Program and Proposition 1B. Specific reductions are provided in Tables 1 through 4 below.

Description of Source Category

The purpose of this measure is to develop a rule similar to SJVAPCD Rule 9610 – State Implementation Plan Credit for Emission Reductions Generated through Incentive Programs such that emission reductions generated through incentive programs can be credited in State Implementation Plan (SIP) emission inventories. Such emission reductions have been accounted in the development of historic base year emissions inventories where actual

emission reductions have occurred. Future emission reductions from adopted regulations can be credited towards attainment of air quality standards. However, future emission reductions as a result of incentive-based programs cannot be credited towards attainment prospectively without a demonstration and commitment that the reductions are real, quantifiable, surplus, enforceable, and permanent (for mobile sources to the extent of their useful life). The lack of a SIP-creditability mechanism is now a major constraint in developing future AQMPs since the reductions cannot be counted in the future year emissions baseline. This proposed measure would provide a new administrative mechanism to credit towards SIP requirements for future emission reductions achieved in the Basin through incentive programs administered by the District, CARB, or U.S. EPA.

Background

The District has a long history of successful implementation of incentive programs that help fund the accelerated deployment of cleaner engines and aftertreatment technologies in on-road heavy-duty vehicles and off-road mobile equipment. Such accelerated deployment not only result in early emission reductions, but also provides a signal for technology providers, engine and automobile manufacturers, and academic researchers to develop and commercialize the cleanest combustion engines possible and further the efforts to commercialize zero-emission technologies into a wider market. Some of the major incentive programs are discussed below.

Carl Moyer Memorial Air Quality Standards Attainment Program

In fiscal year 1998-99, the California State Legislature created the Carl Moyer Memorial Air Quality Standards Attainment Program, to facilitate the move to cleaner-burning engines, which otherwise would have taken decades. The program continues to drive early introduction of clean air technologies, and includes funding for measures that reduce NOx, VOC, and PM caused by the combustion of diesel fuel and gasoline in on-road vehicles and off-road engines. The program also funds after-treatment devices such as diesel oxidation catalyst and PM filters.

A variety of vehicle classes and types are funded under the Carl Moyer Program to help purchase new vehicles or new engines/repowers and for installation of retrofit units on older engines. New vehicles and engines must achieve a least 30 percent reduction, and repowered vehicles and retrofits must achieve a 15 percent reduction of NOx emissions compared to current emission standards. New on-road engines should be CARB-certified to meet an optional NOx emissions standard and retrofits should be CARB-verified. Projects reducing PM and/or VOC are also eligible for funding provided they are cost-effective. Alternative fuel engines, such as those using compressed natural gas, liquefied natural gas, propane and electricity will be given preference for funding if less polluting. Cleaner diesel engines may also be considered in the off-road category.

Vehicles and equipment funded must remain in operation for at least three years, and 75 percent of their use must be within the Basin. All potential projects must meet cost-effectiveness requirements to be eligible for funding consideration.

The Carl Moyer Program under its new guidelines also includes “Fleet Modernization” and “Light-Duty Vehicle Repair and Scrapping” programs. The fleet modernization Program replaces older heavy-duty diesel vehicles with 2007 and newer diesel or 2010 and newer natural gas vehicles. The Light-Duty Vehicle Repair and Scrapping Program identifies high polluting light-duty vehicles with remote sensing and offers repair or scrapping options.

Proposition 1B – Air Quality Improvement Fund

In 2006, California voters approved a bond measure called Proposition 1B. The bond measure would generate $19 billion of which $2 billion would go towards improving California's freight transportation infrastructure, $1 billion towards the cleaning up older diesel vehicles, and $200 million to school bus retrofits. The funding is predicated on bond sales. To-date, over 6,000 older diesel trucks have been replaced with either newer diesel trucks or alternative fuel trucks. In addition, Proposition 1B funding has helped with installation of shore side power for marine vessels and assisted in the purchase of cleaner locomotives. Proposition 1B is in its final year and the last round of funding is anticipated to help cover the cost for the replacement of 1,000 older trucks and a number of cargo handling equipment and locomotives.

The U.S. EPA recently provided an overview of six components that a measure would need to consider at a minimum, in order for U.S. EPA to determine if the emission reductions can be approve into the SIP. The six components are based on U.S. EPA's analysis of the various voluntary emission reduction program guidance that U.S. EPA has issued to-date and the six components are common among the guidance. The six components are:

- Demonstration/documentation that the emission reductions associated with the economic incentive programs (EIP) are quantifiable, surplus, enforceable, and permanent.
- An enforceable commitment to monitor emission reductions achieved by EIPs and to rectify shortfalls in emission reductions no later than statutory implementation deadlines.
- Technical analyses/support – documentation to explain how the State/District have relied upon EIP emission reductions in the emission inventories, RFP demonstration, and attainment or maintenance demonstration, as applicable
- Demonstration of State funding and legal authority – documentation to show that State has adequate funding, personnel, implementation authority, and other resources to implement the EIP on schedule
- Procedures for public disclosure of information – provisions to ensure that EPA and the public have access to emission data in accordance with the requirements of the Clean Air Act, Section 114 and U.S. EPA's implementing regulations in 40 CFR 2.301.
- Provisions to measure and track programmatic results – evaluation procedures to retrospectively determine overall effectiveness of program and procedures to correct emissions projections.

Emission reductions in 2023 and 2031 associated with projects awards to-date and projected emission reductions as a result of future awards are provided in Tables 1 through 4, respectively.

TABLE 1

NOx and PM Emission Reductions in 2023 Associated with Existing Project Awards

Funding Source	Implementation Status	Project Types	No. of Units	NOx tons/day	PM tons/day
AB 923	2013	School Bus Replacement	264	0.15	0.01
Prop 1B	Projects implemented since 2013 and still operational in 2023	Freight Locomotives	10	0.14	0.01
SB 1107 & AB 923	In operation since 2013 and still operational in 2023	Off-road Equipment Harbor Craft (Fishing Vessels) Freight Locomotives		1.71 1.96 0.87	0.05 0.07 0.02
Total				**4.84**	**0.16**

TABLE 2

Projected NOx and PM Emission Reductions in 2023 Associated with Future Funding

Funding Source	Implementation Status	Project Types	No. of Units	NOx tons/day	PM tons/day
AB 923	Future Projects from 2017 to 2023	School Bus Replacement	600	0.22	0.01
Prop 1B	Future Projects to be implemented by end of 2016 through 2019	Cargo Handling Equipment Freight Locomotives	29 10	0.16 0.14	0.00 0.01
SB 1107 & AB 923	Projected from 2017 through 2023	On-road		4.11	0.03
Total				**4.63**	**0.05**

TABLE 3

NOx and PM Emission Reductions in 2031 Associated with Existing Project Awards

Funding Source	Implementation Status	Project Types	No. of Units	NOx tons/day	PM tons/day
AB 923	2016	School Bus Replacement	144	0.05	0.00
Prop 1B	Projects implemented since 2013 and still operational in 2031	--	--	--	--
SB 1107 & AB 923	In operation since 2013 and still operational in 2031	Off-Road Freight Locomotives		1.71 0.87	0.05 0.02
Total				**2.63**	**0.07**

TABLE 4

Projected NOx and PM Emission Reductions in 2031 Associated with Future Funding

Funding Source	Implementation Status	Project Types	No. of Units	NOx tons/day	PM tons/day
AB 923	Future Projects from 2017 to 2031	School Bus Replacement	600	0.22	0.01
Prop 1B	Future Projects to be implemented by end of 2016 through 2019	Cargo Handling Equipment Freight Locomotives	29 10	0.16 0.14	0.00 0.01
SB 1107 & AB 923	Projected from 2017 through 2031	On-road Heavy-Duty Trucks		2.47	0.02
Total				**2.99**	**0.04**

Regulatory History

In addition to the legislature introducing the Carl Moyer Program, SB 1107 and AB 923 were passed with support from the business community, environmental groups, and public agencies, which provide a long-term source of funding for the expansion of the Carl Moyer Program.

Proposed Method of Control

The proposed measure is based on the implementation of the financial incentives programs currently implemented by the District such as the Carl Moyer Program and Proposition 1B. The measure proposes to take credit for the emission reductions achieved through past and future projects funded under these programs for SIP purposes. Examples of projects include on-road heavy-duty vehicle modernization, installation of retrofit units, and engine repowers. The emission reductions are provided in two parts. The first part of the measure is the actual emission reductions associated with current projects that will have remaining useful life in 2023 and 2031. The second part of this measure is based on future reductions to be achieved from the implementation of new projects under the Carl Moyer Program and other incentive programs such as Proposition 1B. These reductions were estimated based on the committed level of funding for this Program and a conservative cost-effectiveness assumption of $18,262 per ton specified in the Carl Moyer Program guidelines (although existing projects have substantially lower cost-effectiveness). Emission reductions associated with both parts are shown in Tables 1 through 4.

Emission Reductions

The emission reductions from existing projects that will have remaining useful life and projected future projects based on current funding levels of the control measure are reflected in the Control Measure Summary Table. In addition, the implementation of Light-Duty Vehicle Repair and Scrapping will start generating VOC emission reductions.

Rule Compliance and Test Methods

The District has developed policies and procedures to ensure that this control measure is successfully implemented. In addition to the District's requirements for program implementation, the District adheres to CARB's Carl Moyer Guidelines. Because the Carl Moyer Program is implemented by a partnership of CARB and the District, CARB has oversight authority to ensure that funds are expended as required by the Health and Safety Code and to ensure that the Carl Moyer Program Guidelines are met. CARB is required to audit the District's program by reviewing the District's solicitation, evaluation, selection, contract, and invoicing process. CARB staff also visits a sample of funded projects to ensure that public funds are used to pay for qualifying projects that are operating and obtaining emission reductions.

Cost-Effectiveness

The cost-effectiveness of this control measure is based on the Carl Moyer Program guidelines, which is currently set at an upper limit of $18,262 per ton.

Implementing Agency

CARB

References

SJVAPCD (2013). SJVAPCD Rule 9610 – State Implementation Plan Credit for Emission Reductions Generated Through Incentive Programs.

U.S. EPA (2016). Presentation at the SCAQMD 2016 AQMP Advisory Group Meeting (May 4, 2016).

SECTION 2

PM2.5 CONTROL MEASURES

BCM-01: FURTHER EMISSION REDUCTIONS FROM COMMERCIAL COOKING [PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	UNDER-FIRED CHARBROILERS		
CONTROL METHODS:	ADD-ON CONTROL EQUIPMENT WITH VENTILATION HOOD REQUIREMENTS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2012**	**2021**	**2025**
PM2.5 INVENTORY	10.4	11.9	12.3
PM2.5 REDUCTION			3.3*
PM2.5 REMAINING		11.9	9
CONTROL COST:	$15,000–$18,000/TON		
IMPLEMENTING AGENCY:	SCAQMD		

** Reductions are designed to serve as a contingency measure and are approximate. Reductions will be submitted into the SIP once final feasible control levels are established.*

Description of Source Category

This proposed control measure would seek PM reductions from commercial under-fired charbroilers.

Background

Cooking activities are the largest source of directly emitted PM2.5 emissions in the Basin. The inventory estimates provided in the above summary table include emissions from charbroilers (chain-driven and under-fired), griddles, deep fat fryers, ovens, and other equipment. However, under-fired charbroilers are responsible for the majority of emissions from this source category (2007, SCAQMD) given the higher emission potential when compared with other cooking devices (e.g., 32.5 lbs per 1,000 lbs of meat cooked via under-fired-charbroiler compared to 5 lbs PM per 1,000 lbs of meat cooked via a griddle). An under-fired charbroiler consists of three main components: a heating source, a high temperature radiant surface, and a slotted grill (grate). The grill holds the meat or other food while exposing it to the radiant heat. PM and VOC emissions occur when grease from the meat falls onto the high temperature radiant surface. Most under-fired charbroilers burn natural gas; however, solid fuels, such as charcoal or wood with or without the addition of ceramic stones, are sometimes used. Restaurant PM emissions are also classified as a black carbon source which recent studies identify as contributing to climate change both directly by absorbing sunlight and indirectly by disrupting cloud formation, precipitation patterns and water storage in snow pack.

Regulatory History

Efforts to reduce PM emissions from commercial cooking activities have been included in AQMP control measures since the early 1990s. While the goal has been to develop a comprehensive rule applicable to all commercial

cooking activities the only available, cost-effective PM control was initially limited to chain-driven charbroilers. In 1997, the SCAQMD Governing Board adopted Rule 1138 – Control of Emissions from Restaurant Operations, which requires chain-driven charbroilers to install a catalytic oxidizer (or equivalent) control device. These types of charbroilers were uniquely suited for the implementation of commercially available, low cost catalyst oxidizers (flameless incineration) which operate with the necessary exhaust temperature of 700–800º F. Rule 1138 applies to commercial cooking operations with chain-driven charbroilers cooking more than 875 pounds of meat per week and required control devices must be certified to achieve an 83 percent reduction in PM emissions.

Since adoption of Rule 1138, SCAQMD staff efforts to reduce emissions from commercial cooking operations have been focused on under-fired charbroilers and a series of reports were made to the SCAQMD Governing Board in 1999, 2001, and 2004 to present results of under-fired charbroiler control technology research. Affordable controls were not commercially available at that time for under-fired charbroilers.

In 2007, the Bay Area Air Quality Management District (Bay Area AQMD) adopted Regulation 6, Rule 2 (Commercial Cooking) which included provisions for both chain-driven and under-fired charbroilers. The Bay Area regulation requires a catalytic oxidizer for chain-driven charbroilers with a throughput of at least 400 pounds of beef per week. Under-fired charbroilers with more than 10 square feet of cooking area are required to limit emissions to 1 pound of PM10 per 1,000 pounds of cooked beef (greater than 90 percent reduction in direct PM emissions) under the Bay Area rule. Requirements for chain-driven charbroilers have been successfully implemented, however, there are no commercially-available devices that meet the Bay Area AQMD emissions standards for under-fired charbroilers.

As a result of the Bay Area regulation, a subsequent SCAQMD rule development effort to control PM emissions from under-fired charbroilers was initiated in 2008. A Working Group of approximately 35 members from affected industry, equipment manufacturers and researchers was formed to initially discuss current research and later to provide comment on draft rule language. Three working group meetings were held in 2008 and 2009 and a public workshop was held in August 2009. Due to concerns over control device availability and initial equipment costs affecting small businesses, Proposed Rule 1138 amendments were postponed. Instead, SCAQMD initiated further research on under-fired charbroiler control technologies with the goal of identifying and testing lower cost devices.

In 2015 the New York City Department of Environmental Protection (DEP) initiated a program to reduce PM emissions from commercial charbroilers. The DEP program generally follows SCAQMD and other California air district requirements for chain-driven charbroiler restaurants (e.g., flameless catalytic oxidizers) but also establishes requirements for new restaurants with under-fired charbroilers. Specifically, the DEP regulation prohibits operation of a new under-fired commercial charbroiler cooking more than 875 pounds of meat per week unless an Electrostatic Precipitator (ESP) or other type of device achieving a 75 percent PM10 reduction (including condensable PM) is installed. Provisions for certification of emissions control devices and recordkeeping requirements are also established by the DEP program which is in effect as of September 1, 2016 (New York City, 2016).

AB 32 (California Global Warming Solutions Act of 2006) includes provisions to achieve and maintain Statewide GHG emission limits, however, recent legislation [Senate Bill 605 (SB 605), Lara, Chapter 523, Statutes of 2014] requires CARB to develop a plan to reduce what are referred to as short lived climate pollutants, including black carbon. In response to SB 605, CARB has recently circulated for comment the Short-Lived Climate Pollutant

Reduction Strategy (SLCP Reduction Strategy) which acknowledges the benefits from control of smaller sources of PM, including commercial cooking.

Control Technology Research

In October 2011, the SCAQMD Governing Board approved approximately $200,000 for control device testing and authorized the release of a Program Opportunity Notice (PON) to solicit proposals from control device manufacturers. Under the PON process, SCAQMD staff and an inter-agency working group consisting of representatives from U.S. EPA, SJVAPCD and Bay Area AQMD reviewed manufacturer proposals based on anticipated emission reductions and available cost data. Equipment showing promise would be subject to an initial screening test. Based on screening results, equipment could be tested using the full SCAQMD Test Protocol for Determining PM Emissions from Under-fired Charbroilers. All testing was initially funded by SCAQMD and conducted under an existing contract with the University of California at Riverside – Center for Environmental Research and Technology (CE-CERT). Subsequent additional funding was provided by U.S. EPA, and the Bay Area AQMD has funded a related charbroiler testing project at the CE-CERT facility.

To date, screening tests have been conducted on control device configurations provided by eight manufacturers. Protocol tests were then conducted on the most promising technologies and draft test results have been received on five control device configurations. Types of devices include commercially or near-commercially available technologies, including a multi-stage filter system, an Electrostatic Precipitator (ESP), and an in-hood baffle filter. Protocol tests were also conducted on prototype designs consisting of an inertial separator/aerosol mist device and a ceramic filter with microwave regeneration. Draft test results and preliminary device cost information is presented in Table 1. The preliminary cost information is for control devices only and does not include installation or operation costs which can vary significantly based on the facility. Also, cost estimates for new facilities represent an incremental increase in costs to what traditionally would have been installed whereas a retrofit device installed at an existing facility may require a complete system overhaul including fire suppression, ventilation, and electrical components which would be expected to increase cost estimates.

TABLE 1

Draft Control Device Testing Results and Preliminary Cost Estimates

Device Type	PM Control Efficiency	Preliminary Device Cost Estimates
Electrostatic Precipitator (ESP)	86%	$31,000
Multi-Stage Filter	80%	$47,000
Ceramic Filter/Microwave Regeneration	63%	$20,000
Centrifugal Separator/Aerosol Mist Nebulizer	58%	$27,000
In-Hood Baffle Filter (new – retrofit)	25%	$225–$250/linear ft. of exhaust hood

In addition to the above technologies, SCAQMD staff is reviewing test results from a low cost device intended to reduce emissions by preventing the generation of smoke at the source instead of removing particulates from the exhaust stream with a traditional PM control device. SCAQMD staff are also reviewing other promising

technologies intended to provide low to mid-range control efficiencies at lower costs. All of the CE-CERT test results and manufacturer supplied cost data, along with previous control device testing, are being compiled and will be presented in a technical and cost feasibility analysis intended to guide future regulation of PM emissions from under-fired charbroilers.

An additional action was approved by the SCAQMD Governing Board in 2011 to develop a companion $150,000 contract with CE-CERT to further characterize emissions from under-fired charbroilers. A draft of the report, entitled "Characterization of Under-Fired Charbroiler Emissions" has been received by SCAQMD and the report confirms that under-fired charbroiler PM emissions are primarily less than one micron in size, are dominated by organic carbon and include compounds which are known toxics, mutagens, and carcinogens. As presented in Figure 1, the CE-CERT Characterization report also documented that several of the control technologies could significantly reduce Polycyclic Aromatic Hydrocarbons (PAHs) compounds which have mutagenic and carcinogenic properties. Applicable information from the characterization study will be included in the technical and cost feasibility report.

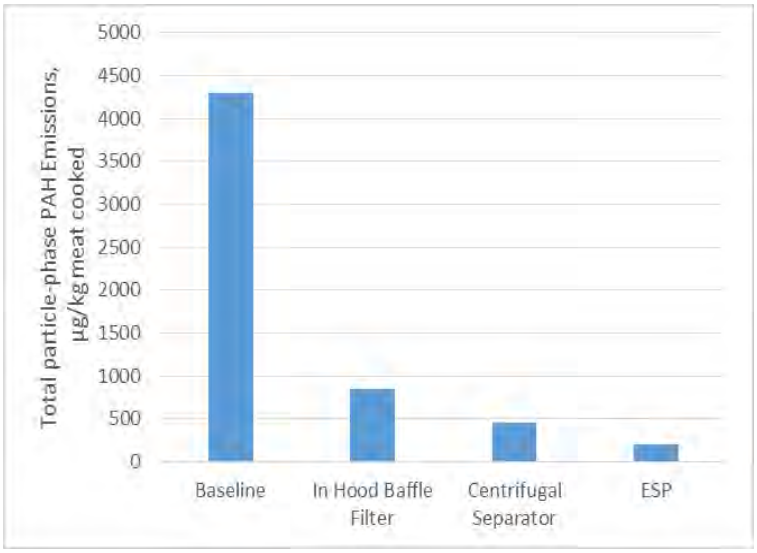

FIGURE 1

Particle-phase PAH Emissions for Baseline Test and Three Control Technologies

The SJVAPCD strategy for meeting the federal PM2.5 NAAQS includes plans to expand their commercial charbroiling rule. Through a public rule development process, SJVAPCD plans to further reduce air pollutant emissions from under-fired charbroilers beginning in 2017. For reference, the 2012 SJVAPCD PM2.5 plan estimated a 20 percent reduction in PM2.5 emissions was feasible by placing requirements on restaurants with under-fired charbroilers. In anticipation of the rule development effort, the SJVAPCD Governing Board authorized $750,000 in funding to conduct a series of demonstration projects where participating restaurants will be provided funding for the full cost to purchase, install, and maintain PM control device systems over two years of operation. Participating restaurants will be allowed to keep the equipment after the demonstration period has concluded. Project funding was approved in June of 2015 and a control device has been installed in one

restaurant and SJVAPCD staff is currently negotiating agreements between other control device vendors and host restaurants with the goal of up to five demonstration sites. SCAQMD staff is reviewing the SJVAPCD demonstration project as part of the technical and cost feasibility report.

Proposed Method of Control

The proposed reductions are designed to serve as a contingency measure. It will be implemented if the Basin does not attain the PM2.5 annual standard by 2025.

Emissions from under-fired charbroilers continue to be a significant contributor to the direct PM2.5 emission inventory. To date, a variety of control device technologies have been tested by CE-CERT and SCAQMD staff and the inter-agency working group has reviewed draft test results. SCAQMD staff has also reviewed existing and proposed under-fired charbroiler control programs undertaken by the Bay Area AQMD, the San Joaquin Valley APCD, and the New York City DEP.

Testing conducted by CE-CERT and the demonstration projects in the San Joaquin Valley show control technology for under-fired charbroilers has continued to develop over the past few years. Identification of affordable, commercially-available PM control technologies, especially for retrofit projects at existing restaurants, remains elusive. If necessary to meet contingency measure commitments, the SCAQMD is proposing to require PM control devices for new restaurants with high-use under-fired charbroilers, provided appropriate control devices can be identified. Requiring control devices for new restaurants would allow control systems to be designed into the proposed ventilation system thereby avoiding potentially prohibitive retrofitting costs. Applicability thresholds and the required PM control efficiency would be established during the rule development process.

If needed, a delayed effective date would be proposed to allow control device manufacturers to submit equipment for evaluation using the under-fired charbroiler testing protocol and equipment would be certified based on test results. Applicable sources could then select the control device which met operational needs and certification standards as required by a potential future SCAQMD regulation. Similar to existing Rule 1138 provisions, efforts could also be taken to develop a control device registration program as an alternative to the SCAQMD permit process.

The longer term goal of this control measure, if necessary to meet contingency measure commitments, would be to potentially develop requirements for existing restaurants based on the above described SCAQMD experiences and continuing efforts by other air agencies to develop under-fired charbroiler control programs. Following identification of affordable commercially-available control devices for existing restaurants, a tiered program could be developed that targets higher efficiency controls for under-fired charbroilers at large volume restaurants, with more affordable, lower efficiency controls at smaller restaurants. Small business incentive programs funded by mitigation fees or other sources could also be explored to help offset initial purchase and installation costs for existing restaurants.

Emission Reductions

If triggered as a contingency measure, the proposed control program for new under-fired charbroiler sources would limit emissions growth from this source category. Based on information from the control measure summary, existing emissions from this source category are projected to increase from 11.9 tons to 12.3 tons per day from

2021 to 2025, or 0.4 tons per day. Those emissions estimates are from all commercial cooking sources although under-fired charbroiler emissions are the largest portion of this source category. Emissions reductions from requirements for new under-fired charbroilers cannot be estimated until the applicability threshold and the control device efficiency requirement has been established. For comparative purposes, uncontrolled emissions from an under-fired charbroiler cooking 1,250 pounds of beef per week were estimated at approximately one ton of PM2.5 per year (SCAQMD, 2009).

If commercially-available, affordable control devices can be identified requiring existing high activity charbroiler restaurants to install control devices with at least an 80 percent control efficiency has been estimated to reduce emissions by approximately 2 tons per day by 2025. Establishing a requirement for existing lower activity restaurants to install a lower efficiency (e.g., 25 percent) control devices has been estimated to yield an additional 1.3 tons of PM2.5 reductions per day. Taken together, the requirements for existing high and lower use charbroiler restaurants to install PM control devices has been estimated to reduce emissions by approximately 3.3 tons of directly emitted PM2.5 per day by 2025. Reducing directly emitted PM emissions from commercial cooking is also consistent with the SLCP Reduction Strategy goals to reduce black carbon emissions.

Rule Compliance and Test Methods

Compliance determinations could be made through inspections aided by facility recordkeeping and equipment registrations or certifications.

The "Protocol – Determination of Particulate and Volatile Organic Compound Emissions from Restaurant Operations" is the test method currently being used for testing of charbroilers and potential control devices. The test methods are used by qualified labs to certify the emissions level of specific control systems but are not employed to test emissions at individual restaurants.

Cost-Effectiveness

A cost effectiveness assessment for new restaurants to install a PM control device for high use, under-fired charbroilers will be conducted as part of the rule development effort. The cost effectiveness for a restaurant cooking 1,250 pounds of beef per week to install a control device with 85 percent PM control efficiency was previously estimated at approximately $8,000 per ton of PM2.5 reduced (SCAQMD, 2009).

If affordable, commercially-available control devices can be identified, the cost-effectiveness associated with achieving 2 tons per day reduction by requiring existing high use under-fired charbroiler restaurants to install 80 percent efficient control devices has been estimated at approximately $15,000 per ton PM2.5. The cost-effectiveness of requirements for existing lower activity restaurants to install lower efficiency devices has been estimated at approximately $18,000 per ton of PM2.5 reduced. SCAQMD staff continues to work with control device manufacturers and restaurants to quantify costs, especially for retrofit technologies. SCAQMD staff would analyze industry cost impacts as part of any potential rule development process. In addition to cost-effectiveness, given that many restaurants are small businesses, affordability will also be assessed relative to capital and installation costs, as well as ongoing operational costs. Where affordability may be an issue for smaller, low-volume restaurants an incentive program to help cover capital costs may be beneficial. As mentioned, small business incentive programs funded by mitigation fees or other sources could be explored to help offset initial purchase and installation costs for existing restaurants.

Implementing Agency

The SCAQMD has the authority to regulate PM emissions from restaurant operations. SCAQMD staff also participates in an informal restaurant emissions working group with staff from other California air districts and U.S. EPA. During this process, participating agencies have shared staff resources and provided funding to conduct research projects.

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BCM-02: EMISSION REDUCTIONS FROM COOLING TOWERS [PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	INDUSTRIAL COOLING TOWERS		
CONTROL METHODS:	DRIFT ELIMINATOR		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2012**	**2021**	**2025**
PM10 INVENTORY	TBD	TBD	TBD
PM10 REDUCTION		TBD	TBD
PM10 REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	SCAQMD		

Description of Source Category

This control measure seeks reductions of PM emissions from industrial cooling towers through the use of the latest drift eliminator technologies. The proposed control measure will reduce PM emissions from existing cooling towers by requiring the use of more efficient drift eliminators that keep drift losses to 0.001 percent of the circulating water flow rate (0.0005 percent for newly constructed cooling towers), which will also result in water conservation.

Background

According to the surveys conducted in 1988 by the SCAQMD for the development of Rule 1404 – Hexavalent Chromium Emissions from Cooling Towers, there were approximately 4,300 cooling towers operating in the Basin. Industrial cooling towers are widely used to remove large amounts of heat absorbed in the circulating cooling water systems at power plants, petroleum refineries, petrochemical plants, natural gas processing plants, etc. A large cooling tower at a refinery typically handles approximately 350,000 gallons of water per minute, but most industrial cooling towers are considerably smaller. Industrial cooling towers can be mainly classified into dry towers and wet towers.

Wet Cooling Towers

Wet cooling towers (direct or open circuit cooling tower) are enclosed structures containing a labyrinth-like packing or "fill" and are operated on the principle of latent and sensible cooling. The sensible cooling occurs as the air temperature increases by absorbing heat from the process water. The latent cooling occurs as some of the process water evaporates. As a result, hot water from the process stream is cooled as it descends through

the fill while in direct contact with air that passes through it. The cooled water is collected in a cold water basin and is recycled to absorb more heat. The heated air leaving the fill is discharged to the atmosphere. Wet cooling towers can be further categorized as mechanical-draft and natural-draft cooling towers.

Mechanical-draft cooling towers use large fans to force or draw air through the cooling towers, and are referred to as forced or induced-draft. Mechanical forced-draft cooling towers use mounted fans from the sides to force air into the towers. The more common induced-draft towers use mounted fans at the top to draw air in through the sides and expel it through the top of the towers. The induced draft towers discharge warm air at higher velocities, resulting in better dispersion of the expelled air, minimizing re-circulation of discharged air flow back into the air intake, thus maximizing cooling towers performance.

Natural-draft cooling towers generate airflow from natural driving pressure caused by the difference in density between the outside cool air and the inside hotter, humid air. The driving pressure is a function of the outside and inside air density and the height of the cooling tower. Natural-draft cooling towers require significant height (can be in excess 500-feet height) to generate the required airflow through the tower and is less aesthetically desirable.

Dry Cooling Towers

Dry cooling towers are closed systems where circulating water does not interact with ambient air and heat rejection occurs through sensible heat transfer. Sensible heat transfer is achieved by passing the circulating water through finned tubes over which ambient air is passed. Sensible heat transfer limits the maximum attainable water outlet temperature to the local ambient dry bulb temperature.

Although dry cooling towers do not directly emit any pollutants to the atmosphere, they generate indirect emissions due to additional parasitic losses and reduced heat transfer efficiency. Parasitic losses result from the additional fan load required to move more air in dry cooling towers. Reduced heat transfer efficiency and parasitic losses will require increased fuel consumption to attain an equivalent power output. In addition, according to U.S. EPA, the installation cost of a dry cooling tower would be approximately 3.3 times that of an equivalent wet cooling tower.

Drift Issues Associated with Wet Cooling Towers

Since wet cooling towers provide direct interaction of the cooling water and the air passing through, some of the water may be entrained in the air stream and carried out of the cooling towers as drift droplets. Drift droplets contain the same minerals and chemicals as the circulating water, and can be converted to airborne emissions upon release. Drift droplets can also potentially carry bacteria such as Legionella. Inhaling airborne water droplets containing Legionella can pose significant health issues.

Large drift droplets that settle out of the exhaust air stream and deposit near the towers can cause damage to surrounding equipment and vegetation due to wetting, icing, and salt deposit. Other drift droplets evaporate before being deposited on the surrounding areas, discharging PM emissions as the drift droplets evaporate and form fine particulate matter by crystallization of dissolved solids. The rate of PM discharged to the atmosphere depends upon the following:

- The mass fraction of Total Dissolved Solids (TDS) in circulating water;

- Drift factor which is the percentage of water that leaves as drift droplets with respect to circulating water flow rate; and
- Circulating water flow rate through the tower.

In addition to PM, heavy toxics may also be released through drift droplets. Toxic compounds may be introduced to the circulating water intentionally (as with chromium compounds for water treatment) or as a result of leakage from a process heat exchanger that handles fluid containing toxics.

The amount of solid mass in each drop is dependent on the TDS content and drift droplet size distribution. The estimated fraction of PM emissions as PM10 and PM2.5 therefore varies with TDS content.

Drift rates range between 0.01 percent and 0.0005 percent of the circulating water flow, for the 1970s era cooling towers to the cooling towers with advanced technology that are available currently, respectively.

Regulatory History

Cooling towers are largely exempt from permits requirement under Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II, which exempts towers that are not used to cool process water by evaporation and do not use chromium compounds to treat circulating water. In the past, chromium compounds were added to cooling tower water to protect equipment and piping from corrosion, and to control algae growth in the towers.

Cooling towers that have used hexavalent chromium for water treatment are subjected to Rule 1404. Rule 1404 phased-out the use of hexavalent chromium (Cr+6) and limited the concentration of Cr+6 in circulating water to 0.15 mg/L as of 1990. The use of Cr+6 in cooling towers built after 1990 is prohibited in the Basin. However, older cooling towers might still emit chromium, but that is likely only in trace quantities.

SCAQMD rules pertaining to PM mass rates and concentrations in discharged air could be applied to cooling towers (Rule 404 – Particulate Matter - Concentration and Rule 405 – Solid Particulate Matter - Weight). However, these rules are generally ineffective for the control of PM emissions from cooling towers due to characteristically lower emission rates or concentrations.

Proposed Method of Control

Drift eliminators are usually incorporated into the design of cooling towers to limit the amount of drift droplets from the air stream before air exits the towers. Drift eliminators rely on the inertial impaction principle caused by sudden change in direction of the air stream passing through the eliminators. The momentum of the heavier water droplets causes them to separate from the air stream and impinge against the drift eliminators. The water droplets coalesce into a film that will fall back into the towers.

Drift eliminator configurations include blade-type, wave form, and cellular designs. They can be made of ceramics, fiber reinforced cement, fiberglass, metal, plastic, and wood, formed into closely spaced slats, sheets, honeycomb assemblies, or tiles. The selected materials may include other features, such as corrugations and water removal channels to further enhance drift removal rates.

Blade drift eliminators are more durable compared to other configurations due to their heavier gauge blades. They are designed for effectively capturing drift droplets in a most cost-effective manner.

In general, cellular drift eliminators provide the greatest effective surface area for maximum drift removal efficiency at minimum pressure drop. With proper installation, a cellular drift eliminator can keep drift losses to less than 0.001 percent of the recirculating water flow rate, resulting in water savings as well. In addition, cellular drift eliminators can be trimmed for a tightest fit, hence further improve the drift eliminator efficiency.

Cooling towers built in the 2000s have a drift rate of 0.001 percent while the older ones built in 1970's and 1990's have higher drift rates (0.01–0.002 percent). The proposed control measure will seek to phase-in the use of drift eliminators with 0.001 percent drift rate for existing cooling towers where cost-effective. This can be achieved by retrofitting the older cooling towers with a modification to the cooling fans to accompany the drift eliminators. Newly constructed cooling towers have demonstrated ultra-low drift rate of 0.0005 percent. This drift rate has been achieved in practice and could be considered BACT for new construction.

Emission Reductions

To be determined.

Rule Compliance and Test Methods

To be determined.

Cost-Effectiveness

To be determined.

Implementing Agency

The SCAQMD has the authority to regulate emissions from stationary sources such as cooling towers.

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BCM-03: FURTHER EMISSION REDUCTIONS FROM PAVED ROAD DUST SOURCES [PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	PAVED ROAD DUST		
CONTROL METHODS:	MINIMUM STREET SWEEPING FREQUENCY, TARGETED CLEANING OF ROADS WITH HIGH SILT LOADINGS, WHEEL WASHING SYSTEMS FOR STATIONARY SOURCES		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2012**	**2021**	**2025**
PM2.5 INVENTORY	7.8	8.5	8.7
PM2.5 REDUCTION		TBD	TBD
PM2.5 REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	SCAQMD		

Description of Source Category

The purpose of this control measure is to reduce paved road dust emissions.

Background

Particulate emissions occur whenever vehicles travel over a paved surface such as a road or parking lot through the re-suspension of loose material. Paved road dust emissions have been found to vary with what is termed the "silt loading" present on the road surface. Silt loading is more specifically defined as the mass of silt-sized material (> 75 micrometers in diameter) per unit area of the travel surface. Sources affecting silt loading generally include: 1) pavement wear and decomposition; 2) vehicle-related deposition; 3) dust fall; 4) litter; 5) mud and soil carryout from unpaved areas; 6) erosion from adjacent areas; 7) spills; 8) biological debris; 9) ice control compounds; 10) recent precipitation history; and 11) recent road sweeping/cleaning history. Because of the importance of silt loadings to emissions, paved road dust control techniques attempt to either prevent material from being deposited on the surface (preventative controls) or remove material deposited on travel lanes (mitigative controls). Examples of preventative controls include covering of haul trucks or paving of access areas to construction sites. Street sweeping is an example of a mitigative control. In general, preventative controls are usually more cost-effective than mitigative controls to reduce paved road dust PM emissions.

Regulatory History

In accordance with U.S. EPA guidance, SCAQMD has implemented programs to reduce paved road dust emissions through both preventative and mitigative controls. SCAQMD Rule 1157 – PM10 Emission Reductions from Aggregate and Related Operations, for example, requires access improvements which are intended to reduce the amount of material tracked out from a facility onto surrounding paved public roads. Similarly, SCAQMD Rule 403 – Fugitive Dust, requires access improvements for sites greater than five acres and all material tracked out from applicable sources must be removed at the conclusion of the work day or at any time it extends more than 25 feet out from a site. SCAQMD Rule 1186 – PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations, includes requirements for local governments which are responsible for public paved road construction and maintenance activities. Rule 1186 requires new or widened roads to be constructed with curbing or, as an alternative, paved shoulders. Local governments are also required to remove material deposited onto roads as a result of wind, water erosion, or by other means, and are also required to procure only SCAQMD Rule 1186-certified street sweepers when replacing equipment.

Proposed Method of Control

Existing SCAQMD Rules 1157 and 403 requirements to reduce track out from stationary sources (e.g., aggregate facilities, construction sites, landfills, etc.) are based on a list of options. Further emission reductions could be achieved by specifying the most effective track out prevention measures, such as use of a wheel washing system, for sites with high vehicular activity exiting the site, or those with repeated track-out violations.

Existing Rule 1186 requires the procurement of Rule 1186-certified street sweepers for equipment purchases or contracts initiated after January 1, 2000. Based on information provided by local governments, street sweepers typically have a useful life of seven to 10 years, and thus presumably, all street sweepers in use today by local governments are certified devices. Rule 1186 requires that certified equipment be used on public roads currently subject to routine street sweeping but does not specify frequency. Accordingly, further paved road dust PM2.5 emission reductions could be sought through specifying the frequency of street sweeping. In the San Joaquin Valley, for example, a regulation requires street sweeping at a frequency of at least once per month for roads where sweeping is conducted. Street sweeping as part of routine roadway and highway maintenance may be included in a state, regional and/or local jurisdiction's National Pollutant Discharge Elimination System (NPDES) permits as part of federal Clean Water Act provisions to reduce debris from entering the storm drain system. NPDES permits are governed by the U.S. EPA and issued and maintained by regional water quality control boards. SCAQMD will coordinate with NPDES permittees and regional water quality control boards to ensure rules of this Plan or future Plans do not conflict with or otherwise compromise NPDES permit requirements. This review is not intended to be a part of the NPDES permit approval process or a reevaluation of existing NPDES permits, but is intended to determine current street sweeping or highway maintenance requirements and practices to ensure that any SCAQMD rulemaking would not be in conflict with existing NPDES permit requirements.

As part of efforts to reduce paved road dust silt loadings and the corresponding PM emissions, an evaluation of existing SCAQMD fugitive dust regulations will be conducted to determine if additional PM2.5 emissions can be achieved.

Emission Reductions

Emissions in the control measure summary represent baseline PM2.5 emissions from all road classifications (e.g., freeways, collector streets, etc.) and emission reductions from a potential control program have not yet been estimated. Future emission reduction calculations will take into account any adjustments to U.S. EPA AP-42 or CARB emission factors.

Rule Compliance and Test Methods

Compliance with this control measure can be monitored through recordkeeping and inspections. Street sweeper certification standards are presently contained in Rule 1186 and the SCAQMD Test Protocol: Rule 1186 Certified Street Sweeper Compliance Testing.

Cost-Effectiveness

The cost-effectiveness of this control measure has not been determined. The design of a wheel washing system will vary greatly depending on site-specific characteristics and anticipated traffic levels. Basic wheel washer system costs for a site with 100 trucks exiting a day have been estimated to range from $55,000 to $63,000 (approximately $12,500 for installation) and operational costs will vary with local utility rates. Wheel washing systems can also be leased for approximately $3,000 per month with one time installation/removal, including transportation, costs estimated at approximately $14,000. Operational and maintenance costs will depend on site-specific conditions. Street sweeping costs vary greatly based on number of miles and frequencies and whether the work is conducted with in-house or contracted resources. One local jurisdiction estimated twice monthly contract sweeping costs at $25 per curb mile. SCAQMD will continue to analyze the most recent emission factors for paved road dust and will provide cost-effectiveness information as it becomes available.

Implementing Agency

The SCAQMD has the authority to adopt and enforce rules and regulations to reduce emissions from fugitive dust sources.

References

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BCM-04: EMISSION REDUCTIONS FROM MANURE MANAGEMENT STRATEGIES

[NH3]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	FRESH LIVESTOCK WASTE		
CONTROL METHODS:	YEAR-ROUND OR SEASONAL/EPISODIC MANURE MANAGEMENT – ACIDIFIER APPLICATION, DIETARY MANIPULATION, FEED ADDITIVES, AND OTHERS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2012**	**2021**	**2025**
NH3 INVENTORY	9.61	5.20	4.0
NH3 REDUCTION*		0.26	0.20
NH3 REMAINING		4.94	3.80
CONTROL COST:	$15,000/TON NH3		
IMPLEMENTING AGENCY:	SCAQMD		

* The ammonia emission reductions include only estimates from the implementation of the feasible measure to lower the threshold for large confined animal facilities in existing Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities.

Description of Source Category

The purpose of this control measure is to reduce ammonia emissions (a PM2.5 precursor) from livestock waste with an emphasis on dairy manure. The control measure will seek to use manure management, such as acidifier application, dietary manipulation, feed additives, and other manure control strategies, which can be applied on a year-around basis. To minimize costs, some control techniques could be seasonally or episodically applied during times when high ambient PM2.5 levels are of concern.

Background

Ammonia contributes to formation of PM2.5 via atmospheric reactions with NOx and SOx emissions to form aerosol ammonium nitrate and ammonium sulfate. Livestock waste produces significant amounts of ammonia emissions.

In 2013, there were approximately 154,000 dairy cattle, 7.9 million poultry, and 5,500 swine in the Basin. In general, with existing regulation (i.e., Proposition 2 – known as cage-free proposition that passed in 2008), economics, and product demand, the livestock industry in the South Coast jurisdiction is not considered a growth industry. However, due to large amount of cow manure generated daily and with recent research findings that

freshly excreted manure in the animal housing areas is a significant source of ammonia emissions, selection of effective measures to minimize ammonia emissions from fresh manure is the focus of this control measure.

In the 2014 Update to the Climate Change Scoping Plan, short-lived climate pollutants (SLCPs) including methane, black carbon, and fluorinated gases (hydrofluorocarbon), were identified as an important aspect of a comprehensive approach to addressing climate change. Pursuant to Senate Bill [SB] 605 (Lara, Chapter 523, Statutes of 2014), in coordination with other State agencies and local air agencies, CARB developed the proposed SLCP Reduction Strategy to address SLCP reductions. California's dairy and livestock industries account for roughly half of the State's total methane emissions. About half of the methane emissions are attributed to enteric fermentation and the other half of the methane emissions come from manure management practices, primarily lagoon storage of flushed manure from milking cows. Potential methane reduction strategies are still being studied, including converting flush systems to dry manure systems, changing nutrition and feed supplements, and increasing milk production efficiencies to reduce methane emissions from the dairy industry.

Regulatory History

Rule 1133.2 – Emission Reductions from Co-Composting Operations requires proper composting and control in order to achieve a minimum of 70 percent and 80 percent VOC reductions, respectively, from existing and new co-composting (including manure composting) facilities with similar reductions for ammonia.

The 2007 AQMP Control Measure MCS-05 – Emission Reductions from Livestock Waste sought additional emission reductions from confined animal facilities (CAFs), beyond those achieved by current Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities and Rule 1127 – Emission Reductions from Livestock Waste. Control Measure MCS-05 suggested adding control requirements for swine operations to meet the objectives of California Senate Bill (SB) 700 – Agriculture & Air Quality Summary and Implementation. The control measure aimed to require more stringent controls (Class Two Mitigation Measures) for large confined animal facilities and lesser controls (Class One Mitigation Measures) for smaller confined animal facilities not currently subject to Rule 223 by bringing them into the SCAQMD's permit system. The control measure also aimed to further expand the scope of Rule 1127 based on anticipated results of ongoing and future scientific research regarding manure management. Overall, MCS-05 estimated 20 percent emission reduction from each of the dairy, poultry, and swine categories.

Currently, Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities (CAFs) requires a Permit to Operate for all large CAFs, which include facilities with (1): 1,000 or more milking cows; or 3,500 or more beef cattle; or 7,500 or more calves, heifers, or other cattle; or (2): 650,000 or more laying hens; or (3): 3,000 or more swine. In addition, the rule also requires these large facilities to submit and implement an emission mitigation plan developed based on different classes of mitigation measures to minimize VOC emissions from housing, feed operations, and manure handling.

Rule 1127 – Emission Reductions from Livestock Waste, requires best management practices for dairies, and specific requirements regarding manure removal, handling, and composting; however, the rule does not focus on fresh manure, which is one of the largest dairy sources of ammonia emissions.

In 2011, staff conducted a Technology Assessment that included a revised emissions inventory for all pollutants, including ammonia, to reflect new emission factors as well as current and future livestock animal headcounts. Based on the revised emissions inventory, industry-level projections (i.e., mostly negative growth), and current regulatory requirements, Rule 1127 amendments were not pursued at that time.

The 2012 AQMP Control Measure BCM-04 – Further Ammonia Reductions from Livestock Waste sought ammonia emission reductions from cow manure through seasonal or episodic application of the acidifier sodium bisulfate (SBS). The control measure also suggested a two-stage implementation. Phase I would include a technical assessment of the aforementioned method of control. If deemed feasible and effective, Phase II would implement the measure as needed to address future PM2.5 standards. Rule requirements would be specific to dairies in the AQMD jurisdiction and may be unique to localized operations only. SBS application will continue to be included in this control measure.

Proposed Method of Control

The following are new approaches to reduce ammonia emissions from manure and through modification of the animal food intake.

Acidifier Application

Reducing the pH level in manure through the application of acidifiers is one of the potential mitigation strategies for ammonia. SBS is being considered for use in animal housing areas where high concentrations of fresh manure are located. Research indicates best results with the use of SBS on hot spots. SBS can also be applied to manure stock piles and at fencelines, and upon scraping manure to reduce ammonia spiking from the leftover remnants of manure and urine. In California, SBS has been used at dairies in Tulare, Fresno, Merced, Stanislaus, San Joaquin, Kings, Kern, San Bernardino, Riverside, San Benito, and Sacramento, mainly to prevent cow lameness and nuisance flies. It has also been used by dairies in Walla Walla, Columbia, and Whitman (Washington), Wallowa (Oregon), and Wisconsin.

The emission reductions associated with SBS application are unknown at this time. Based on historical data, application may only be required for eight weeks out of the year; hence, seasonal or episodic application of SBS may be effective during times when high ambient PM2.5 levels are of concern.

Research indicates emission reduction potential in the range of 60 percent; however, SBS application timing and manure coverage variables require further evaluation. Existing information regarding SBS application at dairies in the Basin indicates an overall emission reduction potential of about 50 percent. Current use of SBS and application coverage volume and rates, along with cost, will be examined in conjunction with the above referenced Phase I pilot program and assessment.

Dietary Manipulation

Dietary manipulation, such as lowering the protein content and including high-fiber ingredients, is an effective method to decrease ammonia emissions from monogastric animals and ruminants manure. Experiments found up to 76 percent ammonia, as well as methane, emission reductions in manure of dairy cows fed with reduced protein diet. For swine, with the addition of amino acid supplements, lowering crude protein content by 3 percent would decrease nitrogen excretion by approximately 30 percent and ammonium concentration of the slurry by 37 percent. The decrease in nitrogen excretion reduces the concentration of ammonium, which in turn decreases ammonia emissions. In addition, the reduction in ammonium concentration also lowers the slurry pH which affects ammonia volatilization. Lower ammonia emissions are also found in manure of laying-hen fed low-protein and high-fiber diet (i.e., DDGS, a corn distiller's dried grains with solubles, or EcoCalTM, a mixture of calcium sulfate and zeolite). Research indicates that lowering 1 percent of crude protein diet results in a 10 percent decrease in

ammonia emission from laying hens in high-rise houses while egg production is not compromised. Manure of hens fed with 10 percent DDGS is found to emit 40 percent less ammonia. Dietary manipulation can also be considered for household pets. The use of dietary manipulation also has a co-benefit resulting in decreased potential for methane production from ruminant digestive system.

Feed Additives

Research indicates that for each 1 percent increase in fermented carbohydrates, such as bran and pulp, added into growing-finishing diets, a 14 percent ammonia emission reduction would occur. The reduction may be due to a pH effect or a shift of urinary to fecal nitrogen excretion.

Additives that either bind ammonia or inhibit urease (an enzyme that breaks down to ammonia) also showed reductions in ammonia emission (26 percent over a seven-week period in swine fed yucca extract).

The use of amino acid and enzyme supplements can reduce nitrogen excretion up to 40 percent, which in turn, reduces ammonia emissions. Feed additives can be considered as a seasonal or episodic control strategy when ambient PM2.5 concentrations are highest. In addition to ammonia emission reductions, feed additives can also help in reducing enteric methane emissions from dairy cows. Enteric fermentation accounts for 29 percent of California's methane inventory.

In addition, the following are new approaches aiming to reduce ammonia emissions from manure.

Manure Slurry Injection

Manure slurry injection would provide a significant (greater than 90 percent) reduction in odor and ammonia emissions compared to conventional land spreading. Manure injection would require approximately four to five times less fresh air dilutions than land spreading to reach the odor threshold. However, potential soil salinity and groundwater contamination must be carefully examined.

Conventional tillage and no-till injection systems are available for slurry and liquid manure. Currently, the injection systems are not commercially available for solid manures. Manure injection might disturb the soil or crop root system (forages, pasture/sod) and is more costly due to higher tractor horsepower and additional equipment maintenance. Cost increases as application rate decreases and distance from the manure storage site increases. At a 5,500 gallons per acre application rate, commercial drag hose injection cost is currently $0.014/gal compared to $0.0085/gal for land spreading. Manure injection can be considered as a seasonal or episodic control strategy.

Microbial Manure Additives

The use of bacterial products (Bacillus based) has demonstrated to effectively reduce ammonia emissions in broiler, layer, and turkey manure by lowering the gram negative bacterial population. Gram negative bacteria break down nitrogen in uric acid and convert it to ammonia emissions. Typical treatment costs are $0.005 per broiler, $0.055 per 40-lb turkey, and $0.028 per 16-lb hen, and $2.0 per ton of feed for layers.

Manure Belt Cleaning In Laying Hen House

Increasing manure belt cleaning frequency in laying hen house from once every four days to once every two days has the potential to reduce ammonia emissions by 45 percent. More frequent cleaning should be conducted when ambient PM2.5 concentrations are highest in the region.

Cage-Free Egg Laying Manure Removal

Cage-free egg laying hens produce eggs as well as manure in their living areas. Manure in the barns needs to be removed preferably on a daily basis to reduce ammonia emissions and minimize dust particles containing pathogens and toxins. The Aviary system where cage-free chicken can move up and down several levels and manure belt collects the falling dirt and manure is one of the many options available commercially. Manure belts of this system should be cleaned at least once every two days.

Poultry Manure Thermal Gasification

An emerging approach to manure management involves thermal gasification, whereby, after approximately 20 percent moisture content is removed, egg-laying manure is fed into a thermal gasifier where remaining moisture is evaporated, organic solids are converted into syngas, and mineral-rich ash is produced. Combustion gases from the process are treated by a bag filtration system before being released into the atmosphere. Syngas is ducted to a thermal oxidizer for heat generation. Ash byproduct is used as an animal feed supplement.

For example, by processing 240 tons of poultry manure daily from 5 million egg layers, the $30 million thermal gasifier plant in Pennsylvania is anticipated to reduce approximately 50 percent of ammonia emission and over 34,000 tons of carbon dioxide-equivalent greenhouse gases annually in addition to other benefits, such as biomass energy and mineral production.

CARB SLCP Reduction Strategy

Some control methods proposed in this control measure, such as dietary manipulation, feed additives, and manure removal can also be used as potential control methods to reduce livestock methane emissions, consistent with CARB's SLCP Reduction Strategy. The SLCP Reduction Strategy proposes potential 75 percent methane reductions from manure management in 2030 and 25 percent methane reductions from enteric fermentation in 2030—combined more than 40 percent reduction in methane emissions from entire dairy sector in 2030—with rulemaking beginning in 2017.

Finally, this control measure will implement all feasible control measures, including lowering the threshold for Large Confined animal facilities under Rule 223 – Emission Reduction Permits for Large Confined Animal Facilities.

Emission Reductions

Lowering the headcount threshold for Large Confined animal facilities is estimated to result in a reduction in emissions (from additional 46,000 cows regulated relative to a threshold reduction from 1,000 cows to 500 and 650,000 chickens to 400,000). The approach would be much more efficient depending on the options in the mitigation menu for cows and chickens that are implemented, and reductions from the remaining proposed control methods will be determined during rule development.

Rule Compliance and Test Methods

To be determined.

Cost-Effectiveness

The costs that would incur to the 36 dairy farms impacted by the proposed lower threshold include the additional cost of disposing manure though composting compared to disposing manure by land application, and the cost of more frequent corral cleaning (4 versus 2 times per year per farm). The cost of corral cleaning would be approximately $204.50 per cleaning. The analysis assumes that 119,732 tons of manure is sent to fabric in-vessel (FIV) composting operations, which would cost approximately $31 per ton of manure. In the absence of the composting facilities, the base case assumes that manure will be land spread in the Basin (least cost option currently available, which is approximately $10.20 per ton of manure).

The cost-effectiveness analyses uses the Discounted Cash Flow (DCF) method to compute the present value of the additional proposed control measure' costs and the incremental emissions reduction over a 10-year period (the assumed equipment lifetime) with a 4 percent real interest rate, which gives the present value factor of 8.111. DCF cost effectiveness can then be calculated as:

$$\textit{Cost Effectiveness} = \frac{\textit{Additional Compliance Cost} \times 8.111}{\textit{Incremental Emission Reductions}_{tons/year} \times 10 \text{ years}}$$

Where:

1. *Additional Annual Compliance Cost = ($FIV_{cost/ton}$ – In-basin spreading) x tons manure + extra corral cleaning costs*
   =(($31 – $10.2) x 119,732)) + $14,724
   =$2.5 million
2. *Emission Reductions$_{tons/year}$ = (Annual Emission Reductions with Current Rule 223) – (Annual Emission Reductions with lower threshold)*

The 2016 annual emission reductions are 0.37 tons/day (135 tons/year) ammonia and 0.07 tons/day (26 tons/year) VOC.

Pollutant	Additional Emission Reductions from Impacted Dairies	Cost-effectiveness
VOC	26 tons/year	$78,000/ton
Ammonia	135 tons/year	$15,000/ton

Implementing Agency

The SCAQMD has the authority to regulate emissions from livestock waste.

References

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BCM-05: AMMONIA EMISSION REDUCTIONS FROM NOx CONTROLS [NH3]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	VARIOUS NOX SOURCES		
CONTROL METHODS:	AMMONIA SLIP CATALYSTS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2012**	**2021**	**2025**
NH3 INVENTORY	TBD	TBD	TBD
NH3 REDUCTION		TBD	TBD
NH3 REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	SCAQMD		

Description of Source Category

The purpose of this control measure is to seek reductions of ammonia from NOx controls such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR).

Background

Ammonia slip results from of the injection of ammonia into the flue gas stream of combustion equipment such as boilers, engines, furnaces, and turbines that utilize either SCR or SNCR. Ammonia (or urea) is used in these control systems to react with NOx for conversion into nitrogen gas (N_2) and water (H_2O). These systems are capable of reducing NOx emissions from combustion sources very effectively. However, the use of these systems also results in potential emissions of ammonia that "slip" past the control equipment and into the atmosphere.

Ammonia molecules react with NOx molecules at a 1:1 stoichiometric ratio. NOx reductions are readily achievable if excess ammonia is used. However, ammonia is a precursor for particulate matter. SCR and SNCR systems include balancing and feedback loops to prevent too much or too little ammonia from being injected, while maintaining a sufficiently fast response time for any load changes.

Regulatory History

SCAQMD Rule 1105.1 – Reduction of PM10 and Ammonia Emissions from Fluid Catalytic Cracking Units which applies to fluid catalytic cracking units at petroleum refineries, contains an ammonia slip limit of 10 ppmv corrected to 3 percent oxygen (O_2) dry, averaged over 60 consecutive minutes. Although there are no other source specific rules for ammonia emissions resulting from the use of add-on controls for combustion equipment, there are limits

set forth in the SCAQMD's Best Available Control Technology (BACT) guidelines for major and non-major polluting facilities. Ammonia slip emissions for large IC engines at facilities with add-on controls have a limit of less than or equal to 10 ppmv (corrected to 15 percent O_2). The limits at non-major polluting facilities for gas turbines are less than or equal to 9 ppmv for smaller units and 5 ppmv for larger units (corrected to 15 percent O_2). For large boilers and process heaters at non-major polluting facilities, the ammonia slip limits are less than or equal to 5 ppmv (corrected to 3 percent O_2). At major polluting facilities, the ammonia slip limits for gas turbines and for boilers and process heaters are 5 ppmv (corrected to 15 percent O_2) and 5 ppmv (corrected to 3 percent O_2), respectively.

Proposed Method of Control

Recent advances in catalyst technology have resulted in the development of ammonia slip catalysts that selectively convert ammonia into nitrogen (N_2). These catalysts could be installed post-SCR and would result in less ammonia slip.

Emission Reductions

Ammonia slip catalysts can generally achieve at least a 75 percent ammonia reduction, which can vary based on process parameters. Potential emission reductions based on the ammonia slip inventory are yet to be determined.

Rule Compliance and Test Methods

SCAQMD Method 207-1, Determination of Ammonia Emissions from Stationary Sources, or any alternative or equivalent test method approved by the Executive Officer, CARB, and U.S. EPA.

Cost-Effectiveness

To be determined.

Implementing Agency

The SCAQMD has the authority to regulate emissions from stationary sources.

References

1. *SCR and Advanced Ammonia Slip Catalyst*, Johnson Matthey Presentation, SCAQMD 2016 AQMP Control Strategy Symposium, June 2015.

2. Gil, Elena. *Evaluation of Ammonia Slip Catalysts*, Department of and Chemical Biological Engineering, Chalmers University of Technology, Göteburg, Sweden, 2013.

BCM-06: EMISSION REDUCTIONS FROM ABRASIVE BLASTING OPERATIONS

[PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	ABRASIVE BLASTING		
CONTROL METHODS:	DUST COLLECTION WITH AIR FILTRATION		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2012**	**2021**	**2025**
PM2.5 INVENTORY*	0.006	0.006	0.007
PM2.5 REDUCTION		TBD	TBD
PM2.5 REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	SCAQMD		

***** Inventory will be re-assessed as part of rulemaking process.

Description of Source Category

Abrasive blasting is the cleaning, preparing or texturizing of the surface of a material such as metal or masonry by forcibly propelling a stream of abrasive material against the surface. Sand is the most widely used blasting abrasive. Other abrasive materials include slag, steel or iron shot/grit, garnet or walnut shells. Abrasive blasting operations are done in both confined and unconfined conditions.

Background

Abrasive blasting includes both permitted and non-permitted sources. Based on the preliminary permit record, SCAQMD received a total of 243 permit applications for abrasive blasting operations since 1991. There are 84 active permits received from 58 facilities within the SCAQMD jurisdiction. Out of the active permits, 68 permits are for cabinet/machine/room abrasive blasting and the remaining 16 permits are for portable/open abrasive blasting. More than one half of the active permits are from manufacturing industry establishments. Because some abrasive blasting equipment are exempt from a written permit according to Rule 219, the total universe of abrasive blasting operations is expected to be much broader than the permit record.

Regulatory History

SCAQMD Rule 1140 – Abrasive Blasting was first adopted in February 1980 and then amended in 1985 to conform to the California Code of Regulations (CCR) Title 17, Subchapter 6 – Abrasive Blasting. The CCR and Rule 1140 establish both operating requirements and abrasive materials requirements. These regulations establish prohibition against visible emissions from confined or unconfined abrasive blasting operations. Abrasive blasting operations are also subject to the no visible emissions requirements in the SCAQMD Rule 1155 – Particulate Matter (PM) Control Devices, for operations used in conjunction with a PM air pollution control device. This control measure would seek voluntary applications of proposed control methods by providing incentives.

The California Health and Safety Code prohibits local districts from requiring emission and performance standards more or less stringent that the State regulation as stated in Section 41904, *"the standards shall be statewide, and no rule or regulation of any district that is applicable to sandblasting operations shall be stricter or less strict that the standards adopted by the State board pursuant to the recommendations of the committee."* SCAQMD Rule 1140 has been development with the ultimate goal of consistency.

Proposed Method of Control

Current permit conditions for abrasive blasting in confined (cabinet/machine/room) conditions require venting to a PM air pollution control (APC) equipment when in full use. Baghouses or dry filters are the most frequently used APC equipment. For open and portable blasting operations, venting to APC equipment is not required unless abrasives contain a carcinogenic toxic material. This control measure proposes voluntary applications of the following methods of control by providing incentives, primarily focusing on dry abrasive blasting operations conducted in open areas using portable blasting equipment with or without a written SCAQMD permit:

- Blasting Enclosures and Dust Collection
    - A portable blasting enclosure/booth can be installed at the outdoor job site with a dust collection system. The portable enclosure for outdoor blasting can be used to further reduce emissions even when abrasives used do not contain any known carcinogenic toxic material. The blasting emissions can then be vented to PM APC equipment with a combination of filters installed. If abrasives contain a known carcinogenic material, a manufacturer-certified HEPA filter can be used in the APC equipment for additional control.
    - The outdoor workspace may be walled off with permanent or temporary construction barriers while maintaining a negative pressure environment.
    - Pressure conditions can be monitored to ensure proper pressure is maintained so that blasting dust would not escape out of the enclosed workspace. Portable or fixed differential pressure monitors may be considered to continuously monitor and assist in the maintenance of pressure condition.

Emission Reductions

The universe of PM emissions and emission reductions will be investigated during implementation of this control measure. Once dust is captured by a collection system, cartridge-type dust collectors can achieve up to 99.9 percent removal efficiency on 0.2–2 µm particles, if well maintained. A HEPA filter is generally certified by

manufacturers to remove PM down to a size of 0.3 µm with 99.97 percent efficiency. Dust collection efficiency of these systems can vary based on the operation and equipment type.

Rule Compliance and Test Methods

All abrasives used for dry unconfined blasting should be tested in accordance with "Method of Test for Abrasive Media Evaluation, Test Method No. Calif. 371-A," or other test method approved by the Executive Officer.

Cost-Effectiveness

Cost-effectiveness will be determined during control measure implementation.

Implementing Agency

The SCAQMD has the authority to regulate emissions from both permitted and non-permitted blasting operations.

References

1. SCAQMD, Rule 1140 – Abrasive Blasting, Amended August 2, 1985.
2. SCAQMD, Rule 1155 – Particulate Matter (PM) Control Devices, Amended May 2, 2014.
3. California Code of Regulations, Title 17 Subchapter 6 – Abrasive Blasting (Sections 92000-92530).
4. DOE, Specifications for HEPA filters used by DOE contractors, U.S. Department of Energy, DOE-STD-3020-2005, December 2005.

BCM-07: EMISSION REDUCTIONS FROM STONE GRINDING, CUTTING AND POLISHING OPERATIONS [PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	STONE FABRICATION OPERATIONS		
CONTROL METHODS:	WET DUST SUPPRESSION, PORTABLE DUST COLLECTOR WITH HEPA FILTER		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2012**	**2021**	**2025**
PM2.5 INVENTORY*	0.013	0.017	0.017
PM2.5 REDUCTION		TBD	TBD
PM2.5 REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	SCAQMD		

* Inventory will be re-assessed as part of rulemaking process.

Description of Source Category

Stone fabrication such as grinding, cutting, drilling, scarifying, polishing, carving, and etching generates significant amounts of dust emissions containing PM10, some PM2.5, and silica particles which are known to cause lung diseases or silicosis. Uncontrolled PM emissions from stone work can contribute to regional PM levels, can cause high concentrations of PM locally, while also elevating the exposure of workers and neighborhood residents to toxic silica particles.

Background

Masonry or building materials such as concrete, stone, granite, tile, brick, and mortar can be processed for a variety of purposes at confined (e.g., stone shops) or unconfined (outdoor) worksites. Examples of these processes include, but are not limited to, grinding, milling, cutting, scarifying, drilling, carving, etching, and polishing operations for residential and commercial new construction and renovation. Many of those operations are performed by builders, landscapers and remodeling contractors, and may not be properly controlled for dust emissions. These operations are most likely to be exempt from requiring a permit under Rule 219.

Regulatory History

SCAQMD Rule 219 does not require permits from machining equipment exclusively used for polishing, cutting, surface grinding, etc. However, SCAQMD Rule 403 – Fugitive Emissions, prohibits fugitive emissions from any onsite mechanical activities, including cutting, from exceeding a 20 percent opacity limit.

Proposed Method of Control

This control measure would seek to control PM including silica particles. Both dry and wet dust control options are available. Some of these methods of control are already regulated by the California Occupational Safety and Health Administration (Cal/OSHA) as existing work place standards.

- Wet Control Methods: wet systems involve spraying water onto the rotating cutting disc to reduce dust emissions. Emissions are expected to be minimal, provided the waste material is disposed of properly. This method will produce a wet slurry associated with the wet dust suppression, in which case wet vacuuming, wet wiping, and wet sweeping can be implemented as housekeeping measures.

- Dry Control Methods:

  - Local exhaust ventilation (LEV) would be suitable for hand-held power tools (e.g., cut-off saws and grinders). It uses guards and directors attached to the tools to act as a dust collecting hood. The guard or director is connected to an industrial vacuum cleaner which provides sufficient exhaust ventilation to capture the majority of dust emitted during the cutting or grinding operation. The vacuum cleaner is equipped with high efficiency particulate air (HEPA) filter to protect workers from silica dust.

  - Dry cutting emissions can be controlled at the point of operation using a portable dust collector, air scrubber and negative air machine to prevent dust from being released into the atmosphere. A combination of a variety of filter media can be customized to achieve appropriate controls, including HEPA filters.

- Incentives: financial incentives can be made available to exchange existing dry/wet equipment with new equipment that includes integrated add-on controls.

Emission Reductions

HEPA filters are certified by manufacturers to be 99.97 percent efficient in removing particles 0.3 microns or larger once airborne dust is diverted to a collection system. However, the collection efficiency of these systems can vary widely. The PM emissions inventory and emission factors from these mechanical activities are currently not determined and will be examined during rule development.

Rule Compliance and Test Methods

Some work may be conducted at residential job sites, which presents enforcement challenges. A SCAQMD rule, other enforceable instrument, or use of equipment certification or incentives will be considered. The most efficient regulatory approaches will be selected considering cost-effectiveness.

Cost-Effectiveness

Cost-effectiveness for proposed methods of control will be determined during rule development.

Implementing Agency

SCAQMD has the authority to regulate emissions from non-vehicular sources.

References

1. Occupational Safety and Health Administration, Hazards of Operating Unguarded Stone Cutters and Splitters in Landscaping and Other Worksites, Safety and Health Information Bulletin, SHIB 01-25-2013 (online accessed in September 2015).

2. California Code of Regulations, Title 8, Section 1530.1 – Control of Employee Exposures from Dust-Generating Operations Conducted on Concrete or Masonry Materials.

BCM-08: FURTHER EMISSION REDUCTIONS FROM AGRICULTURAL, PRESCRIBED AND TRAINING BURNING [PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	OPEN BURNING		
CONTROL METHODS:	INCENTIVIZE BURN ALTERNATIVES, BURN PROHIBITIONS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2012**	**2021**	**2025**
PM2.5 INVENTORY	0.34	0.68	0.68
PM2.5 REDUCTION		TBD	TBD
PM2.5 REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	SCAQMD		

Description of Source Category

This control measure proposes to further reduce PM emissions from open burning sources.

Background

Agricultural burning involves collection and combustion of vegetative materials produced from the growing and harvesting of crops. Prescribed burning is the planned burning of vegetative materials, usually conducted by a fire protection agency or the department of forestry in order to control plant disease and pests or to reduce fire episode impacts. Training burns are hands-on activities conducted by fire protection agencies to practice suppressing fires. Based on 2015 burn permit acreage data, over 90 percent of agricultural burns are conducted within the Coachella Valley area (Salton Sea Air Basin) but a limited amount of agricultural burning continues within the western Riverside/San Bernardino County portions of the Basin. Prescribed burns occur on the northern and eastern boundaries of the Basin and are sometimes incorporated into fire suppression activities. Training burns occur throughout the region. The emissions estimates shown in the table above are all of the year's open burning emissions divided by 365 days and represent annual average day emissions. Open burning emissions estimates presented on a 24-hour (daily) basis, which could include individual agricultural and prescribed burns, would be higher. Biomass burning is also a source of black carbon (soot) which recent studies suggest influences climate by directly absorbing light, reducing the reflectivity of snow and ice through deposition and interaction with clouds.

Regulatory History

Open burning activities are currently subject to SCAQMD Rule 444 – Open Burning provisions which are intended to minimize PM emissions and smoke in a manner that is consistent with State and federal laws. Under the program, open burning is allowed on a permissive burn day, provided that a permit and an event authorization is obtained, and that such burning event is not prohibited by a fire protection agency. A permissive burn day is declared by SCAQMD when certain meteorological conditions are met. Rule 444 also includes general requirements (i.e., burning time window and ignition device) for open burning, as well as additional requirements, such as moisture level and firing methods for agricultural burning. A Smoke Management Plan is required for prescribed burning. In addition, Rule 444 sets SCAQMD-wide maximum daily burn acreage for agricultural and prescribed burning, but allows for training burns if the duration is less than 30 minutes and clean fuel is utilized.

In 2013, Rule 444 was amended to align burn prohibitions with the SCAQMD Rule 445 – Wood-Burning Devices requirements during the winter season. As a result, Rule 444 now limits open burning whenever a mandatory winter burning curtailment is called under Rule 445 for individual source/receptor areas or the entire Basin. These revised provisions do not apply to open burning sources above 3,000 feet in elevation.

AB 32 (California Global Warming Solutions Act of 2006) includes provisions to achieve and maintain Statewide GHG emission limits. Recent legislation [Senate Bill (SB) 605 (Lara, Chapter 523, Statutes of 2014)] requires CARB to develop a plan to reduce what are referred to as short lived climate pollutants, including black carbon. In response to SB 605, CARB has recently circulated for comment the Short-Lived Climate Pollutant Reduction Strategy (SLCP Strategy) which includes recommended control measures and emission reduction targets. For anthropogenic (non-forest) black carbon sources such as agricultural burning, the SLCP Strategy includes a 50 percent reduction target in emissions by 2030 when compared to business as usual (BAU) conditions. Ultimately, the SLCP Reduction Strategy, along with other planning efforts, will be incorporated into the 2030 Target Scoping Plan update scheduled for completion by 2017 (CARB, 2016).

Proposed Method of Control

Further PM emission reductions could be achieved through use of a fee schedule and/or an incentive program to limit agricultural burning and promote burning alternatives (e.g., chipping/grinding or composting). For example, under current program requirements, agricultural producers greater than 10 acres are charged approximately $150 for a burn permit and smaller sites pay no fees. One approach to reduce emissions could involve establishing an administrative fee as part of the burn permit program based on acreage or amount of material burned, to the extent these factors are related to efforts required for processing and enforcing. Fees would not be charged to producers using alternatives to burning. Another approach could involve providing incentives to agricultural producers, especially in peak PM2.5 areas, to implement alternatives to burning. A demonstration project could also be established where a SCAQMD contractor could be utilized to conduct chipping/grinding and removal activities in peak PM2.5 areas at no cost to producers.

Rule 444 was amended in 2013 to align no burn prohibitions with Rule 445 no burn day requirements during the months of November through the end of February. As described in Control Measure BCM-09, the PM2.5 threshold used to forecast no burn days under Rule 445 could be lowered or the winter season could be potentially expanded to also include October and/or March. Realigning Rule 444 burn prohibitions with any potential changes to the Rule 445 no burn day provisions could further reduce open burning emissions during peak PM2.5 episodes.

Approximately 90 percent of agricultural burning occurs outside of the Basin. If necessary to maintain PM2.5 attainment in the Salton Sea Air Basin or in response to a public concerns, Rule 444 provisions applicable to the Basin could be extended to Salton Sea Air Basin sources. Additionally, the current prohibition of open burning within 1,000 feet of a sensitive receptor could be applied to the burning of currently exempted plant materials, such as Russian Thistle (tumbleweeds).

Alternatives to agricultural open burning, such as chipping/grinding/land application and composting are consistent with the SLCP Reduction Strategy goals to reduce biomass burning. The proposed 2016 SLCP Reduction Strategy also includes recommended actions such as thinning overstocked forests either manually, mechanically, or through use of prescribed fire to reduce wildfire risk and the associated black carbon emissions. It is acknowledged prescribed fire is a black carbon source; however, unlike wildfires, the SLCP Reduction Strategy describes it can be timed to favorable atmospheric conditions to ultimately reduce the risk of crown fires, which are a driver for large, catastrophic wildfires. Lastly, the Governor's Cap-and-Trade Expenditure Plan for the 2016-17 proposed budget includes $140 million for CAL FIRE to support forest health and resiliency programs that reduce GHG emissions.

Emission Reductions

The emissions in the control measure summary represent baseline annual average day emissions from agricultural burning. The emission reductions from this control measure have not been estimated. For reference, a report to the SJVAPCD Governing Board estimated a net PM2.5 reduction of approximately seven pounds per acre when shredding and land application of material was utilized instead of open burning. Implementing agricultural burning alternatives is also consistent with SLCP Reduction Strategy goals to reduce black carbon emissions.

If Rule 444 provisions were realigned to match potential changes to Rule 445 under BCM-09, there likely would be a slight increase in the number of no-burn days under Rule 444. However, no annual emission reductions would be anticipated as the burning prohibited during a revised program would likely be switched to other, non-episodic times of the year.

Rule Compliance and Test Methods

Rule compliance could be achieved through recordkeeping and inspections.

Cost-Effectiveness

The cost-effectiveness of this control measure has not been estimated but costs to implement burning alternatives would be expected to be higher due to equipment and labor costs. The SJVAPCD report on alternatives to agricultural burning estimated shredding and land application of vineyard material for a 20 acre site at approximately $975 per acre while open burning was estimated to cost approximately $200 per acre.

Cost impacts from an increase in burning prohibitions due to elevated PM2.5 levels are expected to be minimal as burning would likely be switched to other times of the year.

Implementing Agency

The SCAQMD has the authority to regulate emissions from open burning sources. SCAQMD will also seek partnerships with CAL FIRE, Resource Conservation Districts, County agricultural commissioner's offices and other agencies to secure funding to implement programs to promote open burning alternatives.

References

California Code of Regulations, Title 17 – Agricultural Burning Guidelines.

CARB, 2016. California Air Resources Board; Proposed Short-Lived Climate Pollutant Reduction Strategy; April 2016.

SCAQMD, 2013. South Coast Air Quality Management District, Final Staff Report Rule 444 – Open Burning, May 2013.

SJVAPCD, 2010. San Joaquin Valley Air Pollution Control District, Final Staff Report and Recommendations on Agricultural Burning, July 2010.

U.S. EPA, 2016. U.S. Environmental Protection Agency, Black Carbon Background Publication https://www3.epa.gov/blackcarbon/basic.html#where and Effects of Black Carbon Publication https://www3.epa.gov/blackcarbon/effects.html.

BCM-09: FURTHER EMISSION REDUCTIONS FROM WOOD-BURNING FIREPLACES AND WOOD STOVES [PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	RESIDENTIAL WOOD COMBUSTION		
CONTROL METHODS:	MANDATORY CURTAILMENTS, INCENTIVE PROGRAMS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2012**	**2021**	**2025**
PM2.5 INVENTORY	5.2	4.9	4.9
PM2.5 REDUCTION		TBD	TBD
PM2.5 REMAINING		TBD	TBD
CONTROL COST:	TO BE DETERMINED		
IMPLEMENTING AGENCY:	SCAQMD		

Description of Source Category

The purpose of this control measure is to seek additional emission reductions from residential wood burning activities.

Background

The types of devices used to burn wood in a typical residence are fireplaces and wood heaters (e.g., fireplace inserts and free-standing wood stoves). Since fireplaces are very inefficient heat sources and given the temperate climate in the Basin, they are used primarily for aesthetic purposes. Fireplace inserts and wood stoves are much more efficient and in some residences, are used as the primary source of heating.

Emissions from residential wood burning devices are caused primarily by incomplete combustion and include PM, CO, NOx, SOx, and VOC. Particulate emissions, however, have been the focus of most air district control programs. Studies indicate that the vast majority of particulate emissions from residential wood combustion are in the fine (2.5 micrometers or less) fraction. Additionally, incomplete combustion of wood produces polycyclic organic matter (POM), a group of compounds classified as hazardous air pollutants under Title III of the federal Clean Air Act. Biomass burning is also a source of black carbon (soot) which recent studies suggest can influence climate by directly absorbing light, reducing the reflectivity of snow and ice through deposition and interacting with clouds. According to CARB, soot from residential wood combustion is forecast to be the largest individual anthropogenic (man-made) source of black carbon in 2030 if no new programs are implemented.

In 2011, CARB conducted a Statewide evaluation of emissions from residential wood combustion based on the most recent emission factors, activity data, and data from the American Housing Survey, and the U.S. Census Bureau where available. The results of the updated residential wood combustion emissions inventory, including reductions from existing control programs, are provided in the emissions summary which represents all of the emissions occurring within the year expressed in terms of an annual average day. Average winter day emissions would be higher as it is estimated that 90 percent of residential wood burning occurs in the months from October through the end of March.

Regulatory History

Control measures for residential wood combustion were included in the 2007 and 2012 AQMPs and Rule 445 was adopted in 2008 and amended in 2013 to implement those control measures. Under the Rule 445 provisions, only gaseous-fueled hearth devices are allowed in new developments. For additions or modifications to existing developments, Rule 445 allows any gaseous-fueled device but any wood-burning devices sold or installed must be U.S. EPA Phase II-certified or equivalent. Rule 445 prohibits the burning of any product not intended for use as a fuel (e.g., trash) in a wood burning device and requires commercial firewood facilities to only sell seasoned firewood (20 percent or less moisture content) from July through February. Rule 445 also established a mandatory wood burning curtailment program extending from November 1 through the end of February each winter season. During a wood burning curtailment period, the public is required to refrain from both indoor and outdoor solid fuel burning in specific areas when PM2.5 air quality is forecast to exceed 30 $\mu g/m^3$. These no burn provisions apply to the entire Basin whenever a PM2.5 level of greater than 30 $\mu g/m^3$ is forecast for any monitoring station that has recorded violations of the federal 24-hour PM2.5 standard in either of the previous two years. Lastly, Rule 445 requires commercial firewood or other wood-based fuel sellers to notify the public of the Check Before You Burn wood burning curtailment program through a labeling program.

AB 32 (California Global Warming Solutions Act of 2006) includes provisions to achieve and maintain Statewide GHG emission limits. Recent legislation [Senate Bill (SB) 605 (Lara, Chapter 523, Statutes of 2014)] requires CARB to develop a plan to reduce what are referred to as short lived climate pollutants, including black carbon. In response to SB 605, CARB has recently circulated for comment the Short-Lived Climate Pollutant Reduction Strategy (SLCP Reduction Strategy), which includes recommended control measures and emission reduction targets. For residential wood combustion, the SLCP Reduction Strategy includes a 50 percent reduction target in black carbon emissions by 2030 when compared to business as usual (BAU) conditions. Ultimately, the SLCP Reduction Strategy, along with other planning efforts, will be incorporated into the 2030 Target Scoping Plan update scheduled for completion by 2017.

Proposed Method of Control

Wood smoke reduction programs have been implemented in this area since 2008 and in other jurisdictions for many years. The stringency of each air district's program depends on the region's PM air quality and the relative contribution of fine particulates from this source category. While it is acknowledged that the Basin has some of the highest ambient PM concentrations in the nation, speciated air quality data indicates that the contribution of residential wood smoke to regional particulate pollution is less than 10 percent. However, given that residential wood burning is one of the last lesser-controlled sources of direct PM2.5 emissions, curtailment programs can be very cost-effective relative to other source categories.

In 2014, the SJVAPCD amended Rule 4901 and the threshold used to forecast no burn days was reduced to 20 µg/m^3. The Bay Area AQMD recently adopted amendments to the Regulation 6, Rule 3: Wood Burning Device regulation. The original Bay Area AQMD proposal would have required multiple day burn prohibitions to prevent smoke accumulation leading to exceedance of the federal NAAQS but this proposal was removed as the current rule has been determined to provide the agency enough flexibility to declare consecutive no burn days in anticipation of a possible exceedance. SCAQMD is evaluating the amended Bay Area AQMD regulation which also includes clarifications to exemptions.

Based on a review of U.S. EPA guidance documents and other air district wood smoke control programs the existing SCAQMD curtailment program threshold could be lowered and a review of historical air quality data indicates establishing a 20 µg/m^3 threshold, as was done in the San Joaquin Valley, could result in 28 additional no burn days each winter above the estimate of 24 days at the current threshold. For reference, air quality data from the last three years indicates, on average, 11 additional no burn days would be anticipated each winter if the curtailment threshold was set at 25 µg/m^3. Another control option could be to utilize a similar approach as Bay Area AQMD and forecast more consecutive no burn days. The Check Before You Burn program could also be extended to also include the months of October and/or March as high PM2.5 levels can occur during these periods. All of these potential control options would increase the number of no burn days which could lower the contribution of wood smoke to ambient PM2.5 levels in the winter months. Although these episodic reductions are designed to address 24-hour PM2.5 concentrations, a consistent reduction in wintertime PM2.5 from reduced wood burning could have an impact on annual average PM2.5 concentrations. Further analysis will be conducted to determine the appropriate approach to achieve the emission reductions necessary to assist attainment of the annual average federal PM2.5 NAAQS as needed.

Since 2008, SCAQMD has implemented programs which provide financial incentives to encourage the public to switch to cleaner hearth devices. The current program encourages households within inland (high PM2.5 areas) to upgrade wood-burning devices through SCAQMD incentives of up to $1,600 to offset purchase and installation costs. Although this program has been effective, additional reductions may be achieved through the use of higher incentives or expansion of the eligible geographic area. Experience has shown that education and outreach to targeted households is vital to ensure program participation; An additional element of this control measure would focus on expanding the effectiveness of incentive programs.

The proposed 2016 SLCP Reduction Strategy includes recommended actions to further reduce non-forest black carbon emissions from residential wood combustion. Specific measures include prohibition of wood-burning devices in new developments, removal of old fireplaces and woodstoves and replacement with EPA-certified devices, electric heaters or gas fireplaces through incentive programs and education and outreach to develop a better public understanding of health and environmental impacts from wood smoke. The proposed SLCP Reduction Strategy also states that the Governor's 2016–17 proposed budget includes $40 million of cap-and-trade expenditures to implement a residential woodstove replacement program, however, the funding must be appropriated by the Legislature.

Emission Reductions

The emission reductions from this control measure have not been estimated but previous control measures and Rule development efforts have estimated emission reductions from the mandatory wood burning curtailment program. It should be noted that while controlling emission from residential wood burning is primarily intended

to reduce PM2.5 emissions, an added benefit is reduced emissions of CO, VOC, NOx, SOx, and hazardous air pollutants. Emission reductions from existing and potential new wood smoke reduction programs are also consistent with the SLCP Reduction Strategy goals to reduce black carbon emissions from residential wood combustion sources.

Rule Compliance and Test Methods

Compliance with this control measure is reliant on use of incentives and verification through complaint response. U.S. EPA is responsible for certifying wood burning devices under Title 40 Code of Federal Regulations, Part 60, Subpart AAA.

Cost-Effectiveness

The cost-effectiveness of this control measure has not been determined, however, increasing the number of curtailment days would result in relatively few cost increases to the impacted community.

Based on results of the current and former SCAQMD incentive programs, a basic gas log set can be purchased at a local retailer and installed by a contractor into a home with an existing wood burning fireplace plumbed for natural gas for approximately $400 to $500. Average cost associated with removal and replacement of conventional (uncertified) wood heater with a U.S. EPA Phase II-certified device has been estimated at $4,000 per unit.

Implementing Agency

The SCAQMD has the authority to regulate emissions from residential wood combustion sources. SCAQMD will also seek partnerships with CARB, hearth product manufacturers and other air districts to secure funding to expand on current incentive programs that encourage the public to switch to lower emission fireplaces and woodstoves through financial incentives.

References

Bay Area AQMD, 2015. Bay Area Air Quality Management District, Air District Proposed Amendments to Regulation 6, Rule 3: Wood Burning Devices, August 17, 2015.

CARB, 2011. California Air Resources Board; Area Source Methodology, Section 7.1 Residential Wood Combustion; March 2011.

CARB, 2016. California Air Resources Board; Proposed Short-Lived Climate Pollutant Reduction Strategy; April 2016.

Naeher, 2007. Woodsmoke Health Effects: A Review, Journal of Inhalation Toxicology, 19:67-107, 2007

SJVAPCD, 2014. San Joaquin Valley Air Pollution Control District, Rule 4901 – Wood Burning Fireplaces and Wood Burning Heaters; Amended September 18, 2014.

SCAQMD, 2013. South Coast Air Quality Management District; Draft Final Staff Report for Proposed Rule 445 – Wood Burning Devices; May 2013.

U.S. EPA, 1996a. U.S. Environmental Protection Agency AP-42, Section 1.9, Residential Fireplaces; October 1996.

U.S. EPA, 1996b. U.S. Environmental Protection Agency AP-42, Section 1.10, Residential Wood Stoves; October 1996.

U.S. EPA, 2016. U.S. Environmental Protection Agency, Black Carbon Background Publication https://www3.epa.gov/blackcarbon/basic.html#where and Effects of Black Carbon Publication.

BCM-10: EMISSION REDUCTIONS FROM GREENWASTE COMPOSTING [VOC, NH3]

As this measure is a continued implementation from the 8-hour ozone control measures, the reader is referred back to BCM-10 in Section 1 of this Appendix.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix IV-B

CARB's Mobile Source Strategy

2016 AIR QUALITY MANAGEMENT PLAN



January 2017

DRAFT FINAL 2016 AQMP
APPENDIX IV-B

CALIFORNIA AIR RESOURCES BOARD
MOBILE SOURCE STRATEGY FOR SOUTH COAST

JANUARY 2017

South Coast-Related Excerpts from the Proposed 2017 State Strategy for the State Implementation Plan

California Environmental Protection Agency
Air Resources Board

Excerpts from Chapter 3: Proposed SIP Commitment

SIPs must contain enforceable commitments to achieve the level of emissions necessary to meet federal air quality standards, as defined by the attainment demonstration. The State SIP Strategy proposes new SIP measures and quantifies SIP commitments for two areas of the State – the South Coast and the San Joaquin Valley. The State SIP Strategy will also serve as the basis for additional quantified commitments if needed by other federal nonattainment areas. Adoption of the State SIP Strategy by the Board would create a commitment for new emission reductions by the attainment deadlines for each region. The commitment consists of two components:

1. A commitment to bring to the Board or take action on defined new measures; and
2. A commitment to achieve aggregate emission reductions by specific dates.

The total emission reductions and the obligation to propose certain actions would become enforceable upon approval by U.S. EPA of the elements of the State SIP Strategy included in each air district's SIP.

While this proposed State SIP Strategy discusses a range of measures and indicates that ARB will undertake various actions, this State SIP Strategy remains a staff proposal. The proposed commitment is subject to ARB's formal approval process and will not be final until the Board formally takes action on the State SIP Strategy.

Commitment to Act on Defined New Measures

ARB staff proposes to commit to bring to the Board or take action on the list of proposed SIP measures shown in Table 1. For each measure, ARB staff will initiate a rule development process or other appropriate action designed to achieve the emission reduction estimates identified for each measure. This rule development process will provide additional opportunity for public and stakeholder input, as well as ongoing technology review, and assessments of costs and environmental impacts. The measures as proposed by staff to the Board or adopted by the Board may therefore provide more or less than the initial emission reduction estimates. In addition, action by the Board may include any action within its discretion. For proposed measures in Table 1 that are not under ARB's regulatory authority, ARB staff proposes to commit to take the appropriate actions as identified in the proposed measure descriptions.

These actions include:

- Petitioning U.S. EPA for federal action on sources under their authority;
- Advocating with federal and international partners for the International Maritime Organization (IMO) to establish more stringent standards for ocean going vessels; and,
- Working with the BAR to conduct an In-Use Performance Assessment.

Commitment to Achieve Emission Reductions

The next two sections describe the emission reduction commitments from the proposed new SIP measures for the South Coast. While the State SIP Strategy includes estimates of the emission reductions from each of the individual new measures, ARB's overall commitment is to achieve the total emission reductions necessary to attain the federal air quality standards, reflecting the combined reductions from the existing control strategy and new measures. Therefore, if a particular measure does not get its expected emission reductions, the State is still committed to achieving the total aggregate emission reductions. If actual emission decreases occur that exceed the projections reflected in the current emissions inventory and the State SIP Strategy, ARB will submit an updated emissions inventory to U.S. EPA as part of a SIP revision. The SIP revision would outline the changes that have occurred and provide appropriate tracking to demonstrate that aggregate emission reductions sufficient for attainment are being achieved through enforceable emission reduction measures.

ARB's emission reduction commitments may be achieved through a combination of actions including but not limited to: the implementation of control measures; the expenditure of local, State or federal incentive funds; or through the implementation of other enforceable measures. In some cases, actions by federal and international agencies will be needed. In others, programmatic approaches must be developed and funding secured to achieve the reductions outlined in the further deployment of cleaner technologies measure for each sector.

The Clean Air Act includes a provision for approval under Section 182(e)(5) advanced technology provisions to allow this future flexibility for Extreme areas such as the South Coast needing additional reductions to meet the ozone standard. ARB staff have therefore identified the "Further Deployment of Cleaner Technology" measures as needing U.S. EPA approval under the 182(e)(5) provisions of the Clean Air Act. Measures where federal action is needed are also identified under the Section 182(e)(5) provisions. Section 182(e)(5) measures are noted with an asterisk in Table 1.

Table 1: Proposed New SIP Measures and Schedule

Proposed Measure	Agency	Action	Implementation Begins
On-Road Light-Duty			
Advanced Clean Cars 2	ARB	2020 – 2021	2026
Lower In-Use Emission Performance Assessment	ARB / BAR	n/a	ongoing
Further Deployment of Cleaner Technologies*	ARB / SCAQMD / U.S. EPA	ongoing	2016
On-Road Heavy-Duty			
Lower In-Use Emission Performance Level	ARB	2017 – 2020	2018 +
Low-NOx Engine Standard – California Action	ARB	2019	2023
Low-NOx Engine Standard – Federal Action*	U.S. EPA	2019	2024
Medium and Heavy-Duty GHG Phase 2	ARB / U.S. EPA	2017 – 2019	2018 +
Innovative Clean Transit	ARB	2017	2018
Last Mile Delivery	ARB	2018	2020
Innovative Technology Certification Flexibility	ARB	2016	2017
Zero-Emission Airport Shuttle Buses	ARB	2018	2023
Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles	ARB / SCAQMD	ongoing	2016
Further Deployment of Cleaner Technologies*	ARB / SCAQMD / U.S. EPA	ongoing	2016
Off-Road Federal and International Sources			
More Stringent National Locomotive Emission Standards *	U.S. EPA	2016	2023
Tier 4 Vessel Standards *	ARB / IMO	2016 – 2018	2025
Incentivize Low Emission Efficient Ship Visits	ARB	2018 – 2020	2018 +
At-Berth Regulation Amendments	ARB	2017 – 2018	2023
Further Deployment of Cleaner Technologies*	ARB / SCAQMD / U.S. EPA	ongoing	2016
Off-Road Equipment			
Zero-Emission Off-Road Forklift Regulation Phase 1	ARB	2020	2023
Zero-Emission Off-Road Emission Reduction Assessment	ARB	2025 +	--
Zero-Emission Off-Road Worksite Emission Reduction Assessment	ARB	tbd	--
Zero-Emission Airport Ground Support Equipment	ARB	2018	2023
Small Off-Road Engines	ARB	2018 – 2020	2022
Transport Refrigeration Units Used for Cold Storage	ARB	2018 – 2019	2020 +
Low-Emission Diesel Requirement	ARB	by 2020	2023
Further Deployment of Cleaner Technologies*	ARB / SCAQMD / U.S. EPA	ongoing	2016
Consumer Products			
Consumer Products Program	ARB	2019 – 2021	2020 +

* Request U.S. EPA approval under the provisions of Section 182(e)(5) of the Clean Air Act allowing for reliance on anticipated development of new control techniques or improvement of existing control technologies. Also includes identification of needed funding, infrastructure development, and actions/resources required from other agencies

South Coast Commitment

The current control program is expected to provide sufficient reductions for the entire South Coast region to attain the 12 μg/m^3 annual PM2.5 standard by 2025. For ozone, air quality modeling indicates that total NOx emissions from all sources in the South Coast will need to decrease to approximately 141 tpd in 2023, and 96 tpd in 2031, representing an approximate 70 percent and 80 percent reduction from current levels, respectively. Most of the necessary reductions will come from the existing control program, which is projected to reduce NOx emissions from all sources by approximately 50 percent by 2031, providing a significant down payment on the emission reductions needed.

Emission Reductions from Current Programs

Ongoing implementation of current control programs is projected to reduce NOx emissions in the South Coast from today's levels by 153 tpd in 2023 and 184 tpd by 2031. Achieving the benefits projected from the current control program will continue to require significant efforts for implementation and enforcement and thus represents a key element of the overall strategy.

In the light-duty sector, currently adopted programs reduce NOx emissions from today's levels almost 80 percent by 2031. Key regulations include ARB's Low Emission Vehicle (LEV) fleet emission standards, which have driven the ongoing clean-up of combustion technology. The Smog Check program has ensured clean in-use performance, and the continued lower in-use performance assessment will do so even more effectively in the future. California's reformulated gasoline standard requires fuel producers to meet increasingly stringent standards, which has reduced NOx, ROG, and toxic emissions from gasoline. ARB's technology-forcing ZEV regulation continues to drive technology development needed for the long-term transformation of the passenger vehicle fleet.

In the heavy-duty sector, currently adopted programs reduce NOx emissions by nearly 70 percent by 2031. The Truck and Bus Regulation is one of the most significant rules addressing the legacy heavy-duty truck fleet. Since 2012, it has phased in PM emission controls for nearly all vehicles operating in California, and by 2023 nearly all vehicles will meet 2010 model year engine emissions levels. For municipal and public fleets, the 2005 Fleet Regulation for Public Agencies and Utilities reduces emissions of NOx and diesel PM from federal, State, county, and city government fleets, as well as universities, airports, school districts, ports, and special districts such as water, utility, and irrigation districts, by phasing-in requirements for emission control equipment in on-road heavy-duty diesel-fueled fleets. Diesel fuel requirements have further reduced emissions from diesel engines are operating in California.

NOx emissions from off-road equipment are projected to decrease approximately 45 percent by 2031 as a result of ARB programs to establish more stringent engine standards, in-use fleet rules, idling limits, and increasing electrification of smaller equipment. ARB's Cleaner In-Use Off-Road Equipment Regulation (Off-Road

Regulation) reduces emission from large diesel off-road equipment that remains in use for long periods of time. The Off-Road Regulation accelerates the penetration of the cleanest equipment and will significantly reduce emissions of NOx and toxic diesel PM from the over 150,000 in-use off-road diesel vehicles that operate in California by requiring modernized fleets and exhaust retrofits.

Overall, NOx emissions from sources that are primarily regulated by the federal government, such as ocean going vessels, aircraft, and locomotives, have not kept pace with reductions in other sectors, and are in aggregate projected to remain fairly constant through 2031. While emissions from locomotives continue to decline, emissions from ocean going vessels and aircraft are projected to increase. Although ARB does not have primary regulatory authority over many of these sources, ARB has nonetheless adopted two major regulations to reduce emissions from ocean-going vessels (OGVs), including the OGV Shore Power Regulation, which reduces emissions from diesel auxiliary engines on container ships, passenger ships and refrigerated-cargo ships at-berth at California ports, and the comprehensive OGV Clean Fuel Regulation, which requires vessel operators to use cleaner distillate fuels in their main engines, auxiliary engines, and auxiliary boilers within 24 nautical miles of the California coastline and islands.

Emission Reductions from Proposed New Measures

The new measures contained in the State SIP Strategy commitment reflect a combination of State actions, petitions for federal action, as well as actions that outline a pathway for achieving further deployment of the cleanest technologies in each sector. Together with the emission reductions associated with ongoing implementation of the existing control program, these measures identify all of the reductions needed to achieve a 70 percent reduction in NOx emissions from mobile sources by 2023, and an 80 percent reduction by 2031 in the South Coast. Table 2 summarizes the combined reductions that will accrue through implementation of the current control program, along with proposed new measures identified in the SIP Strategy. Combined, they will reduce NOx emissions 266 tpd by 2023, and 295 tpd by 2031

Table 2: South Coast Mobile Source Emission Reductions
(NOx emission reductions in tpd, from current levels)

	2023		2031	
	Emission Reductions	Percent of Needed Reductions	Emission Reductions	Percent of Needed Reductions
Current Control Programs	153	58%	184	62%
New Proposed Measures	113	42%	111	38%
Total Reductions	**266**	**100%**	**295**	**100%**

The South Coast NOx and ROG emission reductions in 2023 and 2031 from each of the proposed new SIP measures are summarized in Table 3. As part of the proposed State SIP Strategy, ARB will provide an enforceable commitment to achieve in aggregate an additional 113 tpd of NOx reductions by 2023 beyond the current control program, and 111 tpd beyond the current control program by 2031, The proposed new measures in the State SIP Strategy will also provide approximately 50 and 60 tpd of ROG reductions in 2023 and 2031, respectively, which provide supplemental benefits in reducing ozone in portions of the air basin. While Table 3 shows the anticipated emission reductions associated with each measure, the measures as proposed by staff or adopted by the Board may provide more or less reductions than the amount shown.

Table 3: South Coast Expected Emission Reductions from State SIP Measures

All emission reductions in tons per day (tpd)

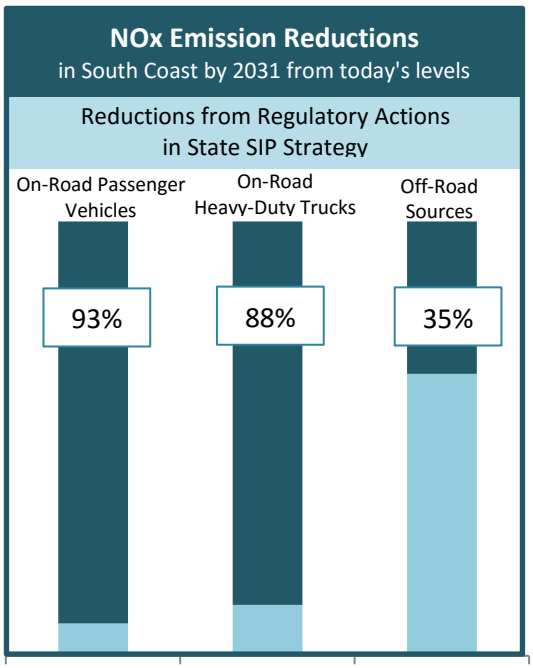
Proposed Measure	2023		2031	
	NOx	ROG	NOx	ROG
On-Road Light-Duty				
Advanced Clean Cars 2	--	--	0.6	0.4
Lower In-Use Emission Performance Assessment	NYQ	NYQ	NYQ	NYQ
Further Deployment of Cleaner Technologies*	7	16	5	16
Total Category Reductions	**7**	**16**	**6**	**16**
On-Road Heavy-Duty				
Lower In-Use Emission Performance Level	NYQ	<0.1	NYQ	<0.1
Low-NOx Engine Standard – California Action	--	--	5	--
Low-NOx Engine Standard – Federal Action*	--	--	7	--
Medium and Heavy-Duty GHG Phase 2	NYQ	NYQ	NYQ	NYQ
Innovative Clean Transit	<0.1	<0.1	0.1	<0.1
Last Mile Delivery	<0.1	<0.1	0.4	<0.1
Innovative Technology Certification Flexibility	NYQ	NYQ	NYQ	NYQ
Zero-Emission Airport Shuttle Buses	NYQ	NYQ	NYQ	NYQ
Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles	3	0.4	3	0.4
Further Deployment of Cleaner Technologies*	34	4	11	1
Total Category Reductions	**37**	**4**	**27**	**2**
Off-Road Federal and International Sources*				
Aircraft				
Further Deployment of Cleaner Technologies*	9	NYQ	13	NYQ
Locomotives				
More Stringent National Locomotive Emission Standards*	<0.1	<0.1	2	<0.1
Further Deployment of Cleaner Technologies*	7	0.3	3	0.3
Ocean-Going Vessels				
Tier 4 Vessel Standards*	--	--	NYQ	NYQ
Incentivize Low Emission Efficient Ship Visits	NYQ	NYQ	NYQ	NYQ
At-Berth Regulation Amendments	0.3	<0.1	1	<0.1
Further Deployment of Cleaner Technologies*	30	NYQ	38	NYQ
Total Off-Road Federal and International Reductions	**46**	**0.3**	**57**	**0.3**
Off-Road Equipment				
Zero-Emission Off-Road Forklift Regulation Phase 1	--	--	1	0.1
Zero-Emission Off-Road Emission Reduction Assessment	NYQ	NYQ	NYQ	NYQ
Zero-Emission Off-Road Worksite Emission Reduction Assessment	NYQ	NYQ	NYQ	NYQ
Zero-Emission Airport Ground Support Equipment	<0.1	<0.1	<0.1	<0.1
Small Off-Road Engines	0.7	7	2	16
Transport Refrigeration Units Used for Cold Storage	NYQ	NYQ	NYQ	NYQ
Low-Emission Diesel Requirement	0.3	NYQ	1	NYQ
Further Deployment of Cleaner Technologies*	21	21	18	20
Total Off-Road Equipment Reductions	**22**	**28**	**22**	**36**
Consumer Products				
Consumer Products Program	--	1 – 2	--	4 – 5
Total Consumer Products Reductions	**--**	**1 – 2**	**--**	**4 – 5**
Aggregate Emission Reductions	**113**	**50 - 51**	**111**	**59 - 60**

* Request U.S. EPA approval under the provisions of Section 182(e)(5) of the Clean Air Act; "NYQ" denotes emission reductions are Not Yet Quantified; "—" denotes no anticipated reductions

Actions to Implement the Further Deployment of Cleaner Technology Measures

Implementation of the current control program and new regulatory actions to establish requirements for cleaner technologies comprise the core of the overall strategy. Figure 1 illustrates the role of regulatory actions in each sector, as a percentage of the total reductions needed for attainment in the South Coast. The relative proportion of regulatory and incentive reductions varies by the sector, reflecting differences in the maturity of the current control program, authority, and technology development. For example, existing regulations and new proposed regulations for passenger cars provide 93 percent of the overall reductions for the light-duty sector in the SIP Strategy.[1] For trucks, current and proposed regulations provide 88 percent of the overall reductions in the strategy.

Figure 1: NOx Emission Reductions in South Coast



Achieving reductions in the off-road sectors remains a greater challenge due to the diverse nature of these sources, regulatory authority that rests outside of ARB in many cases, and the length of time sources such as locomotives, marine vessels, and aircraft remain in the fleet. Nevertheless, the State SIP Strategy includes key regulatory actions to establish the next tier of cleaner combustion for locomotives and marine vessels, and introduction of ZEV technologies for smaller off-road equipment.

Overall, approximately 70 percent of the total reductions in the strategy come from regulations. These regulatory measures represent a comprehensive and aggressive scope of actions across all sectors to establish and deploy requirements for significantly cleaner technologies over the next fifteen years.

The remaining increment of reductions will be achieved through a suite of actions as part of implementation of the further deployment of cleaner technology measures. These actions reflect the importance of a variety of tools and approaches to achieve emission reductions through a comprehensive transformation of the transportation

[1] Percentages in Figure 1 represent the relative portion of total emission reductions for each mobile source category that are anticipated to result from regulatory actions (shown in graph in the darker, top portion) in the South Coast. Emission reductions represent reductions by 2031, from today's levels.

system. Building from the core regulatory efforts, implementing the complementary actions to support this transformation will include efforts to: 1) enhance the penetration of cleaner technologies through incentive programs and other funding mechanisms; 2) advocacy for further federal actions; 3) further regulatory development as new technologies emerge; 4) quantification of the benefits of increased system efficiencies, utilization of intelligent transportation systems and emerging autonomous and connected vehicle technologies; and 5) other innovative efforts to incentivize the demand for cleaner technologies. The South Coast has also proposed a number of complementary mobile source measures[2] that are designed to help implement the further deployment measures included in the SIP Strategy. These measures play an important role at the local level and include facility oriented measures, as well as incentive based programs for both on-road and off-road sources.

The specific combination of approaches for each further deployment measure will vary by source sector. However ARB and South Coast staff have collaborated to develop an illustrative pathway for each sector outlining the scope of technology required and the suite of implementation tools and recommended actions by both agencies along with continued collaboration with U.S. EPA. Together, these actions provide the mechanisms for achieving the identified emission reductions. Additional discussion of overall approaches is provided below, with individual pathways described as part of the Further Deployment of Cleaner Technologies measure write-ups for each sector contained in Chapter 4.

Identifying and Securing Funding and Other Incentive Mechanisms

Funding to support incentive-based programs and other innovative mechanisms will be an essential element of the further deployment measures. This will be especially important for achieving significant penetration of the cleanest technologies in the South Coast and the San Joaquin Valley over the next five to ten years. The South Coast's Draft AQMP identifies several different approaches for quantifying the range of funding necessary to achieve the scale of technology deployment needed between now and 2031. The estimated total funding levels range from approximately $4 billion to $14 billion dollars, which translates into $250 million to approximately $1 billion per year. This represents the upper limit on funding needs assuming no other actions are taken to achieve the emission reduction associated with the further deployment measures. Emission reductions achieved through system efficiencies, additional regulatory efforts, and co-benefits from climate program initiatives would reduce the overall funding needed.

Current incentive programs have been an important part of a portfolio to accelerate the penetration of cleaner technologies. Existing State-level incentive programs include the Carl Moyer Program, Clean Vehicle Rebate Project (CVRP), Enhanced Vehicle Modernization Program (EFMP), Hybrid Truck and Bus Voucher Incentive Program (HVIP), the Low Carbon Transportation investments, and the California Energy

[2] South Coast AQMD Draft Final 2016 AQMP Mobile Source Measures, December, 2016 http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/final-draft-2016-aqmp

Commissions Alternative and Renewable Fuel and Vehicle Technology Program, which helps to fund alternative fuels, advanced technology vehicles, and the needed infrastructure development.[3] Local programs include the Carl Moyer Program authorized under AB 923, AB 2766 local government funding, and the South Coast District's Clean Fuels Fund, which is used primarily to commercialize advanced technology vehicles and trucks and alternative fuel infrastructure. The District also receives funding from the U.S. EPA Diesel Emissions Reduction Act (DERA), and Targeted Airshed Grants on a competitive basis, and one time enforcement settlement agreements and mitigation funds. These programs have continued to grow over time as a result of increasing recognition of the role they play in advancing technologies. Today, the District receives approximately $100 to $150 million per year through ongoing and one-time funding mechanisms.

However, funding levels beyond what is available through current programs will be needed over the next seven to fifteen years. The South Coast recently released a Draft Financial Incentives Funding Action Plan[4] to identify the necessary actions by the State, District, region, federal government, and other partnerships to ensure that sustained levels of funding are secured as early as possible and continue through 2031. The action plan describes existing funding programs, new funding opportunities, activities that will be undertaken to pursue each potential funding mechanism, and a schedule and reporting process. As part of this effort, the South Coast is establishing a stakeholder working group to help further develop and implement the Draft Financial Incentives Funding Action Plan. ARB will continue to collaborate with the South Coast on the funding plan, as well as play a key role in implementing State-level programs, and coordination with other states regarding national programs.

An initial listing of potential mechanisms is described in the Funding Action Plan. Examples of funding mechanisms that the South Coast District has identified at the federal, State, and local level include:

Federal

- Creation of national Clean Air Investment and Cleanup Fund
- Expansion of Diesel Emissions Reduction Act (DERA)
- Continued Targeted Airshed Grants
- U.S. Department of Energy Clean Cities Program
- U.S. Department of Transportation Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users Program
- Federal Aviation Administration (FAA) Voluntary Airport Low Emission Program
- National container fee
- VW settlement agreement

[3] http://www.energy.ca.gov/contracts/transportation.html

[4] The South Coast Draft Financial Incentives Funding Action Plan (December 2016) is available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draftfinancialincentivefunddec2016.pdf?sfvrsn=6

- Expansion of federal tax credits

State

- Continuation of existing incentive programs, and other potential new monetary programs, with focus on program design to maximize criteria pollutant and GHG reduction benefits
- Carl Moyer Memorial Air Quality Standards Attainment Program (AB 923)
- The California Energy Commission's Alternative and Renewable Fuel and Vehicle Technology Program (AB 118) and Low Carbon Transportation Funding (from the Greenhouse Gas Reduction Fund, or GGRF)
- Development of new mechanisms similar to Proposition 1B
- Gasoline/Diesel excise tax add-on
- Crude oil sales tax
- Sales tax breaks for zero-emission vehicles

Local

- Local Motor Vehicle Registration Fees (AB 2766)
- South Coast District's Control of NOx Emissions from Off-Road Diesel Vehicles and California In-Use Off-Road Diesel Fleet Regulation (SCAQMD Rule 2449)
- South Coast District's On-Road Motor Vehicle Mitigation Options Program (SCAQMD Rule 2202)
- Local ballot measures
- Expanded auto registration fee
- Mileage-based user fee
- Property tax / retail sales tax add-on
- Continuation of South Coast District Clean Fuels Program
- Mitigation funds from other local rules and enforcement actions

The broad scope of funding sources reflects the important role that all levels of government must play in bringing healthy air to the South Coast region. Successful efforts will also require building public/private coalitions to advocate for the needs of the region, along with other areas of the State such as the San Joaquin Valley. These coalitions can include establishment of new partnerships with other national nonattainment areas through the National Association of Clean Air Agencies for pooling and coordinating funds, State collaborations with the California Air Pollution Control Officers Association, and expansion of the District's Strategic Alliance Initiative to implement collaborative efforts to identify and seek federal funding.

Given the $100 million per year the South Coast currently receives, an expansion of current programs, coupled with a number of the new initiatives identified above would provide an effective framework for achieving the necessary funding stream. The earlier attainment deadline for meeting the 80 ppb ozone standard by 2023 constitutes the more significant challenge. This will require a greater influx of funding during the early

years to support the enhanced deployment of cleaner technologies. However, early investments will reduce the need for funding later in the decade.

While no single funding source or government entity can fulfill the South Coast region's funding needs, in combination the broad spectrum of mechanisms and approaches described above have the potential to provide over $2.3 billion per year to the South Coast if currently quantified opportunities are realized, exceeding the $1 billion per year necessary to meet the region's attainment needs. Many of the identified funding sources represent expansion of current successful programs, or mechanisms that have been effectively applied in other situations. For example, a Clean Air Investment Fund could be patterned off of similar efforts used for addressing Superfund cleanup efforts for soil and water contamination. This effort could focus on national and international sources of emissions. Similarly, an additional auto registration fee has been providing funding for numerous incentive programs in the San Joaquin Valley, with a portion of the funds specifically targeted towards programs which benefit disadvantaged communities.

These investments will also help support the comprehensive transformation needed to meet California's climate and risk reduction goals. Targeted funding in disadvantaged communities can provide significant benefits for residents who are disproportionately impacted by multiple emission sources by reducing both criteria pollutants and TACs. A number of incentive programs are also specifically focused on assisting low-income residents with access to cleaner technologies, such as the EFMP Plus Up program. An enhanced focus on investments in these communities will be an important element of the implementation of the funding plan.

Beyond individual funding mechanisms, there are multiple State level programs and legislative mandates that are facilitating the overall transformation to cleaner, more efficient technologies in California. These programs are designed to provide an overall framework to support needed technology development and infrastructure, increase consumer awareness and outreach, and provide for focused investments in individual communities. These efforts also help meet the State's transportation electrification goals under SB 350 through pursuit of transformational programs that can catalyze widespread transportation electrification. Examples of the State's high level commitment to supporting this transformation include:

- Volkswagen (VW) Settlement Agreement: The proposed VW California settlement agreement includes both a Mitigation Trust to remedy total lifetime excess NOx emissions, as well as a ZEV Investment Commitment which establishes eligible categories for VW investments. The Mitigation Trust includes $381 million for California which will be used to provide funding to replace older vehicles and equipment with cleaner models, as well as fund light-duty ZEV infrastructure. The ZEV Investment Commitment includes $800 million for California to support transportation electrification and the next generation of electric vehicles. Key focus areas will include installing zero-emission vehicle fueling infrastructure (for both electric and hydrogen-powered cars), funding

brand-neutral consumer awareness campaigns to increase the zero-emission vehicle market, and investing in projects such as car-sharing programs that will increase access to zero-emission vehicles for all consumers in California. The ZEV Investment Commitment funding also includes a Green City initiative that will demonstrate in a concentration fashion the operation of car sharing services, ZEV/shuttle transit services, and ZEV freight transport projects.

- Transformative Climate Communities: The State of California is proposing to invest $140 million of cap-and-trade auction proceeds next year in the State's most disadvantaged communities through the Transformative Climate Communities Program, which integrates multiple, cross-cutting approaches to reduce GHG emissions. These revenues – likely $70 million for Fresno, $35 million for Los Angeles, and $35 million in a third location[5] – are for broad-based GHG emission reduction projects that provide local economic, environmental, and health benefits to disadvantaged communities.[6]

- ZEV Action Plan: In October, the Governor's Office released the 2016 ZEV Action Plan[7], which builds on the successful implementation of the 2013 ZEV Action Plan and identifies new actions State agencies will collaboratively take to raise consumer awareness about ZEVs; ensure ZEV accessibility to a broad range of Californians; achieve ZEV commercial availability in targeted heavy-duty applications and in the freight sector; and aiding ZEV market growth beyond California.

- Plug-in Electric Vehicle Collaborative: The California Plug-In Electric Vehicle Collaborative is a public/private organization focused on accelerating the adoption of plug-in Electric Vehicles (PEVs) to meet California's economic, energy and environmental goals. Using the expertise of each member, the PEV Collaborative collaborates on emerging PEV market trends and works to address challenges and enable strong PEV market growth. The Collaborative's 2010 Strategic Plan, ***Taking Charge***, is designed to facilitate PEV market growth so that, by the end of the decade, hundreds of thousands of PEVs will be sold annually in California and the market will contribute significantly to California's ongoing economic, energy and environmental policy objectives. Its strategic focus is to solidify California as a technological, manufacturing, economic, and policy leader that benefits from – and shapes – the global PEV market for decades to come.

- California Fuel Cell Partnership: The California Fuel Cell Partnership is a collaboration of organizations, including auto manufacturers, energy providers, government agencies and fuel cell technology companies, that work together to promote the commercialization of hydrogen fuel cell vehicles. By working

[5] http://sgc.ca.gov/Grant-Programs/Transformative-Climate-Communities-Program.html
[6] http://sgc.ca.gov/Grant-Programs/TCC-Rulemaking.html
[7] https://www.gov.ca.gov/docs/2016_ZEV_Action_Plan.pdf

together, the Partnership helps ensure that vehicles, stations, regulations and people are in step with each other as the technology comes to market

- California Sustainable Freight Action Plan: The California Sustainable Freight Action Plan outlines an integrated approach to coordinate State agency priorities and timing on actions to influence freight transportation and energy infrastructure, vehicle and equipment technologies, and facility and operations efficiency, rather than the traditional and separate planning efforts for transportation, environment, and energy. The Action Plan is the beginning of a process, and signals State government's interest in collaborating with stakeholders on defining the actions necessary to make the 2050 Vision for a sustainable freight transport system a reality. The Action plan also includes 2030 targets for guide the State towards meeting this vision, as well as focused pilot projects to achieve near-term progress.

Programs to Support Continued Technology Advancement

ARB, along with other public and private partners, also continue to sponsor research and demonstration programs to further promote advanced technology development. This will occur through ARB's annual research program, grant programs, and other cooperative agreements. For example, ARB, U.S. EPA, the South Coast, and the San Joaquin Valley are partners in a memorandum of understanding that commits to developing and testing new sustainable technologies by aligning resources and evaluating innovative technologies. ARB is funding an examination of the feasibility of various engine configurations and after treatment technologies that enable diesel and natural gas heavy-duty trucks to meet the proposed low-NOx standard of 0.02g/bhp-hr.[8] ARB is also funding an analysis of the effectiveness, feasibility, and cost-effectiveness of after treatment controls that reduce NOx and PM emissions from off-road diesel engines less than 37 kW.[9]

ARB also supports technology demonstrations through various grant programs, including a current award to the South Coast for a $24 million Statewide demonstration project for zero-emission drayage trucks.[10] The South Coast and the California Energy Commission are co-funding a $2.6 million demonstration project for two Class 8 drayage trucks at the Ports of Long Beach and Los Angeles. ARB has awarded $9 million to demonstrate two types of zero-emission trucks in the weight classes most commonly used at rail yards and freight transfer yards.[11] This project reduces emissions from rail yards and freight facilities in Southern California, while also accelerating ZEV commercialization by providing a model for heavy-duty truck electrification that can be scaled for individual facility needs. Additionally, in partnership with the Port of Los Angeles, ARB has awarded $14 million for a demonstration project

[8] https://www.arb.ca.gov/research/veh-emissions/low-nox/low-nox.htm
[9] https://www.arb.ca.gov/research/single-project.php?row_id=65212
[10] https://www.arb.ca.gov/newsrel/newsrelease.php?id=809
[11] https://www.arb.ca.gov/newsrel/newsrelease.php?id=824

that integrates near-zero and zero-emission vehicles and cargo handling equipment into marine terminal operations.[12] This project is expected to reduce NOx, diesel PM and GHG emissions from marine terminals, and leverages private investments to demonstrate the latest generation of advanced technologies. Finally, in October 2016, the Board approved $60 million under the Low Carbon Transportation program for zero-emission truck and bus pilot deployments to accelerate deployment and drive consumer acceptance at the early stages of commercialization. 75 percent of the funding will be focused in disadvantaged communities. Together, these projects help to accelerate the commercialization of advanced clean technologies, and provide cleaner air for all Californians, especially those who live in disadvantaged communities located next to industrial facilities, freight transfer facilities, or along the State's businesses trade corridors.

Several proposed measures in the State SIP Strategy also focus on deploying zero-emission vehicles and equipment in initial applications that are currently well-suited for broader market deployment such as the Last Mile Delivery measure. Depending upon the success of these applications, and ongoing technology assessment, further regulatory mechanisms for additional applications can be identified. As part of this effort, ARB will also work with federal and international agencies to advocate for more stringent emission standards and efficiency requirements for sources that are not under ARB's regulatory purview.

Other Mechanisms for Emission Reductions

In addition to the technology and funding approaches described above, other technology innovations and policies provide further mechanisms and opportunities for emission reductions as part of the broader transformation of the mobile sector. Additional gains in passenger transportation efficiencies can be achieved through more efficient land use and developing sustainable communities that feature a range of mobility choices. Intelligent transportation systems, and autonomous and connected vehicles and new approaches to personal mobility also represent an opportunity to fundamentally transform the transportation system and provide synergies for greater use of zero-emission vehicles. As part of the California Sustainable Freight Action Plan, ARB and other State agencies are identifying strategies, developed in partnership with stakeholders, to promote greater efficiencies in the freight transport system and approaches to reduce emissions around freight hubs such as rail yards, seaports, airports, and distribution centers. As part of this effort, ARB is initiating a survey to collect information related to the types of emission sources and activities associated with freight hubs. This effort will provide the necessary data for supporting identification of effective mechanisms for reducing emissions. At the same time, ARB is strategically funding innovative demonstration programs that integrate a wide array of intelligent transportation systems and autonomous and connected vehicles with the latest near-zero and zero-emission technologies, powered by renewable fuel sources.

[12] https://www.portoflosangeles.org/newsroom/2016_releases/news_052616_green_omni.asp

Aviation fuels are also being considered as a potential voluntary opt-into the Low Carbon Fuel Standard (LCFS).

Many of these actions will be further defined through companion planning efforts occurring over the next year, including the California Sustainable Freight Action Plan described above, California's 2030 Target Scoping Plan Update, and SB 375, the Sustainable Communities and Climate Protection Act. For example, in 2017 ARB will be considering more stringent per capita GHG reduction targets as part of SB 375. These targets would require development of additional strategies to reduce VMT from light-duty vehicles, thereby reducing both GHG and criteria pollutant emissions. In addition, the 2030 Target Scoping Plan Update identifies a number of measures that would provide criteria pollutant reductions in addition to GHG reductions. As these measures move forward, the reductions can be quantified and incorporated into the SIP.

Additional strategies that target mechanisms for increasing consumer demand for cleaner technologies also offer promise. These strategies could include approaches developed with the goal of expanding the market for green products that are within the budget of more consumers, increasing the frequency in which people can invest in cleaner technologies, including enhanced education and outreach on the benefits of advanced technologies, and providing mechanisms through which consumers can demand the use of greener technologies and supply chains in the products that they buy. Other mechanisms could include dedicated lanes and preferential access to encourage purchase of near-zero and zero-emission technologies.

In addition to connected and autonomous vehicles and truck platooning, new communication and GPS technologies are paving the way to incorporating zero-emission approaches to reducing VMT by integrating flexible, on-demand, technology-based ridesharing, vanpooling and micro-transit into our transit system. These technologies can reduce VMT and expand transit options into areas that do not lend themselves to traditional transit options and encourage new users in current transit areas. This will allow traditional transit to remain strong in those communities that are dependent on such transit.

Commitment for Monitoring Progress and Ensuring Emission Reductions

As part of ongoing implementation of the AQMP, both ARB and the South Coast commit to monitoring progress in obtaining funding and in quantifying the benefits of reductions from mechanisms such as system efficiencies, advanced transportation systems, and other complementary programs including the California Sustainable Freight Action Plan, the 2030 Target Scoping Plan Update, and the SB 375 target setting process. As noted earlier, ARB's overall commitment is to achieve the aggregate emission reductions necessary to attain the federal air quality standards, reflecting the combined reductions from the existing control strategy and new measures. Based on a continuing assessment of progress, ARB will identify, as necessary, appropriate regulatory mechanisms to achieve any shortfall in reductions. These regulatory mechanisms could include fleet rules to require enhanced deployment of cleaner technologies, expanded

purchase requirements for zero emission technologies, and establishment of more stringent engine standards for additional vehicle and equipment types.

As part of ARB's efforts to implement the further deployment measures, ARB commits to report back to the Board within one year of adoption of the State SIP Strategy, and yearly thereafter. This report will include:

1. The status of partnerships with the South Coast, San Joaquin Valley, U.S. EPA, other government agencies, and the private sector to pursue research, demonstration, and pilot projects for further advancement of zero and near-zero emission technologies;

2. The status of the Financial Incentives Funding Action Plan, progress in identifying and implementing funding mechanisms, and status of State level incentive programs and allocation of funding to the South Coast and San Joaquin Valley regions;

3. The status of technology assessments, emerging technologies and emission reduction opportunities. ARB staff will also report on implementation of actions identified by the South Coast and San Joaquin Valley as well as actions contained in the California Sustainable Freight Action Plan, the 2030 Target Scoping Plan Update, SB 375, and other complementary efforts and the criteria pollutant benefits that result from these actions; and,

4. Recommendations on the development of further regulatory measures and schedules for their development for inclusion in the SIP.

ARB staff will also provide periodic reports to U.S. EPA on the progress in developing and implementing the further deployment measures. This process will also include coordination with U.S. EPA to develop the programmatic structure for use of incentive-based measures in the SIP to satisfy Clean Air Act requirements. These include: 1) demonstration that the incentive program reductions are quantifiable, enforceable, permanent, and surplus, 2) provisions for an enforceable commitment, 3) technical analyses and supporting documentation, 4) demonstration of funding and legal authority, 5) procedures for public disclosure of information, and 6) provisions to measure and track program results.

At the District level, South Coast staff will assess progress in identifying actions to achieve emission reductions at the local level and report to the Governing Board on a routine basis. If progress is not made in identifying specific actions within one year from adoption of the Final 2016 AQMP, South Coast staff will recommend whether the Governing Board should consider proceeding with the development of rules within its existing legal authority or seek additional authority to adopt and implement measures to cost-effectively reduce mobile source emissions. Such authority includes development of new or expanded clean vehicle fleet rules or indirect source regulations.

Excerpts from Chapter 4: State SIP Measures

Proposed Measures: On-Road Light-Duty Vehicles

Description of Source Category:

Passenger cars and light trucks (up to 8,500 lbs., otherwise called light-duty vehicles), are a major contributor to NOx and GHG emissions in California. The State's 39 million residents collectively own about 25 million passenger vehicles and drive more than most other Americans. Over ten million of these vehicles are in the South Coast. The vast majority of these vehicles have internal combustion engines and use gasoline. A small portion is powered by diesel compression ignition engines, and a smaller portion still has electric powertrains. The light-duty vehicle sector is projected to grow to approximately 30 million vehicles Statewide by 2031, and will increasingly rely on electric drive vehicles of varying types (e.g. battery electric, plug-in hybrid, or fuel cell electric vehicles).

Advanced Clean Cars 2

Overview:

The goal of this proposed measure is to make sure that near-zero and zero emission technology options continue to be commercially available, with electric driving range improvements to address consumer preferences and to maximize electric vehicle miles traveled (eVMT). ARB would consider expanded California-specific standards for new light-duty vehicles to increase the number of new ZEVs and PHEVs sold in California and increased stringency of fleet-wide emission standards.

Background / Regulatory History:

Since setting the nation's first motor vehicle exhaust emission standards in 1966 that led to the first pollution controls, California has dramatically tightened emission standards for light-duty vehicles. Through ARB regulations, today's new cars pollute 99 percent less than their predecessors did thirty years ago. In 1970, ARB required auto manufacturers to meet the first standards to control NOx emissions along with hydrocarbon emissions, which together form smog. The simultaneous control of emissions from motor vehicles and fuels led to the use of cleaner-burning gasoline that has removed the emissions equivalent of 3.5 million vehicles from California's roads. Since ARB first adopted it in 1990, the LEV I and LEV II, and the ZEV Programs have resulted in the production and sales of hundreds of thousands of ZEVs in California. More recently, there is a focus on reducing GHGs from motor vehicles. Transportation is California's largest source of carbon dioxide, with passenger vehicles and light-duty trucks creating more than 30 percent of total climate change emissions. ARB adopted the first GHG emission standards for new passenger vehicles in the United States, effective with the 2009 model year.

Proposed Actions:

For this proposed measure, ARB staff would develop a regulation based on the technology and market assessments for advanced technology vehicles that would increase the number of new ZEVs and PHEVs sold in California. The regulation may include lowering fleet emissions further beyond the super-ultra-low-emission vehicle (SULEV) standard for the entire light-duty fleet through at least the 2030 model year, and look at ways to improve real world emissions through implementation programs. Additionally, new standards would be considered to further increase the sales of ZEVs and PHEVs in 2026 (and later years) beyond the levels required to ensure future emission reduction, climate, and petroleum targets are met.

Estimated Emission Reductions:

ARB staff used ARB's Vision 2.1[13] model to estimate the emission reductions associated with this proposed measure. Baseline projections include emissions from light- and medium-duty passenger car, trucks, and sport utility vehicles. Baseline emissions reflect projected benefits from the LEV III criteria emission vehicle fleet standards which have increasing stringency for new vehicles through the model year 2025. Emission reductions projected beyond baseline were calculated assuming new vehicles continue to become cleaner through the year 2031. ARB staff assumed a combined passenger vehicle (LDA/LDT2) ZEV/PHEV sales increase from 18 percent to 40 percent between 2025 and 2030, medium-duty trucks (MDV) ZEV/PHEV sales beginning 2026, ramping up to 10 percent by 2030, with 100 percent sales of super-ultra-low-emission vehicles certified to the SULEV 20 exhaust emission standards by 2030 for gasoline light-duty automobiles (LDAs). ARB staff also modeled increased fuel efficiency (at approximately 2.9 percent per year) between 2025 and 2035 for gasoline vehicles.

Timing:

Proposed ARB Board hearing:	2020 – 2021
Proposed implementation schedule:	2026 – 2030

Proposed SIP Commitment:

ARB staff proposes to commit to bring this measure to the Board by 2021. ARB staff will initiate a rule development process designed to achieve the NOx emission reductions shown in Table 3 for the South Coast nonattainment area in 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less than the amount shown.

[13] Vision Scenario Planning http://www.arb.ca.gov/planning/vision/vision.htm

Lower In-Use Emission Performance Assessment

Overview:

The goal of this proposed measure is to ensure that in-use vehicles continue to operate at their cleanest possible level. This joint ARB and BAR assessment is an ongoing further study measure focused on in-use performance and diagnostic inspection procedures.

Description of Source Category:

This evaluation will apply to all On-Board Diagnostic (OBD) II equipped vehicles that are subject to the Smog Check program. OBD II is the second generation of requirements for on-board, self-diagnostic equipment that monitors a vehicle's control components to ensure they are functioning correctly. Light- and medium-duty vehicles are major contributors of air pollutants in the South Coast. While VMT increased more than 50 percent over the last 20 years, vehicle emissions have dropped threefold due to increasingly stringent vehicle emission standards. Yet, the light- and medium-duty vehicle fleet continues to contribute significantly to the NOx emissions in the State. Studies show that the highest emitting 20 percent of the light-duty fleet contribute well over 50 percent of the fleet's total emissions, emphasizing the need to identify and repair these high emitting vehicles.

Background / Regulatory History:

OBD II

California's first OBD regulation required manufacturers to monitor some of the emission control components on vehicles starting with the 1988 model year. In 1989, ARB adopted OBD II, which required 1996 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines to be equipped with second generation OBD systems. OBD systems are designed to identify when a vehicle's emission control systems or other emission-related computer-controlled components are malfunctioning, causing emissions to be elevated above the vehicle manufacturer's specifications. ARB subsequently strengthened OBD II requirements and added OBD II specific enforcement requirements for 2004 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines. In 2005, the Board adopted regulations that required OBD systems in heavy-duty engines (HD OBD) beginning in the 2010 model year and that established HD OBD-specific enforcement requirements.

Smog Check

BAR is the State agency charged with administration and implementation of the Smog Check Program. The Smog Check Program is designed to reduce air pollution from California registered light-duty vehicles by requiring periodic inspections for emission-control system problems, and by requiring repairs for any problems found. Prior to 2015,

Smog Check stations relied on the BAR-97 Emissions Inspection System (EIS) to test tailpipe emissions with either a Two-Speed Idle (TSI) or Acceleration Simulation Mode (ASM) test depending on the program area. For instance, vehicles registered in urbanized areas or "Enhanced Areas," received an ASM test, while vehicles in rural areas or "Basic Areas" received a TSI test.

Assembly Bill (AB) 2289 (Eng, Chapter 258, Statutes of 2010) required BAR to implement a new protocol for testing 2000 and newer model-year vehicles. This new test, which relies primarily on the vehicle's OBD system, provides for a faster and more cost effective inspection compared to tailpipe testing. The BAR-97 EIS utilized OBD test equipment; however, this equipment was outdated and incapable of collecting complete OBD information for all vehicles. To facilitate state-of-the-art OBD-based testing, BAR developed equipment specifications for a new OBD communications device, referred to as the Data Acquisition Device (DAD), which is a component of the new OBD Inspection System (OIS) that replaces the EIS. These changes are aimed at providing for quicker and potentially less costly Smog Check inspections for consumers, and lower Smog Check station operating costs, all while preserving, or even enhancing the emission benefits associated with the Smog Check Program. However, because the OBD inspection procedure does not provide for direct measurement of vehicle emission levels, ARB believes it is prudent to monitor the effectiveness of the new procedure in identifying vehicles in need of emission repairs, and to implement changes necessary to address any issues that are uncovered.

Proposed Actions:

ARB and BAR staff would perform a comprehensive evaluation of California's in-use performance-focused inspection procedures and, if necessary, make improvements to further the Smog Check Program's effectiveness. ARB will conduct a study to further evaluate California's in-use performance inspection procedures through analysis of the Smog Check database and vehicle sampling obtained through BAR's Random Roadside Inspection Program. Comparison of test results from the fleet at the time Smog Check inspections take place with the results of roadside inspections conducted at random times in between Smog Check inspections will allow for analysis of Smog Check station performance, repair durability, the real-world performance of OBD II systems in detecting emission-related problems, and other factors that impact the emission benefits provided by the program. Further investigation and analysis of in-use vehicles at the ARB Haagen-Smit Laboratory will be conducted as needed based on the preliminary findings of the roadside data. Results from the study can be used to improve inspection test procedures, address program fraud, improve the effectiveness and durability of emission-related repair work, and to improve the regulations governing the design of in-use performance systems on motor vehicles to the extent necessary.

Estimated Emission Reductions:

As this proposed measure is a study to further evaluate California's in-use performance and vehicle inspection and maintenance program, anticipated emission reductions are not identified at this time. This measure may provide emission reduction; should the

evaluation identify necessary program improvements, the emission reduction potential and cost effectiveness of such enhancements will be identified at that time.

Timing:

Proposed ARB Board hearing: n/a
Proposed implementation schedule: ongoing

Proposed SIP Commitment:

ARB staff proposes to commit to conduct a study to further evaluate California's in-use performance inspection procedures in order to improve inspection test procedures as necessary, address program fraud, improve the effectiveness and durability of emission-related repair work, and to improve the regulations governing the design of in-use performance systems on motor vehicles.

Further Deployment of Cleaner Technologies: On-Road Light-Duty Vehicles

Overview:

The goals of this proposed measure are to accelerate the penetration of near-zero and zero emission vehicles and to promote in-use efficiency gains related to vehicle miles travelled, and through use of autonomous vehicles and advanced transportation systems. This measure is only applicable to the South Coast.

Background / Regulatory History:

ARB's mobile source regulatory program is complemented by additional efforts that reduce emissions. These include incentive programs and implementation of SB 375, the Sustainable Communities and Climate Protection Act. Incentive Programs are intended to accelerate the introduction of advanced technology vehicles, accelerate the turnover of the oldest, highest emitting vehicles, and increase access to clean vehicles and transportation in disadvantaged communities and lower-income households. The three programs established by AB 118 (Núñez, Chapter 750, Statutes of 2007) and reauthorized by AB 8 (Perea, Chapter 401, Statutes of 2013) provide funding for light-duty vehicle incentives. These include are ARB's Air Quality Improvement Program (AQIP), California's Energy Commission's Alternative and Renewable Fuel and Vehicle Technology Program, and the ARB / BAR's Enhanced Fleet Modernization Program (EFMP). More recently, Cap-and-Trade auction proceeds have greatly expanded the scale of light-duty vehicle incentive funding. Local air district incentive programs complement these Statewide efforts. The State's light-duty incentive strategy includes:

- *ZEV Deployment and Infrastructure:* ARB's Clean Vehicle Rebate Project (CVRP) provides consumer rebates for the purchase of zero-emission and plug-in hybrid passenger vehicles in order to increase the number of ZEVs on California's roadways and help achieve the large scale transformation of the fleet. The Energy Commission's electric vehicle charging and hydrogen fueling infrastructure investments complement ARB's vehicle deployment incentives.

- *Disadvantaged Community Programs:* CVRP is complemented by incentives aimed at increasing access to these clean vehicles in disadvantaged communities and lower-income households. These include car sharing and other mobility improvement programs and financing assistance, among others.

- *Car Scrap:* EFMP provides incentives to lower-income vehicle owners to retire older, higher emitting vehicles. EFMP includes pilot programs run by the South Coast and San Joaquin Valley air districts that provide additional incentives for lower-income vehicle owners who replace their scrapped vehicles with cleaner, more fuel-efficient vehicles, and the EFMP Plus-Up pilot provides

an even greater incentive for ZEV, hybrid, or plug-in hybrid replacement vehicles in underserved communities.

Proposed Actions:

This proposed measure is designed to achieve further emission reductions for South Coast attainment in 2023 and 2031 through a suite of additional actions, including early penetration of near-zero and zero technologies, and emission benefits associated with increased transportation efficiencies, as well as the potential for autonomous vehicles and advanced transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both ARB and the South Coast. These actions reflect an initial assessment of a pathway, recognizing that as funding is allocated and advanced technologies further develop, the balance amongst approaches will necessarily adjust.

Scope of Technology Penetration and Mechanisms to Achieve Reductions:
The Advanced Clean Cars regulation brings together a suite of regulations, including the LEV III standards and the ZEV regulation. To achieve the further reductions associated with early penetration of the near-zero and zero vehicle technologies established under the ZEV regulation, ARB and South Coast staff estimate that approximately 500,000 to 600,000 of the oldest passenger cars and trucks would need to be turned over to model year vehicles meeting the currently applicable LEV III emission standard or advanced hybrid or zero-emission technology by 2023. The following mechanisms provide a pathway for achieving this scale of technology deployment:

- Expand and enhance existing incentive and other innovative funding programs for light-duty vehicles in order to accelerate the replacement of older vehicles with vehicles meeting a LEV III or better emissions level. Assuming incentive funding is the primary mechanism to achieve the scope of further technology deployment described above, funding would be required for approximately 70,000 to 85,000 vehicles per year over a seven year period. The incentive funding required for this effort would go beyond the amount currently authorized for existing programs through 2023. This effort could expand upon the current EFMP and EFMP Plus-Up programs, and include increasing the use of these vehicles in underserved communities and by lower-income consumers. Continued incentive funding post-2023 to further accelerate the deployment of zero-emission vehicles would provide additional reductions for 2031.

  Determination of the needed resources will be based on assessment of the incremental cost of technologies and the type of funding mechanism employed. Funding needs and mechanisms will be identified working in collaboration with the South Coast and other State agencies over the next several months.

- Continue to support infrastructure investment programs with the California Energy Commission (CEC) to maximize the use of electric vehicles through

expanding charging and hydrogen networks.

- Expand upon consumer awareness and education campaigns for electric vehicles. Awareness in California is currently low and outreach efforts are critical to ensure new car buyers understand ZEVs are available and offer benefits. In addition to ARB's current DriveClean education website, new campaigns are being launched by the PEV Collaborative, electric utilities, and automakers. ARB also supports national efforts by the U.S. DOE and Northeast States for Coordinated Air Use Management (NESCAUM).

Additional mechanisms reflect reductions achieved through reducing growth in VMT as well as through intelligent transportation systems. While these approaches have the greatest potential to provide further reductions post-2023, early advances in these areas could offset some of the reductions required through incentive funding. These additional pathway mechanisms include:

- Reducing growth in passenger vehicle VMT. Local planning jurisdictions are implementing strategies to create more sustainable communities and integrate transportation and land use planning. These efforts to increase mobility choices and focus growth within existing urban boundaries provide a more efficient passenger transportation system that reduces VMT. SB 375, the Sustainable Communities and Climate Protection Act serves as a mechanism for implementation of efforts to reduce growth in passenger vehicle VMT.

- Advances in the development of autonomous and connected vehicles. These changes in how the on-road light-duty sector would operate offer the potential to achieve criteria and GHG emission reductions, but could also reduce VMT and congestion as well as petroleum usage. These concepts are based on emerging technologies and will require significant exploration and demonstration, but also offer synergies in a continued transition to zero-emission vehicle technologies.

Additional mechanisms may be developed to achieve additional reductions from vehicles in this category, including on-road motorcycles.

Timing:

Proposed ARB Board hearing:	n/a
Proposed implementation schedule:	2016 - 2031

Implementation Milestones and Schedule		
Implementation Milestone	Implementation Steps	Schedule
Identify and secure funding for incentive based and other innovative funding programs for accelerated turn-over of near-zero and zero passenger cars and trucks	*Phase 1*: Identify funding needs and potential sources	2016+ (annually)
	Phase 2: Pursue actions to secure funding	
	Phase 3: Implement funding/incentive programs	
Evaluate potential emission benefits from VMT reductions and autonomous vehicles and quantify and develop mechanisms to provide SIP reductions as appropriate	*Phase 1:* Evaluation of approaches and potential for emission reductions	2016 - 2023
	Phase 2: Demonstration of systems	2017 – 2026
	Phase 3: Quantification of emission reductions and mechanisms for incorporating into SIP	2023 – 2027
Provide annual reports to Board on status of funding, technology development, and identification of potential further regulatory measures	*Phase 1:* Evaluate status of funding, technology development, and potential for further regulatory measures	2017+ (annually)
	Phase 2: Develop potential regulatory actions as appropriate	

Proposed SIP Commitment:

ARB commits to bring to the Board programs and policies or take other actions to implement this measure to achieve the NOx emission reductions shown in Table 3 for the South Coast in 2023 and 2031. Further development measures for each source category may provide more or less emission reductions than the amount shown.

Proposed Measures: On-Road Heavy-Duty Vehicles

Description of Source Category:

Heavy-duty trucks over 8,500 pounds are currently the fastest growing transportation sector in the United States, responsible for about 33 percent of total Statewide NOx emissions, approximately 26 percent of total Statewide diesel PM emissions, and a significant source of GHG emissions.

Most of the NOx emissions from heavy-duty engines come from diesel-cycle engines, especially in the higher weight classes. Gasoline and natural gas Otto-cycle spark-ignited engines are also used in heavy-duty trucks, to a lesser extent, and primarily in the lower weight classification vehicles.

Lower In-Use Emission Performance Level

Overview:

The goal of this proposed measure is to ensure that in-use heavy-duty vehicles continue to operate at their cleanest possible level. ARB staff would develop and propose new, supplemental actions to address in-use emissions and compliance and to decrease engine deterioration.

Background / Regulatory History:

Since 1982, both U.S. EPA and ARB have required manufacturers to submit emissions data showing that their engines and vehicles meet applicable emission standards to qualify for a federal "Certificate of Conformity" and/or a California "Executive Order" in order to be sold. The data are generated using specific test procedures for measuring emission levels and assessing durability. The number and types of these tests vary according to the engine/vehicle being tested. The Federal Test Procedure (FTP) is used for regulatory emissions testing of on-road heavy-duty engines. While the FTP was developed to assess emissions performance of an engine under representative operating conditions, it does not assess emissions under all driving conditions, such as high-speed freeway driving and hard accelerations, such as acceleration on an entrance ramp to a freeway.

In the late 1990s, many heavy-duty engine manufacturers were accused of deliberately calibrating their engines to run extremely lean during high-speed freeway driving, which improved fuel economy but increased NOx emissions. U.S. EPA and ARB deemed this strategy to be a defeat device deliberately designed to delay or deactivate emissions controls, which prompted both agencies to seek remedial action and penalties against the offending manufacturers. As part of a related settlement agreement, all affected parties were directed to work together to further develop the Not To Exceed (NTE) test protocol. The development effort was successful, and the NTE requirement is in effect today.

In addition to complying with the FTP and NTE requirements, compliance with OBD, anti-tampering, fuel tank fill-pipe and openings, crankcase emissions, and other requirements, as applicable, must also be demonstrated as part of the existing certification protocol. Manufacturers must also provide a warranty for the emissions control systems of their certified engines and vehicles for a specified durability period and identify them with emissions control labels. Also, these engines and vehicles are subject to compliance testing and are required to report warranty-related repair rates to both U.S. EPA and ARB.

Additionally, all heavy-duty vehicles in California are subject to in-use inspections in order to control excessive smoke emissions and tampering. These programs are described below:

- The Heavy-Duty Vehicle Inspection Program, adopted in 1988, requires heavy-duty vehicles to be inspected for smoke opacity (i.e., excessive smoke), tampering, and engine certification label compliance. Any heavy-duty vehicle operating in California, including vehicles registered in other states and foreign countries, may be inspected. Inspections are performed by ARB inspection teams at border crossings, California Highway Patrol weigh stations, fleet facilities, and randomly selected roadside locations.

- The Periodic Smoke Inspection Program, also adopted in 1988, requires heavy-duty vehicle fleet owners to conduct annual smoke opacity inspections of their vehicles, and have them repaired if excessive smoke emissions are observed. In addition, ARB has the authority to randomly audit these fleets, by reviewing the owners' maintenance and inspection records, and conducting opacity inspections on a representative sample of the vehicles.

- The Emissions Control Label Inspection Program requires all vehicles operating in California be equipped with engines that meet California and/or U.S. EPA emission standards. The engine must have an emissions control label which is legible, displayed as originally installed by the engine manufacturer, and must match the engine serial number stamped on the engine. Owners of applicable vehicles not meeting the emissions control label requirements are subject to a penalty.

Currently, there is no regular, mandatory in-use screening for NOx or any emissions other than visible smoke.

Proposed Actions:

For this proposed measure, ARB staff would develop new, supplemental actions, in the form of regulatory amendments or new regulations, to address in-use compliance and to decrease engine deterioration. This suite of actions includes:

- Amendments to ARB's existing Periodic Smoke Inspection and Heavy-Duty Vehicle Inspection Programs to revise the current opacity limit and make other program improvements;
- Amendments to warranty and useful life provisions;
- Amendments to the durability demonstration provisions within the certification requirements for heavy-duty engines;
- Amendments to the NTE supplemental test procedures for heavy-duty diesel engines; and
- Adoption of comprehensive heavy-duty vehicle inspection and maintenance program.

Estimated Emission Reductions:

The estimated emission benefits and cost effectiveness associated with each of the identified supplemental actions will be quantified and vetted through ARB's public

regulatory process for each of the proposed amendments or new regulatory actions. The regulatory development process for a comprehensive heavy-duty vehicle inspection and maintenance program also includes a research study to assist the staff in evaluating potential test methods and program designs, emission benefit potential, and cost effectiveness.

Initial, estimated emission benefits (calculated using ARB's motor vehicle emissions inventory model, EMFAC2014) are shown below for proposed amendments scheduled to be presented to the Board in September 2017 to reduce the current opacity limit in the Periodic Smoke Inspection and Heavy-Duty Vehicle Inspection Programs. While small, these estimated emission benefits demonstrate ARB's commitment to evaluate all source categories for potential emission reductions to assist local air districts in meeting the air quality targets in their regional SIPs. ARB staff will reassess and refine the estimated emissions benefits during the formal regulatory process for this amendment package. Based on the initial review of more current data so far, staff expects the emission benefits to be higher than currently estimated using EMFAC2014. The measure as proposed by staff to the Board or adopted by the Board may provide more or less reductions than as proposed by staff.

Table 4: Estimated PM2.5 Emission Benefits from Proposed Amendments to the Periodic Smoke Inspection Program and the Heavy-Duty Vehicle Inspection Program

Reductions shown in tons per day (tpd)

Region	2023	2024	2031
Statewide	.065	.067	.070
South Coast	.018	.019	.022
San Joaquin Valley	.014	.015	.017

Timing:

Proposed ARB Board hearing: 2017 – 2020[14]
Proposed implementation schedule: 2018 – 2024

Proposed SIP Commitment:

ARB staff proposes to commit to bring the above-described elements of this measure that the further study determines are necessary program improvements to the Board between 2017 and 2020. ARB staff will initiate a rule development process designed to achieve the NOx emission reductions shown in Table 3 for the South Coast nonattainment area in 2023 and 2031.

[14] This proposed measure will be implemented via amendment and adoption of multiple regulations. Staff anticipates bringing several of the items to the Board between 2017 and 2020, but some elements may be brought to the Board later.

Low-NOx Engine Standard

Overview:

The goal of this proposed measure is to introduce near-zero emission engine technologies that will substantially lower NOx emissions from on-road heavy-duty vehicles. Coordinating as much as possible with U.S. EPA, ARB will develop a heavy-duty low-NOx engine standard in California, and urge U.S. EPA to a similar federal standard.

Background / Regulatory History:

California is the only state with the authority to adopt and enforce emission standards for new motor vehicle engines that differ from the federal emission standards. Since 1990, heavy-duty engine NOx emission standards have become dramatically more stringent, dropping from 6 grams per brake horsepower-hour (g/bhp-hr) in 1990 down to the current 0.2 g/bhp-hr standard, which took effect in 2010. In addition to mandatory NOx standards, there have been several generations of optional lower NOx standards put in place over the past 15 years. From 1998 to 2003, optional NOx standards ranged from 0.5 g/bhp-hr to 2.5 g/bhp-hr, at 0.5 g/bhp-hr increments, which was much lower than the mandatory 4 g/bhp-hr limit. Starting in 2004, engine manufacturers could choose to certify to optional NOx + non-methane hydrocarbon (NMHC) standards ranging from 0.3 g/bhp-hr to 1.8 g/bhp-hr, at 0.3 g/bhp-hr increments, which was significantly below the mandatory 2.4 g/bhp-hr NOx+NMHC standard. Starting in 2015, engine manufacturers could certify to three optional NOx emission standards of 0.1 g/bhp-hr, 0.05 g/bhp-hr, and 0.02 g/bhp-hr (i.e., 50 percent, 75 percent, and 90 percent lower than the current mandatory standard of 0.2 g/bhp-hr). The optional standards allow local air districts and ARB to preferentially provide incentive funding to buyers of cleaner trucks, which encourages the development of cleaner engines.

Proposed Actions:

This proposed measure would establish low-NOx engine standards for new on-road heavy-duty engines used in medium and heavy-duty trucks (for gross vehicle weight rating (GVWR) over 8,500 pounds).

<u>California Action</u>

ARB began development of new heavy-duty low-NOx emission standards in 2016, and Board action is expected in 2019. ARB staff will coordinate as much as possible with U.S. EPA and urge U.S. EPA to develop a similar federal standard.

A California-only low-NOx standard would apply to vehicles with new heavy-duty engines sold in California starting in 2023. However, the dynamics of the heavy-duty market means that this approach would not achieve the full benefit of the emission reductions that could be realized through a federal program. In order to achieve the

maximum emission reductions from this proposed measure, a federal standard is necessary.

Federal Action

Federal low-NOx standards could apply to all new heavy-duty trucks sold nationwide starting in 2024 or later. This will ensure that all trucks traveling within California would eventually be equipped with an engine meeting the lower NOx standard. Federal action is critical to implement this emission standard, since emission reductions would come mostly from Class 4-6 vehicles (as most Class 7 and 8 vehicles operating in California were originally purchased outside the State) from a California-only ARB regulation.

Due to the preponderance of interstate trucking's contribution to emissions in California, timely federal action to implement a national low-NOx engine standard is critical to provide the emission reductions needed for attainment. The State SIP Strategy thus calls for U.S. EPA to develop a national low-NOx standard. In June of 2016, the South Coast, San Joaquin Valley and Bay Area air districts and nine other state and local air control agencies formally petitioned U.S. EPA to adopt 0.02 g/bhp-hr NOx standards for medium- and heavy-duty truck engines nationally. U.S. EPA responded to those petitions on December 20, 2016, stating that they will initiate the work necessary to issue a Notice of Proposed Rulemaking for a new on-road heavy-duty NOx program, with the intention of proposing standards that could begin in model year 2024, consistent with the lead-time requirements of the Clean Air Act. Additionally, U.S. EPA stated they intend to work with CARB to develop such new standards and to address improved warranties and test procedures as well.

Estimated Emission Reductions:

ARB staff used ARB's Vision 2.1 model to estimate the emission reductions associated with this proposed measure. Both the Federal and California-only low-NOx standards were assumed to provide 90 percent overall NOx emission reductions from the current engine and emission control technologies. This reduction, in part, reflects assumptions on decreasing engine deterioration due to Lower In-Use Emission Performance Level Measure. For Federal low-NOx standards, NOx reductions were applied to all heavy-duty trucks starting in model year 2024, regardless of vocation and registration.

In addition to trucks coming from out-of-state, many California heavy-duty truck owners also purchase used trucks from out-of-state. Therefore, a California-only low-NOx standard would only impact a fraction of the heavy-duty activity and emissions in California. Staff assumed an aggregated fraction to estimate emission reduction based on survival rates derived from multiple years of EMFAC baseline data.

Timing:

U.S. EPA Rulemaking:	2019
ARB Rulemaking:	2019
Proposed ARB Board hearing:	2019

Proposed implementation schedule:	California regulation implementation would be starting in 2023; If U.S. EPA establishes a federal low-NOx standard, implementation nationwide could occur no earlier than 2024. If U.S. EPA adopts standards, ARB would harmonize as much as possible.

Proposed SIP Commitment:

ARB proposes to commit to bring this measure to the Board by 2019. ARB staff will pursue a rule development process designed to achieve the NOx emission reductions shown in Table 3 for the South Coast nonattainment area in 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less than the amount shown.

Medium and Heavy-Duty GHG Phase 2

Overview:

The goal of this proposed measure is to advance fuel efficiency improvements and achieve greater GHG emission reductions through the introduction of the next generation of integrated engine, powertrain, vehicle and trailer technologies designed to reduce climate emissions and fuel use. This new round of medium and heavy-duty vehicle and engine GHG emission standards, known as Phase 2, will build upon the Phase 1 standards adopted federally in 2011 and in California in 2013.

Background / Regulatory History:

The California Global Warming Solutions Act of 2006, AB 32, established requirements for a comprehensive program of regulatory and market mechanisms to reduce GHG emissions in California. AB 32 also required ARB to develop and approve a Scoping Plan that describes California's approach to reducing GHG emissions to 1990 levels by 2020. The Scoping Plan was first approved by the Board in 2008 and updated for the first time in 2014.

The Tractor-Trailer GHG Regulation was an early action measure from the 2008 Scoping Plan. First approved by the Board in late 2008 and later amended in 2010, this regulation required improved aerodynamics and tires for 53-foot and longer long-haul tractors and trailers operating on California's roads.

The Phase 1 GHG standards, based on off-the-shelf technologies and applicable to 2014 and later model year medium- and heavy-duty engines and vehicles, were adopted by U.S. EPA in 2011 and by the Board in 2013. The Phase 1 standards took effect with the 2014 model year and are projected to reduce CO2 by about 12.5 percent by 2035.

Proposed Actions:

U.S. EPA finalized the federal Phase 2 standards for medium- and heavy-duty vehicles in August 2016.[15] The new standards, which push technology improvements beyond what is currently in widespread commercial use, are expected to take effect with model year 2021 for all new class 2b-8 medium- and heavy-duty trucks sold in the nation and in model year 2018 for new trailers, and to be fully phased in by model year 2027. This measure establishes Phase 2 GHG standards for all new class 2b-8 medium- and heavy-duty trucks starting in 2021, and for certain classes of new trailers, starting in 2018. At the federal level, GHG emission reduction requirements would apply to certain box-type trailers for the first time.

Following an informational update to the Board in 2016, ARB staff plans to present a California Phase 2 proposal for the Board's consideration in 2017. Staff plans to propose a California Phase 2 regulation that harmonizes with the federal Phase 2

[15] https://www.epa.gov/newsreleases/heavydutyaug162016

regulation in structure, timing, and stringency. However, there will be minor differences to facilitate enforcement, align with existing California programs, and provide incentives for manufacturers to bring advanced technologies to the market.

In addition, ARB is funding research into further aerodynamic improvements for trailers and vocational vehicles, and depending on the outcome of that research, may in 2019 propose regulations with additional requirements for trailer and vocational vehicle aerodynamics beyond what Phase 2 requires. For example, staff may amend the Tractor-Trailer GHG to include requirements for trailer categories not included in the federal Phase 2 program in order to further reduce GHG emissions in California. In California, GHG emission reduction requirements for certain 53-foot and longer box-type trailers have been in place since 2008 under ARB's Tractor-Trailer GHG Regulation. Amendments to this regulation, could potentially include GHG emission reduction requirements for flatbed, tanker, container, and curtain side trailers, thus providing additional GHG reductions in California. California is the only state with the authority to adopt and enforce emission standards for new motor vehicles and engines that differ from the federal emission standards.

Estimated Emission Reductions:

While criteria emission reductions have not been identified at this time, emission reductions for the measure will be identified as part of the rule development process. The measure as proposed by staff to the Board or adopted by the Board may provide more or less reductions than as proposed by staff.

Timing:

Proposed ARB Board hearing:	2017 - 2019 Proposed implementation schedule: Implementation will begin with model year 2021 for all new heavy-duty trucks class 2b-8 sold in the nation and model year 2018 for new trailers, and will be fully implemented by model year 2027.

Proposed SIP Commitment:

ARB staff proposes to commit to bring the California Phase 2 proposal to the Board by 2017. ARB staff also proposes to commit to bring the amendments to the Tractor-Trailer GHG regulation to the Board by 2019. Emission reductions for the measure will be identified as part of the rule development process. The measure as proposed by staff to the Board or adopted by the Board may provide more or less reductions than as proposed by staff.

Innovative Clean Transit

Overview:

Development of a modern, multi-modal, clean transit system is critical to meeting the state's criteria, toxics, and climate emissions and petroleum reduction goals. Access to public transit is especially important for people in disadvantaged communities who may have limited mobility choices. The proposal will support the transition to a suite of cleaner transit options to support these goals. The measure will consider a variety of mechanisms to support access to innovative transit and mobility options that together will achieve emission reductions or other benefits in disadvantaged communities, maintain or expand service, while deploying advanced, clean technologies. These approaches are intended to: 1) support the long-term transition to zero-emission technologies as soon as they become viable economic options for transit agencies; 2) provide transit options to support regional sustainable communities strategies; and 3) support service for people with limited transportation options. Experience from using advanced technology in buses and other modes of transit will also expand the market for the same technologies in other heavy-duty vehicle applications.

Description of Source Category:

There are about 200 transit agencies in California that provide a variety of transit services including bus, passenger rail and other transportation options. This includes approximately 11,000 buses that are currently fueled primarily by diesel and natural gas, with zero-emission options growing rapidly as an alternative technology.

Background / Regulatory History:

Adopted by ARB in 2000, the Fleet Rule for Transit Agencies required reductions in diesel PM and NOx emissions from urban buses and transit fleet vehicles, and required future zero-emission bus purchases. Urban bus fleets were required to select either the diesel path or the alternative-fuel path. Transit agencies on the diesel path needed to demonstrate zero-emission buses, and to meet the zero-emission bus purchase requirements sooner, while agencies on the alternative-fuel path had to ensure that 85 percent of urban bus purchases were alternative fueled without a demonstration requirement.

The Transit Fleet Rule was amended in 2004, and again in 2006. The 2006 amendments temporarily postponed the zero-emission bus purchase requirement (until 2011 and 2012, depending on the compliance path) and expanded the initial demonstration with a subsequent advanced technology demonstration phase.

In 2009, ARB staff provided a technology update to the Board on the commercial readiness of zero-emission buses. At that time, the extended demonstration was behind schedule due to delays in funding and vehicle production. ARB staff recommended a postponement of the purchase requirements, and proposed to establish technology performance metrics that could be used to assess commercial

readiness of zero-emission buses. The Board, through Resolution 09-49, directed ARB staff to delay the purchase requirement, research and develop commercial-readiness metrics to be used as criteria to initiate the zero-emission bus purchase requirement, and to conduct a technology assessment on the readiness of zero-emission bus technologies.

Proposed Actions:

ARB would develop and propose a variety of approaches and mechanisms to support the transition to a suite of innovative clean transit options. ARB has convened a technical workgroup and a transit agency subcommittee to inform key data collection and analysis, and help develop and refine potential approaches. These approaches may include: 1) securing binding commitments from the state's transit providers for a long-term vision for transitioning to zero-emission buses and other technologies. Progress towards this zero-emissions goal would be tracked through emissions related metrics such as aggregate emissions per fleet or per capita for the individual transit agencies; 2) continuing to support to the maximum extent possible the near-term deployment of zero-emission buses into service where transit agency commitments exist or new actions where the economics become viable and transit service can be maintained, expanded, or enhanced; and 3) working with transit agencies to pilot innovative approaches, including the use private sector shared vehicle services, to enhance access to existing transit systems with zero-emission first and last-mile solutions. These zero-emissions technologies exist today and can serve as an immediate step towards the deployment of a modern, long-term zero-emission transit system.

These approaches would provide flexibility to transit fleets that support timely implementation of advanced technology in ways that are synergistic with their operation and recognize factors such as early actions to reduce emissions, utilization of alternative modes of zero emission transportation (e.g., light-rail, shared vehicle services), and improved efficiencies of the transit system.

Estimated Emission Reductions:

ARB staff used ARB's Vision 2.1 model to estimate the emission reductions associated with this proposed measure. As a bounding exercise to estimate the potential emissions benefits, ARB staff modelled 20 percent of the new urban buses purchased by transit agencies beginning in 2018 will be zero-emission buses with the penetration of zero-emission technology ramped up to 100 percent of new sales in 2030. The emission reductions themselves may come from a combination of new purchase requirements, incentives, or alternative performance standards. ARB staff also assumed any new natural gas buses, starting in 2018, and diesel buses, starting in 2020, would meet the optional heavy-duty low-NOx standard. The low-NOx standard was assumed to provide 90 percent overall NOx emission reductions from the current engine and emission control technologies.

Timing:

Proposed ARB Board hearing: 2017
Proposed implementation schedule: 2018-2040

Proposed SIP Commitment:

ARB staff proposes to bring the Innovative Clean Transit proposal to the Board in 2017. ARB staff will initiate a process designed to develop actions to achieve the NOx emission reductions shown in Table 3 for the South Coast in 2023 and 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less reductions than as proposed by staff.

Last Mile Delivery

Overview:

The goal of this proposed measure is to achieve NOx and GHG emission reductions through advanced clean technology, and to increase the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. Last mile delivery fleets are well suited for introducing zero-emission technology because they operate in urban centers, have stop and go driving cycles and are centrally maintained and fueled. Experience gained from demonstrating the viability of advanced technologies in these fleets will benefit the market and enable the same technologies to be used in other heavy-duty vehicle applications.

Description of Source Category:

The source category includes Classes 3-7 heavy-duty delivery trucks operated within California that are used in last mile freight delivery applications. Most of the last mile delivery trucks are within vehicle classes 3-6 (10,000 -26,000 lbs.) and some are in the vehicle class 7 (26,001-33,000 lbs.) Last mile delivery trucks are predominately used in urban areas to deliver freight from warehouses and distribution centers to its final point of sale or use (last mile delivery). Their duty cycle is favorable for accelerated penetration of zero-emission technology because they typically operate at low average driving speeds with frequent stop-and-go drive cycles, and are centrally maintained and fueled at an urban distribution center.

Background / Regulatory History:

The Last Mile Delivery is a newly proposed measure to support the SIP, Sustainable Freight Action Plan, SB 350, AB 32, and the Diesel Risk Reduction Plan. This proposed measure would be developed in partnership with affected stakeholders to identify the most effective strategy to influence advanced technologies such as low-NOx engines and zero-emission trucks, primarily for class 3-7 last mile delivery trucks in California. Although there have not been previous regulations specific to last mile delivery trucks, ARB has controlled these sources through other regulations such as the Truck and Bus Regulation. All privately and federally owned diesel trucks with a GVWR of 14,0001 pounds and greater (Class 4 and above) that operate in California are subject to the requirements of the Truck and Bus Regulation, which include meeting particulate matter (PM) filter requirements and upgrading to 2010 or newer model year engines.

Proposed Actions:

ARB would develop and propose a regulation that would result in the use of low-NOx engines and the deployment of increasing numbers of zero-emission trucks where best suited, primarily for class 3-7 last mile delivery trucks in California. This proposed measure will begin in 2020, with a small scale deployment initially, and ramping up to a higher percentage of new vehicles sales. The initial ramp up of zero-emission trucks

will consider the ability of the new technology to meet the operational needs of the users. ARB staff is evaluating options for purchase requirements.

Estimated Emission Reductions:

ARB staff used ARB's Vision 2.1 model to estimate conservative emission reductions associated with this proposed measure. The benefits were estimated assuming that zero-emission vehicles comprise 2.5 percent of new Class 3-7 trucks sales in local fleets starting 2020. The penetration rate increases to 10 percent in 2025, and is assumed to remain flat through 2030.

Timing:

Proposed ARB Board hearing:	2018
Proposed implementation schedule:	2020-2050

Proposed SIP Commitment:

ARB staff proposes to commit to bring this measure to the Board in 2018. ARB staff will initiate a rule development process designed to achieve the NOx emission reductions shown in Table 3 for the South Coast nonattainment area in 2023 and 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less than the amount shown.

Innovative Technology Certification Flexibility

Overview:

The goal of this proposed measure is to encourage early deployment of the next generation of truck and bus technologies through defined, near-term ARB certification and OBD compliance flexibility for medium- and heavy-duty vehicles. This regulation is intended to balance the need to provide key, promising technologies with a predictable, and practical ARB-certification pathway, while preserving ARB's overarching objective to ensure expected emission benefits of advanced truck and bus technologies are achieved in-use. This regulation would provide the greatest flexibility for potentially transformational engine and vehicle technologies, such as robust hybrids and heavy-duty engines meeting the current optional low-NOx standard.

The deployment of robust hybrids (including those with zero-emission capability) is expected to both yield near-term emission benefits and facilitate the battery innovation needed to expand the application of zero-emission technology. By enabling early deployment of electric drivelines, low-NOx engines, and other key truck and bus technologies, this regulation would also help lay the foundation for the future technology-advancing regulation(s) needed to meet air quality and climate goals.

Background / Regulatory History:

In December 2013, ARB adopted Optional Reduced Emission Standards for Heavy-Duty Engine to further reduce emissions from the heavy-duty vehicle sector. These optional low-NOx emission standards set targets of 0.10, 0.05, and 0.02 g/bhp-hr NOx, which are 50 percent, 75 percent, and 90 percent, respectively, below the current 2010 emission standard. As of November 1, 2015, only one heavy-duty engine has been certified to an optional low-NOx standard – a Cummins ISL 8.9 liter alternative-fueled engine meeting the 0.02 g/bhp-hr NOx standard.

California law requires new motor vehicles and engines to be certified by ARB for emission compliance before they are legal for sale, use, or registration in California. Light- and medium- duty vehicle emissions are typically evaluated on a *chassis dynamometer* as part of the vehicle certification process. Heavy-duty vehicles (greater than 14,000 lbs.) are not required to be ARB-certified as a complete vehicle; instead, an engine must be ARB-certified for use in a heavy-duty vehicle.[16] Heavy-duty engine emissions are certified using an engine dynamometer, in part due to challenges in chassis testing heavier vehicles, and the impracticality of chassis certifying the diversity of potential truck and bus configurations in which a heavy-duty engine could be installed. However, dynamometer testing of heavy-duty engines does not quantify the potential emission impact of innovative non-engine technologies, such as hybrid drivelines.

[16] Hybrid heavy-duty vehicles have the option for complete full vehicle certification, utilizing ARB's Heavy-Duty Hybrid-Electric Vehicles Certification Procedures (December, 2013)

ARB certification requirements mandate that manufacturers demonstrate that their new engines or vehicles comply with applicable exhaust and evaporative emission standards over their useful life, and comply with other requirements, such as labeling and emissions warranty requirements.

OBD is an important emission control program that is critical for California to achieve its air quality goals. OBD consists mostly of added software in the relevant powertrain control modules that monitor critical components of the engine and aftertreatment. The OBD system monitors virtually every component that can cause an emission increase, including but not limited to all emission controls and all electronic components (such as sensors and actuators) that affect emissions or are used to monitor other emission controls. To function properly, OBD monitors must run with a specified minimum frequency in-use. The OBD system alerts the driver if something is wrong via the dashboard “check engine” (or malfunction indicator) light, and stores information pinpointing the likely root cause of a potential malfunction to assist repair technicians.

Light- and medium-duty vehicles have met OBD requirements beginning in 1996. Heavy-duty gasoline and diesel engine OBD requirements phased-in with the 2013 model year, while alternative fuel heavy-duty engines must begin OBD compliance in the 2018 model year due in part to their limited production volumes.

Proposed Actions:

ARB’s existing medium- and heavy-duty vehicle certification and OBD requirements provide a critical and effective mechanism for ensuring a vehicle’s expected emission benefits are achieved in-use. However, ARB’s engine and vehicle approval paradigm, geared towards traditional technologies, may deter some manufacturers from developing promising new truck and bus technologies that are uncertain to achieve market acceptance.

Hybrid truck and bus technology, in particular plug-in technology, has potential to achieve near-term emission benefits and provide a technology bridge to zero-emission solutions. Hybrid truck and bus technology can support battery innovation in higher demand zero-emission applications, and help build supply chains for zero-emission components like controllers, motors, and electricity converters. Plug-in hybrids with a robust electric drive can also foster fleet acceptance of zero-emission technology and drivetrains. However, California demand for hybrid trucks and the number of manufacturers offering hybrid truck technology in California has declined significantly in recent years. Part of this decline in hybrid truck manufacturers may be attributed to reduced demand from initial large, early adopter fleets as well as challenges meeting California heavy-duty OBD requirements.

Initial Innovative Technology Regulation concepts discussed with stakeholders would provide tiered ARB certification and OBD requirements for an innovative heavy-duty engine or vehicle technology, providing targeted flexibility at market launch and early technology deployment stages, and reverting back to full ARB approval requirements

once the technology achieves a market foothold. Initial draft flexibility provisions for hybrid trucks are geared towards encouraging manufacturers to enter the market, and address OBD compliance challenges encountered by what are typically non-vertically integrated engine, driveline and vehicle manufacturers. Hybrid flexibility provisions discussed with stakeholders thus far are structured to preferentially encourage hybrids capable of achieving at least 35 miles of zero-emission range. Initial Innovative Technology Regulation concepts for low-NOx engines are geared towards encouraging manufacturers to accelerate development and market launch of a diversity of alternative-fuel and diesel low-NOx engine families.

Estimated Emission Reductions:

As this measure is a modification to a test procedure that is intended to enable key technology-advancing heavy-duty vehicle regulations and incentive programs identified in this SIP, it does not have associated emission reductions.

Timing:

Proposed ARB Board hearing:	2016
Proposed implementation schedule:	2017 – 2027

Proposed SIP Commitment:

In October 2016, ARB staff brought this measure to the Board for its consideration. At the October 2016 Board Hearing, the Proposed Innovative Technology Regulation (IRT) was adopted.

Zero-Emission Airport Shuttle Buses

Overview:

The goal of this proposed measure is to achieve NOx and GHG emission reductions goals through advanced clean technology, and to increase the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use.

Description of Source Category:

Airport shuttle buses include buses that transport passengers to and from car parking lots and airport terminals as well as those that transport passengers to airport car rental facilities. The emissions in this source category are expected to increase with the projected increase in passenger aviation activities.

Background / Regulatory History:

Diesel airport shuttle buses with a GVWR greater than 14,000 pounds that are owned or operated by a municipality are regulated under California's Diesel Particulate Matter Control Measure for Municipality or Utility On-Road Heavy-Duty Diesel Fueled Vehicles (Public Agency and Utility Regulation). This regulation requires a municipality or utility that owns, leases or operates on-road diesel fueled vehicles with engine model year 1960 or newer and GVWR greater than 14,000 pounds to reduce its engine's PM2.5 emissions to 0.01 g/bhp-hr. This can be done by repowering, retrofitting, or retiring the vehicle. Implementation of the rule started in 2007, with a compliance schedule based on the engine model year. Airport shuttle buses owned by a municipality that are less than 14,000 pounds GVWR are not subject to the Public Agency and Utility Regulation.

Private contractors that operate diesel airport shuttles are regulated under the Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants from In-Use Heavy-Duty Diesel-Fueled Vehicles (Truck and Bus Regulation). The regulation requires airport shuttle buses with engines older than 2010 to eventually be replaced with engines that meet the 2010 emission standard of 0.2 g/bhp-hr NOx and 0.01 g/bhp-hr PM2.5. As a result, by 2023, nearly all shuttle buses should be compliant with this regulation. However, similar to the Public Agency and Utility Regulation, this regulation does not apply to shuttle buses with GVWR less than 14,000 pounds.

Diesel and alternative-fueled shuttles less than 14,000 GVWR are subject to new engine emission standards of 0.20 g/bhp-hr NOx and 0.01 g/bhp-hr PM.

There are additional regulatory requirements for airport shuttle fleets that operate in the South Coast District's jurisdiction, as specified in Rule 1194. This rule requires public and private fleets of 15 or more vehicles that provide passenger pickup services at commercial airports to acquire cleaner burning (certified to ARB's ultra-low emission

vehicle, super-ultra-low emission vehicle, or zero-emission vehicle emission standards) or alternative-fueled vehicles when procuring their vehicles.

Non-diesel airport shuttles are not subject to ARB in-use fleet regulations.

Proposed Actions:

ARB would develop and propose a regulation or other measures to deploy zero-emission airport shuttles in order to further support market development of zero-emission technologies in the heavy-duty sector. Airport passenger shuttles that frequent the airport such as rental car and parking lot shuttles typically operate fixed short routes coupled with stop-and-go operation and low average speeds. As seen in past zero-emission bus demonstrations, vehicles that operate on fixed routes, have stop-and-go operation, and maintain low average speeds are ideal candidates for zero-emission electric technologies.

The current successes of zero-emission transit buses can reasonably be translated to airport shuttle buses due to the similarities between these two vehicle types. A near-term strategy to encourage airports to begin purchasing zero-emission shuttle buses would introduce these buses into the marketplace, which may result in entire zero-emission shuttle bus fleets in the future. Like transit buses, the inclusion of zero-emission airport shuttles would serve as a stepping stone to encourage broader deployment of zero-emission technologies in the on-road sector. Initially, incentive funding could be used to help defer the higher incremental cost of zero-emission airport shuttles as compared to traditionally-fueled shuttles. As the capital costs for zero-emission technologies decrease due to higher sales volume, implementation of the near-term strategy could occur either by regulation or a memorandum of understanding, or a combination thereof.

ARB will also consider the feasibility of expanding the scope of this measure to include emission compliance requirements for other heavy-duty airport vehicles, such as fixed route vehicles entering/exiting the airports and vehicles operating almost exclusively at the airport facility, such as airport owned operational and maintenance vehicles.

Estimated Emission Reductions:

While emission reductions have not been identified at this time, ARB will quantify any emission reductions from this measure during the rule development process. The measure as proposed by staff to the Board or adopted by the Board may provide more or less reductions than as proposed by staff.

Timing:

Proposed ARB Board hearing:	2018
Proposed implementation schedule:	2023

Proposed SIP Commitment:

ARB staff proposes to commit to bring this measure to the Board in 2018.

Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles

Overview:

The goal of this proposed measure is to provide incentive funding to accelerate the penetration of near-zero and zero-emission engines beyond the rate of natural turnover achieved through implementation of the other proposed measures identified for on-road heavy-duty vehicles. This measure is specifically for the South Coast.

Background / Regulatory History:

Several State and local incentive funding pools have been used historically -- and remain available -- to fund the accelerated turnover of on-road heavy-duty vehicles. Since 1998, the Carl Moyer Program (Moyer Program) has provided funding for replacement, new purchase, repower and retrofit of trucks in the South Coast. Beginning in 2008, the Goods Movement Emission Reduction Program funded by Proposition 1B has funded cleaner trucks for the region's transportation corridors; the final increment of funds will implement projects in South Coast through 2018.

ARB's Air Quality Improvement Program (AQIP) has funded the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) since 2010, and continued South Coast participation is expected. ARB has also administered a Truck Loan Assistance Program since 2009. Beyond these Statewide programs, the District receives local funds to improve air quality through vehicle registration fees authorized by AB 923, AB 2766, and Senate Bill 1928. The South Coast AB 2766 Motor Vehicle Subvention Program, funded by a motor vehicle registration fee surcharge, incentivizes emission reduction from mobile sources and is used to drive early introduction of clean air technology such as cleaner vehicle engines, and accelerated vehicle retirement and repair programs. The South Coast's Clean Fuels Program funds the development, demonstration, and accelerated deployment of clean fuels and transportation technologies.

Additionally, funding could also be provided through programs including Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007), which authorized the California Energy Commission (CEC)'s Alternative and Renewable Fuel and Vehicle Technology Program. This program has an annual program budget of approximately $100 million to support projects including improved heavy-duty vehicle technologies, retrofitting on-road heavy-duty vehicle fleets, and expanding infrastructure. The Low Carbon Transportation Program provides mobile source incentives to reduce GHG emissions, criteria pollutants, and air toxics through the development of advanced technology and clean transportation. Low Carbon Transportation investments are supported by California Cap-and-Trade auction proceeds. A voluntary incentive program administered by ARB, the Low Carbon Transportation Investment program funds clean vehicle and equipment projects. The Enhanced Fleet Modernization Program (EMP) and EMP Plus-up programs augment the State's existing vehicle retirement program,

with approximately $30 million available annually to provide funds for car scrapping, provided the vehicles meet certain eligibility requirements.

At the Federal level, U.S. EPA's Diesel Emission Reduction Act (DERA) funds projects that reduce diesel emissions from on-road heavy-duty engines, including school buses, Class 5 – 8 heavy-duty interstate vehicles, locomotive engines, marine engines, and non-road engines, equipment or vehicles used in construction, cargo handling equipment, and off-road equipment used in agricultural, mineral, or energy production industries.

Proposed Actions:

This proposed measure would use existing incentive and other innovative funding programs to help increase the penetration of near-zero and zero heavy-duty trucks. Funding mechanisms would target technologies that meet or exceed an optional low-NOx standard through 2023, when implementation of a new federal low-NOx standard will begin and part of the current round of Moyer Program funding ends.

Implementation will require commitment of at least $28 million of the current State and South Coast District incentive funds described above to truck replacement projects in the 2015 to 2020 timeframe. In addition, pending annual appropriation by the Legislature and approval by the Board, ARB's Low Carbon Transportation and AQIP funds can be apportioned from 2015 through 2020, with approximately $7 million per year allocated for low-NOx trucks using renewable fuels in South Coast. These funds could be used to target applications that are well-suited for ZEV applications, such as ZEV drayage.

It is important to note that funds under the control of the South Coast District may also be used for other applications, including off-road vehicles. Identifying the most effective use of funds in order to maximize emission reductions will depend on the incremental cost of technologies, cost effectiveness, and the type of financing mechanism employed. Accordingly, the use of these funds to maximize emission reductions for 2023 may be further refined.

Timing:

Proposed ARB Board hearing:	2016 and annually thereafter
Proposed implementation schedule:	2016 – 2023

Proposed SIP Commitment:

ARB staff proposes to commit to bring to the Board by 2018 a prospective incentive-based emission reduction measure designed to achieve the NOx emission reductions shown in Table 3 for the South Coast in 2023 and 2031, for inclusion in the California SIP as a mechanism to allow California to receive SIP credit for reductions achieved through these incentive programs. These measures will meet U.S. EPA integrity requirements and will include a mechanism for tracking and backstopping

reductions. The measure as proposed by staff to the Board or adopted by the Board may provide more or less reductions than as proposed by staff.

Further Deployment of Cleaner Technologies: On-Road Heavy-Duty Vehicles

Overview:

The goal of this proposed measure is to identify concepts that will further reduce NOx emissions. These concepts will include additional incentive funding and developing technologies to accelerate the penetration of near-zero and zero equipment beyond the rate of natural turnover achieved through implementation of the other proposed measures identified for on-road heavy-duty vehicles. This measure is specifically for the South Coast.

Background / Regulatory History:

A number of existing measures will achieve NOx reductions from heavy-duty trucks, and could be expanded to provide additional reductions. In addition, new technologies, along with regulations, could potentially provide additional NOx reductions.

Incentives:

Several State and local incentive funding pools have been used historically -- and remain available -- to fund the accelerated turnover of on-road heavy-duty vehicles in the South Coast. Since 1998, the Carl Moyer Program has provided funding for replacement, new purchase, repower and retrofit of trucks in the basin. Beginning in 2008 the Goods Movement Emission Reduction Program funded by Proposition 1B has funded cleaner trucks for the region's transportation corridors. The Air Quality Improvement Program has funded the HVIP since 2010. In addition, new Low Carbon Transportation incentives funded by the GGRF are available for zero-emission and cleaner combustion truck projects that achieve GHG benefits, and these projects may often provide criteria pollutant reduction co-benefits. However, to achieve additional reductions in this category, new sources of funding will be pursued.

Advanced Technologies Such as Connected and Autonomous Vehicles/Systems:

Advanced technologies are expected to be introduced into the market and could replace or supplement the need to solely rely on additional funding pools. Examples of these strategies include autonomous and connected vehicle systems, greater fleet and system operational efficiencies, and improvements in transportation logistics. Some of these strategies are currently in the early stages of development and are expected to bring not only emission reductions, but cost savings to the industry once deployed. Many of these technologies will ultimately bring cost saving to the freight movement sector. It is likely that this deployment can be accelerated if necessary using by incentive funding and regulations.

Proposed Actions:

This proposed measure is designed to achieve further emission reductions for South Coast attainment in 2023 and 2031 through a suite of additional actions, including early penetration of near-zero and zero technologies, emission benefits associated with

increased operational efficiency strategies, and the potential for new driver assist and intelligent transportation systems. The emission reductions will be achieved through a combination of industry actions, motivated by both ARB and the South Coast. These actions reflect an initial assessment of a pathway, recognizing that as funding is allocated and advanced technologies further develop, the balance amongst approaches will necessarily adjust.

Scope of Technology Penetration and Mechanisms to Achieve Reductions:

Under current ARB regulations, nearly all heavy-duty trucks operating in the South Coast must meet today's 2010 engine standards by 2023, with the exception of very low mileage fleets and public fleets regulated under earlier fleet rule requirements. A key component of the mobile source strategy for heavy-duty vehicles is the adoption of a more stringent engine performance standard reflecting technology that is effectively 90 percent cleaner than today's standards. To achieve the further reductions associated with early penetration of these cleaner heavy-duty technologies, ARB and South Coast staff estimate that by 2023, approximately 100,000 to 150,000 trucks would need to have engine technologies equivalent to emissions represented by a 0.02 g/bhp-hr low-NOx standard. The following mechanisms provide a pathway for achieving this scale of technology deployment:

- Identify and develop regulatory mechanisms that encourage the development of near-zero and zero-emission heavy-duty truck deployment. Similar actions have been done previously in the South Coast, including local regulations and the San Pedro Bay Ports Clean Truck Program. The South Coast will include local measures in its AQMP to address the accelerated deployment of heavy-duty vehicles.

- Expand and enhance existing incentive and other innovative funding programs for heavy-duty vehicles to increase the emphasis on and support for purchase of near-zero and zero equipment. Funding mechanisms would target technologies that meet either lower NOx standards, or are hybrid/zero-emission technologies. If incentive funding is the primary mechanism to achieve the scope of further technology deployment described above, funding would be required for approximately 15,000 to 20,000 trucks per year over a seven year period, depending upon the availability of zero-emission vehicles and engines certified to ARB's optional low-NOx standards of 0.05 g/bhp-hr and 0.02 g/bhp-hr or other advanced hybrid/zero-emission technologies. The incentive funding required for this effort would go beyond the amount currently authorized for existing programs through 2023. Continued incentive funding post-2023 to further accelerate the deployment of trucks meeting or exceeding a 0.02 g/bhp-hr standard would provide additional reductions for 2031.

  Determination of the needed resources will be based on assessment of the incremental cost of technologies, cost effectiveness, and the type of financing mechanism employed. Funding needs and mechanisms will be identified working

in collaboration with the District and other State agencies over the next several months.

Additional mechanisms for achieving the needed emission reductions reflect actions by ARB and others to continue increasing the penetration of zero-emission technologies, intelligent transportation systems, and other operational efficiencies. While these approaches have the greatest potential to provide further reductions post 2023, early advances in these areas could offset some of the reductions required through incentive funding or regulations. These additional pathway mechanisms include:

- Several individual proposed measures focus on deploying zero-emission vehicles in heavier applications that are currently well-suited for broad market development, such as transit buses, airport shuttles, and last mile delivery. Depending upon the success of these applications, and ongoing technology assessment, regulatory mechanisms to require zero-emission vehicles in additional applications may be feasible. The greatest opportunities exist for fleets that are captive to the South Coast, and drive shorter distances. This technology assessment is already underway.

- Advances in the development of autonomous and connected vehicle systems, particularly if based on zero-emission technologies, as well as greater operational efficiencies, and improvements in transportation logistics. These changes in how the heavy-duty truck sector would operate offer the potential to achieve criteria, toxic, and GHG emission reductions, but also reduce VMT and congestion as well as petroleum usage. These concepts are based on emerging technologies, and will require significant exploration and demonstration prior to becoming concepts with quantified emission reductions. To promote initial demonstration of these concepts, the FY 16/17 Low Carbon Transportation Funding Plan will include eligibility for demonstration projects related to intelligent transportation systems and connected vehicles.

Timing:

Proposed ARB Board hearing:	n/a
Proposed implementation schedule:	2016 – 2031

Implementation Milestones and Schedule		
Implementation Milestone	**Implementation Steps**	**Schedule**
Identify and secure funding for incentive based and other innovative funding programs for accelerated deployment of near-zero and zero heavy-duty vehicles	*Phase 1*: Identify funding needs and potential sources *Phase 2*: Pursue actions to secure funding *Phase 3*: Implement funding/incentive programs	2016 + (annually)
Develop regulatory strategies for deployment of zero-emission technologies in additional heavy-duty vehicle applications as appropriate	*Phase 1:* Evaluation of technology and prototype demonstrations. Regulatory strategies brought to ARB Board for approval.	2016 – 2023
	Phase 2: Development of regulatory strategies	2020 - 2023
	Phase 3: Measure implementation	2025 – 2031
Evaluate potential for emission benefits from operational efficiencies and intelligent transportation systems and quantify and develop mechanisms to provide SIP reductions as appropriate	*Phase 1:* Evaluation of approaches and potential for emission reductions	2016 – 2023
	Phase 2: Demonstration of systems	2020 – 2024
	Phase 3: Quantification of emission reductions and mechanisms for incorporating into SIP	2024 – 2027
Provide annual reports to Board on status of funding, technology development, and identification of potential further regulatory measures	*Phase 1:* Evaluate status of funding, technology development, and potential for further regulatory measures *Phase 2:* Develop potential regulatory actions as appropriate	2017+ (annually)

Proposed SIP Commitment:

ARB commits to bring to the Board programs and policies or take other actions to implement this measure to achieve the NOx emission reductions shown in Table 3 for the South Coast in 2023 and 2031. Further development measures for each source category may provide more or less emission reductions than the amount shown.

Proposed Measures: Off-Road Federal and International Sources

Description of Source Categories:

Locomotives

Union Pacific Railroad (UP) and BNSF Railway (BSNF) are the two Class I, or major, freight railroads operating in California. There are also seven intrastate passenger commuter operators and up to 26 freight shortline railroads currently operating in California. UP and BNSF, however, generate the vast majority (90 percent) of locomotive emissions within the State, with most attributable to interstate line haul locomotives.

UP and BNSF operate three major categories of freight locomotives, both nationally and in California. The first category is interstate line haul locomotives, which are primarily ~4,400 horsepower (HP). The second category is made up of medium-horsepower (MHP) locomotives, as defined by ARB staff as typically between 2,301 and 3,999 HP. MHP locomotives are typically older line haul locomotives that have been cascaded down from interstate service. And lastly, there are switch (yard) locomotives, specifically defined by U.S. EPA as between 1,006 and 2,300 HP.

Locomotives operating at railyards and traveling throughout the nation are a significant source of emissions of diesel PM (which ARB has identified as a toxic air contaminant), NOx, and GHGs. These emissions often occur in or near densely populated areas and neighborhoods, exposing residents to unhealthy levels of toxic diesel PM, plus regional ozone and fine particulates that form in the atmosphere.

Ocean-Going Vessels

OGVs are very large vessels designed for deep water navigation. OGVs include large cargo vessels such as container vessels, tankers, bulk carriers, and car carriers, as well as passenger cruise vessels. These vessels transport containerized cargo; bulk items such as vehicles, cement, and coke; liquids such as oil and petrochemicals; and passengers. Ocean-going vessels travel internationally and may be registered by the U.S. Coast Guard (U.S.-flagged), or under the flag of another country (foreign-flagged). The majority of vessels that visit California ports are foreign-flagged vessels.

More Stringent National Locomotive Emission Standards

Overview:

The goal of this proposed measure is to reduce emissions from locomotives in order to meet air quality, localized health risk, and climate change goals. Under the proposed measure, ARB will petition U.S. EPA to promulgate by 2020 both Tier 5 national emission standards for newly manufactured locomotives, and more stringent national requirements for remanufactured locomotives, to reduce criteria and toxic pollutants, fuel consumption, and GHG emissions.

Background/Regulatory History:

Under the Clean Air Act, U.S. EPA has the sole authority to establish emissions standards for new locomotives. (42 United States Code (U.S.C.) §7547, (a)(5)) By regulation, U.S. EPA has defined "new" locomotives to include both those newly manufactured and those existing locomotives that are remanufactured or rebuilt.

U.S. EPA has previously promulgated two sets of national locomotive emission regulations (1998 and 2008). In 1998, U.S. EPA approved national regulations that primarily emphasized NOx reductions through Tier 0, 1, and 2 emission standards. Tier 2 NOx emission standards reduced older uncontrolled locomotive NOx emissions by up to 60 percent, from 13.2 to 5.5 g/bhp-hr.

In 2008, U.S. EPA approved a second set of national locomotive regulations. Older locomotives, upon remanufacture, are required to meet more stringent particulate matter (PM) emission standards, which are about 50 percent cleaner than Tier 0-2 PM emission standards. U.S. EPA refers to the PM locomotive remanufacture emission standards as Tier 0+, Tier 1+, and Tier 2+. The new Tier 3 PM emission standard (0.1 g/bhp-hr), for model years 2012-2014, is the same as the Tier 2+ remanufacture PM emission standard. The 2008 regulations also included new Tier 4 (2015 and later model years) locomotive NOx and PM emission standards. U.S. EPA Tier 4 NOx and PM emission standards further reduced emissions by approximately 90 percent from uncontrolled levels.

Proposed Actions:

ARB would petition U.S. EPA for new national locomotive emission standards for significant additional reductions in criteria and toxic pollutants, and GHG emissions from existing and future locomotives. ARB staff estimates that U.S. EPA could require manufacturers to implement the new locomotive emission regulations by as early as 2023 for remanufactures and 2025 for newly manufactured locomotives.

This measure describes the emissions levels that ARB staff believes would be achievable with a new generation of national emissions standards for locomotives, including both newly manufactured and remanufactured units. The description focuses on technology that could be employed to reach the lower emission levels to address local, regional, and global air pollution concerns in California, and in other states with high levels of railyard activity or rail traffic.

As documented in the Final Technology Assessment for Freight Locomotives,[17] ARB staff believes the most technologically feasible advanced technology for near-term deployment is the installation of a compact aftertreatment system (e.g., combination of selective catalytic reduction (SCR) and diesel oxidation catalyst (DOC) onto new and remanufactured diesel-electric freight interstate line haul locomotives. Newly manufactured locomotives can also be augmented with on-board batteries to provide an additional 10-25 percent reduction in diesel fuel consumption and GHG emissions to achieve the Tier 5 emission levels shown in the table below. For purposes of this document, ARB staff assumes a 15 percent reduction in fuel use for locomotives equipped with this battery technology. On-board batteries could also provide zero-emission track mile capabilities in and around railyards to further reduce diesel PM and the associated health risks.

A new federal standard could also facilitate development and deployment of zero-emission track mile locomotives and zero-emission locomotives by building incentives for those technologies into the regulatory structure.

The compact SCR and DOC aftertreatment system could also be retrofitted to existing Tier 4 locomotives to be able to achieve a Tier 4+ emissions standard, when Tier 4 locomotives are scheduled for remanufacture (every 7 to 10 years). Based on the typical remanufacture schedule, all Tier 4 locomotives could potentially be retrofitted with aftertreatment between 2025 and 2037. Existing locomotives originally manufactured to meet Tier 2 or Tier 3 standards could also be upgraded with the same compact aftertreatment system upon remanufacture to achieve emissions equal to Tier 4 levels. The potential amended emission standards for locomotives and locomotive engines are shown in the table below.

[17] Final Technology Assessment for Freight Locomotives available at: https://www.arb.ca.gov/msprog/tech/report.htm

Potential Amended Emission Standards for Locomotives and Locomotive Engines

Tier Level	Year of Manufacture	NOx		PM		GHG		HC		Proposed Effective Date
		Standard (g/bhp-hr)[2]	Percent Control[1]	Standard (g/bhp-hr)[2]	Percent Control[1]	Standard (g/bhp-hr)[2]	Percent Control[1]	Standard (g/bhp-hr)	Percent Control[1]	
2++	2005-2011	1.3	90	0.03	95	NA	0	0.14	85	2023
3+	2012-2014	1.3	90	0.03	95	NA	0	0.14	85	2023
4+	2015-2024	0.3	99	<0.01	99	NA	0	0.05	95	2023
5	2025	0.2	99+	<0.01	99	NA	10-25%	0.02	98	2025
		With capability for zero-emission operation in designated areas.								

1. Compared with uncontrolled baseline, reflects percent control over line haul baseline for illustrative purposes; ARB staff assumed older pre-Tier 0 line haul and switch locomotives would be able to emit up to the Tier 0 PM emission standards, based on American Association of Railroads in-use emission testing (required to comply with U.S. EPA in-use emission testing requirements) for older switch locomotives with EMD 645 engines.
2. ARB, Draft Technology Assessment: Freight Locomotives, 2016.

Estimated Emission Reductions:

ARB staff used ARB's Vision 2.1 model to estimate the emission reductions associated with this proposed measure.

Newly manufactured locomotives:

The Tier 5 emissions standard was modeled as a new tier of locomotives to be introduced in 2025. Tier 5 is defined by the same emission standards as Tier 4 for all pollutants except NOx, PM, HC, and GHG, which would be at the levels shown in the table above. This was represented in the model by increasing the Tier 5 locomotive activity in the total tier distribution by ~3.0 percent per year.

Remanufactured locomotives:

The locomotive fleet meeting the remanufacture emissions levels was modeled by assuming approximately 8 percent of the Tier 4 activity every year in the baseline will be operated by Tier 4+ locomotives.

Timing:

ARB petition to U.S. EPA	2016
U.S. EPA rulemaking date:	2020
Proposed implementation schedule:	2023 for remanufactured locomotives 2025 for newly manufactured locomotives

Proposed SIP Commitment:

ARB staff proposes to commit to petition U.S. EPA in 2016 to promulgate these standards by 2020 to achieve the NOx emission reductions shown in Table 3 for the South Coast in 2023 and 2031. U.S. EPA's action may provide more or less reductions than the amount shown.

Tier 4 Vessel Standards

Overview:

The goal of this proposed measure is to reduce emissions from OGVs. ARB would advocate with international partners for the IMO to establish new Tier 4 NOx and PM standards, plus efficiency targets for existing vessels, and new vessel categories not covered by IMO efficiency standards.

Background/Regulatory History:

The IMO, under Annex VI ("Regulations for the Prevention of Air Pollution from Ships"), specifies new engine NOx standards and sets fuel sulfur limits. Tier 2 IMO NOx standards have applied to new vessels since 2011, and in 2016, Tier 3 NOx standards will apply within NOx Emission Control Areas (ECAs) such as the North American ECA. However, the Tier 3 NOx limits are relatively high compared to the standards that apply to landside diesel engines. Annex VI regulations also do not limit PM exhaust emissions from new engines. The fuel sulfur limit in the North American ECA is 0.1 percent sulfur, the same as the ARB regulation discussed below. However, there are some differences between the regulations. The California regulation specifies the use of cleaner "distillate" grades of fuel, rather than just a sulfur limit, and the federal ECA provides exemptions for many vessels that are not exempted by the California rule.

The IMO also established amendments to Annex VI in 2011 that set in place efficiency standards for new ships. Beginning in 2013, the regulations establish energy efficiency design index (EEDI) standards that become progressively more stringent over time. The EEDI requires a minimum energy efficiency level per capacity mile (e.g., ton-mile) for different ship types and size segments. The categories of ships covered include oil and gas tankers, bulk carriers, general cargo ships, refrigerated cargo carriers and container ships. Together, these vessel categories account for over 70 percent of the carbon dioxide emissions from the new-build fleet. The regulations do not cover passenger vessels, mixed-use vessels, other specialty vessels, and vessels below 400 gross tons. For vessel types not covered, EEDI formulas are expected to be developed in the future.

The IMO also requires operators of both new and existing vessels to develop and maintain a Ship Energy Efficiency Management Plan (SEEMP). The SEEMP, a complement to the EEDI, provides a mechanism to improve the energy efficiency of a ship. A vessel's SEEMP document is expected to change over time, and many companies already use a similar plan to reduce fuel costs. The SEEMP regulations only require that ships have plan, but an approval of the plan, and tracking of the vessel's progress by the flag state administration is not required.

California regulations include the Ocean-going Vessel Fuel Regulation and the At-Berth (Shore-power) Regulation. The OGV Fuel Regulation was designed to reduce diesel

PM, NOx, and SOx emissions. This regulation was implemented in 2009, and required that vessels use lower sulfur distillate fuels. The current fuel sulfur limit of 0.1 percent was implemented in 2014, a year before the ECA set this same sulfur standard. The At-Berth Regulation was designed to limit emissions of diesel PM, NOx, and GHG from vessels at dockside. The regulation requires that vessels turn off their auxiliary diesel engines and plug in to shore-based grid electrical power, or utilize alternative technologies to achieve comparable emission reductions.

California has the authority to regulate marine vessels, including foreign-flagged vessels, when they visit our ports, to the extent such regulation is not preempted by federal law. The California OGV Fuel Regulation was adopted as two essentially identical regulations under our authority to regulate both TACs and criteria pollutants.

Proposed Actions:

Under this Action, ARB would work with U.S. EPA, U.S. Coast Guard, and international partners to urge the IMO to adopt more stringent emission standards for new ocean-going vessels and efficiency requirements for existing vessels. Specifically, ARB would advocate for a Tier 4 NOx standard for new marine engines on ocean-going vessels and vessel efficiency requirements for the existing in-use fleet.

Additional regulations are necessary because the existing IMO marine engine regulations do not include a PM standard, and the Tier III 2016 NOx standard is higher than the NOx standards for other diesel equipment categories. In addition, the IMO efficiency standards for existing vessels only require that vessels have a "Ship Energy Efficiency Management Plan." These regulations do not require approval of the plan, tracking of the vessel's progress, or actual improvement in energy efficiency.

Estimated Emission Reductions:

While emission reductions have not been identified at this time, ARB will quantify any emission reductions from this measure during the measure development process.

Timing:

ARB advocacy:	2016 - 2018
IMO action, ratification, and implementation:	2020 - 2025[18]

Proposed SIP Commitment:

ARB staff proses to commit to advocate with international partners for the IMO to establish new Tier 4 NOx and PM standards, and more comprehensive efficiency standards for existing vessels. The measure as proposed may provide more or less emission reductions than the amount shown.

[18] Anticipated implementation beginning in 2025

Incentivize Low Emission Efficient Ship Visits

Overview:

The goal of this proposed measure is to achieve early implementation of clean vessel technologies such as liquefied natural gas, Tier 3 standards or better, and incentivize vessels with those technologies in California service. ARB staff would work with California seaports, ocean carriers, and other stakeholders to develop the criteria and to identify the best way to incentivize introduction of Low Emission Efficient Ships into the existing fleet of vessels that visit California seaports.

Background/Regulatory History:

In addition to the traditional regulations outlined in the previous proposed measure, Port authorities in California have developed a number of measures for OGVs which are typically implemented through incentive programs or lease agreements.

The Ports of Los Angeles and Long Beach (San Pedro Bay Ports) have the most comprehensive program. The San Pedro Bay Ports Clean Air Action Plan (CAAP) is designed to reduce the emissions from a variety of port sources, including OGVs. The plan includes reductions from Port ordinances, regulations, green lease agreements, environmental mitigation requirements, and voluntary and incentive efforts such as the "Green Ship Incentive Program" and "Vessel Speed Reduction Incentive Program" (VSR). In addition, the Ports of Los Angeles, Long Beach, Oakland, San Diego, San Francisco, and Hueneme have installed shoreside infrastructure for vessels to plug in at berth, and some have provisions in leases to require use of the infrastructure beyond the requirements of ARB's Statewide At-Berth regulation. Prior to the implementation of a Statewide clean fuel regulation for OGVs, the San Pedro Bay Ports also developed a clean fuel incentive program which covered the cost differential between dirty heavy fuel oil and cleaner burning low sulfur distillate fuel.

The Port of Los Angeles' Voluntary Environmental Ship Index Program (ESI) rewards vessel operators for reducing NOx, SOx, and CO2 from OGVs. When an operator goes beyond what is required for compliance by bringing their newest and cleanest vessels to the Port and demonstrating technologies onboard their vessels, they are rewarded with incentives via lower dockage fees. It also encourages use of cleaner technology and practices in advance of regulations.

Proposed Actions:

Numerous technologies are available that can reduce emissions from ships and improve the efficiency of a vessel. Incentive programs can be leveraged to encourage vessel owners and operators to implement technologies that exceed current regulatory requirements. Under this proposed measure, ARB staff would work with California seaports and other stakeholders to develop criteria for a Low Emission Efficient Ship, targeting NOx, diesel PM, GHG, and sulfur oxide emissions. ARB would also pursue

partnerships with other jurisdictions and ports along the Pacific shipping corridor to develop a “green lane” concept with multiple small incentives for cleaner vessels that add up to sufficient financial benefit to change the decisions of vessel operators about which vessels are deployed on which routes. Incentives to encourage visits from ships meeting the criteria would involve identification of funding sources and implementation mechanisms such as development of new programs, enhancement of existing programs such as the Port of Long Beach Green Flag program and the Port of Los Angeles Environmental Ship Index Incentive Program, or incorporation into existing Statewide incentive programs.

Estimated Emission Reductions:

While emission reductions have not been identified at this time, ARB will quantify any emission reductions from this measure during the rule development process.

Timing:

Proposed ARB action date:	2018 – 2020
Proposed implementation schedule:	2018 +

Proposed SIP Commitment:

ARB staff proposes to commit to develop criteria for a Low Emission Efficient Ship and incentives for using these ships at California ports by 2020.

At-Berth Regulation Amendments

Overview:

The goal of this proposed measure is to further reduce emissions from ships that visit California ports. ARB staff would develop and propose amendments to the current At-Berth Regulation and look for additional reductions from additional vessel fleets, types, and operations.

Description of Source Category:

Ocean-going vessels are large vessels designed for deep water navigation. This category includes vessels such as container ships, tankers, bulk carriers, refrigerated cargo vessels, passenger cruise ships, and "roll-on, roll-off" ships used to transport automobiles. These vessels make about 9,000 visits to California ports annually, and are mostly foreign-flagged vessels engaged in international trade.

Most ocean-going vessels are propelled by a single very large diesel engine (main engine), and also typically have several diesel-powered generator sets (auxiliary engines) providing electrical power to the ship, as well as diesel powered boilers to produce steam for heating or other uses. Passenger cruise ships use a different engine configuration that is referred to as "diesel-electric." These vessels use large diesel generator sets to provide electrical power for both propulsion and ship-board electricity. For the purpose of the regulation, these engines are treated as auxiliary engines.

Emissions from ocean-going vessels occur while vessels transit to and from California ports, during maneuvering operations into and out of berth, and while anchored offshore, or berthed at dock (hoteling). During transiting, the main and auxiliary engines are operating, while the boiler on many vessels may not be operating or may be used at partial load, since the heat from the main engine exhaust may be sufficient to produce ship steam. During maneuvering, main and auxiliary engines, as well as the boiler, would typically be operating. At berth or anchorage, only the auxiliary engines and boiler would typically be operating, while the main engine would be turned off.

Background/Regulatory History:

In December 2007, ARB approved the Airborne Toxic Control Measure (ACTM) for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port Regulation (At-Berth Regulation). ARB has broad authority to regulate ocean-going vessel emissions, including the emissions from diesel auxiliary engines on ocean-going vessels docked at California ports.

The At-Berth Regulation was designed to reduce emissions from diesel auxiliary engines on container ships, passenger ships, and refrigerated cargo ships while at berth at California's major seaports, and is limited to fleets of 25 or more vessels (five or more for passenger ships). The At-Berth regulation also requires that vessels turn off their

auxiliary diesel engines and plug in to shore-based grid electrical power, or utilize alternative technologies to achieve comparable emission reductions.

ARB staff has begun developing proposed amendments to the Regulation. These amendments will be designed to address current implementation issues while preserving the intended air quality benefits, and to expand the scope of the Regulation to achieve additional emission reductions.

Proposed Actions:

ARB would evaluate how the Regulation can be amended to achieve further emission reductions by including smaller fleets, additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers), and additional operations. In addition, there are two companies with portable emissions capture and control systems that have successfully demonstrated performance and may now be used for compliance with the Regulation on certain container vessels. If one or both systems prove to be feasible and cost-effective on additional vessel types, the technology could help support an ARB staff proposal to expand the scope of the Regulation to include additional vessel types and/or smaller fleets.

Estimated Emission Reductions:

ARB staff used ARB's Vision 2.1 model to estimate the emission reductions associated with this proposed measure. The amendments would require additional vessels to reduce emissions, with the primary compliance options likely to be the use of shore power or the emissions capture and control systems. For this calculation, staff assumed that additional vessels (i.e., auto carriers, bulk cargo, general cargo, roll-on roll-off carriers, and tankers) would connect to shore power rather than run auxiliary engines. For modeling purposes, the amendments were limited to the ports that are currently offering shore power and implementation was assumed to start in 2022 at 10 percent fleet compliance and to increase to 50 percent fleet compliance by 2032. This compliance rate was converted into the number of ships impacted, and then multiplied by the average time spent at berth. As the current regulation allows between 3 to 5 hours of auxiliary engine operation for each affected visit, four hours was used as the average time spent at berth using auxiliary engines. The results from above were then combined to find the total hours of auxiliary engine use at berth that would be reduced by the amendments.

Timing:

Proposed ARB Board hearing:	2017 - 2018
Proposed implementation schedule:	2023 - 2031

Proposed SIP Commitment:

ARB staff proposes to commit to bring this measure to the Board in 2017 - 2018. ARB staff will initiate a rule development process designed to achieve the NOx emission

reductions shown in Table 3 for the South Coast nonattainment area in 2023 and 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less than the amount shown.

Further Deployment of Cleaner Technologies: Off-Road Federal and International Sources

Overview:

The goals of this proposed measure are to increase the penetration of cleaner ocean-going vessel, locomotive, and aircraft technologies, and to promote efficiency improvements at the equipment, sector, and systems levels. This measure is specifically for the South Coast.

Background/Regulatory History:

This category includes a variety of sources that travel both nationally and internationally, including ocean going vessels, locomotives, and aircraft. Under current requirements, new locomotive engines must meet a Tier 4 engine emission standard. Beginning in 2016, new ocean going vessels must meet a Tier 3 standard if the vessel will be calling at marine ports located in an Emissions Control Area such as the North American Emission Control Area. Finally, new certificated aircraft engines must meet Tier 8 (CAEP/8) standards.

Proposed Actions:

This proposed measure is designed to achieve further emission reductions for South Coast attainment in 2023 and 2031 through a suite of additional actions, including early penetration of cleaner technologies and emission benefits associated with increased efficiencies.

While more stringent engine standards have been established for new equipment, existing equipment tends to remain in operation for a long period of time. In addition, these sources are primarily regulated by the federal government and international organizations. As a result, emissions from these categories have not decreased at the same pace as those for other mobile sources. By 2023, ocean going vessel NOx emissions in the South Coast are projected to grow to 37 tpd. Locomotive emissions are projected at 15 tpd, and aircraft emissions will grow to 17 tpd. Achieving the magnitude of emission reductions necessary from this category is therefore more difficult, and will require strong action at the federal and international level, coupled with State and local advocacy and action to facilitate these efforts.

ARB and South Coast staff have estimated a scope of technology development and penetration as one example pathway of what would be necessary by 2023 and 2031 to achieve equal share reductions from this sector. Achieving equal share reductions would represent a significant expansion of cleaner technology deployment. The time frame to accomplish this is short, the development of cleaner technologies lags behind those for other sectors, and the scope of State and local authority is limited. These issues will need to be considered as the proposed measures are further developed for this SIP. For 2023, this would require: 1) all locomotives operating in the South Coast meeting the Tier 4 standard; 2) all aircraft meeting today's Tier 8 emission levels; and

3) ocean going vessels achieving emission levels significantly cleaner than today's requirements. An equal share pathway for this sector post-2023 would require deployment of locomotives meeting a more stringent Tier 5 standard. More stringent Tier 4 ocean going vessel standards would also be necessary. Finally, operational efficiency strategies would be needed to provide an additional mechanism for further reductions as a complement to deployment of cleaner technologies.

A series of actions that would be taken at the State and local level to achieve further reductions are outlined below:

- Expand and enhance existing incentive and innovative funding programs to increase the emphasis on and support for deployment of cleaner technologies in these sectors. Air quality incentives and transit funding programs, for example, will be effective in transforming the passenger rail system in the South Coast, with nearly all Metrolink trains expected to reach a Tier 4 level by 2023.

  The incentive funding required will go well beyond the amount currently authorized under existing programs through 2023. Funding needs and mechanisms will be identified working in collaboration with the District over the next several months.

- Partner with airports to incentivize cleaner aircraft to come to California airports, along with partnerships with international engine manufacturers to encourage production of cleaner, more efficient engines.
- Seek continued funding for and partnerships with federal agencies such as the U.S. Department of Energy, U.S. EPA, FAA, U.S. Maritime Administration, and Federal Railroad Administration for new technology and fuel demonstration projects. This would include efforts on development of hybrid, battery and fuel cell technologies for locomotives, the FAA's CLEEN program, and retrofit technologies for in-use vessels and boilers.
- Encourage efficiency improvements, including industry based initiatives (like the San Pedro Bay Ports' Supply Chain Optimization effort to increase port competitiveness), as well as concepts being developed as part of the California Sustainable Freight Action Plan. These improvements may include approaches such as reducing unproductive moves, use of marine vessel sharing agreements that result in maximum use of cargo space, and increased reliance on logistics planning and operations software.

Timing:

Proposed implementation schedule: 2016 – 2031

Implementation Milestones and Schedule		
Implementation Milestone	**Implementation Steps**	**Schedule**
Identify and secure incentives, including funding, for accelerated deployment of cleaner ocean going vessels, locomotives, and aircraft in California service	*Phase 1*: Identify incentives, including funding needs and potential sources *Phase 2*: Pursue actions to secure funding *Phase 3*: Implement funding/incentive programs	2016 + (annually)
Work with federal and international agencies to advocate for increased stringency of emission standards and efficiency requirements, demonstration of new technologies, and incentives to attract the cleanest technologies to California	*Ongoing*	2016 - 2031
Evaluate, quantify and encourage efficiency improvements with the potential to result in lower emissions per unit of cargo transported, including changes in cargo and equipment activity that are typically reflected in SIP emission inventories	*Phase 1:* Retrospective and prospective evaluation of approaches with potential for lower systemwide emissions per unit of cargo transported	2016 – 2023
	Phase 2: Demonstration of system efficiency improvements and support for expanded private and public efforts	2018 – 2027
	Phase 3: Ongoing quantification of the effect of efficiency improvements on freight activity and emissions for incorporation into SIP	2020 – 2031
Provide annual reports to Board on status of funding, technology development, and identification of potential further regulatory measures	*Phase 1:* Evaluate status of funding, technology development, and potential for further regulatory measures *Phase 2:* Develop potential regulatory actions as appropriate	2017+ (annually)

Proposed SIP Commitment:

ARB commits to bring to the Board programs and policies or take other actions to implement this measure to achieve the NOx emission reductions shown in Table 3 for the South Coast nonattainment area in 2023 and 2031. Further development measures for each source category may provide more or less emission reductions than the amount shown.

Proposed Measures: Off-Road Equipment

Description of Source Category:

The Off-Road Equipment category includes lawn and garden equipment, transport refrigeration units, vehicles and equipment used in construction and mining, forklifts, cargo handling equipment, commercial harbor craft, and other industrial equipment. Given the diversity of equipment and duty cycles that comprises this category, each measure includes a more detailed description of the specific source.

Zero-Emission Off-Road Forklift Regulation Phase 1

Overview:

The goal of this proposed measure is to accelerate the deployment of zero-emission technologies in off-road equipment types that are already primed for the technologies that exist today and facilitate further technology development and infrastructure expansion by demonstrating its viability. ARB would develop a regulation that focuses on forklifts with lift capacities equal to or less than 8,000 pounds.

Description of Source Category:

Forklifts operate in many different industry sectors but are most prevalent in manufacturing and at locations such as warehouses, distribution centers, and ports. There are approximately 100,000 forklifts operating in California, most of which are battery-electric, propane, diesel, or gasoline-fueled. Although battery-electric forklifts offer reduced maintenance requirements, lifetime cost savings, and cleaner tailpipe emissions, electric forklift usage has not changed significantly relative to internal combustion forklift usage over the past 20 years. While the equipment population of this source category has seen limited growth, without ARB actions, the transition to zero-emission may remain very gradual.

Background/Regulatory History:

Manufacturers of forklift engines are subject to new engine standards for both diesel and Large Spark Ignition (LSI) engines. Off-road diesel engines were first subject to engine standards and durability requirements in 1996 while the most recent Tier 4 Final emission standards were phased in starting in 2013. Tier 4 emission standards are based on the use of advanced after-treatment technologies such as diesel particulate filters and selective catalytic reduction. LSI engines have been subject to new engine standards that include both criteria pollutant and durability requirements since 2001 with the cleanest requirements phased-in starting in 2010.

Forklift fleets can be subject to either the LSI fleet regulation, if fueled by gasoline or propane, or the off-road diesel fleet regulation. Both regulations require fleets to retire, repower, or replace higher-emitting equipment in order to maintain fleet average standards. The off-road diesel regulation was adopted by the Board in 2007 with implementation beginning in 2010. It is applicable to all diesel-fueled, self-propelled off-road equipment with at least 25 HP. Forklifts are included in the fleet average along with other equipment. The LSI fleet regulation was originally adopted in 2007 with requirements beginning in 2009. While the LSI fleet regulation applies to forklifts, tow tractors, sweeper/scrubbers, and airport ground support equipment, it maintains a separate fleet average requirement specifically for forklifts. The LSI fleet regulation requires fleets with four or more LSI forklifts to meet fleet average emission standards.

The Clean Air Act preempts states, including California, from adopting requirements for new off-road engines less than 175 HP used in farm or construction equipment.

California may adopt emission standards for in-use off-road engines pursuant to Section 209(e)(2), but must receive authorization from U.S. EPA before it may enforce the adopted standards.

Proposed Actions:

ARB staff would develop and propose a regulation to increase penetration of ZEVs in off-road applications, with specific focus on forklifts with lift capacities equal to or less than 8,000 pounds, for which zero-emission technologies have already gained appreciable customer acceptance and market penetration. This regulation would send a market signal to technology manufacturers and investors that zero-emission technologies will be strongly supported moving forward. This proposed measure would advance ZEV commercialization by increasing the penetration of zero-emission technologies. Experience gained from demonstrating the viability of advanced technologies in heavier-duty applications will spur market development and enable the technologies to be transferred to larger, higher power-demand off-road equipment types, such as high lift-capacity forklifts and other equipment types in the construction, industrial, and mining sectors. The regulation could also include requirements that result in the deployment of zero-emission technologies in heavier equipment fleets that remain at a particular location for extended periods of time or other similar provisions that would spur further technology innovation.

Estimated Emission Reductions:

ARB staff used ARB's Vision 2.1 model to estimate the emission reductions associated with this proposed measure. This measure requires electrification of diesel and LSI forklifts with horsepower ratings less than 65 HP in the industrial and airport ground support sectors. Electrification would be accomplished through incentives as well as natural and accelerated turnover. To model the emission reductions, ARB staff reviewed the reporting data and found that approximately 73 percent of forklifts in California were in medium or large fleets and would be subject to the regulation. Additionally, it was assumed that 90 percent of qualifying forklifts (overall 65.7 percent of the total) could reasonably be targeted for electrification by 2035 with a proposed starting year of 2028. A linear penetration of replaced equipment from 2028 to 2035 was applied to the emissions data from the official in-use off-road model.

Timing:

Proposed ARB Board hearing:	2020
Proposed implementation schedule:	2023 - 2035

Staff Proposed Commitment:

ARB staff proposes to commit to bring this measure to the Board by 2020. ARB staff will initiate a rule development process designed to achieve the NOx emission reductions as shown in Table 3 for the South Coast nonattainment area in 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less than the amount shown.

Zero-Emission Off-Road Emission Reduction Assessment

Overview:

The goal of this proposed measure is to expand the use of zero-emission technology in non-freight, off-road applications. This further-study proposed measure would be a follow-up to off-road measures implemented in the 2023+ timeframe, such as the Zero-Emission Off-Road Forklift Regulation Phase 1, and through it ARB would identify opportunities to further expand the use of near-zero and zero emission technologies in off-road applications.

Description of Source Category:

Equipment in these sectors is typically high power and utilizes diesel powertrains. While it is expected that these sectors will be heavily reliant on diesel for the foreseeable future, diesel-electric and hybrid powertrains significantly reduce fuel consumption and are in the early stages of commercialization. As battery technology develops, it may open up opportunities to apply these advanced technologies to more applications as well as develop all-electric versions of equipment. While new engine and fleet standards continue to reduce emissions from heavy-duty off-road equipment, it is important that ARB continue to look for ways to continue to apply advanced technology to further increase the sustainability of the off-road sector.

Background/Regulatory History:

Fleets with diesel equipment are subject to the off-road diesel fleet regulation. This regulation requires fleets to retire, repower, or replace higher-emitting equipment in order to maintain fleet average standards. The off-road diesel regulation was adopted by the Board in 2007 with implementation beginning in 2010. It is applicable to all diesel-fueled, self-propelled off-road equipment with at least 25 HP, excluding equipment used at seaports and railyards. Manufacturers of diesel engines are subject to new engine standards. Off-road diesel engines were first subject to engine standards and durability requirements in 1996 while the most recent Tier 4 Final emission standards were phased in starting in 2013. Tier 4 emission standards are based on the use of advanced after-treatment technologies such as diesel particulate filters and selective catalytic reduction.

Proposed Actions:

ARB staff would conduct an assessment and provide the Board with an informational update regarding the status of ZEVs in off-road applications, once the Phase I Forklift Regulation is in place. The update would be the result of a technology assessment, and would identify opportunities to further expand their use. The focus of this proposed measure is on transferring near-zero and zero emission technologies to heavier pieces of off-road equipment, such as high lift-capacity forklifts or other equipment in the construction, industrial, and mining sectors, with the intent of expanding their application as technology matures and infrastructure grows. This evaluation would focus primarily

on the scalability and transferability of zero-emission technologies from smaller applications to larger, higher power-demand equipment types and would be used to inform the development of the Phase 2 regulation. The information obtained from this technology review would be used to inform the development of Phase 2 of the Zero-Emission Off-Road Regulation. The Zero-Emission Off-Road Phase 2 Regulation would build upon the Phase 1 regulation and focus primarily on larger, higher power-demand equipment types, such as large forklifts, construction equipment, etc. The scope and timeframe of the Phase 2 regulation would depend upon advancements in technology and information obtained through the Zero-Emission Off-Road Emission Reduction Assessment.

Estimated Emission Reductions:

As this proposed measure is a study to further evaluate the status of ZEVs in off-road applications and to identify opportunities to further expand their use, anticipated emission reductions are not identified at this time. This measure may provide emission reduction; should the evaluation identify necessary program improvements, the emission reduction potential and cost effectiveness of such enhancements will be identified at that time.

Timing:

Proposed ARB Board hearing:	2025+
Proposed implementation schedule:	--

Staff Proposed Commitment:

ARB staff proposes to commit to bring this technology review and assessment to the Board by 2025, in order to identify opportunities to further expand the use of near-zero and zero emission technologies in off-road applications. The intent of this evaluation is to expand the application of near-zero and zero emission technologies as technology matures and infrastructure grows, with a primary focus on the scalability and transferability of zero-emission technologies from smaller applications to larger, higher power-demand equipment types.

Zero-Emission Off-Road Worksite Emission Reduction Assessment

Overview:

The goal of this proposed measure is to advance ZEV commercialization by increasing the penetration of zero-emission technologies. Through this emission reduction assessment and technology review, ARB would analyze developing worksite integration and efficiency technologies, such as connected vehicle, automation, and fleet management technologies in off-road sectors. ARB would also encourage deployment via incentives or by providing credit in the off-road rule.

Description of Source Category:

This assessment will focus on technologies and strategies that increase worksite efficiency, such as automation, connected vehicles, and fleet management. These technologies are already being applied to the construction industry in a variety of equipment types, including graders, excavators, and tractors. Examples include grading assisted technologies that can use on-board sensors and GPS to accurately grade to a desired depth and slope thus reducing the number of passes needed. Fleet management technologies allow a fleet manager to monitor parameters such as fuel usage and productivity to optimize equipment utilization on the job site. Technologies such as these have the potential to achieve significant fuel-savings if applied across the industry and could yield emission reductions beyond what is achieved through engine and fleet regulations.

Background/Regulatory History:

Currently, there is no regulatory program that considers worksite efficiency technologies. One of the goals of the assessment will be to consider potential metrics in order to compare fuel efficiency, work productivity, and emission reductions and develop ways to award either regulatory credits or credits or incentives for usage of these technologies.

Fleets with diesel equipment are subject to the off-road diesel fleet regulation. This regulation requires fleets to retire, repower, or replace higher-emitting equipment in order to maintain fleet average standards. The off-road diesel regulation was adopted by the Board in 2007 with implementation beginning in 2010. It is applicable to all diesel-fueled, self-propelled off-road equipment with at least 25 HP. Manufacturers of diesel engines are subject to new engine standards. Off-road diesel engines were first subject to engine standards and durability requirements in 1996 while the most recent Tier 4 Final emission standards were phased in starting in 2013. Tier 4 emission standards are based on the use of advanced after-treatment technologies such as diesel particulate filters and selective catalytic reduction.

Proposed Actions:

Staff would conduct an assessment and provide the Board an informational update regarding the technologies and/or strategies that increase worksite efficiency, such as

connected vehicles, automation, and fleet management technologies. While there is not yet a consensus on how to quantify the benefits of such technologies, advanced machine control and worksite integration technologies that are commercially available today reportedly hold the potential for fuel savings of up to 30 percent or more, depending on worksite conditions. Some of these products are available today from new equipment manufacturers, as well as aftermarket suppliers, and can be adapted or retrofitted to much of the existing legacy fleet. The scalability of these systems is wide ranging and such systems can be applied to a single piece of off-road equipment on a small project or on many vehicles at the largest, most complex worksites. While there is significant promise in these types of technologies, more work has to be done to ensure the development of a robust worksite efficiency program that is cost-effective and achieves emission reductions that are real and quantifiable. This proposed measure would evaluate business return on investment, sustainability of the system, and ancillary benefits such as improved safety and work consistency. There would also be potential testing comparing fuel efficiency, work productivity, and emission reductions via portable emission measurement system (PEMS).

Estimated Emission Reductions:

As this proposed measure is an assessment of the technologies and/or strategies to increase worksite efficiency, anticipated emission reductions are not identified at this time. This measure may provide emission reduction; should the evaluation identify necessary program improvements, the emission reduction potential and cost effectiveness of such enhancements will be identified at that time.

Timing:

Proposed ARB Board hearing: tbd
Proposed implementation schedule: --

Staff Proposed Commitment:

ARB staff proposes to commit to bring this technology review and assessment to the Board, with a focus on the technologies and/or strategies that increase worksite efficiency in off-road sectors, such as connected vehicles, automation, and fleet management technologies. This assessment would analyze developing worksite integration and efficiency technologies for their potential to yield further emission reductions.

Zero-Emission Airport Ground Support Equipment

Overview:

The goal of this proposed measure is to increase the penetration of the first wave of zero-emission heavy-duty technology in applications that are well suited to its use, and to facilitate further technology development and infrastructure expansion. ARB staff would develop a regulation to accelerate the transition of diesel and LSI Airport Ground Support Equipment (GSE) to zero-emission technology.

Description of Source Category:

Airport GSE are used in airport operations and perform a wide variety of functions including providing power to aircraft, transporting cargo, baggage, and passengers to and from aircraft, and providing aircraft maintenance and fueling. The most common equipment types include belt loaders, baggage tugs, cargo tractors, cargo loaders, forklifts, and aircraft tugs. GSE are fueled by gasoline, liquefied petroleum gas (LPG), compressed natural gas (CNG) and diesel fuel. Battery-electric GSE are the most common zero-emission alternative technology equipment commercially available today. The current California population estimate of internal combustion powered GSE is greater than 10,000. This includes approximately 4,000 compression ignition engine powered equipment and approximately 6,000 large spark-ignited engine powered equipment. Aircraft activity is expected to increase significantly by 2050. This increase will likely necessitate an increase in GSE population as well.

Background/Regulatory History:

California has adopted regulations limiting emissions from new engines used in GSE as well as emissions from existing GSE in-use.

Engines used in newly manufactured GSE operating on gasoline, LPG, and CNG are required to meet California's new engine emission standards for LSI. The LSI engine standard for engines greater than 1.0 liter (typical for GSE) is 0.6 g/bhp-hr of hydrocarbons (HC) and NOx. Engines meeting this standard are 70 percent cleaner than LSI engines produced as recent as 2009. Additionally, fleets operating LSI GSE must meet the in-use LSI engine fleet requirements. Adopted in 2006, the LSI fleet rule requires GSE fleets to maintain an average emission level of no more than 2.5 g/bhp-hr HC+NOx, starting January 1, 2013.

Diesel engines in newly manufactured GSE must meet the Tier 4 emission standards applicable to off-road compression-ignition engines. These standards vary by horsepower and are more than 90 percent cleaner than the emissions levels of engines produced twenty years ago. Additionally, in 2007, California adopted the In-Use Off-Road Diesel-Fueled Fleets regulation which requires fleets operating in-use diesel equipment to meet an annual fleet average emissions target that decreases over time. For example, for equipment over 175 and under 750 HP, the final 2023 NOx fleet average target is 1.5 g/bhp-hr, which is equivalent to the interim Tier 4 NOx standard for

newly produced engines. Fleets that do not meet the required annual fleet average must meet the best available control technology (BACT) requirements that require turnover, repower or retrofit of a specific percent of a fleet's total HP. These requirements are currently being phased-in.

Lastly, non-mobile GSE such as portable air-start units, ground power units and air conditioners may be subject to the Portable Diesel-Engines Air Toxic Control Measure (ATCM). The ATCM reduces PM emissions by requiring engine replacement in a schedule based on a fleet's weighted PM emission average.

Proposed Actions:

ARB would develop and propose a regulation to transition diesel and LSI GSE to zero-emission technology. The current commercial availability of several GSE equipment types indicates the feasibility of this transition. Battery-electric GSE are the most common type of zero-emission GSE, and are available for several high-population equipment types. Many large air carriers which operate diesel GSE have already begun moving towards electric equipment. The added introduction of zero-emission GSE will act as a catalyst to further zero-emission equipment penetration in the off-road equipment sector and other heavier duty-cycle and longer range applications.

A conservative strategy would rely on incentives and natural turnover, along with current in-use requirements, to replace equipment in which electric replacements are readily available, such as belt loaders, baggage tractors and cargo tractors. A more aggressive turnover and implementation strategy could utilize a memorandum of understanding, regulation, or a combination thereof, along with incentives for demonstration, to ensure 60 percent of existing diesel equipment in these categories would be replaced with zero-emission equipment by 2032, along with 50 percent of narrow body aircraft tugs and 30 percent existing wide-body aircraft tugs. Incentive funds would be targeted to demonstrating the feasibility of zero-emission technologies in the high-power equipment applications (e.g., wide-body aircraft tugs).

Estimated Emission Reductions:

ARB staff used ARB's Vision 2.1 model to estimate the emission reductions associated with this proposed measure. This proposed measure requires electrification of certain diesel airport ground support equipment (belt loaders, baggage tugs, and cargo tractors) through incentives and natural turnover. To model emission reductions, ARB staff used the turnover inherent in the official in-use off-road model, and assumed all new vehicles of the applicable types would be electric starting in 2023. For modeling purposes, new electric GSE vehicles would replace older vehicles using the natural turnover rate for this sector, which is the historical rate that equipment has been replaced, with no acceleration of purchasing habits.

Timing:

Proposed ARB Board hearing:	2018
Proposed implementation schedule:	2023

Staff Proposed Commitment:

ARB staff proposes to commit to bring this measure to the Board in 2018. ARB staff will initiate a rule development process designed to achieve the NOx emission reductions shown in Table 3 for the South Coast in 2023 and 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less reductions than as proposed by staff.

Small Off-Road Engines

Overview:

The goal of this proposed measure is to reduce emissions from Small Off-Road Engines (SORE) and to increase the penetration of zero-emission technology. Small off-road engines that are subject to ARB regulations are used in residential and commercial lawn and garden equipment, and other utility applications. ARB staff will promote increased use of zero-emission equipment, propose tighter exhaust and evaporative emission standards, and enhance enforcement of current emission standards for SORE.

Description of Source Category:

SORE are spark-ignited engines rated at or below 19 kilowatts. They are used in applications such as lawn and garden, industrial, construction and mining, logging, airport ground support, commercial utility, and farm equipment, golf carts, and specialty vehicles. It is estimated that there are approximately 16.5 million pieces of SORE equipment in California in 2016. In the absence of tighter emission standards for SORE, emissions of the ozone precursors ROG and NOx are expected to increase beginning in the late-2020s.

Background/Regulatory History:

The Board first approved regulations to control exhaust emissions from SORE in December 1990. ARB adopted amendments to the 1990 regulations to further control exhaust emissions in 1998 and 2003. These regulations were implemented through three tiers of progressively more stringent exhaust emission standards that were phased in between 1995 and 2008. Evaporative emissions from SORE were uncontrolled prior to the adoption of standards by the Board in 2003, which were implemented from 2006-2013. As a result of these regulations, the sum of exhaust and evaporative ROG emissions from SORE in the South Coast have been reduced by 55 percent in 2016, compared to 1990 levels, and NOx emissions from SORE in the South Coast have been reduced by 2 percent in 2016, compared to 1990 levels.

Proposed Actions:

ARB will develop and propose regulations to reduce emissions from small off-road engines through tightened exhaust and evaporative emission standards. High failure rates have been observed in evaporative emissions testing of SORE, preventing previously-claimed emission reductions from being realized. Exhaust and evaporative emissions from SORE would be reduced through enhanced enforcement of the current emission standards, adoption of tighter exhaust and evaporative emission standards, and increased use of zero-emission equipment. Strategies will be developed for transitioning to zero-emission technologies, including an initial focus on incentives for use of zero emission equipment, coupled with increasingly stringent emission standards for criteria pollutants and GHGs.

Estimated Emission Reductions:

ARB staff estimated the emission reductions associated with this proposed measure by applying NOx and hydrocarbon emission factor reductions by model year, beginning in 2022 with a reduction of 25 to 60 percent, and increasing in stringency to 2030 with reductions of approximately 90 percent. The reductions apply to exhaust and evaporative emissions (though each has its own reduction factor), and manufacturers are assumed to meet the required reductions with improved engine design and by increasing sales of battery or electric powered equipment to replace spark-ignited engines.

Timing:

ARB enhanced enforcement:	2016
Proposed ARB Board hearing:	2018 – 2020;
Proposed implementation schedule:	2022 – 2030

Staff Proposed Commitment:

ARB staff brought to the Board for its consideration the enhanced enforcement components of this measure in November 2016, which were adopted by the Board.

ARB staff proposes to bring to the Board by 2018-2020 regulations to achieve the emission reductions described in this measure. ARB staff will initiate a rule development process designed to achieve the NOx emission reductions shown in Table 3 for the South Coast nonattainment area in 2023 and 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less than the amount shown.

Transport Refrigeration Units Used for Cold Storage

Overview:

The goal of this proposed measure is to advance near-zero and zero emission technology commercialization by increasing the early penetration of hybrid electric and electric standby-equipped Transport Refrigeration Units (TRU) used for cold storage, and supporting the needed infrastructure developments. ARB would develop a regulation to reduce NOx, PM, and GHG emissions by reducing the amount of time TRUs operate using internal combustion engines while refrigerated trucks, trailers, and shipping containers are parked (stationary) at certain California facilities and other locations.

Description of Source Category:

TRUs are refrigeration systems powered by an internal combustion engine (inside the unit housing), designed to control the environment of temperature-sensitive products that are transported in refrigerated trucks, trailers, railcars, and shipping containers. Examples of the products hauled are food, beverages, pharmaceuticals, flowers, medical products, industrial chemicals, and explosives. TRUs may be capable of both cooling and heating. TRUs operate in large numbers at distribution centers, food manufacturing facilities, packing houses, truck stops, and intermodal facilities. They deliver perishable goods to retail outlets, such as grocery stores, restaurants, cafeterias, convenience stores, etc. The growth rate of TRUs is tied to population, since food is the main product type that is hauled.

Background/Regulatory History:

The Board identified diesel PM as a TAC and in October 2000, ARB published a "*Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles*." In the Diesel Risk Reduction Plan, ARB identified TRU PM emissions associated with refrigerated warehouse distribution centers as creating potential cancer risks and included TRU engines in the plan to reduce diesel PM emissions 85 percent by 2020.

ARB adopted its ATCM for In-Use Diesel-Fueled TRUs and TRU Generator Sets in 2004. This regulation requires TRU diesel engines to meet in-use diesel PM emission standards by the end of the seventh year after manufacture. Implementation of the TRU ATCM began in 2009. The TRU ATCM was amended in 2010 and 2011.

Proposed Actions:

The initial concepts of the proposed regulation would limit the amount of stationary operating time that a transport refrigeration system powered by an internal combustion engine can operate at certain facilities. The time limit would decrease on a phased compliance schedule. Compliance options include the use of commercially available

hybrid electric TRUs, TRUs equipped with electric standby motors, and cryogenic transport refrigeration systems. Hybrid electric and electric standby-equipped TRUs would plug into electric power plugs while stationary and use diesel engine power while on the road. Facilities may be required to provide the necessary electric infrastructure to support this action. ARB is currently offering funding through the Proposition 1B Goods Movement Emission Reduction Program to support both purchase of TRUs that can plug in and the stationary electric infrastructure. Cryogenic transport refrigerators use liquid nitrogen and liquid carbon dioxide to provide cooling. Development and use of zero-emission technologies, such as all-electric plug-in / advanced battery transport refrigeration systems would be encouraged, as well as adequately-sized cold storage facilities, and more efficient inbound delivery appointment and outbound dispatch scheduling.

Estimated Emission Reductions:

While emission reductions have not been identified at this time, ARB will quantify any emission reductions from this measure during the measure development process.

Timing:

Proposed ARB Board hearing:	2018 – 2019
Proposed implementation schedule:	2020+

Proposed SIP Commitment:

ARB staff proposes to commit to bring this measure to the Board in 2018 - 2019. Emission reductions for the measure will be identified as part of the rule development process. The measure as proposed by staff to the Board or adopted by the Board may provide more or less reductions than as proposed by staff.

Low-Emission Diesel Requirement

Overview:

The goal of this proposed measure is to reduce emissions from the portion of the heavy-duty fleet that will continue to operate on internal combustion engines in order to reduce emissions as quickly as possible. This proposed measure would establish performance requirements for Low-Emission Diesel, and would require that diesel fuel providers decrease criteria pollutant emissions from their diesel products until 2031.

Description of Source Category:

The total diesel sales in California in 2012 were about 3.3 billion gallons.[19] Based on the California Energy Commission analysis, it is expected that the total diesel demand may remain more or less the same or slightly decline by 2030.[20] The use of low-emission diesel in on-road vehicles and off-road equipment will reduce tailpipe NOx and PM emissions, in addition to other criteria pollutants. Some studies carried out to date on hydrotreated vegetable oil have reported NOx emission reductions of 6 percent to 25 percent and PM emission reductions of 28 percent to 46 percent, depending on the types of fuels, drive cycles tested, and diesel engines used. The absolute amounts of NOx and PM reductions will be determined during a subsequent rulemaking process.

ARB has a long history of achieving emission reductions via setting fuel standards. Cleaner fuel has an immediate impact in reducing emissions from the mobile source sector and has had a significant impact in reducing reactive organic compounds and sulfur oxide emissions. More recently, ARB developed the LCFS to reduce the carbon intensity of transportation fuels, which will reduce our dependence on petroleum, and incentivizes increased production and use of renewable, low-carbon fuels.

California's stringent air quality programs treat motor vehicles and their fuels holistically (as a system, rather than as separate components). As a result, ARB's fuels programs achieve significant reductions in criteria and toxic air pollution from motor vehicles used in California. Relative to federal gasoline, ARB's reformulated gasoline program reduces NOx emissions by 15 percent and TACs by 50 percent. Similarly, ARB's ultralow sulfur diesel program reduces emissions significantly relative to federal diesel, about 7 percent reduction in NOx and 25 percent in diesel PM. Further, in combination with other State and federal GHG-reduction programs (California's Advanced Clean Cars and Pavley Vehicle Standards programs; the U.S. EPA's Renewable Fuel Standard 2 and Corporate Average Fuel Economy programs), implementation of the recently re-adopted LCFS and adopted new Alternative Diesel Fuel (ADF) regulations is anticipated to result

[19] California Energy Commission. Retrieved from http://energyalmanac.ca.gov/gasoline/piira_retail_survey.html

[20] Gene Strecker, 2015. Overview of Preliminary Transportation Energy Demand Forecast. Retrieved from http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-10/TN205135_20150623T151914_Overview_of_Preliminary_Transportation_Energy_Demand_Forecast.ppt.

in environmental benefits that include an estimated reduction in GHG emissions of more than 60 MMTCO2e from transportation fuels used in California from 2016 through 2020. On its own, the LCFS is estimated to reduce transportation-related GHG emissions by 35 MMTCO2e during those years.

In 2015, Governor Brown set a goal to reduce petroleum use by up to 50 percent by 2030. One of the opportunities to help meet this goal is for fuel providers to sell diesel with incrementally higher blends of advanced renewable diesel replacement fuels. As the mobile sector will continue operating on internal combustion engines for some time, it is critical that the fuels consumed in these vehicles contribute to the emission reductions needed to meet our 2031 air quality and 2030 climate and petroleum reduction goals. The Vision scenarios illustrate that, since diesel vehicles will comprise a large portion of the fleet still operating with combustion engines, a low-emission diesel standard would reduce NOx and diesel PM. Furthermore, a low-emission diesel fuel standard could be designated to provide the flexibility to target the most cost-effective emission reductions, for example by requiring emission reductions sooner in the South Coast than in the rest of the State.

Proposed Actions:

ARB would bring to the Board a proposed low-emission diesel measure that would require diesel fuel providers to steadily decrease criteria pollutant emissions from their diesel products. Due to the magnitude of needed NOx reductions in the South Coast and the large volumes of low-emission diesel needed for full Statewide implementation, the proposed measure could be phased-in with a gradual implementation strategy that starts in the South Coast, and subsequently expands Statewide.

This standard is flexible and enables multiple fuel types to meet this standard. The low-emission diesel standard would achieve a reduction in NOx and PM relative to current conventional diesel. The amount of NOx and PM reduction required would be determined in a subsequent rulemaking. This standard is anticipated to both increase consumption of low-emission diesel fuels, and to reduce emissions from conventional fuels. This proposed measure would provide NOx benefits predominately from legacy (pre-2010) on-road heavy-duty vehicles, off-road engines, stationary engines, portable engines, marine vessels and locomotives, as well as NOx and diesel PM benefits in potentially all model year off-road engines, stationary engines, portable engines, marine vessels and locomotives. Interstate vehicles, even those registered out-of-state but operating on ARB diesel blended with low-emission diesel, are also anticipated to provide emission reduction benefits.

This standard would complement existing ARB programs that incentivize increased use of renewable fuels as substitutes for conventional fuels, and will focus on more completely transitioning the fuel mix to a cleaner mix of diesel substitute fuels. Potential diesel substitutes that may be considered include: renewable hydrocarbon diesel; NOx mitigated biodiesel; natural gas; gas to liquid diesel; and further refined conventional diesel. The proposed measure is anticipated to diversify the fuel pool, as it will

incentivize increased production of low-emission diesel fuels. This proposed measure would provide reductions in criteria pollutants from on- and off-road diesel products sold in the State through 2031.

Estimated Emission Reductions:

To calculate the emission reductions for this requirement, ARB staff used ARB's official emissions inventory coupled with the reductions associated with the aforementioned measures. Under this requirement, off-road NOx and PM2.5 emissions from non-SCR diesel engines using CARB diesel would be reduced by 2 percent to 4.5 percent and 6 to 8 percent, respectively. For modeling purposes, the emissions associated with ocean-going vessels were excluded, and the total emissions associated with locomotives were reduced by 50 percent (in-state fuel), while the rest of the off-road inventory emissions were reduced to include only those emissions associated with non-SCR engines. The total emissions were then calculated (locomotive and the rest of the off-road inventory) and this number was reduced by the sum of the measure reductions, and multiplied by 3.25 percent or 7.25 percent (average NOx or PM2.5 reductions, respectively) to determine the total reductions in NOx and PM2.5 for this requirement.

Timing:

Proposed ARB Board hearing:	by 2020
Proposed implementation schedule:	2023 – 2031

Proposed SIP Commitment:

ARB staff proposes to commit to bring this measure to the Board by 2020. ARB staff will initiate a rule development process designed to achieve the NOx emission reductions shown in Table 3 for the South Coast nonattainment area in 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less than the amount shown.

Further Deployment of Cleaner Technologies: Off-Road Equipment

Overview:

The goals of this proposed measure are to accelerate the penetration of near-zero and zero equipment and to promote in-use efficiency gains through use of connected and autonomous vehicles, and worksite efficiencies. This measure is specifically for the South Coast.

Background/Regulatory History:

Incentive Funding

Several State and local incentive funding pools have been used historically – and remain available – to fund the accelerated turnover of off-road heavy-duty vehicles in the South Coast. Since 1998 the Carl Moyer Program has provided funding for replacement, new purchase, repower and retrofit of engines in the South Coast. However, to achieve additional reductions in this category, new sources of funding will be pursued.

Low Emission Technologies and Efficiency Improvements

In addition to developing new funding sources, alternative strategies may exist to replace or supplement additional funding pools. While new engine and fleet standards continue to reduce emissions from heavy-duty off-road equipment, it is important that ARB continue to look for ways to apply advanced technology to further increase the sustainability of the off-road sector such as automation, connected vehicles, and fleet management. These technologies are already being applied to the construction industry in a variety of equipment types, including graders, excavators, and tractors. Examples include grading assisted technologies that can use on-board sensors and GPS to accurately grade to a desired depth and slope thus reducing the number of passes needed. Fleet management technologies allow a fleet manager to monitor parameters such as fuel usage and productivity to optimize equipment utilization on the job site. Technologies such as these have the potential to achieve significant fuel-savings if applied across the industry and will yield emission reductions beyond what is achieved through engine and fleet regulations.

Proposed Actions:

This proposed measure is designed to achieve further emission reductions through a suite of additional actions, including early penetration of near-zero and zero technologies, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle technologies. These emission reductions will be achieved through a combination of actions to be undertaken by both ARB and the District.

Scope of Technology Penetration and Mechanisms to Achieve Reductions:

Under current requirements, most new equipment is required to meet Tier 4 emission standards, and many smaller engines are converting to use of zero-emission technologies. To achieve the further reductions associated with early penetration of the cleanest technologies across each sector, ARB and South Coast staff estimated the scope of penetration that would be required by 2023. This would include: 1) electrification of small engine forklifts less than 65 HP; 2) cleaner near-zero and zero technologies for TRUs; 3) electrification of ground support equipment such as baggage tugs, belt loaders, cargo tractors, and aircraft tugs; 4) electrification of certain types of lawn and garden equipment such as mowers, leaf blowers, and edgers; and 5) replacement of construction, mining, and industrial equipment with engines that are below Tier 4 with Tier 4 final equipment.

The following mechanisms provide a pathway for achieving this scale of technology deployment: Identify and develop mechanisms to incentivize deployment of construction and mining equipment meeting Tier 4 final standards such as the South Coast's SOON program for the clean-up of off-road diesel equipment. Such programs have allowed affected fleets to meet requirements through public funding assistance. This could achieve further reductions from the approximately 7,000 pieces of equipment that would still have engines that are Tier 2 and below in 2023. The South Coast will include local measures to address certain types of heavy-duty equipment in their AQMP.

- Develop requirements for cleaner near-zero and zero technologies for TRUs. Emission reductions associated with Transport Refrigeration Units Used for Cold Storage measure have not yet been quantified. This proposed measure reflects concepts to limit the amount of stationary operating time that a TRU powered by an internal combustion engine could operate at certain facilities. Development and use of zero-emission technologies would be encouraged. This proposed measure will need to motivate distribution and other facilities to install the infrastructure needed to support near-zero and zero emissions technologies, encourage the development and demonstration of near-zero and zero emission technologies, and cause refrigerated fleets to evaluate and invest in near-zero and zero technologies.
- Expand and enhance existing incentive and other innovative funding programs for off-road equipment to increase the emphasis on and support for zero-emission capable equipment. Assuming incentive funding is the primary mechanism to achieve early deployment of zero-emission capable technologies for forklifts, airport ground support equipment, and TRUs by 2023, funding would be required for at least 4,000 pieces of equipment per year over a seven year period. This early deployment through enhanced incentive funding would provide a down payment towards meeting requirements that would be established through the subsequent regulatory mechanisms identified for these categories. The population of lawn and garden equipment in the South Coast is very large; thus funding programs

would target the types of lawn and garden equipment with the greatest emissions, such as mowers, leaf blowers, and edgers. Use of zero-emission technologies would also provide near-source risk reduction for operators of the equipment. The incentive funding required for these efforts would go beyond the amount currently authorized through 2023.

Determination of the needed resources will be based on assessment of the incremental cost of technologies, cost effectiveness, and the type of financing mechanism employed. Funding needs and mechanisms will be identified working in collaboration with the District and other State agencies over the next several months.

Additional mechanisms reflect continued penetration of near-zero and zero-emission technologies, as well as reductions achieved through worksite efficiencies. Reductions from other equipment types within this category will also be considered, including motorcycles, watercraft, aftermarket parts, and additional enforcement initiatives. While these approaches have the greatest potential to provide further reductions post 2023, early advances in these areas could offset some of the reductions required through incentive funding. These additional pathway mechanisms include:

- Further advanced technology deployment. Based on on-going technology assessment, regulatory mechanisms to expand zero-emission technologies into heavier pieces of off-road equipment such as high lift-capacity forklifts and other equipment in the construction, mining, and industrial sectors may be feasible. The greatest opportunities exist for engines that have a duty cycle to accommodate battery electric or fuel cell electric technologies.
- Advances in the development of autonomous systems, particularly if based on zero-emission technologies, as well as greater worksite integration, efficiency and fleet management technologies. These changes in how the off-road equipment sector would operate offer the potential to achieve criteria, toxic, and GHG emission reductions as well as reduce petroleum usage. These concepts are based on emerging technologies, and will require exploration and demonstration prior to quantifying emission reductions.

Timing:

Proposed implementation schedule: 2016 – 2031

Implementation Milestones and Schedule:		
Implementation Milestones	Implementation Steps	Schedule
Identify and secure funding for incentive based and other innovative funding programs for accelerated deployment of near-zero and zero off-road equipment	*Phase 1*: Identify funding needs and potential sources	2016 + (annually)
	Phase 2: Pursue actions to secure funding	
	Phase 3: Implement funding/incentive programs	
Develop regulatory strategies for deployment of zero-emission technologies in off-road equipment applications as appropriate	*Phase 1:* Evaluation of technology and prototype demonstrations	2016 – 2023
	Phase 2: Development of regulatory strategies	2022 – 2025
	Phase 3: Measure implementation	2027 – 2031
Evaluate potential for emission benefits from operational efficiencies, and intelligent transportation systems and quantify and develop mechanisms to provide SIP reductions as appropriate	*Phase 1:* Evaluation of approaches and potential for emission reductions	2016 – 2023
	Phase 2: Demonstration of systems	2020 – 2025
	Phase 3: Quantification of emission reductions and mechanisms for incorporating into SIP	2025 – 2031
Provide annual reports to Board on status of funding, technology development, and identification of potential further regulatory measures	*Phase 1:* Evaluate status of funding, technology development, and potential for further regulatory measures	2017+ (annually)
	Phase 2: Develop potential regulatory actions as appropriate	

Proposed SIP Commitment:

ARB commits to bring to the Board programs and policies or take other actions to implement this measure to achieve the NOx emission reductions shown in Table 3 for the South Coast nonattainment area in 2023 and 2031. Further development measures for each source category may provide more or less emission reductions than the amount shown.

Proposed Measures: Consumer Products

Description of Source Category:

Chemically formulated consumer products such as personal care products, household care products, and automotive care products are a significant source of ROG emissions and have been regulated as a source of ROG in numerous rulemakings since 1989. Consumer products are the largest source category of ROG emissions in the South Coast, and the fourth largest category Statewide**.** The magnitude of emissions from this sector indicates that additional approaches to reduce emissions from this sector remain important, even though the average photochemical reactivity of ROG emissions from the consumer product sector has decreased.

Consumer Products Program

Overview:

Current regulations have been effective in substantially reducing emissions of ROG from consumer products. The goal of this proposed measure would be to maintain this success in light of population growth. Staff would evaluate the 2013-2015 data reported to the Consumer Products Program to identify strategies to maintain emission reductions from consumer products. The proposed measure may involve establishing new ROG limits for categories currently unregulated and/or lowering ROG limits for categories already regulated. To identify categories of consumer products for rulemaking, staff may consider both mass and reactivity of category emissions.

Background/Regulatory History:

Consumer products are a source of ROG emissions and have been regulated since 1989. These products are widely used by consumers throughout the State.

As part of the State's effort to reduce air pollutants, in 1988 the Legislature added section 41712 to the California Clean Air Act (Act) in the Health and Safety Code. Along with subsequent amendments, this section requires ARB to adopt regulations to achieve the maximum feasible reduction in ROG emissions from consumer products. Prior to adopting regulations, the Board must determine that adequate data exist to establish that the regulations are necessary to attain State and federal ambient air quality standards. Commercial and technological feasibility of the regulations must also be demonstrated. The Act further stipulates that regulations adopted must not eliminate any product form, and that recommendations from health professionals must be considered when developing ROG control measures for health benefit products.

For almost 30 years, the Board has taken actions pertaining to the regulation of consumer products. Three regulations have set ROG limits for 129 consumer product categories. The most recent amendments to these three regulations were approved for adoption on September 26, 2013. The regulations will cumulatively reduce ROG emissions by about 50 percent. By 2020, limits on the use of ingredients with higher GWP values will provide reductions of approximately 0.23 million metric tons of carbon dioxide equivalents per year.

Aerosol coating products are regulated under a reactivity-based regulation. This regulation limits the ozone formation potential of all aerosol coating product emissions. Tables of Maximum Incremental Reactivity have also been adopted to implement the Aerosol Coating Products Regulation.

Exposure to TACs has also been reduced by prohibiting use of certain chlorinated compounds in 83 categories of consumer products. Total emissions of TACs have been reduced by over 13 tpd. Furthermore, when setting ROG limits, ARB has applied California Environmental Quality Act provisions requiring that environmental impacts of

proposed regulations be evaluated. Consequently, use of alkylphenol ethoxylate surfactants has also been prohibited in several categories of consumer products.

In addition, a voluntary program regulation, the Alternative Control Plan was adopted to provide compliance flexibility to companies.

Despite the progress with emission reductions, population growth in the years ahead is expected to increase emissions from consumer products after 2023 even as new and revised limits become effective in 2017.

In order to ensure the ROG emission reductions are based on the state-of-science, ARB staff periodically conducts mandatory Consumer and Commercial Surveys (Survey) to assess the volume of sales of consumer products sold in California and the ingredients within those products. Over the past 25 years ARB has conducted at least seven of these data collection efforts. ARB staff is currently conducting a Survey on consumer products sold into California during the years 2013 to 2015. ARB staff expects to use this data to assess future regulatory directions for the Consumer Products Program. Staff will conduct a Survey for Aerosol Coatings in 2018 to determine emissions and reformulation trends.

Proposed Actions:

Approaches being considered include evaluating categories with higher mass and reactivity, investigating concepts for expanding manufacturer compliance options, and reviewing existing exemptions. Staff will work with stakeholders to explore mechanisms that would encourage the development, distribution, and sale of cleaner, very low, or zero-emitting products. In undertaking these efforts staff will ensure that no negative impacts occur either through the use of TACs or other chemicals that may have other negative environmental impacts.

Estimated Emission Reductions:

In the South Coast, emissions of ROG from consumer products are projected to grow from an estimated 90 tpd in 2023 to 94 tpd in 2031. Staff will use the Survey data, along with other technical information, to propose control strategies to mitigate projected ROG emission increases in the South Coast.

Timing:

Proposed ARB Board hearing:	2019 – 2021
Proposed implementation schedule:	2020 – 2023

Proposed Commitment:

ARB staff proposes to commit to bring this measure to the Board by 2021. ARB staff will initiate a rule development process designed to achieve the reductions shown for the South Coast nonattainment area in 2031. The measure as proposed by staff to the Board or adopted by the Board may provide more or less than the amount shown.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix IV-C

Regional Transportation Strategy and Control Measures

2016 AIR QUALITY MANAGEMENT PLAN



December 2016

DRAFT FINAL 2016 AQMP

APPENDIX IV-C

Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures

DECEMBER 2016

MISSION STATEMENT

Under the guidance of the Regional Council and in collaboration with our partners, our mission is to facilitate a forum to develop and foster the realization of regional plans that improve the quality of life for Southern Californians.

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Executive Summary

This Appendix IV-C (Appendix) describes the Southern California Association of Government's (SCAG) Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures (TCMs) to be included as part of the Draft 2016 South Coast Air Quality Management Plan (AQMP) which includes both new and updates to previous ozone and PM2.5 State Implementation Plans (SIPs) for the South Coast Air Basin. This Appendix IV-C is based on SCAG's Final 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) and 2015 Federal Transportation Improvement Program (FTIP) as amended. The RTP/SCS and FTIP were developed in consultation with federal, state and local transportation and air quality planning agencies and other stakeholders. The four County Transportation Commissions (CTCs) in the South Coast Air Basin, namely Los Angeles County Metropolitan Transportation Authority, Riverside County Transportation Commission, Orange County Transportation Authority and the San Bernardino Associated Governments, were actively involved in the development of the regional transportation measures of this Appendix.

This Appendix consists of the following four Sections.

Section I. Introduction

As required by federal and state laws, SCAG is responsible for ensuring that the regional transportation plan, program, and projects are supportive of the goals and objectives of applicable AQMPs/SIPs. SCAG is also required to develop demographic projections and regional transportation strategy and control measures for the South Coast AQMP/SIP.

As the Metropolitan Planning Organization (MPO), SCAG develops the RTP/SCS every four years. The RTP/SCS is a long-range regional transportation plan that provides for the development and integrated management and operation of transportation systems and facilities that will function as an intermodal transportation network for the SCAG region. The RTP/SCS also outlines certain land use growth strategies that provide for more integrated land use and transportation planning, and maximize transportation investments to achieve regional greenhouse gas (GHG) reduction targets set by the California Air Resources Board (CARB) pursuant to SB 375 (codified in California Government Code §65080(b)(2)(B)).

In addition, SCAG develops the biennial FTIP. The FTIP is a list of multimodal capital improvement projects to be implemented over a six year period. The FTIP implements the programs and projects in the RTP/SCS.

Section II. Regional Transportation Plan/Sustainable Communities Strategy and TCMs

The SCAG region faces many critical challenges including demographics, transportation system preservation, transportation funding, goods movement, housing, air quality, climate change, and public health. Under the guidance of the goals and objectives adopted by SCAG's Regional Council, the 2016 RTP/SCS was developed to provide a blueprint to integrate land use and transportation strategies to help achieve a coordinated and balanced regional transportation system. The 2016 RTP/SCS represents the culmination of more than three years of work involving dozens of public agencies, 197 local jurisdictions

in the SCAG region, hundreds of local, county, regional and state officials, the business community, environmental groups, as well as various nonprofit organizations. The 2016 RTP/SCS was adopted by SCAG's main governing board, the Regional Council, on April 7, 2016.

The 2016 RTP/SCS makes a concerted effort to integrate the region's transportation network with land uses in order to achieve an even more sustainable region over the coming decades. Accordingly, the 2016 RTP/SCS includes a host of regional strategies for addressing growth, land use and improving the region's transportation system.

Land Use Strategies

- Focus New Growth around Transit/High Quality Transit Areas (HQTAs)
- Plan for Growth around Livable Corridors
- Provide More Options for Short Trips/Neighborhood Mobility Areas
- Support Zero Emission Vehicles & Expand Electric Vehicle Charging Stations
- Support Local Sustainability Planning
- Protect Natural and Farm Lands
- Balance Growth Distribution between 500-Foot Buffer Areas and HQTAs

Transportation Strategies

- Preserve Our Existing System
- Manage Congestion through Transportation Demand Management (TDM) and Transportation System Management (TSM)
- Expand Regional Transit System
- Expand Passenger Rail and Maintain High-Speed Rail Commitments
- Promote Active Transportation
- Improve Highway and Arterial Capacity
- Strengthen Regional Transportation Network for Goods Movement
- Improve Airport Ground Access

Included within these strategies are SIP-committed transportation programs and projects that reduce vehicle use or change traffic flow or congestion conditions, better known as Transportation Control Measures or "TCMs." In the South Coast Air Basin, TCMs include the following three main categories of transportation improvement projects and programs that have funding programmed for right-of-way and/or construction in the first two years of the 2015 FTIP:

- Transit, Intermodal Transfer, and Active Transportation Measures;
- High Occupancy Vehicle (HOV) Lanes, High Occupancy Toll (HOT) Lanes, and their pricing alternatives; and
- Information-based Transportation Strategies.

The total expenditure for the various strategies in the Final 2016 RTP/SCS is forecasted to be $556.5 billion. The Final RTP/SCS has identified the same amount of total revenues from both existing and several new funding sources that are reasonably expected to be available.

If the future vehicle fleet mix and emission factors are held constant as those in the RTP/SCS base year 2012, the Final 2016 RTP/SCS is estimated to yield a reduction in NOx emissions by about five tons per day (tpd) in 2021, 10 tpd in 2031, and 15 tpd in 2040 compared with their respective Baselines without the RTP/SCS. However, if accounting for mandated future improvement in vehicle fleet mix and emission factors, the estimated NOx reduction from the Final 2016 RTP/SCS is reduced by more than half, because the vehicles as a whole are becoming much cleaner and reduction of every vehicle mile traveled from the RTP/SCS yields less NOx reduction.

Attachment A of Appendix IV-C is a list of transportation control measure projects that are specifically identified and committed to in the Draft 2016 South Coast AQMP/SIPs. Per the CAA, these committed TCMs are required to receive funding priority and be implemented timely. In the event that a committed TCM cannot be delivered or will be significantly delayed, the TCM must be substituted for. It is important to note that as the SCAG's FTIP is updated every two years, new committed TCMs are added to the applicable SIP from the previous FTIP.

Compared with the Baseline alternative, the life-cycle incremental costs of the Final 2016 RTP/SCS are estimated to be about $95 billion while the life-cycle incremental benefits of the Final RTP/SCS are about $190 billion. Most of the benefits (72.3 percent) are from travel time savings, followed by vehicle operating costs savings (19.9 percent), accident cost savings (4.3 percent), and emission reduction cost savings (3.4 percent). Overall, the transportation investments in the Final 2016 RTP/SCS will provide a return of two dollars for every dollar invested.

This Section also contains brief background information on the growth forecasts concept and assumptions in the Final 2016 RTP/SCS including an assessment of uncertainty of SCAG historical population and employment projections.

Section III. Reasonably Available Control Measure Analysis

As required by the Federal Clean Air Act (CAA), a Reasonably Available Control Measure (RACM) analysis must be included as part of the overall control strategy in the ozone and moderate PM2.5 SIPs to ensure that all potential control measures are evaluated for implementation and that justification is provided for those measures that are not implemented. This Appendix IV-C contains the TCM RACM component for the South Coast ozone and PM2.5 control strategy. In accordance with the U.S. Environmental Protection Agency (EPA) procedures, this analysis considers TCMs in the Final 2016 RTP/SCS, measures identified by the CAA, and relevant measures adopted in other ozone and moderate PM2.5 nonattainment areas of the country.

Based on this comprehensive review, it is determined that the TCMs being implemented in the South Coast Air Basin are inclusive of all TCM RACM.

Section IV. TCM Best Available Control Measure (BACM) Analysis for 2006 24-Hour and 2012 Annual PM2.5 NAAQS

The South Coast Air Basin has been reclassified as a Serious nonattainment area under the 2006 PM2.5 NAAQS effective February 12, 2016. In addition, as part of the 2016 South Coast AQMP, South Coast Air Quality Management District (SCAQMD) is requesting a voluntary bump-up reclassification to Serious under the 2012 Annual PM2.5 standard. As a result, the South Coast Air Basin is required to implement BACMs including TCMs for the control of direct PM2.5 and PM2.5 precursors from on-road mobile sources. This section serves as the TCM BACM component for the new South Coast 2006 24-hour and 2012 annual PM2.5 standard SIPs.

Following the applicable U.S. EPA guidance, the TCM BACM analysis consists of a review of the on-going implementation of TCMs in the South Coast Air Basin, a review of TCM measures implemented in other Moderate and Serious PM2.5 nonattainment areas as well as Serious PM10 nonattainment areas throughout the country, and a review of TCMs not implemented in the SCAG region. The analysis demonstrates that the TCM projects being implemented in the South Coast Air Basin constitute TCM BACM.

Section I. Introduction

Federal and State Requirements

The transportation conformity requirements of the Federal CAA establish a need to integrate air quality planning and regional transportation planning. This integration presents the challenge of balancing the real need for improved mobility with the equally important goal of cleaner air. As the federally-designated MPO for the six-county Southern California region, SCAG is required by law to ensure that transportation activities "conform" to, and are supportive of, the goals of regional and state air quality plans to attain the National Ambient Air Quality Standards (NAAQS). In other words, transportation plans, programs, and projects are required to not create new violations, worsen the existing violations, or delay timely attainment of relevant NAAQS.

In addition, SCAG is a co-producer, with the SCAQMD and CARB, of the AQMP for the South Coast Air Basin. SCAG has the responsibility of providing the demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies, as well as analyzing and providing travel activity data related to its planning responsibilities (California Health and Safety Code §40460).

Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and Federal Transportation Improvement Program (FTIP)

The SCAG Region is the largest metropolitan planning area in the United States, encompassing 38,000 square miles. The region is divided into 15 subregions and is one of the largest concentrations of population, employment, income, business, industry and finance in the world. The six-county SCAG Region is home to about 19 million people, nearly half of the population of the State of California.

Federal and State regulations require SCAG, as the MPO and Regional Transportation Planning Agency, to develop an RTP/SCS every four years in order for our region's transportation projects to qualify for federal and state funding and approval. The RTP/SCS is updated to reflect changes in trends, progress made on projects, and to adjust the growth forecast for population and employment changes. The long-range RTP/SCS integrates land use and transportation strategies that will achieve CARB greenhouse gas emissions reduction targets and provides a vision for transportation investments throughout the region. Using growth forecasts and economic trends that project out over a period of more than 20 years, the RTP/SCS considers the role of transportation in the broader context of land use, economic, environmental, and quality-of-life goals for the future, identifying regional land use and transportation strategies to address our mobility needs, air quality and climate change challenges.

The RTP/SCS is developed through a collaborative process, guided by SCAG's main governing board, the Regional Council, and its Policy Committees and Sub-committees, the Transportation Working Group, numerous technical advisory committees/working groups/task force, CTCs, subregions, local

governments, state and federal agencies, environmental and business communities, tribal governments, non-profit groups, as well as the general public.

SCAG is also responsible for developing a biennial short-term (six year planning horizon) FTIP. SCAG develops the FTIP in partnership with the CTCs of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura, and Caltrans Districts 7, 8, 11, and 12. The FTIP is a multimodal list of capital improvement projects to be implemented over a six-year period. The FTIP identifies specific funding sources and fund amounts for each project. It is prioritized to implement the region's overall strategy for providing mobility and improving both the efficiency and safety of the transportation system, while supporting efforts to attain federal and state air quality standards for the region by reducing transportation related air pollution. The FTIP must include all federally funded transportation projects in the region, as well as all regionally significant transportation projects for which approval from federal funding agencies is required, regardless of funding source. The FTIP is developed to incrementally implement the programs and projects in the RTP/SCS. TCMs that are committed to in the applicable SIP are derived from the first two years of the prevailing FTIP.

Section II. Regional Transportation Plan/Sustainable Communities Strategy and TCMs

Introduction

The Final 2016 RTP/SCS is a long-range regional plan that provides a blueprint to integrate land use and transportation strategies to help achieve greater mobility and sustainable growth. Transportation projects in the SCAG region must be included in the RTP/SCS in order to receive federal funding and approval. The Final 2016 RTP/SCS is comprised of the Executive Summary, nine Chapters and 20 Appendices listed below:

- Chapter 1 Introduction
- Chapter 2 Where We Are Today
- Chapter 3 Challenges in a Changing Region
- Chapter 4 Building a Plan for Our Future
- Chapter 5 The Road to Greater Mobility & Sustainable Growth
- Chapter 6 Paying for the Plan
- Chapter 7 A Plan that Creates Economic Opportunity: The Big Picture
- Chapter 8 Measuring Our Progress for the Future
- Chapter 9 Looking Ahead

- 1) Active Transportation Appendix
- 2) Aviation and Airport Ground Access Appendix

- 3) Congestion Management Appendix
- 4) Demographics and Growth Forecast Appendix
- 5) Economic and Job Creation Analysis Appendix
- 6) Environmental Justice Appendix
- 7) Goods Movement Appendix
- 8) Highways and Arterials Appendix
- 9) Mobility Innovations Appendix
- 10) Natural and Farm Lands Appendix
- 11) Passenger Rail Appendix
- 12) Performance Measures Appendix
- 13) Project List Appendix
- 14) Public Health Appendix
- 15) Public Participation and Consultation Appendix
- 16) Sustainable Communities Strategy (SCS) Background Documentation Appendix
- 17) Transit Appendix
- 18) Transportation Conformity Analysis Appendix
- 19) Transportation Finance Appendix
- 20) Transportation Safety and Security Appendix

The Final 2016 RTP/SCS represents the culmination of more than three years of work involving dozens of public agencies, 197 local jurisdictions in the SCAG region, hundreds of local, county, regional and state officials, the business community, environmental groups, as well as various nonprofit organizations, and was founded on a broad-based public outreach effort. The implementation of a comprehensive and coordinated public participation effort undertaken by SCAG is documented in the Public Participation and Consultation Appendix http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_PublicParticipationConsultation.pdf.

The Final 2016 RTP/SCS was adopted by the SCAG Regional Council on April 7, 2016. The Final 2016 RTP/SCS constitutes the transportation control strategy portion of the Draft 2016 South Coast AQMP. A full, illustrative list of the 2016 RTP/SCS projects can be found in the Project List Appendix http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_ProjectList.pdf.

Key Planning Challenges

Our region is facing many formidable challenges.

Economic and Goods Movement Challenges: Although the region has been steadily recovering from the Great Recession with lowering unemployment and housing foreclosures, and employment levels in the Southern California region are where we were before the Recession in 2007, the region's median household income (adjusted for inflation) has declined as wages have stagnated for a larger population base. This is due to the lack of high income jobs for the median household as well as the inability to access higher paying jobs that are available but require higher education and/or technical skills. An increase in

the number of low-paying jobs, and the resulting lower income, have contributed to more people slipping into poverty.

The smooth and efficient movement of goods is critical to our regional economy, particularly as our region continues to recover from the recession. However, as consumer demand for products continue to increase and the region continues to grow as a major exchange point for global trade, infrastructure for freight traffic will be strained and current efforts to reduce air pollution from goods movement sources will not be sufficient to meet national air quality standards. In addition, capacity at international ports will be over-burdened and warehouse space could fall short of demands.

Demographic Trend Challenges: Though slower than in the past, the overall population will continue to grow and the SCAG region is projected to add nearly four million people by 2040. More people in our region will increase the demands on our already strained transportation system, as well as on available land for development.

The region will experience population aging with an increasing share of senior citizens. A key challenge for the region will be to provide seniors with more transportation options for maintaining their independence as they age. With population aging, the share of people over the age of 65 to people of working age (15 to 64) is expected to increase. This means that our region could face a labor shortage and a subsequent reduction in tax revenues.

Many people in the region will continue to live in suburban neighborhoods and drive alone to work and for other activities. However, a large number of the population including both the Millennials and the Baby Boomers are expected to demand more compact communities and more access to transit. The regional priorities for the overall transportation system and the types of new housing are expected to shift as a result.

Transportation Funding and Infrastructure Preservation Challenges: Of all the challenges facing the transportation system today, there is perhaps none more critical than funding. With the projected growth in population, employment, and demand for travel, the costs of our multimodal transportation needs surpass projected revenues available from our historic transportation funding source - the gas tax. State and federal gas tax rates have not changed in more than 20 years while transportation costs escalate, fuel efficiency improves, and the number of alternative-fuel vehicles continues to grow.

The region's transportation system is becoming increasingly compromised by decades of underinvestment in maintaining and preserving our infrastructure. These investments have not kept up the pace with the demands placed on the system and, as a result, the quality of many of our roads, highways, bridges, transit, bicycle and pedestrian facilities continues to deteriorate. If we continue on our current path of seriously underfunding system preservation, the cost of bringing our system back to a reasonable state of good repair will grow exponentially.

Housing Challenges: Affordable housing throughout Southern California remains a very challenging issue, particularly as the economy continues to recover and grow. Housing prices are rising steadily, and affordability is declining. While residential construction has improved notably since the recession, the production of affordable housing has not kept pace with the demand for it. As our region builds communities that are more compact and more transit-oriented, regional greenhouse gas emissions are anticipated to decline, and residents from a variety of income levels will continue to make housing choices that allow them to use an increasing number of mobility options. Although the overall quality of life will increase for many people, people from low-income communities near new transit infrastructure may face displacement as they are no longer able to afford to live in the area.

Air Quality and Public Health Challenges: While Southern California is a leader in reducing pollutant emissions and the ambient level of air pollution has been improving substantially, the SCAG region, particularly the South Coast Air Basin, continues to have the worst air quality in the nation.

Many people in the region suffer from poor health due to chronic diseases related to poor air quality and physical inactivity. Chronic diseases are responsible for 72 percent of all deaths in our region. Health care costs resulting from being physically inactive, obese and overweight, and asthma cost our region billions of dollars annually in medical expenses, lost life and lost productivity. A challenge facing SCAG to improve public health is the sheer size and diversity of our region. Public health varies widely by geographic location, income and race. There is no one size fits all approach to meeting this complex challenge. It requires flexibility and creativity to ensure that initiatives are effective in both rural and urban areas.

Climate Change Challenges: Climate change has impacted and will continue to impact our region in various ways. Both coastal and inland Southern California are projected to experience many more days of extreme heat, with temperatures exceeding 95 degrees Fahrenheit. This is expected to increase heat-related mortality, lower labor productivity and increase demands for energy. The impacts of climate change are expected to hit hardest those communities that are least equipped to handle them. People who are most vulnerable to extreme heat and air pollution are the elderly and children under the age of five.

Climate change is also expected to impact rain and snowfall – including the amount, frequency and intensity of precipitation across the state – and will have serious long-term impacts on the supply and quality of water in Southern California, as well as how the State manages it.

Regional Goals and Policies

The development of projects, programs, and strategies are guided by the following goals and objectives that help carry out the 2016 RTP/SCS vision for improved mobility, a strong economy and sustainability. The regional goals reflect the wide-ranging challenges facing decision-makers and urban planners in achieving the RTP/SCS vision. The goals demonstrate the need to balance many priorities in the most cost-effective manner. Based on an assessment of the major developments that have occurred and influenced the development of the 2016 RTP/SCS, the goals of the 2016 RTP/SCS remain unchanged from those adopted by the SCAG's Regional Council in the 2012–2035 RTP/SCS.

1. Align the RTP/SCS investments and policies with improving regional economic development and competitiveness.
2. Maximize mobility and accessibility for all people and goods in the region.
3. Ensure travel safety and reliability for all people and goods in the region.
4. Preserve and ensure a sustainable regional transportation system.
5. Maximize the productivity of our transportation system.
6. Protect the environment and health of our residents by improving air quality and encouraging active transportation (e.g., bicycling and walking).
7. Actively encourage and create incentives for energy efficiency, where possible.
8. Encourage land use and growth patterns that facilitate transit and active transportation.
9. Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies.

However, two new guiding policies (Guiding Policies 6 and 7, noted on the next page) have been added to the six adopted 2012–2035 RTP/SCS guiding policies to help better focus future investments on the best-performing projects and strategies that seek to preserve, maintain, and optimize the performance of the existing system in the 2016 RTP/SCS.

1. Transportation investments shall be based on SCAG's adopted regional Performance Indicators.
2. Ensuring safety, adequate maintenance, and efficiency of operations on the existing multimodal transportation system should be the highest RTP/SCS priorities for any incremental funding in the region.
3. RTP/SCS land use and growth strategies in the RTP/SCS will respect local input and advance smart growth initiatives.
4. Transportation demand management (TDM) and active transportation will be focus areas, subject to Policy 1.
5. HOV gap closures that significantly increase transit and rideshare usage will be supported and encouraged, subject to Policy 1.
6. The RTP/SCS will support investments and strategies to reduce non-recurrent congestion and demand for single occupancy vehicle use, by leveraging advanced technologies.
7. The RTP/SCS will encourage transportation investments that result in cleaner air, a better environment, a more efficient transportation system, and sustainable outcomes in the long run.
8. Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan.

Integrated Land Use and Transportation Strategies

Integrating strategies for land use and transportation is SCAG's overarching strategy for achieving its goals of regional economic development, maximized mobility and accessibility for all people and goods in our region, safe and reliable travel, a sustainable regional transportation system, a protected natural environment, good health for our residents and more.

The land use strategies included in the Final 2016 RTP/SCS are built on a foundation of contributions from communities and local jurisdictions across the SCAG region. Pursuant to SB 375, as codified in California Government Code §65080(b)(2)(B), an overall land use pattern has been developed that respects local control but also incorporates best practices for achieving State-mandated reductions in greenhouse gas emissions through decreases in per capita vehicle miles traveled (VMT) regionally. The Final 2016 RTP/SCS reflects a continuation of the shift in demographics and household demand since 2012. In 2008, 45 percent of all housing units were multifamily homes. From 2012 through 2040, the RTP/SCS projects that 66 percent of the 1.5 million new homes expected to be built in the SCAG region will be multifamily units, reflecting demographic shifts and anticipated market demand. This will result in an increase of multifamily units in the region to 49 percent of all housing units in the region.

Focus New Growth around Transit/High Quality Transit Areas (HQTAs): The Final 2016 RTP/SCS reinforces the trend of focusing on new housing and employment in the region's HQTAs, areas within one-half mile of a fixed guideway transit stop or a bus transit corridor where buses pick up passengers at a frequency of every 15 minutes or less during peak commuting hours. HQTAs are a cornerstone of land use planning best practices in the SCAG region because they concentrate on roadway repair investments, leverage transit and active transportation investments, reduce regional life cycle infrastructure costs, improve accessibility, create local jobs and have the potential to improve public health and housing affordability. The Final 2016 RTP/SCS assumes that 46 percent of new housing and 55 percent of new employment locations developed between 2012 and 2040 will be located within HQTAs, which comprise only three percent of the total land area in the SCAG region.

Plan for Growth around Livable Corridors: The Livable Corridors strategy seeks to revitalize commercial strips through integrated transportation and land use planning that results in increased economic activity and improved mobility options. Livable Corridors strategies include a special emphasis on fostering collaboration between neighboring jurisdictions to encourage better planning for various land uses, corridor branding, roadway improvements and focusing retail into attractive nodes along a corridor. The Livable Corridor strategies integrate the following three different components: transit improvements; active transportation improvements; and land use policies.

Provide More Options for Short Trips/Neighborhood Mobility Areas (NMAs): The Final 2016 RTP/SCS includes land use strategies, Complete Streets integration and a set of State and local policies to encourage the use of active transportation or neighborhood electric vehicles (NEVs) for short trips in NMAs. NMAs have a high intersection density, low to moderate traffic speeds and robust residential retail connections. The land use strategies include shifting retail growth from large centralized retail strip malls to smaller distributed centers throughout an NMA. The strategies associated with this concept are

intended to provide sustainable transportation options for residents of the region who do not have convenient access to high frequency transit options.

Support Zero Emissions Vehicles & Expand Electric Vehicle Charging Stations: As part of the Final 2016 RTP/SCS, SCAG has focused location-based strategies specifically on increasing the efficiency of Plug-in Hybrid Electric Vehicles (PHEVs) in the region. These are electric vehicles that are powered by a gasoline engine when their battery is depleted. The Final 2016 RTP/SCS proposes a regional charging network that will increase the number of PHEV miles driven on electric power, in addition to supporting the growth of the PEV market generally. In many instances these chargers may double the electric range of PHEVs, reducing vehicle miles traveled that produce tail-pipe emissions.

Support Local Sustainability Planning: To implement the SCS, SCAG supports local planning practices that help lead to a reduction of greenhouse gas emissions. Sustainable Planning & Design, Sustainable Zoning Codes and Climate Action Plans are three methods that local agencies have been adopting and implementing to help meet the regional targets for greenhouse gas emission reductions.

Protect Natural and Farm Lands: To coordinate with and support the viability of the Livable Corridors and HQTA land use strategies, the Final 2016 RTP/SCS suggests redirecting growth away from high value habitat areas to existing urbanized areas. SCAG is also engaging numerous stakeholders as it creates a Natural Lands Conservation Plan. The 2012 RTP/SCS has committed to a regional mitigation plan for inclusion in the 2016 RTP/SCS. With that as the foundation, additional steps have been identified for further developing a regional conservation strategy.

Balance Growth Distribution between 500-Foot Buffer Areas and HQTAs: The Final 2016 RTP/SCS recognizes guidance from the 2005 CARB air quality manual, which recommends limiting the siting of sensitive uses within 500 feet of freeways and urban roads carrying more than 100,000 vehicles per day. 500 feet is approximately one-fifth of a HQTA. Less than 10 percent of HQTAs planned in the 2016 RTP/SCS would fall within 500 feet of highways and highly traveled corridors, according to geographic information system (GIS) analyses. While the density is increased in some areas of HQTAs, the growth in the 500-foot buffer areas is similar to local input, thereby balancing the growth distribution.

Supportive of the above land use strategies, the Final 2016 RTP/SCS includes over $550 billion in transportation system investment through 2040 aiming at maximizing and completing our system. All the transportation strategies are tightly integrated with the above land use strategies.

Preserve Our Existing System: About $275 billion, or nearly half of all of the 2016 RTP/SCS proposed expenditures through 2040, is allocated to system preservation and operation. The Final 2016 RTP/SCS system preservation strategies include 1) Protecting and preserving what we have first, supporting a "fix it first" principle; 2) Considering life-cycle costs beyond construction; and 3) Continuing to work with stakeholders to identify and support new sustainable funding sources and/or increased funding levels for system preservation and maintenance.

Manage Congestion through Transportation Demand Management (TDM) and Transportation System Management (TSM): The Final 2016 RTP/SCS has integrated the federally mandated Congestion Management Process (CMP) to improve and optimize the transportation system, to provide for the safe and effective management of the regional transportation system through the use of monitoring and maintenance, demand education, land use, operational management strategies and strategic capacity enhancements.

The Final 2016 RTP/SCS commits $6.9 billion toward TDM strategies throughout the region. These TDM strategies focus on three main areas: 1) Reducing the number of solo-occupancy vehicle (SOV) trips and overall vehicle miles traveled (VMT) through ridesharing and supportive policies for shared ride services; 2) Redistributing or eliminating vehicle trips from peak demand periods through incentives for telecommuting and alternative work schedules; and 3) Reducing the number of SOV trips through the use of other modes of travel.

The Final 2016 RTP/SCS also includes $9.2 billion for TSM improvements, including extensive advanced ramp metering, enhanced incident management, bottleneck removal to improve traffic flow, expansion and integration of the traffic signal synchronization network, data collection to monitor system performance and other Intelligent Transportation System (ITS) improvements. A comprehensive set of TSM strategies have been identified in the Final 2016 RTP/SCS that work in concert to optimize the performance of the transportation system.

Expand Regional Transit System: The Final 2016 RTP/SCS commits $56 billion for capital transit projects, including significant expansion of the Metro subway and light rail transit (LRT) system in Los Angeles County. Meanwhile, new Bus Rapid Transit (BRT) routes will expand higher-speed bus service regionally; new streetcar services will link major destinations in Orange County; and new Metrolink extensions will further connect communities in the Inland Empire. Other extensive improvements are planned for local bus, rapid bus, BRT and express service throughout the region. To make transit a more attractive and viable option, the 2016 RTP/SCS also supports implementing and expanding transit signal priority; regional and inter-county fare agreements and media; increased bicycle carrying capacity on transit and rail vehicles; real-time passenger information systems to allow travelers to make more informed decisions; and implementing first/last mile strategies to extend the effective reach of transit.

Expand Passenger Rail and Maintain High-Speed Rail Commitments: The Final 2016 RTP/SCS calls for an investment in passenger rail of $38.6 billion for capital projects and $15.7 billion for operations and maintenance. The RTP/SCS also calls for maintaining the commitments in the 2012–2035 RTP/SCS, including Phase 1 of the California High-Speed Train system and the High-Speed Train System Memorandum of Understanding (MOU), which identifies a candidate project list to improve the Metrolink system and the LOSSAN rail corridor, thereby providing immediate, near-term benefits to the region while laying the groundwork for future integration with California's High-Speed Train project. These capital projects will bring segments of the regional rail network up to the federally defined speed of 110 miles per hour or greater, and help lead to a blended system of rail services.

Promote Active Transportation: The Final 2016 RTP/SCS includes $12.9 billion for active transportation improvements, including $8.1 billion in capital projects and $4.8 billion as part of the operations and maintenance expenditures on regionally significant local streets and roads. The Final 2016 RTP/SCS plans for continued progress in developing our regional bikeway network, assumes all local active transportation plans will be implemented, and dedicates resources to maintain and repair thousands of miles of dilapidated sidewalks. The Final RTP/SCS also considers new strategies and approaches beyond those proposed in the 2012 RTP/SCS. The 2016 Active Transportation Plan has 11 specific strategies to maximize active transportation in the SCAG region. These are grouped into four broad categories: Regional Trips, Transit Integration, Short Trips and Education/encouragement. All 11 strategies are based on a comprehensive local bikeway and pedestrian network that uses complete streets principles.

Improve Highway and Arterial Capacity: The Final 2016 RTP/SCS calls for investing $54 billion in capital improvements and $103 billion in operations and maintenance of the state highway system and regionally significant local streets and roads throughout the region. This includes focusing on achieving maximum productivity by adding capacity primarily by closing gaps in the system and improving access; and other measures including the deployment of new technology. The RTP/SCS also continues to support a regional network of Express Lanes, building on the success of the State Route 91 Express Lanes in Orange County, as well as Interstate 10 and Interstate 110 Express Lanes in Los Angeles County.

Strengthen Regional Transportation Network for Goods Movement: The Final 2016 RTP/SCS includes $70.7 billion in goods movement strategies. Among these are 1) Regional Clean Freight Corridor System to establish a system of truck-only lanes extending from the San Pedro Bay Ports to downtown Los Angeles along Interstate 710 and connecting to the State Route 60 east-west segment and finally reaching Interstate 15 in San Bernardino County; 2) Truck Bottleneck Relief Strategy to relieve the top 50 truck bottlenecks; 3) Rail Strategy to add mainline tracks for the Burlington Northern Santa Fe (BNSF) San Bernardino and Cajon Subdivisions and the Union Pacific Railroad (UPRR) Alhambra and Mojave Subdivisions; to expand/modernize intermodal facilities; to build highway-rail grade separations; and to improve port area rail infrastructure; and 4) Goods Movement Environmental Strategy to reduce environmental impacts by supporting the deployment of commercially available low-emission trucks and locomotives for the near term; and in the longer term advancing technologies to implement a zero- and near zero-emission freight system.

Improve Airport Access: The Final 2016 RTP/SCS includes strategies for reducing the impact of air passenger trips on ground transportation congestion. Such strategies include supporting the regionalization of air travel demand; continuing to support regional and inter-regional projects that facilitate airport ground access; supporting ongoing local planning efforts by airport operators, county transportation commissions and local jurisdictions; encouraging development and use of transit access to the region's airports; encouraging the use of modes with high average vehicle occupancy; and discouraging the use of modes that require "deadhead" trips to/from airports.

Financial Plan

To accomplish the ambitious goals of the Final 2016 RTP/SCS through 2040, SCAG forecasts expenditures of $556.5 billion. Forecasted revenues comprise both existing and several new funding sources that are reasonably expected to be available for the 2016 RTP/SCS through its horizon year of 2040, which together total $556.5 billion. Reasonably available revenues include short-term adjustments to state and federal gas excise tax rates and the long-term replacement of gas taxes with mileage-based user fees (or equivalent fuel tax adjustment). These and other categories of funding sources were identified as reasonably available on the basis of their potential for revenue generation, historical precedence and the likelihood of their implementation within the time frame of the RTP/SCS. In accordance with federal guidelines, the Final RTP/SCS includes strategies for ensuring the availability of these sources.

Regional Transportation Emissions

Based on the travel activity projections generated from SCAG's Regional Travel Demand Model, an estimate of emissions associated with on-road mobile sources can be generated using CARB's Emission Factor Model (EMFAC). Through this process, future emissions from on-road mobile sources can be compared for the regional transportation system assuming implementation of the RTP/SCS versus the RTP/SCS baseline without RTP/SCS implementation. It is generally understood that potential future improvements in air quality deriving from the RTP/SCS will likely be much smaller, since motor vehicle emissions have and will continue to be substantially reduced through technology (i.e., emission standards for new engines and in-use standards for existing fleets).

Under two different assumptions on future vehicle technology, Tables 1-1 and 1-2 compare VOC (ROG), NOx, and PM2.5 emissions between implementation of the Final 2016 RTP/SCS and the RTP/SCS Baseline excluding RTP/SCS land use and transportation strategies for 2021, 2031, and 2040. Specifically, the emission reduction benefits shown in Table 1-1 are based on the assumption that the EMFAC2014 vehicle fleet mix and emission factors in the future years remain the same as in 2012 (the 2016 RTP/SCS and 2016 AQMP base year); while the emission reduction benefits shown in Table 1-2 factor in the future improvements in the fleet mix and emission factors as reflected in the EMFAC2014.

Note that the RTP/SCS emission reductions in Tables 1-1 and 1-2 are not double-counted toward the emission reductions presented in the main report of the 2016 AQMP because the RTP/SCS is considered in the AQMP air quality modeling baseline.

TABLE 1-1. Regional Transportation Emissions (annual average) (tons per day) * Assuming Constant 2012 Vehicle Fleet Mix and Emission Factors

	VOC (ROG)			NOx			PM2.5 **		
	2021	2031	2040	2021	2031	2040	2021	2031	2040
2016 RTP/SCS	162.7	164.8	165.2	380.5	440.4	495.4	17.1	19.2	20.8
RTP/SCS Baseline	169.2	176.5	180.8	385.9	450.2	510.0	17.4	19.7	21.5
RTP/SCS Reduction	-6.5	-11.7	-15.6	-5.4	-9.8	-14.6	-0.3	-0.5	-0.7

Note: * Calculated with EMFAC2014; ** Does not include fugitive dust calculations

TABLE 1-2. Regional Transportation Emissions (annual average) (tons per day) * Based on Vehicle Fleet Mixes and Emission Factors as Reflected in EMFAC2014

	VOC (ROG)			NOx			PM2.5 **		
	2021	2031	2040	2021	2031	2040	2021	2031	2040
2016 RTP/SCS	71.8	47.0	35.4	135.1	68.9	62.9	10.2	9.9	9.8
RTP/SCS Baseline	74.6	50.3	38.8	137.9	73.4	69.1	10.5	10.5	10.5
RTP/SCS Reduction	-2.8	-3.3	-3.4	-2.8	-4.5	-6.2	-0.3	-0.6	-0.7

Note: * Calculated with EMFAC2014; ** Does not include fugitive dust calculations

Transportation Control Measures (TCMs)

TCMs are measures that are specifically identified and committed to in the applicable SIP that are either one of the types listed in CAA section 108, or any other measures for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions. Vehicle technology-based, fuel-based, and maintenance-based measures which control the emissions from vehicles under fixed traffic conditions are not TCMs. The committed TCMs identified in this RTP/SCS include the following three main categories of transportation improvement projects and programs:

- Transit, Intermodal Transfer, and Active Transportation Measures;

- High Occupancy Vehicle (HOV) Lanes, High Occupancy Toll (HOT) Lanes, and their pricing alternatives; and
- Information-based Transportation Strategies.

The Final 2016 RTP/SCS includes TCM type projects throughout the entire planning horizon (i.e., 2040) and are all part of the regional transportation strategy for the 2016 South Coast AQMP. Those TCM type projects which have funding programmed for right of way or construction in the first two years of the prevailing FTIP are considered "committed" for air quality planning purposes in the applicable SIP. Attachment A of this Appendix illustrates the currently committed TCMs that are derived from the TCM projects of the 2015 FTIP, as amended. Per the CAA, these committed TCMs are required to receive funding priority and be implemented timely. In the event that a committed TCM cannot be delivered or will be significantly delayed, the TCM must be substituted for. It is important to note that as the SCAG's FTIP is updated every two years, new committed TCMs are added to the applicable SIP mainly from the TCM-type projects in the previous FTIP. As a result of the TCM "rollover process," thousands of committed TCM projects have been implemented over the last two decades. The "rollover" of TCMs updates the AQMPs/SIPs to include new projects in addition to ongoing projects from previous FTIPs. As the FTIP gets adopted every two years, new TCMs emerge and completed TCMs get removed.

TCM Emissions Reduction Benefits To estimate the emission benefits of TCMs, the socio-economic data variables of the Final 2016 RTP/SCS were held constant while the transportation network was modified to account for the TCMs in the RTP/SCS (both TCM-type projects and committed TCMs). In other words, the TCM emissions reduction benefits are the difference between the Final 2016 RTP/SCS which includes TCMs and the Final 2016 RTP/SCS without TCMs. It should be noted that this analysis is done for illustrative purposes, as the regional transportation strategy is appropriately viewed on a systems-level basis, and not by its components since each of the individual transportation improvements and strategies affect each other and the system. Further, it should be noted that the TCM emission reductions in Tables 2-1 and 2-2 are not double-counted toward the emission reductions presented in the main report of the Draft 2016 AQMP because the TCMs are part of the RTP/SCS which is considered in the AQMP air quality modeling baseline.

Compared to previous AQMPs/SIPs, potential future improvements in air quality deriving from TCMs is consistently diminishing for two reasons. On one hand, motor vehicle emissions have and will continue to be substantially reduced through technology. On the other hand, most of the TCM projects in the South Coast Air Basin have been adopted into the SIP and have already been implemented. Thus, the emission reductions associated with these projects are now included in the RTP/SCS baseline emissions and no longer show up in the TCM benefit values.

Under the same two different assumptions on future vehicle technology, Tables 2-1 and 2-2 show the results of the TCM modeling analysis for years 2019, 2021, and 2031. Specifically, the emission reduction benefits shown in Table 2-1 are based on the assumption that the EMFAC2014 vehicle fleet mix and emission factors in the future years remain the same as in 2012 (the 2016 RTP/SCS and 2016 AQMP base year); while the emission reduction benefits shown in Table 2-2 factor in the future improvement in the fleet mix and emission factors as reflected in the EMFAC2014.

**TABLE 2-1. TCM Emissions (annual average) (tons per day) *
Assuming Constant 2012 Vehicle Fleet Mix and Emission Factors**

	VOC (ROG)			NOx			PM2.5 **		
	2019	2021	2031	2019	2021	2031	2019	2021	2031
2016 RTP/SCS	162.8	162.7	164.8	367.9	380.5	440.4	16.6	17.1	19.2
RTP/SCS without TCM	163.2	163.9	165.9	368.4	381.7	441.2	16.6	17.2	19.2
TCM Reduction	-0.4	-1.2	-1.1	-0.5	-1.2	-0.8	0.0	-0.1	0.0

Note: * Calculated with EMFAC2014; ** Does not include fugitive dust calculations

**TABLE 2-2. TCM Emissions (annual average) (tons per day) *
Based on Vehicle Fleet Mixes and Emission Factors as Reflected in EMFAC2014**

	VOC (ROG)			NOx			PM2.5 **		
	2019	2021	2031	2019	2021	2031	2019	2021	2031
2016 RTP/SCS	82.5	71.8	47.0	166.5	135.1	68.9	10.8	10.2	9.9
RTP/SCS without TCM	82.7	72.3	47.3	166.9	135.8	69.6	10.8	10.3	10.0
TCM Reduction	-0.2	-0.5	-0.3	-0.4	-0.7	-0.7	0.0	-0.1	-0.1

Note: * Calculated with EMFAC2014; ** Does not include fugitive dust calculations

Cost-Benefit Analysis

Implementation of the 2016 RTP/SCS will secure a safe, efficient, sustainable and prosperous future for the SCAG region. To demonstrate how effective the RTP/SCS would be toward achieving our regional goals, SCAG conducted a RTP/SCS vs. RTP/SCS Baseline cost-benefit analysis – essentially comparing how the region would perform with and without implementation of the RTP/SCS.

The cost-benefit analysis utilizes the Cal-B/C Model to calculate regional network benefits. It calculates and aggregates scenario benefits after travel impacts are evaluated using a regional travel demand model.

SCAG's regional travel demand model data for the Final 2016 RTP/SCS was summarized in one mile per hour (1-mph) speed bins to facilitate analysis.

The benefit/cost ratio compares the incremental benefits with the incremental costs of multimodal transportation investments. The benefits are divided into the following four categories:

- Savings resulting from reduced travel delay
- Air quality improvements
- Safety improvements
- Reductions in vehicle operating costs

For these categories, the economic values and parameters found in Cal-B/C Model are utilized in conjunction with SCAG's regional travel demand model outputs to estimate the benefits of the Final 2016 RTP/SCS compared with the Baseline alternative. Most of these benefits are a function of changes in VMT and Vehicle Hours Traveled (VHT). To estimate the benefit/cost ratio, the benefits in each category are converted into dollars and added together. These are divided by the total incremental costs of the transportation improvements to produce a ratio. For this analysis, benefits are estimated over the planning period through 2040. This analysis also uses standard economic valuations. Further information on the economic values represented in the Cal-B/C Model can be found at the following:

http://www.dot.ca.gov/hq/tpp/offices/eab/benefit_files/CalBC_Tech_Supplement_Vol3.pdf

Compared with the alternative of not adopting the RTP/SCS, the Final 2016 RTP/SCS would result in significant benefits to our region, not only with respect to mobility and accessibility, but also in the areas of air quality, economic growth and job creation, sustainability and environmental justice. Compared with the Baseline alternative, the life-cycle incremental costs of the Final 2016 RTP/SCS are about $95 billion, while the life-cycle incremental benefits of the Final RTP/SCS are about $190 billion. Most of the benefits (72.3 percent) are from travel time savings, followed by vehicle operating costs savings (19.9 percent), accident cost savings (4.3 percent), and emission reduction cost savings (3.4 percent). In other words, overall, the transportation investments in the Final 2016 RTP/SCS will provide a return of $2.00 for every dollar invested.

- The Final RTP/SCS would result in an eight percent reduction in greenhouse gas emissions per capita by 2020, an 18 percent reduction by 2035 and a 21 percent reduction by 2040 – compared with 2005 levels. This would exceed the State's mandated reductions, which are eight percent by 2020 and 13 percent by 2035, respectively.
- Regional air quality would improve under the RTP/SCS, as cleaner fuels and new vehicle technologies help to significantly reduce many of the pollutants that contribute to smog and other airborne contaminants that may impact public health in the region.
- The combined percentage of work trips made by carpooling, active transportation and public transit would increase by about four percent, with a commensurate reduction in the share of commuters traveling by single occupant vehicle.

- The number of VMT per capita would be reduced by over seven percent and VHT per capita by about 17 percent (for automobiles and light/medium duty trucks) as a result of more location efficient land use patterns and improved transit service.
- Daily travel by transit would increase by nearly one third, as a result of improved transit service and more transit-oriented development patterns.
- The Final RTP/SCS would reduce delay per capita by 39 percent, and heavy duty truck delay on highways by 40 percent. This means we would spend less time sitting in traffic and our goods would move more efficiently.
- About 351,000 additional new jobs would be created annually, due to the region's increased competitiveness and improved economic performance that would result from congestion reduction and improvements in regional amenities as a result of the implementation of the RTP/SCS.
- The 2016 RTP/SCS would reduce the amount of previously undeveloped (greenfield) lands converted to more urbanized use by 23 percent. By conserving open space and other rural lands, the RTP/SCS provides a solid foundation for more sustainable development in the SCAG region.
- The Final RTP/SCS would result in a reduction in our regional obesity rate of 2.5 percent, and a reduction in the share of our population that suffers with high blood pressure by three percent. It would also result in a reduction in the total annual health costs for respiratory disease of more than 13 percent.

For details of the cost-benefit analysis, please refer to 1) Chapter 8: Measuring Our Progress, 2) Economic and Job Creation Analysis Appendix, and 3) Performance Measures Appendix of the Final 2016 RTP/SCS (http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx).

Background Information on Growth Forecasts Concept and Assumptions

SCAG developed a new set of regional growth projections including jobs, population and households for the Final 2016 RTP/SCS. The regional and county projections were completed with the help from a panel of experts consisting of some 20 economists and demographers, and the Center for Continuing Study of the California Economy (CCSCE) helped to lead the process. The new projections extend to 2040 and use a 2012 base year. These regional projections were reviewed and revised with input and comments provided by local jurisdictions and, then further disaggregated to develop small area socioeconomic (population, household, jobs) distributions.

The regional projections are based on assessment of historical trends in the SCAG region competitiveness in terms of job shares by industrial groups with the assumptions and conclusions that:

- The majority of policies and investments in the previous regional plans, including the 2012 RTP/SCS and AQMPs will be successfully implemented to improve air quality and maintain the quality of life in terms of congestion, sustainability, attractiveness and as such the economic competitiveness of the region will be stable relative to the nation and the rest of California.

- Other enabling factors, for example government finance/taxes, education, workforce/labor force training, energy/water resources, sewer, climate, etc. will maintain similar trends in the future and enable the economic and population growth.

For detailed information about the growth forecast assumptions, methodology, and results, please refer to the Demographics & Growth Forecast Appendix of the Final 2016 RTP/SCS (http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_DemographicsGrowthForecast.pdf).

Assessment of Uncertainty of SCAG Historical Population and Employment Projections: Forecast Accuracy and Bias: The forecast error is usually defined as the difference between the population forecast for a particular geographic area in a particular target year and the actual population for the same area and year. Forecast errors are oftentimes measured as mean error (ME), mean absolute error (MAE), mean algebraic percent error (MALPE), mean absolute percent error (MAPE), mean squared error (MSE), root mean squared error (RMSE), root mean squared percent error (RMSPE), etc. MAPE, a measure in which positive and negative values do not offset each other, is one of the most popular error measures. MALPE is a popular measure of the forecast bias, which shows a general tendency to be high or low.

There have been empirical findings on the factors affecting the forecast accuracy. Those factors include projection methodology, population size, population growth rate, length of horizon, length of base period, launch year, etc. It is commonly found that no single method consistently produces more accurate projections than any other, forecast accuracy increases with population size, and forecast accuracy decreases with population growth rate and the length of projection horizon. A forecast bias also occurs when there are consistent differences between actual outcomes and previously generated forecasts.

There is no empirically established range of acceptable forecast errors by level of geography and length of horizon due to a variety of contexts for population projections. Instead the typical MAPEs for population projections by level of geography and length of horizon are proposed by a group of experienced demographers. For a 20-year projection horizon, the State level population projections would be different from the actual population at 12 percent of MAPE, while the County level population projections would be different from the actual population at 24 percent of MAPE.

The SCAG region's population projections are generally found accurate and are within an acceptable range of typical errors. As shown in Table 3, the SCAG region's population projections show 9 percent difference of MAPE than actual population for 20-year projection horizon as a result of comparison of seven series of population projections with actual populations. The 9 percent of MAPE from the SCAG region's population projections for 20-year projection horizon is smaller than 12 percent of a typical MAPE from the State level population projections. It is likely that regular updates of the regional population projections which occur every three or four years contribute to the maintenance of the reasonable forecast errors. The SCAG region's population projections tend to show MALPE of -4 percent for the 20-year projection horizon, which means lower projections than the actual estimate during the same projection horizon.

The SCAG region's employment projections generally show a higher MAPE than population projections, and tend to show MALPE of 5 percent for the 20-year projection horizon, which means higher projections than the actual estimate during the same projection horizon. For additional information regarding the interpretation issues in SCAG forecast evaluation, see the PowerPoint Presentation presented at the May 25, 2016 SCAQMD 2016 AQMP Scientific, Technical & Modeling Peer Review Advisory Group Meeting (STMPR) (http://www.aqmd.gov/docs/default-source/Agendas/STMPR-Advisory-Group/may-2016/socio/2_scagforecasteval.pdf?sfvrsn=2).

TABLE 3. Mean Absolute Percent Error (MAPE) and Mean Algebraic Percent Error (MALPE) of SCAG Region Population and Employment Projections by Length of Horizon (as of 2015)

Accuracy Measure	Variable	Length of Horizon (Years)			
		5-Year	10-Year	15-Year	20-Year
MAPE	**Population**	3%	6%	8%	9%
	Employment	5%	10%	15%	12%
MALPE	**Population**	0%	-1%	-3%	-4%
	Employment	-1%	1%	3%	5%
Observations		12	11	10	7

Note:

MAPE = |PEt|/n, PEt = [(Ft – At)/At] × 100, where PE represents the percent error, t the target year, F the population projection, A the actual population, and n the number of areas;

MALPE = PEt/n; The intermediate years' projections were calculated using the compound growth rate.

Sources:

SCAG, SCAG Development Guide - Growth Forecast Selection, Jan. 1974 (SCAG90 adopted in 1972); SCAG, SCAG Development Guide - Growth Forecast Selection, Jan. 1974 (D/E 2a adopted in 1974); SCAG, SCAG-76 Growth Forecast Policy, Jan 1976 (adopted in December 1975); SCAG, SCAG78 Growth Forecast Policy (adopted in January 1979); SCAG, SCAG82 Growth Forecast Policy (adopted in October 1982); SCAG, Growth Management Plan (adopted in February 1989); SCAG, Regional Comprehensive Plan and Guide (adopted in June 1994); SCAG, 1998 RTP Growth Forecast (adopted in April 1998); SCAG, 2001 RTP Growth Forecast (adopted in April 2001); SCAG, 2004 RTP Growth Forecast (adopted in April 2004); SCAG, 2008 RTP Integrated Growth Forecast (adopted in April 2008); SCAG, 2012 RTP Integrated Growth Forecast (adopted in April 2012)

Section III. Reasonably Available Control Measure Analysis

Introduction

Clean Air Act Section 172(c)(1) requires SIPs to provide for the implementation of all reasonably available control measures (RACM) as expeditiously as practicable. Guidance on interpreting RACM requirements in the context of the 1990 Amendments was set forth in the General Preamble (57 FR 13498, 13560) in 1992. In the General Preamble, U.S. EPA interpreted section 172(c)(1) as imposing a duty on States to consider all available control measures and to adopt and implement measures that are reasonably available for implementation in a specific nonattainment area. It also retained an earlier interpretation of RACM that it would not be reasonable to require the implementation of measures that do not advance the date for attainment.

With regard to TCMs, U.S. EPA revised earlier guidance by indicating that it is inappropriate to presume that all Section 108(f)(1)(A) measures of the CAA are available in all nonattainment areas. Instead, States should consider Section 108(f)(1)(A) measures as potential options that are not exhaustive, but indicative of the types of measures that should be considered. In addition, any measure identified as reasonably available during the public comment period should also be considered for implementation. U.S. EPA indicated that States could reject measures as not reasonably available for reasons related to local conditions. States are required to justify why available measures were not considered RACM and not adopted in the SIP.

To meet the RACM requirements articulated in the U.S. EPA guidance described above, this RACM analysis was performed using several steps. First is a description of the process by which SCAG and related transportation agencies in the South Coast Air Basin identify, review, and make enforceable commitments to implement TCMs. Second is the assembly and review of a list of control measures recently implemented in other ozone nonattainment areas. This effort involved a review of measures implemented in California nonattainment areas as well as those located in other states, and the organization of those measures in the 16 categories specified in CAA Section 108(f). The third step is to determine RACM by contrasting the list of candidate measures with measures implemented to date in the South Coast Air Basin, as well as any new TCMs in the current AQMP. The fourth step is to provide a reasoned justification for any of the available measures that have yet to be implemented. These justifications must address criteria described in the above-cited guidance.

SCAG RACM/TCM Development Process

While the SCAG Region has an extensive, systematic TCM development program continually updated through the FTIP process, areas are obligated during SIP preparation to evaluate TCMs and determine whether they qualify as RACM.

The RACM process relies predominantly on the continuous process of updating and adding TCMs in the South Coast Air Basin. The current TCM "Rollover Process" was established for the South Coast Air Basin

to replace a process that developed TCMs each time a SIP was produced with a continuous ongoing TCM process. This process continues to govern the selection and implementation of TCMs today. TCMs are continuously identified and reviewed throughout the transportation planning process. SCAG's ongoing public outreach effort, including an involved interagency input process via the TCWG, helps ensure that the process to identify and review TCMs is robust, inclusive, and comprehensive. Development of TCMs arises from multiple processes and multiple sources, which include CTCs, subregional agencies, task forces, committees, and the public. These funding and scheduling procedures ensure that TCMs are developed, sponsored, and clearly identified throughout the process and implemented on schedule.

Assembly and Review of Candidate RACM

U.S. EPA and related court decisions have maintained that TCMs considered RACM must be measures that 1) advance the attainment date, typically by at least one year and 2) are technologically and economically feasible. Measures must pass both the advance attainment and technical/economic feasibility tests to be deemed RACM.

U.S. EPA guidance documents provide help in identifying the type of measures to be considered. CAA Section 108(f)(1)(A) provides a list of sixteen categories of TCMs that are potential options that should be considered indicative types of control measures:

i. *Programs for improved use of public transit;*
ii. *Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;*
iii. *Employer-based transportation management plans, including incentives;*
iv. *Trip-reduction ordinances;*
v. *Traffic flow improvement programs that achieve emission reductions;*
vi. *Fringe and transportation corridor parking facilities, serving multiple occupancy vehicle programs or transit service;*
vii. *Programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration, particularly during periods of peak use;*
viii. *Programs for the provision of all forms of high-occupancy, shared-ride services, such as the pooled use of vans;*
ix. *Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;*
x. *Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;*
xi. *Programs to control extended idling of vehicles;*
xii. *Programs to reduce motor vehicle emissions, consistent with Title II of the Clean Air Act, which are caused by extreme cold start conditions;*

xiii. *Employer-sponsored programs to permit flexible work schedules;*

xiv. *Programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;*

xv. *Programs for new construction and major reconstruction of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation, when economically feasible and in the public interest; and*

xvi. *Programs to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks.*

U.S. EPA guidance has emphasized that these sixteen measures are an illustrative, but not exhaustive list. Instead, TCMs need to be evaluated on an area-by-area basis to determine which are reasonably available. In addition to the measures listed above, the 1992 General Preamble of the CAA cite other sources to include TCMs that were a) suggested during public comments (e.g. at workshops, public hearings, in written comments, etc.); b) adopted in other nonattainment areas of the country; and c) specifically identified by the U.S. EPA (i.e., U.S. EPA TCM database, support documents for rulemaking, etc.).[1]

To develop a list of candidate RACM, SCAG performed a comprehensive review of available TCMs in California, as well as in other states. SCAG re-examined the candidate RACM identified during the comprehensive RACM analysis performed for the 2012 AQMP and updated TCMs based on new SIPs implemented since the last RACM analysis. The SIPs reviewed by SCAG included all plans from 1997 8-hour ozone,[2] 1997 Annual PM2.5,[3] and 2006 24-hour PM2.5[4] nonattainment areas. Tables 4 and 5 list these ozone and PM2.5 nonattainment area SIPs that SCAG reviewed for candidate measures as part of this analysis.

Additionally, TCMs were discussed and reviewed at numerous TCWG meetings as part of the 2013 FTIP, 2015 FTIP, 2016 RTP/SCS, and 2016 AQMP. Further, SCAG has an extensive and robust public participation process for the development of the RTP/FTIP through ongoing public meetings, and technical, advisory,

[1] Seitz, John S. (December 2, 1999). Memo from John Seitz: Guidance on the Reasonably Available Control Measures (RACM) Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas. Available at: http://www.epa.gov/ttn/oarpg/t1/memoranda/revracm.pdf.

[2] EPA's 1997 8-hour ozone standard nonattainment designations are available at *http://www3.epa.gov/airquality/greenbook/gncs.html*.

[3] EPA's 1997 Annual PM2.5 standard nonattainment area designations are available at *http://www3.epa.gov/airquality/greenbook/qnca.html*.

[4] EPA's 2006 24-hour PM2.5 standard nonattainment area designations are available at *http://www3.epa.gov/airquality/greenbook/rnca.html*.

and policy committees. These groups generally meet on a monthly basis and provide explicit opportunities for the public to participate and contribute.

TABLE 4. 8-Hour Ozone Standard Nonattainment Areas Reviewed for RACM

Region	Designation	Applicable SIP
San Joaquin Valley, CA	Extreme	San Joaquin Valley 2007 Ozone Plan
Ventura, CA	Serious	Ventura County Air Quality Management Plan, 2007
Sacramento, CA	Serious	Sacramento Metropolitan Air Quality Management District. Sacramento Regional 8-Hour Ozone Attainment and RFP Plan, 2008
Bay Area, CA	Marginal	Revised San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard, 2001
Washington DC	Moderate	State Implementation Plan for 8-Hour Ozone Standard for the Washington DC-MD-VA Nonattainment Area, 2007
Baltimore, MD	Serious	Baltimore Serious Nonattainment Area 0.08 ppm 8-Hour Ozone Implementation Plan, 2013
Maricopa, AZ	Moderate	MAG Eight-Hour Ozone Resignation Request and Maintenance Plan for the Maricopa Nonattainment Area, February, 2009
Denver-Boulder, CO	Marginal	Denver Metro Area & North Front Range Ozone Action Plan Including Revisions to the State Implementation Plan, 2008
Boston-Manchester, NH	Moderate	Revision to the New Hampshire State Implementation Plan Request for Redesignation of the Boston-Manchester-Portsmouth (SE), NH 8-Hour Ozone (1997 Standard) Nonattainment Area, 2012
Philadelphia-Wilmington, PA	Moderate	State Implementation Plan Revision: Attainment Demonstration and Base Year Inventory Bucks, Chester, Delaware, Montgomery and Philadelphia Counties located in the Philadelphia-Wilmington-Atlantic City, PA-NJ-DE Eight-Hour Ozone Nonattainment Area, 2007
Houston-Galveston, TX	Severe	Houston-Galveston-Brazoria Reasonable Further Progress State Implementation Plan Revision for the1997 Eight-Hour Ozone Standard, 2010
Dallas-Fort Worth, TX	Serious	Dallas-Fort Worth 1997 Eight-Hour Ozone Standard Nonattainment Area Plan, 2011
New York-New Jersey, NY	Moderate	New Jersey Department of Environmental Protection State Implementation Plan (SIP) Revision for the Attainment and Maintenance of Ozone NAAQS, 2007
Pittsburgh-Beaver Valley	Moderate	Final Pittsburgh-Beaver Valley Area Ozone Maintenance Plan And Request For Redesignation As Attainment For Ozone, 2001
Poughkeepsie, NY	Moderate	New York State Implementation Plan For Ozone (8-Hour NAAQs) Attainment Demonstration For Poughkeepsie, NY Area, 2008

TABLE 5. 24-Hour and Annual PM2.5 Nonattainment Areas Reviewed for RACM		
Region	**Designation**	**Applicable SIP**
Fairbanks North Star Borough, AK	Moderate	Alaska Department of Environmental Conservation Amendments to State Air Quality Control Plan Section III.D.5.1-5.14, 2014
Imperial County, CA	Moderate	Imperial County 2013 State Implementation Plan for the 2006 24-hour PM2.5 Moderate Nonattainment Area, 2014
Klamath Falls, OR	Moderate	Klamath Falls Fine Particulate Matter (PM2.5) Attainment Plan, 2012
Logan, UT	Moderate	Utah State Implementation Plan Control Measures for Area and Point Sources, Fine Particulate Matter, PM2.5 SIP for the Logan, UT-ID Nonattainment Area, 2014
Provo, UT	Moderate	Utah State Implementation Plan Control Measures for Area and Point Sources, Fine Particulate Matter, PM2.5 SIP for the Provo, UT Nonattainment Area, 2014
Salt Lake City, UT	Moderate	Utah State Implementation Plan Control Measures for Area and Point Sources, Fine Particulate Matter, PM2.5 SIP for the Salt Lake City, UT Nonattainment Area, 2014
San Joaquin Valley, CA	Moderate/Severe	Plan for the 1997 PM2.5 Standard San Joaquin Valley Unified Air Pollution Control District, 2015. U.S. EPA approval pending.
San Joaquin Valley, CA	Moderate	SJV 2012 PM2.5 Plan
San Francisco Bay Area, CA	Moderate	BAAQMD Final Clean Air Plan, 2010
Sacramento, CA	Moderate	PM2.5 Implementation/Maintenance Plan and Redesignation Request for Sacramento PM2.5 Nonattainment Area, 2013
Oakridge, OR	Moderate	Oakridge Fine Particulate Matter (PM2.5) Attainment Plan Adoption, 2012
Atlanta, GA	Moderate	Georgia's Redesignation Request and Maintenance Plan for the Atlanta Non-attainment Area for 1997 PM2.5 NAAQS
Knoxville, TN	Moderate	Attainment Demonstration Knoxville, Tennessee, Annual PM2.5 Non-attainment Area (Anderson, Blount, Knox, Loudon, and Roane Counties)
St. Louis, MO-IL	Moderate	Supplement/Revision to the Redesignation Demonstration and Maintenance Plan for the Missouri Portion of the St. Louis Nonattainment Area for the 1997 Annual Fine Particulate Matter (PM2.5) National Ambient Air Quality Standard
LA-SCAB, CA	Moderate	Final 2012 Air Quality Management Plan, February 2013
Pittsburgh-Beaver Valley, PA	Moderate	State Implementation Plan Revision: Maintenance Plan and Comprehensive Inventory Pittsburgh-Beaver Valley Nonattainment Area 1997 and 2006 Fine Particulate Matter National Ambient Air Quality Standards
West Central Pinal, AZ	Moderate	Arizona State Implementation Plan Revision West Central Pinal County 2006 PM2.5 Nonattainment Area, 2014. U.S. EPA approval pending.

In summary, SCAG performed the RACM analysis based on information reviewed from the following sources:

- CAA Section 108(f)(1)(A)
- 2012 South Coast AQMP RACM Analysis
- Other nonattainment areas in California
- Other nonattainment areas outside California
- RTP/FTIP Updates
- Interagency Consultation (TCWG)
- Transportation Committee, Energy and Environment Committee, and Active Transportation Working Group meeting materials and input

The candidate measures were reviewed to determine which can be considered RACM. As discussed above, the RACM TCM requirement consists of two core criteria that must be satisfied: 1) TCMs must advance attainment of the air quality standards; and 2) TCMs must be both technically and economically feasible. U.S. EPA has not provided specific definitions on these core criteria, but has preferred to allow flexibility in each region's determination.

In practice, agencies have based their determination of the first criteria on whether a measure or group of measures would help an area achieve attainment one year earlier than in the absence of the measure or group of measures. In other words, TCM implementation must significantly reduce emissions to facilitate attainment of the NAAQS one year earlier than without the TCMs. Considering the magnitude of the emissions reductions necessary to demonstrate attainment in the South Coast Air Basin, the implementation of TCMs is not expected to meet this criterion. Technical feasibility has been determined in terms of local factors, such as environmental impacts, availability of control measures, and ability to achieve the emission reductions. Project cost-effectiveness has been considered a determining factor for economic feasibility.

Determining RACM Measures

For this step of the RACM analysis, SCAG compared the list of measures implemented within the South Coast Air Basin with those implemented in other areas. SCAG then organized measures, including candidate measures and those measures currently implemented in the region, according to the sixteen categories specified in Section 108(f)(1)(A) of the CAA. No formal requirement exists on how to organize TCMs. However, SCAG utilized this organization scheme as a way to highlight those measures that fall within the sixteen CAA categories, which are formally recognized as "TCMs" and subject to CAA and federal conformity requirements. SCAG found a small number of candidate measures that were not currently implemented in the region and not included in the 2012 South Coast AQMP RACM analysis. In

addition, a new category titled "Other Measures" was added to the list of measures. This category includes TCMs that do not fall in any of the sixteen Section 108(f) categories. New measures that were in addition to those reviewed as part of the 2012 RACM analysis were highlighted in bold font as shown in Attachment B.

For this RACM analysis, SCAG also reviewed statewide and South Coast AQMD measures that have been adopted since the last RACM analysis. Although these measures are out of the realm of SCAG's funding authority, they are discussed below for completeness. Statewide mobile source measures are also covered in California RACM analysis completed for the latest ozone and PM2.5 SIP revisions for the South Coast Air Basin. Table 6 shows on-road and off-road TCMs and mobile source measures that were adopted by the CARB and are currently being implemented in the SCAG region.

TABLE 6. Adopted California Transportation Control Measures

Transportation Control Measure	Implementing Agency	Implemented in SCAG Region?
California Diesel Fuel Regulation	CARB	Yes
On-Road Heavy-Duty Diesel Vehicles Regulation	CARB	Yes
California Reformulated Gasoline	CARB	Yes
Advanced Clean Cars (Low Emission Vehicle Standards III)	CARB	Yes
Transportation Refrigeration Unit ATCM	CARB	Yes
School Bus Idling ATCM	CARB	Yes
Fleet Rule for Transit Agencies	CARB	Yes
Drayage Truck Regulation	CARB	Yes
Hybrid Truck and Bus Voucher Incentive Program	CARB	Yes
Clean Vehicle Rebate Project	CARB	Yes
Solid Waste Collection Vehicle Rule	CARB	Yes
Heavy-Duty Vehicle Inspection Program	CARB/BAR	Yes
Periodic Smoke Inspection Program	CARB/BAR	Yes
School Bus Retrofit Program	CARB/SCAQMD	Yes
Goods Movement Program/Proposition 1B	CARB/CTC/SCAQMD	Yes
Portable Diesel Engines ATCM	CARB	Yes
In-Use Off-Road Diesel Equipment Regulation	CARB	Yes
Railyard Emission Reduction and Fuel Use Program	CARB/SCAQMD	Yes
In-Use Off-Road Mobile Agricultural Equipment Regulation	CARB	Yes
Cargo Handling Equipment Regulation	CARB	Yes
Ocean-Going Vessels and Commercial Harborcraft Regulations	CARB	Yes
Airport Ground Support Equipment	CARB/SCAQMD	Yes
Off-Road Large Spark-Ignition Equipment Regulation	CARB	Yes
California Active Transportation Program	CTC	Yes

Reasoned Justification

The fourth step is to provide a reasoned justification for any of the available measures that have yet to be implemented or will not be implemented. In 1999, U.S. EPA issued a memorandum entitled "Guidance on the Reasonably Available Control Measures Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas."[5] In this memorandum, U.S. EPA states that in order to determine whether a State has adopted all RACM necessary for attainment and as expeditiously as practicable, the State must explain why the selected implementation schedule is the earliest schedule based on the circumstances of the area. This indicated that States could reject measures as not reasonably available for reasons related to local conditions. In such cases, States are obligated to provide justification as to why potentially reasonable measures have not been adopted. Valid reasons for rejecting a measure include: it would not advance the attainment date, it is economically infeasible, or it is technologically infeasible.

The complete listing of all candidate measures evaluated for RACM determination is included in Attachment B. A "Measure Number" is assigned for each strategy for ease of discussion (not rank in priority). The "Description" column provides a brief description of the relevant measure in discussion. "Has It Been Implemented?" confirms whether the measure is currently implemented in the SCAG region. The final column "Reasoned Justification for Not Implementing" provides a reasoned justification for those measures that were not considered RACM. SCAG appropriately considered a number of factors that included technical and economic feasibility, enforceability, geographic applicability, and ability to provide emission reductions. Of the TCMs that were deemed candidate measures, none were found to meet the criteria for RACM implementation of advance attainment and technical/economic feasibility.

Conclusion

CAA Section 172(c)(1) requires SIPs to provide for the implementation of all RACM as "expeditiously as practicable." U.S. EPA and related court decisions have maintained that TCMs considered RACM must be measures that 1) advance the attainment date, typically by at least one year and 2) are technologically and economically feasible. Measures must pass both the advance attainment and technical/economic feasibility tests to be deemed RACM.

Based on a comprehensive review of TCM projects in other nonattainment areas or otherwise identified, it is determined that the TCMs being implemented in the South Coast Air Basin are inclusive of all RACM.

[5] Seitz, John S. (December 2, 1999). *Memo from John Seitz: Guidance on the Reasonably Available Control Measures (RACM) Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas.* Available at: http://www.epa.gov/ttn/oarpg/t1/memoranda/revracm.pdf

None of the candidate measures reviewed herein and determined to be infeasible meets the criteria for RACM implementation.

SCAG and the local transportation agencies have in place a comprehensive, formal process for identifying, evaluating, and selecting TCMs. The regular RTP, FTIP, and AQMP/SIP public update processes ensure that TCM identification and implementation is a routine consideration that helps SCAG and the AQMD demonstrate attainment of applicable NAAQS.

Section IV. TCM Best Available Control Measure (BACM) Analysis for 2006 24-Hour and 2012 Annual PM2.5 NAAQS

Introduction

On January 13, 2016, U.S. EPA published in the Federal Register a final rule reclassifying the South Coast Air Basin from a "Moderate" to a "Serious" nonattainment area under the 2006 PM2.5 NAAQS, effective February 12, 2016.[6] In addition, as part of the 2016 South Coast AQMP, SCAQMD is requesting a voluntary bump up reclassification to Serious under the 2012 annual PM2.5 standard. These reclassifications require the area to implement the BACM including TCMs to bring the area into attainment of the 2006 and 2012 PM2.5 standards as expeditiously as practicable.

While there is not a formal U.S. EPA guidance on TCM BACM, U.S. EPA has provided general guidance on the process of identifying measures that constitute BACM for PM2.5 nonattainment areas based on Subpart 1 of Part D of the Clean Air Act. However, the U.S. Court of Appeals upheld a challenge to that interpretation in January 2013, which requested the interpretation to be based on Subpart 4. U.S. EPA responded to that decision in a Federal Register Notice on March 23, 2015, with a proposed rule for implementing fine particulate matter (PM2.5) national ambient air quality standards (NAAQS). The rule was finalized and published in the Federal Register on August 24, 2016. The final rule establishes the following four-step PM2.5 BACM/BACT selection process mirroring the four-step PM10 BACM/BACT selection process for PM10 Serious nonattainment areas:

> *Step 1: Develop a comprehensive inventory of sources and source categories of directly emitted PM2.5 and PM2.5 precursors.*
>
> *Step 2: Identify potential control measures.*
>
> *Step 3: Determine whether an available control measure or technology is technologically feasible.*

[6] Federal Register, Vol. 81, No. 8, January 13, 2016.

Step 4: Determine whether an available control technology or measure is economically feasible..[7]

U.S. EPA's final PM2.5 rule clarifies that BACM is "Generally Independent" of attainment to reaffirm U.S. EPA's past interpretation of BACM as "those measures that best control sources' emissions without regard to whether such measures are needed for the purposes of attainment of the relevant NAAQS." In other words, "the test for BACM puts a 'greater emphasis on the merits of the measure or technology alone,' rather than on 'flexibility in considering other factors,' in contrast to the approach for determining RACM." BACM "should represent a more stringent and potentially more costly level of control" compared with RACM. U.S. EPA expects the BACM analysis, at least, to examine all measures analyzed in the RACM analysis. In addition, BACM should include control measures "not previously considered RACM for the area, as well as additional measures not previously evaluated in the RACM/RACT analysis." To identify new measures for consideration in a BACM analysis, U.S. EPA recommends evaluation of both existing and potential control measures from a wide range of sources such as other PM nonattainment areas throughout the country as well as summaries of control measures developed by regional planning organizations, state and local air quality consortiums.

Additional guidance on issues to be considered in a TCM BACM demonstration can be found in U.S. EPA's proposed approval of San Joaquin Valley's Serious Area PM2.5 Plan.[8] The issues highlighted in the TCM review provide insight into U.S. EPA's views about TCM BACM requirements under Subpart 4. The U.S. EPA's review of Local Jurisdiction Transportation Control Measures (TCMs) in the submitted San Joaquin Valley SIP notes the on-going implementation of a broad range of TCMs and the Air District's "long history of adopting and then enhancing programs to reduce emissions from on-road vehicles by reducing vehicle miles traveled, vehicle trips and/or congestion." U.S. EPA also highlights the San Joaquin Valley metropolitan planning organizations' (MPOs) efforts to evaluate and prioritize emission reductions in Congestion Mitigation and Air Quality Improvement (CMAQ) scoring criteria. The aggregate funding allocated for TCMs identified in the eight 2015 FTIPs in the San Joaquin Valley area was noted for:

- Improved Transit
- Traffic Flow Improvements
- Park and Ride Lots
- Ridesharing/Trip Reduction Programs
- Bicycle/Pedestrian Facilities

The review concluded with a finding that:

[San Joaquin Valley] 2015 PM2.5 Plan provides for the implementation of BACM … for sources of direct PM2.5 and indirect PM2.5 precursors as expeditiously as practicable, in accordance with CAA sections 189(b))1)(B) and 188 (e).

[7] https://www.gpo.gov/fdsys/pkg/FR-2016-08-24/pdf/2016-18768.pdf

[8] Federal Register, Vol. 81, No. 26, February 9, 2016

Based on the U.S. EPA guidance outlined above, the following steps were used to determine BACM for TCMs in the South Coast Air Basin:

1) A review of the on-going implementation of TCMs in the South Coast;
2) A review of TCMs implemented in other moderate and serious PM2.5 and serious PM10 nonattainment areas throughout the country;
3) A review of TCM measures that are not implemented in the SCAG region and the justifications for not implementing them; and
4) TCM BACM conclusions.

Review of On-Going Implementation of TCMs in the South Coast Air Basin

In the South Coast Air Basin, TCM projects and programs are defined in the following three main categories per the applicable SIPs as documented in the SCAG's Final 2015 FTIP Guidelines:

- Transit, Intermodal Transfer Facilities, and Non-motorized Transportation Mode Facilities
- High Occupancy Vehicle (HOV) Lanes, High Occupancy Toll (HOT) Lanes, and their pricing alternatives
- Information-based Transportation Strategies

TCM Selection and TCM Rollover Process – TCMs in the South Coast Air Basin are developed[9] through a continuous and exhaustive process. Projects identified as TCMs in the RTP/SCS are tracked as they get programmed in the FTIP. Only projects that have money programmed for right-of-way and/or construction in the first two years of the FTIP are considered TCMs subject to the Clean Air Act timely implementation requirements. Approximately every two years, as the FTIP is updated, additional TCMs will be added to the South Coast AQMPs/SIPs based on the new FTIP and the FTIP Guidelines. The "rollover" of TCMs updates the AQMPs/SIPs to include new projects in addition to ongoing projects from previous FTIPs. The "rollover" is monitored for adherence to the schedule established in the FTIP at the time a project is identified as a committed TCM. The identification of TCMs from the FTIP is agreed upon by both SCAG and the appropriate CTCs. As the FTIP gets adopted every two years, new TCMs emerge and completed TCMs get removed. This rollover process was included in the 1994 SIP and approved by the U.S. EPA. The rollover process has been refined in the FTIP Guidelines adopted with every FTIP. The rollover process has worked remarkably well, and has resulted in hundreds of TCMs being implemented/constructed. Thus, the rollover process produces more than RACM would produce and

[9] *Rollover History: In the 1979 SIP, there were six TCMs adopted, most of which relied on Federal funding allocated or being allocated. However, in 1980, with the change in federal administration, all the federal funds were removed. So in the new 1982 SIP, the 1979 measures were withdrawn, and new measures were adopted and subsequently approved by EPA. However, a lawsuit challenged the 1982 SIP and a court agreed and threw out the 1982 SIP, including the TCMs. The result was the 1979 TCMs were still operative, and until 1994 those TCMs had to be reported on for timely implementation, which took much creativity. New AQMPs were developed and adopted, but lawsuits resulted in EPA having to do a Federal Implementation Plan (FIP). While the FIP was under development, the 1990 CAA amendments were passed. A lawsuit challenged the FIP process as being superseded by the new CAA amendments. However a judge denied the challenge. Congress subsequently removed that FIP.*

As the 1993 SIP was being developed, all the parties desired a process that would be comprehensive and fully funded. Thus the rollover process, with its guaranteed funding in the first two years of the TIP, was agreed upon and included in the SIP that was approved by EPA in 1994

meets BACM. This ensures that RTP/SCS projects that are potential TCMs will, through the rollover process, eventually become committed TCMs.

To illustrate the extraordinary past and future impact of the TCM rollover process, Table 7 summarizes the magnitude of major TCM infrastructure in 2012 and 2040, the base and planning horizon years of the 2016 RTP/SCS, respectively, in the SCAG region of which almost all are located within the South Coast Air Basin. For illustrative purposes, the values are interpolated for 2020 which is very close to the attainment year of the 2006 PM2.5 standards under the Serious nonattainment classification. It shows over the 28-year forecast period, high occupancy lane miles will more than double, transit bus operations will increase by more than 140,000 miles, rapid/express bus operations will increase by almost 30,000 miles and transit rail miles and bike lane miles will more than triple.

TABLE 7. Magnitude of Major TCM Infrastructure in SCAG Region 2012–2040

TCM Infrastructure Indicator	Base Year (2012)	Interim Year (2020)	Horizon Year (2040)	2012–2040 Increase	
				#	%
HOV, HOT, and Toll Lanes (lane miles)	1,256	1,543	2,583	1,327	106%
Regular Transit Bus (operation miles[10])	494,422	531,194	635,540	141,118	29%
Bus Rapid and Express Bus (operation miles)	72,537	79,985	102,124	29,587	41%
Transit Rail (operation miles)	33,836	46,961	106,568	72,732	215%
Bikeway (Class 1-4) (miles)	3,913	5,478	12,700	8,787	225%

TCM Funding – Funding for TCMs traditionally depended mostly on federal & state sources. But with gas tax revenues declining and both federal and state budgets tightly constrained, local agencies in California asked the state legislature for permission to go to the voters in each county for a ½ percent sales tax for transportation. This required a 2/3 voter approval in each county, and all four counties in the South Coast Air Basin won approval. Extensions were subsequently approved in three counties: Orange County's Measure M sunsets in 2041, Riverside's Measure A sunsets in 2039 and San Bernardino County's Measure I sunsets in 2040; Los Angeles County has approved three ½ percent sales tax measures: Propositions A & C are permanent and Measure R sunsets in 2039.

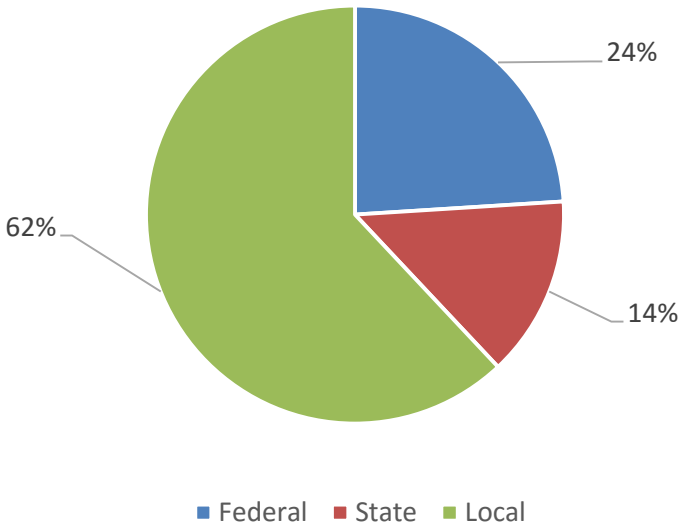
As a result of these local sales measures, the mix of revenues in the current 2015 FTIP is $19.7 billion local (62 percent), $4.4 billion state (14 percent), and $7.7 billion federal (24 percent) (see Figure 1); while in

[10] A transit route's operations miles or service miles is calculated by the number of transit services during a day times the route length.

the recently adopted 2016-2040 RTP/SCS, the mix is $254.7 billion local (71.5 percent) (of which 52 percent is local sales tax), $63.8 billion state (17.9 percent), and $37.7 billion federal (10.6 percent).

These local revenues fund mostly capital expenditures for TCM projects. For example, in the current 2015 FTIP, HOV projects receive $2.8 billion, toll facilities $1.8 billion, transit $7.2 billion, bicycle/pedestrian $396 million, and ITS $226 million; and in the 2016 RTP/SCS, HOV projects receive $15.5 billion, toll facilities $8.4 billion, and transit $56.1 billion. HOV projects being funded include widening of I-5, I-405, I-10, I-215, I-605, SR-110, and SR-91. Transit projects include the Gold Line extension, the Exposition Line extension, the new Crenshaw Line, the East LA extension, the Regional Connector, and the Purple Line subway extension.

Figure 1. Summary of 2015 FTIP by Funding Source



Extraordinary efforts were undertaken to pass sales taxes for transportation in each county (even after some did not reach the 2/3 necessary for approval, all subsequently met the approval threshold) and were successful. The effort to organize and pass these local sales taxes goes well beyond what could have been expected and provides funding for TCMs which could not have been built without these local efforts. These efforts are certainly BACM, not just in revenue raised but without which, none of the major TCMs in transit rail, HOV, etc. could have been financed and constructed.

In summary, SCAG's TCM selection process and commitments satisfy the latest criteria U.S. EPA used to evaluate San Joaquin Valley's Serious PM2.5 TCM BACM commitments. That evaluation focused on three areas of performance:

- Adoption and enhancement of programs that reduce trips, travel and/or congestion – SCAG's rollover process ensures steady TCM infrastructure improvements through 2040 that will provide these reductions.
- Adoption of a standardized program to select cost-effective control measures – SCAG's FTIP Guidelines emphasize requirements for County assessments of control measure cost-effectiveness in TCM development and selection.
- Presentation of FTIP funding commitments – SCAG's County specific sales tax commitments fund more than 50 percent of the capital for TCM projects and the distribution of those funds within the RTP/SCS and FTIP programs is well documented in the SIP.

Another area of performance highlighted in U.S. EPA's draft approval of San Joaquin Valley's Serious Area PM2.5 Plan (not in the assessment of TCMs but for the overall Plan) is public participation in Plan development and approval. SCAG's Public Participation Plan ensures extensive public outreach, open houses, web access, opportunity for comment and public participation in TCM development and selection (http://www.scag.ca.gov/participate/Pages/PublicParticipationPlan.aspx).

Review of TCMs Implemented in Other Moderate and Serious PM2.5 and Serious PM10 Nonattainment Areas

SCAG performed a comprehensive review of available TCMs in California, as well as in other states. The review encompassed SIPs for all Moderate and Serious PM2.5 nonattainment areas and all Serious PM10 nonattainment areas. SCAG also reexamined the RACMs identified in the Section III RACM Analysis and searched the literature to identify new SIPs implemented since the last RACM analysis. A list of the SIPs reviewed is presented in Table 8.

In addition, SCAG's review considered TCMs discussed and reviewed at numerous TCWG meetings as part of the 2015 FTIP, 2016–2040 RTP/SCS,[11] and 2016 AQMP development. Finally, SCAG considered information from the following sources:

- CAA Section 108(f)(1)(A);
- Section III RACM Analysis;
- RTP/FTIP Updates; and
- Interagency Consultation (TCWG).
- Transportation Committee, Energy and Environment Committee, and Active Transportation Working Group meeting materials and input

The review found that no new SIPs had been submitted since the completion of the RACM analysis presented in Section III, which means no new TCMs were identified for consideration from control

[11] Regional Transportation Plan/Sustainable Communities Strategy

programs outside of the SCAG region. Similarly, the review found no evidence of new TCMs being discussed in public meetings within the SCAG region.

Given the importance of funding decisions highlighted in the proposed approval of San Joaquin Valley's Serious Area PM2.5 Plan, the SIPs listed in Table 8 were reviewed to identify information on TCM financial commitments and funding decisions. That review found little information on funding decisions or commitments for specific TCMs in most SIPs. Of the 33 PM nonattainment areas reviewed, only three SIPs include TCM commitments; and only two of the three SIPs include information on funding commitments for TCMs. San Joaquin Valley's plan documented efforts by the eight Valley MPOs to select the most cost effective measures for funding in the FTIP process. It also displayed the funding allocated valley-wide in the 2015 FTIPs for a sample of TCM categories: Improved Transit; High Occupancy Vehicle Lanes; Traffic Flow Improvements; Park and Ride lots; Ridesharing/Trip Reduction Programs; Bicycle/Pedestrian Facilities.

TABLE 8. Moderate and Serious PM2.5 and Serious PM10 Nonattainment Area SIPs Reviewed

Nonattainment Area	Standard and Area Designation				TCMs Included in SIP & Level of Detail
	PM2.5			PM10	
	1997	2006	2012[a]	1987	
Allegheny County, PA			Moderate		N/A
Chico, CA		Moderate			No
Cleveland, OH			Moderate		N/A
Coachella Valley, CA				Serious	No
Delaware County, PA			Moderate		N/A
East Kern Co, CA				Serious	No
Fairbanks, AK		Moderate			Yes, limited activity data but no emissions or funding estimates
Imperial County, CA		Moderate	Moderate		No
Imperial Valley, CA				Serious	No
Klamath Falls, OR		Moderate			No
Knoxville, TN	Moderate				No
Knoxville-Sevierville-La Follette, TN		Moderate			No
Lebanon County, PA			Moderate		N/A
Libby, MT	Moderate				No
Liberty-Clairton, PA	Moderate	Moderate			No, but evaluated under RACM
Logan, UT-ID		Moderate			No
Los Angeles-South Coast Air Basin, CA	Moderate	Serious	Moderate		N/A
Louisville, KY-IN	Moderate				No
Nogales, AZ		Moderate			No
Oakridge, OR		Moderate			No
Owens Valley, CA				Serious	No
Phoenix, AZ				Serious	No

TABLE 8. Moderate and Serious PM2.5 and Serious PM10 Nonattainment Area SIPs Reviewed (CONCLUDED)

Nonattainment Area	Standard and Area Designation				TCMs Included in SIP & Level of Detail
	PM2.5			PM10	
	1997	2006	2012[a]	1987	
Pittsburgh-Beaver Valley, PA		Moderate			No
Plumas County, CA			Moderate		N/A
Provo, UT		Moderate			No
Sacramento, CA		Moderate			No
Salt Lake City, UT		Moderate			No
San Francisco Bay Area, CA		Moderate			Yes, multiple categories, funding data provided in two phases (2012 & 2020)
San Joaquin Valley, CA	Serious	Serious	Moderate		Yes, 2015 funding in several categories
St. Louis, MO-IL	Moderate				No
Washoe Co, NV				Serious	Not in PM SIP (idling reductions in State Mobile Sources SIP)
West Central Pinal, AZ		Moderate			No
West Silver Valley, ID			Moderate		N/A

[a] Area designations for most areas of the United States under the 2012 Annual PM2.5 standards became effective on April 15, 2015. Since areas have five years from designation to prepare a SIP, plans for violation of the 2012 annual PM2.5 standard in these areas have not yet been prepared and submitted to U.S. EPA.

Source: U.S. EPA, http://www3.epa.gov/airquality/greenbook/

San Francisco's Moderate PM2.5 Plan lists the funding commitments for individual TCMs. Funding levels for 2012 and 2020 are presented for improvements in the 17 categories of measures. Examples include: local and area wide bus service; local and regional rail service; freeway and arterial operations strategies; transit efficiency and use strategies; bay area express lane network; voluntary employer based ridesharing; bicycle access and facilities improvements; and parking policies to reduce motor vehicle travel. Overall, funding commitments were provided for over 80 separate measures. Efforts to select the most cost effective measures in the FTIP process were also highlighted.

Because the horizon years are different between the SIP of San Joaquin Valley (the only other Serious nonattainment area under the 2006 PM2.5 standard) and SCAG's RTP/FTIP, a comparison of TCM funding has been done only for the year 2015. The analysis shows that the SCAG region committed nearly nine times as much of TCM funding than San Joaquin Valley ($12.43 billion vs. $1.44 billion). Since the SCAG region is a more densely populated than the San Joaquin Valley region, a per capita comparison is more meaningful. Using that metric, the SCAG region TCM funding commitment is more than double the commitment under the San Joaquin Valley PM2.5 SIP ($762 per capita vs. $332 per capita).

In summary, the review of other Moderate and Serious PM2.5 and Serious PM10 SIPs found that TCM commitments are rarely made in those areas; Compared to the other Serious nonattainment area under the 2006 PM2.5 standard, the South Coast region has committed much greater level of funding for TCMs in terms of total funding and funding per capita.

Review of Candidate Measures Not Implemented in the South Coast Air Basin

SCAG's review identified 24 candidate RACM measures in Attachment B that are not implemented within the SCAG region because of reasoned justifications. Some of the listed measures have the same title, however, while the category title is the same, the methodology used to achieve an emission reduction is different (e.g., traffic flow improvements can impose different speed limits on different facilities within the transportation network). A list of those measures and the justifications for not implementing them are presented in Table 9. These measures are candidates for BACM. To aid in review of the justifications, each measure is categorized by the cause cited for their exclusion including:

- No Authority
- No or Non-quantifiable Emission Reduction Benefits
- Not Feasible
- Not Cost-Effective

Reasoned Justifications for Excluded Measures – SCAG reviewed the RACM exclusion justifications listed for each of the measures listed in Table 9. That review considered the technical and economic feasibility tests that U.S. EPA specified for candidate RACM and BACM measures. Presented below is a review of each of the exclusion categories.

No Authority – SCAG lacks the authority to implement the twelve (12) measures in this category. Lack of authority satisfies the technical infeasibility test for selecting RACM/BACM measures. A review of the SIPs addressing PM2.5 controls showed that lack of authority was commonly cited as a basis for not implementing candidate control measures. These measures do not constitute BACM.

No or Non-quantifiable Emission Reduction Benefits – SCAG's RACM analysis determined that no or non-quantifiable emission benefits would result from the five (5) measures in this category. Since the key determinant of a TCM is the quantified emission benefit, these measures which did not constitute RACM cannot constitute BACM.

Not Feasible – Infeasibility justification for this category was cited for five (5) separate measures. Since these four measures are not feasible, they cannot constitute BACM.

Not Cost-Effective – Not cost-effective justification for this category was cited for two (2) separate measures. Measures that are not cost-effective cannot constitute BACM.

In summary, the 24 candidate RACM measures in Attachment B that are not implemented within the South Coast region are not TCM BACM.

Conclusion

This analysis clearly demonstrates that the TCM projects being implemented in the South Coast Air Basin constitute BACM.

- The South Coast region has been implementing a much more robust TCM selection process, has committed a much greater level of funding for TCMs in terms of total funding and funding per capita, has substantially increased and will continue to dramatically increase the TCM infrastructure than other PM2.5 nonattainment areas.
- No new TCMs were identified for consideration from TCM programs outside of the South Coast region.
- The further evaluation of the exclusion justifications for the 24 measures presented in the RACM analysis re-confirmed that they cannot be implemented because there is no authority to implement, no or non-quantifiable emission reduction benefits, or it is not feasible, or not cost-effective.
- Finally, a review of the FTIP and the continuous TCM reassessment/rollover process demonstrates that SCAG and local transportation agencies conduct a unique, court approved TCM selection process that is unmatched in other PM nonattainment areas. The fact that this program fails to select/fund the listed infeasible measures demonstrates their economic infeasibility and thus exclusion from BACM.

TABLE 9. Candidate TCMs Not Implemented in SCAG RACM Analysis							
Section 108(f) Type	**Section 108(f) Description**	**Measure No.**	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**BACM Exclusion Category**
1	Improved Transit	1.7	Free transit during special events	Require free transit during selected special events to reduce event-related congestion and associated emission increases.	No *(The Mobile Source Air Pollution Reduction Review Committee has been co-funding free event center shuttle service demonstration projects)*	The Legislature significantly reduced authority of SCAQMD to implement indirect source control measures through revisions to the Health & Safety Code (HSC 40717.8). Transit agencies should decide individually whether this measure is economically feasible for them.	No Authority
1	Improved Transit	1.15	Maglev	Construct regional low-speed magnetic levitation transit	No	The region is already being serviced by light rail; Not Cost-effective.	Not Cost-Effective

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Section 108(f) Type	**Section 108(f) Description**	**Measure No.**	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**BACM Exclusion Category**
3	Employer Transportation Management Plans (TMPs)	3.7	Merchant transportation incentives	Implement "non-work" related trip reduction ordinances requiring merchants to offer customers mode shift travel incentives such as free bus passes and requiring owners/managers/developers of large retail establishments to provide facilities for non-motorized modes.	No	Requires State legislation.	No Authority
3	Employer TMPs	3.12	Income Tax Credit to Telecommuters	Provide tax relief to employees telecommuting.	No	Requires State legislation.	No Authority
5	Traffic Flow Improvements	5.12	Ban left turns	Banning all left turns would stop the creation of bottlenecks although slightly increase travel distances.	No	Left turns are not allowed in some heavy-traffic streets. No clear demonstration of emission reduction benefits.	No or Non-quantifiable Emission Reduction Benefits

TABLE 9. Candidate TCMs Not Implemented in SCAG RACM Analysis							
Section 108(f) Type	**Section 108(f) Description**	**Measure No.**	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**BACM Exclusion Category**
5	Traffic Flow Improvements	5.22	55 mph speed limit during ozone season	Self-explanatory	No	Reductions in freeway speeds are governed by California Vehicle Code 22354, which authorizes Caltrans to lower speeds after doing an engineering and traffic survey, which shows that the legislatively set maximum speed of 65 mph is more than is reasonable or safe. No consideration of emissions is contemplated under this statute. This measure is not feasible until the statute is changed.	No Authority
5	Traffic Flow Improvements	5.23	Require 40 mph speed limit on all facilities	Self-explanatory.	No	California Vehicle Code Sections 22357 and 22358 mandate a methodology for setting speed limits for local areas. This measure is not feasible until the statute is changed.	No Authority

TABLE 9. Candidate TCMs Not Implemented in SCAG RACM Analysis							
Section 108(f) Type	**Section 108(f) Description**	**Measure No.**	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**BACM Exclusion Category**
5	Traffic Flow Improvements	5.24	Require lower speeds during peak periods	Self-explanatory.	No	California Vehicle Code Sections 22357 and 22358 mandate methodology for setting speed limits for local areas. This measure is not feasible until the statute is changed.	No Authority
7	Vehicle Use Restrictions	7.4	Adjust school hours so they do not coincide with peak traffic periods and ozone seasons	Measure to reduce travel during peak periods and ozone-contributing periods in the early morning.	No	School hours are dictated by many variables, including overcrowding and year-round schooling. This measure is not technically feasible.	Not Feasible
7	Vehicle Use Restrictions	7.6	Increase parking fees	Reduce driving by limiting parking through pricing measures.	No	Attorney General ruled SCAQMD lacks authority to implement this measure.	No Authority

TABLE 9. Candidate TCMs Not Implemented in SCAG RACM Analysis							
Section 108(f) Type	**Section 108(f) Description**	**Measure No.**	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**BACM Exclusion Category**
7	Vehicle Use Restrictions	7.9	Limit the number of parking spaces at commercial airlines to support mass transit	Reduce airport travel by limits on parking at airports.	No	Regulatory agencies do not have the legal authority to make local land use decisions. It is at the discretion of the regional or local airport authority to make local land use decisions pertaining to airports. Additionally, it is necessary to have significant mass transit available at airports before this measure can be implemented.	No Authority
7	Vehicle Use Restrictions	7.10	No Central Business District (CBD) vehicles unless LEV or alt fuel or electric	Define high-use area and ticket any vehicles present unless they are low-emitting, alternative-fueled or electric.	No	The Legislature significantly reduced authority to implement Indirect Source Control Measures through revisions to the Health & Safety Code (40717.6, 40717.8, and 40717.9).	No Authority
7	Vehicle Use Restrictions	7.14	Cash incentives to foster jobs/housing balance	Specific to locality – encouraged by California Clean Air Plan.	No	No dedicated source of funding for this measure.	Not Feasible

TABLE 9. Candidate TCMs Not Implemented in SCAG RACM Analysis							
Section 108(f) Type	**Section 108(f) Description**	**Measure No.**	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**BACM Exclusion Category**
9	Non-Motorized Road Use	9.6	Free bikes	Provide free bikes in the manner of Boulder, CO. Simple utilitarian bikes that can be used throughout the metro area and dropped off at destination for use by anyone desiring use.	No	Bike share is being implemented in the South Coast region; free bikes are not cost-effective; In addition, evidence suggests that bicycle theft is a problem in other programs.	Not Cost-Effective
9	Non-Motorized Road Use	9.9	Use condemned dirt roads for bike trails	Self-explanatory.	No	Not applicable because there are no condemned dirt roads in the region.	Not Feasible
11	Extended Idle Control Programs	11.1	Limit excessive car dealership vehicle starts	Require car dealers to limit the starting of vehicles for sale on their lot(s) to once every two weeks. Presently, a number of new and used car dealers start their vehicles daily to avoid battery failure and assure smooth start-ups for customer test drives.	No	This measure was investigated by the SCAQMD and it was determined that, in contrast to colder climates where vehicles are started on a daily basis, vehicles in the South Coast are started much less frequently. No clear demonstration of emission reduction benefits.	No or Non-quantifiable Emission Reduction Benefits

TABLE 9. Candidate TCMs Not Implemented in SCAG RACM Analysis							
Section 108(f) Type	**Section 108(f) Description**	**Measure No.**	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**BACM Exclusion Category**
11	Extended Idle Control Programs	11.3	Turn off engines while stalled in traffic	Public outreach or police-enforced program.	No	This measure raises safety and congestion concerns. No clear demonstration of emission reduction benefits.	No or Non-quantifiable Emission Reduction Benefits
11	Extended Idle Control Programs	11.4	Outlaw idling in parking lots	Self-explanatory and police-enforced program.	No	No clear demonstration of emission reduction benefits.	Not or Non-quantifiable Emission Reduction Benefits
11	Extended Idle Control Programs	11.5	Reduce idling at drive-throughs; ban drive-throughs	Mandate no idling or do not allow drive-through windows during ozone season.	No	No clear demonstration of emission reduction benefits.	No or Non-quantifiable Emission Reduction Benefits
14	SOV Reduction Programs	14.9	Increase State gas tax	Self-explanatory.	No	Need State legislation.	No Authority
14	SOV Reduction Programs	14.10	Pay-As-You-Drive Insurance	Self-explanatory.	No	Need State legislation. No clear demonstration of emission reduction benefits and does not advance attainment date.	No Authority

TABLE 9. Candidate TCMs Not Implemented in SCAG RACM Analysis							
Section 108(f) Type	**Section 108(f) Description**	**Measure No.**	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**BACM Exclusion Category**
16	Voluntary Scrappage Programs	16.3	Demolish impounded vehicles that are high emitters	Self-explanatory.	No	SCAQMD Rule 1610 issues mobile source emission reduction credits in exchange for the scrapping of old, high emitting vehicles. No clear demonstration of emission reduction benefits due to small number of impounded old vehicles.	No or Non-quantifiable Emission Reduction
16	Voluntary Scrappage Programs	16.4	Do whatever is necessary to allow cities to remove the engines of high emitting vehicles (pre-1980) that are abandoned and to be auctioned	Self-explanatory.	No	SCAQMD Rule 1610 issues mobile source emission reduction credits in exchange for the scrapping of old, high emitting vehicles. No clear demonstration of emission reduction benefits due to small number of abandoned or auctioned old vehicles.	No or Non-quantifiable Emission Reduction

TABLE 9. Candidate TCMs Not Implemented in SCAG RACM Analysis							
Section 108(f) Type	**Section 108(f) Description**	**Measure No.**	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**BACM Exclusion Category**
17	Other	17.2	Promote business closures on high ozone days	Non-employer-based strategy to require local business to close on bad air quality days, thereby reducing travel.	No	No authority to implement; not economically feasible	No Authority

Attachment A: Committed Transportation Control Measures (TCMs)

Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
AZUSA	LAF5309	CITY OF AZUSA TRAFFIC MANAGEMENT SYSTEM. THIS PROJECT WILL UPGRADE TRAFFIC SIGNALS AT 43 INTERSECTIONS IN THE CITY OF AZUSA. THE PROJECT WILL FUND THE DESIGN AND CONSTRUCTION/IMPLEMENTATION OF CONTROLLERS, WIRING, DETECTION, CONDUIT, FIBER OPTIC, COUNTDOWN PEDESTRIAN HEADS, SIGNALS, VIDEO DETECTION, CCTV CAMERAS AND TRAFFIC CONTROL AND MONITORING UPGRADES AT THE 43 INTERSECTIONS.	12/1/2017
BALDWIN PARK	LA0G1140	COMPLETE STREET IMPROVEMENTS ALONG MAINE AVE. FROM LOS ANGELES ST. TO ARROW HWY. IMPROVEMENTS INVOLVE THE RECONFIGURATION OF THE CORRIDOR BY MEANS OF ROAD DIET. PROJECT COMPONENTS INCLUDE (1) CLASS II BIKE WAYS (2) ROAD DIET FROM 4 TRAVEL LANES TO 2 LANES (3) SHARE LEFT TURN LANES (4) CURB EXTENSION AT 13 INTERSECTIONS (5) SIDEWALK EXTENSION (6) HIGH VISIBILITY CROSSWALKS (7) REPLACING PED SIGNALS AT 5 INTERSECTIONS (8) PED LIGHTING AND (9) ADA IMPROVEMENTS	10/1/2018
BALDWIN PARK	LA0G1178	EXPANSION OF THE CITY'S CIRCULATOR SHUTTLE TO CONNECT TO BUSINESS AND MEDICAL COMMUTERS FROM THE BALDWIN PARK TRANSIT CENTER AND METROLINK STATION TO THE CITY'S MAIN BUSINESS CENTERS. PURCHASE OF 2 CNG BUSES.	12/31/2018
BALDWIN PARK	LAF3507	SOUTH BALDWIN PARK COMMUTER BIKEWAY PROJECT. CONSTRUCT 3-MILE COMMUTER CLASS I BIKE PATH ALONG SAN GABRIEL RIVER AND WALNUT CREEK CONNECTING TO MAJOR EMPLOYMENT CENTERS ON BALDWIN PARK BLVD.	6/30/2018
BURBANK	LA0G1211	THIS PROJECT WOULD PROVIDE TRAFFIC SIGNAL UPGRADES, SIGNAL CONTROLLER UPGRADES, TIMING PLANS, AND TRAFFIC SIGNAL SYSTEM MONITORING TO INTERSECTIONS ON ARTERIAL STREETS WITHIN 1 MILE OF THE INTERSTATE 5 CORRIDOR. SCOPE INCLUDES AUGMENTING BURBANK TMC STAFF FOR MONITORING SIGNAL COORDINATION AND POLICE TRAFFIC CONTROL DURING THE LIFE OF THE CONSTRUCTION PROJECT.	7/30/2019
BURBANK	LA0G916	MEASURE R ARROYO VERDUGO HIGHWAY OPERATIONAL IMPROVEMENTS ALONG SR-134 CORRIDOR. INCLUDES APPROXIMATELY 20+ INTERSECTIONS (NON-CONSECUTIVE) AND INCLUDES CCTV, SIGNAL/TURN-SIGNAL IMPROVEMENTS, FIBER COMMUNICATIONS AND VIDEO DETECTION.	12/1/2016
BURBANK	LF1502	SAN FERNANDO BIKEWAY. IMPLEMENT A CLASS I BIKEWAY ALONG SAN FERNANDO BLVD, VICTORY PLACE AND BURBANK WESTERN CHANNEL TO COMPLETE THE BURBANK LEG OF A 12 MILE BIKEWAY.	10/30/2019

Attachment A: Committed Transportation Control Measures (TCMs)

Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
BURBANK	LAF3313	BURBANK-GLENDALE TRAFFIC SYSTEM COORDINATION. REPLACE TYPE 170 TRAFFIC SIGNAL CONTROLLERS WITH TYPE 2070 & ASSOCIATED COMMUNICATIONS EQUIPMENT IN BURBANK & GLENDALE & INSTALL SYSTEM DETECTION ON GLENOAKS BL & SAN FERNANDO BL. CITY OF BURBANK AND CITY OF GLENDALE ALONG GLENOAKS BOULEVARD BETWEEN BUENA VISTA STREET IN BURBANK AND GENEVA STREET IN GLENDALE, AND ALONG SAN FERNANDOM BOULEVARD BETWEEN OLIVE AVENUE IN BURBANK AND GLENDALE AVENUE IN GLENDALE (SIG SYN - APROX. 65 SIGNALS).	12/1/2017
BURBANK GLENDALE PASADENA AIRPORT	LA000789A	BURBANK-GLENDALE-PASADENA AIRPORT INTERMODAL GROUND ACCESS LINK: CONSTRUCTION OF A LINK BETWEEN THE AIRPORT AND OTHER TRANSPORTATION SERVICES, INCLUDING CONSTRUCTION OF A NEW METROLINK STATION AT HOLLYWOOD WAY/SAN FERNANDO ROAD ON THE ANTELOPE VALLEY LINE AND A LINK BETWEEN THE AIRPORT AND OTHER TRANSPORTATION SERVICES. (CONSTRUCTION OF LA000789)	3/31/2017
CALABASAS	LA0G606	THIS PROJECT WOULD REDESIGN THE INTERSECTION AT THE PARKWAY CALABASAS ON/OFF RAMP FOR THE US101. PRESENTLY, TRAFFIC QUEUES OBSTRUCT THROUGH TRAFFIC ALONG CALABASAS ROAD, AND THERE ARE NO PEDESTRIAN IMPROVEMENTS. THIS PROJECT WOULD WIDEN CALABASAS ROAD FROM MUREAU ROAD TO THE PARKWAY CALABASAS OFFRAMP AND PROVIDE BIKE LANES AND SIDEWALKS.	7/1/2016
CALTRANS	LA000358	ROUTE 005: --- FROM ROUTE 134 TO ROUTE 170 HOV LANES (8 TO 10 LANES) (CFP 346)(2001 CFP 8355). (EA# 12180, 12181,12182+12183=1218W,12184, 13350 PPNO 0142F,151E,3985,3986,3987) SAFETEA LU # 570. CONSTRUCT MODIFIED IC @ I-5 EMPIRE AVE, AUX LNS NB & SB BETWEEN BURBANK BLVD & EMPIRE AVE; AND MODIFY EXISTING STRUCTURES. ADD AUXILIARY LANE BETWEEN ALAMEDA AND OLIVE FROM PM 28.43 TO PM 29.78	6/30/2019
CALTRANS	LA000548	ROUTE 10: FROM PUENTE TO CITRUS HOV LANES FROM 8 TO 10 LANES & SOUNDWALLS (C-ISTEA 77720, 95 STIP-IIP) (EA# 117080,11172, 1170U, PPNO# 0309N, 0309S)-(USE TOLL CREDITS AS LOCAL MATCH).	10/31/2018
CALTRANS	LA0B875	ROUTE 10: HOV LANES AND PAVEMENT REBHAB FROM CITRUS TO ROUTE 57 - (EA# 11934+31120 = 1193U, PPNO# 0310B+4812=0310B).USE TOLL CREDIT AS LOCAL MATCH	1/4/2018

Attachment A: Committed Transportation Control Measures (TCMs)

Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
CALTRANS	LA0D73	ROUTE 5: LA MIRADA, NORWALK & SANTA FE SPRINGS-ORANGE CO LINE TO RTE 605 JUNCTION. WIDEN FOR HOV & MIXED FLOW LNS, RECONSTRUCT VALLEY VIEW (EA 2159A0 = 21591, 21592, 21593, 21594, 21595, 31320 PPNO 2808 = 4153, 2808, 4154, 4155, 4156, 4841). TCRP#42.2&42.1 (USE TOLL CREDITS AS LOCAL MATCH)	9/12/2019
CALTRANS	LA0G440	ROUTE 005: **PHASE 2**, FROM SR-14 TO PARKER ROAD, CONSTRUCT HOV/HOT, TRUCK & AUX LANES (EA 2332C, PPNO 3189A & EA 2332E PPNO 3189B), SAFTETEA-LU#465. PE & RW $ ARE PROGRAMMED FOR EA 2332E ONLY.	6/11/2020
CARSON, CITY OF	LA0G1130	ACTIVE TRANSPORTATION PROGRAM - CITY-WIDE BIKE AND PEDESTRIAN IMPROVEMENTS - THE INFRASTRUCTURE COMPONENT INCLUDES A CLASS II BIKE LANE (1.07 MILE) ON SANTA FE AVE, HIGH VISIBILITY CROSSWALKS, COUNTDOWN PEDESTRIAN SIGNALS, CURB RAMPS, ETC. THE NON-INFRASTRUCTURE COMPONENT INCLUDES, EDUCATION, ENCOURAGEMENT, AND ENFORCEMENT PROGRAMMING THAT WILL OCCUR OVER A THREE YEAR PERIOD.	12/31/2018
CARSON, CITY OF	LA0G1179	TRANSFORM MAINTENANCE ROAD TO A NEW 1.3 MILE CLASS I BIKE PED PATH ON DOMINGUEZ CHANNEL. IMPROVEMENTS INCLUDE IMPROVING HORIZONTAL AND VERTICAL GEOMETRY FOR IMPROVED SIGHT DISTANCE, ADDING A GUARDRAIL TO EXISTING BRIDGE, AND IMPROVING THE AVALON BLVD. INTERSECTION SIGNAL.	12/30/2018
COMPTON	LA0G1131	WILMINGTON AVE SAFE STREETS PED/BICYCLE IMPROVEMENTS IS A PED/BIKE SAFETY IMPROVEMENT PROJECT FOR THE COMMUNITIES ADJACENT TO THE WILMINGTON AVENUE TRANSPORTATION CORRIDOR BY DEVELOPING SAFER PED CROSSINGS AND INTERSECTIONS AS WELL AS INSTALLING BIKE PATHS TO IMPROVE PED/BIKE SAFETY. TOTAL LENGTH OF CLASS II BIKE WAY IS 1.09 MILE ALONG WILMINGTON AVE BETWEEN EL SEGUNDO BLVD AND ROSECRANS AVE (0.9 MILE) AND ALONG ROSECRANS AVE BETWEEN WILMINGTON AVE AND COMPTON CREEK (0.19 MILE).	6/30/2018
COVINA	LAF5501	CITY OF COVINA BICYCLE NETWORK-CONSTRUCT CLASS II BIKE LANES ON CITRUS AV (1.8 MI), FRONT ST (0.13 MI), SECOND AV (0.87 MI), BADILLO ST (3.61 MI) AND AZUSA AV (1.53 MILES). THIS PROJECT PROVIDES DIRECT CONNECTIVITY TO A REGIONALLY SIGNIFICANT BIKE-TRANSIT HUB (COVINA METROLINK STATION) IDENTIFIED IN METRO'S 2006 BICYCLE TRANSPORTATION STRATEGIC PLAN. THE PROJECT WILL ALSO PROVIDE SECURE BIKE PARKING AT A LOCATION DETERMINED TO HAVE SIGNIFICANT NEED FOR BICYCLISTS.	4/30/2019
CULVER CITY	LAF3318	TRAFFIC MONITORING AND SURVEILLANCE SYSTEM GAP CLOSURE. DESIGN AND IMPLEMENTATION OF 14 CCTV CAMERA TRAFFIC MONITORING AND SURVEILLANCE SYSTEM, HUB SWITCHING EQUIPMENT AND APPROX. 4 MI OF FIBER OPTIC COMMUNICATION CABLES, AND EOC VIDEO.	12/30/2016

Attachment A: Committed Transportation Control Measures (TCMs)

Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
CULVER CITY	LAF5302	PROJECT WILL UPGRADE THE CURRENT TRAFFIC CONTROL SYSTEM TO AN ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS). PROJECT WILL REPLACE 90 TYPE 170 CONTROLLERS WITH TYPE 2070, ADD ADDITIONAL VEHICLE DETECTORS AT 102 LOCATIONS, AND UPGRADE COMMUNICATIONS EQUIPMENT AND CONNECTION TO FIBER-OPTIC BACKBONE. THE ATCS WILL CONTROL 102 INTERSECTIONS THROUGHOUT CULVER CITY.	3/1/2019
CULVER CITY MUNI BUS LINES	LAF3317	BUS SIGNAL PRIORITY IN CULVER CITY. DESIGN, DEVELOP & INSTALL WIRELESS BUS SIGNAL PRIORITY SYSTEM ON CULVER CITY BUS FLEET AND AT INTERSECTIONS TO INCREASE OPERATION EFFICIENCY & TRAVEL TIME SAVINGS. THE PROJECT INCLUDES INTERSECTIONS WITH TRANSIT SERVICE WITHIN THE BOUNDARY OF THE CITY OF CULVER CITY.	6/30/2017
DIAMOND BAR	LAF7300	DIAMOND BAR ADAPTIVE TRAFFIC CONTROL SYSTEM PROJECT : INSTALLS ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS) AT SIGNALIZED INTERSECTIONS ON DIAMOND BAR BL, GOLDEN SPRINGS DR, AND GRAND AV. (2) PROVIDES FULLY TRAFFIC RESPONSIVE SIGNAL CONTROL SYSTEM BASED ON TRAFFIC DEMANDS.	6/30/2019
DOWNEY	LAF5114	TELEGRAPH ROAD TRAFFIC THROUGHPUT AND SAFETY ENHANCEMENT BETWEEN THE RIO HONDO RIVER CHANNEL TO THE SAN GABRIEL RIVER CHANNEL, A DISTANCE OF 2.2 MILES. PROJECT INVOLVES THE CONSTRUCTION OF RAISED MEDIAN ISLANDS, MINOR WIDENING AT INTERSECTIONS, TRANSIT PRIORITY SYSTEM AND BIKE (2.2 MILES IN LENGTH) AND PEDESTRIAN CIRCULATION IMPROVEMENTS.	6/30/2018
DUARTE	LAF5627	DUARTE GOLD LINE STATION PEDESTRIAN IMPROVEMENTS. THIS PROJECT IS LOCATED IN DUARTE ON DUARTE RD BETWEEN HIGHLAND AV AND BUENA VISTA ST. IT WILL FUND PEDESTRIAN IMPROVEMENTS AROUND THE DUARTE GOLD LINE STATION, CONNECTING THE STATION WITH SURROUNDING LAND USES AND OTHER TRANSIT LINES BY CONSTRUCTING SIDEWALK ON THE NORTH SIDE OF DUARTE RD AND INSTALLING PEDESTRIAN LIGHTING, LANDSCAPING, BENCHES, TRASH RECEPTACLES, CURB RAMPS, PEDESTRIAN CROSSINGS, AND WAYFINDING SIGNS.	6/1/2017

Attachment A: Committed Transportation Control Measures (TCMs)

Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
EL MONTE	LA0G1180	A 0.5 MILE CLASS III BIKE ROUTE WITH SHARROWS, A 0.7 MILE CLASS II GREEN-PAINTED BIKE LANE, AND A 2 MILE A CLASS II BIKE LANE WITH BUFFER PAVEMENT STENCILING. IMPROVEMENTS INCLUDES ROADWAY RESURFACING, HIGHLIGHTING, CROSSWALK IMPROVEMENTS, CAMERA INSTALLATION AT INTERSECTIONS, AND WAYFINDING SIGNAGE. THE PROJECT RUNS 3.2 MILES ALONG SANTA ANITA FROM ELLIOT AVENUE (SOUTH) TO WEST HONDO PARKWAY (NORTH).	12/30/2018
EL MONTE	LAF5705	SHARED PARKING PROGRAM/SMART PARKING DETECTION SYS IN DOWNTOWN AREA; I-10 FWY, EL MONTE BUSWAY, EL MONTE TRANSIT CTR, TRANSIT VILLAGE, AND EL MONTE METROLINK STATION. COMPREHENSIVE PARKING STRATEGY PLAN. INCLUDES SMART PARKING DETECTION SYSTEM AND SHARED PARKING PROGRAM. UTILIZE MOBILE COMMUNICATION DEVICES TO ASSESS THE PARKING AVAILABILITY AT MULTIPLE PARKING LOTS. PROVIDE REAL-TIME INVENTORY OF PARKING SPACES.	6/30/2017
GARDENA	LA0G1164	LINE 1X-EXPAND TRANSIT BUS SERVICE ON I-110 FREEWAY: EXPANSION OF LINE 1X TRANSIT SERVICE TO PROVIDE MID-DAY SERVICE. THIS PROJECT IS FUNDED BY THE METRO'S EXPRESSLANES TOLL REVENUE REINVESTMENT PROGRAM.	6/30/2018
GARDENA	LA0G1175	COMPUTER AUTOMATED DISPATCHING/AUTOMATED VEHICLE LOCATION (CAD/AVL)SOLUTION WITH REAL TIME PASSENGER INFORMATION NETWORK. TOLL CREDIT (TDC) OF $400 WILL BE UTILIZED IN FY15/16 TO MATCH FTA 5307 FUNDS.	12/30/2016
GARDENA	LAF3306	THIS PROJECT WILL ALLOW GMBL TO IMPLEMENT TRANSIT SIGNAL PRIORITY ALONG ITS LINE 2 TO REDUCE TRANSIT TRAVEL TIMES AND ENHANCE ON TIME PERFORMANCE. SCOPE INCLUDES INSTALLATION OF TRAFFIC SIGNAL PRIORITY EQUIPMENT ALONG THE FOLLOWING STREETS IN THE CITY OF GARDENA: VERMONT AVE FROM EL SEGUNDO BLVD TO 182ND ST; WESTERN AVE FROM EL SEGUNDO BLVD TO CASSIDY ST; 182ND ST FROM NORMANDIE AVE TO THE HARBOR GATEWAY TRANSIT CENTER. THIS WILL INCLUDE UP TO 27 LOCATIONS.	6/30/2016
GLENDALE	LA0G1148	SIGNAL INSTALLATION AT VARIOUS LOCATIONS- PACIFIC AVE. TRAFFIC SIGNAL MODIFICATIONS. SIGNAL SYNCH FOR SIX (6) NON-CONSECUTIVE INTERSECTIONS ALONG PACIFIC AVENUE.	6/1/2016
GLENDALE	LA0G809	CONSTRUCTION OF CITYWIDE BIKEWAY FACILITY THIS PROJECT INCLUDES CONSTRUCTION OF CLASS II, AND SHARROWS RECOMMENDED IN THE GLENDALE BICYCLE MASTER PLAN AND INSTALLATION OF CITYWIDE BIKE RACKS, AND OTHER AMENITIES RELATED TO BICYCLE. THE PROJECT LENGTH MAY INCLUDE OVER 12 MILES OF BIKE LANES.	12/1/2018

Attachment A: Committed Transportation Control Measures (TCMs)

Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
HUNTINGTON PARK	LA0G1141	STATE ST. COMPLETE STREET PROJECT BETWEEN RANDOLPH ST AND SANTA ANA ST (1.5 MILE) PROPOSES IMPROVEMENTS THAT WILL HELP IMPROVE STATE STREET'S OVERALL OPERATION AND EFFICIENCY WHILE PROMOTING BICYCLING AND WALKING WITHIN HUNTINGTON PARK.	5/1/2017
INGLEWOOD	LA0G843	MEASURE R ITS PHASE IV - PART A OF A TWO PART ITS IMPROVEMENT PROJECT. DESIGN AND CONSTRUCTION OF APPROXIMATELY 2.7 MILES OF COMMUNICATION INFRASTRUCTURE ALONG LA BREA, FLORENCE, CRENSHAW, MANCHESTER AND CENTINELA. SIGNAL SYNCHRONIZATION (APPROX. 20 LOCATIONS); DESIGN AND CONSTRUCTION OF SYSTEM DETECTION (APPROX. 40 INTERSECTIONS); CHANGEABLE MESSAGE SIGNS (2 LOCATIONS); CCTV CAMERAS (APPROX. 6 LOCATIONS) AND TRAFFIC MANAGEMENT CENTER EQUIPMENT AND COMMUNICATION NETWORK INTEGRATION.	6/30/2016
LAWNDALE	LAF7500	HAWTHORNE BOULEVARD CLASS II BICYCLE LANES: (1) INSTALLS 1.0 MILE OF CLASS 2 BIKE LANES ON HAWTHORNE BLVD FOR BOTH DIRECTIONS. (2) PROVIDES BICYCLE PARKING.	10/31/2019
LONG BEACH	LAE0332	LONG BEACH PARK AND RIDE FACILITY AT 3RD STREET AND PACIFIC AVE SOUTH OF THE MTA BLUE LINE PACIFIC STATION. 300 TO 500 SPACE AND INCLUDE RESIDENTIAL AND COMMERCIAL DEVELOPMENT	COMPLETE TCM SUBSTITUTION, REPLACED BY LAF75D8, LAF7512, AND LAF7517
LONG BEACH	LAE1296	LONG BEACH INTELLIGENT TRANSPORTATION SYSTEM	12/31/2016
LONG BEACH	LAF1530	BICYCLE SYSTEM GAP CLOSURES & IMPROVED LA RIVER BIKE PATH. PROJECT WILL CONSTRUCT PRIORITY CLASS I & III BICYCLE SYSTEM GAP CLOSURES IN LONG BEACH AND IMPROVE CONNECTION TO LA RIVER. CLASS II BIKE LANES 4.8 MILES, CLASS III 3 MILES.	6/30/2016
LONG BEACH	LAF5503	CITY OF LONG BEACH PHASE II BIKE SHARE PROGRAM. THIS PROJECT IS LOCATED IN THE CITY OF LONG BEACH AND WILL IMPLEMENT A PHASE II BIKE-SHARE PROGRAM. FUNDS ARE REQUESTED FOR THE PURCHASE AND INSTALLATION OF 500 BIKES, 50 DOCKING STATIONS AND KIOSKS, AND WAYFINDING/SIGNAGE. THE PROJECT WILL SUPPORT LOCAL AND METRO TRANSIT STATIONS, EMPLOYMENT AREAS, BUSINESS DISTRICTS, AND MAJOR ACTIVITY NODES.	6/30/2019

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Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
LONG BEACH	LA0G830	I-710 IMPROVEMENTS/SHOEMAKER BRIDGE - DOWNTOWN EXITS. THE PROJECT MAKES BICYCLE, PEDESTRIAN, AND STREETSCAPE IMPROVEMENTS ON MAJOR THOROUGHFARES.	12/31/2020
LONG BEACH	LAF5609	DOWNTOWN LONG BEACH PINE AVENUE STREETSCAPE IMPROVEMENT. THIS PROJECT IS LOCATED ON PINE AVE BETWEEN SEASIDE WY AND ANAHEIM ST. IT WILL IMPLEMENT STREET IMPROVEMENTS, SUSTAINABLE DESIGN FEATURES, AND PEDESTRIAN ENHANCEMENTS ALONG A MAJOR TRANSIT NODE INCLUDING: PEDESTRIAN LIGHTING, CROSSWALK ENHANCEMENTS, DIAGONAL CROSSWALKS, STREET FURNITURE, BIKE RACKS, STREET TREES, LANDSCAPING, BOLLARDS TO FACILITATE STREET CLOSURE FOR COMMUNITY EVENTS AND REMOVAL OF OBSTRUCTIONS FROM THE WALKWAY.	7/1/2016
LONG BEACH	LAF7316	ARTESIA CORRIDOR ATCS ENHANCEMENT PROJECT : (1) UPGRADES TRAFFIC SIGNALS ALONG ARTESIA BL BETWEEN LONG BEACH BL AND DOWNEY AV TO CONNECT WITH ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS). (2) INSTALLS CCTV AND CMS ON ARTESIA BL. (3) INSTALLS FIBER OPTIC CABLE AND DEVICES TO CONNECT SIGNALS TO EACH OTHER AND TRAFFIC MANAGEMENT CENTER (TMC). (4) TWO NEW TRAFFIC SIGNALS IN COMPTON (5) INSTALLS CLASS II BIKE LANE IN BOTH DIRECTIONS FROM ATLANTIC AV TO SUSANA RD. (6) PEDESTRIAN IMPROVEMENTS.	1/1/2019
LOS ANGELES COUNTY	LA0C8120	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN & CONSTRUCTION OF MULTI JURISDICTIONAL, SIGNAL SYSTEM IMPROVEMENTS ON REGIONAL ARTERIALS & ADVANCED ITS TECHNOLOGY. (APROX. 770 INTERSECTIONS)	12/31/2015
LOS ANGELES COUNTY	LA0D465	COLIMA ROAD-CITY OF WHITTIER LIMITS TO FULLERTON ROAD, FOR A TOTAL DISTANCE OF 4.9 MILES. THE PROJECT WILL WIDEN COLIMA RD BY UP TO SIX FEET AT SPOT LOCATIONS AND RESTRIPE TO ACCOMMODATE THREE THROUGH LANES IN EACH DIRECTION.. A CLASS II BIKEWAY FROM THE CITY OF WHITTIER WILL BE EXTENDED TO ALLENTON AV, A DISTANCE OF 1.2 MILES, AND BUS PADS WILL BE REPLACED. INCLUDES MEDIAN LANDSCAPING. TOLL CREDITS USED TO MATCH FY 14/15 AND FY 15/16 CMAQ.	12/15/2020
LOS ANGELES COUNTY	LAF1511	EASTSIDE LIGHT RAIL BIKE INTERFACE PROJECT. PROJECT INCLUDES DESIGN AND CONSTRUCTION OF BIKE ROUTES WITH APPROPRIATE SIGNAGE AND STRIPING TO ACCESS METRO GOLD LINE STATIONS. TOLL CREDITS - LOCAL AND STATE HWYOF $20 WILL BE USED TO MATCH FY16 FEDERAL FUNDS FOR THE CON PHASE	10/30/2016
LOS ANGELES COUNTY	LAF3308	SAN GABRIEL VALLEY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN AND CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCH, INTERSECTION OPERATIONAL IMPROVEMENTS, AND INTELLIGENT TRANSPORTATION SYSTEM COMPONENTS ON REGIONAL ARTERIALS. APROX. 183 SIGNALS TOTAL.	6/30/2016

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Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
LOS ANGELES COUNTY	LAF3310	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN AND CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, OPERATIONAL IMPROVEMENTS & ITS COMPONENTS ON ARTERIALS IN THE SOUTH BAY AREA OF LA COUNTY. (APROX 40+ SIGNALS)	6/30/2016
LOS ANGELES COUNTY	LAF5515	FLORENCE METRO BLUE LINE STATION BIKEWAY ACCESS IMPROVEMENTS.DESIGN AND CONSTRUCT 11.19 MILES OF CLASS III BIKE ROUTES WITH SHARROWS AND ENHANCED TREATMENTS (BICYCLE BOULEVARD). SHORT-TERM BICYCLE PARKING WILL BE PROVIDED AND LIMIT LINE LOOP DETECTORS WILL BE UPGRADED TO DETECT BICYCLES AT ALL REQUIRED SIGNALIZED INTERSECTIONS. CLASS III BIKE ROUTES WITH SHARROWS WILL BE INSTALLED AT VARIOUS LOCATIONS.. TOLL CREDITS - LOCAL AND STATE HWYOF $18 WILL BE USED TO MATCH FY16 FEDERAL FUNDS FOR THE CON PHASE	10/30/2020
LOS ANGELES COUNTY	LA0D461	RECONSTRUCT- THE OLD ROAD FROM HILLCREST PARKWAY TO LAKE HUGHES RD & WIDEN FROM 40' TO 68', 2 VEH. LANES AND A 5' CLASS II BIKELANE IN EA DIR & STRIPPED MEDIAN (FROM 2 TO 4 LNS 2 EA DIR) FOR 2.1 MILES.	6/30/2021
LOS ANGELES COUNTY	LAF1311	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN & CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, INTERSECTION OPERATIONAL IMPROVEMENTS, AND INTELLIGENT TRANSP. SYSTEM COMPONENTS ON REGIONAL ARTERIALS. SYNCHRONIZES 50 CONSECUTIVE INTERSECTIONS.	10/1/2016
LOS ANGELES COUNTY	LAF1321	SAN GABRIEL VALLEY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN & CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, INTERSECTION OPERATIONAL IMPROVEMENTS, AND INTELLIGENT TRANSPORTATION SYSTEM COMPONENTS. SYNCHRONIZES 83 CONSECUTIVE INTERSECTIONS.	10/1/2016
LOS ANGELES COUNTY	LAF3309	GATEWAY CITIES FORUM TRAFFIC SIGNAL CORRIDORS PROJ, PHASE VI. DESIGN AND CONSTRUCT MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, INTERSECTION OPERATIONAL IMPROVEMENTS & ITS COMPONENTS ON REGIONAL ARTERIALS IN GATEWAY CITES AREA. (APROX. 126 SIGNALS)	6/30/2016

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Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
LOS ANGELES COUNTY	LAF5310	RAMONA BOULEVARD/BADILLO STREET/COVINA BOULEVARD TSSP/BSP. IMPLEMENTION OF A TRAFFIC SIGNAL SYNCHRONIZATION PROJECT (TSSP) ON RAMONA BL/BADILLO ST/COVINA BL FROM SANTA ANITA AV TO THE 57 FREEWAY. A BUS SIGNAL PRIORITY (BSP) PROJECT WILL BE IMPLEMENTED ON RAMONA BL/BADILLO ST FROM TYLER AV TO GRAND AV TO GIVE TRANSIT PRIORITY FOR FOOTHILL TRANSIT OPERATIONS (APROX. 48 SIGNAL LOCATIONS)	6/30/2019
LOS ANGELES COUNTY	LAF5314	GATEWAY CITIES FORUM TRAFFIC SIGNAL CORRIDORS PROJECT - IMPROVE TRAFFIC SIGNAL OPERATIONS BY UPGRADING EACH TRAFFIC SIGNAL TO FEDERAL AND STATE STANDARDS, PROVIDING ADDITIONAL VEHICLE DETECTION TO ENABLE OPERATION AS A FULLY TRAFFIC-ACTUATED SIGNAL, INSTALLING THE APPROPRIATE COMPONENTS TO ENABLE EACH SIGNAL TO BE CAPABLE OF TIME-BASED COORDINATION AND RETIMING SIGNALS TO IMPROVE THE OVERALL PROGRESSION OF TRAFFIC.(APROXIMATLY 17 SIGNALS INCLUDED)	6/30/2019
LOS ANGELES COUNTY	LAF5315	SAN GABRIEL VALLEY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. THIS PROJECT INCLUDES 6 INTERSECTIONS AT MYRTLE AV/PECK RD BETWEEN HUNTINGTON DR AND CLARK ST AND PROVIDES FOR SYSTEM WIDE COORDINATION, TIMING AND OPERATIONAL IMPROVEMENTS AND TRAFFIC SIGNAL SYNCHRONIZATION, EQUIPMENT UPGRADES AND INTERSECTION OPERATIONAL IMPROVEMENTS. (APROX. 20+ SIGNALS)	6/30/2019
LOS ANGELES COUNTY	LAF5316	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT - SYSTEMWIDE COORDINATION, TIMING AND OPERATIONAL IMPROVEMENTS AND TRAFFIC SIGNAL SYNCHRONIZATION, EQUIPMENT UPGRADES AND INTERSECTION OPERATIONAL IMPROVEMENTS IN SOUTH BAY REGION. 25 SIGNALS SYSTEM WIDE. ADDITIONALLY, THIS PROJECT WILL INSTALL ANY WARRANTED AND FEASIBLE ROADWAY IMPROVEMENTS ALONG THE ROUTES TO IMPROVE OVERALL PROGRESSION.	6/30/2019
LOS ANGELES COUNTY	LAF5514	VERMONT AVE BIKE LANE - MANCHESTER BLVD TO EL SEGUNDO BLVD. FUNDS ARE REQUESTED TO DESIGN AND CONSTRUCT CLASS II BIKE LANES ON VERMONT AV (3.0 MILES). SHORT TERM BICYCLE RACKS (14) ARE ALSO PROPOSED AT KEY DESTINATIONS.. TOLL CREDITS OF $10 WILL BE USED TO MATCH FY16 FEDERAL FUNDS FOR THE CON PHASE	2/26/2019
LOS ANGELES COUNTY	LAF7703	EXPERIENCELA 3.0-MOBILITY IN THE CLOUD : DEVELOPS AND IMPLEMENTS CLOUD COMPUTING BASED SOFTWARE TECHNOLOGY TO PROVIDE TRANSIT USERS LOCATION SPECIFIC INFORMATION VIA PERSONAL MOBILE DEVICES AND INTERACTIVE KIOSKS AT KEY TRANSPORTATION FACILITIES.	6/30/2019
LOS ANGELES COUNTY MTA	LA0C8164	EXPOSITION BLVD RIGHT-OF-WAY BIKE PATH-WESTSIDE EXTENSION. DESIGN AND CONSTRUCTION OF 2.5 MILES OF CLASS 1 BIKEWAY, LIGHTING, LANDSCAPING & INTERSECTION IMPROVEMENTS. (PPNO# 3184)	7/31/2018

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Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
LOS ANGELES COUNTY MTA	LA0C8114	LA CNTY RIDESHARE SERVICES; PROVIDE COMMUTE INFO, EMPLOYER ASSISTANCE AND INCENTIVE PROGRAMS THROUGH CORE & EMPLOYER RIDESHARE SERVICES & MTA INCENTIVE PROGRAMS. PPNO 9003	12/30/2016
LOS ANGELES COUNTY MTA	LA0D198	CRENSHAW/LAX TRANSIT CORRIDOR - THE CRENSHAW/LAX TRANSIT CORRIDOR PROJECT IS AN 8.5-MILE LIGHT RAIL TRANSIT (LRT) LINE EXTENDING FROM THE INTERSECTION OF CRENSHAW AND EXPOSITION BOULEVARDS ALLOWING FOR TRANSFER TO THE EXPOSITION LIGHT RAIL TRANSIT LINE TO A CONNECTION WITH THE METRO GREEN LINE AT THE AVIATION/LAX STATION	4/30/2021
LOS ANGELES COUNTY MTA	LA0F021	EXPOSITION LIGHT RAIL TRANSIT SYSTEM PHASE II - FROM CULVER CITY TO SANTA MONICA	12/31/2017
LOS ANGELES COUNTY MTA	LA0F075	LIGHT RAIL TRANSIT FLEET-UP TO 133 NEW CARS SYSTEMWIDE. THESE EXPANSION RAIL CARS WILL BE ASSIGNED TO EXPO II, GOLD LINE FOOTHILL AND VEHICLE REPLACEMENTS.	3/30/2019
LOS ANGELES COUNTY MTA	LA0G010	REGIONAL CONNECTOR - LIGHT RAIL IN TUNNEL ALLOWING THROUGH MOVEMENTS OF TRAINS, BLUE, GOLD, EXPO LINES. FROM ALAMEDA / 1ST STREET TO 7TH STREET/METRO CENTER	5/31/2021
LOS ANGELES COUNTY MTA	LA0G1052	METRO PURPLE LINE WESTSIDE SUBWAY EXTENSION SECTION 2 - WILSHIRE/LA CIENEGA TO CENTURY CITY	6/30/2026
LOS ANGELES COUNTY MTA	LA0G1149	IMPROVEMENTS AT FOUR SITES ALONG CESAR CHAVEZ AVENUE, THE PERIMETER OF THE LOS ANGELES UNION STATION, AT ALAMEDA AND VIGNES STREETS. LAND WILL BE ACQUIRED FOR A BUS PAVILION, BIKE FACILITIES, AND ENHANCED LANDSCAPING AT ONE SITE. STREET FURNITURE WILL BE REPLACED AND UPDATED AT THE THREE OTHER SITES. A CONTINENTAL CROSSWALK WILL BE INSTALLED ON ALL FOUR SEGMENTS OF THE INTERSECTION AT CESAR CHAVEZ AVENUE AND VIGNES STREET	5/31/2017
LOS ANGELES COUNTY MTA	LA0G1167	DESIGN AND CONSTRUCTION OF STREETSCAPE, PEDESTRIAN AND BICYCLE ACCESS IMPROVEMENTS IN THE LITTLE TOKYO AND ARTS DISTRICT NEIGHBORHOOD OF DOWNTOWN LOS ANGELES WITHIN A ONE-MILE RADIUS OF THE 1ST/CENTRAL STATION OF THE REGIONAL CONNECTOR LIGHT RAIL LINE.	8/31/2020

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Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
LOS ANGELES COUNTY MTA	LA0G1182	EXPRESS LANES - 84 BIKE STATION AND 840 BIKES FOR DEPLOYMENT OF THE BIKESHARE WITHIN 1 MILE RADIUS OF RAIL STATIONS.	12/30/2018
LOS ANGELES COUNTY MTA	LA0G1184	DESIGN AND CONSTRUCT A HIGH-CAPACITY BIKE PARKING FACILITY TO ACCOMDATE AT LEAST 300 PARKED BICYCLES IN A SECURE ENVIRONMENT.	12/30/2018
LOS ANGELES COUNTY MTA	LA0G447	METRO PURPLE LINE WESTSIDE SUBWAY EXTENSION SECTION 1 - WILSHIRE/WESTERN TO LA CIENEGA	12/31/2023
LOS ANGELES COUNTY MTA	LA29202W	WILSHIRE BLVD BRTPHASE I: 12.5-MI. CORRIDOR WITH 7.7-MI. PEAK PERIOD BUS LANE ON WILSHIRE WITHIN THE CITY AND COUNTY OF LA FROM VALENCIA ST. TO CITY OF SANTA MONICA. INCLUDES STREET WIDENING, CURB LANE REPAVING/RECONSTRUCTING, IMPROVED TRAFFIC SIGNAL TIMING & BUS SIGNAL PRIORITY. PHASE II: INCLUDES ENHANCED SHELTERS & LANDSCAPING; STREET REPAIR/RECONSTRUCTION; CONCRETE BUS PADS AND P&R FACILITIES.	6/30/2016
LOS ANGELES COUNTY MTA	LA0B408	ROUTE 405: ADD A 10-MILE HOV LANE ON THE NORTHBOUND 405 BETWEEN I-10 AND U.S. 101 IN LA FROM RTE 10 TO RTE 101 WIDEN FOR HOV LANE & MODIFY RAMPS, & HOV INGRESS/EGRESS AT SANTA MONICA BLV(EA 12030, PPNO 0851G, SAFETLU SECTION 1302 #18, 1934 #20)	5/24/2016
LOS ANGELES COUNTY MTA	LA0G1048	ACTON SIDING AND SECOND PLATFORM. LENGTHEN AN EXISTING SIDING WEST OF CP QUARTZ BY APPROX. 4,000 FEET INCLUDING A CROSSOVER, AND ADD A SECOND STATION PLATFORM AT VINCENT GRADE/ ACTON STATION. THE PROJECT WILL PROVIDE BENEFITS TO FREIGHT AND COMMUTER RAIL WITH IMPROVED OVERALL CAPACITY, TRACK OPERATIONS, AND SAFETY ALONG A VITAL SEGMENT OF THE ANTELOPE VALLEY LINE.	12/31/2016
LOS ANGELES COUNTY MTA	LA0G1051	EXTEND SEVERAL OF THE STUB-END TRACKS IN UNION STATION TO CONNECT WITH EXISTING MAINLINE TRACKS. THE PROJECT WILL SERVE THE EXISTING METROLINK, AMTRAK, AND NEW HIGH SPEED TRAIN PROJECT IN THIS CORRIDOR. IT WILL INCLUDE THE PREPARTION OF AN UPDATED ENVIRONMENTAL REPORT AND CLEARANCE, PREPARATION OF THE P/E DOCUMENTATION, PREPARATION OF FINAL PLANS, SPECIFICATIONS AND ESTIMATES, AND THE CONSTRUCTION OF THE PROJECT.	2/28/2019
LOS ANGELES COUNTY MTA	LA0G635	DESIGN AND CONSTRUCTION OF PEDESTRIAN AND TRANSIT ENHANCEMENTS ALONG THE PUBLIC RIGHT-OF-WAY OF THE METRO GOLD LINE EASTSIDE EXTENSION TO SURROUNDING NEIGHBORHOOD.TRANSIT ENHANCEMENTS ARE WITHIN 3 MILES OF EASTSIDE GOLDLINE EXTENSION STATION.	6/30/2020

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Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
LOS ANGELES COUNTY MTA	LA0G640	PACIFIC SURFLINER CORRIDOR - RAYMER/BERNSON DOUBLE TRACK IMPROVEMENTS - UPGRADE THE RAIL CORRIDOR FROM A SINGLE TRACK TO A DOUBLE TRACK, INSTALL CONCRETE TIES ON BOTH TRACKS, INSTALL FOUR NEW SPECIAL TRACKWORK TURNOUTS, NINE AT-GRADE CROSSINGS AND TWO BRIDGES, A NEW SECOND PLATFORM & NEW FENCING AT NORTHRIDGE AND A NEW PEDESTRIAN UNDERPASS. OTHER ENHANCEMENTS INCLUDE SIGNAL RELOCATION, UTILITY RELOCATION AND DRAINAGE IMPROVEMENTS.	12/31/2018
LOS ANGELES, CITY OF	LA0G1128	EXPO LINE BUNDY STATION FIRST?]LAST MILE IMPROVEMENTS. THIS PROJECT WILL ESTABLISH PEDESTRIAN/BIKE-FRIENDLY ROUTES TO THE EXPO/BUNDY STATION THROUGH TRAFFIC CALMING, SAFETY IMPROVEMENTS, WAYFINDING, AND PLACE MAKING. PROJECT ELEMENTS INCLUDE SHADE TREES, ACCESS RAMPS, NEW SIDEWALKS, MEDIAN REFUGE, BICYCLE PARKLET, CURB EXTENSIONS, PEDESTRIAN LIGHTING, BIKE RACKS, AND STREET FURNITURE.	6/30/2017
LOS ANGELES, CITY OF	LA0G1165	COMMUTER EXPRESS SERVICE EXPANSION TO ALLEVIATE CONGESTION ON HARBOR FREEWAY: PURCHASE ONE NEW COMMUTER EXPRESS BUS AND EXTENSION OF SEVERAL AM & PM TRIPS ON EXPRESS ROUTE 438.	12/31/2018
LOS ANGELES, CITY OF	LA0G182	THE CENTRAL CITY EAST PROJECT WILL PROVIDE A FULLY TRAFFIC RESPONSIVE SIGNAL CONTROL SYSTEM TO APPROXIMATELY 150 INTERSECTIONS CURRENTLY OPERATIONAL WITH ATSAC CAPABILITY.	12/31/2016
LOS ANGELES, CITY OF	LA0G901	HISTORIC LOS ANGELES STREETCAR	6/30/2017
LOS ANGELES, CITY OF	LAF1524	SAN FERNANDO RD. BIKE PATH PH. IIIA/IIIB - CONSTRUCTION. RECOMMEND PHASE IIIA-CONSTRUCTION OF A CLASS I BIKE PATH WITHIN METRO OWNED RAIL RIGHT-OF-WAY ALONG SAN FERNANDO RD. BETWEEN BRANFORD ST. AND TUXFORD ST INCL BRIDGE. 2 MILE BIKEPATH.	6/30/2017
LOS ANGELES, CITY OF	LAF1708	HOLLYWOOD INTEGRATED MODAL INFORMATION SYSTEM. INSTALLATION OF ELECTRONIC, DIRECTION AND PARKING AVAILABILITY SIGNS WITH INTERNET CONNECTIVITY TO PROVIDE ADVANCE AND REAL-TIME INFORMATION INTENDED TO INCREASE TRANSIT RIDERSHIP	9/21/2017
LOS ANGELES, CITY OF	LAF3171	DE SOTO AVE WIDENING: RONALD REAGAN FWY TO DEVONSHIRE ST.. WIDEN DE SOTO AVE FR SR-118 TO DEVONSHIRE ST TO PROVIDE 3 LANES IN EACH DIRECTION & UNIFORM ROADWAY WIDTH. EXISTING ASPHALT BERMS TO BE	12/31/2017

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Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
		REPLACED WITH CURB, GUTTER, & 10' SIDEWALK. SIDEWALK IS 1.42 MILES, 90% OF THE SIDEWALKS ALONG THE PROJECT LIMITS WILL BE NEW.	
LOS ANGELES, CITY OF	LAF3314	INTELLIGENT TRANSPORTATION SYSTEM (ITS) COMMUNICATION SYSTEM. UPGRADE AND REPLACE UNDER CAPACITY COMMUNICATION SYSTEM HARDWARE IN ORDER TO PROVIDE A VIABLE AND COST EFFECTIVE COMMUNICATION LINK BETWEEN TRAFFIC CORRIDORS AND THE LA COUNTY IEN.	12/31/2016
LOS ANGELES, CITY OF	LAF3513	DESIGN AND CONSTRUCT 3.85 MILE BIKEWAY ALONG FUTURE EXPOSITION LIGHT RAIL CORRIDOR BETWEEN VENICE/ROBERTSON BLVDS. AND SANTA MONICA CITY LIMITS AT CENTINELA. CLASS I AND CLASS II BIKEWAYS.	12/31/2016
LOS ANGELES, CITY OF	LAF3731	DOWNTOWN LA INTER-MODAL TRANSIT INFORMATION AND WAYFINDING. INSTALL TRANSIT INFORMATION MONITORS, VARIABLE MESSAGE SIGNS, INTERACTIVE KIOSKS & PARKING AVAILABILITY SIGNAGE ALONG BROADWAY CORRIDOR TO OLYMPIC.	12/31/2017
LOS ANGELES, CITY OF	LAF5518	THIS PROJECT IS LOCATED IN THE CITY OF LOS ANGELES IN THE WEST SAN FERNANDO VALLEY. CONSTRUCTION OF A BICYCLE/PEDESTRIAN PATH FROM OWENSMOUTH AV TO MASON AV (1.25 MILES) ALONG THE SOUTH BANK OF THE LA RIVER. INCLUDES UNDERPASSES AT DE SOTO AV AND CANOGA AV/BUSWAY BRIDGES. THE PROJECT WILL INCLUDE LIGHTING, RAILING, STRIPING AND SIGNAGE AND A CONNECTION STRUCTURE TO THE METRO ORANGE LINE BIKEWAY.	6/30/2018
LOS ANGELES, CITY OF	LAF5620	EXPO LINE - TRANSIT/PEDESTRIAN LINKAGES - WEST. IT WILL FUND PEDESTRIAN IMPROVEMENTS BY INSTALLING DECORATIVE SIDEWALKS, STREET TREES, NEW AND UPGRADED ACCESS RAMPS, TRASH RECEPTACLES, BENCHES, BICYCLE RACKS, PEDESTRIAN LIGHTING, AND DECORATIVE CROSSWALKS. FUNDS ARE REQUESTED FOR DESIGN AND CONSTRUCTION COSTS. PEDESTRIAN LINKAGES 2.5 MILES.	7/1/2018
LOS ANGELES, CITY OF	LAF1612	CENTURY CITY URBAN DESIGN AND PEDESTRIAN CONNECTION PLAN. PROJECT WILL IMPLEMENT SIDEWALK IMPROVEMENTS, DECORATIVE CROSSWALKS, MEDIAN ISLAND, CURB RAMPS, PEDESTRIAN LIGHTING, SHELTERS, BENCHES, TRASH RECEPTACLES & STREET TREES. THE PHYSICAL IMPROVEMENTS WILL CONSIST OF A MEANDERING PEDESTRIAN WALKWAY, SOLAR-POWERED PEDESTRIAN SCALE LIGHTING, STREET LIGHTING, TRASH RECEPTACLES, BUS BENCHES, (10)BICYCLE RACKS.	12/31/2016
LOS ANGELES, CITY OF	LAF3315	CITY/COUNTY TRAFFIC MANAGEMENT INTEGRATION PHASE 2 PROJECT. INTEGRATE THE IEN TRAFFIC SIGNAL TIMING DATA AS SECOND LEVEL INPUTS INTO ATCS AND MAKE REVISIONS FROM 2007 CALL APPLICATION TO THIS PROJECT.	12/31/2016

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Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
LOS ANGELES, CITY OF	LAF3515	SAN FERNANDO RD. BIKE PATH PH. IIIB CONSTRUCTION. CONSTRUCT 2.75 MILE CLASS I BIKE PATH WITHIN METRO RIGHT-OF-WAY ALONG SAN FERNANDO RD. BETWEEN TUXFORD ST. AND COHASSET ST. TO COMPLETE 12-MILE BIKEWAY.. THE PROJECT IS LOCATED WITHIN THE CITY OF LOS ANGELES, IN THE COMMUNITY OF SUN VALLEY. THE PROJECT CONSISTS OF A CLASS I FACILITY 12 FEET IN WIDTH AND 2.75 MILES IN LENGTH BETWEEN TUXFORD ST. AND COHASSET ST. (BURBANK CITY LIMIT).	1/1/2016
LOS ANGELES, CITY OF	LAF3646	ARTS DISTRICT/LITTLE TOKYO GOLD LINE STATION LINKAGES. PEDESTRIAN ENHANCEMENTS INCLUDING SIDEWALK/PATH PAVING; PED LIGHTS; STREET TREES/PLANTING; DISTRICT SIGNAGE; ENTRY ELEMENTS; STREET FURNITURE; CROSSWALK PAVING; AND BIKE PARKING. (10 BIKE RACKS)	12/30/2017
LOS ANGELES, CITY OF	LAF5519	THIS PROJECT IS LOCATED IN THE CITY OF LOS ANGELES. CONSTRUCTION OF BICYCLE FRIENDLY STREET TREATMENTS: AT LEAST 100 DIRECTIONAL SIGNS, AT LEAST 500 SHARED LANE MARKINGS, AND BICYCLE DETECTORS AND MARKINGS PROVIDED TO AT LEAST 15 SIGNALIZED INTERSECTIONS. OTHER TREATMENTS WILL INCLUDE TRAFFIC CALMING DEVICES AND DIVERSION, WHICH INCLUDE AT LEAST ONE DIVERTER AND ROUNDABOUT.	12/31/2018
LOS ANGELES, CITY OF	LAF5525	TO DESIGN AND CONSTRUCT CURB-SIDE BICYCLE PARKING (BICYCLE CORRAL) THAT WILL SERVE EACH COUNCIL DISTRICT. THE PROJECT REQUIRES SURFACE MODIFICATIONS TO CURBSIDE PARKING AREAS FOR INSTALLING AT LEAST 150 BIKE RACKS.	1/1/2018
LOS ANGELES, CITY OF	LAF7628	WATTS STREETSCAPE IMPROVEMENTS PHASE 2: INSTALLS ADA RAMPS, LANDSCAPING STREET TREES, STREET FURNITURE, PED LIGHTING, CROSSWALK ENHANCEMENTS, CURB EXTENSIONS, SHARROWS, AND PED & BIKE WAYFINDING SIGNAGE.	12/31/2019
LOS ANGELES, CITY OF	LAF7707	LAST MILE FOLDING BIKE INCENTIVE PROGRAM : PROVIDES FINANCIAL INCENTIVES TO TRANSIT RIDERS TOWARDS THE PURCHASE OF 1,800 COLLAPSIBLE OR ELECTRIC BIKES TO USE IN CONJUNCTION WITH BUS AND RAIL SYSTEMS.	12/31/2018
MALIBU	LA0G910	PACIFIC COAST HIGHWAY REGIONAL TRAFFIC MESSAGE SYSTEMS. THE PROJECT WILL ENABLE THE CITY OF MALIBU AND OTHER AGENCIES TO NOTIFY TRAVELERS OF CRITICAL REGIONAL TRAFFIC AND SAFETY INFORMATION AND FACILITATE TRAFFIC FLOW THROUGHOUT THE REGION. 6 PERMANENT AND 2 MOBILE CHANGEABLE MESSAGE SIGNS WILL BE INSTALLED AT STRATEGIC LOCATIONS ALONG PCH/SR-1 CORRIDOR IN THE CITY OF MALIBU.	12/1/2017

Attachment A: Committed Transportation Control Measures (TCMs)

Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
METRO GOLD LINE FOOTHILL EXTENSION CONSTRUCTION AU	LA0G558	GOLD LINE FOOTHILL LRT EXTENSION - PASADENA TO AZUSA	12/31/2017
MONTEBELLO	LAES757	CUSTOMER INFORMATION SYSTEM PROJECT: INCLUDING AUTOMATIC VEHICLE LOCATION AND REAL-TIME PASSENGER INFORMATION SYSTEMS.	7/1/2016
MONTEBELLO	LA0G862	PURCHASE OF SEVEN (7) ALTERNATIVE FUEL EXPANSION TRANSIT BUSES	12/31/2016
MONTEREY PARK	LA0G1181	2.86 MILES CLASS III BIKE PATH. 1.96 MILES CLASS II BIKE PATH CONVERTED FROM ON-STREET PARKING AND MEDIAN. CLASS III BIKE PATH: MONTEREY PASS RD/GARVEY AVE (2.86 MILE). CLASS II BIKE PATH: CESAR CHAVEZ/RIGGIN (1.96 MILE)	12/31/2018
NORWALK	LAF3443	IMPROVEMENTS TO THE PEDESTRIAN PLAZA AT THE NORWALK/SANTA FE SPRINGS METRLINK STATION. IMPROVEMENTS INCLUDE DEVELOPMENT OF A CONTINUOUS NEW PEDESTRIAN WALKWAY AND BICYCLE PATH UTILIZING THE ROADBED ALONG THE NORTHERN EDGE OF THE PROPERTY. ADDITIONAL IMPROVEMENTS INCLUDE PASSENGER CAR PICK-UP/DROP-OFF AREA, PROPER SIGNAGE AND STRIPING, BUS SHELTER/SEATING AREA, SECURITY LIGHTING, AND LANDSCAPING AND INSTALLATION OF CLOSED CIRCUIT TELEVISION (CCTV) SURVEILLANCE SECURITY SYSTEM.	6/1/2016
PASADENA	LAE3790	THE PASADENA ITS INTEGRATES 2 COMPONENTS; TRAFFIC SIGNAL COMMUNICATION AND CONTRL, AND PUBLIC PARKING AVAILABILITY INFO. SAFETEA-LU PRJ #3790	4/30/2016
PASADENA	LAF3501	DETECTION OF BICYCLES AT SIGNAL CONTROLLED INTERSECTIONS. BICYCLE DETECTION SYSTEMS AT INTERSECTIONS CONTROLLED BY TRAFFIC SIGNALS ALONG BIKE CORRIDORS. PROJECT CORRIDOR LENGTH IS 15.5 MILES.	6/30/2016
PASADENA	LAF3301	METRO GOLD LINE AT-GRADE CROSSING MOBILITY ENHANCEMENTS. DEPLOYMENT OF ITS AT SIGNALIZED INTERSECTIONS ADJACENT TO METRO GOLD LINE AT-GRADE CROSSINGS TO PROVIDE ADAPTIVE TRAFFIC SIGNAL CONTROL TO IMPROVE MOBILITY & ENHANCE SAFETY. PROJECT INCLUDES 14 INTERSECTIONS.	5/1/2016
PASADENA	LAF3302	INTELLIGENT TRANSPORTATION SYSTEM (ITS) PHASE III (SIGNAL SYNCHRONIZATION PROJECT 3+ SIGNALS). COMPLETE THE MAIN COMMUNICATION INFRASTRUCTURE SYSTEM OF THE ITS COMMUNICATION MASTER PLAN BY CLOSING ALL GAPS IN THE EXISTING FIBER COMMUNICATION NETWORK. AS STATED IN THE PROJECT DESCRIPTION, THIS PROJECT TARGETS CRITICAL EXISTING GAPS WITHIN THE CITY'S ITS FIBER MASTER PLAN.	12/30/2016

Attachment A: Committed Transportation Control Measures (TCMs)

Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
PASADENA	LAF3710	PASADENA'S WAYFINDING SYSTEM. IMPLEMENT WAYFINDING SYSTEM INCLUDING TRANSIT INFORMATION AND CONNECTIVITY TO ADJACENT DESTINATIONS AT TRANSIT STOPS AND PARKING LOTS.	5/1/2016
POMONA	LA0G1135	DESIGN AND CONSTRUCT 14.5 MILE OF NEW BIKEWAYS AND IMPROVE PEDESTRIAN SAFETY THROUGH CROSSING IMPROVEMENTS AT EIGHT MAJOR INTERSECTIONS. BIKE IMPROVEMENTS INCLUDE 3.8 MILES OF CLASS II BUFFERED BIKE LANES, 2.9 MILES OF CLASS II BIKE LANES, AND 7.8 MILES OF CLASS III BIKE ROUTES.	9/30/2019
PORT OF LOS ANGELES	LAF3170	PORT TRUCK TRAFFIC REDUCTION PROGRAM: WEST BASIN RAILYARD. INTERMODAL RAILYARD CONNECTING PORT OF LA WITH ALAMEDA CORRIDOR TO ACCOMMODATE INCREASED LOADING OF TRAINS AT THE PORT, THEREBY REDUCING TRUCK TRIPS TO OFF-DOCK RAILYARDS.(LAF5204)	4/30/2017
REDONDO BEACH	LA0D29	HEART OF THE CITY BUS TRANSFER STATION AMENITIES. RELOCATE THE EXISTING INTERMODAL TRANSIT TERMINAL AND CONSTRUCT A NEW TRANSIT CENTER WITH 12 BUS BAYS, PASSENGER WAITING AREA AND INFORMATION CENTER, AND A DRIVER OPERATOR LOUNGE. THE PROPERTY WILL ALSO PROVIDE 339 PUBLIC PARKING SPACES (PLUS 2 FOR STAFF: MAINTENANCE & SECURITY) AND BICYCLE FACILITIES. LOCATION - 1521 KINGSDALE AVENUE, REDONDO BEACH, CA 90278	12/31/2016
REDONDO BEACH	LAF3502	REDONDO BEACH BICYCLE TRANSPORTATION PLAN IMPLEMENTATION. IMPLEMENT CLASS II AND III BIKE FACILITIES IDENTIFIED IN THE CITY OF REDONDO BEACH'S ADOPTED BICYCLE TRANSPORTATION PLAN. APPROXIMATELY 2.1 CENTERLINE MILES OF BIKE LANES AND 15.8 CENTERLINE MILES OF BIKE ROUTES THROUGHOUT THE CITY OF REDONDO BEACH.	6/30/2017
SAN GABRIEL VALLEY COG	LA990359	GRADE SEP XINGS SAFETY IMPR; 35- MI FREIGHT RAIL CORR. THRGH SAN.GAB. VALLEY - EAST. L.A. TO POMONA ALONG UPRR ALHAMBRA &L.A. SUBDIV - ITS 2318 SAFETEA #2178;1436 #1934 PPNO 2318. NOGALES(LA) PROJECT INCLUDES WIDENING FROM 2 TRAVEL LANES TO 4 TRAVEL LANES OF E.WALNUT DRIVE NO. EAST OF NOGALES FOR 2600 LINEAR FEET AND WIDENING FROM 2 TRAVEL LANES TO 4 TRAVEL LANES OF GALE AVE. WEST OF NOGALES FOR 1900 LINEAR FEET.	6/30/2018
SANTA CLARITA	LAF3535	CITYWIDE WAYFINDING PROGRAM FOR PEDESTRIANS AND BICYCLISTS. DIRECT USERS TO METROLINK STATIONS AND OTHER REGIONAL TRIP GENERATORS, DESIGN AND INSTALL WAYFINDING SIGNS ALONG THE CITY'S EXISTING	12/31/2017

Attachment A: Committed Transportation Control Measures (TCMs)

Los Angeles County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
		NETWORK OF MULTI-USE PATHS, ON-STREET BIKEWAYS, PASEOS IN THE VALENCIA AND SAUGUS NEIGHBORHOODS, AND SIDEWALKS ALONG MOST MAJOR ROADWAYS.	
SANTA CLARITA	LAF3300	ITS PHASE IV INTERCONNECT GAP CLOSURE AND SIGNAL SYNCH. THIS PROJECT INVOLVES RE-SYNCHRONIZING TRAFFIC SIGNALS ON ARTERIALS, DEPLOYING AN ADAPTIVE SIGNAL SYSTEM, AND A REDUNDANT FIBER-OPTIC INTERCONNECT SYSTEM. (APROX. 40+ SIGNALS)	12/31/2017
SANTA MONICA	LAF3703	A 'NO NET NEW TRIPS' RIDESHARE TOOLKIT. DEVELOP A TDM TOOLKIT WITH ONLINE MULTI-MODAL MOBILITY INFORMATION, BIKE ACCOMMODATIONS, 300 WALKING-ROLLING CARTS, 75 BIKE LOCKERS & INCENTIVE PROGRAMS FOR EMPLOYERS, SCHOOLS & NEIGHBORHOODS. WITHIN THE CITY OF SANTA MONICA IN DEMAND MANAGEMENT AREAS AS DEFINED IN THE LAND USE AND CIRCULATION ELEMENT (LUCE) ADOPTED JULY 2010.	6/30/2016
SANTA MONICA	LAF3505	BIKE NETWORK LINKAGES TO EXPOSITION LIGHT RAIL PROJECT. BIKE NETWORK ENHANCEMENTS TO SUPPORT EXPOSITION LINE. INCREASED SAFETY AND CONVENIENCE WITH SIGNAL DETECTION, HIGHLY VISIBLE LANE MARKINGS AND NEW BIKE RACKS. THE PROJECT AREA IS LOCATED THROUGHOUT THE CITY OF SANTA MONICA AND NO MORE THAN TWO MILES FROM THE PROPOSED EXPOSITION LIGHT RAIL LINE STATIONS.	12/31/2016
SANTA MONICA	LAF5524	IMPLEMENTATION OF A SANTA MONICA BIKE-SHARE PROGRAM, INCLUDING THE PURCHASE AND INSTALLATION OF 250 BIKES AND 25 DOCKING STATIONS TO BE LOCATED AT ACTIVITY NODES AND TRANSIT STATIONS (INCLUDING EXPO LRT STATIONS). TWO VEHICLES WILL BE ACQUIRED AND OUTFITTED TO TRANSPORT AND REDISTRIBUTE BICYCLES BETWEEN STATIONS AS NEEDED. THE BIKE-SHARE DOCKING STATIONS WILL BE SOLAR POWERED WHERE APPROPRIATE AND INCLUDE A TECHNOLOGY PLATFORM FOR SYSTEM OPERATION THROUGH THE WEB AND SMART PHONE APPLICATIONS.	6/30/2019
TORRANCE	LA0G358	SOUTH BAY REGIONAL INTERMODAL TRANSIT CENTER PROJECT AT 465 N. CRENSHAW BLVD., TORRANCE, CA 90503.	12/31/2016
WHITTIER	LA0G257	WHITTIER GREENERY TRAILHEAD PARK. EXTENSION OF WHITTIER GREENERY TRAIL FROM MILLS AVENUE TO 300 FEET EAST OF MILLS AVENUE IN CONJUNCTION WITH CONSTRUCTION OF NEW TRAILHEAD PARK AND 20 SPACE PARK & RIDE PARKING LOT.	9/30/2017

Attachment A: Committed Transportation Control Measures (TCMs)

Orange County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
ANAHEIM	ORA112622	BROOKHURST ST (600' NORTH OF I-5 TO SR-91). ADD ONE LANE EACH DIRECTION. FROM 4 TO 6 LANE FACILITY WITH RAISED MEDIAN. THE PROJECT WILL INCLUDE SIX-FOOT-WIDE CLASS II BIKEWAYS, TEN-FOOT WIDE PARKWAYS/SIDEWALKS AND CONCRETE SOUNDWALLS ALONG THE EAST AND/OR WEST SIDES OF BROOKHURST ST. CONSISTENT WITH THE 2012 RTP	6/30/2017
BREA	ORA150103	THE TRACKS AT BREA SEGMENTS 2 & 3. CONSTRUCTION CLASS I BICYCLE/PEDESTRIAN TRAIL ALONG 1.15 MILE LONG SECTION ON THE TRACKS AT BREA. SEGMENT 2 FROM BREA FLOOD CONTROL CHANNEL TO NORTH BREA BOULEVARD. SEGMENT 3 FROM NORTH BREA BOULEVARD TO STATE COLLEGE BOULEVARD.	7/30/2017
CYPRESS	ORA131706	CERRITOS AVENUE BIKE CORRIDOR IMPROVEMENTS (FROM DENNI STREET TO WALKER STREET) - CONSTRUCT AN OFF-ROAD BIKE PATH TO REPLACE AN EXISTING ON-STREET BIKE ROUTE TO IMPROVE SAFETY AND CONNECTIVITY. CLASS 1 FOR 1 MILE. TOLL CREDITS: FY 15/16 CMAQ CON FOR $9,405, FY 15/16 ATP-MPO CON FOR $72,490.	7/1/2017
LA HABRA	ORA113011	LA HABRA UNION PACIFIC RAILROAD BIKEWAY. ENG FOR UNION PACIFIC RAILROAD RIGHT-OF-WAY BETWEEN LA HABRA WEST CITY LIMITS AND LA HABRA EAST CITY LIMITS. ROW FOR LA HABRA WEST CITY LIMITS TO BEACH BOULEVARD. TOLL CREDIT MATCH: FY15/16 CMAQ CON FOR $10,552, FY15/16 ATP-MPO CON FOR $81,235.	7/1/2025
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA085004	ANAHEIM CANYON STATION PROJECT WILL ADD DOUBLE TRACK AND ANOTHER PLATFORM AS WELL AS EXTEND THE EXISTING PLATFORM TO BE IN CONFORMANCE WITH THE METROLINK STANDARDS FOR PASSENGER PLATFORM LENGTH. (PROJECT UTILIZES $1,812,260 IN TOLL CREDIT IN FY15/16 FOR CON, & $400,200 IN STATEWIDE TOLL CREDIT FOR FTA 5337 FY14/15 FOR CON)	7/23/2020
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111001	INTERSTATE 5 ADD 1 HOV IN EACH DIRECTION FROM SOUTH OF PACIFIC COAST HIGHWAY TO SAN JUAN CREEK ROAD. PPNO:2531F	12/13/16
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111002	INTERSTATE 5 ADD 1 HOV IN EACH DIRECTION FROM SOUTH OF AVENIDA VISTA HERMOSA TO SOUTH OF PACIFIC COAST HIGHWAY. PPNO 2531E	10/26/16
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA65002	RIDESHARE SERVICES RIDEGUIDE, DATABASE, CUSTOMER INFO, AND MARKETING (ORANGE COUNTY PORTION).	12/30/2020

Attachment A: Committed Transportation Control Measures (TCMs)

Orange County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA990929	INTERSTATE 5 ADD 1 HOV IN EACH DIRECTION FROM SOUTH OF AVENIDA PICO TO SOUTH OF AVENIDA VISTA HERMOSA AND RECONFIGURE AVENIDA PICO INTERCHANGE. PPNO:2531D (UTILIZE TOLL CREDIT MATCH FOR IMD AND STIP)	11/1/17
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111209	LAGUNA NIGUEL TO SAN JUAN CAPISTRANO PASSING SIDING - ADD 1.8 MILES OF NEW RAILROAD TRACK ADJACENT TO THE EXISTING MAIN TRACK. MP 193.9 - MP 195.7 (PROJECT WILL UTILIZE TRANSIT DEVELOPMENT CREDITS MATCH - CMAQ FY13/14 FOR $438 AND FY14/15 FOR $1,832)	1/21/2020
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111801	I-5 (ALICIA PARKWAY TO EL TORO ROAD) SEGMENT 3 - THE PROJECT WILL ADD ONE GENERAL PURPOSE LANE ON THE I-5 IN EACH DIRECTION BETWEEN ALICIA PARKWAY AND EL TORO ROAD (APPROXIMATELY 1.7 MILES), EXTEND THE 2ND HOV LANE IN BOTH DIRECTIONS AND ADD AUXILIARY LANES WHERE NEEDED.	6/30/2023
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA030612	PLACENTIA TRANSIT STATION - E OF SR-57 AND MELROSE ST AND N OF CROWTHER AVE. CONSTRUCT NEW METROLINK STATION AND RAIL SIDEING PPNO 9514	6/30/2018
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA110304	GOLDENWEST TRANSPORTATION CENTER. CONSTRUCT A SURFACE PARKING LOT (300 SPACES)	4/30/2016
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA111210	I-5 FROM SR 55 TO SR 57 - ADD 1 HOV LANE EACH DIRECTION	12/1/2018
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA112702	RIDESHARE VANPOOL PROGRAM - CAPITAL LEASE COST FY12/13 - FY16/17. (USE TOLL CREDITS FOR $1.338 IN FY12/13)	1/31/2017
SANTA ANA	ORA131709	NEWHOPE-CIVIC CENTER-GRAND CLASS II BIKE LANES PROJECT - CLASS II 0.45 MILE ON NEWHOPE STREET FROM FIRST STREET TO MCFADDEN AVENUE. CLASS II 0.87 MILE SEGMENT ON CIVIC CENTER DRIVE FROM BRISTOL TO BROADWAY. CLASS II 1.25 MILE SEGMENT ON GRAND AVENUE FROM 21ST STREET TO FAIRHAVEN AVENUE. TOLL CREDITS FY 14/15 CON FOR $31,349.	7/1/2017
SANTA ANA	ORA150106	DEVELOP, DESIGN, AND CONSTRUCT BISHOP-PACIFIC-SHELTON BIKE BOULEVARDS. CONSTRUCT CLASS III FACILITIES ALONG BISHOP STREET, PACIFIC AVENUE, AND SHELTON STREET. DEVELOPMENT, DESIGN, AND CONSTRUCTION. INCLUDES BULB OUTS, TRAFFIC CIRCLES, AND TRAFFIC TURNING RESTRICTIONS AND/OR SPEED BUMPS. IMPROVEMENTS ALONG 2.268 MILES OF BIKEWAYS. TOLL CREDITS FOR FY 14/15 PA&ED/PS&E FOR $8,029, FY 15/16 CON FOR $100,936.	12/31/2017
TCA	10254	SAN JOAQUIN HILLS TRANSPORTATION CORRIDOR (SJHTC – SR 73). 15 MI TOLL RD BETWEEN 1-5 IN SAN JUAN CAPISTRANO & RTE 73 IN IRVINE, CONSISTENT WITH SCAG/TCA MOU 4/5/01. EXISTING 3 M/F EA DIR. 1 ADDITIONAL M/F EA DIR, PLUS CLIMBING & AUX LANES BY 2020.	12/31/2020

Attachment A: Committed Transportation Control Measures (TCMs)

Orange County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
TCA	ORA050	EASTERN TRANSPORTATION CORRIDOR (ETC- SR 241/261/133) 26.4 MI TOLL ROAD CONNECTS SR 91 TO I-5 VIA SR 261 AND SR 133, CONSISTENT WITH SCAG/TCA MOU 4/05/01. EXISTING 2 M/F EA DIR. 2 ADDITIONAL M/F IN EA DIR, PLUS CLIMBING AND AUX LANES BY 2020.	12/31/2020
TCA	ORA051	FOOTHILL TRANSPORTATION CORRIDOR-NORTH (FTC-N - SR 241). 12.7 MI TOLL ROAD BETWEEN OSO PKWY AND ETC, CONSISTENT WITH SCAG/TCA MOU 4/05/01. EXISTING 2 M/F IN EA DIR. 2 ADDITIONAL M/F, PLS CLIMBING & AUX LANES BY 2020.	12/31/2020
TCA	ORA052	FOOTHILL TRANSPORTATION CORRIDOR-SOUTH (FTC-S - SR 241). 10.3 MI TOLL ROAD BETWEEN SAN DIEGO COUNTY LINE AND OSO PKWY, CONSISTENT WITH SCAG/TCA MOU 4/05/01. 2 M/F EA DIR FROM OSO PKWY TO COW CAMP RD BY 2017. 2 M/F EA DIR FROM COW CAMP RD TO SAN DIEGO CO LINE BY 2021. 1 ADDITIONAL M/F EA DIR PLS CLIMBING & AUX LANES BY 2030.	2021/2030
VARIOUS AGENCIES	ORA150602	ABRAZAR - 2 MEDIUM EXPANSION BUSES, 7 EXPANSION MINIVANS, AND 6 SMALL EXPANSION BUSES. (TRANSIT DEVELOPMENT CREDITS MATCH – FTA 5310 FY14/15 FOR $163)	4/30/2017

Attachment A: Committed Transportation Control Measures (TCMs)

Riverside County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
MORENO VALLEY	RIV151202	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF MORENO VALLEY - DESIGN AND CONSTRUCTION OF ITS, INCLUDING AN ETHERNET FIBER-OPTIC BACKBONE SYSTEM, CCTV CAMERAS AT 26 KEY INTERSECTIONS, AND NEW TRAFFIC SIGNAL CONTROLLERS AT EXISTING 43 SIGNALIZED INTERSECTIONS (CMAQ PM 2.5 BENEFITS .21 KG/DAY)	12/31/2016
PERRIS	RIV140850	IN WESTERN RIVERSIDE CO. IN THE CITY OF PERRIS – MURRIETA RD PED IMPROVEMENTS: INSTALL 1.0 MILE OF SIDEWALK GAPS, CURB & GUTTER ON W-SIDE OF MURRIETA RD W/ CLASS II BIKE LANES IN BOTH DIRECTIONS B/W SAN JACINTO AVE & 1000' NORTH OF NUEVO RD; 10' WIDE BRIDGE OVER METZ FLOOD CONTROL CHANNEL; TRAFFIC SIGNAL AT MURRIETA & NUEVO RDS; NEW SIDEWALK ON DALE ST B/W WILSON & MURRIETA RD. TC TO MATCH ATP	12/31/2020
RIVERSIDE COUNTY	RIV140838	IN WESTERN RIVERSIDE CO. FOR THE COUNTY OF RIVERSIDE IN MEAD VALLEY-CLARK ST S/W & INTERSECTION SAFETY IMPROVEMENTS: ON EASTSIDE OF CLARK ST B/W RIDER ST AND CAJALCO RD, CONSTRUCT APPROX. 2,000 L.F. OF CONCRETE SIDEWALK, CURB & GUTTER, PAVEMENT IMPROVEMENTS, NEW CURB RAMPS MEETING LATEST ADA REQS, DRIVEWAY APPROACHES, SIGNS, MARKINGS, & OTHER INCIDENTAL ITEMS TO IMPROVE PEDESTRIAN SAFETY.	12/31/2021
RIVERSIDE COUNTY	RIV151210	IN WESTERN RIVERSIDE COUNTY FOR THE COUNTY OF RIVERSIDE - CONSTRUCTION OF A 7.2 MILE MULTI-MODAL URBAN TRAIL ALONG THE SALT CREEK FLOOD CONTROL CHANNEL BETWEEN THE COMMUNITIES OF HEMET, MENIFEE AND CANYON LAKE. THE MULTI-MODAL TRAIL WILL INCLUDE A 16 FT WIDE CLASS I BIKEWAY AND 12 FT WIDE DECOMPOSED GRANITE PEDESTRIAL TRAIL	12/31/2018
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV071250	ON SR-91/I-15: SR91 - CONST 1 MF LN (SR71-I15)/1 AUX LN VAR LOCS(SR241-PIERCE) (OC PM 14.43-18.91), CD SYSTEM (2/3/4 LNS MAIN-I15), 1 TOLL EXPR LN (TEL) & CONVERT HOV TO TEL EA DIR (OC-I15); I15- CONST TEL MED DIR CONNCT NB15 TO WB91 AND EB91 TO SB15, 1 TEL EA DIR SR91 DIR CONNCT-ONTARIO IC (I15 PM 37.56-42.94).	9/4/2017
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV111207	IN WESTERN RIVERSIDE COUNTY - CONTINUE THE IMPLEMENTATION OF PARK-N-RIDE FACILITIES THROUGH PROPERTY LEASES (VARIOUS LOCATIONS THROUGHOUT THE WESTERN COUNTY).	12/30/2018
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV520111	REGIONAL RIDESHARE - CONTINUING PROGRAM ($115.73 IN FY12/13 AND $193.96 IN FY 13/14 IN TOLL CREDITS UTILIZED TO MATCH CMAQ IN CONS).	6/30/2018
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV071267	I-15 IN RIVERSIDE COUNTY: CONSTRUCT 4 TOLL EXPR LNS (TEL) (2 TE EA DIR) FROM SR60 (PM 51.4) TO HIDDEN VALLEY PKWY (PM 42.9) AND CONS 2 TE LNS (1 TE EA DIR) FROM HIDDEN VALLEY PKWY (PM 42.9) TO CAJALCO RD (PM 36.8). ADVANCE SIGNAGE WILL BE INSTALLED A THE SOUTH END BETWEEN PM 34.7 TO PM 36.8 (CAJALCO RD) AND AT THE NORTH END BETWEEN PM 51.4 (SR60) TO PM 1.3 IN SAN BERNARDINO COUNTY.	12/31/2020
RIVERSIDE TRANSIT AGENCY	RIV151211	IN WESTERN RIVERSIDE COUNTY FOR RTA: RAPIDLINK SERVICE ALONG THE RTE 1 SERVICE AREA DURING WEEKDAY PEAK COMMUTE PERIODS ALONG UNIVERSITY AND MAGNOLIA AVES (RIVERSIDE/CORONA CORRIDOR) BETWEEN UCR AND	12/31/2020

Attachment A: Committed Transportation Control Measures (TCMs)

Riverside County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
		CORONA. THIS INCLUDES PURCHASE OF 14 NEW BUSES (40 FT) AND OPERATING ASSISTANCE FOR THE FIRST THREE TO FIVE YEARS OF SERVICE. (CMAQ - $9,212K) (BENEFITS FOR PM 2.5 = .239 KG/DAY; PM 10 = .258 KG/DAY)	
RIVERSIDE, CITY OF	RIV140841	IN WESTERN RIVERSIDE COUNTY FOR CITY OF RIVERSIDE-IOWA AVE & MLK BLVD BIKE IMPROVEMENTS: CONSTRUCT 0.8 MI 10 FT WIDE TWO DIR MULTI-USE PATH ON N.SIDE OF MLK BLVD B/W CANYON CREST DR & CHICAGO AVE & WIDENING IOWA AVE B/W MLK BLVD & EVERTON PL INCLUDES GRADING, ASPHALT PAVING, SIGNS, & RESTRIPING & INSTALL 6 FT CLASS II BIKE LNS FOR 0.8 MI WITH 2 FT BUFFERS	12/31/2020
RIVERSIDE, CITY OF	RIV140843	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE-WELLS/ARLANZA SIDEWALK IMPROVEMENTS: INSTALL ADA RAMPS, DRIVEWAY APPROACHES & 32,730 SQ FT OF SIDEWALK ON ONE SIDE OF FIVE STREETS (CHALLEN AVE, IVANHOE AVE, KENT AVE, RUTLAND AVE, BABB AVE) SURROUNDING WELLS MIDDLE SCHOOL AND ARLANZA ELEMENTARY SCHOOL. TC USED TO MATCH ATP FUNDS	12/31/2020
RIVERSIDE, CITY OF	RIV140844	IN WESTERN RIVERSIDE CO. IN THE CITY OF RIVERSIDE - NORTE VISTA SIDEWALK IMPROVEMENTS: INSTALL ADA RAMPS, DRIVEWAY APPROACHES & 94,200 SQ.FT. OF SIDEWALK ON ONE SIDE OF FOUR STREETS (GAYLORD ST, JONES AVE, CHADBOURNE AVE, BUSHNELL AVE) NEAR NORTE VISTA HIGH SCHOOL, ROSEMARY KENNEDY ELEMENTARY SCHOOL, AND TWINHILL ELEMENTARY SCHOOL. TC USED TO MATCH ATP	12/31/2020
RIVERSIDE, CITY OF	RIV140852	IN WESTERN RIVERSIDE CO. IN THE CITY OF RIVERSIDE – DOWNTOWN & ADJOINING AREAS BICYCLE AND PED IMPROVEMENTS: 17 MILES OF BIKE LANES, 2,500 FT. OF CONNECTING SIDEWALKS, BIKE STATION AT METROLINK, CONNECTIVITY MAP KIOSKS, TWO NEW HAWK SIGNALS, BIKE STAGING AREA, BIKE SHARE TERMINAL, BIKE CORRALS, BIKE BLVD, PEDESTRIAN SIGNALS, WALKING PATH, ALL-WAY STOP CROSSWALK & NEW SIDEWALK.	12/31/2020
RIVERSIDE, CITY OF	RIV151205	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE - INSTALL FIBER-OPTIC SIGNAL INTERCONNECT IMPROVEMENTS ON MARKET ST/MAGNOLIA AVE FROM FIRST ST TO BUCHANAN ST AND INSTALL MISSING CONDUITS ON MAGNOLIA AVE FROM LA SIERRA AVE TO PIERCE ST UPDATING 49 SIGNALIZED INTERSECTIONS	12/31/2016
RIVERSIDE, CITY OF	RIV151209	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE - INSTALL UP TO FOUR BICYCLE STATIONS AND PROVIDE FORTY BICYCLES, TEN AT EACH STATION, TO IMPLEMENT A BIKE SHARE PROGRAM IN THE VICINITY OF DOWNTOWN RIVERSIDE, RIVERSIDE METROLINK STATION AND UNIVERSITY OF CALIFORNIA IN RIVERSIDE.	12/31/2016

Attachment A: Committed Transportation Control Measures (TCMs)

Riverside County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
RIVERSIDE, CITY OF	RIV151215	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE - CONSTRUCTION OF SIDEWALK ON ONE SIDE OF BRUCE STREET FROM ADAIR AVE TO LAKE AVE. IMPROVEMENTS INCLUDE A TOTAL OF 2,100 LF OF NEW SIDEWALK	10/31/2016
SAN JACINTO	RIV140856	IN WESTERN RIVERSIDE CO. IN THE CITY OF SAN JACINTO – SAFE & ACTIVE SAN JACINTO SRTS: INFRASTRUCTURE INCLUDES 33,275 SQ. FT. OF NEW SIDEWALK, 5,215 SQ. FT. OF EXISTING SIDEWALK UPGRADES, 52,800 SQ. FT. OF BIKE TRAILS WITHIN WALKING DISTANCE TO SCHOOLS; NON-INFRASTRUCTURE INCLUDES PED/BIKE SAFETY EDUCAITON, SRTS WORKSHOPS, DEVELOPMENT OF SRTS PLANS FOR EACH SCHOOL, AND OUTREACH.	12/31/2020
TEMECULA	RIV62029	IN SOUTHWEST RIVERSIDE COUNTY IN TEMECULA ON TEMECULA PKWY (FORMERLY SR79) AT LA PAZ ST: ACQUIRE LAND, DESIGN AND CONSTRUCT PARK-AND-RIDE LOT - 157 SPACES. OTHER IMPROVEMENTS INCLUDE THE CONSTRUCTION OF 10 BICYCLE LOCKERS, PASSENGER LOAD/UNLOAD ZONE AND ADA ACCESSIBLE PARKING.	9/1/2016
WILDOMAR	RIV151213	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF WILDOMAR - WIDENING OF GRAND AVE (CLINTON KEITH RD TO DAVID BROWN MIDDLE SCHOOL) TO INCLUDE A CLASS II BIKE LANE AND MINIMAL WORK TO INCORPORATE CLASS II/III BIKE LANES ON CLINTON KEITH RD FROM GRAND AVE TO GEORGE AVE. IMPROVEMENTS INCLUDE A TOTAL OF 7,300 LF OF NEW BIKE LANES	8/31/2016
WILDOMAR	RIV151214	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF WILDOMAR - WIDENING OF GRAND AVE (CORYDON RD TO DAVID BROWN MIDDLE SCHOOL) TO INCLUDE A CLASS II BIKE LANES. IMPROVEMENTS INCLUDE A TOTAL OF 12,000 LF OF NEW BIKE LANES	8/31/2016

Attachment A: Committed Transportation Control Measures (TCMs)

San Bernardino County			
Lead Agency	**Project ID**	**Project Description**	**Completion Date**
RIALTO	200450	RIALTO METROLINK STATION - INCREASE PARKING SPACES FROM 225-775	6/30/2016
SANBAG	20061012	DOWNTOWN S.B. PASSENGER RAIL – FROM SAN BERNARDINO METROLINK STATION TO APPROX. 1 MILE EAST TO A NEW TRANSIT STATION AT RIALTO AVE AND E ST. IN DOWNTOWN SAN BERNARDINO	8/30/2016
SANBAG	2011150	SOUTH COAST AIR BASIN RIDESHARE PROGRAM (TOLL CREDITS ARE BEING USED AS MATCH FOR CMAQ IN FY14/15 FOR $233)	12/1/2019
SANBAG	20150108	BICYLE AND PEDESTRIAN ACCESSIBILITY IMPROVEMENTS ALONG SIX METROLINK TRANSIT STATIONS (MONTCLAIR, UPLAND, RANCHO CUCAMONGA,FONTANA, RIALTO, AND SAN BERNARDINO) PHASE I. (TOLL CREDIT TO MATCH ATP IN ALL PHASES)	12/31/2021
OMNITRANS	20150109	PEDESTRIAN & BICYCLE ACCESS IMPROVEMENTS WITHIN 1/2 MILE OF RAPID TRANSIT STATIONS, INCLUDING SIDEWALK AND CURB RAMP REPLACEMENT & BIKE PARKING AT STATIONS (TERMINI AT POMONA DOWNTOWN METROLINK STATION & KAISER MEDICAL CENTER FONTANA, FOLLOWING HOLT AVE/BLVD, ARCHIBALD AVE, MILLIKEN AVE, FOOTHILL BLVD, & SIERRA AVE).	7/3/12019

Note: Projects may include TCM and non-TCM portions. Committed TCMs include only that portion of the projects that meets the definition of TCMs.

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 1. Programs for Improved Public Transit					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
1.1	Regional Express Bus Program	Purchase of buses to operate regional express bus services.	Yes		CTCs (MTA, OCTA), Transit Operators
1.2	Transit access to airports	Operation of transit to airport to serve air passengers.	Yes		Transit Operators, Burbank Glendale Pasadena Airport, CTCs (MTA, SCRRA)
1.3	Accelerate Bus Retrofit Program	Accelerate application of retrofit of diesel-powered buses to achieve earlier compliance with state regulations.	Yes		CTCs (MTA, OCTA), Transit Operators
1.4	Mass transit alternatives	Major change to the scope and service levels.	Yes		SCAG, CTCs
1.5	Expansion of public transportation systems	Expand and enhance existing public transit services.	Yes		CTCs
1.6	Transit service improvements in combination with park-and-ride lots and parking Management	Local jurisdictions and transit agency improve the public transit system and add new park-and-ride facilities and spaces on an as needed basis.	Yes		CTCs (MTA, SCRRA)

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 1. Programs for Improved Public Transit					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
1.7	Free transit during special events	Require free transit during selected special events to reduce event-related congestion and associated emission increases.	No *(The Mobile Source Air Pollution Reduction Review Committee has been co-funding free event center shuttle service demonstration projects)*	The Legislature significantly reduced authority of SCAQMD to implement indirect source control measures through revisions to the Health & Safety Code (HSC 40717.8). Transit agencies should decide individually whether this measure is economically feasible for them.	
1.8	Require that government employees use transit for home to work trips, expand transit, and encourage large businesses to promote transit use	Require all government employees use transit a specified number of times per week, or expand transit, and encourage business to promote transit use.	Yes		CTCs
1.9	Increase parking at transit centers or stops	Encourage transit convenience by providing additional parking at transit centers.	Yes		CTCs
1.10	Expand regional transit connection ticket distribution	Provides interchangeability of transit ticket.	Yes		CTCs, Metrolink
1.11	Bus Signal Priority	Wireless bus signal priority system on bus fleets for increased operation efficiency and travel time savings.	Yes		Transit Agencies

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 1. Programs for Improved Public Transit					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
1.12	Passenger rail improvements	Installation of additional platforms, double tracks, concrete ties, bridges, signal relocation.	Yes		Cities, MTAs
1.13	Alternative Fuel Buses	Self-explanatory.	Yes		Cities, Transit Agencies
1.14	Intermodal Centers	Improved transit connection of various travel modes	Yes		Cities, Transit Agencies
1.15	Maglev	Construct regional low-speed magnetic levitation transit	No	Though considered in past South Coast transportation plans, Maglev has never been a committed TCM; in addition, the region is already being serviced by light rail	
1.16	High Speed Rail	Construct high speed rail connecting large metropolitan centers in the state	Yes		HSRA

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 2. Restriction of Certain Roads or Lanes to, or Construction of Such Roads or Lanes for Use By, Passenger Buses or High Occupancy Vehicles					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
2.1	Update High Occupancy Vehicle (HOV) Lane Master Plan	Analysis of increased enforcement, increasing occupancy requirements, conversion of existing HOV lanes to bus only lanes and/or designation of any new carpool lanes as bus-only lanes; utilization of freeway shoulders for peak-period express bus use; commercial vehicle buy-in to HOV lanes; and appropriateness of HOV lanes for corridors that have considered congestion pricing or value pricing.	Yes		SCAG, Caltrans, CTCs
2.2	Fixed lanes for buses and carpools on arterials	Provide fixed lanes for buses and carpools on arterial streets where appropriate.	Yes		CTCs (MTA, OCTA), LA City
2.3	Expand number of freeway miles available, allow use by alternative fuel vehicles, changes to HOV lane requirements and hours	Various measures evaluated in many ozone nonattainment areas. Specifics vary according to freeway system, use patterns and local characteristics.	Yes		CARB, Caltrans
2.4	Express toll lanes/High Occupancy Toll (HOT) Lanes	Self-explanatory.	Yes		Caltrans, CTCs

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 3. Employer-Based Transportation Management Plans, Including Incentives					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
3.1*	Commute solutions	The federal law that complements parking cash-out is called the *Commuter Choice Program*. It provides for benefits that employers can offer to employees to commute to work by methods other than driving alone.	Yes		Employer, SCAQMD
3.2*	Parking cash-out	State law requires certain employers who provide subsidized parking for their employees to offer a cash allowance in lieu of a parking space.	Yes		Employer, SCAQMD
3.3*	Employer Rideshare Program Incentives	Employer rideshare incentives and introduction of strategies designed to reduce single occupant vehicle trips. Examples include: employee awareness campaigns, Transportation Management Associations (TMA) membership, alternative work hours, and financial incentives.	Yes		Employer, SCAQMD
3.4*	Implement Parking Charge Incentive Program	Evaluate feasibility of an incentive program for cities and employers that convert free public parking spaces to paid spaces. Review existing parking polices as they relate to new development approvals.	Yes		Cities, Counties, Employer

* *This measure relates to SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Administered by AQMD, Rule 2202 provides a menu of options for employers in choosing how they will comply. Individual employers implement the mitigation option(s) that they have chosen.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 3. Employer-Based Transportation Management Plans, Including Incentives					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
3.5*	Preferential parking for carpools and vanpools	This measure encourages public and private employers to provide preferential parking spaces for carpools and vanpools to decrease the number of single occupant automobile work trips. The preferential parking could include covered parking spaces or close-in spaces.	Yes		Employer, SCAQMD
3.6*	Employee parking fees	Encourage public and private employers to charge employees for parking.	Yes		Employer, SCAQMD
3.7	Merchant transportation incentives	Implement "non-work" trip reduction ordinances requiring merchants to offer customers mode shift travel incentives such as free bus passes and requiring owners/managers/developers of large retail establishments to provide facilities for non-motorized modes.	No	Require state legislation.	
3.8*	Purchase/lease/third-party vans for vanpool programs	Provide a specified number of vans for use in employee commute travel.	Yes		Employer, SCAQMD

* *This measure relates to SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Administered by AQMD, Rule 2202 provides a menu of options for employers in choosing how they will comply. Individual employers implement the mitigation option(s) that they have chosen.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 3. Employer-Based Transportation Management Plans, Including Incentives					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
3.9*	Encourage merchants and employers to subsidize the cost of transit for employees	Provide outreach and possible financial incentives to encourage local employers to provide transit passes or subsidies to encourage less individual vehicle travel.	Yes		Employer, SCAQMD
3.10*	Compressed work weeks	Work 80 hours in 9 days, or 40 hours in 4 days, or 36 hours in 3 days in lieu of working 40 hours in 5 days.	Yes		Employer, SCAQMD
3.11*	Telecommuting	Goal of specified percentage of employees telecommuting at least one day per week.	Yes		Employer, SCAQMD
3.12	Income Tax Credit to Telecommuters	Provide tax relief to employees who participate in telecommuting programs.	No	Requires State legislation.	

* *This measure relates to SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Administered by SCAQMD, Rule 2202 provides a menu of options for employers in choosing how they will comply. Individual employers implement the mitigation option(s) that they have chosen.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 4. Trip Reduction Ordinance
In December 1995, Congress changed the Clean Air Act Amendments to make the Employee Commute Option program voluntary (no longer mandatory). California State Law prohibits mandatory employer based trip reduction ordinance programs (SB437). (HSC 40717.9) To account for these restrictions, SCAQMD Rule 2202 provides employers with a menu of options to reduce mobile source emissions generated from employee commutes. Rule 2202 complies with federal and state Clean Air Act requirements, HSC 40458, and HSC 182(d)(1)(B) of the federal Clean Air Act. Nevertheless, some jurisdictions continue to implement Trip Reduction Ordinances. For example, the City of Santa Monica requires new and existing non-residential development projects to adopt Emission Reduction Plans and pay transportation impact fees to reduce traffic congestion and improve air quality in the city.

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 5. Traffic Flow Improvement Programs That Achieve Emissions Reductions					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
5.1	Develop Intelligent Transportation Systems	The term "Intelligent Transportation Systems" includes a variety of technological applications intended to produce more efficient use of existing transportation corridors.	Yes		CTCs, Caltrans
5.2	Coordinate traffic signal systems	This measures implements and enhances synchronized traffic signal systems to promote steady traffic flow at moderate speeds.	Yes		CTCs, Counties, and Cities
5.3	Reduce traffic congestion at major intersections	This measure implements a wide range of traffic control techniques designed to facilitate smooth, safe travel through intersections. These techniques include signalization, turn lanes or median dividers. The use of grade separations may also be appropriate for high volume or unusually configured intersections.	Yes		CTCs, Counties, and Cities
5.4	Site-specific transportation control measures	This measure could include geometric or traffic control improvements at specific congested intersections or at other substandard locations. Another example might be programming left turn signals at certain intersections to lag, rather than lead, the green time for through traffic.	Yes		CTCs, Counties, and Cities
5.5	Removal of on-street parking	Require all commercial/industrial development to design and implement off-street parking.	Yes		CTCs, Counties, and Cities

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 5. Traffic Flow Improvement Programs That Achieve Emissions Reductions					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
5.6	Reversible lanes	Implement reversible lanes on arterial streets to improve traffic flow where appropriate.	Yes		CTCs, Counties, and Cities
5.7	One-way streets	Redesignate streets (or portions of in downtown areas) as one-way to improve traffic flow.	Yes		CTCs, Counties, and Cities
5.8	On-Street parking restrictions	Restrict on-street parking where appropriate.	Yes		CTCs, Counties, and Cities
5.9	Bus pullouts in curbs for passenger loading	Provide bus pullouts in curbs, or queue jumper lanes for passenger loading and unloading.	Yes		CTCs, Counties, and Cities
5.10	Additional freeway service patrol	Operation of additional lane miles of new roving tow truck patrols to clear incidents and reduce delay on freeways during peak periods.	Yes		CTCs, CHP
5.11	Fewer stop signs, remove unwarranted and "political" stop signs and signals	Improve flow-through traffic by removing stop signs and signals. Potential downside in safety issues.	Yes		CTCs, Counties, and Cities
5.12	Ban left turns	Banning all left turns would stop the creation of bottlenecks although slightly increase travel distances.	No	No clear demonstration of emission reduction benefits.	
5.13	Changeable lane assignments	Increase number of one-way lanes in congested flow direction during peak traffic hours.	Yes		Caltrans, CTCs, Counties, and Cities

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 5. Traffic Flow Improvement Programs That Achieve Emissions Reductions					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
5.14	Adaptive traffic signals and signal timing	Self-explanatory.	Yes		Counties, Counties, and Cites
5.15	Freeway bottleneck improvements (add lanes, construct shoulders, etc.)	Identify key freeway bottlenecks and take accelerated action to mitigate them.	Yes		Caltrans, SCAG
5.16	Minimize impact of construction on traveling public. Have contractors pay when lanes are closed as an incentive to keep lanes open.	Prohibit lane closures during peak hours, limit work to weekends and/or nights.	Yes		Caltrans
5.17	Internet provided road and route information	Reduce travel on highly congested roadways by providing accessible information on congestion and travel.	Yes		CTCs, Caltrans, Counties, Cities
5.18	Regional route marking systems to encourage underutilized capacity	Encourage travel on local roads and arterials by better route marking to show alternatives.	Yes		Caltrans, Counties, Cities
5.19	Congestion management field team to clear incidents	Self-explanatory.	Yes		CTCs, CHP
5.20	Use dynamic message signs to direct/smooth speeds during incidents	Self-explanatory.	Yes		Caltrans
5.21	Get real-time traffic information to trucking centers and rental car agencies	Reduce travel in congested areas by providing information directly to high volume travelers.	Yes		CTCs, Caltrans

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 5. Traffic Flow Improvement Programs That Achieve Emissions Reductions					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
5.22	55 mph speed limit during ozone season	Self-explanatory	No	Reductions in freeway speeds are governed by California Vehicle Code 22354, which authorizes Caltrans to lower speeds after doing an engineering and traffic survey, which shows that the legislatively-set maximum speed of 65 mph, is more than is reasonable or safe. No consideration of emissions reductions is contemplated under this statute. This measure is not feasible until the statute is changed.	
5.23	Require 40 mph speed limit on all facilities	Depends on area's emission factors.	No	The California Vehicle Code Sections 22357 and 22358 mandates a methodology for setting speed limits for local areas. This measure is not feasible until the statute is changed.	

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 5. Traffic Flow Improvement Programs That Achieve Emissions Reductions					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
5.24	Require lower speeds during peak periods	Self-explanatory.	No	The California Vehicle Code Sections 22357 and 22358 mandates methodology for setting speed limits for local areas. This measure is not feasible until the statute is changed.	
5.25	On-street parking restrictions	Restrict on-street parking where appropriate.	Yes		State, Counties, and Cities

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 6. Fringe and Transportation Corridor Parking Facilities Serving Multiple Occupancy Vehicle Programs or Transit Service					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
6.1	Park-and-ride lots	Develop, design, and implement new park-and-ride facilities in locations where they are needed.	Yes		Caltrans, CTCs, Transit Operators, SCRRA
6.2	Park-and-ride lots serving perimeter counties	Specific to a locality.	Yes		Caltrans, CTCs, Transit Operators, SCRRA

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 7. Programs to Limit or Restrict Vehicle Use in Downtown Areas or Other Areas of Emission Concentration Particularly During Periods of Peak Use					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
7.1	Off-peak goods movement	Restrict truck deliveries by time or place in order to minimize traffic congestion during peak periods.	Yes		PierPass A non-profit organization of marine terminal operators at the Ports of Los Angeles and Long Beach.
7.2	Truck restrictions during peak periods	Restrict truck travel during peak periods in order to minimize traffic congestion.	Yes		See Measure 7.1
7.3	Involve school districts in encouraging walking/bicycling to school	Decrease vehicle emissions associated with school trips by reducing these trips through education and out-reach programs.	Yes		School Districts
7.4	Adjust school hours so they do not coincide with peak traffic periods and ozone seasons	Measure to reduce travel during peak periods and ozone-contributing periods in the early morning.	No	School hours are dictated by many variables, including overcrowding and year-round schooling. This measure is not feasible.	

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 7. Programs to Limit or Restrict Vehicle Use in Downtown Areas or Other Areas of Emission Concentration Particularly During Periods of Peak Use					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
7.5	Area-wide tax for parking	Reduce driving by limiting parking through implementation of pricing measures.	Yes		Counties, Cities
7.6	Increase parking fees	Reduce driving by limiting parking spaces through pricing measures.	No	Attorney General ruled SCAQMD lacks authority to implement this measure.	
7.7	Graduated pricing starting with highest in Central Business District (CBD)	Increase parking charge in the CBD or other high volume areas in a city to discourage vehicle travel in these areas.	Yes		Market Driven
7.8	Purchase parking lots and convert into other land uses	Limit parking by converting available parking to other land uses to discourage driving.	Yes		Counties and Cities

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 7. Programs to Limit or Restrict Vehicle Use in Downtown Areas or Other Areas of Emission Concentration Particularly During Periods of Peak Use					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
7.9	Limit the number of parking spaces at commercial airlines to support mass transit	Reduce airport travel by limits on parking at airports.	No	Regulatory agencies do not have the legal authority to make local land use decisions. It is at the discretion of the regional or local airport authority to make local land use decisions pertaining to airports. Additionally, It is necessary to have significant mass transit available at airports before this measure can be implemented.	
7.10	No CBD vehicles unless LEV, alternative fuel, or electric	Define high-use area and ticket any vehicles present unless they are low emitting, alternative fueled or electric.	No	The Legislature significantly reduced authority of the SCAQMD to implement indirect source control measures through revisions to the Health & Safety Code (40717.6, 40717.8, and 40717.9).	
7.11	Auto restricted zones	No vehicles allowed in certain areas where high emissions, congestion or contribution to ozone problems.	Yes		Counties and Cities
7.12	Incentives to increase density around transit centers	Lower travel by increasing residential and commercial density in areas near transit.	Yes		Counties and Cities

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 7. Programs to Limit or Restrict Vehicle Use in Downtown Areas or Other Areas of Emission Concentration Particularly During Periods of Peak Use					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
7.13	Land use/air quality guidelines	Guidelines for developments that contribute to achieving air quality goals.	Yes		CARB, SCAQMD,SCAG
7.14	Cash incentives to foster jobs/housing balance	Specific to locality – encouraged by California Clean Air Plan.	No	Has never been a committed TCM.	
7.15	Trip reduction oriented development	Land use decisions that encourage trip reductions.	Yes		Counties, Cities, CTCs
7.16	Transit oriented development	Land use decisions that encourage walkable communities and multi-modal transit systems.	Yes		Counties, Cities, CTCs
7.17	Sustainable development	Land use decisions that create equitable standards of living to satisfy the basic needs of all peoples, all while taking the steps to avoid further environmental degradation.	Yes		Counties, Cities, CTCs
7.18	Smart Parking Detection System	Utilize mobile communication devices to access the parking availability at multiple lots and provide real-time inventory of parking spaces.	Yes		Cities

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 8. Programs For the Provision of All Forms of High-Occupancy, Shared-Ride Services					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
8.1*	Financial Incentives, Including Zero-Bus Fares	Provide financial incentives or other benefits, such as free or subsidized bus passes and cash payments for not driving, in lieu of parking spaces for employees who do not drive to the workplace.	Yes		SCAQMD, Employer
8.2	Internet ride matching services	Provide match-lists, route info, hours and contact information over the internet to assist individuals in joining or developing carpools.	Yes		CTCs, Employer
8.3*	Preferential parking for carpoolers	Provide free, covered, near-building parking or parking incentives to carpoolers.	Yes		SCAQMD, Employer
8.4*	Credits and incentives for carpoolers	Self-explanatory – form depends on locality.	Yes		SCAQMD, Employer
8.5*	Employers provide vehicles to carpoolers for running errands or emergencies	Having vehicles available for workday errands makes it easier to go to work without one.	Yes		SCAQMD, Employer
8.6	Subscription services	Free van services to provide transportation for the elderly, handicapped or other individuals who have no access to transportation.	Yes		County, CTCs, Employer

* *This measure relates to SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Administered by SCAQMD, Rule 2202 provides a menu of options for employers in choosing how they will comply. Individual employers implement the mitigation option(s) that they have chosen.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 8. Programs For the Provision of All Forms of High-Occupancy, Shared-Ride Services					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
8.7	School carpools	Self-explanatory and voluntary.	Yes		School Parents
8.8*	Guaranteed ride home	Self-explanatory.	Yes		CTCs, SCAQMD, Employer
8.9	Transit Voucher Program	Transit vouchers for elderly and low income commuters.	Yes		CTCs, Cities, Counties
8.10	Rideshare and vanpool services	Non-employer based rideshare and vanpool option near transit stations.	Yes		CTCs, Transit Agencies, Cities and Counties

* *This measure relates to SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Administered by SCAQMD, Rule 2202 provides a menu of options for employers in choosing how they will comply. Individual employers implement the mitigation option(s) that they have chosen.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 9. Programs to Limit Portions of Road Surfaces or Certain Sections of the Metropolitan Area to the Use of Non-Motorized Vehicles or Pedestrian Use, Both as to Time and Place					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
9.1	Establish Auto-Free Zones and pedestrian malls	Establish auto free zones and pedestrian malls where appropriate.	Yes		Counties and Cities
9.2	Encouragement of pedestrian travel	This measure involves encouraging the use of pedestrian travel as an alternative to automobile travel. Pedestrian travel is quite feasible for short shopping, business, or school trips.	Yes		CTCs, Counties, Cities, SCAG
9.3	Bicycle/Pedestrian Program	Fund high priority projects in countywide plans consistent with funding availability.	Yes		CTCs, Counties, and Cities
9.4	Close certain roads for use by non-motorized traffic	During special events, weekends, or certain times of the day, close some roads to all but non-motorized traffic.	Yes		Counties, and Cities
9.5	Encourage bicycle travel	Promotion of bicycle travel to reduce automobile use and improve air quality. Bikeway system planning, routes for inter-city bike trips to help bicyclists avoid other, less safe facilities. Another area for potential actions is the development and distribution of educational materials, regarding bicycle use and safety.	Yes		SCAG, CTCs, Counties, Cities, and Employer

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 9. Programs to Limit Portions of Road Surfaces or Certain Sections of the Metropolitan Area to the Use of Non-Motorized Vehicles or Pedestrian Use, Both as to Time and Place					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
9.6	Free bicycles	Provide free bikes in the manner of Boulder, CO. Simple utilitarian bikes that can be used throughout the metro area and dropped off at destination for use by anyone desiring use.	No	Evidence suggests that bicycle theft is a problem in other programs and renders the measure technically and economically infeasible.	
9.7*	Cash rebates for bikes	Provide financial incentives to purchase bicycles and thereby encourage use.	Yes		Employer
9.8	Close streets for special events for bikes and pedestrians	Self-explanatory.	Yes		Counties and Cities
9.9	Use condemned dirt roads for bike trails	Self-explanatory.	No	Not applicable because there are no condemned dirt roads in the region.	

* *This measure relates to SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Administered by SCAQMD, Rule 2202 provides a menu of options for employers in choosing how they will comply. Individual employers implement the mitigation option(s) that they have chosen.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 10. Programs for Secure Bicycle Storage Facilities and Other Facilities, Including Bicycle Lanes, for the Convenience and Protection of Bicyclists, in Both Public and Private Areas					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
10.1*	Bike racks at work sites	Self-explanatory.	Yes		SCAQMD, Employer
10.2	Bike racks on buses	Bike racks would be placed on a to-be-determined number of buses to increase bicycle travel.	Yes		CTCs, Transit Operators, SCRRA
10.3	Regional bicycle parking	Bike Transit Centers	Yes		CTCs
10.4	Develop bicycle travel facilities	Encourages a variety of capital improvements to increase bicycle use. Off-street bikeways where high-speed roadways preclude safe bicycling. Clearly mark travel facilities with signs and provide adequate maintenance.	Yes		CTCs, Transit Operators, SCRRA
10.5	Expedite bicycle projects from RTP/SCS	Create bicycle and pedestrian master plan and build out at an accelerated rate to achieve benefits in advance of attainment deadline.	Yes		SCAG, CTCs, Counties, Cities
10.6	Provide bike/pedestrian facilities safety patrols	Self-explanatory.	Yes		Counties and Cities

* *This measure relates to SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Administered by SCAQMD, Rule 2202 provides a menu of options for employers in choosing how they will comply. Individual employers implement the mitigation option(s) that they have chosen.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 10. Programs for Secure Bicycle Storage Facilities and Other Facilities, Including Bicycle Lanes, for the Convenience and Protection of Bicyclists, in Both Public and Private Areas					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
10.7	Inclusion of bicycle lanes on thoroughfare projects	Self-explanatory.	Yes		State, CTCs, Counties, and Cities
10.8	Bicycle lanes on arterial and frontage roads	Self-explanatory.	Yes		State, Counties, and Cities
10.9	Bicycle route lighting	Self-explanatory.	Yes		State, Counties, Cities
10.10	Complete Streets	Install bicycle and pedestrian facilities, upgrade traffic control systems, urban design improvements, street lights and transit connections.	Yes		Cities, Counties, CTCs, Transit Agencies
10.11	Bike Share	Provide bike-share and neighborhood electric vehicle transit services in downtown areas.	Yes		Cities, Counties, Transit Agencies
10.12	Bike Purchase Incentives	Cash incentives to transit riders to purchase collapsible or electric bikes.	Yes		Cities
10.13	Longer Bike Racks on Buses	Install or modify bike rack on transit buses to accommodate up to three bikes	Yes		Transit Agencies
10.14	Greenway Network	Use riverbeds and other rights-of-way for bike and pedestrian paths to separate them from auto traffic	Yes		Cities, Counties

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 10. Programs for Secure Bicycle Storage Facilities and Other Facilities, Including Bicycle Lanes, for the Convenience and Protection of Bicyclists, in Both Public and Private Areas					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
10.15	First Mile/Last Mile Program	Variety of strategies to encourage active transportation including wayfinding, sidewalk improvements, pedestrian priority signalization, and bike/pedestrian facilities near transit.	Yes		CTCs, Transit Agencies

Section 108 (f) 11. Programs to Control Extended Idling of Vehicles					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
11.1	Limit excessive car dealership vehicle starts	Require car dealers to limit the starting of vehicles for sale on their lot(s) to once every two weeks. Presently, a number of new and used car dealers start their vehicles daily to avoid battery failure and assure smooth start-ups for customer test drives.	No	This measure was investigated by the SCAQMD and it was determined that in contrast to colder climates where vehicles are started on a daily basis, vehicles in the South Coast started much less frequently. For this reason it was determined not to be technically feasible. No clear demonstration of emission reduction benefits.	

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 11. Programs to Control Extended Idling of Vehicles					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
11.2	Encourage limitations on vehicle idling	Encourage limitations to limit extended idling operations.	Yes		CARB
11.3	Turn off engines while stalled in traffic	Public outreach or police-enforced program.	No	This measure raises safety and congestion concerns. No clear demonstration of emission reduction benefits.	
11.4	Outlaw idling in parking lots	Self-explanatory and police-enforced program.	No	Enforcement of idle restrictions is a low priority for police relative to their other missions. The cost effectiveness of this measure has not been demonstrated. It is not economically feasible. No clear demonstration of emission reduction benefits.	
11.5	Reduce idling at drive-throughs; ban drive-throughs	Mandate no idling or do not allow drive-through windows during ozone season.	No	No clear demonstration of emission reduction benefits. This measure is not economically feasible.	
11.6	Promote use of pony engines	Use special battery engines to keep air conditioning and other truck systems working while truck not in use.	Yes		CARB

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 11. Programs to Control Extended Idling of Vehicles					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
11.7	Idle restrictions at airport curbsides	Self-explanatory and police-enforced.	Yes		Airport Authority
11.8	Truck Stop Electrification	Provide electric charging stations for at truck stops to power heating/AC units and other on-board equipment.	Yes		CARB

Section 108 (f) 12. Program to Reduce Motor Vehicle Emissions Consistent with Title II, Which Are Caused by Extreme Cold Start Conditions	
Not applicable. The definition of an "extreme cold start" specifies temperatures below 20 degrees Fahrenheit.	Not applicable in the South Coast - No extreme cold start conditions

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 13. Employer-sponsored programs to permit flexible work schedules					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
13.1*	Alternative work schedules	Enables workers to choose their own working hours within certain constraints. Flextime provides the opportunity for employees to use public transit, ridesharing, and other Nonmotorized transportation. A related strategy, staggered work hours, is designed to reduce congestion in the vicinity of the workplace. Alternative workweeks have been implemented extensively by large private and public employers.	Yes		SCAQMD, Employer
13.2*	Modifications of work schedules	Implement alternate work schedules that flex the scheduled shift time for employees. Encourage the use of flexible or staggered work hours to promote off-peak driving and accommodate the use of transit and carpooling.	Yes		SCAQMD, Employer
13.3*	Telecommunications-Telecommuting/Teleconferencing	Encourage telecommuting and use of telecommuting/teleconferencing equipment in place of motor vehicle use where appropriate.	Yes		SCAQMD, Employer

* *This measure relates to SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Administered by SCAQMD, Rule 2202 provides a menu of options for employers in choosing how they will comply. Individual employers implement the mitigation option(s) that they have chosen.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 14. Programs and Ordinances to facilitate Non-automotive travel, provision to and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
14.1	Areawide public awareness programs	This measure focuses on conducting ongoing public awareness programs throughout the year to provide the public with information on air pollution and encourage changes in driving behavior and transportation mode use.	Yes		SCAQMD
14.2	Special event controls	This measure would require new and existing owners/operators of the special event centers to reduce mobile source emissions generated by their events. A list of optional strategies would be available that reduce mobile source emissions.	Yes		Counties, Cities, Special Event Operators
14.3	Land Use/development alternatives	This measure includes encouraging land use patterns, which support public transit and other alternative modes of transportation. In general, this measure would also encourage land use patterns designed to reduce travel distances between related land uses	Yes		CARB, SCAG, SCAQMD, Counties, Cities
14.4	Voluntary No-Drive Day Programs	Conduct voluntary No-Drive Day Programs during the ozone season through media and employer based public awareness activities.	Yes		CTCs

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 14. Programs and Ordinances to facilitate Non-automotive travel, provision to and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
14.5**	New Development Air Quality Impact Evaluation	Evaluate air quality impacts of new development and recommend or require mitigation for significant adverse impacts.	Yes		SCAQMD, Counties, Cities, CEQA Lead Agencies
14.6	Transportation for Livable Communities (TLC)/Housing Incentive program	Program provides planning grants, technical assistance, and capital grants to help cities and Nonprofit agencies define and implement transportation projects that support community plans including increased housing near transit.	Yes		SCAG, State
14.7	Incentives to increase density around transit centers	Lower travel by increasing residential and commercial density in areas near transit.	Yes		Counties, Cities, CTCs
14.8	Incentives for cities with good development practices	Provide financial or other incentives to local cities that practice air quality-sensitive development.	Yes		CTCs, Counties, Cities
14.9	Increase State gas tax	Self-explanatory.	No	Need State legislation.	

** SC*AQMD and SCAG recommend mitigation as commenting agencies on new development projects; cities and counties require mitigation under their discretionary authority as lead agency.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 14. Programs and Ordinances to facilitate Non-automotive travel, provision to and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
14.10	Pay-As-You-Drive Insurance	Self-explanatory.	No	Need State legislation. No clear demonstration of emission reduction benefits and does not advance attainment date..	

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 15. Programs for new construction and major reconstructions of paths, tracks or areas solely for the use by pedestrian or other Non-motorized means of transportation when commercially feasible and in the public interest					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
15.1[12]	Encourage Pedestrian Travel	Promote public awareness and use of walking as an alternative to the motor vehicle.	Yes		SCAQMD, SCAG, CTCs, Counties, Cities, Employer
15.2	Pedestrian and bicycle overpasses where safety dictates	Ongoing implementation as development occurs.	Yes		Counties, Cities

[12] *This measure relates to SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Administered by SCAQMD, Rule 2202 provides a menu of options for employers in choosing how they will comply. Individual employers implement the mitigation option(s) that they have chosen.*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

Section 108 (f) 16. Program to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
16.1	Counties assess ten dollar license plate fee to fund repair/replacement program for high-emitters	Self-explanatory.	Yes		CARB, BAR[13]
16.2	Offer incentives for retirement and replacement of vehicles for participants meeting specific requirements	Self-explanatory.	Yes		CARB, SCAQMD[14]
16.3	Demolish impounded vehicles that are high emitters	Self-explanatory.	No	Not economically feasible.	
16.4	Do whatever is necessary to allow cities to remove the engines of high emitting vehicles (pre-1980) that are abandoned and to be auctioned	Self-explanatory.	No	Not economically feasible.	
16.5	Accelerated retirement program	Identify high-emitting vehicle age groups and develop a program to remove them from use.	Yes		CARB, SCAQMD

[13] *Similar program administered with different funding source as part of smog check*

[14] *Voluntary car scrapping programs to generate credits*

Attachment B: 2016 South Coast AQMP Reasonably Available Control Measure (RACM) Analysis - TCMs

17. Other					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
17.1	Truck-Only Lanes	Self-explanatory.	Yes		Caltrans, CTCs
17.2	Promote business closures on high ozone days	Non-employer-based strategy to require local business to close on bad air quality days, thereby reducing travel.	No	No authority to implement; not economically feasible	
17.3	Clean Fleet Vehicles for Government Employees	Provide alternative fuel vehicles for government employees.	Yes		CARB, SCAQMD, Counties, Cities

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix V

Modeling and Attainment Demonstration

2016 AIR QUALITY MANAGEMENT PLAN



December 2016

DRAFT FINAL 2016 AQMP
APPENDIX V

MODELING AND ATTAINMENT DEMONSTRATIONS

DECEMBER 2016

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
GOVERNING BOARD

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Speaker of the Assembly Appointee

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CHAPTER 1

MODELING OVERVIEW

Introduction

Modeling Methodology

Uncertainties Associated with the Technical Analysis

Document Organization

Introduction

Air quality modeling to demonstrate future attainment of air quality standards is an integral part of the planning process to achieve clean air. Modeling provides the means to relate emission reductions from pollution sources to the resulting air quality improvements. The attainment demonstrations provided in the 2016 AQMP reflect updated emissions estimates, new technical information, enhanced air quality modeling techniques, updated attainment demonstration methodology, and the control strategies provided in Chapter 4. While the primary target of the 2016 AQMP is to demonstrate progress toward the 2008 8-hour ozone standard of 75 ppb by 2031, efforts to meet other air quality standards and the corresponding analyses are included in the 2016 AQMP and presented in this appendix. Both the revoked 1997 8-hour standard (80 ppb) and the revoked 1979 1-hour standard (120 ppb) are included in the analysis with attainment years of 2023 and 2022, respectively. This Appendix also provides detailed attainment demonstrations of the annual and 24-hour PM2.5 standards (12 and 35 $\mu g/m^3$).

The District's goal is to develop a control strategy and corresponding attainment demonstration that: 1) ensures that ambient air quality standards for all criteria pollutants are met by the established deadlines in the federal Clean Air Act (CAA) and 2) achieves an expeditious rate of progress towards attaining the air quality standards. The overall control strategy is designed such that efforts to achieve the standard for one criteria pollutant complement efforts to meet standards for other pollutants.

Background

The South Coast Air Basin is classified as an "extreme" nonattainment area for ozone. The 2016 AQMP addresses three ozone standards: the 2008 8-hour standard of 75 ppb, the revoked 1997 8-hour standard of 80 ppb, and the revoked 1-hour standard of 120 ppb. The attainment deadline years are 2031, 2023 and 2022, respectively. The emissions inventory and meteorological conditions were developed for 2012 base year.

The Basin is currently a "serious" nonattainment area for 24-hour PM2.5 and "moderate" nonattainment for annual PM2.5. The 2012 AQMP addressed attainment of the 2006 24-hour standard of 35 $\mu g/m^3$ by 2014; however, the unforeseen drought that occurred in the 2011-2014 time period inhibited the projected progress towards attainment. The District requested a voluntary bump-up from "moderate" status to "serious" nonattainment status in the "Supplement to the 24-Hour PM2.5 State Implementation Plan for the South Coast Air Basin" submitted to U.S. EPA in 2015 and subsequently approved in 2016. For "moderate" nonattainment areas, the attainment deadline was 2015 based on CAA *Title 1, Part D, Subpart 4, Section 188(c)(l),* which establishes that attainment must be reached by the end of the 6th calendar year after the effective date of designation. The year 2019 is the new attainment deadline for "serious" nonattainment areas for the 24-hour PM2.5 standard.

The Basin was designated a "moderate" nonattainment area for the 2012 annual PM2.5 standard of 12 $\mu g/m^3$ on April 15, 2015. This designation sets an attainment deadline of December 31, 2021. Despite the recent drought, the Basin shows continued improvement in annual PM2.5 design values. The base year annual PM2.5 design values at Mira Loma are lower than the previous 1997 standard of 15 $\mu g/m^3$, but do

not yet meet the new 2012 standard of 12 µg/m^3 (Figure 5-11), indicating that additional reductions may be needed to meet the more stringent standard. Acknowledging the challenges in meeting the standard, including the feasibility of proposed measures, uncertainties in drought conditions, and the potential inability to credit all ozone strategy reductions towards PM2.5 attainment if approved under CAA Section 182(e)(5), SCAQMD will request a voluntary bump-up to the "serious" classification, with a new attainment date of 2025. Future year attainment was analyzed for 2021, the original target for "moderate" nonattainment, and 2025, the revised attainment date for the requested "serious" status. This AQMP includes all the milestone years significant to future PM2.5 attainment status: 2019 (24-hour PM2.5 attainment date), 2021 (annual PM2.5 attainment date for "moderate" nonattainment status) and 2025 (annual PM2.5 attainment date for "serious" nonattainment status). In addition, 2023 was included in the analysis to evaluate co-benefits of the ozone strategy on PM attainment and to assess the practicability of an earlier PM2.5 attainment date.

Model Selection

The numerical platform employed in AQMP attainment demonstrations has been updated continually to reflect the state-of-the-science available at the time of plan development throughout the past decades.

During the development of the 2003 Plan, the District convened a panel of seven experts to independently review the regional air quality modeling conducted for ozone and PM10. The consensus of the panel was for the District to move to more current state-of-the-art dispersion platforms and chemistry modules.

At that time, the model selected for the 2007 AQMP ozone attainment demonstrations was the Comprehensive Air Quality Model with Extensions (CAMx) [Environ, 2002], using SAPRC99 chemistry. For PM2.5, the 2007 AQMP used the CAMx "one atmosphere" approach which coupled CB-IV gas-phase chemistry and a static two-mode particle size aerosol module as the particulate modeling platform. The CAMx "one atmosphere" chemistry approach better preserved mass consistency taking advantage of an advanced dispersion platform.

In the 2007 AQMP, CAMx coupled with the SAPRC99 chemistry was used to demonstrate attainment of the federal ozone standard. A total of 36 days were simulated, covering 6 ozone episode periods from which 19 days meeting performance criteria were selected for inclusion in the attainment demonstration. Future year ozone projections were developed using the CAMx/SAPRC99 couple supported by MM5 meteorological data fields and day specific emissions inventories.

The 2007 AQMP PM2.5 attainment demonstration incorporated the CAMx/CB-IV chemistry and aerosol modules together with the MM5 meteorological fields. The PM2.5 analyses relied on average week day and weekend day emissions profiles that were adjusted for monthly averaged temperature and humidity. The annual and episodic PM2.5 demonstrations were based on 365 days of particulate simulation. It is important to note that PM2.5 and ozone attainment demonstrations were run independently due to differences in the computational requirements resulting from separate modeling domains and definitions of vertical structure.

In keeping with the recommendations of the expert panel as well as the Scientific Technical Peer Modeling Review Committee, the 2012 AQMP continued to move forward in the incorporation of state-of-the-art modeling platforms to conduct regional modeling analyses in support of the PM2.5 attainment demonstrations and ozone updates. The 2012 AQMP PM2.5 attainment demonstration was developed using the U.S. EPA supported Community Multiscale Air Quality (CMAQ) (version 4.7.1) air quality modeling platform with SAPRC99 chemistry, and the Weather Research and Forecasting model (WRF) (version 3.3) meteorological fields. Supporting PM2.5 and ozone simulations were also conducted using the most current, publicly available version of CAMx (Environ, Inc, version 5.3) which also used SAPRC99 chemistry and WRF meteorology. The model analyses were conducted on an expanded domain, with increased resolution in the vertical structure and a 4 x 4 km horizontal grid size.

The 2016 AQMP ozone and PM2.5 attainment demonstration has been developed using the U.S. EPA recommended CMAQ (version 5.0.2) modeling platform with SAPRC07 chemistry, and the Weather Research and Forecasting Model (WRF) (version 3.6) meteorological fields. (Comprehensive descriptions of the CMAQ modeling system are provided by U.S. EPA at their SCRAM website: http://www.epa.gov/scram001/. Additional descriptions of the SAPRC99 chemistry module are provided at the UCR website: http://www.engr.ucr.edu/~carter/SAPRC/. Documentation of the NCAR WRF model is available from UCAR website: http://www.wrf-model.org/).

Modeling Methodology

Design Values

U.S. EPA guidance recommends the use of multiple year averages of design values, where appropriate, to dampen the effects of single year anomalies to the air quality trend due to factors such as adverse or favorable meteorology or radical changes in the local emissions profile. The trend of Basin ozone design values is presented in Figure V-1-1. The 8-hour design values have averaged a reduction of approximately 2 ppb per year over the 14-year period while the 1-hour design values have decreased 2.3 ppb per year on average. The most recent 8-hour design value (102 ppb) continues to exceed the 1997 8-hour ozone standard (80 ppb) by 28 percent and the 2006 ozone standard by 36 percent (75 ppb). In addition, the most recent 1-hour design value of 135 ppb exceeds the 1979 1-hour ozone standard (120 ppb) by 13 percent. In each case, the trend in ozone levels is steadily moving in the direction of air quality improvement.

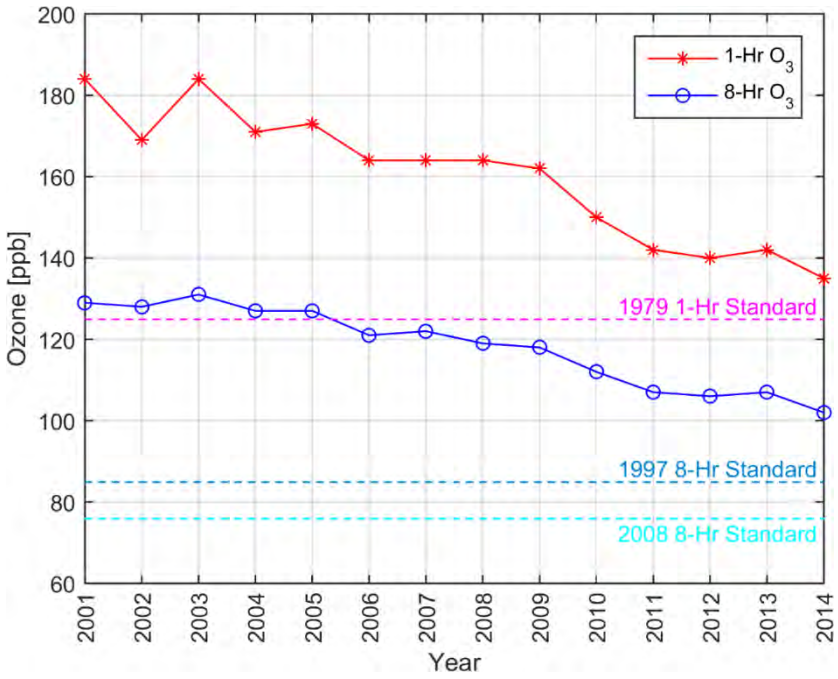


FIGURE V-1-1

South Coast Air Basin Ozone Design Values
Note: Each value represents the 3-year average of the 4th highest 8-Hour Average Ozone concentration. 1-hour Ozone design value was determined as the 4th highest value within a three year period.

The trend in the Basin 24-hour PM2.5 design values, determined from routinely monitored Federal Reference Methods (FRM) monitoring, from 1999 through 2014 (Figure V-1-2) depicts sharp reductions in concentrations over the period. However, the rate of decrease in both annual and 24-hour design values has slowed in recent years. The 24-hour PM2.5 design value for 2001 was 76 µg/m^3 while the 2014 design value (based on data from 2012, 2013 and 2014) is 38 µg/m^3. The annual PM2.5 design value has demonstrated a reduction of 15.2 µg/m^3 over the period from 2001 through 2014. The apparent slowing in the rate of PM2.5 reduction in recent years is largely due the reduced convection and wet deposition from the multi-year drought affecting the region. In the absence of this severe drought, it is anticipated that the Basin would be closer to attaining both the annual and 24-hour PM2.5 standards.

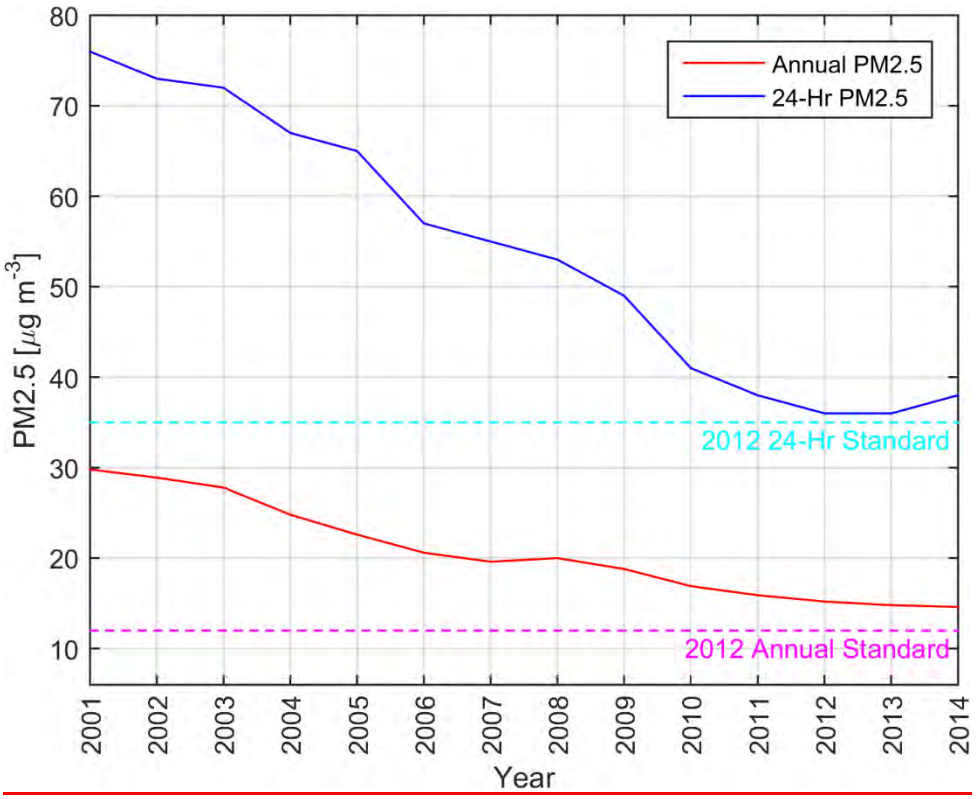


FIGURE V-1-2

South Coast Air Basin Annual PM2.5 and 24-Hour Average Design Values
Note: Each value represents the 3-year average of the highest annual average PM2.5 concentration

In its modeling guidance, U.S. EPA has recommended that a multiple year weighted design value be used in the attainment demonstrations. The 2012 AQMP relied on a set of 5-years of monitored particulate data centered on 2008, the base year selected for the emissions inventory development and the anchor year for the future year PM2.5 projections. The 2016 AQMP relies on a set of 5-years of monitored ozone and PM2.5 data centered on 2012, the base year of the analysis.

Regional Modeling

The 2012 AQMP employs the CMAQ air quality modeling platform with SAPRC07 chemistry and WRF meteorology as the primary tool used to demonstrate future year attainment of the ozone and PM standards. As in the 2012 AQMP attainment demonstrations, PM2.5 and ozone were modeled jointly with the same model configuration. Ozone simulations focused on the ozone season (May 1st to September 30th) and PM2.5 simulations were conducted for 366 days. Predicted daily maximum values of 24-hour PM2.5 and 8-hour ozone were calculated from the respective running 24-hour and 8-hour average simulated concentrations. In addition, daily-maximum 1-hour ozone values were calculated from the ozone simulations and annual average PM2.5 values were calculated from the PM2.5 simulations.

As in the 2012 AQMP, the 2016 AQMP simulations were conducted using a Lambert Conformal grid projection where the western boundary of the domain is at 084 UTM, over 100 miles west of the ports of

Los Angeles and Long Beach. The eastern boundary extends beyond the Colorado River, while the northern and southern boundaries of the domain extend to the San Joaquin Valley and the Northern portions of Mexico (3543 UTM). The grid size is 4 x 4 kilometers with a vertical resolution of 18 layers. Figure V-1-3 depicts the modeling domain which includes a grid of 154 cells from west to east and 102 cells from south to north.

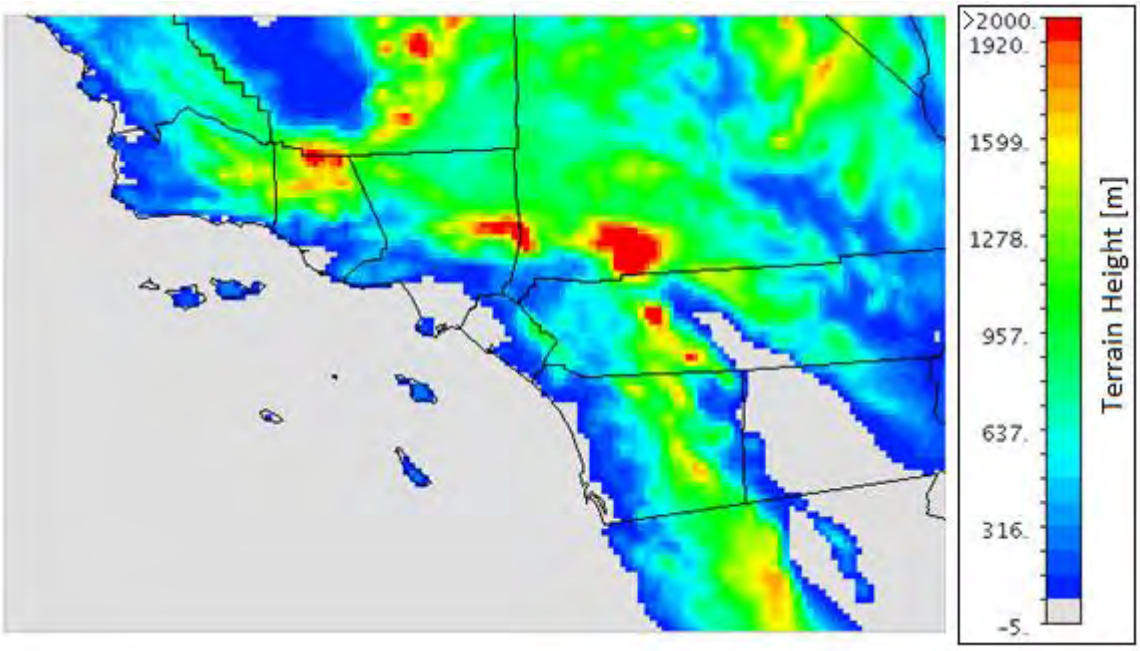


FIGURE V-1-3

2016 AQMP Regional Modeling Domain

For the 2016 AQMP, WRF was updated with the most recent version (version 3.6) available at the time of this protocol preparation and was evaluated with a set of input data, which include land-use classification and sea-surface temperature initialization fields. The WRF simulations were initialized from National Centers for Environmental Prediction (NCEP) analyses data and run for 4-day increments with the option for four dimensional data assimilation (FDDA). NCEP analysis data refers to the set of model predictions assimilated with available measurements in a retrospective mode.

The atmospheric chemistry package used in the CMAQ simulations relied on SAPRC07 gas phase chemistry with version "c" toluene updates with the AERO6 aerosol mechanism, the Euler Backward Iterative solver, the Yamo horizontal advection scheme, the WRF vertical advection scheme, the multiscale CMAQ horizontal diffusion scheme, the ACM2 vertical diffusion scheme, in-line photolysis calculations, and clean homogeneous initial values.

Relative Response Factors and Future Year Design Values

To bridge the gap between air quality model output evaluation and applicability to the health based air quality standards, EPA guidance has proposed the use of relative response factors (RRF). The RRF concept was first used in the 2007 AQMP modeling attainment demonstrations. The RRF is simply a ratio of future year predicted air quality with the control strategy fully implemented to the simulated air quality in the base year. The procedure for the attainment demonstration are pollutant and averaging period specific. For 8-hour ozone simulations, the top 10 days in the base-year and the corresponding days in the future year are used to determine the RRF. This is different from the methodology used in the 2012 AQMP where the aggregated response of several episode days to the implementation of the control strategy are used to develop an averaged RRF for projecting a future year design value. To demonstrate attainment of 1-hour ozone, the top three days in the base year and the corresponding days in the future year are used to determine the RRF. This provides a more objective and accurate analysis that they episode-based strategy in previous AQMPs. For 24-hour PM2.5, the top 10 percentile of modeled concentrations in each quarter of the simulation year are used to determine the quarterly RRF. For the annual average PM2.5, the quarterly average RRFs are used for the future year projections.

The future year design value is estimated by multiplying the non-dimensional RRF to the measured base year design value. Thus, the simulated improvement in air quality, based on multiple meteorological episodes, is translated to a simple metric that directly determines compliance of the standard. Equations V-1 and V-2 summarize the calculation.

Equation V-1.

RRF = (Future-Year Model Prediction) / (Base-Year Model Prediction)

Equation V-2.

To demonstrate attainment: RRF x Measured Base Year Design Value ≤ Air Quality Standard

The modeling analyses described above use the RRF and design value approach to demonstrate future year attainment of the standards. The RRF approach aims to minimize the effects of biases in the model simulations, thus providing more accurate projections of future air quality.

Weight of Evidence

Modeling guidance strongly recommends the use of corroborating evidence to support the future year attainment demonstration. The weight of evidence demonstration for the 2016 AQMP includes a sensitivity analysis where area-source emissions were spatially perturbed and a model performance evaluation of two different approaches for modeling on-road emissions. A multi-variable regression model was also developed to forecast 24-hour and annual PM2.5 design values as a function of emissions and meteorological conditions.

Uncertainties Associated with the Technical Analysis

As with any attainment plan, there are uncertainties associated with the technical analysis. The following paragraphs describe the primary contributors to such uncertainties as well as some of the safeguards built in to the air quality planning process to manage and control such uncertainties.

Demographic and Growth Projections

Uncertainties exist in the demographic and growth projections for future years. As projections are made to longer periods (i.e., over ten or more years), the uncertainty of the projections become greater. Examples of activities that may contribute to these types of uncertainties include the rate and the type of new sources locating in the Basin and their geographic distribution, future year residential construction, military base reuse and their air quality impact, and economic conditions.

Emissions Inventory

While significant improvements have been realized in mobile source emissions models, uncertainties continue to exist in the mobile source emissions inventory estimates. EMFAC2014 on-road mobile source emission estimates have improved with each new EMFAC release. On-road mobile source emissions have inherent uncertainties with the current methodologies used to estimate vehicle miles traveled and the impacts of fuel additives such as ethanol. Stationary (or point) source emission estimates have less associated uncertainties compared to area source emission estimates. Major stationary sources report emissions annually whereas minor stationary and area source emissions are, in general, estimated based on a top down approach that relies on production, usage or activity information. Area source emissions including paved road dust and fugitive dust have significant uncertainties in the estimation of particulate ($PM_{2.5}$) emissions due to the methodologies used for estimation, temporal loading and weather impacts.

Ambient Air Quality Monitoring Data

Generally, ambient air quality measurements are accurate to within plus or minus half of a unit of measurement (e.g., for ozone usually reported in units of parts-per-hundred million (pphm) would be accurate to within ±0.5 pphm or ±5 ppb). Due to rounding conventions, the Basin's 8-hour attainment status based on ambient monitoring data would be achieved if all ozone monitors reported ozone concentration levels less than or equal to 84.9 ppb. Similar uncertainty is observed in particulate data measurements and laboratory analysis. For example, PM2.5 is comprised of six primary constituents ($NH4^+$, NO3, $SO4^-$, OC, EC and crustal), as well as bonded water and total mass. Each of the primary species has individual uncertainty associated with the laboratory analysis procedure and the type of filter media to collect the sample. The total mass collected can be affected by minor changes in the volumetric flow that fall within the approved instrument calibration range. As a consequence, the sum of the total species may not add up to or may exceed the filter measured mass.

Air Quality and Meteorological Models

The air quality models used for ozone and particulate air quality analysis are state-of-the-art, comprehensive 3-dimensional models that utilize 3-dimensional meteorological models, complex chemical mechanisms that accurately simulate ambient reactions of pollutants, and sophisticated numerical methods to solve complex mathematical equations that lead to the prediction of ambient air quality concentrations. While air quality models progressively became more sophisticated in employing improved chemical reaction modules that more accurately simulate the complex ambient chemical reaction mechanisms of the various pollutants, such improved modules are still based on limited experimental data that carry associated uncertainties. In order to predict ambient air quality concentrations, air quality models rely on the application of sophisticated numerical methods to solve complex mathematical equations that govern the highly complex physical and chemical processes that also have associated uncertainties. Layer averaging of model output reduces the sensitivity of the model to changing patterns in the vertical structure.

Safeguards against Uncertainties

While completely eliminating uncertainties is an impossible task, there are a number of features and practices built into the air quality planning process that manage and control such uncertainties and preserve the integrity of an air quality management plan.

The concerns regarding future year uncertainties in the technical analysis are reduced with future AQMP revisions. Each AQMP revision employs the best available technical information. Under state law, AQMP revision is a dynamic process with revisions occurring every three years. AQMP revision represents a "snapshot in time" providing the progress achieved since the previous AQMP revision and efforts still needed in order to attain air quality standards.

Under the federal Clean Air Act, a state implementation plan (SIP) is prepared for each criteria pollutant. The SIP is not required to be updated on a routine basis under the federal Clean Air Act. However, the federal Clean Air Act recognizes that uncertainties do exist and provides a safeguard if a nonattainment area does not meet an applicable milestone or attain federal air quality standards by their applicable dates. Contingency (or backstop) measures are required in the AQMP and must be developed into regulations such that they will take effect if a nonattainment area does not meet an applicable milestone or attainment date. In addition, federal sanctions may be imposed until an area meets applicable milestone or attainment targets.

In December 2014, U.S. EPA released an updated draft guidance document (U.S. EPA 2014) on the use of modeled results to demonstrate attainment of the federal ozone, PM2.5 and regional haze air quality standards. The guidance document recognized that there will be uncertainties with the modeling analysis and recommends supplemental analysis or a weight of evidence discussion that corroborates the modeling attainment analysis where attainment is likely, even if the modeled results are inconclusive. Where possible, the U.S. EPA recommends that at least one "mid-course" review of air quality, emissions and modeled data be conducted. A second review, shortly before the attainment date, should be

conducted also. Statistical trend analyses of monitored data can also provide support for assessing the likelihood for future year attainment. The District will undertake such actions at the appropriate times.

Document Organization

This document provides the federal attainment demonstration for ozone and updates for annual and 24-hour PM2.5 attainment. Chapter 2 provides the Modeling Protocol which summarizes the key elements that have been revised relative to the 2012 AQMP Modeling protocol. Chapter 3 provides a discussion of the meteorological modeling including a comprehensive model performance evaluation. Chapter 4 provides a brief summary of the modeling emissions, including characterization of the daily/diurnal emissions profiles and OGV emissions. Chapter 5 provides the 8-hour ozone attainment demonstration meeting the 2023 and 2031 attainment dates. The ozone analysis includes discussions of the representativeness of the 2012 meteorological year, base-year modeling performance, and projections of future year concentrations for baseline emissions as well as the implementation of the short-term control strategy. The ozone analysis will also provide updated isopleth analyses and a discussion of future year carrying capacities for the current and proposed ozone standards. Carrying capacity plots for the 8-hour Ozone attainment target years are provided in Attachment 5 and 6 of this report. As with the particulate analyses, weight of evidence discussions for ozone will be incorporated in Chapter 5. Chapter 6 provides an update to projected annual PM2.5 concentrations for the different future year emissions scenarios. The chapter includes a characterization of the particulate species profile, discussion of the revised attainment demonstration methodology, and selected future year particulate impacts. Similarly, Chapter 7 will provide an update to the future year 24-hour PM2.5 attainment demonstration. Chapter 8 updates the 1-hour ozone attainment demonstration presented in the 2012 AQMP. 1-hour ozone isopleths to estimate carrying capacity were updated and provided in Attachment 6 of this report. Chapter 9 provides a brief summary of the analysis. Table V-1-2 lists the Attachments to this document.

TABLE V-1-2

Attachments

Number	Description
Attachment-1	WRF Graphical Performance Statistics
Attachment-2	CMAQ Model Performance Figures
Attachment-3	CEPA Source Level Emissions Reduction Summary
Attachment-4	8-hour Ozone Isopleths for 2031
Attachment-5	8-hour Ozone Isopleths for 2023
Attachment-6	1-hour Ozone Isopleths for 2022
Attachment-7	Annual Unmonitored Area Analysis Supplement
Attachment-8	24-hour Unmonitored Area Analysis Supplement

References

U.S. EPA (2014) Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2s, and Regional Haze

CHAPTER 2

MODELING PROTOCOL

Background

Attainment Demonstrations

Numerical Models Employed for the 2016 AQMP

Emission Processing

Computational Resources

References

Background

One of the basic requirements of a modeling attainment demonstration is the development of a comprehensive modeling protocol that defines the scope of the regional modeling analyses including the attainment demonstration methodology, meteorological and chemical transport platforms, gridded and speciated emission inventories, and geographical characteristics of the modeling domains. The protocol also defines the methodology to assess model performance and the selection of the simulation periods. The 2012 AQMP provided a comprehensive discussion of the modeling protocol used for the development of the PM2.5 and ozone attainment demonstrations. The 2012 AQMP Modeling Protocol, presented in the Chapter 2 of Appendix V, served as the prototype of the 2016 AQMP modeling protocol.

The 2016 AQMP demonstrates attainment of ozone and PM2.5 standards in 12 future landmark years. (See Table V-2-1) The future attainment years are identified based on nonattainment designation, pollutant standards, and geographical area. 2012 was chosen as the base year to maintain consistency with the base year employed in the SCAG's Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS).

TABLE V-2-1

Modeling Years for 2016 AQMP

Modeling Year	Plan	NAAQS	Areas
2012	Base Year	Modeling Base Year	
2017	2008 8-hour ozone	75 ppb	Imperial, San Diego
2018	1997 8-hour ozone	80 ppb	Coachella, W. Mojave Desert
2019	2006 24-hour PM2.5	35 µg/m3	South Coast
2020	2008 8-hour ozone	75 ppb	Ventura
2021	Annual PM2.5	12 µg/m3	South Coast
2022	1-hour ozone	120 ppb	South Coast
2023	1997 8-hour ozone	80 ppb	South Coast
	Annual PM2.5	12 µg/m3	South Coast
2025	Annual PM2.5	12 µg/m3	South Coast
2026	2008 ozone	75 ppb	Coachella, W. Mojave Desert
2031	2008 ozone	75 ppb	South Coast
2037	2015 ozone	70 ppb	South Coast

Attainment Demosntration

8-hour Ozone

The methodology used to demonstrate attainment depends on the pollutant of interest. The 8-hour attainment demonstration was performed based on the U.S. EPA guidance document, "Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2s, and Regional Haze", issued on Dec 3rd, 2014. Compared to the previous guidance, US EPA (2007), the ozone attainment demonstration has been significantly updated. The new guidance requires that a maximum concentration be determined among 9 grids around a monitoring station and that the specific grid location be carried to a future year modeling scenario when calculating relative response factors (RRF). This 3 X 3 grid is recommended for all model grid resolutions, differing from the previous guidance, which recommended a 7 X 7 grid for a 4 km grid resolution simulation—the grid resolution used in this modeling. Another major difference is the number of days accounted for in the attainment demonstration. In the 2012 and earlier AQMPs, all days that met the selection criteria were used to calculate future year design values. The specific criteria used in the last AQMP required that the predicted daily max was within 20 % of the site-specific design value, the unpaired daily-max prediction error was less than 20%, and the prediction was higher than the federal standard, for inclusion. In the new guidance, the number of days accounted for in the RRF calculation is limited to the top 10 days of base year simulated concentrations. In the past, the uniquely high ozone concentrations in the Basin led to the inclusion of more than ten days in the RRF calculation. For example, the Crestline site, a design site in the 2012 AQMP, typically would have over 50 days or more included in the RRF calculation. On the other hand, a focus on the top ten days meeting the selection criteria in the new methodology produces future-year design values that are more responsive to emission reductions.

Annual PM2.5

The Final 2016 AQMP annual PM2.5 modeling employs the same approach to estimate the future year annual PM2.5 levels as was described in the 2012 and 2007 AQMP attainment demonstrations, except for the changes described in the 2014 U.S. EPA guidance document (U.S. EPA, 2014). The site- and species-specific RRF approach is consistent with the previous AQMPs. Four SASS sites and Mira Loma, the design site of the Basin, were used in the analysis. Quarterly averaged speciation fractions from the 2012 SASS measurements and quarterly-mean PM2.5 concentrations from corresponding FRM monitors (5 years and 20 quarters) were used to determine quarterly averaged concentrations of nitrate ion (NO3), ammonium ion (NH4), sulfate ion (SO4), elemental carbon (EC), organic carbon (OC), sea salt, and other primary PM2.5 material. The modeling platform developed for the ozone attainment demonstration was extended to the entire year to acquire quarterly average RRFs for each of the seven relevant species. Component-specific RRF values were applied to the base-year species concentrations to forecast future year component-specific concentrations. Particle bound water is then calculated using U.S. EPAs regression model approximation of the AIM model based on simulated concentrations of the ammonium, nitrate, and sulfate ions. (EPA, 2006). All species concentrations, along with a "blank" concentration, are summed for each quarter to produce quarterly averaged future total PM2.5 concentrations. A 5-year weighted

average of the annual mean concentrations is then calculated to produce a future-year 5-year weighted design value.

24-hour PM2.5

FRM mass and species-specific mass were calculated using an approach similar to the one followed for the annual design value, except that the 8 highest days from each quarter were included in the calculation. This is based on the assumption that the 98th percentile value can occur in any quarter and the 8th highest is the 98th percentile of 365 samples. Then, 32 sets of FRM mass and corresponding species fractions were retrieved per year, for the five-year period from 2010 to 2014. A set of species-specific RRFs were generated for each future year simulation from the top 10% of modelled PM2.5 days. RRFs were generated for the ammonium ion (NH4), nitrate ion (NO3), sulfate ion (SO4), organic carbon (OC), elemental carbon (EC), sea salt (Salt) and a combined grouping of other primary PM2.5 material (Other). A total of 7 species-specific RRFs were generated per quarter. Then future year concentrations of the seven component species were calculated by applying the model generated quarterly RRFs to the speciated 160 base year design values (8 days per quarter, 4 quarters per year and 5 year period). Particle bound water was determined using U.S. EPAs regression model approximation of the AIM model based on simulated concentrations of the ammonium, nitrate and sulfate ions (EPA, 2006). A blank mass of 0.5 µg/m3 was added to each base and future year simulation. The 32 days in each year (8 per quarter) were then re-ranked based on the sum of all predicted PM species to establish a new 98th percentile concentration. A weighted average of the resulting future year 98th percentile concentrations for each of the five years was used to calculate future design values for the attainment demonstration.

1-hour Ozone

For 1-hour ozone, no recent modeling guidance has been developed since the standard has been revoked.

The 1997 AQMP and 2003 AQMP 1-hour ozone attainment demonstrations relied on direct output from model simulations to project future year air quality and design values. This “deterministic” approach was based on the premise that future year projected baseline inventories were accurate and the impacts of implementing the control program were well simulated. In addition, the form of the 1-hour ozone standard was directed at the fourth highest concentration in a three year period for a given air monitoring station. In essence, the analysis looked at the 2nd highest concentration in a given year, typically occurring during the worst-case meteorological scenario.

The 2012 AQMP attainment demonstration relied primarily on the “deterministic approach”, but included the RRF methodology as weight of evidence discussion. Similar to the 2012 AQMP, the current AQMP utilized both “deterministic” and RRF approaches, given the fact that there is no official guidance for 1-hour ozone and both approaches have their limitations and strengths. The deterministic method relies on accurate modeling and the proper selection of a meteorological episode while the RRF approach tends to place less reliance on individual day model performance since the factor is based on an average of several events having similar meteorological profiles. However, basing the RRF on multiple days may mask the meteorological profile characteristics of an extreme event such as an annual second maximum concentration.

However, even if the RRF approach similar to the 8-hour demonstration was employed, the number of days included in the RRF calculation was re-evaluated. This was intended to accommodate the definition of the 1-hour ozone design value in contrast to that of the 8-hour. The 8-hour ozone standards takes the 4th highest readings of a year averaged over a three-year period. However, the 1-hour standard allows one exceedance a year, resulting in a design value based on the 4th highest value in a three-year period. In other words, the 1-hour standard focuses on the 1st or the 2nd highest day of the year, while the 8-hour accounts for the 4th highest day. Therefore, the optimal number of days for inclusion in the RRF calculation was determined to be three days after carefully examining CMAQ performance to capture episode days in 2012.

Numerical Models Employed for the 2016 AQMP

Table V-2-2 provides a side-by-side comparison of the 2007, 2012 and the current 2016 AQMP modeling protocols. The modelling protocol was significantly updated from the 2007 to the 2012 AQMP; however, changes between the 2012 and 2016 AQMP were minimal. In general, changes have occurred in the following categories: emissions inventories, future-year simulations, the level of the non-attainment designation and the attainment demonstration methodology. As such, these changes are expected to occur with each subsequent modeling update.

TABLE V-2-2

Numerical Modeling Platforms and Domains for 2016 and previous AQMPs

	2007 AQMP	**2012 AQMP**	**2016 AQMP**
Modeling Base Year	2005 Ozone: episode based PM: Annual	2008 Ozone: June – Aug PM: Annual	2012 Ozone: May – Sep PM: Annual
Chemical Transport Model	CAMx	CMAQ as primary tool CAMx as weight of evidence	CMAQ
Meteorological Model	MM5 version 3 Non-Hydrostaic model Hybrid of MM5/CALMET as weight of evidence	WRF version 3.3 with Updated Land Use	WRF version 3.6 with Updated Land Use
Emission: On-Road Off-Road	EMFAC 2007 CARB OFFROAD Model	EMFAC 2011 EMFAC-LDV EMFAC-HD EMFAC-SG Category Specific Calculation	EMFAC 2014 Single package Category Specific Calculation
Modeling Domain	Separate domains for O3 and PM modeling O3: 550 km by 370 km in E-W and N-S PM: 325 km by 200 km	624 km by 408 km	624 km by 408 km
Grid Resolution	5km by 5km grid	4km by 4 km grid	4km by 4km grid
Vertical Layer	O3: 16 layers up to 5km above the ground level (agl) PM: 8 layers	18 layers with 14 layer below 2000 m agl and 50 hPa as top boundary	18 layers with 14 layer below 2000 m agl and 50 hPa as top boundary

An entire year from January to December was simulated for the PM attainment demonstration – both 24-hour and annual averages. Five consecutive months starting from May 1st until September 30th were modeled for the ozone analysis. While this approach is similar to the approach used in the 2012 AQMP, it differs from the 2007 AQMP and prior AQMPs, which focused on selected high ozone episodes.

As in the 2012 AQMP, CMAQ was selected as the primary chemical transport modeling platform in the 2016 AQMP. CMAQ is a community model readily available in the public domain, allowing for the incorporation of the most recent algorithms and parameterizations as compared to models maintained by the private sector. For example, CMAQ has been recently equipped with the newest chemical mechanism, SAPRC07, however, CAMx still uses the older version of SAPRC99. In addition, as demonstrated in the 2012 AQMP, CMAQ performed comparatively or better than CAMx when simulating photochemistry within the Basin. Note that CAMx was employed for a weight of evidence analysis in the 2012 AQMP and as the primary dispersion platform in the 2007 AQMP. The CMAQ version used for 2016 AQMP included a modification in the subroutine "rdbcon.F", which reads lateral boundary values from the boundary conditions file. The original "rdbcon.F" repeatedly accesses boundary files at every chemical sync step, even though the boundary values stay constant during an hour window. The updated version reads the boundary values only once in every hour, which is the frequency interval of both the MCIP meteorological input file and the boundary conditions file. This modification reduces CPU time substantially by decreasing the input read time, while results do not change because the boundary values read by CMAQ are the same. The update was reported to Community Modeling and Analysis System (CMAS) center who is in charge of CMAQ update and maintenance. An additional modification was included in the AERO_DATA.F subroutine to by-pass the reading of PH2O emissions. Emissions of PH2O is not included in the AQMP inventory. The default AERO6 subroutine in CMAQ requires PH2O emission, and if these species are not present in the emission files, CMAQ does not run. This subroutine was modified so that these species are no longer required to continue with the simulation. Details of the CMAQ configuration are given in Table V-2.3.

TABLE V-2-3

Chemical Transport Modeling Platform for the 2016 and 2012 AQMPs

Options	2012 AQMP	2016 AQMP
Numerical Model	CMAQ version 4.7.1 as primary CAMx as Weight of Evidence	CMAQ version 5.0.2
Modeling Grid	156 by 102 grids with 4 km grid distance	Same
Gas Phase Chemical Mechanism	SAPRC99	SAPRC07 with version "c" toluene updates
Aerosol Mechanism	AERO5	AERO6
Chemical Solver	Euler Backward Iterative solver (EBI)	Same
Horizontal Advection	Piecewise Parabolic Method. (PPM)	Yamo
Vertical Advection	PPM	WRF
Horizontal Diffusion	Multiscale CMAQ scheme	Same
Vertical Diffusion	ACM2	Same
Photolysis	Lookup table	In-line Calculation
Initial Values	Clean Homogeneous Condition	Same
Boundary Values	Model for OZone and Related chemical Tracers (MOZART)	Same

The Weather Research and Forecast (WRF) model remains as the primary tool for meteorological modeling. For the 2016 AQMP, WRF was updated with the most recent version (version 3.6) available at this time and was evaluated with a set of input data, which include land-use classification and sea-surface temperature initialization fields (Table V-2-4).

TABLE V-2-4

Meteorological Modeling Platform for 2016 and 2012 AQMPs

Options	2012 AQMP	2016 AQMP
Numerical Model	WRF version 3.3	WRF Version 3.6.1
Nesting	Same	Same
Vertical Layers	30 layers with the lowest layer at 20 m above ground level	Same
Simulation Length	4 day with 24 hour spin-up	Same
Initial & Boundary Value	NAM Analysis field	NAM analysis field NARR analysis field
Landuse	Modified USGS landuse with 24 categories	Modified USGS landuse with 24 categories MODIS satellite retrieved landuse
Sea Surface Temperature	NAM surface analysis field	NAM surface analysis field Global Ocean Data Assimilation Experiment (GODAE) SST
Surface Layer Scheme	Slab Thermal Diffusion scheme	Slab Thermal Diffusion scheme NOAH scheme
Planetary Boundary Layer (PBL) scheme	YSU	Same
Date Assimilation	Analysis nudging at every 6 hours for the outermost domain only No temperature and moisture nudging for the PBL	Same

WRF simulations were conducted with three nested domains with grid resolutions of 36, 12 and 4 km (Figure V-2-1). The innermost domain spans 652 km by 460 km in the east–west and north–south directions, respectively, which includes the greater Los Angeles area, its surrounding mountains, and ocean waters off the coast of the Basin (Figure. V-2-2). A Lambert conformal map projection was used with reference latitudes of 30° and 60° N and the center of the modeling domain positioned at 37° N and 120° 30 ′ W.

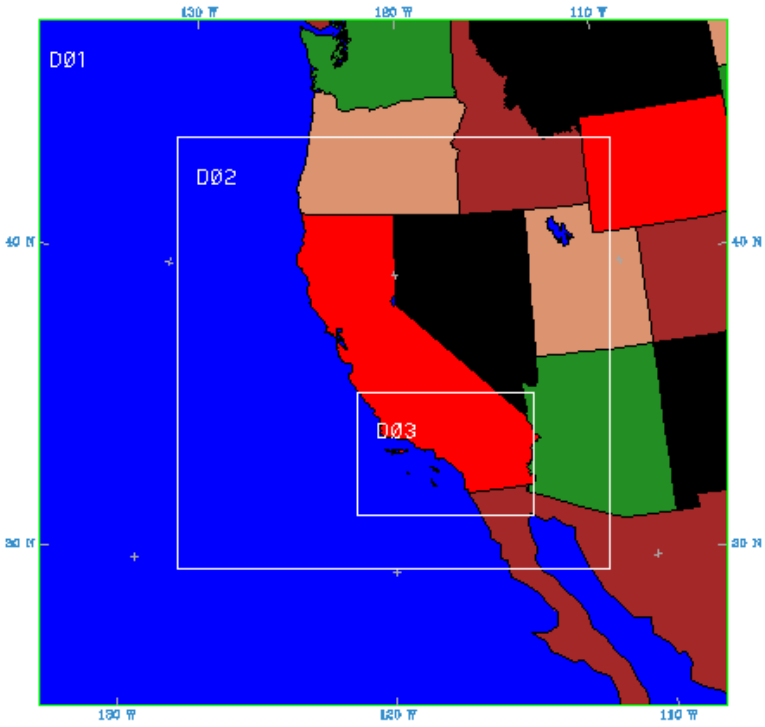


FIGURE V-2-1

Three nested domains used in WRF simulation

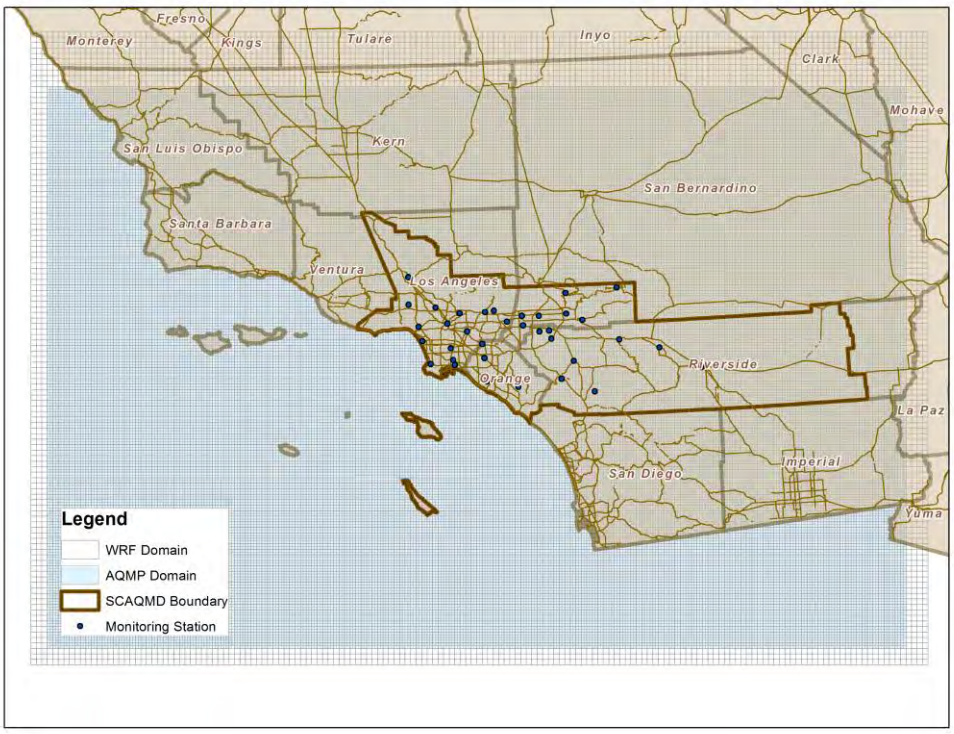


FIGURE V-2-2

The relative locations of the inner most WRF domain compared to the CMAQ domain. The boundary of South Coast AQMD boundary and air monitoring locations are overlaid by a thick solid line and black dots, respectively.

The model employed 30 vertical layers, with the lowest computational layer centered approximately at 20 m above ground level (agl) and a top layer centered at 50 hPa. Note that the WRF layers given in the Table V-2-5 are layer interfaces, meaning that actual computational volume is defined as the space between layer interfaces. The National Center for Environmental Prediction (NCEP) North American Model (NAM) model output (grid 212, 40 km grid spacing) together with vertical soundings and surface measurements, were used to compile initial and boundary values for the outermost domain as well as for the Four Dimensional Data Assimilation (FDDA) to WRF. The YSU planetary boundary layer scheme, WSM 3-class simple ice microphysics scheme, RRTM longwave radiation, Dudhia shortwave radiation were chosen as the default methods for the AQMP simulations after carefully considering various options available for WRF. Kain–Fritsch cumulus schemes were employed for the outer two domains, while no cumulus parameterization was used for the innermost domain. The thermal diffusion land-surface scheme was employed after evaluating the NOAH and Pleim-Xu schemes extensively.

TABLE V-2-5

Vertical Computational Layer Interfaces for 2016 AQMP modeling

Layer Index	Eta Level for WRF	Eta Level for CMAQ
31	0.0000	0.0000
30	0.0232	
29	0.0493	
28	0.0788	0.0788
27	0.1120	
26	0.1495	
25	0.1917	
24	0.2394	
23	0.2930	0.2930
22	0.3536	
21	0.4218	
20	0.4954	
19	0.5635	
18	0.6254	0.6254
17	0.6809	
16	0.7301	
15	0.7733	0.7733
14	0.8107	0.8107
13	0.8431	0.8431
12	0.8709	0.8709
11	0.8946	0.8946
10	0.9148	0.9148
9	0.9319	0.9319
8	0.9463	0.9463
7	0.9585	0.9585
6	0.9688	0.9688
5	0.9774	0.9774
4	0.9846	0.9846
3	0.9907	0.9907
2	0.9958	0.9958
1	1.0000	1.0000

Emissions Processing

On-Road mobile source emissions were calculated based on EMFAC 2014 and the 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). Temporal and spatial allocation of on-road emissions were improved to accurately represent continuous measurements from in-road traffic sensors. Traditionally, on-road vehicle count is specified at five distinctive time zones of the day: morning peak (7-9AM), mid-day (10am-3pm), afternoon peak (4-7pm), evening peak (8-9pm) and night (10pm-6am). This profile was used to simulate a typical weekday traffic pattern in the Basin. The traffic count was then scaled to reflect changes in volume during each day of week based on an adjustment factor from CARB. However, this approach does not account for variations in traffic patterns due to seasonal changes, holidays, cultural activities or weather since it simulates a 'typical weekday' traffic flow. In an attempt to reflect such seasonal and cultural effects on on-road emissions, new temporal allocation profiles were constructed from traffic measurements available through the California Department of Transportation Performance Measurement System (PeMS). The PeMS network collects traffic data at over 9000 sensor locations within the Basin on a real-time basis at 5-minute time resolution, providing an actual real world traffic allocation that reflects social events, responses to weather conditions, and cultural behavior. This new PeMS-based methodology reallocates emissions temporally and spatially but does not affect the total amount of emissions from on-road mobile sources.

Off-Road emissions reflect updated speciation profiles and spatial surrogate factors for the following categories: construction equipment, recreational boats, composting, dairy cattle count, prescribed burning in future years, agricultural burning, architectural coatings, aircraft emissions, and military ordinance and vehicles on the San Clemente Naval Station. Gasoline dispensing facilities and oil and gas operations are subject to changes based on revised CARB and U.S. EPA emission calculation methodologies, respectively. Table V-2-6 summarizes changes in emission processing methodology between the 2012 and 2016 AQMP. The list of categories adjusted for day specific weather and activity is given in Table V-2-7.

TABLE V-2-6

Summary of Emission Processing for 2012 and 2016 AQMPs

Options	2012 AQMP	2016 AQMP
On-Road Emissions	EMFAC 2011 o 3 modules Light Duty Vehicles (LDV), Heavy Duty vehicles (HD) and Scenario Generating module (SG). o Modified DTIM Temporal Allocation using CARB/Caltrans Adjustment Factors	EMFAC 2014 o Single package integrated all the three components of the previous version o Emissions mode to get total amount of emissions in Tons per Day o Emissions rate to estimate grams per emissions of specific vehicle category, activity, etc Temporal Allocation using Caltrans real-time traffic data
Vehicle Miles Traveled	2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)	2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)
Off-Road Emissions	Category Specific Calculation	Same
Mexico Emissions	Revised Mexican emissions profile	Same

TABLE V-2-7

List of Emissions Categories with Day-Specific Adjustments

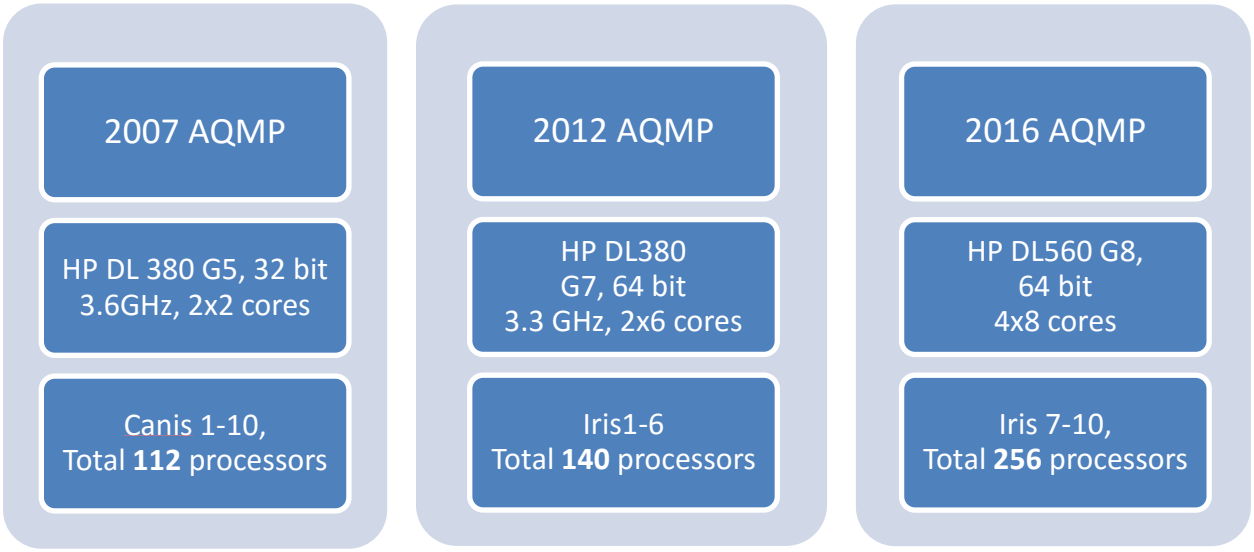
Day-Specific Emission Categories
• Ocean-going vessels • Agricultural burning • Wildfires • Prescribed burns • Residential wood combustion (curtailment programs) • Facilities that have closed since 2012 • Facilities that have had large upsets • Paved road dust • Unpaved road dust • Windblown dust • Livestock dust • Biogenic and On-Road motor vehicle emissions are adjusted using day/hour-specific meteorological data.

Computational Resources

The main computation platform employs Linux-based parallel processing computers. New servers, compiled to enhance computational capability, were configured with Red-Hat version 6.4 O/S and 64 bit operating systems. The Fortran and C compilers were transitioned to Intel group compilers for the current AQMP, while Portland Group Compilers were used in the default configuration for the 2012 AQMP. The shift to the Intel compilers was initiated to provide a 10-20% improvement in computational speed. Details of the computing resources are summarized in Table V-2-8.

TABLE V-2-8

Details of Computational Resources used in the 2007, 2012 and 2016 AQMPs.



References

US EPA (2007) Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze, EPA -454/B-07-002

US EPA (2011) Memorandum on "Update to the 24 Hour PM2.5 NAAQS Modeled Attainment Test"

US EPA (2014) Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2s, and Regional Haze

CHAPTER 3

METEOROLOGICAL MODELING AND SENSITIVITY ANALYSES

Overview

Meteorological Modeling Configuration

Sensitivity Tests for Numerical Parameterizations

Initial Guess Field

Land Surface Scheme

Land Use Representation

Sea Surface Temperature

Statistical Evaluation of Sensitivity Tests

Overall Performance Evaluation

Overview

This chapter provides a description of the meteorological modeling that serves as the foundation of the 2016 AQMP modeling analysis. During the 2012 AQMP, SCAQMD conducted extensive tests on the performance of WRF compared with the previously used MM5 model and showed that WRF performs as well as or even better than MM5. Based on the discussions with the District's science and technology advisory groups during the 2012 AQMP, WRF was selected as the primary numerical platform for the generation of meteorological fields. Therefore, WRF-derived meteorology was used for chemical transport modeling in the 2012 AQMP and presently, the 2016 AQMP. WRF is a mesoscale meteorological forecast model used by the National Weather Service, academic institutes and the scientific community. It is under continual review and updates, under the administration of National Center for Atmospheric Research (NCAR), to reflect state-of-art modeling knowledge. This chapter describes the numerical configuration, sensitivity tests on key parameterizations, the input database, and initial and boundary values used in the ozone and PM2.5 attainment demonstration.

Meteorological Modeling Configuration

WRF is one of the most widely used meteorological models. It has been applied to a wide variety of phenomena and a wide spectrum of geographical and climatological situations. It is also listed in EPA's Support Center for Regulatory Atmospheric Modeling (SCRAM) site, a numerical-model clearinghouse. The WRF Non-hydrostatic Mesoscale Model (NMM) core is also used as a platform for official weather forecast by National Weather Service (NWS). One of the most significant advantages of using WRF arises from its large user community; the model is regularly applied to simulate various phenomena on a wide variety of computational machines. This enables robust tests of the model physics and numerics and provides a unique opportunity to fix any errors and incorporate the state-of-the science in a short time period.

WRF is a 3-D prognostic model that solves the Navier-Stokes' equation, accounts for thermodynamics, conserves mass, and incorporates radiative energy transfer. WRF has been applied to a wide range of phenomena, such as regional climate, monsoons, cyclones, mesoscale fronts, land-sea breezes and mountain-valley circulations. There are two platforms within the WRF framework: Advanced Research WRF (ARW) and Non-hydrostatic Mesoscale Model (NMM). The ARW configuration was chosen for the current modeling analyses.

WRF simulations were conducted with three nested domains at grid resolutions of 36, 12 and 4 km. The innermost domain has 163 by 115 grid points in abscissa and ordinate, respectively, which spans 652 km by 460 km in east-west and north-south directions, respectively. Geographically, the domain encompasses the greater Los Angeles and suburban areas, its surrounding mountains, and seas off the coast of the Basin as shown in Figure V-3-1. The figure also shows the relative locations and sizes of the three nested grids. The innermost domain, excluding first three boundary columns and rows, served as the CMAQ chemical transport modeling domain. The relative locations of the WRF, CMAQ, and SCAQMD's jurisdiction are presented in Figure V-3-2.

The model employed 30 layers vertically with the lowest computational layer being approximately 20 m above ground level (agl) and the top layer at 50 hPa. Four Dimensional Data Assimilation (FDDA) was conducted using grid analysis data that was enhanced with available surface and vertical sounding data. The Yon-Sei University (YSU) (Hong, 1996) scheme was used to model the planetary boundary layer (PBL). Cloud radiation and simple ice cloud physics were chosen for simulations after carefully considering various available options in WRF. Kain-Fritsch cumulus schemes were employed to the outer two domains, while no cumulus parameterization was used for the innermost domain. The selections of LSM scheme, initial and boundary values, and the use of land use and sea surface temperature data are discussed further in the next section.

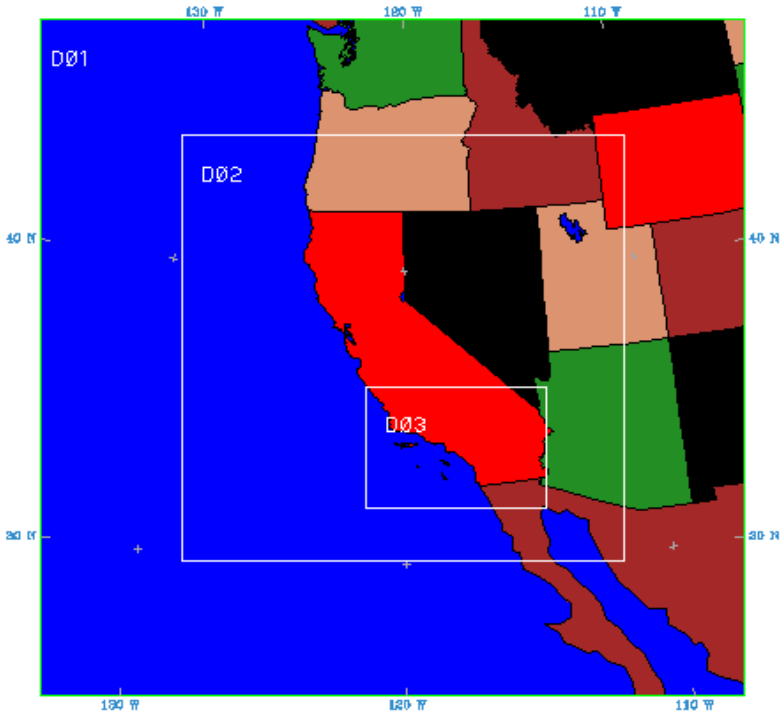


FIGURE V-3-1

Three nested modeling domains employed in the WRF simulations

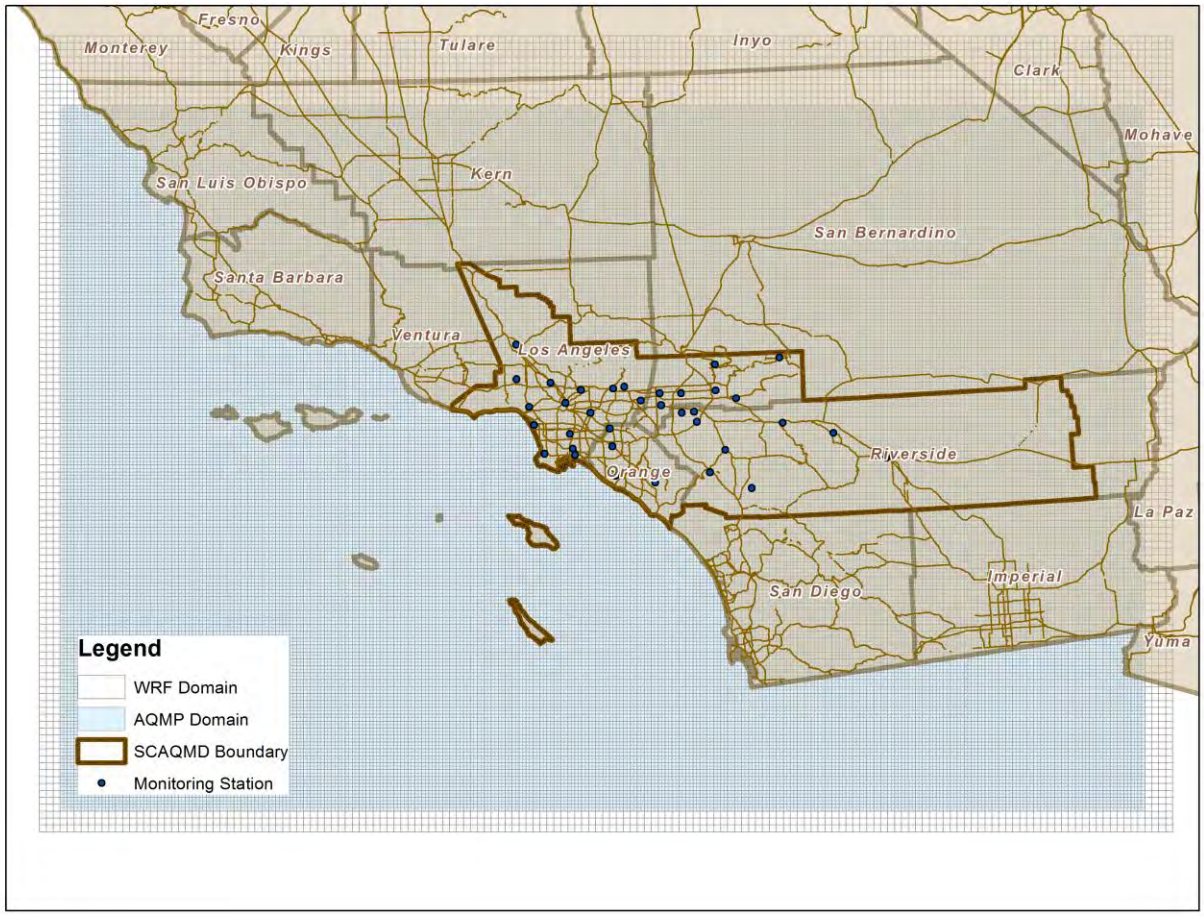


FIGURE V-3-2

The inner most WRF domain and CMAQ modeling domain with respect to the SCAQMD jurisdiction boundary.

Table V-3-1 below provides a summary of the WRF configuration used in the 2016 AQMP in comparison with the 2012 AQMP. Major parameters finalized for the 2016 AQMP are similar to those used in the 2012 AQMP, except sea surface temperature. A list of physics options and parameters that were evaluated extensively as a part of the 2016 AQMP is provided in Table V-3-2. Those that were identified as critical to describe air pollution episodes are presented.

TABLE V-3-1

Overview of WRF configuration for 2016 AQMP in comparison with 2012 AQMP

Options	2012 AQMP	2016 AQMP
Numerical Model	version 3.3	Version 3.6.1
Nesting	Three nested Domains	
Vertical Layers	30 Layers with the lowest layer at 18 m agl	
Simulation Length	4 day with 24 hour spin-up	
Planetary Boundary Layer (PBL) scheme	Yon-Sei University (YSU) scheme	
Data Assimilation	Analysis nudging at every 6 hours for the outermost domain only No temperature and moisture nudging within the PBL	
Initial & Boundary Value	NAM Analysis field	
Landuse Database	Modified USGS Landuse with 24 categories	
Sea Surface Temperature	NAM surface analysis field	Global Ocean Data Assimilation Experiment High Resolution Sea Surface Temperature (GHR SST) Data
Surface Layer Scheme	Thermal Diffusion scheme	

TABLE V-3-2

The list of WRF Sensitivity Test Categories and elements tested in each category

Testing Categories	Database
Initial Guess Field	– North American Model (NAM) Analysis Field – North American Regional Re-analysis (NARR) Field
Land Surface Scheme	– Thermal Diffusion scheme – NOAH Land Surface scheme – Pleim-Xu scheme
Land Use Database	– USGS 2001 vs. 2011 database – SCAQMD modified Sub-Urban category – MODIS satellite driven dataset
Sea Surface Temperature	– Global Ocean Data Assimilation Experiment High Resolution Sea Surface Temperature (GHR SST)Data 6hourly, about 9 km spatial resolution

Sensitivity Tests for Numerical Parameterizations

WRF offers multiple user options for numerical parameterizations, initial and boundary values, values of various coefficients, the level of observational data assimilation, etc. While these options provide an opportunity to optimize the model for a specific application, an ill-suited configuration can lead to less accurate results. In this context, atmospheric physics and parameters closely related with air quality were screened and the options with the most representative results were incorporated into subsequent numerical experiments. The categories given in Table V-3-1 and Table V-3-2 have been thoroughly vetted to determine the best model options.

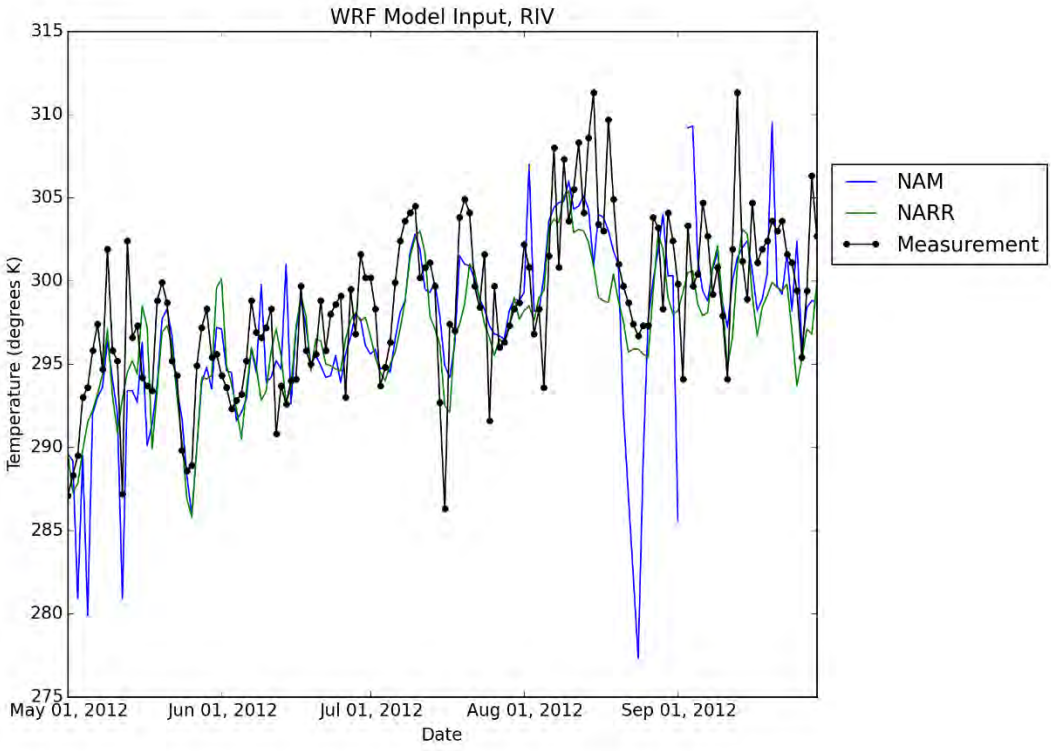
Initial Guess Field

WRF, as any mesoscale-meteorological model, reads in an initial 3-D field of prognostic meteorological variables. These initial fields are usually an output of a larger-scale model such as global scale model or mesoscale model covering a larger domain. The North American Model (NAM) analysis product, a National Weather Service (NWS) operational forecast product, was employed in the WRF simulations for the 2012 AQMP. NAM is a real-time forecast product enhanced with available surface and atmospheric vertical sounding data in a retrospective fashion. The NAM analysis output is widely used and readily available through the National Center for Atmospheric Research (NCAR) science data repository. While NAM is the default analysis product used for the Basin simulations, other data sets such as the Global Forecast System (GFS) forecast and the North American Regional Reanalysis (NARR) data are alternatives known to produce synoptic activities in the Pacific Northwest reasonably well. Angevine (2011) suggested that the

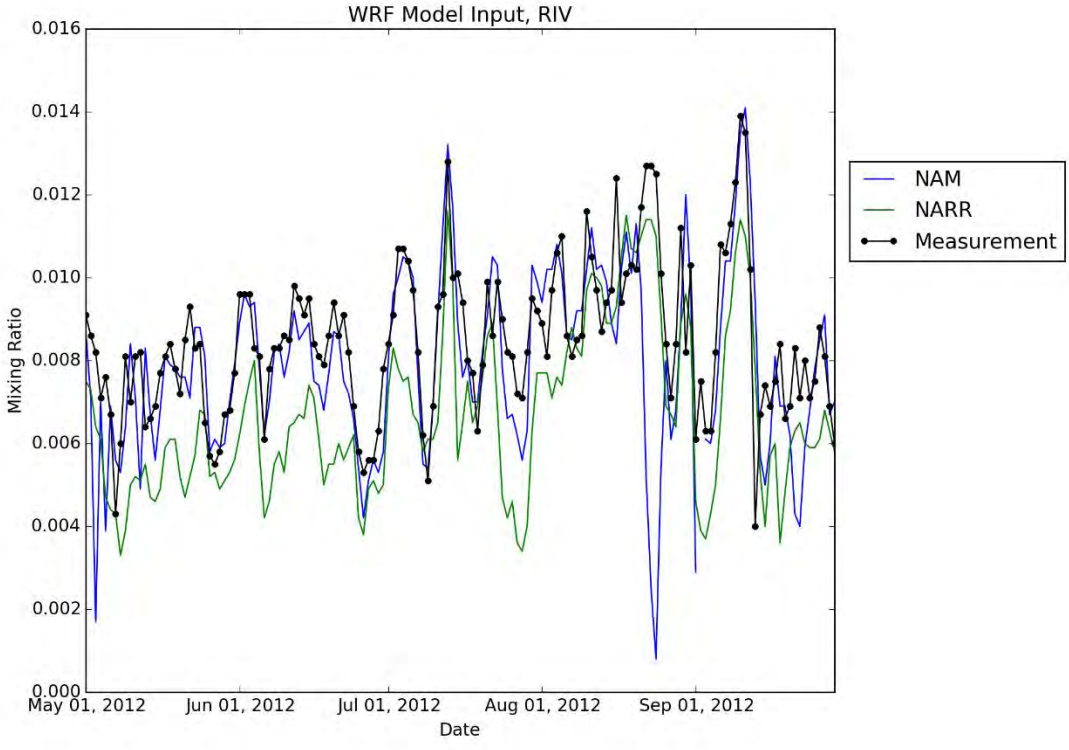
European Center for Medium-range Weather Forecast model (ECMWF) and the GFS data were superior in simulating the marine boundary layer along the Southern California coast. However, ECMWF data is not readily available free-of-charge since it is a European product. In addition, the GFS has a coarser grid resolution that may affect its capability to regenerate high resolution topographic features that are critical to re-produce orography induced thermal circulation pattern in the Basin. The GFS products are available from 28 to 70 km resolution. The National Center for Environmental Prediction (NCEP) NARR products are on the Eta 221 grid at 29 pressure levels. They were produced using the Eta 32 km model with 45 vertical layers. The input data includes all observations used in the NCEP/NCAR Global Reanalysis project, and additional precipitation data, TOVS 1B radiances, profiler data, land surface and moisture data, etc. The output analyses are presented every third hour with an additional 9 variables in the 3-hour forecasts to reflect accumulations or averages. Like the NAM analysis product, the NARR data is readily available free-of-charge through the NCAR science data repository. In addition, CARB uses NARR as their default initial and boundary values for their WRF simulation. The NAM analysis data was produced for Grid 212 with 40 km grid spacing.

The initial data field was used to drive lateral boundary values of the outermost domain, after it was nudged with available measurements to further reduce potential errors in the input data field. Therefore, the information embedded in those data fields impact not only the initial time step but also the entire simulation.

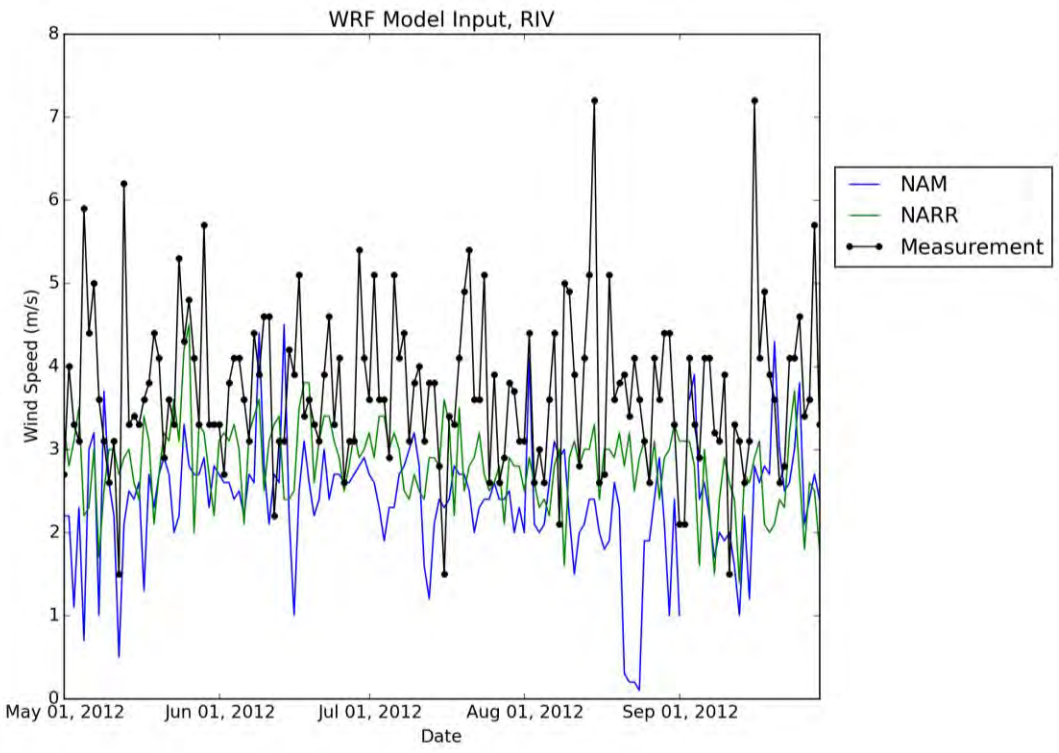
The differences in the NAM and NARR dataset were rather significant especially for water vapor mixing ratio and surface wind speed. Temperature followed each other closely. Figure V-3-3 shows the time series of daily max temperature, water vapor mixing ratio and wind speed retrieved from NAM, NARR and corresponding observations for the period of May 1st to September 30th, 2012 in Riverside. NAM data followed the observed water vapor trend closely, but showed substantial under-bias for wind speed. On the contrary, NARR generated a relatively dry atmosphere, but represented measured wind speed better than NAM. Note the data in Figure V-3-3 is WRF input data taken directly from NAM and NARR rather than WRF output.


WRF Model Input, RIV
Temperature (degrees K)
315
310
305
300
295
290
285
280
275
May 01, 2012
Jun 01, 2012
Jul 01, 2012
Aug 01, 2012
Sep 01, 2012
Date
NAM
NARR
Measurement

(a)


WRF Model Input, RIV
Mixing Ratio
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
May 01, 2012
Jun 01, 2012
Jul 01, 2012
Aug 01, 2012
Sep 01, 2012
Date
NAM
NARR
Measurement

(b)

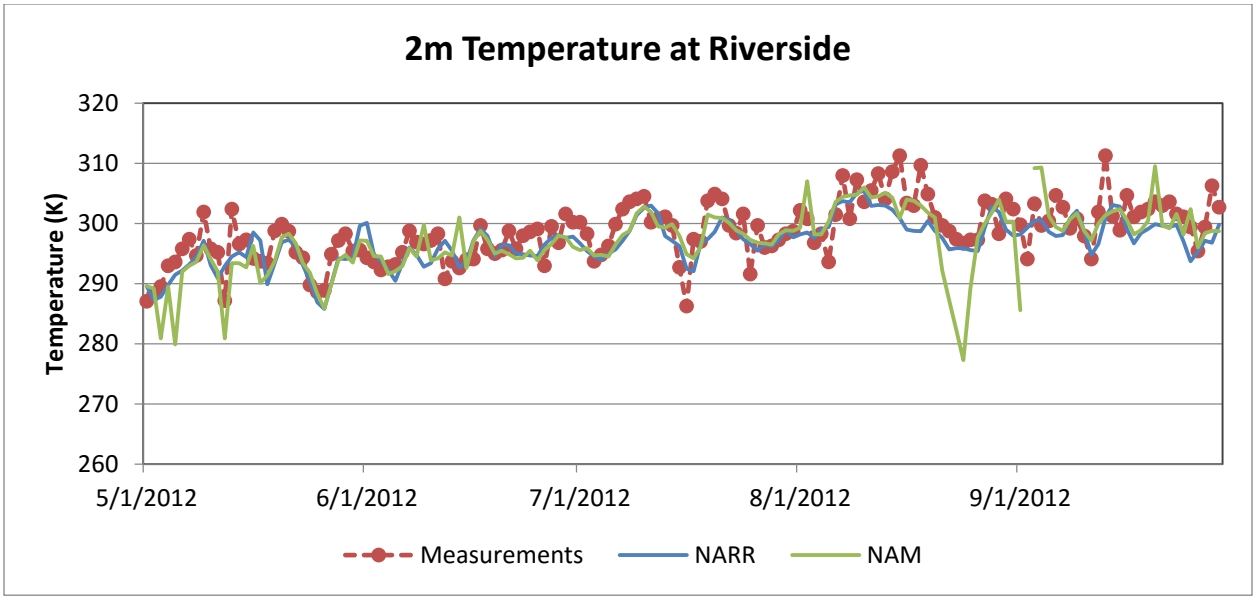


(c)

FIGURE V-3-3

Time series of (a) Temperature, (b) Water Vapor Mixing Ratio and (c) Wind Speed retrieved from NAM and NARR and measurements taken at Riverside March Air Force Base.

The input fields create noticeable differences in the WRF prediction, as shown in Figure V-3-4. While temperature fields were well predicted by both of the initial datasets, the moisture field simulated with the NARR was drier than NAM. This dry bias appears to be carried over from the input data fields to the output data fields presented in Figure V-3-4.



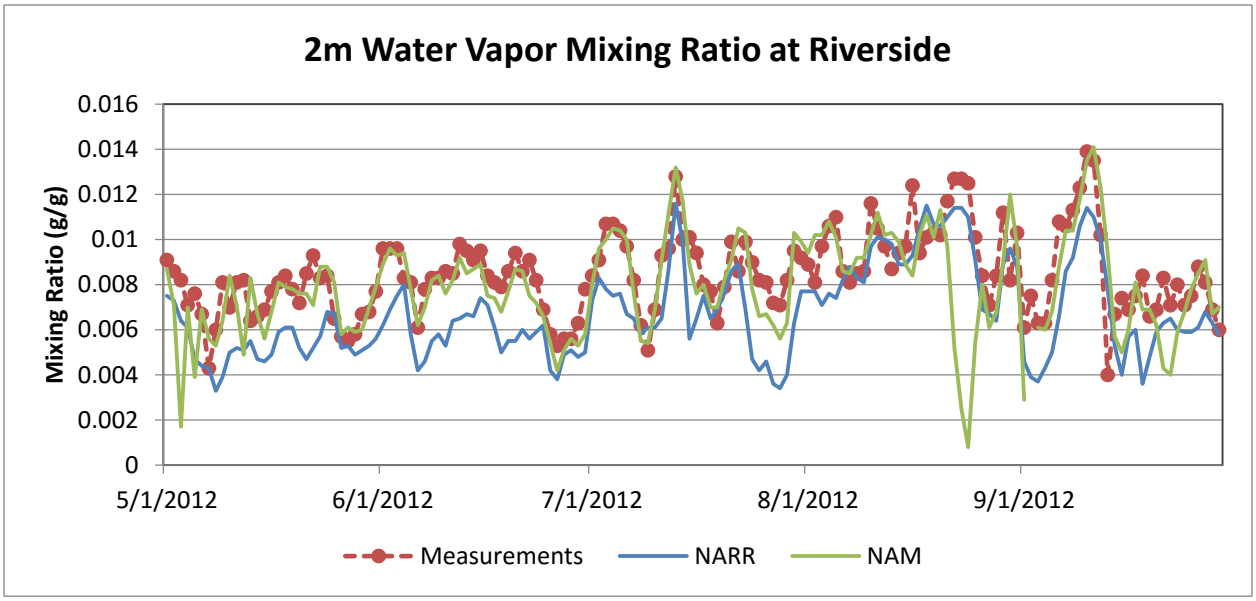


FIGURE V-3-4

Time Series of Measurements and WRF predicted Temperature (top), and Water Vapor Mixing Ratio (bottom) at Riverside. NARR (blue solid line) and NAM (green solid line), respectively, used as initial and boundary values.

Land Surface Scheme

The three land surface models (LSM) considered for WRF performance tests were the five-layer thermal diffusion scheme, the NOAH, and Pleim-Xiu (P-X) schemes. Similar tests were conducted during the 2012 AQMP attainment demonstration, but model output is especially sensitive to the choice of land surface scheme. Since a new series of input data fields including Sea Surface Temperature (SST) and land use was introduced for WRF modeling, it was necessary to re-visit the performance of the widely available schemes and re-optimize the performance.

The thermal diffusion scheme is the simplest and least computationally expensive among the three schemes. It calculates soil temperature as a result of thermal diffusion between layers, which are defined at the depths of 0.01, 0.02, 0.04, 0.08, and 0.16 m with the deepest layer being a fixed substrate. The NOAH scheme predicts the soil temperature and moisture prognostically in four layers (Chen and Dudhia, 2001). The P-X LSM (Pleim and Xiu, 1995; Xiu and Pleim, 2001), originally based on the ISBA model of Noilhan and Planton (1989), includes a 2-layer force-restore soil temperature and moisture model. The top layer is taken to be 1 cm thick, and the lower layer is 99 cm. Grid aggregate vegetation and soil parameters are derived from fractional coverages of land use categories and soil texture types. There are two indirect nudging schemes using soil moisture and deep soil temperature (Pleim and Xiu, 2003).

The three schemes provided notably different predictions (Figure V-3-5, Figure V-3-6 and Figure V-3-7). First, wind speed was stronger with the Thermal-diffusion scheme both for the convective and the nocturnal periods. While the NOAH and P-X schemes produced approximately similar wind speeds, the P-X showed the lightest wind during the convective period (Figure V-3-6). The PBL heights were dramatically different in all three schemes. The NOAH scheme predicted the deepest mixing, which in-turn, triggered momentum transfer from the upper atmosphere to the surface level, contributing to stronger winds near the surface level. The Thermal-diffusion scheme showed the least amount of vertical mixing, indicating a lower extent of ventilation, which is the product of vertical mixing and horizontal advection wind. As expected, the Thermal-diffusion scheme was the most successful in simulating high ozone concentrations observed during the summer ozone season. The overall performance of the three schemes are summarized in Table V-3-3, which will be discussed in the following section.

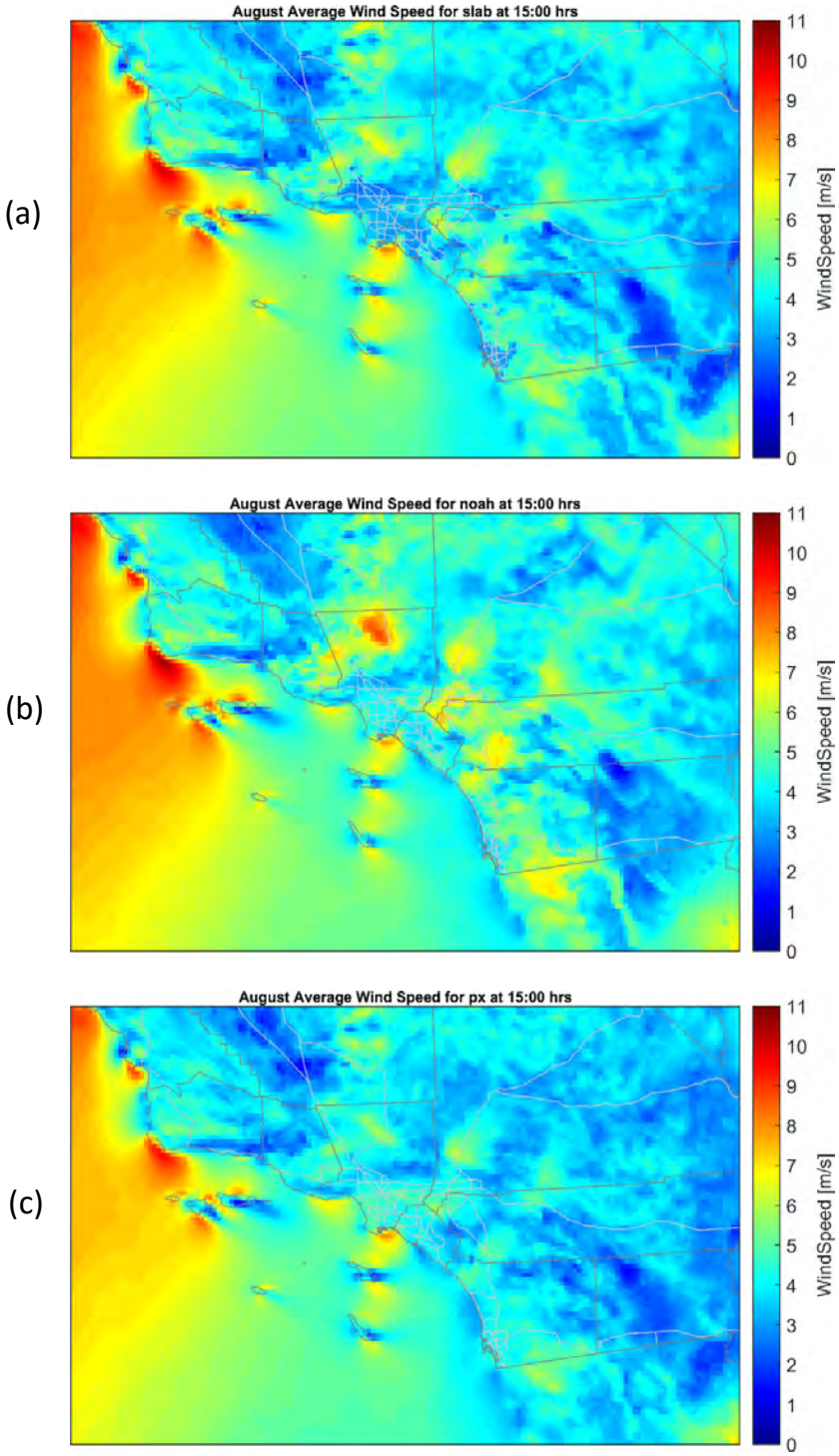
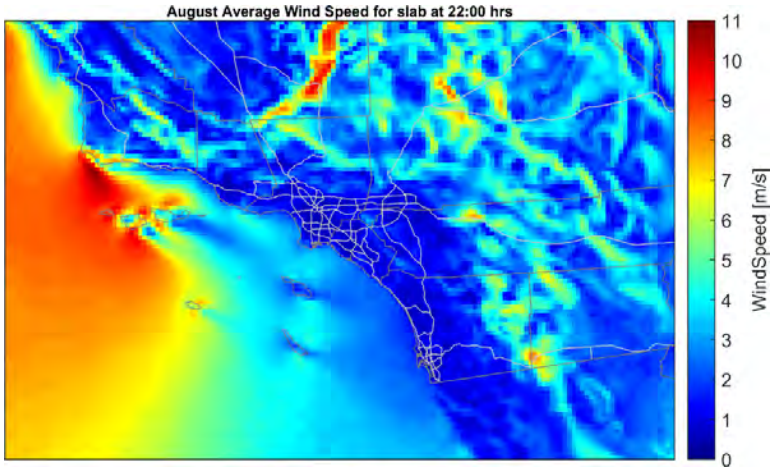


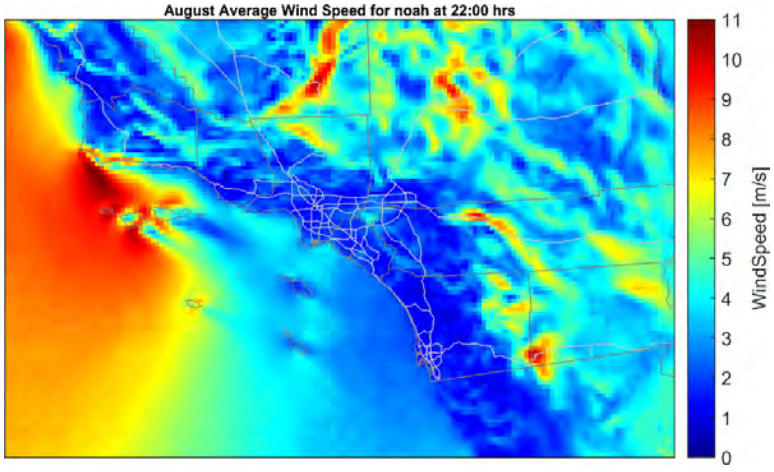
FIGURE V-3-5

Horizontal distribution of wind speed at 1500 PST predicted with (a) Thermal Diffusion, (b) NOAH, and (c) Pleim-Xiu Land Surface Scheme. The winds are composited for the month of August.

(a)



(b)



(c)

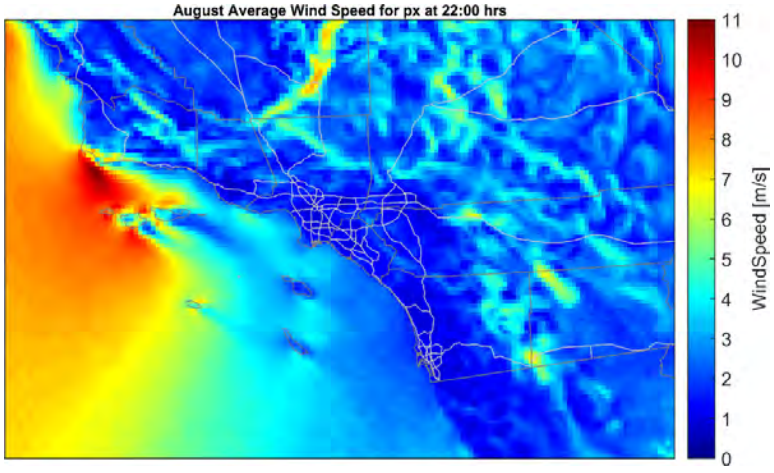


FIGURE V-3-6

Horizontal distribution of wind speed at 2200 PST predicted with (a) Thermal Diffusion, (b) NOAH, and (c) Pleim-Xiu Land Surface Scheme. The winds are composited for the month of August.

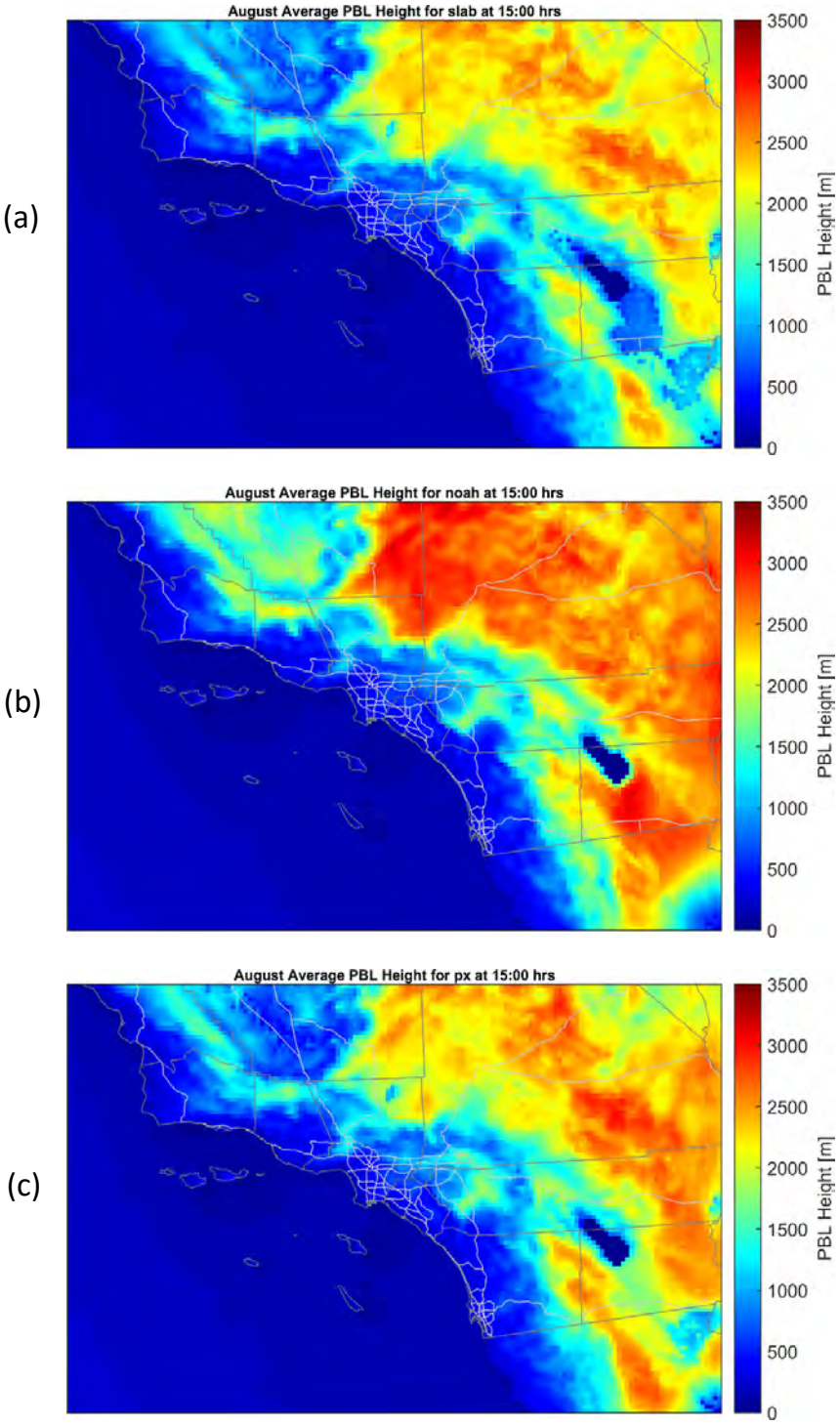


FIGURE V-3-7

Planetary Boundary Layer depth predicted for 1500 PST in August. (a) Thermal Diffusion, (b) NOAH, and (c) Pleim-Xiu Land Surface Schemes were used respectively.

The performance of each scheme was compared against measurements taken from NWS weather stations. Figures V-3-8 through Figure V-3-11 show seasonal average biases of surface wind speed predicted by the Thermal Diffusion and NOAH land surface schemes. During morning hours, both the Thermal Diffusion and the NOAH schemes under-predict surface wind speeds. This negative bias occurred at most of the locations within the Basin, while coastal stations showed a larger degree of under-prediction than inland locations. The under-prediction continues to prevail for the convective period (Figure V-3-10 and Figure V-3-11), yet the degree of negative bias was enhanced in the Thermal Diffusion scheme, indicating that the Thermal Diffusion scheme tended to simulate weak winds that lead to the accumulation of air contaminant concentrations. This is well represented by the ventilation index, defined as horizontal advection multiplied by vertical mixing layer depth (Figure V-3-12). As expected from the surface wind and PBL depth, the Thermal Diffusion scheme ("slab") showed less ventilation than the NOAH scheme, leading to the highest pollutant concentration. Accordingly, the Thermal Diffusion scheme excelled in predicting high ozone concentrations observed during episode periods in the Basin compared to the other schemes and therefore, it was selected as the default land surface scheme for this attainment demonstration. The amount of ventilation is sensitive to geographical location since the PBL depth and horizontal wind speed depends on geography and its associated thermal and dynamic forcing. Deeper mixing in the inland sites, such as Ontario and Riverside resulted in a greater amount of ventilation (Figure V-3-12).

While the PBL depth is one of key elements to predict pollutant concentrations, no conventional measurements are available to validate the PBL predictions. The closest National Weather Service Radiosonde site is located in San Diego, which is over 150 miles away from LA, representing different weather and climate. Staff conducted a preliminary study to retrieve PBL depths from a radiometer and Radar wind profilers/Radio Acoustic Sounding System (RASS) placed at the Los Angeles airport, Ontario airport, Riverside and Irvine. Even though the results from the wind profilers/RASS appear to be good for qualitative assessments of diurnal and seasonal variation, the degree of uncertainties involved in the measurements and data retrieval pose challenges in drawing quantitative information to evaluate model predictions. Still, the PBL heights predicted by the NOAH scheme appeared to be significantly deeper than previous measurements reported in the area for similar climatological conditions. A radiometer provides little more reasonable PBL depth than the RASS, but the measurements are limited to the Los Angeles airport site. All three land surface schemes showed large deviations from the radiometer data, indicating challenges to simulate the marine boundary layer correctly.

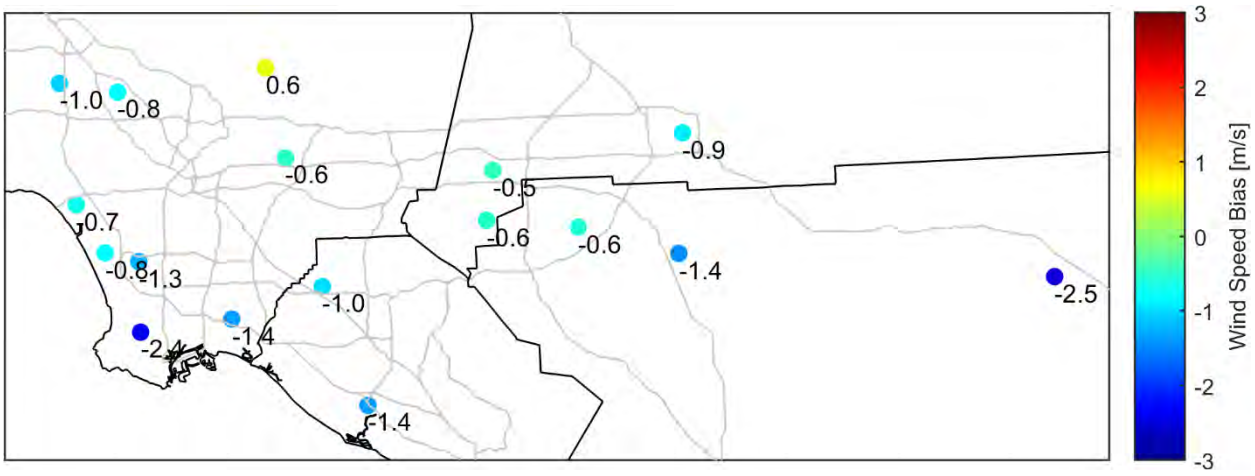


FIGURE V-3-8

August average bias of surface wind speed predicted with the Thermal Diffusion Land Surface Scheme. The bias corresponds to 0800 PST.

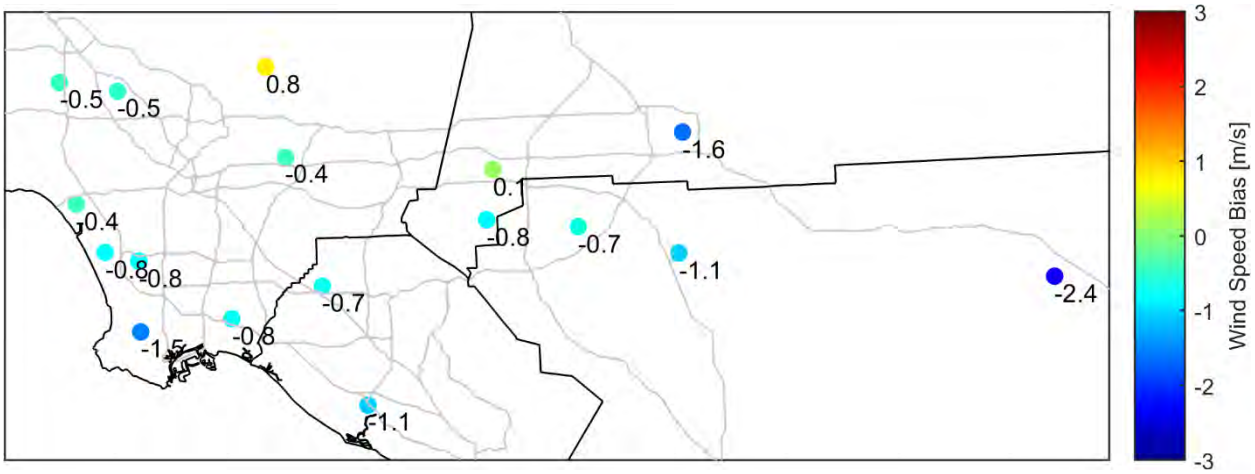


FIGURE V-3-9

August average bias of surface wind speed predicted with the NOAH Land Surface Scheme. The bias corresponds to 0800 PST.

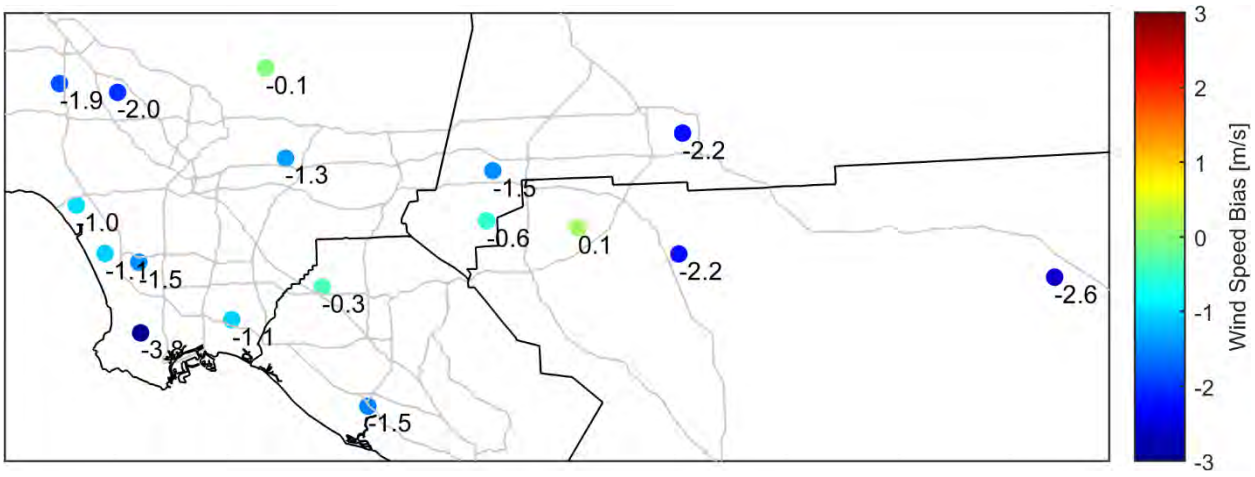


FIGURE V-3-10

August average bias of surface wind speed predicted with the Thermal Diffusion Land Surface Scheme. The bias corresponds to 1700 PST.

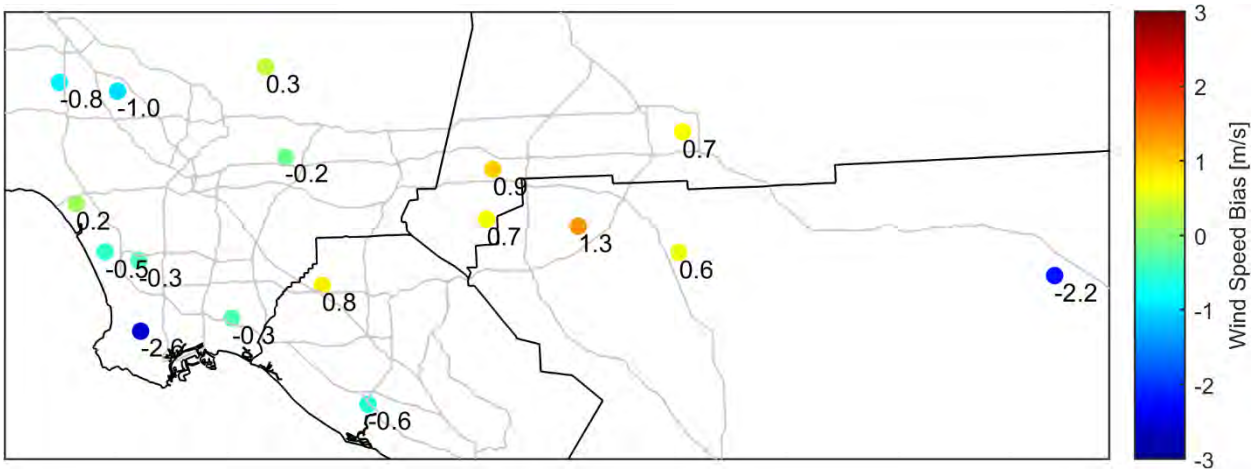


FIGURE V-3-11

August average bias of surface wind speed predicted with the NOAH Land Surface Scheme. The bias corresponds to 1700 PST.

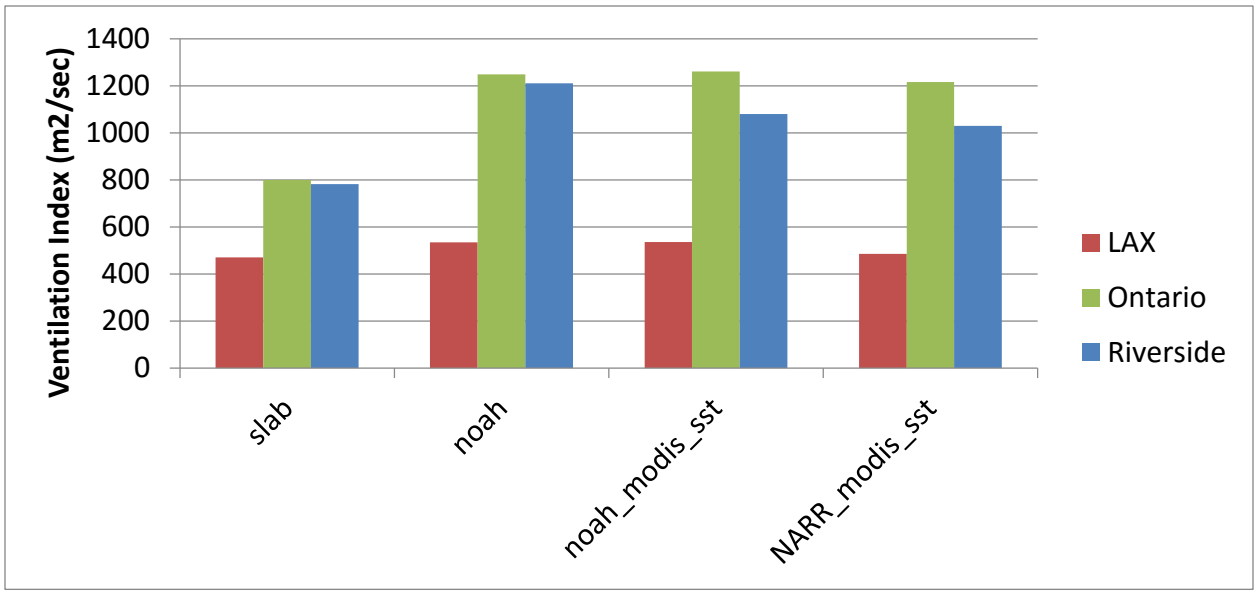


FIGURE V-3-12

Seasonal Average Ventilation Index (calculated as PBL height multiplied by surface wind speed) for the period from May through September

Land Use Representation

The U.S. Geological Society (USGS) default land use database and the Moderate Resolution Imaging Spectroradiometer (MODIS) satellite-based dataset (NASA, 2012) are both available to represent land use in WRF. The USGS dataset has been the default dataset for mesoscale modeling for WRF. While it is a ready-to-use off-the-shelf database, some data representations are several-decades old and consequently do not reflect changes in the areas that have experienced rapid development in recent years. The South Coast Air Basin, especially in parts of Riverside, San Bernardino and the San Fernando Valley areas, have experienced rapid development in the last decade that turned shrub and grassland into suburban housing units and impervious land cover. Accordingly, the location and extent of urban representation in the USGA dataset is often inaccurate for the Basin. During the 2012 AQMP, SCAQMD staff developed new land use categories ready for the use in WRF simulation. The new dataset was based on the USGS database, but contains a new category defined as 'sub-urban', which represents low-density residential neighborhoods with single and/or double story houses. The new category was introduced mostly in the inland Riverside, San Bernardino and San Fernando valleys where rapid growth occurred in early 2000's. Land use retrieved by the MODIS satellite shows a large degree of development, for which extent and location agrees well with the modified USGS category in Figure V-3-13a. While the MODIS land use is expected to capture concurrent land use adequately, it is compatible only with NOAH land surface scheme, thus cannot be used with the Thermal Diffusion nor PX schemes. On the contrary, the USGS can be used universally in all the land surface schemes. In this context, this modified USGS land use with the added sub-urban category is used for the current modeling simulations (Figure V-3-13).

The USGS updates Land Use Land Cover (LULC) periodically. The latest version, updated in 2011, was compared with 2001, which was approximately when the recent rapid development in the Basin started (Figure V-3-14). The red shading represents urbanized areas. While the expansion of urban areas is evident from the first two figures, the difference of the two shown in Figure V-3-14c emphasizes the location and size of the expansion.

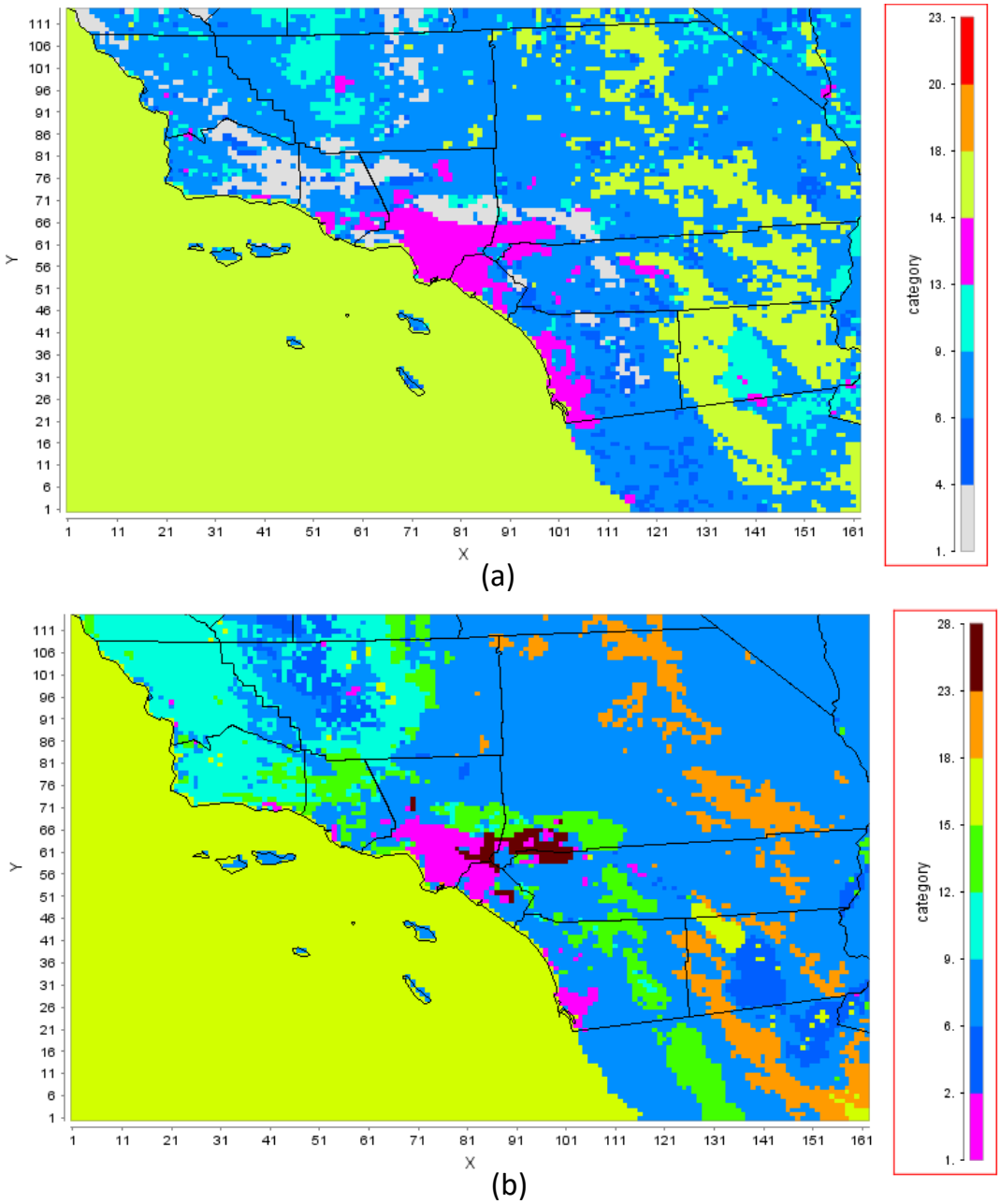
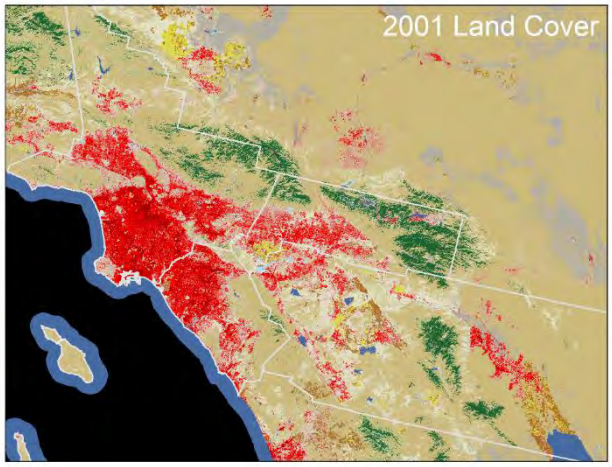


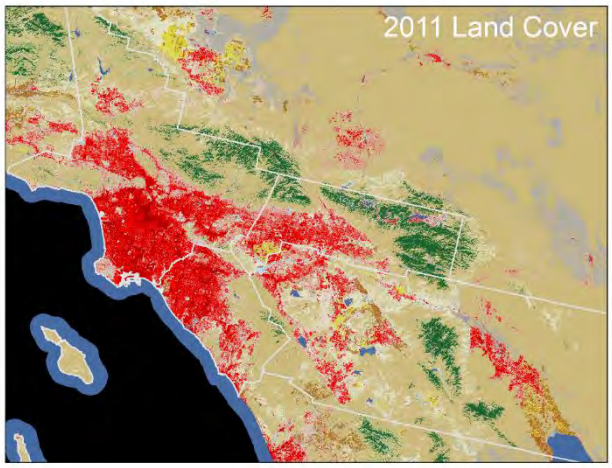
FIGURE V-3-13

Land Use categories for the WRF innermost domain. They are retrieved from (a) MODIS satellite based 20 categories, and (b) USGS land use with added Suburban category. The dark brown color represents the suburban category.

(a)



(b)



(c)

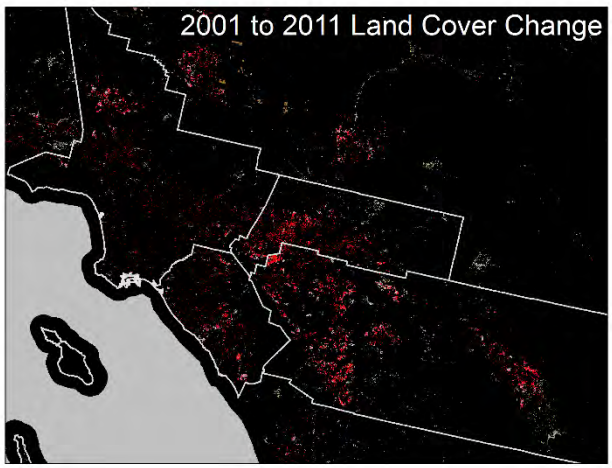


FIGURE V-3-14

Land Use Land Cover data for the South Coast Air Basin compiled for (a) 2001, (b) 2011, and (c) the difference between the two.

Sea Surface Temperature

Sea Surface Temperature (SST) is another critical factor that drives the land-sea breeze and up-slope/down-slope flow. The NAM analysis field, the initial guess field used for the current project, includes skin temperature, but not SST. The skin temperature is defined as the temperature of the interface between soil and the atmosphere that establishes radiative equilibrium. The skin temperature is identical to the SST over the sea. While the default approach in the NAM analysis field uses the skin temperature as SST, the satellite based SST is available in a high resolution real-time based format. The Global Data Assimilation Experiment (GODAE) provides 4-5 km grid resolution SST data as a part of High Resolution Sea Surface Temperature Pilot Project (GHRSST-PP). It was initiated to develop an operational system to produce a climate quality SST data product to serve the needs of GODAE and the wider scientific community. Every 6-hour SST data was acquired through GODAE FTP data hub. The SST was averaged for the month of August and compared with the skin temperature from the NAM analysis data. The SST shows large degree of variability in the domain (Figure V-3-15). But, in general the GODAE SST indicates warmer ocean waters south of Point Conception and colder waters along the shore of Ventura, Los Angeles, Orange and northern San Diego counties. The colder ocean during the daytime can result in an enhanced sea breeze. A grid cell near Catalina Island was treated as land in the NAM field, resulting in the hot spot near the Island. Note that SST is incorporated only for the ocean grid points; therefore, values over land were discarded.

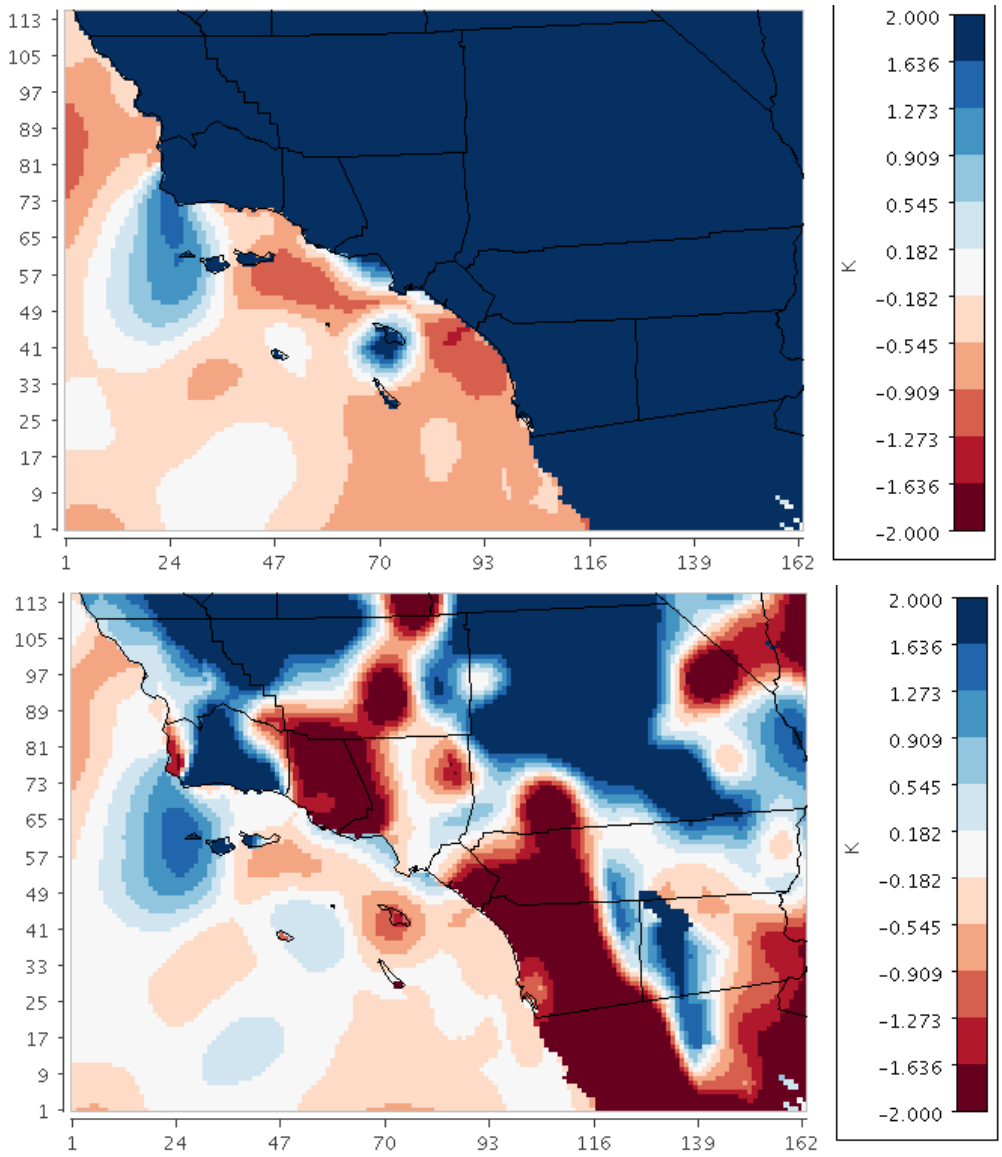


FIGURE V-3-15

The differences of Skin Temperature and Sea Surface Temperature (Skin Temperature – Sea Surface Temperature) composited for the month of August. The 0000 UTC and 1200 UTC fields are presented in the upper and lower panel, respectively.

Statistical Evaluation of the Sensitivity Tests

The sensitivity tests discussed above were evaluated using statistical measures to determine the optimum configuration for the Basin. The measurements used in this statistical evaluation were taken from NWS stations which were predominately located at airports. This is due to the assumption that an airport site

appropriately represents prevailing weather conditions with minimum interference of local obstructions. The stations used in the evaluation and their geographical locations are marked in Figure V-3-16. The 2 m temperature, water vapor mixing ratio and 10 m wind speed were selected for the evaluation based on the importance in simulated chemical reactions and transportation pattern. The following statistical measures were used in the evaluation:

Bias Error (B): calculated as the mean difference in prediction (*P*)-observation (*O*) pairings with valid data within a given analysis region and for a given time period (hourly or daily):

$$B = \frac{1}{IJ}\sum_{j=1}^{J}\sum_{i=1}^{I}\left(P_j^i - O_j^i\right)$$

Gross Error (E): calculated as the mean absolute difference in prediction-observation pairings with valid data within a given analysis region and for a given time period (hourly or daily):

$$E = \frac{1}{IJ}\sum_{j=1}^{J}\sum_{i=1}^{I}\left|P_j^i - O_j^i\right|$$

Root Mean Square Error (RMSE): calculated as the square root of the mean squared difference in prediction-observation pairings with valid data within a given analysis region and for a given time period (hourly or daily):

$$RMSE = \left[\frac{1}{IJ}\sum_{j=1}^{J}\sum_{i=1}^{I}\left(P_j^i - O_j^i\right)^2\right]^{1/2}.$$

The graphical presentation of the WRF performance evaluation for the ozone season, May 1st to September 30th 2012 is provided in Figures V-3-17 through Figure V-3-19. Four sets of simulations included in the comparison are 1) Thermal diffusion LSM with modified USGS land use, 2) NOAH LSM with default USGS land use, 3) NOAH with MODIS land use and GODAE SST, and lastly 4) NOAH with NARR initial guess field, MODIS land use and GODAE SST. All four simulations showed distinctive geographical dependency. Inland locations such as Riverside and San Bernardino show a larger degree of error than coastal stations. This appeared to be consistent with temperature, water vapor and wind predictions. NOAH LSM with MODIS land use and GODAE SST showed the least amount of errors in all the variables and locations. Between NAM and NARR, NAM best represented temperature, but predictions of wind speed were comparable between the two methods. The updated SST resulted in a better prediction of temperature, but not water vapor nor wind speed. The temperature gradient between sea and land drives local thermal circulation. However, while, the improved temperature fields were expected to lead to a better land-sea breeze wind prediction, improved performance was not evident in the simulations. This reflects the fact that wind is driven not only by thermal gradients but also other factors such as pressure gradients, Coriolis force, friction, and turbulent mixing. Therefore, temperature itself is not enough to improve the wind predictions. The sensitivity tests are summarized in Table V-3-3 as well. The table

includes all the three major LSMs – Thermal Diffusion, NOAH and PX schemes, sensitivity tests on land use and SST. While all the three LSMs showed advantages in a specific variable, the overall performance was similar. The MODIS land use did not show any improvement over the default USGS land use. However, the updated SST fields improved all four variables – wind speed, direction, temperature and water vapor in the Basin.

The sensitivity tests were extended to CMAQ in order to evaluate their impacts on chemical transport. Table V-3-4 summarizes the ozone statistics simulated with three different WRF fields (Thermal Diffusion, NOAH and P-X land surface schemes). The Thermal Diffusion scheme showed a tendency to over-predict ozone in the coastal areas and slightly under-predict ozone in the inland downstream areas. On the contrary, NOAH yielded smaller biases in the coastal regions but a larger degree of biases in the receptor areas. The performance of the PX scheme was in between the NOAH and Thermal Diffusion schemes. While all the schemes appeared to have strengths and weakness in certain geographical area, design sites are typically in the inland receptor region. Consequently, accurate predictions in the inland receptor region are more imperative than performance in the coastal or central LA basin. Therefore, the Thermal Diffusion scheme with the updated SST and modified USGS was selected as a default configuration.

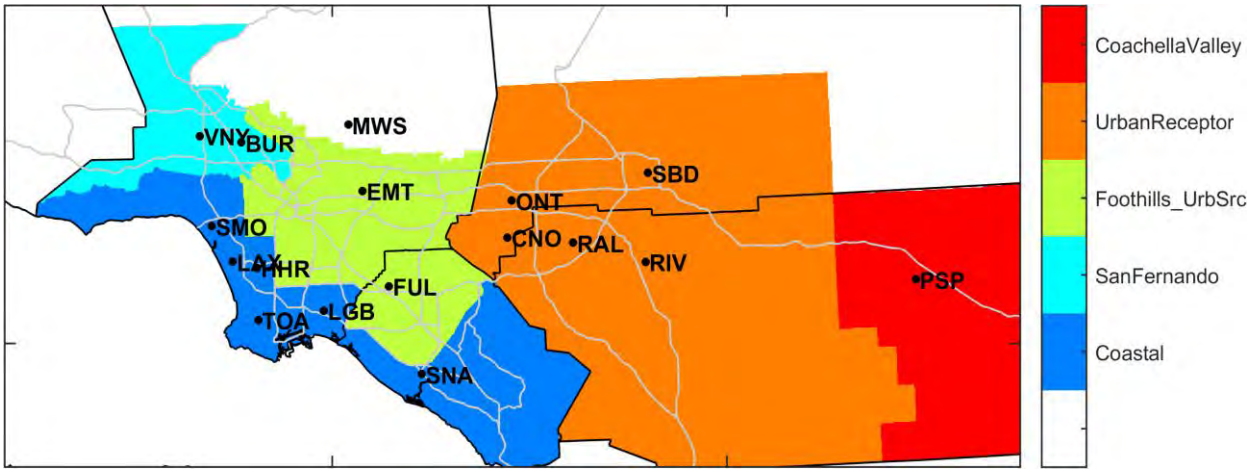


FIGURE V-3-16

Location of NWS stations used in the model performance evaluation and geographical zones

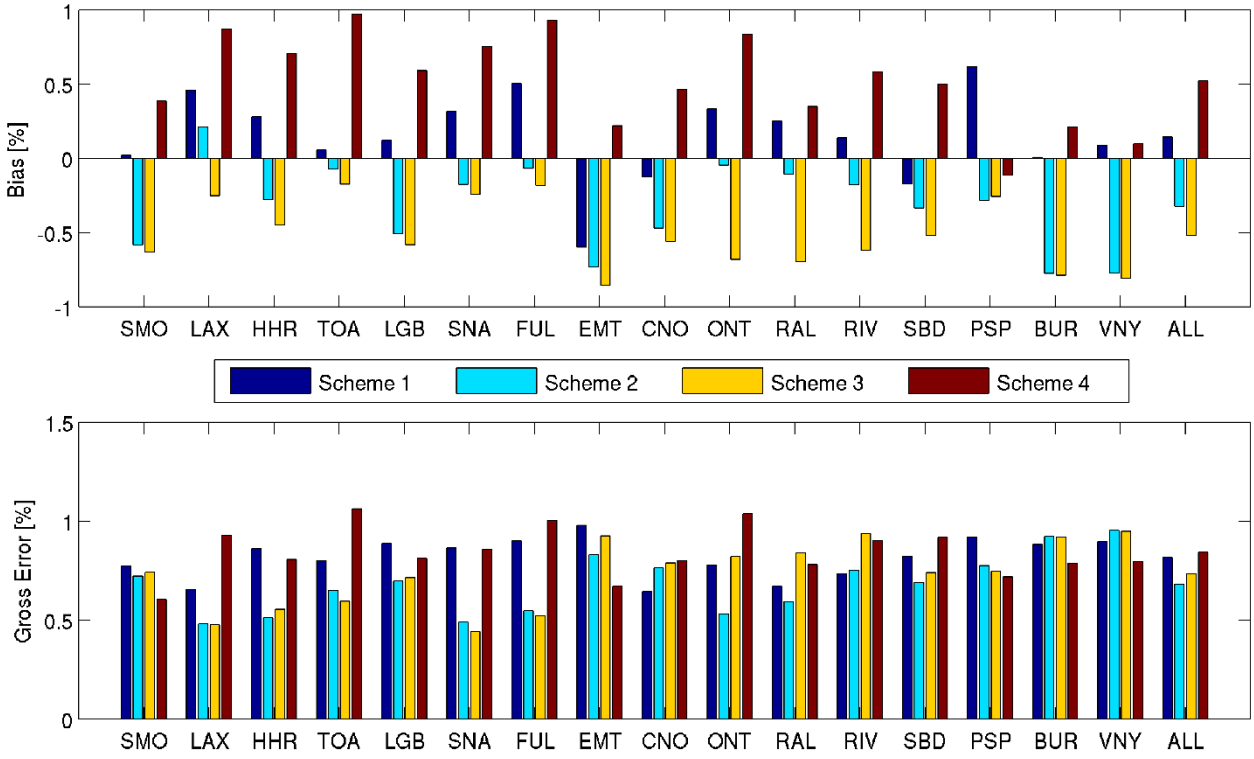


FIGURE V-3-17

Normalized Bias Error (upper panel) and Normalized Gross Error (lower panel) of temperature predictions at NWS airport monitor locations. They are averaged over the period of May 1st to September 30th, 2012. Scheme 1) Thermal diffusion LSM with modified USGS land use. Scheme 2) NOAH LSM with default USGS land use. Scheme 3) NOAH with MODIS land use and GODAE SST. Scheme 4) NOAH with NARR initial guess field, MODIS land use and GODAE SST.

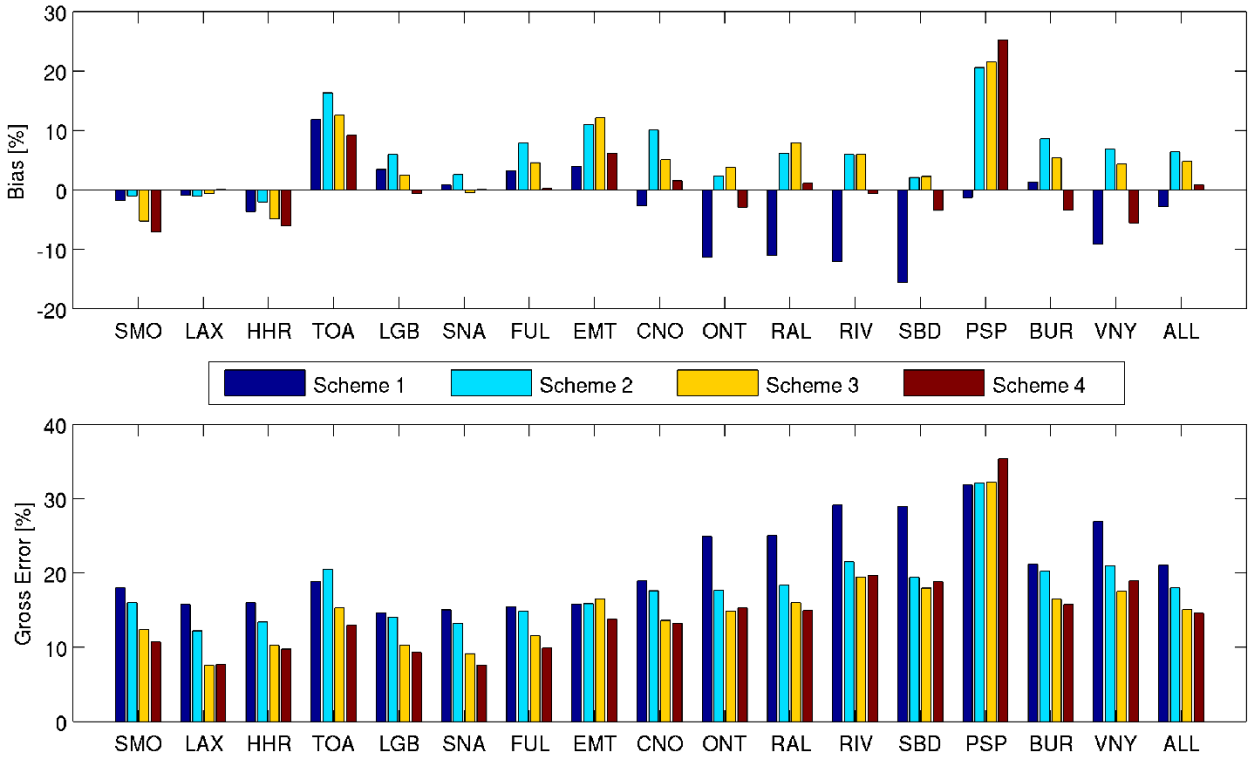


FIGURE V-3-18

Normalized Bias Error (upper panel) and Normalized Gross Error (lower panel) of water vapor mixing ratio predictions at NWS airport monitor locations. They are averaged over the period of May 1st to September 30th, 2012. Scheme 1) Thermal diffusion LSM with modified USGS land use. Scheme 2) NOAH LSM with default USGS land use. Scheme 3) NOAH with MODIS land use and GODAE SST. Scheme 4) NOAH with NARR initial guess field, MODIS land use and GODAE SST.

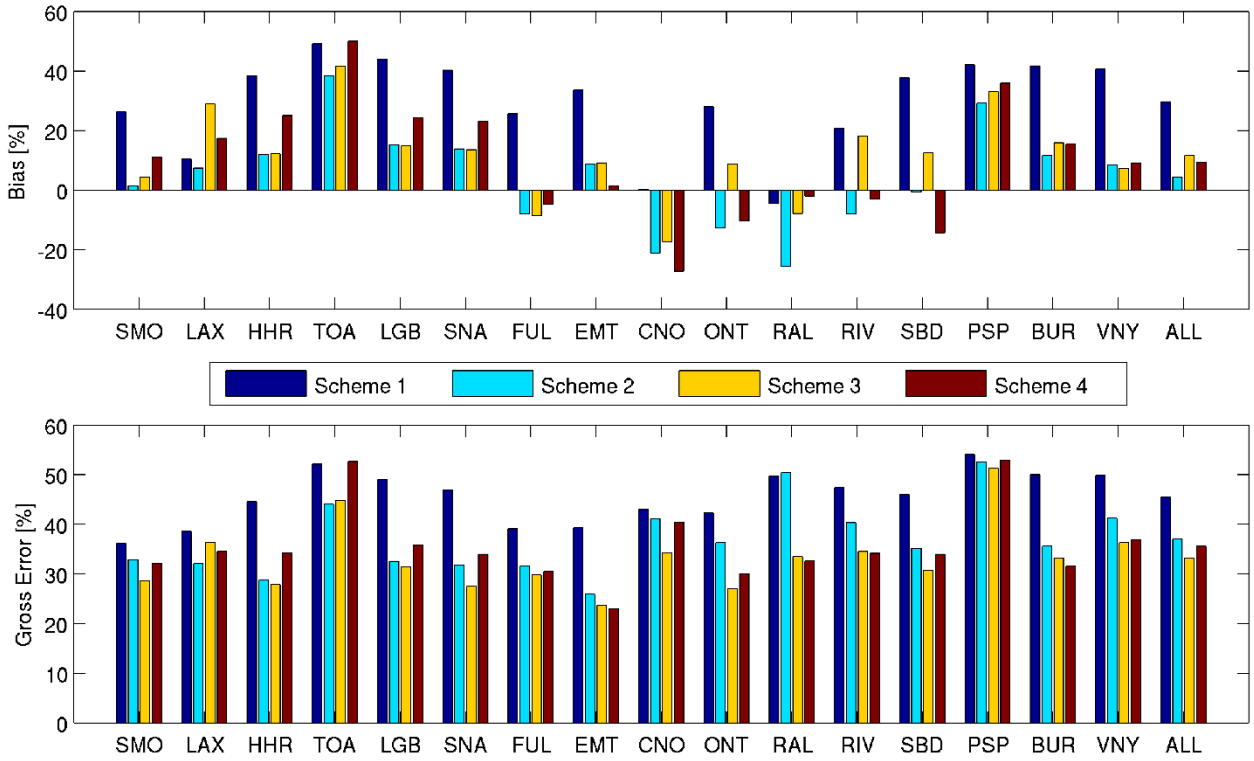


FIGURE V-3-19

Normalized Bias Error (upper panel) and Normalized Gross Error (lower panel) of surface wind speed predictions at NWS airport monitor locations. They are averaged over the period of May 1st to September 30th, 2012. Scheme 1) Thermal diffusion LSM with modified USGS land use. Scheme 2) NOAH LSM with default USGS land use. Scheme 3) NOAH with MODIS land use and GODAE SST. Scheme 4) NOAH with NARR initial guess field, MODIS land use and GODAE SST.

TABLE V-3-3

WRF performance statistics analyzed for the month of August 2012. Land Surface Schemes and Land use dataset and Sea Surface Temperature were included in the evaluation.

		Thermal Diffusion	NOAH	PX	NOAH_MODIS	NOAH_MODIS_SST	Thermal Diffusion_SST
Wind Speed [m/s]	Mean OBS	3.4	3.4	3.4	3.4	3.4	3.4
	Mean PRD	1.6	2.5	2.1	2.3	2.3	2.0
	Bias	1.3	0.4	0.8	0.6	0.6	1.0
	Gross Error	1.5	1.0	1.2	1.1	1.1	1.2
	RMSE	1.8	1.4	1.5	1.5	1.5	1.6
Temperature [K]	Mean OBS	299.2	299.2	299.2	299.2	299.2	299.2
	Mean PRD	299.0	299.6	298.9	300.1	300.3	298.9
	Bias	-0.2	-0.7	0	-1.2	-1.3	-0.1
	Gross Error	2.1	1.6	1.8	1.8	1.9	1.8
	RMSE	2.7	2.2	2.3	2.4	2.4	2.3
Humidity [kg/kg]	Mean OBS	10.9	10.9	10.9	10.9	10.9	10.9
	Mean PRD	11.7	10.6	11.6	10.5	10.8	12.1
	Bias	-0.7	0.4	-0.7	0.4	0.2	-1.2
	Gross Error	1.6	1.3	1.5	1.3	1.3	1.7
	RMSE	2.1	1.8	2.0	1.7	1.8	2.2

TABLE V-3-4

CMAQ simulated 1-hour ozone concentrations and Root Mean Square Errors using Thermal-Diffusion, NOAH and PX Land Surface Schemes. The statistics were analyzed for the month of August, 2012.

Stations	1-hour O3 Measurements		Thermal Diffusion		NOAH		PX	
			Average	RMSE	Average	RMSE	Average	RMSE
WSLA	51.1		69.5	25.8	63.4	19.0	67.3	24.4
LAXH	47.0		62.5	23.3	57.3	16.9	60.1	20.1
LGBH	45.9		63.8	25.5	55.6	15.5	61.1	21.8
CELA	58.2		68.0	20.0	61.2	12.4	66.6	17.9
CMPT	50.8		66.8	22.6	59.1	13.8	63.9	19.7
PICO	67.2		71.2	16.0	63.9	12.5	70.1	14.3
LAHB	61.6		73.9	19.7	66.3	11.0	72.1	17.2
POMA	85.2		83.0	17.0	74.4	17.2	80.5	15.6
PASA	76.9		73.7	15.6	66.8	16.5	74.0	15.5
BURK	81.3		75.5	18.8	69.9	19.6	74.5	20.0
RESE	83.1		78.0	16.1	72.4	19.4	75.8	19.5
SCLA	99.4		82.5	23.9	76.7	28.1	80.7	26.2
AZUS	84.4		79.4	17.7	70.5	20.4	78.0	15.9
GLEN	97.6		82.4	24.0	73.1	29.0	79.8	23.9
CSTA	46.6		63.7	24.6	56.5	14.8	60.8	20.1
ANAH	52.0		70.1	24.3	61.6	14.9	67.1	21.5
MSVJ	61.7		73.6	20.4	64.1	14.4	71.1	18.6
RIVR	94.3		89.2	18.3	82.1	20.2	86.7	16.8
MRLM	92.2		89.5	17.4	81.7	19.5	88.4	15.0
PERI	85.9		79.9	20.4	82.5	14.4	83.3	16.2
ELSI	77.0		77.9	13.7	78.3	14.2	81.7	12.8
UPLA	99.9		86.0	23.5	75.6	29.5	82.2	24.0
FONT	102.6		88.5	24.2	78.2	30.2	85.2	23.5
SNBO	96.8		90.2	17.3	80.1	21.6	83.2	19.3
RDLD	97.6		85.4	19.4	80.5	22.8	82.5	21.1
CRES	98.3		90.1	18.4	79.8	22.7	83.9	20.3
BNAP	80.2		72.2	18.0	71.7	13.7	70.7	16.4
PLSP	74.2		61.8	16.5	64.6	14.5	62.9	16.4
INDI	59.5		61.5	8.6	60.6	8.4	61.8	9.5

Overall Performance Evaluation

The overall performance of WRF simulations used as transport fields for the CMAQ modelling is provided in Figure V-3-20 through Figure V-3-22. The Basin is divided into five zones based on geographical location and emission source-receptor characteristics (Figure V-3-16). They are listed below:

- Coastal zone including inland Orange County
- Foothills and Urban Source zone that covers heavy traffic urban center and its surrounding foothill areas
- Urban Receptor zone that covers most of inland Riverside and San Bernardino areas
- San Fernando Valley
- Coachella Valley

Performance was evaluated for each month in each zone for the entire year of 2012. Temperature, water vapor mixing ratio, and wind speed were evaluated in terms of Normalized Gross Bias and Normalized Gross Error. Temperature and water vapor predictions are more accurate in the summer season than the winter months. Wind speed deviations did not show a strong seasonal variation. Geographically, winds are predicted most accurately at the inland urban receptor sites. Accurate wind predictions in this region of elevated ozone concentrations is one of the most critical factors to simulate chemical transport. Hourly predictions compared against measurements at two selected locations are provided in Figure V-3-23 and Figure V-3-24. Diurnal variation of temperature, humidity and surface wind are well represented by WRF.

Overall, the daily WRF simulation for 2012 provided representative meteorological fields that well characterized the observed conditions. These fields were used directly in the CMAQ joint particulate and ozone simulations.

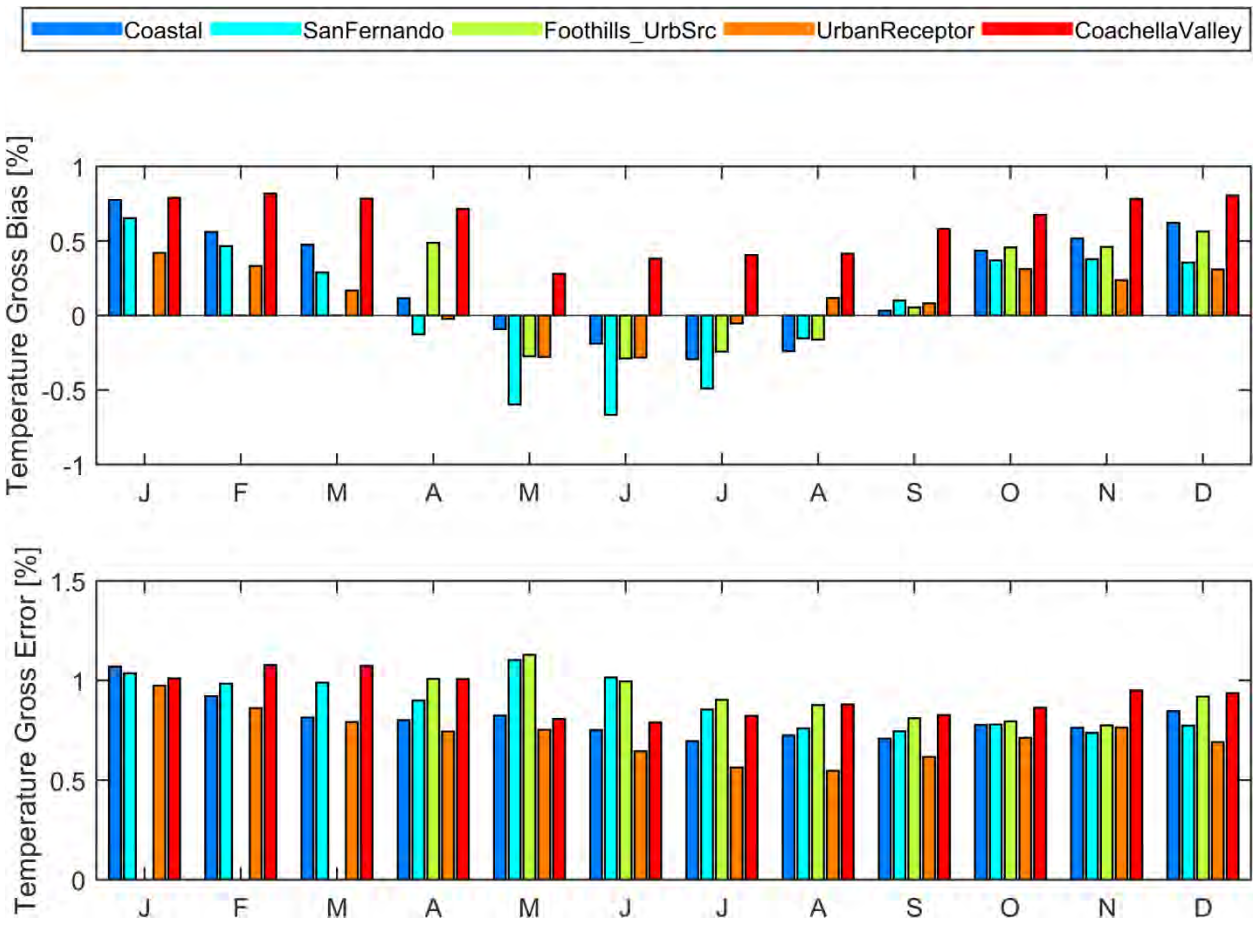


FIGURE V-3-20

Monthly Averaged Normalized Gross Bias and Normalized Gross Error of WRF predicted temperatures at each geographical zone. Missing regional monthly data indicate that more than 50percent of the measurements are not available.

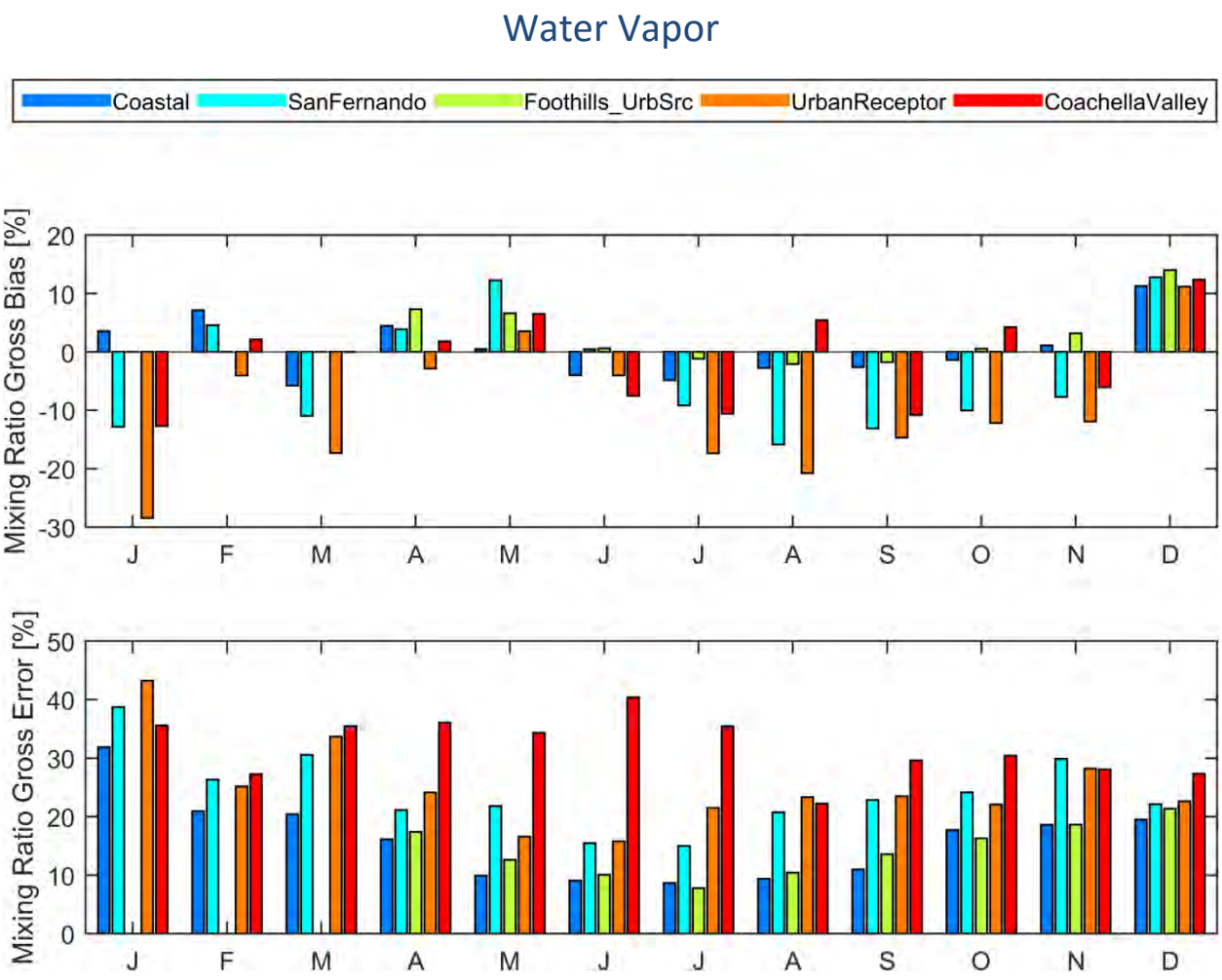


FIGURE V-3-21

Monthly Averaged Normalized Gross Bias and Normalized Gross Error of WRF predicted water vapor mixing ratio at each geographical zone. Missing regional monthly data indicate that more than 50percent of the measurements are not available.

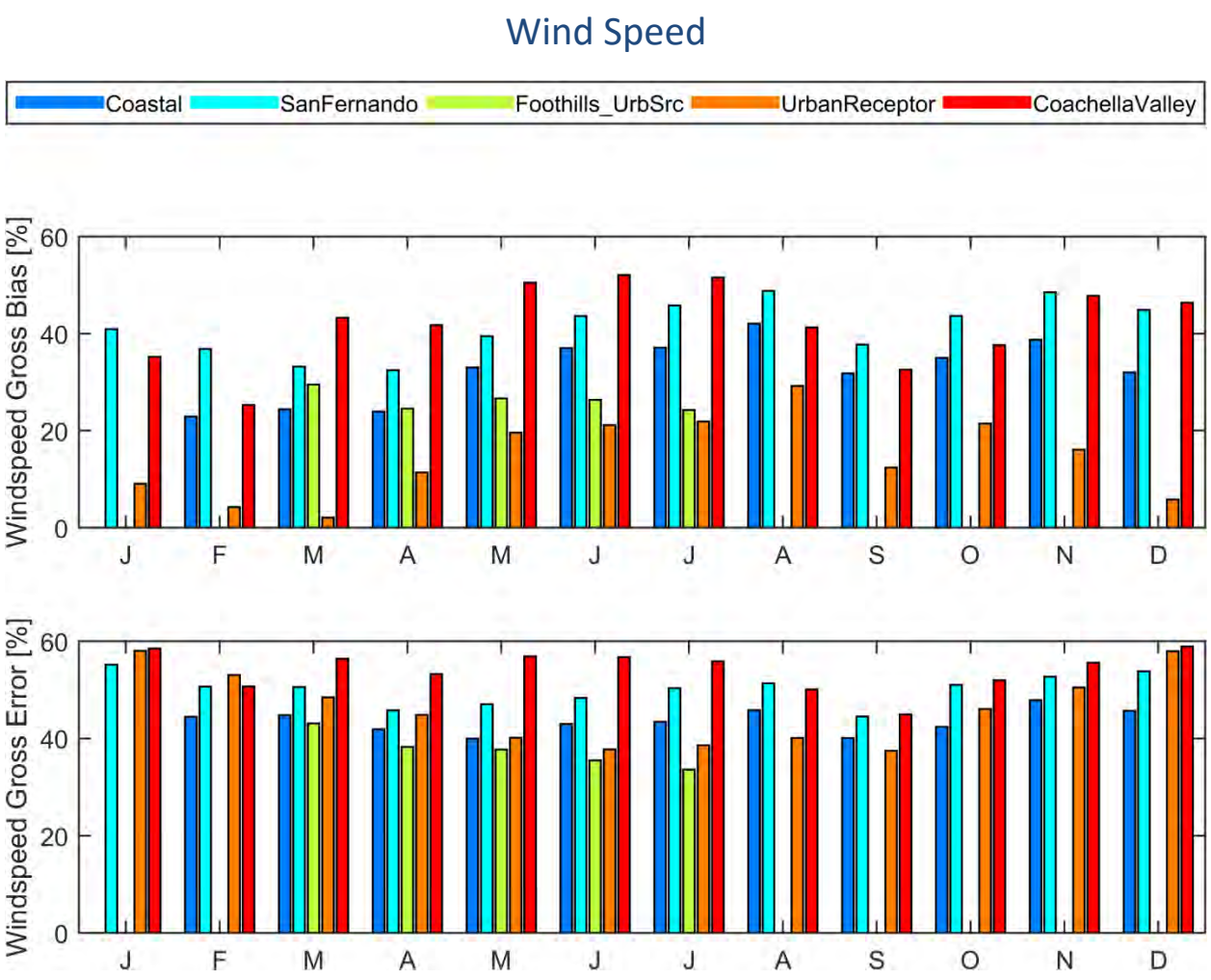
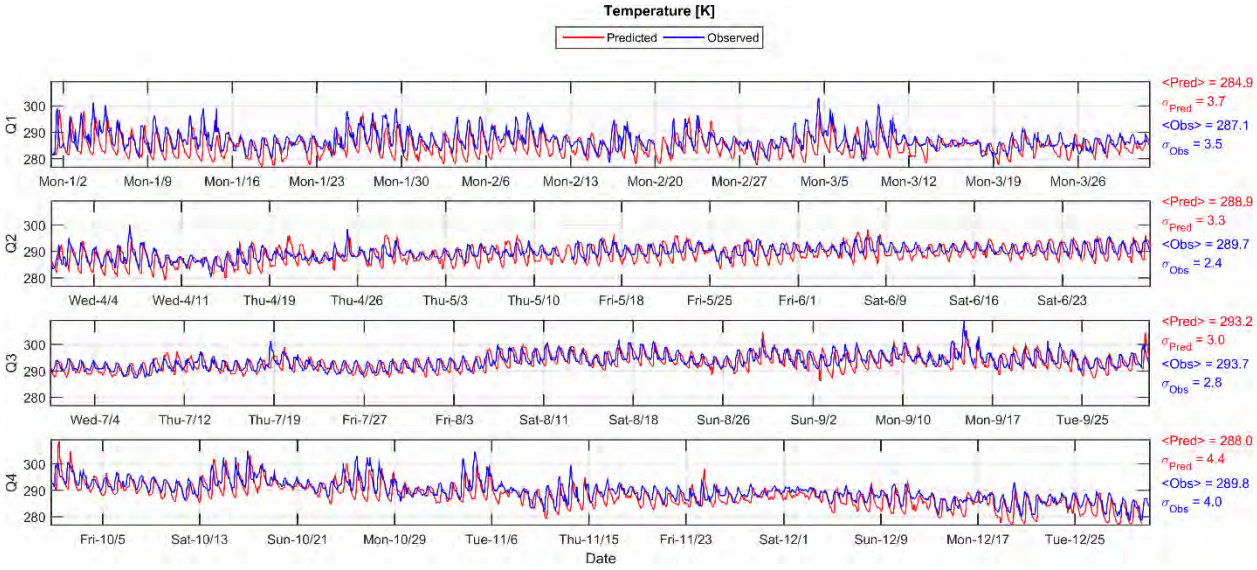


FIGURE V-3-22

Monthly Averaged Normalized Gross Bias and Normalized Gross Error of WRF predicted wind speed at each geographical zone. Missing regional monthly data indicate that more than 50percent of the measurements are not available.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Predicted
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Q3
Q4
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Wed-4/11
Thu-4/19
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Sat-10/13
Sun-10/21
Mon-10/29
Tue-11/6
Thu-11/15
Fri-11/23
Sat-12/1
Sun-12/9
Mon-12/17
Tue-12/25
Date

(a)


Mixing Ratio [g/kg]
Predicted
Observed
Q1
Q2
Q3
Q4
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10
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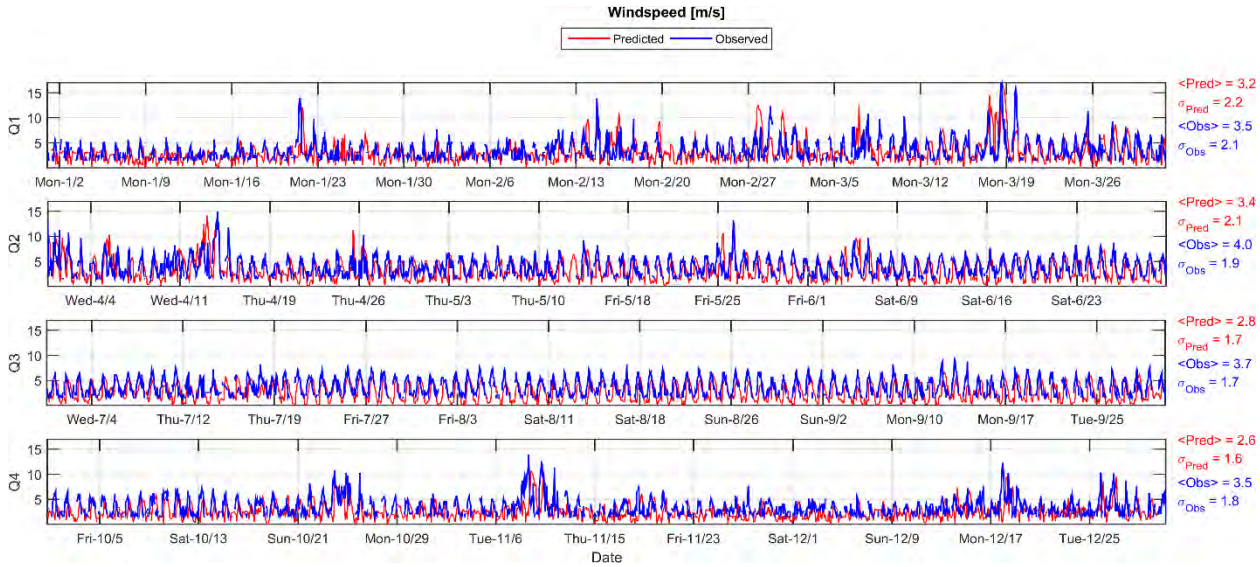
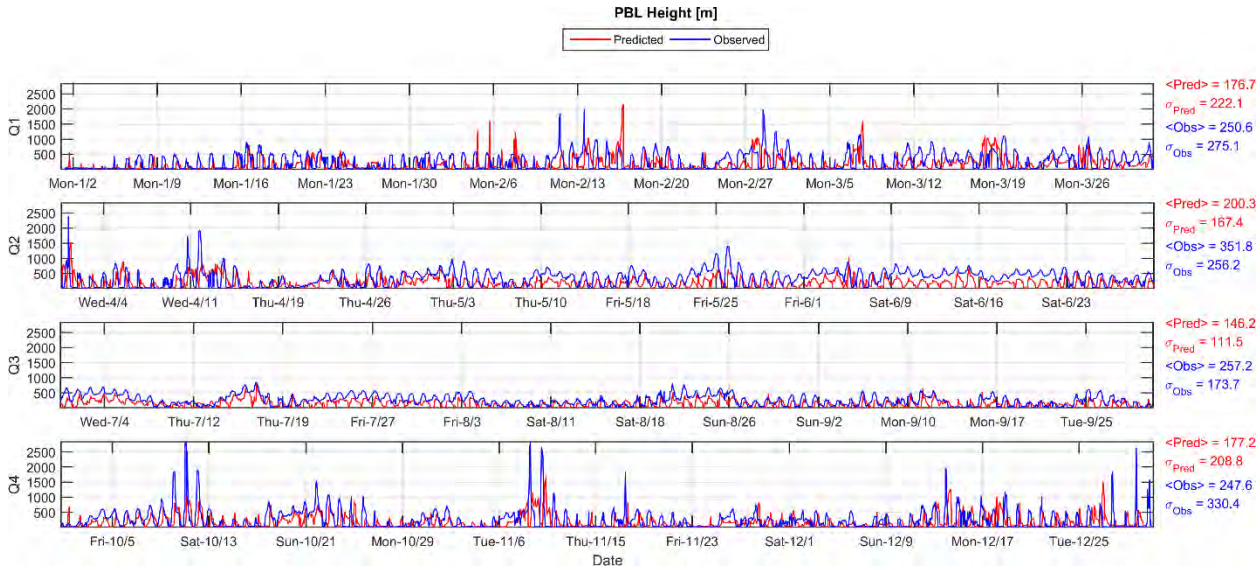
Date

(b)



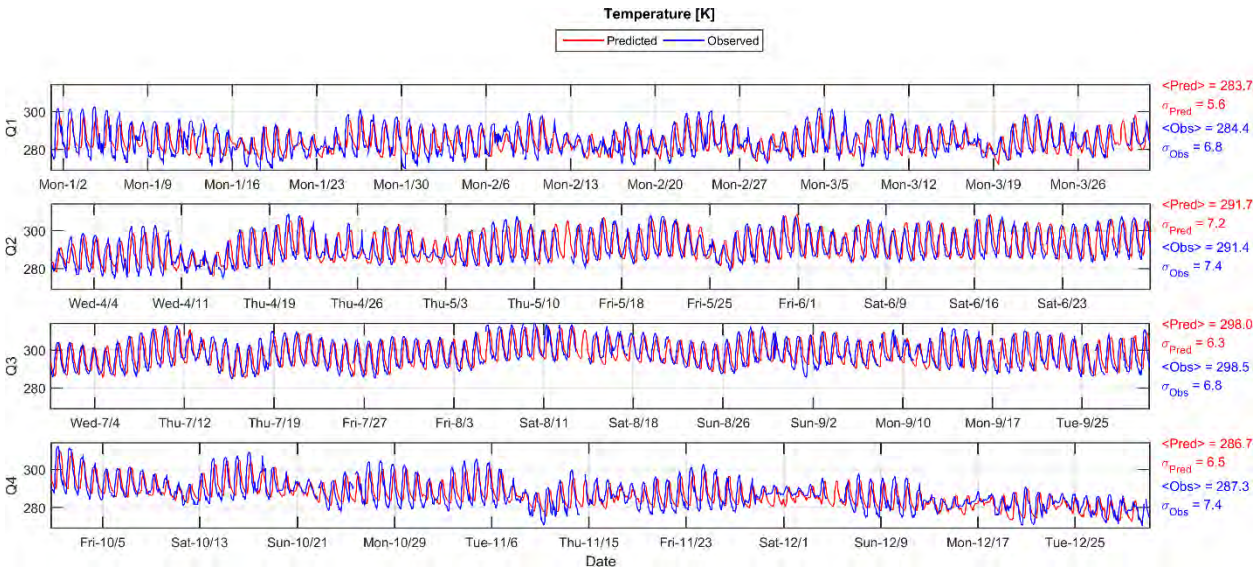
(c)



(d)

FIGURE V-3-23

Times Series of Measured and WRF simulated (a) Temperature, (b) Water Vapor Mixing Ratio, (c) Wind Speed and (d) PBL depth at Los Angeles international airport for the period of Jan 1st to December 31st, 2012. Measurements are presented in blue and Model predictions are in red.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Predicted
Observed
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Q2
Q3
Q4
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Mon-2/6
Mon-2/13
Mon-2/20
Mon-2/27
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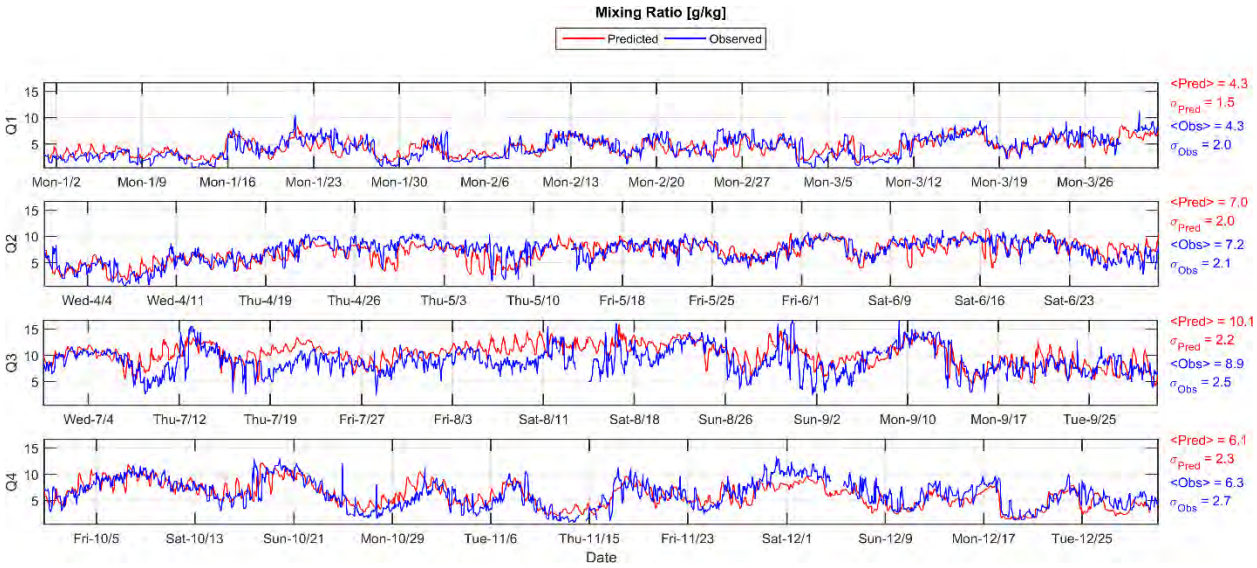
Date

(a)


Mixing Ratio [g/kg]
Predicted
Observed
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Q2
Q3
Q4
15
10
5
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σPred = 1.5
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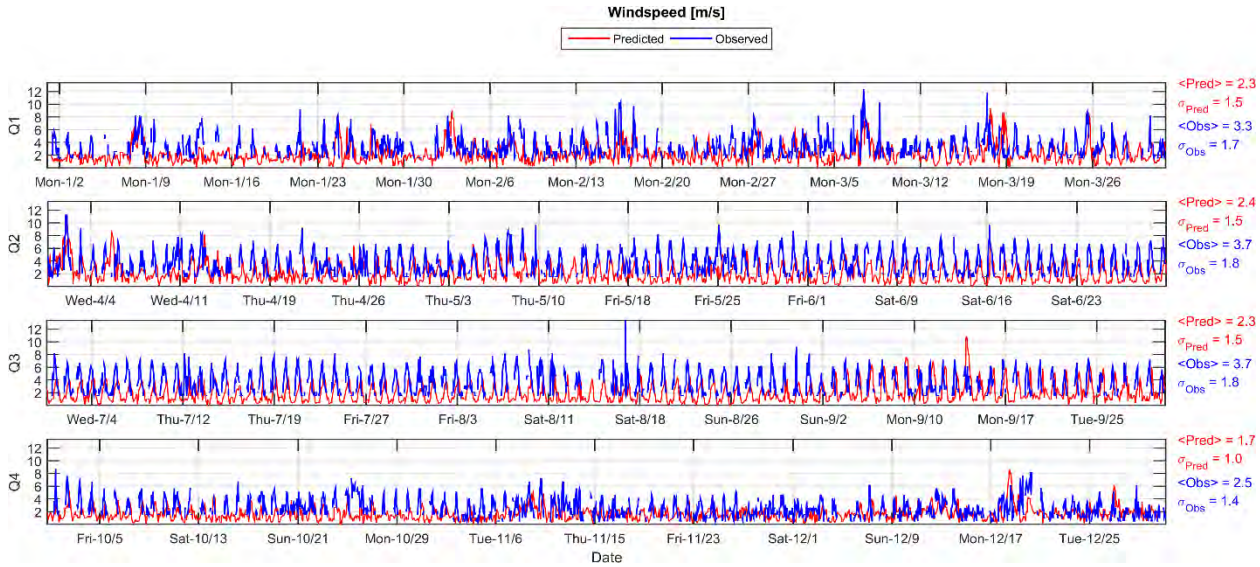
Tue-12/25
Date

(b)



(c)

FIGURE V-3-24

Times Series of Measured and WRF simulated (a) Temperature, (b) Water Vapor Mixing Ratio, and (c) Wind Speed at March Air Force Base for the period of Jan 1st to December 31st, 2012. Measurements are presented in blue and Model predictions are in red.

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CHAPTER 4

MODELING EMISSIONS, BOUNDARY CONDITIONS, AND INITIAL CONDITIONS

Modeling Emissions Inventory

Inventory Profile

Gridded Day-Specific On-Road Emissions

Methodology

Boundary and Initial Conditions

References

Modeling Emissions Inventory

Table V-4-1 provides the baseline and controlled modeling emissions inventories used in the attainment demonstration and alternative analyses. The CMAQ simulations were based on the annual average inventory, with adjustments made for source-specific temporal profiles and daily temperature variations. A brief characterization of the annual day emissions used for the modeling analysis follows. An extensive discussion of the overall emissions inventory is summarized in Appendix III.

Inventory Profile

Baseline modeling inventories for the historical year 2012 and the future years 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2025, 2026, 2031 and 2037 are discussed in this section. The baseline emissions projection assumes no emission controls beyond already adopted measures and rules. These projections reflect the emissions resulting from increases in population and vehicle miles traveled (VMT), as well as the implementation of all adopted rules and regulations. The cut-off date for the District's regulations is December 2015 and for CARB's regulations is November 2015. The controlled emission projections reflect the benefits of implementation of the 2016 AQMP control measures relative to future baseline emissions. Detailed descriptions of the control measures are provided in Chapter 4 and Appendix IV of the 2016 AQMP.

Appendix III contains emission summary reports by source category for the historical base year and future baseline scenarios used in this modeling analysis. Attachments 2 and 3 of this appendix contain the Controlled Emission Projection Algorithm (CEPA) emissions summary report by source category for the future (2022, 2023, 2025 and 2031) controlled scenarios. Day specific point, mobile and area emissions inventories were generated for each day in the 2012 base year. On-road mobile source emissions were generated based on information from SCAG transportation modeling, ARB EMFAC2014 emissions rates, observed daily traffic variations and modeled daily temperatures. A more detailed description on generating on-road modeling emissions follows. County-wide area source and off-road source emissions were gridded using the spatial emissions surrogate profiles developed for the 2016 AQMP.

TABLE V-4-1

Annual Average Day and Planning Anthropogenic Emissions Inventory (tons/day)

	Annual Average						Summer Planning		Winter Planning	
Year	VOC	NOX	CO	SOX	PM2.5	NH3	PVOC	PNOX	PCO	PNO2
(a) Baseline										
2012	470	540	2123	18	66	81	500	522	2053	530
2017	392	398	1590	17	64	76	416	390	1532	390
2018	382	373	1506	17	64	75	405	366	1450	366
2019	376	353	1447	17	64	74	398	347	1392	347
2020	370	330	1394	17	64	73	391	325	1339	324
2021	365	309	1357	17	64	73	386	305	1303	304
2022	362	290	1325	17	64	73	383	287	1271	286
2023	359	257	1298	17	64	72	379	255	1245	253
2025	353	241	1247	17	64	72	372	239	1194	237
2026	352	234	1232	17	64	72	370	233	1180	231
2031	345	214	1188	18	65	73	362	214	1139	211
(b) Controlled[1]										
2022	352	268	1238	17	62	73	371	265	1189	263
2023	307	143	822	17	64	72	319	141	807	143
2025	341	214	1136	17	64	72	358	213	1089	211
2031	284	96	666	18	62	73	294	96	651	95

[1]Reflecting SCAG's 2016 RTP/SCS

Gridded day-specific on-road emissions

On-road mobile sources are responsible for a large fraction of the total VOC, NOx, and CO emissions in the modeling domain. These emission sources are highly dependent on time and location with variations up to a factor of 8 between overnight and peak traffic hours at a specific location. On-road mobile emission patterns vary significantly throughout the week and year. This variation may also be location-dependent as emissions are a function of the proximity to high-employment areas, sporting events, or seasonal activities.

In past AQMPs, the temporal variation of on-road mobile emissions was purely a function of the day of the week. The total emissions in each grid cell was determined with SCAG transportation modeling outputs on traffic volumes and speeds along with EMFAC emission rates. Traffic emissions were apportioned hourly by a day-of-week throughput profile consisting of a Sunday, Monday, Tuesday-Thursday, Friday, and Saturday schedule. A light-duty and heavy-duty vehicle throughput profile was used to apportion emissions for each vehicle class independently. The same day-of-week throughput profiles were applied to each grid cell in each county in the modelling domain. The peak emissions occur mid-week (Tuesday through Thursday) while emissions on Saturday and Sunday decreased by about 30 percent, primarily due to a reduction in truck traffic during the weekend.

For the 2016 AQMP modelling, real-time traffic flow measurements from 2012 were used to apportion traffic volumes on an hourly basis throughout the five counties, Ventura, Los Angeles, Orange, Riverside and San Bernardino, in the center of the modelling domain. Light- and heavy-duty vehicle flow data is location dependent and accounts for special events, holidays, seasonality, and meteorologically-driven traffic profiles. Due to of the sparsity of monitoring data in the five outlying counties, San Luis Obispo, Santa Barbara, Kern, Imperial and San Diego, grid-based on-road emissions in those counties were created with the traditional approach.

Methodology

The CalTrans Performance Measurement System (PeMS) data was used to simulate light-duty vehicle emissions from 2012. Data from over 9,000 traffic monitoring stations were processed to generate traffic profiles for each hour of 2012 as a function of location. FIGURE V-4-1 details the location of each PeMS monitoring station. Vehicle flow measurements were normalized by the annual average traffic flow at that particular location.



FIGURE V-4-1

Location of PeMS traffic monitoring station. Each monitoring station is noted with a green dot. Monitoring stations typically had sensors in each lane of traffic travelling in one direction.

Caltrans PeMS Weight-In-Motion (WIM) data was used to model the flow profiles of heavy-duty vehicles. While it was only possible to use 11 WIM stations in the modelling domain, heavy-duty vehicles tend to make longer distance trips than light-duty vehicles, allowing for reasonable projections of flow profiles over longer distances. Since heavy-duty vehicles are classified by weight, the WIM data could partitioned between heavy-heavy-duty, medium-heavy-duty, and light-heavy-duty vehicle flow. These flow profiles are extrapolated along routes that were expected to share similar characteristics such as direction of travel and/or proximity to shipping hubs. Figure V-4-2 illustrates the locations of each of the 11 WIM stations and the routes assumed to share the same flow characteristics. Flow profiles at each WIM station were normalized by the yearly average vehicle flow.

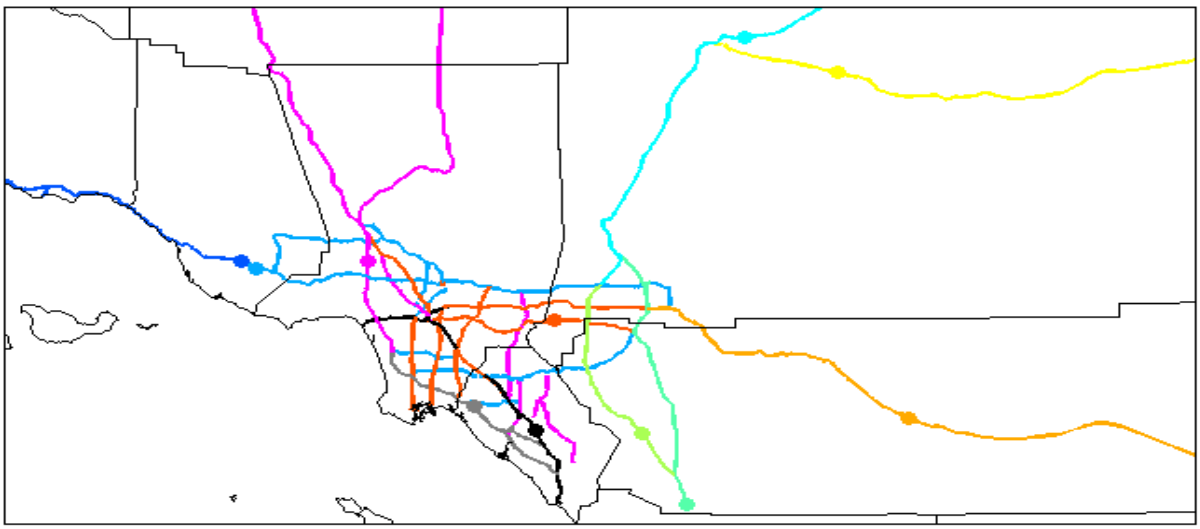

FIGURE V-4- 2

Locations of WIM sensors and corresponding routes assumed to share flow characteristics. Sensors are illustrated with colored dots. Major freeways are colored to indicate the WIM sensor used to represent their heavy-duty vehicle flow profile.

Normalized light- and heavy-duty (light-heavy-duty, medium-heavy-duty, and heavy-heavy-duty) traffic profiles were gridded into the 4km x 4km modelling grid. An inverse-distance-squared weighted interpolation was used to fill in grid cells without traffic sensors. FIGURE V-4-3 and Figure V-4-4 show the spatial dependence of normalized traffic profiles at two specific times in 2012: Wednesday July 4th (a holiday) at 5:00 PM and Wednesday July 11th at 5:00 PM, respectively. 2012 traffic links were assigned a yearly flow profile based on the grid cell that the center of the link occupies. The yearly flow profile determined from 2012 measurement data was applied to projected link locations in future years as well.

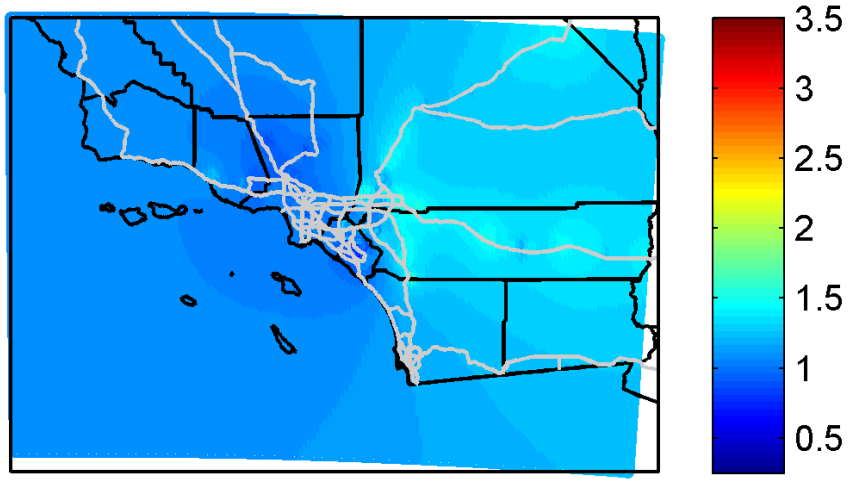

FIGURE V-4-3

Normalized light-duty vehicle flow on Wednesday, July 4th 2012 at 5:00 PM

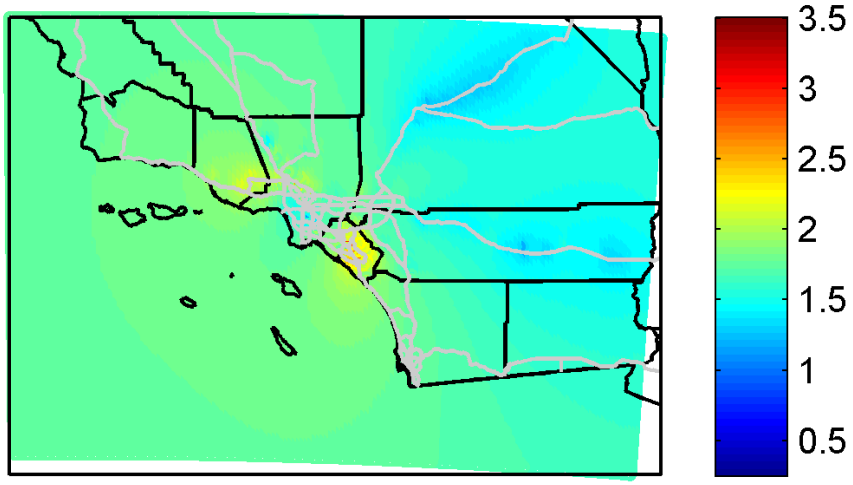

FIGURE V-4-4

Normalized light-duty vehicle flow on Wednesday, July 11th 2012 at 5:00 PM

As shown in Figure V-4-5, the resulting daily total SCAB on-road emissions vary significantly. The variations are primarily due to day of week and major holidays. The daily changes in atmospheric conditions and traffic volumes in addition to day of week also affected the emissions. The seasonal changes in fuel blends also contributed to lower levels of NOx emissions in summer, especially in on-road mobile section.

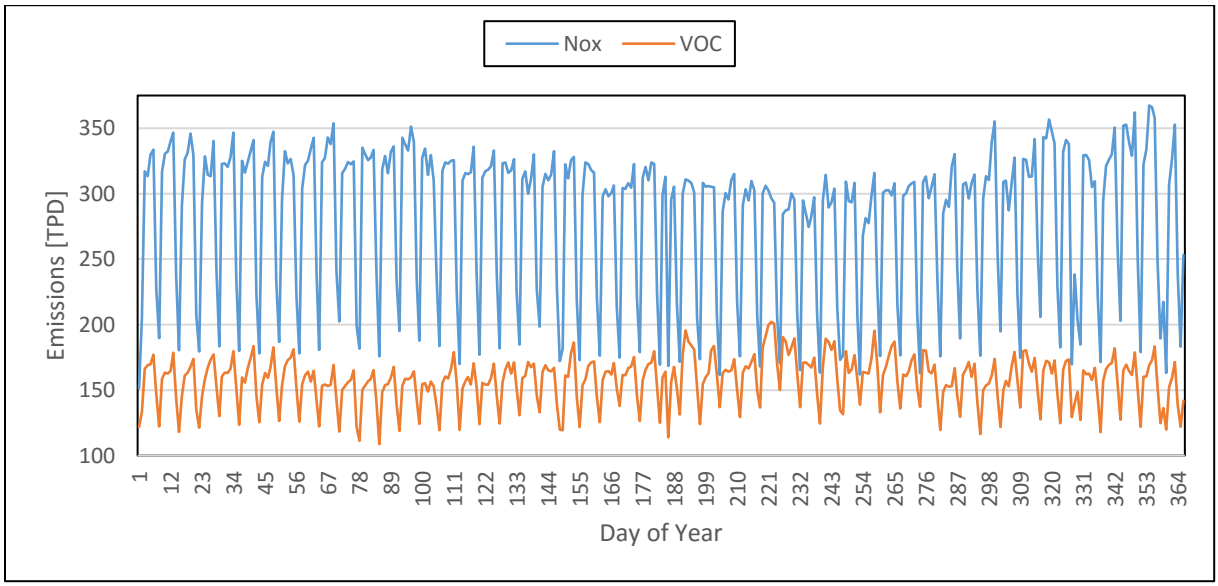

FIGURE V-4-5

2012 daily On-Road NOx and VOC emissions in the SCAB.

Annual Emissions Profiles

Day specific emissions were generated for all days in 2012. Figure V-4-6 illustrates the total CO and NOx emissions contained in the modeling domain for each day in 2012. CO emissions are indicative of the on-road mobile source inventory while NOx further incorporates signatures of stationary and off-road emissions. Note that the emissions totals in tons per day are roughly double the totals presented in Table V-4-1. This is because the values in Table V-4-1 represent basin-wide total emissions while those in Figure V-4-6 comprise totals from the entire modeling domain. The profile clearly depicts a changing emissions pattern with two distinct cycles represented: a weekly cycle, illustrated by Sunday through Saturday peaks and valleys, and day-to-day variations in emissions within the weekly cycle. Although not included in Figure V-4-6, spatially and temporally resolved emissions from wild and prescribed fires were also included in the emissions in the modeling domain.

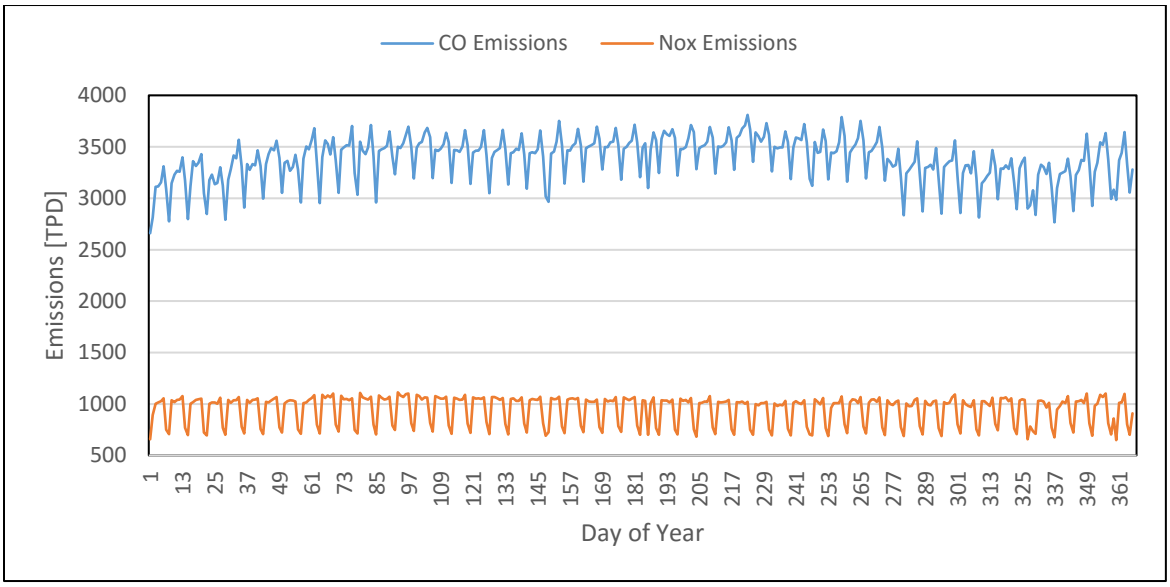

FIGURE V-4-6

2012 daily CO and NOx emissions in the modeling domain.

Diurnal Emissions Profiles

Where applicable, point, area and off-road mobile sources were adjusted to a day-of-week throughput profile consisting of a Monday-Friday, Saturday and Sunday schedule. Figure V-4-7 depicts the day-of-week and hour-of-day NOx emissions patterns for stationary, on-road, and off-road sources with ocean going vessels (OGVs) independently represented. The peak emissions occur mid-week (Tuesday through Thursday) while emissions on Saturday and Sunday decrease by about 30 percent. Based on CALTRANS data, NOx emissions from heavy-duty vehicles are reduced by more than 60 percent on Saturdays with further reductions occurring on Sundays. Increases in off-road mobile source activities (e.g. pleasure craft and recreational vehicles) account for the bulk of the VOC increase on both Saturdays and Sundays.

Monday and Friday are transitional days with on-road emissions slightly lower than mid-week with slightly modified diurnal profiles. Off-road emissions are relatively consistent throughout the week whereby weekend reductions in some off-road categories (e.g. construction) are replaced by weekend activity emissions (e.g. recreational vehicles and boats). In general, OGV emissions are constant with shipping activities ongoing as a function of arrivals and departures. The largest stationary source contributions (e.g. refineries, power generation and residential combustion) represent daily usage and do not vary much over the course of the week.

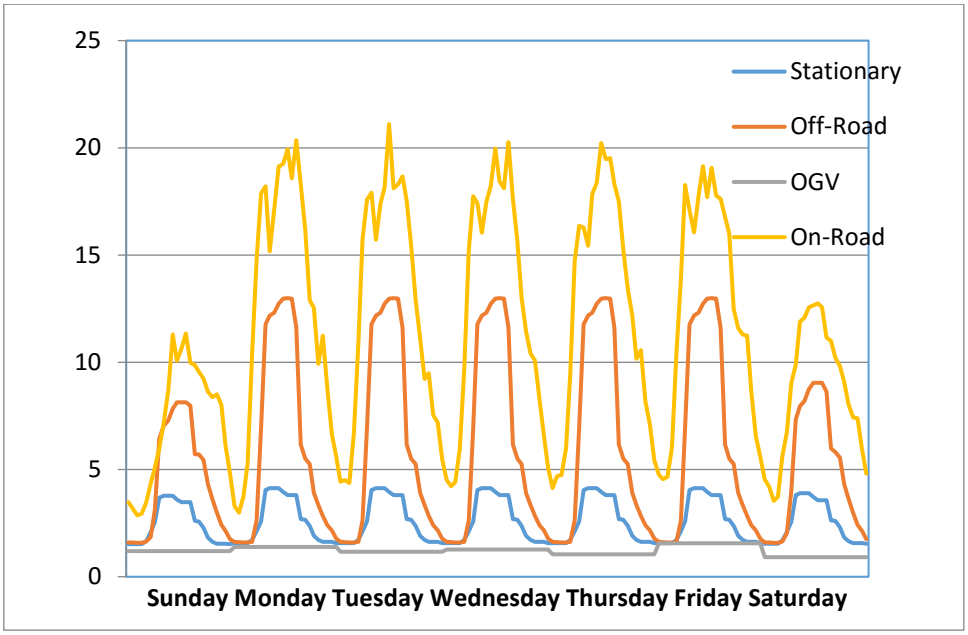

FIGURE V-4-7

Diurnal NOx emissions (tons per hour) in the SCAB: Sunday - Saturday.

Spatial Distribution

Figures V-4-8 through V-4-11 provide the spatial distribution of NOx emissions for the stationary (including area sources), OGV, off-road, on-road and total anthropogenic categories. Area and off-road sources in the modeling domain are typically assigned to a surrogate distribution profile (maintained by CARB) to allocate the daily emissions. Area source NOx emissions are included in the stationary source projection depicted in Figure V-4-8.

Over 90 spatial gridding surrogates were used in distributing area and off-road source emissions. The surrogates were developed and accumulated over the last twenty years and undergo some revisions during each AQMP development process. As in past AQMPs base and future year socioeconomic data, information such as population, employment and housing, developed by SCAG during its 2016 RTP/SCS process, were incorporated in the surrogates. Notable revisions in gridding surrogates during this AQMP include changes in surrogates for recreational boats and off-road equipment.

Paved and Unpaved Road Dust Emissions

U.S. EPA recently revised its AP-42 methodology to estimate paved road dust whereby the new method removed the factor addressing tire and brake wear (to address potential double counting) but retained a California usage profile and adjustments for rain and silt loading (CARB, 2013).

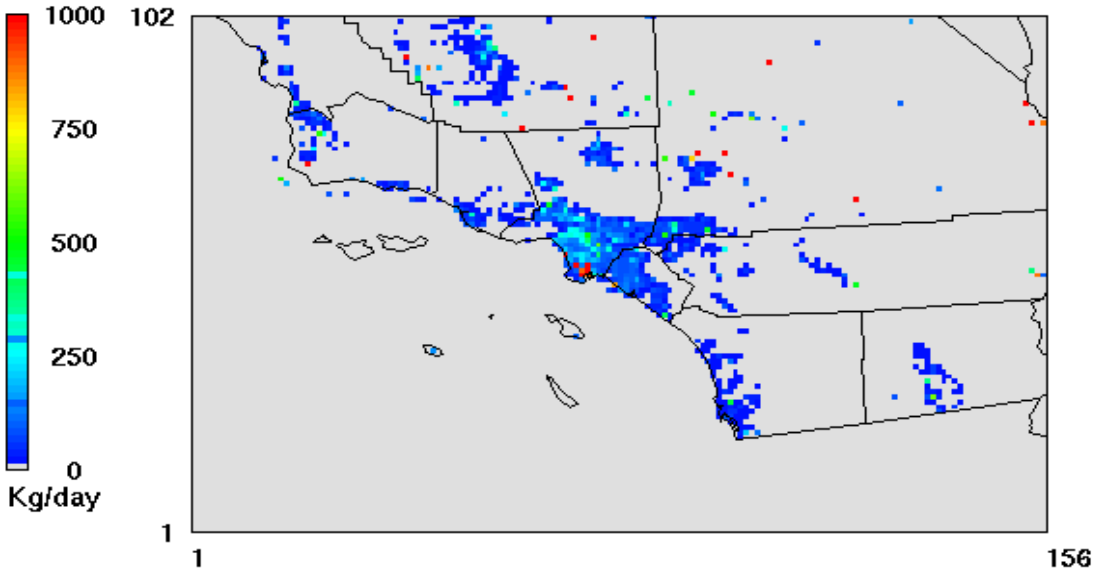

FIGURE V-4-8

Stationary source NOx emissions (Kg per day) in the modeling domain

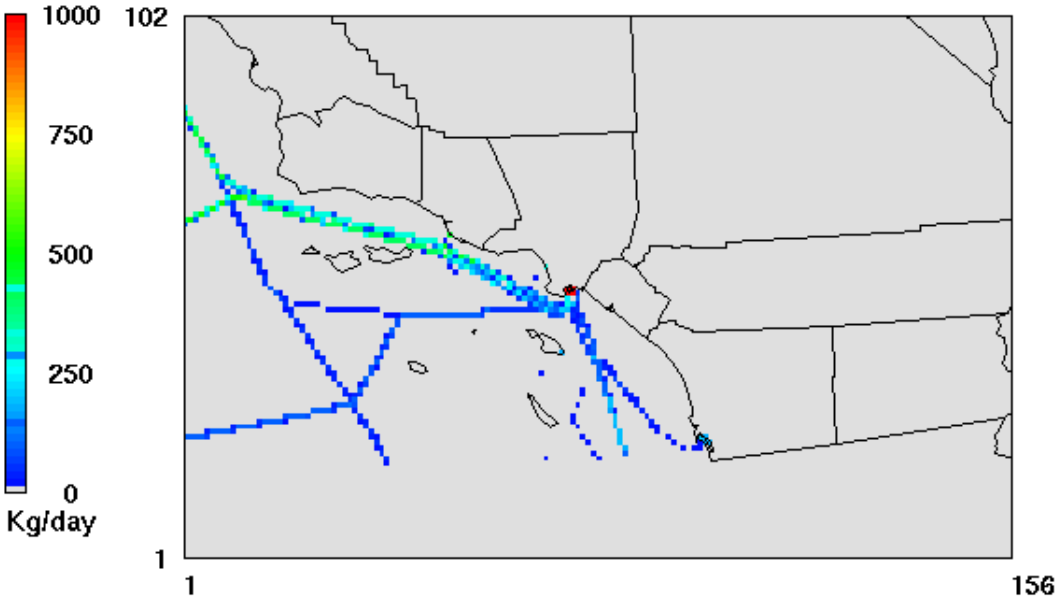

FIGURE V-4-9

OGV NOx emissions (Kg per day) in the modeling domain

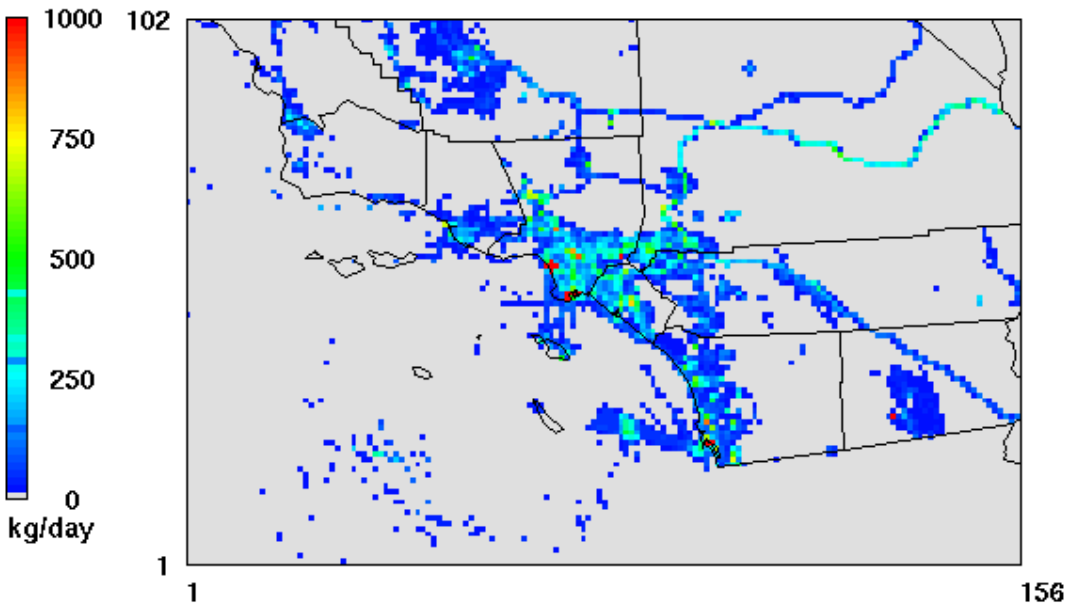

FIGURE V-4-10

Off-Road NOx emissions (Kg per day) in the modeling domain

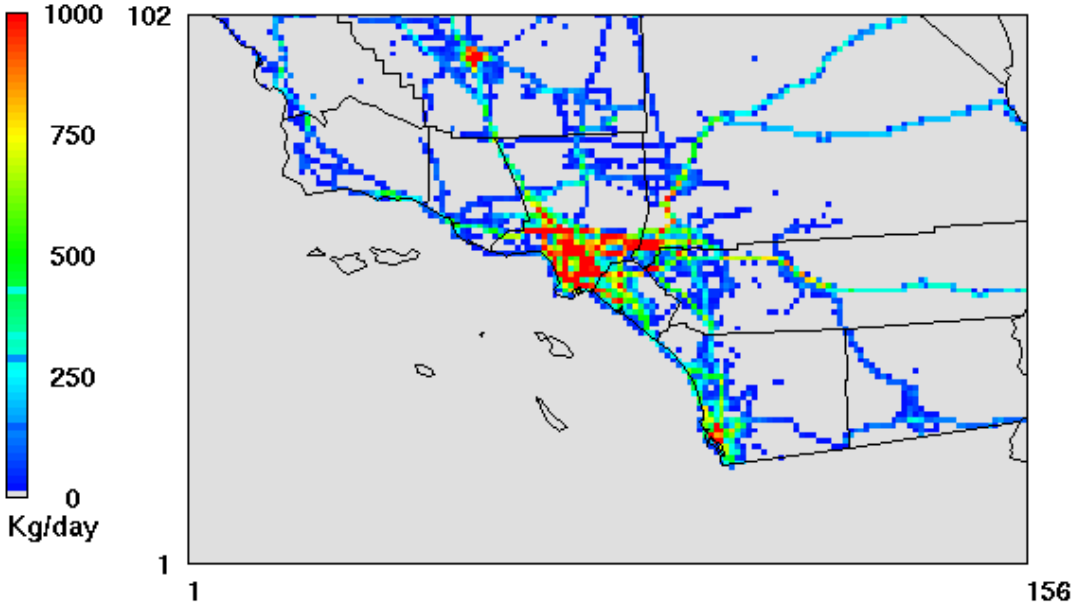

FIGURE V-4-11

On-Road NOx emissions (Kg per day) in the modeling domain

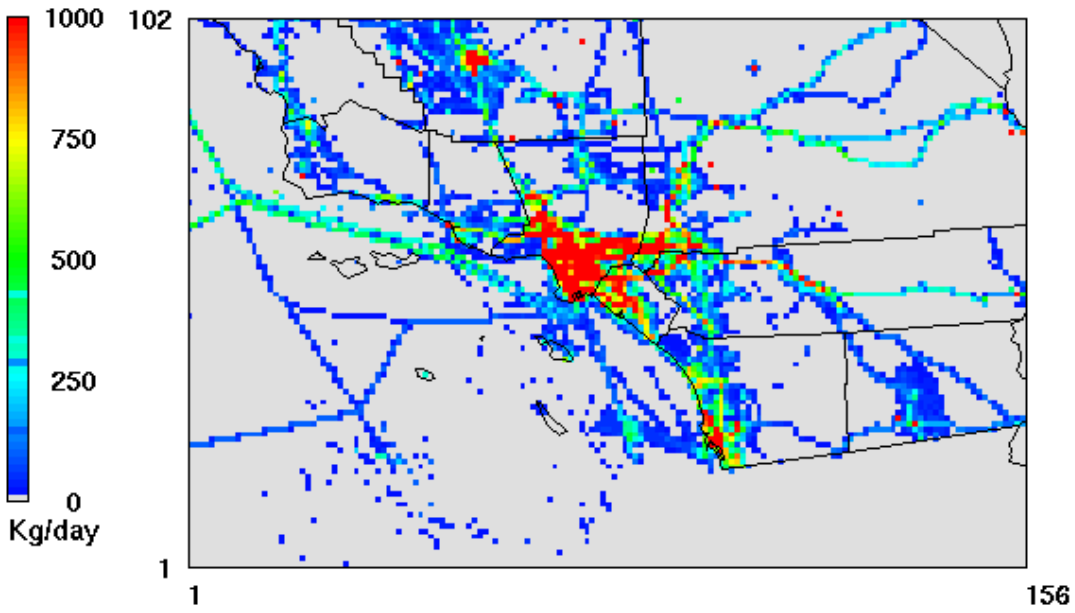

FIGURE V-4-12

Total Anthropogenic NOx emissions (Kg per day) in the modeling domain

In addition, the base year paved road dust emissions are a function of VMT. In the four preceding AQMPs, paved road dust emissions were adjusted to reflect a cap on emissions growth for high VMT road types in future years. The adjustment was made by leaving paved road dust constant on freeways unless there was a change in centerline miles. The US EPA expressed a preference in using the same methodology when calculating base and future emissions. For the current AQMP analysis, future year road dust emissions were projected based on SCAG future year VMT. Daily road dust emissions were adjusted according to countywide precipitation in 2012. Unpaved road dust was allocated based on GIS land use profiles.

Ammonia Inventory Adjustments

Selected revisions were made to the spatial distribution and emissions categories for the ammonia inventory. In general, the total ammonia in the inventory was reduced from 119 TPD in the 2007 AQMP inventory, 109 TPD in the 2012 AQMP to the 81 TPD in current AQMP. The reduction of ammonia emissions was primarily due to the continuation of decreasing livestock operations in the SCAB. Table V-4-2 provides a summary comparison of the 2002, 2008 and 2012 ammonia inventories from the 2007 AQMP, the 2012 AQMP and the current 2016 AQMP.

TABLE V-4-2

Annual average day ammonia emissions inventory (tons/day)

Source Category	2007 AQMP	Final 2012 AQMP	2016 AQMP
	2002 Inventory	2008 Inventory	2012 Inventory
Livestock	26	18.6	12.7
Soil*	1.4	1.8	1.8
Domestic	25.1	25.1	25.1
Landfill	1.1	3.6	3.8
Composting	9.7	17.8	1.0
Fertilizer	6.1	1.5	1.4
Sewage Treatment	0.1	0.2	0.2
Wood Combustion		0.1	0.2
Industrial	13.2	20.2	18.9
On-Road Mobile	36.1	19.9	18.1
Off-Road Mobile		0.1	0.1
Total	118.8	108.9	82.9

*Not anthropogenic

Biogenic Emissions

Daily biogenic VOC emissions inventories were developed by CARB using the Model of Emissions of Gases and Aerosols from Nature (MEGAN) emissions model. The biogenic inventories were calibrated based on spatially resolved hourly temperature from WRF modeling. Figure V-4-13 provides the daily total emissions of biogenic VOC, in TPD, in the SCAB. The trend shows higher emissions for the spring and summer months with several peaks occurring in May, July and August when temperatures were elevated.

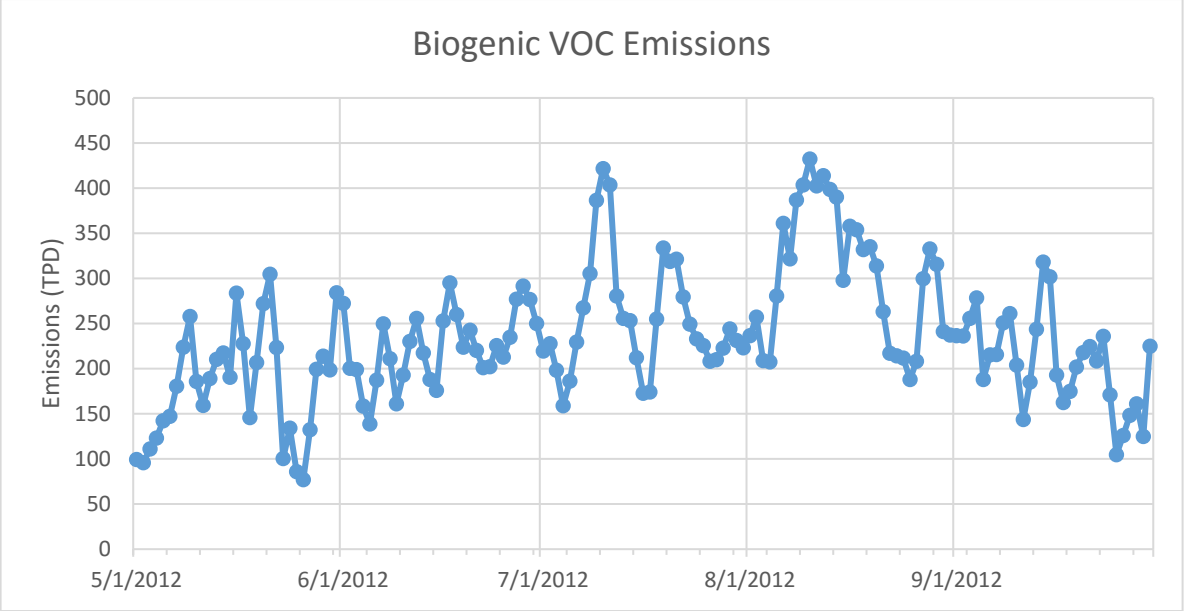

FIGURE V-4-13

2012 daily biogenic VOC emissions in the Basin.

Ocean Going Vessels

The information on daily vessel arrivals and departures was provided by the ports of Long Beach and Los Angeles. Factors were developed to capture the day-to-day variation in emissions. Figure V-4-14 depicts the vessel weighted adjustment factors throughout 2012. The factor ranges from 0.73 to 1.33. The daily OGV emissions were obtained by applying the adjustment factor to the annual average day OGV emissions. Although the adjustment factors were developed based on the information from the ports of Los Angeles and Long Beach, the factors were applied to OGV emissions throughout the modeling domain.

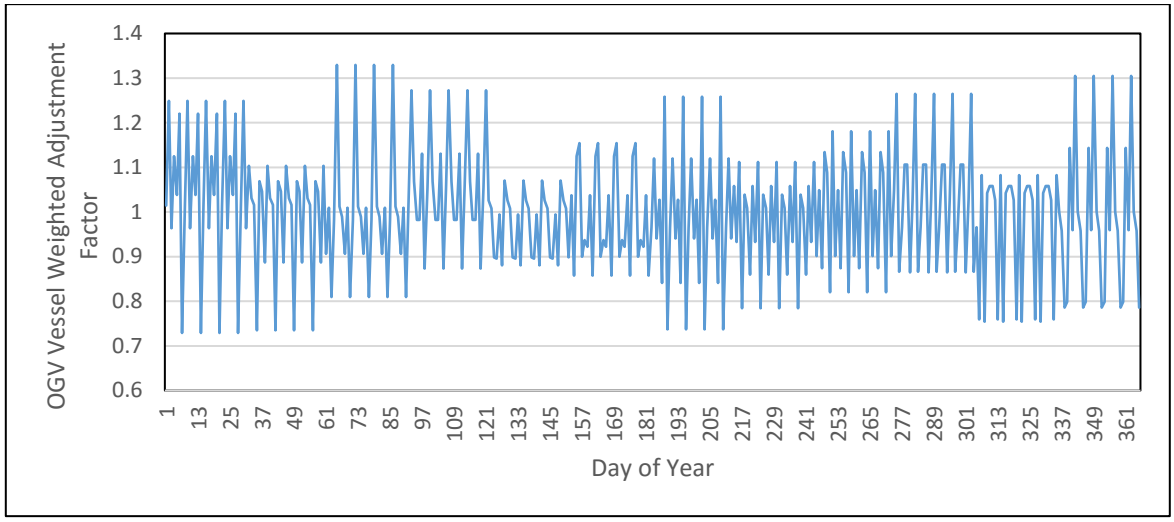

FIGURE V-4-14

2012 daily vessel weighted OGV SOx emissions in the modeling domain

Recreational Boats

Recreational boat emissions were assigned spatially to lakes and coastal waters and temporally to weekends and weekdays based on an analysis of 173 images of harbors and lakes throughout the SoCAB. In total, approximately 2500 boats were counted, measured, and categorized from high-resolution aerial images. Approximately 1000 boats were counted from aerial lower-resolution images. 20 lakes and 7 coastal areas were investigated. Only images captured after 2001 were used for the analysis. Spatial surrogates were developed from these data to allocate recreational boat emissions to coastal waters or lakes in Los Angeles County and Orange County.

Boundary and Initial Conditions

The initial condition for the CMAQ simulations was generated using the default profile available from the CMAQ standard package. Then, a five day spin-up period was introduced to offset the homogeneity in initial values. This method is consistent with the strategy implemented in the 2007 and 2012 AQMP's.

The 2012 AQMP addressed the impact of lateral boundary conditions on simulation predictions. Lateral boundaries investigated include the U.S. EPA's clean boundary, a global chemistry model driven boundary (Model for OZone and Related chemical Tracers, MOZART) and a hybrid approach using the clean boundary and field measurements. Sensitivity tests concluded that the MOZART driven boundary values performed best, therefore it served as the primary platform for boundary values.

As in the 2012 AQMP, MOZART (Emmons et al., 2010) was used to define the boundary conditions (BCs) for the outer 12 km statewide CMAQ domain, while boundary conditions for the inner South Coast 4 km domain were derived from the 12 km output. MOZART is a comprehensive global model used to simulate atmospheric composition including both gases and bulk aerosols (Emmons et al., 2010). It was developed by the National Center for Atmospheric Research, the Max-Planck-Institute for Meteorology (Germany), and the Geophysical Fluid Dynamics Laboratory of the National Oceanic and Atmospheric Administration, and is widely used in the scientific community for both global atmospheric chemistry studies and for providing the dynamic boundary conditions needed for regional air quality modeling. Boundary conditions were extracted for inorganic gases and VOCs along with aerosol species such as elemental carbon, organic matter, sulfate, soil and nitrate. MOZART4-GEOS5 simulations by Dr. Louisa Emmons (NCAR) for the year 2012 were used to represent the boundary conditions in the 2012 AQMP. These simulations are publically available and can be downloaded at http://www.acom.ucar.edu/wrf-chem/mozart.shtml. These simulations are similar to those of Emmons et al. (2010), but with updated meteorological fields. Boundary condition data was extracted from the MOZART-4 output and processed into CMAQ model ready format using the computer program "mozart2camx" developed by the Ramboll-Environ Corporation (available at http://www.camx.com/download/support-software.aspx). The final MOZART derived BCs for the statewide domain represent day-specific mixing ratios, which vary in both space (horizontal and vertical) and time (every hour).

Figures V-4-15 and V-4-16 show surface ozone concentrations averaged along the four domain boundaries. Typically, the western boundary, located west of the Basin over the Pacific Ocean, shows the lowest concentrations followed by the southern boundary. The average ozone concentration over the entire ozone season at the western boundary is approximately 35 ppb, whereas the seasonally averaged concentration on the southern boundary is approximately 42 ppb. The general circulation in Southern California is from west to east, and as a result, the eastern boundary is affected by the upwind emissions in the domain, which results in a higher boundary value over the eastern boundary. The average ozone concentration along the eastern boundary is approximately 50 ppb. Finally, the northern boundary is affected by emissions from central California and present the highest average concentration of ozone, approximately 55 ppb.

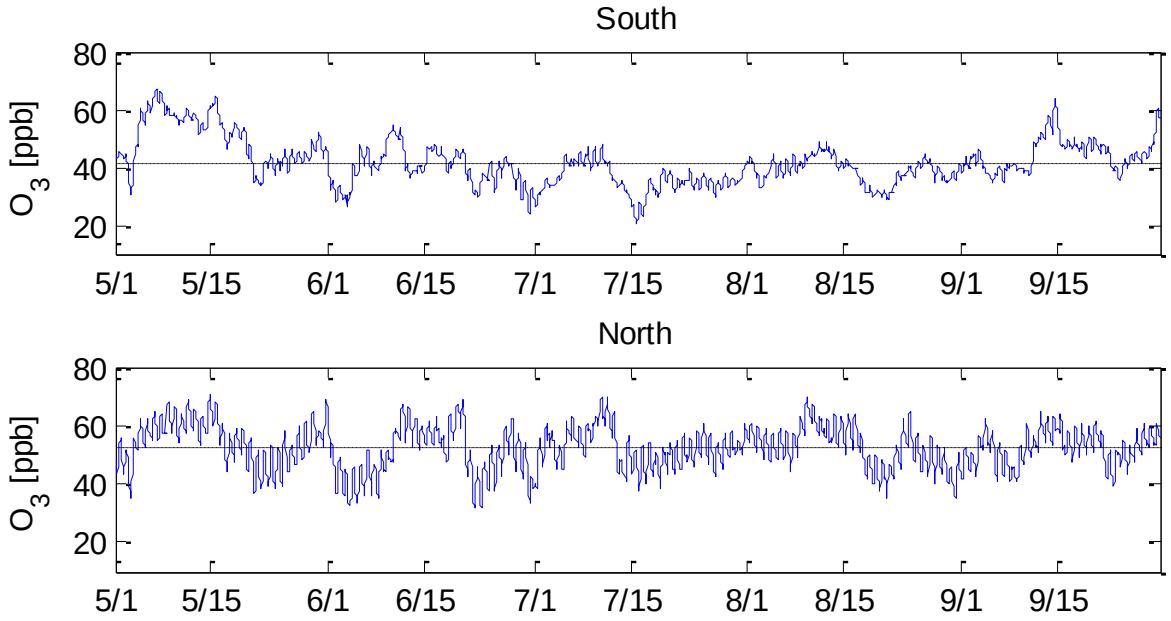

FIGURE V-4-15

Surface ozone concentration at the South and North boundary

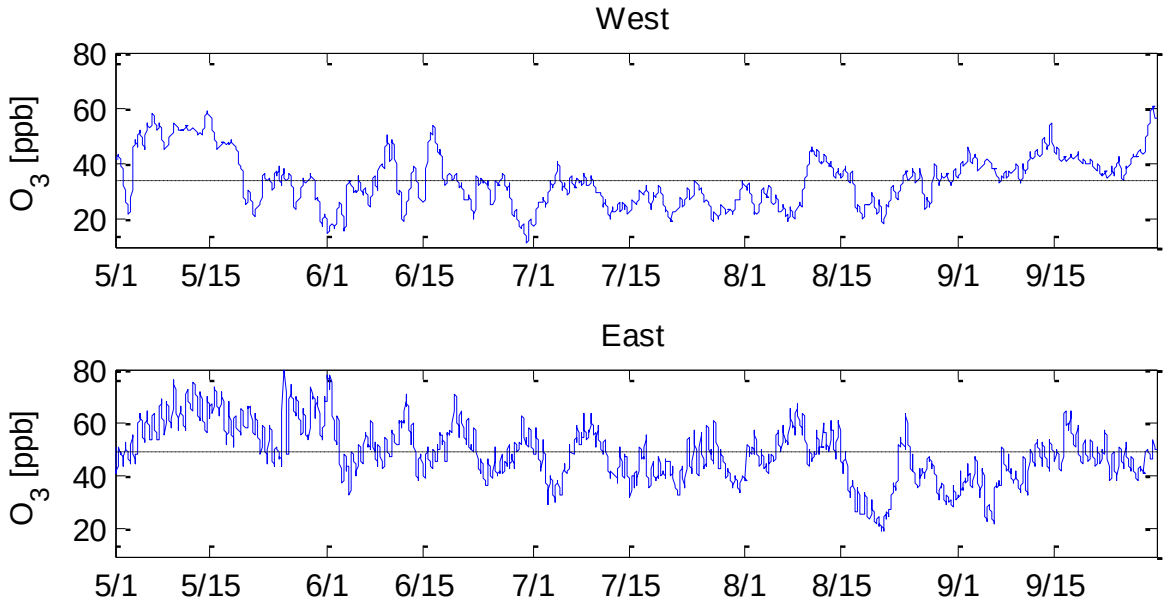

FIGURE V-4-16

Surface ozone concentration at the West and East boundary

Figures V-4-17 through V-4-20 present the monthly ozone vertical profiles averaged long the southern and northern boundaries, respectively, at two hours of the day. In general, ozone concentrations tend to be higher in the upper layers, especially along the cleaner boundaries. The difference between concentrations at the surface and concentrations aloft is larger along the cleaner boundaries. In particular, ozone concentrations along the western boundary exhibit the most contrast between ground level and upper levels. On the contrary, the northern and eastern boundary, which have higher ozone concentrations due to the influence of central and Southern California emissions, present a flatter vertical profile throughout the ozone season.

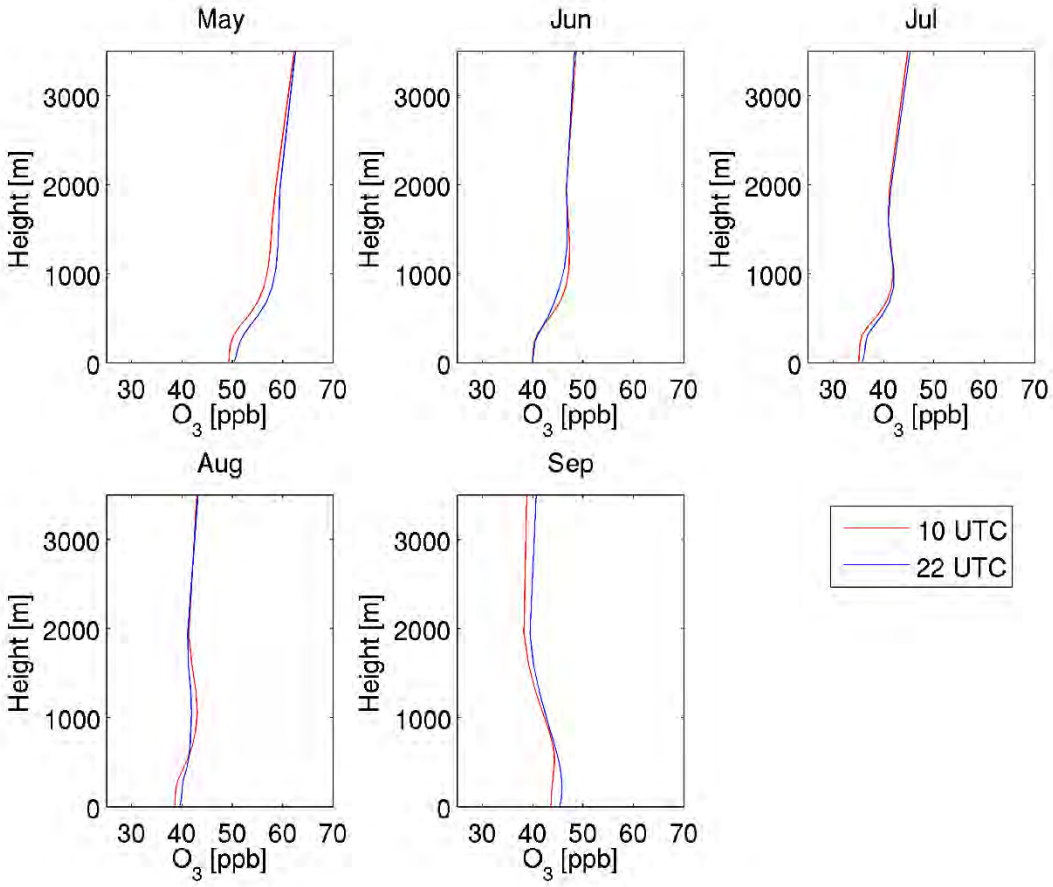

FIGURE V-4-17

Ozone vertical profile in the South boundary

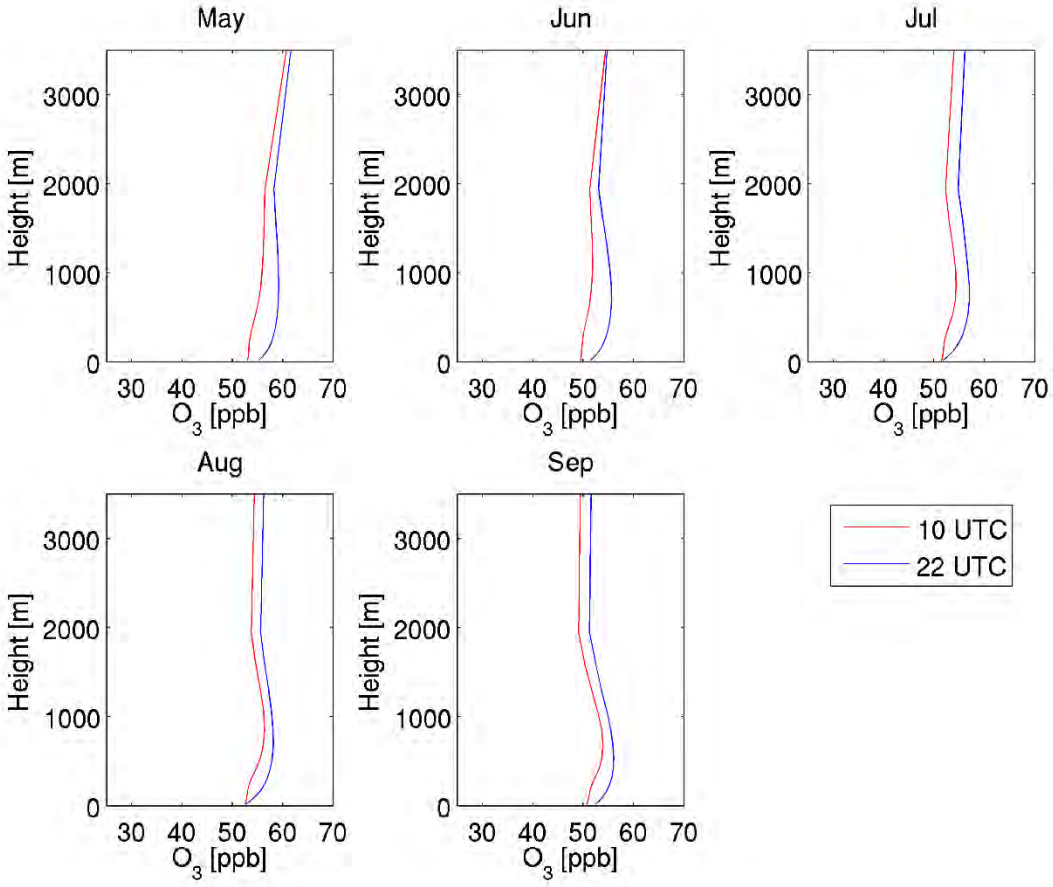

FIGURE V-4-18

Ozone vertical profile in the North boundary

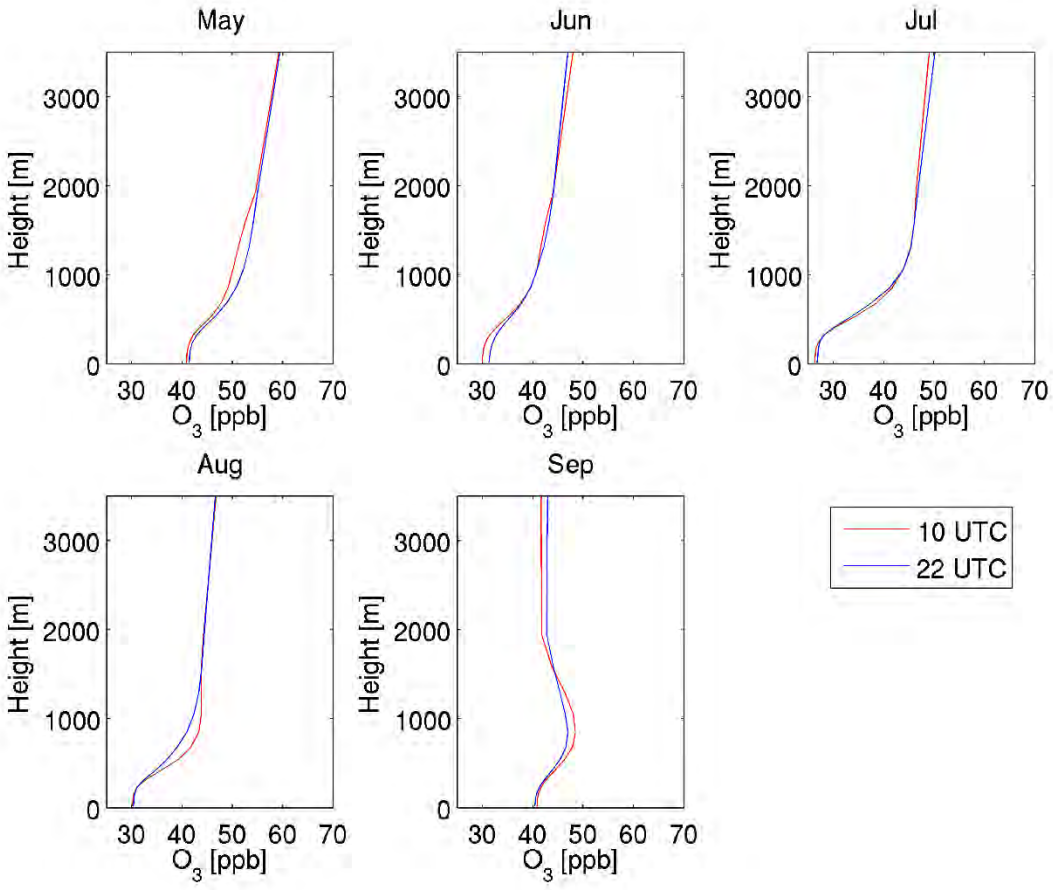

FIGURE V-4-19

Ozone vertical profile in the West boundary

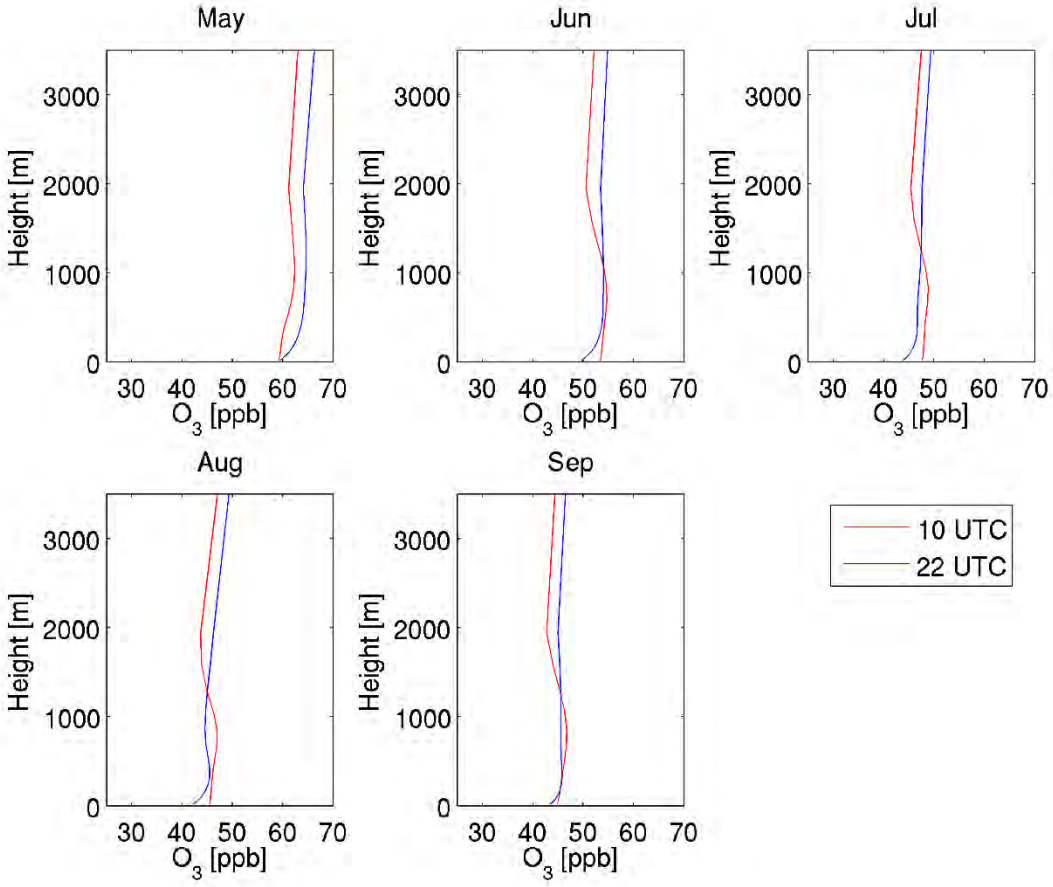

FIGURE V-4-20

Ozone vertical profile in the East boundary

The boundary values used in future year simulations were retrieved from the same approach as the base year (2012), except that anthropogenic emissions were adjusted based on the projected future emission levels in the State. In this approach, the emissions from out of state and out of continent were not adjusted due to the lack of accurate information, but the impact of state-wide emission reductions was considered.

References

Emmons, L. K., Walters, S., Hess, P. G., Lamarque, J.-F., Pfister, G. G., Fillmore, D., Granier, C., Guenther, A., Kinnison, D., Laepple, T., Orlando, J., Tie, X., Tyndall, G., Wiedinmyer, C., Baughcum, S. L., and Kloster, S.: Description and evaluation of the Model for Ozone and Related chemical Tracers, version 4 (MOZART-4), Geosci. Model Dev., 3, 43-67, doi:10.5194/gmd-3-43-2010, 2010.

CHAPTER 5

8-HOUR OZONE ATTAINMENT DEMONSTRATION

Introduction

Ozone Representativeness

Ozone Modeling Configuration

Base-Year Ozone Model Performance Evaluation

Ozone Modeling Approach

Future Ozone Air Quality

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Unmonitored Area Analysis

Looking Beyond 2031

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Long-Term Trends in Ozone Background Levels

Introduction

The 2016 AQMP demonstrates attainment of two 8-hour ozone standards: the 2008 standard of 75 ppb and currently revoked 1997 standard of 80 ppb.

The 2012 AQMP provided a comprehensive 8-hour ozone analysis that demonstrated future year attainment of the 1997 federal ozone standard (80 ppb) by 2023 with implementation of short-term measures and CAA Section 182(e)(5) long term emissions reductions. The analysis concluded that NOx emissions of approximately 65 percent from the 2023 baseline were necessary to demonstrate attainment. The 2023 baseline summer planning emissions inventories included 438 and 319 TPD of VOC and NOx, respectively.

As presented in Chapter 3 of the 2016 AQMP, 2023 baseline emissions of both precursor pollutants are estimated to be lower than th3 2023 baseline emissions established in the 2012 AQMP. The 2016 AQMP baseline VOC and NOx summer planning emissions for 2023 have been revised to 379 and 255 TPD, respectively. The emissions revision incorporated changes made by federal and California regulations adopted post-2010, changes resulting from updates in the emission calculation methodologies for selected sources, and changes resulting from updated socio-economic factors.

The 2016 AQMP attainment demonstrations rely on air quality measurements collected during the 5-year period centered on 2012, which is the base year selected for the emissions inventory development, the WRF meteorological simulation, and the anchor year for the future year ozone and PM2.5 projections. The attainment demonstration methodology, established in the updated U.S. EPA guidance, was used to demonstrate attainment with a revised Relative Response Factor (RRF) approach.

Ozone Representativeness

The CMAQ modeling provided Basin-wide ozone air quality simulations for each hour in 2012. It includes 153 days from May 1st to September 30th of 2012.

The 2007 AQMP ozone attainment demonstrations evaluated a set of days characterized by restrictive meteorology or episodes occurring during concurrent intensive field programs. These episode periods were rated based on how representative they were relative to the ozone standard being evaluated. For the now revoked 1-hour ozone standard, the attainment demonstration focused on a limited number of days closely matching the annual design value. Typically, the analysis addressed 5 episodes of each last a few days. The 2007 AQMP was the first to address the 8-hour ozone standard and the use of RRFs in the future year ozone projection. The analysis included 36 days in the simulation to provide a robust characterization of the RRFs for use in the attainment demonstration. The ozone modeling guidance recommended that a minimum of 5-days of simulations meeting modeling acceptance criteria were used in a future year RRF calculation, but also recommended incorporating as many days as possible to fully

capture both the meteorological variations in the ozone season and the response to different daily emissions profiles.

The 2012 AQMP used a different approach. Instead of the episode-based limited simulation days, it included season-long comprehensive CMAQ simulations. The ozone season was assumed to be June through August. It analyzed 92 simulation days and chose the days where the predicted daily max is within the 20 % error of the site-specific design value, the unpaired daily-max prediction error is less than 20%, and the prediction is higher than the federal standard. The number of days used in the RRF calculation differed from station to station. Approximately 50 days met the criteria at Crestline—more than half of the entire simulation period.

The approach used in the current AQMP is similar to the approach of the 2012 AQMP with the following exceptions per the U.S. EPA guidance (U.S. EPA, 2014). The ozone season was expanded from May to September (153 simulation days) in order to capture exceedances that occurred in early and late summer. Only the top 10 days are used to calculate the RRF. Some stations employ less than 10 days as daily maximum 8-hr values must exceed 60 ppb for inclusion into the analysis. In the 2012 AQMP, the maximum modelled grid cell in the 3x3 grid centered at each station was retrieved from the base and future simulations. In the current AQMP, the maximum modelled value in the 3x3 grid surrounding each station is compared to the corresponding grid position in the future year.

Basin-wide ozone air quality simulations were conducted for each hour in the 2012 ozone season (May 1st to September 30th). Figure V-5-1 depicts the time series of the daily Basin 8-hour maximum and the daily maximum 8-hour ozone air quality at Crestline (the past Basin design station) and Redlands (the current Basin design station) during the 2012 ozone season. All station days meeting the acceptance criteria—the predicted daily max is within the 20 % error of the site-specific design value and the prediction is higher than the federal standard of 75 ppb— were included in the RRF calculation. During this period, several well defined multiday ozone episodes occurred in the Basin with 107 total days having daily Basin-wide maximum concentrations of 75 ppb or higher. Several locations in the San Bernardino and Riverside Valleys exhibit similar transport and daily patterns of ozone formation as Crestline and Redlands. Typically, Crestline shows the highest concentration in the Basin and has been the design site in the previous AQMPs. Crestline exhibits the highest daily maximum 8-hr ozone in the Basin of 112 ppb in 2012.

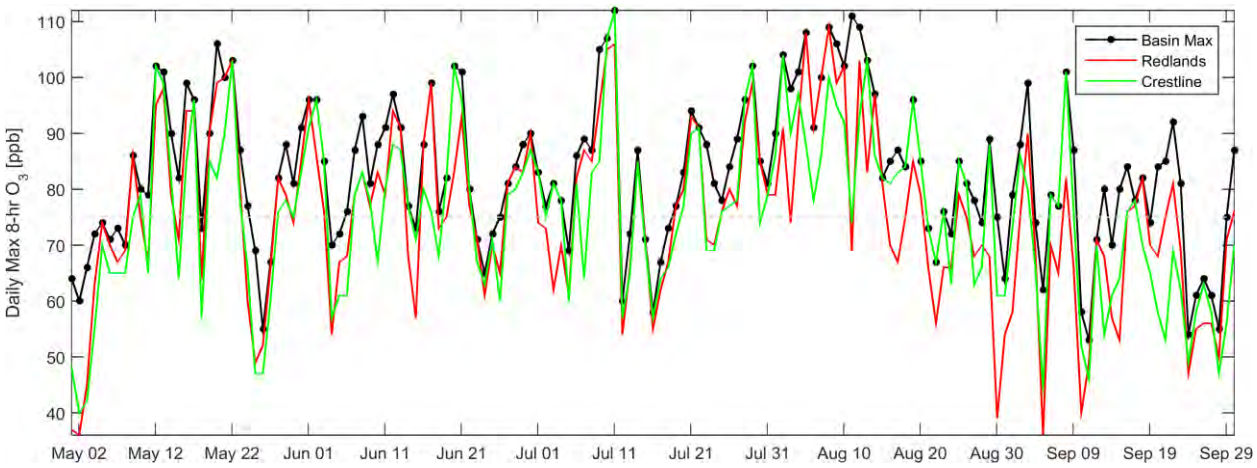

FIGURE V-5-1

Observed Basin, Redlands, and Crestline Daily Maximum 8-Hr Average Ozone Concentrations: May 1 through Sept 30, 2012.

However, Redlands is the new design site with a 5-year weighted design value of 104.7 ppb for the period of 2010 to 2014. This reflects changes in the emission characteristics and associated changes in the chemical reactions instrumental for ozone production. Crestline is the second highest site with design value of 103.0 ppb. Note that the 5-year weighted design value for the attainment demonstration should be rounded to the nearest tenth of a ppb, while the conventional design value for a three-year period should be truncated to the integer value. Table V-5-1 lists the 2010 to 2014 5-year weighted design values used in the future year ozone projections. Stations are color coded according to their performance evaluation zone defined in the Model Performance Evaluation section below.

TABLE V-5-1

2010–2012 Weighted 8-hr Ozone Design Values

Station	2010–2014 8-hr Design Value	2012 Weekend Days > 75 ppb	2012 Weekday Days > 75 ppb	Performance Evaluation Zone
Costa Mesa	63.2	1	0	Coastal
LAX	61.0	1	0	Coastal
Long Beach	56.0	0	0	Coastal
Mission Viejo	72.0	0	1	Coastal
West Los Angeles	64.7	0	0	Coastal
Burbank	78.3*	6	3	SanFernando
Reseda	89.0	11	17	SanFernando
Santa Clarita	97.3	30	32	SanFernando
Azusa	79.3	9	2	Foothills
Glendora	92.7	29	18	Foothills

TABLE V-5-1 (CONCLUDED)

2010–2012 Weighted 8-hr Ozone Design Values

Station	2010–2014 8-hr Design Value	2012 Weekend Days > 75 ppb	2012 Weekday Days > 75 ppb	Performance Evaluation Zone
Pasadena	76.7*	7	5	Foothills
Anaheim	65.0	0	0	UrbanSource
Central Los Angeles	64.0	1	0	UrbanSource
La Habra	69.3	2	0	UrbanSource
Pico Rivera	67.7	2	0	UrbanSource
Pomona	84.3	12	5	UrbanSource
Banning	95.3	21	45	UrbanReceptor
Crestline	103.0	30	59	UrbanReceptor
Fontana	101.0	35	30	UrbanReceptor
Lake Elsinore	85.3	6	11	UrbanReceptor
Mira Loma	92.7	24	29	UrbanReceptor
Perris	91.0	17	32	UrbanReceptor
Redlands	104.7	35	50	UrbanReceptor
Rubidoux	96.3	24	29	UrbanReceptor
San Bernardino	98.0	29	28	UrbanReceptor
Upland	96.7	25	24	UrbanReceptor
Indio	84.3	7	23	CoachellaValley
Palm Springs	91.7	14	43	CoachellaValley

* NOTE: Burbank and Pasadena are each missing one three-year design value due to the inability to satisfy the completeness criteria. Therefore, the design values at these sites are estimated from the remaining years.

Ozone Modeling Configuration

In the 2007 AQMP, Comprehensive Air Quality Model with extensions (CAMx) was used as the primary chemical transport modeling platform. CAMx, including its predecessor, the Urban Airshed Model (UAM) (EPA, 1990) has been applied to many air pollution episodes in California and has demonstrated its capability as a tool for the attainment demonstration. While the District has a long history and significant expertise with the use of CAMx, the Community Multi-scale Air Quality (CMAQ) model has been widely applied to various locations and episodes and is actively updated by a large users' community, including the U.S. EPA. Therefore, the 2012 AQMP used CMAQ as the primary modeling tool and CAMx to provide weight of evidence. CMAQ version 5.0.2, used in the current AQMP, has an updated aerosol chemical mechanism, updated numerical solvers for mass consistent advection scheme, updated in-line plume rise calculation, updated in-line photolysis calculation, and an updated adjustment for nocturnal diffusion parameters when compared to version 4.7.1 used in the 2012 AQMP. SAPRC07 with version "c" toluene

updates, Euler Backward Iterative (EBI) chemical solver, aero6 aerosol module, Yamo horizontal advection scheme, WRF vertical advection, and Asymmetric Convective Model version-2 (ACM2) vertical diffusion scheme were used in CMAQ. See Chapter 2 of Appendix 5 for the details of the modeling protocol associated with the chemical transport modeling.

The inner-most modeling domain of the WRF simulation overlaps the CMAQ modeling domain, except that the WRF domain contains an extra 3 grid cells along the western, southern, and eastern boundary and an extra 9 grid cells along the northern boundary. The CMAQ domain contains 156 cells in the east/west direction and 102 cells in the N-S direction. The vertical coordinate and each computational layer definition are identical to those of the WRF. However, layers in the middle and upper troposphere are combined to maximize computational efficiency, resulting in fewer number of layers. Impacts of vertical layer collapsing and the configuration employed to minimize artificial errors associated with this approximation have been evaluated intensively during the 2012 AQMP; the configuration developed in the previous AQMP was employed in the current simulations. In total, 18 layers were included in the CMAQ simulations with approximately 14 layers located below 2000 m above the ground level.

Base-Year Ozone Model Performance Evaluation

For the CMAQ performance evaluation, the modeling domain is separated into several sub-regions or zones. Figure V-5-2 depicts the sub-regional zones used for base-year simulation performance. The different zones present unique air quality profiles. Previous AQMP's employed nine zones that represented the Basin and portions of Ventura County, the Mojave Desert and the Coachella Valley. However, based on recent measurement findings, current analysis re-defined the analysis zone into six areas: "Coastal" zone representing monitoring areas 2-4 and 18-21, "SanFernando" zone representing monitoring areas 6,7, and 13 within the San Fernando Valley, "Foothills" zone representing monitoring areas 8 and 9, "UrbanSource" zone representing monitoring areas 1, 5, 10-12, 16, and 17, "UrbanReceptor" zone representing monitoring areas 22-29 and 33-38, and "CoachellaValley" zone representing monitoring areas 30 and 31. Of the six areas, the "UrbanReceptor" region represents the Basin maximum ozone concentrations and the primary downwind impact zone. Table V-5-2 contains additional information regarding each station used in the analysis.

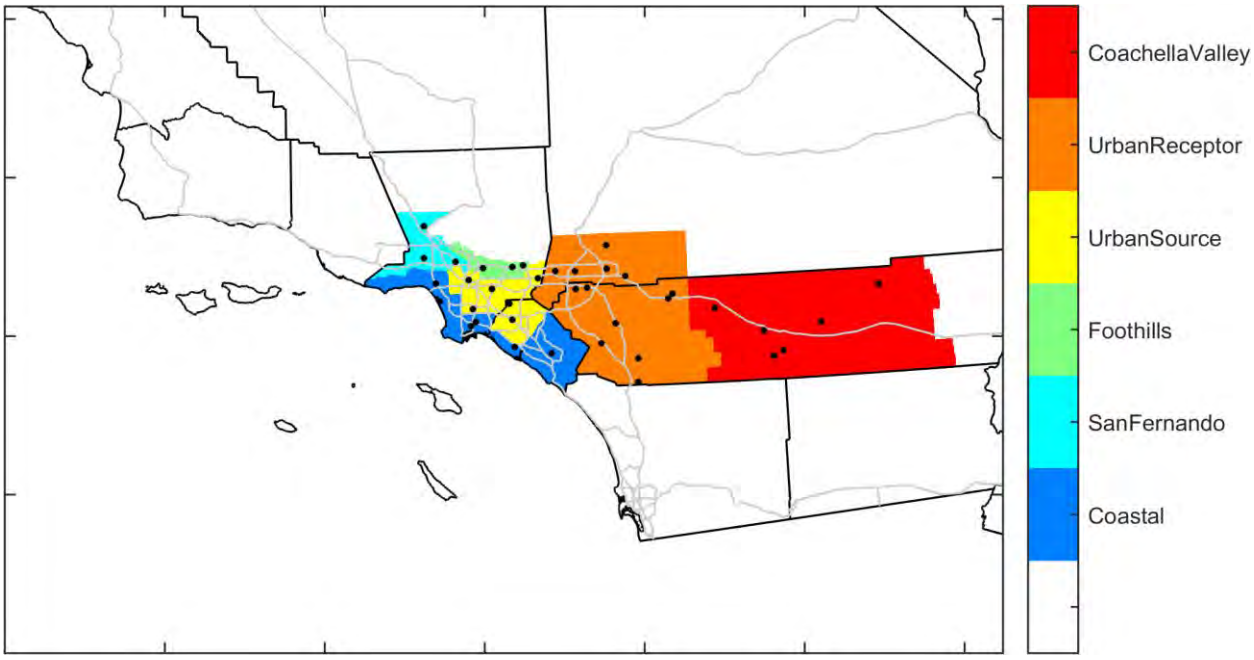

FIGURE V-5-2

Performance Evaluation Zones

TABLE V-5-2

Station Information

Location	Abbreviation	County	EPA Site Number	Monitoring Area	Performance Evaluation Zone
Costa Mesa	CSTA	Orange	1003	18	Coastal
LAX	LAXH	Los Angeles	5005	3	Coastal
Long Beach	LGBH	Los Angeles	4002	4	Coastal
Long Beach Hudson	HDSN	Los Angeles	4006	4	Coastal
Mission Viejo	MSVJ	Orange	2022	19	Coastal
West Los Angeles	WSLA	Los Angeles	113	2	Coastal
Burbank	BURK	Los Angeles	1002	7	SanFernando
Reseda	RESE	Los Angeles	1201	6	SanFernando
Santa Clarita	SCLR	Los Angeles	6012	13	SanFernando
Azusa	AZUS	Los Angeles	2	9	Foothills
Glendora	GLEN	Los Angeles	16	9	Foothills
Pasadena	PASA	Los Angeles	2005	8	Foothills
Anaheim	ANAH	Orange	7	17	UrbanSource
Central Los Angeles	CELA	Los Angeles	1103	1	UrbanSource
Compton	CMPT	Los Angeles	1302	12	UrbanSource
La Habra	LAHB	Orange	5001	16	UrbanSource

TABLE V-5-2 (CONCLUDED)

Station Information

Location	Abbreviation	County	EPA Site Number	Monitoring Area	Performance Evaluation Zone
Pico Rivera	PICO	Los Angeles	1602	11	UrbanSource
Pomona	POMA	Los Angeles	1701	10	UrbanSource
Banning	BNAP	Riverside	12/1016	29	UrbanReceptor
Crestline	CRES	San Bernardino	5	37	UrbanReceptor
Fontana	FONT	San Bernardino	2002	34	UrbanReceptor
Lake Elsinore	ELSI	Riverside	9001	25	UrbanReceptor
Mira Loma	MRLM	Riverside	8005	23	UrbanReceptor
Perris	PERI	Riverside	6001	24	UrbanReceptor
Redlands	RDLD	San Bernardino	4003	35	UrbanReceptor
Riverside	RIVR	Riverside	8001	23	UrbanReceptor
San Bernardino	SNBO	San Bernardino	9004	34	UrbanReceptor
Temecula	TMCA	Riverside	9	26	UrbanReceptor
Upland	UPLA	San Bernardino	1004	32	UrbanReceptor
Indio	INDI	Riverside	1999/2002	30	CoachellaValley
Palm Springs	PLSP	Riverside	5001	30	CoachellaValley

Statistical Evaluation

The statistics used to evaluate 8-hour average CMAQ ozone performance include the following:

Statistic for O_3	Definition
Daily-Max Bias Error Unpaired	Average of the differences in observed and predicted daily maximum values. Negative values indicate under-prediction. $BiasError = \frac{1}{N}\sum(Obs - Pred)$
Daily-Max Bias Error Paired	Average of the differences in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached. Negative values indicate under-prediction. $BiasError = \frac{1}{N}\sum(Obs - Pred)$

Daily-Max Gross Error Unpaired	Average of the absolute differences in observed and predicted daily maximum values $GrossError = \frac{1}{N}\sum\lvert Obs - Pred\rvert$
Daily-Max Gross Error Paired	Average of the absolute differences in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached. $GrossError = \frac{1}{N}\sum\lvert Obs - Pred\rvert$
Normalized Daily-Max Bias Error Unpaired	Average of the quantity: difference in observed and predicted daily maximum values normalized by the observed daily maximum values. Negative values indicate under-prediction. $NormBiasError = \frac{1}{N}\sum\left(\frac{Obs-Pred}{Obs}\right)\cdot 100$
Normalized Daily-Max Bias Error Paired	Average of the quantity: difference in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached normalized by the observed daily maximum concentration. Negative values indicate under-prediction. $NormBiasError = \frac{1}{N}\sum\left(\frac{Obs-Pred}{Obs}\right)\cdot 100$
Normalized Daily-Max Gross Error Unpaired	Average of the quantity: absolute difference in observed and predicted daily maximum values normalized by the observed daily maximum concentration $NormGrossError = \frac{1}{N}\sum\left\lvert\frac{Obs-Pred}{Obs}\right\rvert\cdot 100$
Normalized Daily-Max Gross Error Paired	Average of the quantity: absolute difference in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached normalized by the observed daily maximum concentration $NormGrossError = \frac{1}{N}\sum\left\lvert\frac{Obs-Pred}{Obs}\right\rvert\cdot 100$

Peak Prediction Accuracy Unpaired	Difference in the maximum of the observed daily maximum and the maximum of the predicted daily maximum normalized by the maximum of the observed daily maximum $PPA = \frac{(maximum(Pred) - \text{maximum}(Obs))}{\text{maximum}(Pred)}$

Predicted concentrations are extracted from model output in the grid cell that each monitoring station resides.

The base year average regional model performance for May through September 2012 for each of the six zones are presented in Tables V-5-3 to V-5-8 for days when Basin maximum 8-hour ozone levels were at least 60 ppb. Only stations with more than 75% of the hourly measurements during each month of the ozone season were included in the analysis.

In general, the model over-predicts 8-hr daily-maximum ozone concentrations in the "Coastal" and "UrbanSource" regions. Conversely, the model under-predicts 8-hr daily-maximum ozone concentrations in the "SanFernando", "Foothills", and "UrbanReceptor" regions.

U.S. EPA guidance (2014) describes four types of analysis as model performance evaluation. They are operational, diagnostic, dynamic and probabilistic approaches. The operational evaluation techniques include statistical and graphical analyses aimed at determining whether the modeled simulated variables are comparable to measurements and the diagnostic evaluation focuses on process-oriented analyses that determine whether the individual processes and components of the model system are working correctly, both independently and in combination. The statistical evaluation and series of sensitivity tests discussed in the 'Weight of Evidence and Stress Test' section were focused on these two types of evaluation. While the Dynamic evaluation assesses the ability of the air quality model to predict changes in air quality given changes in source emissions or meteorology, the principal forces that drive the air quality model, the U.S. EPA guidance recommends a test as a part of the dynamic evaluation. That is to look at operational performance under varying conditions, e.g., by day of the week, by season, and regionally The mix of pollutants vary by day of the week and from city to city so when a model shows good operational performance across these different chemical environments, this supports the assertion that it will respond appropriately to changes in emissions. The AQMP attainment modeling includes a five-month period starting from May to September, which includes various meteorological conditions, emission variability, seasonal changes, etc. Modeling results exhibit a robust model performance across these different chemical environments, thus supporting the assertion that the modeling set-up responds appropriately to changes in emissions. Lastly, the probabilistic evaluation attempts to assess the level of confidence in the model predictions through techniques such as ensemble model simulations. As an attempt to an ensemble analysis or, at least evaluation over multiple the modeling platforms, CAMx model was tested extensively within the AQMP modeling framework as well as Multiple Air Toxics Exposure studies (MATES). CAMx fundamentally yielded results comparable to CMAQ for the modeling cases (not presented) so that CMAQ was selected as the primary modeling platform. In all, the 2012 AQMP covers

all the four types of model performance evaluation methods that the U.S. EPA guidance (2014) recommends.

TABLE V-5-3

2012 Base Year 8-Hour Average Ozone Performance for Days When Regional 8-Hour Maximum ≥ 60 ppb in the "Coastal" region

Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Number of Daily Max > 60 ppb	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	41.5	37.7	145	56.8	53.4	48.4	8.4	5	9.5	8.4	13.6	6.5	16.3	16.1	21.4
Jun	34.8	34.5	150	50.5	47.1	43.7	6.9	3.4	8.5	7.9	12.1	2.8	16.5	18.6	12.8
Jul	29.9	30.1	145	44	41.8	41.3	2.7	0.5	6.5	6.9	3.2	-4.2	15.7	19.1	11.7
Aug	33.4	28.6	155	50.1	48.9	41.5	8.6	7.4	10.7	10.1	13.9	11.5	19.8	19.1	21.6
Sep	36.4	30.7	130	53.4	51.9	48.1	5.3	3.8	9.2	8.9	7.4	3.5	17.1	18	10.3

TABLE V-5-4

2012 Base Year 8-Hour Average Ozone Performance for Days When Regional 8-Hour Maximum ≥ 60 ppb in the "SanFernando" region

Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Number of Daily Max > 60 ppb	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	46.1	38.5	87	62.3	60.9	62.9	-0.7	-2	7	6.9	-1.5	-4.1	11.5	11.8	-10.5
Jun	40.7	39	90	60.3	59.3	62.4	-2.2	-3.1	6.9	6.9	-5.1	-6.8	12.4	12.8	0.4
Jul	35.5	38.2	87	56.7	56	65.7	-9.1	-9.8	10.6	10.9	-17.5	-19.1	20.1	21	-28.6
Aug	41.3	37.4	93	63	62.1	68.5	-5.5	-6.4	9.3	9.7	-10.4	-12.1	15.9	16.9	-14.5
Sep	39	33.3	78	56.7	55.7	63.3	-6.6	-7.6	10.9	11.4	-15.7	-18.5	22.3	24.6	-18.8

TABLE V-5-5

2012 Base Year 8-Hour Average Ozone Performance for Days When Regional 8-Hour Maximum ≥ 60 ppb in the "Foothills" region

Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Number of Daily Max > 60 ppb	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	45.5	34.5	87	61.7	60.9	56.9	4.8	4	7.8	7.4	7.8	6.6	12.6	12	-13.2
Jun	39.5	34.6	90	58.2	57.4	56.7	1.5	0.7	7	6.9	1.7	0.2	12.1	12.3	-20.9
Jul	33.2	31.8	87	52.2	51.4	59.6	-7.4	-8.2	9.9	9.8	-17.5	-19.3	21.8	22.2	-8.9
Aug	39.1	32	93	59.6	58.4	63.8	-4.2	-5.4	9.1	10	-10.1	-13.1	17	19.6	-14.9
Sep	39.2	32.5	78	54.4	52.6	62.2	-7.7	-9.5	12.3	12.7	-18	-23.3	25.2	28.6	-14.3

TABLE V-5-6

2012 Base Year 8-Hour Average Ozone Performance for Days When Regional 8-Hour Maximum ≥ 60 ppb in the "UrbanSource" region

Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Number of Daily Max > 60 ppb	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	41.2	34.1	174	59.1	57.6	49.9	9.2	7.7	9.9	8.8	15.1	12.6	16.3	14.7	3.7
Jun	35	32.4	180	54.2	52.7	47.5	6.7	5.2	8.3	7.2	11.2	8.6	14.7	13.4	2.5
Jul	29.6	28.6	170	47.7	45.6	46.6	0.7	-0.4	7	6.6	-1.2	-4.1	15.9	16.3	4.4
Aug	33.8	26.8	186	54.7	53.9	48.3	6.4	5.6	9.8	9.5	9.1	7.4	17.3	17.3	8.3
Sep	34.5	27.3	156	53.7	52.7	52.6	1.1	0.1	9.3	9.2	-0.4	-3.2	18.2	19	-13.5

TABLE V-5-7

2012 Base Year 8-Hour Average Ozone Performance for Days When Regional 8-Hour Maximum ≥ 60 ppb in the "UrbanReceptor" region

Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Number of Daily Max > 60 ppb	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	54.7	45.5	258	71.5	69.7	68.8	2.6	1.4	8.9	8.3	3.8	2.2	12.5	11.9	-6.9
Jun	49.6	44.1	267	68.9	67.1	68.8	0.3	-1	9.5	9.4	-0.7	-2.6	14.3	14.8	-0.8
Jul	44	43.5	257	64.1	62.9	71.2	-6.7	-7.7	11.6	12.1	-13	-15.6	20.4	22.2	-11.1
Aug	47.9	43.5	279	69.6	68.6	74	-4.4	-5.3	10.4	10.7	-8.5	-10.3	16.2	17.2	-0.7
Sep	44.7	38.7	234	60.5	59	65.5	-5	-6.5	11.5	11.5	-11.2	-14.3	20.9	21.7	-7.2

TABLE V-5-8

2012 Base Year 8-Hour Average Ozone Performance for Days When Regional 8-Hour Maximum ≥ 60 ppb in the "CoachellaValley" region

Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Number of Daily Max > 60 ppb	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	61.5	59.8	116	69.4	67.9	70.9	-1.4	-2.9	6.7	7	-2.5	-4.8	9.6	10.6	-6.5
Jun	54.3	55.8	120	63.3	60.7	66.8	-3.6	-6.1	9	9.5	-7.1	-11.5	15.1	16.8	-2.5
Jul	46.4	47.5	114	54.1	51.1	57.4	-3.1	-6.1	8.7	9.2	-6.9	-13.2	16.8	18.8	-10.4
Aug	47.1	43.3	124	55.6	51.7	54.3	1.2	-2.6	8.4	8.3	1.8	-6.4	15.4	16.9	-21.5
Sep	46.4	38.7	104	54.2	52	50.9	3.3	1.1	8.6	8.4	5.4	0.4	15.8	16.6	-1

Model performance can be evaluated graphically with scatter plots. Figure V-5-3 compares the measured and modelled maximum 8-hr ozone concentrations for 2012 in each region. Figure V-5-4 compares the measured and modelled 8-hr ozone concentrations for every hour in each region.

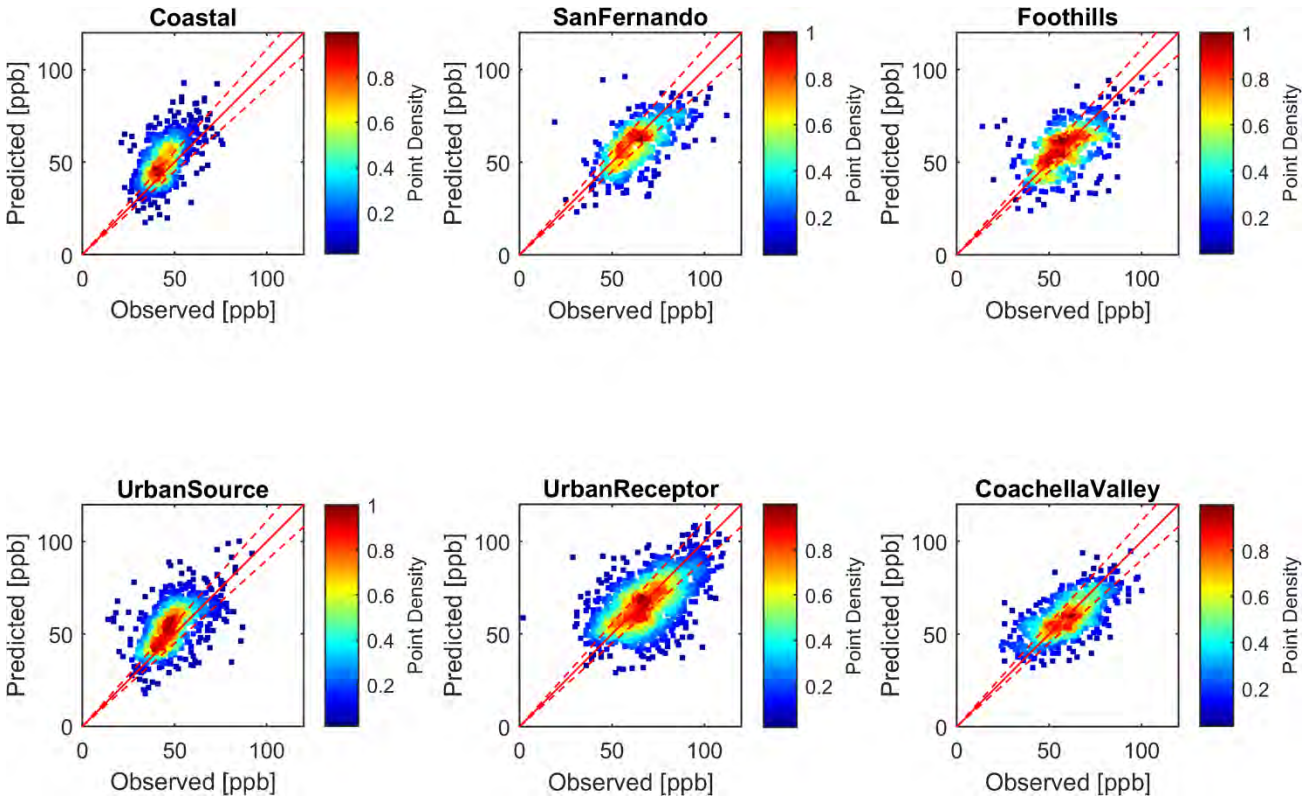

FIGURE V-5-3

Observed Vs.Predicted 8-Hour Ozone Maximums. Dashed lines Indicate 10% Error Bounds.

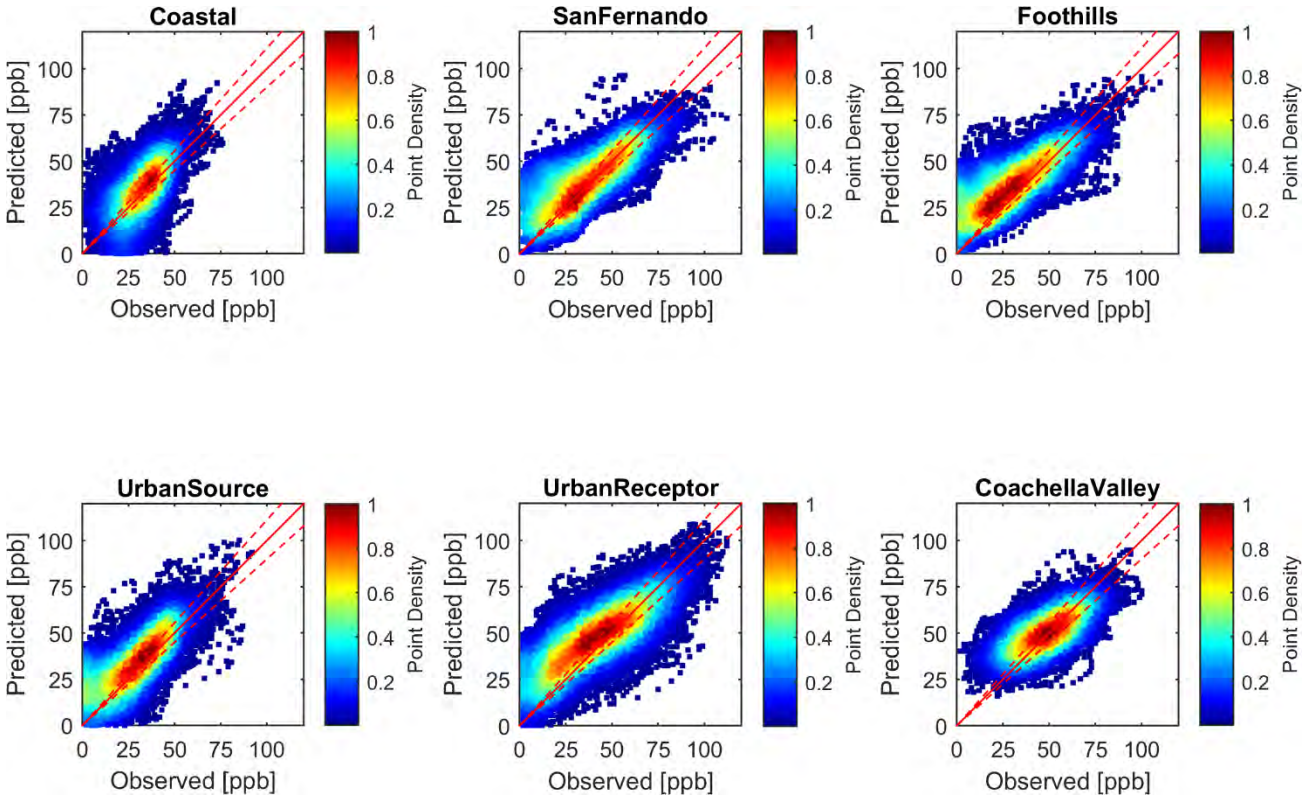

FIGURE V-5-4

Density Scatter Plot of Observed Vs.Predicted 8-Hour Regional Ozone Hourly Values. Dashed lines Indicate 10% Error Bounds.

The scatter and density scatter plots show consistent results: low bias in the high concentration cases and high bias in the low concentration regime with larger deviations at low concentrations. Geographical bias is also evident, with over-prediction in the coastal zone and under-prediction in the 'San Fernando', and 'Foothills' zones. Still, predictions in the 'UrbanReceptor' zone, in where the design site and most of traditional receptor stations are located, agrees reasonably well with the measurements. While the model deviation is more noticeable at low concentrations, the latest U.S. EPA guidance (U.S. EPA, 2014) requires the use of only the top 10 days in the RRF calculation, indicating that the modeling capability to predict high concentrations is more important than the prediction of low concentrations.

Time Series of Observed and Predicted Ozone

Figures V-5-5 through V-5-10 show the diurnal trends of observed and predicted 8-hour ozone for the each day from May 1st through September 30th, 2012 for six stations following a transport route from the coastal area of the Basin to inland Crestline and Redlands. Supplemental diurnal observed and predicted 8-hour ozone for all remaining air quality sites are provided as Attachment 7 to this appendix. The geographical bias is clearly present in the time series – over-prediction in West Los Angeles, and under-prediction in the inland area. However, the under-prediction of peak concentration is not rare in photochemical modeling. In fact, the District has successfully demonstrated its capability to predict episodic events better than other agencies

in the nation, including the National Oceanic and Atmospheric Administration (NOAA)/EPA, the official air quality forecast agency.

Overall, it is important to note that the effects of prediction biases or errors are mitigated by the use of relative response factors for the attainment analysis.

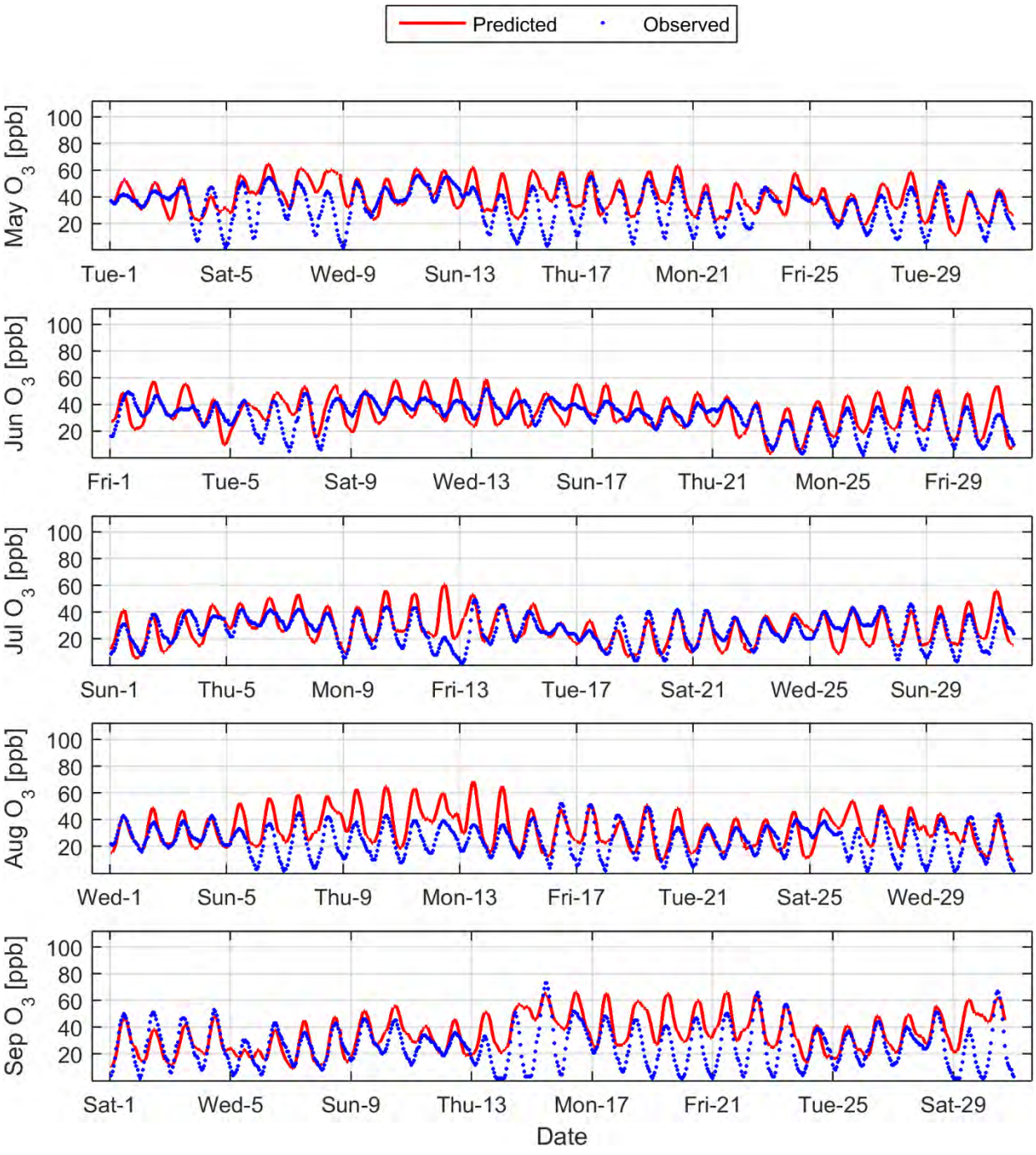

FIGURE V-5-5

Time Series of Observed Vs.Predicted 8-Hour West Los Angeles Ozone

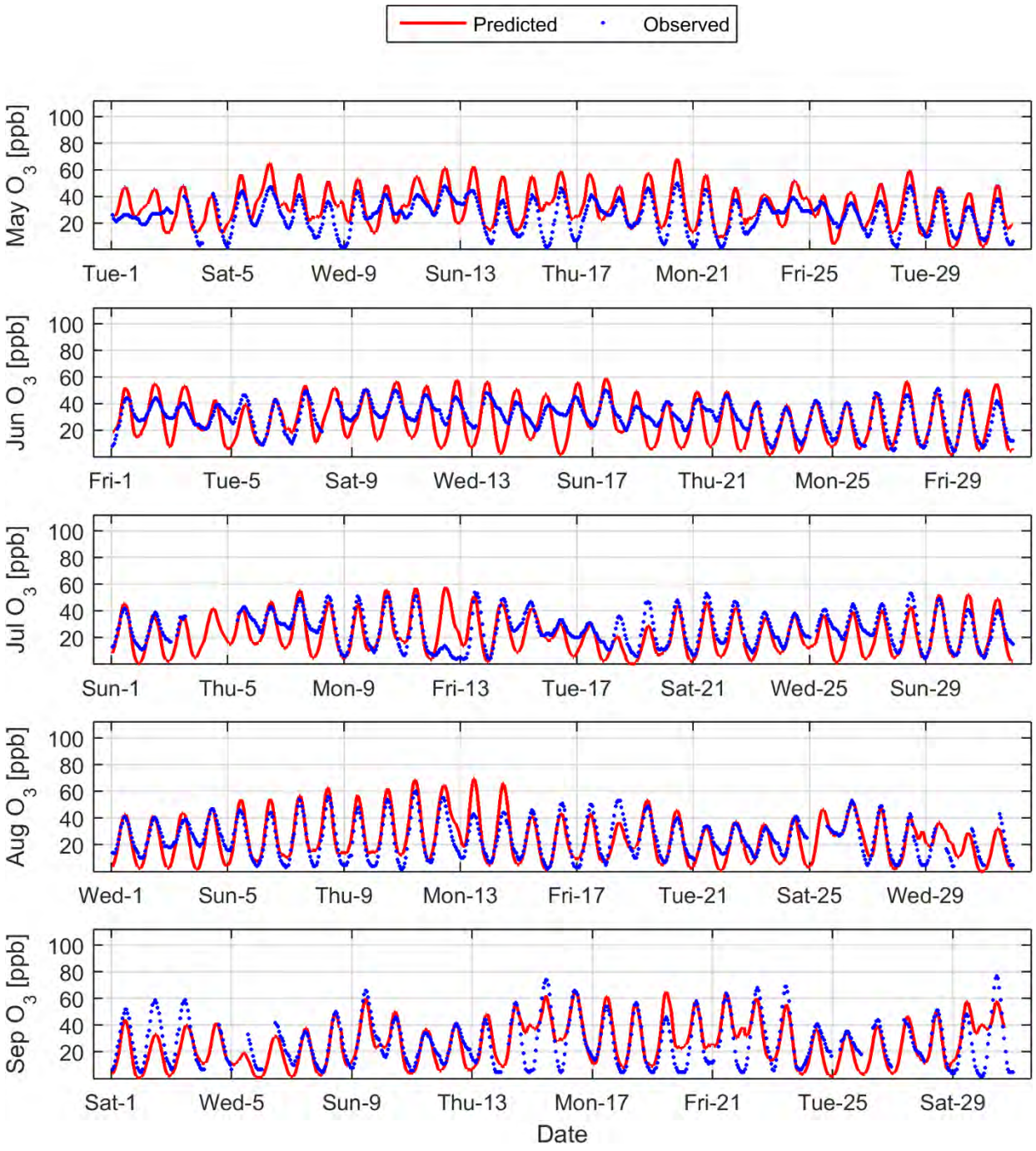

FIGURE V-5-6

Time Series of Observed Vs.Predicted 8-Hour Central Los Angeles Ozone

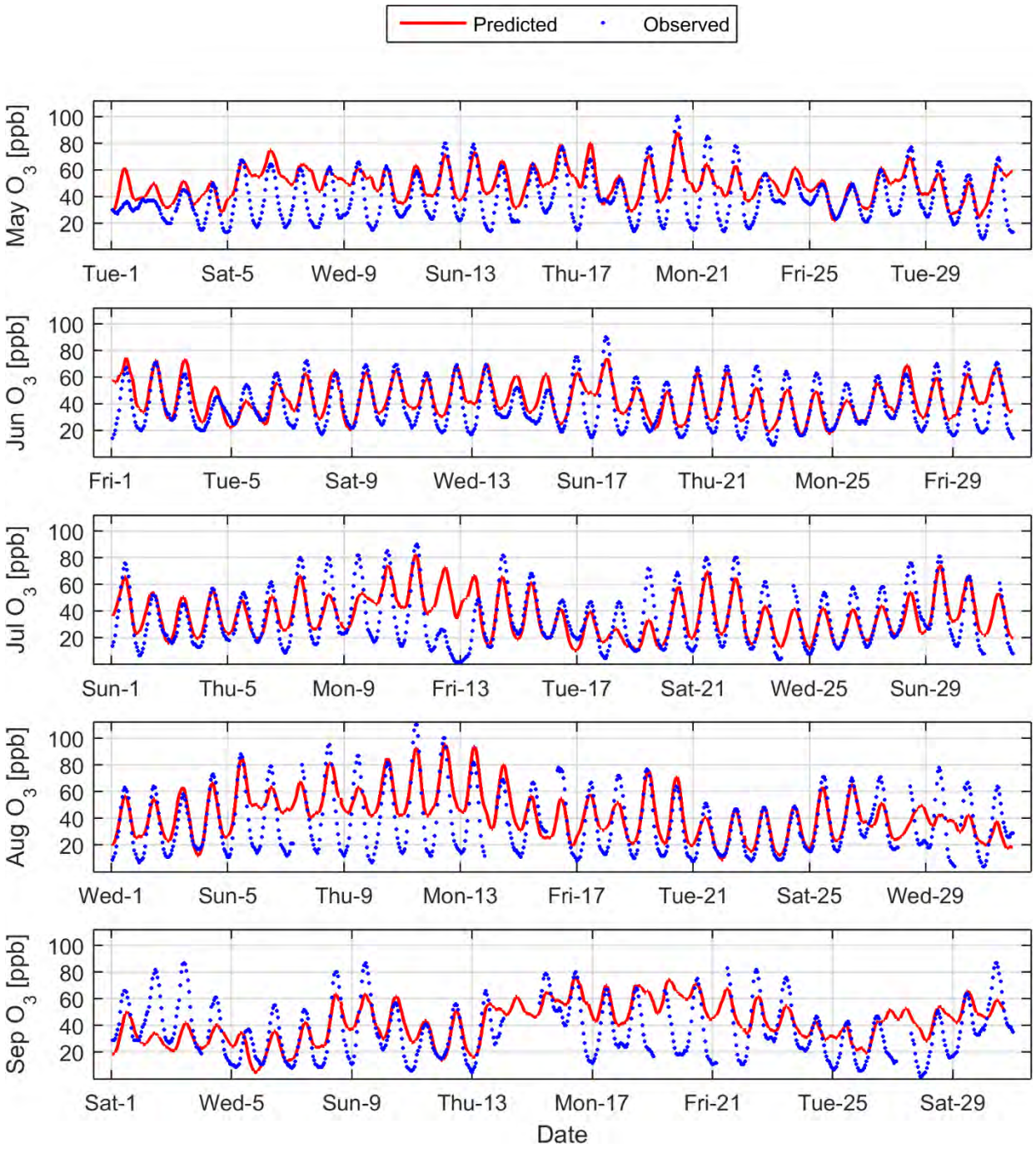

FIGURE V-5-7

Time Series of Observed Vs. Predicted 8-Hour Glendora Ozone

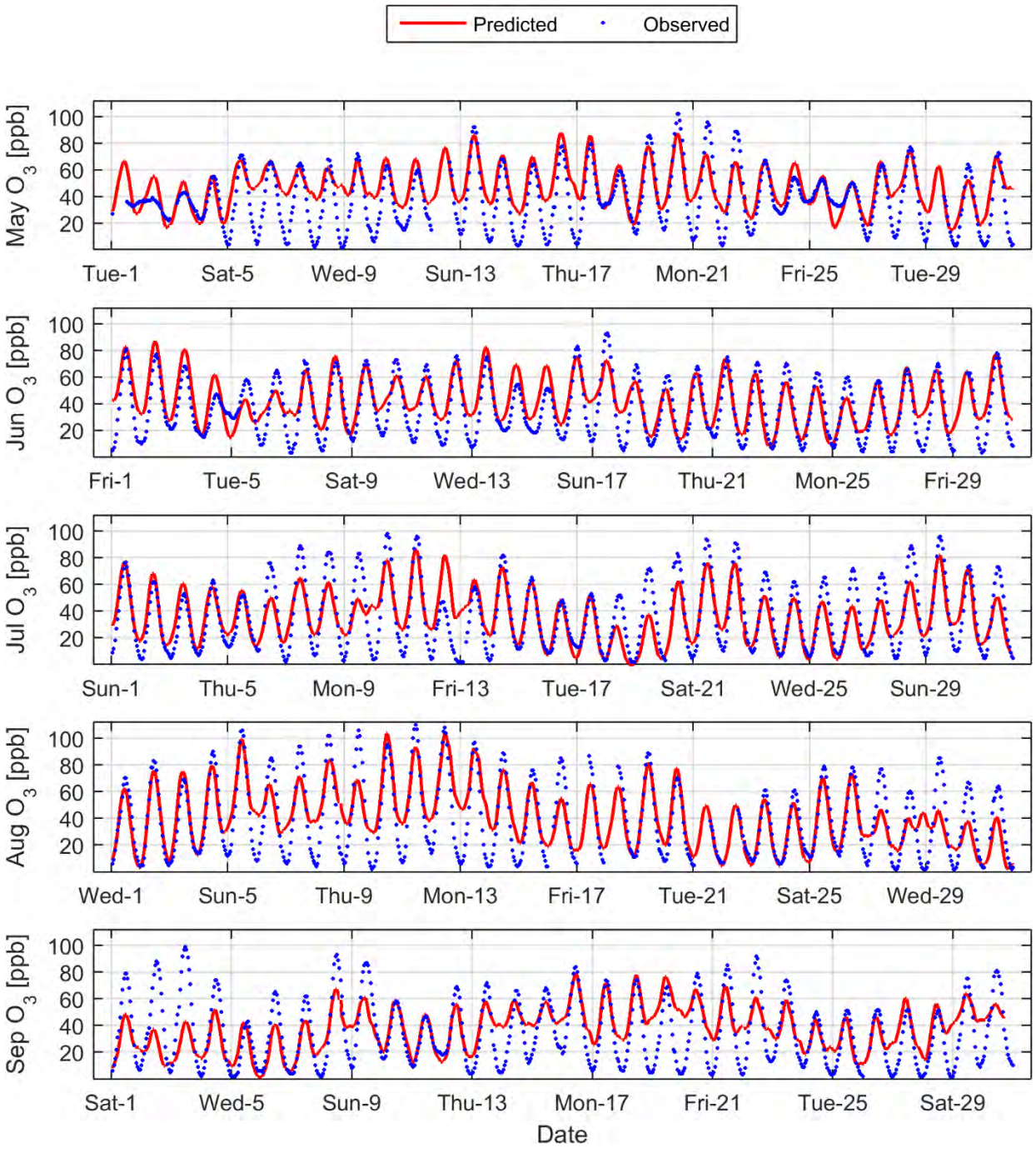

FIGURE V-5-8

Time Series of Observed Vs. Predicted 8-Hour Fontana Ozone

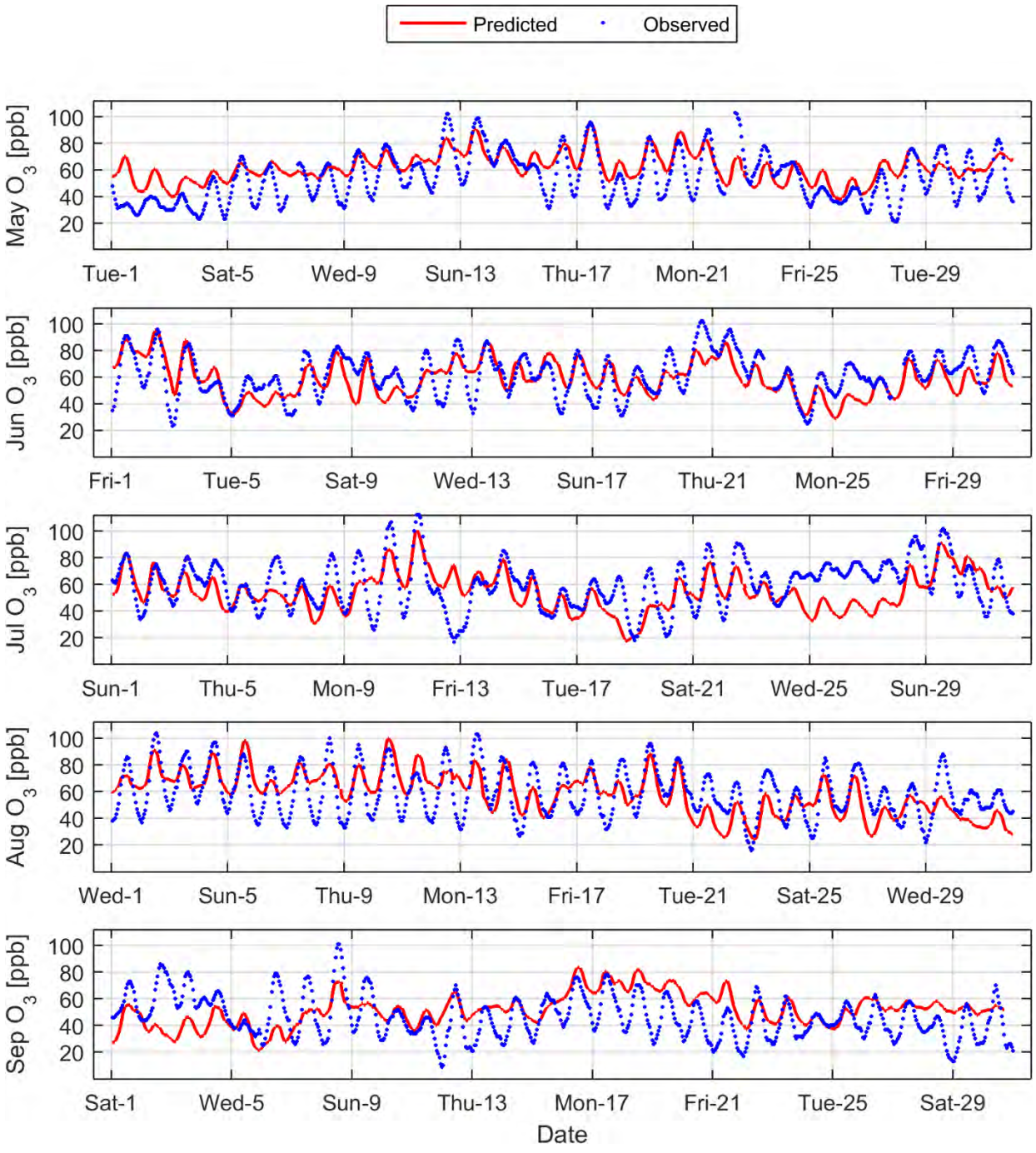

FIGURE V-5-9

Time Series of Observed Vs. Predicted 8-Hour Crestline Ozone

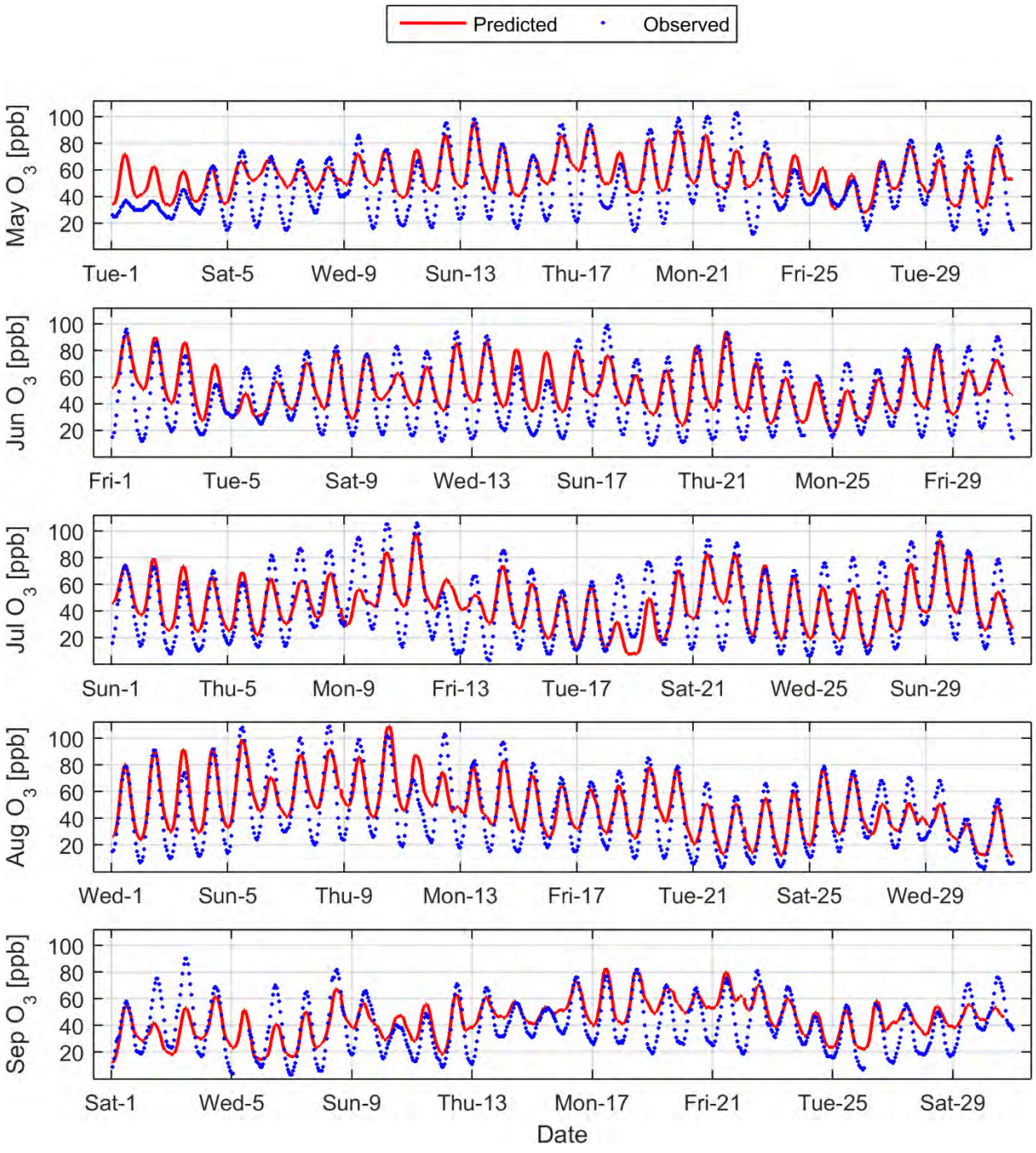

FIGURE V-5-10

Time Series of Observed Vs.Predicted 8-Hour Redlands Ozone

Ozone Modeling Approach

The set of 153 days from May 1st through September 30th, 2012 was simulated and analyzed to determine daily 8-hour average maximum ozone for the 2012, 2023, and 2031 emissions inventories. A set of simulations with incremental VOC and NOx emissions reductions from 2023 and 2031 baseline emissions was generated to create ozone isopleths for each station in the Basin. The ozone isopleths provide updated guidance for the formulation of the future control strategies.

Ozone RRFs were calculated using the ratio methodology described in the EPA modelling guidance (U.S. EPA, 2014). The RRF calculation has been changed significantly from the previous guidance. The guidance released in 2007 provided the framework for the 2012 AQMP (U.S. EPA, 2007). One of the biggest differences is the number of days accounted for in the RRF calculation. The 2007 guidance calls for all the days that meet the selection criteria to be included in the RRF calculation. The criteria required that the un-paired peak error was less than 20% ((Pred – Obs) /Pred ≤ 0.2), the predicted daily max was within 20 % of the site specific design value ((Pred – DV)/DV) ≤ 0.2), and the prediction was higher than the federal standard of 75 ppb. The new approach recommended by the EPA (2014) recommends that only the top 10 days are included in the RRF. The model performance criteria requiring that the unpaired peak error is less than 20% is still employed along with requiring that all values included in the RRF have predictions greater than or equal to 60 ppb. The RRF is undefined at sites with less than 5 days that meet this criteria. The number of days that meet the selection criteria are different from station to station, depending on model prediction accuracy and air quality characteristics. In the case of Crestline, the number of days that qualified for the RRF in the 2007 guidance was approximately 50 days, more than half of the entire simulation period, whereas the new approach uses only 10 days.

In the 2012 AQMP, the maximum modelled grid cell in the 3x3 grid centered at each station was retrieved from the base and future simulations. In the current AQMP, the maximum modelled value in the 3x3 grid surrounding each station is compared to the corresponding grid position in the future year. In addition, the definition of a neighboring grid is fixed to 3X3, regardless of the grid resolution. For example, the 2007 guidance required a 7X7 grid surrounding each station for the default AQMP 4 km grid resolution. Overall, the new guidance promotes control strategies to be focused on high episode days rather than the average high days of a season.

Future Ozone Air Quality

The 2016 AQMP addresses both the 2007 standard of 75 ppb and the 1997 standard of 80 ppb, of which attainment dates are 2031 and 2023, respectively. Table V-5-9 summarizes the results of the updated ozone simulations. Included in the table are the 2023 ozone baseline and 2023 controlled ozone projections from the 2012 AQMP ozone attainment demonstration submitted to U.S. EPA as part of the SIP. The 2012 AQMP concluded that NOx emission must be reduced by more than 70% of baseline emissions to meet the 80 ppb standard by 2023.

The Final 2016 AQMP baseline ozone simulations reflect the changes made to the 2023 and 2031 baseline inventories. The Final 2016 AQMP summer planning inventory for 2023 has a similar VOC/NOx emissions

ratio, (1.49 vs. 1.37) although total tonnages of both precursor emissions are lower than presented in the 2012 AQMP. Reduced 2023 baseline VOC and NOx emissions in the 2016 AQMP relative to the 2012 AQMP reflects the impact of rules and regulations adopted after the 2012 AQMP, updated methodologies to estimate emissions, and revised growth projections.

Both 2023 and 2031 baseline scenarios without any additional reduction beyond already adopted measures do not lead to attainment, indicating additional emission reductions are necessary to meet the standards. NOx must be reduced by 45% and 60% beyond the 2023 and 2031 baseline, respectively. With proposed controls in place, the updated analysis demonstrates that all stations in the Basin will meet the 1997 federal 8-hour ozone standard by 2023 and the 2007 standard by 2031. The proposed reduction is significantly less than the estimates presented in the 2012 AQMP. Several factors contributed to this change. First, year-to-year, design values are declining, indicating improvements in air quality. This is partly due to the Great Recession, which reduced emissions during 2010 to 2014, the period used in the 5-year weighted design value. The decline in design values are also an indication of the efficacy of control strategies proposed and implemented in Basin. Secondly, the unforeseen economic downturn lowered the baseline inventory substantially; therefore, even though the carrying capacity is somewhat similar, the percentage reduction is higher. Thirdly, the new attainment demonstration focuses on high days, as discussed in the RRF calculation. The high days are assumed to be caused by local emission sources rather than transport from out-of-state or from higher altitudes. Therefore, the controls on local emission sources are more effective as the model is more responsive to reductions.

Note that the implementation thresholds are 84.9 ppb for the 1997 standard and 75.9 ppb for the 2008 standard. This is due to the unit (0.08 ppm) and the number of decimal points written in the CAA when referencing the 1997 standard along with the truncation approach associated with the 2008 standard.

TABLE V-5-9

Model-Predicted 8-Hour Ozone Design Values (ppb)

Station	2012 AQMP		2016 AQMP			
	2023 Baseline	2023 Controlled Scenario	2023 Baseline	2023 Controlled Scenario	2031 Baseline	2031 Controlled Scenario
Azusa	95	77	77	70	75	62
Banning	94	73	89	78	85	71
Crestline	107	81	93	81	89	72
Fontana	104	81	96	84	92	75
Glendora	107	84	93	83	90	74
Lake Elsinore	85	66	74	65	70	58
Perris	88	66	80	70	76	62
Pomona	100	80	83	75	81	67
Redlands	103	77	95	82	90	73
Reseda	90	73	79	71	75	64
Riverside	100	77	89	78	86	69
San Bernardino	108	83	90	78	86	70
Santa Clarita	94	73	84	76	80	68
Upland	106	83	92	82	89	73

**Burbank and Pasadena do not have 2012 base-year design values due incomplete measurement data in one or multiple years between 2010 and 2014.

Spatial Projections of 8-Hour Ozone Design Values

The spatial distribution of ozone design values for the 2012 base year is shown in Figure V-5-11. Future year ozone air quality projections for 2023 and 2031 with and without implementation of all proposed control measures are presented in Figures V-5-12 through V-5-15. The predicted ozone concentrations will be significantly reduced in the future years in all parts of the Basin with the implementation of proposed control measures in the South Coast Air Basin. Future design values are predicted from model RRFs and measured base-year design values. Future design values are then interpolated using a natural neighbor interpolation to generate the interpolated fields.

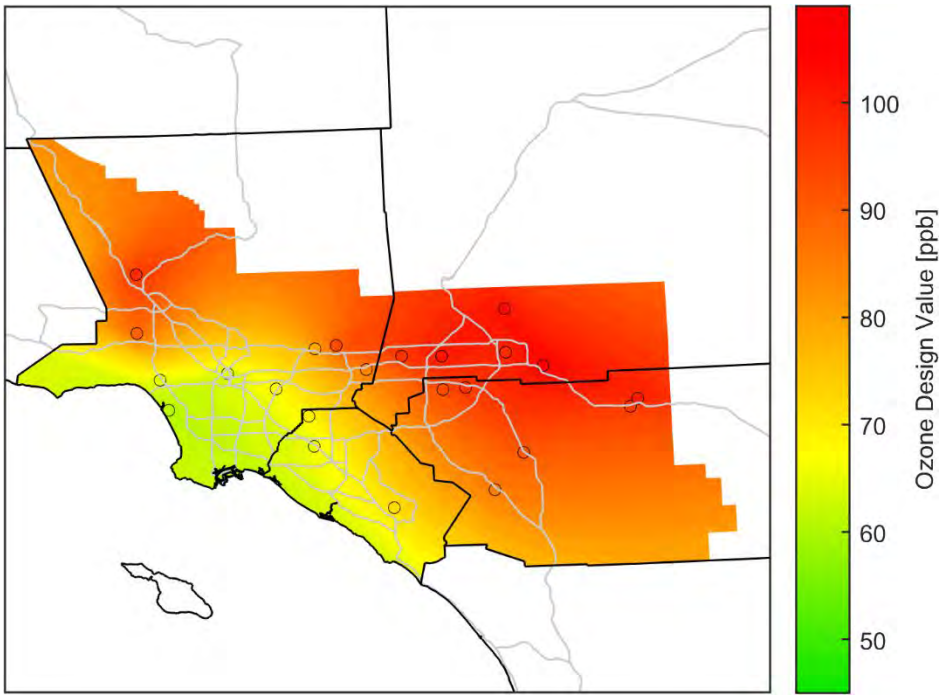

FIGURE V-5-11

Interpolated 2012 8-Hour Ozone Design Values (ppb). The Circles Indicate Air Monitoring Stations.

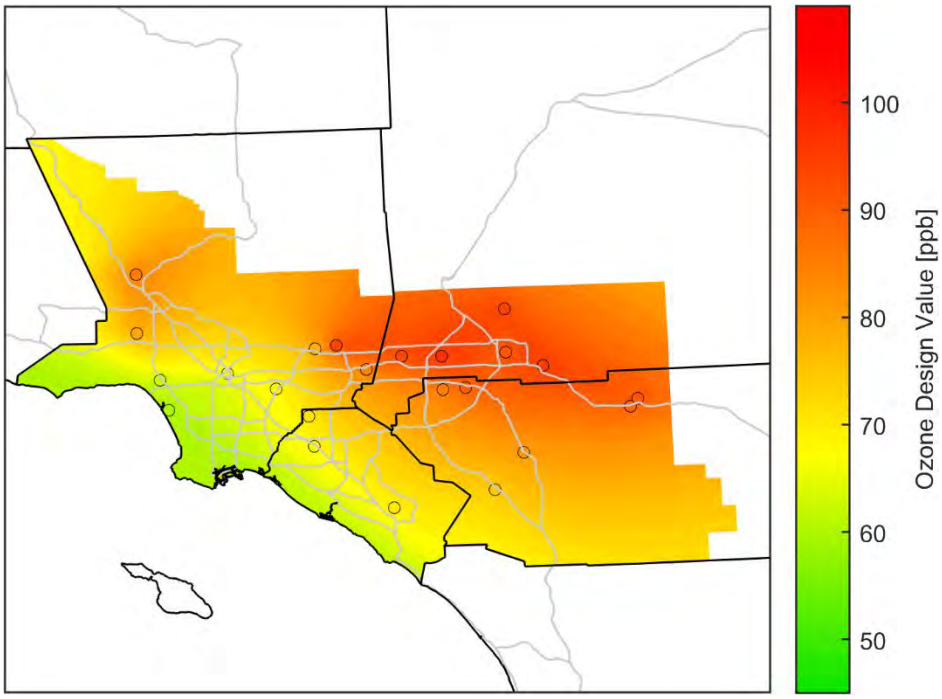

FIGURE V-5-12

Interpolated 2023 Baseline 8-Hour Ozone Concentrations (ppb)

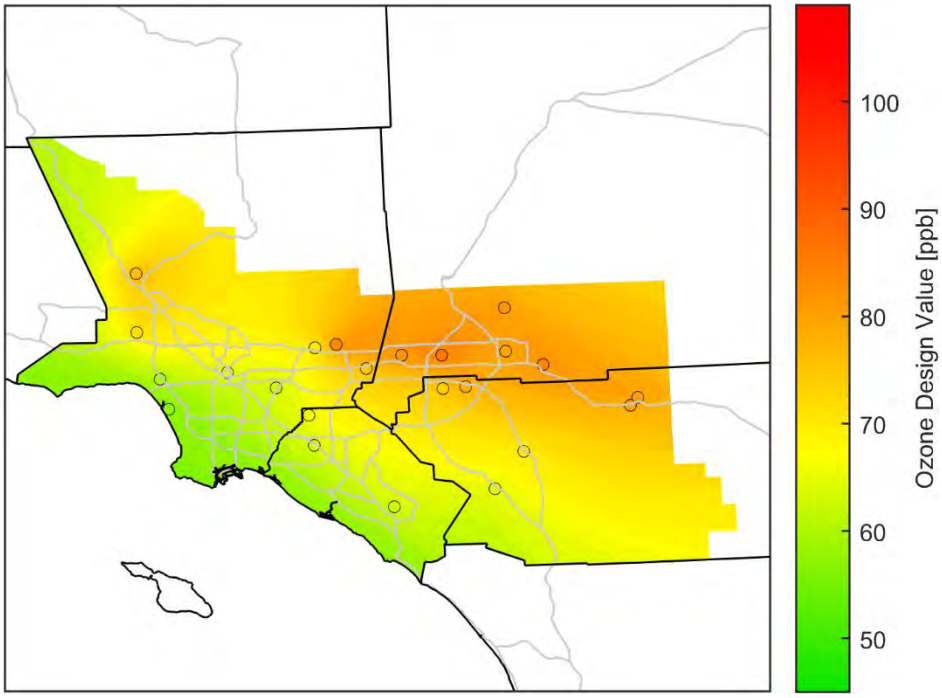

FIGURE V-5-13

Interpolated 2023 Controlled 8-Hour Ozone Concentrations (ppb)

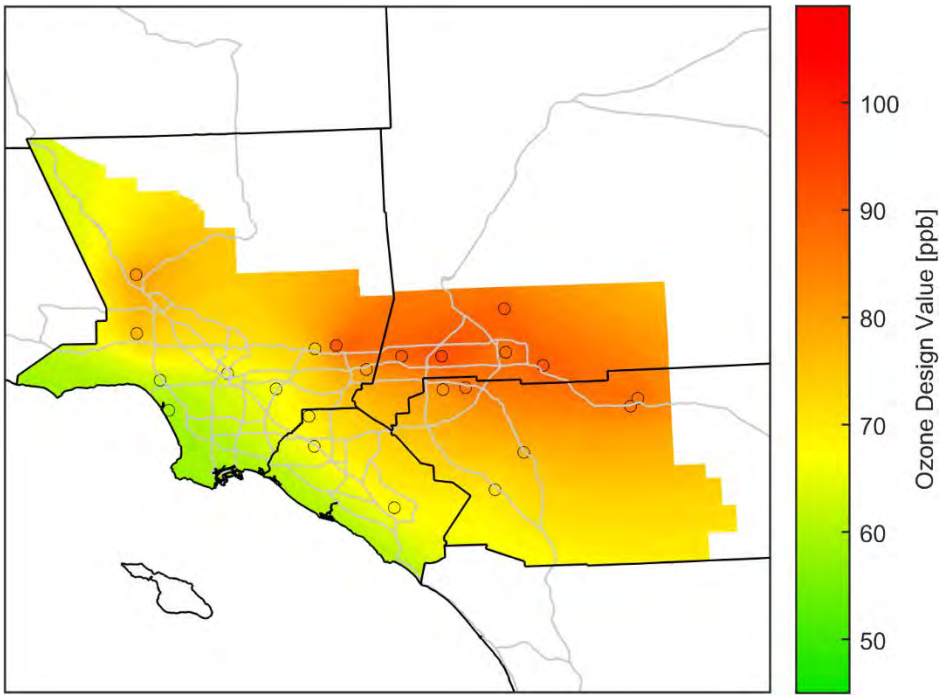

FIGURE V-5-14

Interpolated 2031 Baseline 8-Hour Ozone Concentrations (ppb)

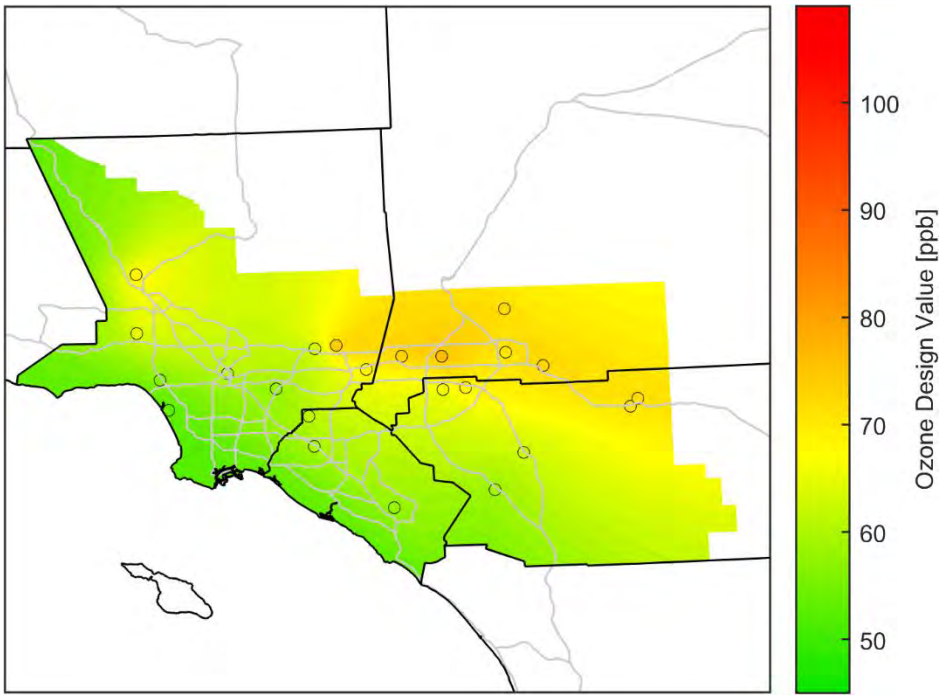

FIGURE V-5-15

Interpolated 2031 Controlled 8-Hour Ozone Concentrations (ppb)

Coachella Valley

The Coachella Valley is currently a nonattainment area for the 2008 8-hour ozone NAAQS (0.075 ppm). With an attainment due date of July 20, 2027, emission reductions required to meet the standard need to be in place by the end of 2026 and the modeling demonstration must show attainment in 2026. The 2026 baseline future projection, with no additional emissions controls beyond rules and regulations already adopted, still exceed the 2008 standard at Palm Springs (0.079 ppm), but not at Indio (0.075 ppm). However, further control measures applied to upwind South Coast Air Basin emission reductions will be in place by 2023, as described in Chapter 4, in order for the Basin to meet the 1997 ozone NAAQS (0.08 ppm). With these additional Basin reductions, the Coachella Valley is projected to be below the 2008 NAAQS in 2023, three years before the 2026 deadline, with all Coachella Valley design values predicted to be below 0.075 ppm. Thus, attainment of the 2008 8-hour ozone NAAQS in the Coachella Valley is ensured by the anticipated NOx reductions from the Basin's control strategy designed to meet the 1997 ozone standard in the Basin.

Unmonitored Area Analysis

An unmonitored area analysis was conducted to estimate the design values at unmonitored locations. This analysis uses both the measurement design values and the modelled ozone profiles throughout the modelling domain to estimate 8-hour daily max ozone design values at unmonitored locations.

Five-year weighted design values were calculated for all monitoring stations within and in the vicinity of the modelling domain for the 2010 to 2014 period. These measured design values were then interpolated spatially using a natural-neighbor interpolation based on a Voronoi tessellation. Figure V-5-16 and Figure V-5-17 illustrates the spatial distribution of 8-hr Ozone 5-year weighted design values. Only stations that meet the data completeness requirement for each of the 5 years were included in the analysis.

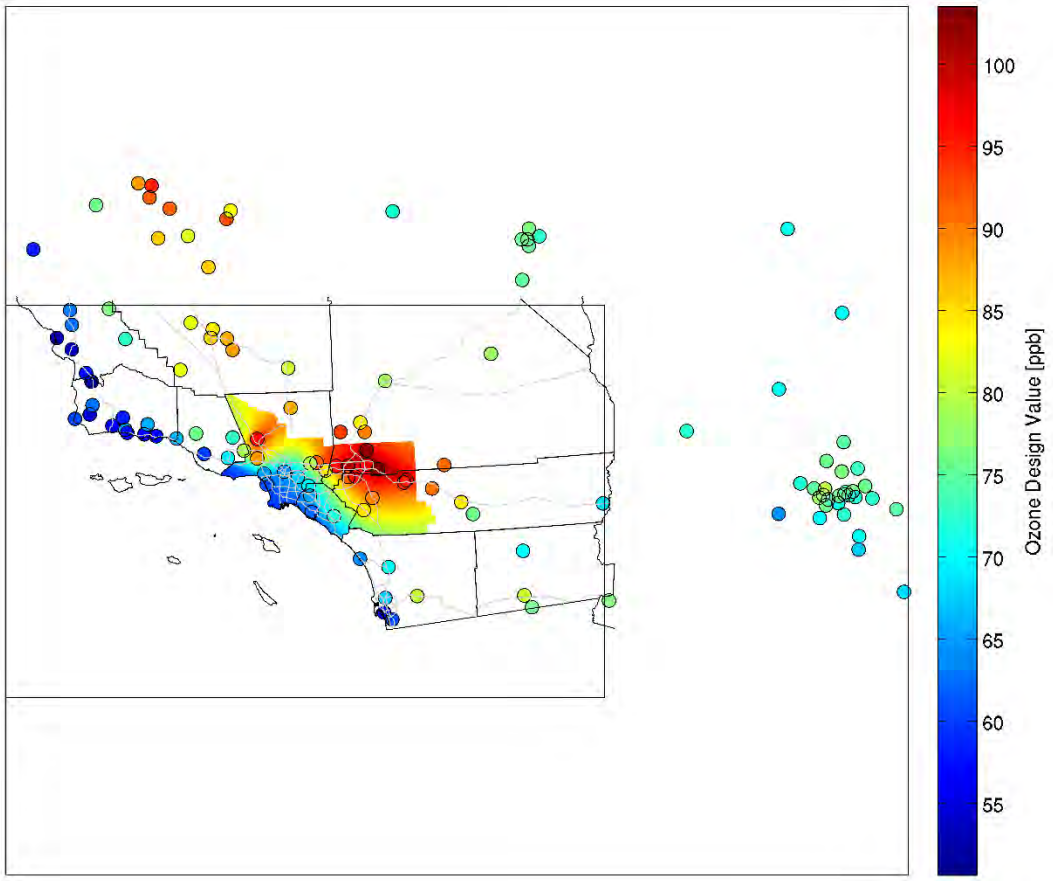

FIGURE V-5-16

8-hr Daily Maximum Ozone Design Values in 2012. Interpolated Fields and Monitor Data.

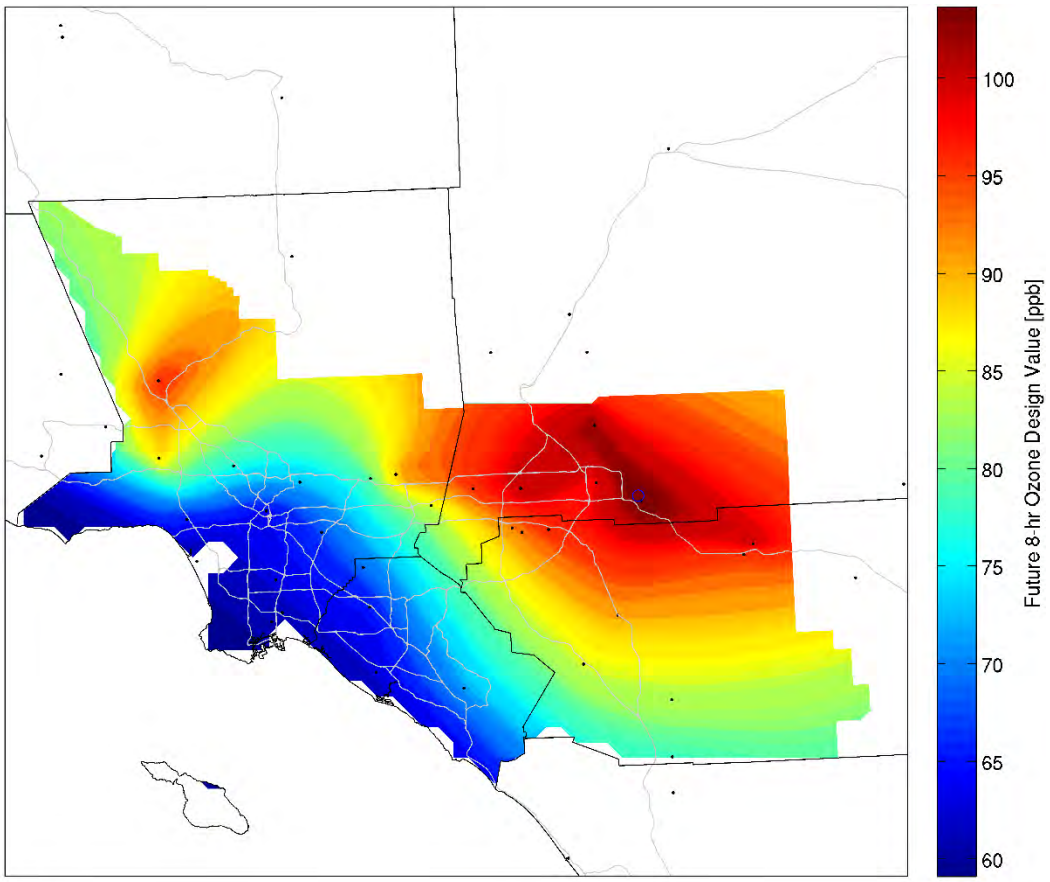

FIGURE V-5-17

Interpolated 8-hr Daily Maximum Ozone Design Values in 2012.

Domain-wide relative response factors (RRFs) can be calculated to forecast ozone design values in future years. The top 10 highest daily-maximum 8 hour concentrations in the model data are averaged in the base and future years. The RRF is the quotient of this average in the future year and this average in the base year. Only top ten daily-maximum 8-hour concentrations that are greater or equal to 60 ppb are used in the RRF. RRFs are still calculated if at least 5 daily measurements in the top ten values are greater or equal to 60 ppb. However, the RRF cannot be calculated if there are less than 5 daily measurements exceeding 60 ppb in either the base or future years. The domain-wide RRF for the 2023 model simulation and the 2031 model simulation are presented in Figure V-5-18 and Figure V-5-19, respectively.

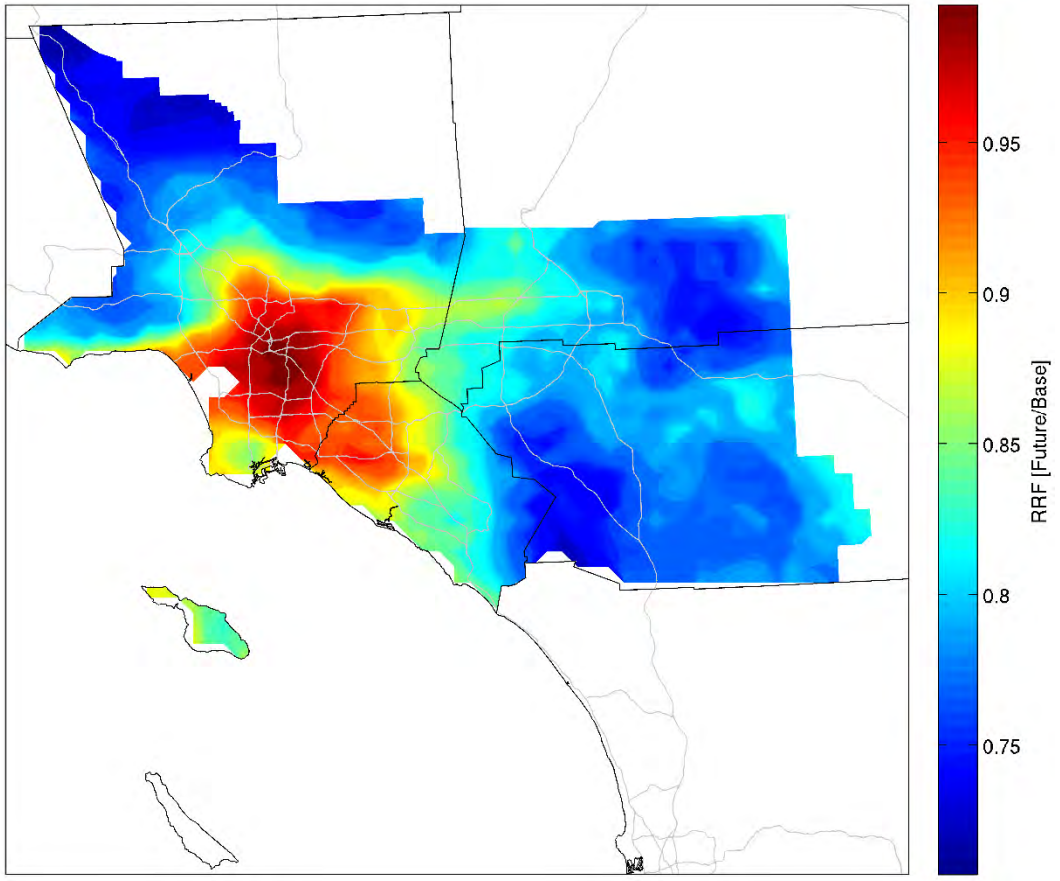

FIGURE V-5-18

2023 RRF Fields. White Areas within the Basin Indicate that There Are Not Enough Measurements Greater Than or Equal to 60 ppb to Calculate a RRF.

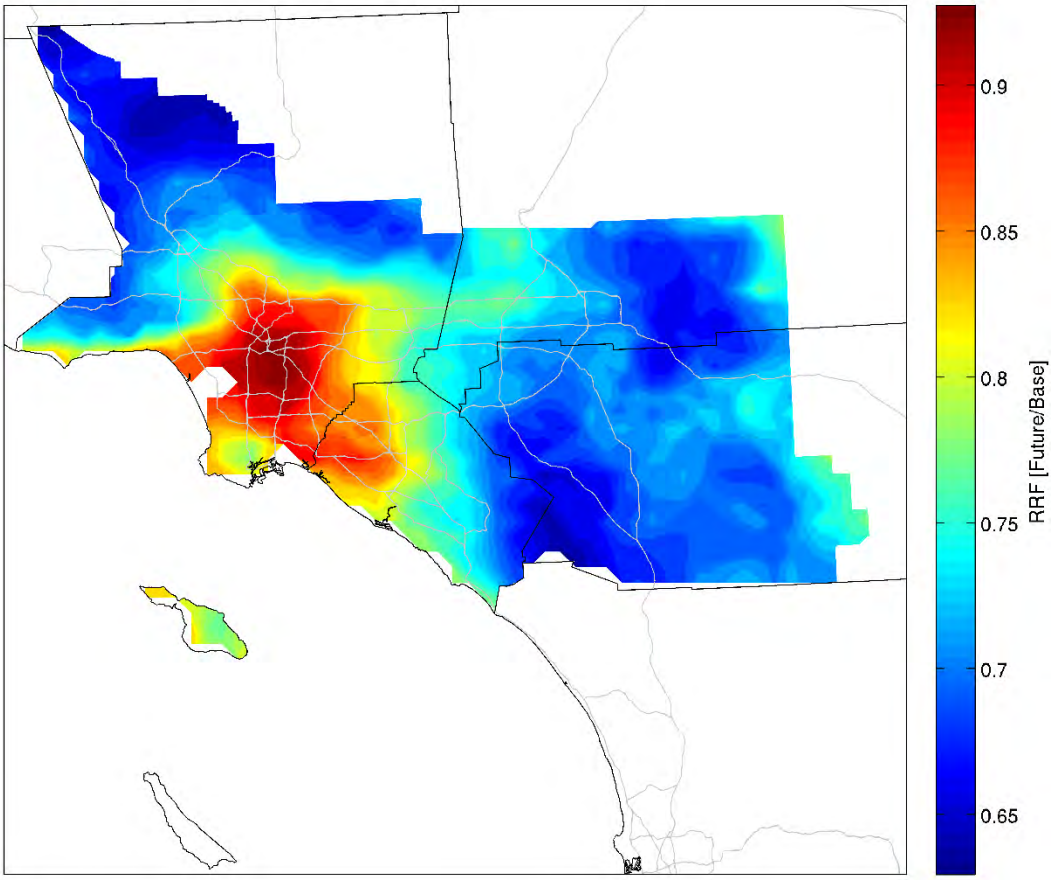

FIGURE V-5-19

2031 RRF Fields. White Areas within the Basin Indicate that There Are Not Enough Measurements Greater Than or Equal to 60 ppb to Calculate a RRF.

The calculated RRF fields are then used to project the interpolated measurement field to simulate future year concentrations. Plots illustrating the future ozone predictions for 2023 and 2031 control scenarios are presented below in Figures V-5-20 and V-5-21.

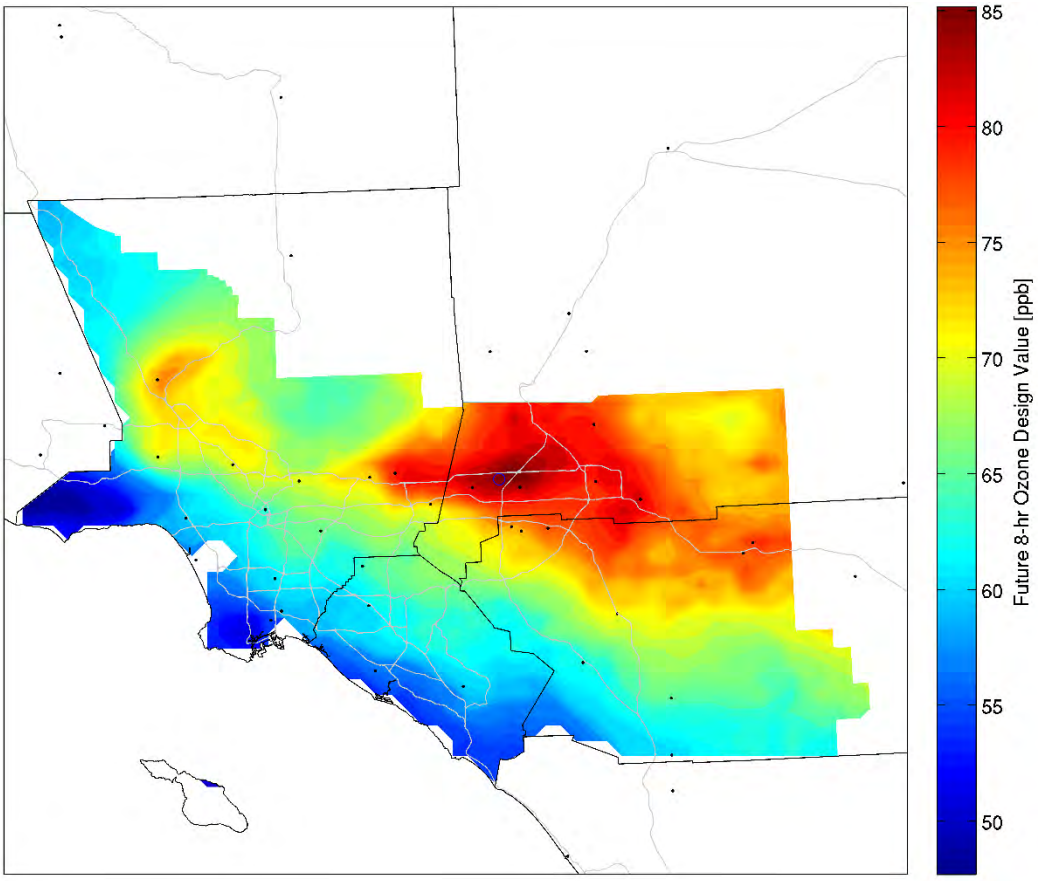

FIGURE V-5-20

2023 Controlled Ozone Predictions throughout the Modelling Domain. The Basin Maximum Concentration is 85.7 ppb. The Blue Circle Indicates the Cell with the Highest Projected Ozone Concentration.

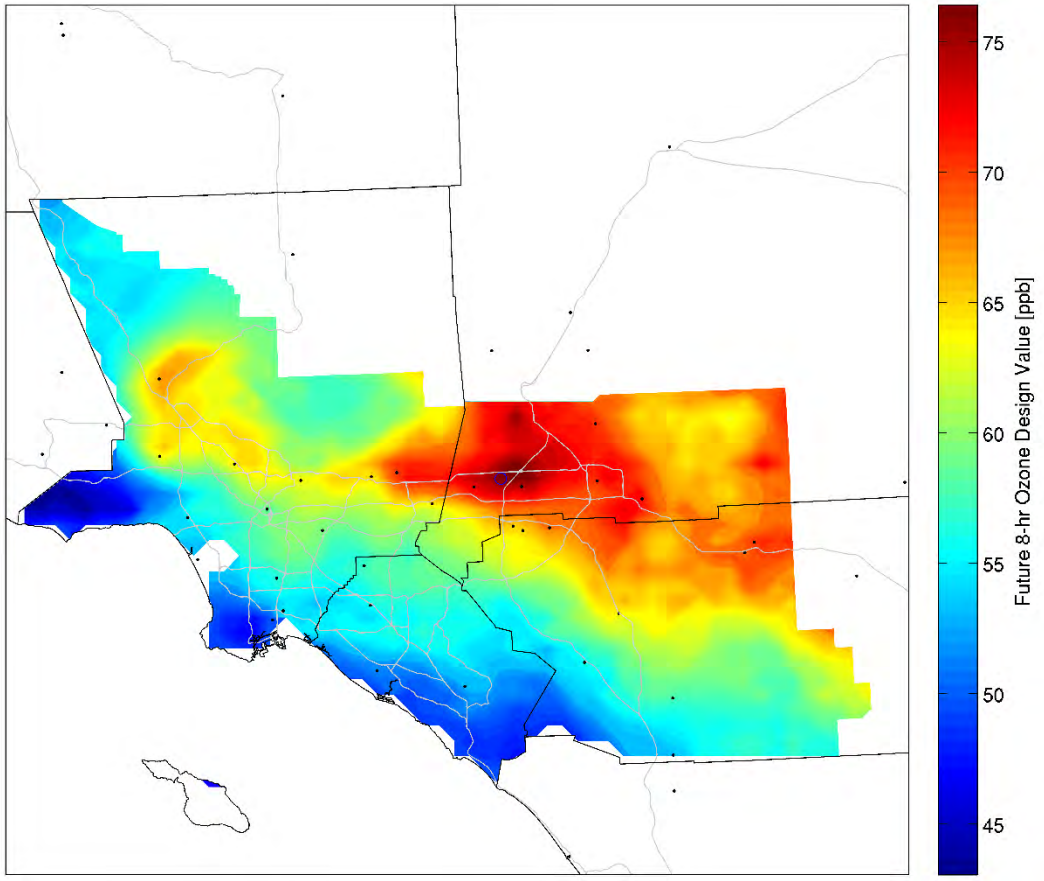

FIGURE V-5-21

2031 Controlled Ozone Predictions throughout the Modelling Domain. The Basin Maximum Concentration is 76.9 ppb. The Blue Circle Indicates the Cell with the Highest Projected Ozone Concentration.

Controls do not reduce ozone concentrations uniformly and therefore, the location with the largest Ozone concentration shifts in future years. Redlands has the highest 2012 5-year weighted design value. In 2023 and 2031, the unmonitored area analysis predicts that the Fontana area will have the largest design value in the Basin. This is consistent with the attainment demonstration, which focuses solely on monitor design values.

The most significant uncertainty in the unmonitored area analysis arises from the choice of interpolation scheme. Measured design values were interpolated using different interpolation methods. They are natural-neighbor interpolation based on a Voronoi tessellation, a nearest-neighbor interpolation scheme, a linear interpolation scheme, "1/R" inverse distance weighting interpolation schemes using several different number of neighbors, and "$1/R^2$" inverse distance weighting interpolation schemes using several different number of neighbors. The performance of each interpolation scheme was evaluated by performing the interpolation with all stations except one and comparing the predicted value in the location of the missing station and the actual design value at that site. This procedure was repeated for each station and interpolation scheme. The

natural-neighbor interpolation produced the lowest residual sum suggesting that it best represents the design values in the modelling domain.

A more comprehensive unmonitored area analysis was conducted using the EPA MATS software. The same procedure as above was repeated in MATS using the default inverse distance weights interpolation to project future design values. A gradient adjusted approach was also performed by adjusting measured 5-year design values by the modelled spatial gradient and interpolating to create a gradient adjusted baseline concentration field. Spatially dependent RRFs were then used to forecast future design values. Forecasted future ozone design values were similar to concentrations predicted with our initial analysis. In 2023 and 2031, Rancho Cucamonga was predicted to have the highest ozone design values at 85.7 and 76.9 ppb, respectively. See Table V-5-10. The differences between the in-house post-processing analysis and the MATS approach were mostly resulted from the spatial interpolation scheme. The in-house post-processor used the Voronoi tessellation per the EPA guidance, while the MATS used inverse-distance weighting scheme since the Voronoi tessellation is not available.

TABLE V-5-10

Comparison of Highest Basin Design Values for Unmonitored Area Analysis. In-House Analysis Summarizes the Results Shown in Previous Figures. Using the MATS Software, this Analysis was Repeated (Left Column) and Enhanced (Right Column).

	In-House Analysis	MATS Software	
Simulation	**Max DV in Basin (ppb)**	**Max DV in Basin (ppb)**	**Max DV in Basin (ppb) gradient adjusted value**
Base Year	104.3 (Redlands)	102.7 (Redlands)	107.6 (Yucaipa/Oak Glen)
2023 Control	85.7 (Rancho Cucamonga)	88.3 (Rancho Cucamonga)	85.6 (Fontana)
2031 Control	76.9 (Rancho Cucamonga)	79.7 (Yucca Valley)	76.9 (Rancho Cucamonga)

Looking Beyond 2031

In 2015, the U.S. EPA lowered the federal 8-hour ozone standard to 70 ppb. Recent 8-hour ozone rule implementation guidance requires that a SIP revision with an updated attainment demonstration and control strategy be submitted to U.S. EPA no later than four years after designation. The Basin will likely be designated as an “extreme” nonattainment area for the new standard in 2017, consistent with the classification of the 75 ppb standard. Thus, the deadline for attainment of the 70 ppb standard is 20 years after designation (likely 2037)—6 years after the attainment deadline for the 75 ppb federal standard. It is critical to conduct a preliminary analyses to assess the need for potential adjustments to the overall control strategy when considering this new standard and deadline. The preliminary projections, based upon ozone “isopleths” developed for the 2031 emission scenarios indicate that the 2037 Basin NOx carrying capacity to meet the 70 ppb standard could be as low as 75 TPD (Figure V-5-22). This is an additional 62 percent of NOx reduction

beyond the projected 2037 baseline and approximately 21 TPD of additional NOx emission reductions between 2031 and 2037. 8-hour ozone isopleths for all Basin sites exceeding the standard are provided in Attachment 4.

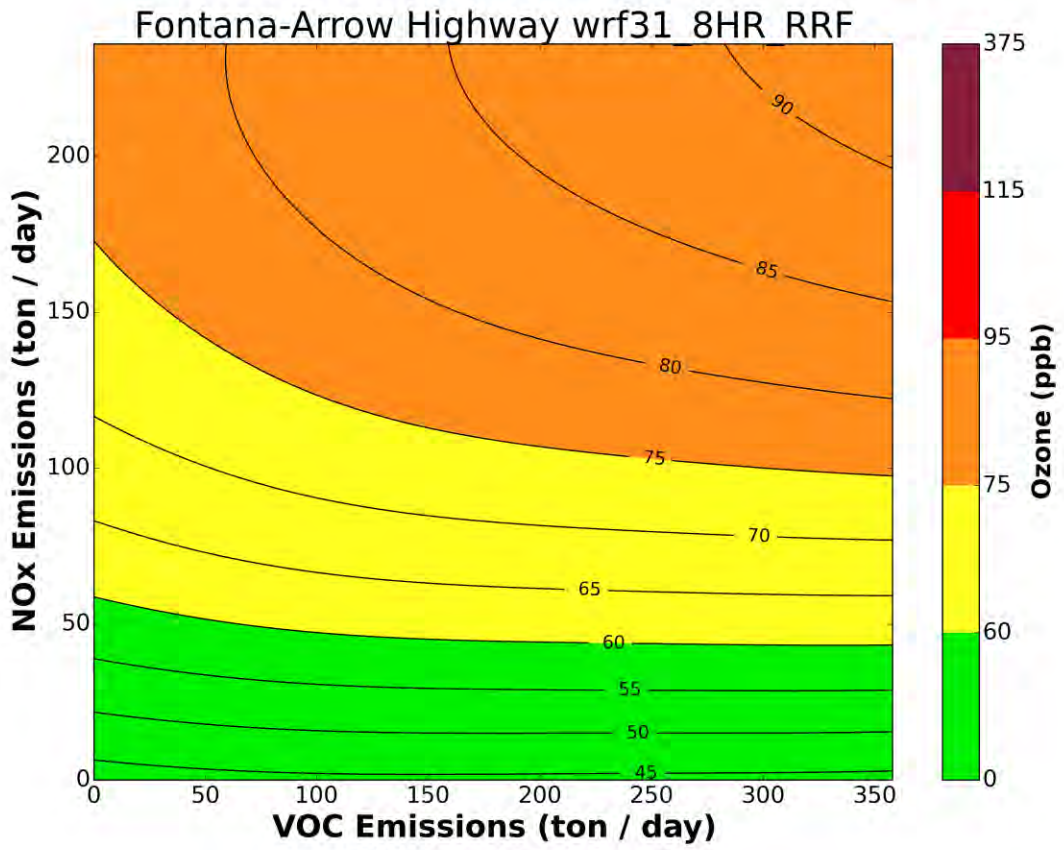

FIGURE V-5-22

2031 Fontana 8-Hour Ozone Isopleth

Weight of Evidence Analysis & Stress Tests

Spatial Perturbation of Emissions

Two emissions scenarios were investigated to evaluate the sensitivity of the spatial distribution of emissions on the resulting air quality. The location of emissions from area sources were shifted from the base configuration using two methods: Case 1) area source emissions were shifted five cells west and five cells south in the modelling domain—a total of 20 km in each direction and Case 2) area source emissions were randomly shuffled by one grid cell at a time along the east-west axis and the north-south axis. The dual axis shuffle is executed a total of 8 times, with the restriction that the max distance moved is 10 cells in any direction. The result is a distribution of emissions relocated from zero to 10 cells in any direction. Figure V-

5-23 displays the number of cells that travel a specified distance along the east-west and north-south direction.

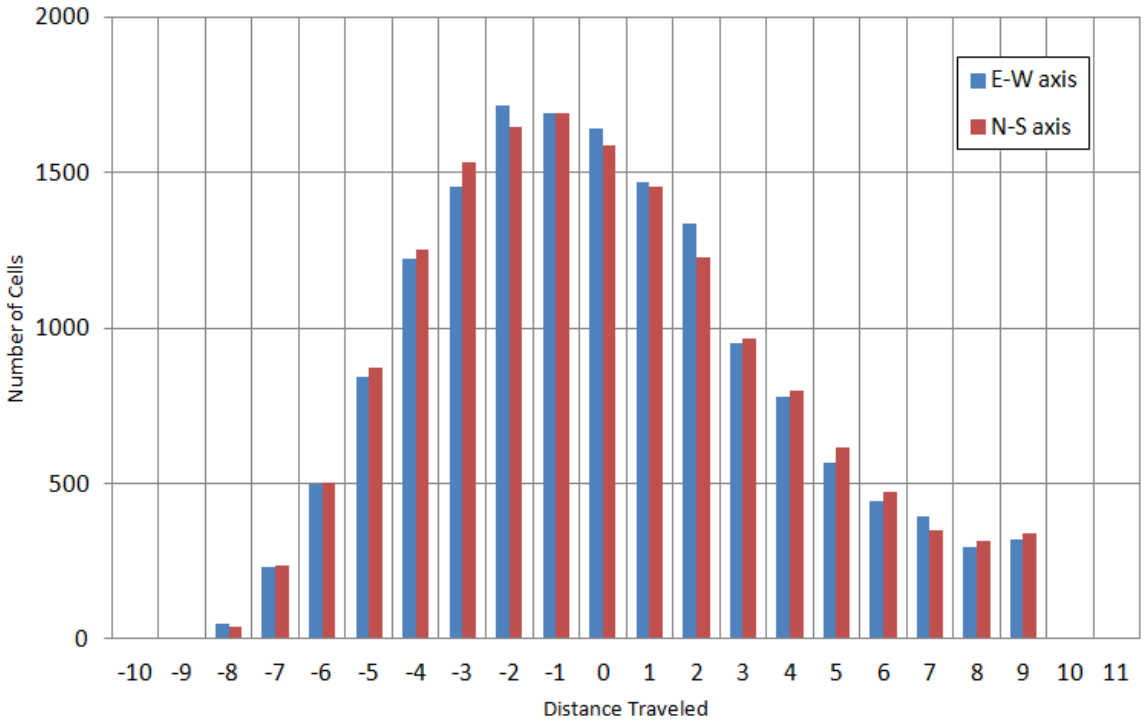

FIGURE V-5-23

Distance Traveled in the "Case 2" Spatial Emissions Perturbation

CMAQ was then used to predict base-year ozone concentrations resulting from these perturbed emission fields. Differences between ozone predicted with unperturbed emissions and perturbed emissions depend on location. At some monitoring stations, differences are significant. Table V-5-11 displays the magnitude of changes in model-output predicted fourth-highest daily maximum ozone values for Case 1 and Case 2.

TABLE V-5-11

Percent Difference in Model Predicted 4th Highest Daily Maximum Ozone Values in the Base Year

Station	Case 1 [%]	Case 2 [%]
Anaheim	0.8	6.8
Azusa	14.3	16.0
Banning	6.3	0.0
Burbank	15.8	13.5
Los Angeles	11.7	11.7
Compton	8.8	9.6
Crestline	-0.1	0.1
Costa Mesa	-1.1	7.2
Lake Elsinore	4.6	1.8
Fontana	5.7	2.4
Glendora	9.7	11.2
Long Beach Hudson	8.9	9.9
La Habra	3.7	6.0
LAX	8.7	7.6
Long Beach Hudson	9.9	12.5
Mira Loma	3.2	2.3
Mission Viejo	0.9	6.8
Pasadena	13.0	10.6
Perris	3.6	1.1
Pico Rivera	6.7	8.9
Pomona	4.1	3.6
Redlands	1.8	3.7
Reseda	5.2	4.4
Riverside	3.4	1.4
Santa Clarita	1.3	3.3
San Bernardino	0.2	0.5
Temecula	7.3	2.6
Upland	5.9	2.3
West Los Angeles	9.0	8.7

Large changes in model predictions throughout the Basin underscore the importance of spatially allocating area source emissions where they are generated. A subsequent analysis can be used to estimate changes in future design values (Table V-5-12) that would result from each perturbed emission scenario.

TABLE V-5-12

Estimated Difference in Future Design Values (Emissions Perturbation – Unperturbed Emissions)

Station	Case 1 2023 [ppb]	Case 1 2031 [ppb]	Case 2 2023 [ppb]	Case 2 2031 [ppb]
Anaheim	1.3	1.3	-0.2	-0.2
Azusa	2.5	2.4	-3.0	-3.0
Banning	0.4	0.4	-1.1	-1.0
Burbank	-0.7	-0.7	0.0	0.0
Compton	0.0	0.0	0.0	0.0
Crestline	-0.5	-0.5	1.1	1.1
Elsinore	0.3	0.3	0.1	0.1
Fontana	-4.6	-4.5	-3.1	-3.0
Glendora	-1.7	-1.7	-3.8	-3.7
La Habra	1.2	1.2	1.5	1.5
LAX	-0.6	-0.6	-0.1	-0.1
Mira Loma	-0.9	-0.9	-0.7	-0.7
Mission Viejo	1.9	1.8	-0.2	-0.2
Pasadena	0.0	0.0	0.0	0.0
Perris	-1.3	-1.3	-0.3	-0.3
Pico Rivera	-1.9	-1.8	-2.2	-2.2
Pomona	-0.5	-0.5	3.6	3.5
Redlands	-0.1	-0.1	-1.6	-1.5
Reseda	1.5	1.4	0.0	0.0
Riverside	0.0	0.0	-1.2	-1.1
Santa Clarita	3.2	3.0	0.5	0.4
San Bernardino	-0.8	-0.8	-2.1	-2.0
Temecula	0.0	0.0	0.0	0.0
Upland	-3.4	-3.3	-2.5	-2.4
West Los Angeles	-2.1	-2.1	-0.5	-0.5

At some locations, estimated 2023 and 2031 design values exhibit significant changes from the unperturbed emission scenario. The Case 1 perturbation leads to overestimates of up to 3 ppb and underestimates of up to 5 ppb in 2023 and 2031. Similarly, the Case 2 perturbation leads to overestimates of up to 4 ppb and underestimates of up to 4 ppb in 2023 and 2031. This analysis further asserts the importance of accurately spatially allocating emissions throughout the modelling domain.

Comparison of 2012 and 2016 On-Road Emissions

For the 2016 AQMP modelling, real-time traffic flow measurements during 2012 were used to apportion emissions on an hourly basis throughout the modelling domain. Light- and heavy-duty vehicle flow data is

location dependent and accounts for special events, holidays, seasonality, and meteorologically-driven traffic profiles. Chapter 4 of Appendix 3 details this revised methodology.

CMAQ simulations of the 2012 base-year were conducted with the traditional on-road emissions framework and the modified (PeMS & WIM) on-road emissions framework. Each simulation used an identical emissions inventory, however, the time and location of on-road emissions was modified. Note that the emissions inventory used for this sensitivity analysis differs from the final emission inventory for the 2016 AQMP. Figure V-5-24 illustrates the model bias, gross error, and RMSE when comparing the "Traditional" and "PEMS & WIM" 8-hour ozone predictions to the measurement data.

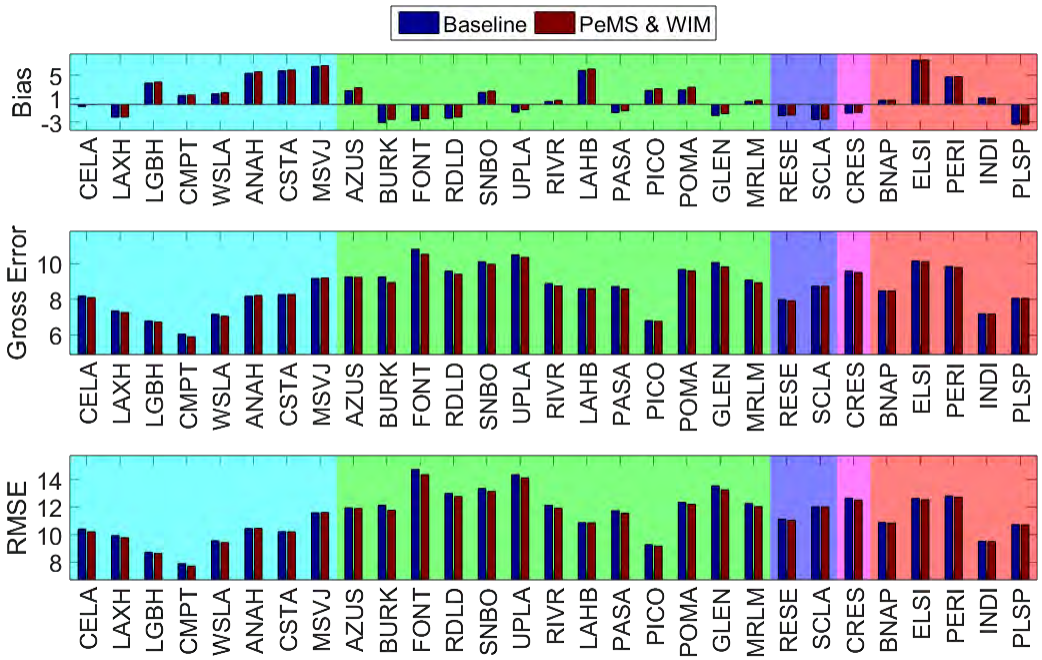

FIGURE V-5-24

Comparison of Bias, Gross Error, and Root-mean-square Error Using the "Traditional" and "PeMS & WIM" On-road Emissions Profiles. Monitoring Stations Are Color-coded Based on the Region of the Basin That They Reside. (Coastal Inland, Inland Urban, San Fernando Valley, Mountain, Inland Desert)

The "PeMS & WIM" on-road emissions profiles predicts slightly higher 8-hour ozone concentrations at most stations in the Basin. However, the gross error and root-mean-squared error has improved in almost all locations over the traditional case. While the model performance is similar on average, some daily maximum 1-hour and 8-hour ozone predictions can differ significantly, up to 10 ppb. The maximum extent of model prediction differences is illustrated with error-bars in Figure V-5-25.

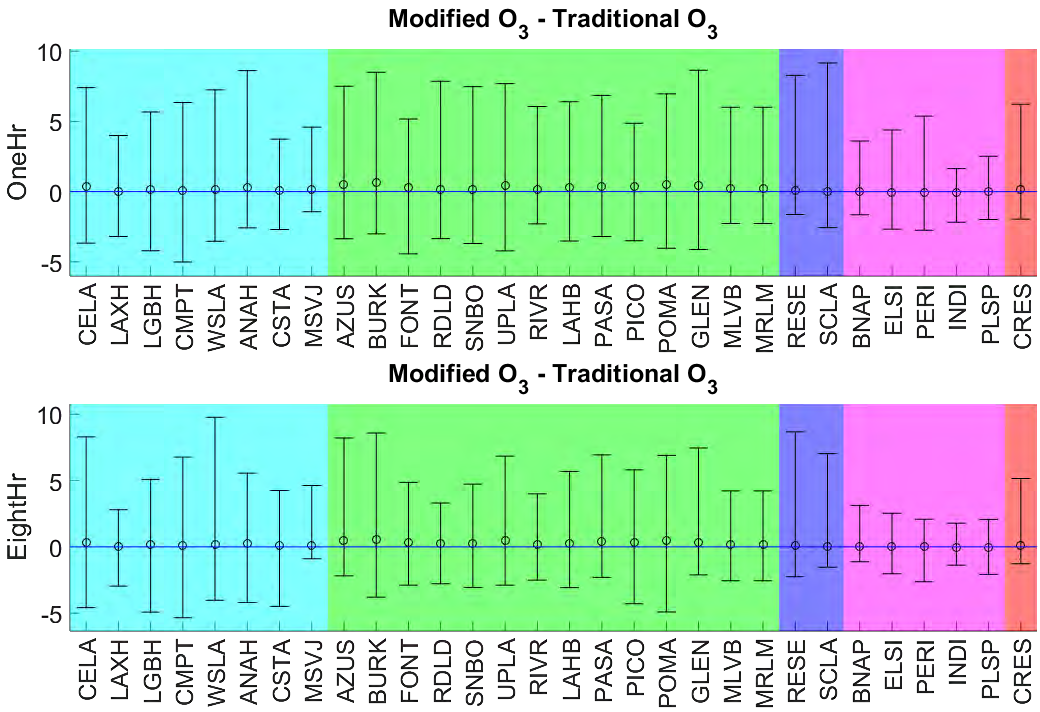

FIGURE V-5-25

Differences in Max-daily 8-hour and 1-hour Ozone Prediction in ppb between "Modified" (PeMS & WIM) and "Traditional" On-road Emissions Profiles. Error Bars Indicate the Maximum and Minimum Extent of Differences in the Predicted Values. Circles Indicate the Average Difference at Each Location. Monitoring Stations Are Color-coded Based on the Region of the Basin That They Reside. (Coastal Inland, Inland Urban, San Fernando Valley, Inland Desert, Mountain)

Significant differences are concentrated on weekends in the inland urban portions of the Basin. Figure V-5-26 shows the daily max 1-hour ozone differences for each station on each day of 2012. The warmest colors typically occur on weekend days, indicating larger daily max 1-hour ozone predictions with the PeMS & WIM profiles. Differences are somewhat seasonal, illustrating the ability of the PeMS & WIM profiles to capture seasonal variations in traffic patterns.

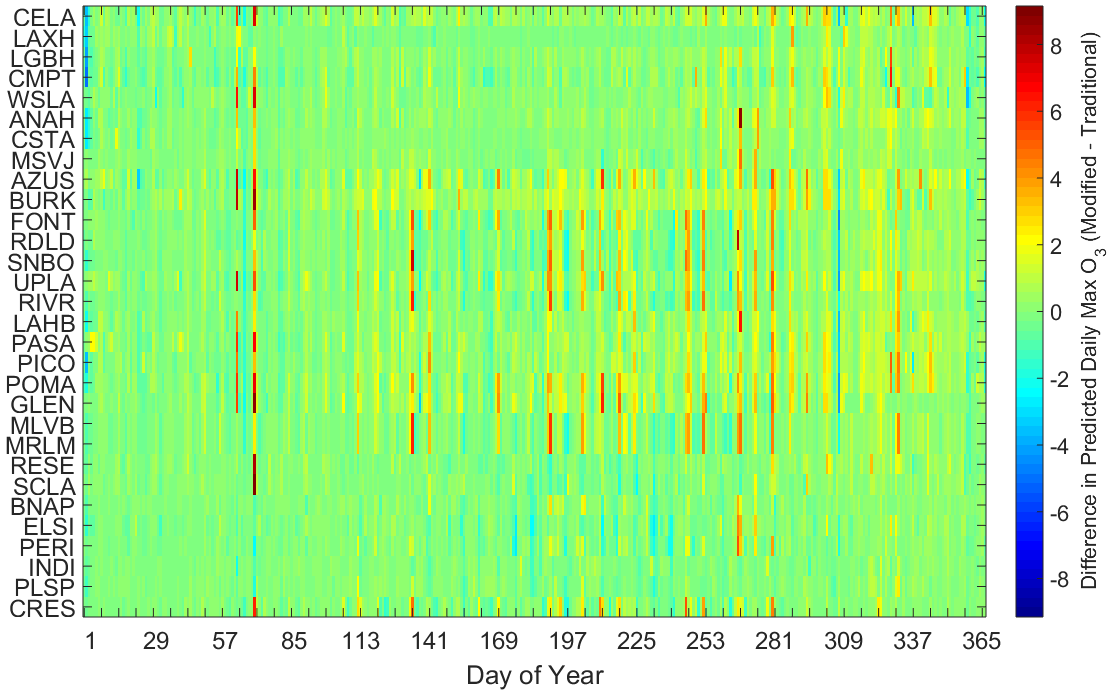

FIGURE V-5-26

Differences in Predicted Daily Max 1-hour Ozone (PeMS & WIM "Modified" – "Traditional")

Projections of Ozone without International Emissions

Section 179(B) of the Clean Air Act states that a state implementation plan shall be approved if the State can establish, to the approval of U.S. EPA that an implementation plan will attain and maintain ambient air quality standards by the attainment date "but for emissions emanating from outside of the United States." Modelling guidance specifying how to evaluate the contribution of emissions emanating from outside the US towards the ozone design values is not available. In light of this, we have done a sensitivity analysis model simulation to probe the contribution of international emissions towards attainment.

The global chemical transport model, MOZART, and CMAQ on a state-wide domain is used to generate boundary conditions of all relevant species for the modelling domain used for the attainment demonstration. To evaluate the contribution of foreign emissions on ozone design values, the contribution of emissions emanating from outside the US should be removed from the boundary conditions allowing CMAQ to forecast ozone concentrations in this hypothetical scenario. Two major problems arise when attempting to quantify this scenario. It is unclear what "emissions emanating from outside the US" entail. One could imagine the situation where all lands outside the US are represented by a desert without biogenic or anthropogenic emissions. However, background concentrations of ozone entering the modeling domain would still be present. The stratospheric ozone layer would likely still be present in the absence of foreign emissions. Stratospheric/tropospheric exchange of ozone would then contribute to background ozone

concentrations in the troposphere. In addition, the contribution of ozone and its precursors from the US would also contribute to the background ozone concentrations entering the modeling domain. The second major problem is operational in nature. The SCAQMD does not currently operate a global model, which is necessary to quantify the regional modeling domain boundary conditions for this hypothetical situation.

In light of these uncertainties and limitations, a sensitivity analysis was conducted to bound the forecasted future design values under various model domain boundary conditions. A relative response factor (RRF) approach was used to forecast 2031 uncontrolled design values. The predicted 2031 design values ($\boldsymbol{DV_{2031\_zeroBV}}$) are a function of the base-year measured design values ($\boldsymbol{DV_{2012\_meas.}}$) and a RRF, which compares the future simulated ozone concentrations ($\boldsymbol{CMAQ_{2031\_zeroBV}}$) with the revised boundary conditions and the 2012 base-year simulations with standard boundary conditions ($\boldsymbol{CMAQ_{2012\_baselineBV}}$):

$$\boldsymbol{DV_{2031\_zeroBV} = DV_{2012\_meas.} * \left(\frac{CMAQ_{2031\_zeroBV}}{CMAQ_{2012\_baselineBV}}\right)} \qquad \text{Eq. 1}$$

The RRF, denoted with the terms in parenthesis is calculated according to the standard methodology, which includes the top 10 days > 60 ppb at each monitoring location meeting the performance criteria from the base year and the corresponding days in the future year. One can derive this equation by framing the analysis in two steps, starting with the derivation of a hypothetical base-year design value that is predicted in the absence of foreign emissions ($\boldsymbol{DV_{2012\_zeroBV}}$).

$$\boldsymbol{DV_{2012\_zeroBV} = DV_{2012\_meas.} * \left(\frac{CMAQ_{2012\_zeroBV}}{CMAQ_{2012\_baselineBV}}\right)} \qquad \text{Eq. 2a}$$

To calculate the future 2031 design values under the revised boundary conditions, the revised base-year design value could then be scaled by a RRF comparing the 2031 ozone concentrations and the 2012 ozone concentrations both predicted in the absence of foreign emissions.

$$\boldsymbol{DV_{2031\_zeroBV} = DV_{2012\_zeroBC} * \left(\frac{CMAQ_{2031\_zeroBV}}{CMAQ_{2012\_baselineBV}}\right)} \qquad \text{Eq. 2b}$$

Combination of Eq. 2a and Eq. 2b yields Eq. 1. A simulation was investigated to evaluate the sensitivity of background ozone concentrations on uncontrolled 2031 design values. An extreme bounding case was design with zero for all the species along the western and southern boundaries. This is an extreme bounding case, given that even pre-industrial ozone level would be approximately 10 ppb (Volz and Kley, 1988). Moreover, in reality, the western and southern boundary conditions would be affected by US emissions and stratospheric/tropospheric transport. This 2031 uncontrolled simulation was run without Mexican emissions.

Future design values were simulated and are summarized in Table V-5-13. The highest values was still expected to occur along the San Bernardino foothill areas, confirming in-Basin emissions and subsequent photochemical reactions are primarily responsible for high design values in the Basin. However, the values in the table need to be interpreted with caution, since this represents unrealistic extreme scenario. Currently, there is no guidance to show the influence of emissions emanating outside the U.S. in the attainment demonstration. While boundary values are close proxy for emissions originating outside a modeling domain, intensity and chemical speciation of emissions cannot be represented via boundary values. A global chemical transport model is the best way to evaluate this influence quantitatively.

TABLE V-5-13

Design Values Calculated for Extreme Bounding Values, Which Has Zero Concentrations along Western and Southern Boundaries

Year	*2012*				*2031*	
Boundary Values	***Realistic Boundary Value***		***Zero Boundary Value***		***Zero Boundary Value***	
Station	***CMAQ Prediction***	***Design Value (Measurements)***	***CMAQ Prediction***	***Adjusted Design Value with zero Transport through boundary***	***CMAQ Prediction***	***Design Value with zero transport through boundary***
Azusa	82.9	79.3	65.9	63.0	66.3	63.4
Glendora	88.7	92.7	69.8	72.9	73.2	76.5
West Los Angeles	64.7	64.7	41.6	41.6	42.3	42.3
Los Angeles	63.4	64.0	48.6	49.1	52.3	52.8
Reseda	83.2	89.0	69.9	74.8	60.0	64.2
Pico Rivera	72.3	67.7	58.7	54.9	59.7	55.8
Pomona	83.3	84.3	66.1	66.9	68.6	69.4
LAX	64.2	61.0	30.7	29.1	32.9	31.3
Santa Clarita	89.1	97.3	74.6	81.5	61.6	67.2
Anaheim	65.8	65.0	48.6	48.1	53.1	52.5
Mission Viejo	72.8	72.0	55.5	55.0	55.2	54.6
La Habra	71.4	69.3	53.4	51.9	56.8	55.1
Banning	88.4	95.3	72.8	78.5	67.6	72.9
Indio	79.4	84.3	63.8	67.7	55.4	58.8
Palm Springs	84.9	91.7	73.6	79.5	62.2	67.1
Perris	91.9	91.0	76.3	75.6	67.8	67.2
Riverside	97.3	96.3	78.4	77.7	75.0	74.3
Mira Loma	96.5	92.7	76.6	73.6	72.3	69.4
Elsinore	88.5	85.3	76.0	73.3	63.8	61.5
Crestline	97.6	103.0	78.8	83.1	73.3	77.4
Upland	90.7	96.7	72.2	77.0	71.9	76.7
Fontana	94.0	101.0	76.8	82.5	74.3	79.9
Redlands	98.6	104.7	80.9	85.9	74.8	79.4
San Bernardino	95.5	98.0	78.7	80.8	71.8	73.7

Long-term Trends in Ozone Background Levels

Between 1980 and 2003, energy consumption more than doubled in Asia leading to a significant increase in Asian emissions. Black carbon, organic carbon, carbon monoxide, non-methane VOCs, SO_2, and NOx have all increased significantly (Ohara, Akimoto et al. 2007). Rapid growth of emissions in Asia along with natural variations in stratospheric/tropospheric exchange (Verstraeten, Neu et al. 2015) affects surface ozone levels in the United States. Moreover, transport of ozone and its precursors to surface locations in the U.S. is strongest in the spring (Brown-Steiner and Hess 2011). Surface measurements and aircraft campaigns over the eastern North Pacific find that background ozone concentrations in the spring have increased by approximately 10 ppb from 1985 to 2003 (Jaffe 2003).

Ground-based background ozone measurements in Southern California are not available. Therefore, we have analyzed long-term height-resolved satellite measurements of ozone to investigate the trend in background concentrations entering the Basin from 2005 to 2013.

Methodology

Satellite-based height resolved ozone measurements were obtained from the Ozone Monitoring Instrument (OMI) aboard the National Aeronautics and Space Administration Aura satellite (Levelt, van den Oord et al. 2006). The OMI is an ultraviolet-visible spectrometer on a sun-synchronous orbit providing once-daily measurements of ozone in the troposphere and stratosphere. Measurements have a spatial resolution of 13km x 24km with 18 height layers, with the center of the lowest layer between the surface and 700 hPa.

Tropospheric data was compared to a network of ozonesondes maintained by NOAA Earth System Research Laboratory (National Oceanic and Atmospheric Administration and Global Monitoring Division 2014). Ozonesonde measurements have a high degree of accuracy compared to tropospheric satellite measurements. Ozonesonde measurements, available at intervals ranging from five to 30 days at six locations (Figure V-5-27), were used to validate and adjust tropospheric ozone satellite measurements. Ozonesonde and satellite measurements during and outside the ozone season at each location were compared as a function of height in Figure V-5-28 and Figure V-5-29, respectively. Measurement locations were considered coincident when the center of a satellite measurement was captured within 0.5 degrees latitude and longitude of the ozonesonde location. In order to detect any systematic biases and calibrate the satellite measurements, corresponding satellite and ozonesonde measurements taken with two hours of each other were identified and plotted on opposite axes. This ozonesonde/satellite comparison in the troposphere for each of the six ozonesonde stations with corresponding data acquired from 2004 to 2014 is presented in Figure V-5-30.

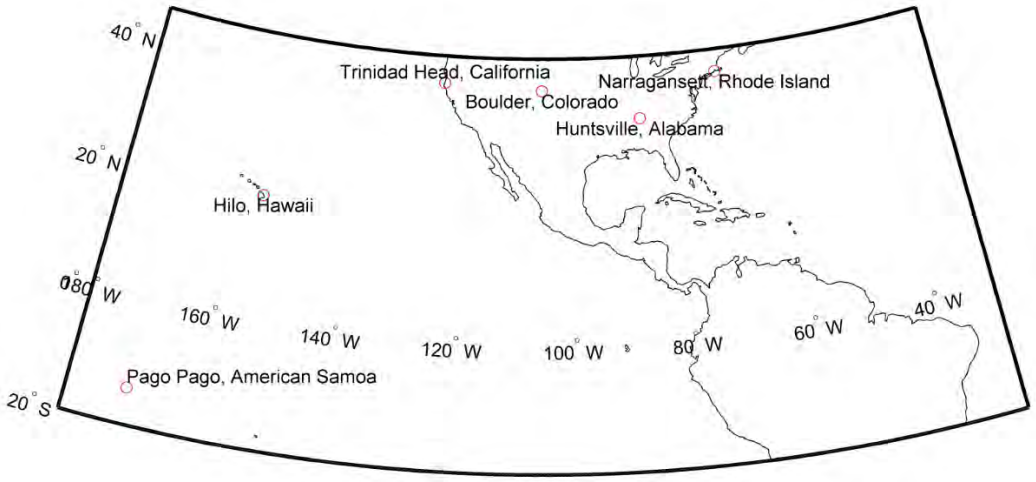

FIGURE V-5-27

Location of Ozonesondes Used to Validate and Calibrate Satellite Data

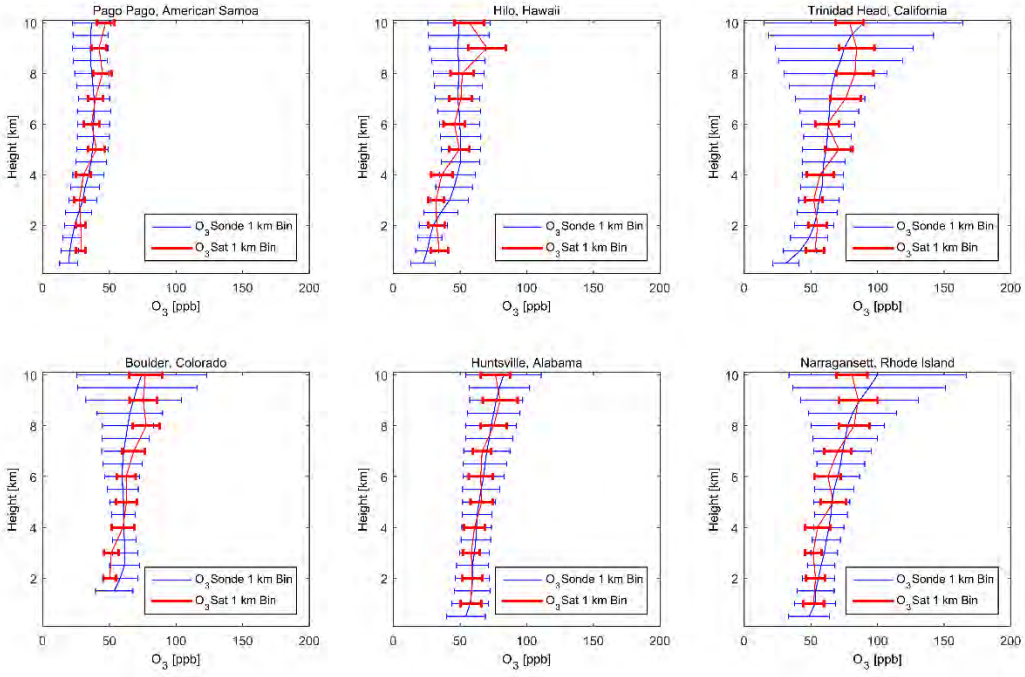

FIGURE V-5-28

Comparison of Ozonesonde and Satellite Data at Six Locations during the Ozone Season. Ozonesonde Data is Binned at a Resolution of 500 m. Satellite Data is Binned at a Resolution of 1 km. The Extent of the Horizontal Bars Represents the Standard Deviation of All Measurements in the Corresponding Height Bin.

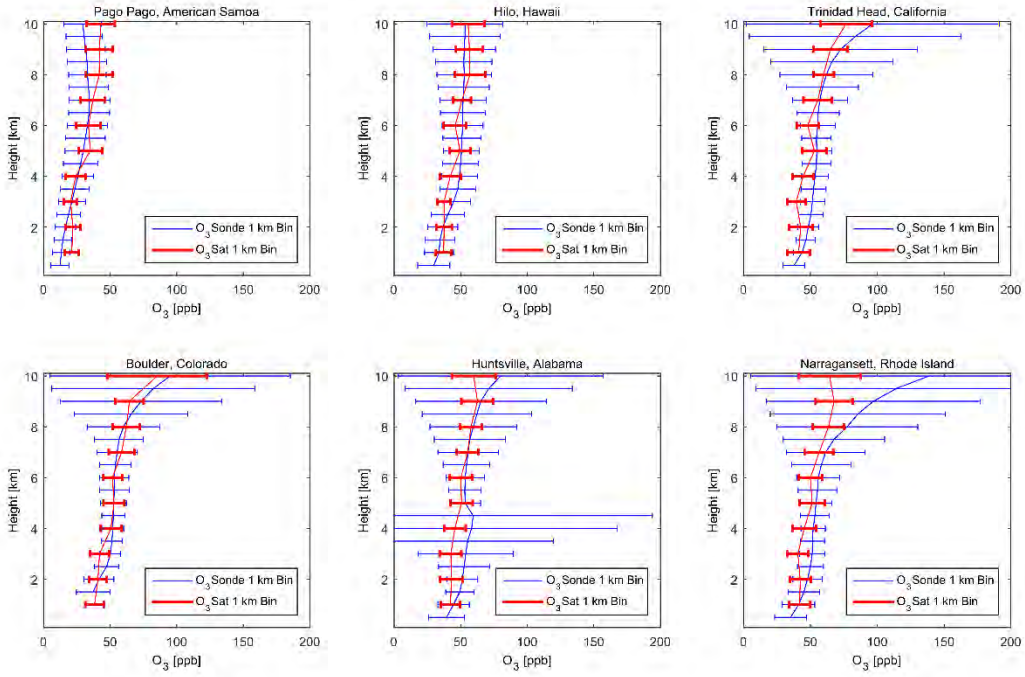

FIGURE V-5-29

Comparison of Ozonesonde and Satellite Data at Six Locations outside the Ozone Season. Ozonesonde Data is Binned at a Resolution of 500 m. Satellite Data is Binned at a Resolution of 1 km. The Extent of the Horizontal Bars Represents the Standard Deviation of All Measurements in the Corresponding Height Bin.

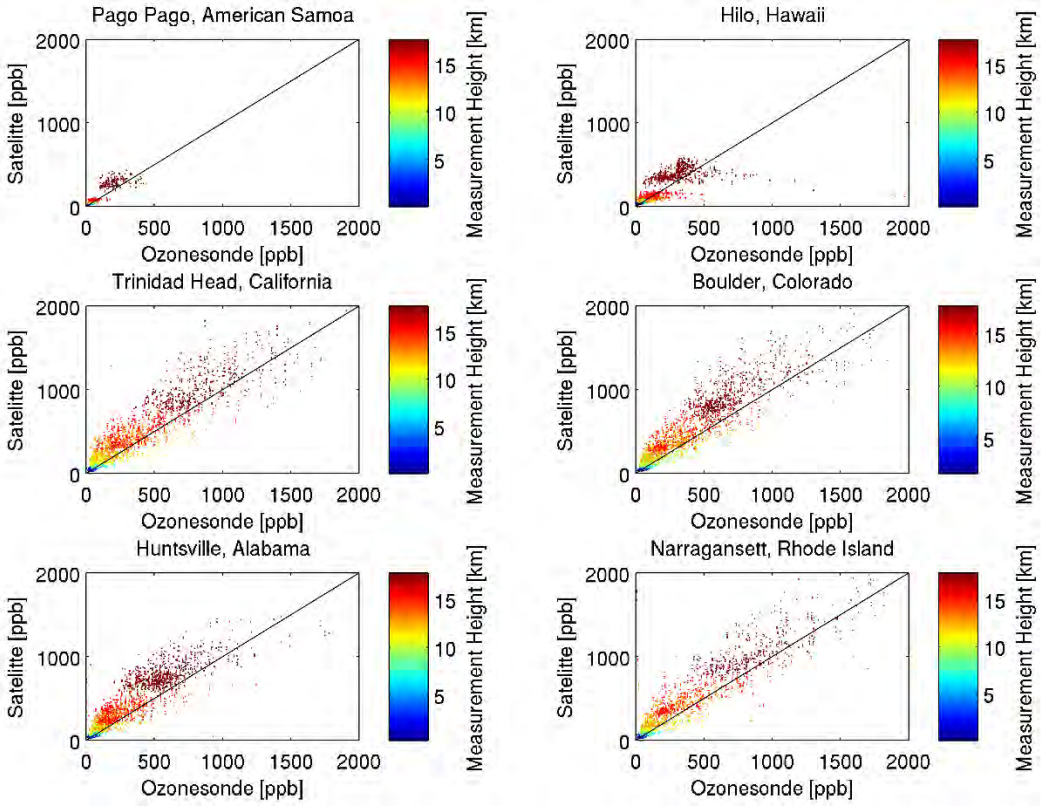

Figure V-5-30

Comparison of Ozonesonde and Satellite Data Taken at Corresponding Locations and Times

Satellite measurements were averaged within three geographical regions (Figure V-5-31). All samples with centers of their 13km x 24km resolution measurements lying inside each of the three geographical regions were considered. "Western Background" and "Eastern Background" comprise two large areas southwest of San Nicolas Island over the Pacific Ocean. Prevailing winds with a large westerly component entering the Basin minimize the influence from SoCAB emissions within the "Western Background" and "Eastern Background" regions. A similar yearly trend in ozone levels within each of these regions further asserts that concentrations are not appreciably influenced from local sources. A third region covering the SoCAB termed "Polluted" was also investigated to further validate the methodology. This region should not be compared to measurements at monitoring stations as many of the satellite measurements sample areas in remote regions of the SoCAB.

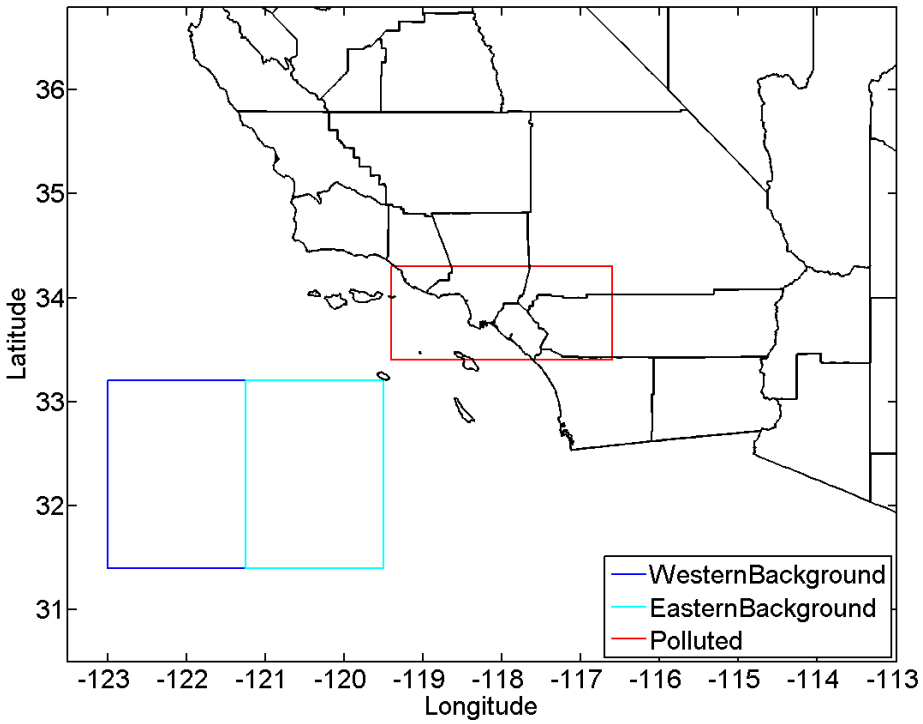

Figure V-5-31

Geographical Regions Investigated to Observe Multi-year Trends in Satellite-based Tropospheric Ozone Levels

Results

Satellite ozone measurements, calibrated with ozonesonde measurements, within each of the three regions investigated were averaged on a yearly basis (Figure V-5-32). Only data from the lowest height bin was used. One should exercise caution in drawing conclusions from the quantitative surface ozone measurements, however, we are confident that long-term trends in the data are grounded in reality. The satellite measurements in the lowest bin are not technically surface measurements as the top of the lowest bin can be on the order of 3000 m in altitude.

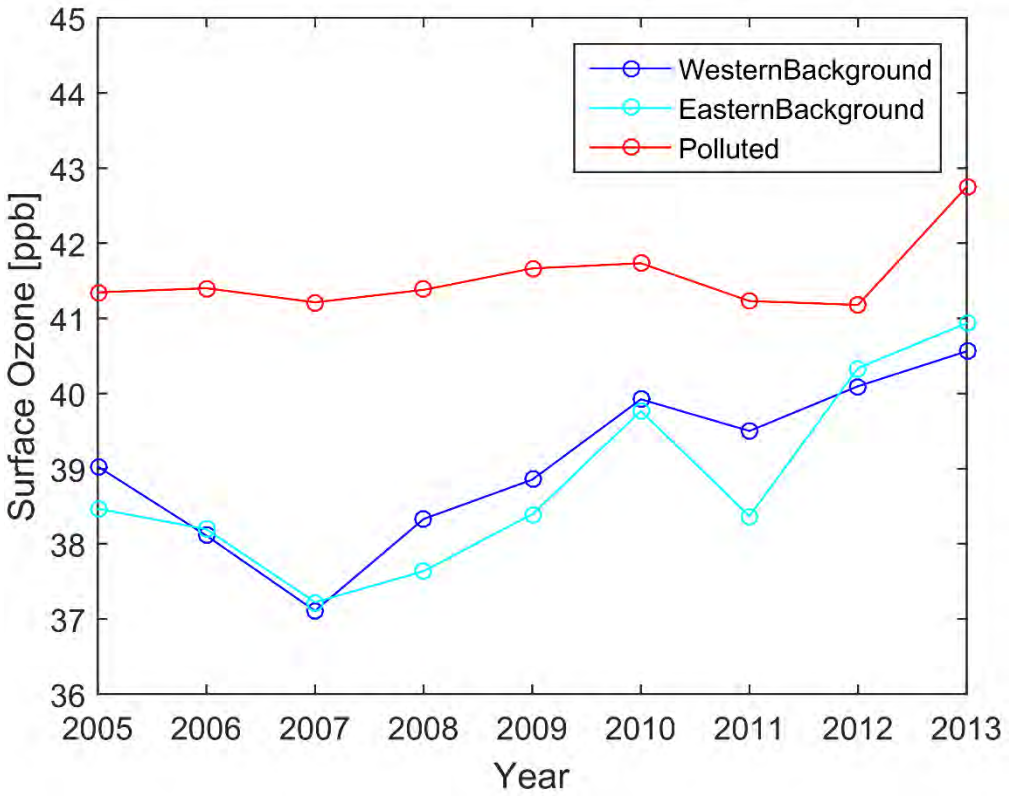

Figure V-5-32

Yearly Averaged Satellite Ozone Measurements within the Lowest Layer

Background ozone concentrations entering the SoCAB have increased between 2005 and 2013 at an average rate of approximately 0.25 ppb per year. As is expected, concentrations over polluted regions are larger than the concentrations in the background regions.

This long-term increase in background concentrations is also evident in the surface measurement station data. Basin design values have decreased significantly since 1980 (Figure V-5-33).



Figure V-5-33

Trend in 3-year Averaged 8-hr Ozone Basin Design Value

However, investigation of histograms (Figure V-5-34) detailing half-decadal changes in average daily maximum 8-hr ozone distributions reveals that concentrations have not decreased uniformly on all days. Figure V-5-34Figure reveals that the percent of days exceeding the 2008 NAAQS 8-hr Federal Standard of 75 ppb has decreased significantly since 1980 when looking at all surface measurement stations in the SoCAB. On the other hand, the frequency of extremely clean days has decreased in the past few decades, further suggesting that background concentrations have increased. An identical trend is observed when separating the measurements into western basin, central basin, and eastern basin categories.

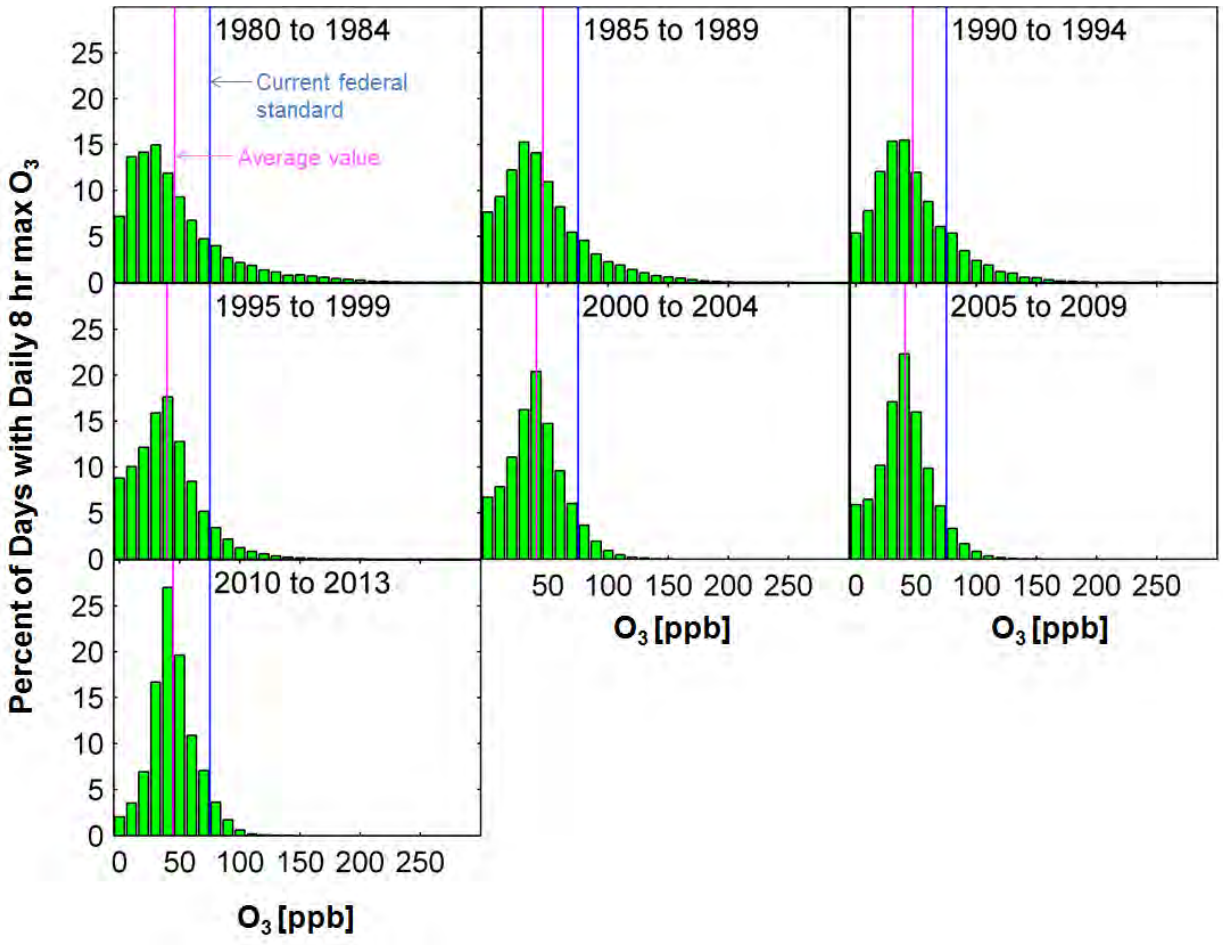

Figure V-5-34

Half-decadal Histograms Detailing the Percent of Days with Each Specific 8-hour Maximum Daily Ozone Value

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CHAPTER 6

ANNUAL PM2.5 ATTAINMENT DEMONSTRATION

Introduction

Annual PM2.5 Modeling Approach

Performance Evaluation

Annual PM2.5

Future Annual PM2.5 Air Quality

Unmonitored Area Analysis

Summary and Control Strategy Choices

References

Introduction

On April 15, 2015, the South Coast Air Basin was designated a 'moderate' non-attainment area for the 2012 annual PM2.5 standard of 12 µg/m3. This designation sets an attainment deadline of December 31, 2021, based on CAA subpart 4, which establishes that attainment must be reached by the end of the 6th calendar year after the effective date of designation. Acknowledging the challenges in meeting the standard, including the feasibility of proposed measures, uncertainties in drought conditions, and the potential inability to credit all ozone strategy reductions towards PM2.5 attainment if approved under CAA Section 182(e)(5), SCAQMD will request a voluntary bump-up to the "serious" classification, with a new attainment date of 2025. Future year attainment was analyzed for 2021, the original target for "moderate" nonattainment, and 2025, the revised attainment date for the requested "serious" status.

The 2012 AQMP demonstrated attainment of the 15 µg/m3 1997 standard as well as the 24-hour standard of 35 µg/m3. As a part of a multi-pollutant integrated plan, the 2016 AQMP demonstrates attainment of the federal annual PM2.5 standard of 12 µg/m3 using the new modeling platform and emissions inventory. This demonstration shows that the 2016 AQMP control strategy will continue to move air quality levels expeditiously towards attainment of the federal standards.

PM2.5 FRM Sampling

The SCAQMD maintains a sampling network of Federal Reference Method (FRM) PM2.5 monitors at 20 sites throughout the Basin and Coachella Valley. This network is supplemented by Federal Equivalent Method (FEM) continuous PM2.5 monitors at a subset of these locations to report real-time data to the public and to feed for forecasting algorithms. The FRM samplers are designated as the primary data to determine attainment status, therefore, FRM data is used for design value calculations and the attainment demonstration. U.S. EPA has granted SCAQMD a waiver from using the continuous PM2.5 monitors for regulatory/attainment determination purposes, since they do not meet the accuracy requirements to be considered federal equivalent method (FEM) measurements.

Speciated PM2.5 Sampling

The District adopted a Multi-Channel Fine Particulate (MCFP) sampling system for the PTEP monitoring program in 1995, and the TEP 2000 program in 1998-1999. New PM samplers, speciated air sampling system (SASS) samplers, were deployed at four sites in the Basin. The SASS sampler collects PM2.5 particles on 47mm quartz and Teflon filters simultaneously within the same sampler continuously for 24-hours for subsequent laboratory chemical analysis. Samples were originally collected one out of every six days.

PM2.5 speciation data, measured as individual species at the four sites in the District air-monitoring network during 2012, provided the PM2.5 chemical characterization for evaluation and validation of the CMAQ annual and episodic modeling. The four sites include Riverside-Rubidoux, Fontana, Anaheim and Central Los Angeles (Figure V-6-1). These four sites represent each county that the monitor is located in. The Riverside-Rubidoux used to have the highest concentration in the Basin until the Mira Loma site established in 2006 showed higher PM concentrations. Mira Loma does not include speciation sampling, but its proximity to Rubidoux and common airflow and transport patterns enables the use of the Rubidoux speciation data to represent particulate speciation at Mira Loma. Both sites are directly downwind of the dairy production areas of Chino and the warehouse distribution centers located in the northwestern corner of Riverside County. PM2.5 mass, ions, organic and elemental carbon, and metals, for a total of 43 chemical species, were analyzed from a one-in-six day sampling schedule at the 4 sites.

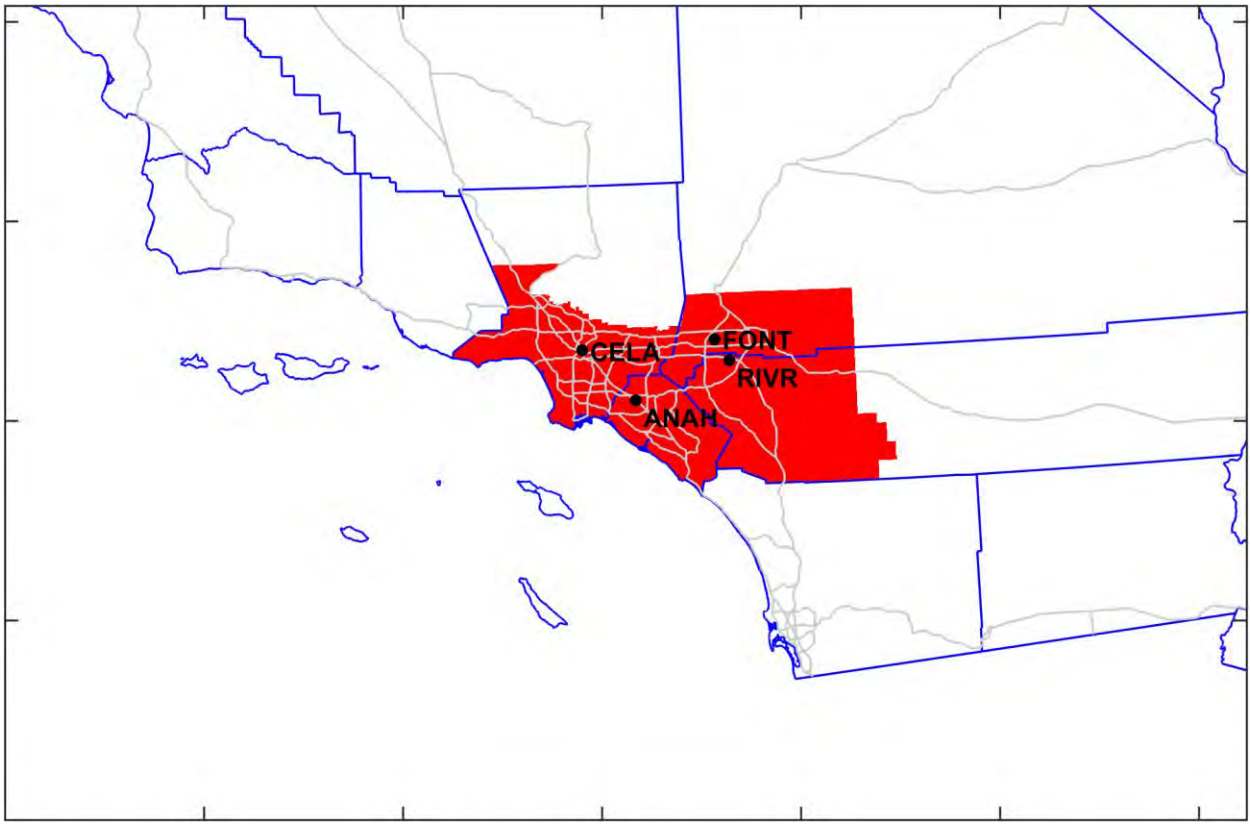

FIGURE V-6-1

SASS Sampling Sites in the Basin

PM2.5 speciation data measured by the SASS samplers are used to derive the species fractions required for the PM2.5 attainment demonstration methodology. U.S. EPA's PM2.5 modeling guidance recommends calculating future year PM2.5 design values by multiplying quarterly, species specific RRFs with the base year speciated design values for each quarter for each monitoring site. Base year design values are determined from the FRM mass data, however the FRM filters are not chemically speciated. Therefore, the guidance document recommends multiplying the species fractions that are measured in a speciation sampler such as the SASS to the FRM mass data to derive chemically speciated design values for the FRM data. In the following sections, 24-hour and annual average species concentrations measured by the SASS sampler are summarized and the chemically speciated FRM data are derived for the future year design value calculations.

Annual PM2.5 Modeling Approach

The Final 2016 AQMP annual PM2.5 modeling employs the same approach to estimate the future year annual PM2.5 levels as was described in the 2012 and 2007 AQMP attainment demonstrations, except for the introduction of minor updates recommended in the 2014 U.S. EPA guidance document (U.S. EPA, 2014). The site and species specific RRF approach is consistent to the previous AQMPs. A five-year weighted quarterly average from the 2010 to 2014 period was established as the 2012 design value. Four SASS sites and Mira Loma, the design site of the Basin, were used in the analysis.

The modeling platform developed for the ozone attainment demonstration was extended to the entire year to acquire quarterly average RRFs. A day-specific emissions inventory was developed to reflect the temperature and relative humidity dependency of mobile sources and biogenic emissions. Also, seasonal fuel switching and the resulting emission rates were incorporated in the modeling inventory.

In addition to the base year (2012), future milestone years simulated under this plan were 2021 and 2025, with the former being the target attainment year for a 'moderate' non-attainment area and the latter for a 'serious' non-attainment area. Both baseline and control scenarios were simulated for each of the future years. CMAQ output was averaged over the 3X3 grid around each monitoring station per the latest EPA guidance, differing from the single-cell strategy used in the 2012 AQMP. In contrast, the 24-hour PM2.5 attainment demonstration requires a single cell retrieval.

The five-year design values based on the FRM method are listed in Table V-6-1. These are calculated according to the following steps; 1) quarterly average of the FRM mass, 2) annual average from the quarterly averages, 3) average of a three-year period centered at 2011, 2012 and 2013, respectively, and lastly 4) average of the three, overlapping three-year periods.

The future year design values reflect the weighted quarterly average concentration calculated from the projections of five years of days. Once site- and species-specific RRFs are calculated from CMAQ simulations, they are applied to the quarterly average design values which are averaged for the period of 2010 to 2014 using the 5-year weighted average approach. The average of the quarterly species-specific projections is the future design value.

TABLE V-6-1

Five-Year Weighted Annual PM2.5 Design Values for 2012 (µg/m^3)

Monitoring Site	Annual
Anaheim	10.6
Los Angeles	12.4
Fontana	12.6
Mira Loma	14.9
Rubidoux	13.2

Performance Evaluation

EPA guidance assesses model performance on the ability to predict both PM2.5 component species concentrations and the total mass. No specific performance criteria thresholds are recommended in EPA's modeling guidance document. This is because the model uses relative response factors rather than direct predictions to forecast future concentrations. Performance is evaluated by examining key statistics and graphical representations of differences between model-predicted concentrations and observations. The statistics examine model bias and error, while graphical representations of model prediction as a function of time and concentration scatter plots supplement the model performance evaluation. The CMAQ modeling results presented for each station are based on the same "1-cell" basis, as recommended by the guidance.

For the CMAQ performance evaluation, the modeling domain is separated into several sub-regions or zones. Figure V-6-2 depicts the sub-regional zones used for base-year simulation performance. The different zones present unique air quality profiles. The Basin is represented by six zones: "Coastal" zone representing Source Receptor Area (SRA) 2-4 and 18-21, "San Fernando" zone representing SRA 6,7, and 13 within the San Fernando Valley, "Foothills" zone representing SRA 8 and 9, "Urban Source" zone representing SRA 1, 5, 10-12, 16, and 17, "Urban Receptor" zone representing SRA 22-29 and 33-38, and "Coachella Valley" zone representing SRA 30 and 31. The "Urban Receptor" region typically has the highest PM2.5 concentrations in the Basin. Table V-6-2 explicitly lists the station location and their assigned performance evaluation zone.

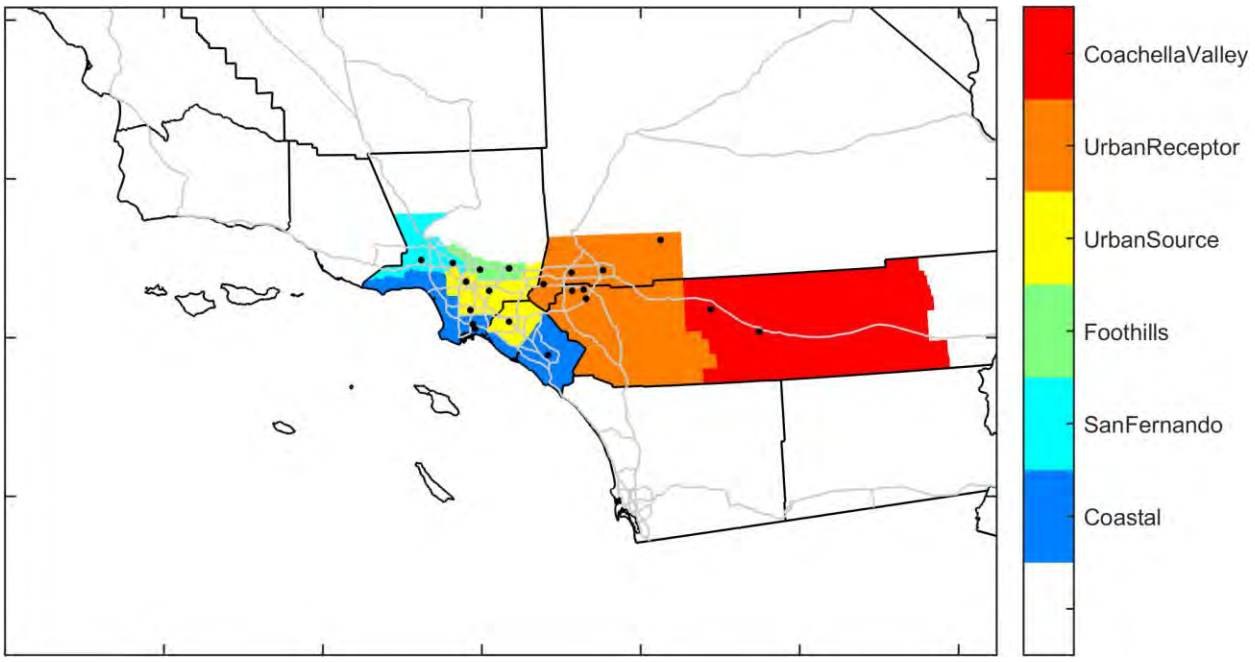

FIGURE V-6-2

Performance Evaluation Zones. Black Dots Indicate the Location of FRM Stations.

Daily predicted and observed PM2.5 concentrations at CELA, ANAH, FONT, MRLM, and RIVR are presented in Figures V-6-3 through V-6-7. While absolute concentrations may differ, the model simulates trends in PM2.5 reasonably well. Both modelled and observed PM2.5 concentrations are more episodic in the 1st and 4th quarter. Concentrations have less day-to-day variation in the 2nd and 3rd quarters at all the 4 sites. This behavior is likely due to differences in meteorology throughout the year. Weather patterns during the first quarter and the second half of the 4th quarter are typically highly variable; precipitation days, cold, high-winds and unstable conditions associated with synoptic scale storms are all commonly experienced during the winter months. On the contrary, spring and summer weather patterns are dominated by high pressure systems, leading to less day-to-day variation in boundary layer heights and wind speeds.

TABLE V-6-2

FRM Stations in the South Coast Air Basin

Station Location	Station Abbreviation	Source Receptor Area (SRA)	Performance Evaluation Zone
Long Beach	LGBH	4	Coastal
Mission Viejo	MSVJ	19	Coastal
South Long Beach	SLBH	4	Coastal
Azusa	AZUS	9	Foothills
Pasadena	PASA	8	Foothills
Burbank	BURK	7	San Fernando
Reseda	RESE	6	San Fernando
Big Bear	BGBR	38	Urban Receptor
Fontana	FONT	34	Urban Receptor
Mira Loma	MRLM	23	Urban Receptor
Ontario	ONFS	33	Urban Receptor
Riverside	RIVR	23	Urban Receptor
Riverside Magnolia	RIVM	23	Urban Receptor
San Bernardino	SNBO	34	Urban Receptor
Anaheim	ANAH	17	Urban Source
Compton	CMPT	12	Urban Source
Los Angeles	CELA	1	Urban Source
Pico Rivera	PICO	11	Urban Source
Indio	INDI	30	Coachella Valley
Palm Springs	PLSP	30	Coachella Valley

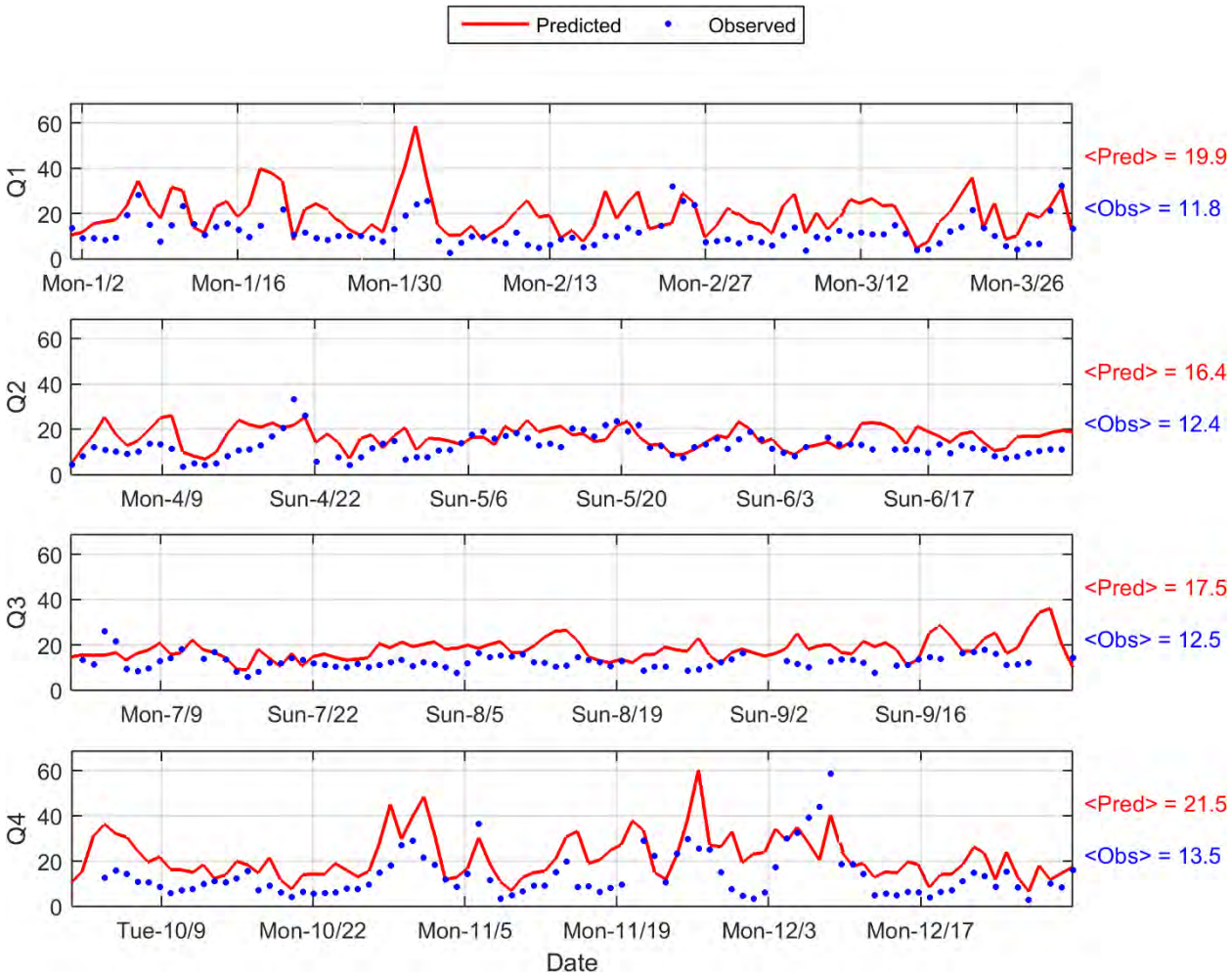

FIGURE V-6-3

2012 Modelled and Measured 24-hour Average PM2.5 Concentrations in Los Angeles

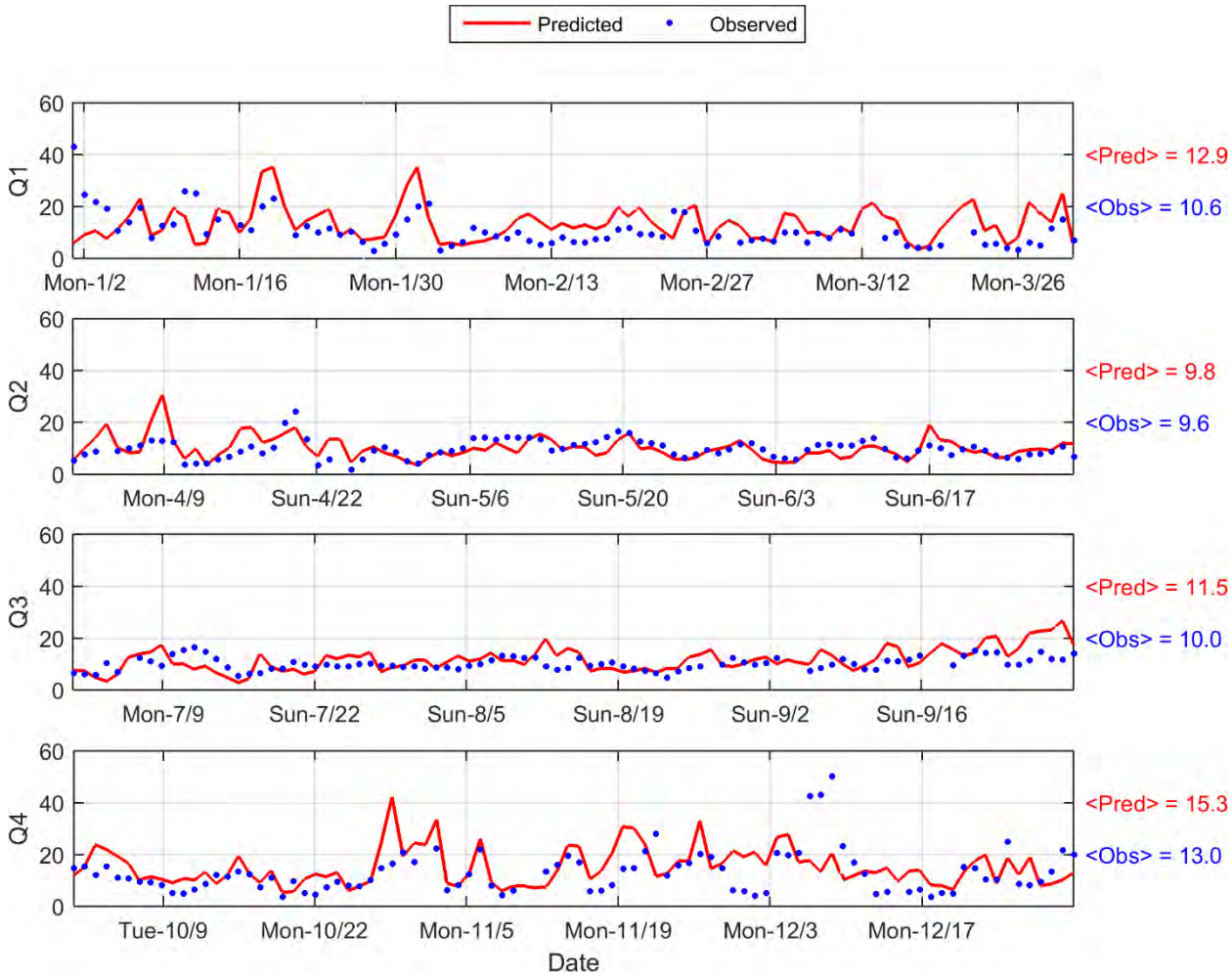

FIGURE V-6-4

2012 Modelled and Measured 24-hour Average PM2.5 Concentrations in Anaheim

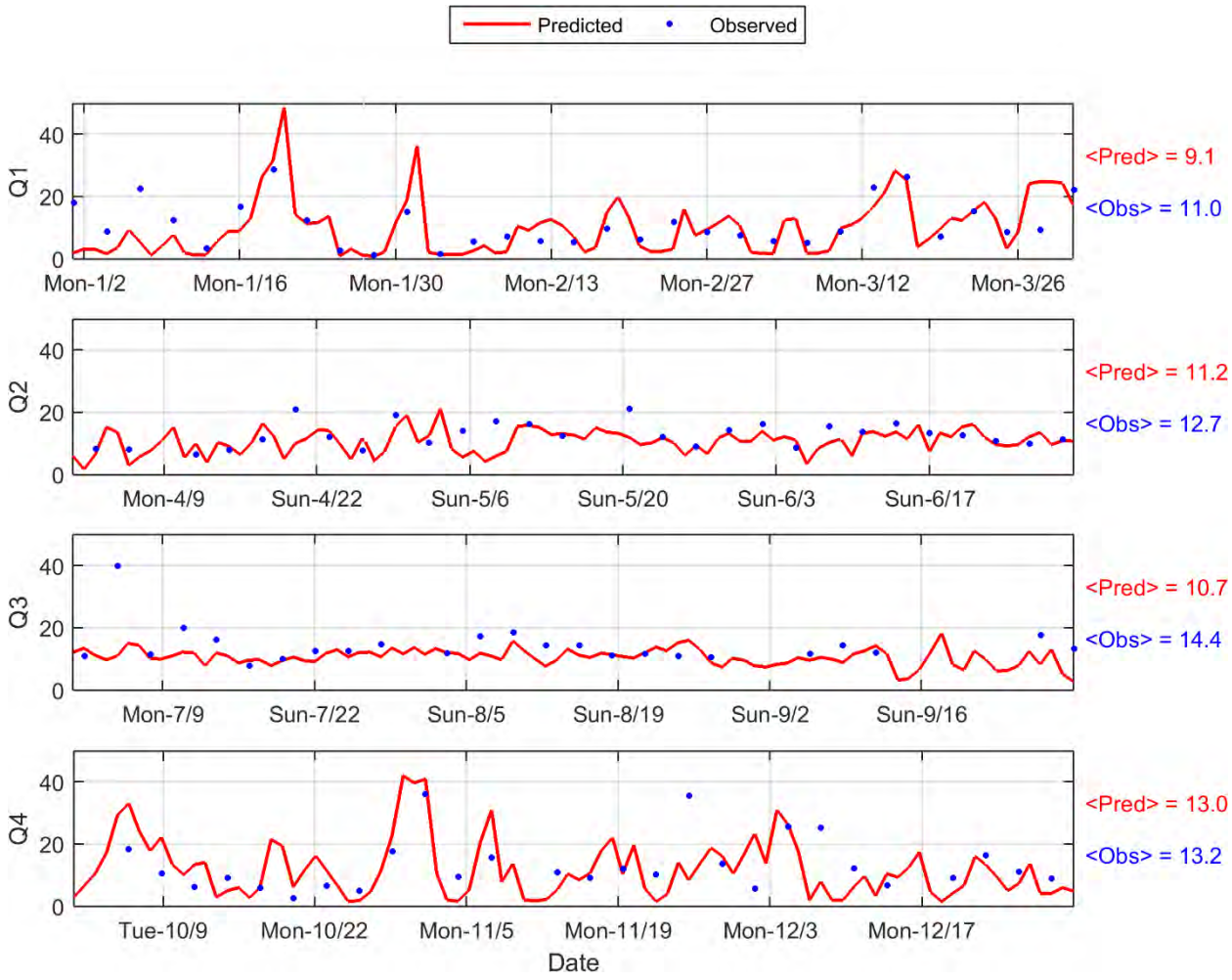

FIGURE V-6-5

2012 Modelled and Measured 24-hour Average PM2.5 Concentrations in Fontana

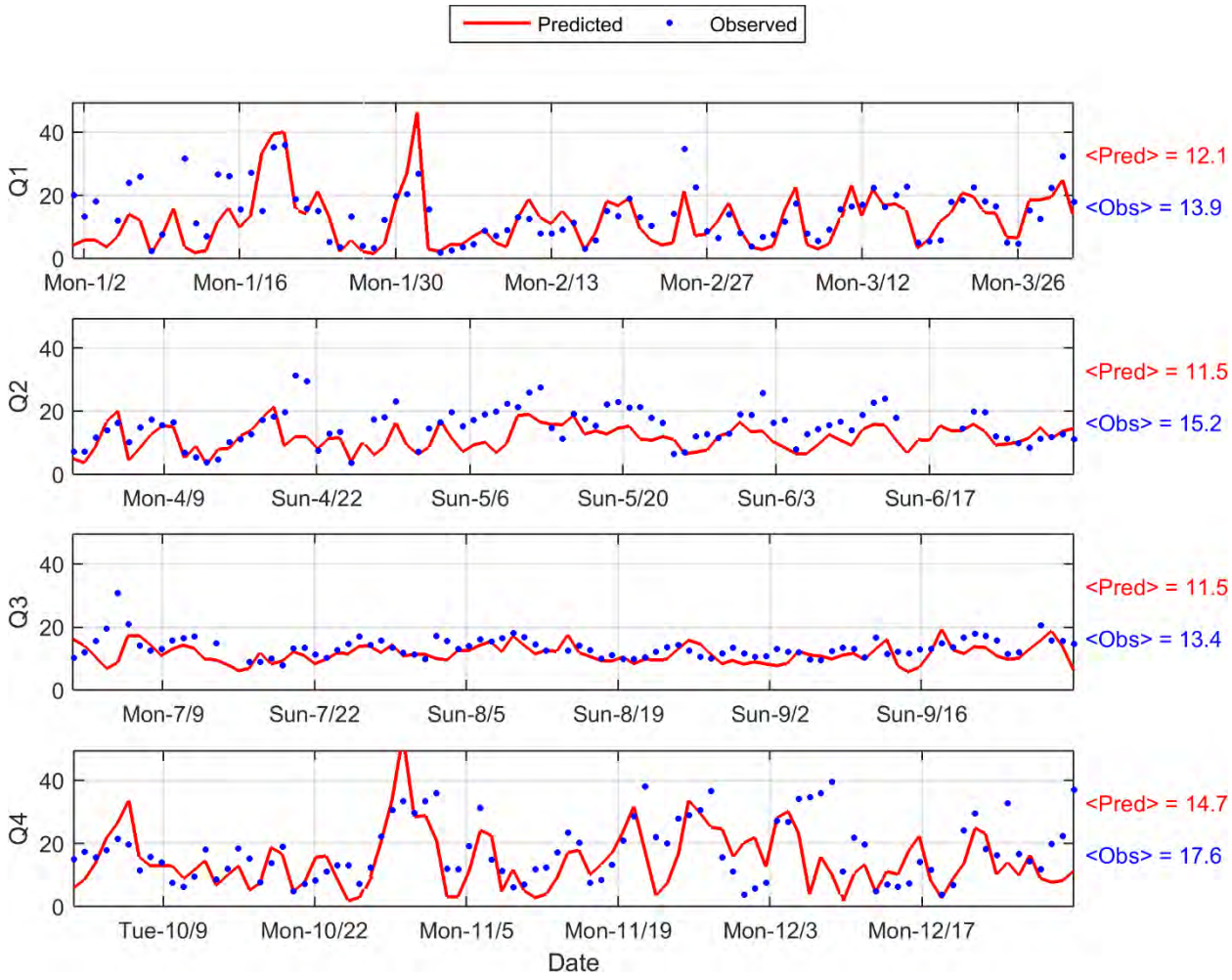

FIGURE V-6-6

2012 Modelled and Measured 24-hour Average PM2.5 Concentrations in Mira Loma

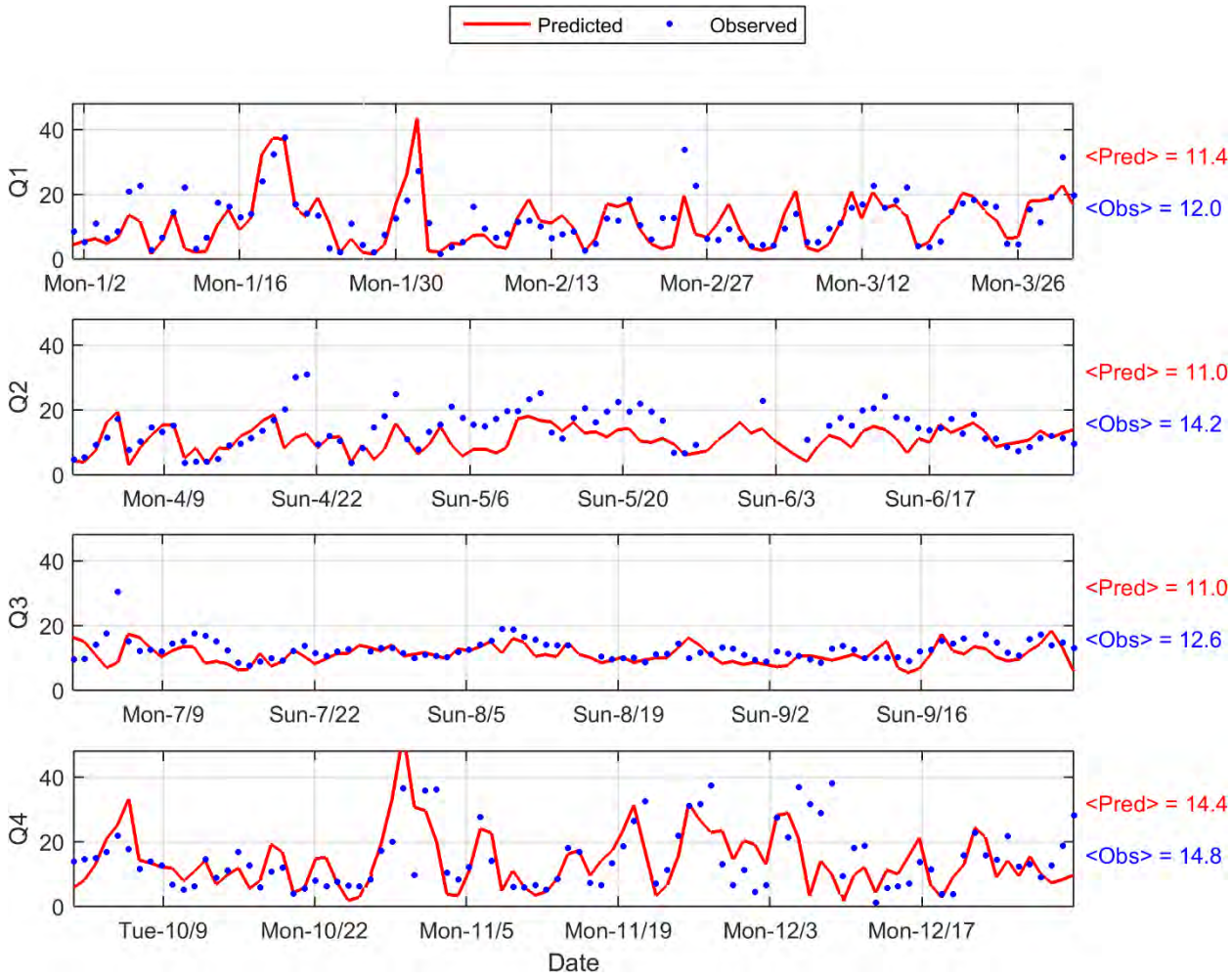

FIGURE V-6-7

2012 Modelled and Measured 24-hour Average PM2.5 Concentrations in Riverside

Scatter plots comparing daily FRM observations and corresponding model predictions for each region are presented in Figure V-6-8.

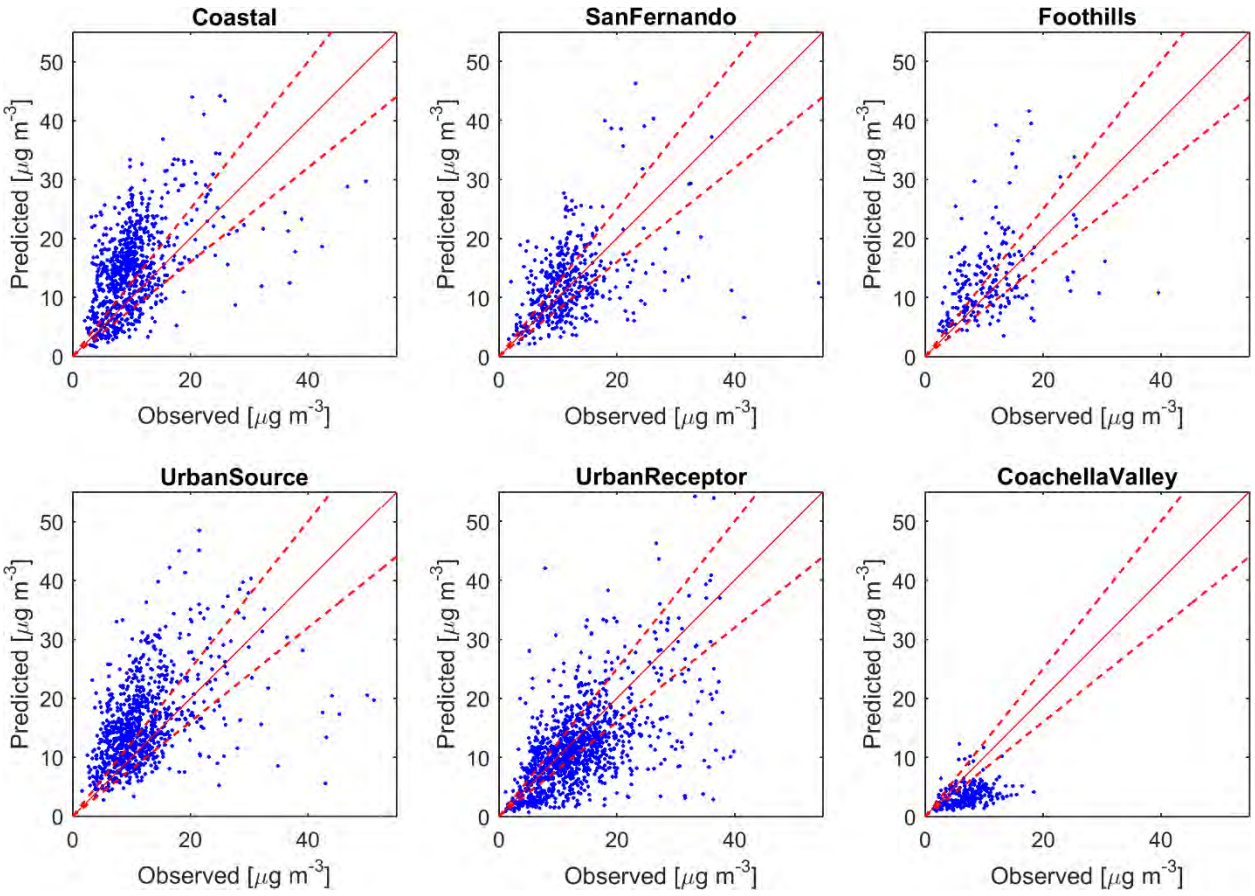

FIGURE V-6-8

2012 Modelled and FRM Measured PM2.5 Comparison for Each Region. Dashed Lines Indicate Agreement within 20 percent.

Statistical Evaluation of Total PM2.5 mass

CMAQ over-predicts total PM2.5 mass in the "Coastal", "Foothills" and "Urban Source" regions. Conversely, PM2.5 concentrations are under-predicted in the "Coachella Valley" region. The "San Fernando", "Urban Receptor" regions, are well represented by CMAQ in the base year. The "Urban Receptor" region typically contains the highest PM2.5 concentrations in the Basin. Statistical measures to evaluate the modeling performance in each geographical zone are provided in Table V-6-3.

The statistics used to evaluate the daily CMAQ PM2.5 performance include the following:

Statistic for PM2.5	Definition
Bias Error	Average of the differences in observed and predicted daily values. Negative values indicate under-prediction. $$BiasError = \frac{1}{N}\sum(Obs - Pred)$$ where "N" is the number of values.
Normalized Bias Error	Average of the quantity: absolute difference in observed and predicted daily values normalized by the observed daily concentration $$NormBiasError = \frac{1}{N}\sum\left(\frac{Obs-Pred}{Obs}\right)\cdot 100$$
Gross Error	Average of the absolute differences in observed and predicted daily values $$GrossError = \frac{1}{N}\sum\lvert Obs - Pred\rvert$$
Normalized Gross Error	Average of the quantity: absolute difference in observed and predicted daily values normalized by the observed daily concentration $$NormGrossError = \frac{1}{N}\sum\left\lvert\frac{Obs-Pred}{Obs}\right\rvert\cdot 100$$

TABLE V-6-3

Quarterly Statistical Analysis of Total PM2.5 Mass for Each of the Six Analysis Zones

Region	Timeframe	Mean Pred. [µg/m^3]	Mean Obs. [µg/m^3]	Bias Error [µg/m^3]	Norm Bias Error [%]	Gross Error [µg/m^3]	Norm Gross Error [%]
Coachella Valley	Q1	3.8	5.3	2	34.8	2.3	40.8
Coachella Valley	Q2	3.1	8.1	5	59.4	5	59.6
Coachella Valley	Q3	3.8	8.9	5.1	55.9	5.1	55.9
Coachella Valley	Q4	4.4	5.9	1.4	16.6	2.3	38
Coachella Valley	**Annual**	**3.8**	**7.1**	**3.4**	**42.1**	**3.7**	**48.7**
Coastal	Q1	14.8	9.9	-6.9	-83.3	8.1	93.6
Coastal	Q2	10.5	9.3	-2.5	-35.7	4.5	54
Coastal	Q3	12.2	9.6	-3.9	-44.1	5.1	56.5
Coastal	Q4	15	11.5	-5.1	-84.9	7.5	95.7
Coastal	**Annual**	**13.1**	**10.1**	**-4.6**	**-61.5**	**6.3**	**74.5**
Foothills	Q1	14	9.4	-4.2	-63	5.8	73
Foothills	Q2	11.7	11.1	-0.9	-21.1	3.8	39
Foothills	Q3	11.8	12.8	1.2	1.7	4.2	30.7
Foothills	Q4	14.6	9.5	-5.2	-71.6	6.8	81.6
Foothills	**Annual**	**13**	**10.7**	**-2.2**	**-37.3**	**5.1**	**55**
SanFernando	Q1	11.5	11.6	-0.3	-12.9	5.3	45.2
SanFernando	Q2	10.5	10.8	-0.5	-12.1	3.6	34.6
SanFernando	Q3	11.4	11.4	-0.6	-9.6	3.2	30.1
SanFernando	Q4	13.2	13.3	-0.4	-28.1	6.6	60.6
SanFernando	**Annual**	**11.6**	**11.7**	**-0.5**	**-15.4**	**4.6**	**42.3**
UrbanReceptor	Q1	10.6	12	0.8	0.3	4.7	41.8
UrbanReceptor	Q2	9.4	13.3	2.6	13.3	4.1	30.2
UrbanReceptor	Q3	9.5	12.8	2.2	13.9	3.2	23.5
UrbanReceptor	Q4	12.5	14.6	0.7	-12.4	6.5	53
UrbanReceptor	**Annual**	**10.5**	**13.2**	**1.6**	**3.5**	**4.6**	**37.4**
UrbanSource	Q1	17.4	11.5	-5.1	-63.2	7.1	72.4
UrbanSource	Q2	12.9	10.9	-2.1	-27.9	3.8	41.1
UrbanSource	Q3	13.9	11	-3	-31	4.4	42.4
UrbanSource	Q4	18.6	13.4	-5.1	-71.5	8	81.6
UrbanSource	**Annual**	**15.7**	**11.7**	**-3.8**	**-48.5**	**5.9**	**59.5**

Model performance in the "Urban Receptor" region consistently outperforms the five other regions exhibiting the smallest normalized bias and normalized gross error for the annual analysis. Model performance in the "Urban Receptor" region is also strong when evaluating statistics on a quarterly basis. It is important to model this region accurately, as it contains the stations with the highest PM2.5 concentrations in the Basin.

Model Performance of Speciated PM2.5 Predictions

Figures V-6-9 through V-6-12 compare predicted and observed particulate sulfate, nitrate, elemental carbon, and organic carbon concentrations for the four stations where speciation data are available (ANAH, CELA, FONT, and RIVR).

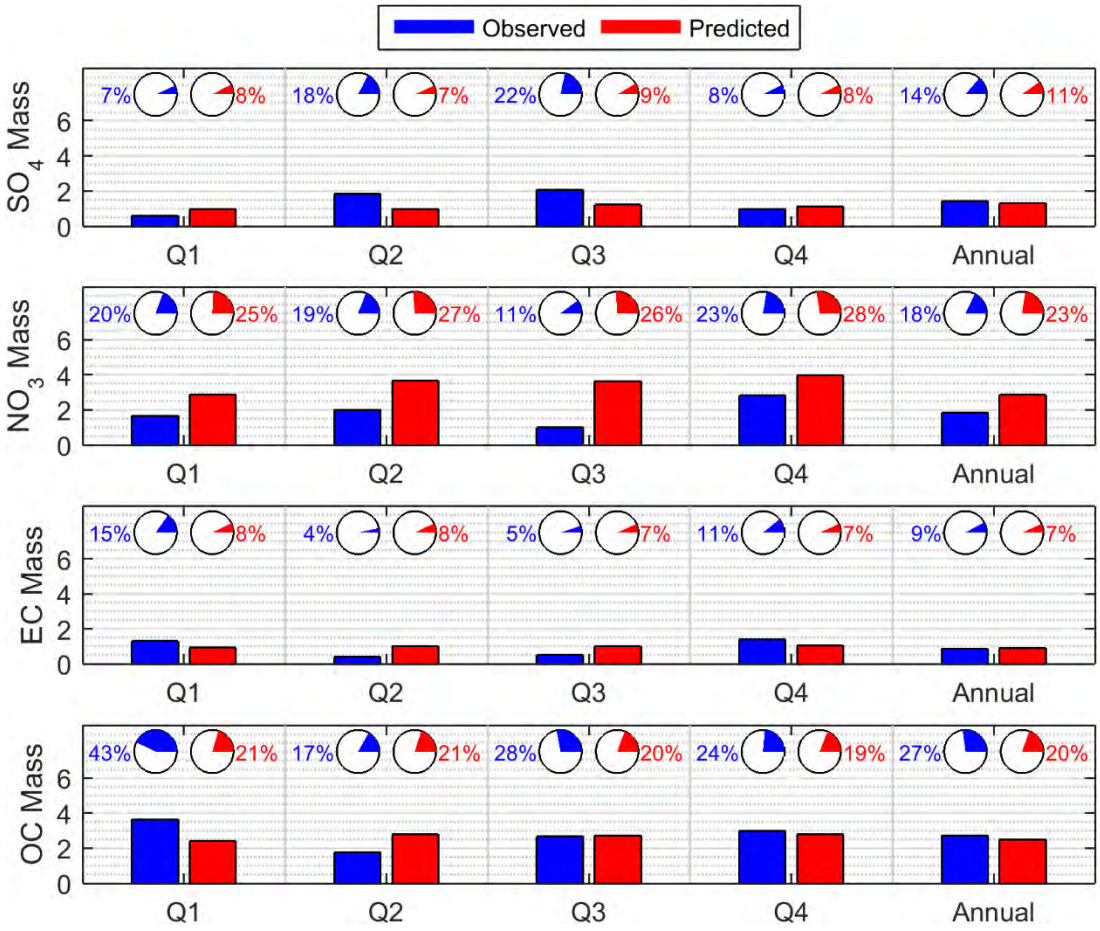

FIGURE V-6-9

2012 Modelled and Measured PM2.5 Speciation in Anaheim. Bars Indicate the Absolute PM2.5 Concentration of Each Species in µg/m^3. Pie Charts Represent the Species Fraction.

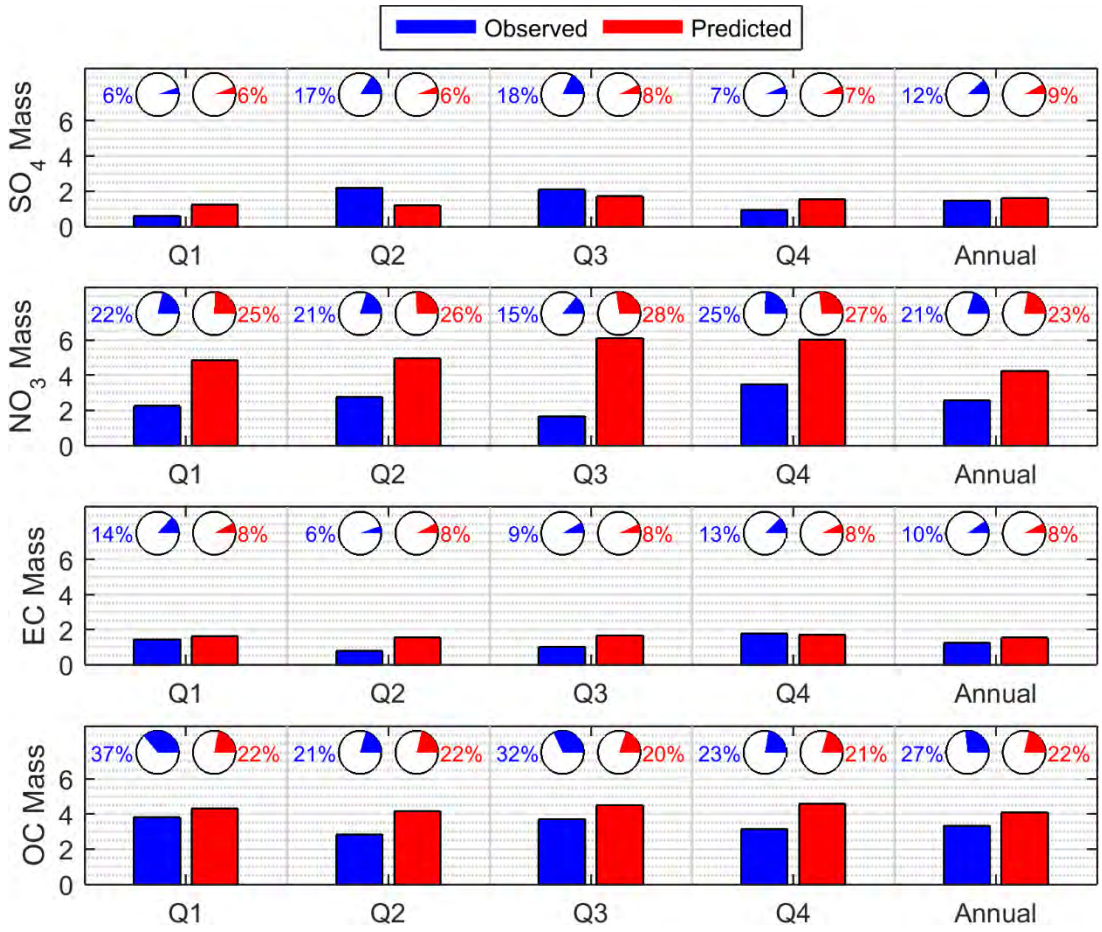

FIGURE V-6-10

2012 Modelled and Measured PM2.5 Speciation in Los Angeles. Bars Indicate the Absolute PM2.5 Concentration of Each Species in µg/m^3. Pie Charts Represent the Species Fraction.

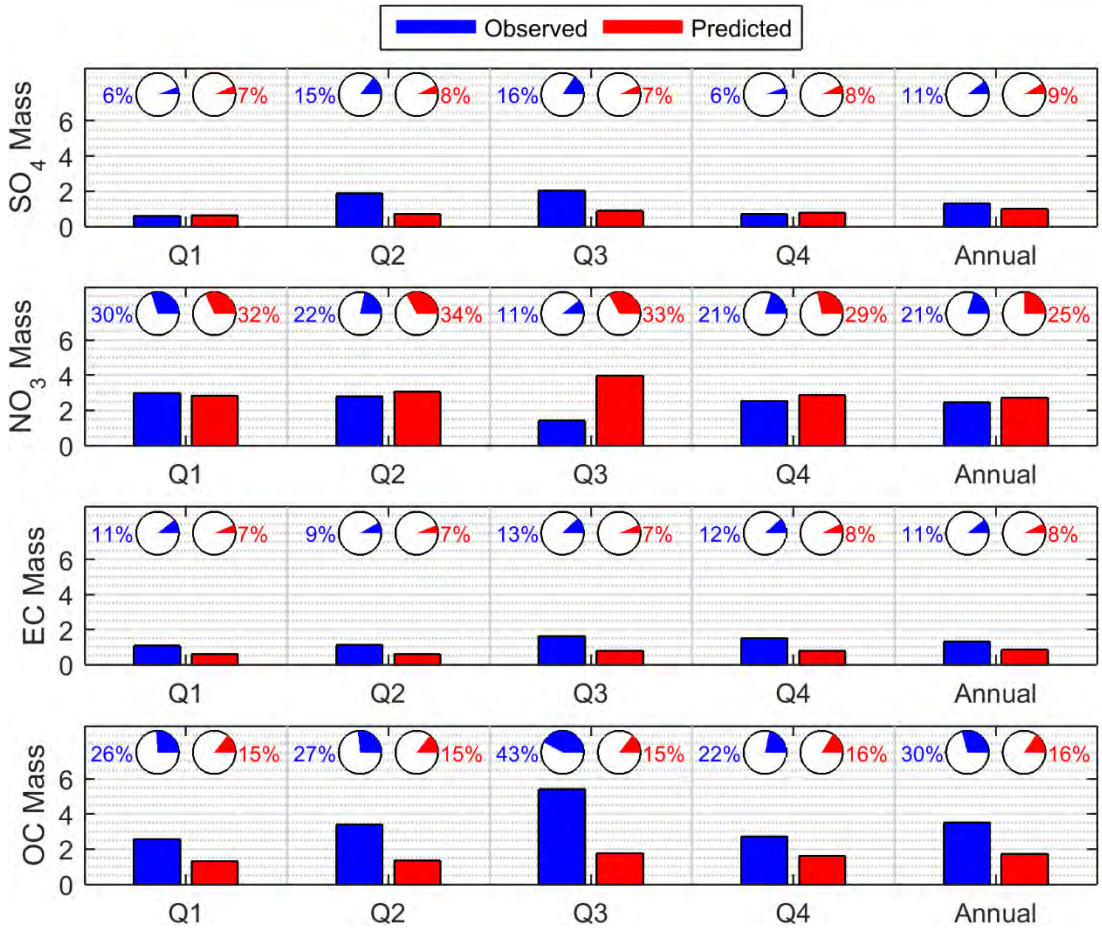

FIGURE V-6-11

2012 Modelled and Measured PM2.5 Speciation in Fontana. Bars Indicate the Absolute PM2.5 Concentration of Each Species in µg/m^3. Pie Charts Represent the Species Fraction.

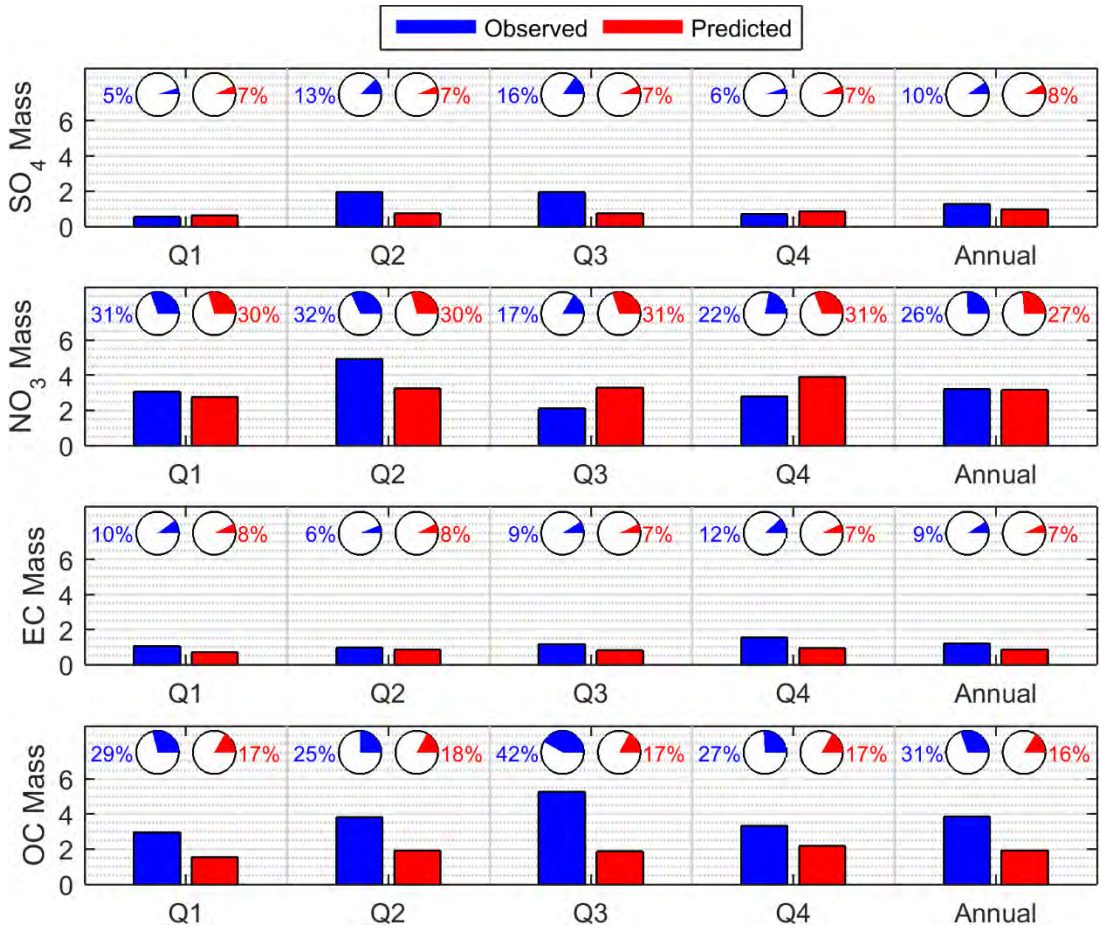

FIGURE V-6-12

2012 Modelled and Measured PM2.5 Speciation in Riverside. Bars Indicate the Absolute PM2.5 Concentration of Each Species in µg/m^3. Pie Charts Represent the Species Fraction.

Nitrate fractions and total nitrate are in general, slightly overestimated by the model. Large differences are exhibited in the third and fourth quarters of the year. One of the largest model uncertainties results from the prediction of boundary layer heights. Inaccuracies in boundary layer height predictions can lead to significant over or under-predictions of concentration. However, comparison of nitrate fraction removes this uncertainty as nitrate concentrations are normalized by the total PM2.5 concentration.

CMAQ predicts EC fractions well, with only slight differences in predicted and observed fractions. Unlike nitrate and sulfate fractions, there is no discernable temporal variation in accuracy.

Both the fraction of sulfate in the particulate mass and the total sulfate mass are represented well in the first and fourth quarters of the year at all stations. However, the model fails to accurately represent the increased sulfate fraction and elevated concentrations typically experienced in the second and third quarters. Figure V-6-13 shows daily differences in modelled and observed sulfate concentrations for each of the monitoring stations with speciation data. Larger under-predictions occur during the spring and summer at each location.

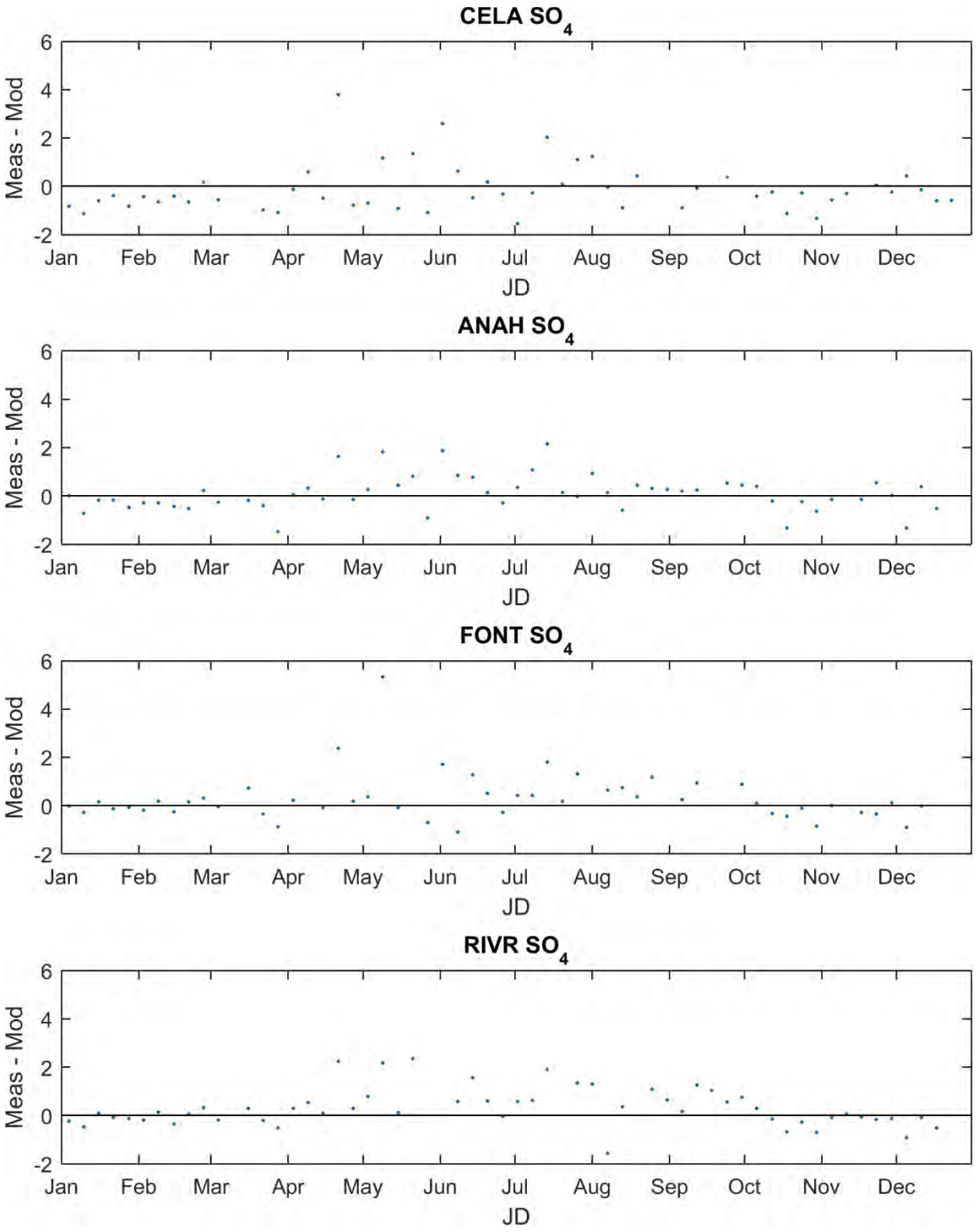

FIGURE V-6-13

2012 Differences in Modelled and Measured SO4 Mass.

Particulate sulfate formation is driven by hydroxyl radical concentrations and aqueous chemistry. The variation of hydroxyl radical concentration with season is well-characterized. Therefore, the modelled and observed dependence of sulfate fraction on water vapor mixing ratio was compared. Figures V-6-14 through V-6-17 illustrate the dependence of water mixing ratio on the sulfate fraction at each of the four measurement stations with speciation measurements.

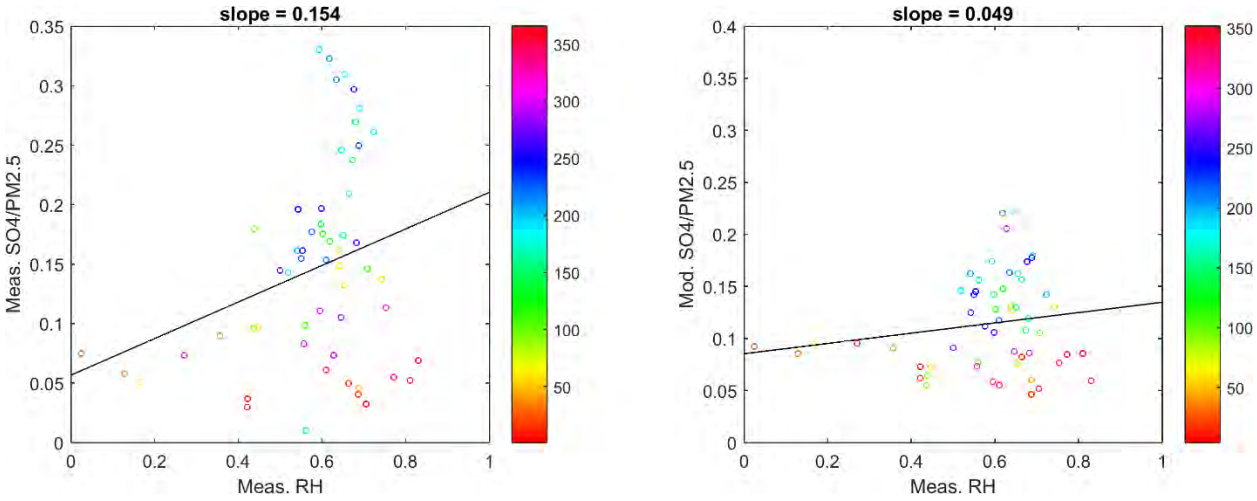

FIGURE V-6-14

2012 modelled and measured sulfate fraction dependence on water mixing ratio. Sulfate fractions are observed/modelled in Anaheim (ANAH). Water mixing ratios are observed/modelled at a nearby meteorological station in Fullerton (FUL). Modelled data points correspond to the days that measurements were available.

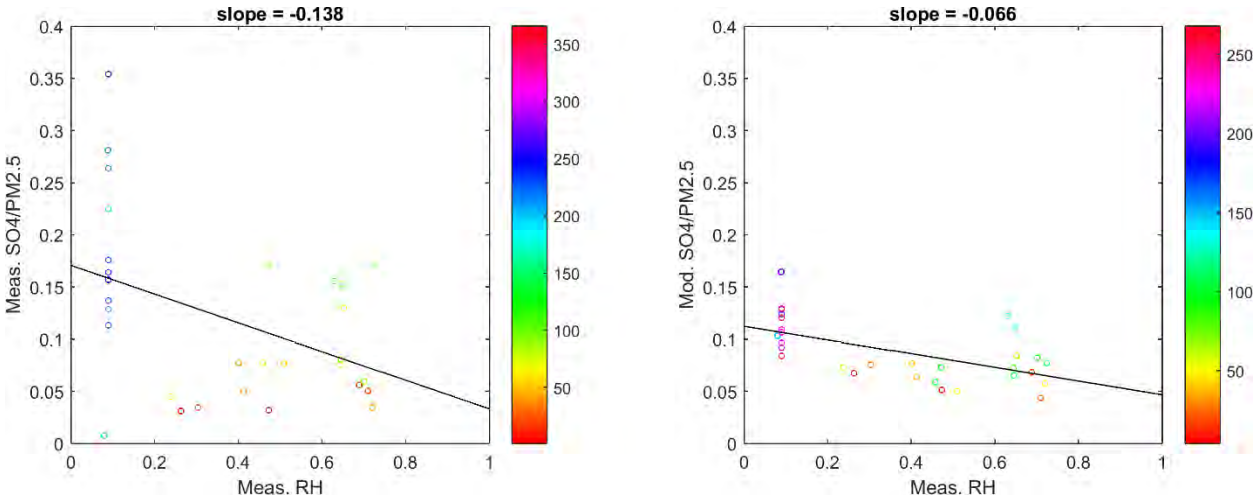

FIGURE V-6-15

2012 modelled and measured sulfate fraction dependence on water mixing ratio. Sulfate fractions are observed/modelled in Los Angeles (CELA). Water mixing ratios are observed/modelled at a representative meteorological station in Fullerton (FUL). Modelled data points correspond to the days that measurements were available.

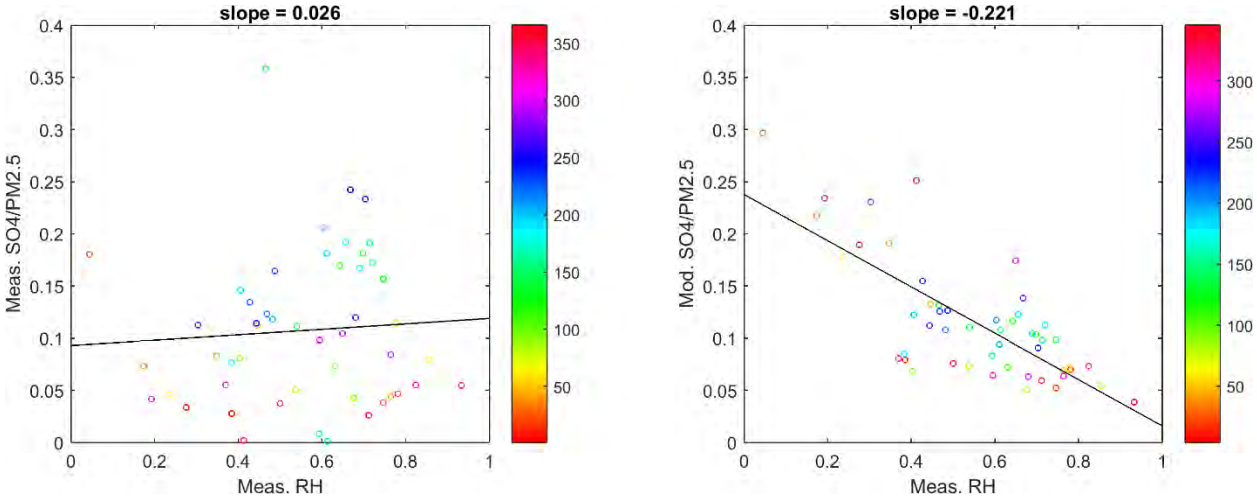

FIGURE V-6-16

2012 modelled and measured sulfate fraction dependence on water mixing ratio. Sulfate fractions are observed/modelled in Fontana (FONT). Water mixing ratios are observed/modelled at a nearby meteorological station in Ontario (ONT). Modelled data points correspond to the days that measurements were available.

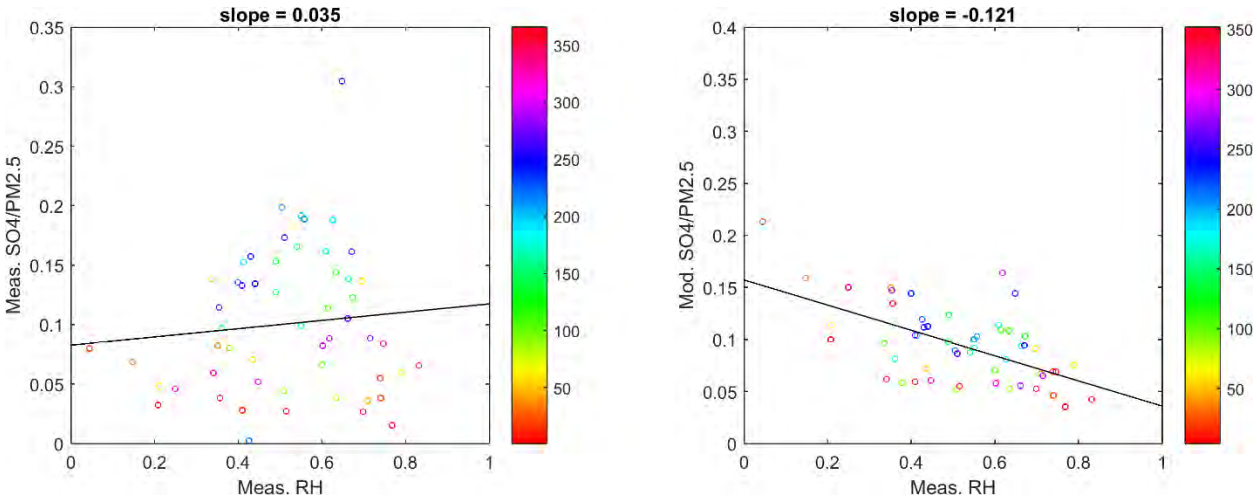

FIGURE V-6-17

2012 modelled and measured sulfate fraction dependence on water mixing ratio. Sulfate fractions are observed/modelled in Riverside (RIVR). Water mixing ratios are observed/modelled at a nearby meteorological station in Riverside (RAL). Modelled data points correspond to the days that measurements were available.

According to the observations, sulfate fraction is a strong function of the water mixing ratio at all four stations with slopes ranging from 0.014 to 0.021 kg g-1. However, modelled values exhibit a much weaker dependence. Since higher water mixing ratios occur in the spring and summer months, the model underestimates sulfate fraction during the second and third quarter. A comparison of modeled sulfate fractions and measured water mixing ratio also exhibits a weak dependence (not pictured). Therefore sulfate underestimation may be in part due to an inadequate capture of aqueous sulfate formation processes and not uncertainties in water mixing ratio predictions.

The absence of dimethyl sulfide emissions, a large source of biogenic sulfur, in our modelling analysis (DMS) may also contribute to this underestimation. DMS is produced by marine organisms. Transfer across the sea-air interface is dependent on ambient temperature, wind speed, and ambient concentrations of DMS. Once in the atmosphere, DMS is oxidized to form SO2. This process is the most important source of SO2 in the marine atmosphere. SO2 is then oxidized in gaseous or aqueous environments leading to the formation of particulate sulfate. Surface oceanic DMS concentrations are typically higher in spring in summer months when biological productivity is highest. Transport across the sea-air interface and into the atmosphere is also expected to be highest in the spring and summer months when on-shore winds are typically strongest. This unaccounted-for source of sulfate, which is more significant in the spring and summer months, could also explain model underestimation of particulate sulfate during the 2nd and 3rd quarter of the year.

Figure V-6-18 illustrates how sulfate model performance correlates with wind speed, wind direction, and ambient temperature. This figure is consistent with the hypothesis that the absence of oceanic DMS emissions in the model leads to an under-prediction of sulfate. This under-prediction is more significant during periods of strong onshore winds and higher temperatures.

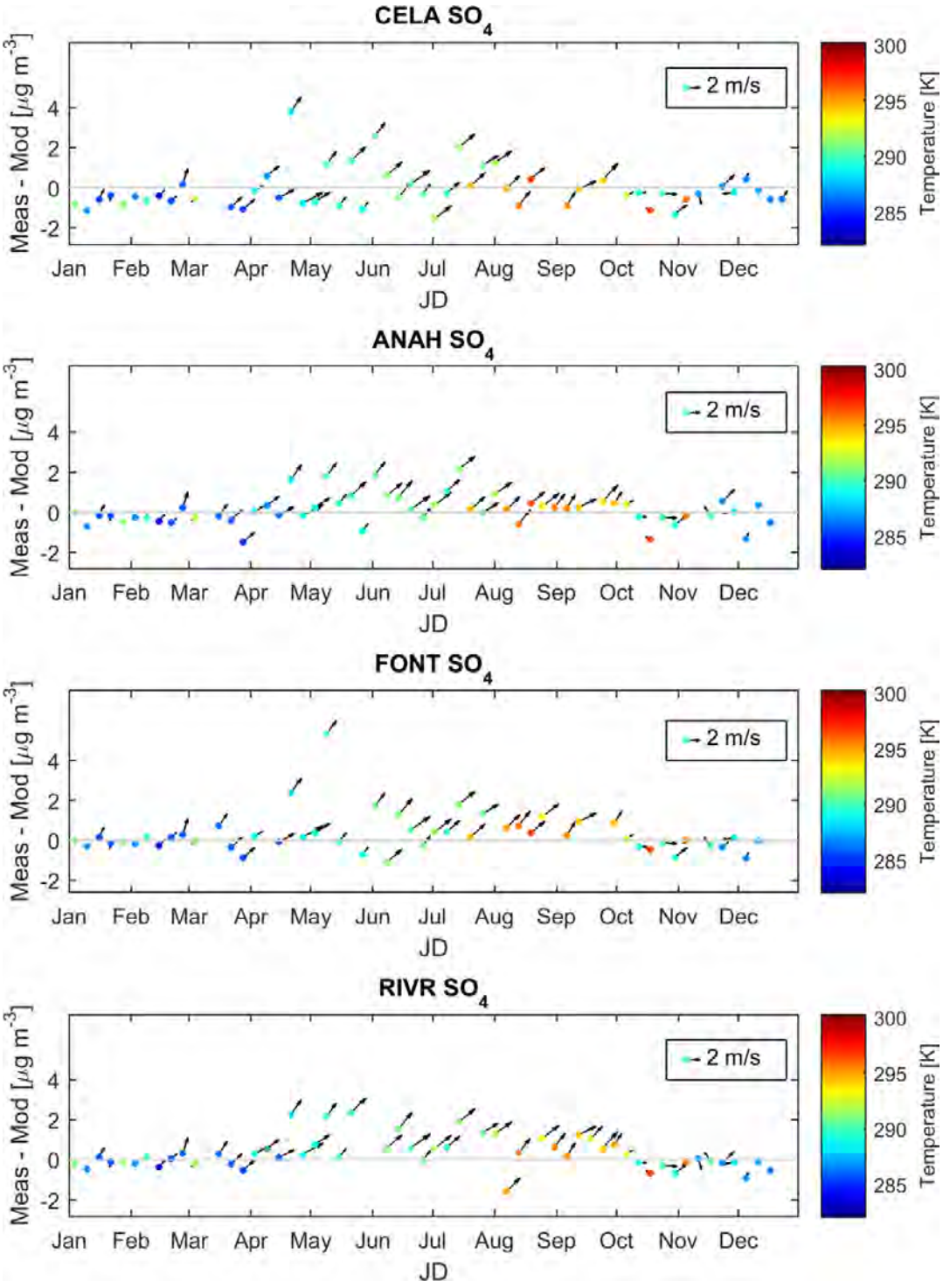

FIGURE V-6-18

PM2.5 sulfate model performance as a function of daily averaged wind speed, wind direction, and temperature at the closest corresponding airport station. Wind vectors indicate the direction that the wind blows from. The legend details the scale of the wind vectors. Colored dots indicate the average daily temperature.

Modelled sulfate is underestimated when the winds are relatively strong and originating from the west-south-west. This is consistent with the hypothesis that DMS from oceanic sources (west-south-west of the Basin) is a significant source of PM2.5 sulfate that is not captured sufficiently in the model.

The organic carbon fraction is underestimated in CMAQ. This underestimation is more significant in the inland locations of Fontana and Riverside, especially during the summer months, potentially due to the increased significance of photo-oxidation during transport from urban source regions. Model comparisons with speciation measurements must be evaluated in light of two main caveats: there is uncertainty of the measured organic fraction (calculated from a mass balance approach) that arises from the SANDWICH technique (Frank 2006) and the observed OC concentrations represent the organic compounds that remain on the FRM filter whereas the modeled OC concentrations represent ambient OC. OC typically contains a large semi-volatile fraction, which may evaporate or condense in response to variations in atmospheric conditions. An in-depth analysis of the sources of OC in the SoCAB and Secondary Organic Aerosol (SOA) formation mechanisms are needed to explain the significant model underestimations.

The average speciation profile at the four SASS stations over all quarters indicates that 34 percent of total PM2.5 mass is organic (Figure V-6-19). This organic fraction is consistent with measurements from other researchers using different instruments. This organic mass is comprised of primary organic aerosol (POA) and secondary organic aerosol (SOA). SOA is a significant fraction of the total organic aerosol; 63 percent of the total organic mass in Pasadena during the CalNex campaign was secondary (Hayes, Ortega et al. 2013; See Figure V-6-20) (Parrish 2014). Note that these measurements were of non-refractory PM1 and may differ slightly for PM2.5. However, less than 20 percent of the total OA mass is larger than 1 µm, indicating that the SOA/POA ratio should be similar for PM2.5 and PM1. This indicates that approximately 21 percent of the total PM2.5 mass in the Basin is SOA and approximately 13 percent is POA.

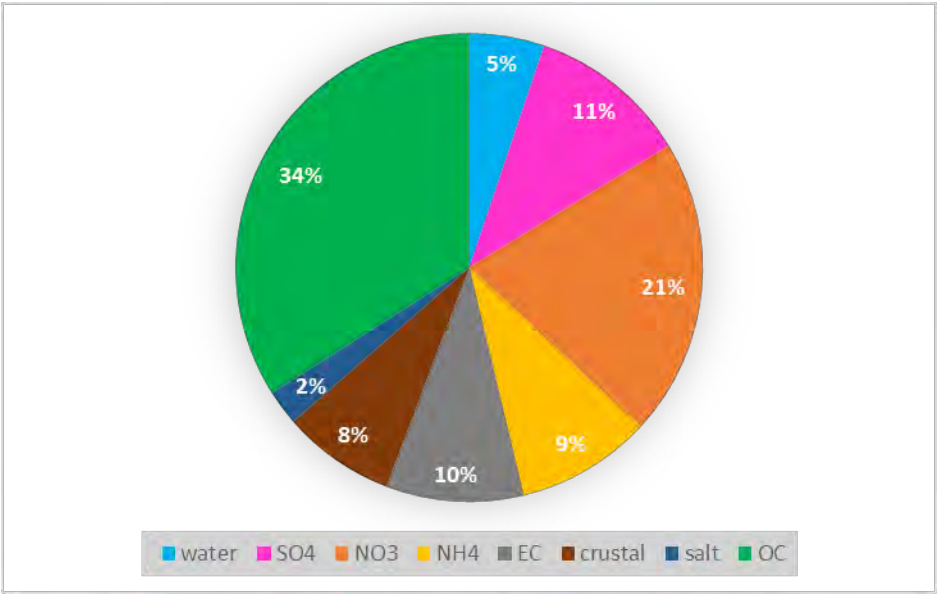

FIGURE V-6-19

Average Speciation Profile of $PM_{2.5}$

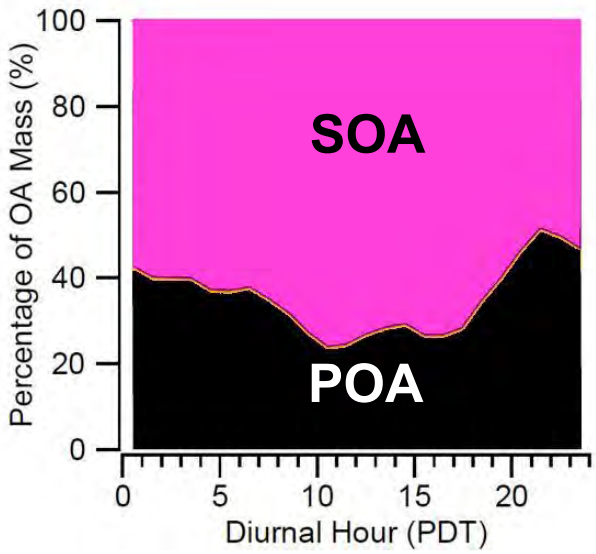

FIGURE V-6-20

Relative contribution of SOA and POA towards total organic aerosol mass in Pasadena in the summer of 2010. Adapted from (Hayes, Ortega et al. 2013)

The recent literature indicates that CMAQ underestimates observed SOA mass in the SoCAB by large factors—in some cases, up to a factor of 25 (Baker, Carlton et al. 2015, Hayes, Carlton et al. 2015). This

severe underestimation can distort prioritization of the most important precursors. While even the most current version of CMAQ does not close this gap, one should be cognizant of the reasons why CMAQ fails to accurately capture both total and secondary organic aerosol mass.

CMAQ SOA Mass Simulation

SOA underestimation may be due to the following factors (Baker, Carlton et al. 2015):

- missing VOC mass in the emission inventory
- poor model characterization of oxidants
- underestimation of SOA formation yields
- missing intermediate volatility organic compound (IVOC) emissions

Recent research has determined that IVOC emissions are an extremely important source of SOA (Figure V-6-21), yet the SOA from these emissions is not captured in CMAQ (Zhao, Hennigan et al. 2014). Certain emission categories are large IVOC sources, suggesting that reduced SOA formation (and lower PM2.5) could be an important co-benefit of controlling these sources.

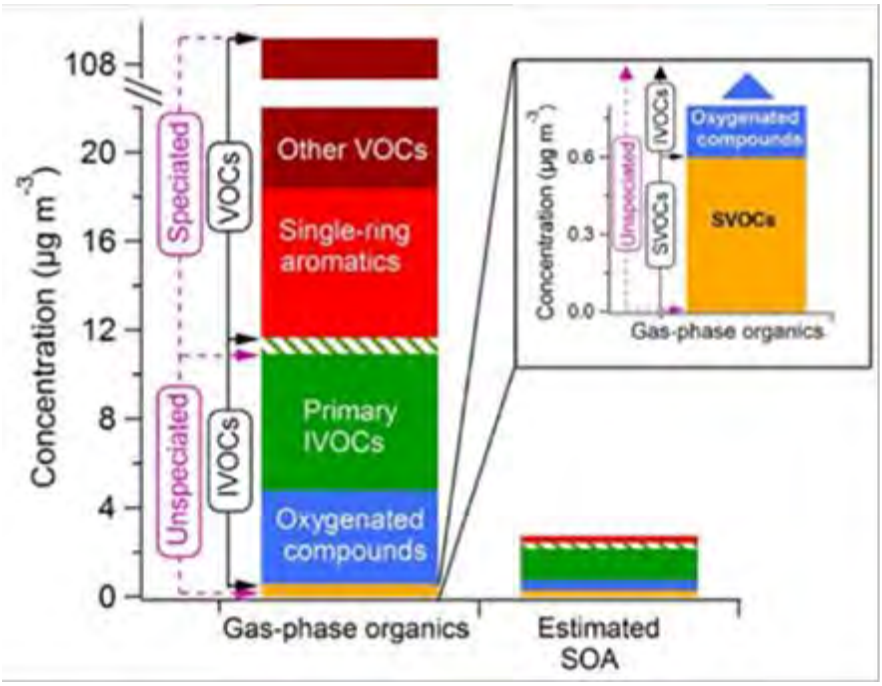

FIGURE V-6-21

Average concentrations of VOCs, IVOCs, and SVOCs and their estimated contribution towards SOA concentrations during CalNex. Total IVOC and Semi-volatile organic compounds (SVOC) are lower estimates. Note the discontinuous y-axis. Adapted from Zhao et al. 2014.

How IVOCs Lead to SOA Emissions

Many combustion sources emit a large set of organic compounds with different volatilities. The least volatile compounds condense soon after they are emitted and cool, forming POA. The most volatile compounds are VOCs, which ultimately may lead to ozone and possibly SOA as they are oxidized in the atmosphere. These VOCs are relatively easy to measure, and their chemistry is captured well with CMAQ. The largest uncertainty arises from the compounds that are less volatile than VOCs, making them difficult measure, but do not have volatilities that are low enough to lead to condensation as POA in the exhaust. These IVOCs and to a lesser extent, semi-volatile organic compounds (SVOCs), are very effective SOA precursors and their chemical reactions and emissions are largely not included in CMAQ. VOC and SVOC evaporation from ambient temperature application such as consumer products could also be an important SOA contributor assuming that there is ample time for evaporation

While these findings are relatively new, laboratory measurements are straightforward. The exhaust from a combustion source is put into a “smog chamber” equipped with UV lights where atmospherically relevant oxidant concentrations are added to simulate atmospheric processing. The SOA emission factor

for some sources may be significantly higher than the POA emission factor. Figure V-6-22 shows the results of experiments designed to measure POA, SOA, and VOC emission factors from gasoline vehicles, diesel vehicles, and biomass combustion. Gasoline vehicles on average can produce 50 times more SOA than POA. Moreover, on the timescale of a few hours, many direct PM combustion sources will also form a significant amount of secondary PM—potentially more than direct PM emissions—after they get oxidized in the atmosphere. The fractional contribution of several SOA sources in Pasadena calculated with a box model is shown in Figure V-6-23. Aerosol composition measurements were used as inputs to the model. The SOA from cooking emissions is a first-order estimate, as experiments designed to quantify these emission factors are still in progress.

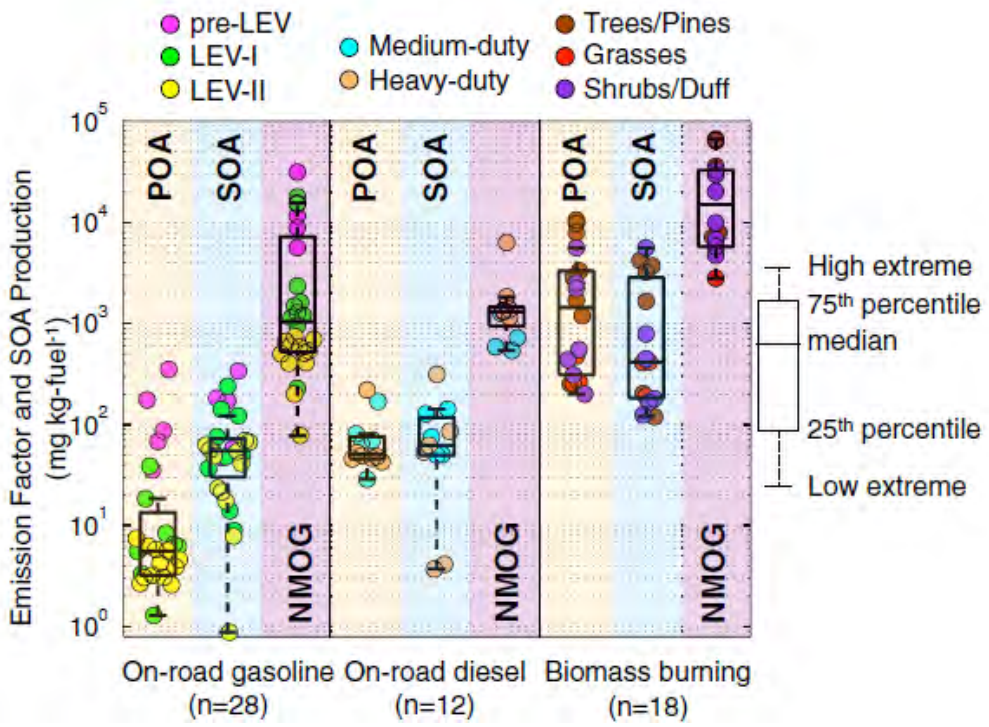

FIGURE V-6-22

Measured smog chamber emission factors of POA, SOA, and NMOG (VOCs) for three combustion sources. SOA emission factors are greater than or equal to POA emission factors for each source. These experiments represent only a few hours of photochemical aging. Diesel vehicles are not equipped with DPF. Figure from: (Jathar, Gordon et al. 2014)

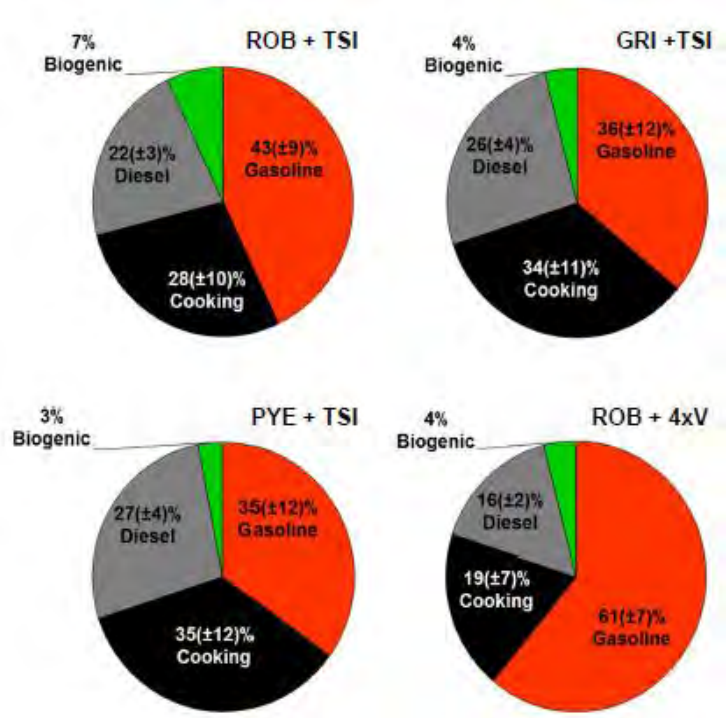

FIGURE V-6-23

Fractional contribution of SOA sources in Pasadena during CalNex 2010 calculated with four parameterizations. Figure from (Hayes, Carlton et al. 2015)

Annual PM2.5

Annual average PM2.5 species concentrations at the four SASS sites are shown in Figure V-6-24. Among the four stations, the lowest annual average PM2.5 concentration was observed at Anaheim and the highest annual average concentration was observed at Rubidoux. The highest sulfate concentration was observed in central Los Angeles, while the highest concentration of ammonium and nitrate occurred in Rubidoux. Annual average concentrations also show that OC is the most abundant component, being approximately equivalent to a third of the total PM2.5 concentration. As measured by the SASS sampler, OC concentrations are believed to be the most uncertain as explained in the 24-hour PM2.5 attainment demonstration chapter of this appendix.

Quarterly Average Data

Quarterly average PM2.5 species concentrations at the four SASS sites are shown in Figure V-6-25 through Figure V-6-28. In general, the sites in the western half of the Basin: Los Angeles and Anaheim, tend to have the highest average levels in the fourth quarter. Rubidoux also presents the highest concentration in the fourth quarter, whereas Fontana experiences the highest concentration in the third quarter. All stations tend to have the lowest concentrations in the first or second quarter. Typically, spring storms and favorable atmospheric dispersion drive PM2.5 concentrations down in the second quarter. Los Angeles and Anaheim presented the lowest concentrations during the second quarter, whereas Rubidoux and Fontana had the lowest value in the first quarter.

On average, secondary ammonium, nitrate and sulfate comprise about 40 percent of the total PM2.5 concentration and show strong seasonal variability. High nitrate concentrations in the fall or winter are caused by the favorable formation of ammonium nitrate under cool temperatures, high humidity and frequent nocturnal inversions. On the contrary, high summertime temperatures reduce concentrations of ammonium nitrate—a relatively volatile species. The higher values of sulfate typically occur under conditions of strong-elevated inversions and strong sea breeze transport toward inland areas, which is the characteristic of late spring and summer. In addition, heterogeneous formation of sulfate is favored by higher temperatures occurring in the summer. Higher temperatures with abundant afternoon sunlight and the persistence of morning fog and low clouds trigger both homogeneous and heterogeneous sulfate formation reactions to produce secondary sulfate.

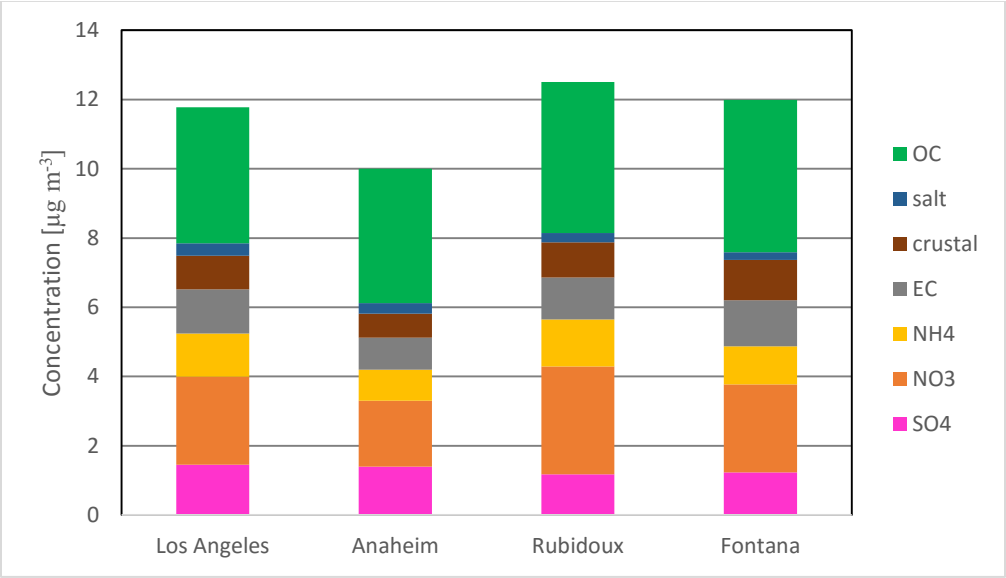

FIGURE V-6-24

Annual Average PM2.5 Species Concentrations at 4 SASS Sites (µg/m^3)

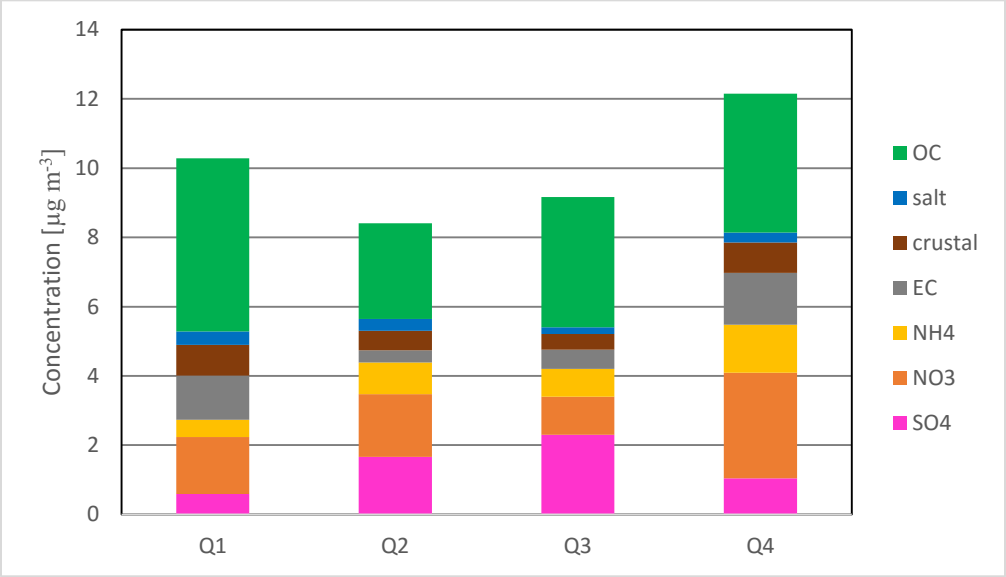

FIGURE V-6-25

PM2.5 Quarterly Average Species Concentrations (µg/m^3) at Anaheim

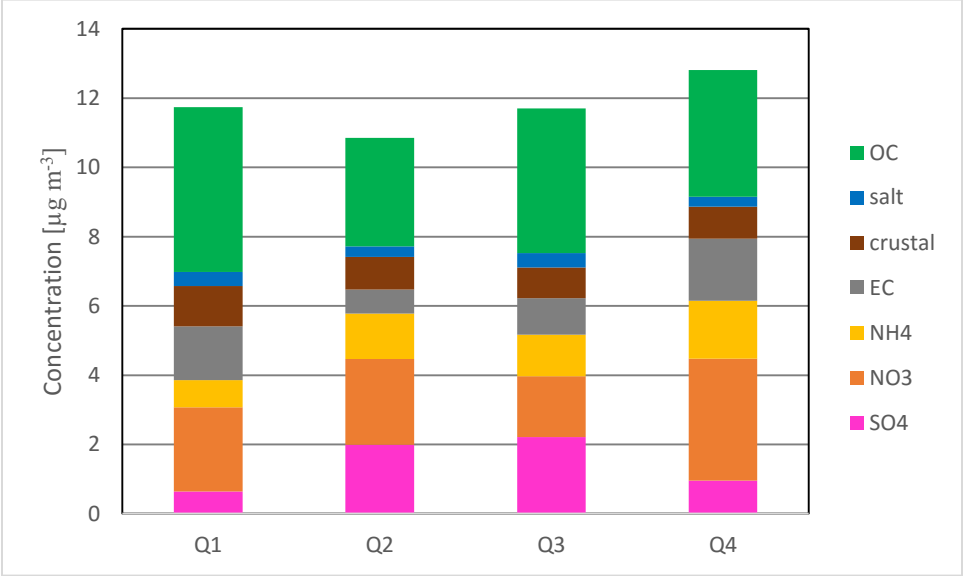

FIGURE V-6-26

PM2.5 Quarterly Average Species Concentrations (µg/m^3) at Downtown Los Angeles

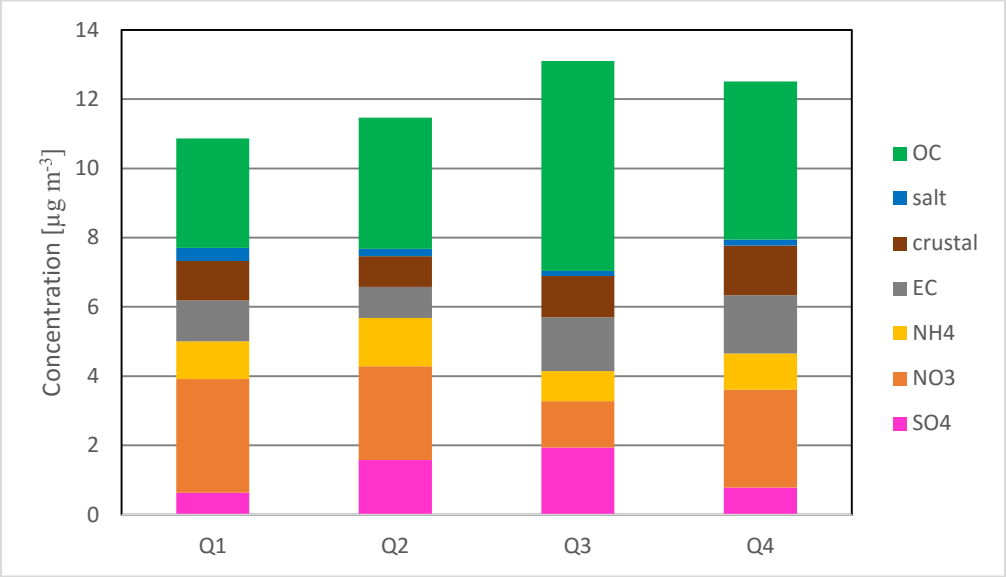

FIGURE V-6-27

PM2.5 Quarterly Average Species Concentrations (µg/m^3) at Fontana

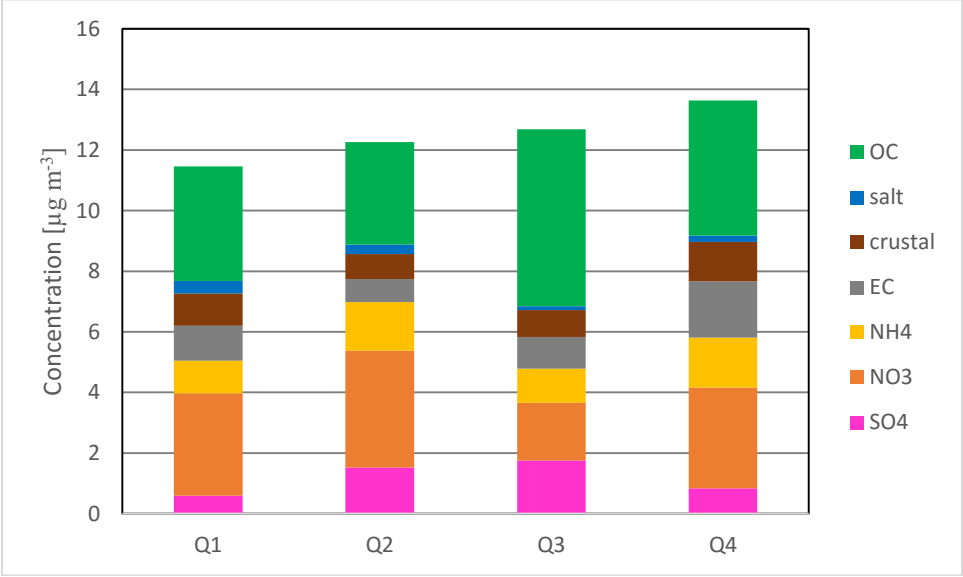

FIGURE V-6-28

PM2.5 Quarterly Average Species Concentrations (µg/m^3) at Rubidoux

OC and nitrate are the two most common species with OC comprising between 25 percent and 43 percent of the total PM2.5 mass, depending on season and location. OC in general tends to be higher during the 3rd quarter. Higher temperatures and abundant sunlight increase evaporative emissions of Secondary Organic Aerosol (SOA) precursors, and increase photochemical processing of those precursors. However, OC concentrations measured with the SASS sampler are believed to be highly uncertain and as a consequence are subject to the "Sulfate, Adjusted Nitrate, Derived Water, Inferred Carbon Hybrid (SANDWICH)" method correction for component mass reconciliation. Roughly 11 percent to 30 percent of the total PM2.5 mass is nitrate. Figures V-6-29 through V-6-32 provide the corrected species fractions for each site and each quarter.

Table V-6-4 lists annual and 5-year weighted quarterly average design values at each of the four SASS sites covering the period 2010 through 2014. Table V-6-5 lists the SANDWICH applied 5-year weighted quarterly speciation FRM data for each station. As expected, the annual fractional contributions to the quarterly mass at each site differed from those on the 24-hour standard design days.

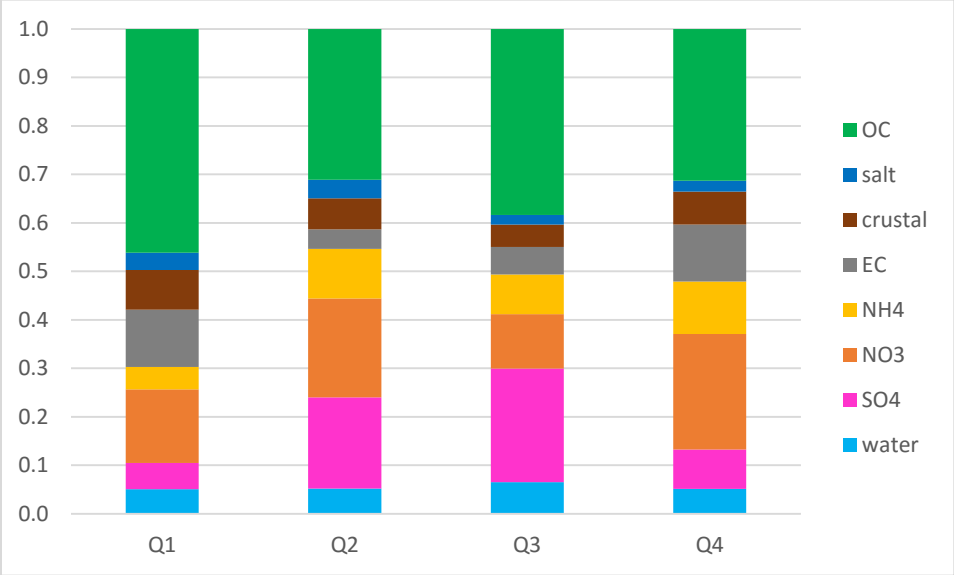

FIGURE V-6-29

2012 Anaheim quarterly PM2.5 species fractional splits after the SANDWICH correction

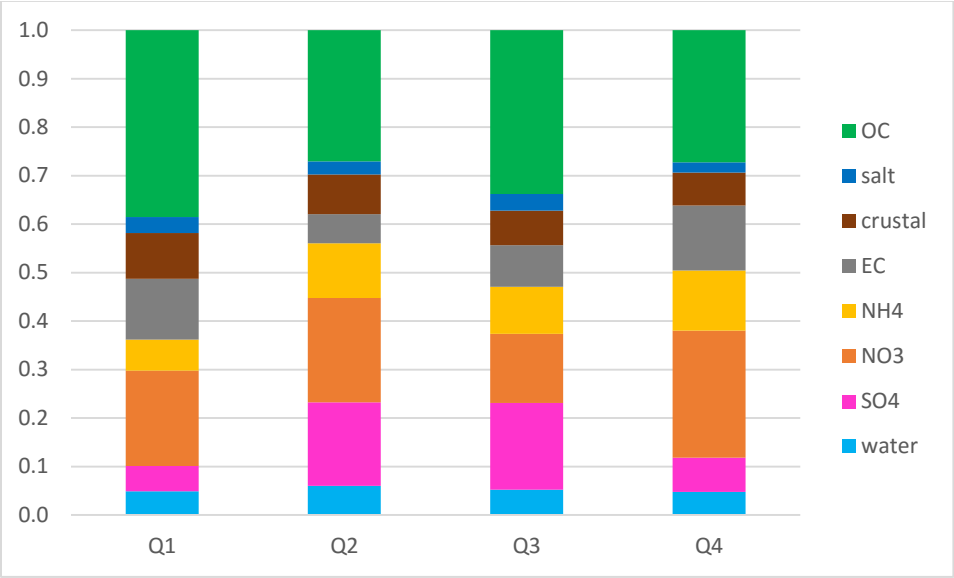

FIGURE V-6-30

2012 Los Angeles quarterly PM2.5 species fractional splits after the SANDWICH correction

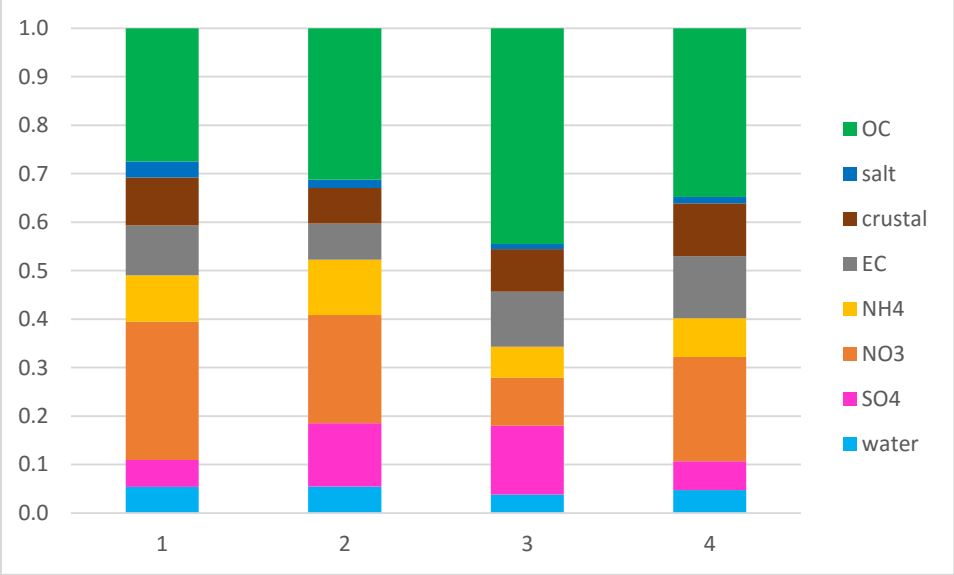

FIGURE V-6-31

2012 Fontana quarterly PM2.5 species fractional splits after the SANDWICH correction

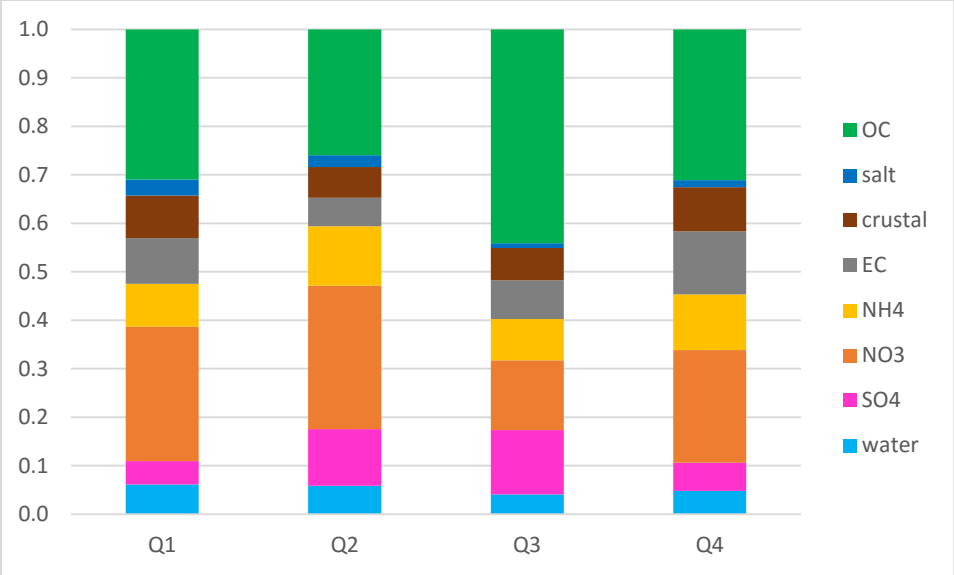

FIGURE V-6-32

2012 Rubidoux quarterly PM2.5 species fractional splits after the SANDWICH correction

TABLE V-6-4

5-Year Weighted Annual and Quarterly PM2.5 Design Values (2010–2014)

Monitoring Site	Quarter 1 (µg/m^3)	Quarter 2 (µg/m^3)	Quarter 3 (µg/m^3)	Quarter 4 (µg/m^3)	Annual (µg/m^3)
Anaheim	10.83	8.87	9.81	12.81	10.58
Los Angeles	12.35	11.55	12.35	13.45	12.43
Fontana	11.48	12.13	13.62	13.13	12.59
Mira Loma	14.50	14.10	13.91	16.94	14.86
Rubidoux	12.20	13.03	13.22	14.32	13.19

TABLE V-6-5

SANDWICH Applied Quarterly Speciated FRM Data

Site		Mass	OC	EC	NH4	NO3	SO4	Crustal	Salt	Water	Blank
Los Angeles	1q	12.350	4.567	1.487	0.760	2.329	0.616	1.114	0.393	0.584	0.500
Los Angeles	2q	11.550	2.991	0.666	1.250	2.374	1.903	0.901	0.297	0.669	0.500
Los Angeles	3q	12.350	4.005	1.018	1.145	1.690	2.122	0.846	0.404	0.620	0.500
Los Angeles	4q	13.450	3.524	1.729	1.612	3.388	0.919	0.884	0.276	0.616	0.500
Anaheim	1q	10.830	4.766	1.219	0.478	1.567	0.561	0.846	0.372	0.521	0.500
Anaheim	2q	8.870	2.603	0.336	0.859	1.710	1.570	0.531	0.323	0.437	0.500
Anaheim	3q	9.810	3.573	0.532	0.762	1.042	2.182	0.429	0.182	0.608	0.500
Anaheim	4q	12.810	3.849	1.445	1.333	2.930	1.000	0.841	0.278	0.634	0.500
Rubidoux	1q	12.200	3.622	1.109	1.035	3.241	0.565	1.020	0.392	0.715	0.500
Rubidoux	2q	13.030	3.252	0.732	1.536	3.710	1.462	0.796	0.308	0.734	0.500
Rubidoux	3q	13.220	5.615	1.014	1.084	1.828	1.688	0.847	0.125	0.520	0.500
Rubidoux	4q	14.320	4.299	1.791	1.588	3.215	0.802	1.262	0.202	0.662	0.500
Fontana	1q	11.480	3.017	1.133	1.047	3.133	0.609	1.085	0.366	0.590	0.500
Fontana	2q	12.130	3.631	0.864	1.332	2.597	1.514	0.849	0.207	0.636	0.500
Fontana	3q	13.620	5.837	1.493	0.836	1.295	1.866	1.153	0.140	0.499	0.500
Fontana	4q	13.130	4.395	1.618	1.005	2.715	0.755	1.377	0.171	0.594	0.500

Figures V-6-33 through V-6-36 present the ratio of the 24-hour to annual PM2.5 fractional species contributions for the four SASS sites. These plots provide insight into the contribution of PM2.5 components during episodic concentration peaks, relative to their contribution to the PM2.5 annual average. In general, the 24-hour PM2.5 “other” category is consistently a smaller percentage than the annual PM2.5 “other” for all seasons. In the inland locations of Fontana and Rubidoux, where secondary PM dominates, ammonium and nitrate have generally higher fractions for the episodic 24-hour PM2.5. On the contrary, EC presents lower fractions for the episodic 24-hour PM2.5. EC is generally a primary pollutant and is generated by sources such as traffic that do not present significant seasonal variability, and therefore contributes consistently to the annual average. OC, which has both primary and secondary contributions, also presents lower fractions in inland locations. This indicates that episodic PM2.5 in inland locations is generally dominated by the formation of ammonium nitrate, which originates predominately from photochemical reactions of NOx emitted at upwind locations. In Los Angeles and

Anaheim, where PM concentrations are dominated by primary emissions, ammonium and nitrate do not have as high of a fraction as compared to the fraction at inland stations. In Los Angeles, sulfate fractions remain fairly constant near unity during the first three quarters, indicating that the influence of sulfate sources like the Long Beach and Los Angeles Port complex and heavy duty vehicle traffic remain constant during those periods.

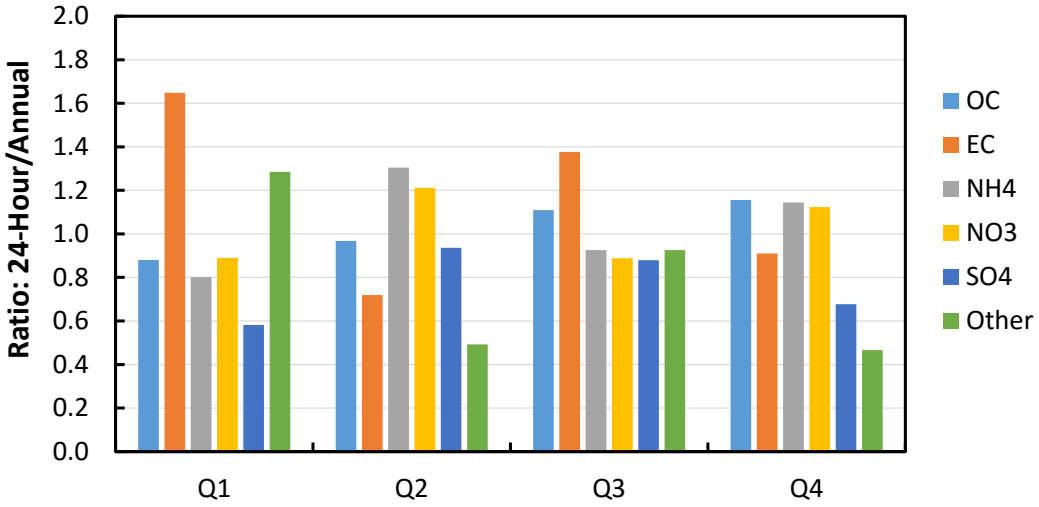

FIGURE V-6-33

2012 average quarterly ratio of 24-hour to annual species fractional contributions to PM2.5 after the SANDWICH correction for Anaheim

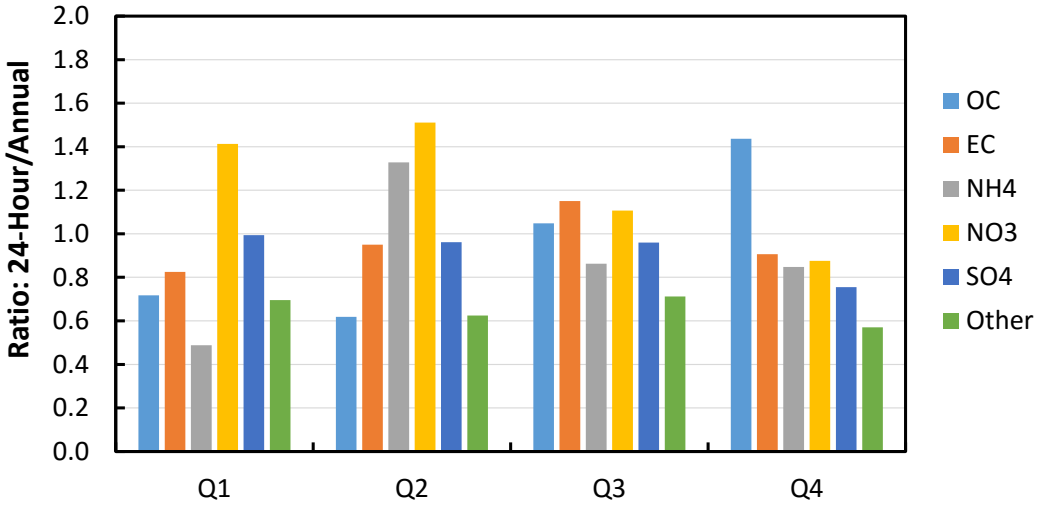

FIGURE V-6-34

2012 average quarterly ratio of 24-hour to annual species fractional contributions to PM2.5 after the SANDWICH correction for Los Angeles

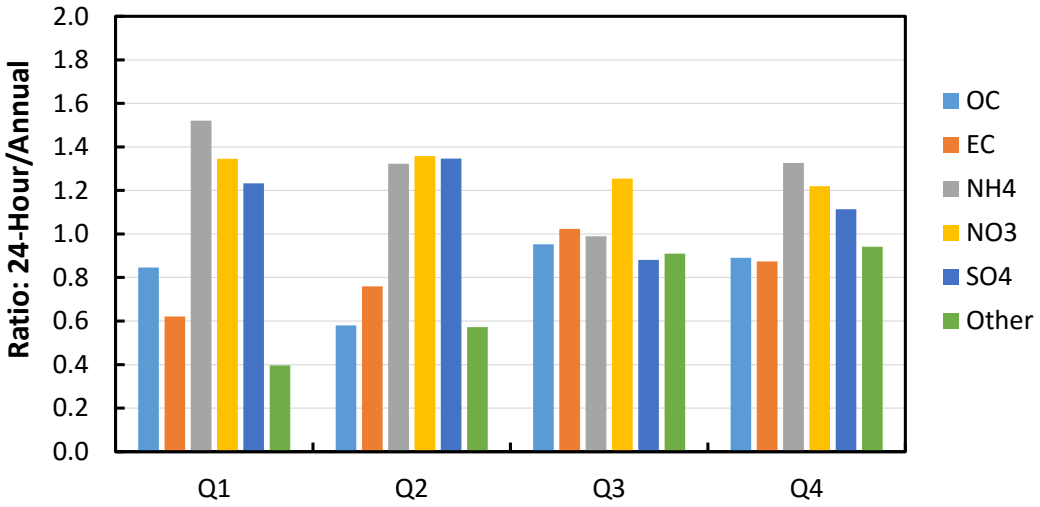

FIGURE V-6-35

2012 average quarterly ratio of 24-hour to annual species fractional contributions to PM2.5 after the SANDWICH correction for Fontana

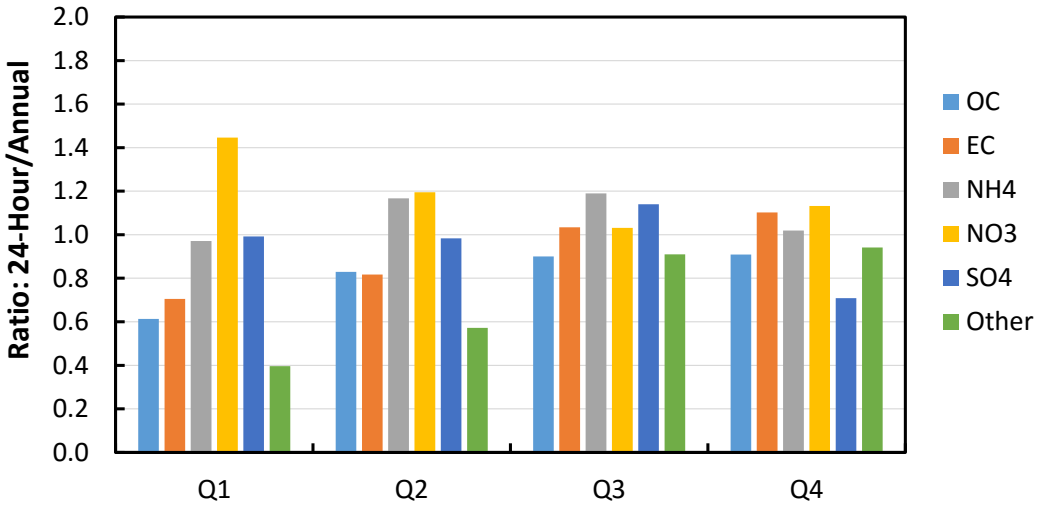

FIGURE V-6-36

2012 average quarterly ratio of 24-hour to annual species fractional contributions to PM2.5 after the SANDWICH correction for Rubidoux

Future Annual PM2.5 air quality

PM2.5 annual concentrations projected for milestone years under different control scenarios are shown in Figure V-6-37. Mira Loma is projected to remain the most polluted station in 2021 and 2025. All areas will be in attainment of the federal annual standard (12 µg/m3) by 2025 in the presence of directly emitted PM controls. However, Mira Loma will not attain the annual standard in 2021, even in the presence of controls. Impacts of the ozone control strategy on future PM2.5 design values were also investigated. The ozone control strategy will lead to attainment of the annual PM2.5 standard by 2023. Due to the limitation that emission reductions approved under CAA Section 182(2)(5) cannot apply toward the PM2.5 attainment demonstration, reductions associated with non 182(e)(5) measures were simulated for 2025 (the column marked in orange in Figure V-6-37). This was projected to be sufficient to reach attainment, indicating that the ozone strategy leading to 2023 attainment is critical for annual PM2.5 attainment. Tables V-6-6 through V-6-9 provide the projected future year PM2.5 annual design values by component species for 2021 and 2025 with proposed controls implemented.

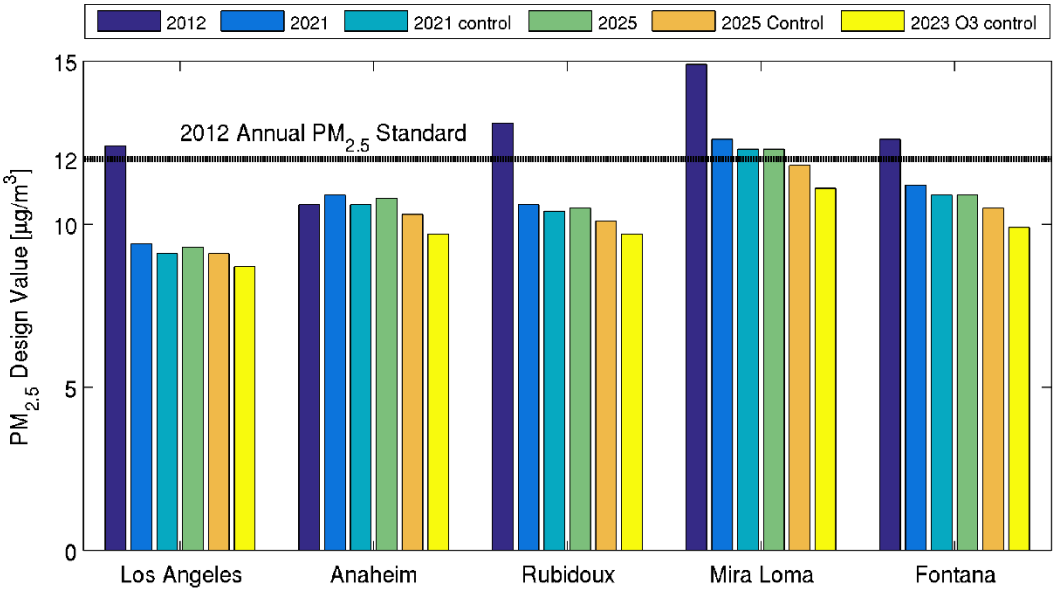

FIGURE V-6-37

Annual Average PM2.5 Concentrations. Federal Standard in Denoted with Horizontal Grey Line.

TABLE V-6-6

CMAQ Predicted 2021 Annual Concentrations (µg/m^3) with Directly Emitted PM Control

Locations	NH4	NO3	SO4	OC	EC	Others	Water	Blank	Salt	Mass
Anaheim	0.6	1.3	1.2	3.4	0.6	0.7	0.5	0.5	0.3	9.1
Fontana	0.7	1.5	1.1	3.8	0.8	1.2	0.5	0.5	0.2	10.4
Los Angeles	0.9	1.9	1.3	3.4	0.8	1.0	0.5	0.5	0.3	10.6
Mira Loma	1.0	2.2	1.2	4.4	0.9	1.3	0.6	0.5	0.3	12.3
Rubidoux	0.8	1.9	1.1	4.0	0.8	1.1	0.5	0.5	0.2	10.9

TABLE V-6-7

CMAQ Predicted 2025 Annual Concentrations (µg/m^3)

Locations	NH4	NO3	SO4	OC	EC	Others	Water	Blank	Salt	Mass
Anaheim	0.6	1.2	1.2	3.7	0.6	0.8	0.5	0.5	0.3	9.3
Fontana	0.6	1.4	1.2	4.1	0.8	1.3	0.5	0.5	0.2	10.5
Los Angeles	0.9	1.8	1.3	3.7	0.8	1.0	0.5	0.5	0.3	10.8
Mira Loma	0.9	2.0	1.2	4.8	0.9	1.3	0.6	0.5	0.3	12.3
Rubidoux	0.7	1.7	1.1	4.3	0.8	1.1	0.5	0.5	0.3	10.9

TABLE V-6-8

CMAQ Predicted 2023 PM Annual Concentration (µg/m^3)
with the Control Strategy to Attain 8-hour Ozone Standard in 2023

Locations	NH4	NO3	SO4	OC	EC	Others	Water	Blank	Salt	Mass
Anaheim	0.4	0.7	1.2	3.7	0.6	0.8	0.7	0.5	0.2	8.7
Fontana	0.4	0.8	1.2	4.1	0.8	1.3	0.5	0.5	0.2	9.7
Los Angeles	0.6	1.0	1.3	3.7	0.8	1.0	0.5	0.5	0.3	9.7
Mira Loma	0.5	1.1	1.2	4.8	0.9	1.2	0.6	0.5	0.3	11.1
Rubidoux	0.5	0.9	1.1	4.3	0.8	1.1	0.5	0.5	0.2	9.9

TABLE V-6-9

CMAQ Predicted 2025 Annual Concentrations (µg/m^3) Emission Reductions Associated with non-182(e)(5) Measures.

Locations	NH4	NO3	SO4	OC	EC	Others	Water	Blank	Salt	Mass
Anaheim	0.5	1.0	1.2	3.7	0.6	0.8	0.6	0.5	0.3	9.0
Fontana	0.5	1.1	1.2	4.1	0.8	1.3	0.5	0.5	0.2	10.1
Los Angeles	0.8	1.5	1.3	3.7	0.8	1.0	0.5	0.5	0.3	10.3
Mira Loma	0.7	1.6	1.2	4.8	0.9	1.3	0.6	0.5	0.3	11.8
Rubidoux	0.6	1.4	1.1	4.3	0.8	1.1	0.5	0.5	0.2	10.5

Spatial Projections of Annual PM2.5 Design Values

Figure V-6-38 provides a perspective of the Basin-wide spatial extent of annual PM2.5 design values in the base year, 2012. Figures V-6-39 and V-6-40 provide the Basin-wide spatial extent of annual PM2.5 projected for 2021 baseline and controlled scenario. With and without additional controls, by 2021, the number of grid cells with concentrations exceeding the federal standard is restricted to a small region around the Mira Loma monitoring station in northwestern Riverside County. Figure V-6-41 shows the projected PM2.5 concentrations in 2023 with the full implementation of the ozone control strategy, but no additional control on directly emitted PM. The 2025 baseline case does not lead to attainment of the standard (Figure V-6-42), but NOx and VOC reductions from non-182(e)(5) control measures are expected to lead to attainment as all the monitoring stations within the Basin exhibit annual PM2.5 levels below the federal standard of 12 µg/m^3. (Figure V-6-43).

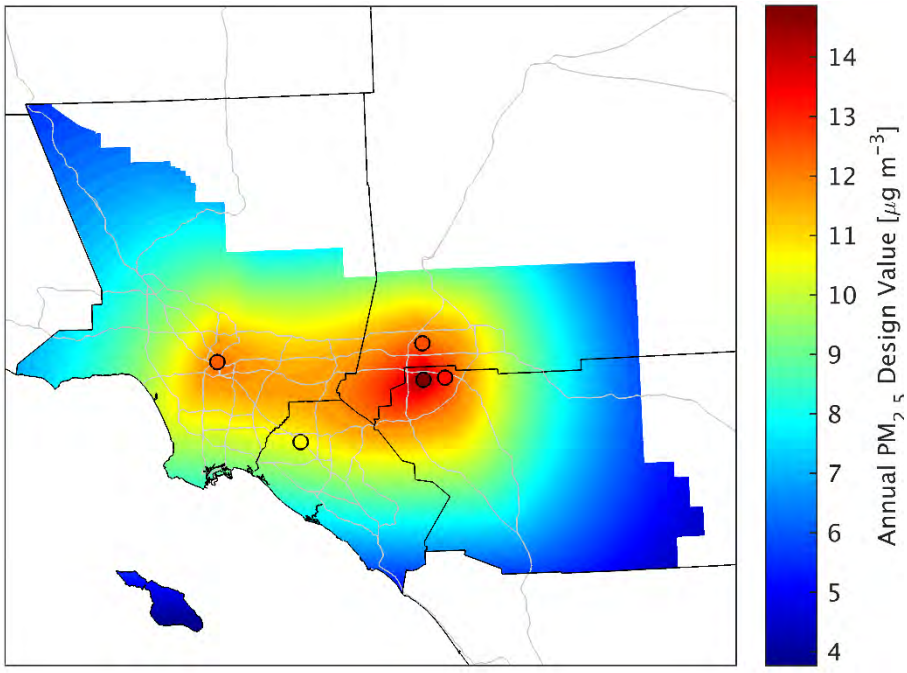

FIGURE V-6-38

2012 Annual PM2.5 Design Value (µg/m^3)

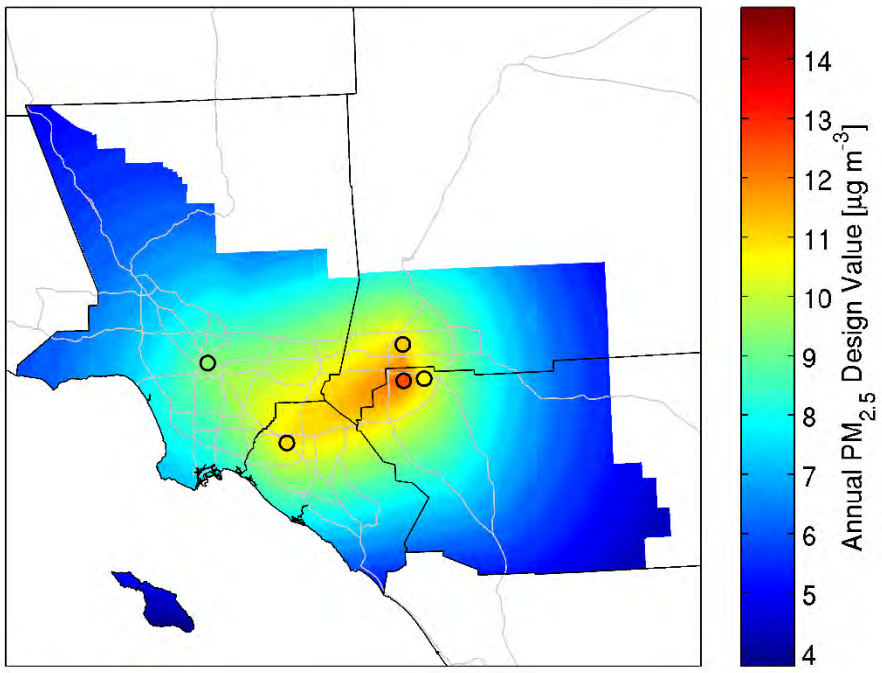

FIGURE V-6-39

2021 Baseline Annual PM2.5 Concentrations (µg/m^3)

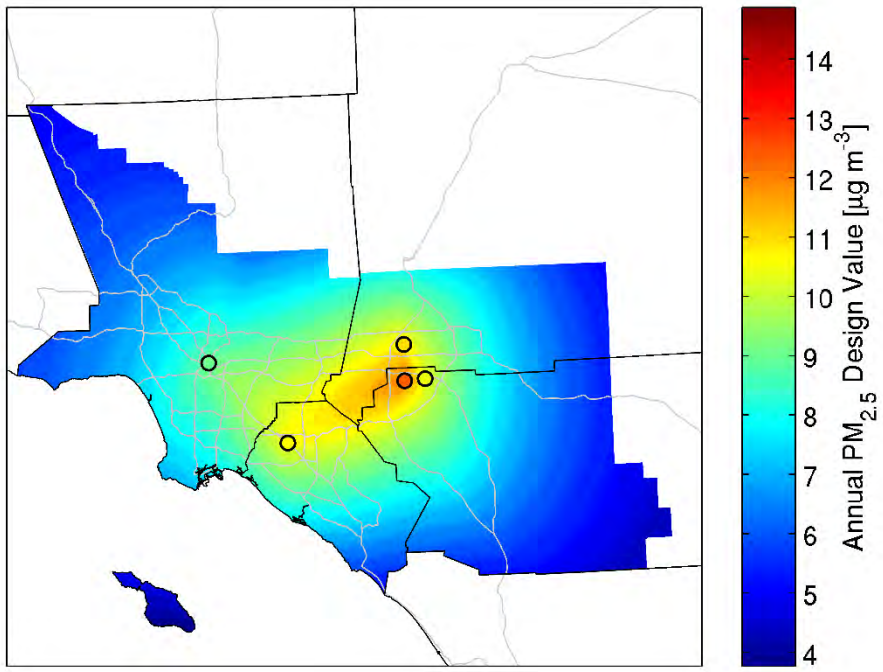

FIGURE V-6-40

2021 Annual PM2.5 Concentrations with Directly Emitted PM Control (µg/m^3)

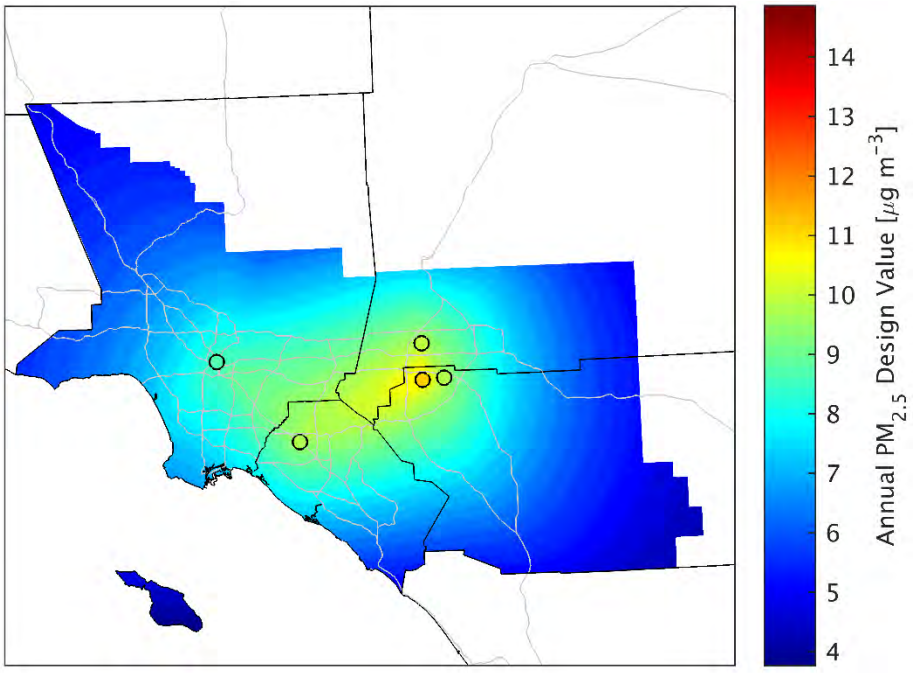

FIGURE V-6-41

2023 Annual PM2.5 Concentration (µg/m^3) with the Control Strategy to attain 8-hour Ozone Standard.

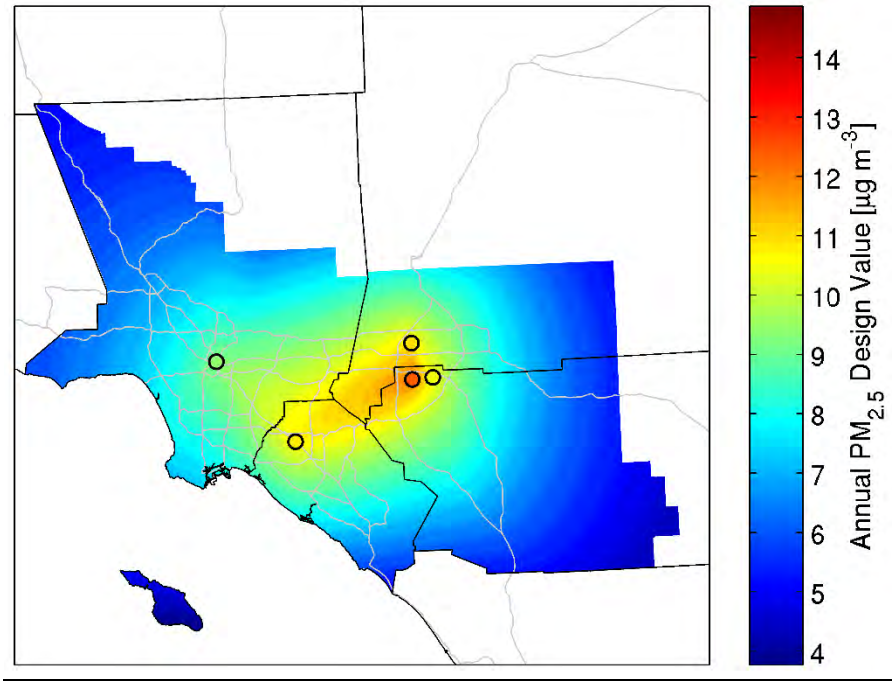

FIGURE V-6-42

2025 Baseline Annual PM2.5 Concentrations (µg/m^3)

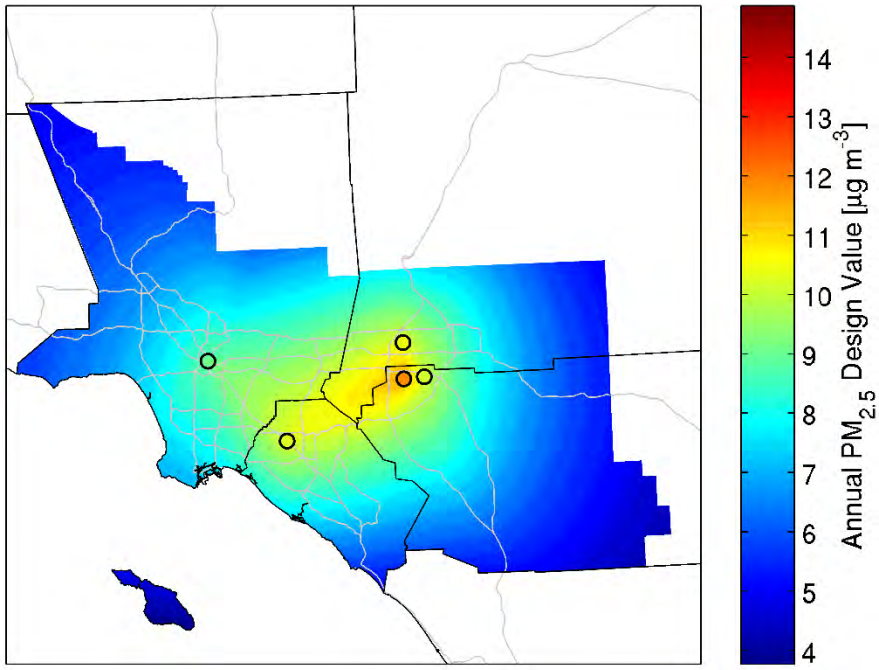

FIGURE V-6-43

2025 Annual PM2.5 Concentration (µg/m^3) with Emission Reductions Associated with non-182(e)(5) measures.

Unmonitored Area Analysis

U.S. EPA modeling guidance requires that the attainment demonstration include an analysis that confirms that all grid cells in the modeling domain meet the federal standard. This "unmonitored area analysis" is essential since speciation monitoring is conducted at a limited number of sites in the modeling domain. Variability in the species profiles at selected locations coupled with the differing responses to emissions control scenarios are expected to result in spatially variable impacts to PM2.5 air quality in any grid cell. As described earlier in this chapter, speciation profiles from SASS sites in adjacent or collocated grid cells are used in the formal attainment demonstration for Mira Loma. With interpolation of the SASS speciation profiles, attainment demonstrations can be directly conducted for the remaining grid cells where FRM mass data has been collected over the 5-year period (2010–2014).

The methodology used to assess the unmonitored grid cell impact is as follows. The speciation fractions throughout the Basin for each relevant species except particle bound water were estimated with a natural neighbor interpolation for each quarter of 2012. While the four SASS speciation stations encompass all areas of high PM concentrations in the Basin, it was necessary to create "pseudo stations" at the corners

of the modelling domain to aid in extrapolation. The speciation fractions at these pseudo stations were assigned as the average speciation fraction measured at all four stations. The speciation fractions in areas of the Basin which are expected to have high PM concentrations were not appreciably affected by the choice of "pseudo station" speciation as the areas of interest are much closer to the SASS stations than the "pseudo stations." A natural neighbor interpolation based on a Voronoi tessellation has been shown to reproduce ozone concentration profiles in the Basin more accurately than an inverse distance weighting, inverse distance weight squared, nearest neighbor, or linear interpolation scheme (See Appendix 5, Chapter 5). Figure V-6-44 details the interpolated nitrate species fractions in quarters 1-4. The interpolated species fractions for all relevant species are presented in Attachment 7.

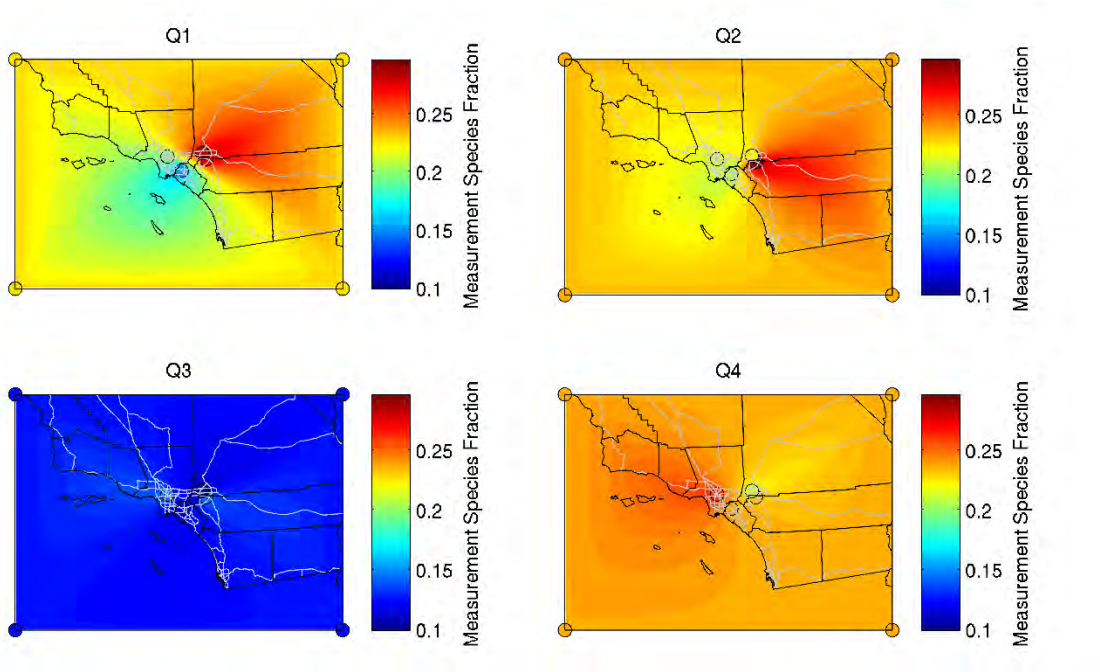

FIGURE V-6-44

2012 Interpolated Annual Measurement Species Fractions for Nitrate. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with circles.

In the unmonitored area analysis, five-year weighted annual PM2.5 design values were calculated for all Federal Reference Method (FRM) monitoring stations within the modelling domain for the 2010 to 2014 period for each quarter. Only quarters that meet the completeness criteria established by the EPA were used in the analysis. While some stations did not have a complete 5-year data record, we still choose to include them in the analysis if they contained more than 6 out of 9 values for the weighted-average. Years 2010 and 2014 were weighed once, years 2011 and 2013 were weighed twice, and 2012 was weighed thrice. Figures V-6-45 through V-6-48 illustrate the number of weighted values for each station for quarters 1-4. Stations that were not used in the analysis are marked with an "x".

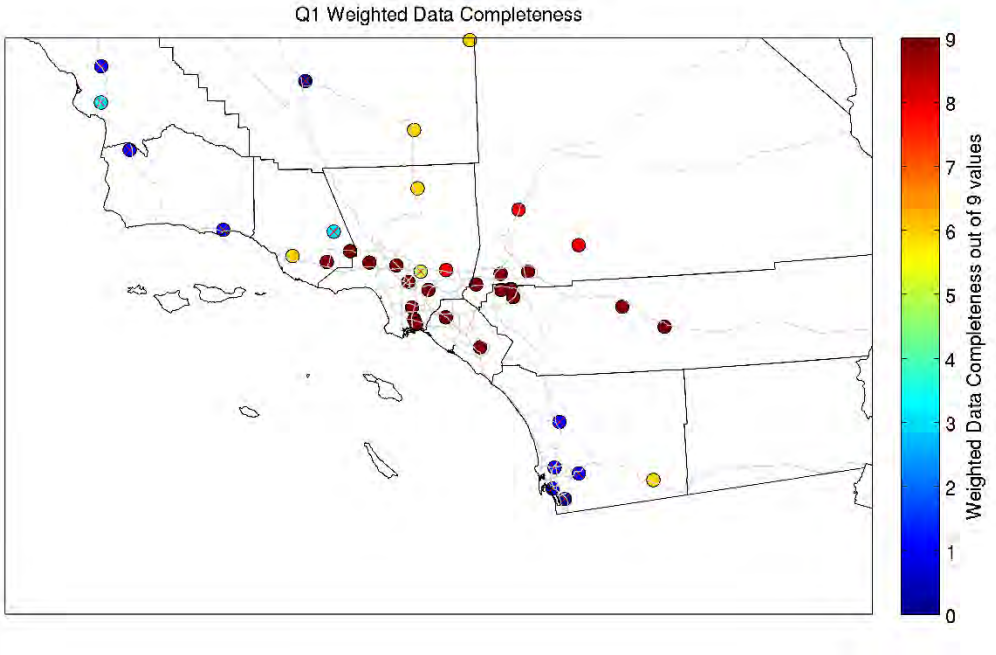

FIGURE V-6-45

Weighted data completeness for quarter 1 (2010–2014)

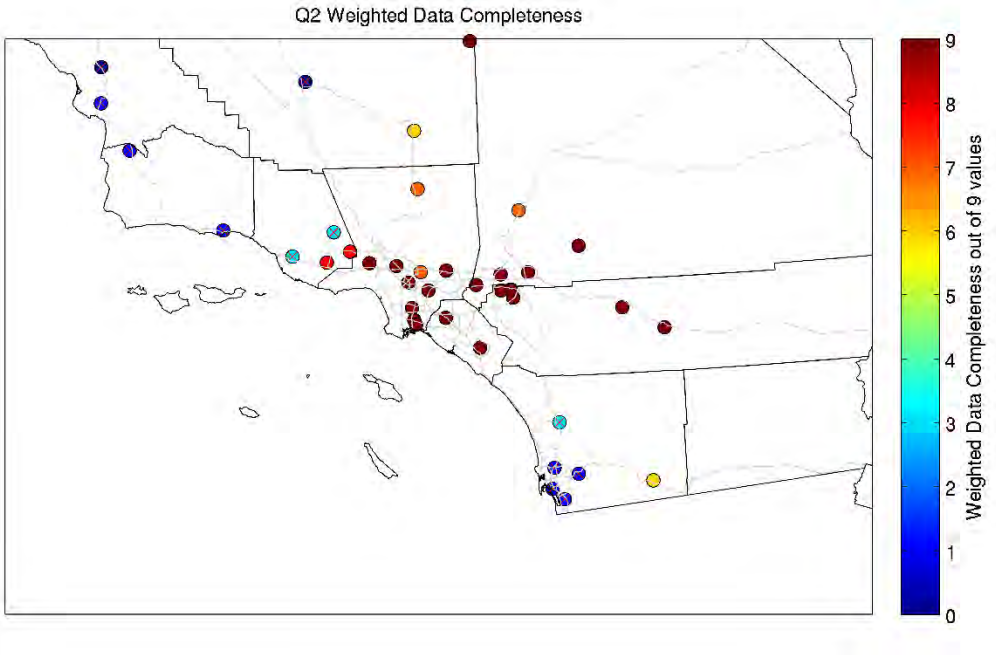

FIGURE V-6-46

Weighted data completeness for quarter 2 (2010–2014)

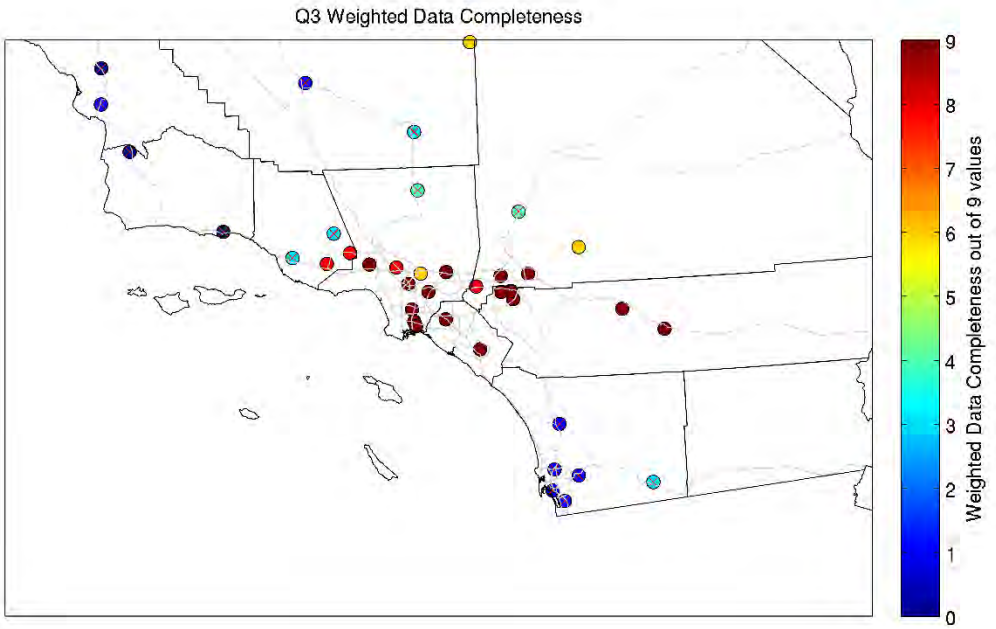

FIGURE V-6-47

Weighted data completeness for quarter 3 (2010–2014)

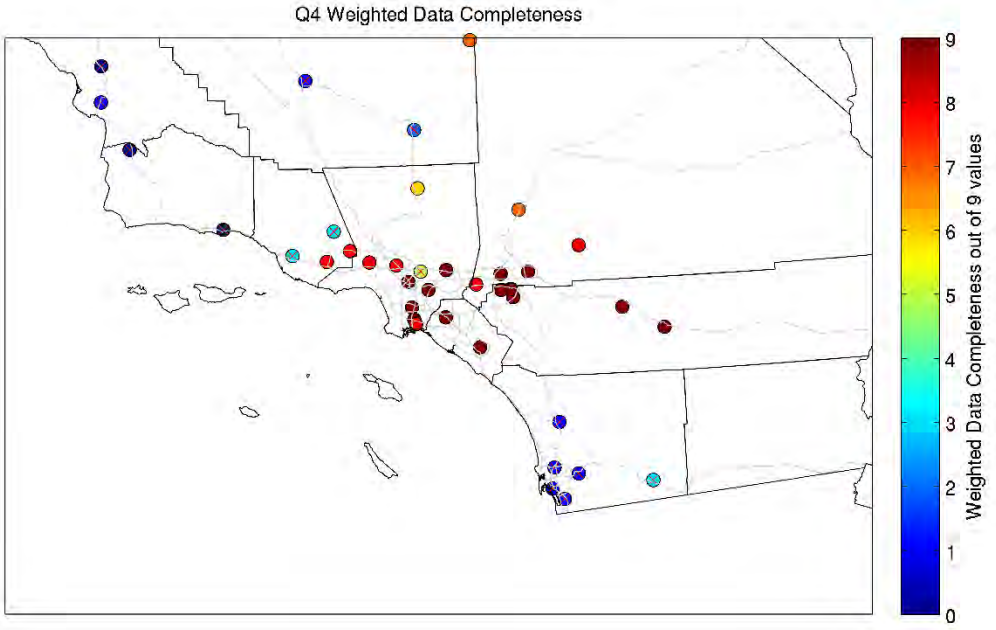

FIGURE V-6-48

Weighted data completeness for quarter 4 (2010–2014)

Quarterly design values were interpolated using a natural neighbor interpolation based on a Voronoi tessellation using only the stations identified to meet the established data completeness requirements. The concentration fields were not extrapolated outside existing stations. Figure V-6-49 presents the interpolated FRM total PM2.5 mass fields for each quarter. The product of the interpolated total PM2.5 mass from the FRM monitors and the interpolated speciation fractions from the SASS monitors yields spatial distributions of speciated mass in each quarter. Figure V-6-50 presents the nitrate mass fields for quarter 1-4. Mass fields for all other species are presented in Attachment 7.

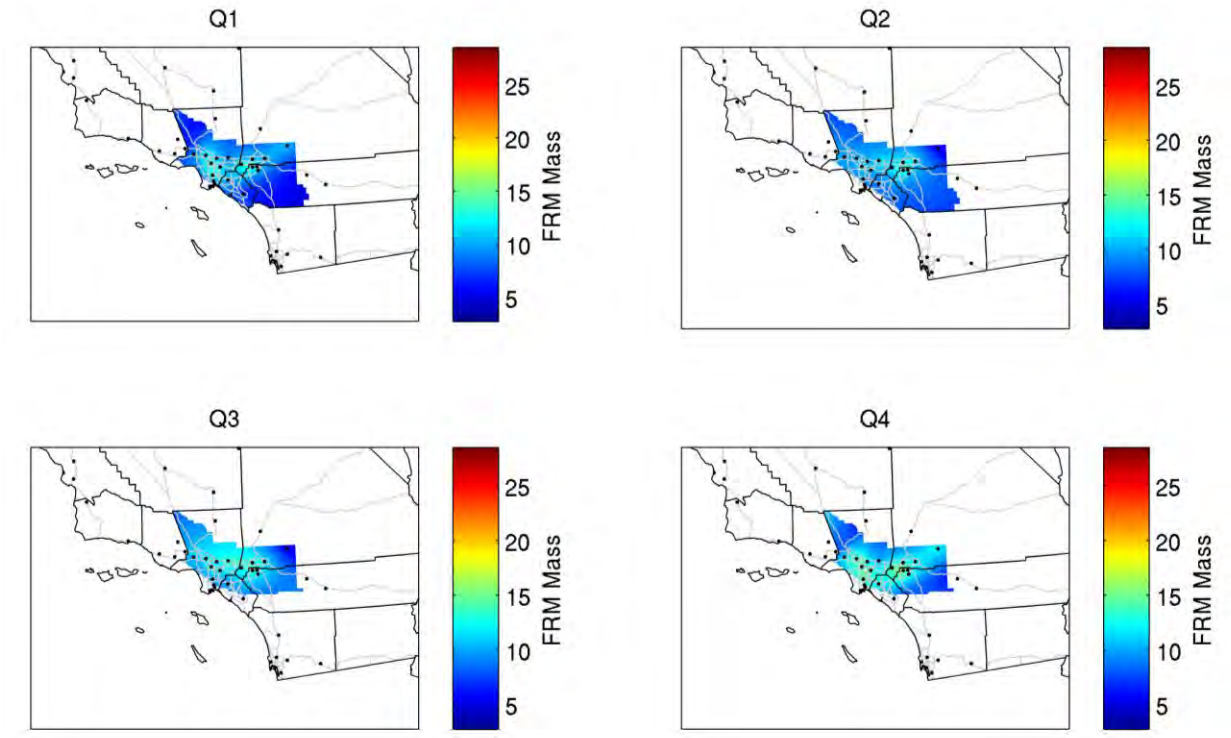

FIGURE V-6-49

Interpolated FRM data from all stations meeting data completeness requirements (2010–2014 weighted average)

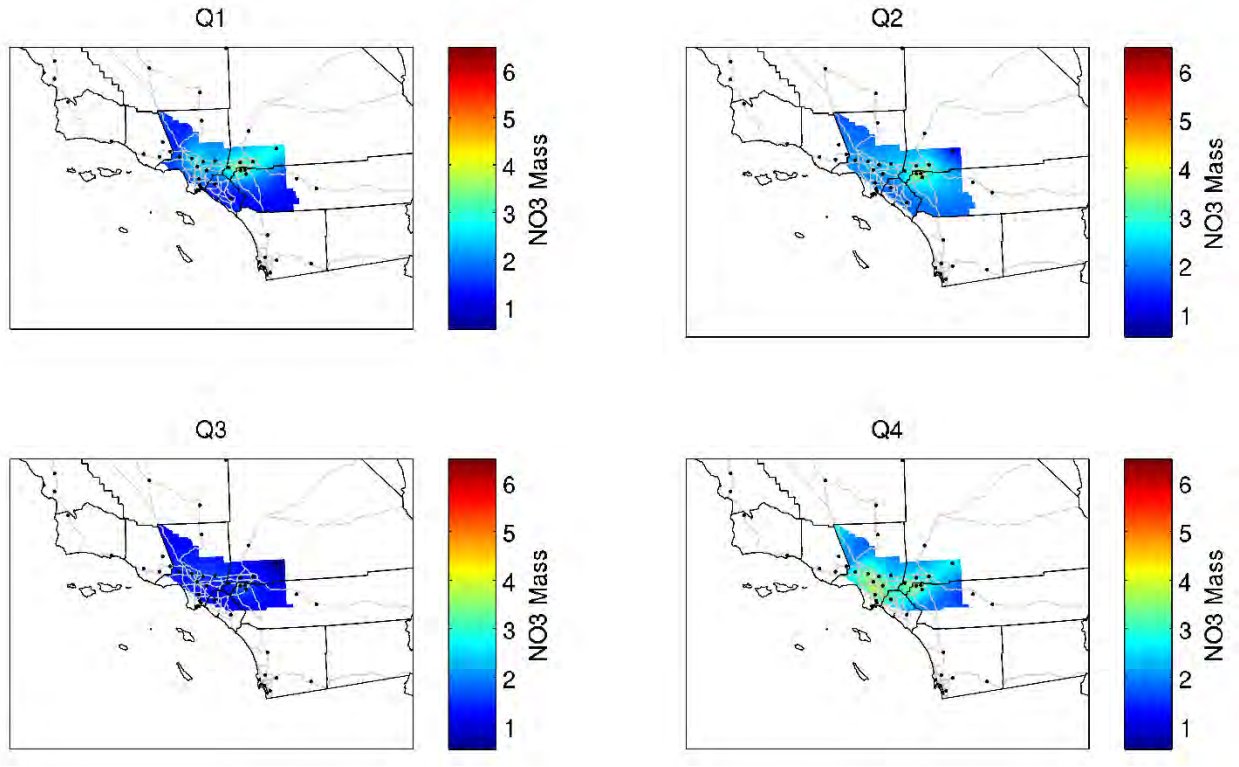

FIGURE V-6-50

Annual quarterly-averaged nitrate mass (2010–2014 weighted average)

In order to maintain consistency with the attainment demonstration at individual stations, base and future year species concentrations at each grid cell were replaced with the average value of the 3x3 grid encompassing the selected grid cell. Model derived base and future-year quarterly-averaged species concentrations were used to calculate RRFs for each species except water. RRFs were multiplied by quarterly-averaged species concentrations (e.g. Figure V-6-51) to project future species concentrations. Particle-bound water was then calculated using a polynomial regression of the Aerosol Inorganic Model (AIM) and summed along with a "blank" concentration to calculate the quarterly-averaged PM2.5 future-year design values. Quarterly PM2.5 concentrations were averaged to produce future-year design values throughout the Basin (See Attachment 7). 2021 design values from uncontrolled and controlled emission scenarios are presented in Figures V-6-51 and V-6-52, respectively. 2023 design values resulting from the ozone control strategy are presented in Figure V-6-53. 2025 design values are presented in Figure V-6-54 (uncontrolled), Figure V-6-54 (controlled), and Figure V-6-56 (controlled with non-182(e)(5) measures).

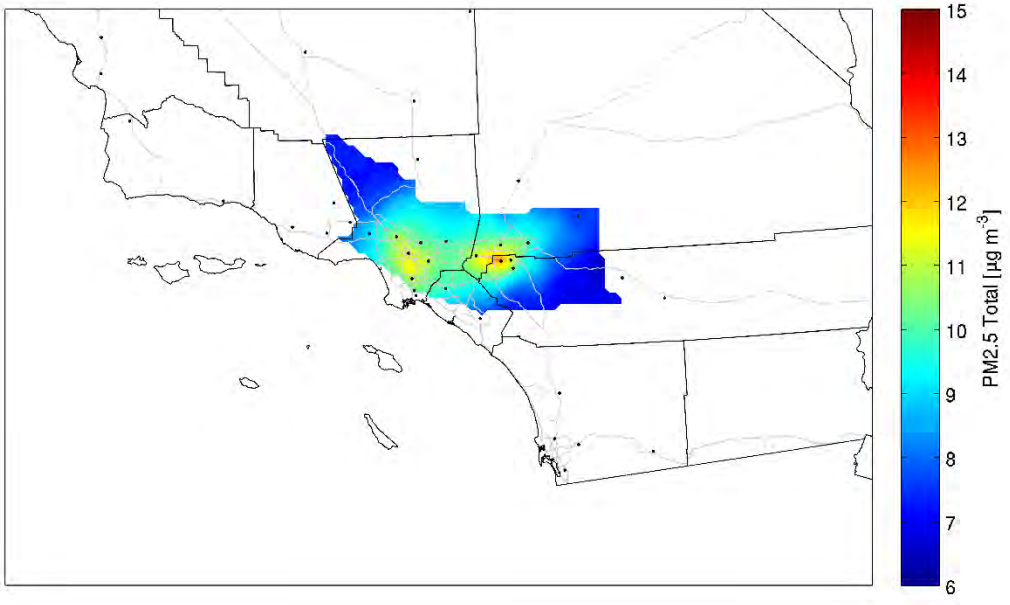

FIGURE V-6-51

2021 Baseline Annual PM2.5 Projection

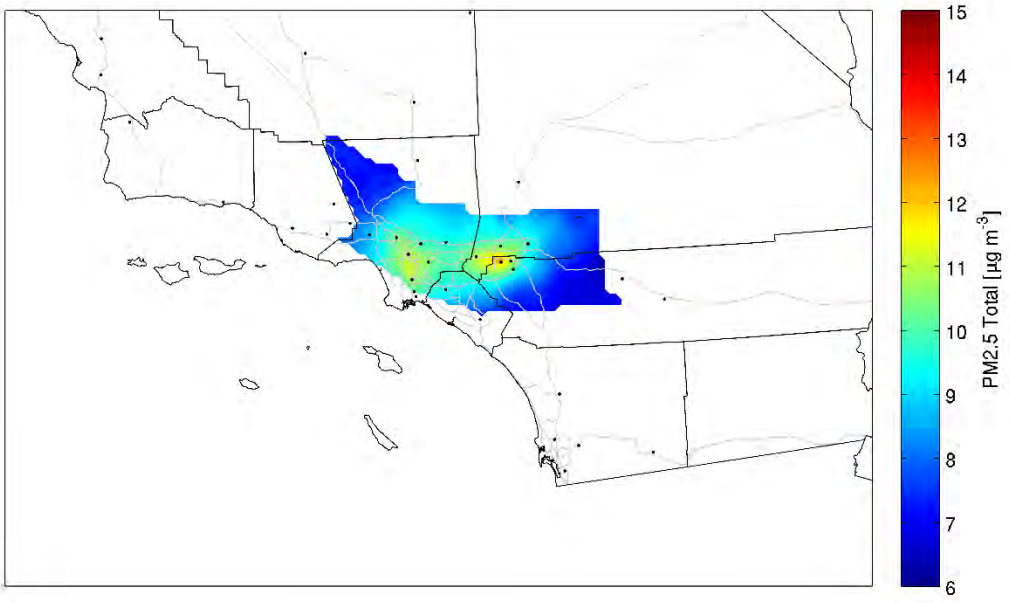

FIGURE V-6-52

2021 Annual PM2.5 Projection with PM control

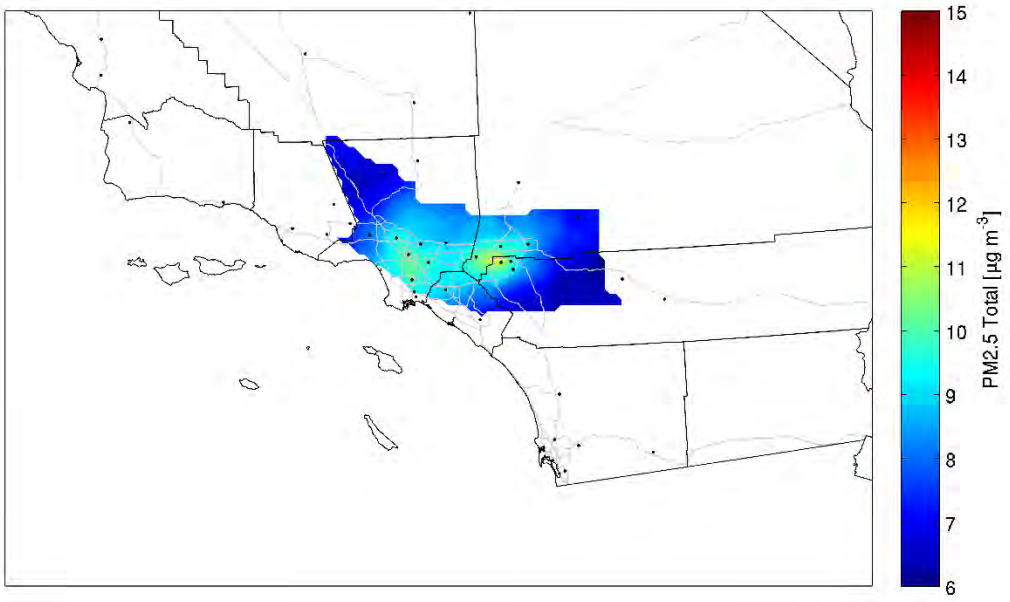

FIGURE V-6-53

2023 Annual PM2.5 Projection with 8-hour Ozone Attainment Scenario

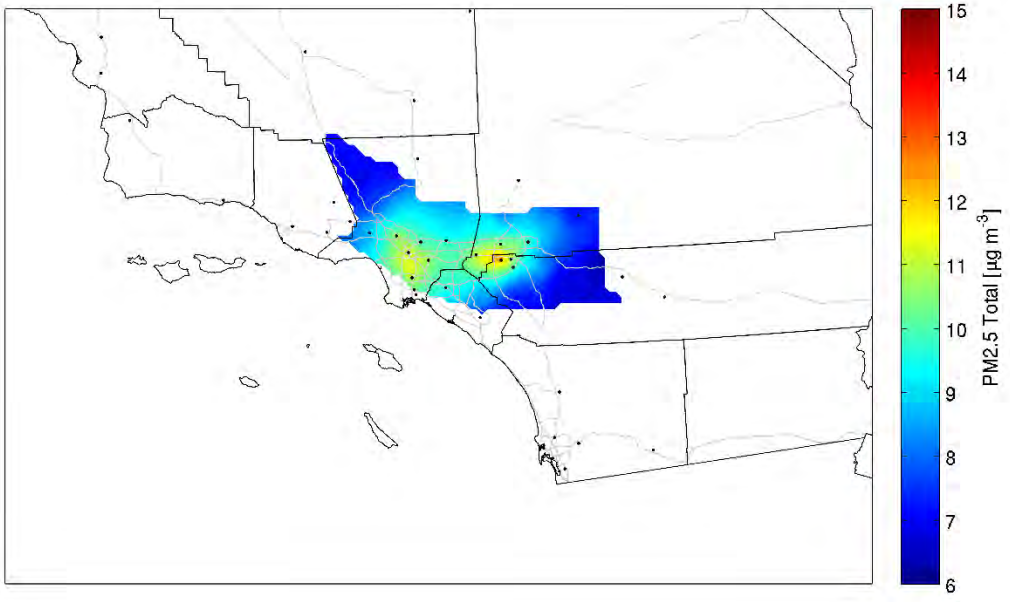

FIGURE V-6-54

2025 Baseline Annual PM2.5 Projection

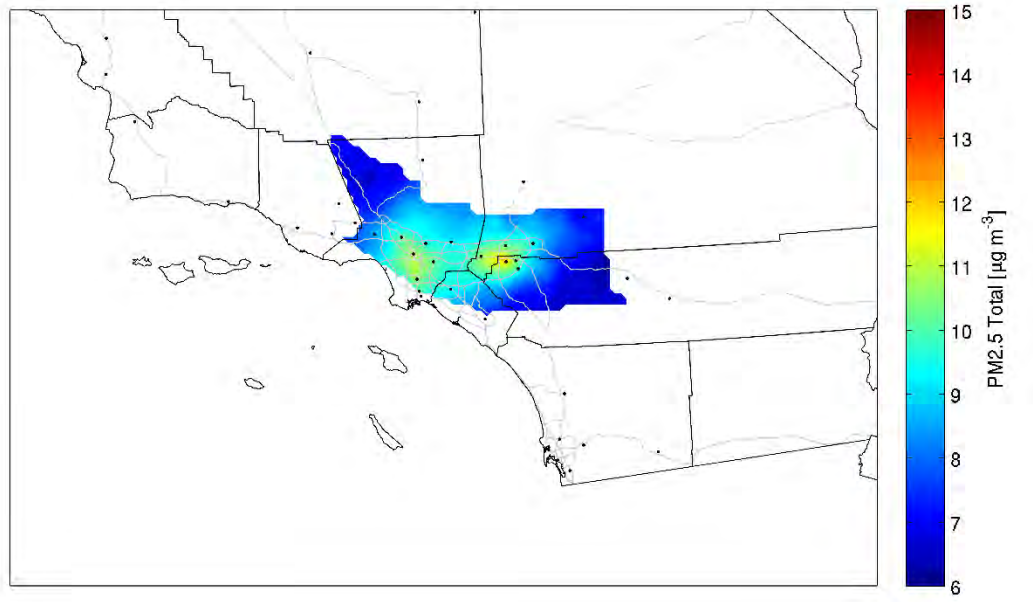

FIGURE V-6-55

2025 Annual PM2.5 Projection with Emission Reductions Associated with non-182(e)(5) Measures.

TABLE V-6-10

Unmonitored Area Analysis Projected Basin-maximum annual PM2.5 design values

Simulation	Maximum Annual PM2.5 Concentration in the Basin
2021 Baseline	13.0
2021 PM Control Strategy	12.7
2023 O3 Control Strategy	11.7
2025 Baseline	12.8
2025 with non-182(e)(5) Measures	12.3

Base-year (2012) spatially interpolated design values are also presented for comparison with the future year projections (Figure V-6-56). The interpolated 2012 grid center design values and projected design values determined from the unmonitored area analysis lined up closely with the station design values. This analysis demonstrates that the relative response to the control program is more effective in the Eastern Basin while portions of the western Basin do not exhibit the equivalent response to the implementation of the proposed control strategy, but they remain in attainment.

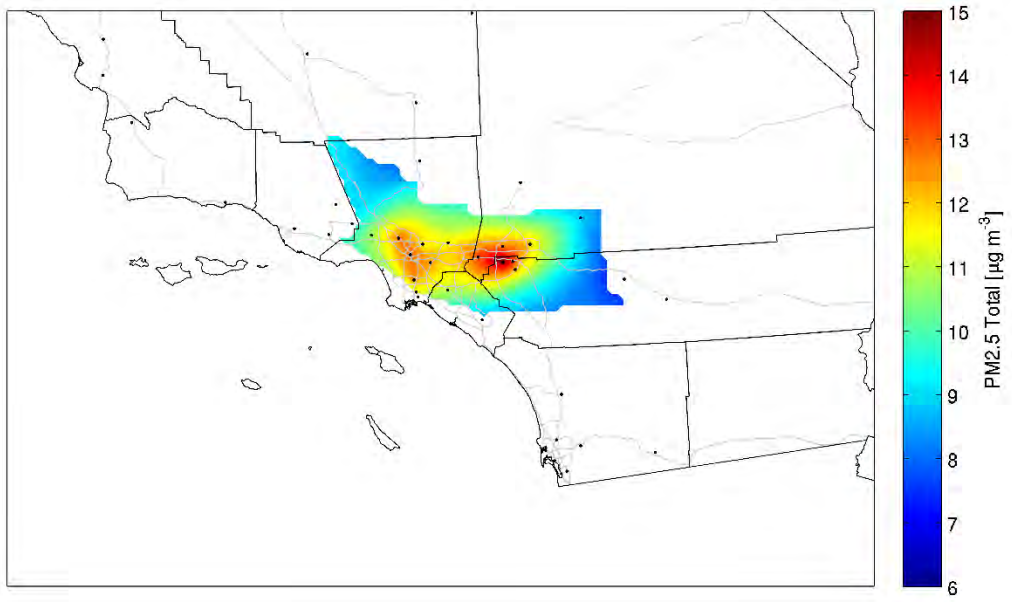

FIGURE V-6-56

2012 Baseline PM2.5 design values

Summary and Control Strategy Choices

PM2.5 has five major precursors that contribute to the mass of the ambient aerosol including ammonia, NOx, SOx, VOC, and directly emitted PM2.5. Various combinations of reductions in these pollutants could all provide a path to clean air. The annual 24-hour PM2.5 attainment strategy presented in this 2016 AQMP relies partially on the control strategy to attain the 1997 8-hour ozone standard in 2023. When all the NOx reductions needed to meet the 8-hour ozone standard in 2023 were incorporated, the annual PM2.5 concentration was projected to be well below the 12 µg/m3 standard, suggesting no further PM control is needed to meet the standard. Due to the limitation of not being able to apply emission reductions associated with CAA Section 182(e)(5) toward PM2.5 attainment, NOx reductions resulted from only non-182(e)(5) measures were simulated as well. This scenario that includes approximately 37 TPD of NOx reduction leads to annual PM2.5 attainment in the Basin in 2025.

The 2016 AQMP includes measures to reduce directly emitted PM emissions. Among them, the measures that have quantified emission reductions are BCM-01, Further Emission Reductions from Commercial Cooking and BCM-10, Emission Reductions from greenwaste composting. The PM emission reductions estimated from the two measures were expected to lead to attainment of the annual PM2.5 standard in 2025, indicating the PM control measures can be used as contingency measures to ensure attainment of the PM2.5 standard in case the NOx reductions from the ozone attainment strategy would not provide sufficient air PM2.5 improvement.

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CHAPTER 7

24-HOUR PM2.5 ATTAINMENT DEMONSTRATION

Introduction

24-Hour PM2.5 Sampling

24-Hour PM2.5 Modeling Approach

Future Air Quality

Effects of Drought

Introduction

This chapter demonstrates attainment of the federal 24-hour PM2.5 standard. The annual PM2.5 attainment demonstration provided in the 2007 AQMP was approved by U.S. EPA on September 30, 2011. The 2012 AQMP updated Annual PM2.5 attainment with supplemental submission on Feb 2015. U.S. EPA approved the reasonably available control measure (RACM), RFP, and impracticability demonstrations in the 2012 PM2.5 Plan. The 2016 AQMP provides newly designated "serious" non-attainment area attainment demonstration. The plan employs the most recent emissions inventory and state-of-the-science numerical modeling tools. An update of the model simulation results for the annual PM2.5 standard is presented in Chapter 6.

The initial sections of this chapter describe the PM2.5 Federal Reference Method (FRM) monitoring data and sampling network, the historical trend of 24-hour PM2.5 design values, revisions to the speciated monitoring attainment test (SMAT) and SANDWICH data analyses, and the CMAQ modeling methodology. The subsequent sections of this chapter provide the 24-hour PM2.5 attainment demonstration, the unmonitored area analysis, and a supporting weight-of-evidence analyses.

24-Hour PM2.5 Sampling

In 2014, the U.S. EPA released the "*Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5 and Regional Haze*." The new guidance recommends using the 8 highest days of FRM data per quarter for each year for each FRM site to calculate the daily design values to ensure that the 98th percentile concentration day for the year is included in the analysis. This resulted in 32 days of FRM data for each year for each site. Tables V-7-1 through V-7-4 list the 2012 FRM data subset included as a component of the 24-hour PM NAAQS attainment analysis. Data from 2010, 2011, 2012, 2013 and 2014 complete the data requirement for the revised attainment test. Except for the Fontana site, which has a FRM sampling schedule of 1-in-3 days, FRM mass samples are collected daily at the other four FRM sampling sites (average sampling days = 341 days per year). The third highest yearly daily maximum represents the design value in Fontana, while the 8th highest is the design value for the rest of the FRM sites. Table V-7-5 provides the 5-year weighted 24-hour PM2.5 design vales for the five sites, which are the four SASS sites plus Mira Loma, the site with the highest concentration in the Basin. The 5-year weighted averages were calculated as the average of the three, three-year design values. The three-year design value periods were 2010-2012, 2011-2013 and 2012-2014. The 5-year weighted average base design value carries one digit to the right of the decimal point for 24-hour PM2.5, per EPA guidance. SASS sampling occurs on an every 6th day frequency.

In many cases, the FRM and SASS monitoring locations do not overlap. The FRM network has 21 stations where the SASS network size has varied in time, being limited to 4 sites in 2012. Four of the SASS sites are co-located with the FRM sites. In Mira Loma, the FRM design site is located in the upwind adjacent grid cell to the Rubidoux SASS sampler. The PM2.5 guidance document recommends estimating speciated

concentrations from a nearby speciation monitor when an FRM site does not have speciation data. Therefore, the Mira Loma FRM data is speciated using the Rubidoux SASS data.

TABLE V-7-1

2012 Eight Highest PM2.5 FRM Data for Each Quarter at Anaheim

	Q1	Q2	Q3	Q4
Highest	42.9	24.1	16.5	50.1
2nd Highest	25.7	19.8	15.4	43.1
3rd Highest	24.9	16.5	15.1	42.5
4th Highest	24.6	15.7	14.7	28.0
5th Highest	23.0	14.3	14.7	25.0
6th Highest	21.6	14.2	14.5	23.1
7th Highest	21.1	14.1	14.2	22.3
8th Highest	**20.0**	**14.0**	**14.0**	**21.9**

TABLE V-7-2

2012 Eight Highest PM2.5 FRM Data for Each Quarter at Central Los Angeles

	Q1	Q2	Q3	Q4
Highest	32.2	31.7	25.0	58.7
2nd Highest	32.0	25.9	21.6	44.0
3rd Highest	28.2	23.6	18.1	39.1
4th Highest	25.6	21.9	18.0	36.4
5th Highest	25.5	21.9	17.7	32.6
6th Highest	23.9	20.6	16.8	31.8
7th Highest	23.7	20.3	16.2	29.8
8th Highest	**23.3**	**20.2**	**16.0**	**29.1**

TABLE V-7-3

2012 Eight Highest PM2.5 FRM Data for Each Quarter at Fontana. Note that Fontana is sampled every third day, and thus the 98th percentile is the 3rd highest day.

	Q1	Q2	Q3	Q4
Highest	28.6	21.1	39.9	36.0
2nd Highest	26.3	20.8	20.0	35.6
3rd Highest	**22.8**	**19.1**	**18.5**	**25.6**
4th Highest	22.5	17.1	17.6	25.3
5th Highest	22.1	16.3	17.3	18.3
6th Highest	17.9	16.1	16.1	17.6
7th Highest	16.8	16.1	14.7	16.4
8th Highest	15.3	15.5	14.4	15.7

TABLE V-7-4

2012 Eight Highest PM2.5 FRM Data for Each Quarter at Mira Loma

	Q1	Q2	Q3	Q4
Highest	35.8	33.2	30.7	39.3
2nd Highest	35.1	29.3	20.8	37.9
3rd Highest	34.5	27.4	20.5	36.8
4th Highest	32.2	25.8	19.3	36.5
5th Highest	31.5	25.6	18.0	35.9
6th Highest	27.0	23.9	17.8	35.9
7th Highest	26.7	23.0	17.1	34.6
8th Highest	**26.5**	**22.7**	**17.0**	**34.1**

TABLE V-7-5

2012 Eight Highest PM2.5 FRM Data for Each Quarter at Rubidoux

	Q1	Q2	Q3	Q4
Highest	37.5	31.0	30.4	38.1
2nd Highest	33.7	30.8	18.9	37.3
3rd Highest	32.3	25.2	18.8	36.9
4th Highest	31.5	24.9	17.5	36.5
5th Highest	27.1	24.1	17.5	36.2
6th Highest	23.9	23.2	17.1	35.9
7th Highest	22.6	22.4	17.1	32.5
8th Highest	**22.6**	**21.8**	**16.9**	**31.6**

TABLE V-7-5

5-year Weighted Design Values for 24-Hour PM2.5 (µg/m^3)

Monitoring Site	24-Hour PM2.5 Design
Anaheim	25.8
Los Angeles	30.5
Fontana	32.7
Mira Loma	36.5
Rubidoux	33.1

The revised guidance updates the quarterly species fractions on "high" days, which are required for the 24-hour modeled attainment test. The new guidance recommends using the top 10% of days in each quarter as the "high" days, resulting in two days per quarter for the 1-in-6 day 2012 SASS data. Figures V-7-2 through V-7-5 depict the PM2.5 chemical species breakdown from the average of the top two PM2.5 concentration days for each quarter for the four SASS sites in the Basin. The data show the unadjusted direct measurements of the chemical species at each site. In general, concentrations in the first or fourth quarter are higher than those in the other quarters and secondary ammonium, nitrate and sulfate can comprise more than half of the total PM2.5 concentrations. Organic carbon (OC) is another significant component, which may contribute close to half of the total mass concentration in some quarters and sites.

OC as measured by a SASS sampler is believed to be highly uncertain with a mostly-positive sampling artifact. The flow rate of the SASS sampler (6.7 LPM) used to collect OC is approximately 2.5 times lower than that of the FRM sampling system (16.7 LPM), which provides the official PM2.5 mass measurement. The slower flow rate in the SASS sampler reduces the pressure drop across the filter and increases the adsorption of organic vapor on the quartz filter medium. The FRM uses a Teflon filter for mass measurements which is much less subject to organic vapor adsorption. Therefore, for the same air mass, more OC can be collected by the SASS sampler than the FRM sampler, often leading to an overbalance in the sum of the PM2.5 species relative to FRM mass. There are uncertainties in the measurements and the speciation analyses for all species; however, the greatest uncertainty in species concentration is generally associated with the measurement and analysis of OC.

U.S. EPA recommends estimating uncertain OC concentrations through an adjustment that is discussed as part of the "**S**ulfate, **A**djusted **N**itrate, **D**erived **W**ater, **I**nferred **C**arbon **H**ybrid (SANDWICH)" material balance method in the 2007 AQMP and U.S. EPA's PM2.5 modeling guidance document (Frank, 2007). According to the SANDWICH method, OC is estimated from the difference between the measured mass and the sum of all chemical species, water and a filter blank of 0.5 $\mu g/m^3$. The new species fractions for each quarter for each site are calculated by estimating OC, which are then applied to the 32 highest days of FRM mass data. Figures V-7-6 through V-7-9 depict the 2012 species fractional splits for the 6 primary components and water vapor for the four SASS sites after SANDWICH was applied.

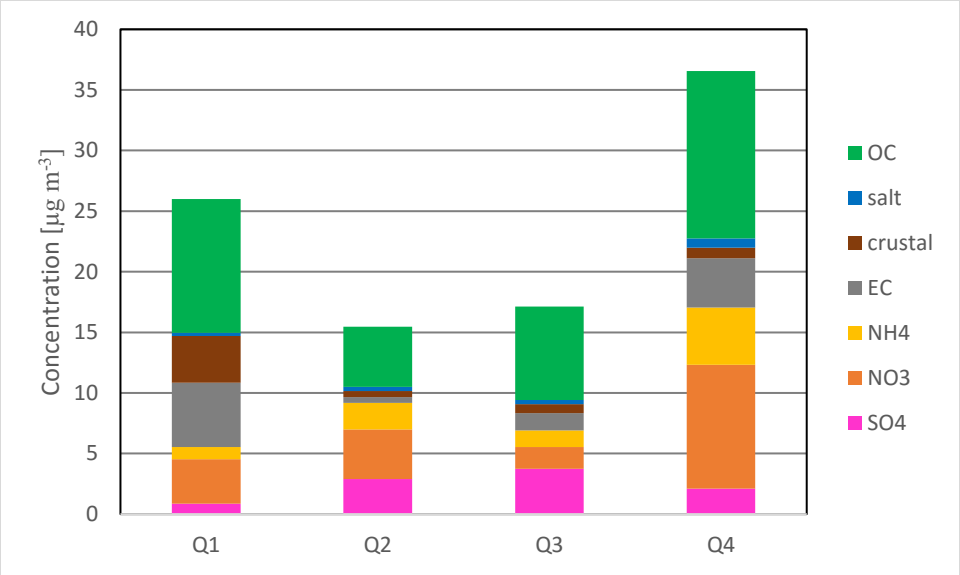

FIGURE V-7-2

Anaheim Top Two day Averaged 24-Hr PM2.5 Concentrations per Quarter in 2012

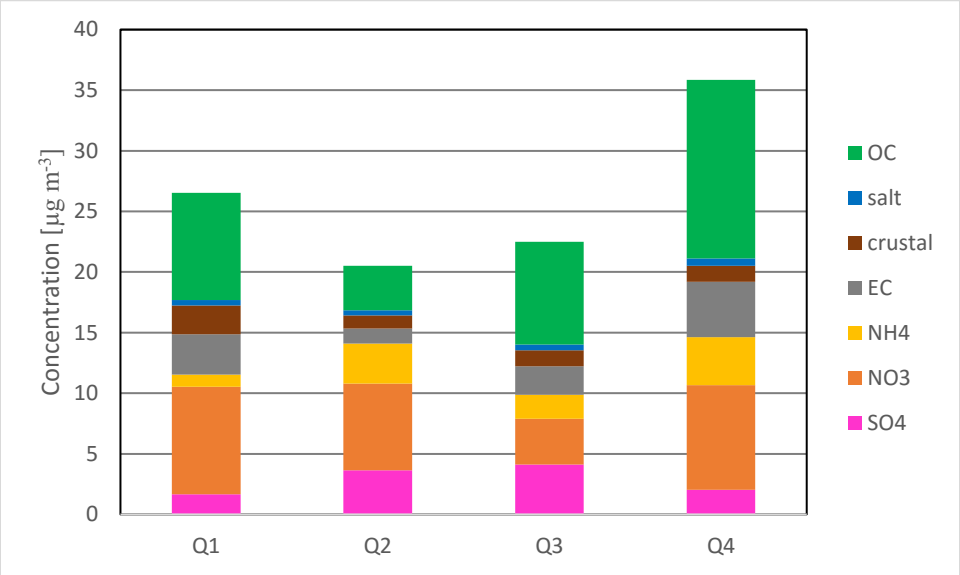

FIGURE V-7-3

Los Angeles Top Two day Averaged 24-Hr PM2.5 Concentrations per Quarter in 2012

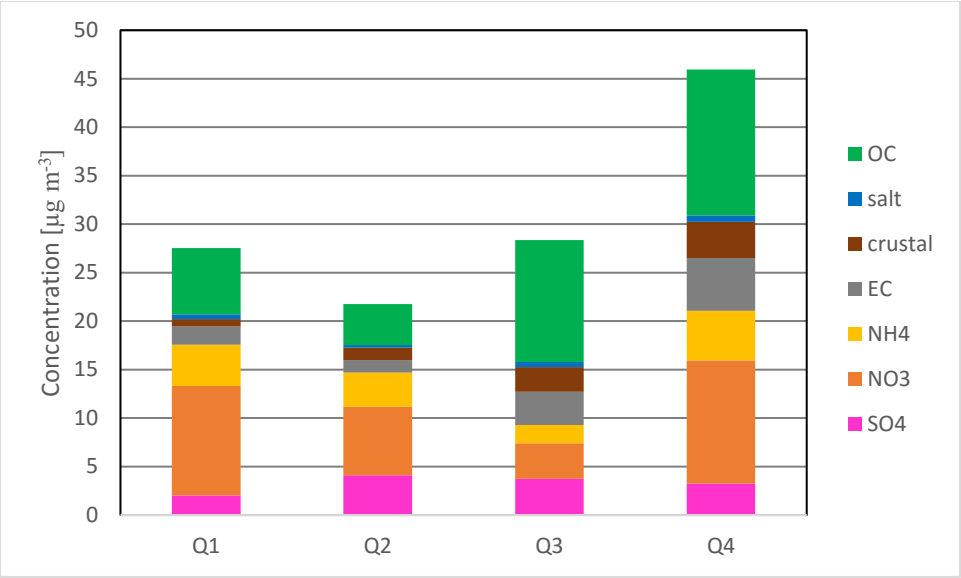

FIGURE V-7-4

Fontana Top Two day Averaged 24-Hr PM2.5 Concentrations per Quarter in 2012

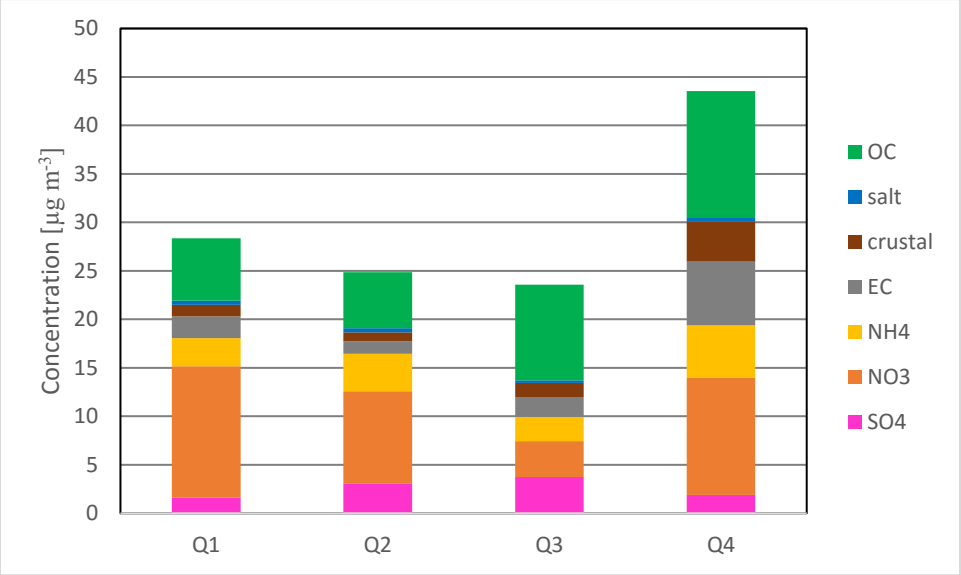

FIGURE V-7-5

Rubidoux Top Two day Averaged 24-Hr PM2.5 Concentrations per Quarter in 2012

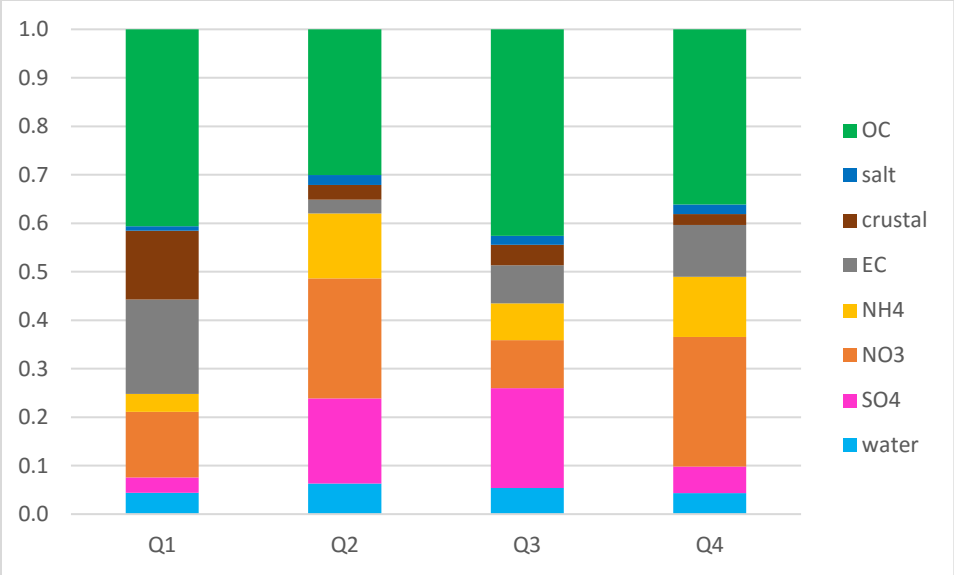

FIGURE V-7-6

2012 Anaheim Top Two day Averaged PM2.5 species fraction after SANDWICH

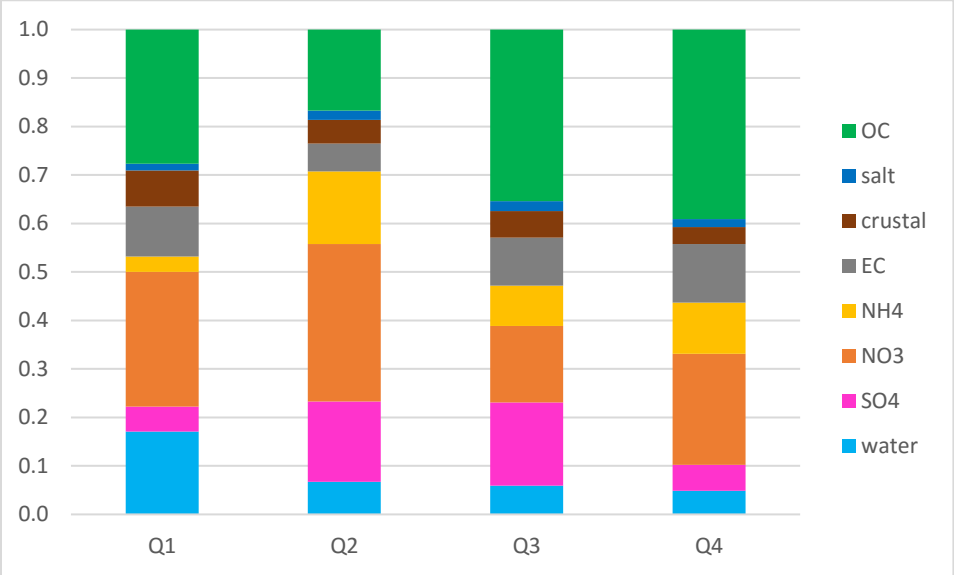

FIGURE V-7-7

2012 Los Angeles Top Two day Averaged PM2.5 species fraction after SANDWICH

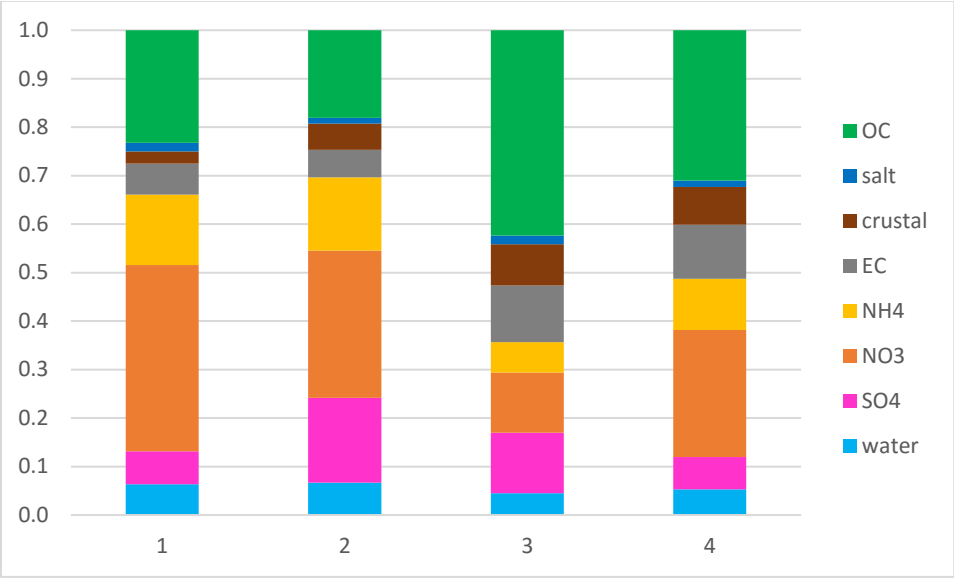

FIGURE V-7-8

2012 Fontana Top Two day Averaged PM2.5 species fraction after SANDWICH

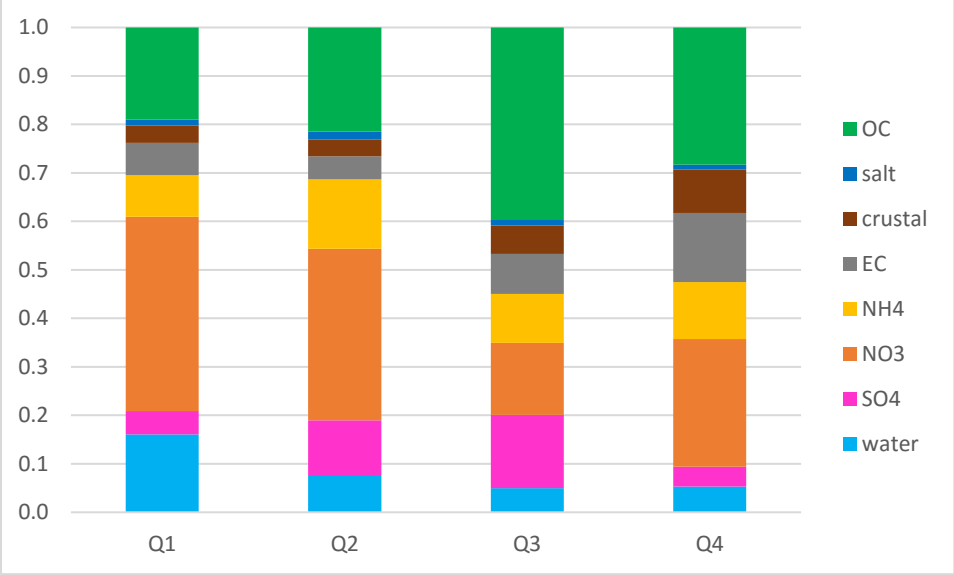

FIGURE V-7-9

2012 Rubidoux Top Two day Averaged PM2.5 species fraction after SANDWICH

24-Hour PM2.5 Modeling Approach

CMAQ simulations were conducted for each day in 2012. The simulations included 8784 consecutive hours (366 days x 24 hours) from which daily 24-hour average PM2.5 concentrations (0000-2300 hours) were calculated. A set of species-specific RRFs were generated for each future year simulation from the top 10% of modelled PM2.5 days. RRFs were generated for the ammonium ion (NH4), nitrate ion (NO3), sulfate ion (SO4), organic carbon (OC), elemental carbon (EC), sea salt (Salt) and a combined grouping of other primary PM2.5 material (Other). A total of 7 RRFs were generated for each quarter of the future year simulation. Future year concentrations of the seven component species were calculated by applying the model generated quarterly RRFs to the speciated 24-hour PM2.5 (FRM) data sorted by quarter for each of the five years used in the design value calculation. The speciation fractions used to generate 24-hour speciated PM2.5 values were determined from the "high" days. Particle bound water was determined using U.S. EPAs regression model approximation of the AIM model based on simulated concentrations of the ammonium, nitrate and sulfate ions (EPA, 2006). A blank mass of 0.5 $\mu g/m^3$ was added to each base and future year simulation. The 32 days in each year (8 per quarter) were then re-ranked based on the sum of all predicted PM species to establish a new 98th percentile concentration. A weighted average of the resulting future year 98th percentile concentrations for each of the five years was used to calculate future design values for the attainment demonstration. The 98th percentile value was determined based on the FRM sampling frequency. All the SASS sites except Fontana have a daily FRM sampling, which gives the 8th highest day as the 98th percentile. Fontana has every-three-day sampling, thus the 3rd highest day becomes the 98th percentile.

Future year PM2.5 24-hour average design values are projected for 2019, the attainment deadline for the 2006 standard of 35 $\mu g/m^3$.

Future Air Quality

The 2012 AQMP demonstrated attainment of the federal PM2.5 air quality standards by December 2014. However, due to the unforeseen drought conditions that prevailed from 2012 to 2014, and into the first quarter of 2015, 24-hour PM2.5 concentrations did not fall to the degree predicted by the model. The District was granted a voluntary bump-up to serious non-attainment status by U.S. EPA, which extended the attainment deadline by 4-years to 2019.

A simulation of 2019 baseline emissions (no controls) was conducted to assess future 24-hour PM2.5 levels in the Basin. The simulation used the projected emissions from 2012 which include all adopted control measures that will be implemented by December 31, 2019.

Simulation of the 2019 baseline emissions indicates that the Basin will attain the federal 24-hour PM2.5 standard in 2019 without additional controls. This is consistent with the findings of the 2012 AQMP, which showed attainment by 2019 with no additional controls. The projected 2019 design value is 32.1 $\mu g/m^3$ at Mira Loma.

Figure V-7-10 depicts future 24-hour PM2.5 air quality projections at the Basin design site (Mira Loma) and the four other PM2.5 monitoring sites equipped with comprehensive particulate species characterization. Shown in the figure are the baseline design values for 2012 along with projections for 2019. All of the sites will meet the 24-hour PM2.5 standard by 2019 without additional reductions beyond already adopted control measures.

Table V-7-6 provides the RRFs developed from the 2012 and 2019 baseline simulations. Table V-7-7 provides the 24-hour PM2.5 design values by component species for 2012. Table V-7-8 provides the projected future year 24-hour PM2.5 design values by component species for 2019.

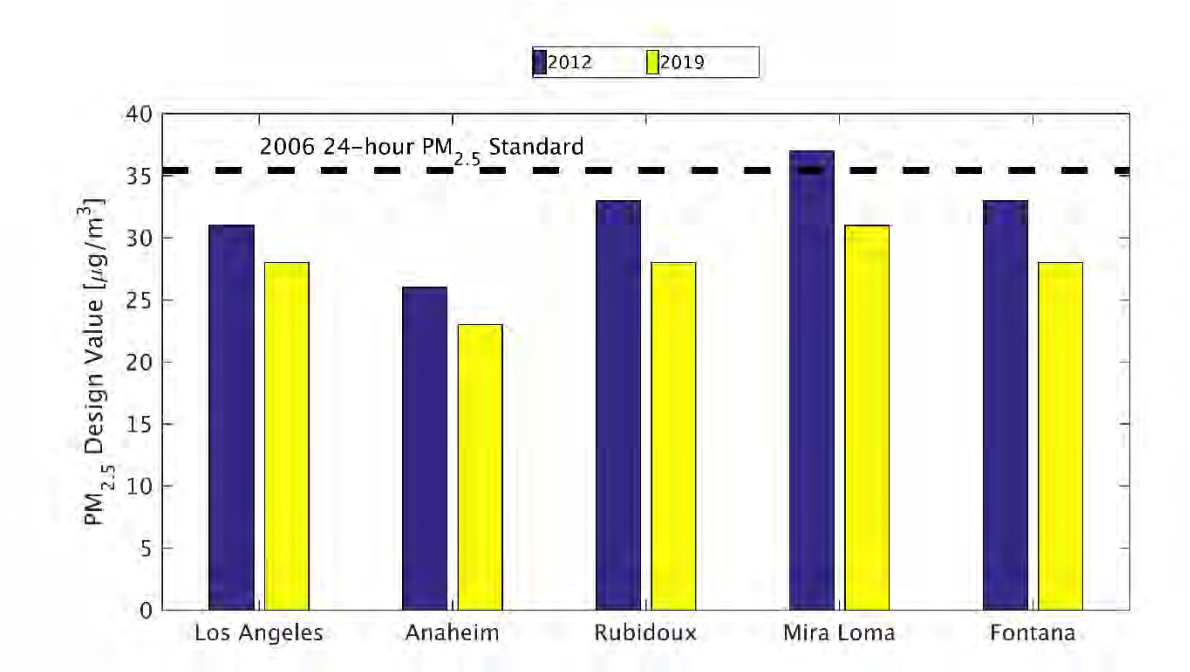

FIGURE V-7-10

Maximum 24-Hour Average PM2.5 Design Concentrations:
2012 and 2019 Baseline.

TABLE V-7-6

CMAQ predicted RRFs per species and quarter at the four SASS sites

Station	Quarter	SO4	NO3	NH4	OC	EC	Salt	Other
Anaheim	Q1	0.931	0.816	0.806	0.995	0.742	0.879	1.099
	Q2	0.936	0.714	0.718	0.993	0.756	0.903	1.09
	Q3	0.889	0.713	0.723	0.999	0.72	0.875	1.082
	Q4	0.938	0.884	0.874	0.991	0.723	0.911	1.095
Los Angeles	Q1	0.975	0.934	0.92	0.978	0.704	0.904	1.075
	Q2	0.921	0.826	0.818	0.981	0.702	0.896	1.071
	Q3	0.884	0.815	0.8	0.993	0.695	0.902	1.07
	Q4	0.979	0.908	0.905	0.982	0.694	0.887	1.076
Fontana	Q1	0.985	0.824	0.82	0.973	0.681	0.938	1.091
	Q2	0.961	0.675	0.69	0.966	0.668	0.915	1.078
	Q3	0.943	0.682	0.707	0.967	0.651	0.971	1.072
	Q4	0.966	0.748	0.752	0.972	0.677	0.924	1.086
Rubidoux	Q1	0.981	0.816	0.81	0.985	0.675	0.926	1.114
	Q2	0.92	0.676	0.667	0.976	0.645	0.948	1.093
	Q3	0.925	0.673	0.683	0.979	0.632	0.983	1.09
	Q4	0.969	0.795	0.793	0.988	0.668	0.942	1.115

TABLE V-7-7

24-hour PM2.5 chemical species and total mass for Base Year, 2012 (µg/m^3)

Locations	NH4	NO3	SO4	OC	EC	Salt	Other	Water	Blank	Mass
Anaheim	1.90	4.88	1.06	9.79	3.96	0.35	2.28	1.11	0.50	25.82
Fontana	3.43	8.48	2.52	10.14	3.29	0.49	2.17	1.73	0.50	32.74
Los Angeles	3.22	6.89	2.38	10.94	3.36	0.51	1.16	1.56	0.50	30.52
Mira Loma	3.34	13.34	1.67	7.58	3.01	0.43	1.70	4.94	0.50	36.52
Rubidoux	3.30	12.29	1.99	6.70	2.32	0.43	1.33	4.30	0.50	33.16

TABLE V-7-8

24-hour PM2.5 chemical component and total mass projected for 2019 (µg/m^3)

Locations	NH4	NO3	SO4	OC	EC	Salt	Other	Water	Blank	Mass
Anaheim	2.21	5.06	1.17	9.30	2.35	0.39	1.44	1.07	0.50	23.49
Fontana	2.57	6.34	2.41	9.75	2.17	0.46	2.33	1.48	0.50	28.01
Los Angeles	2.29	6.07	1.94	10.61	2.35	0.43	1.46	1.96	0.50	27.60
Mira Loma	2.94	9.40	1.54	8.46	2.67	0.37	2.58	2.90	0.50	31.36
Rubidoux	2.37	8.88	1.80	7.37	1.83	0.36	1.76	3.40	0.50	28.27

Spatial Projections of PM2.5 Design Values

Figure V-7-11 provides a Basin-wide perspective of the spatial extent of 24-hour PM2.5 levels in the base year 2012 resulting from the interpolation of design values at the five stations included in the attainment demonstration. Figure V-7-12 shows an interpolated spatial representation of future model-predicted 24-hour design values in 2019. Several areas around the northwestern portion of Riverside and southwestern portion of San Bernardino Counties depict grid cells with weighted PM2.5 24-hour design values exceeding 35 µg/m^3 in 2012. By 2019, Mira Loma, the PM2.5 24-hour design station, will attain the federal standard. The entire South Coast air basin, determined by the interpolated design values from the five speciation sites show attainment by 2019.

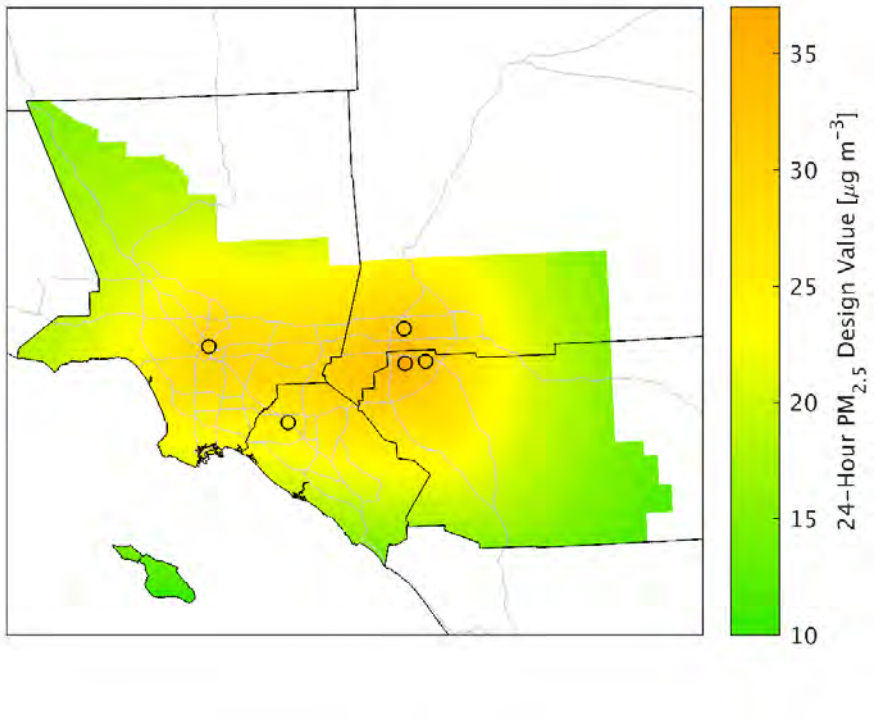

FIGURE V-7-11

2012 24-Hour PM2.5 Design Values interpolated to the South Coast Air Basin (µg/m^3). Colors Correspond to the AQI.

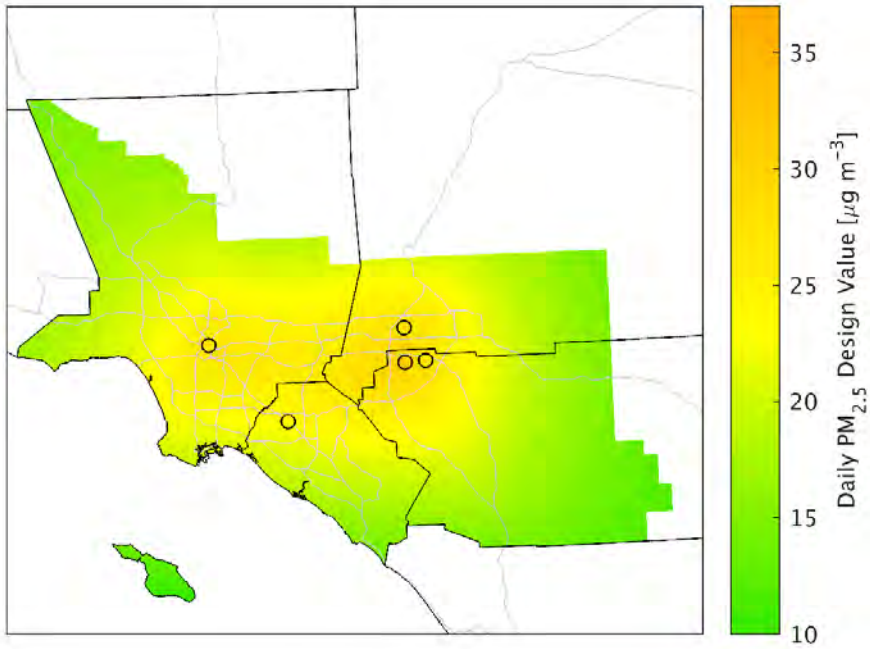

FIGURE V-7-12

2019 projected 24-Hour PM2.5 concentrations interpolated to the South Coast Air Basin (µg/m^3). Colors Correspond to the AQI.

Unmonitored Area Analysis

U.S. EPA modeling guidance requires that the attainment demonstration include an analysis that confirms that all grid cells in the modeling domain meet the federal standard. This "unmonitored area analysis" is essential since speciation monitoring is conducted at a limited number of sites in the modeling domain. Variance in the species profiles at selected locations coupled with the differing responses to emissions control scenarios are expected to result in spatially variable impacts to PM2.5 air quality in any grid cell. As described earlier in this chapter, speciation profiles from SASS sites in adjacent or collocated grid cells are used in the formal attainment demonstration for Mira Loma. With interpolation of the SASS speciation profiles, attainment demonstrations can be directly conducted for the remaining grid cells where FRM mass data has been collected over the 5-year period (2010–2014). The unmonitored area attainment test requires assessing the impacts for 32 days per year, for five years, at each unmonitored grid cell.

The methodology used to assess the unmonitored grid cell impact is as follows. The speciation fractions throughout the Basin for each relevant species, except particle bound water, were estimated with a natural neighbor interpolation for each quarter of 2012. While the four SASS speciation stations encompass all areas of high PM concentrations in the Basin, it was necessary to create "pseudo stations" at the corners of the modelling domain to aid in extrapolation. The speciation fractions at these pseudo stations were assigned as the average speciation fraction measured at all four stations. The speciation

fractions in areas of the Basin which are expected to have high PM concentrations were not appreciably affected by the choice of "pseudo station" speciation as the areas of interest are much closer to the SASS stations than the "pseudo stations." A natural neighbor interpolation based on a Voronoi tessellation has been shown to reproduce ozone concentration profiles in the Basin more accurately than an inverse distance weighting, inverse distance weight squared, nearest neighbor, or linear interpolation scheme (see Appendix 5, Chapter 5.). Figure V-7-13 details the interpolated nitrate species fractions in quarters 1-4. The interpolated species fractions for all relevant species are presented in Attachment 8.

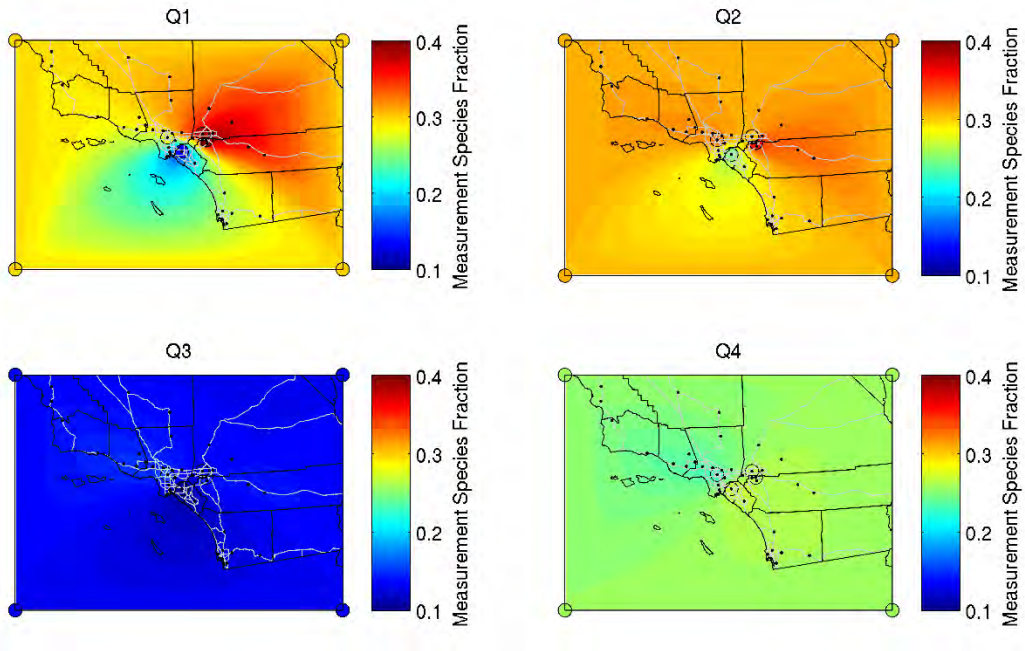

FIGURE V-7-13

2012 Interpolated Measurement Species Fractions for Nitrate. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with circles.

FRM data from 38 monitoring sites within the modeling domain were extracted from the U.S. EPA's AQS database for each year of the 5-year period. Data from stations without daily sampling were adjusted to simulate a daily sampling rate by filling in missing days with nearest measured value. Therefore, the 8th highest value in each year represented the 98th percentile measurement for each station, regardless of the sampling frequency. The highest eight concentrations sampled in each quarter in each of the five years were selected to generate the data set. This resulted in 8 x 4 x 5 = 160 days of data for each of the 38 FRM stations. Data for each of the 38 speciation stations were aggregated so that the highest concentration day measured at a station in a specific quarter and year corresponded the highest concentration day measured at all other stations in the same quarter and year. The interpolated speciation fractions were then applied to the 160 days selected depending on quarter and location. The

species concentrations on each of the 160 selected days were interpolated using a natural neighbor technique.

RRFs were calculated from the model output at each cell in the Basin using the same strategy employed for the station-specific analysis. However, the absence of measurement data between the stations did not allow for the use of selection criteria to filter out days where model performance is inadequate. Quarterly specific RRFs for nitrate are presented in Figure V-7-14. RRFs for all other species are presented in Attachment 8. The interpolated FRM data were then multiplied by the seasonally sorted, RRF-interpolated species fractions to project the future year 24-hr PM2.5 species distribution for each of the five years.

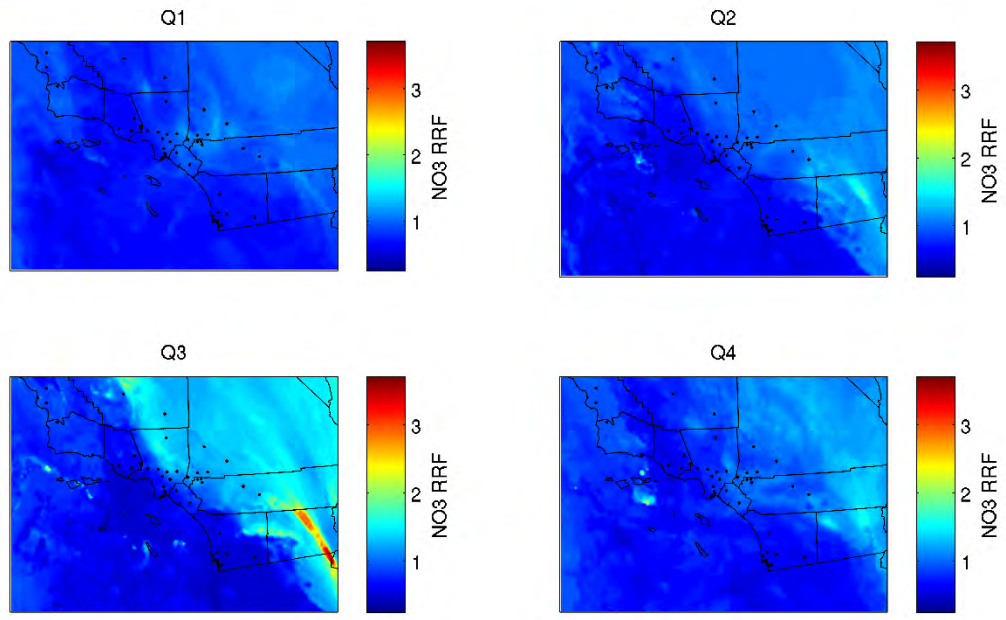

FIGURE V-7-14

2019 Spatial RRFs for Nitrate

Particle-bound water was calculated and then summed along with "blank" and all species concentrations to generate total PM2.5 mass for each of the 160 days. The eighth-highest value at each grid cell was then selected for each year and a 5-year weighted-average was applied to generate a projected 24-hour design value at each grid-cell within the Basin. The projected 24-hour design value for 2019 is presented in Figure V-7-15. All regions of the Basin are expected to attain the 24-hour standard by 2019 with a projected Basin Maximum of 32 µg m^{-3}. Figure V-7-16 presents the 2012 base-year design values for comparison.

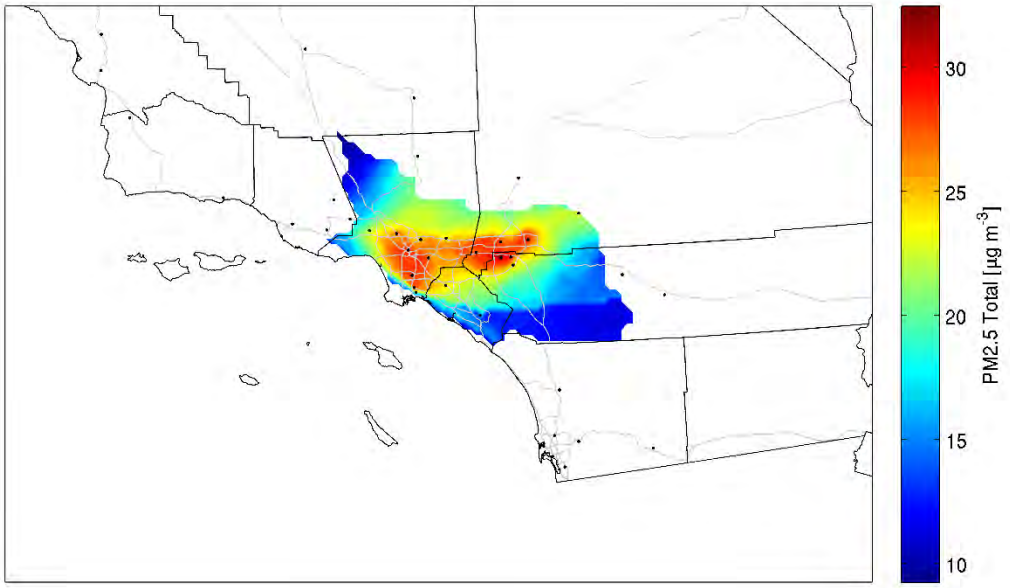

FIGURE V-7-15

2019 Projected 24-hour Design Values.

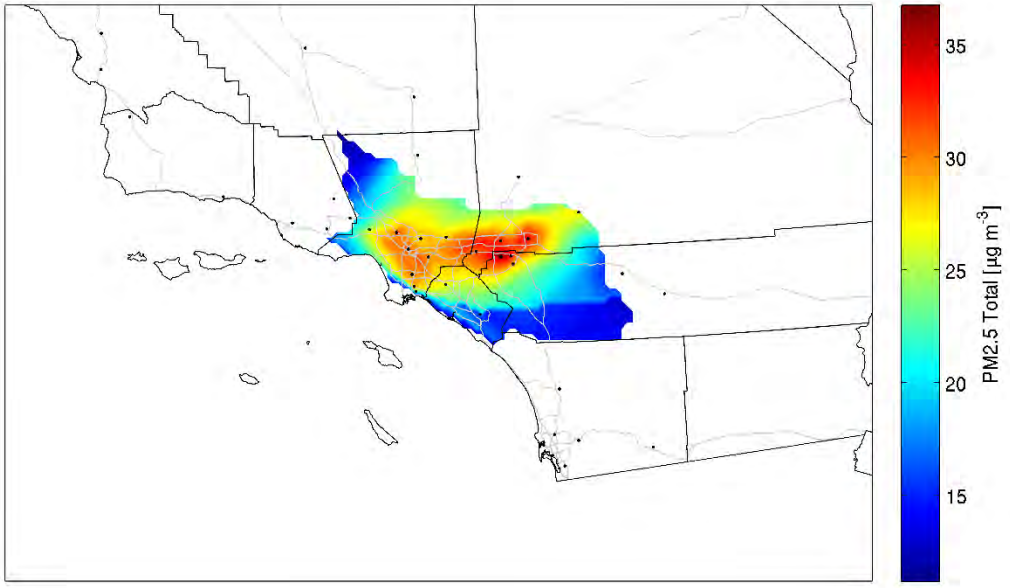

FIGURE V-7-16

2012 Baseline 24-hour Design Values.

The interpolated 2012 design values and 2019 projected design values determined from the unmonitored area analysis line up closely with the station design values. The 2019 maximum projected 24-hour PM2.5 design of 33 µg/m^3 occurred in the Mira Loma grid cell

This analysis demonstrates that the relative response to the control program is more effective in the Eastern Basin while portions of the western Basin do not exhibit the equivalent response to the implementation of the proposed control strategy but remain in attainment of the 24-hour PM2.5 NAAQS.

Effects of the Drought

In the 2012 AQMP, the 24-hour PM2.5 design value was projected to be 34.3 µg/m^3 in 2014 for Mira Loma, which would have met the standard. However, projections were not met and the measured design value ended up being 38 µg/m^3. The five year period used for the design calculation for the 2012 AQMP covered a meteorological period that was typical compared to the long term (50+ year) statistics. As a consequence, the 2014 projected 24-hour PM2.5 design value for Mira Loma assumed a similar window of average precipitation events and rainfall totals with the concurrent natural pollution dispersion potential associated with unstable weather. However, the lack of rainfall and drought conditions in the South Coast Air Basin for the past three years has impacted PM2.5 ambient levels. According to a recent study by Griffin and Anchukaitis (2014) which analyzed tree ring samples, reduced precipitation during these last years is not unprecedented, but its combination with higher temperatures due to climate change is making the drought the most severe in 1,200 years. Limited rain means there is less crusting and wetting of soil and road surfaces. Thus, more road dust and fugitive dust emissions are generated. A reduced frequency of storms translates to fewer days of enhanced pollution dispersion. Without such dispersion, there is no deep mixing of the atmosphere, particulate matter captured by raindrops or wind to transport the pollution away from the region. Further discussion on the effects of the drought can be found in Chapter 2 of the AQMP.

Figure V-7-17 depicts the trends in emissions of PM2.5 and precursors projected to 2019. In addition to the direct contribution from PM2.5 emissions, VOC contribute to the formation of organic carbon, whereas NOx and SOx contribute to the formation of aerosol nitrates and sulfates. Previous simulations for 2014 showed the relative contribution of PM2.5 precursors to total 24-hour PM2.5 concentrations, which provided a basis to aggregate emissions weighted based on their potential to form PM2.5, as equivalent PM2.5 emissions. The relative weight of each precursor was found to be the following: 0.3 for VOC, 1 for NOx, 7.8 for SOx and 14.8 for PM2.5. Figure V-7-18 shows the trend in Equivalent PM2.5 Emissions projected to 2019, which shows a steady decline throughout that time span. Figure V-7-18 also shows the trend in annual 98th percentile 24-Hour PM2.5 concentrations and their corresponding 3-Year design values, overlaid by the number of rain days for Quarters 1 (January–March) and 4 (October–December). With constant meteorological conditions, one would expect the 24-Hour PM2.5 3-Year Design Values to continue to decline following the decline in PM2.5 precursor emissions. However, dry and stable conditions persistent during the past years have offset the benefits of emission reductions and have reversed the decreasing trend in PM2.5. Considering the years 2007 and 2014, which experienced similar low precipitation, the Annual 98th percentile 24-Hour PM2.5 decreased by 42%, in parallel with a 38%

decrease in equivalent PM2.5 emissions. This suggests that despite the effects of the drought, PM2.5 concentrations should continue their decline due to the steady decrease in emissions of PM2.5 precursors. It is uncertain, however, given uncertainties in future weather patterns, how fast the decline in 24-hour PM2.5 will be. Therefore, considering the uncertainties associated with future weather conditions, 2019 remains the attainment target year for the 24-hour PM2.5 standard.

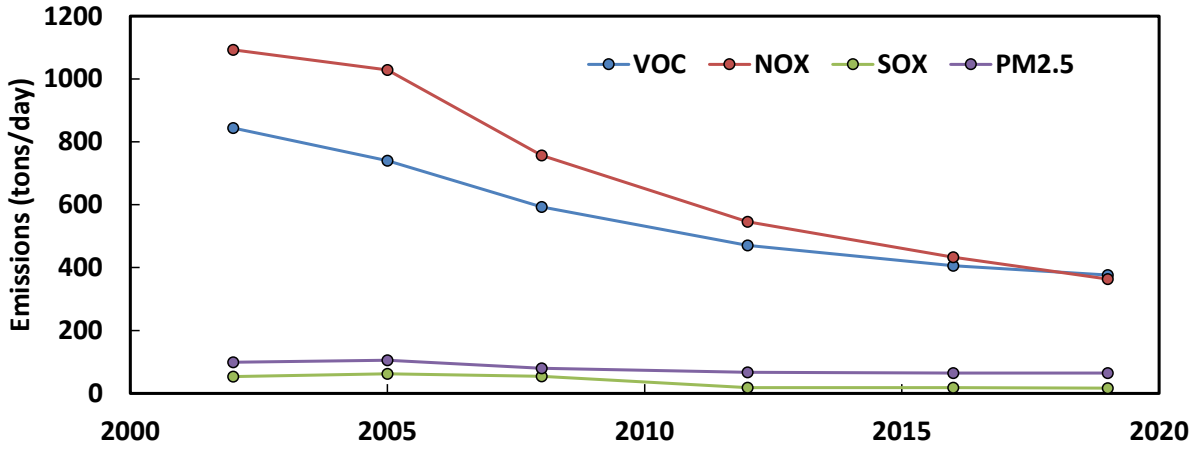

FIGURE V-7-17

Trend of PM2.5 precursor emissions from 2002 to 2019

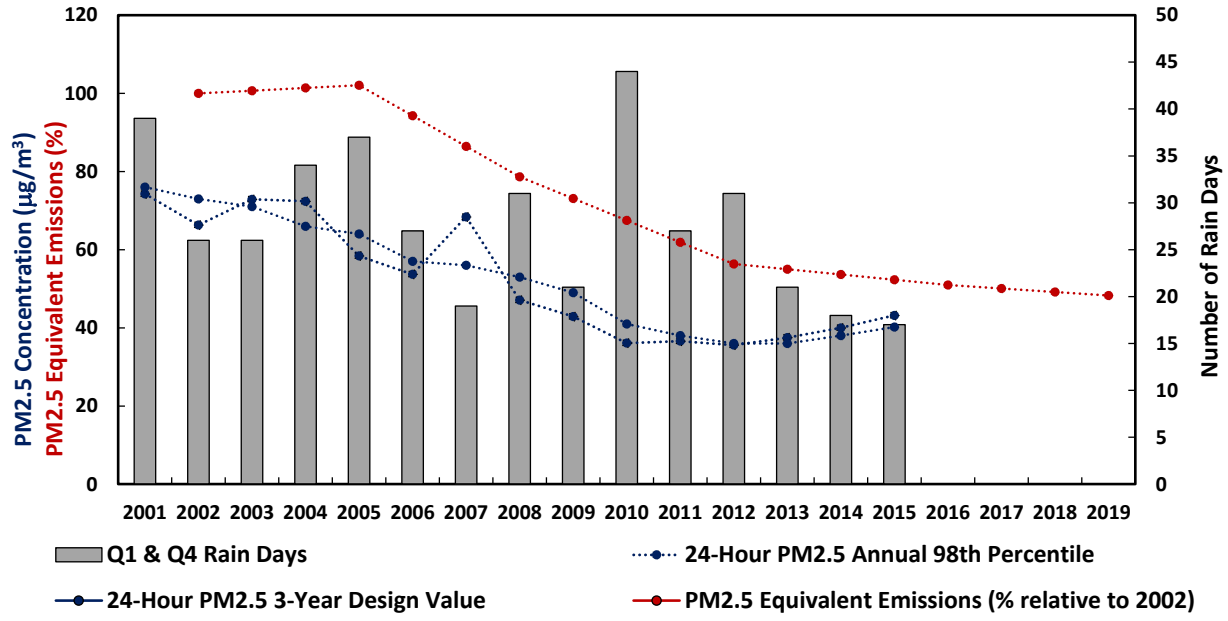

FIGURE V-7-18

Trend of South Coast Air Basin Maximum 24-Hour PM2.5 3-Year Design Values and Corresponding Annual 98th Percentile Concentration, with Number of Rain Days for Quarters 1 (Jan.–Mar.) and 4 (Oct.–Dec.) and Annual Trends of PM2.5 Equivalent Emissions Relative to 2002
(PM2.5 from Riverside-Rubidoux air monitoring station through 2006, then Mira Loma after that station was installed; 2015 PM2.5 data is preliminary)

References

Griffin D., Anchukaitis K.J., 2014. How unusual is the 2012-2014 California drought? *Geophysical Research Letters*, 41, 9017-9023

CHAPTER 8

1-HOUR OZONE ATTAINMENT DEMONSTRATION

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Introduction

On February 6th, 2013, in response to a California Ninth Circuit Court of Appeals remand, U.S. EPA published a final rule to require California to provide a new 1-hour ozone attainment demonstration for the South Coast Air Basin (U.S. EPA, 2013). EPA disapproved the attainment demonstration in the 2003 SIP revision because it relied in large part on control measures that had been withdrawn by CARB following revocation of the 1-hour standard. A comprehensive plan for 1-hour ozone attainment was submitted as a part of the 2012 AQMP. A detailed background discussion on the reasoning for the required revision to the 1-hour ozone SIP was provided in the 2012 AQMP.

The U.S. EPA rule requires that attainment is achieved as expeditiously as practicable, but no later than five years, with a total of up to ten years for attainment of the now revoked 1-hour standard, if the state shows that ten years are needed. This required a demonstration of attainment of the 0.12 ppm standard by 2023, with emissions reductions in place by the end of 2022.

This section updates the attainment demonstration based on most recent emissions inventory and modeling configuration.

Background

Modeling platforms, meteorological models and chemistry packages have undergone significant enhancements since the 1997 AQMP attainment demonstration when the Urban Airshed Model (UAM) with CB-IV chemistry was the primary tool for projecting air quality. During development of the 2003 AQMP, the District convened a panel of seven experts to independently review the regional air quality modeling for ozone. The consensus of the panel was for the District to move to more current state-of-the-art dispersion platforms and chemistry modules. At that time, the model selected for the 2007 AQMP ozone attainment demonstrations was the Comprehensive Air Quality Model with Extensions (CAMx) (Environ, 2002), using SAPRC99 chemistry. The 2012 AQMP continued to move forward in the incorporation of current state-of-the-art modeling platforms to conduct regional modeling analyses. The 2012 AQMP PM2.5 attainment demonstration and ozone implementation update was developed using the U.S. EPA supported Community Multiscale Air Quality (CMAQ) (version 4.7.1) air quality modeling platform with SAPRC99 chemistry, and the Weather Research and Forecasting Model (WRF) (version 3.3) meteorological fields. The 2016 relies on a similar platform with incremental upgrades: CMAQ version 5.0.2 with SAPRC07 chemistry and WRF version 3.6. Appendix V, Chapter 2 provides an expanded discussion of the current modeling platform.

Ozone Representativeness

The 1997 AQMP and 2003 AQMP 1-hour ozone attainment demonstrations relied on direct output from model simulations to project future year air quality and design values. This “deterministic” approach was based on the premise that future year projected baseline inventories were accurate and the impacts of

implementing the control program were well-simulated. In addition, the form of the 1-hour ozone standard was directed at the fourth highest concentration in a three year period for a given air monitoring station. In essence, the analysis looked at the 2nd highest concentration in a given year, typically occurring during the worst-case meteorological scenario.

On the other hand, the 8-hour ozone attainment demonstrations included in the 2007 AQMP and 2012 AQMP have relied on the use of relative response factors (RRF) determined from the ratio of future to base year simulation projections to estimate future year design values. Since shifting to the 8-hour ozone standard, the RRF estimated from multiple meteorological episodes has been the primary methodology to estimate future design values. Both approaches, (deterministic or RRF), have their limitations: the deterministic method relies on accurate modeling and the proper selection of a meteorological episode while the RRF approach tends to place less reliance on individual day model performance since the factor is based on an average of several events having similar meteorological profiles. However, basing the RRF on multiple days may mask the meteorological profile characteristics of an extreme event such as an annual second maximum concentration.

The 1-hour ozone portion of the 2012 AQMP relied on a deterministic approach with the RRF approach included as part of the weight of evidence discussion. The RRF approach employed in the 2012 AQMP as the weight of evidence analysis is deemed the 'tiered approach', which tiered the concentration threshold for accepting a simulation station day based on three criteria for evaluation: (1) the base year daily maximum concentration absolute prediction error (calculated for a station per episode day) must be 20 percent or less; (2) the observed station concentration must be within 25 percent of the design value; and (3) a minimum of four station specific days simulated must meet the error at the set concentration threshold for the RRF to be calculated. If there are less than four days to meet the selection criteria, the threshold was lowered by 5 ppb increments until the RRF included a minimum four days. The first two categories were identical to the 8-hour criteria.

No specific modeling guidance applies to this current analysis since the 1-hour standard has been revoked. For the current AQMP, a RRF method was used as a primary tool to project future design values in order to ensure consistency with the 8-hour analysis.

The approach used in the current AQMP to project 1-hour ozone is similar to the RRF approach established in the U.S. EPA guidance (U.S. EPA, 2014) for 8-hour ozone. The new 8-hour guidance requires 10 days to be included in the RRF. If any of the top 10 days are predicted to be lower than 60 ppb, they are excluded in the RRF calculation, but a minimum of 6 days are required. In the 1-hour analysis, 90 ppb was used as a threshold, which was found to be the optimal value for the 1-hour RRF calculation in the San Joaquin Valley Air Basin (Kulkarni 2014). The 8-hour ozone standards takes the 4th highest reading in a year and averages over a three-year period. However, the 1-hour standard allows on average one exceedance per year, therefore, the 4th highest value over a three-year period is the design value. In other words, the 1-hour standard focuses on the 1st or 2nd highest days of the year, while the 8-hour standard accounts for the 4th highest. In this context, the 10-day RRF approach used in the 8-hour attainment demonstration may be inappropriate for the 1-hour demonstration and may mask the characteristics of the extreme events. Therefore, additional analysis was included using fewer days to estimate future design values.

Calculations with three, five, and ten days included in the RRF were conducted to determine the RRF methodology that represents the 1-hour standard appropriately.

In the 2012 AQMP, the maximum modelled grid cell in the 3x3 grid centered at each station was retrieved from the base and future simulations. In the current AQMP, the maximum modelled value in the 3x3 grid surrounding each station is compared to the corresponding grid position in the future year.

This update to the future year ozone projection focuses on 153 days of ozone air quality observed from May 1st through September 30th of 2012. During this period, several well defined multiday ozone episodes occurred in the Basin with 16 total days having daily Basin-wide maximum concentrations of 120 ppb or higher.

Figure V-8-1 depicts the time series of the daily Basin maximum and the Fontana, Upland, and Redlands daily maximum 1-hour ozone air quality during the ozone season in 2012 (May through September). The design site for 1-hour ozone is Fontana (138 ppb), while the 8-hour ozone design site is Redlands. Several locations in the San Bernardino and Riverside Valleys exhibit similar transport and daily patterns of ozone formation as Fontana. The Basin max for 1-hour ozone in year 2012 was observed at Glendora on August 11th, with a value of 147 ppb.

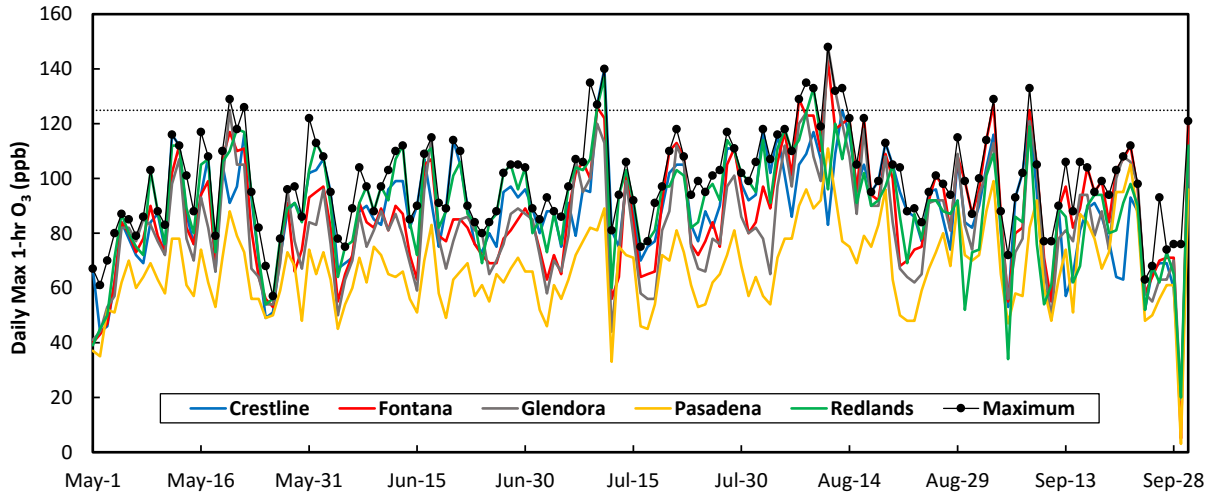

FIGURE V-8-1

Observed Basin, Fontana, Upland, and Redlands Daily Maximum 1-Hr Average Ozone Concentrations: May 1 through Sept 30, 2012.

One-hour ozone design values were calculated for the 2010 to 2014 period for the attainment analysis. At each station, the fourth highest value over each three year period between 2010 and 2014 was averaged, representing the five year average design value. The same data completeness requirement used in the 8-hour design value was adopted for the 1-hour standard as well. In that, even if a year did

not meet the 75% of data completeness test, it was only retained if the resulting design value was greater than the standard.

Table V-8-1 lists the 2010 to 2014 5-year weighted design values used in the future year ozone projections. Stations are color coded according to their performance evaluation zone defined in the Model Performance Evaluation section below.

TABLE V-8-1

2010–2014 Weighted 1-hr Ozone Design Values.

Station	2010–2014 1-hr Design Value	Performance Evaluation Zone
Costa Mesa	86.7	Coastal
LAX	81.3	Coastal
Long Beach	--*	Coastal
Mission Viejo	97.3	Coastal
West Los Angeles	93.7	Coastal
Burbank	--*	SanFernando
Reseda	125.0	SanFernando
Santa Clarita	132.7	SanFernando
Azusa	112.7	Foothills
Glendora	132.3	Foothills
Pasadena	--*	Foothills
Anaheim	86.0	UrbanSource
Central Los Angeles	89.3	UrbanSource
La Habra	98.3	UrbanSource
Pico Rivera	100.0	UrbanSource
Pomona	117.0	UrbanSource
Banning	--*	UrbanReceptor
Crestline	132.7	UrbanReceptor
Fontana	138.3	UrbanReceptor
Lake Elsinore	108.3	UrbanReceptor
Perris	114.7	UrbanReceptor
Redlands	133.3	UrbanReceptor
Rubidoux	124.3	UrbanReceptor
San Bernardino	123.7	UrbanReceptor
Upland	135.0	UrbanReceptor
Indio	97.3	CoachellaValley
Palm Springs	112.0	CoachellaValley

* did not meet the U.S. EPA's data completeness requirement and therefore no Design Value is available

Ozone Modeling Configuration

In the 2007 AQMP, the Comprehensive Air Quality Model with extensions (CAMx) was used as the primary chemical transport modeling platform. CAMx, including its predecessor, the Urban Airshed Model (UAM) (EPA, 1990) has been applied to many air pollution episodes in California and has demonstrated its capability as a valid tool for attainment demonstrations. While the District has a long history and significant expertise with the use of CAMx, the Community Multi-scale Air Quality (CMAQ) model provides two distinct advantages: CMAQ has been widely applied to various locations and episodes and is actively updated by a large users' community, including the U.S. EPA. Therefore, the 2012 AQMP used CMAQ as the primary modeling tool and CAMx to provide weight of evidence. The CMAQ version 5.0.2 used in the current AQMP has an updated aerosol chemical mechanism, updated numerical solvers for mass-consistent advection schemes, updated in-line plume rise calculation, updated in-line photolysis calculation, and an updated adjustment for nocturnal diffusion parameters when compared to version 4.7.1 used in the 2012 AQMP. SAPRC07 with version "c" toluene updates, Euler Backward Iterative (EBI) chemical solver, aero6 aerosol module, Yamo horizontal advection scheme, WRF vertical advection, and Asymmetric Convective Model version-2 (ACM2) vertical diffusion scheme were used in CMAQ. See Chapter 2 of Appendix 5 for the details of the modeling protocol associated with the chemical transport modeling.

The inner-most modelling domain of the WRF meteorological simulations overlaps the CMAQ modeling domain, with the exception of an extra 3 grid cells along the western, southern, and eastern boundary and an extra 9 grid cells along the northern boundary in the WRF domain. The CMAQ domain contains 156 cells in the east/west direction and 102 cells in the N-S direction. The vertical coordinate and each computational layer definition are identical to those of the WRF domain. However, layers in the middle and upper troposphere are combined to maximize computational efficiency, resulting in fewer layers. Impacts of vertical layer collapsing and the configuration employed to minimize artificial errors associated with this approximation have been evaluated intensively during the 2012 AQMP; therefore, the configuration developed in the previous AQMP was employed in the current simulations. In total, 18 layers were included in the CMAQ simulations with approximately 14 layers located below 2000 m above the ground level.

Base-year Ozone Model Performance Evaluation

For the CMAQ performance evaluation, the modeling domain is separated into several sub-regions or zones. Figure V-8-2 depicts the sub-regional zones used for the base-year simulation performance. The different zones present unique air quality profiles. Different performance evaluation zones were used in previous ozone modeling attainment demonstrations. Past evaluations included nine zones that represented the Basin and portions of Ventura County, the Mojave Desert and the Coachella Valley.

For the current analysis, the Basin has been re-categorized into six zones to make the analysis more concise and illustrative: A "Coastal" zone representing source receptor areas (SRA) 2-4 and 18-21, a "San Fernando" zone representing SRA 6,7, and 13 within the San Fernando Valley, a "Foothills" zone representing SRA 8 and 9, an "Urban Source" zone representing SRA 1, 5, 10-12, 16, and 17, an "Urban Receptor" zone representing SRA 22-29 and 33-38, and a "Coachella Valley" zone representing SRA 30 and 31. Of the six zones, the "Urban Receptor" region represents the Basin maximum ozone concentrations and the primary downwind impact zone. Table V-8-2 contains additional information regarding each station used in the analysis.

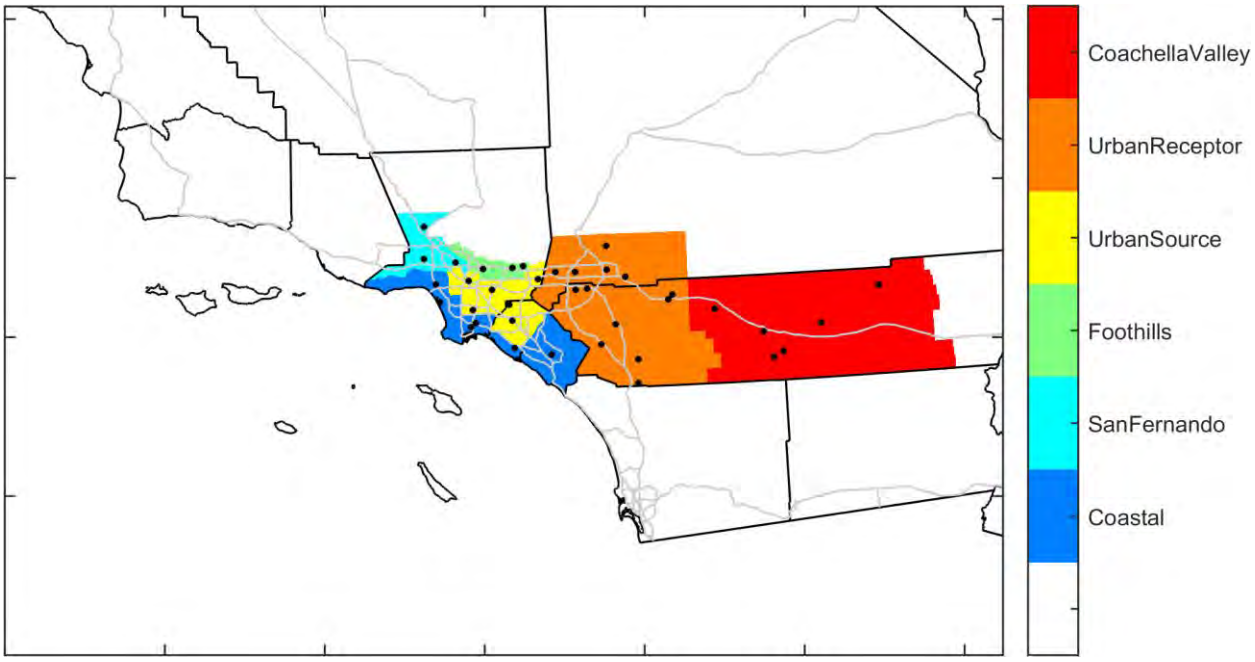

FIGURE V-8-2

Performance Evaluation Zones

TABLE V-8-2

Station Information

Location	Abbrev.	County	EPA Site Number	Source Receptor Area	Performance Evaluation Zone
Costa Mesa	CSTA	Orange	1003	18	Coastal
LAX	LAXH	Los Angeles	5005	3	Coastal
Long Beach	LGBH	Los Angeles	4002	4	Coastal
Long Beach Hudson	HDSN	Los Angeles	4006	4	Coastal
Mission Viejo	MSVJ	Orange	2022	19	Coastal
West Los Angeles	WSLA	Los Angeles	113	2	Coastal
Burbank	BURK	Los Angeles	1002	7	SanFernando
Reseda	RESE	Los Angeles	1201	6	SanFernando
Santa Clarita	SCLR	Los Angeles	6012	13	SanFernando
Azusa	AZUS	Los Angeles	2	9	Foothills
Glendora	GLEN	Los Angeles	16	9	Foothills
Pasadena	PASA	Los Angeles	2005	8	Foothills
Anaheim	ANAH	Orange	7	17	UrbanSource
Central Los Angeles	CELA	Los Angeles	1103	1	UrbanSource
Compton	CMPT	Los Angeles	1302	12	UrbanSource
La Habra	LAHB	Orange	5001	16	UrbanSource
Pico Rivera	PICO	Los Angeles	1602	11	UrbanSource
Pomona	POMA	Los Angeles	1701	10	UrbanSource
Banning	BNAP	Riverside	12/1016	29	UrbanReceptor
Crestline	CRES	San Bernardino	5	37	UrbanReceptor
Fontana	FONT	San Bernardino	2002	34	UrbanReceptor
Lake Elsinore	ELSI	Riverside	9001	25	UrbanReceptor
Mira Loma	MRLM	Riverside	8005	23	UrbanReceptor
Perris	PERI	Riverside	6001	24	UrbanReceptor
Redlands	RDLD	San Bernardino	4003	35	UrbanReceptor
Riverside	RIVR	Riverside	8001	23	UrbanReceptor
San Bernardino	SNBO	San Bernardino	9004	34	UrbanReceptor
Temecula	TMCA	Riverside	9	26	UrbanReceptor
Upland	UPLA	San Bernardino	1004	32	UrbanReceptor
Indio	INDI	Riverside	1999/2002	30	CoachellaValley
Palm Springs	PLSP	Riverside	5001	30	CoachellaValley

Statistical Evaluation

The statistics used to evaluate 1-hour average CMAQ ozone performance include the following:

Statistic for O_3	Definition
Daily-Max Bias Error Unpaired	Average of the differences in observed and predicted daily maximum values. Negative values indicate under-prediction. $BiasError = \frac{1}{N}\sum(Obs - Pred)$
Daily-Max Bias Error Paired	Average of the differences in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached. Negative values indicate under-prediction. $BiasError = \frac{1}{N}\sum(Obs - Pred)$
Daily-Max Gross Error Unpaired	Average of the absolute differences in observed and predicted daily maximum values $GrossError = \frac{1}{N}\sum\lvert Obs - Pred\rvert$
Daily-Max Gross Error Paired	Average of the absolute differences in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached. $GrossError = \frac{1}{N}\sum\lvert Obs - Pred\rvert$
Normalized Daily-Max Bias Error Unpaired	Average of the quantity: difference in observed and predicted daily maximum values normalized by the observed daily maximum values. Negative values indicate under-prediction. $NormBiasError = \frac{1}{N}\sum\left(\frac{Obs-Pred}{Obs}\right)\cdot 100$

Normalized Daily-Max Bias Error Paired	Average of the quantity: difference in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached normalized by the observed daily maximum concentration. Negative values indicate under-prediction. $NormBiasError = \frac{1}{N}\sum\left(\frac{Obs-Pred}{Obs}\right)\cdot 100$
Normalized Daily-Max Gross Error Unpaired	Average of the quantity: absolute difference in observed and predicted daily maximum values normalized by the observed daily maximum concentration $NormGrossError = \frac{1}{N}\sum\left\|\frac{Obs-Pred}{Obs}\right\|\cdot 100$
Normalized Daily-Max Gross Error Paired	Average of the quantity: absolute difference in daily maximum observed value and the corresponding predicted concentration at the hour that the observational maximum was reached normalized by the observed daily maximum concentration $NormGrossError = \frac{1}{N}\sum\left\|\frac{Obs-Pred}{Obs}\right\|\cdot 100$
Peak Prediction Accuracy Unpaired	Difference in the maximum of the observed daily maximum and the maximum of the predicted daily maximum normalized by the maximum of the observed daily maximum $PPA = \frac{(maximum(Pred)-\text{maximum}(Obs))}{\text{maximum}(Pred)}$

Predicted concentrations are extracted from model output in the grid cell that each monitoring station resides.

The base year average regional model performance for May through September 2012 for each of the five zones are presented in Tables V-8-3 to V-8-8 for days when Basin maximum 8-hour ozone levels were at least 60 ppb. Only stations with more than 75percent of the hourly measurements during each month of the ozone season were included in the analysis.

In general, the model over-predicts 8-hr daily-maximum ozone concentrations in the “Coastal” and “Urban Source” regions. Conversely, the model under-predicts 8-hr daily-maximum ozone concentrations in the “San Fernando”, “Foothills”, and “Urban Receptor” regions.

Model performance can be evaluated graphically with density scatter plots. Figure V-8-3 compares the measured and modelled 1-hr ozone concentrations for every hour in each region. Figure V-8-4 compares the measured and modelled maximum 1-hr ozone concentrations for 2012.

TABLE V-8-3

2012 Base Year 1-Hour Average Ozone Performance for Days When Regional 1-Hour Maximum ≥ 100 ppb in the "Coastal" region

Region	Coastal													
Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	41.8	38.8	65.5	59.5	58.5	7	1	10.1	9.8	9.2	-3.5	15.4	19.5	5.6
Jun	37.3	36.8	60.7	52.5	51	9.7	1.5	11.4	8.4	14.4	-5.5	18.6	22.1	7.5
Jul	31.9	32.5	54.8	50.2	51.9	2.9	-1.8	7.5	8.2	3.1	-8.6	13.4	19	13
Aug	36	29.9	62.6	57.6	49.8	12.8	7.7	14.5	12.2	17.6	9.1	21.5	19.9	9.9
Sep	38.2	33	65.3	58.9	61	4.3	-2.1	11.7	12.9	4.2	-10	18.1	25.8	-4.7

TABLE V-8-4

2012 Base Year 1-Hour Average Ozone Performance for Days When Regional 1-Hour Maximum ≥ 100 ppb in the "San Fernando" region

Region	San Fernando													
Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	47.6	42.1	73.6	70.9	83.6	-10.1	-12.7	12.2	14.7	-15.2	-20.1	17.8	22.5	-28.7
Jun	44.8	41.8	75.6	70.4	79.5	-4	-9.2	8.7	12	-6	-14.4	11.7	18.1	2
Jul	39	42.6	72	67.2	86.5	-14.5	-19.2	16.3	19.9	-20.6	-29.6	23	30.5	-33
Aug	46.3	41.7	80.6	74.9	92.9	-12.4	-18	15.1	19.1	-16.2	-25.7	19.5	27.1	-30.3
Sep	42.3	38.2	70.2	61.6	86.6	-16.5	-25	17.5	25.1	-28.1	-49.2	29.4	49.3	-38.9

TABLE V-8-5

2012 Base Year 1-Hour Average Ozone Performance for Days When Regional 1-Hour Maximum ≥ 100 ppb in the "Foothills" region

Region	Foothills													
Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	47.4	37.5	74.8	69.4	79.2	-4.4	-9.8	10.3	12.7	-6.5	-15.3	13.8	18.8	-27.2
Jun	43.3	37.4	72.4	65.1	74.1	-1.7	-9	8.9	11.5	-2.9	-14.4	12.1	17.8	-27
Jul	36.8	36.6	68.8	61.8	83	-14.2	-21.2	15.8	21.6	-22.8	-37	24.7	37.5	-20.2
Aug	44.1	35.8	78.6	72.7	90.4	-11.8	-17.8	15.7	19.8	-17.3	-27.7	21.9	30.3	-27.1
Sep	42.8	39.3	68.2	64	91.5	-23.3	-27.5	24.1	27.6	-42.1	-51.5	43	51.6	-25.2

TABLE V-8-6

2012 Base Year 1-Hour Average Ozone Performance for Days When Regional 1-Hour Maximum ≥ 100 ppb in the "Urban Source" region

Region	Urban Source													
Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	42.2	35.8	70.8	65.6	64.2	6.6	1.5	9.9	8.2	8.8	0.8	13.7	12.8	1.6
Jun	38.2	34.9	67.5	61.5	59	8.6	2.6	10.6	8.4	12.2	2.7	15.3	13.7	0.6
Jul	32.4	31.4	62.5	55.1	61.5	0	-6	9.2	11.1	-1	-12.8	14.5	20.4	1.3
Aug	37.5	29.2	72.6	66.8	64.5	8.1	2.4	13.4	12.7	9.5	0.7	18.2	19.6	7.9
Sep	37.7	31.2	66.3	60.6	72.8	-6.4	-12.2	14.3	16	-13.1	-25.8	24.2	31.6	-28.3

TABLE V-8-7

2012 Base Year 1-Hour Average Ozone Performance for Days When Regional 1-Hour Maximum ≥ 100 ppb in the "Urban Receptor" region

Region	Urban Receptor													
Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	58.2	52.4	88.7	81.1	92.4	-3.8	-9.8	10.8	14.1	-4.8	-13.2	12.4	17.8	-5.7
Jun	53.8	48.4	85	80.4	87.4	-2.4	-7	9.9	10.7	-3.9	-10.2	12	14.5	-5.8
Jul	48.1	49.5	81.9	75.9	93.2	-11.1	-16.9	15.1	18.2	-15.5	-25.3	20	26.8	-17.3
Aug	54	49.1	91.4	84.2	97	-5.6	-12.7	14.5	18.1	-8.6	-19.5	17.4	25	-8
Sep	46.2	42.9	70.7	62.9	86.4	-15.6	-23.5	20.7	26.2	-26.5	-47.4	32.1	50.4	-13.4

TABLE V-8-8

2012 Base Year 1-Hour Average Ozone Performance for Days When Regional 1-Hour Maximum ≥ 100 ppb in the "Coachella Valley" region

Region	Coachella Valley													
Month	Mean Pred. [ppb]	Mean Obs. [ppb]	Daily-Max Mean Pred. Unpaired [ppb]	Daily-Max Mean Pred. Paired [ppb]	Daily-Max Mean Obs. [ppb]	Daily-Max Bias Err. Unpaired [ppb]	Daily-Max Bias Err. Paired [ppb]	Daily-Max Gross Err. Unpaired [ppb]	Daily-Max Gross Err. Paired [ppb]	Norm Daily-Max Bias Err. Unpaired [%]	Norm Daily-Max Bias Err. Paired [%]	Norm Daily-Max Gross Err. Unpaired [%]	Norm Daily-Max Gross Err. Paired [%]	Peak Prediction Accuracy Unpaired [ppb]
May	64.7	64.7	76.5	70.3	82.6	-6.1	-12.3	10.3	14.6	-8.5	-18.9	13.5	21.7	-23.6
Jun	56.5	58.4	69.8	62.6	76.9	-7.1	-14.3	9.6	15.5	-11.5	-26.4	14.8	28	-3.8
Jul	48.8	49.4	64	55	66.9	-2.7	-11.7	7.7	13.1	-4.6	-22.9	12.3	25.1	-9.8
Aug	51.8	48.4	66.5	57.6	67.2	-0.7	-9.6	9.5	12.3	-0.9	-18	14.3	22.4	-20.7
Sep	45.4	38.6	56.3	50.2	58.4	-2.1	-8.2	8.6	12.1	-4.3	-20	15.1	27.1	-24.8

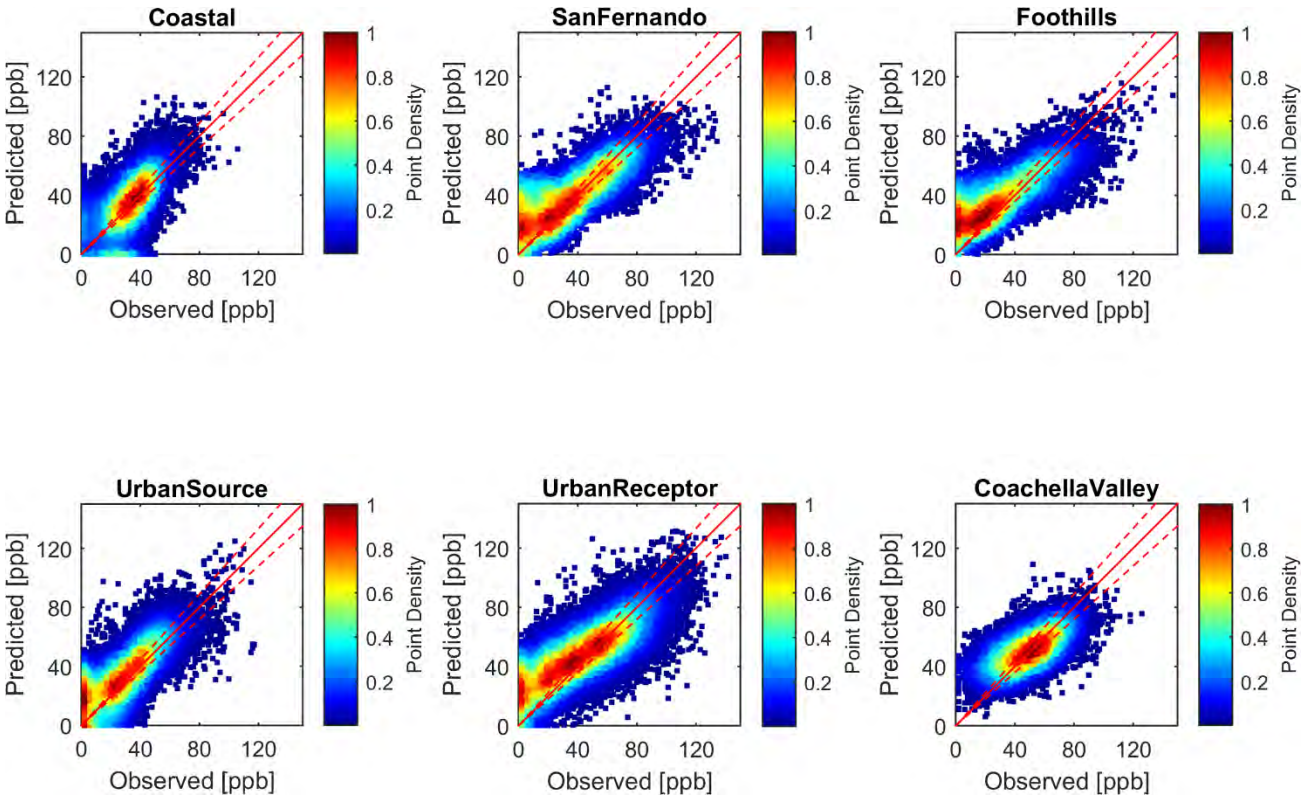

FIGURE V-8-3

Density scatter plot of Observed Vs. Predicted 1-Hour regional ozone hourly values. Dashed lines indicate 10 percent error bounds.

The density scatter plots further illustrate the over-prediction of high 1-hour ozone values in coastal regions. Ozone is also over-predicted at low concentrations at "Urban Receptor", "San Fernando", and "Foothills" stations, which may be due to the uncertainties associated with nocturnal chemistry. However, predictions significantly lower than the 120 ppb standard are unlikely to affect the attainment demonstration. In other words, model performance of the daily maximum is more relevant to the attainment demonstration. Figure V-8-4 presents the density scatter plots of 1-hour daily maximum regional ozone values. A focus on the daily maximum also reveals an over-prediction in "Coastal" and "Urban Source" regions on days with relatively high daily maximum concentrations. In general, the "Urban Receptor" region is slightly under-predicted. Other regions are represented well. While all the analysis zones exhibit varying degrees of bias, the RRF approach assumes that the model biases that exist in the base year are carried over to future year. Thus, the RRF approach, instead of direct model predictions, is expected to minimize errors caused by systematic model biases.

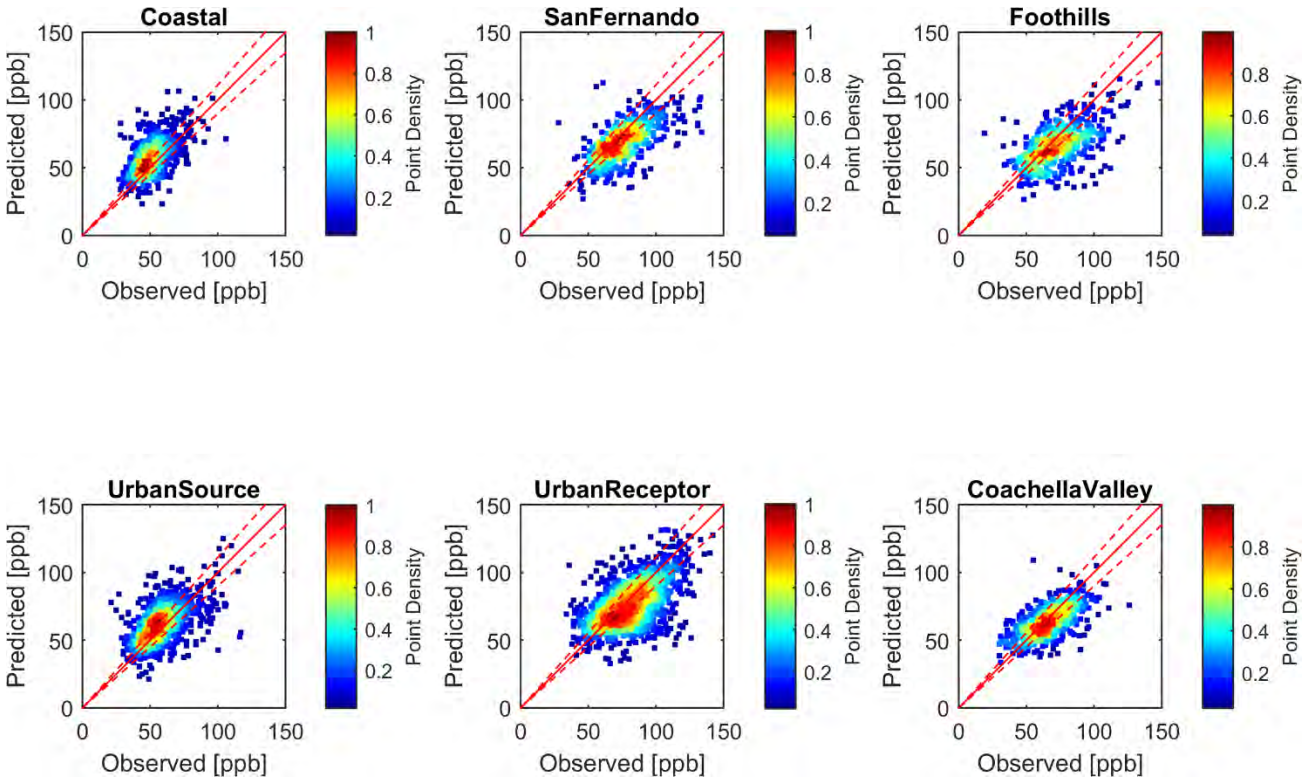

FIGURE V-8-4

Density scatter plot of Observed Vs. Predicted 1-Hour regional ozone daily-maximum values. Dashed lines indicate 10percent error bounds.

Diurnal Trends in 1-hour Ozone

Figures V-8-5 through V-8-10 show the diurnal trends of observed and predicted 1-hour ozone for each day from June 1 through August 31, 2012 for six stations following a transport route from the coastal area of the Basin to inland Crestline and Banning. Supplemental diurnal observed and predicted 1-hour ozone for all remaining air quality sites are provided as Attachment 2 to this appendix. In West Los Angeles, the model over-predicts 1-hr ozone concentrations over several periods during June, July, and August. Conversely, there are periods where the model predicts concentrations in the "Coastal" region well, capturing daily maxima and diurnal trends accurately. In central Los Angeles, the model slightly under-predicts the daily maxima, but captures the diurnal variation well. Daily maximum ozone concentrations are under-predicted in Glendora and Fontana during some periods while daily minimum ozone concentrations are over-predicted. Daily maximum ozone concentrations in Crestline were well-simulated with the exception of nocturnal low ozone. Nighttime NOx scavenging is generally not well represented in the simulations, which is typical in regional photochemical models. Ozone predictions at Banning, the easternmost site in the Basin, track the peak concentrations reasonably well with a slight bias towards over prediction.

Overall, it is important to note that the effects of prediction biases or errors are mitigated by the use of relative response factors for the attainment analysis.

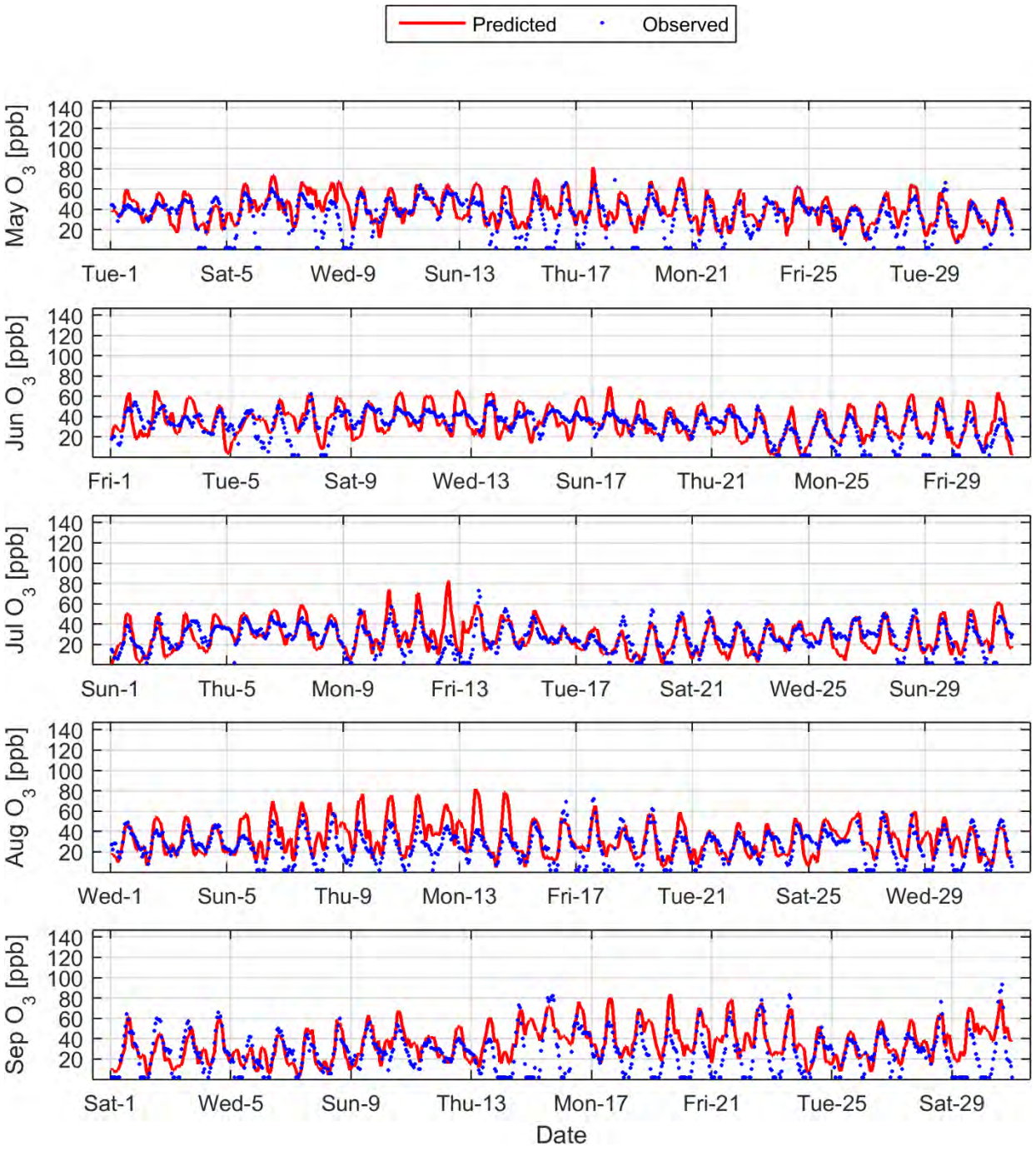

FIGURE V-8-5

Time Series of Observed Vs. Predicted 1-Hour West Los Angeles Ozone

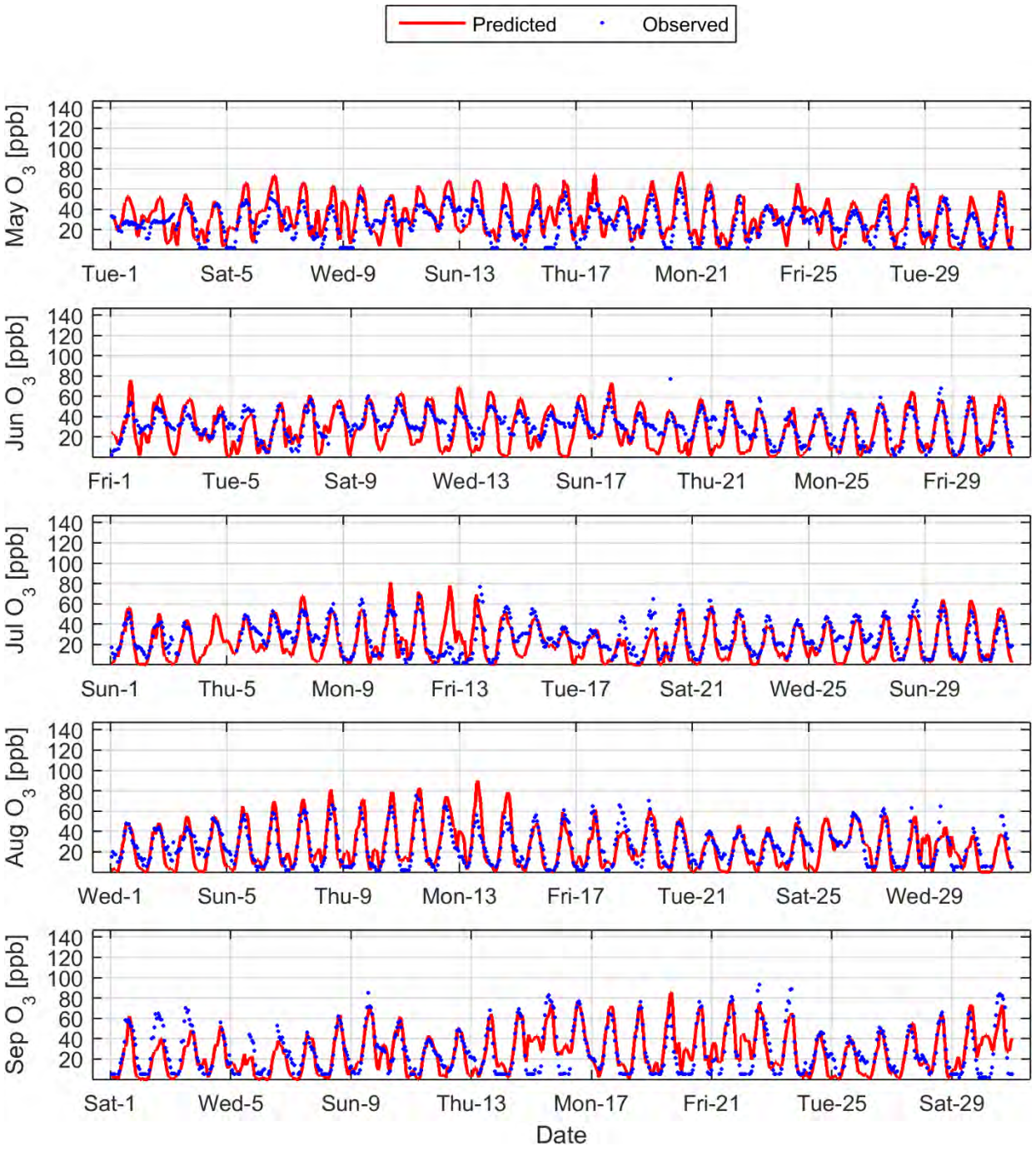

FIGURE V-8-6

Time Series of Observed Vs. Predicted 1-Hour Central Los Angeles Ozone

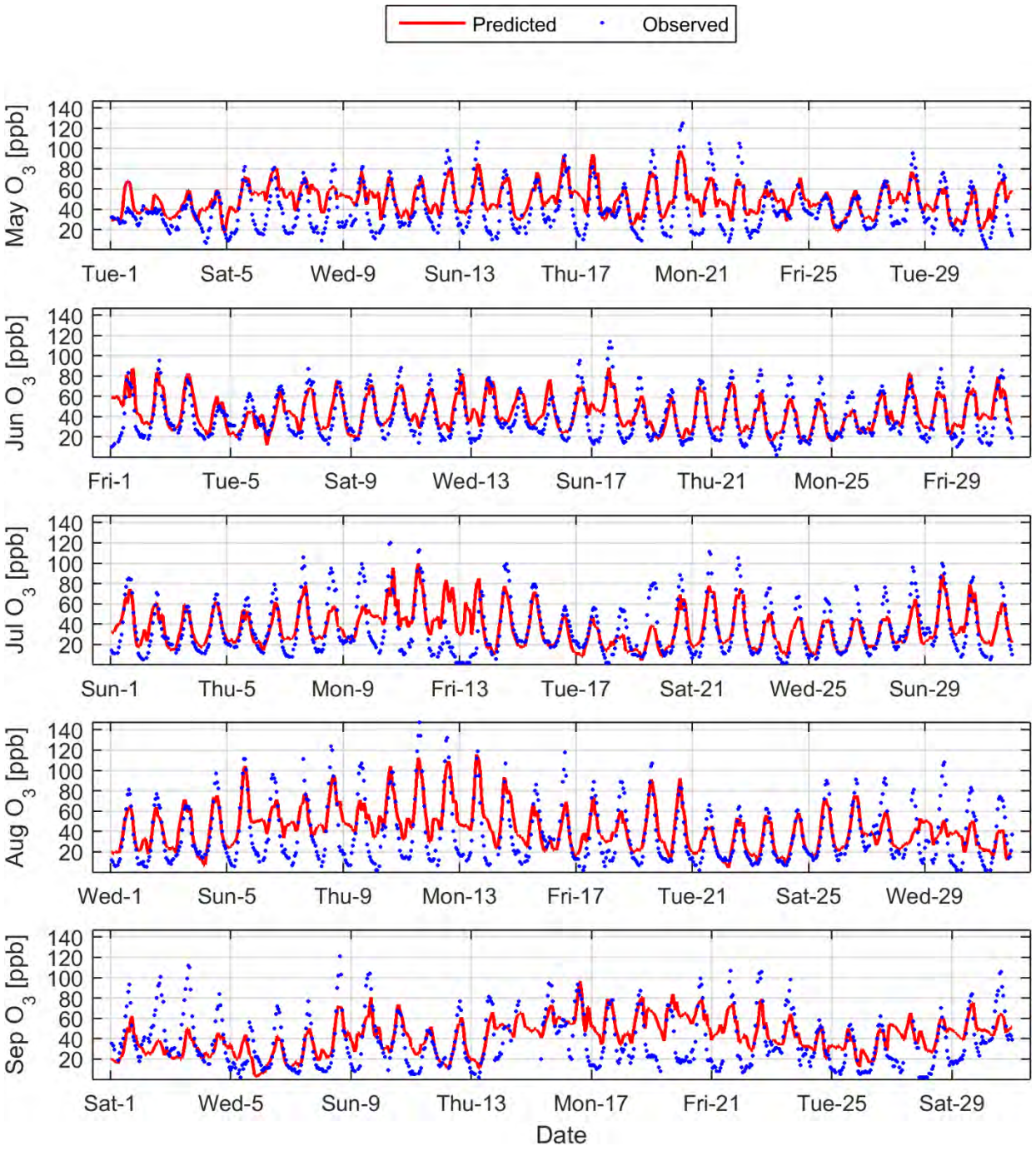

FIGURE V-8-7

Time Series of Observed Vs. Predicted 1-Hour Glendora Ozone

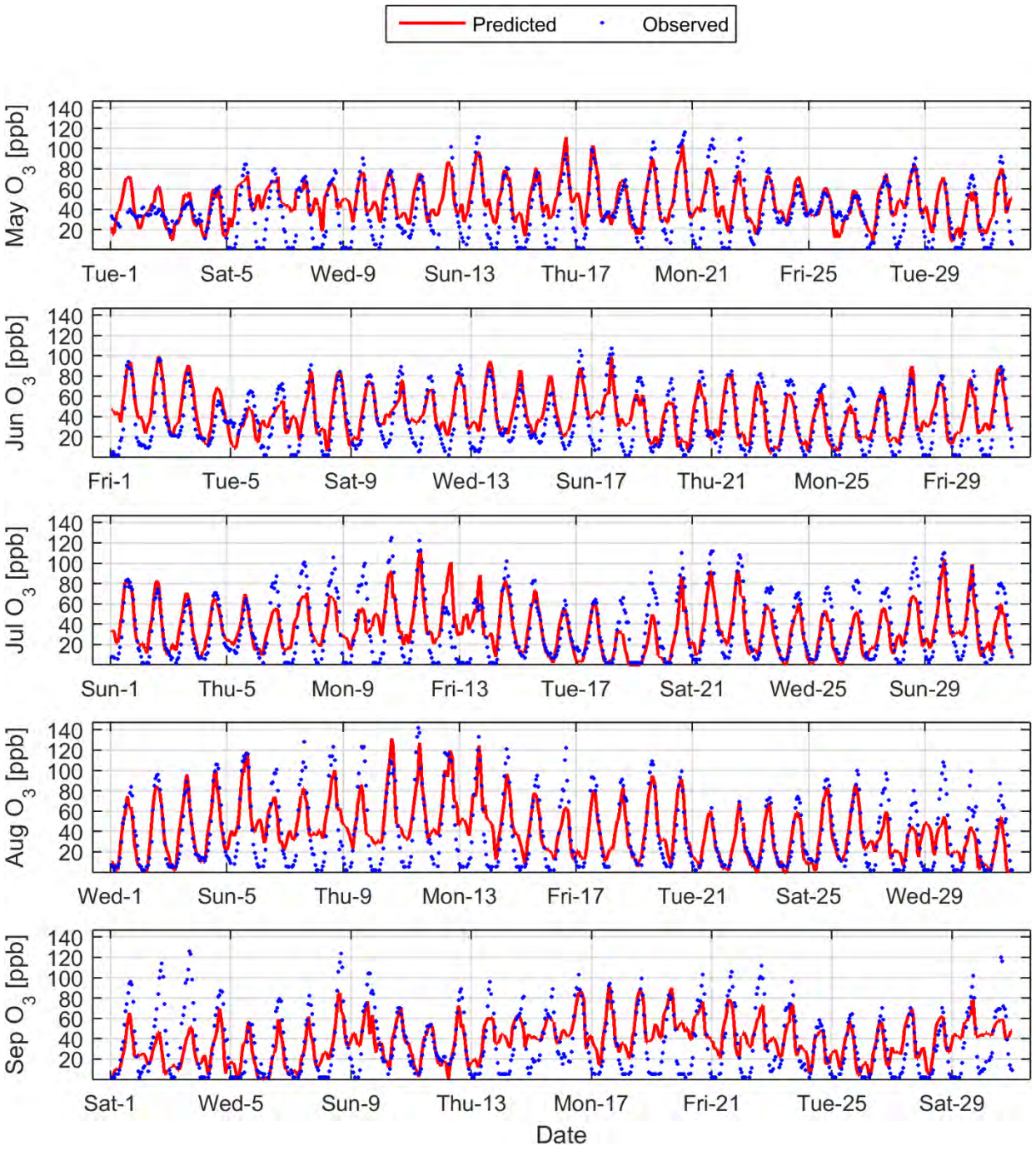

FIGURE V-8-8

Time Series of Observed Vs. Predicted 1-Hour Fontana Ozone

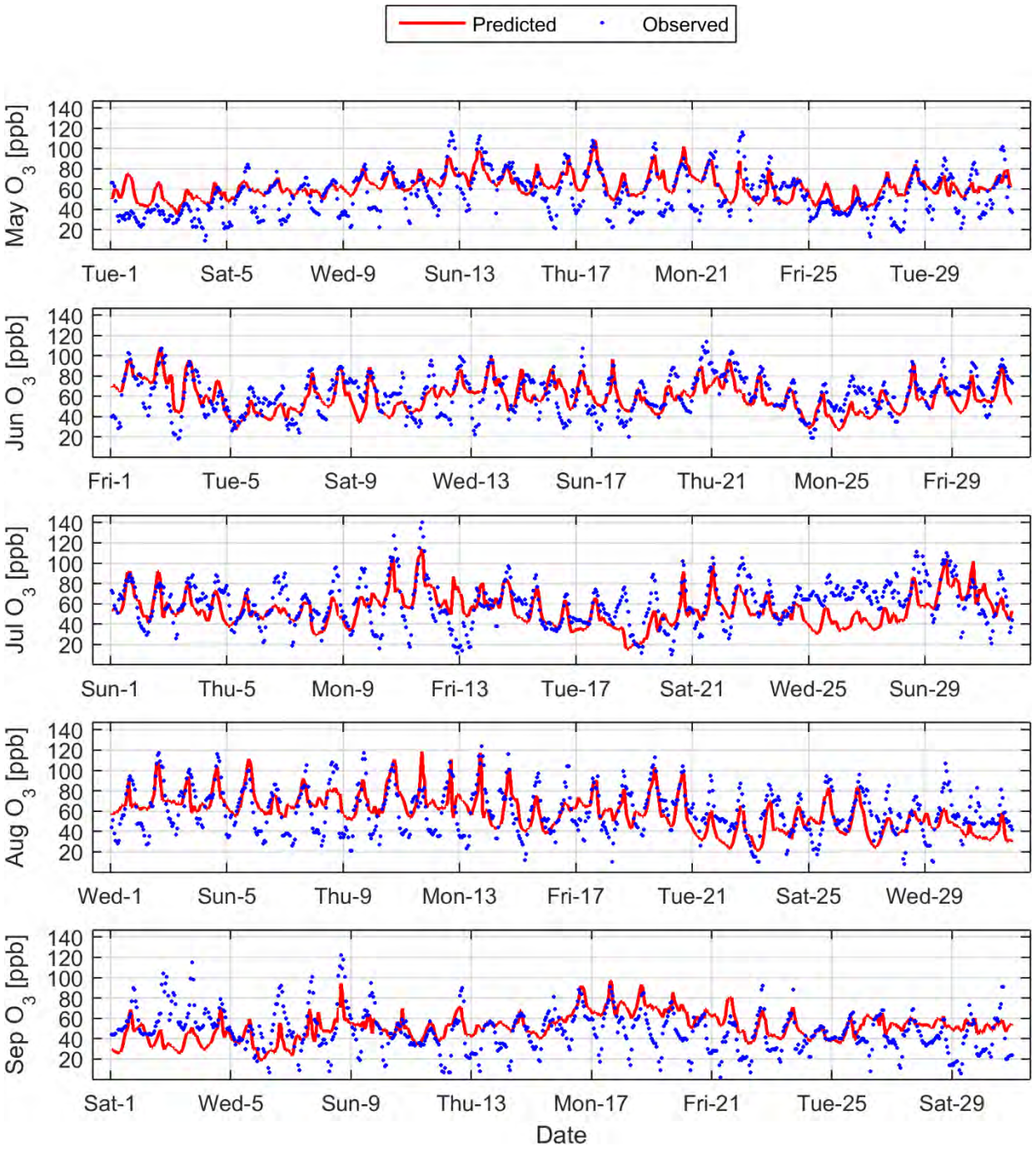

FIGURE V-8-9

Time Series of Observed Vs. Predicted 1-Hour Crestline Ozone

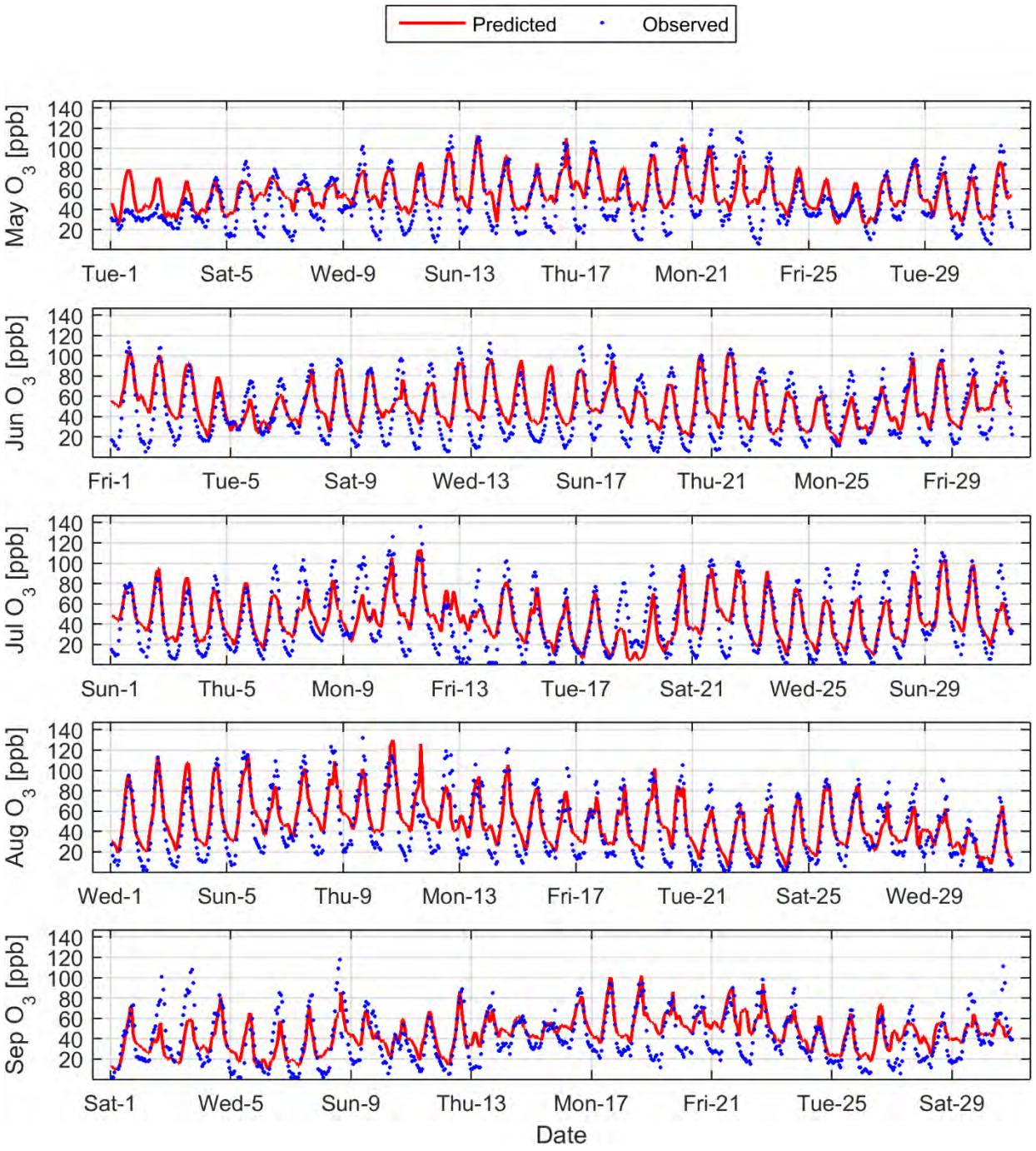

FIGURE V-8-10

Time Series of Observed Vs. Predicted 1-Hour Redlands Ozone

Future-Year Ozone Modeling Approach

The set of 153 days from May 1st through September 30th, 2012 were simulated and analyzed to determine daily 1-hour ozone for the base year (2012) and future attainment year (2022). A set of simulations with incremental VOC and NOx emissions reductions from 2022 baseline emissions was generated to create ozone isopleths for each station in the Basin. The ozone isopleths provide updated guidance for the formulation of future control strategies.

The top three days were chosen for the RRF calculation. While the adjustment was made based on the definition of the design value, a thorough analysis was performed to ensure coherence of the 1-hour and 8-hour attainment demonstrations. (See Weight of Evidence discussion).

The remainder of the attainment demonstration methodology was identical to that of the 8-hour analysis. RRFs were based on a 3x3 cell array of model data centered on the cell that each station resides. The max prediction from the 3x3 array was chosen for the base year simulation and the grid cell location was carried to future year simulations. The number of grids in the array and the comparison of the grid cell location from the base year simulation with the same grid cell in the future year have been established in the 2014 guidance. 20percent peak prediction criteria was applied in the 1-hour as well, except that the threshold for inclusion in the RRFs was set to 90 ppb, consistent with the 60 ppb suggested for the 8-hour analysis.

1-hour Ozone episode

Two episodes during the 2012 ozone season were selected for an in-depth analysis of model performance: July 8-11 and August 9-14. The two episodes included hourly measurements that exceeded the 1-hour ozone standard. Both episodes were characterized by the typical southern California climate conditions that are conducive to ozone episodes, i.e. stagnant flow, strong subsidence induced by synoptic scale high pressure, and subsequently limited vertical mixing and spatial dispersion. High pressure affecting Utah, Colorado and Wyoming and low pressure off the coast of the Basin caused a subsidence inversion and reduced vertical mixing. These conditions brought temperatures greater than 100 oF to many areas of the basin.

During the episode in early July, ozone concentrations remained elevated until July 11, when peak ozone reached 140 ppb in Crestline. This period was followed by slight precipitation on July 12th that broke the stagnation, reduced temperatures and consequently improved ozone air quality.

During the episode in August, ozone concentrations at several stations exceeded the 1-hour standard over a six-day period. The absolute maximum 1-hour ozone concentration in the Basin for 2012 was reached in Glendora, with an ozone concentration of 148 ppb on August 11.

Figure V-8-11 displays maximum 1-hour ozone concentrations at various locations. The air quality model performed well during the August episode, with an overall normalized unpaired bias and normalized unpaired gross error of 2.2percent and 13.8percent, respectively. Model simulations agreed reasonably well during the July episode, with normalized unpaired bias and normalized unpaired gross error of 3.5percent and 30.4percent. The reduced model performance during the July episode is in part attributable to the presence of rain, which is typically more difficult to model than dry conditions.

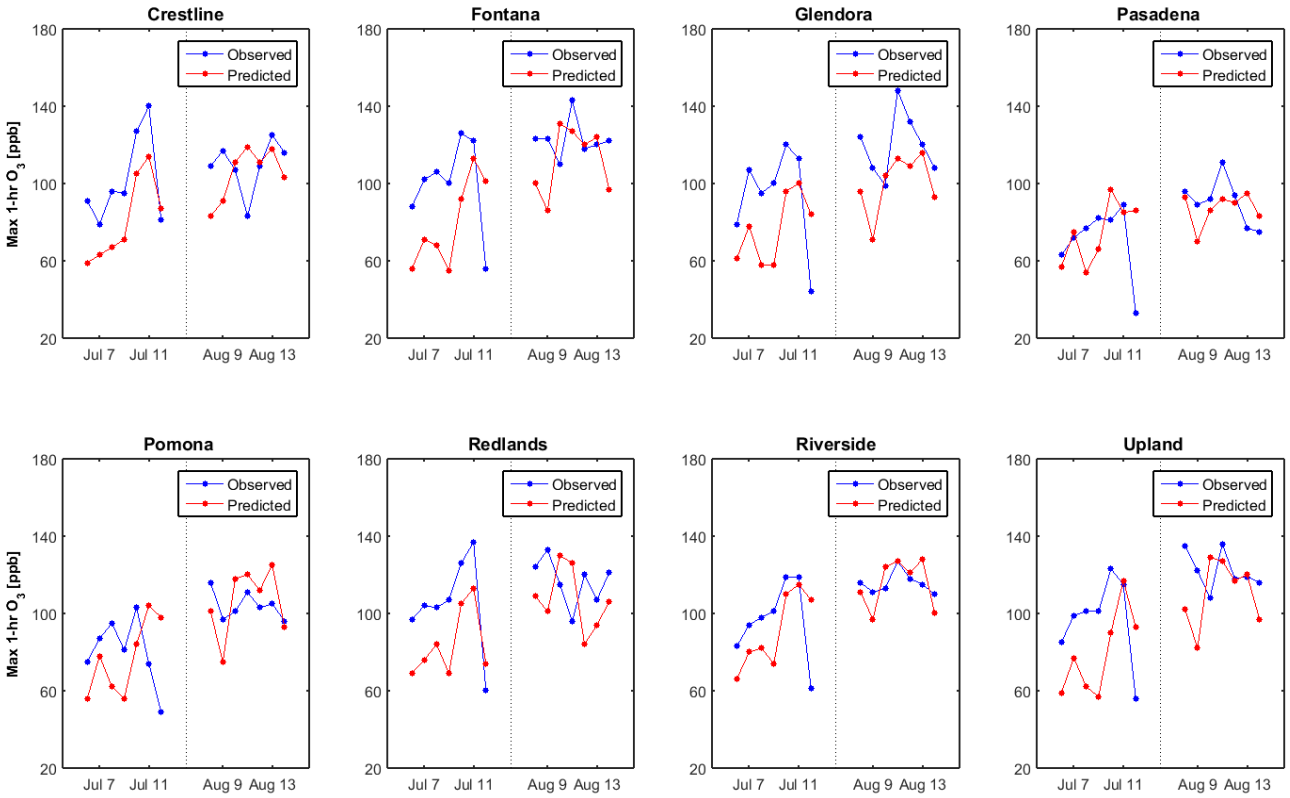

FIGURE V-8-11

Observed Vs. Predicted 1-Hour Max Ozone at selected monitoring stations during the two episodes

Future Ozone Air Quality

The 2016 AQMP addresses the 1979 1-hour ozone standard of 0.12 ppm with an attainment date of February 6, 2023, which requires all the required emission reductions to meet the standard need to be in placed by December 31, 2022. Table V-8-9 summarizes the results of the updated ozone simulations. Included in the table are the 2022 ozone baseline and controlled ozone projections from the 2012 AQMP ozone attainment demonstration. The 2012 AQMP concluded that the carrying capacity to meet 1-hour standard was 150 TPD of NOx, which was approximately a 56 percent additional reduction from 2022 baseline.

The 2016 AQMP baseline ozone simulations reflect the changes made to the 2022 baseline inventories. The 2016 AQMP summer planning inventory for 2022 has the same VOC/NOx emissions ratio of 1.29 as the inventory developed under the 2012 AQMP, although total tonnages of both precursor emissions are lower than the 2012 AQMP. Reduced 2022 baseline VOC and NOx emissions in the 2016 AQMP relative to the 2012 AQMP reflect the rules and regulations updated after the 2012 AQMP, updates in emission estimate methodologies, and updated growth projections.

The current analysis shows that the 2022 baseline emissions with no additional reduction beyond already adopted measures do not lead to attainment, indicating additional emission reductions are necessary to meet the standard. The carrying capacity was estimated to be approximately 250 TPD of NOx if no VOC control is introduced. However, as shown in the ozone isopleths plot (Figure V-8-12), VOC is as effective as or even more effective than NOx reductions in the high ozone regime near the upper right corner of the figure. This indicates the 47 TPD of needed reduction can be achieved either in VOC, NOx, or a combination of both. While the 8-hour ozone strategy relies on NOx reduction, 1-hour ozone can benefit from both NOx and VOC controls.

The revised carrying capacity—250 TPD of NOx, or higher with additional VOC control—is significantly higher than the estimates presented in the 2012 AQMP. As discussed in the earlier 8-hour attainment demonstration, several factors contributed to this change: improved air quality, a revised attainment demonstration methodology, and a revised baseline emissions inventory.

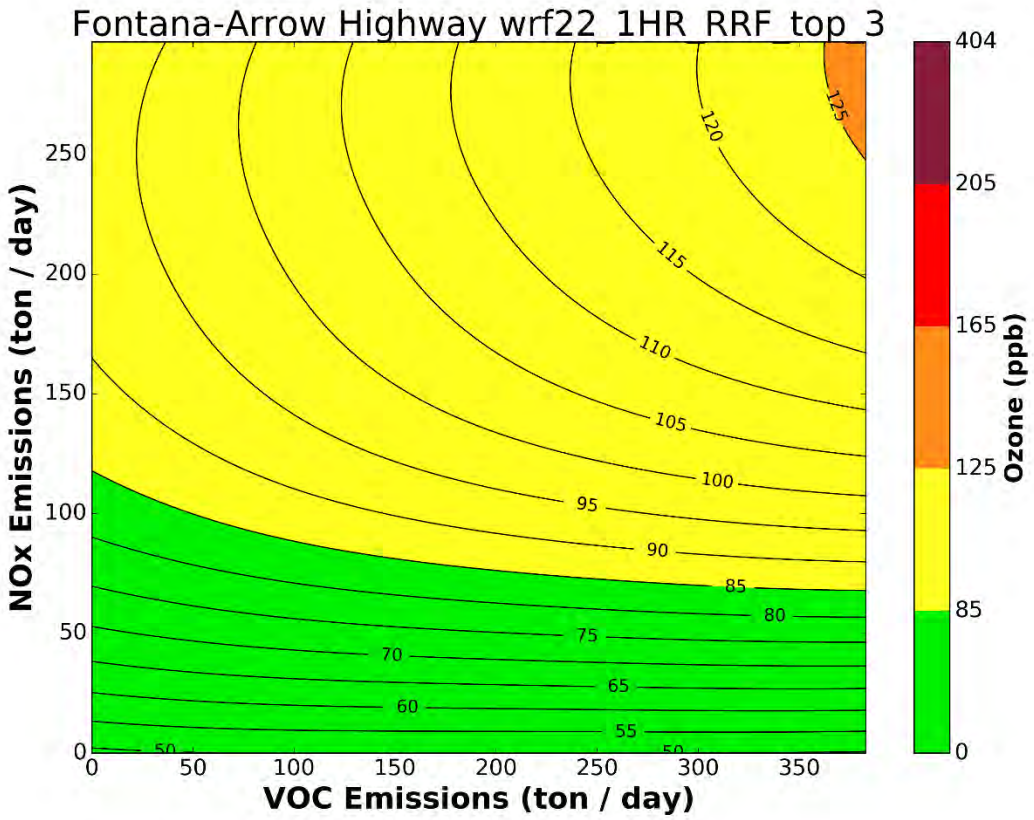

FIGURE V-8-12

1-hour Ozone Isopleths for Fontana

The progress toward to the 2023 target level to meet the 8-hour standard is expected to ensure attainment of the 1-hour standard in 2022. Given the possible approval of emission reductions associated with CAA Section 182(e)(5) measures, a set of future reductions from only defined measures were simulated to test attainment of the 1-hour standard. This scenario consists of reductions of 35 TPD of NOx and 10 TPD of VOC. Refer to CEPA reports presented in Attachment 3 for details. With the proposed defined controls in place, all stations in the Basin will meet the federal one-hour ozone standard by 2022.

The Coachella Valley is expected to meet the 1-hour ozone standard in 2022 with no additional controls beyond already adopted rules and regulations.

TABLE V-8-9

Model-Predicted 1-Hour Ozone Design Values (ppb)

Station	2012 5-year Weighted Design Value	2012 AQMP		2016 AQMP	
		2022 Baseline	2022 Controlled	2022 Baseline	2022 Controlled
Azusa	112.7	139.9	131.0	104	101
Burbank	--	123.0	111.6	--	--
Reseda	125.0	112.4	101.0	105	103
Pomona	117.0	124.5	108.8	103	101
Pasadena	--	141.6	134.6	--	--
Santa Clarita	132.7	119.7	105.3	110	108
Glendora	132.3	143.3	133.5	121	119
Riverside	124.3	116.9	103.8	109	106
Perris	114.7	111.5	94.5	108	106
Lake Elsinore	108.3	108.8	90.9	93	91
Banning	--	119.7	102.5	--	--
Upland	135.0	135.9	121.1	122	119
Crestline	132.7	134.9	116.4	120	118
Fontana	138.3	128.3	110.8	125	122
San Bernardino	123.7	127.7	110.9	107	104
Redlands	133.3	127.2	109.6	120	118

NOTE: Burbank, Pasadena, and Banning do not have 2012 base-year design values due incomplete measurement data in one or multiple years between 2010 and 2014. A design value of 124.9 ppb or lower is needed for attainment

Spatial Projections of 1-Hour Ozone Design Values

The spatial distribution of ozone design values for the 2012 base year is shown in Figure V-8-13. Future year ozone air quality projections for 2022 with and without implementation of non-182(e)(5) control measures are presented in Figures V-8-14 and V-8-15. The predicted ozone concentrations will be significantly reduced in the future years in all parts of the Basin with the implementation of proposed control measures in the South Coast Air Basin. Future design values are predicted from model RRFs and measured base-year design values. Future design values are then interpolated using a natural neighbor interpolation to generate the interpolated fields.

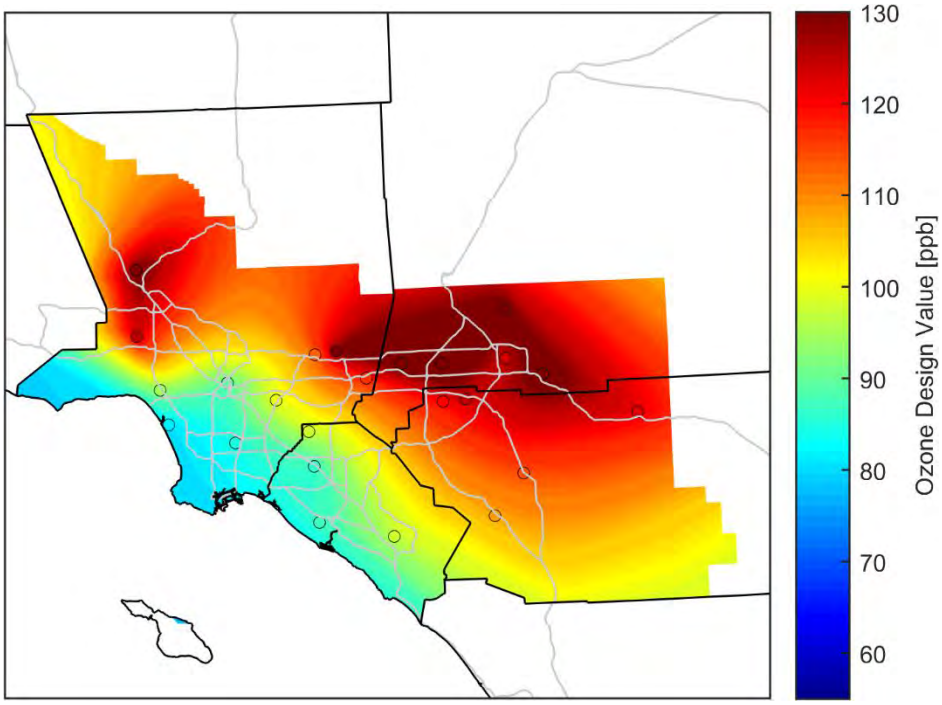

FIGURE V-8-13

2012 Model-Predicted Baseline 1-Hour Ozone Design Concentrations (ppb). The circles indicate the location of air monitoring stations.

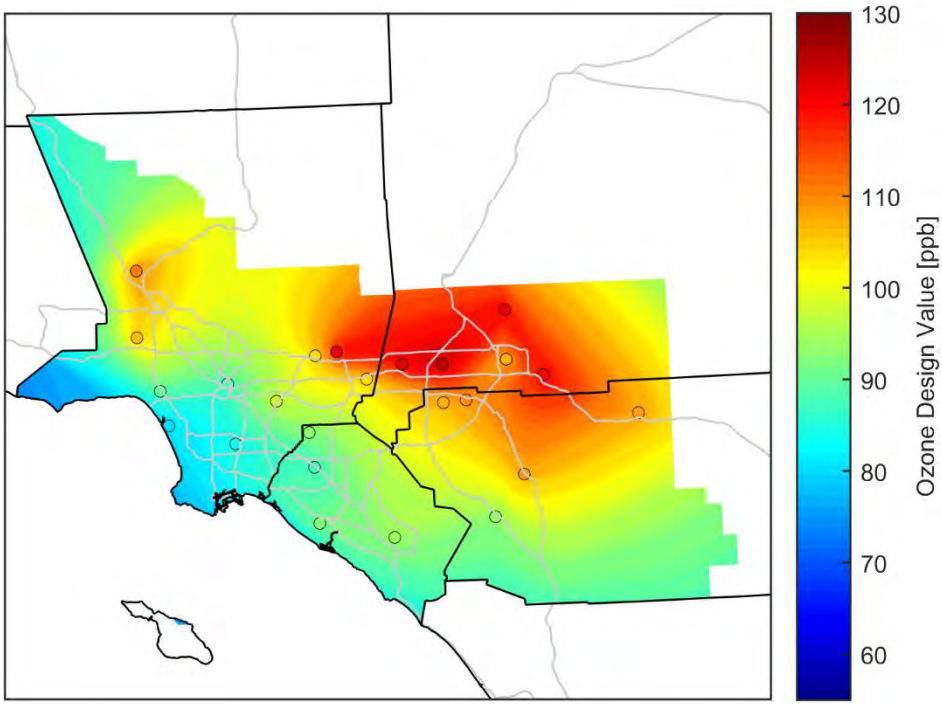

FIGURE V-8-14

Model-Predicted 2022 baseline 1-Hour Ozone Concentrations (ppb)

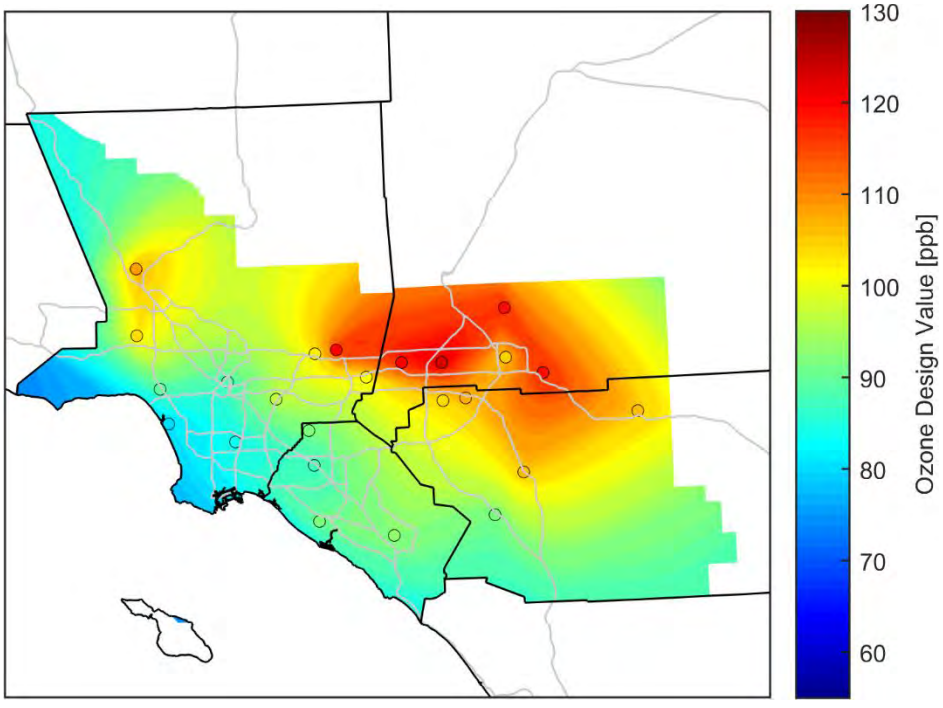

FIGURE V-8-15

Model-Predicted 2022 Controlled 1-Hour Ozone Concentrations (ppb)

Weight of Evidence

The number of days used to represent the RRF can change future predicted ozone design values. To maintain consistency with recommendations for the 8-hour ozone attainment demonstration, only the top three days at each site were used to determine the RRF. The 8-hour standard is based on the fourth highest day of the year and requires ten days in the RRF calculation. The 1-hour standard is based on the fourth highest day in a three year period, which on average, falls between the first and second highest value in a single year (1.33rd highest value). Using the top three days in the RRF calculation results in a similar ratio between the number of days used for the RRF and the standard as the 8-hour guidance requires. (10 RRF days/4th highest day = 2.5 for 8-hour standard; 3 RRF days/1.33rd highest day = 2.3 for 1-hour standard). Calculating the RRF with only the top three days would more accurately predict concentrations in the high end of the ozone distribution, when the exceedances occur. Using too many days for the RRF calculation can mask the impacts of meteorology or chemistry on extreme ozone days. 2012 base year design values along with 2022 baseline concentrations with several RRF methodologies are presented in Table V-8-10. 2022 projected concentrations at Fontana, the 1-hour ozone design station, attain the standard when only using the top two, three or five days, as opposed to using the top ten days. Glendora is more sensitive to the RRF methodology, but like Fontana, attainment is reached when using the top two, three, or five days as opposed to ten days in the RRF calculation.

TABLE V-8-10

RRF Adjusted Future Design Values as a Function of Number of Days Selected for the RRF Calculation

	DV (ppm)	RRF Adjusted 2022 Concentrations (ppm) [non-(e)(5) measures]			
Station	2012 Base Year	2nd highest day	Top 3 days	Top 5 days	Top 10 days
Anaheim	86	84	86	89	87
Azusa	112	98	101	107	109
Central Los Angeles	89	89	88	88	87
Compton	84	83	83	85	85
Crestline	132	114	118	117	115
Costa Mesa	86	90	91	88	85
Lake Elsinore	108	90	91	91	92
Fontana	138	118	122	121	123
Glendora	132	121	119	124	129
Indio	97	85	87	87	87
La Habra	98	91	92	97	100
LAX	81	80	80	79	79
Mira Loma	119	105	104	105	110
Mission Viejo	97	93	93	91	91
Perris	114	107	106	104	100
Pico Rivera	100	97	96	98	101
Palm Springs	112	97	97	98	98
Pomona	117	101	101	107	109
Redlands	133	114	118	118	120
Reseda	125	103	103	106	107
Riverside	124	107	106	108	115
Santa Clarita	132	107	108	113	113
San Bernardino	123	104	104	109	113
Upland	135	120	119	118	121
West Los Angeles	93	89	89	92	91

References

United States EPA, Finding of Substantial Inadequacy of Implementation Plan: Call for California State Implementation Plan Revision; South Coast, February 2013, EPA-R09-OAR-2012-0721

Sarika Kulkarni, Ajith P. Kaduwela, Jeremy C. Avise, John A. DaMassa and Daniel Chau (2014) An extended approach to calculate the ozone relative response factors used in the attainment demonstration for the National Ambient Air Quality Standards, Journal of the Air & Waste Management Association, 64:10, 1204-1213, DOI: 10.1080/10962247.2014.936984

CHAPTER 9

SUMMARY AND CONCLUSIONS

Comparison to State and Federal Standards

Comparison to State and Federal Standards

Figure V-9-1 shows the Basin-wide maximum 8-hour ozone concentrations in the base year (2012) along with projected design values for the attainment deadline of the 1997 standard of 80 ppb (2023) and for the 2008 standard of 75 ppb (2031). Figure V-9-2 shows the same projected design values relative to the California standards. With the controls proposed in the 2016 AQMP, the future year ozone concentrations are expected to meet the federal standards. NOx reductions of approximately 45 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively (Figure V-9-3). Approximately 50 TPD of NOx and VOC combined reductions from the 2022 baseline is needed to meet the 1-hour ozone standard by 2022, confirming that the 8-hour standard is more stringent than the 1-hour standard. The strategies developed for attainment of the 2023 and 2031 8-hour standards will ensure attainment of the 1-hour standard by 2022 (Table V-9-1).

The California standard for 8-hour ozone is 70 ppb, the same level as the 2015 revised federal standard. This State standard will not be achieved by 2031. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 are needed to meet the 70 ppb standard. Challenges in achieving the 70 ppb standard are discussed in Chapter 8.

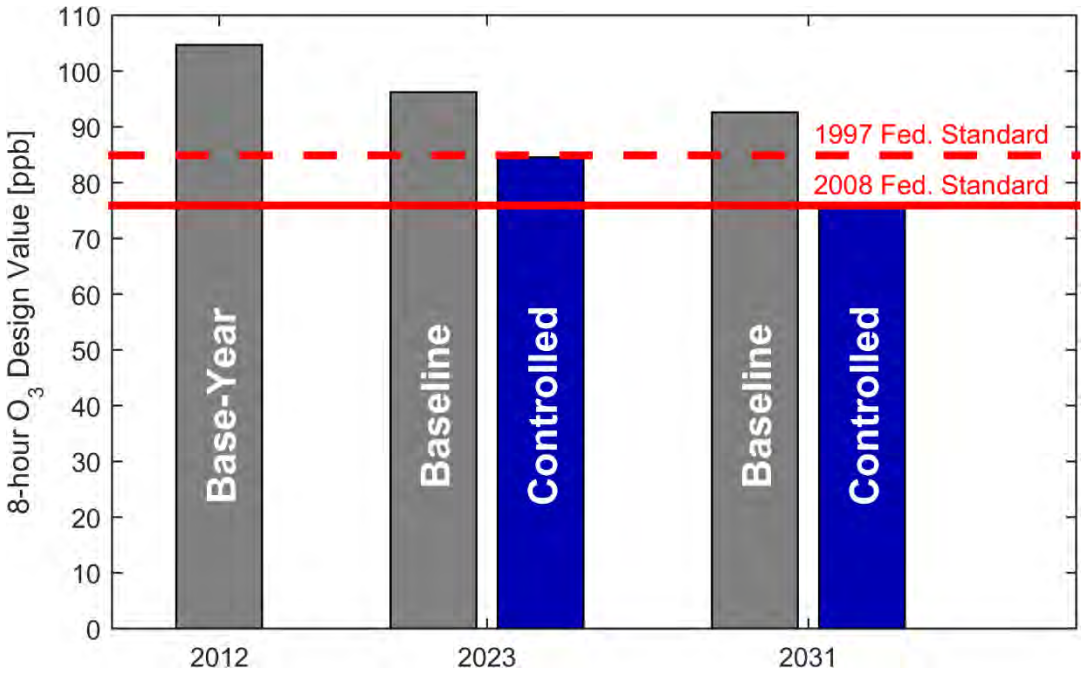

FIGURE V-9-1

Projection of future 8-hour ozone air quality in the Basin
in comparison to federal standards

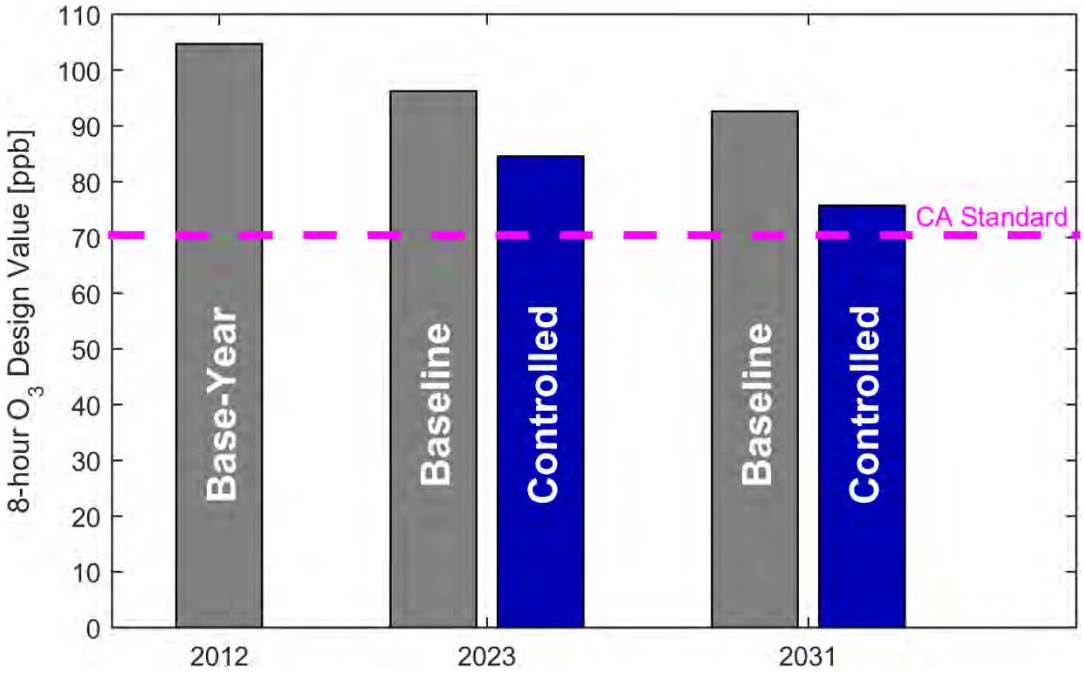

FIGURE V-9-2

Projection of future 8-hour ozone air quality in the Basin in comparison to California standards

TABLE V-9-1

Basin NOx Carrying Capacity for Ozone Attainment

Attainment Year	2022	2023	2031
Federal Standard	1-hr Ozone (120 ppb)	8-hr Ozone (80 ppb)	8-hr Ozone (75 ppb)
NOx Carrying Capacity (TPD)	245	141	96

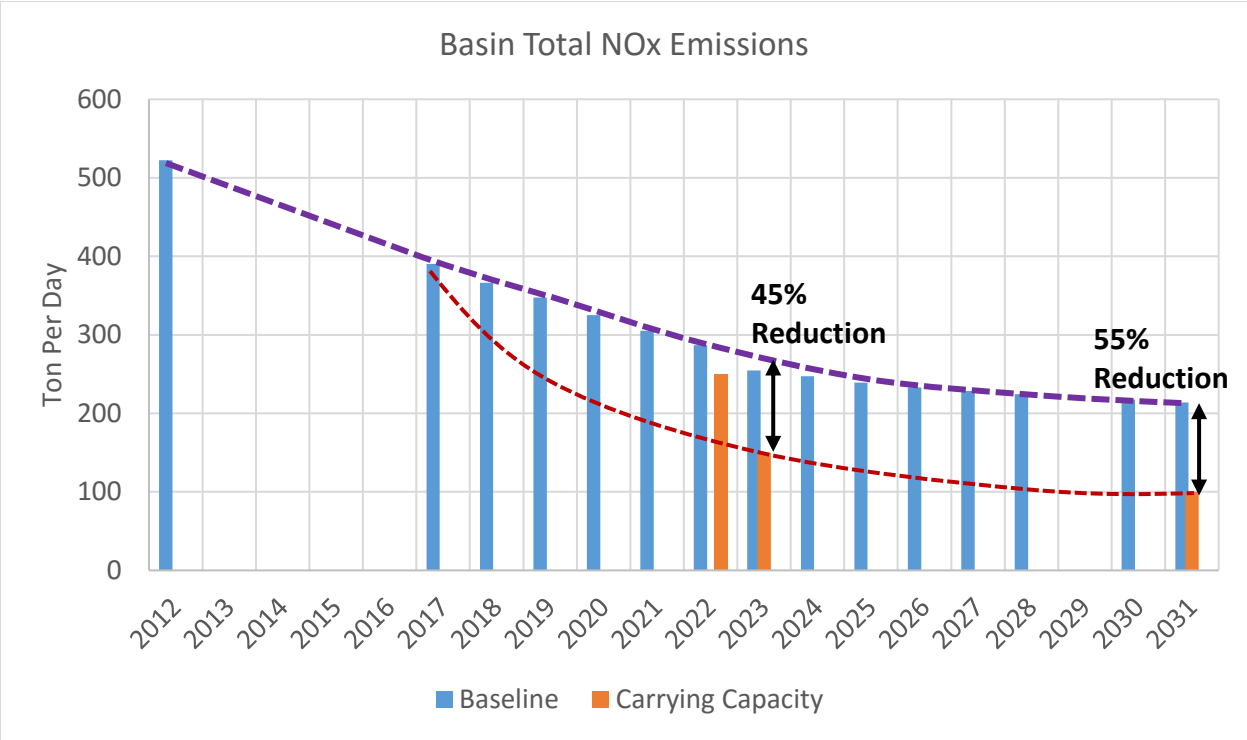

FIGURE V-9-3

Summer planning baseline emissions and ozone carrying capacity

Figure V-9-4 shows the 2012 observed base-year design value along with the 2021, 2023 and 2025 model-predicted future design values of annual PM2.5. The federal annual PM2.5 standards are predicted to be achieved in 2023 with implementation of the proposed ozone strategy. However, the federal CAA does not allow 182(e)(5) measures in the attainment demonstration of PM2.5; therefore, an additional scenario using only non-182(e)(5) measures was developed for 2025 to comply with the CAA requirements. With only the non-182(e)(5) measure reductions, the annual PM2.5 standard is expected to be met in 2025. The California annual PM2.5 standard will not be attained in 2021.

Table V-9-2 presents the future Basin annual PM2.5 design values under each control scenario. Table V-9-2 also contains the predicted 2025 design value resulting from the ozone control strategy in the absence of 182(e)(5) measures. Attainment is achieved in 2025 under this scenario.

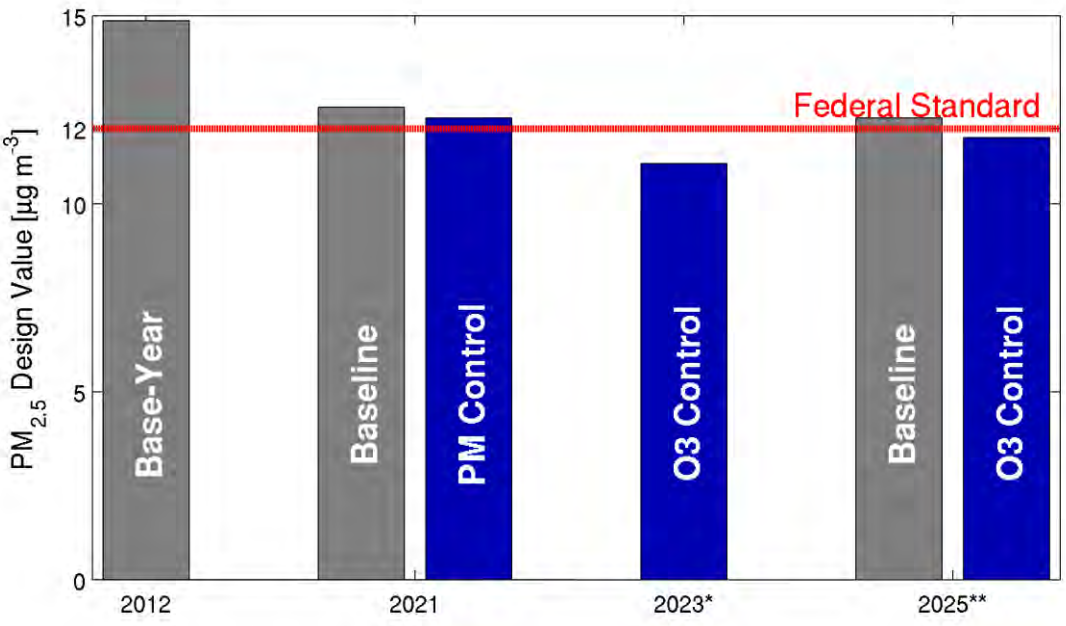

FIGURE V-9-4

Projection of future annual PM2.5 air quality in the Basin in comparison with Federal Standards

*INCLUDES 182(E)(5) MEASURES
**DOES NOT INCLUDE 182(E)(5) MEASURES

TABLE V-9-2

Future Design Values of Annual Average PM2.5 at Mira Loma in µg/m^3

Station	Baseline	Controlled	Control Strategy
2021	12.6	12.3	Directly emitted PM reduction
2023	12.1	11.1	Ozone co-benefit including 182(e)(5) measures
2025	12.3	11.8	Ozone co-benefit without 182(e)(5) measures

The 24-hour PM2.5 standard is expected to attain in 2019 without emission reductions beyond already adopted controls and measures. The 2019 baseline design value was predicted to be 31.4 µg/m^3 at Mira Loma.

Attachment 1

WRF MODEL PERFORMANCE TIME SERIES

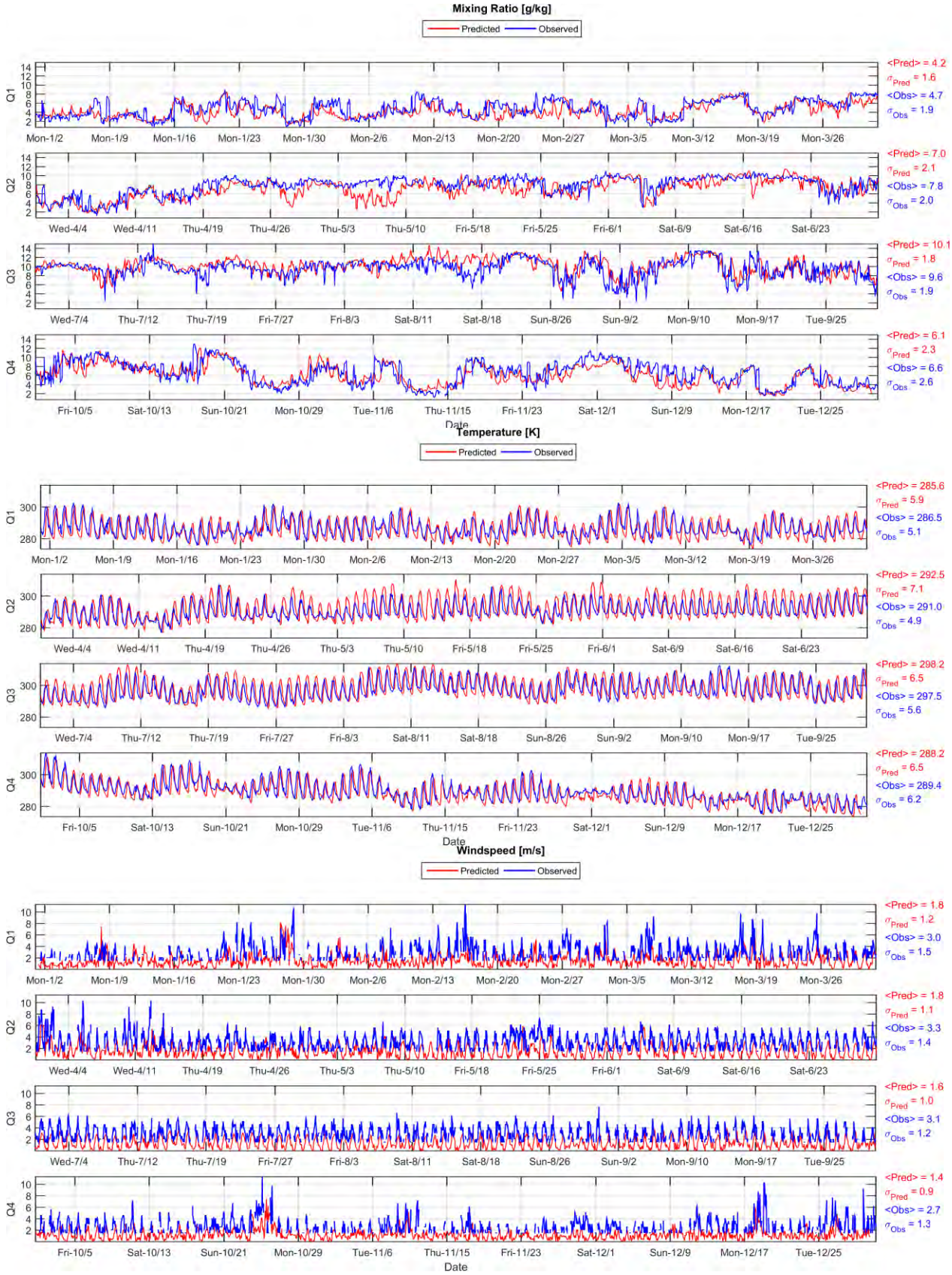

Figure 1: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Burbank International Airport

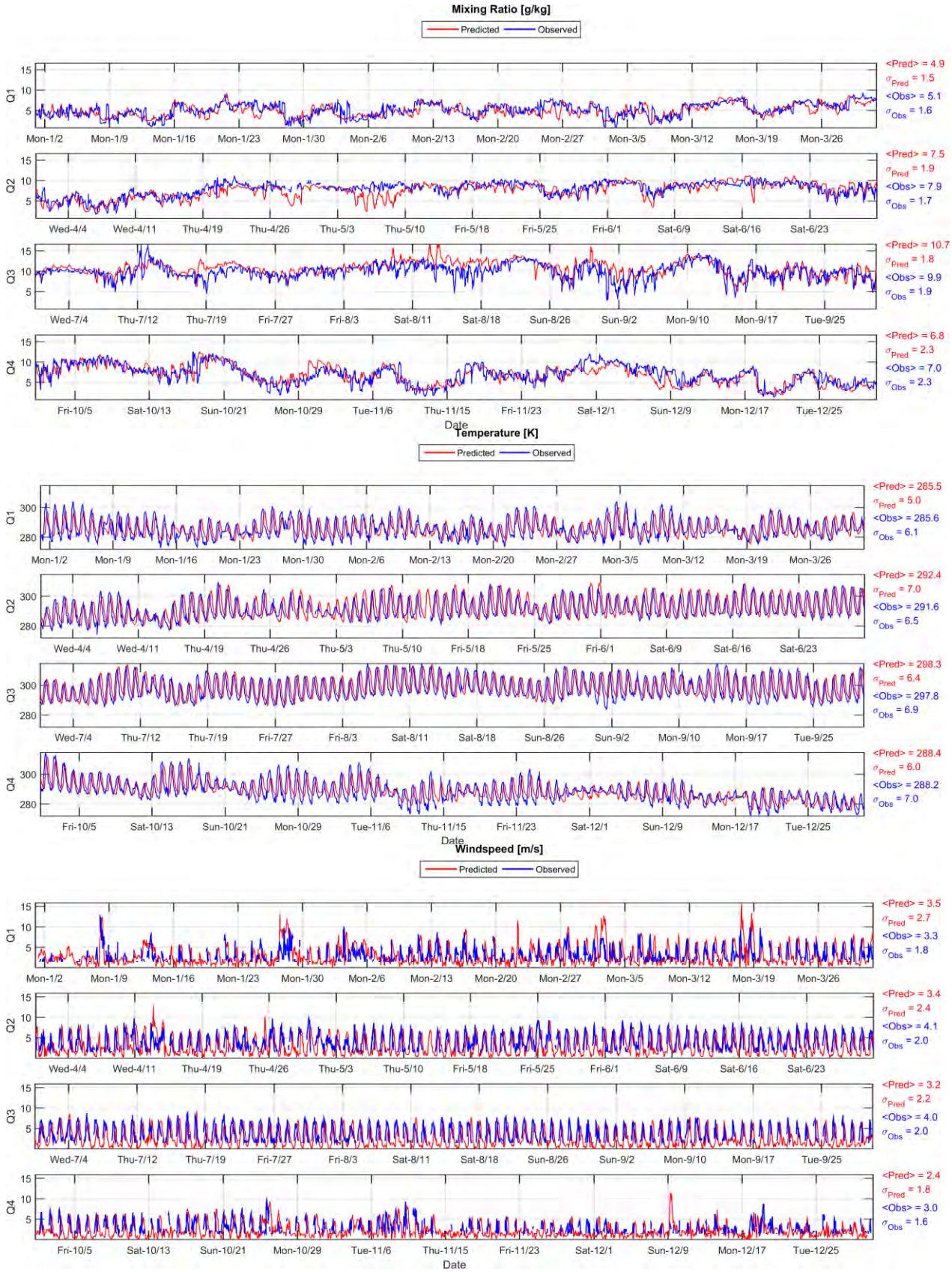

Figure 2: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Chino Airport

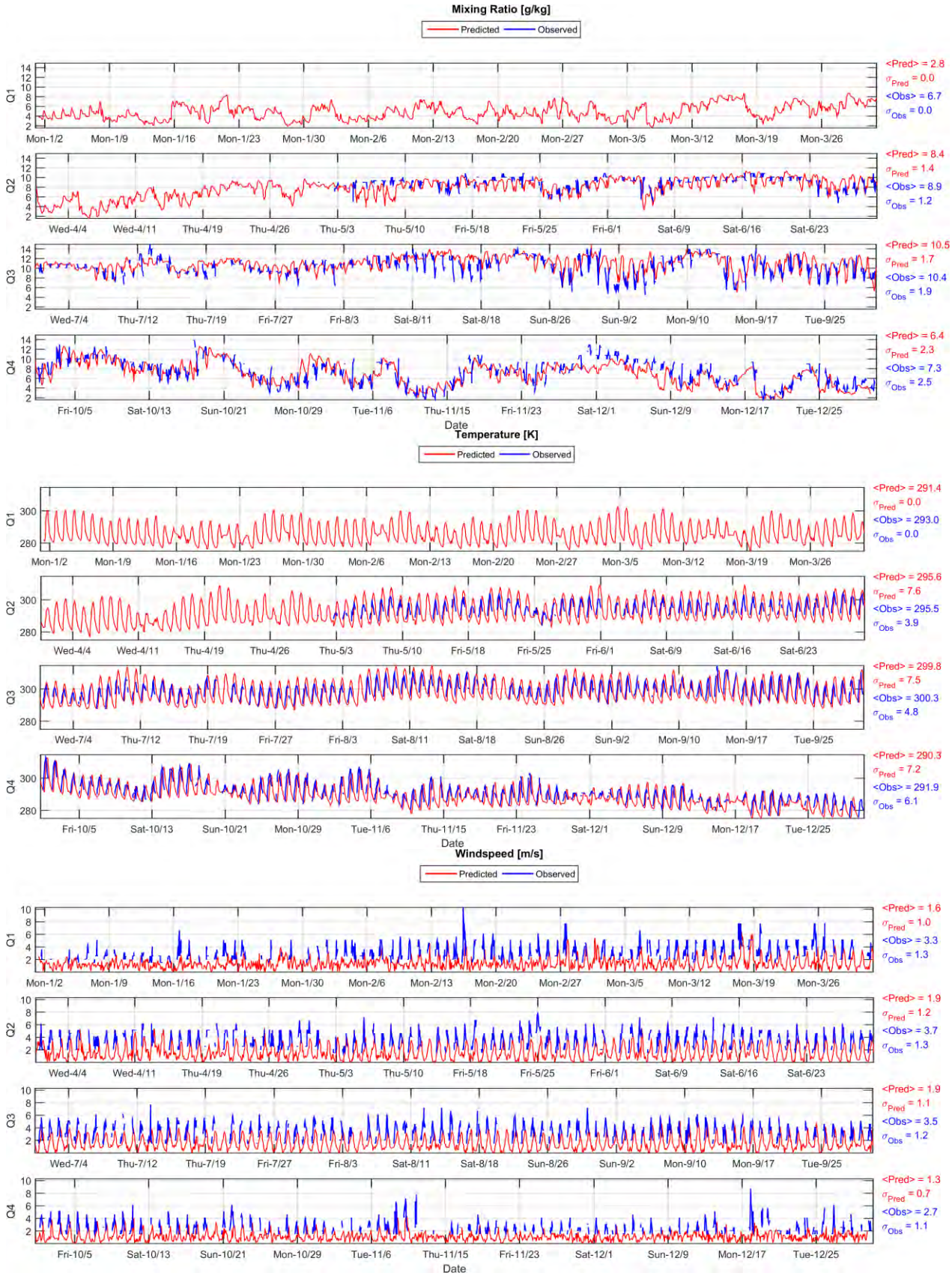

Figure 3: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at El Monte Airport

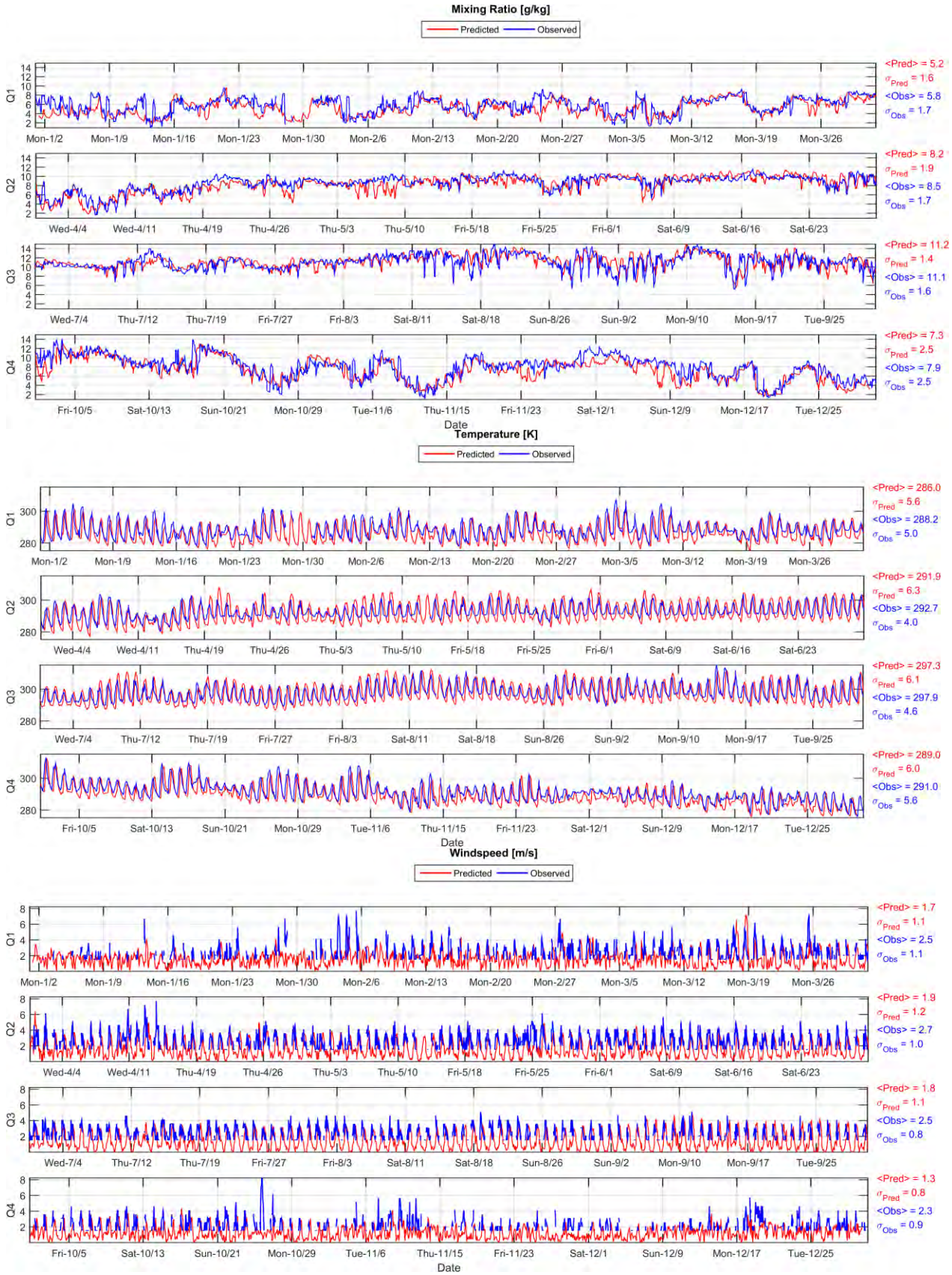

Figure 4: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Fullerton Municipal Airport

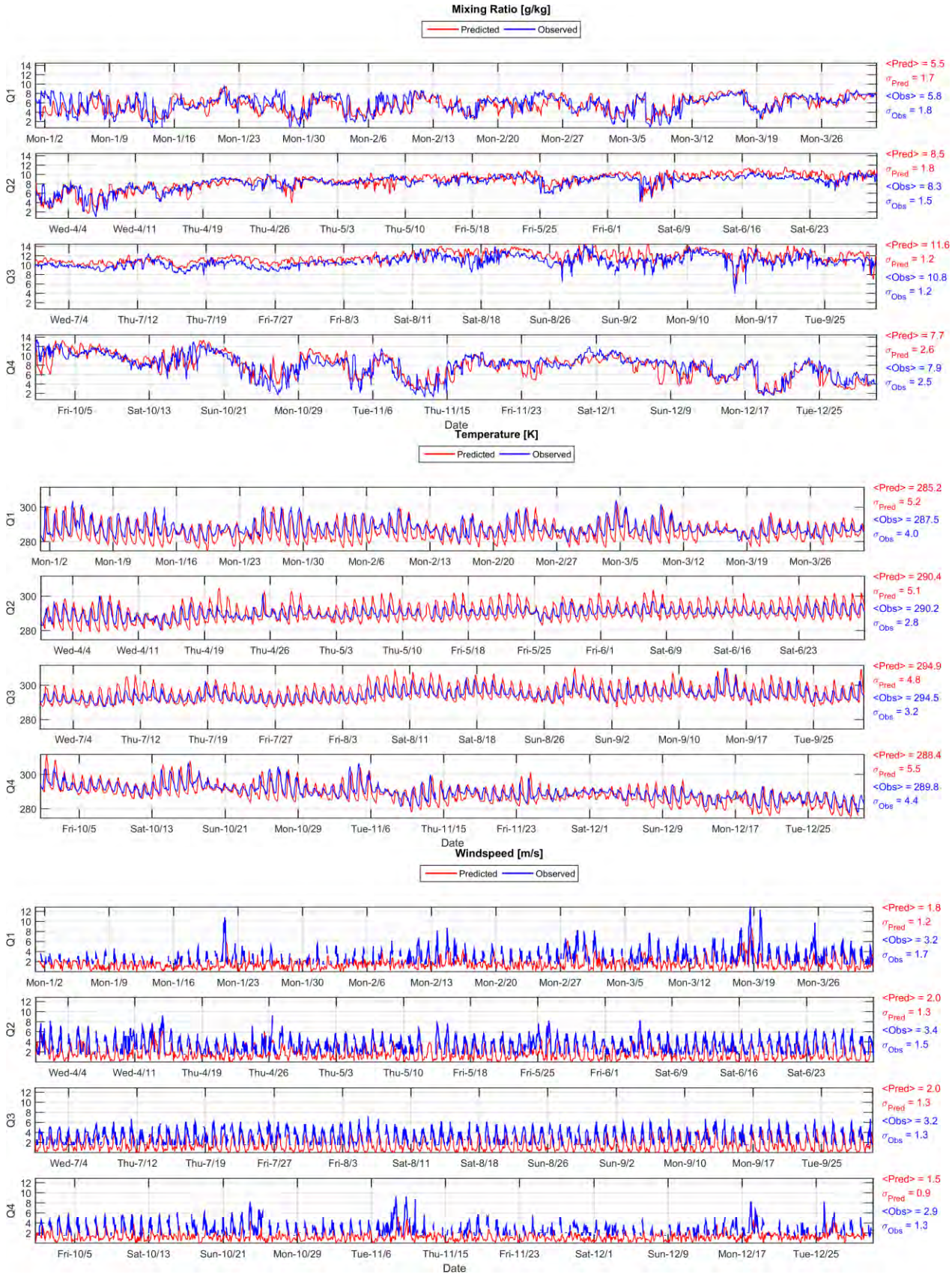

Figure 5: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Hawthorne Airport

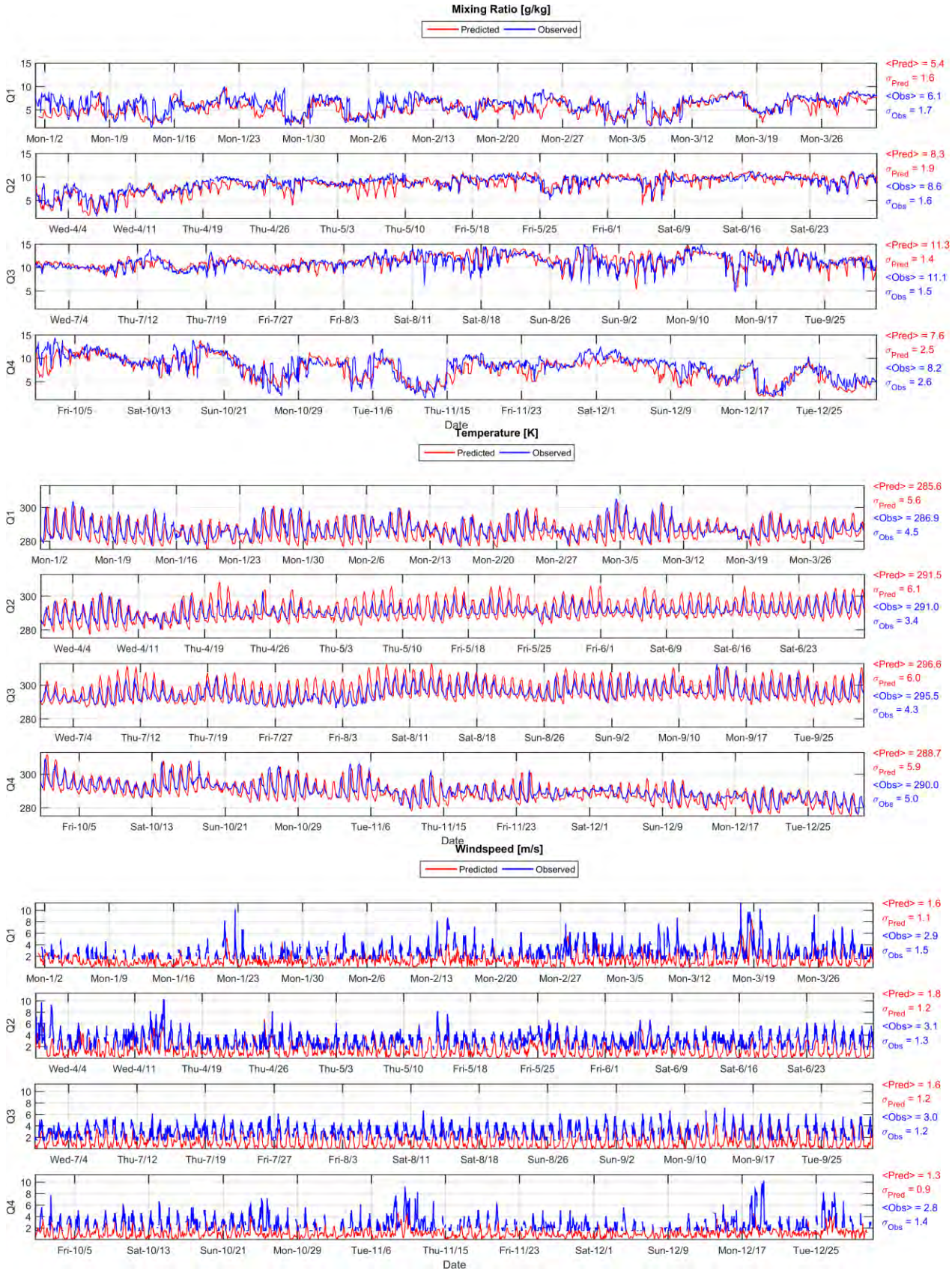

Figure 6: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Long Beach Airport

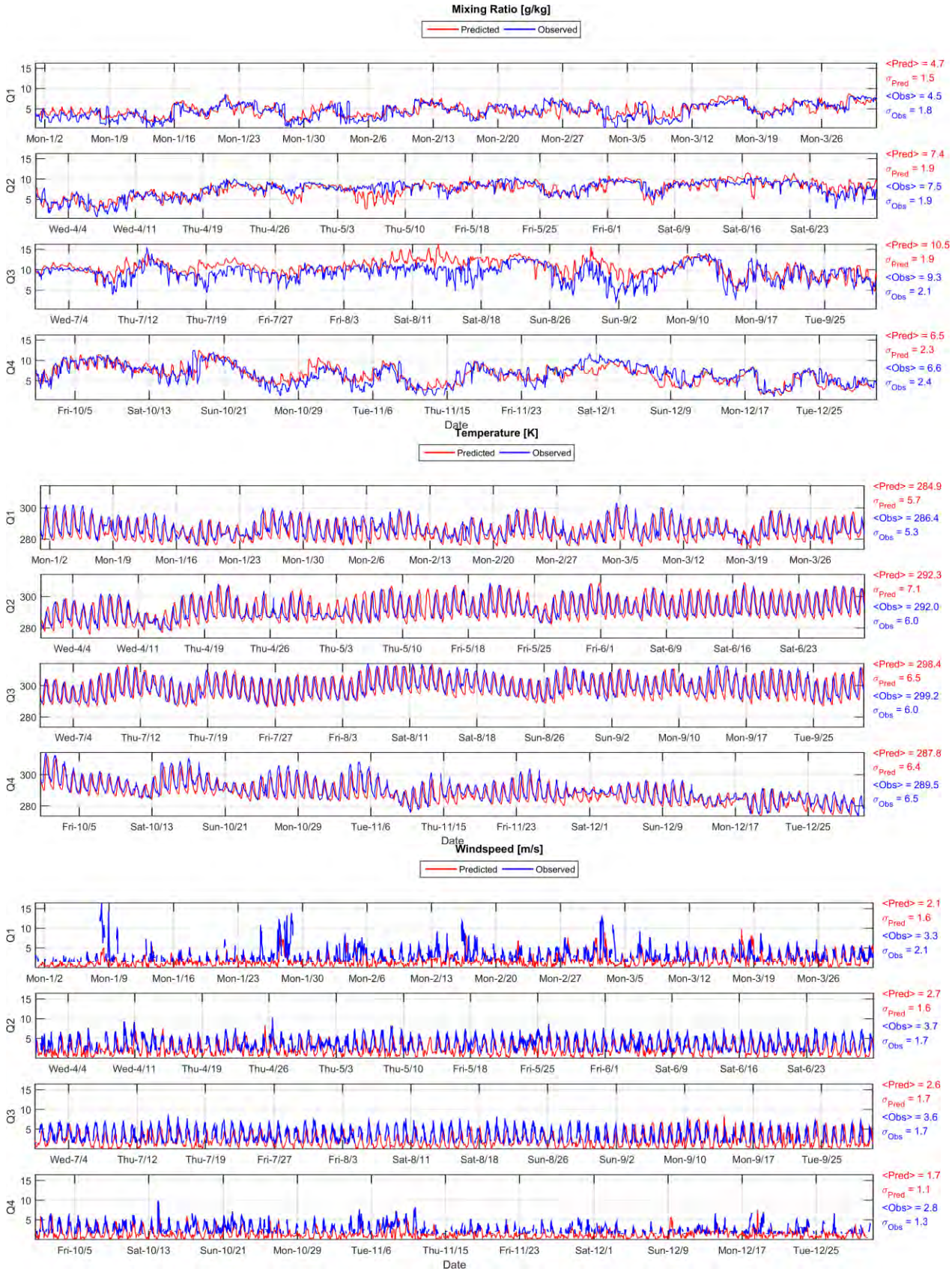

Figure 7: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Ontario International Airport

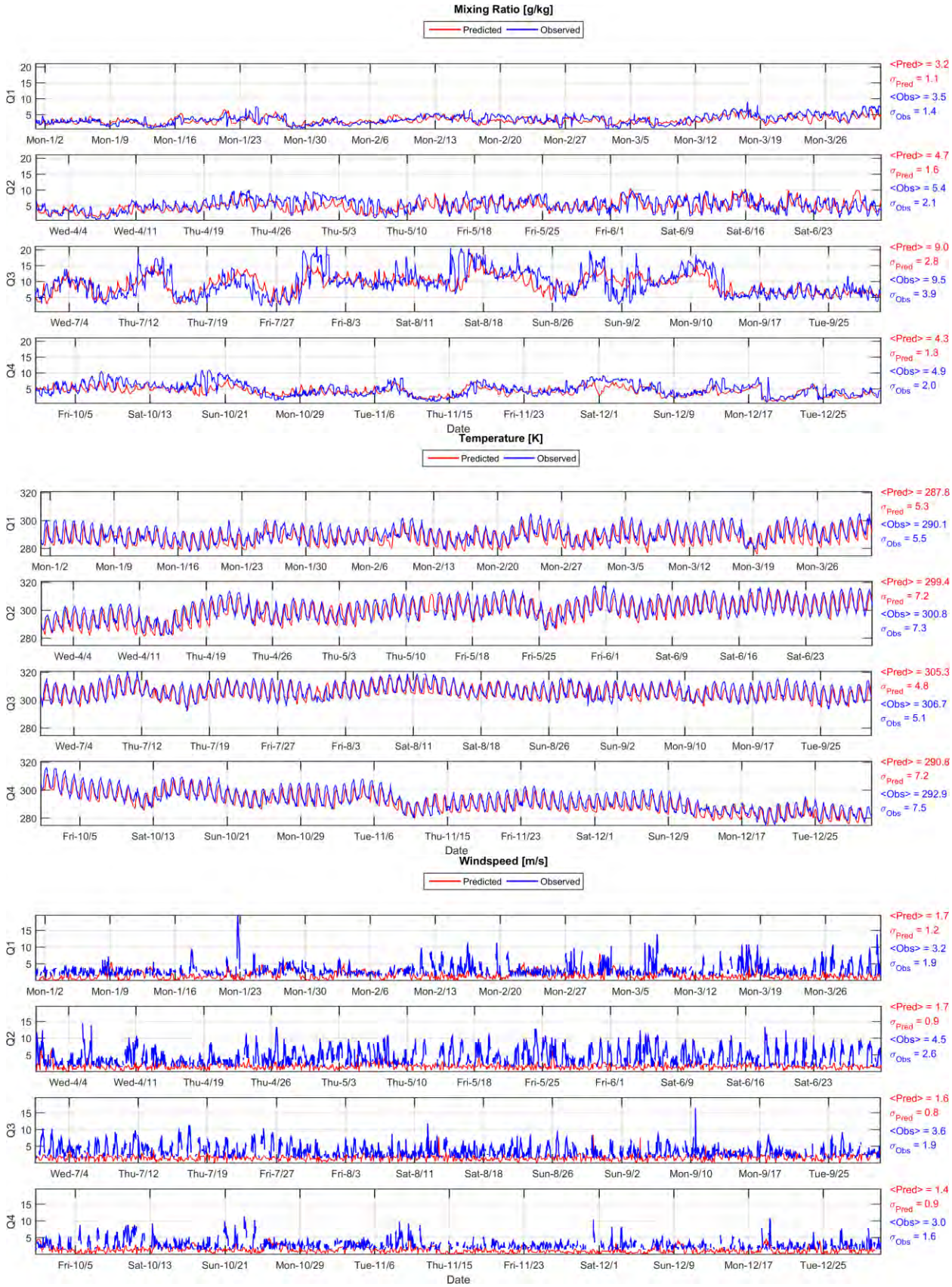

Figure 8: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Palm Springs International Airport



Figure 9: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Riverside Municipal Airport



Figure 10: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at San Bernardino International Airport

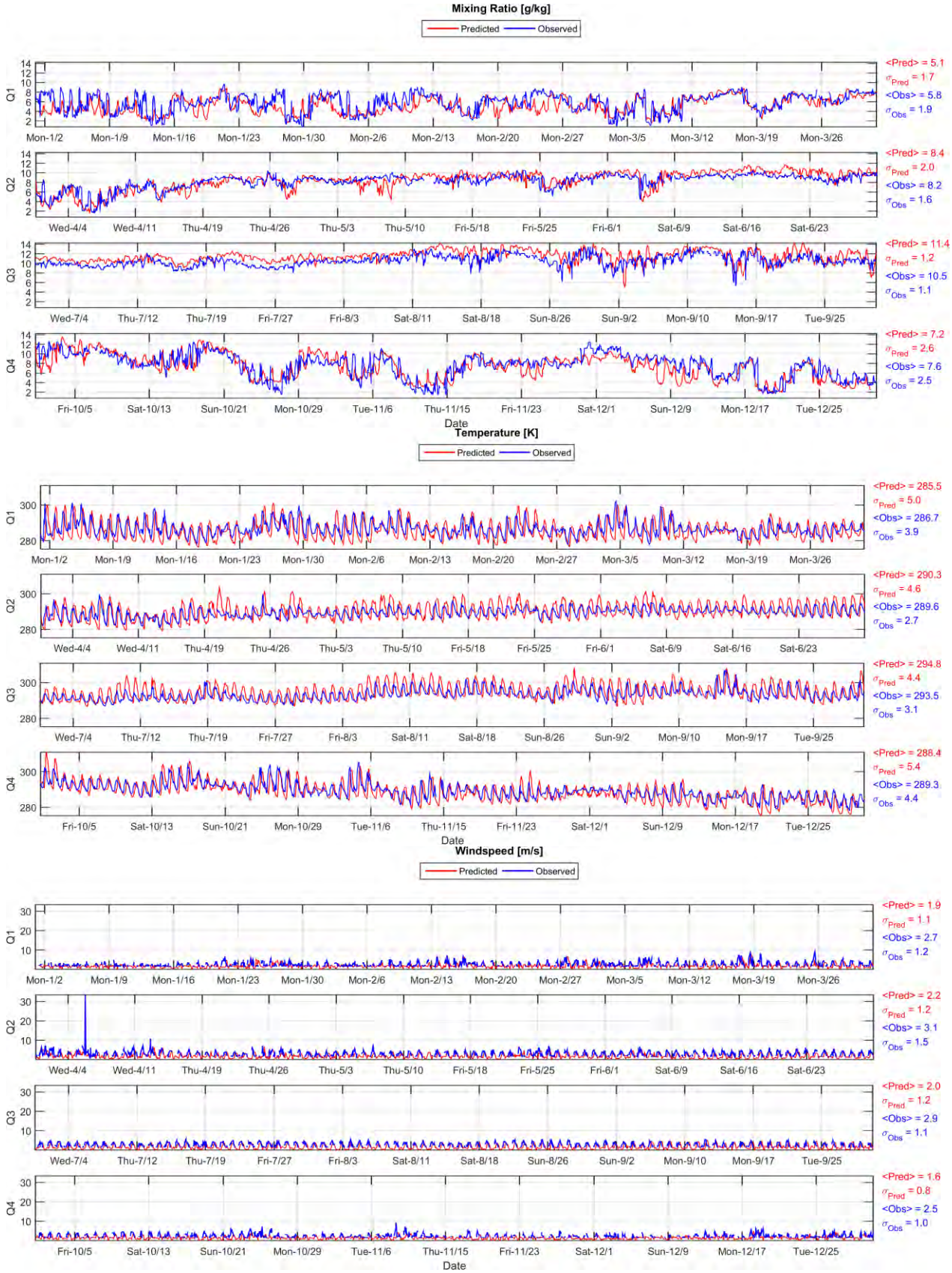

Figure 11: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Santa Monica Airport

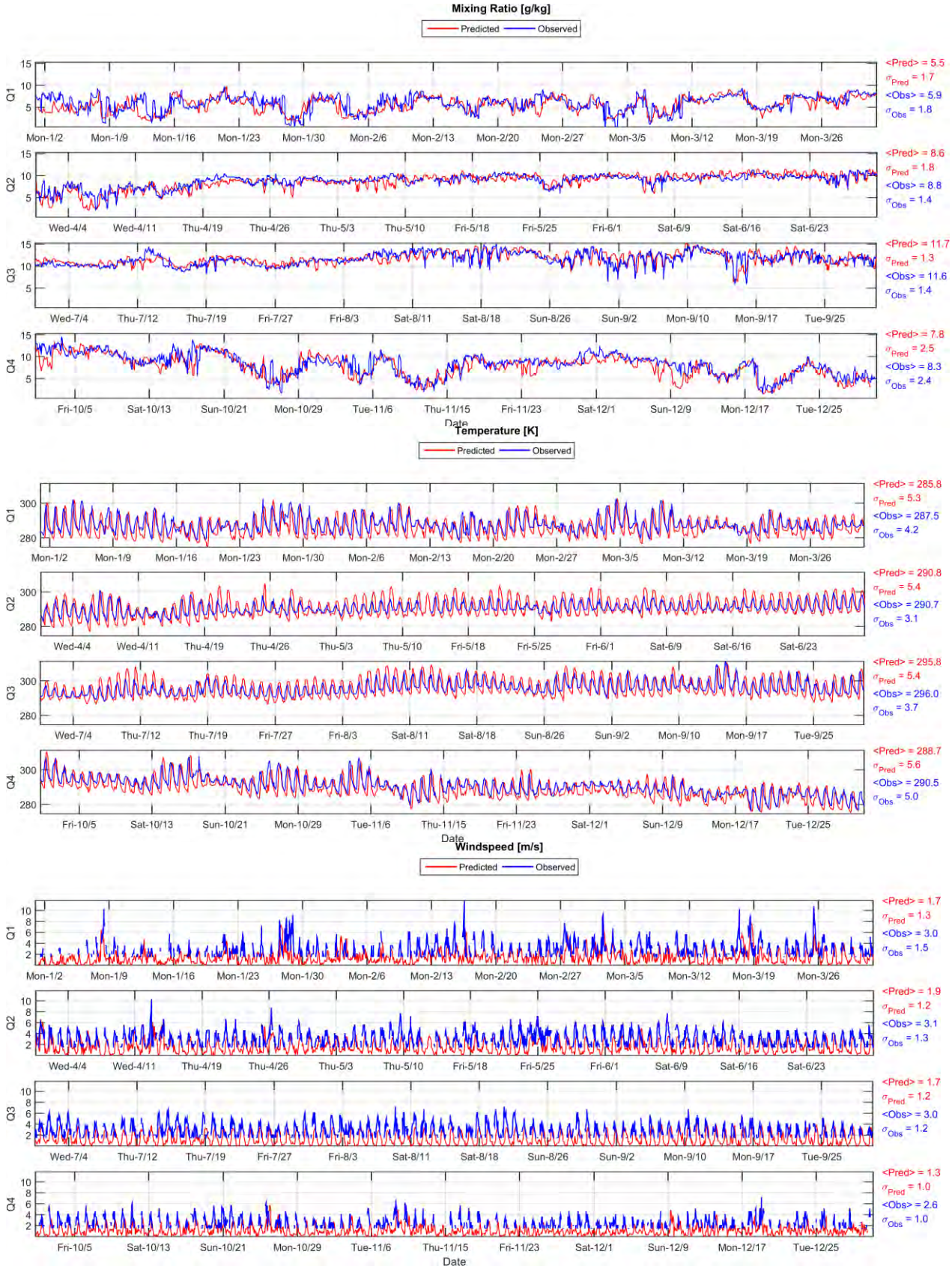

Figure 12: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at John Wayne-Orange County Airport



Figure 13: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Torrance Airport

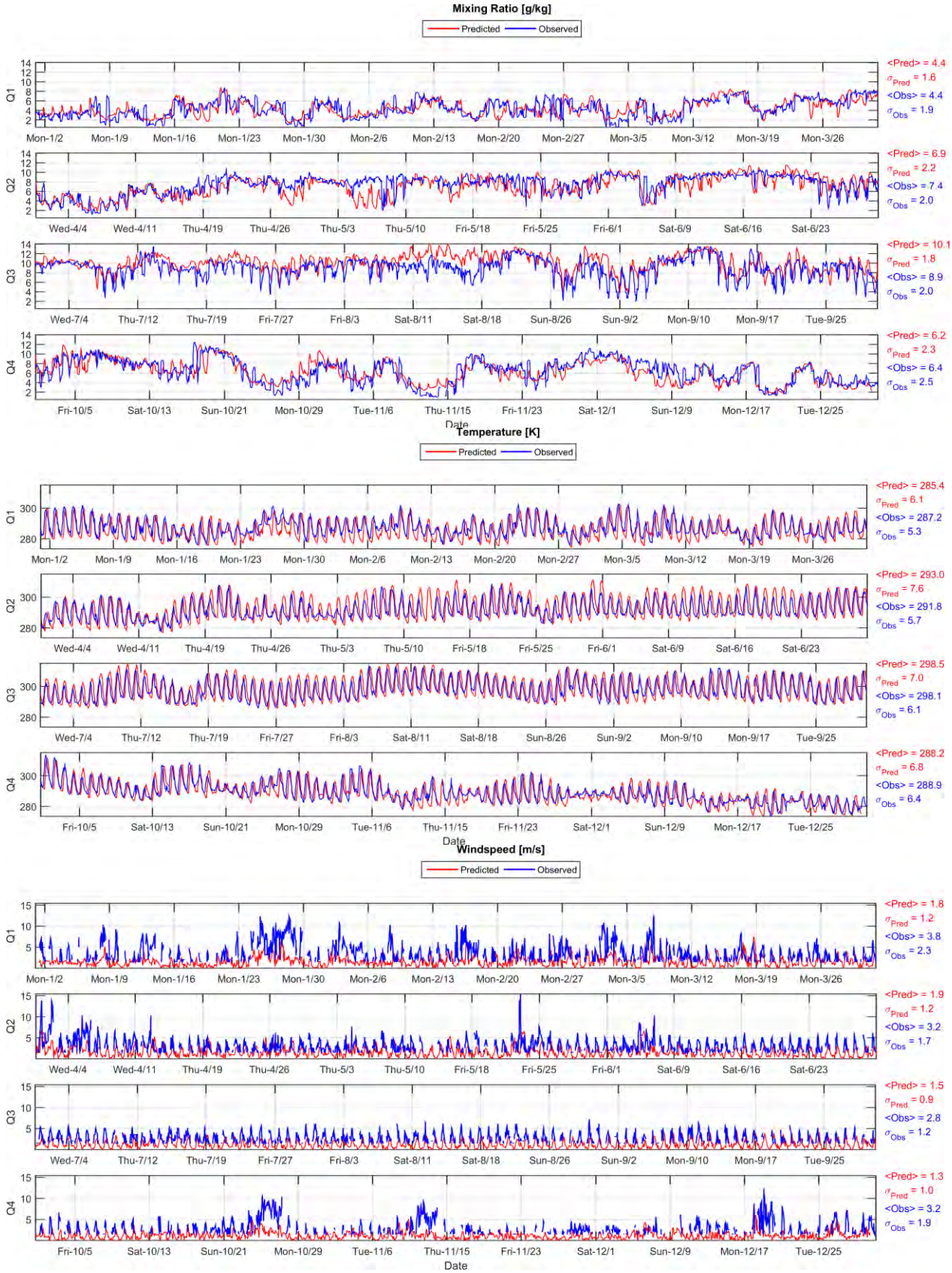

Figure 14: Time Series of Measured and WRF Simulated Mixing Ratio (Top), Temperature (Middle), and Wind Speed (Bottom) for the Period of Jan 1 to Dec 31, 2012 at Van Nuys Airport

Attachment 2

CMAQ MODEL PERFORMANCE TIME SERIES

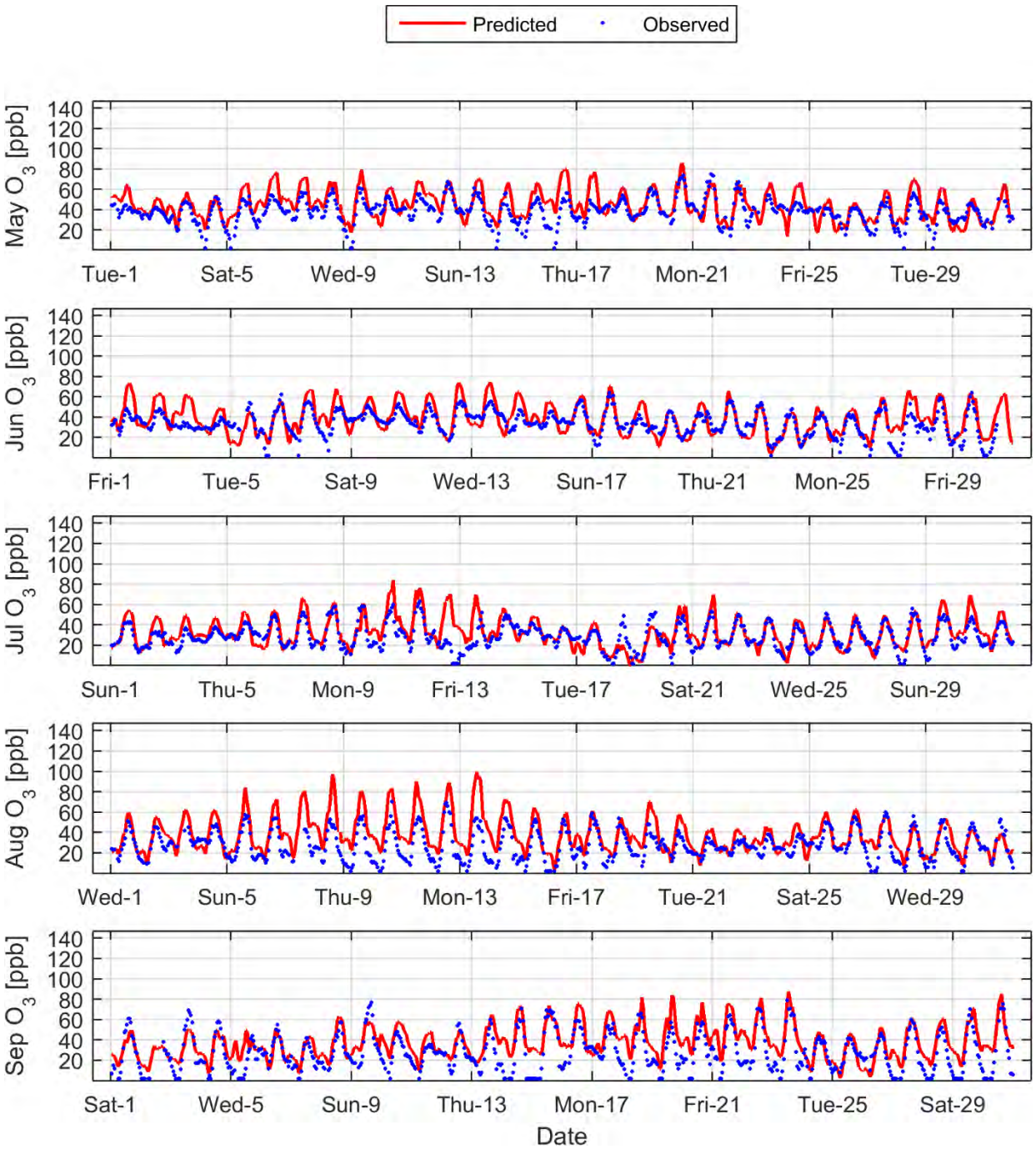

Figure 1: 2012 1-hour Ozone model prediction and measurement comparison at Anaheim

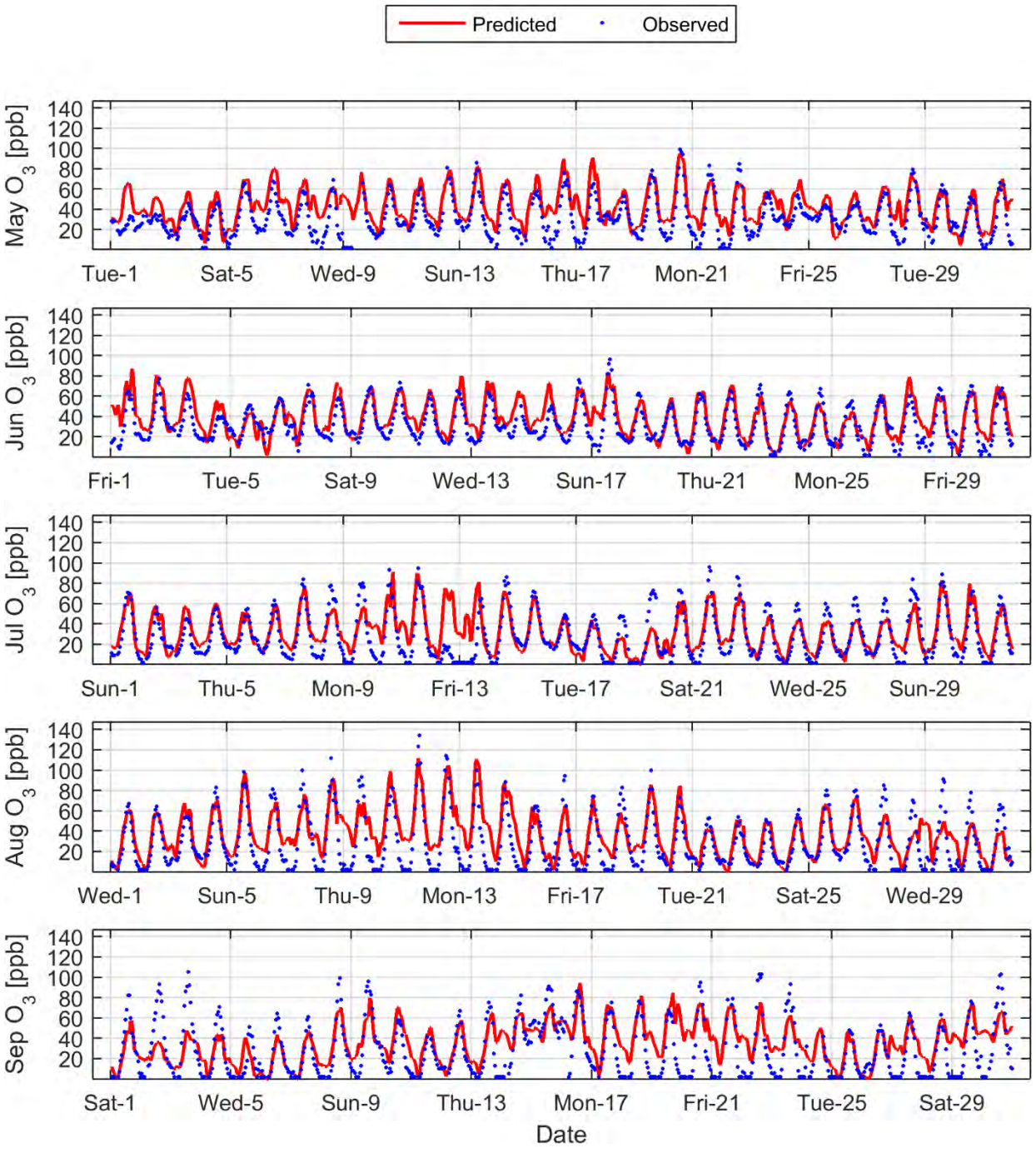

Figure 2: 2012 1-hour Ozone model prediction and measurement comparison at Azusa

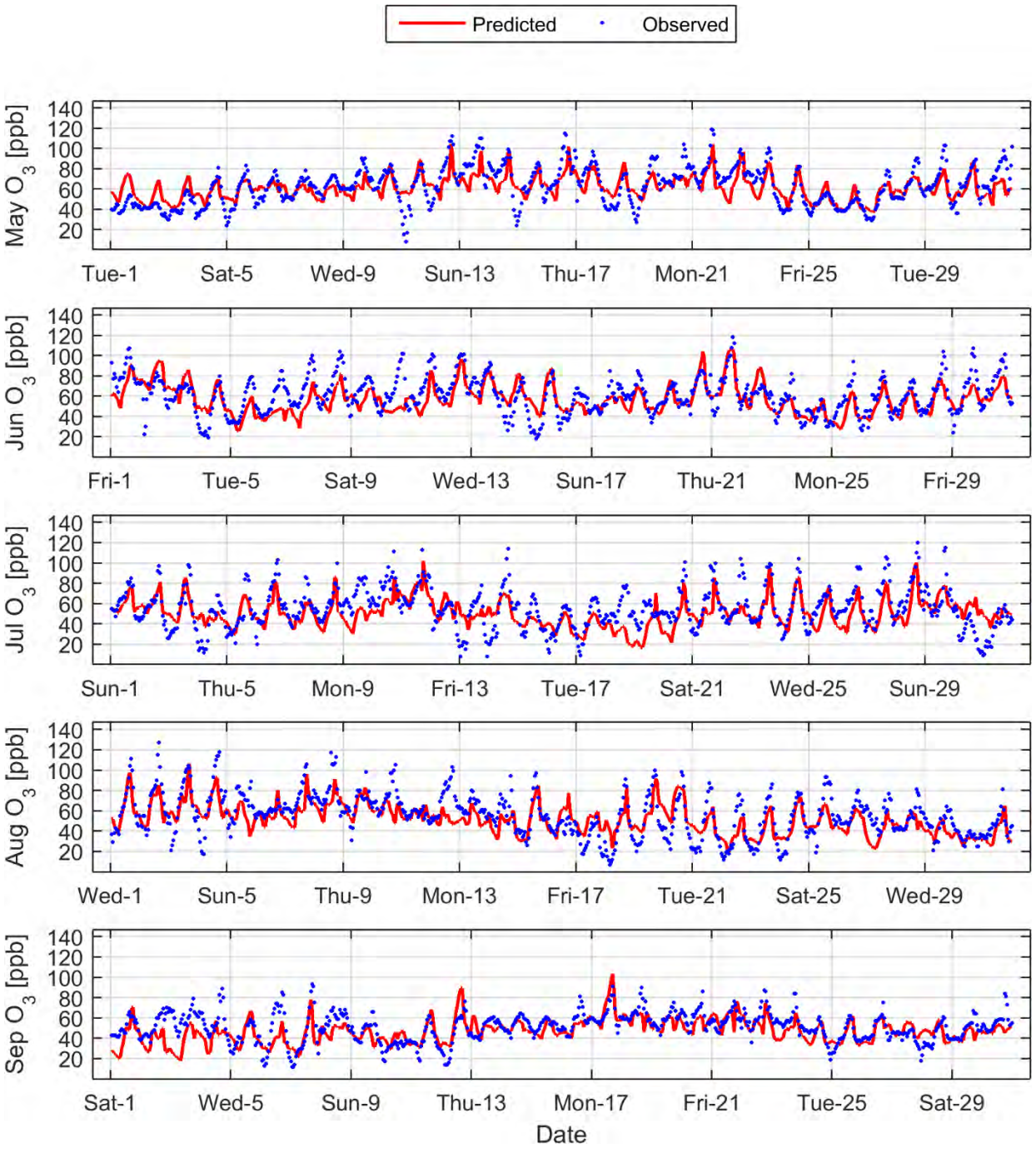

Figure 3: 2012 1-hour Ozone model prediction and measurement comparison at Banning

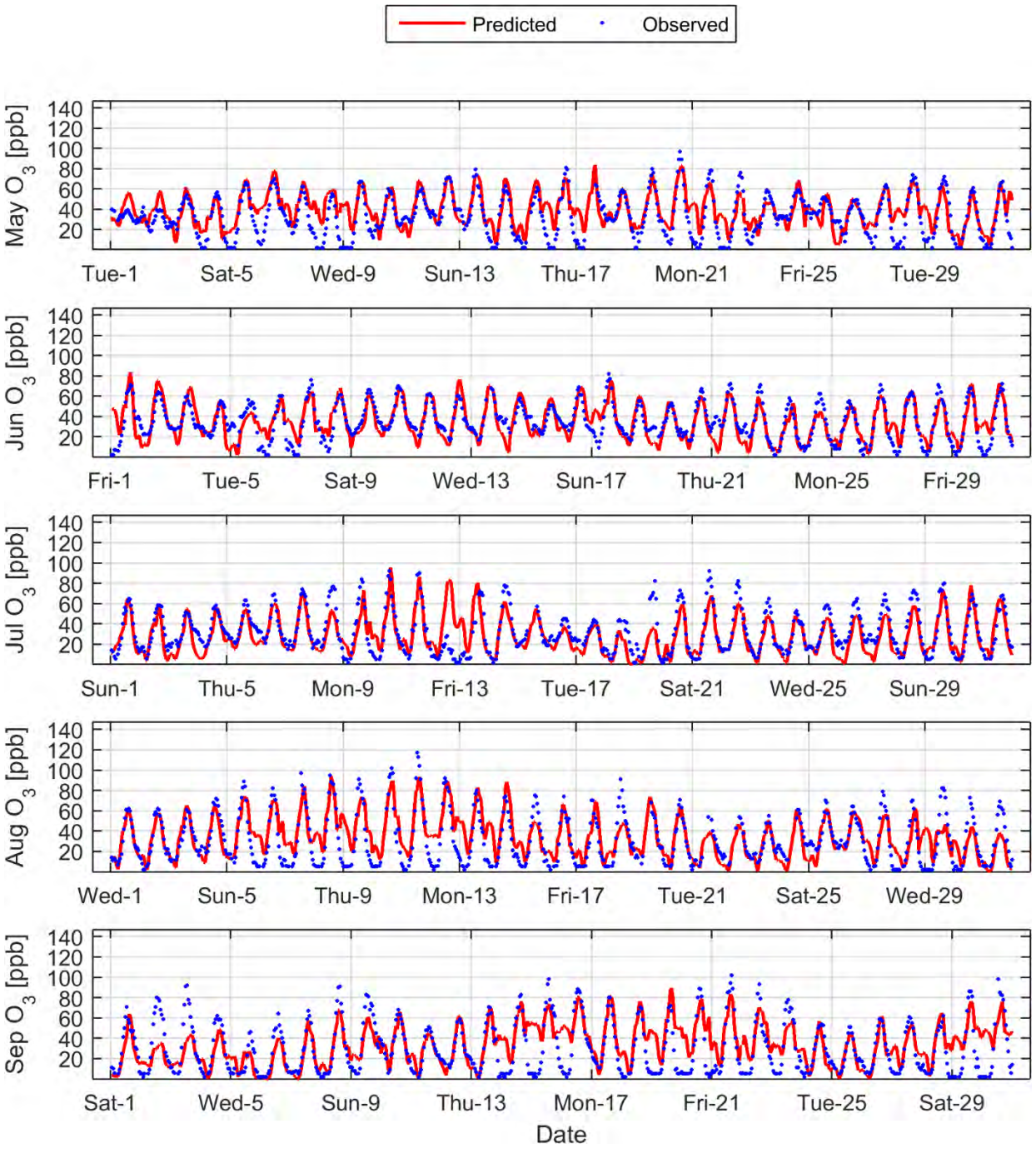

Figure 4: 2012 1-hour Ozone model prediction and measurement comparison at Burbank

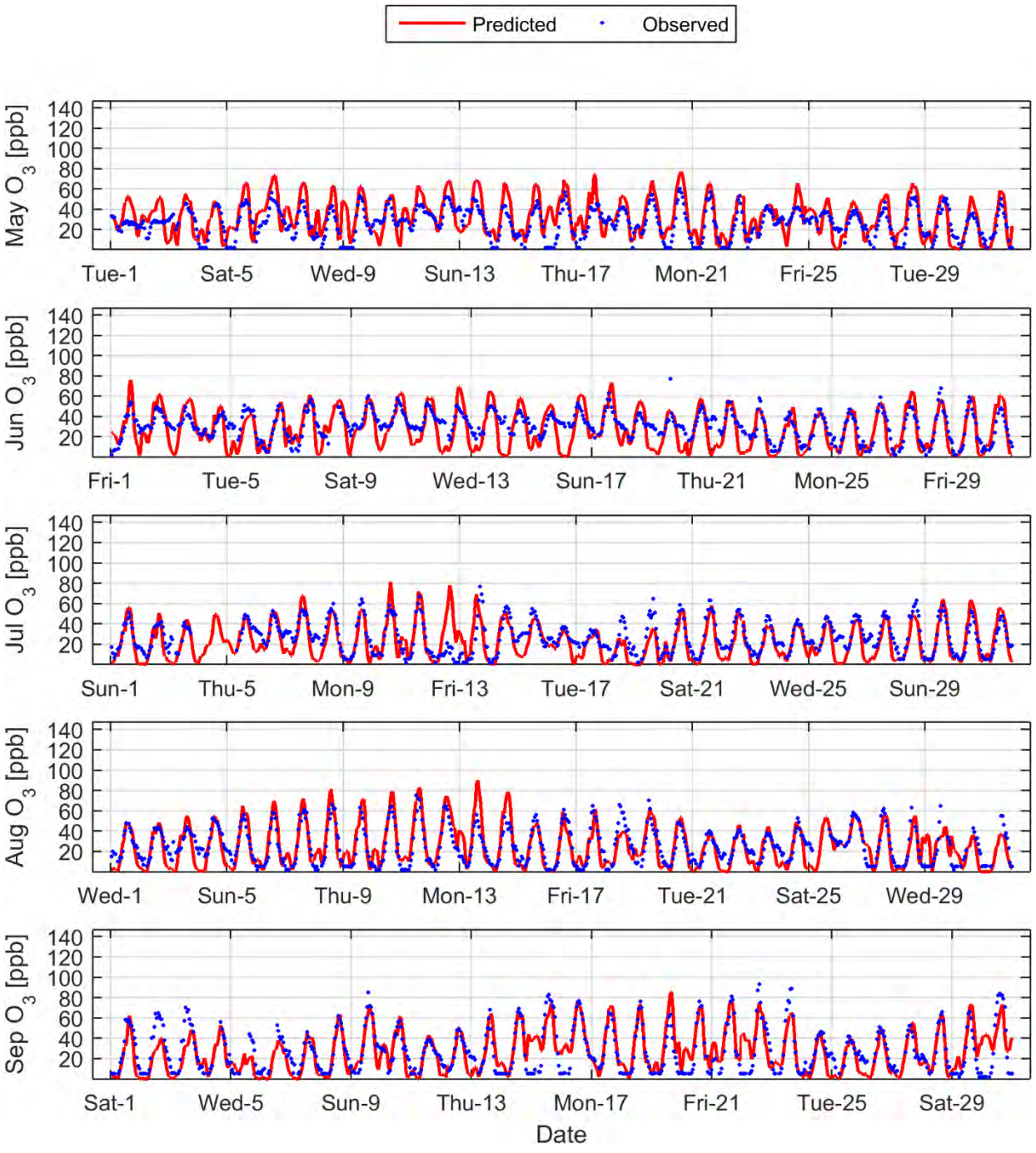

Figure 5: 2012 1-hour Ozone model prediction and measurement comparison at Central Los Angeles

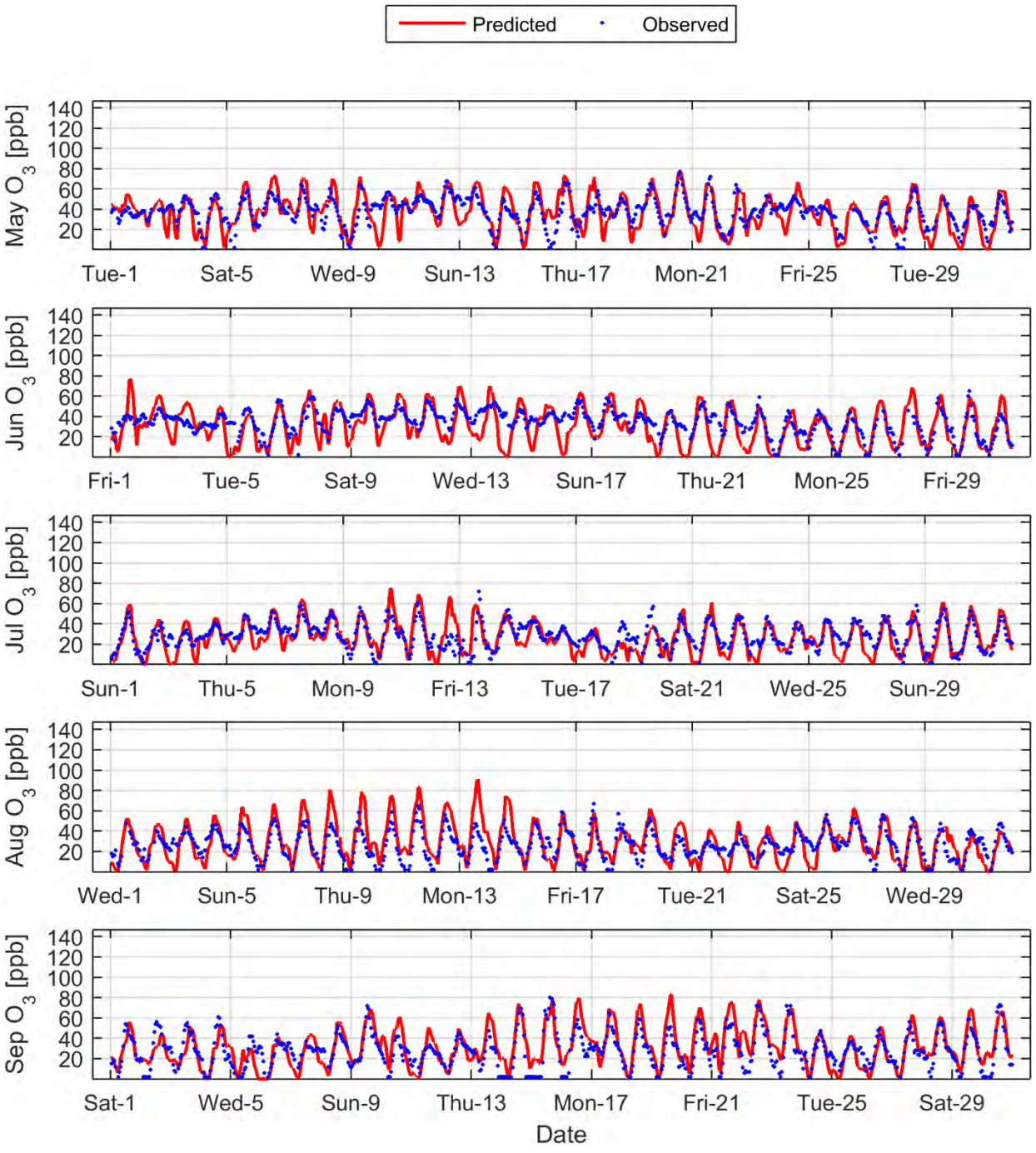

Figure 6: 2012 1-hour Ozone model prediction and measurement comparison at Compton

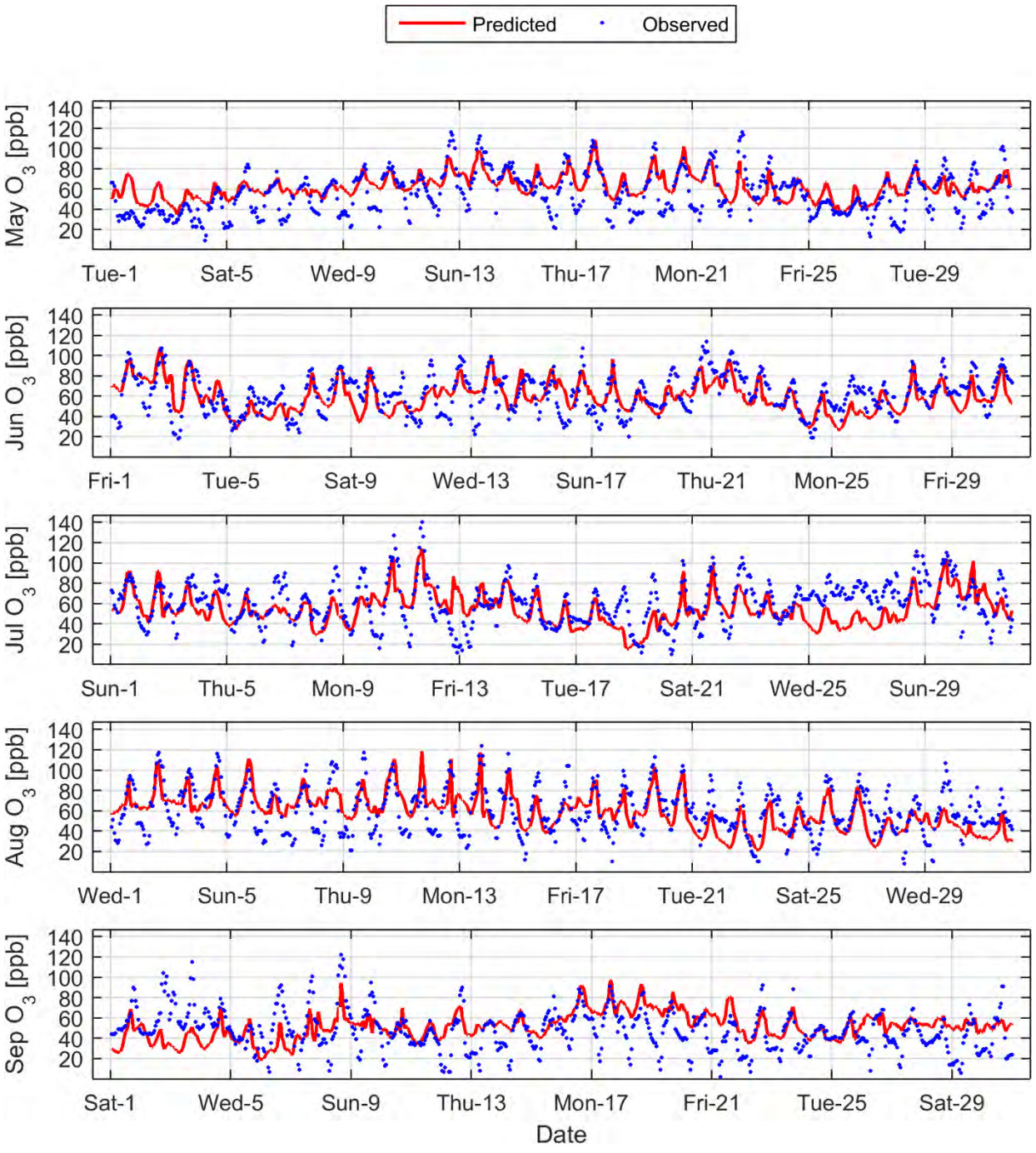

Figure 7: 2012 1-hour Ozone model prediction and measurement comparison at Crestline

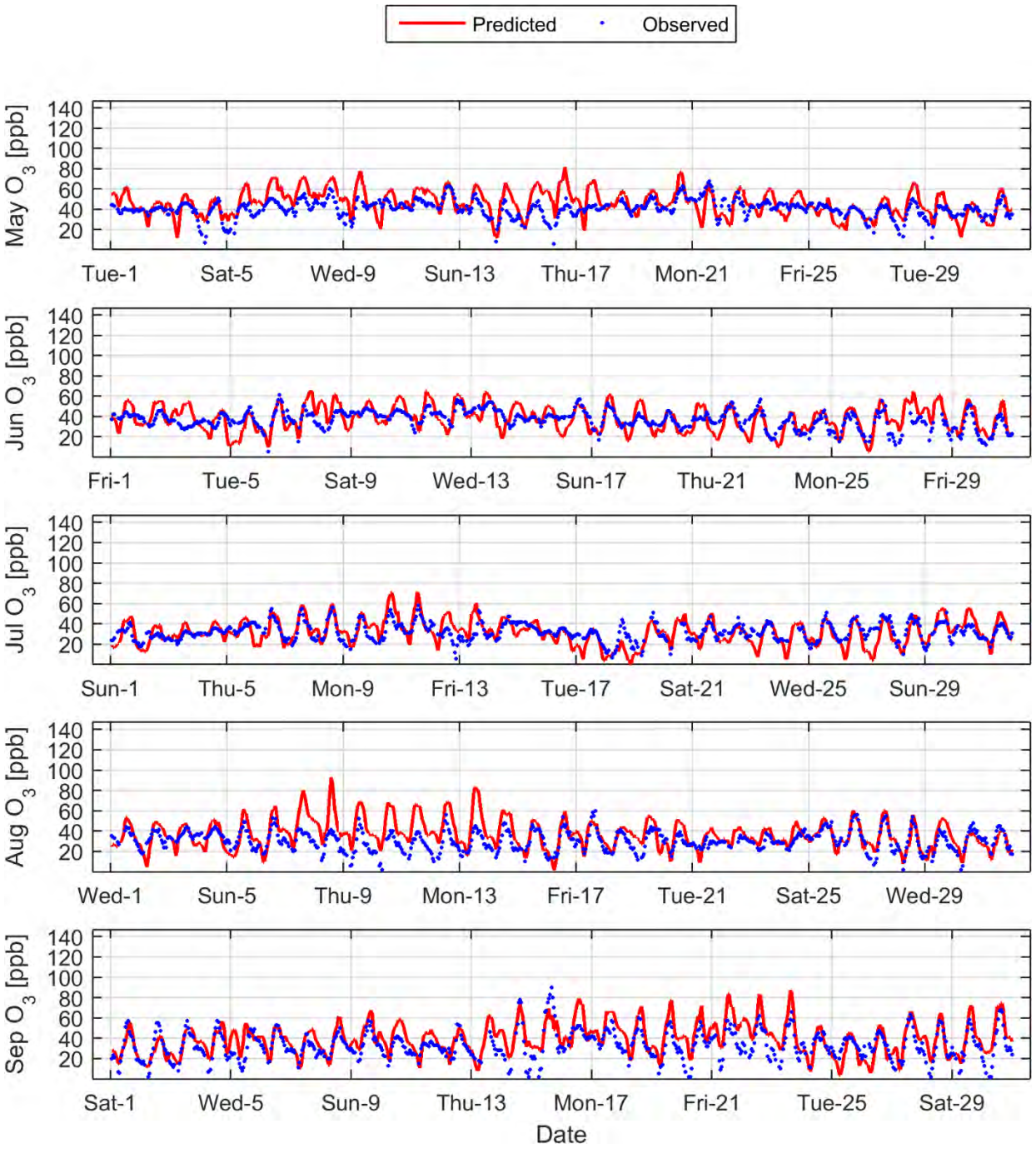

Figure 8: 2012 1-hour Ozone model prediction and measurement comparison at Costa Mesa

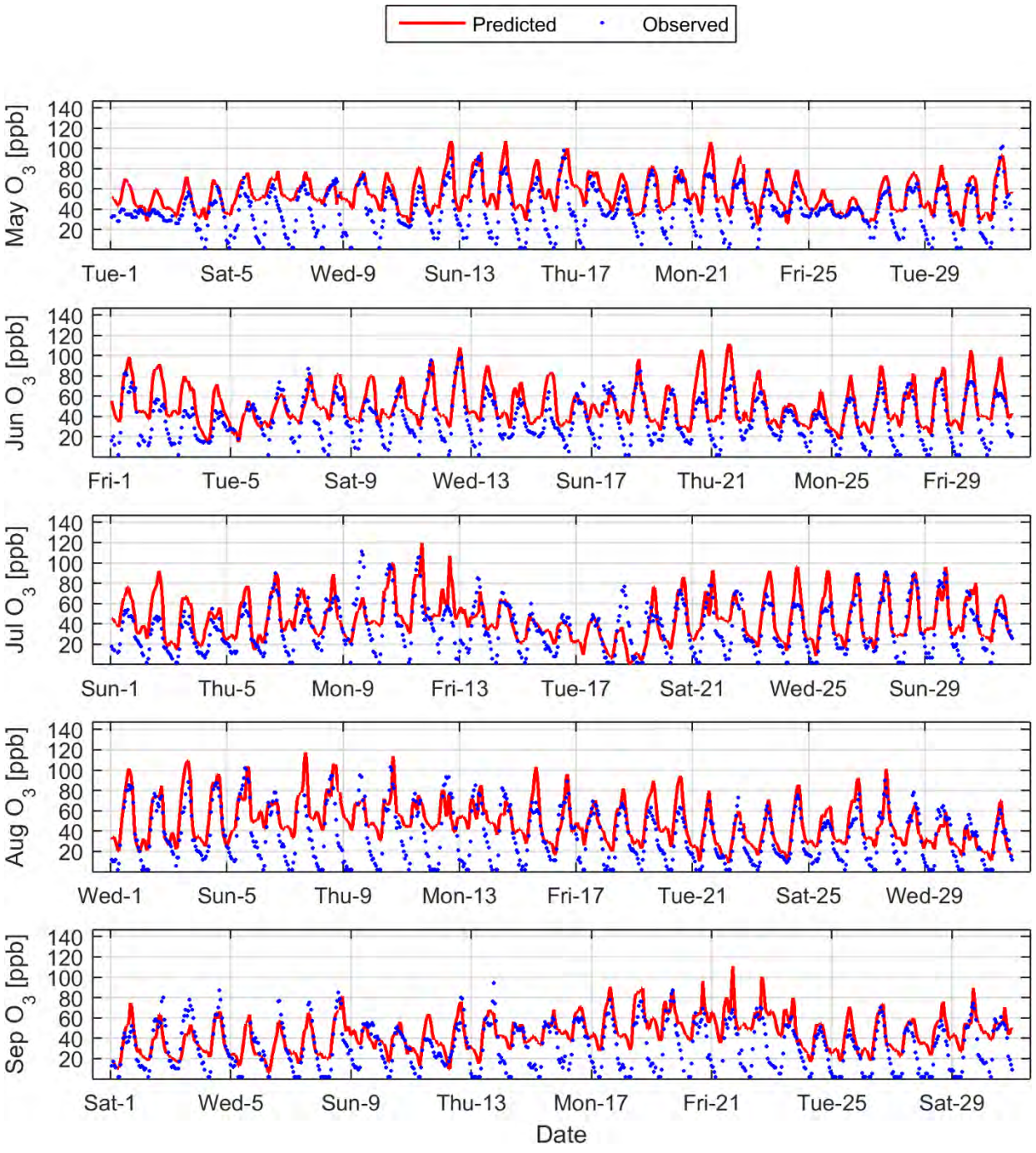

Figure 9: 2012 1-hour Ozone model prediction and measurement comparison at Lake Elsinore

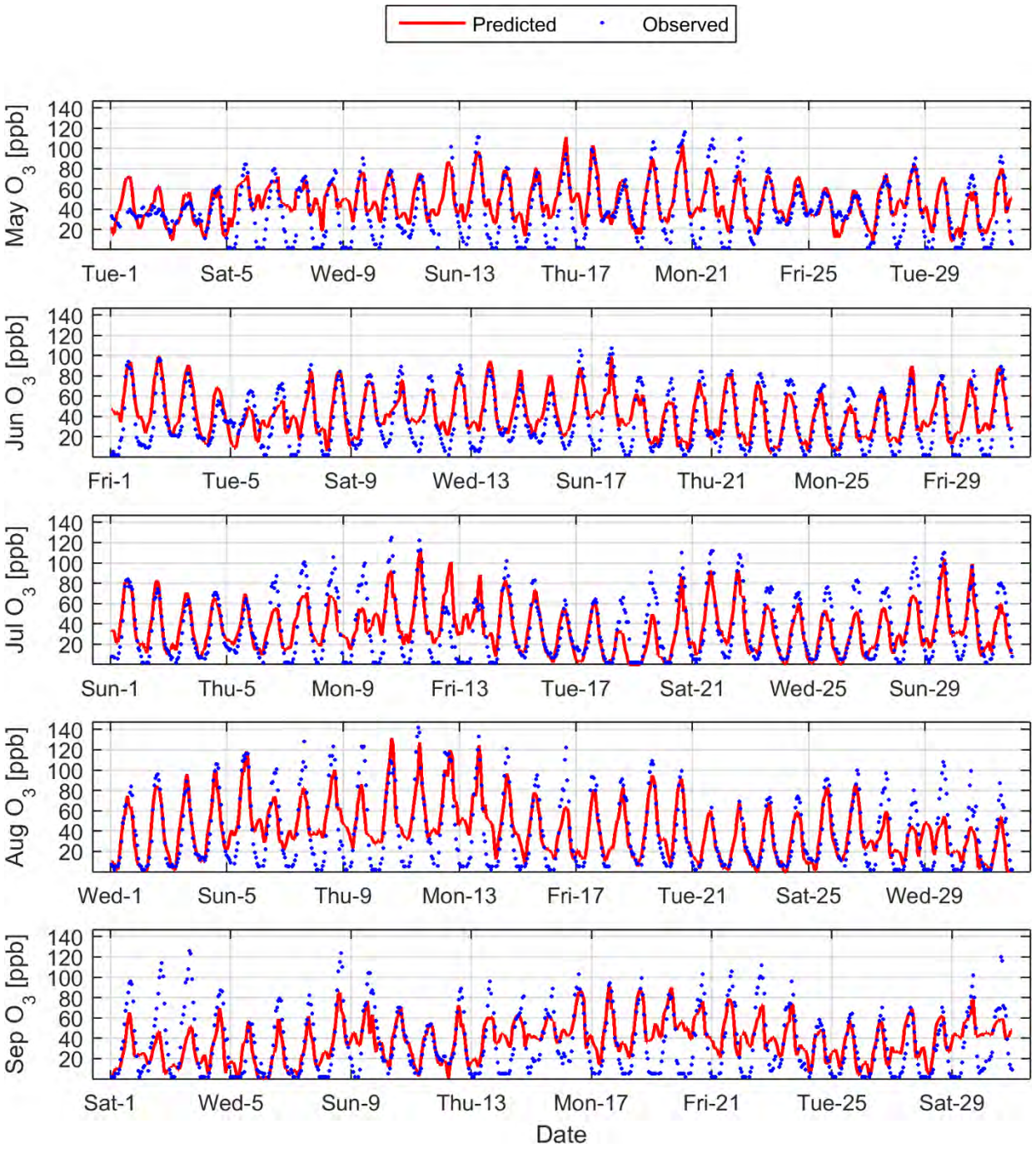

Figure 10: 2012 1-hour Ozone model prediction and measurement comparison at Fontana

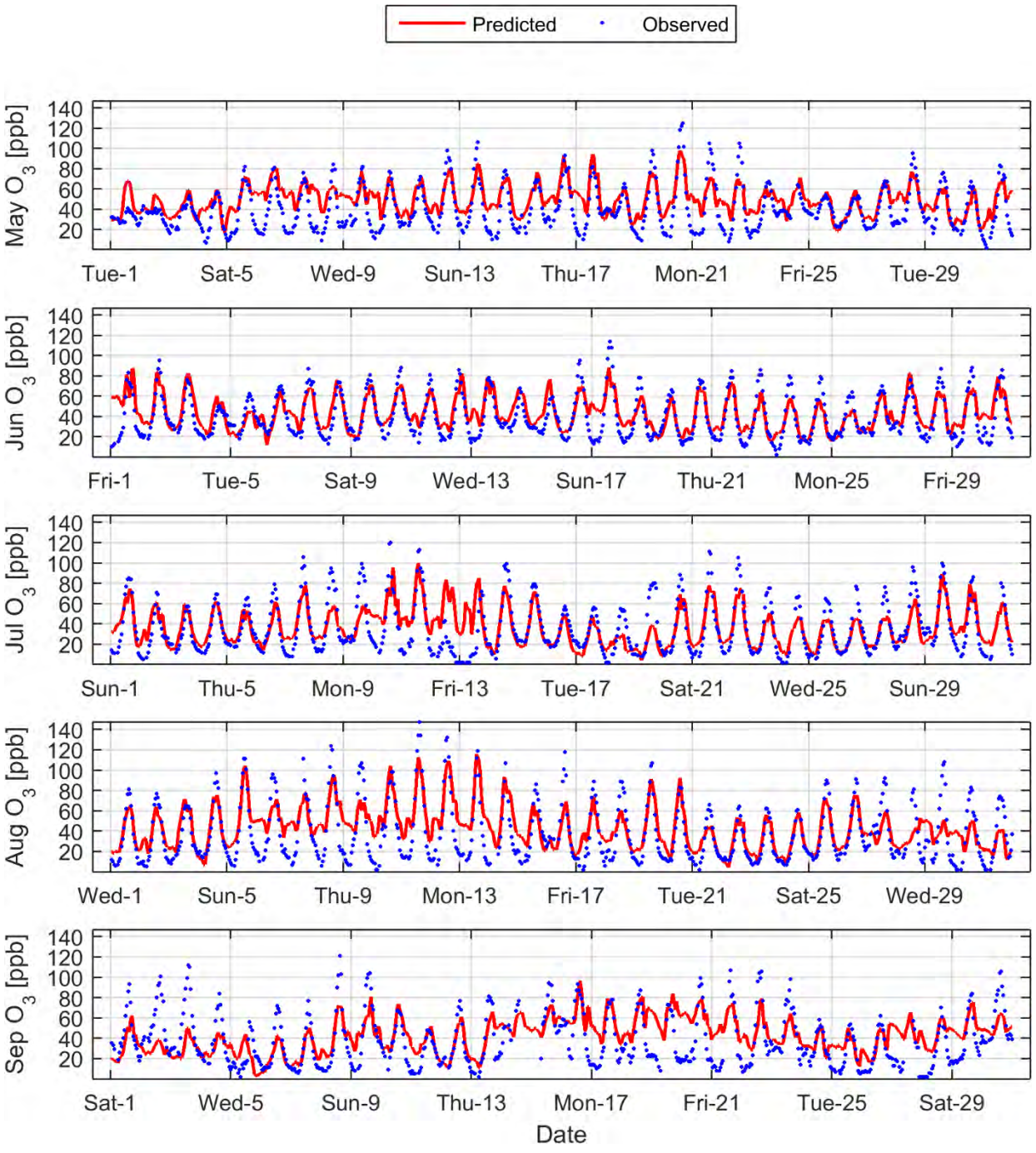

Figure 11: 2012 1-hour Ozone model prediction and measurement comparison at Glendora

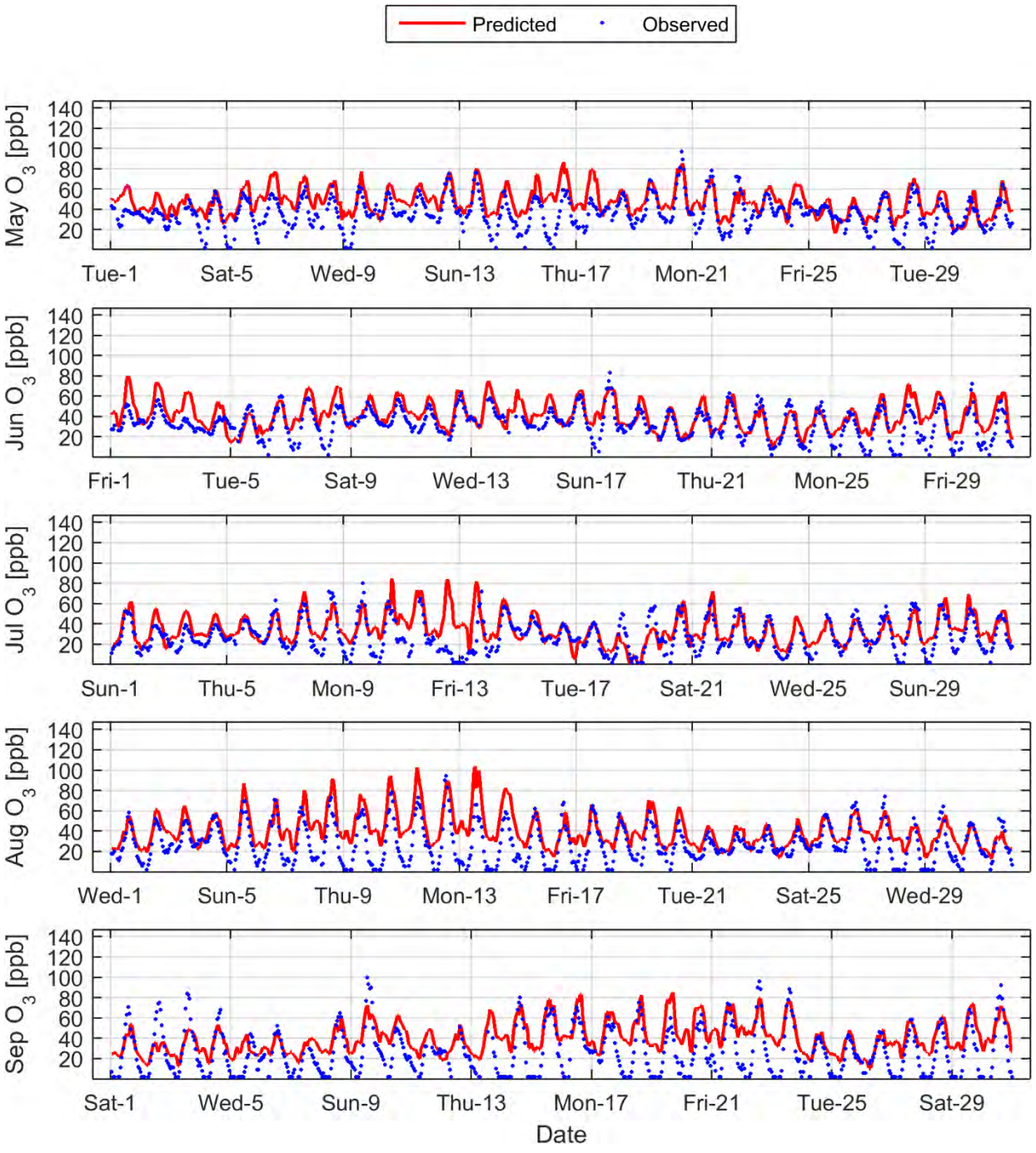

Figure 12: 2012 1-hour Ozone model prediction and measurement comparison at La Habra

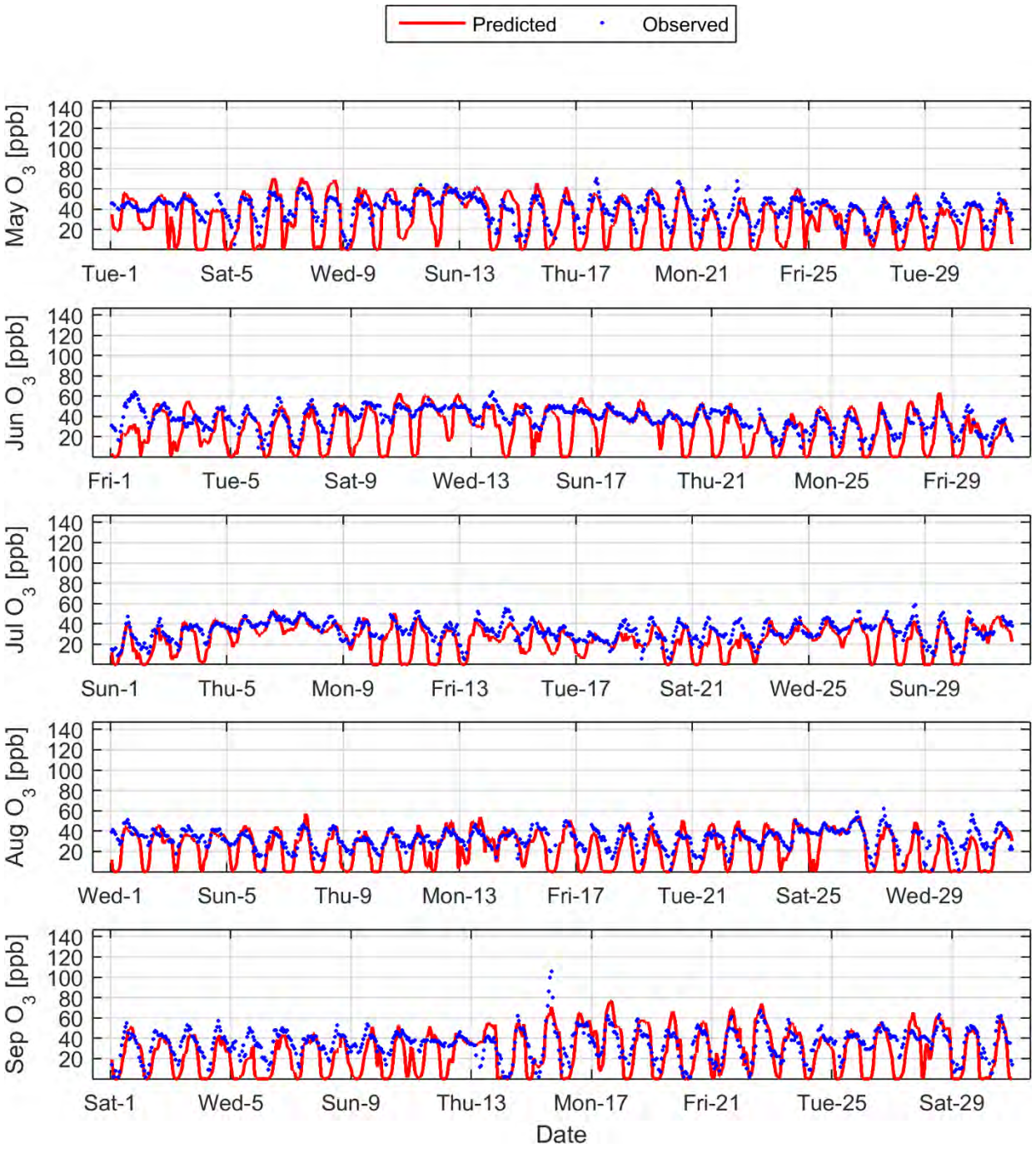

Figure 13: 2012 1-hour Ozone model prediction and measurement comparison at LAX

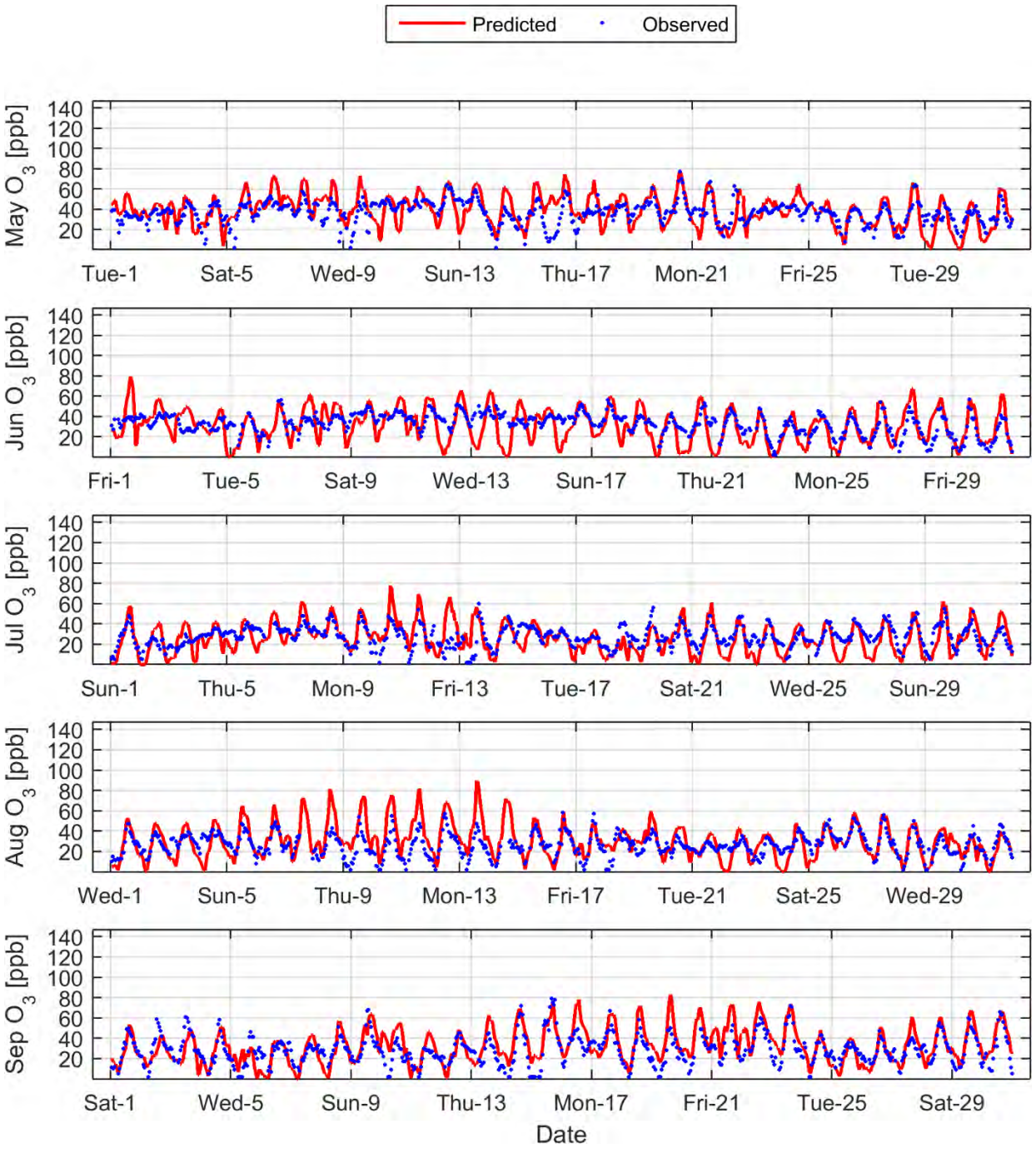

Figure 14: 2012 1-hour Ozone model prediction and measurement comparison at Long Beach

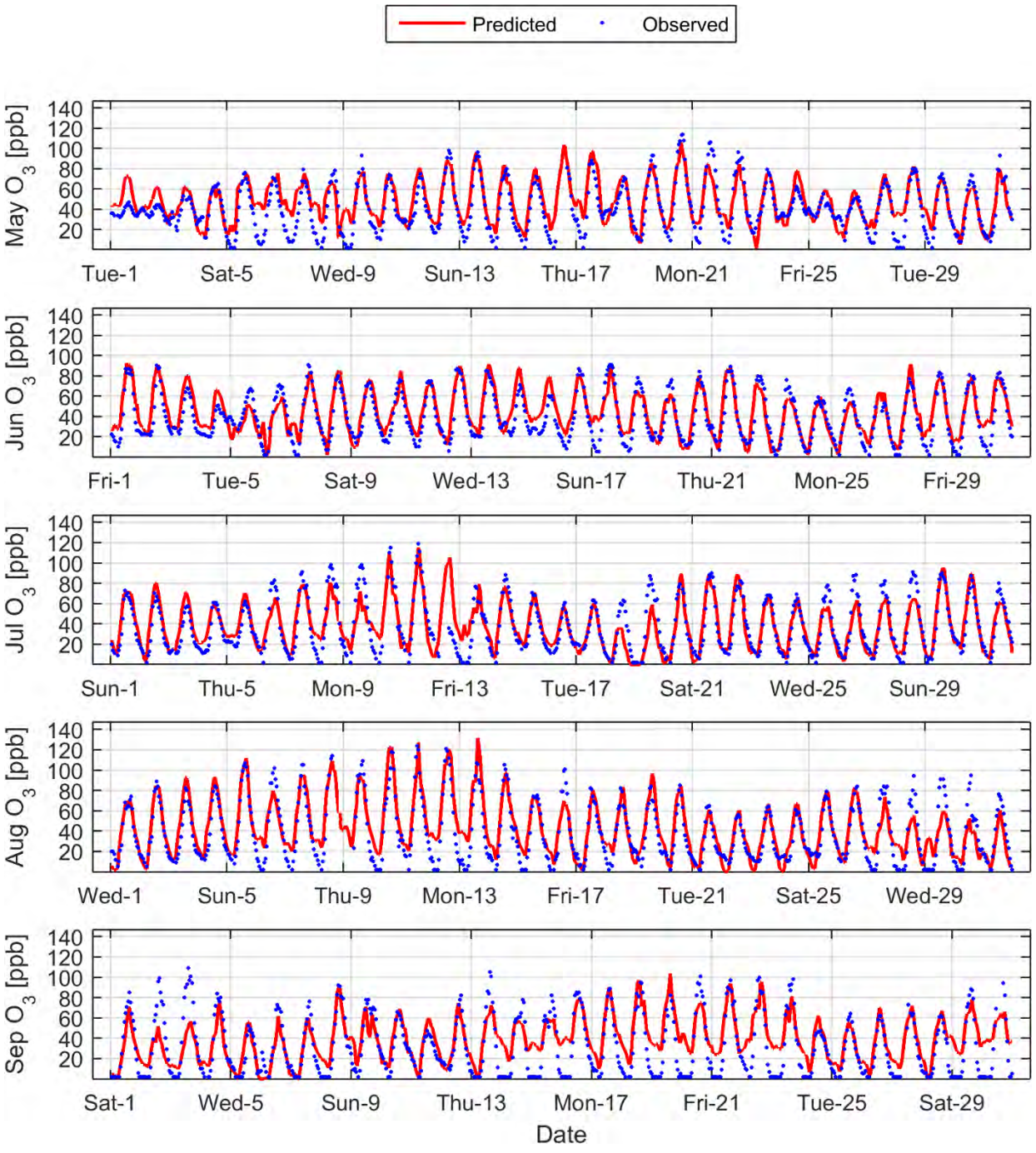

Figure 15: 2012 1-hour Ozone model prediction and measurement comparison at Mira Loma

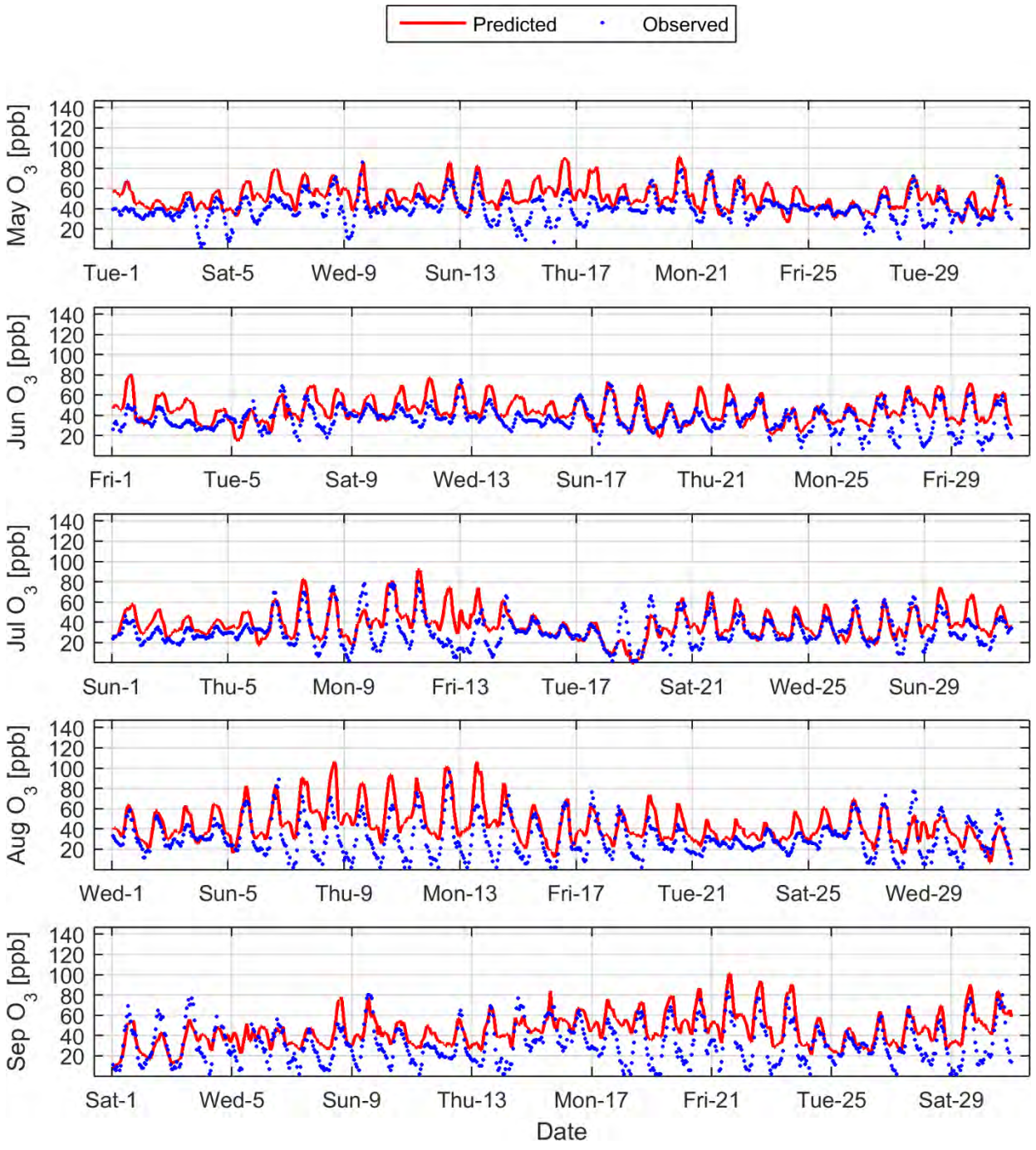

Figure 16: 2012 1-hour Ozone model prediction and measurement comparison at Mission Viejo

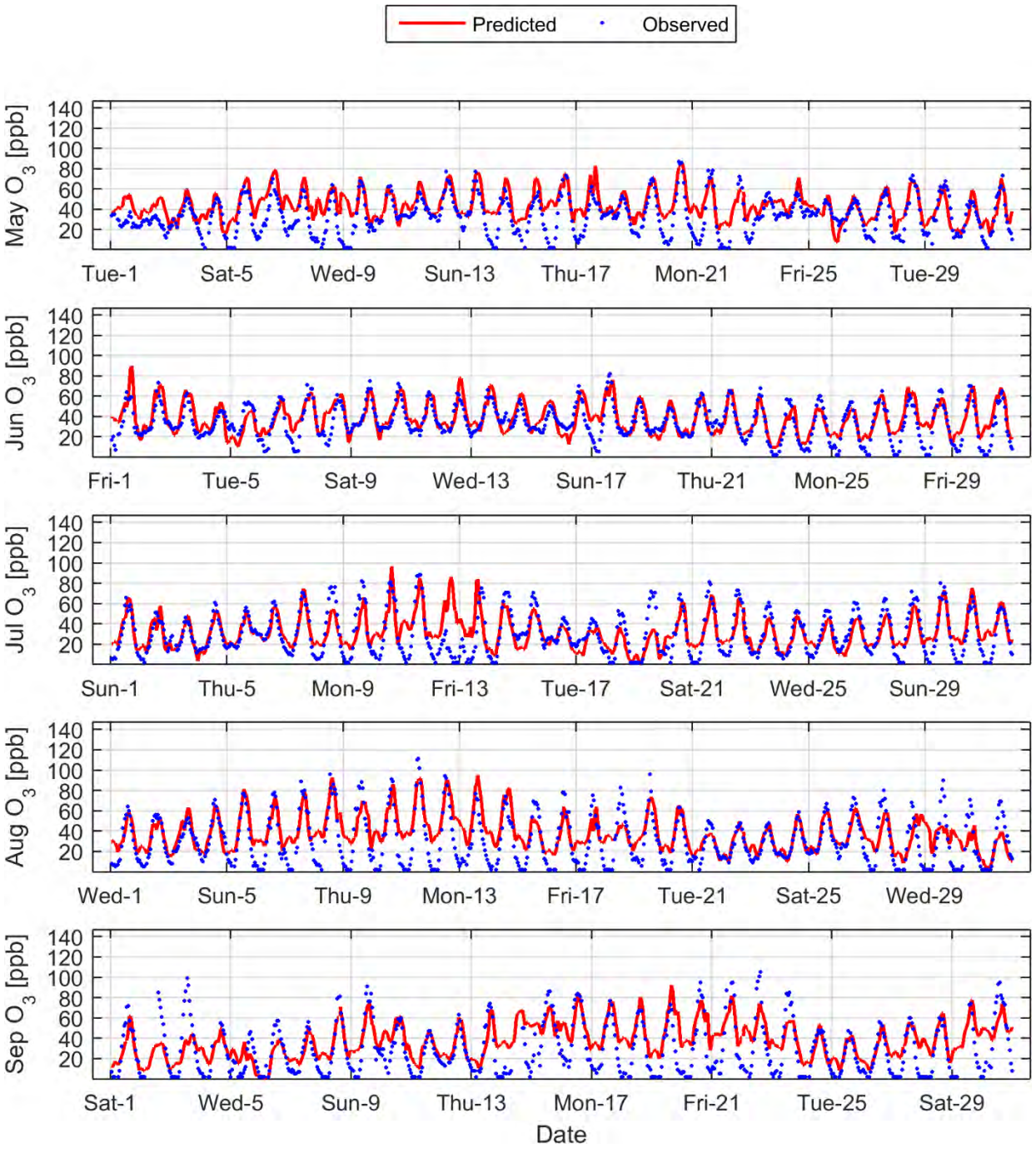

Figure 17: 2012 1-hour Ozone model prediction and measurement comparison at Pasadena

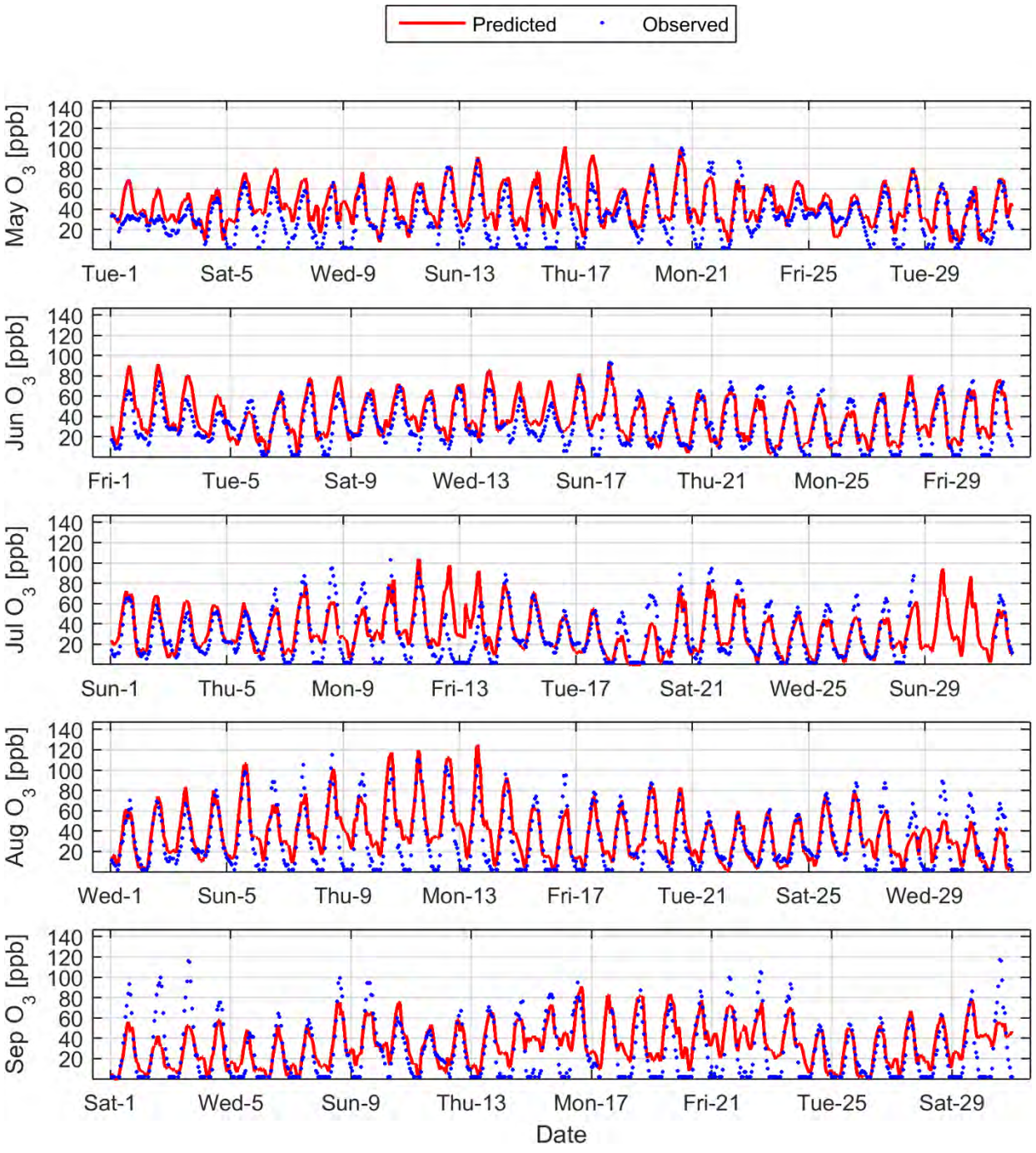

Figure 18: 2012 1-hour Ozone model prediction and measurement comparison at Pomona

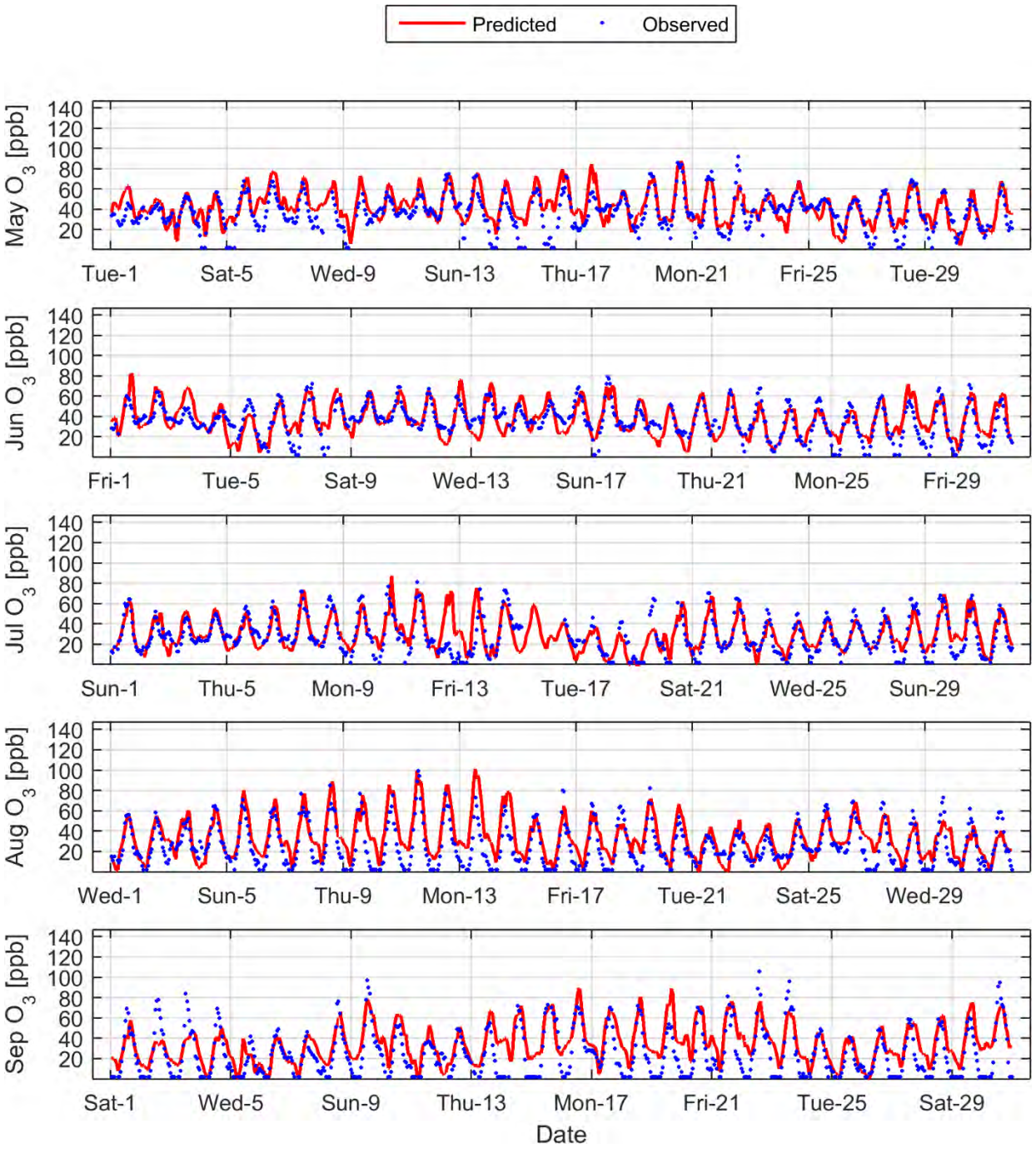

Figure 19: 2012 1-hour Ozone model prediction and measurement comparison at Pico Rivera

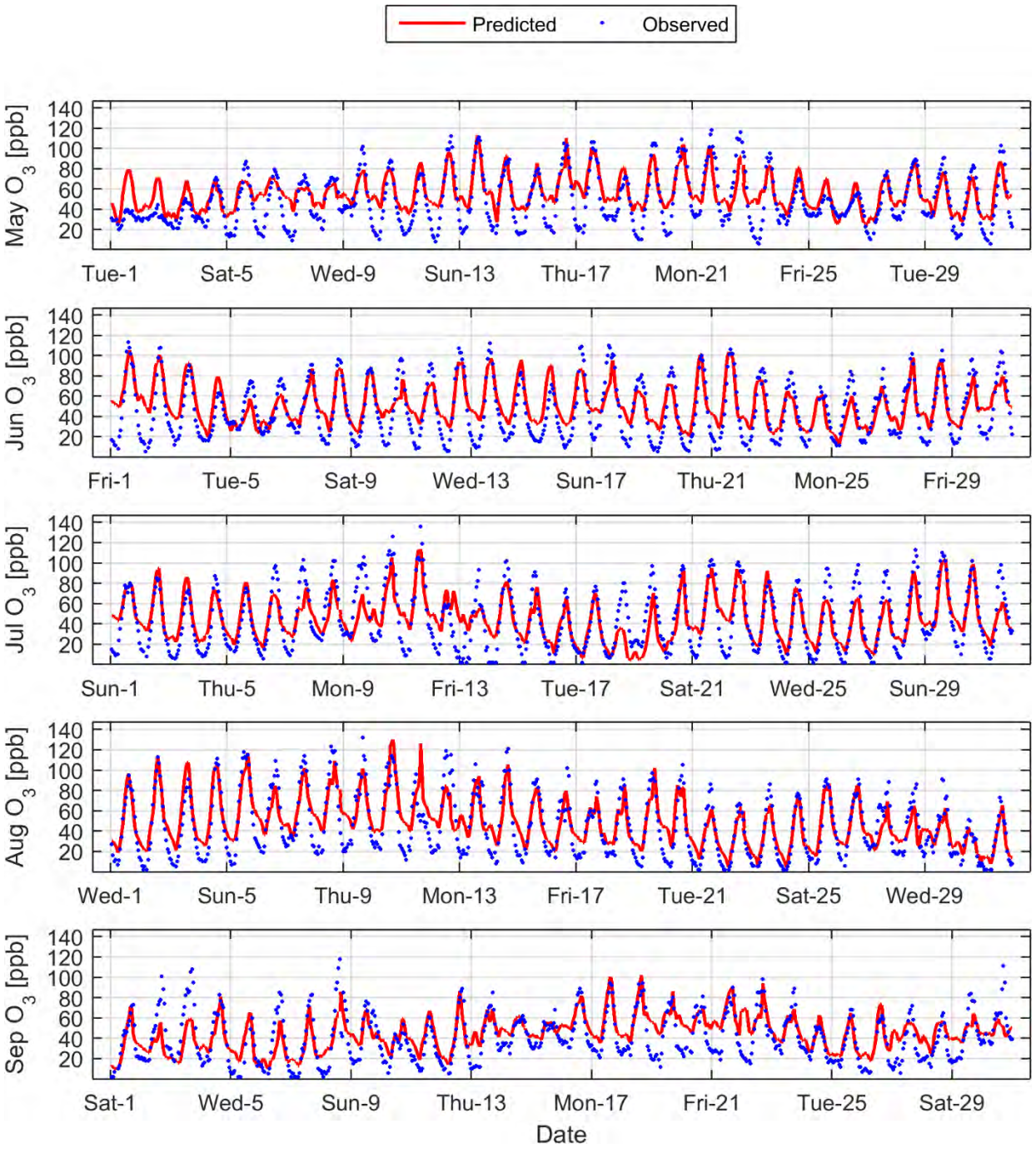

Figure 20: 2012 1-hour Ozone model prediction and measurement comparison at Redlands

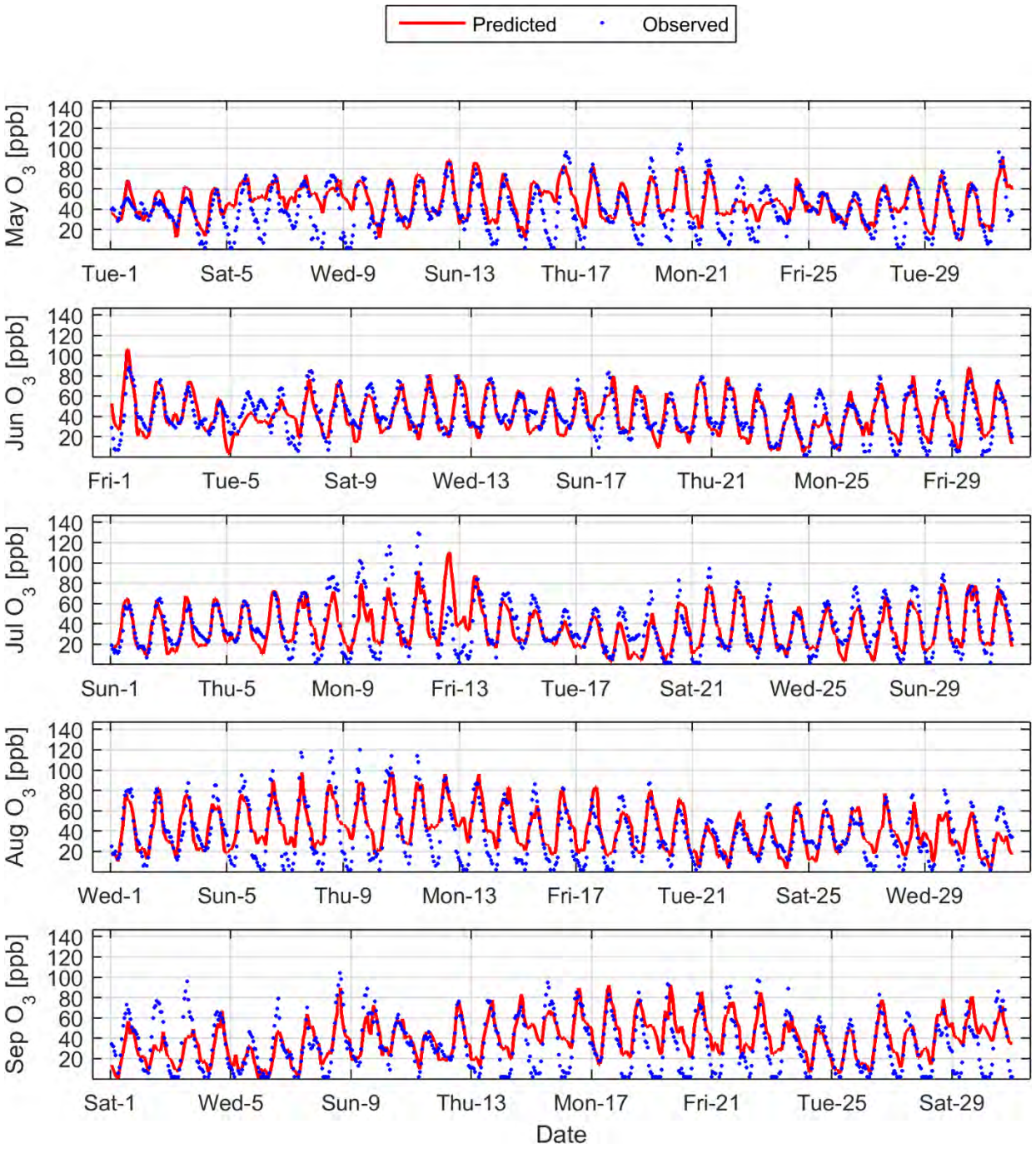

Figure 21: 2012 1-hour Ozone model prediction and measurement comparison at Reseda

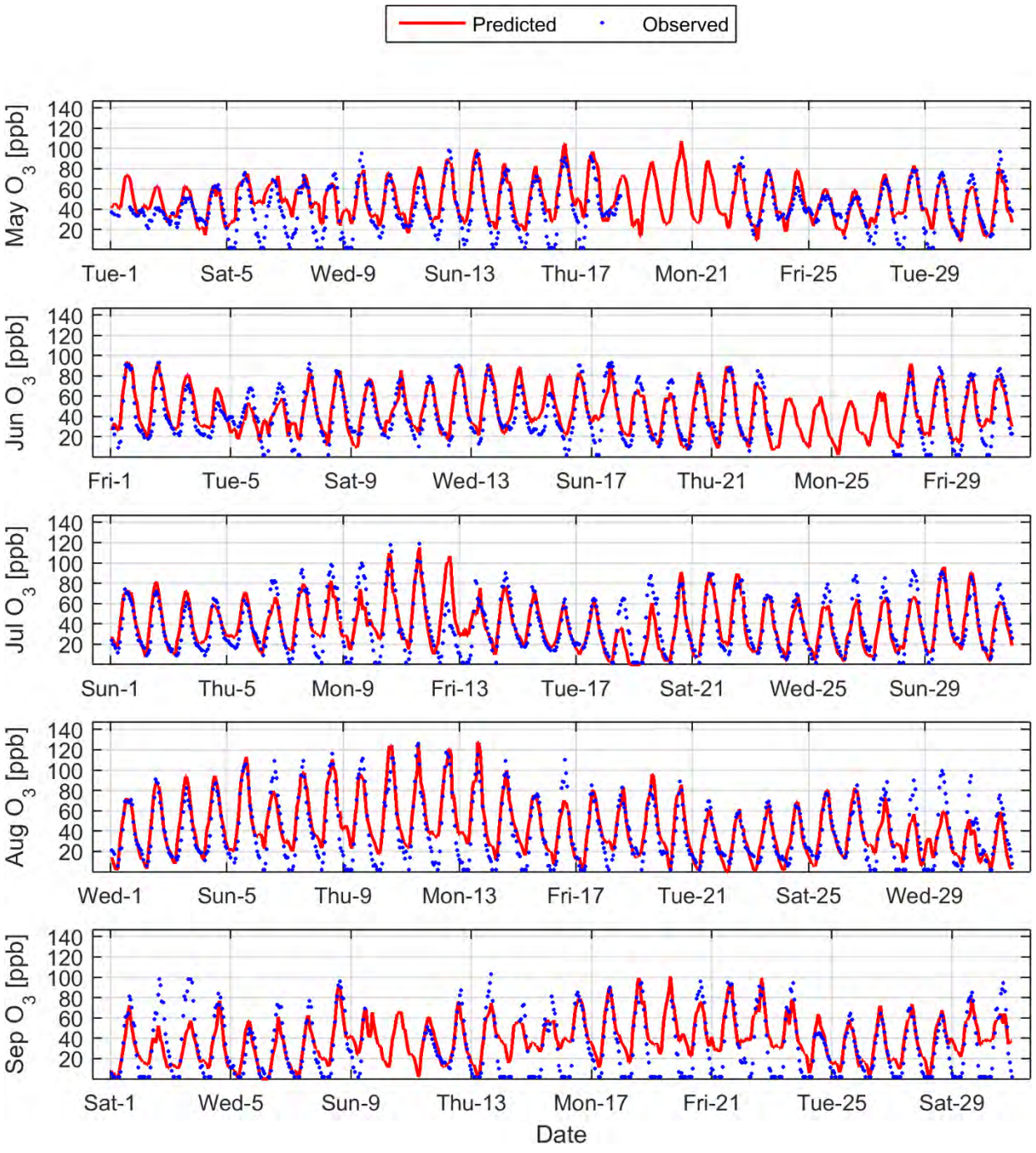

Figure 22: 2012 1-hour Ozone model prediction and measurement comparison at Riverside

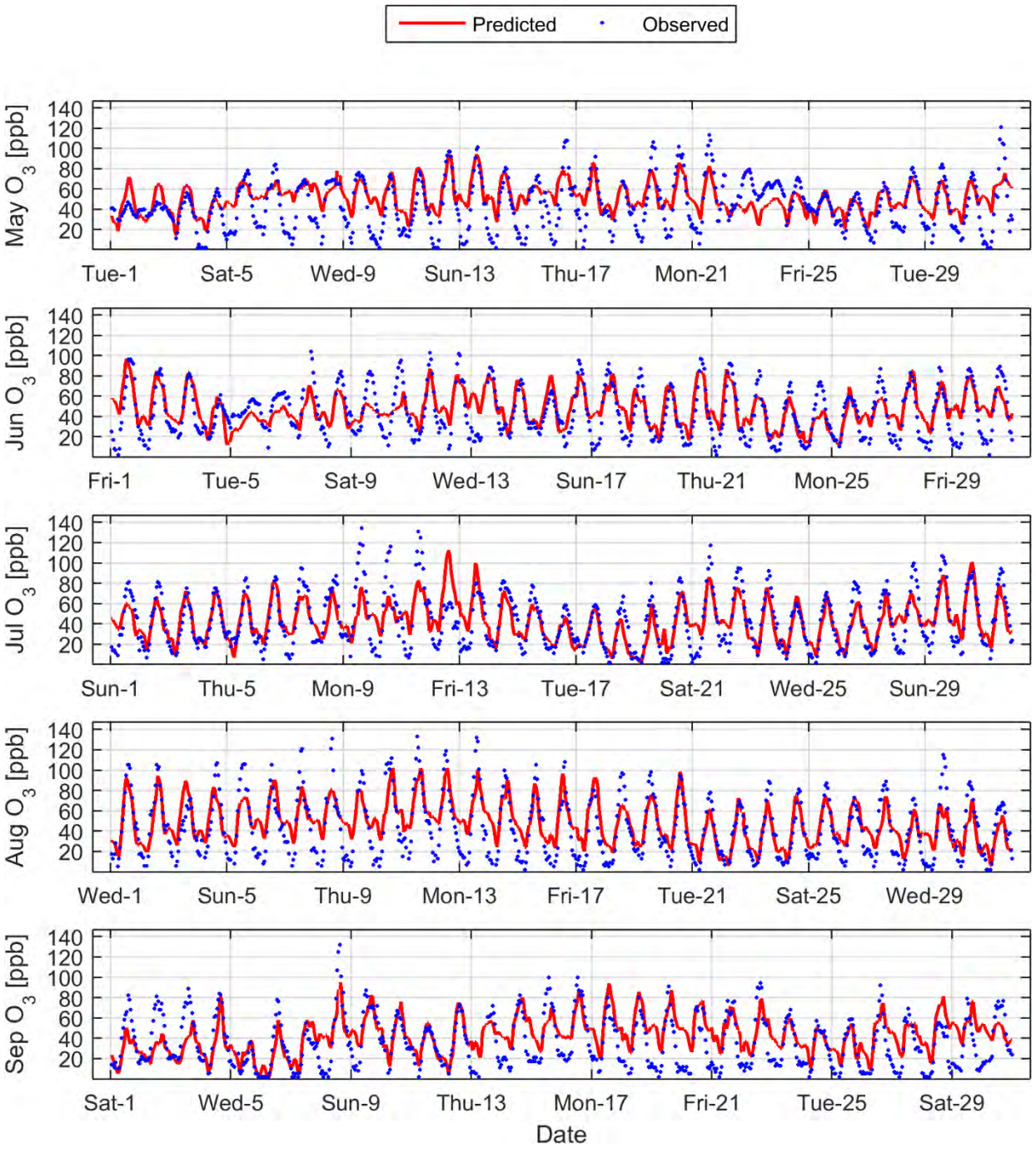

Figure 23: 2012 1-hour Ozone model prediction and measurement comparison at Santa Clarita

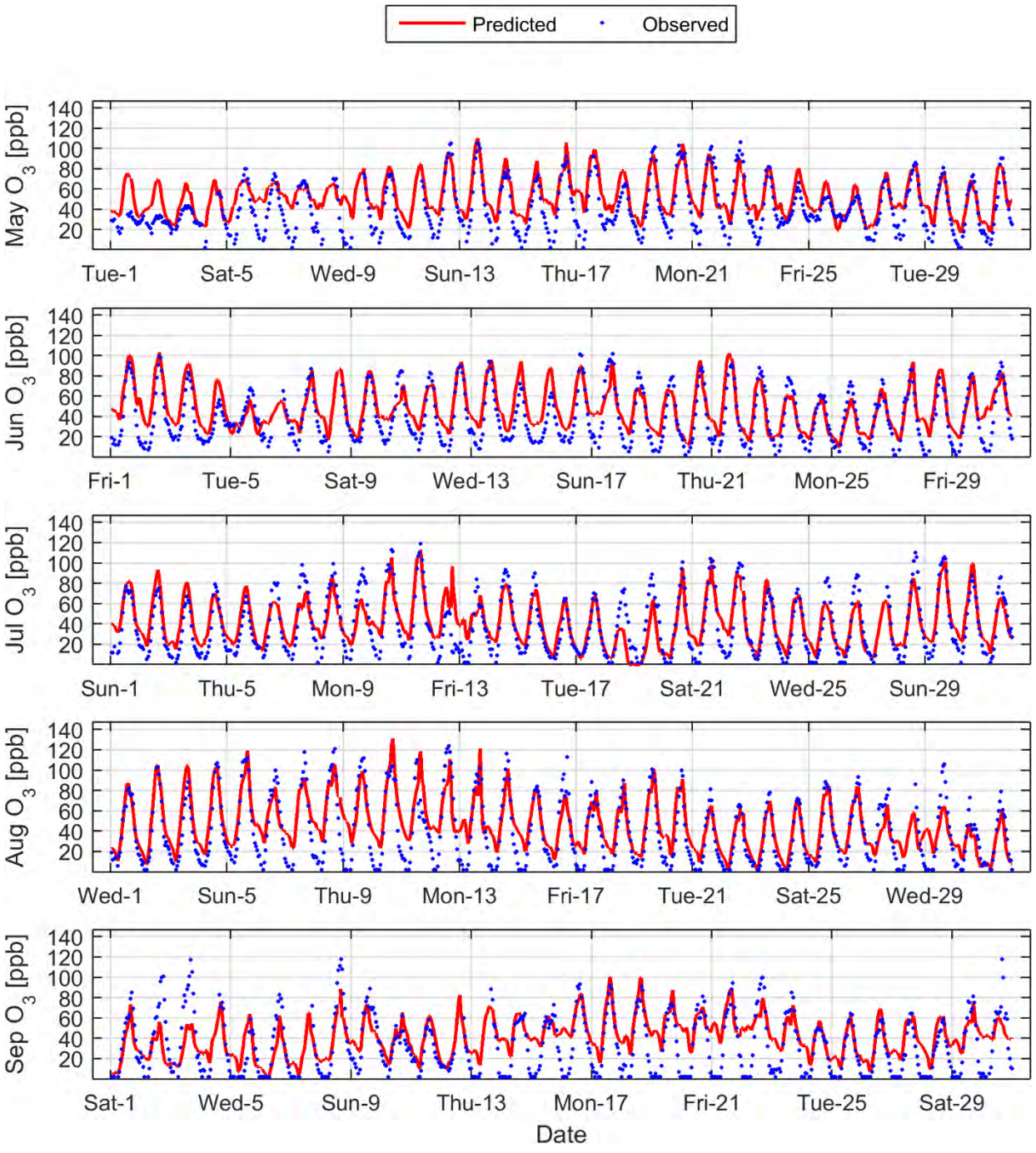

Figure 24: 2012 1-hour Ozone model prediction and measurement comparison at San Bernardino

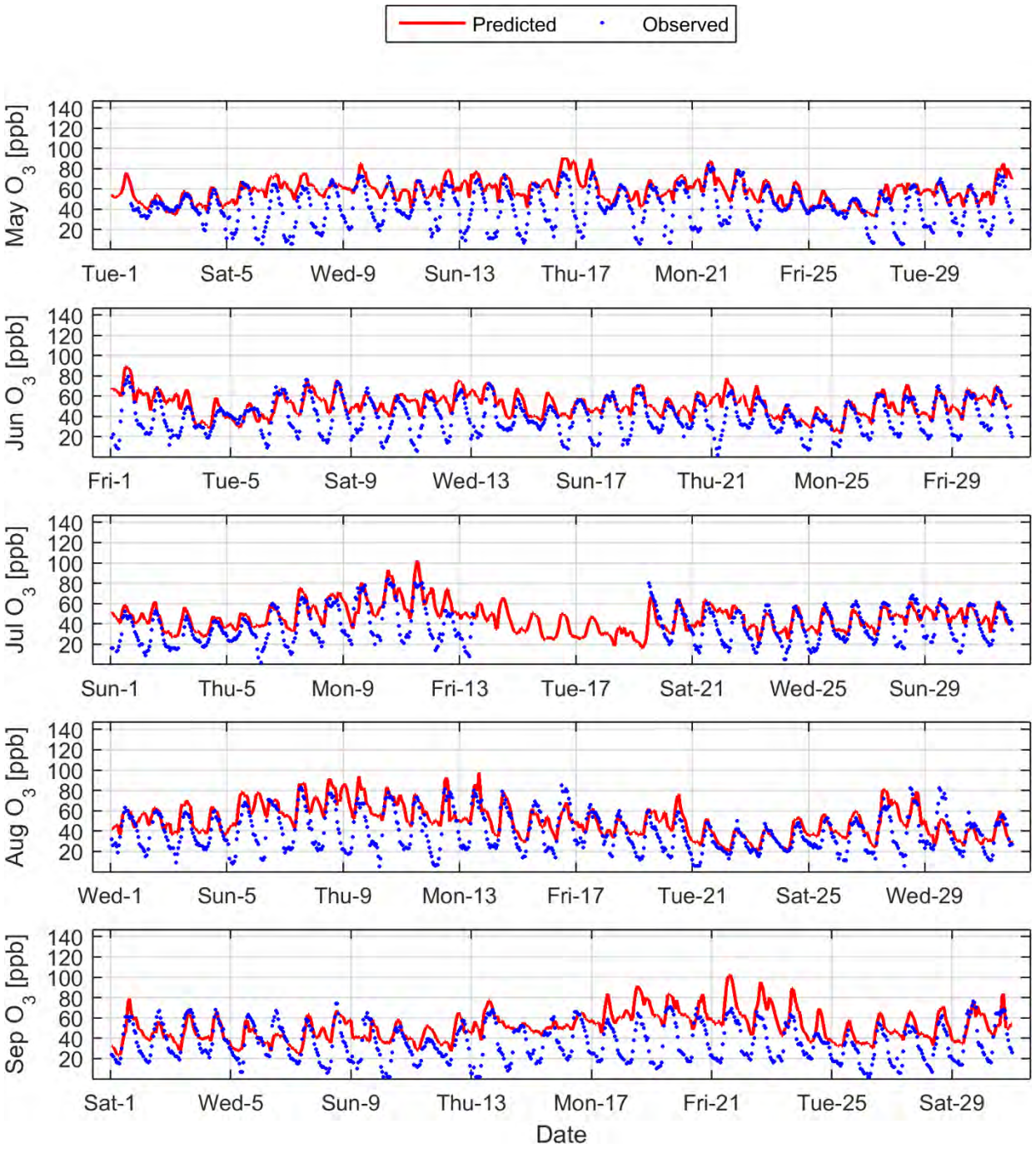

Figure 25: 2012 1-hour Ozone model prediction and measurement comparison at Temecula

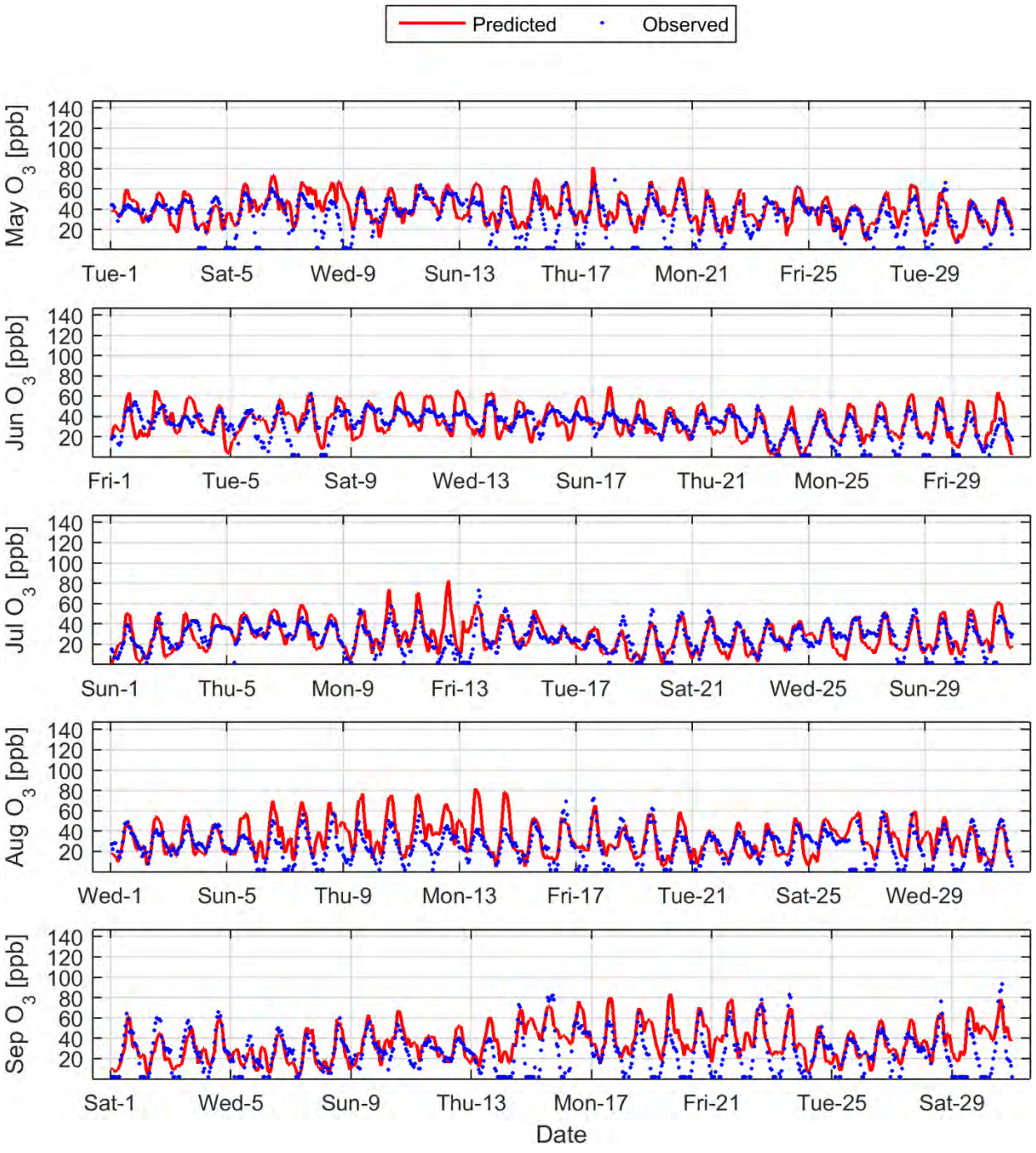

Figure 26: 2012 1-hour Ozone model prediction and measurement comparison at West Los Angeles

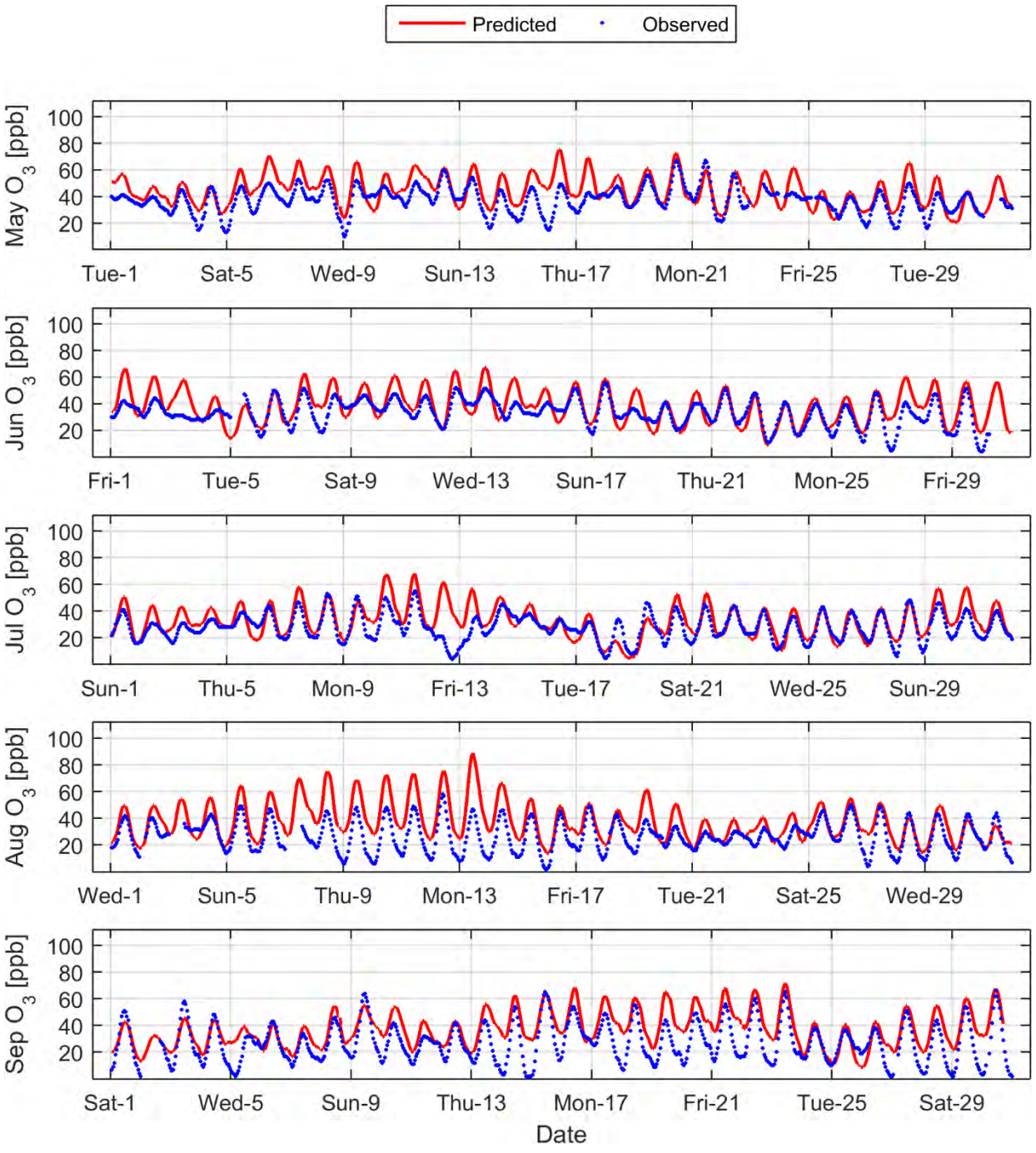

Figure 27: 2012 8-hour Ozone model prediction and measurement comparison at Anaheim

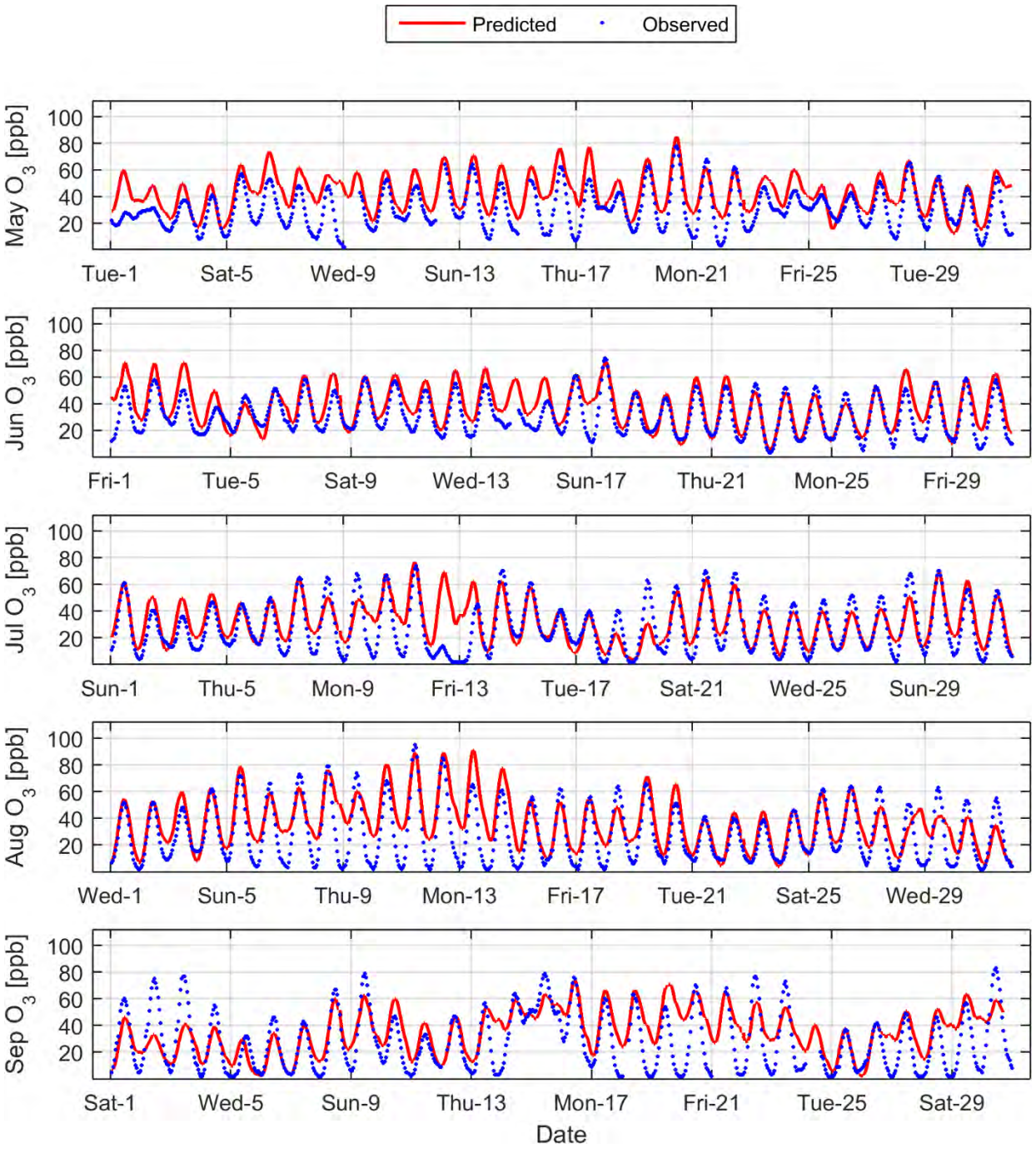

Figure 28: 2012 8-hour Ozone model prediction and measurement comparison at Azusa

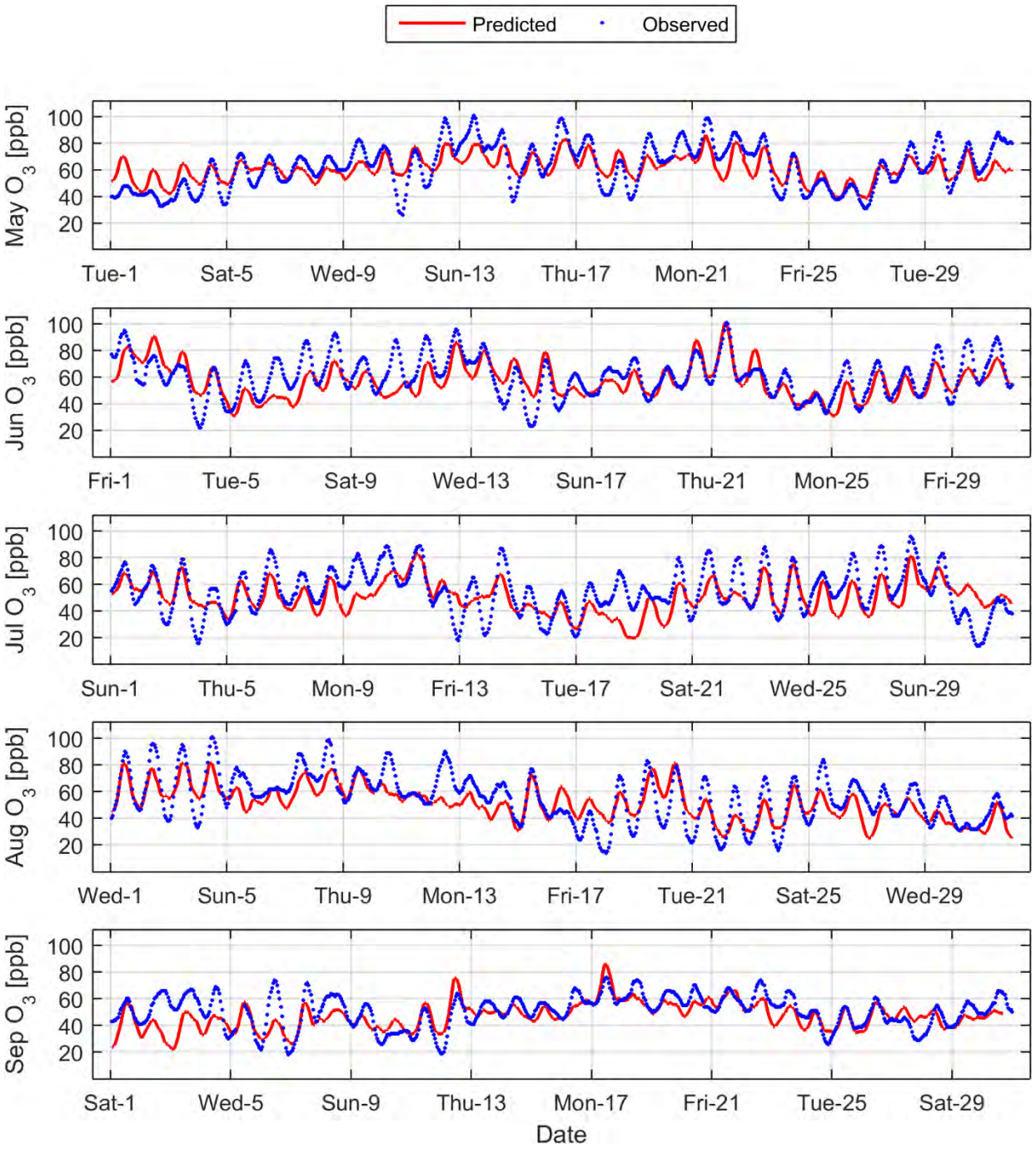

Figure 29: 2012 8-hour Ozone model prediction and measurement comparison at Banning

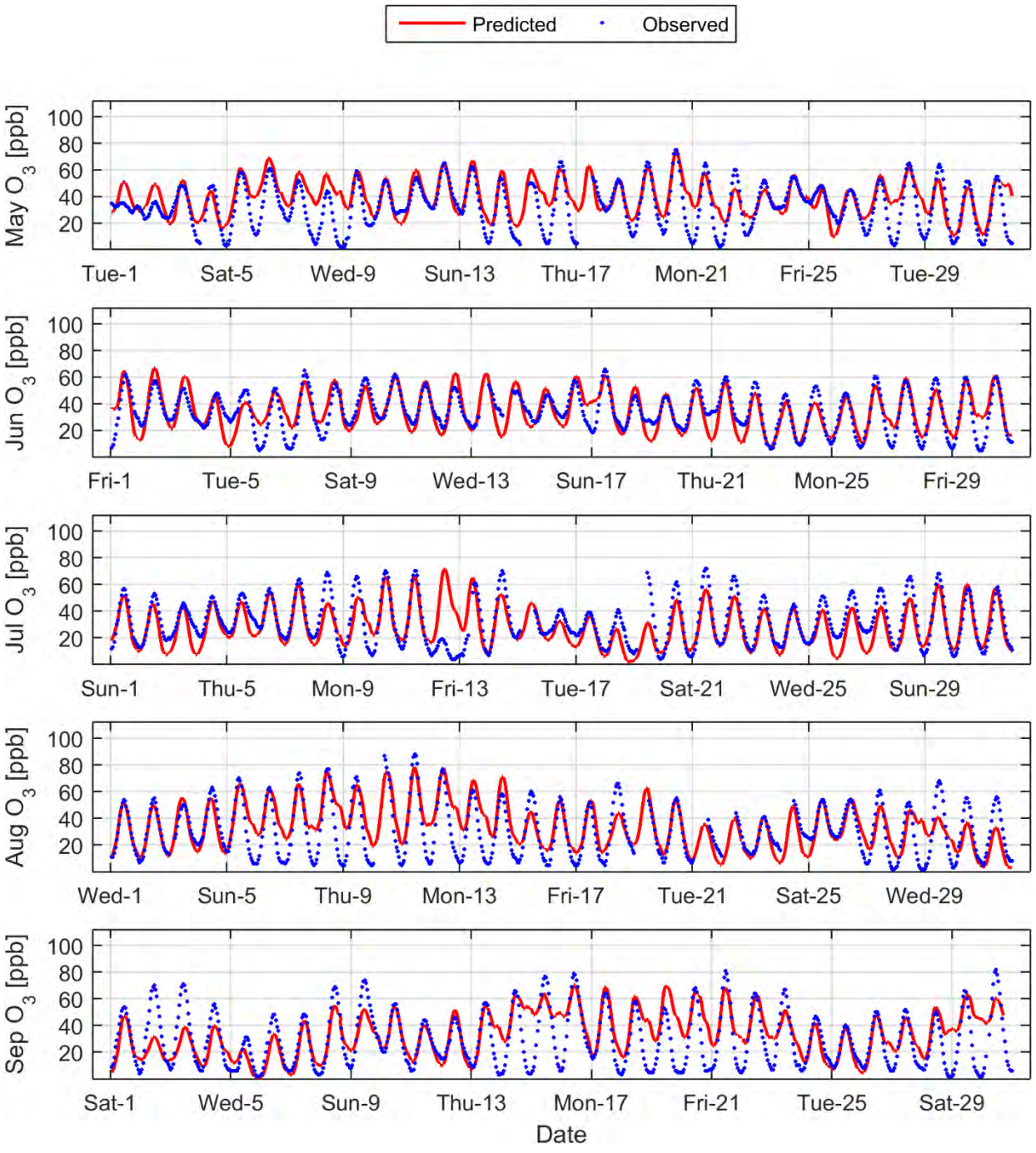

Figure 30: 2012 8-hour Ozone model prediction and measurement comparison at Burbank

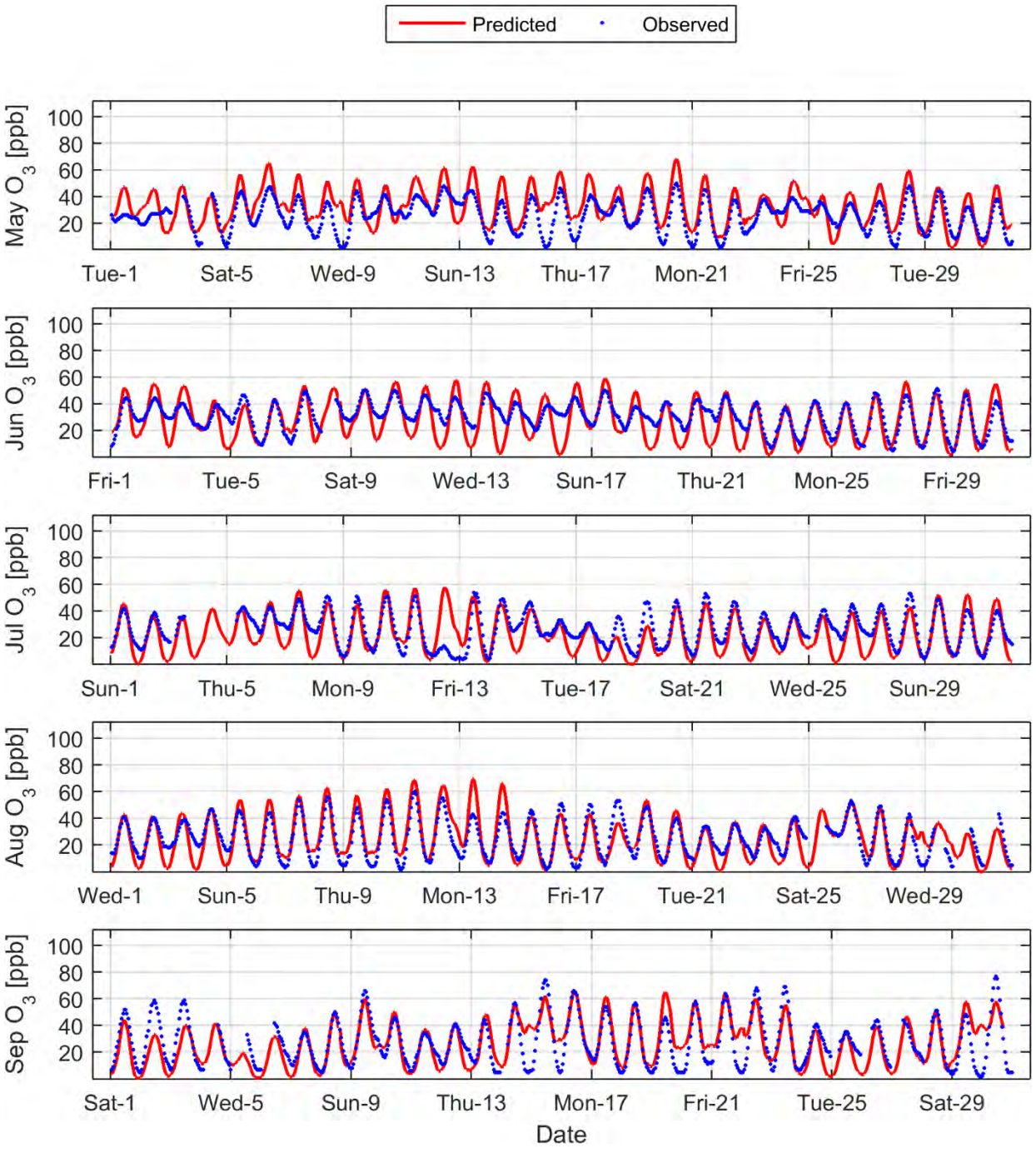

Figure 31: 2012 8-hour Ozone model prediction and measurement comparison at Central Los Angeles

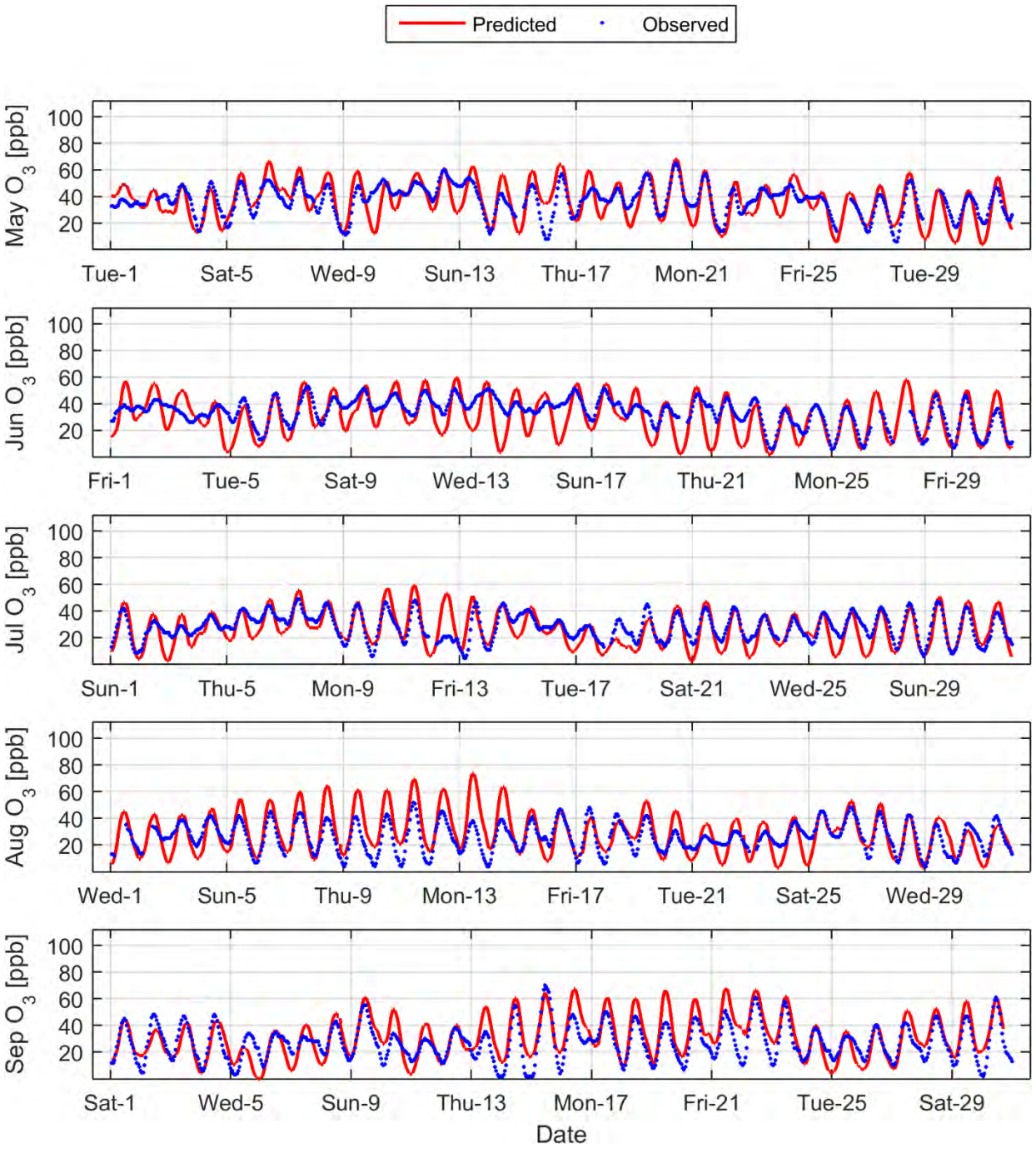

Figure 32: 2012 8-hour Ozone model prediction and measurement comparison at Compton

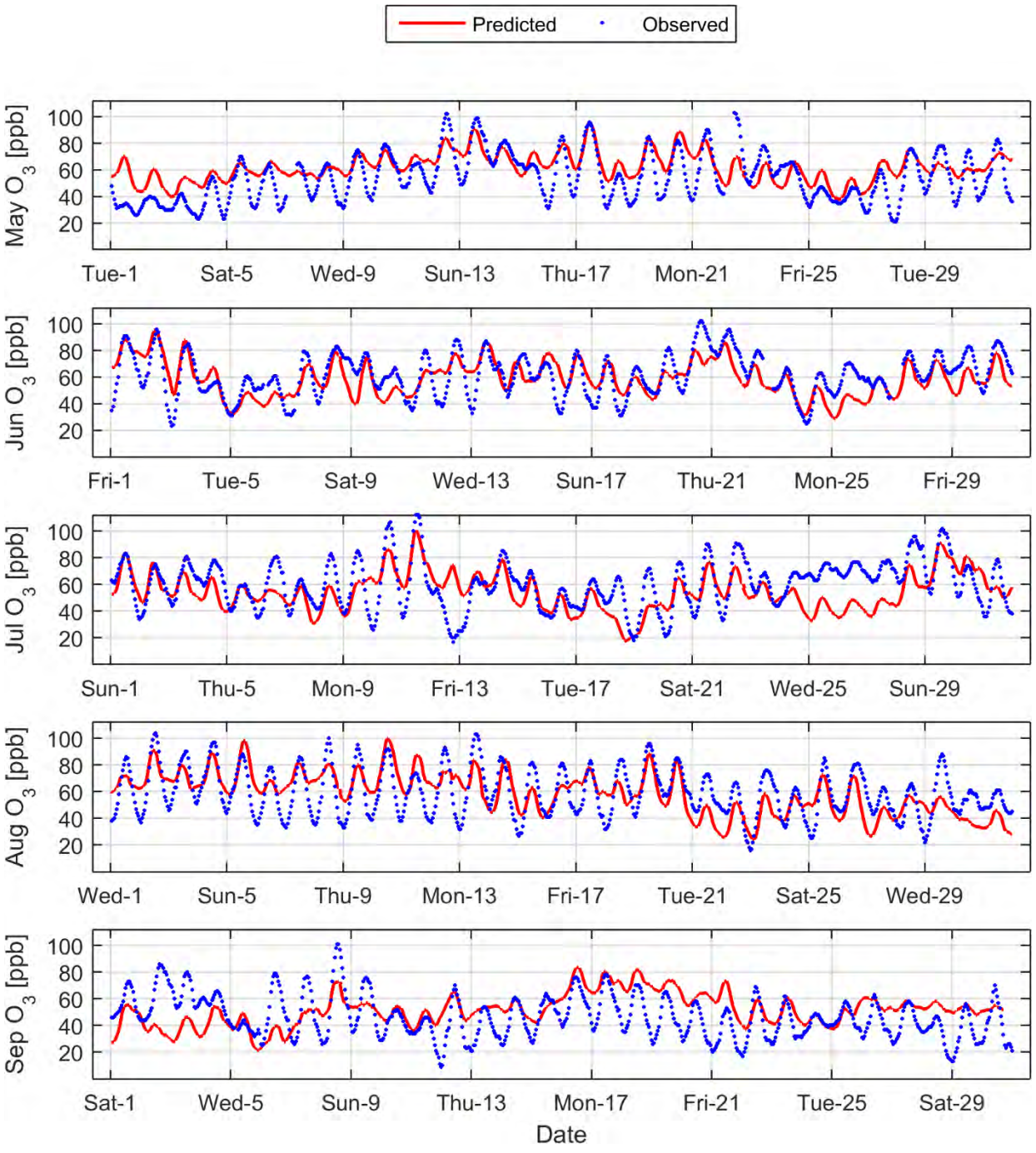

Figure 33: 2012 8-hour Ozone model prediction and measurement comparison at Crestline

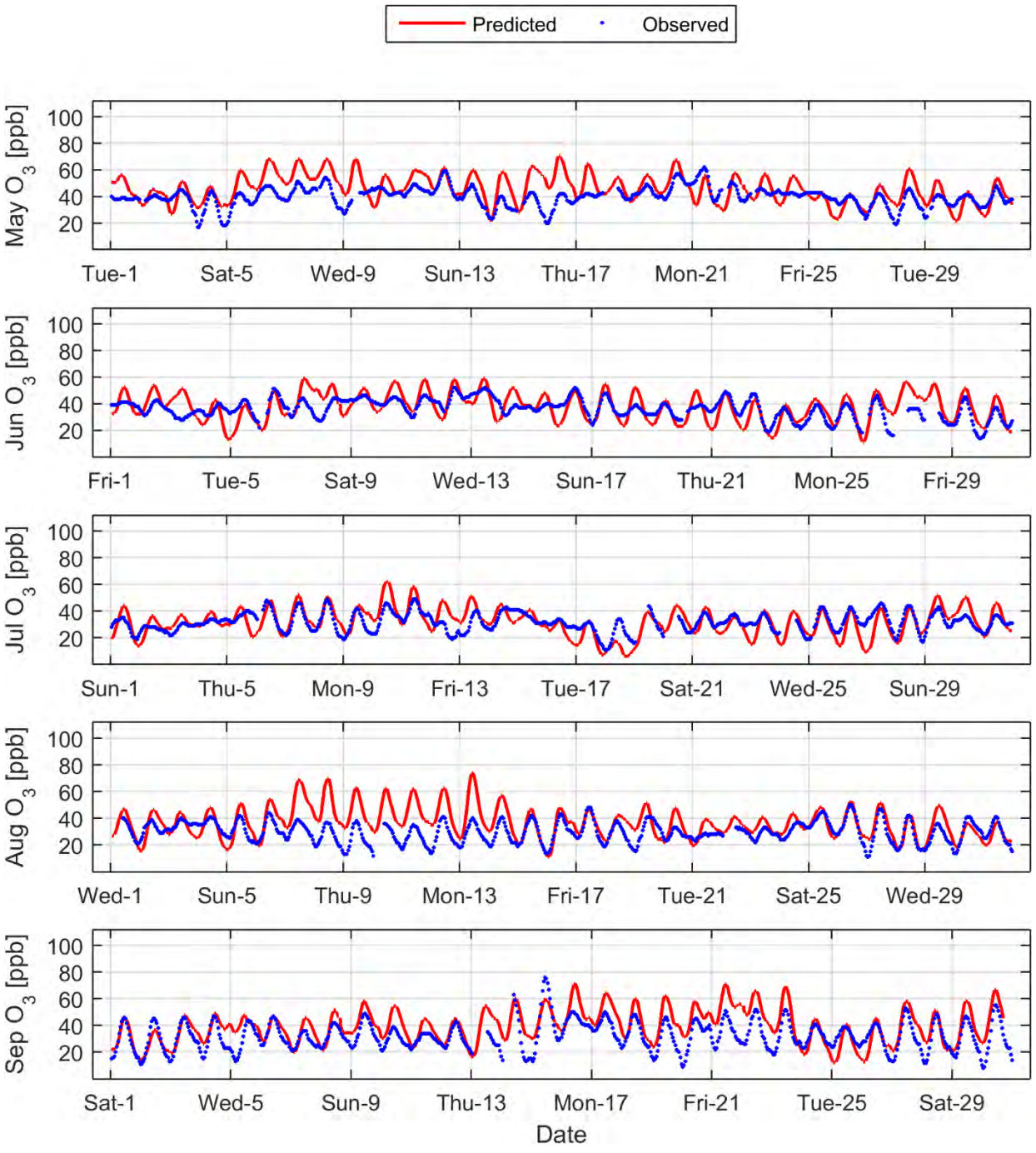

Figure 34: 2012 8-hour Ozone model prediction and measurement comparison at Costa Mesa

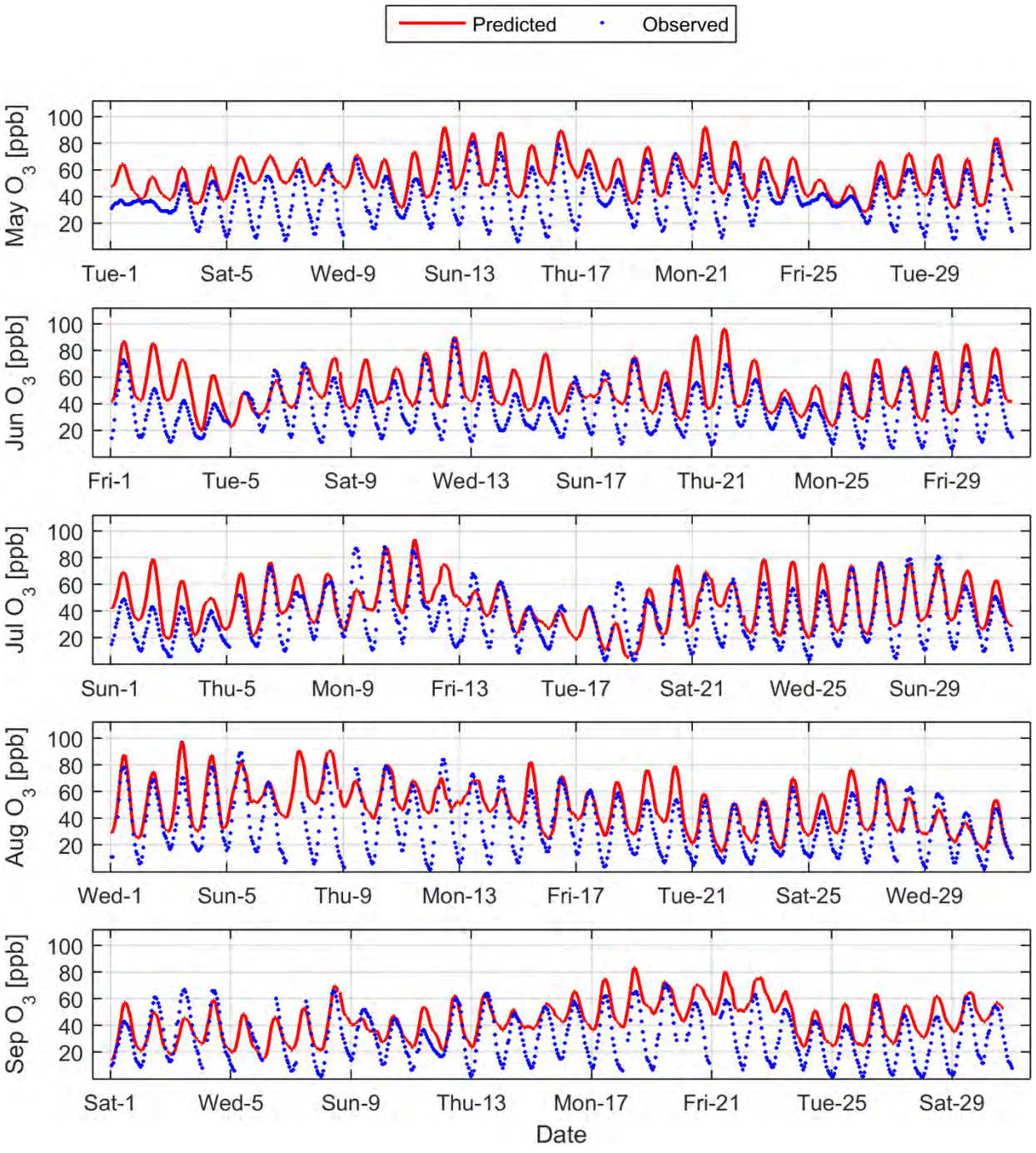

Figure 35: 2012 8-hour Ozone model prediction and measurement comparison at Lake Elsinore

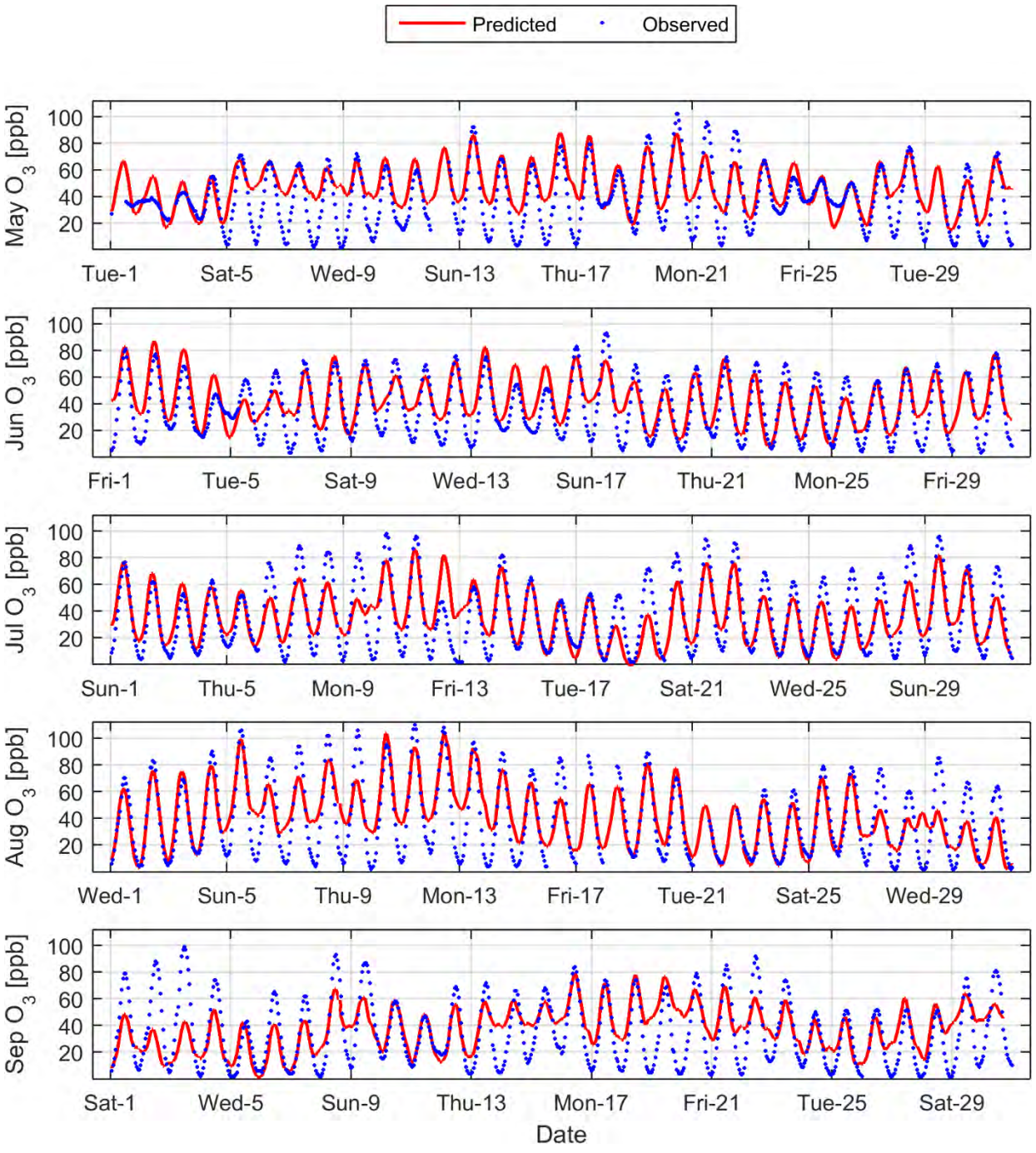

Figure 36: 2012 8-hour Ozone model prediction and measurement comparison at Fontana

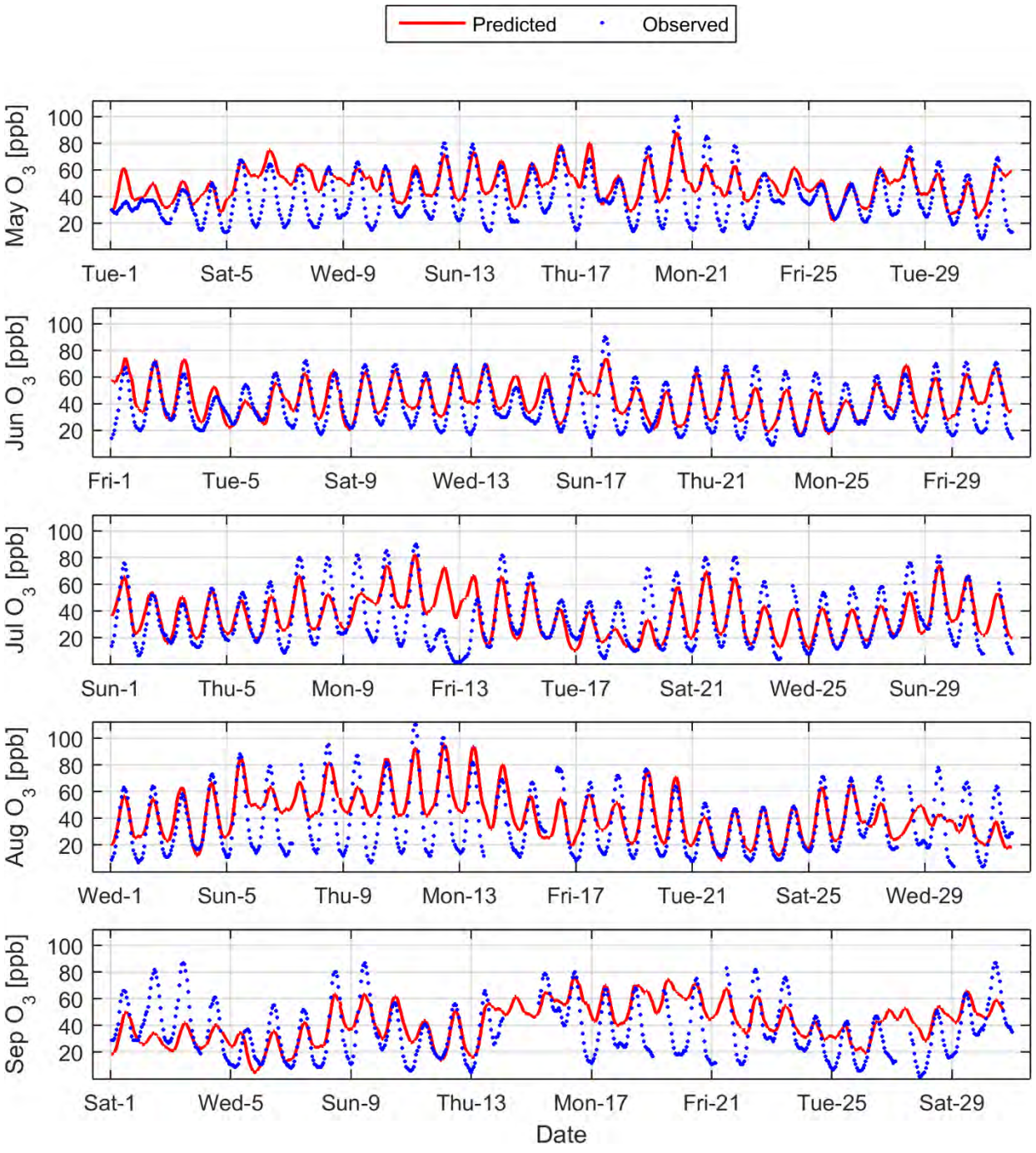

Figure 37: 2012 8-hour Ozone model prediction and measurement comparison at Glendora

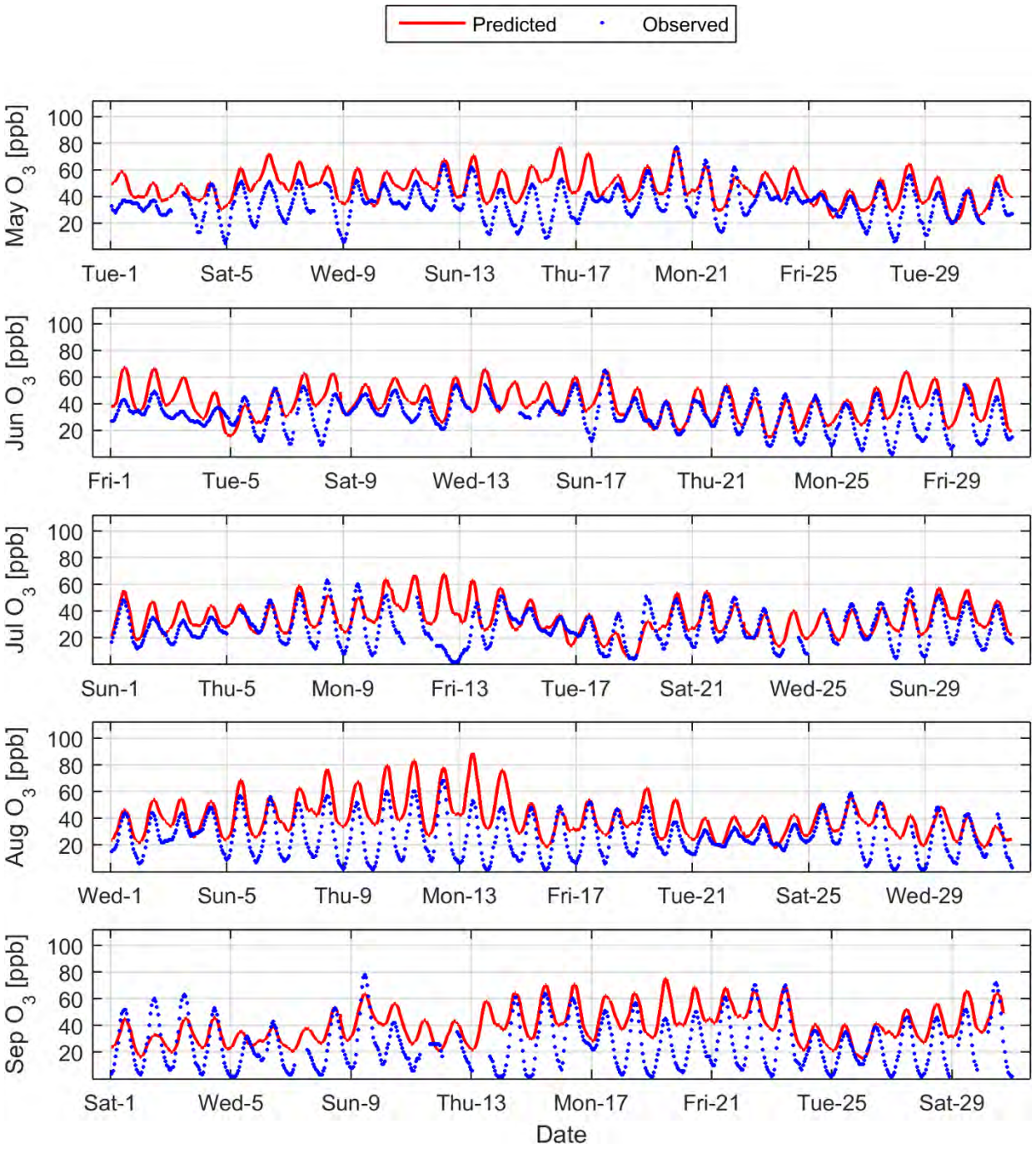

Figure 38: 2012 8-hour Ozone model prediction and measurement comparison at La Habra

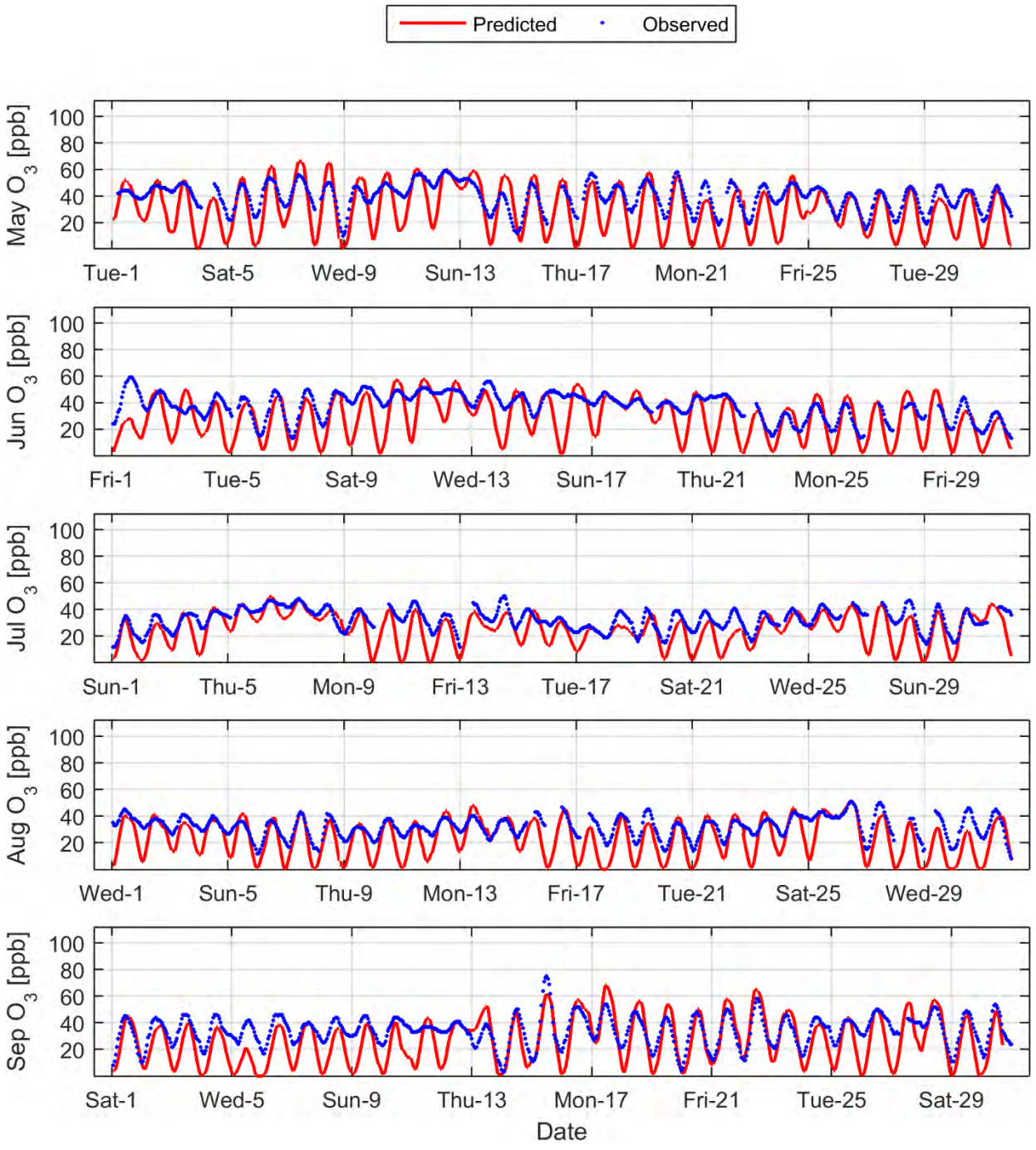

Figure 39: 2012 8-hour Ozone model prediction and measurement comparison at LAX

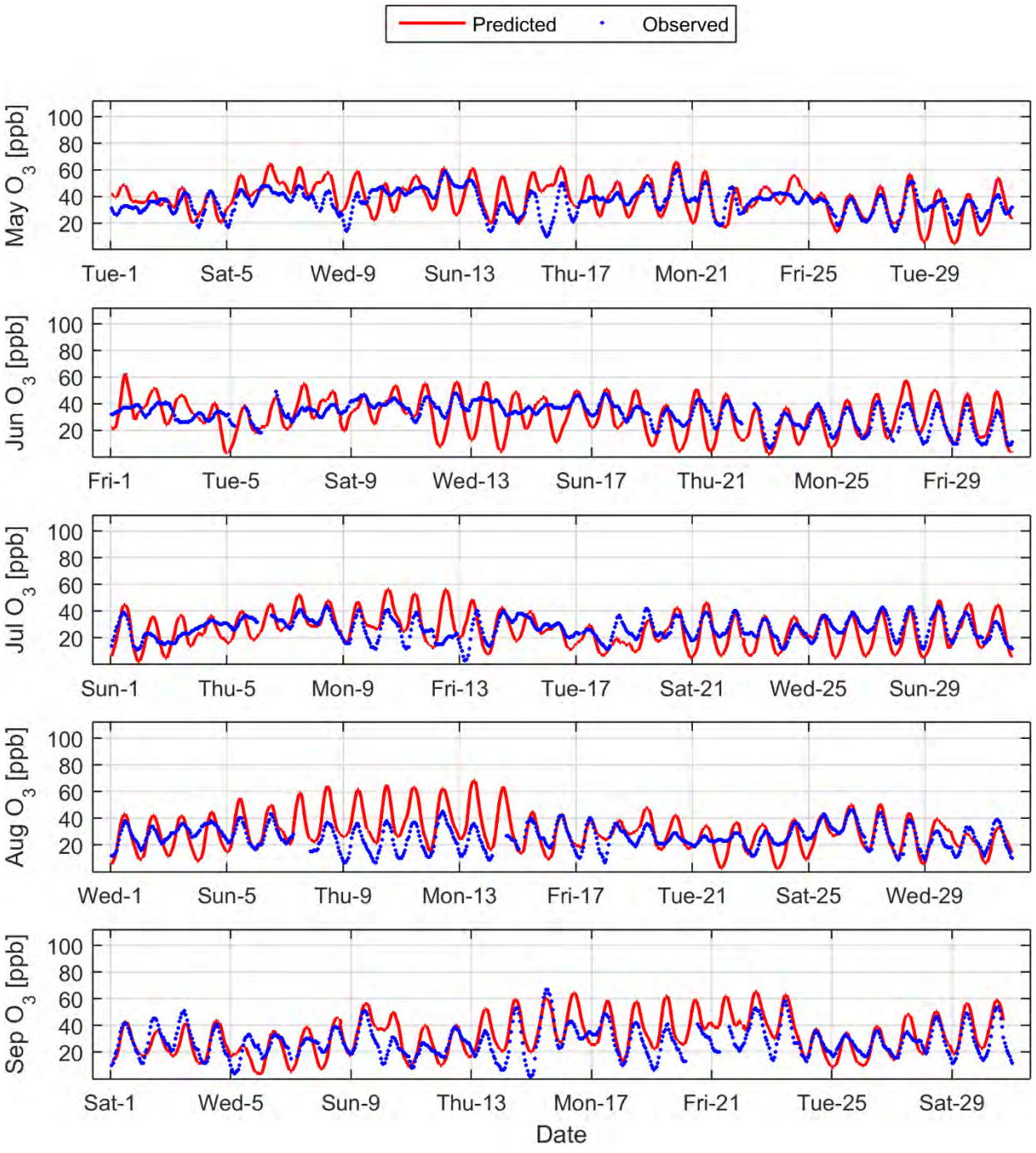

Figure 40: 2012 8-hour Ozone model prediction and measurement comparison at Long Beach

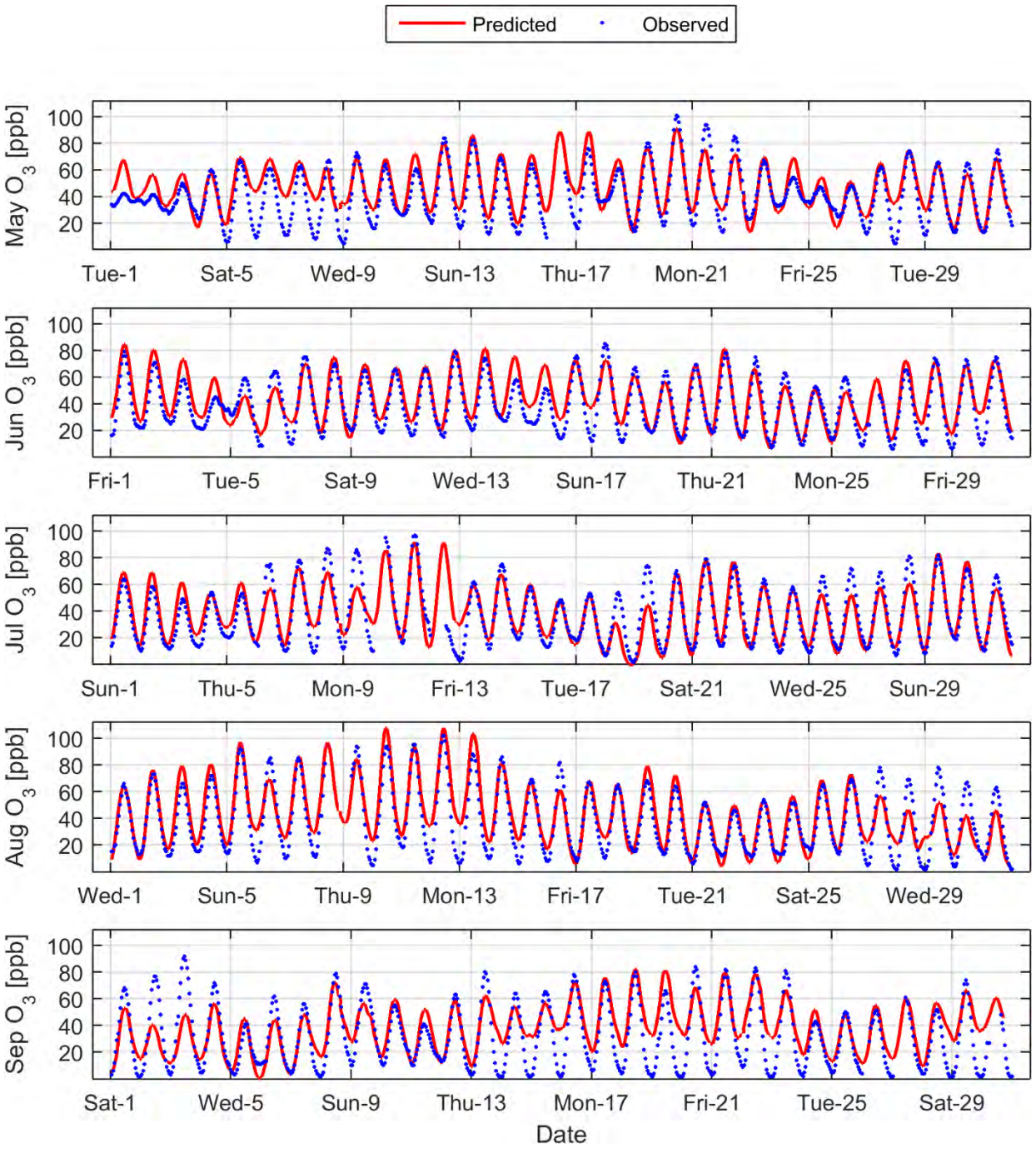

Figure 41: 2012 8-hour Ozone model prediction and measurement comparison at Mira Loma

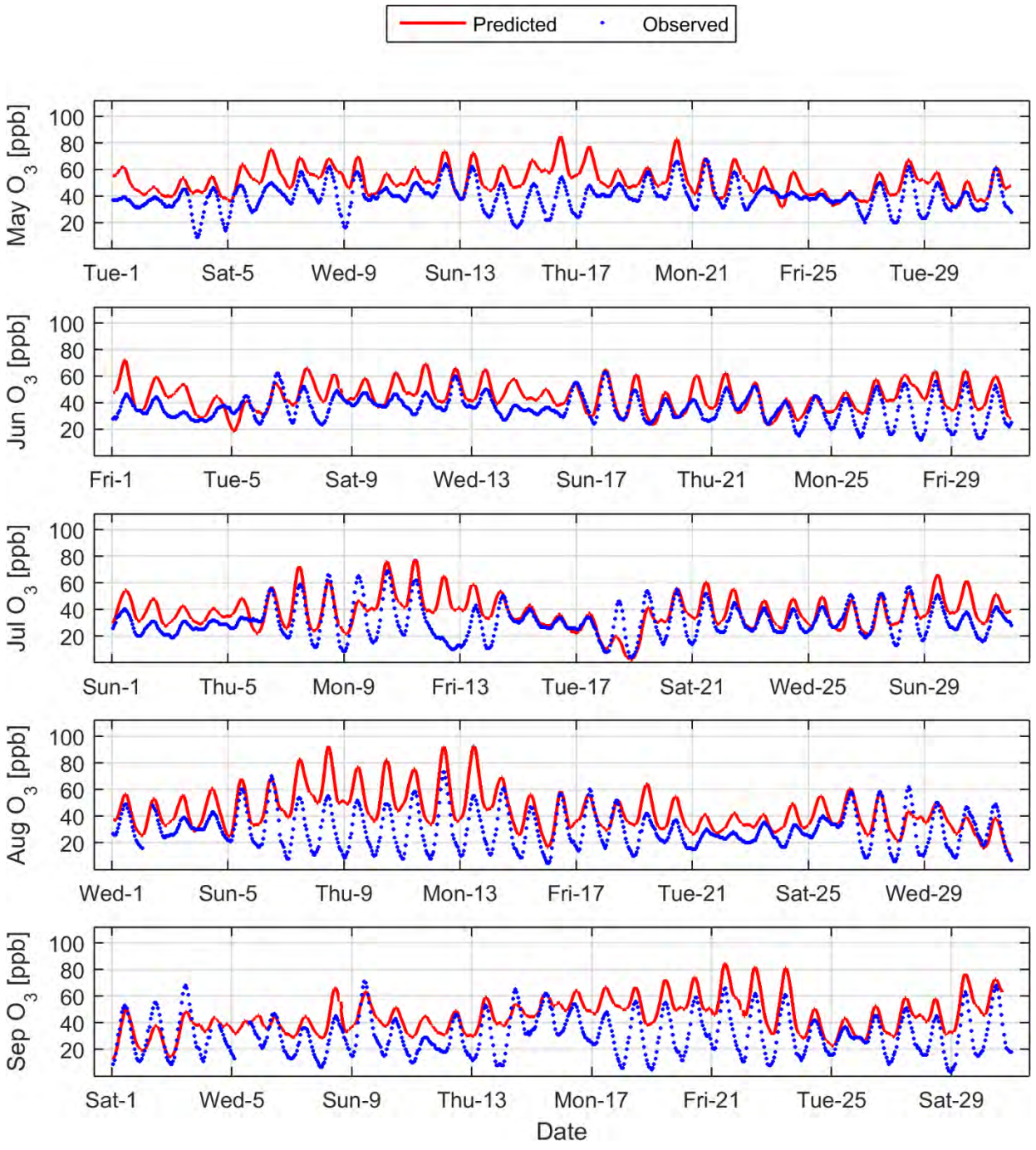

Figure 42: 2012 8-hour Ozone model prediction and measurement comparison at Mission Viejo

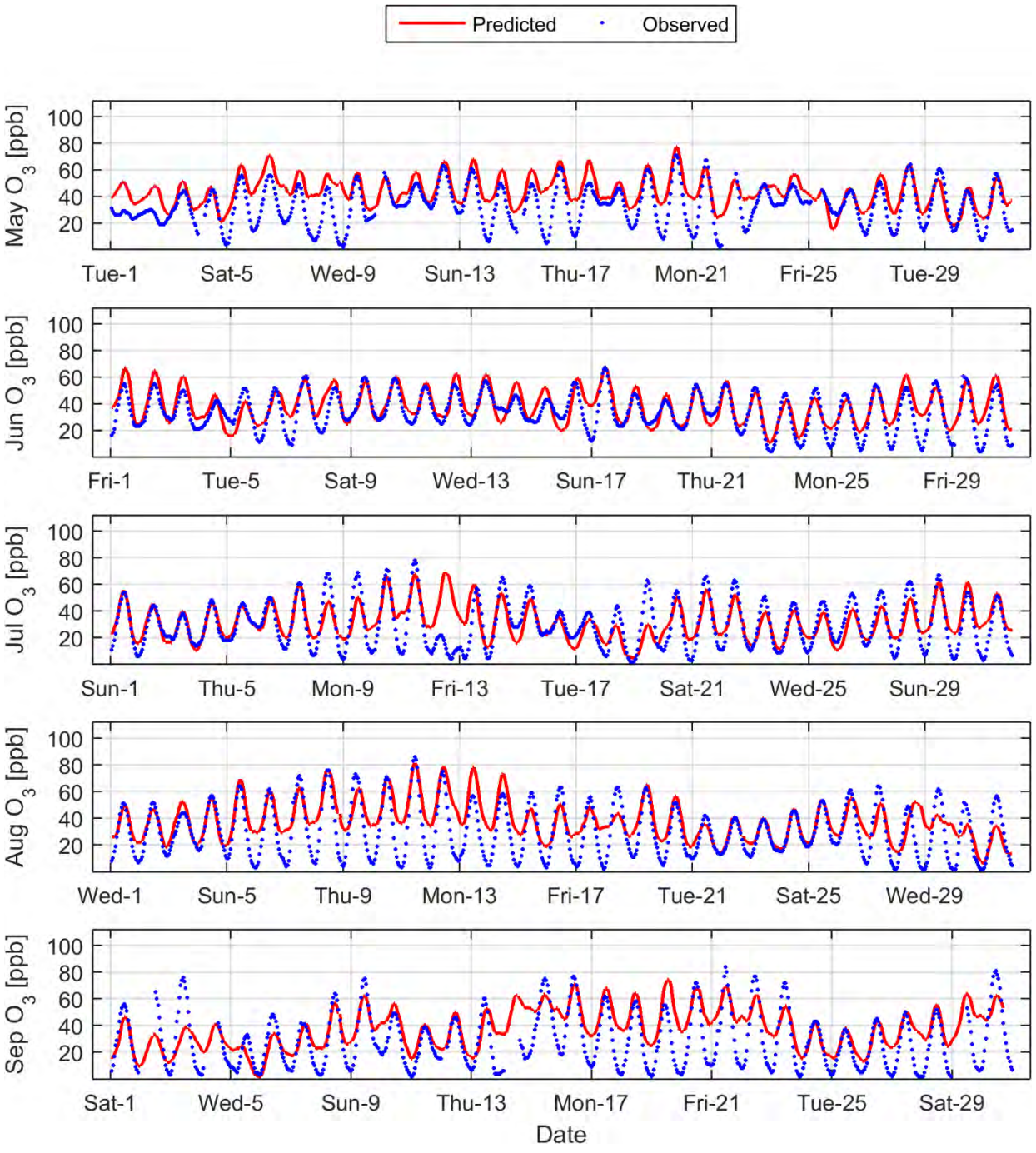

Figure 43: 2012 8-hour Ozone model prediction and measurement comparison at Pasadena

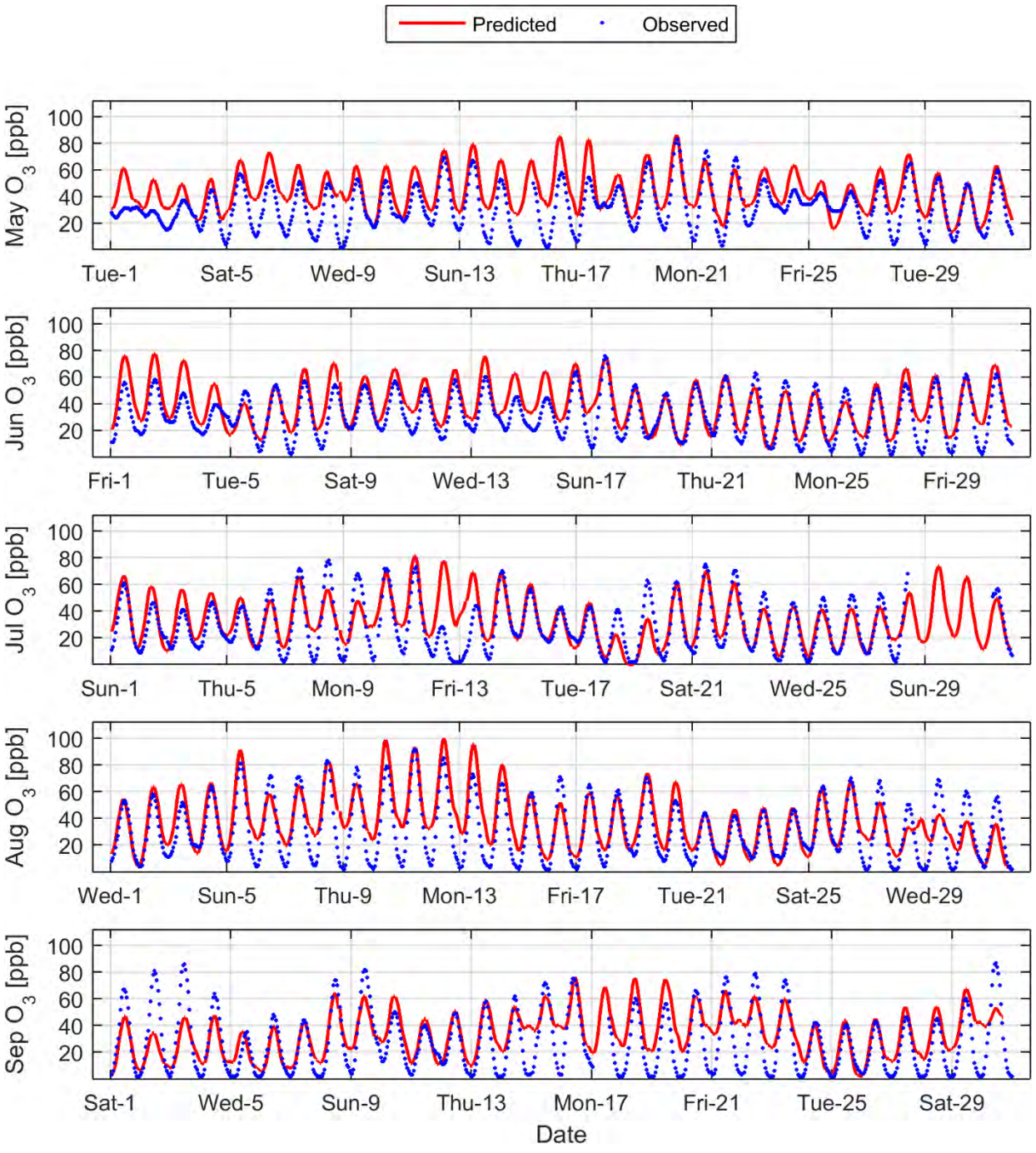

Figure 44: 2012 8-hour Ozone model prediction and measurement comparison at Pomona

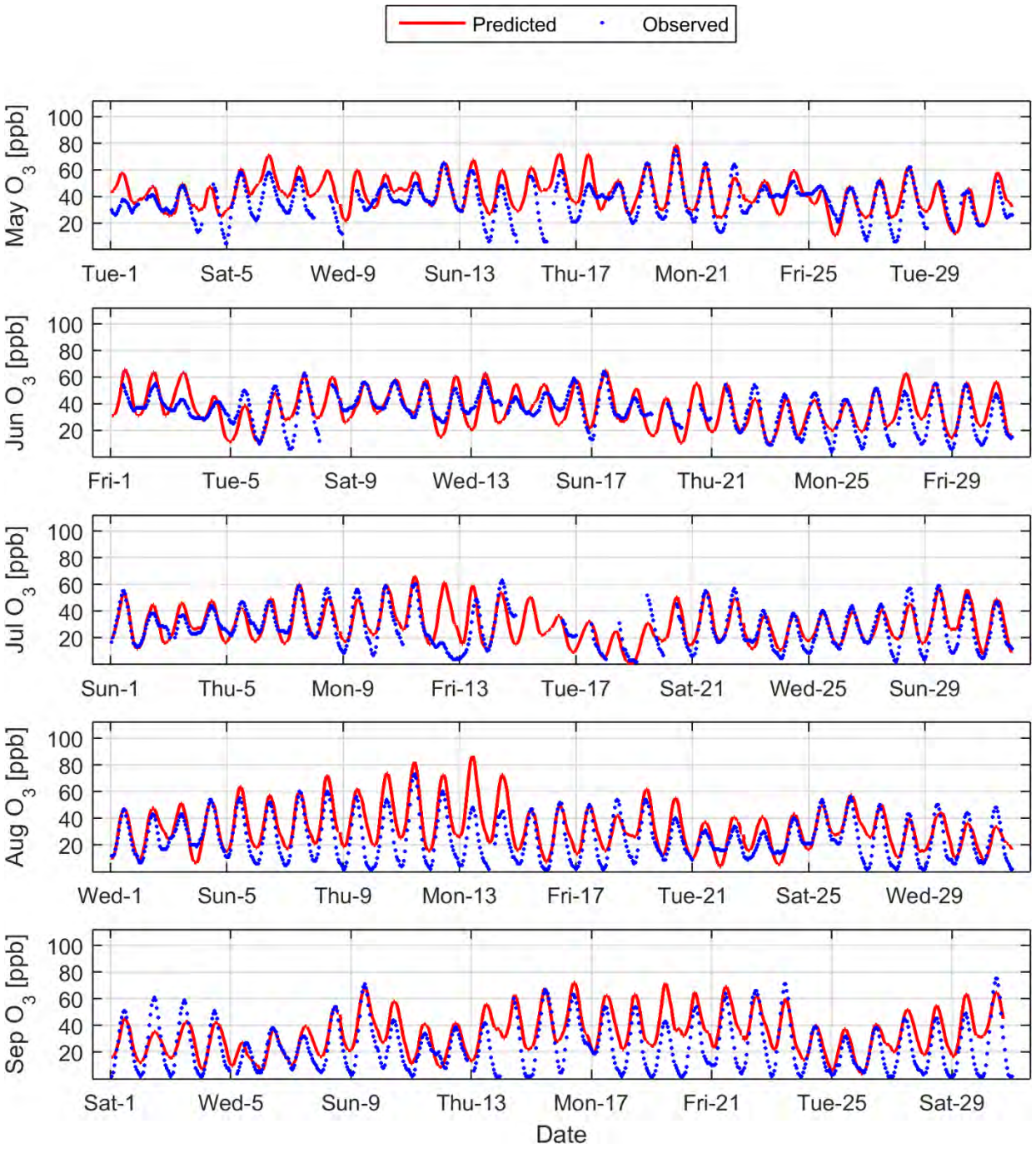

Figure 45: 2012 8-hour Ozone model prediction and measurement comparison at Pico Rivera

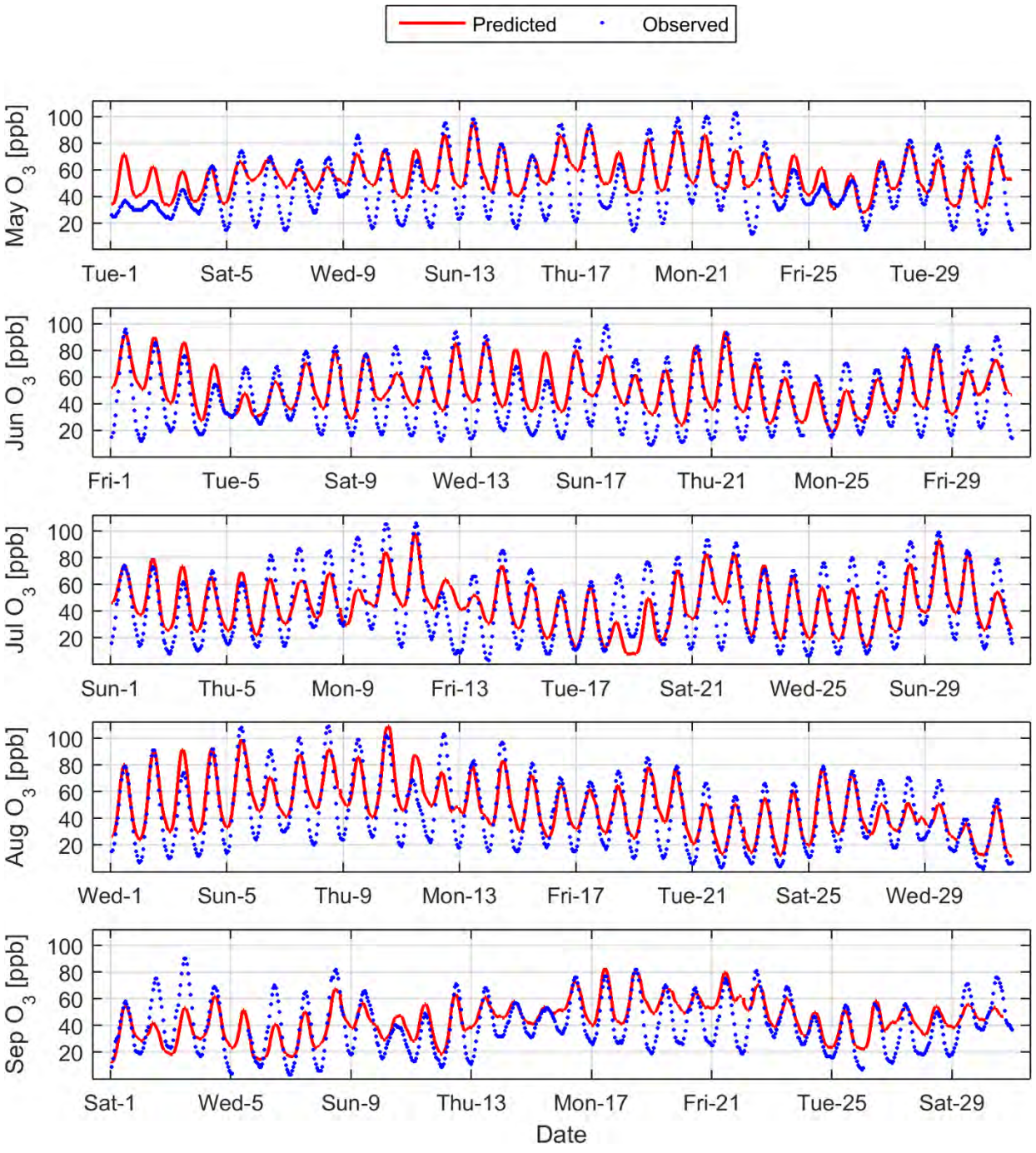

Figure 46: 2012 8-hour Ozone model prediction and measurement comparison at Redlands

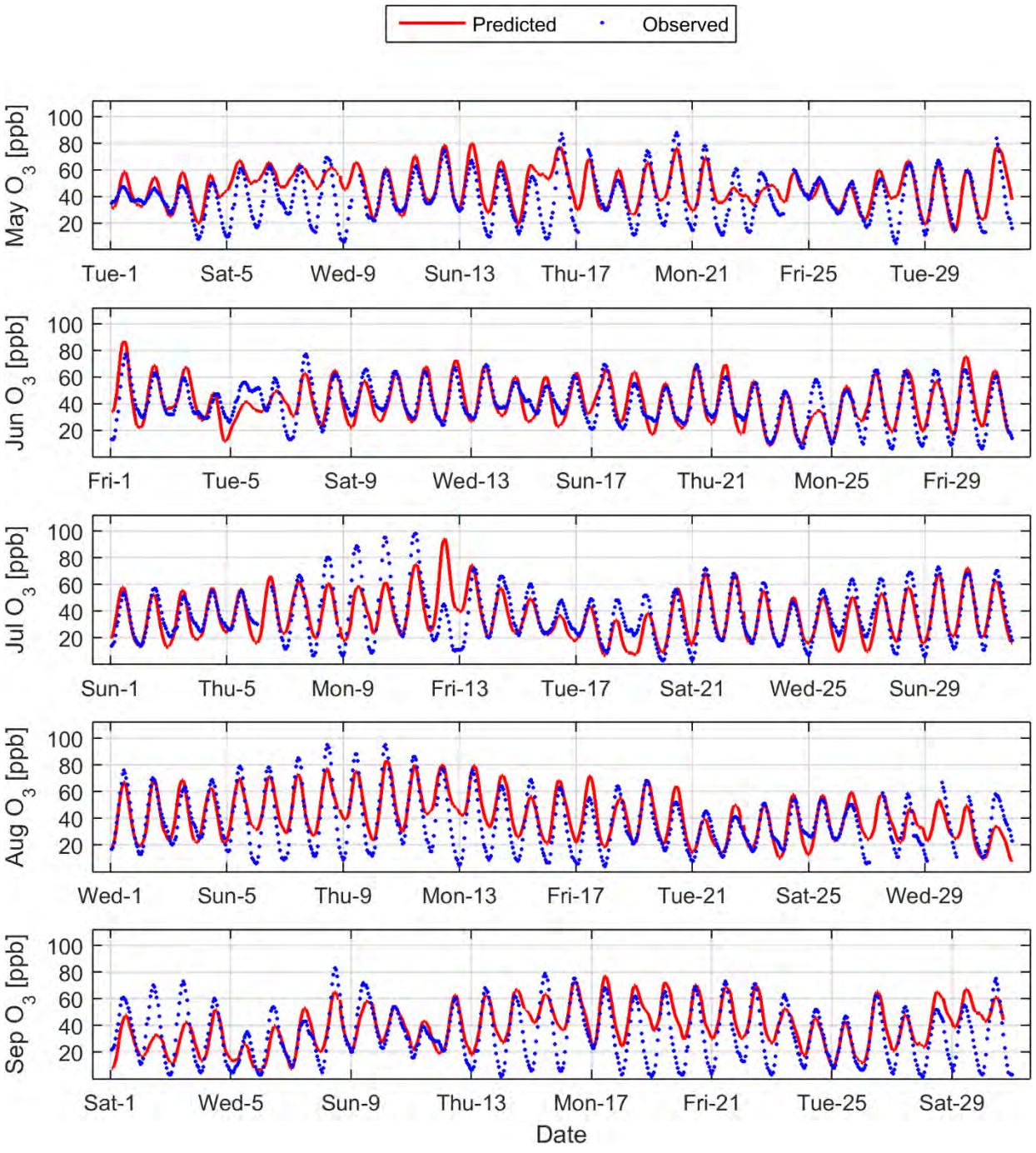

Figure 47: 2012 8-hour Ozone model prediction and measurement comparison at Reseda

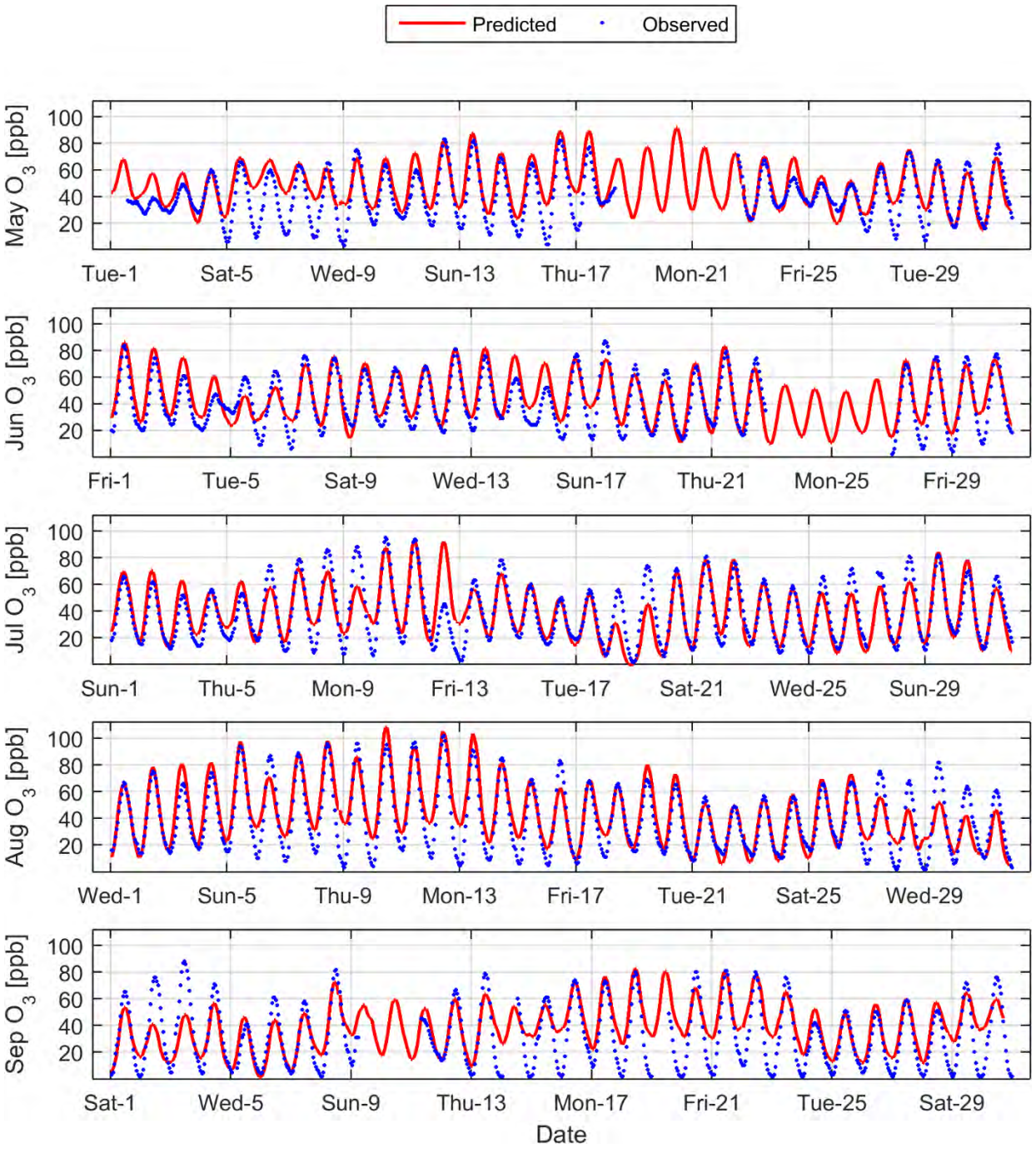

Figure 48: 2012 8-hour Ozone model prediction and measurement comparison at Riverside

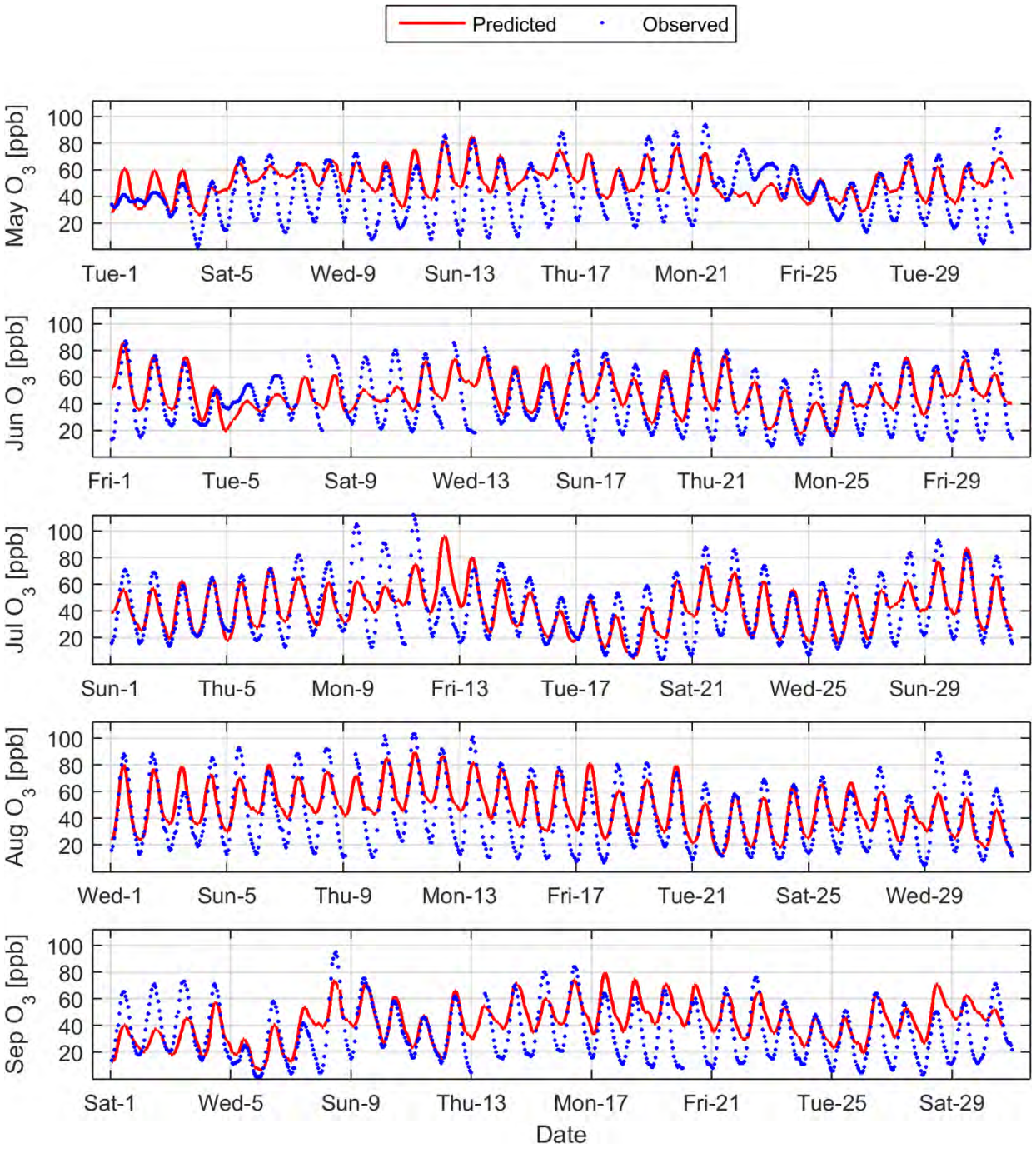

Figure 49: 2012 8-hour Ozone model prediction and measurement comparison at Santa Clarita

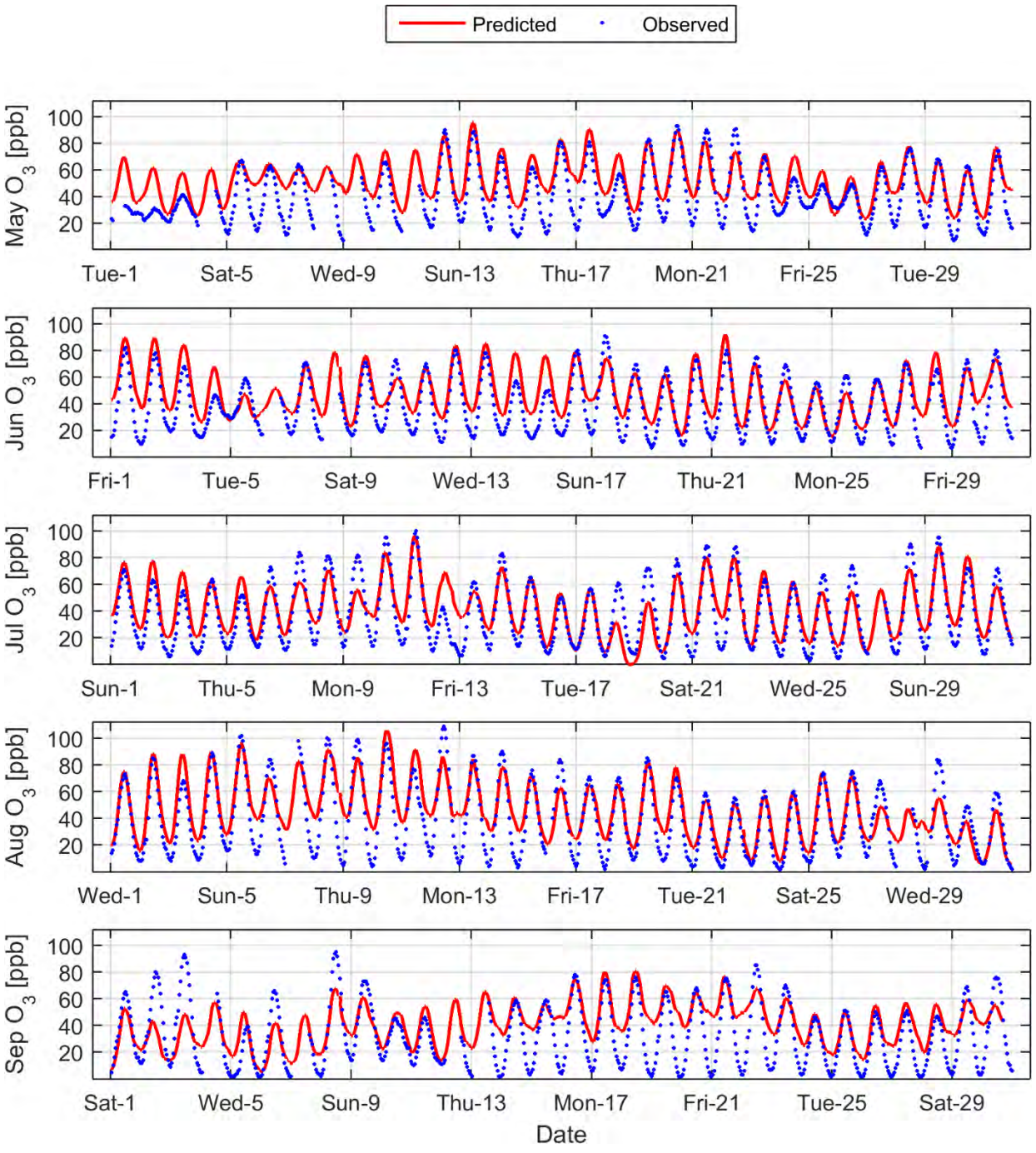

Figure 50: 2012 8-hour Ozone model prediction and measurement comparison at San Bernardino

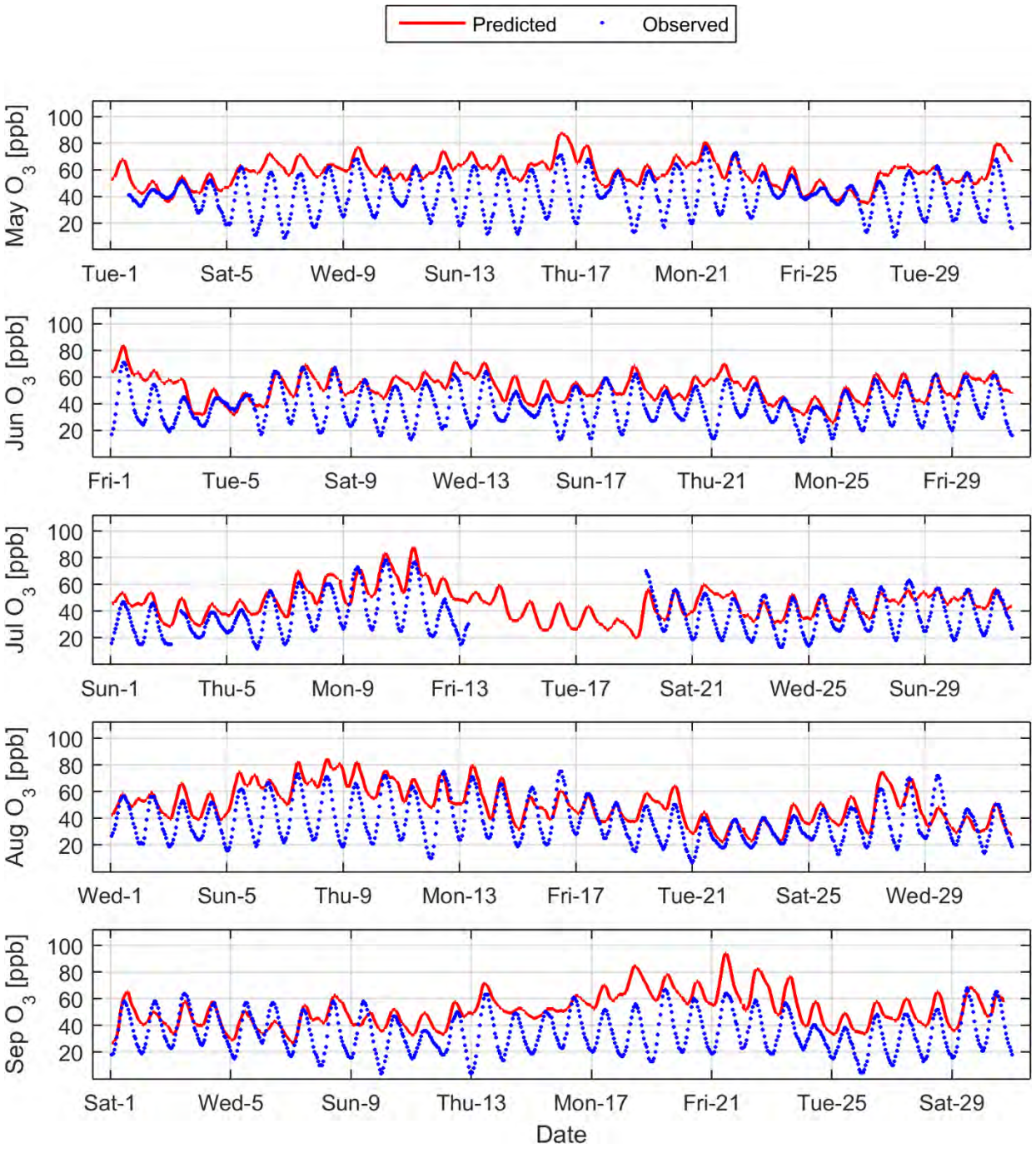

Figure 51: 2012 8-hour Ozone model prediction and measurement comparison at Temecula

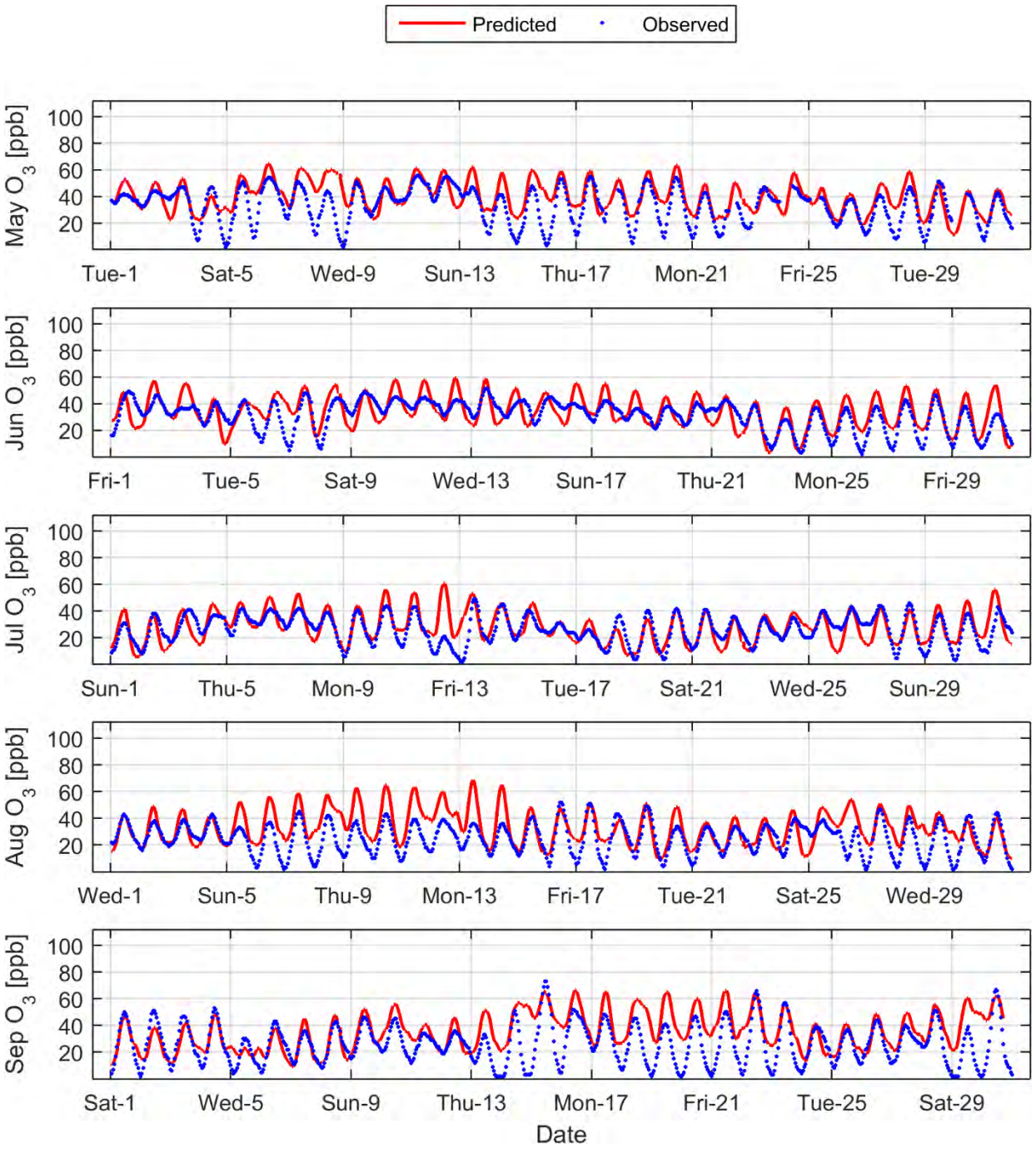

Figure 52: 2012 8-hour Ozone model prediction and measurement comparison at West Los Angeles

Attachment 3

DRAFT CEPA SOURCE LEVEL EMISSIONS REDUCTION SUMMARY

1. 2031 8-hour Ozone Attainment Scenario

2. 2023 8-hour Ozone Attainment Scenario

3. 2022 1-hour Ozone Attainment Scenario

1. 2031 8-hour Ozone Attainment Scenario

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(P2016sy CepaV02 SIC / Nov 2014)
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Year 2031 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(A) Reductions Without Overlapping/Double-Counting With Other Control Measures (1)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-01	MOB-14 (Existing Projects) - School Buses - Diesel	0.00	0.07	0.01	0.07
BA-04	MOB-14 (Existing Projects) - Freight Locomotives (Prop1B/Moyer)	0.06	1.22	0.25	1.22
BA-06	MOB-14 (Existing Projects) - Offroad Equipment - Construction/Min	0.55	2.40	7.43	1.53
BA-07	MOB-14 (Existing Projects) - Harborcraft (Fishing Vessels)	0.00	0.00	0.00	0.00
ECC-02	Co-Benefits from Energy Efficiency Measures - Res/Comm Bldg	0.29	1.15	9.00	1.74
ECC-03	Additional Enhancement of Building Energy Efficiency	0.31	2.11	9.79	3.29
CMB-01	Zero and Near-Zero Emission Technologies at Stationary Sources	2.80	5.96	10.83	5.82
CMB-02	Commercial and Multi-Residential Space & Water Heating	0.36	2.80	3.14	3.89
CMB-03	Emission Reductions From Non-Refinery Flares	0.40	1.50	1.07	1.50
CMB-04	Emission Reductions From Restaurant Burners and Residential Cooki	0.12	1.60	0.73	1.60
FUG-01	Improved Leak Detection and Repair	2.00	0.00	0.00	0.00
CTS-01	Further Reduction from Coatings, Solvents, Adhesives & Lubricants	2.00	0.00	0.00	0.00
BCM-01	Further Emission Reductions from Commercial Cooking	0.00	0.00	0.00	0.00
BCM-10	Emission Reduction from Greenwaste Composting	1.80	0.00	0.00	0.00
ARB-LDV	On-Road Light Duty Vehicles	13.17	5.61	83.73	6.11
ARB-HDV	On-Road Heavy Duty Vehicles	2.43	27.02	19.08	27.63
ARB-OFRD	Offroad Equipment (All except Airc/Loco/OGV)	32.12	21.00	274.88	16.70
CP	Consumer Products	4.99	0.00	0.00	0.00
FIS-AIRC	Federal/International - Aircrafts	2.90	13.00	29.92	13.00
FIS-LOCO	Federal/International - Locomotives	0.33	6.10	1.66	6.10
FIS-OGV	Federal/International - Ocean Going Vessels	2.68	14.98	4.85	14.98
MOB-10	Extension of the SOON Provision	0.25	1.91	2.14	1.33
MOB-11	Extended Exchange Program	1.86	1.00	17.16	0.86
MOB-14a	MOB-14 (Future Project Funding) - School Buses	0.01	0.32	0.03	0.32
MOB-14c	MOB-14 (Future Project Funding) - Cargo Handling Equipment	0.06	0.25	6.23	0.24
MOB-14d	MOB-14 (Future Project Funding) - Freight Locomotives - Road Haul	0.01	0.15	0.17	0.15
MOB-14e	MOB-14 (Future Project Funding) - Heavy Duty Diesel Trucks (>1400	0.12	3.41	1.14	3.47
Grand Total (Net)		71.59	113.55	483.25	111.57

Year 2031 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(B) Reductions With Overlapping/Double-Counting With Other Control Measures (2)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-01	MOB-14 (Existing Projects) - School Buses - Diesel	0.00	0.07	0.01	0.07
BA-04	MOB-14 (Existing Projects) - Freight Locomotives (Prop1B/Moyer)	0.06	1.22	0.25	1.22
BA-06	MOB-14 (Existing Projects) - Offroad Equipment - Construction/Min	0.55	2.40	7.43	1.53
BA-07	MOB-14 (Existing Projects) - Harborcraft (Fishing Vessels)	0.00	0.00	0.00	0.00
ECC-02	Co-Benefits from Energy Efficiency Measures - Res/Comm Bldg	0.29	1.15	9.00	1.74
ECC-03	Additional Enhancement of Building Energy Efficiency	0.35	2.37	11.02	3.70
CMB-01	Zero and Near-Zero Emission Technologies at Stationary Sources	2.80	5.96	10.83	5.82
CMB-02	Commercial and Multi-Residential Space & Water Heating	0.50	4.08	4.78	5.77
CMB-03	Emission Reductions From Non-Refinery Flares	0.40	1.50	1.07	1.50
CMB-04	Emission Reductions From Restaurant Burners and Residential Cooki	0.18	2.21	1.04	2.21
FUG-01	Improved Leak Detection and Repair	2.00	0.00	0.00	0.00
CTS-01	Further Reduction from Coatings, Solvents, Adhesives & Lubricants	2.00	0.00	0.00	0.00
BCM-01	Further Emission Reductions from Commercial Cooking	0.00	0.00	0.00	0.00
BCM-10	Emission Reduction from Greenwaste Composting	1.80	0.00	0.00	0.00
ARB-LDV	On-Road Light Duty Vehicles	13.17	5.61	83.73	6.11
ARB-HDV	On-Road Heavy Duty Vehicles	2.43	27.02	19.08	27.63
ARB-OFRD	Offroad Equipment (All except Airc/Loco/OGV)	32.12	21.00	274.88	16.70
CP	Consumer Products	4.99	0.00	0.00	0.00
FIS-AIRC	Federal/International - Aircrafts	2.90	13.00	29.92	13.00
FIS-LOCO	Federal/International - Locomotives	0.33	6.10	1.66	6.10
FIS-OGV	Federal/International - Ocean Going Vessels	2.68	14.98	4.85	14.98
MOB-10	Extension of the SOON Provision	0.45	3.47	3.89	2.42
MOB-11	Extended Exchange Program	3.38	1.81	31.15	1.55
MOB-14a	MOB-14 (Future Project Funding) - School Buses	0.01	0.32	0.03	0.32
MOB-14c	MOB-14 (Future Project Funding) - Cargo Handling Equipment	0.11	0.52	11.42	0.50
MOB-14d	MOB-14 (Future Project Funding) - Freight Locomotives - Road Haul	0.01	0.21	0.25	0.21
MOB-14e	MOB-14 (Future Project Funding) - Heavy Duty Diesel Trucks (>1400	0.29	8.12	2.71	8.26
Grand Total (with potential overlapping)		73.78	123.12	508.99	121.37

EMISSION SUMMARY FOR
(POINT, AREA, MOBILE SOURCE, AND OFF-ROAD MV)

BASELINE EMISSIONS

	VOC	NOx	CO	NO2
Point source	33.63	7.67	35.18	7.67
Area source	197.76	26.54	118.82	31.66
RECLAIM	0.00	14.90	0.00	14.90
Total Stationary	231.39	49.10	154.00	54.23
On-road	49.48	65.00	304.36	67.70
Off-road	76.14	79.41	630.55	68.98
Aircraft	4.50	20.19	46.47	20.19
TOTAL	361.51	213.70	1135.37	211.10

EMISSION REDUCTIONS

Point source	0.91	2.72	4.89	2.72
Area source	14.15	12.40	29.68	15.12
RECLAIM	0.00	5.14	0.00	5.14
Total Stationary	15.06	20.26	34.56	22.98
On-road	15.73	36.42	103.99	37.61
Off-road	37.91	49.01	314.78	43.12
Aircraft	2.90	13.00	29.92	13.00
TOTAL	71.59	118.69	483.25	116.71

REMAINING EMISSIONS

Point source	32.72	4.95	30.29	4.95
Area source	183.61	14.14	89.14	16.54
RECLAIM	0.00	9.76	0.00	9.76
Total Stationary	216.33	28.85	119.43	31.25
On-road	33.74	28.58	200.37	30.09
Off-road	38.24	30.40	315.77	25.86
Aircraft	1.60	7.19	16.54	7.19
TOTAL	289.91	95.01	652.12	94.39
NSR/Set-Aside	4.42	1.03	0.00	1.03
Public Funding	0.00	0.00	0.00	0.00
GRAND TOTAL (T/D)	294.33	96.04	652.12	95.42
Mobility Adjustments (3)	0.00	0.00	0.00	0.00

(1) Emission reductions for individual measures were estimated based on the sequence of listing contained here. When the sequence changes, reductions from each measure could be affected, but the net total remain the same. The purpose of this table is to estimate total emission reductions without overlapping or double-counting between measures.
(2) Emission reductions for individual measures were estimated in the absence of other measures. Therefore, the sequence of listing does not affect the reduction estimates. The purpose of this table is to provide emission reduction estimates for Appendix IV control measure summary tables as well as cost effectiveness analysis.
(3) Mobility Adjustment includes TCM-01, ATT-01, ATT-02, ATT-05 and adjustments are reflected in the CEPA baseline beyond year 2000.

EMISSION SUMMARY BY AGENCY FOR
EPA, ARB AND SCAQMD

BASELINE EMISSIONS BASE EMISSIONS	VOC	NOx	CO	NO2
EPA	19.08	63.99	216.42	63.36
ARB	211.53	102.82	765.52	95.27
SCAQMD (1)	130.90	46.89	153.44	52.46
TOTAL (2)	361.51	213.70	1135.38	211.09
EMISSION REDUCTIONS				
EPA	11.15	43.77	112.57	43.47
ARB	51.47	55.38	336.28	50.82
SCAQMD	8.98	19.55	34.41	22.42
TOTAL	71.60	118.70	483.26	116.71
REMAINING EMISSIONS				
EPA	7.93	20.22	103.85	19.89
ARB	160.06	47.44	429.24	44.45
SCAQMD (1)	121.92	27.34	119.03	30.04
TOTAL (2)	289.91	95.00	652.12	94.38

(1) SCAQMD figures include RECLAIM
(2) Totals do not include the line items

2. 2023 8-hour Attainment Scenario

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(P2016sy CepaV02 SIC / Nov 2014)
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Year 2023 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(A) Reductions Without Overlapping/Double-Counting With Other Control Measures (1)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-01	MOB-14 (Existing Projects) - School Buses - Diesel	0.00	0.17	0.01	0.17
BA-04	MOB-14 (Existing Projects) - Freight Locomotives (Prop1B/Moyer)	0.07	1.17	0.21	1.17
BA-06	MOB-14 (Existing Projects) - Offroad Equipment - Construction/Min	0.32	1.98	3.68	1.26
BA-07	MOB-14 (Existing Projects) - Harborcraft (Fishing Vessels)	0.22	2.28	0.91	1.95
ECC-02	Co-Benefits from Energy Efficiency Measures - Res/Comm Bldg	0.07	0.30	2.19	0.51
ECC-03	Additional Enhancement of Building Energy Efficiency	0.16	1.19	5.05	2.19
CMB-01	Zero and Near-Zero Emission Technologies at Stationary Sources	1.15	2.48	4.39	2.41
CMB-02	Commercial and Multi-Residential Space & Water Heating	0.13	1.12	1.22	1.79
CMB-03	Emission Reductions From Non-Refinery Flares	0.37	1.40	1.01	1.40
CMB-04	Emission Reductions From Restaurant Burners and Residential Cooki	0.06	0.80	0.37	0.80
FUG-01	Improved Leak Detection and Repair	2.00	0.00	0.00	0.00
CTS-01	Further Reduction from Coatings, Solvents, Adhesives & Lubricants	1.02	0.00	0.00	0.00
BCM-01	Further Emission Reductions from Commercial Cooking	0.00	0.00	0.00	0.00
BCM-10	Emission Reduction from Greenwaste Composting	1.50	0.00	0.00	0.00
ARB-LDV	On-Road Light Duty Vehicles	12.37	7.01	88.03	7.66
ARB-HDV	On-Road Heavy Duty Vehicles	4.03	37.41	28.54	38.48
ARB-OFRD	Offroad Equipment (All except Airc/Loco/OGV)	31.50	22.00	222.22	16.94
CP	Consumer Products	0.00	0.00	0.00	0.00
FIS-AIRC	Federal/International - Aircrafts	2.55	11.01	26.28	11.01
FIS-LOCO	Federal/International - Locomotives	0.18	3.09	0.36	3.09
FIS-OGV	Federal/International - Ocean Going Vessels	1.47	13.00	2.71	13.00
MOB-10	Extension of the SOON Provision	0.20	1.91	1.28	1.30
MOB-11	Extended Exchange Program	5.73	2.89	51.58	2.48
MOB-14a	MOB-14 (Future Project Funding) - School Buses	0.00	0.24	0.02	0.25
MOB-14c	MOB-14 (Future Project Funding) - Cargo Handling Equipment	0.04	0.18	2.85	0.18
MOB-14d	MOB-14 (Future Project Funding) - Freight Locomotives - Road Haul	0.01	0.25	0.10	0.25
MOB-14e	MOB-14 (Future Project Funding) - Heavy Duty Diesel Trucks (>1400	0.16	4.76	1.32	4.85
Grand Total (Net)		65.30	116.62	444.33	113.14

Year 2023 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(B) Reductions With Overlapping/Double-Counting With Other Control Measures (2)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-01	MOB-14 (Existing Projects) - School Buses - Diesel	0.00	0.17	0.01	0.17
BA-04	MOB-14 (Existing Projects) - Freight Locomotives (Prop1B/Moyer)	0.07	1.17	0.21	1.17
BA-06	MOB-14 (Existing Projects) - Offroad Equipment - Construction/Min	0.32	1.98	3.68	1.26
BA-07	MOB-14 (Existing Projects) - Harborcraft (Fishing Vessels)	0.22	2.28	0.91	1.95
ECC-02	Co-Benefits from Energy Efficiency Measures - Res/Comm Bldg	0.07	0.30	2.19	0.51
ECC-03	Additional Enhancement of Building Energy Efficiency	0.17	1.23	5.19	2.25
CMB-01	Zero and Near-Zero Emission Technologies at Stationary Sources	1.15	2.48	4.39	2.41
CMB-02	Commercial and Multi-Residential Space & Water Heating	0.15	1.29	1.43	2.09
CMB-03	Emission Reductions From Non-Refinery Flares	0.37	1.40	1.01	1.40
CMB-04	Emission Reductions From Restaurant Burners and Residential Cooki	0.07	0.87	0.41	0.87
FUG-01	Improved Leak Detection and Repair	2.00	0.00	0.00	0.00
CTS-01	Further Reduction from Coatings, Solvents, Adhesives & Lubricants	1.02	0.00	0.00	0.00
BCM-01	Further Emission Reductions from Commercial Cooking	0.00	0.00	0.00	0.00
BCM-10	Emission Reduction from Greenwaste Composting	1.50	0.00	0.00	0.00
ARB-LDV	On-Road Light Duty Vehicles	12.37	7.01	88.03	7.66
ARB-HDV	On-Road Heavy Duty Vehicles	4.03	37.41	28.54	38.48
ARB-OFRD	Offroad Equipment (All except Airc/Loco/OGV)	31.50	22.00	222.22	16.94
CP	Consumer Products	0.00	0.00	0.00	0.00
FIS-AIRC	Federal/International - Aircrafts	2.55	11.01	26.28	11.01
FIS-LOCO	Federal/International - Locomotives	0.18	3.09	0.36	3.09
FIS-OGV	Federal/International - Ocean Going Vessels	1.47	13.00	2.71	13.00
MOB-10	Extension of the SOON Provision	0.32	3.09	2.08	2.11
MOB-11	Extended Exchange Program	9.31	4.70	83.73	4.03
MOB-14a	MOB-14 (Future Project Funding) - School Buses	0.00	0.24	0.02	0.25
MOB-14c	MOB-14 (Future Project Funding) - Cargo Handling Equipment	0.06	0.32	4.64	0.31
MOB-14d	MOB-14 (Future Project Funding) - Freight Locomotives - Road Haul	0.01	0.25	0.10	0.25
MOB-14e	MOB-14 (Future Project Funding) - Heavy Duty Diesel Trucks (>1400	0.50	15.20	4.22	15.50
Grand Total (with potential overlapping)		69.40	130.47	482.36	126.71

EMISSION SUMMARY FOR
(POINT, AREA, MOBILE SOURCE, AND OFF-ROAD MV)

BASELINE EMISSIONS

	VOC	NOx	CO	NO2
Point source	31.85	7.24	33.82	7.24
Area source	189.26	27.39	118.86	35.07
RECLAIM	0.00	14.90	0.00	14.90
Total Stationary	221.10	49.53	152.69	57.21
On-road	67.68	88.01	458.44	92.58
Off-road	85.86	99.79	592.29	85.58
Aircraft	4.01	17.31	41.31	17.31
TOTAL	378.65	254.63	1244.73	252.67

EMISSION REDUCTIONS

Point source	0.57	1.88	2.49	1.88
Area source	5.90	5.40	11.75	7.22
RECLAIM	0.00	0.00	0.00	0.00
Total Stationary	6.46	7.28	14.24	9.10
On-road	16.57	49.59	117.92	51.41
Off-road	39.72	48.74	285.90	41.62
Aircraft	2.55	11.01	26.28	11.01
TOTAL	65.30	116.62	444.33	113.14

REMAINING EMISSIONS

Point source	31.28	5.36	31.33	5.36
Area source	183.36	21.99	107.12	27.85
RECLAIM	0.00	14.90	0.00	14.90
Total Stationary	214.64	42.25	138.45	48.10
On-road	51.12	38.41	340.52	41.18
Off-road	46.13	51.05	306.39	43.95
Aircraft	1.46	6.30	15.04	6.30
TOTAL	313.35	138.01	800.40	139.53
NSR/Set-Aside	4.52	3.08	0.00	3.08
Public Funding	0.00	0.00	0.00	0.00

GRAND TOTAL (T/D)	317.87	141.09	800.40	142.61
Mobility Adjustments (3)	0.00	0.00	0.00	0.00

(1) Emission reductions for individual measures were estimated based on the sequence of listing contained here. When the sequence changes, reductions from each measure could be affected, but the net total remain the same. The purpose of this table is to estimate total emission reductions without overlapping or double-counting between measures.
(2) Emission reductions for individual measures were estimated in the absence of other measures. Therefore, the sequence of listing does not affect the reduction estimates. The purpose of this table is to provide emission reduction estimates for Appendix IV control measure summary tables as well as cost effectiveness analysis.
(3) Mobility Adjustment includes TCM-01, ATT-01, ATT-02, ATT-05 and adjustments are reflected in the CEPA baseline beyond year 2000.

EMISSION SUMMARY BY AGENCY FOR
EPA, ARB AND SCAQMD

BASELINE EMISSIONS BASE EMISSIONS	VOC	NOx	CO	NO2
EPA	17.69	68.62	205.40	68.00
ARB	237.36	138.69	887.20	129.23
SCAQMD (1)	123.61	47.32	152.12	55.44
TOTAL (2)	378.66	254.63	1244.72	252.67
EMISSION REDUCTIONS				
EPA	9.17	37.53	93.48	37.34
ARB	50.91	72.10	336.67	66.93
SCAQMD	5.23	6.98	14.17	8.87
TOTAL	65.31	116.61	444.32	113.14
REMAINING EMISSIONS				
EPA	8.52	31.09	111.92	30.66
ARB	186.45	66.59	550.53	62.30
SCAQMD (1)	118.38	40.34	137.95	46.57
TOTAL (2)	313.35	138.02	800.40	139.53

(1) SCAQMD figures include RECLAIM
(2) Totals do not include the line items

3. 2022 1-hour Attainment Scenario

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(P2016sy CepaV02 SIC / Nov 2014)
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M:\SYan\2016AQMP\lineitem_p16_pl_shaved.prn

Year 2022 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(A) Reductions Without Overlapping/Double-Counting With Other Control Measures (1)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-01	MOB-14 (Existing Projects) - School Buses - Diesel	0.00	0.15	0.01	0.15
BA-04	MOB-14 (Existing Projects) - Freight Locomotives (Prop1B/Moyer)	0.06	1.01	0.18	1.01
BA-06	MOB-14 (Existing Projects) - Offroad Equipment - Construction/Min	0.27	1.72	2.95	1.10
BA-07	MOB-14 (Existing Projects) - Harborcraft (Fishing Vessels)	0.18	1.96	0.74	1.68
ECC-02	Co-Benefits from Energy Efficiency Measures - Res Bldg	0.06	0.26	1.87	0.45
ECC-03	Additional Enhancement of Building Energy Efficiency	0.14	1.03	4.31	1.92
CMB-01	Zero and Near-Zero Emission Technologies at Stationary Sources	1.00	2.14	3.78	2.09
CMB-02	Commercial and Multi-Residential Space & Water Heating	0.11	0.98	1.07	1.60
CMB-03	Emission Reductions From Non-Refinery Flares	0.37	1.40	1.01	1.40
CMB-04	Emission Reductions From Restaurant Burners and Residential Cooki	0.06	0.80	0.37	0.80
FUG-01	Improved Leak Detection and Repair	2.00	0.00	0.00	0.00
CTS-01	Further Reduction from Coatings, Solvents, Adhesives & Lubricants	1.01	0.00	0.00	0.00
BCM-01	Further Emission Reductions from Commercial Cooking	0.00	0.00	0.00	0.00
BCM-10	Emission Reduction from Greenwaste Composting	1.50	0.00	0.00	0.00
ARB-LDV	On-Road Light Duty Vehicles	0.00	0.00	0.00	0.00
ARB-HDV	On-Road Heavy Duty Vehicles (transit buses)	0.11	1.96	1.64	2.03
ARB-OFF1	Offroad Equipment (lawn & garden)	3.50	0.35	14.49	0.30
CP	Consumer Products	0.00	0.00	0.00	0.00
FIS-AIRC	Federal/International - Aircrafts	0.00	0.00	0.00	0.00
FIS-LOCO	Federal/International - Locomotives (Road Haul)	0.45	10.00	2.73	10.00
FIS-OGV	Federal/International - Ocean Going Vessels (at berth)	0.16	2.00	0.37	2.00
MOB-10	Extension of the SOON Provision	0.00	0.00	0.00	0.00
MOB-11	Extended Exchange Program (lawn & garden)	4.99	2.48	44.70	2.13
MOB-14a	MOB-14 (Future Project Funding) - School Buses	0.00	0.17	0.01	0.17
MOB-14c	MOB-14 (Future Project Funding) - Cargo Handling Equipment	0.03	0.17	2.24	0.16
MOB-14d	MOB-14 (Future Project Funding) - Freight Locomotives - Road Haul	0.00	0.05	0.01	0.05
MOB-14e	MOB-14 (Future Project Funding) - Heavy Duty Diesel Trucks (>1400	0.13	4.24	0.78	4.35
Grand Total (Net)		16.13	32.86	83.26	33.38

Year 2022 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(B) Reductions With Overlapping/Double-Counting With Other Control Measures (2)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-01	MOB-14 (Existing Projects) - School Buses - Diesel	0.00	0.15	0.01	0.15
BA-04	MOB-14 (Existing Projects) - Freight Locomotives (Prop1B/Moyer)	0.06	1.01	0.18	1.01
BA-06	MOB-14 (Existing Projects) - Offroad Equipment - Construction/Min	0.27	1.72	2.95	1.10
BA-07	MOB-14 (Existing Projects) - Harborcraft (Fishing Vessels)	0.18	1.96	0.74	1.68
ECC-02	Co-Benefits from Energy Efficiency Measures - Res Bldg	0.06	0.26	1.87	0.45
ECC-03	Additional Enhancement of Building Energy Efficiency	0.14	1.06	4.41	1.97
CMB-01	Zero and Near-Zero Emission Technologies at Stationary Sources	1.00	2.14	3.78	2.09
CMB-02	Commercial and Multi-Residential Space & Water Heating	0.12	1.11	1.22	1.82
CMB-03	Emission Reductions From Non-Refinery Flares	0.37	1.40	1.01	1.40
CMB-04	Emission Reductions From Restaurant Burners and Residential Cooki	0.07	0.86	0.40	0.86
FUG-01	Improved Leak Detection and Repair	2.00	0.00	0.00	0.00
CTS-01	Further Reduction from Coatings, Solvents, Adhesives & Lubricants	1.01	0.00	0.00	0.00
BCM-01	Further Emission Reductions from Commercial Cooking	0.00	0.00	0.00	0.00
BCM-10	Emission Reduction from Greenwaste Composting	1.50	0.00	0.00	0.00
ARB-LDV	On-Road Light Duty Vehicles	0.00	0.00	0.00	0.00
ARB-HDV	On-Road Heavy Duty Vehicles (transit buses)	0.11	1.96	1.64	2.03
ARB-OFF1	Offroad Equipment (lawn & garden)	3.50	0.35	14.49	0.30
CP	Consumer Products	0.00	0.00	0.00	0.00
FIS-AIRC	Federal/International - Aircrafts	0.00	0.00	0.00	0.00
FIS-LOCO	Federal/International - Locomotives (Road Haul)	0.45	10.00	2.73	10.00
FIS-OGV	Federal/International - Ocean Going Vessels (at berth)	0.16	2.00	0.37	2.00
MOB-10	Extension of the SOON Provision	0.00	0.00	0.00	0.00
MOB-11	Extended Exchange Program (lawn & garden)	5.52	2.64	47.45	2.26
MOB-14a	MOB-14 (Future Project Funding) - School Buses	0.00	0.22	0.01	0.23
MOB-14c	MOB-14 (Future Project Funding) - Cargo Handling Equipment	0.03	0.17	2.24	0.16
MOB-14d	MOB-14 (Future Project Funding) - Freight Locomotives - Road Haul	0.01	0.14	0.04	0.14
MOB-14e	MOB-14 (Future Project Funding) - Heavy Duty Diesel Trucks (>1400	0.13	4.24	0.78	4.35
Grand Total (with potential overlapping)		16.69	33.37	86.33	33.99

EMISSION SUMMARY FOR
(POINT, AREA, MOBILE SOURCE, AND OFF-ROAD MV)

BASELINE EMISSIONS

	VOC	NOx	CO	NO2
Point source	31.65	7.19	33.54	7.19
Area source	188.07	27.63	119.03	35.65
RECLAIM	0.00	14.90	0.00	14.90
Total Stationary	219.73	49.72	152.57	57.74
On-road	71.40	116.78	490.38	122.57
Off-road	88.02	110.92	588.68	95.96
Aircraft	3.92	16.91	40.52	16.91
TOTAL	383.07	294.33	1272.16	293.18

EMISSION REDUCTIONS

Point source	0.54	1.81	2.27	1.81
Area source	5.71	4.79	10.13	6.44
RECLAIM	0.00	0.00	0.00	0.00
Total Stationary	6.24	6.61	12.41	8.25
On-road	0.24	6.52	2.44	6.71
Off-road	9.64	19.73	68.42	18.43
Aircraft	0.00	0.00	0.00	0.00
TOTAL	16.13	32.86	83.26	33.38

REMAINING EMISSIONS

Point source	31.11	5.38	31.26	5.38
Area source	182.37	22.84	108.90	29.21
RECLAIM	0.00	14.90	0.00	14.90
Total Stationary	213.48	43.11	140.16	49.49
On-road	71.16	110.26	487.94	115.86
Off-road	78.39	91.18	520.26	77.53
Aircraft	3.92	16.91	40.52	16.91
TOTAL	366.95	261.47	1188.89	259.80
NSR/Set-Aside	4.52	3.08	0.00	3.08
Public Funding	0.00	0.00	0.00	0.00
GRAND TOTAL (T/D)	371.47	264.55	1188.89	262.88
Mobility Adjustments (3)	0.00	0.00	0.00	0.00

(1) Emission reductions for individual measures were estimated based on the sequence of listing contained here. When the sequence changes, reductions from each measure could be affected, but the net total remain the same. The purpose of this table is to estimate total emission reductions without overlapping or double-counting between measures.
(2) Emission reductions for individual measures were estimated in the absence of other measures. Therefore, the sequence of listing does not affect the reduction estimates. The purpose of this table is to provide emission reduction estimates for Appendix IV control measure summary tables as well as cost effectiveness analysis.
(3) Mobility Adjustment includes TCM-01, ATT-01, ATT-02, ATT-05 and adjustments are reflected in the CEPA baseline beyond year 2000.

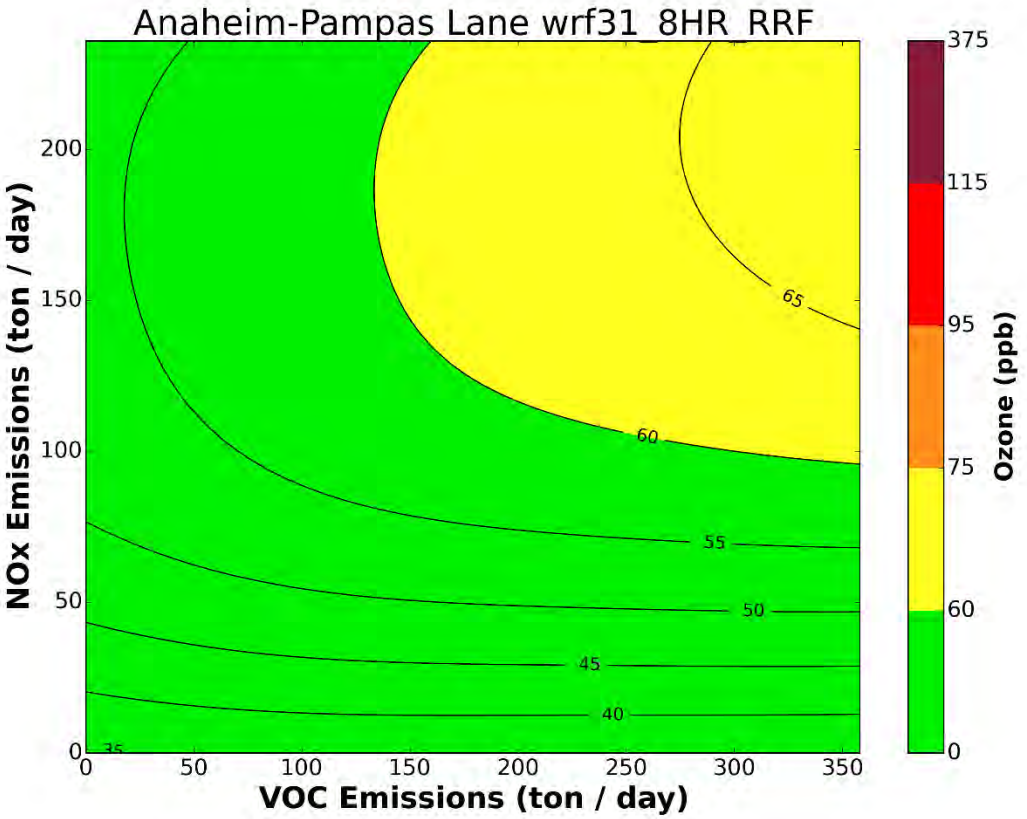
EMISSION SUMMARY BY AGENCY FOR
EPA, ARB AND SCAQMD

BASELINE EMISSIONS BASE EMISSIONS	VOC	NOx	CO	NO2
EPA	18.18	83.56	205.63	83.17
ARB	242.26	163.26	914.52	154.03
SCAQMD (1)	122.63	47.51	152.01	55.97
TOTAL (2)	383.07	294.33	1272.16	293.17
EMISSION REDUCTIONS				
EPA	1.84	14.33	7.15	14.32
ARB	9.30	12.18	63.76	11.01
SCAQMD	4.99	6.35	12.35	8.04
TOTAL	16.13	32.86	83.26	33.37
REMAINING EMISSIONS				
EPA	16.34	69.23	198.48	68.85
ARB	232.96	151.08	850.76	143.02
SCAQMD (1)	117.64	41.16	139.66	47.93
TOTAL (2)	366.94	261.47	1188.90	259.80

(1) SCAQMD figures include RECLAIM
(2) Totals do not include the line items

Attachment 4

2031 8-Hour Ozone Isopleths


Anaheim-Pampas Lane wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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200
250
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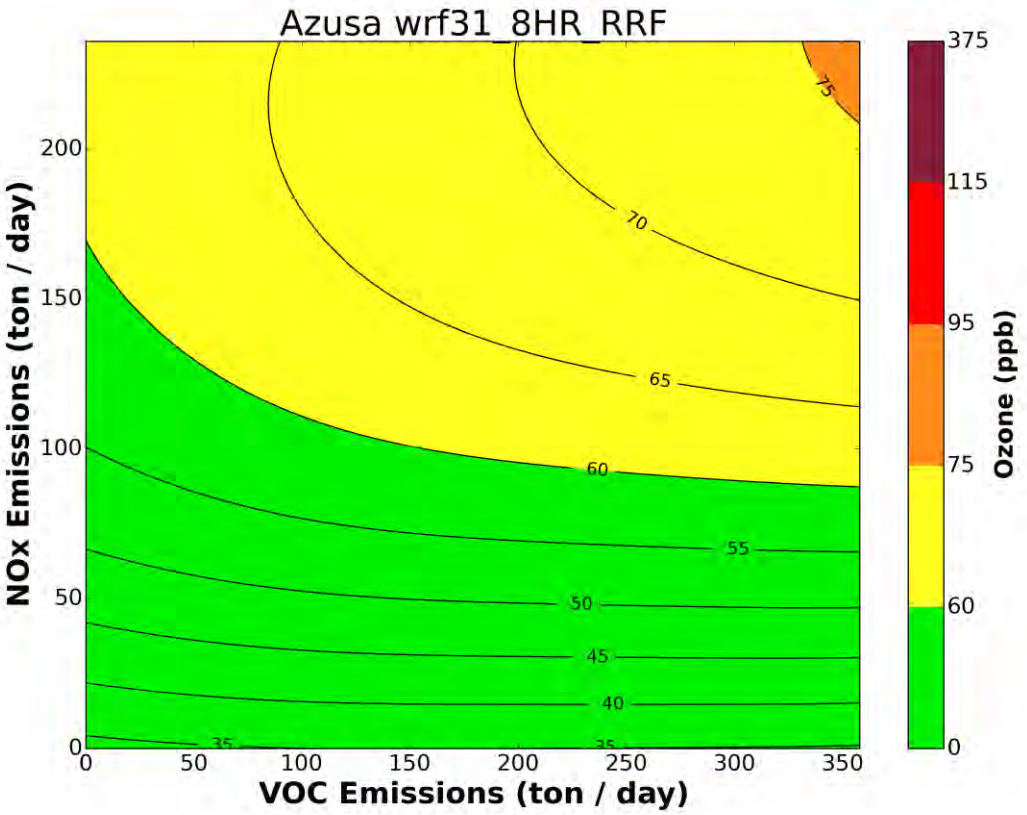
60
55
50
45
40
35


Azusa wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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50
100
150
200
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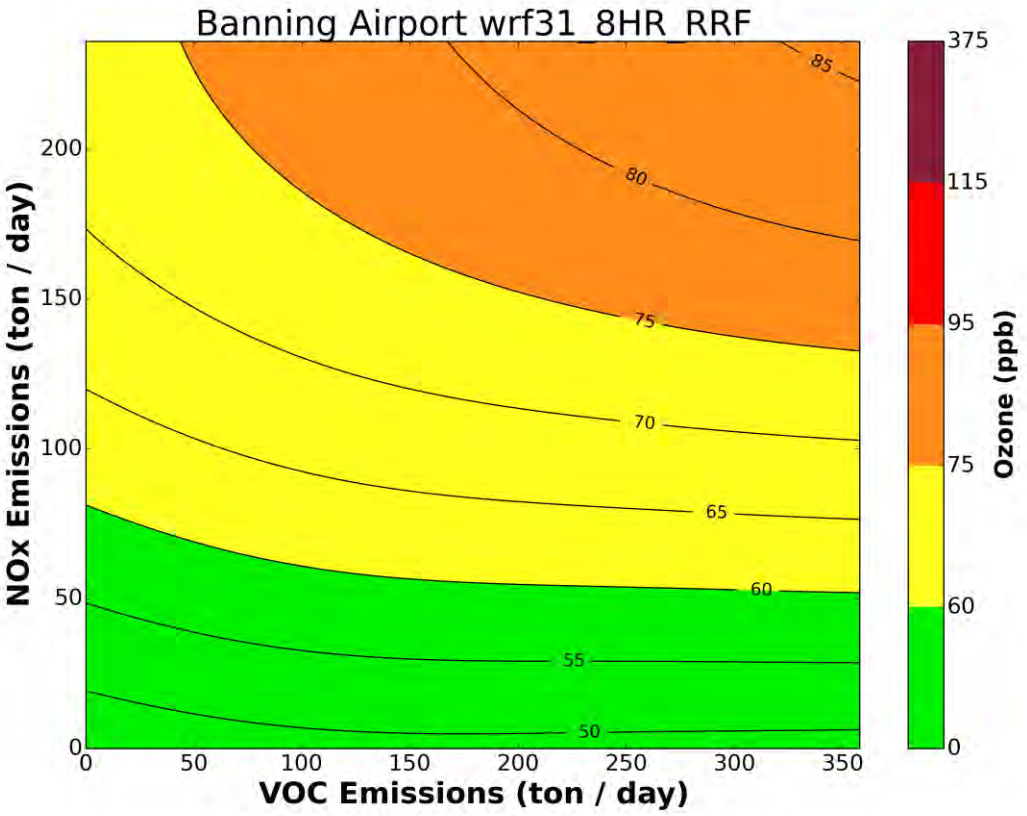
95
75
60
0
75
70
65
60
55
50
45
40
35


Banning Airport wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
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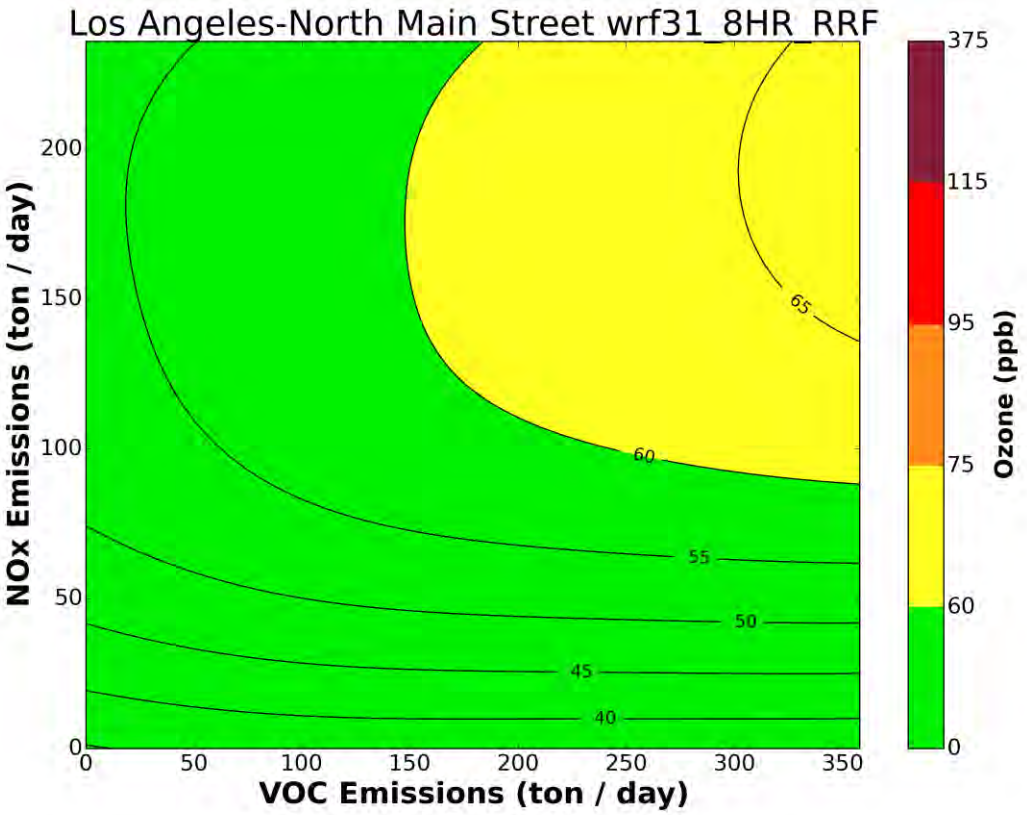
75
70
65
60
55
50


Los Angeles-North Main Street wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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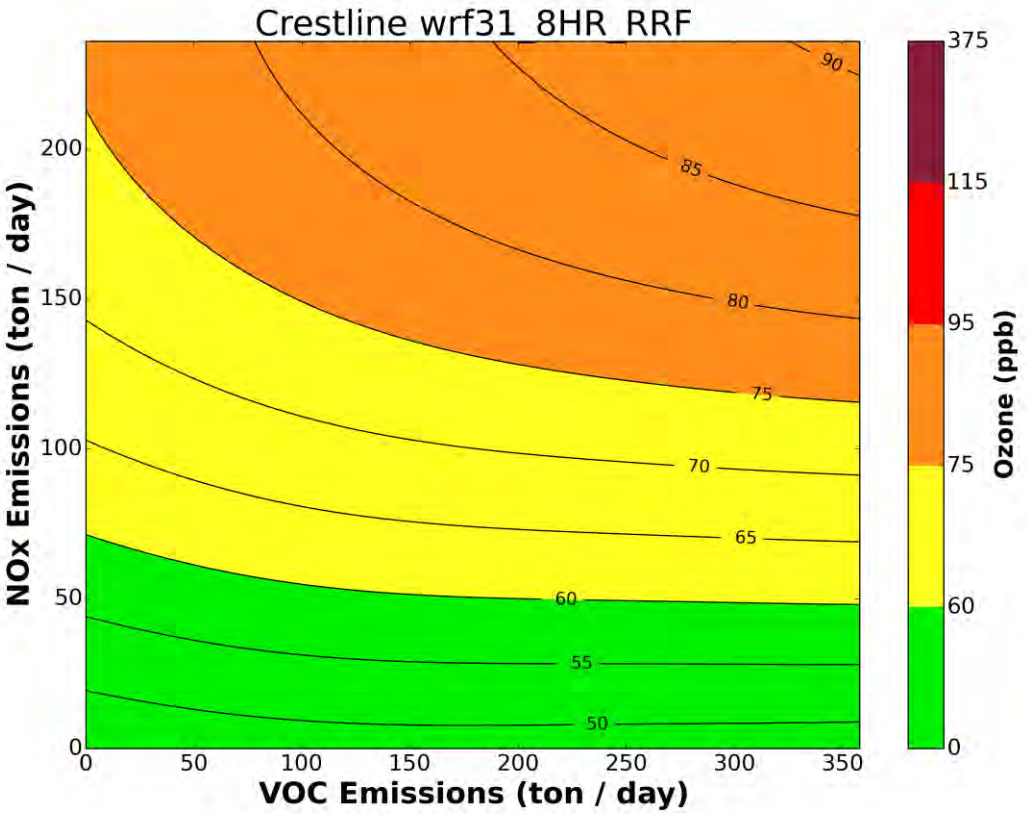
100
150
200
250
300
350
375
115
95
75
60
65
60
55
50
45
40


Crestline wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
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300
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375
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95
75
60
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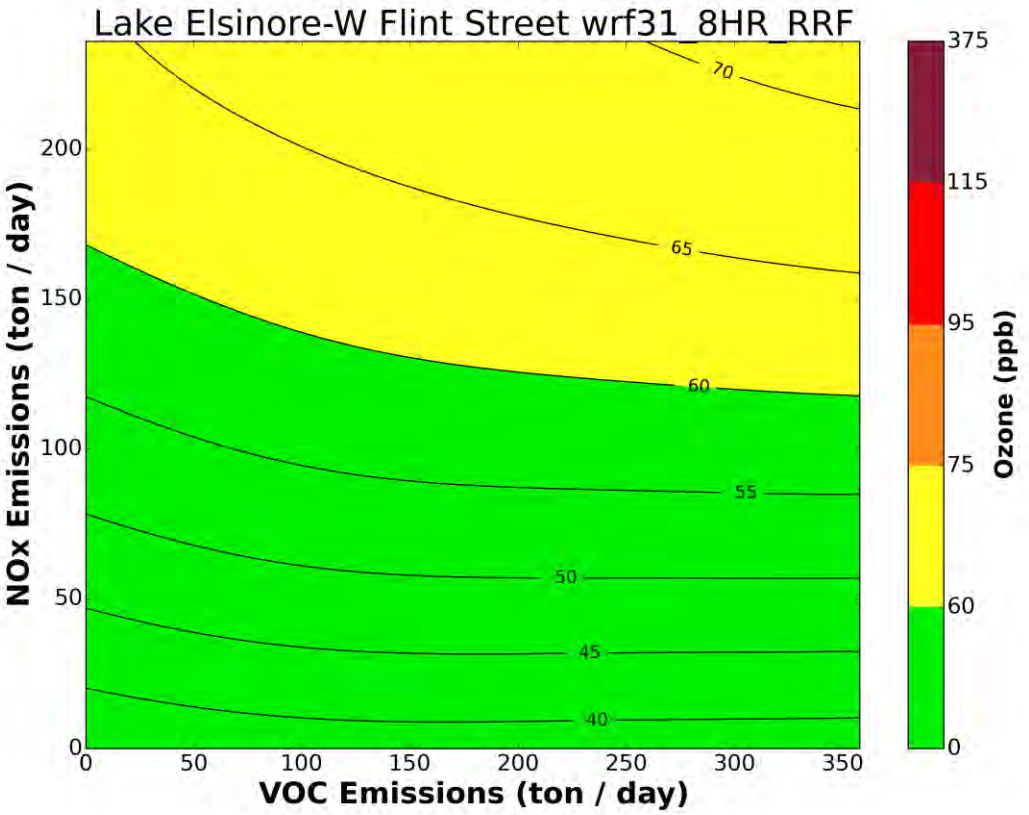
80
75
70
65
60
55
50


Lake Elsinore-W Flint Street wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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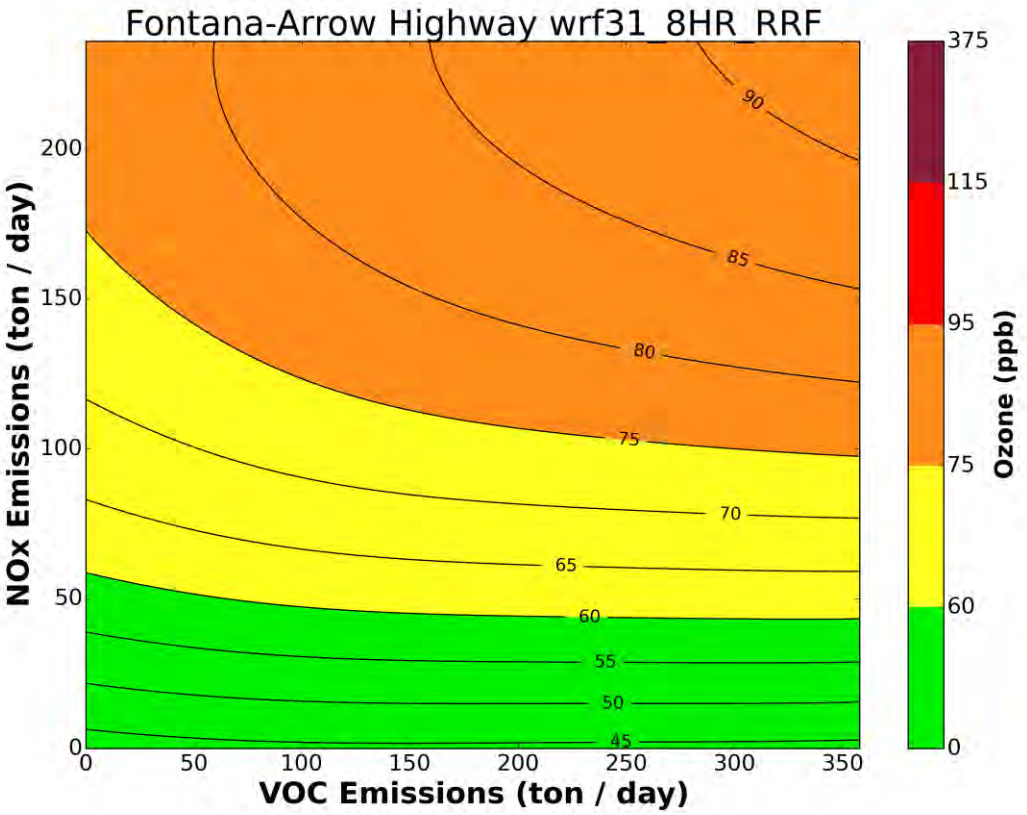
65
60
55
50
45
40


Fontana-Arrow Highway wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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50
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80
75
70
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55
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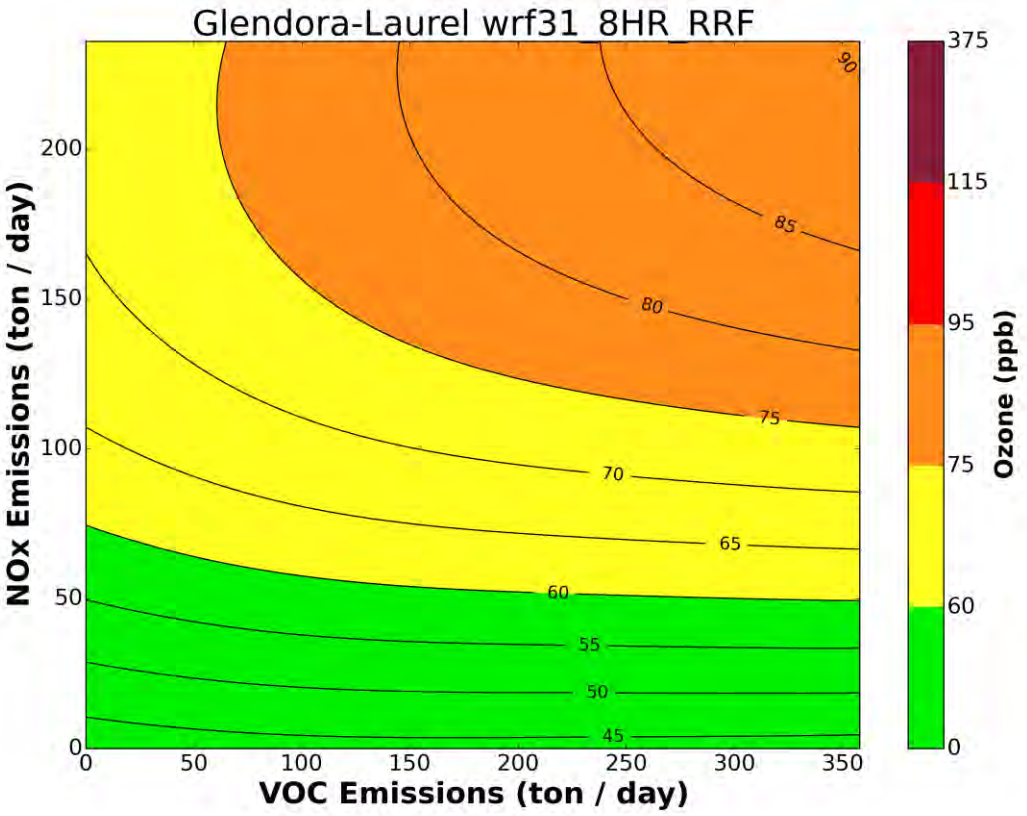
Glendora-Laurel wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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50
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55
50
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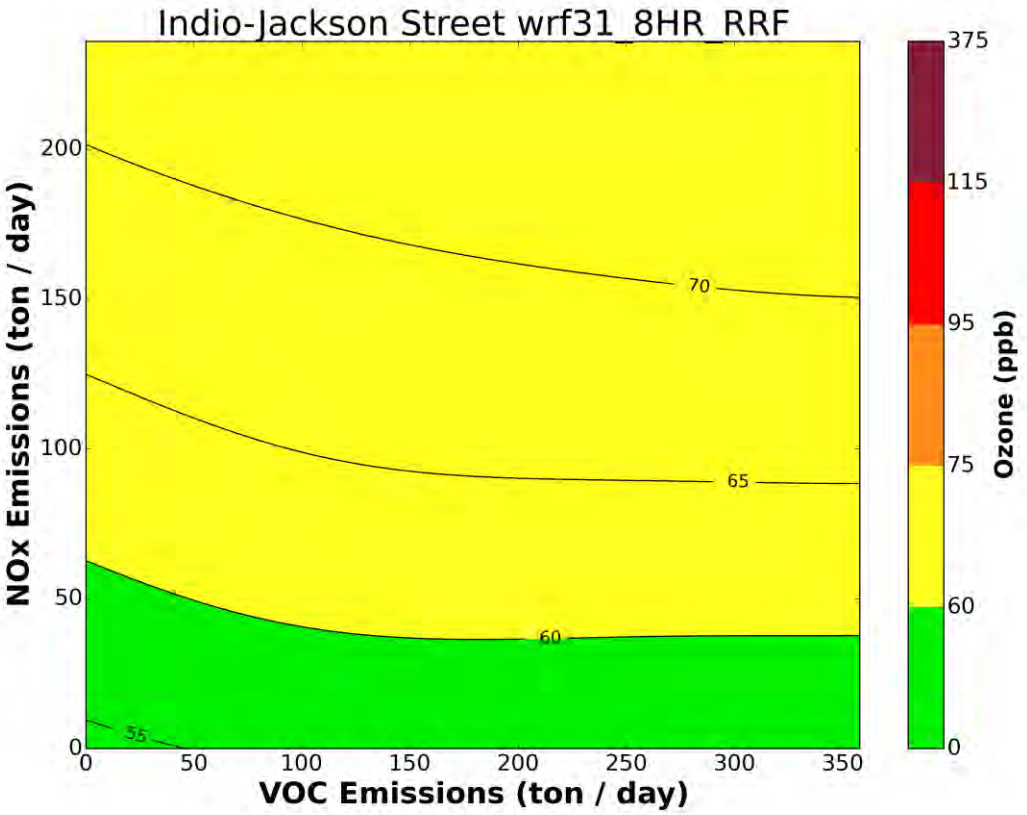
Indio-Jackson Street wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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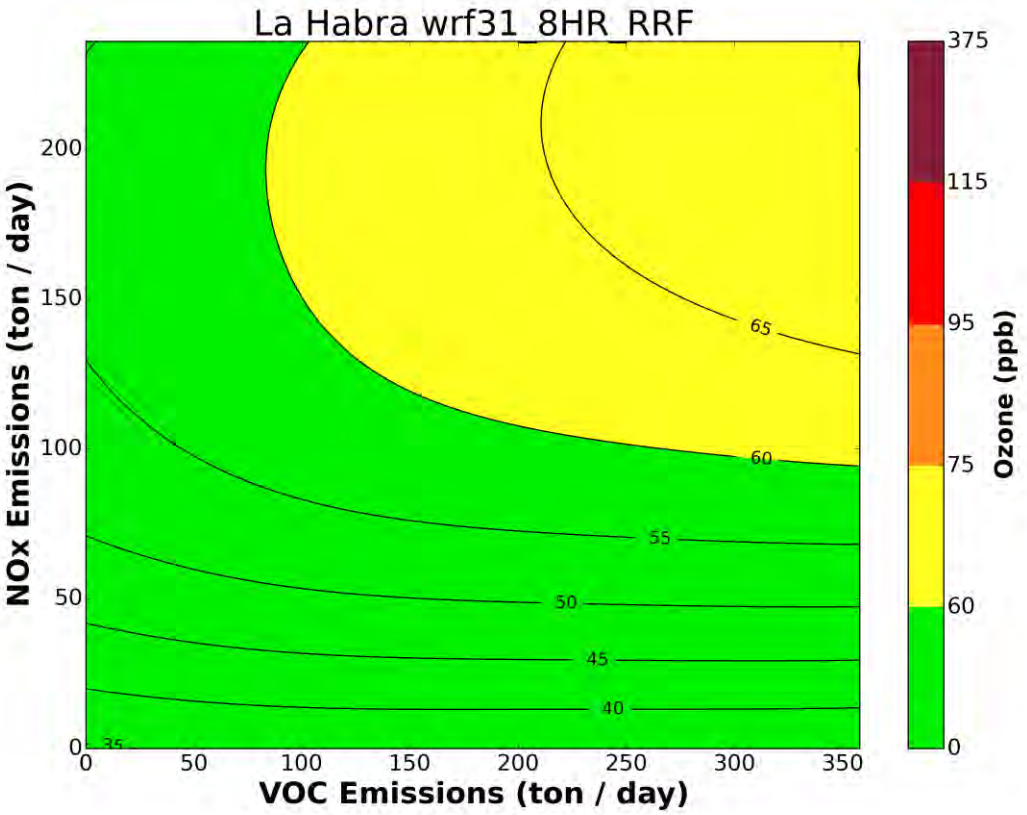
75
60
70
65
60
55


La Habra wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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375
115
95
75
60
65
60
55
50
45
40
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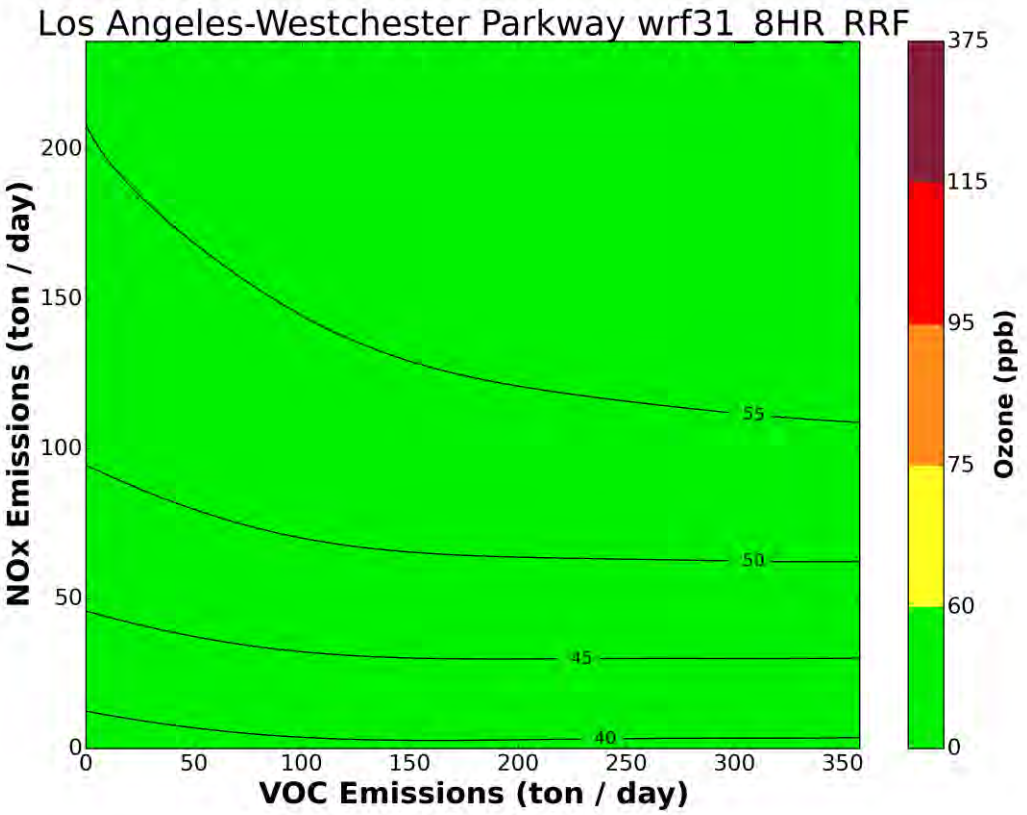
Los Angeles-Westchester Parkway wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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45
40
375
115
95
75
60
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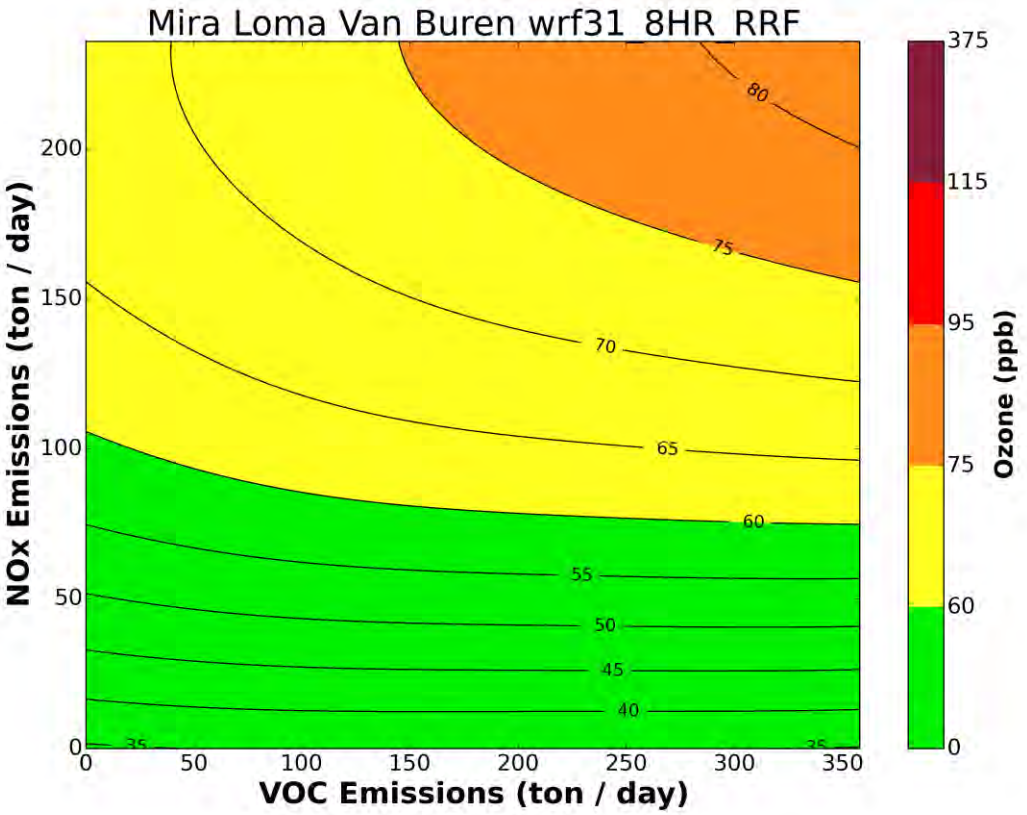
Mira Loma Van Buren wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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150
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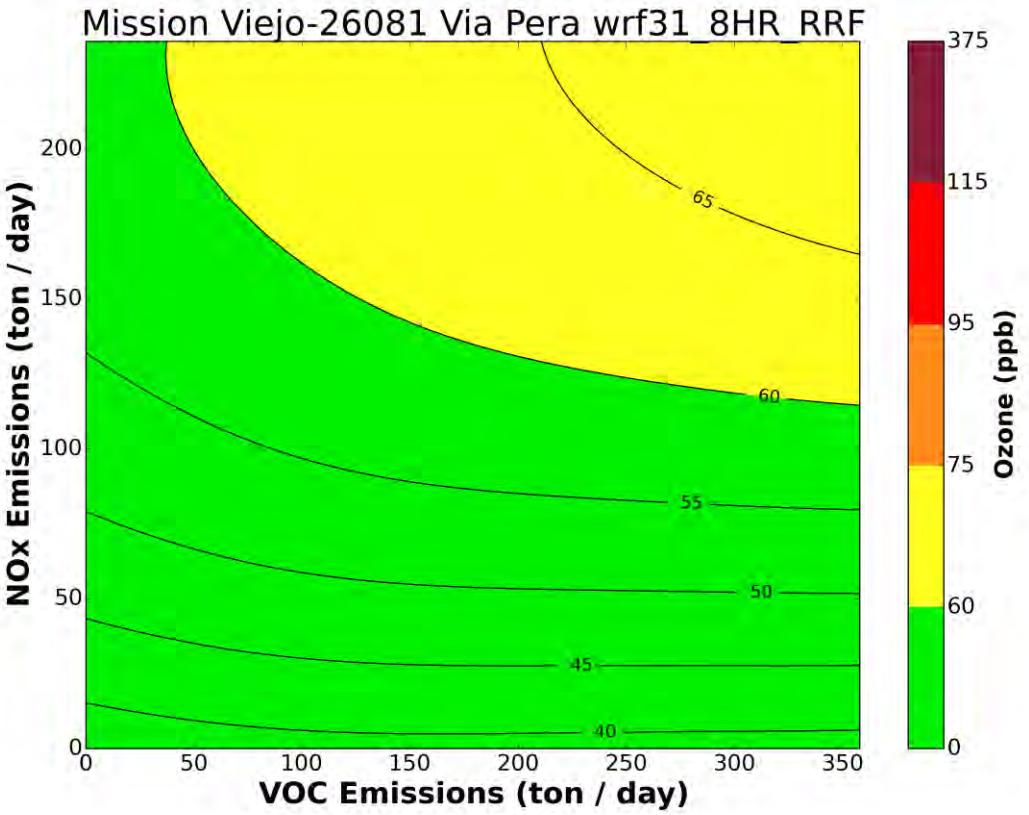
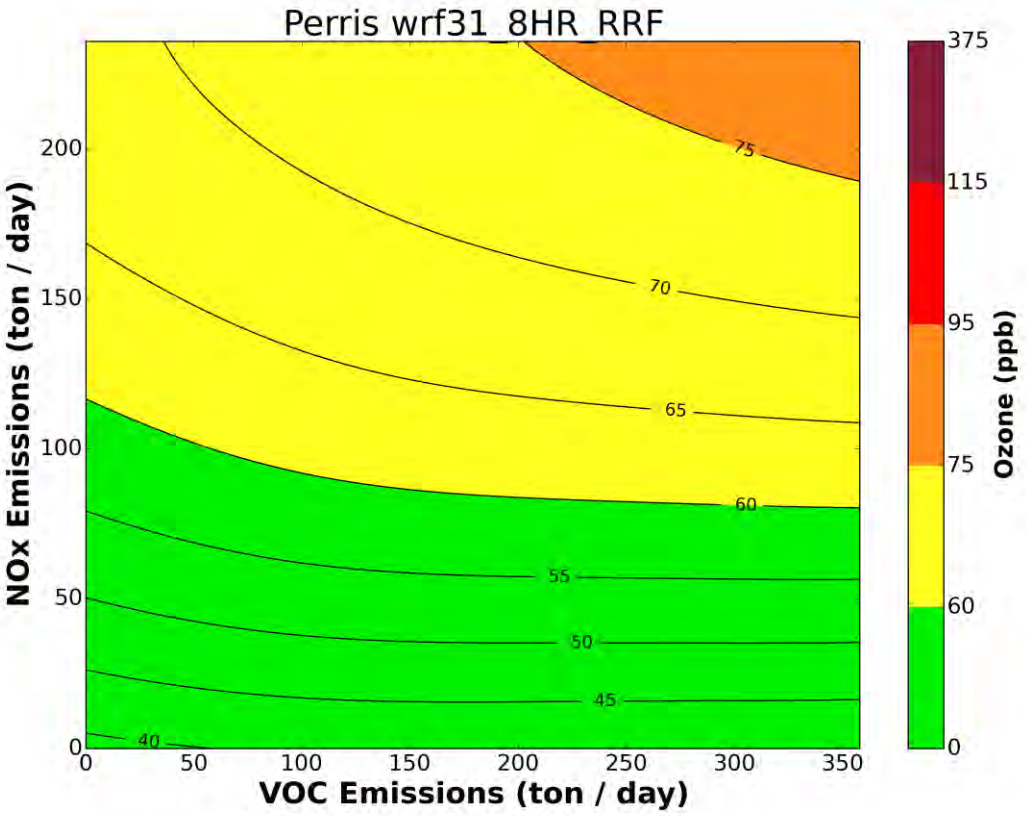
250
300
350
375
115
95
75
60
80
70
65
55
50
45
40
35


Mission Viejo-26081 Via Pera wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
65
60
55
50
45
40


Perris wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
0
40
45
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60
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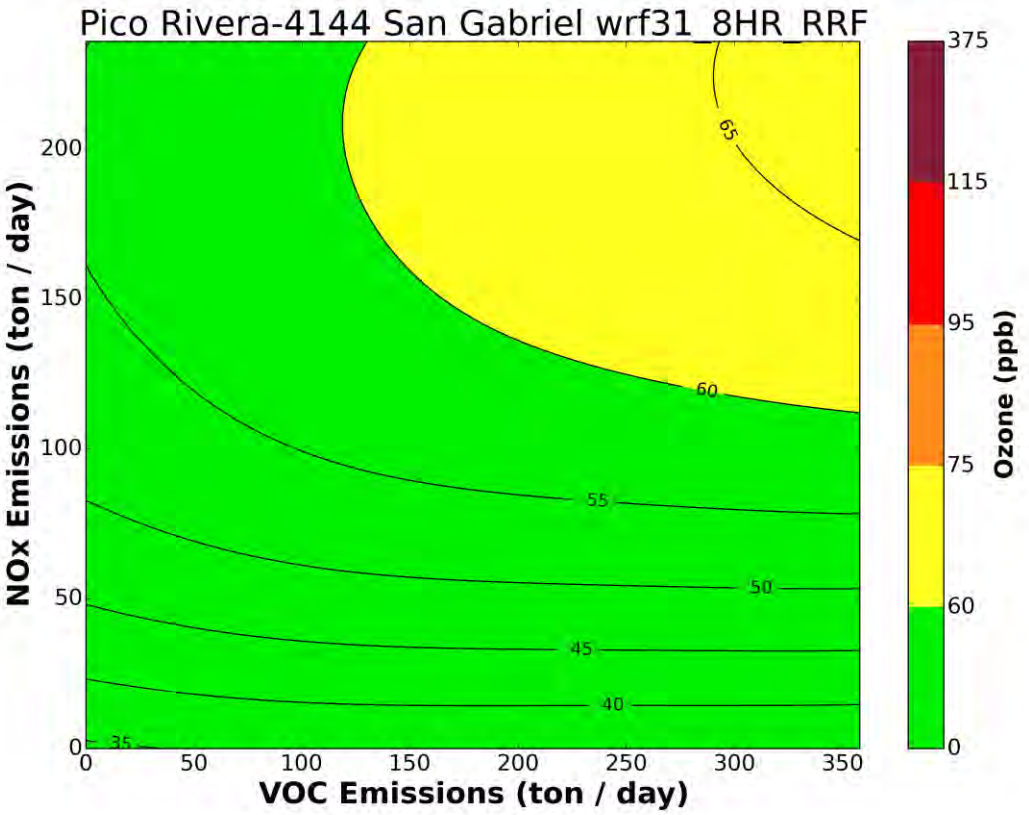
70
75


Pico Rivera-4144 San Gabriel wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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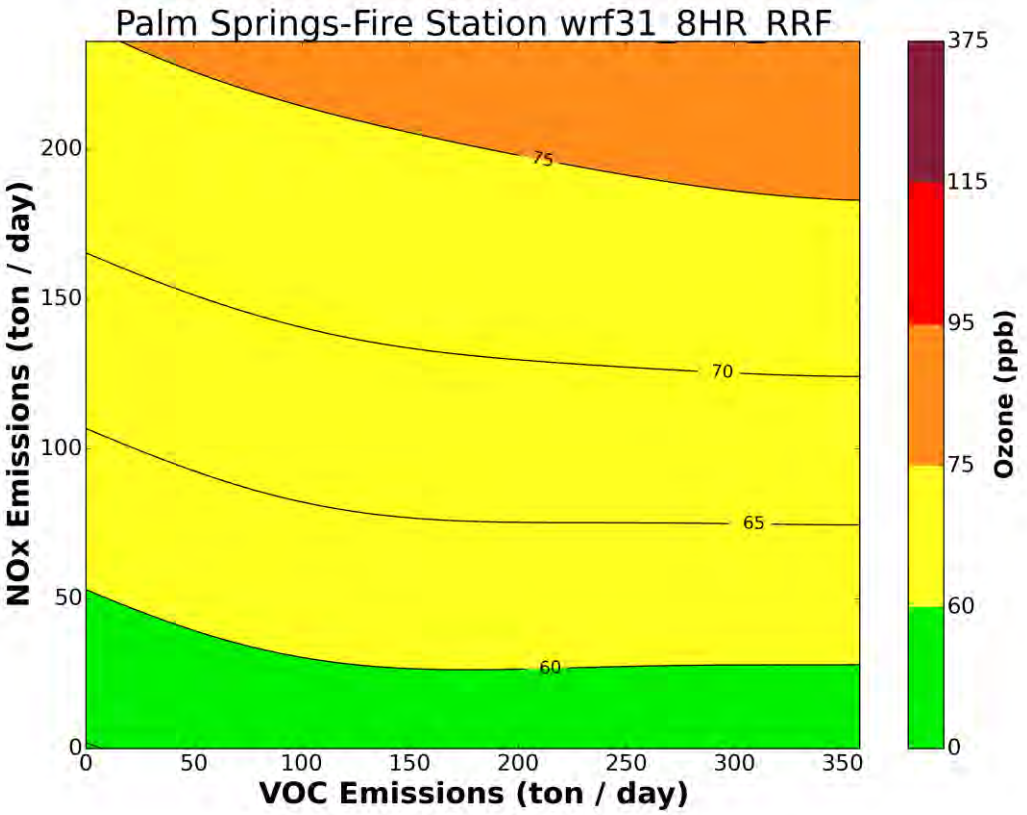
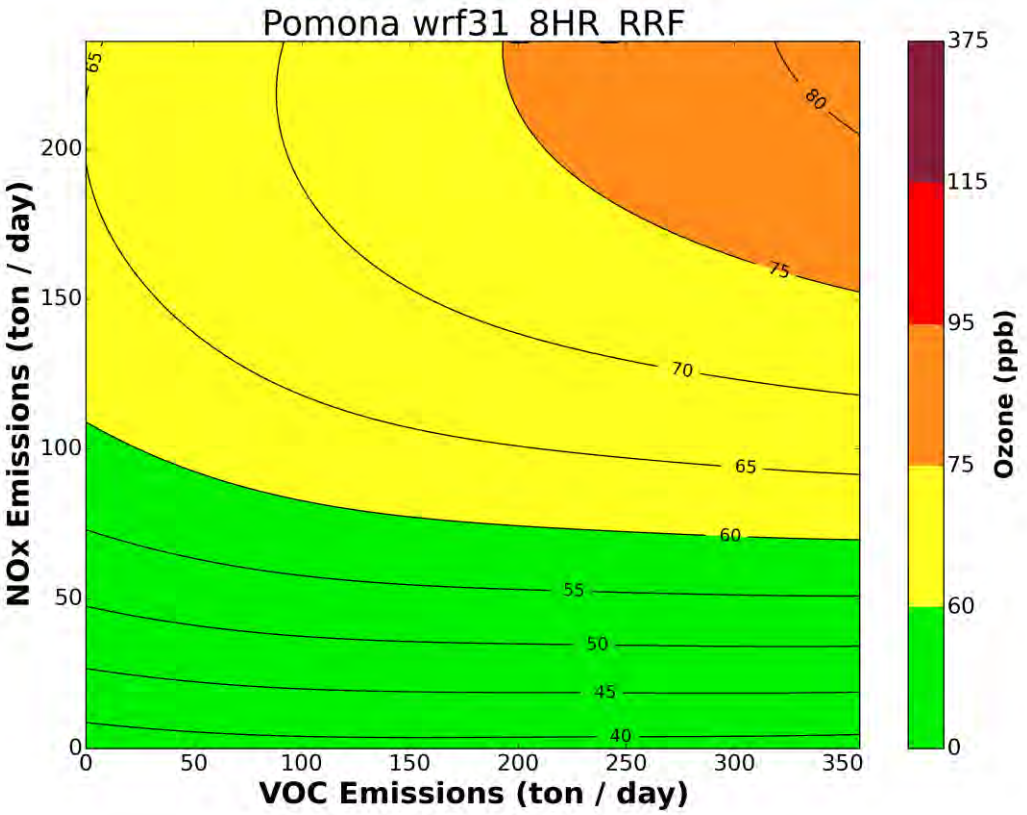
150
200
250
300
350
375
115
95
75
60
65
60
55
50
45
40
35


Palm Springs-Fire Station wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
75
70
65
60


Pomona wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
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75
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80
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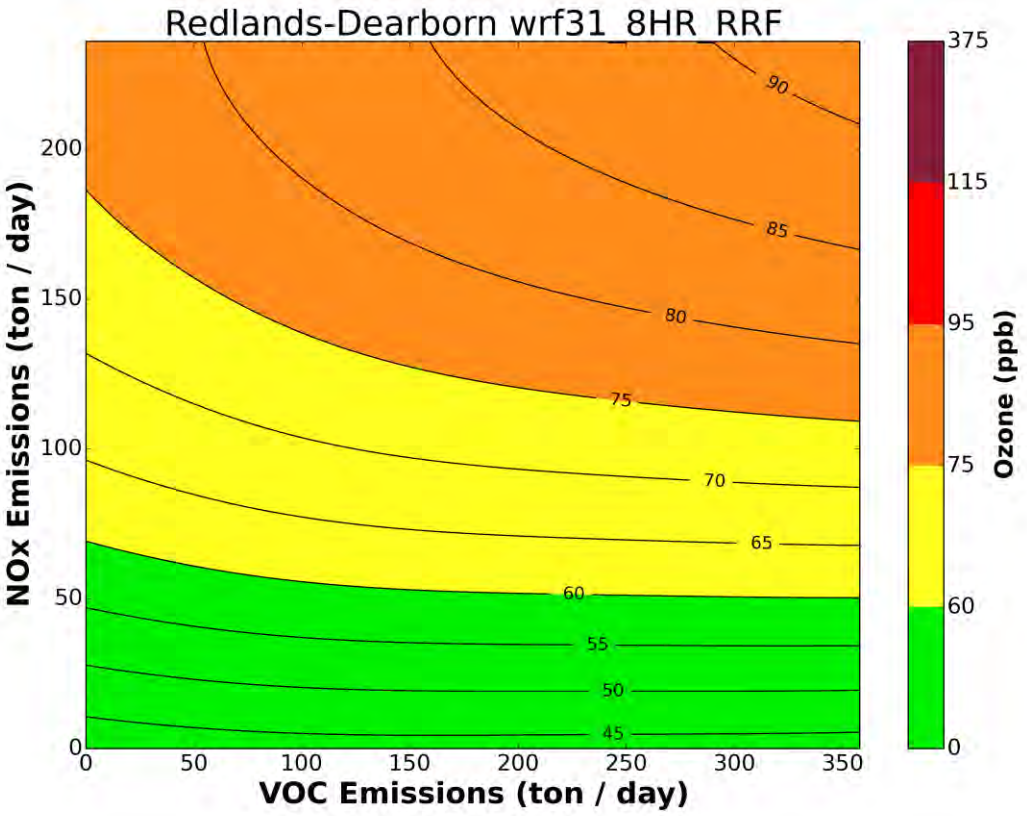
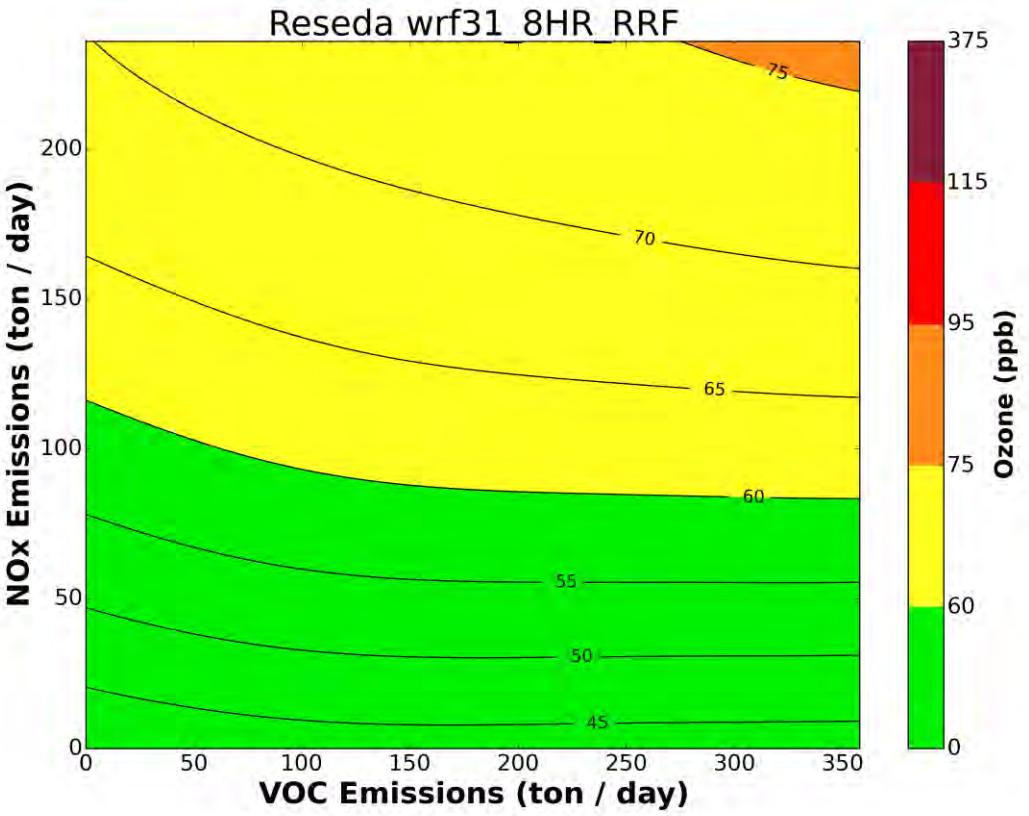
45
40


Redlands-Dearborn wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
90
85
80
75
70
65
60
55
50
45


Reseda wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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100
150
200
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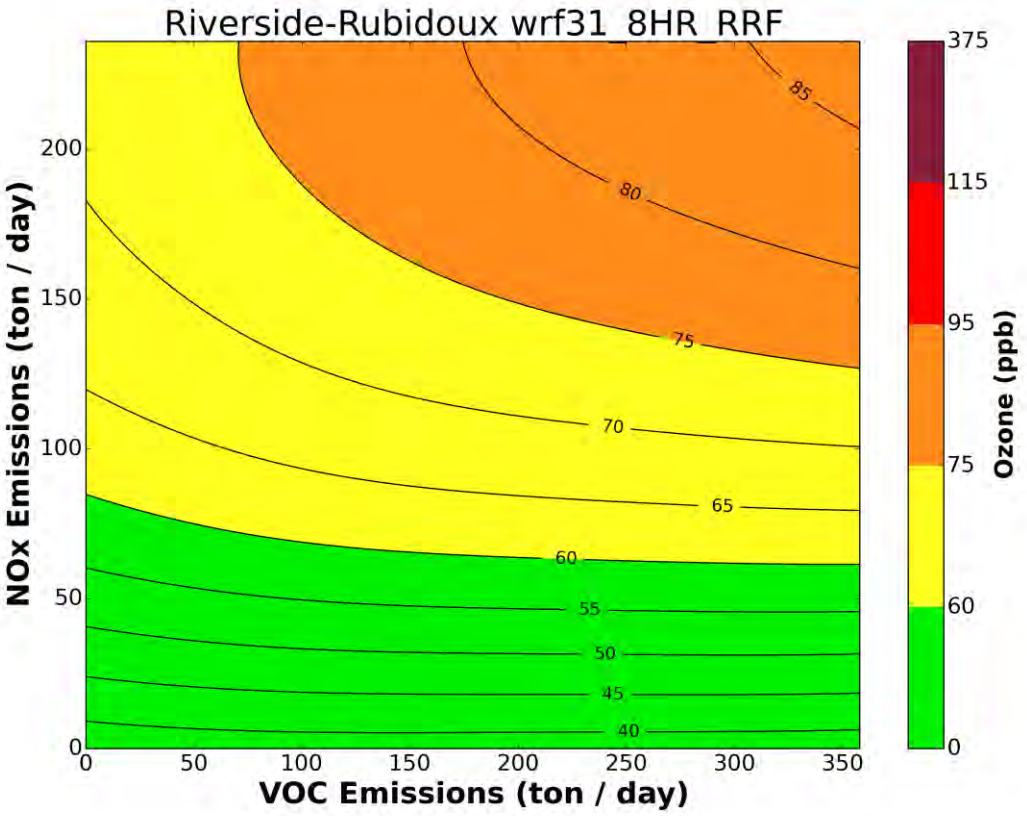
75
60
45
55
65
70


Riverside-Rubidoux wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
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75
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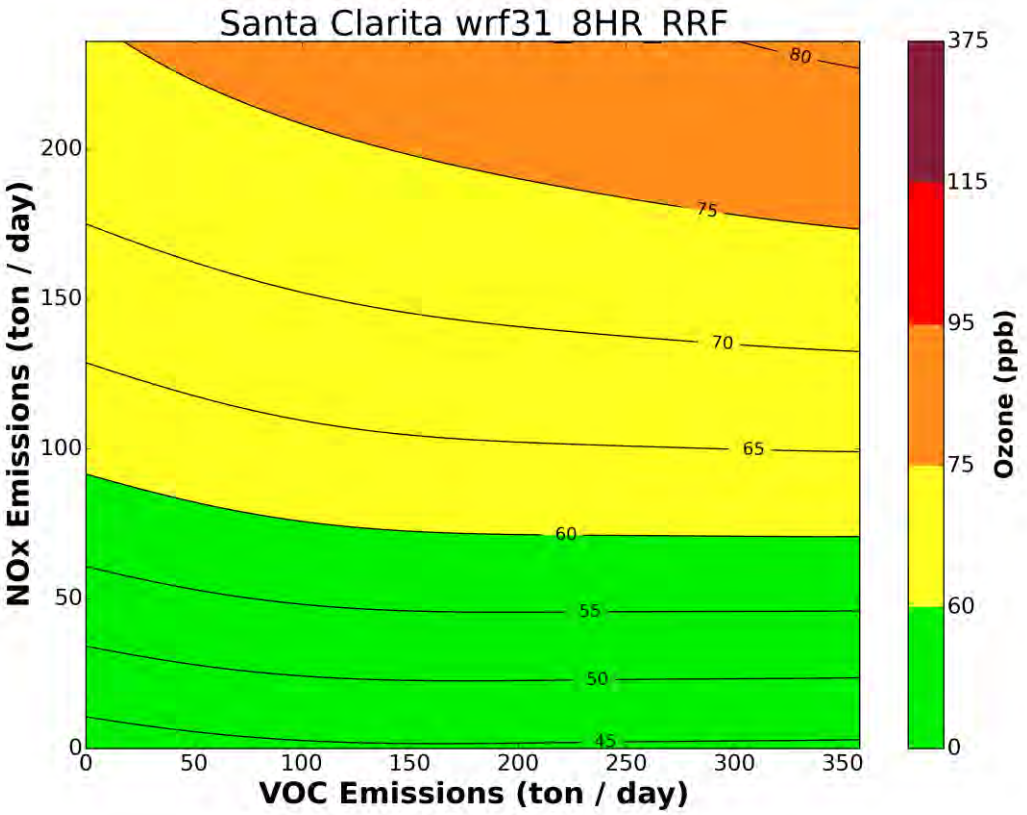
Santa Clarita wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
45
50
55
60
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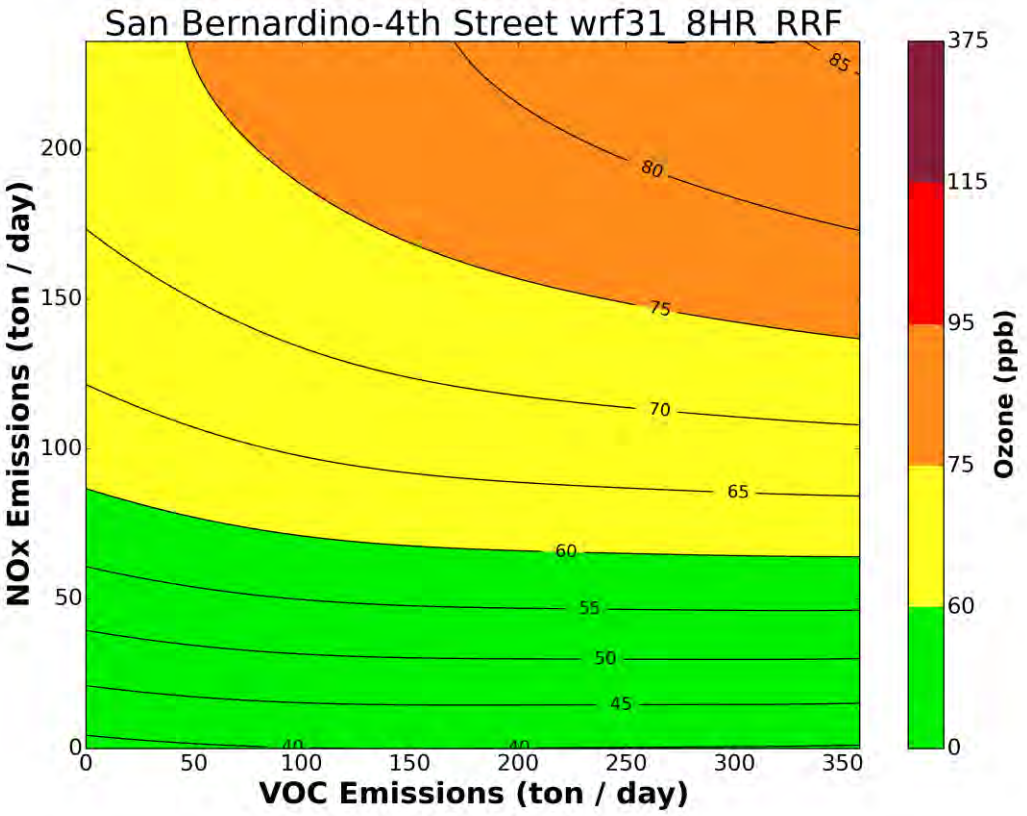
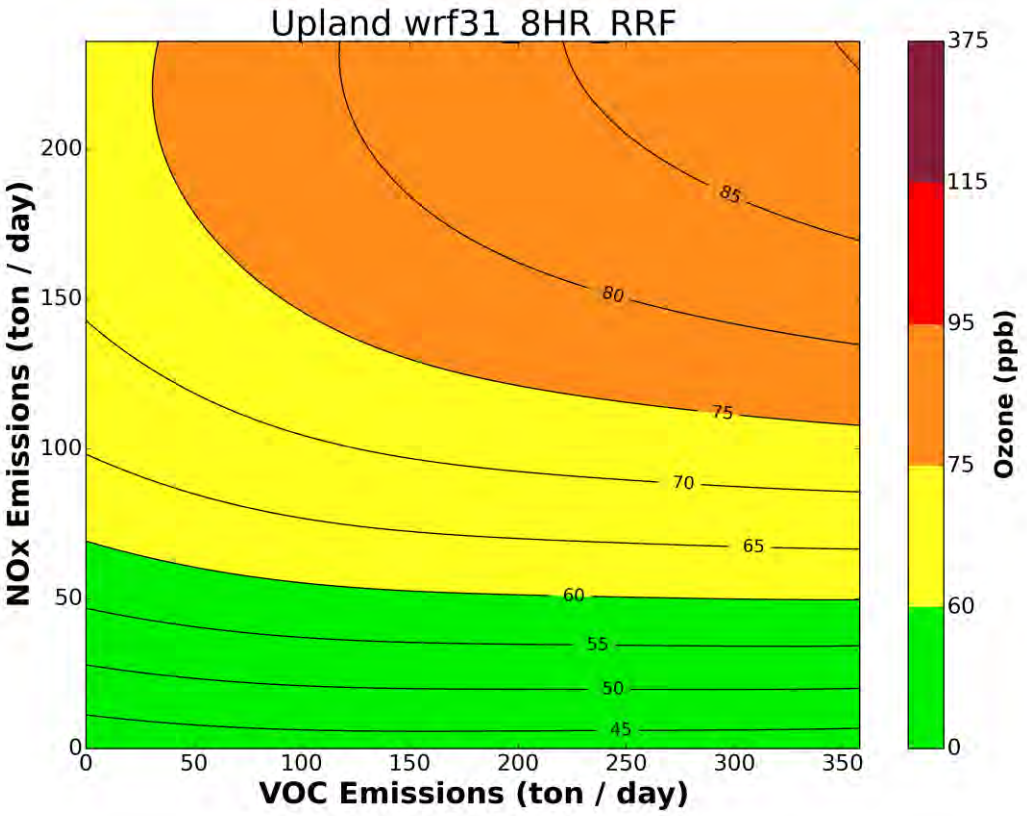
70
75
80
0
60
75
95
115
375


San Bernardino-4th Street wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
85
80
75
70
65
60
55
50
45
40


Upland wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
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300
350
85
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75
70
65
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50
45
375
115
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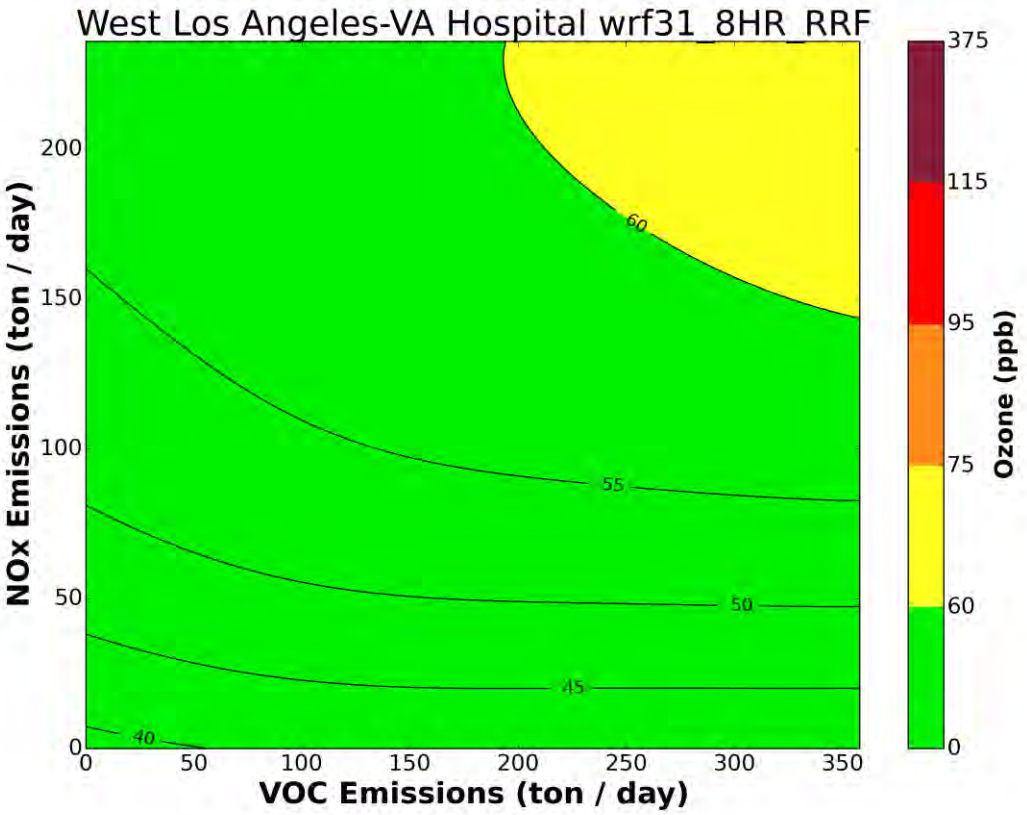
75
60
0


West Los Angeles-VA Hospital wrf31_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
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75
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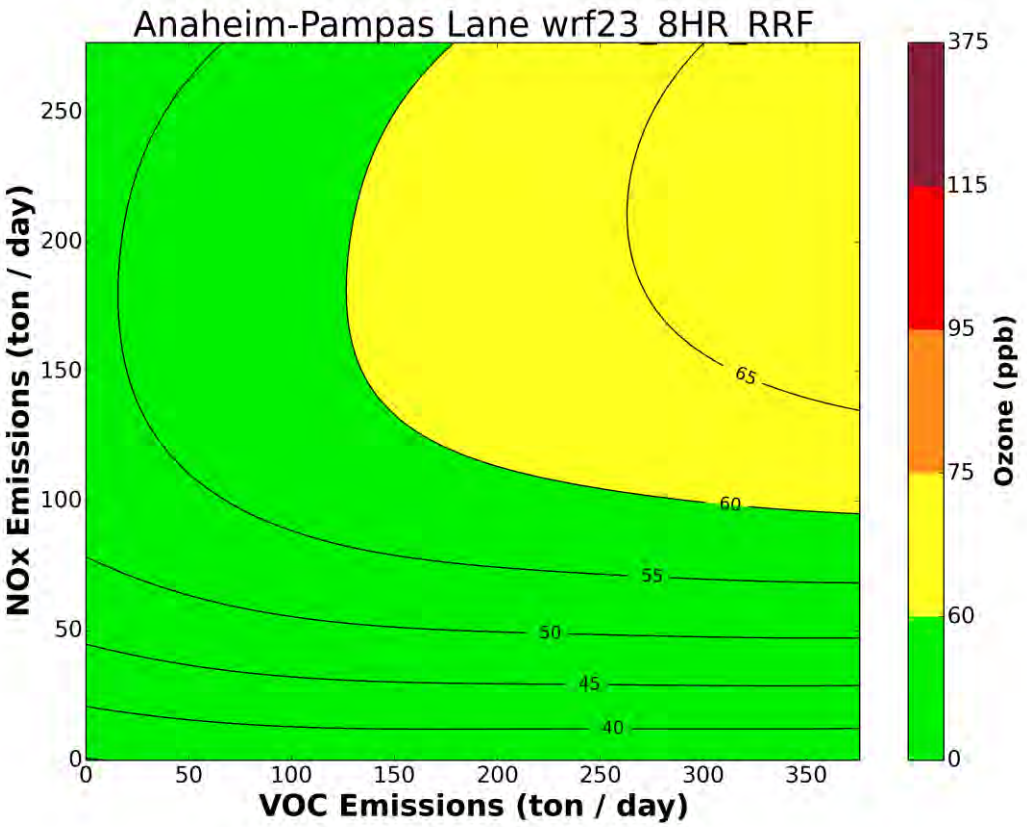
55
60

Attachment 5

2023 8-Hour Ozone Isopleths


Anaheim-Pampas Lane wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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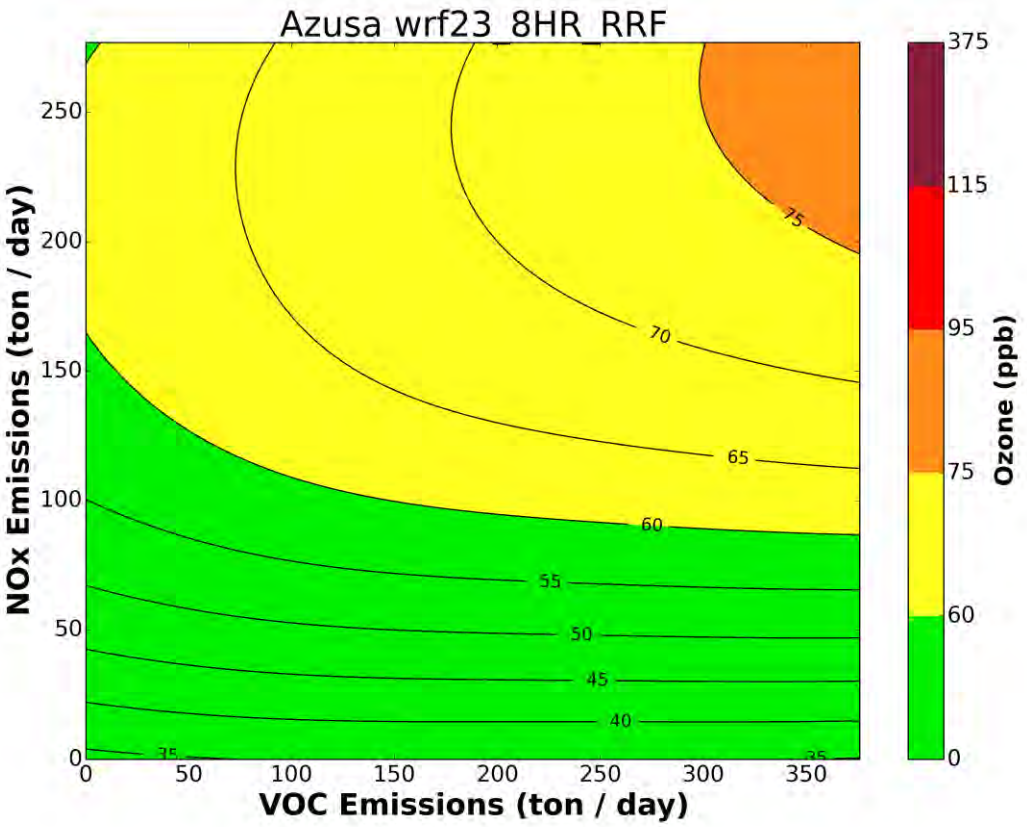
100
150
200
250
300
350
65
60
55
50
45
40
375
115
95
75
60
0


Azusa wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
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300
350
375
115
95
75
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60
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50
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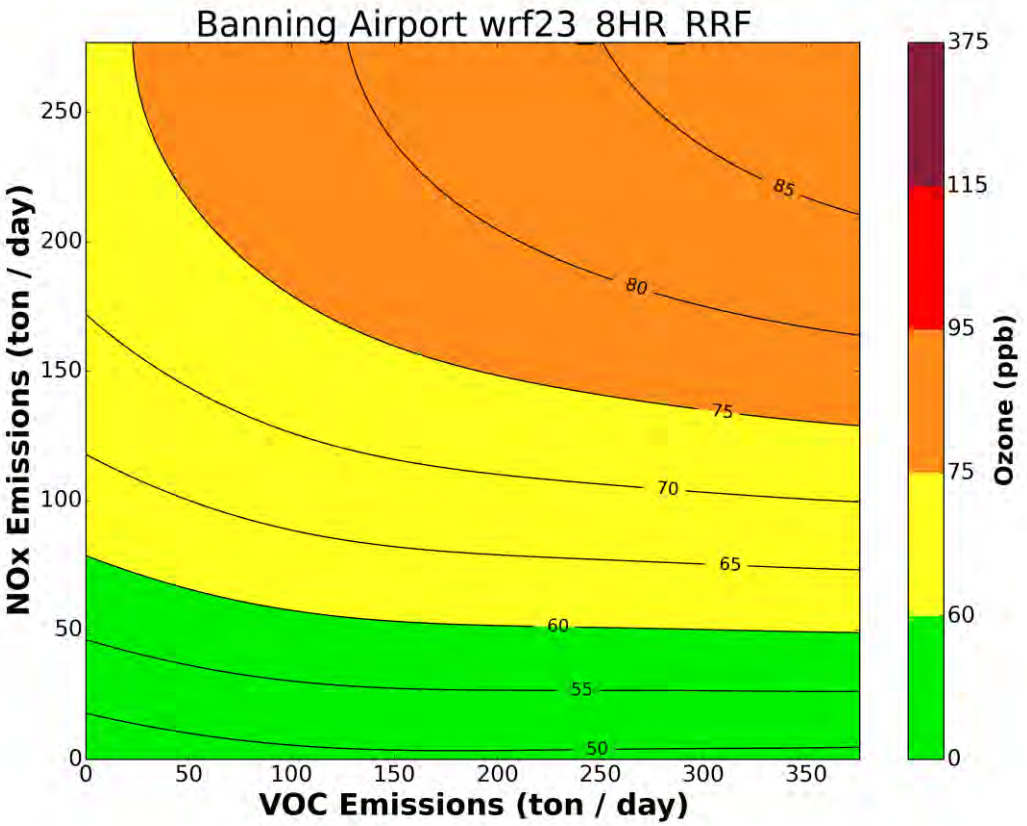
Banning Airport wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
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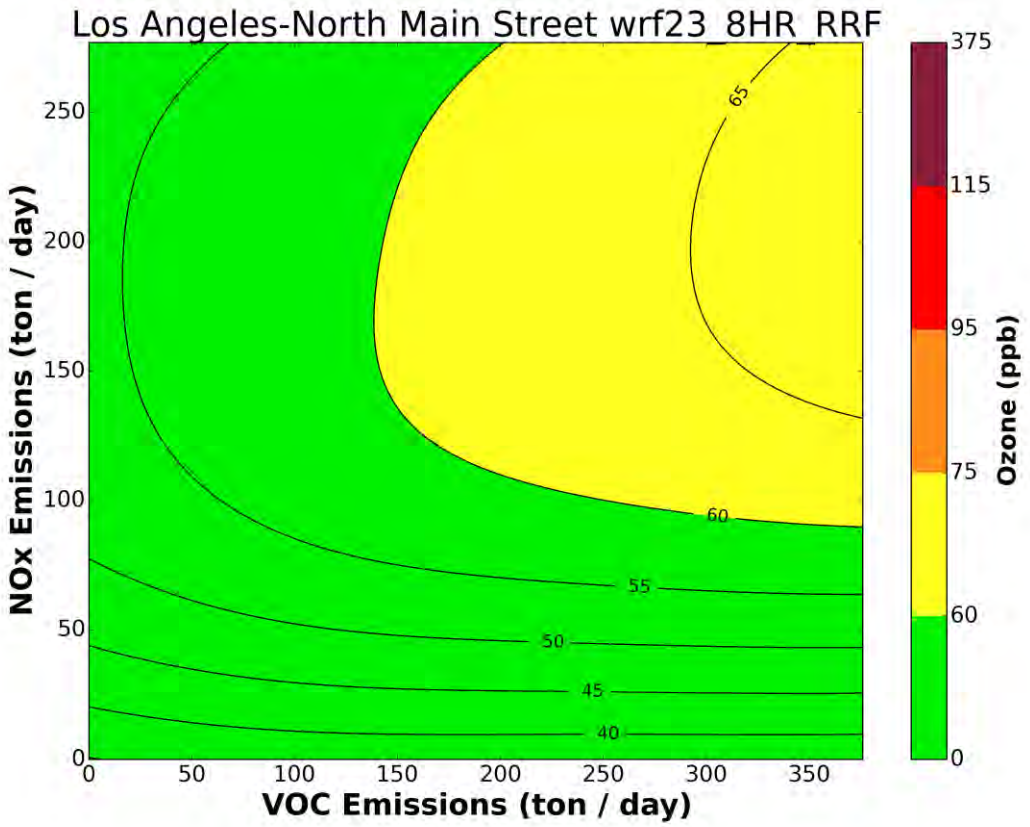
85
80
75
70
65
60
55
50


Los Angeles-North Main Street wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
65
60
55
50
45
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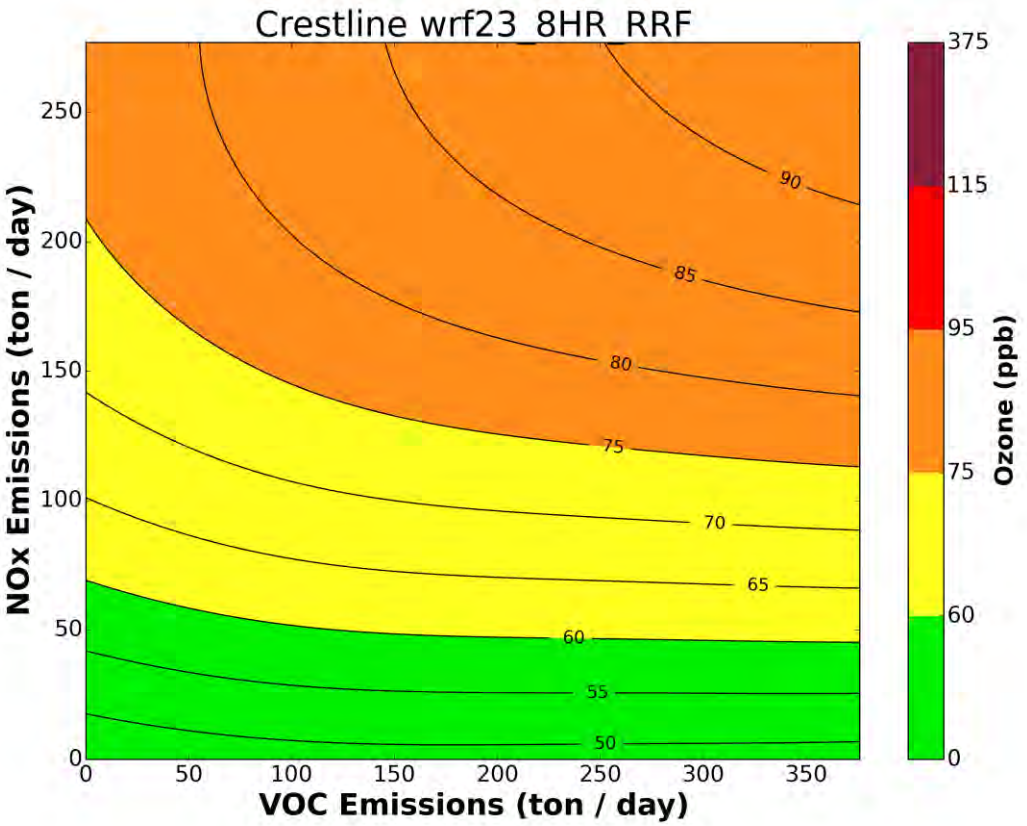
Crestline wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
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85
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75
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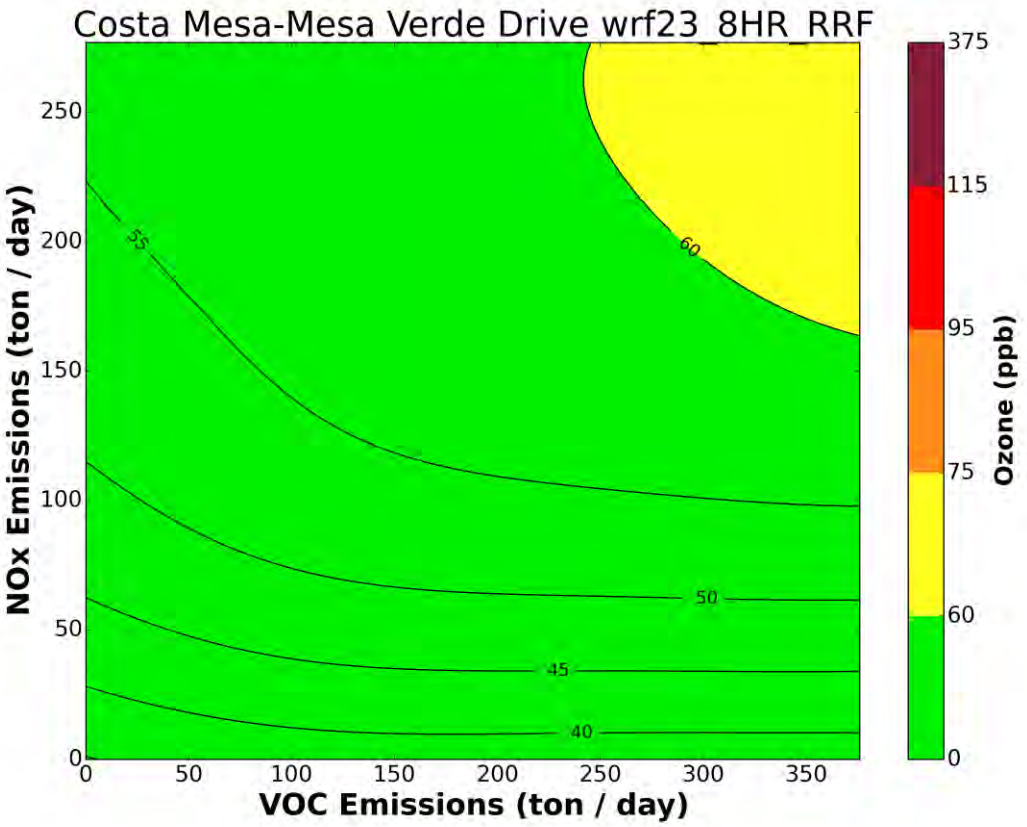
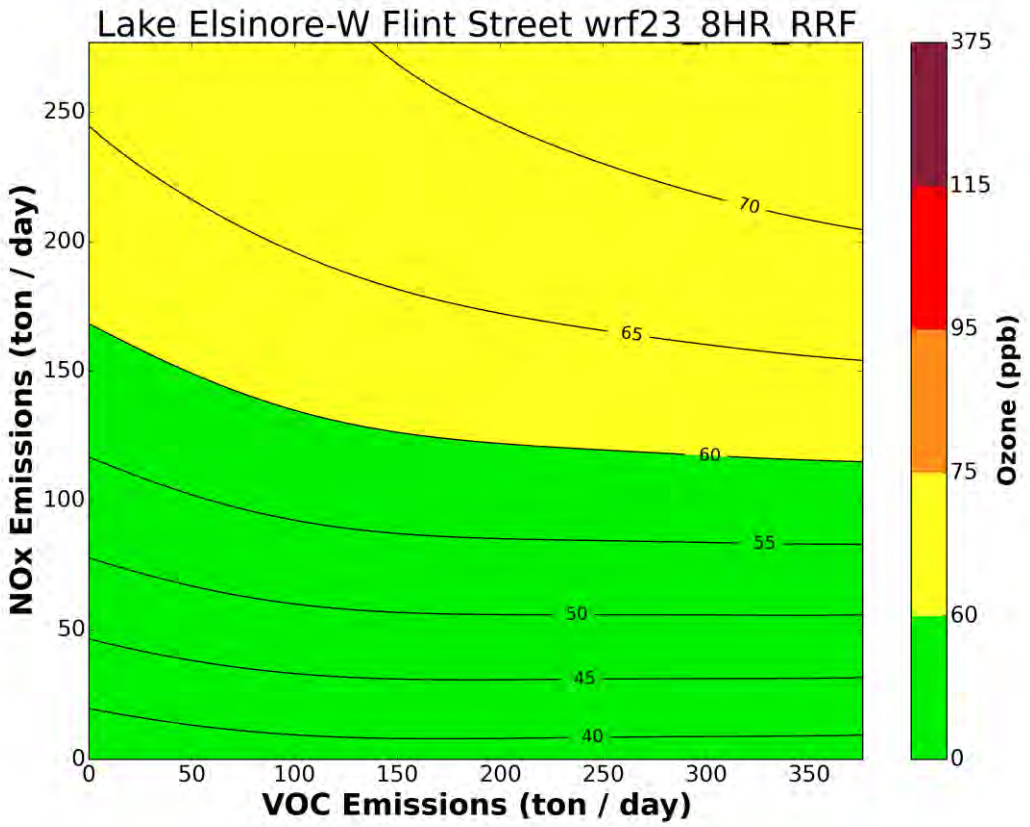
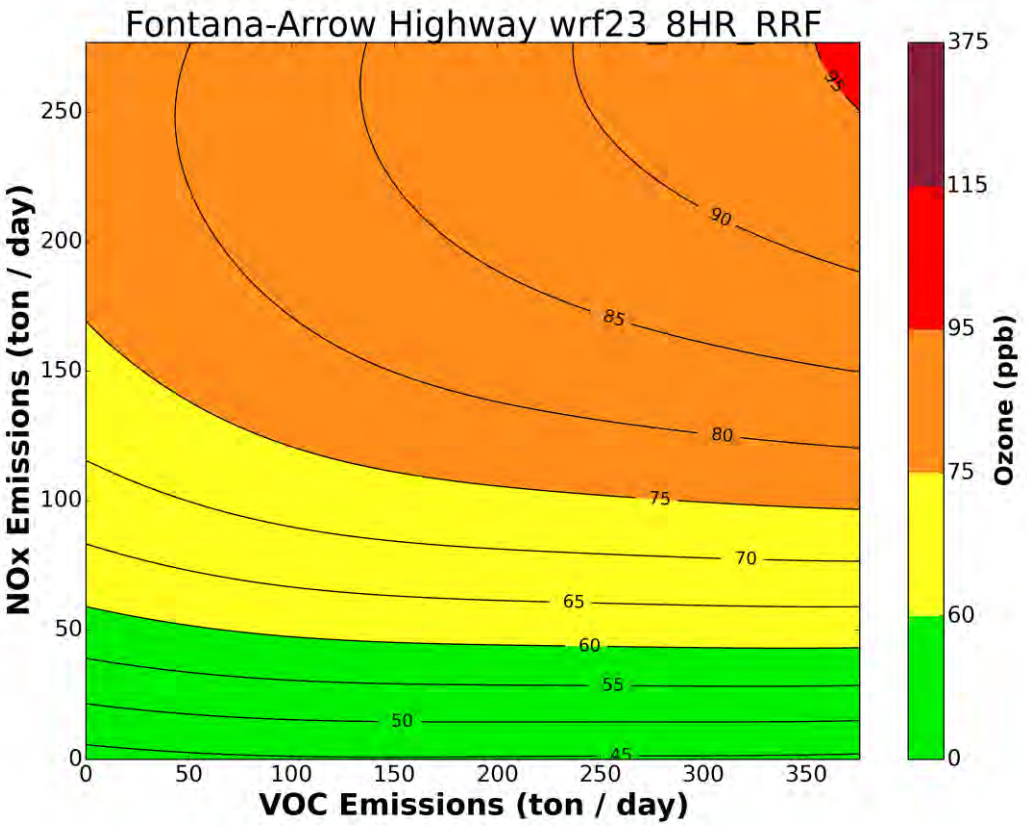
65
60
55
50


Costa Mesa-Mesa Verde Drive wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
55
50
45
40


Lake Elsinore-W Flint Street wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
70
65
60
55
50
45
40
375
115
95
75
60
0


Fontana-Arrow Highway wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
0
95
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85
80
75
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65
60
55
50
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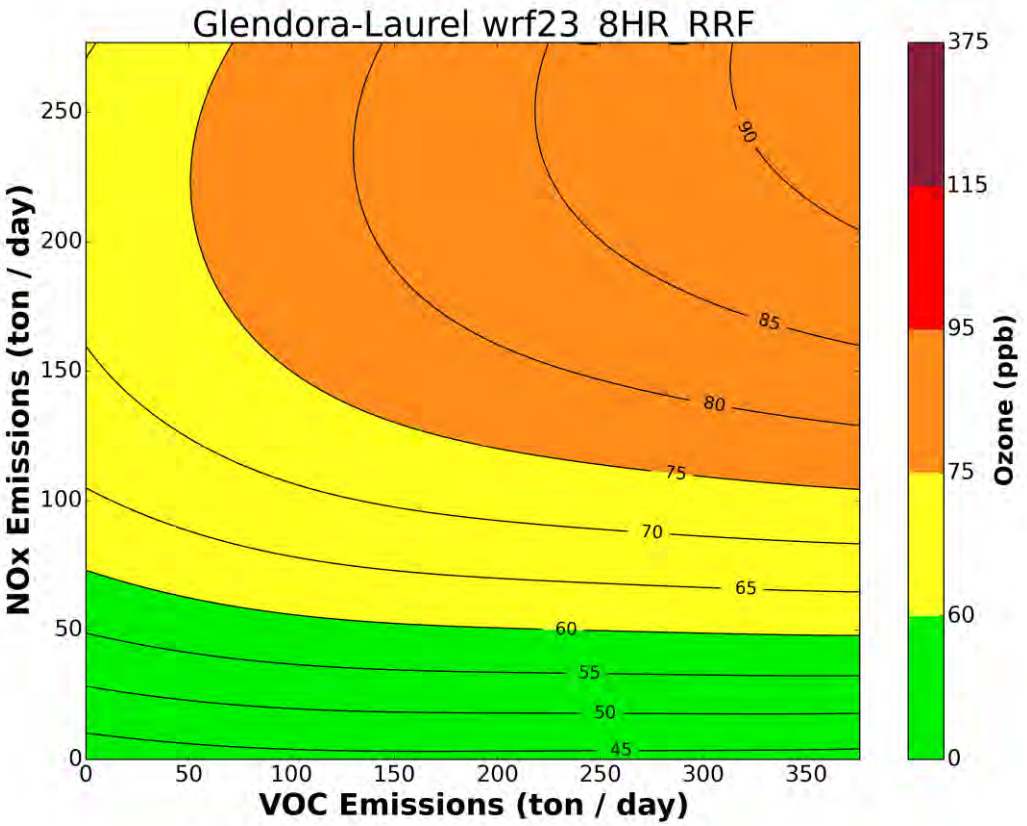
Glendora-Laurel wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
90
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80
75
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60
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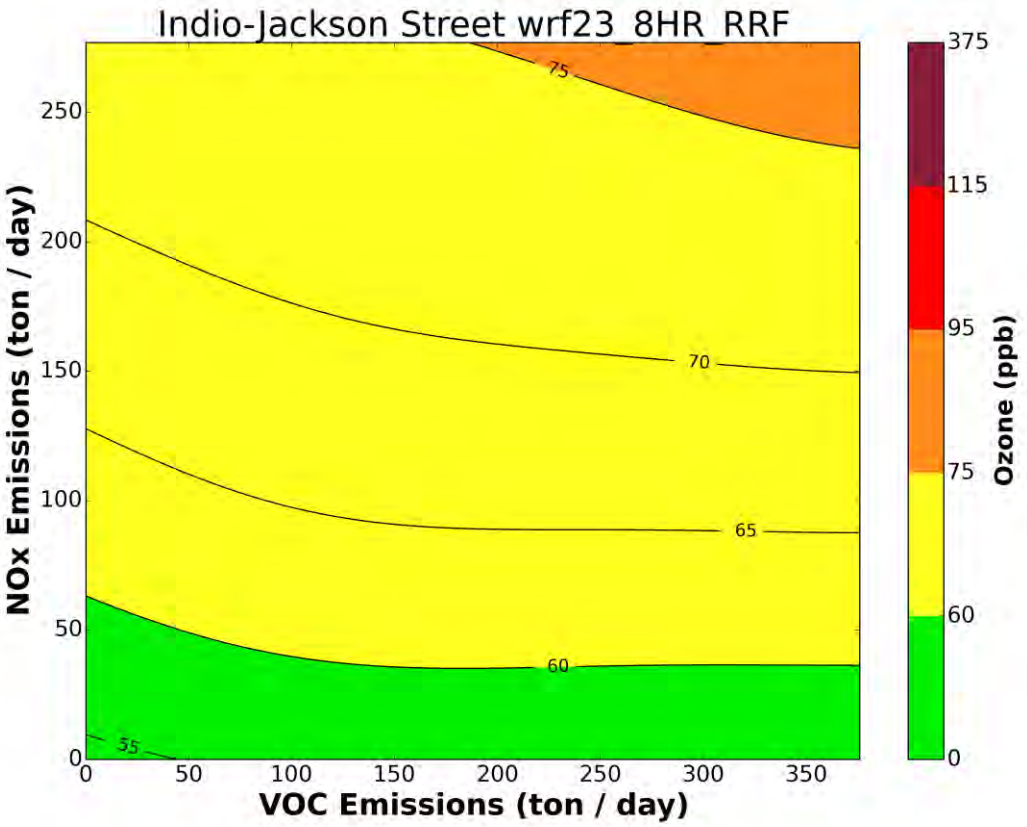
50
45


Indio-Jackson Street wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
0
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60
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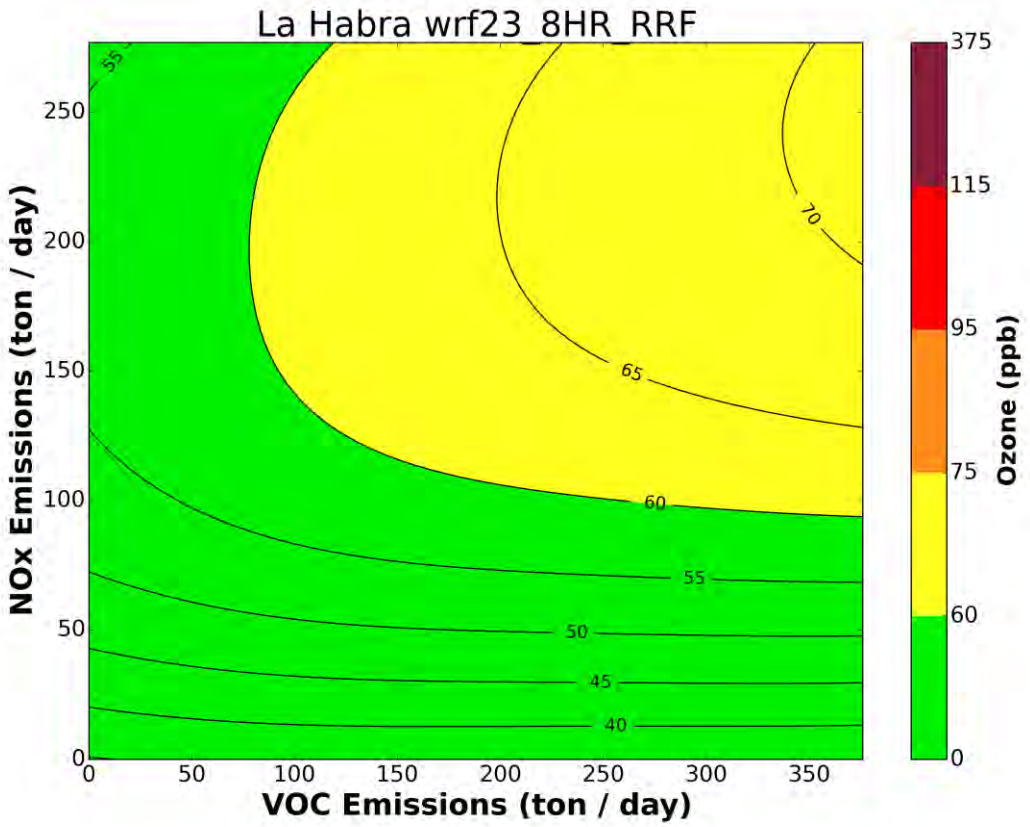
70
75


La Habra wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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100
150
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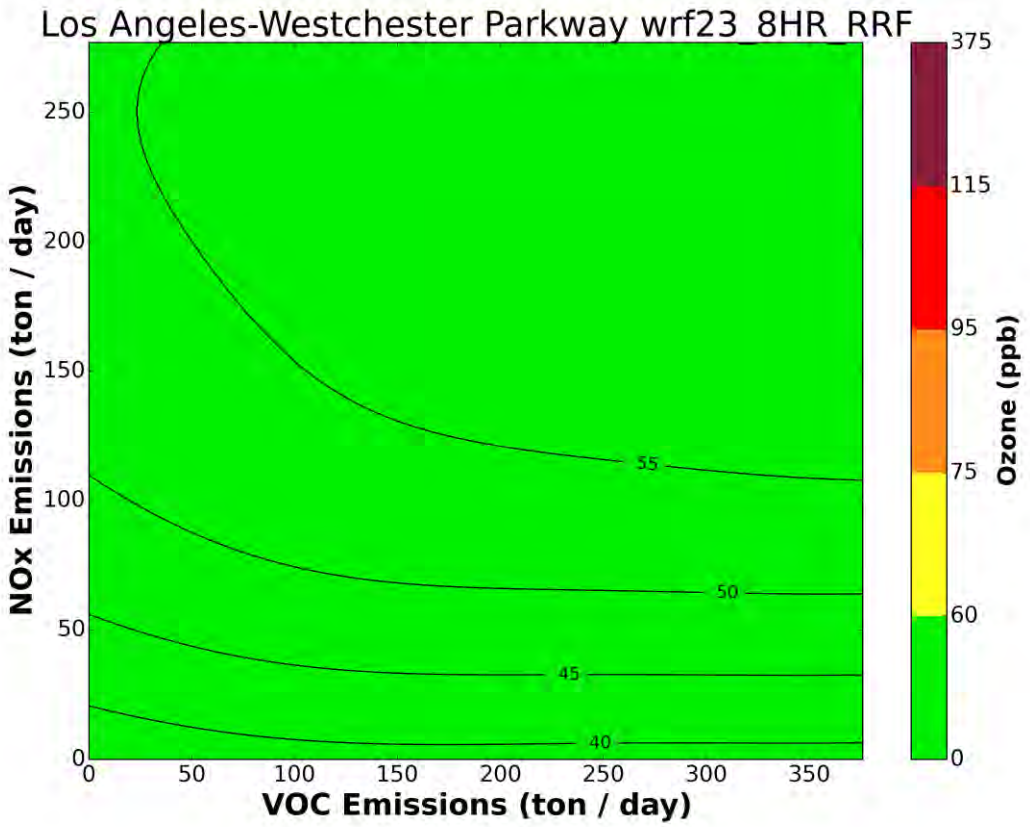
60
55
50
45
40


Los Angeles-Westchester Parkway wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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100
150
200
250
300
350
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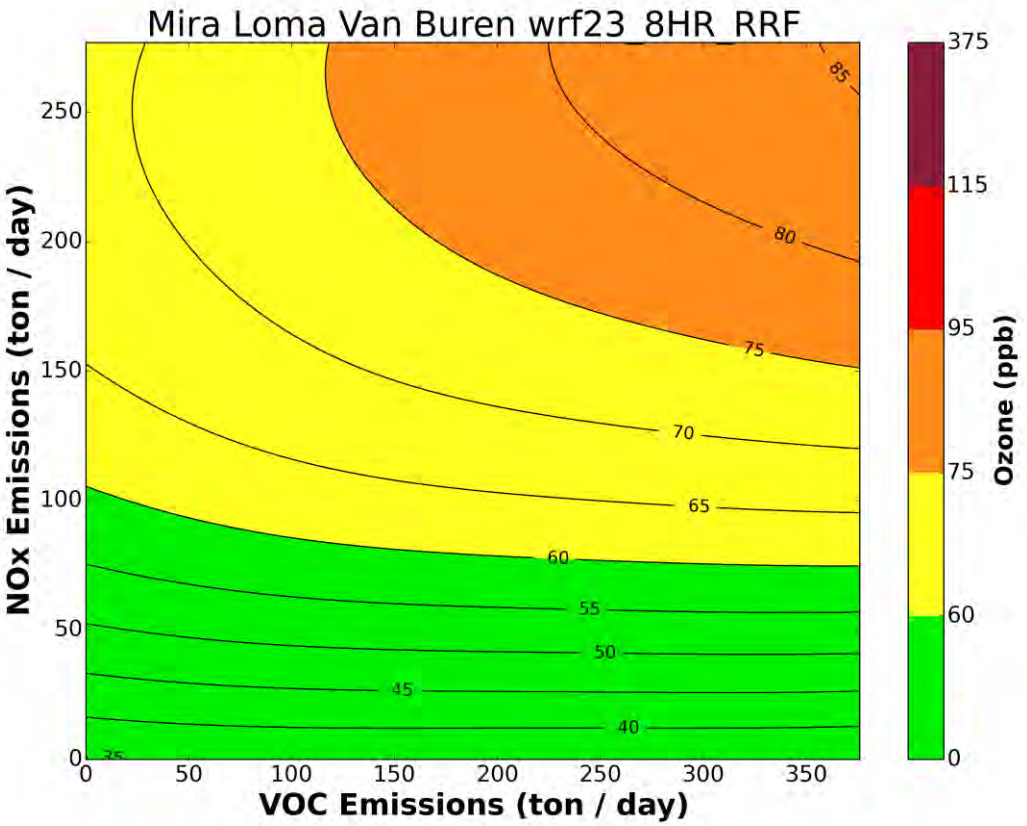
45
40
375
115
95
75
60
0


Mira Loma Van Buren wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
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375
115
95
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60
0
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70
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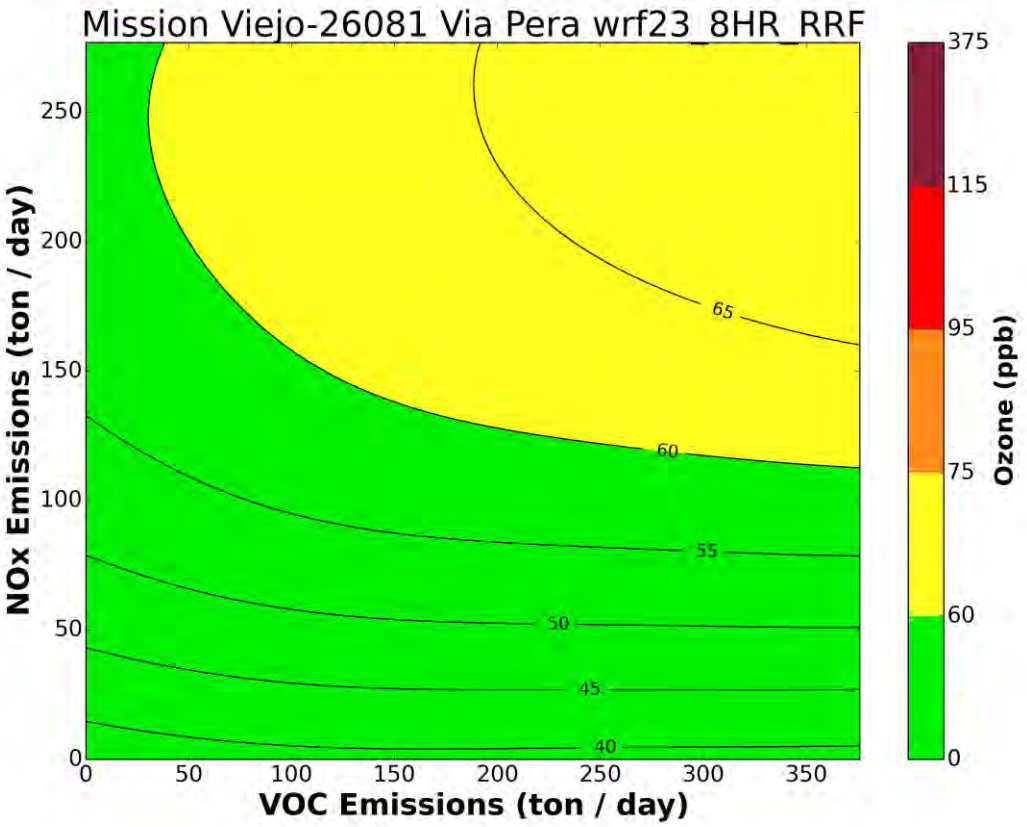
Mission Viejo-26081 Via Pera wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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50
45
40
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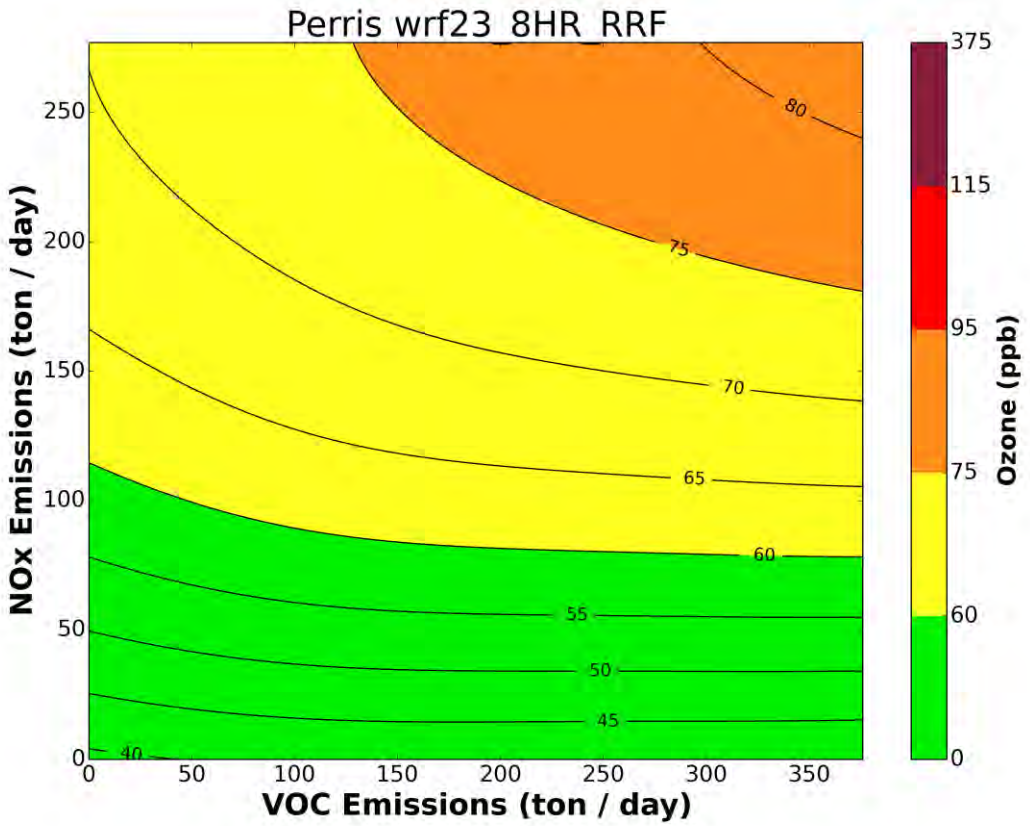
100
150
200
250
300
350
375
115
95
75
60
0


Perris wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
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95
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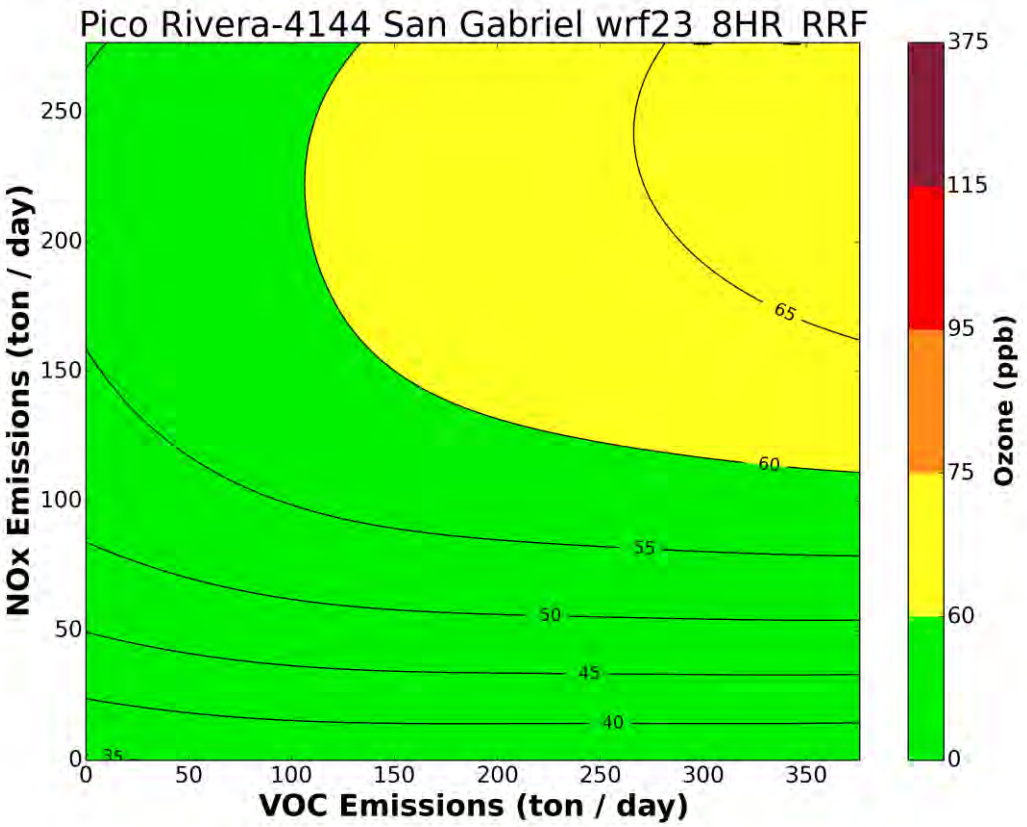
Pico Rivera-4144 San Gabriel wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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100
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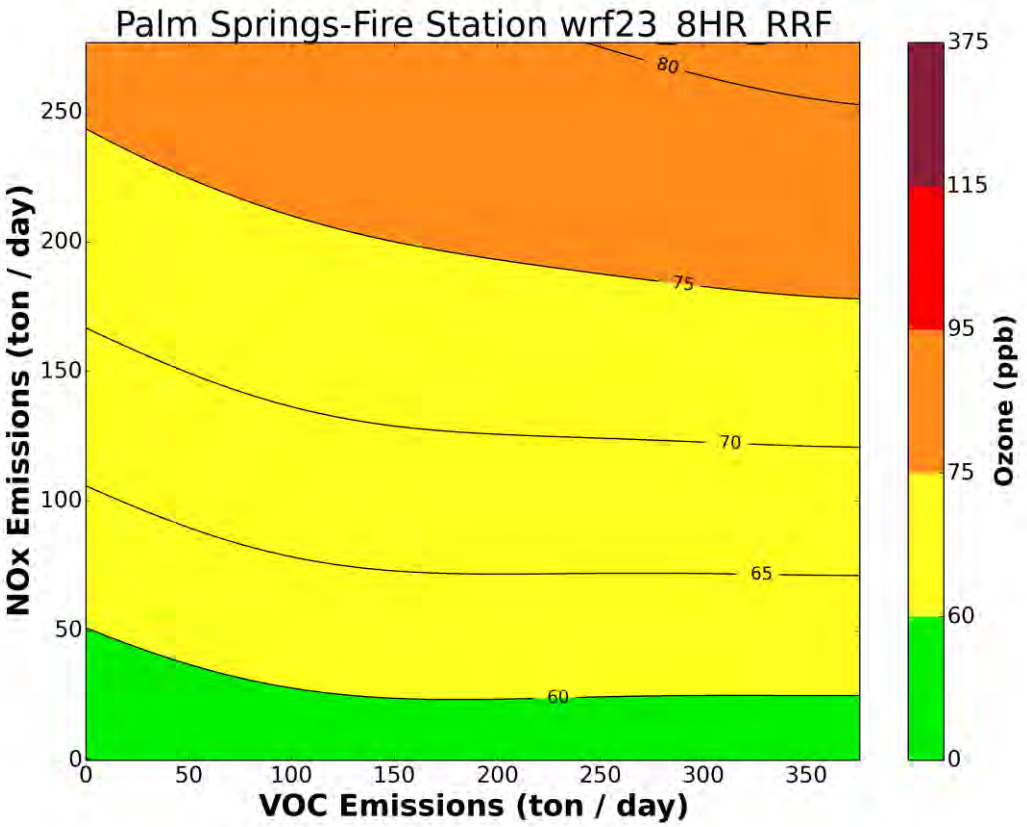
Palm Springs-Fire Station wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
80
75
70
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60
0
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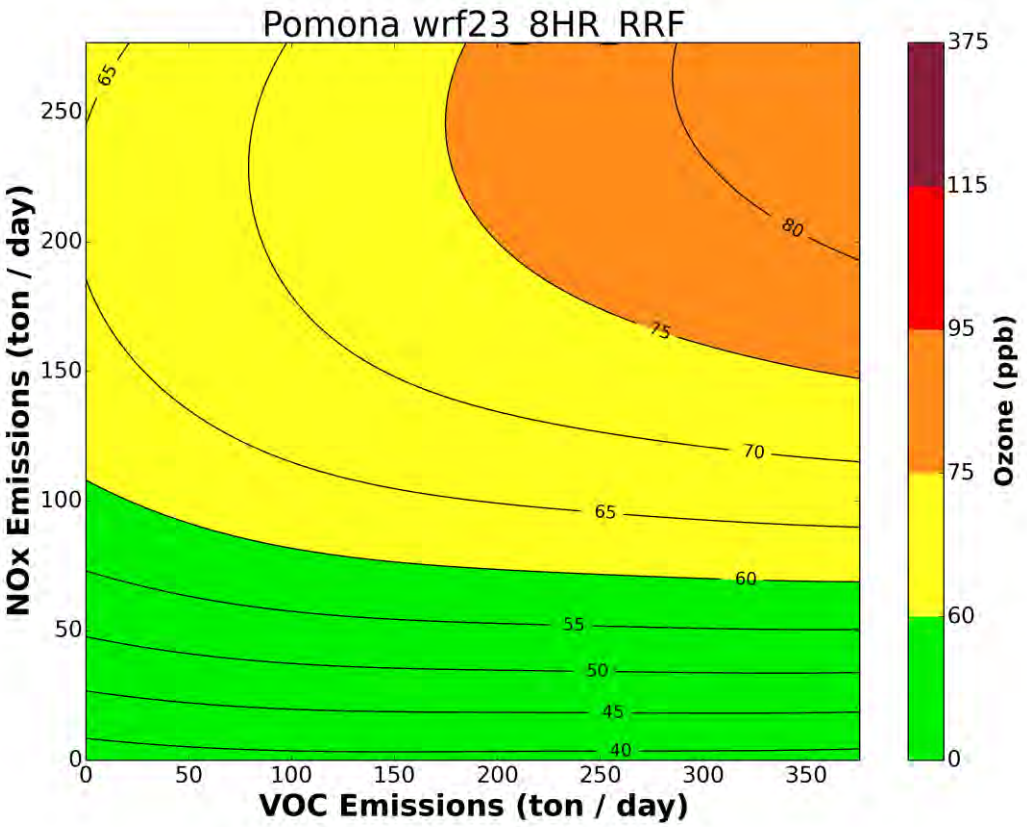
375
115
95


Pomona wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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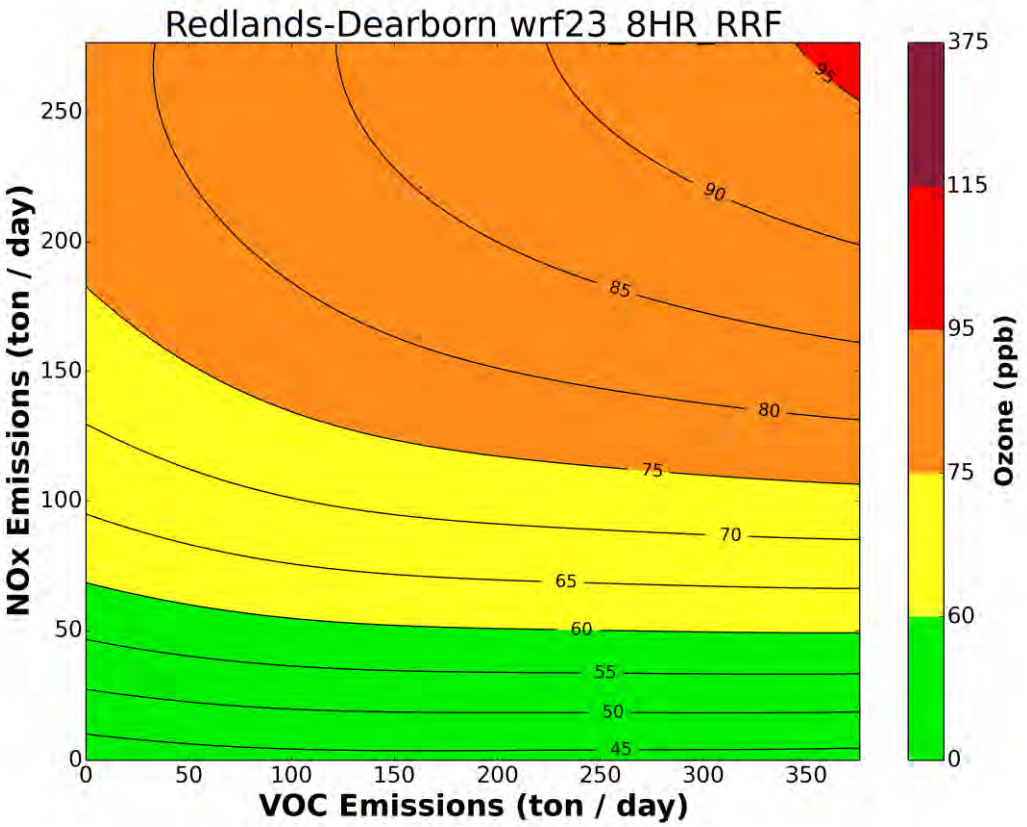
Redlands-Dearborn wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
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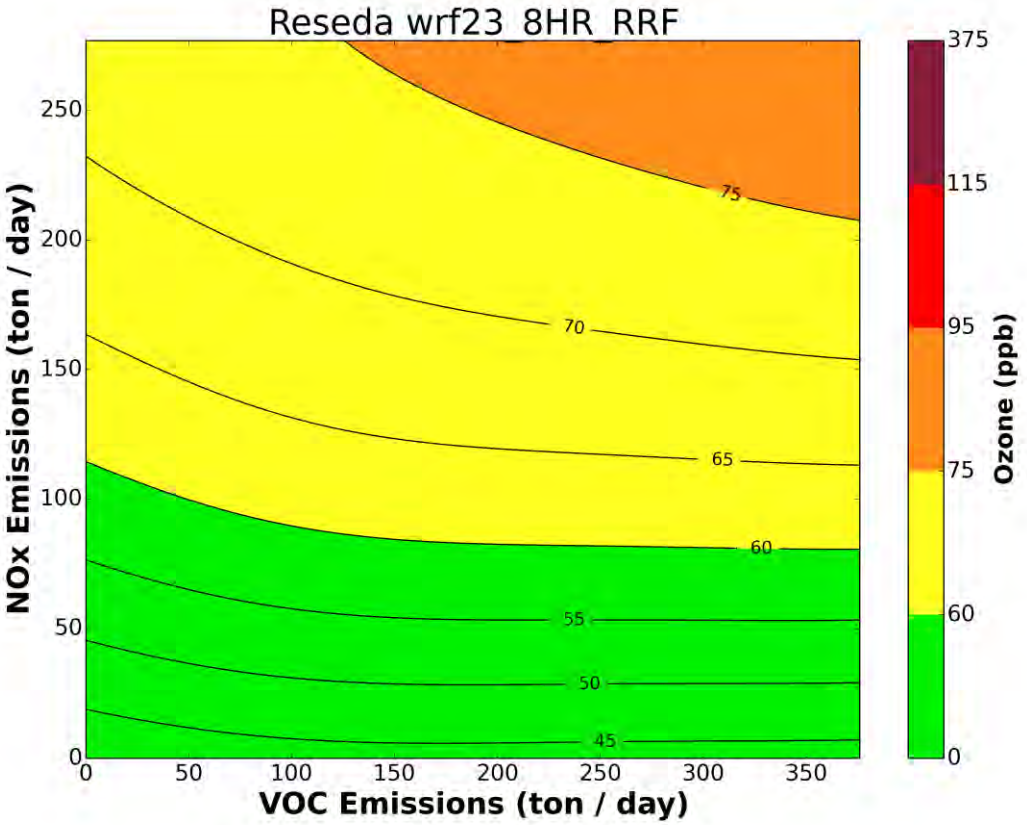
Reseda wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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375
115
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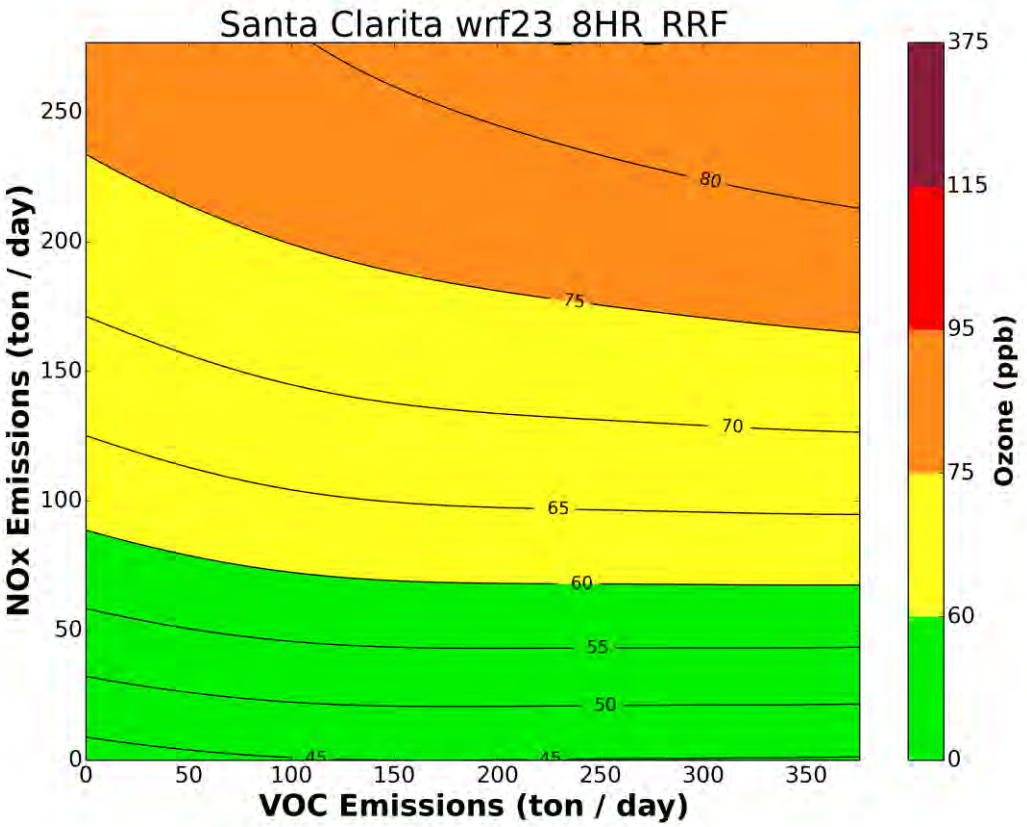
Santa Clarita wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
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115
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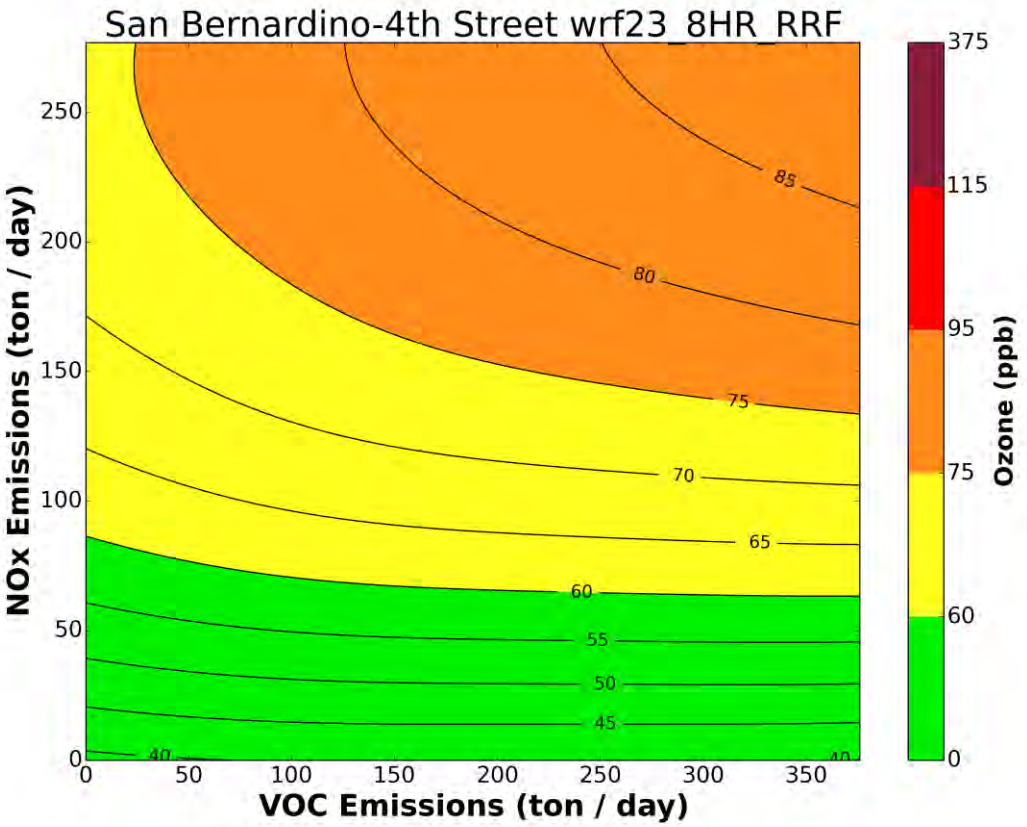
San Bernardino-4th Street wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
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375
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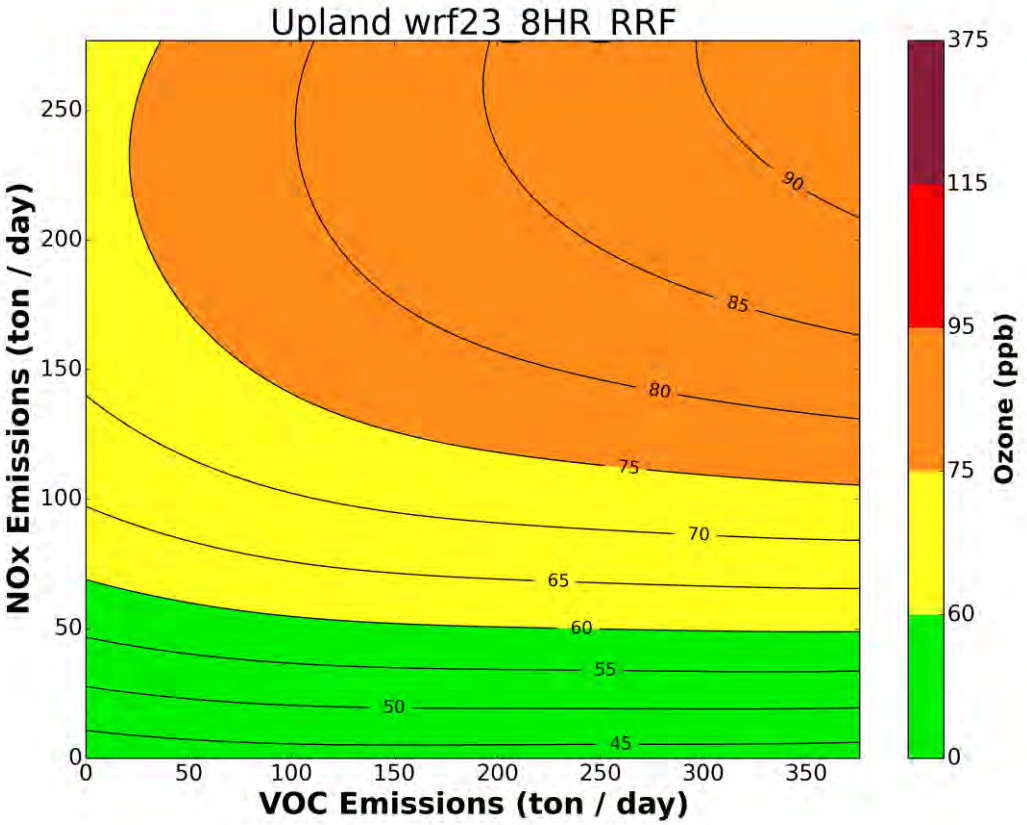
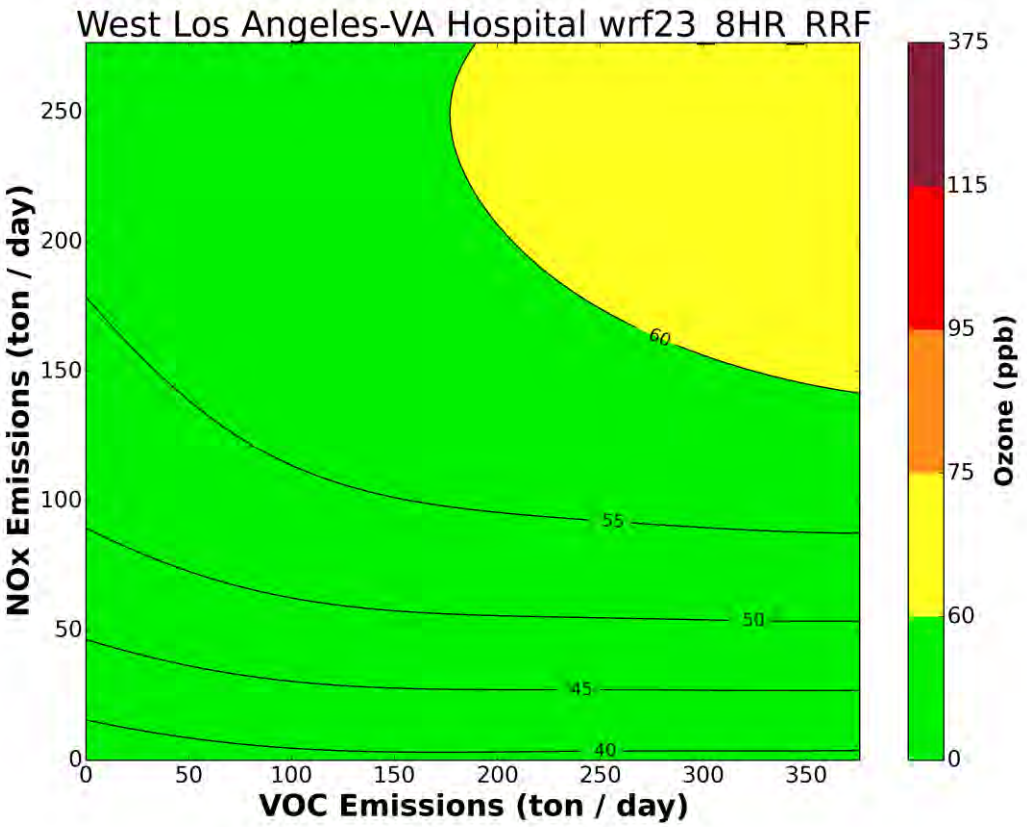
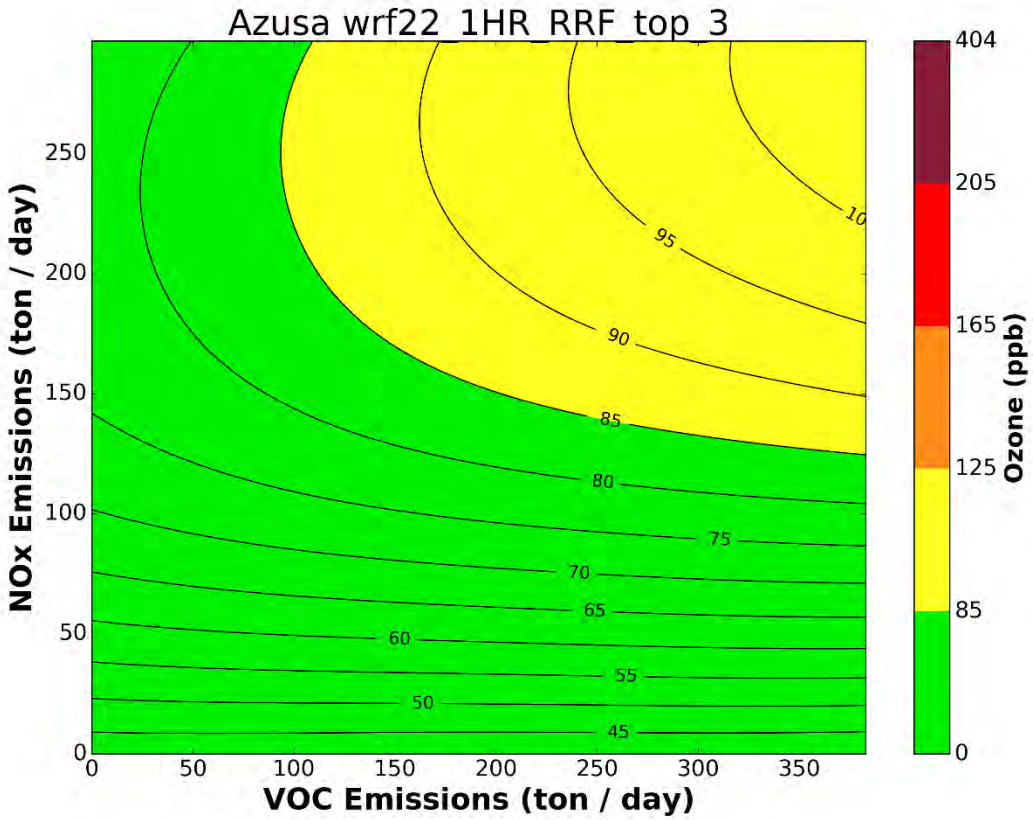
45
40

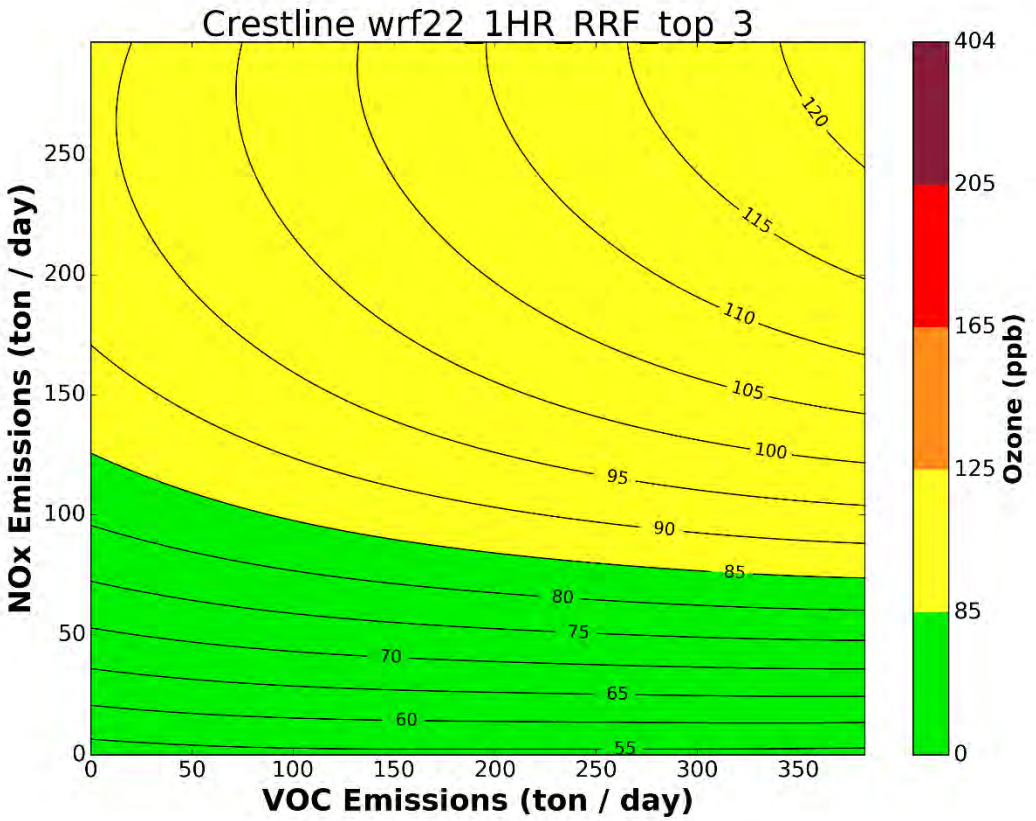

Upland wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
0
90
85
80
75
70
65
60
55
50
45


West Los Angeles-VA Hospital wrf23_8HR_RRF
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
375
115
95
75
60
55
50
45
40

Attachment 6

2022 1-Hour Ozone Isopleths


Azusa wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
95
90
85
80
75
70
65
60
55
50
45


Crestline wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
120
115
110
105
100
95
90
85
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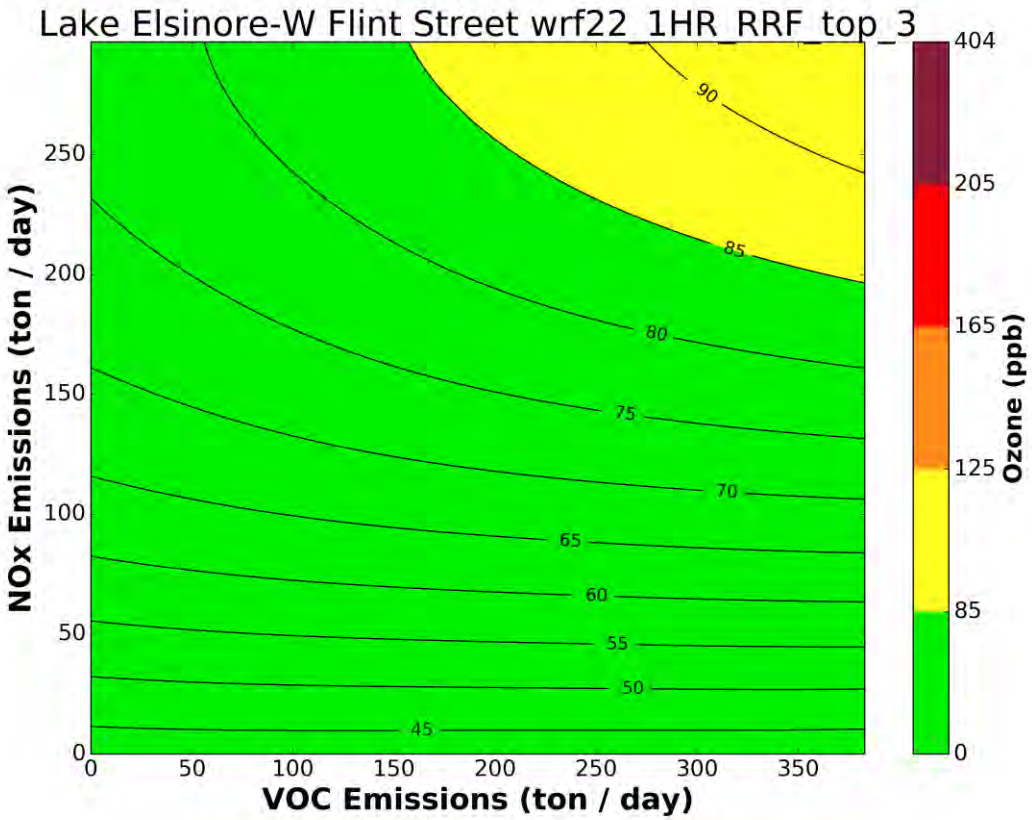
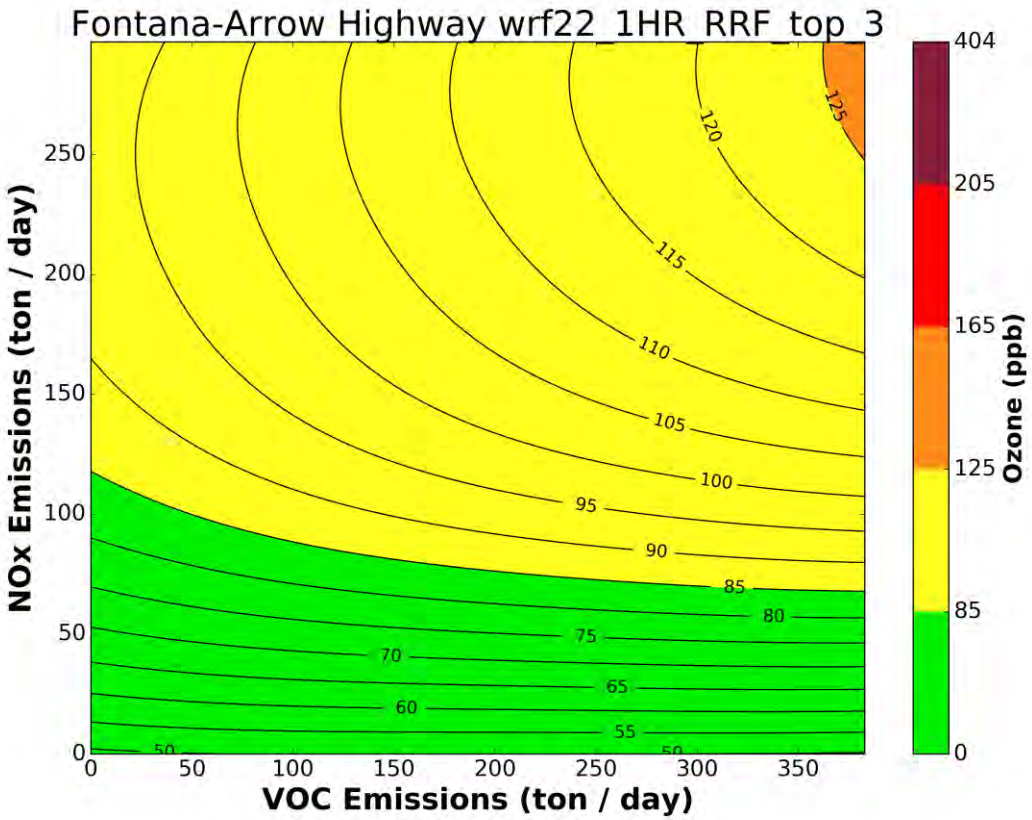
70
65
60
55


Lake Elsinore-W Flint Street wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
90
85
80
75
70
65
60
55
50
45


Fontana-Arrow Highway wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
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150
200
250
300
350
404
205
165
125
85
0
125
120
115
110
105
100
95
90
85
80
75
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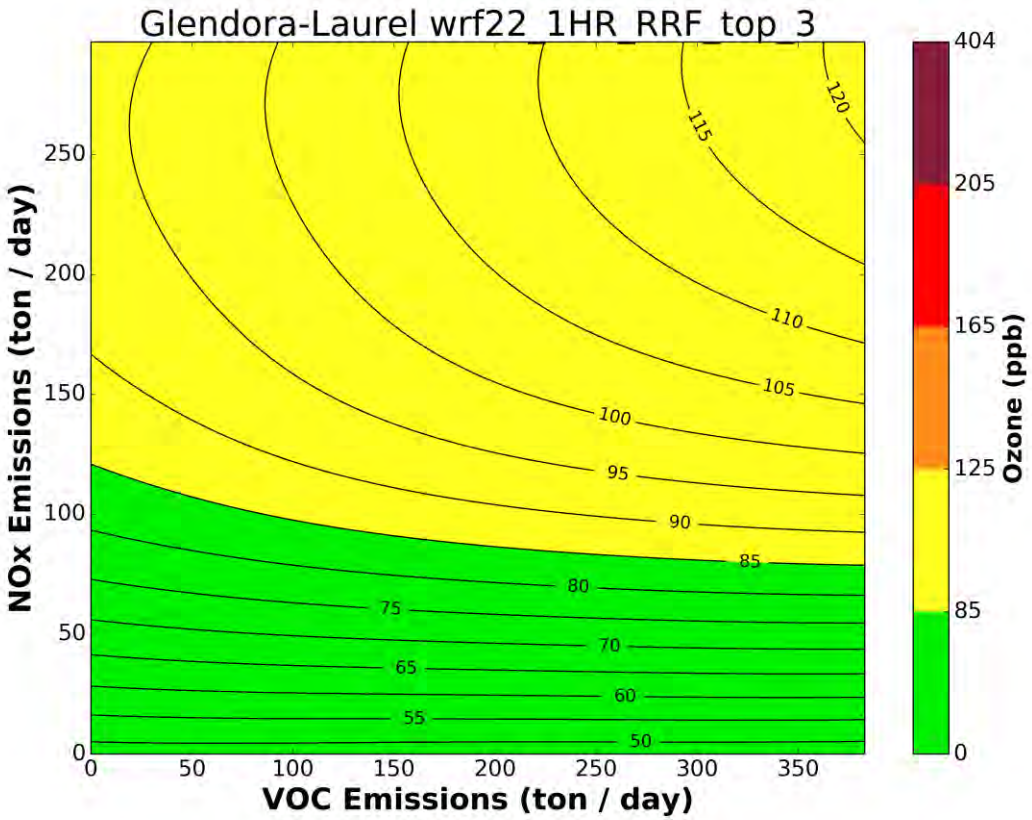
65
60
55
50


Glendora-Laurel wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
120
115
110
105
100
95
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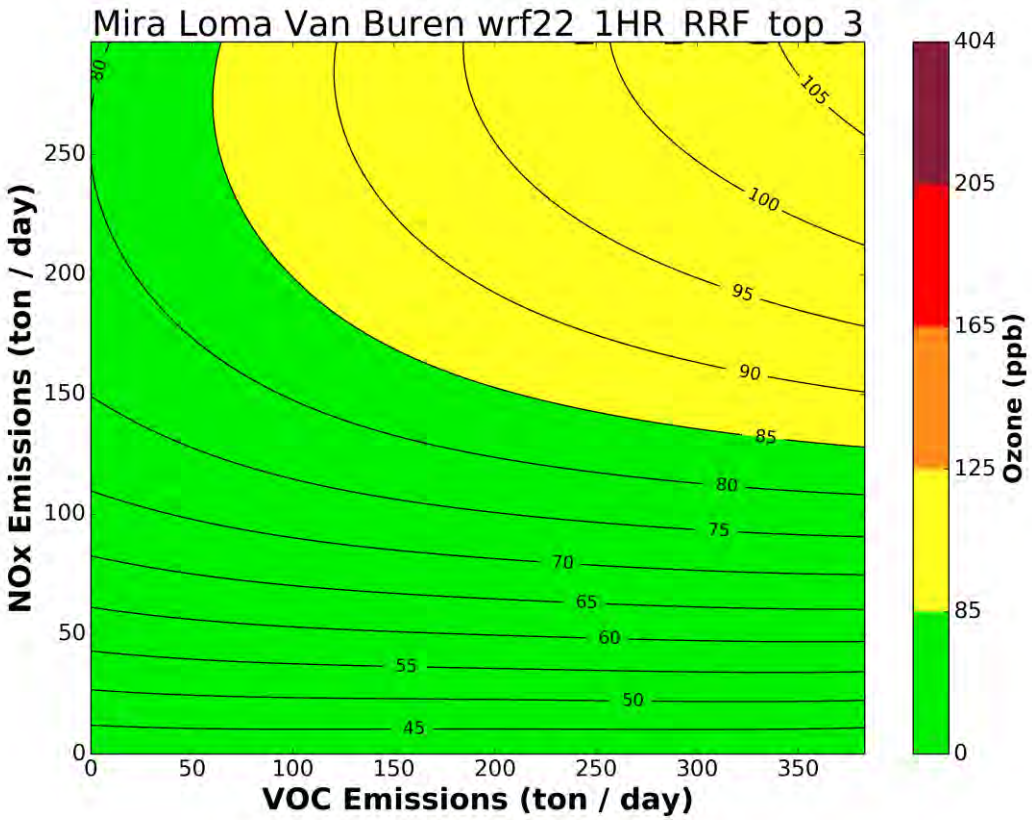
85
80
75
70
65
60
55
50


Mira Loma Van Buren wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
80
105
100
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90
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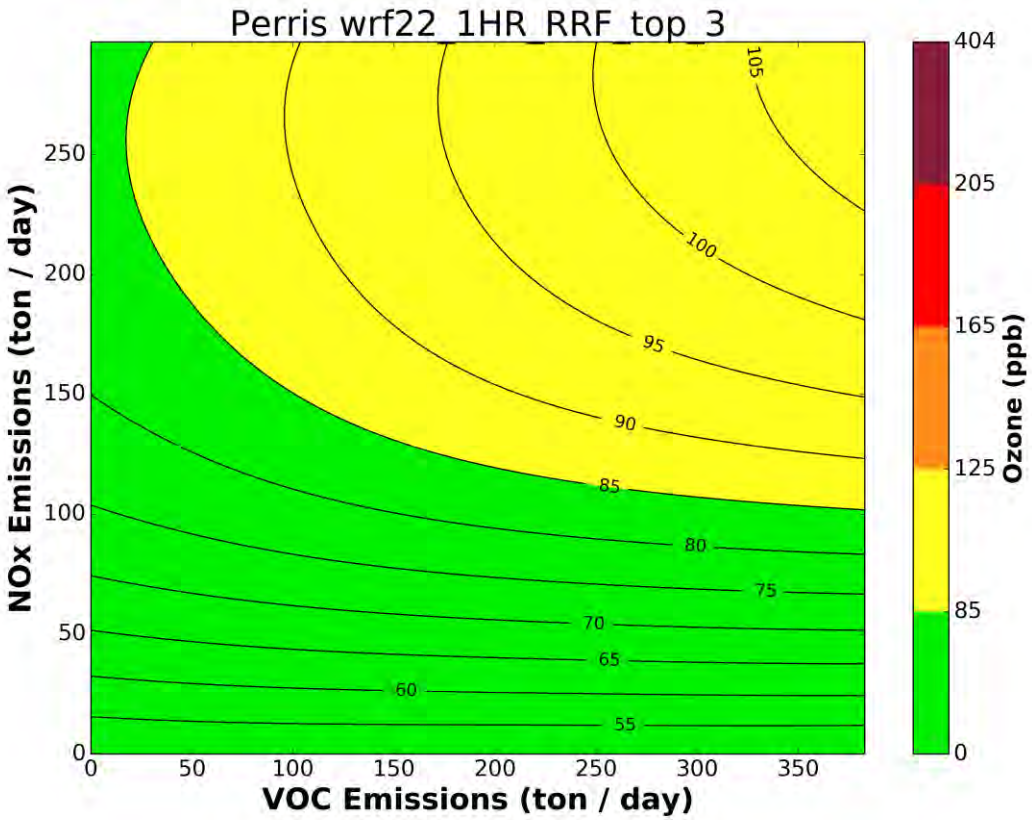
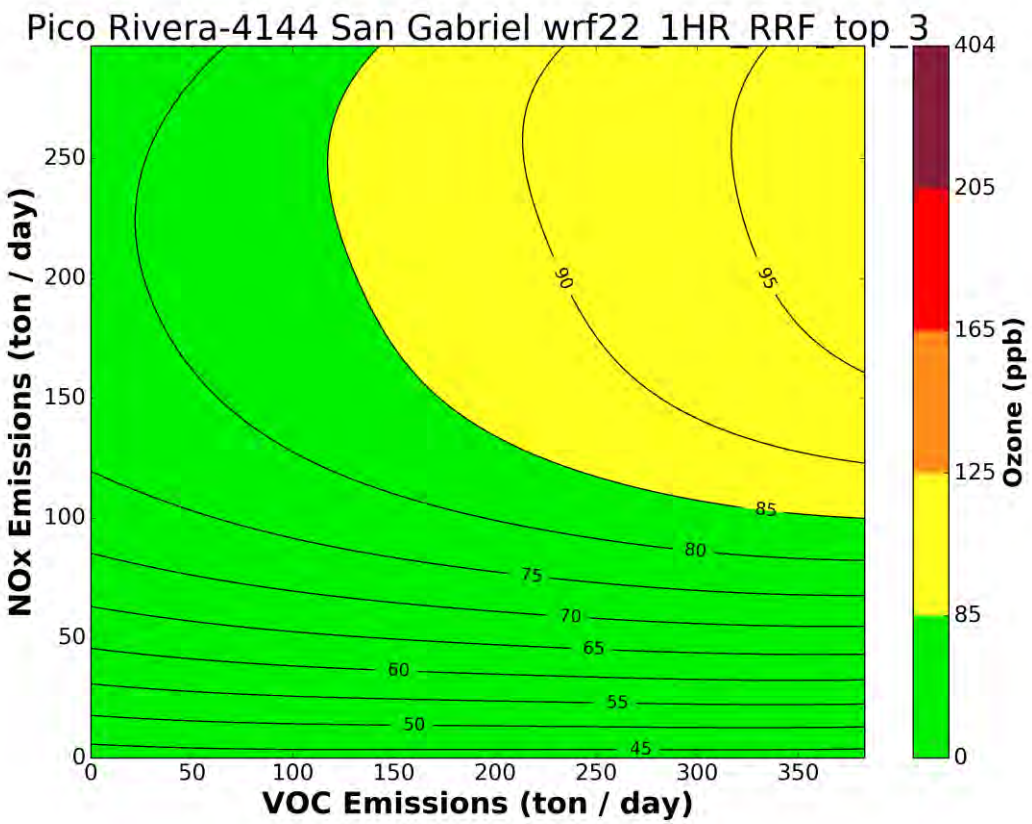
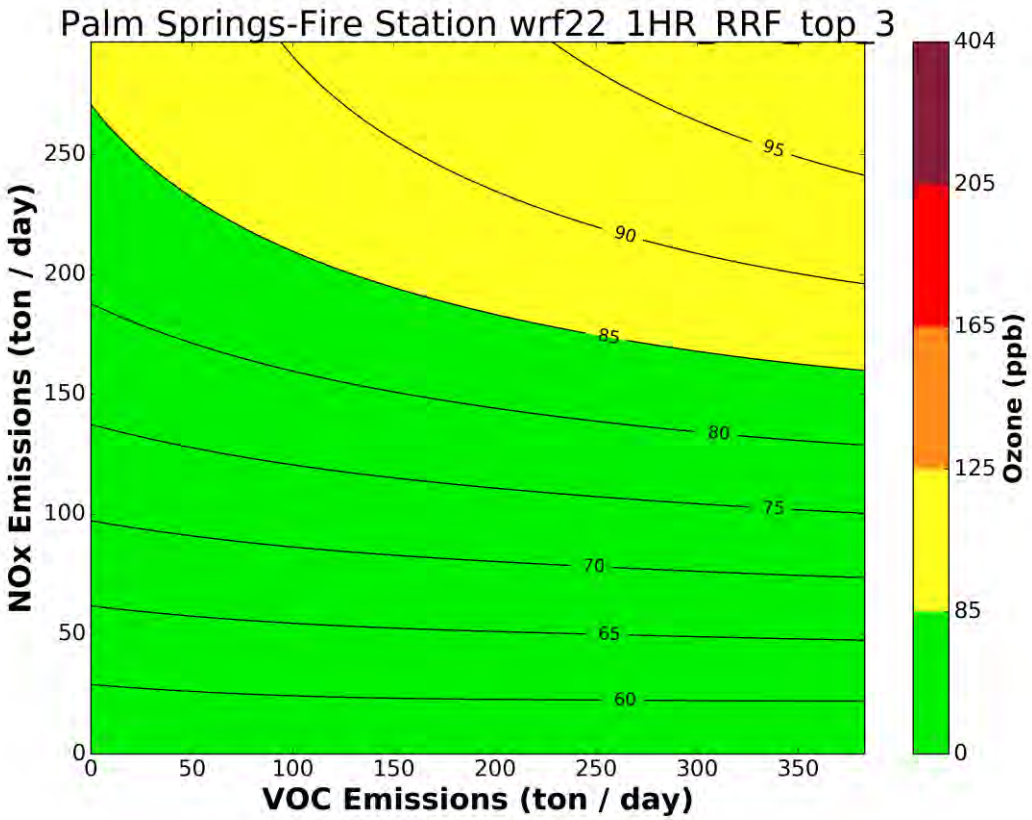
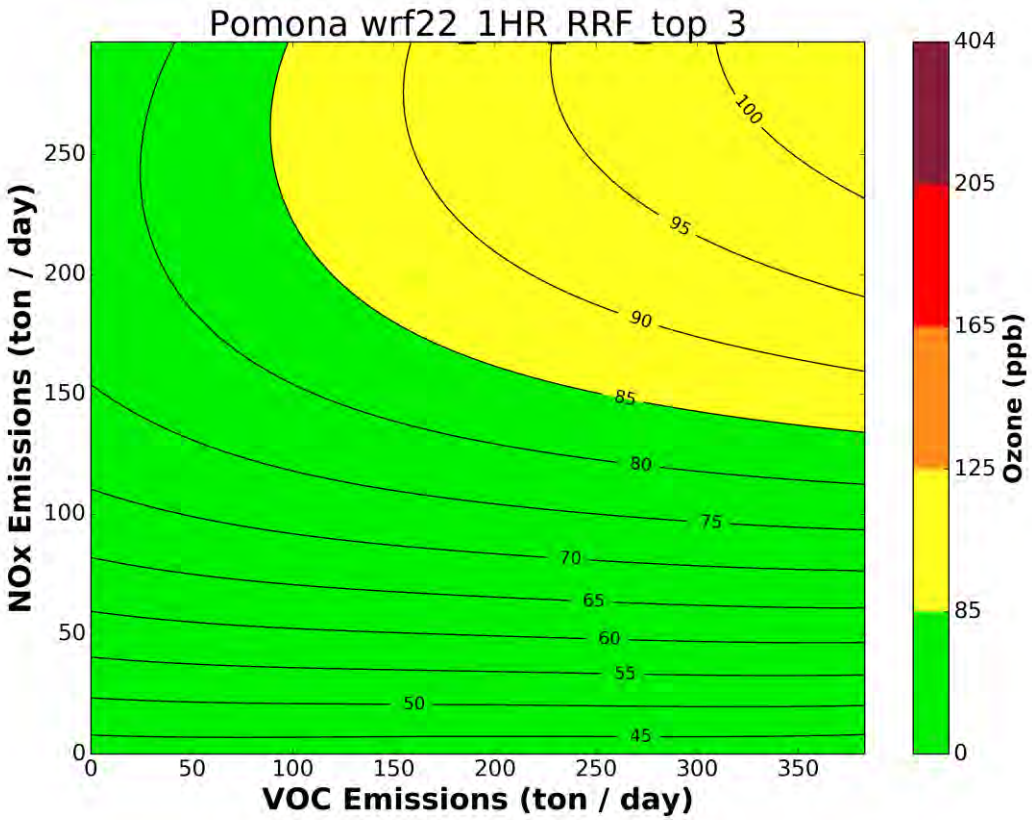
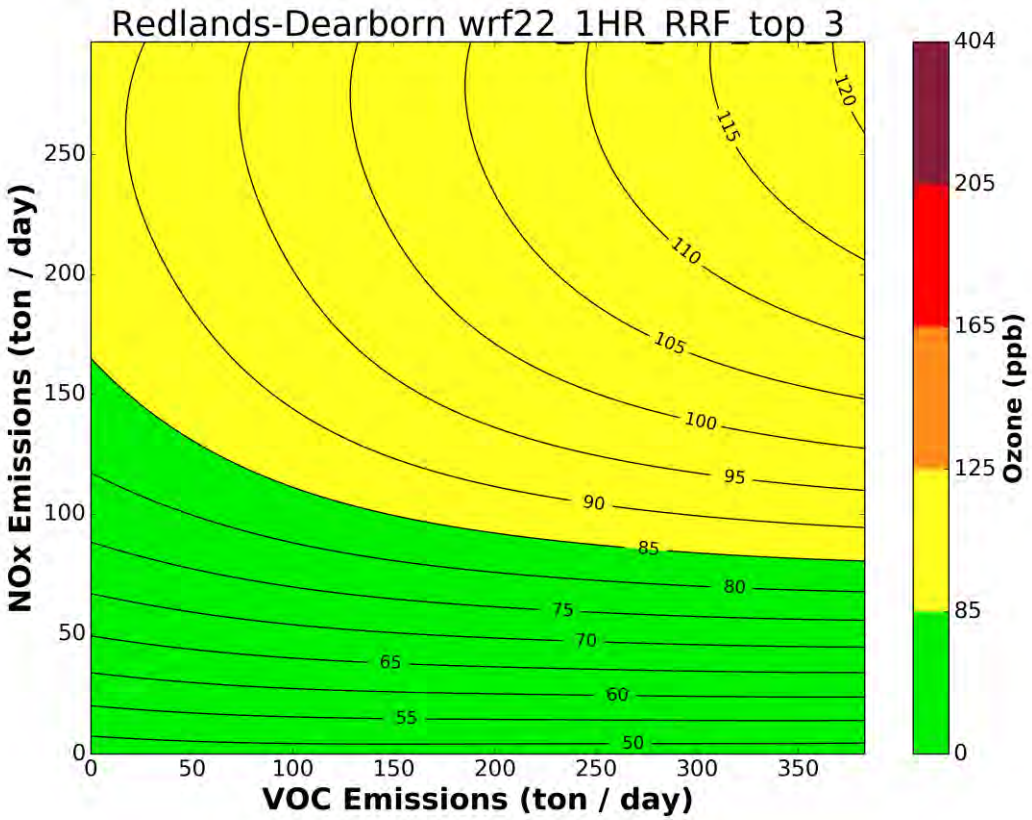
80
75
70
65
60
55
50
45

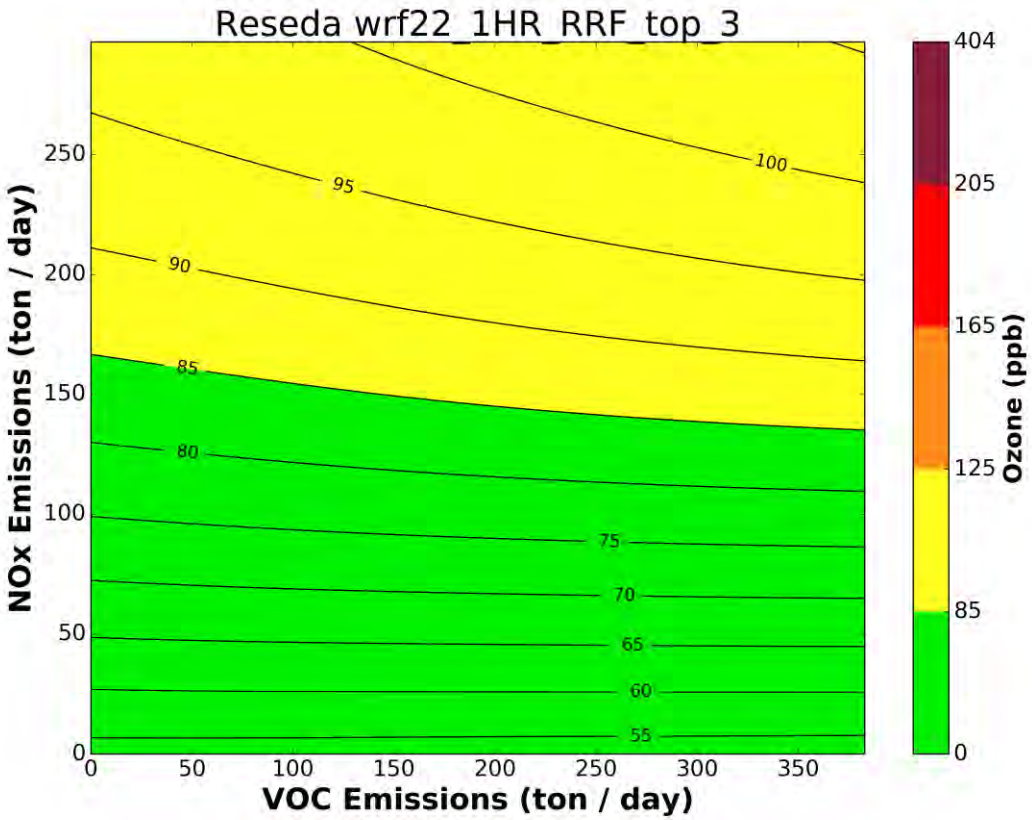

Perris wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
105
100
95
90
85
80
75
70
65
60
55

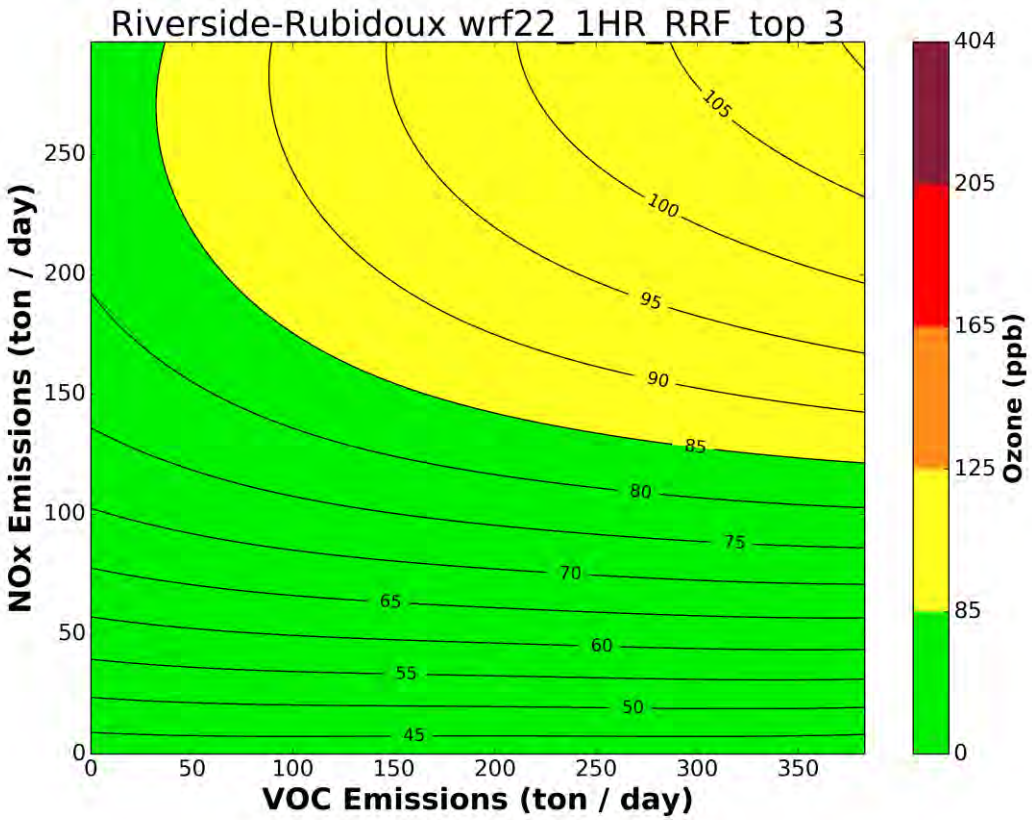

Pico Rivera-4144 San Gabriel wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
90
95
85
80
75
70
65
60
55
50
45

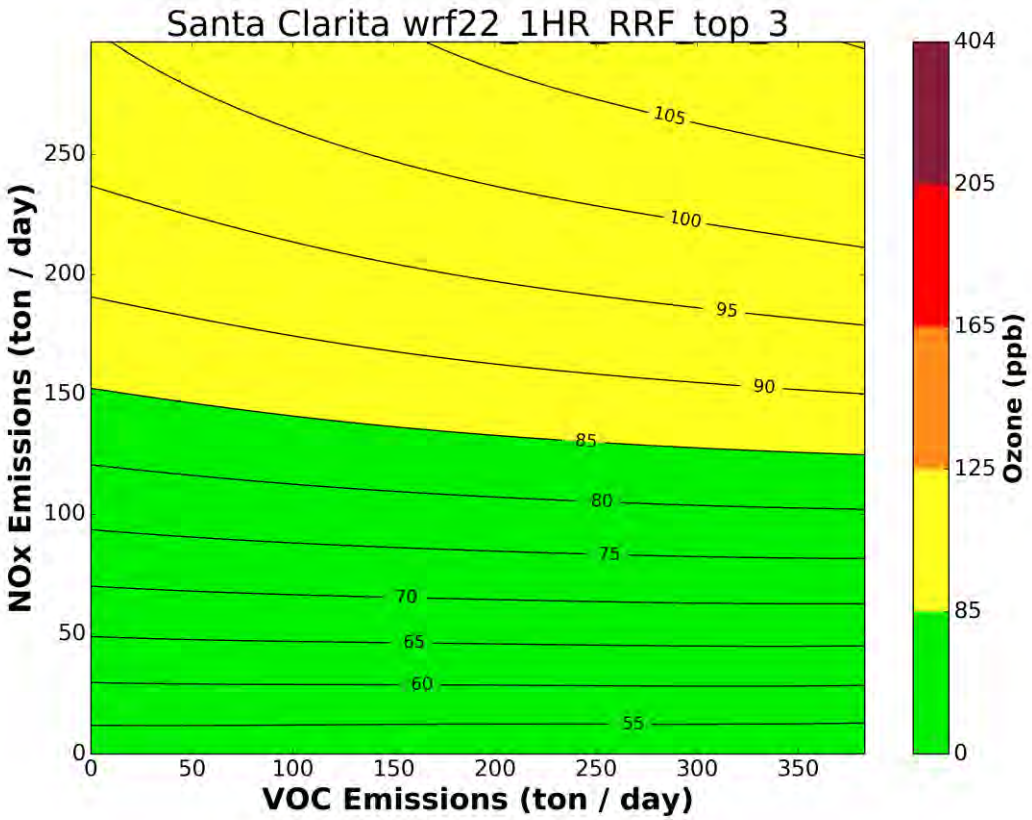

Palm Springs-Fire Station wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
95
90
85
80
75
70
65
60
404
205
165
125
85
0


Pomona wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
100
95
90
85
80
75
70
65
60
55
50
45


Redlands-Dearborn wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50


Reseda wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
100
95
90
85
80
75
70
65
60
55


Riverside-Rubidoux wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
105
100
95
90
85
80
75
70
65
60
55
50
45
404
205
165
125
85
0


Santa Clarita wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
105
100
95
90
85
80
75
70
65
60
55
0
50
100
150
200
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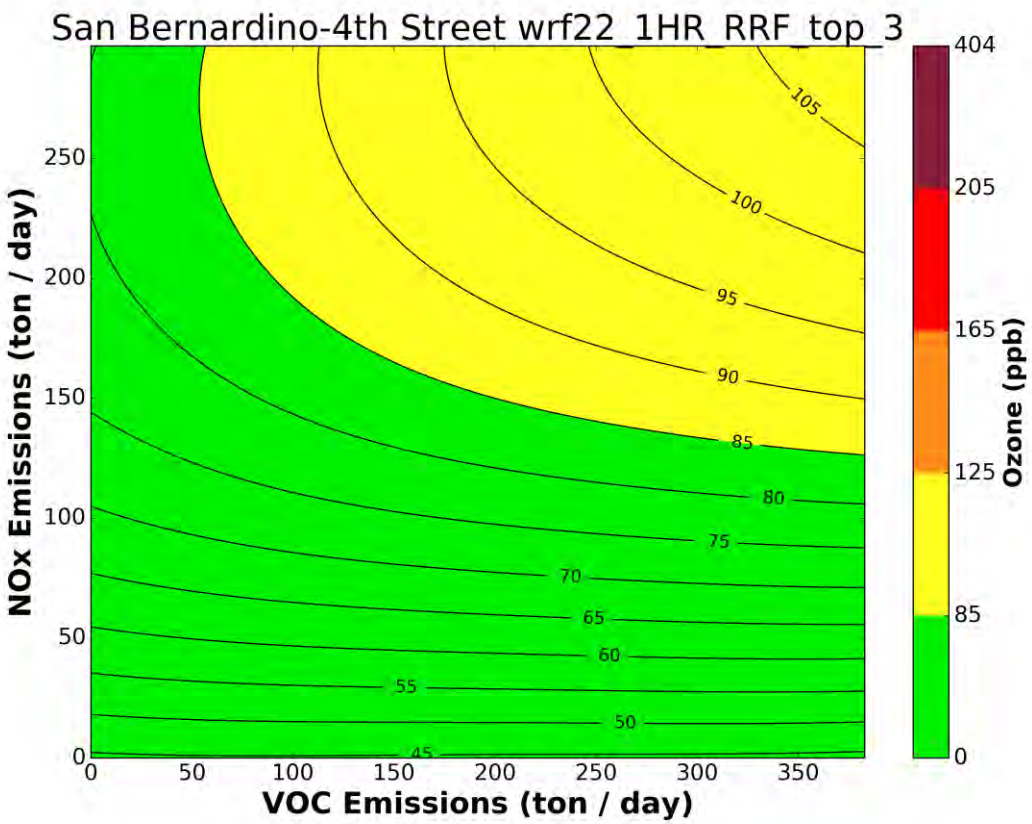
300
350
404
205
165
125
85
0


San Bernardino-4th Street wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
105
100
95
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80
75
70
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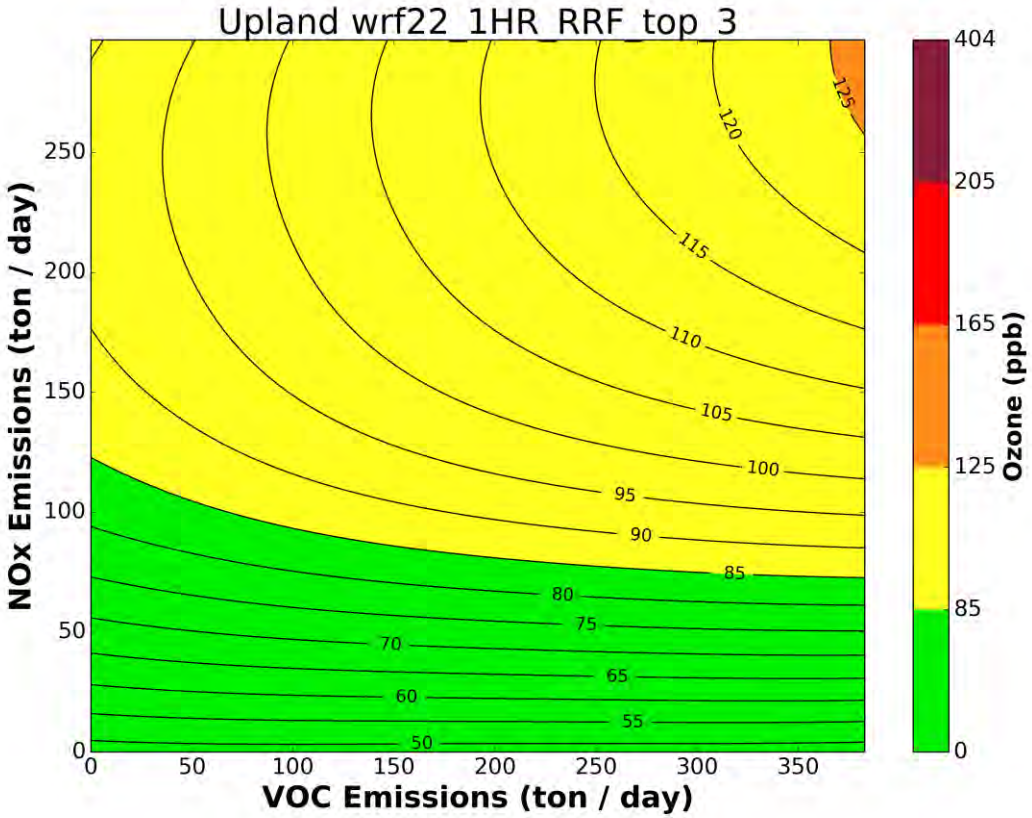
60
55
50
45


Upland wrf22_1HR_RRF_top_3
NOx Emissions (ton / day)
VOC Emissions (ton / day)
Ozone (ppb)
0
50
100
150
200
250
300
350
404
205
165
125
85
0
125
120
115
110
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100
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85
80
75
70
65
60
55
50

Attachment 7

ANNUAL UNMONITORED AREA ANALYSIS SUPPLEMENT

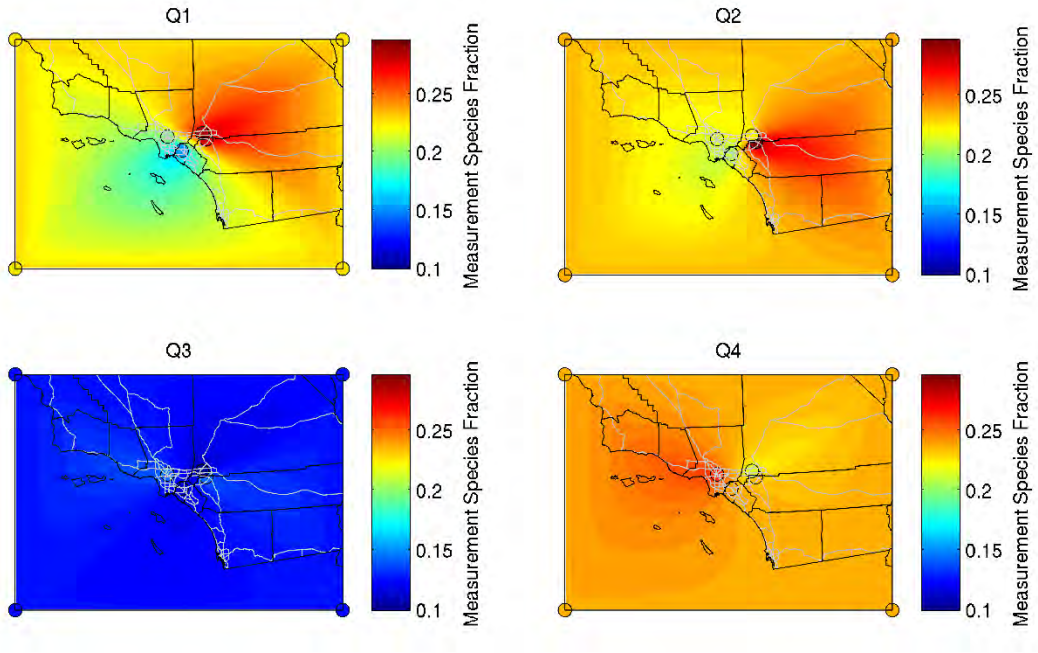

FIGURE 1

2012 Interpolated Measurement Species Fractions for Nitrate. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

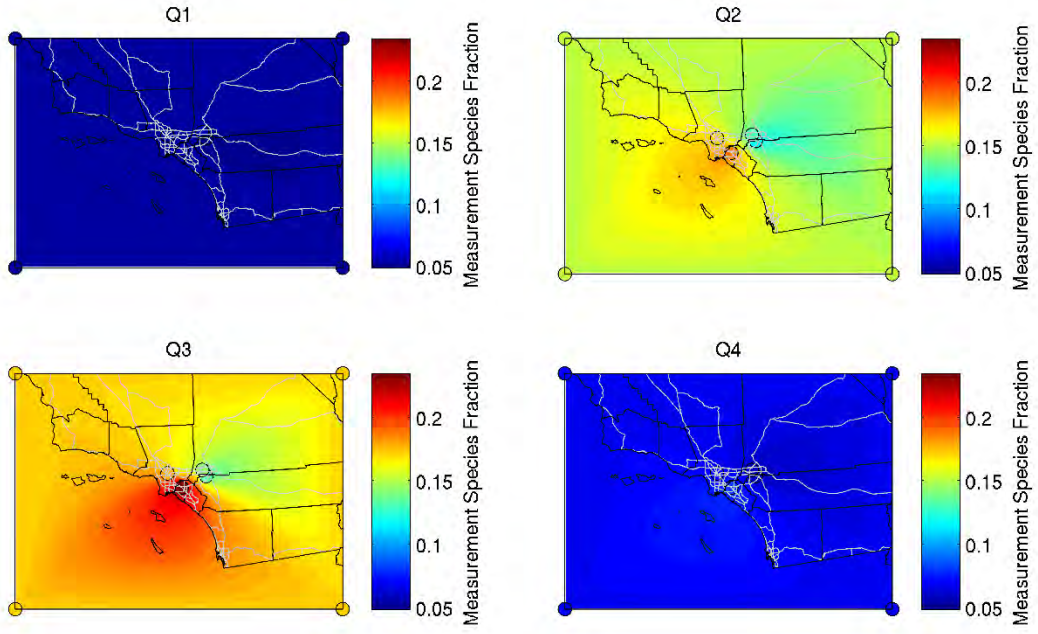

FIGURE 2

2012 Interpolated Measurement Species Fractions for Sulfate. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

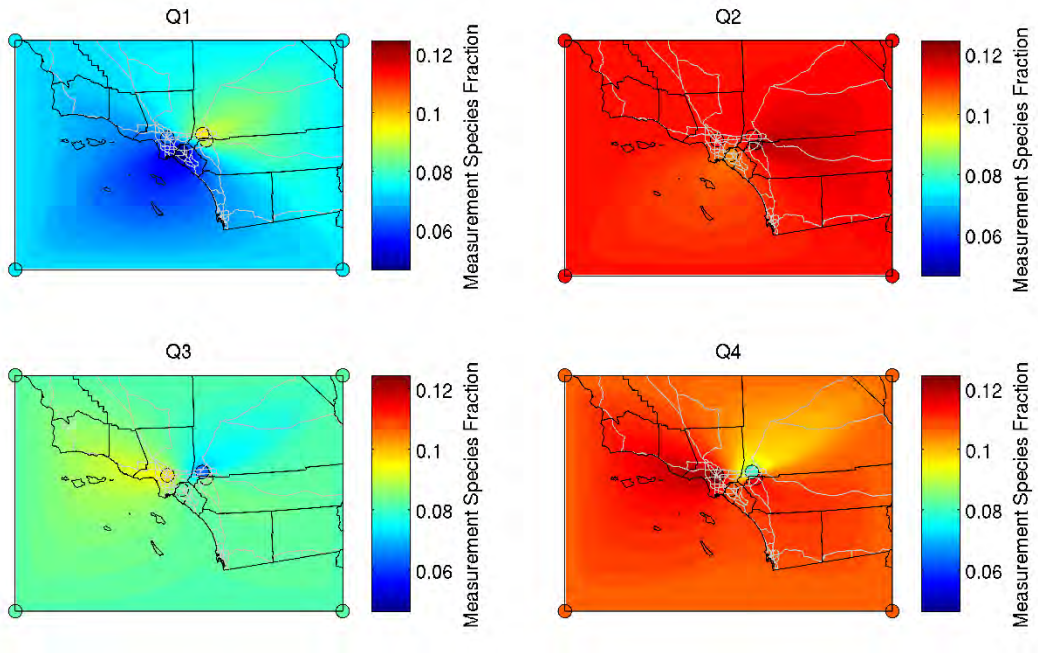

FIGURE 3

2012 Interpolated Measurement Species Fractions for Ammonium. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

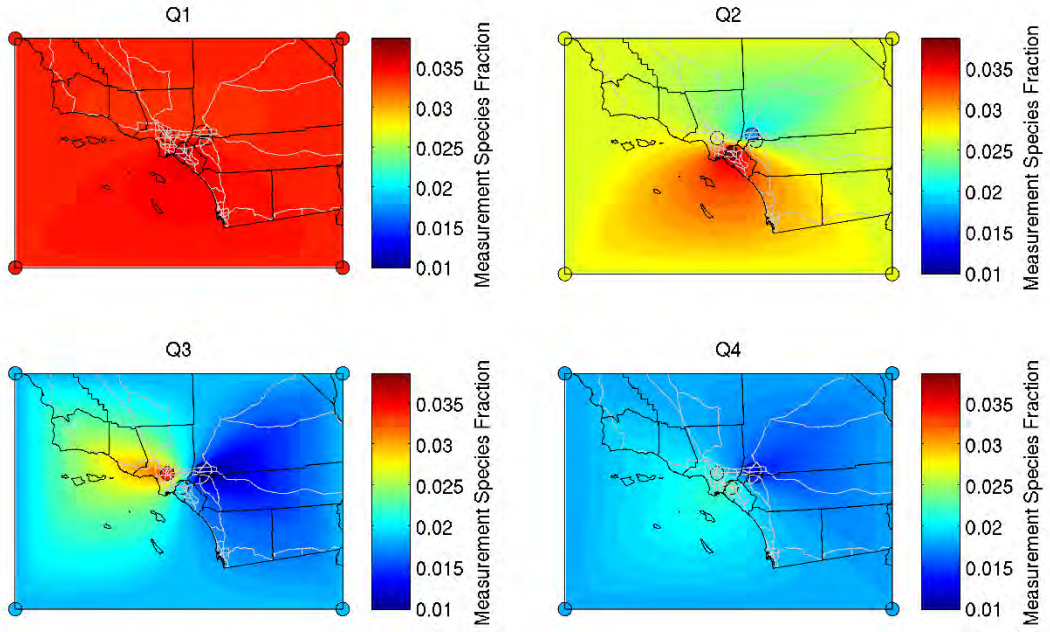

FIGURE 4

2012 Interpolated Measurement Species Fractions for Salt. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

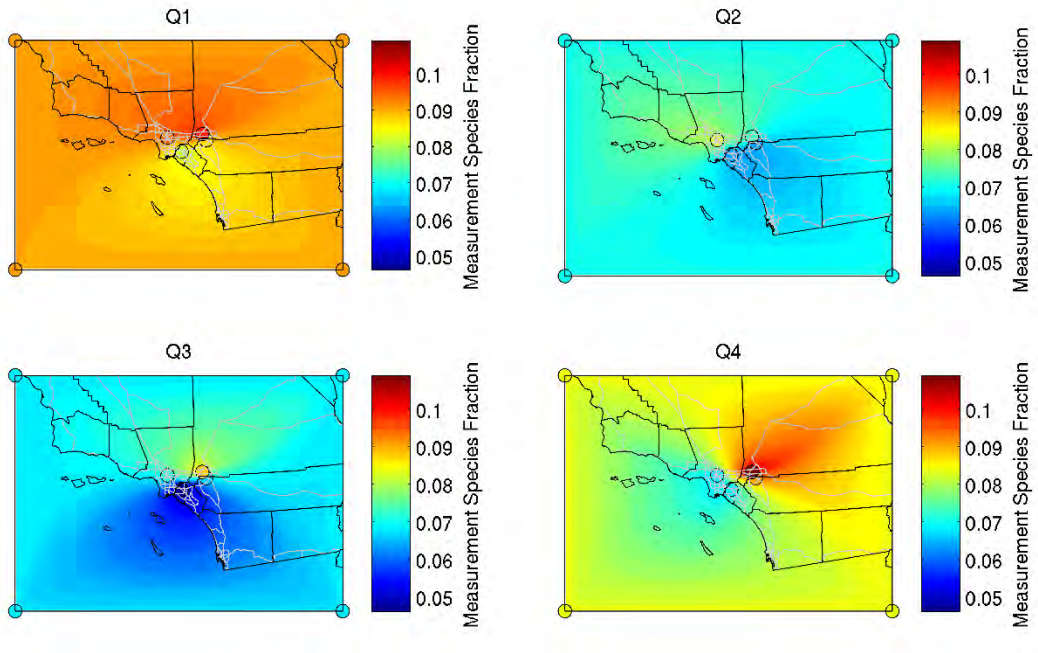

FIGURE 5

2012 Interpolated Measurement Species Fractions for Crustal. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

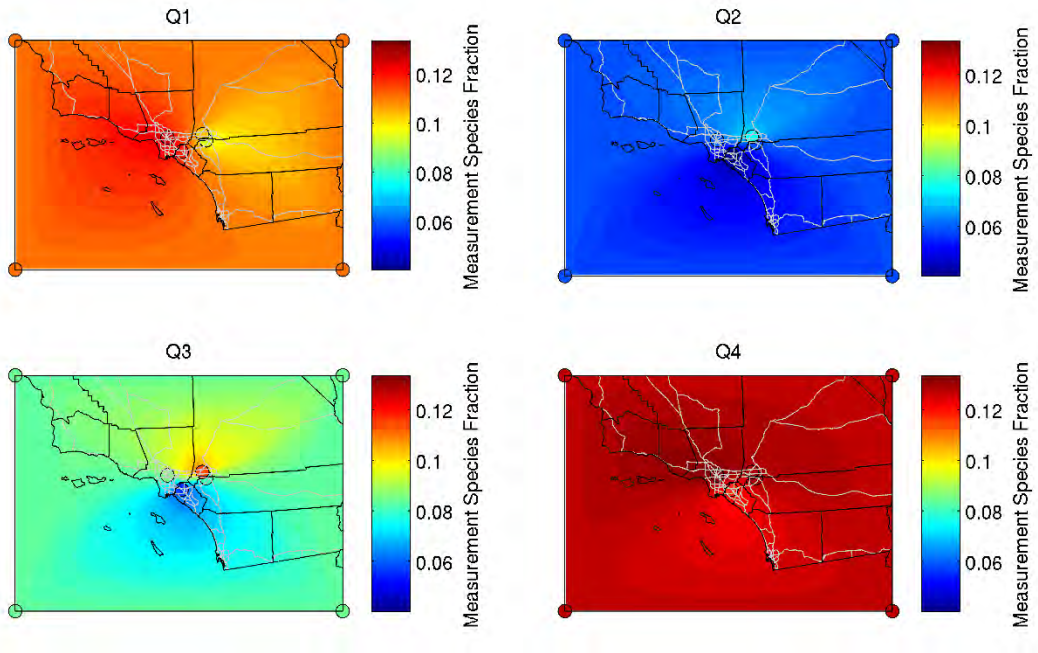

FIGURE 6

2012 Interpolated Measurement Species Fractions for Elemental Carbon. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

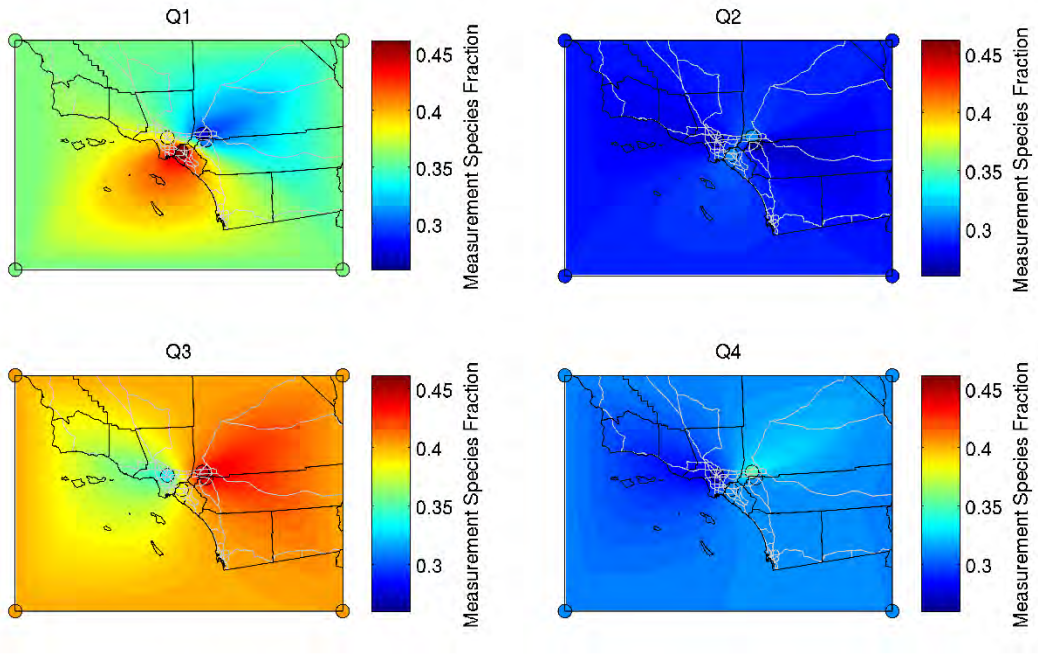

FIGURE 7

2012 Interpolated Measurement Species Fractions for Organic Carbon. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

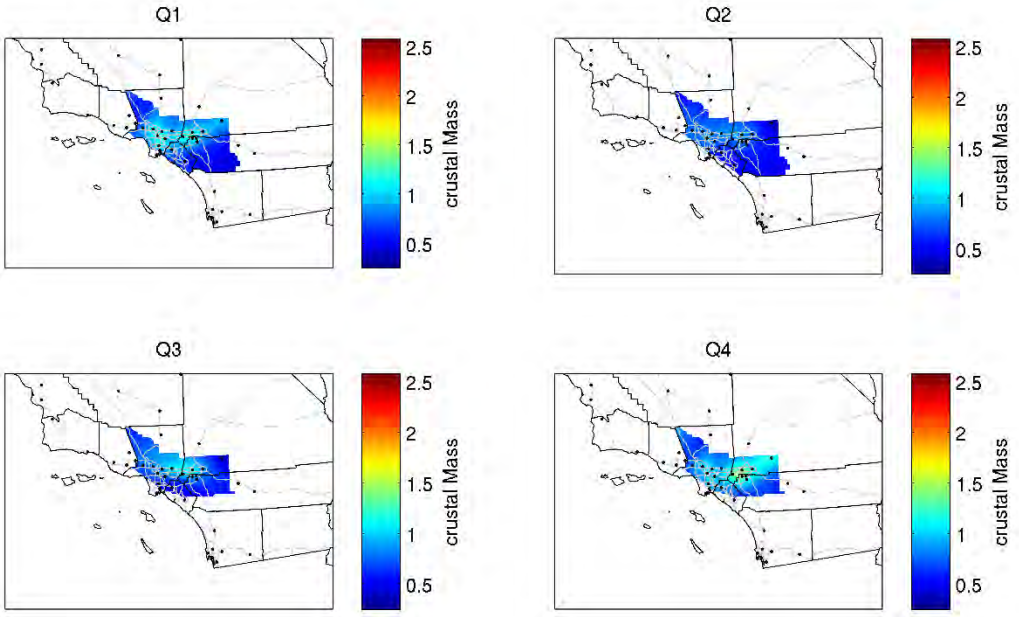

FIGURE 8

Annual quarterly-averaged crustal mass

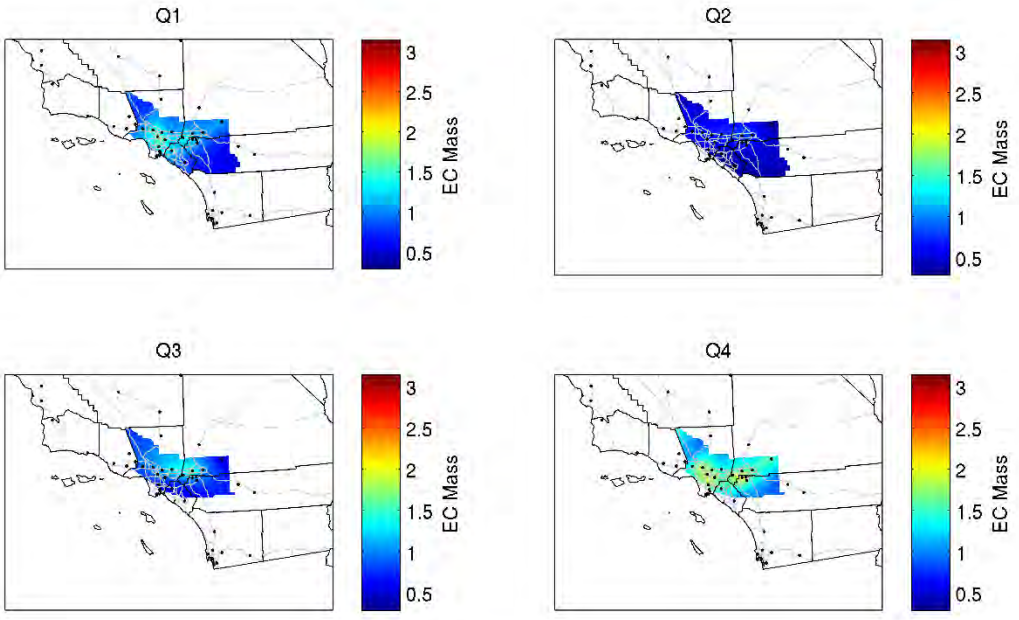

FIGURE 9

Annual quarterly-averaged elemental carbon mass

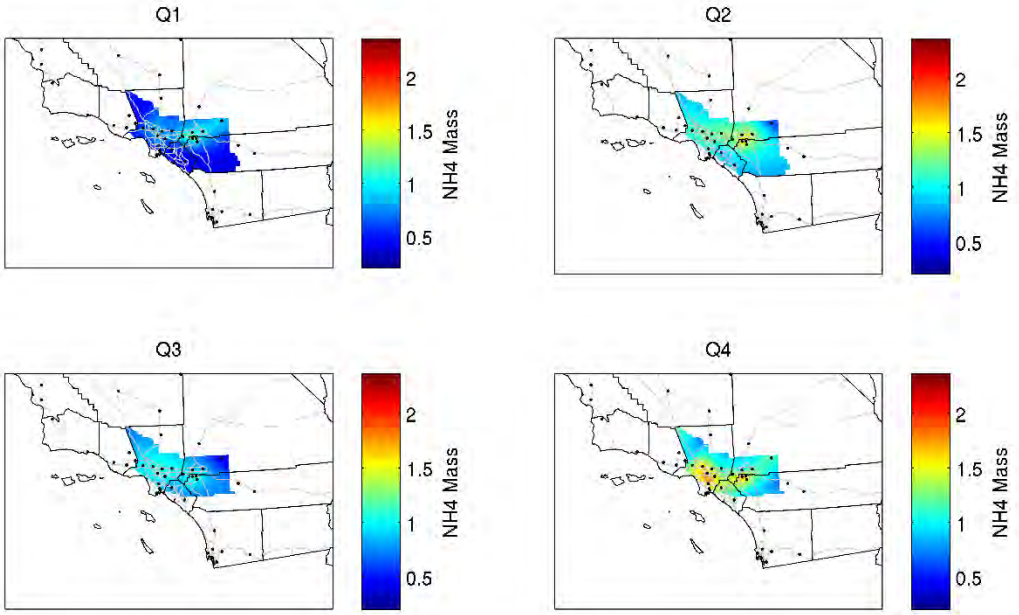

FIGURE 10

Annual quarterly-averaged ammonium mass

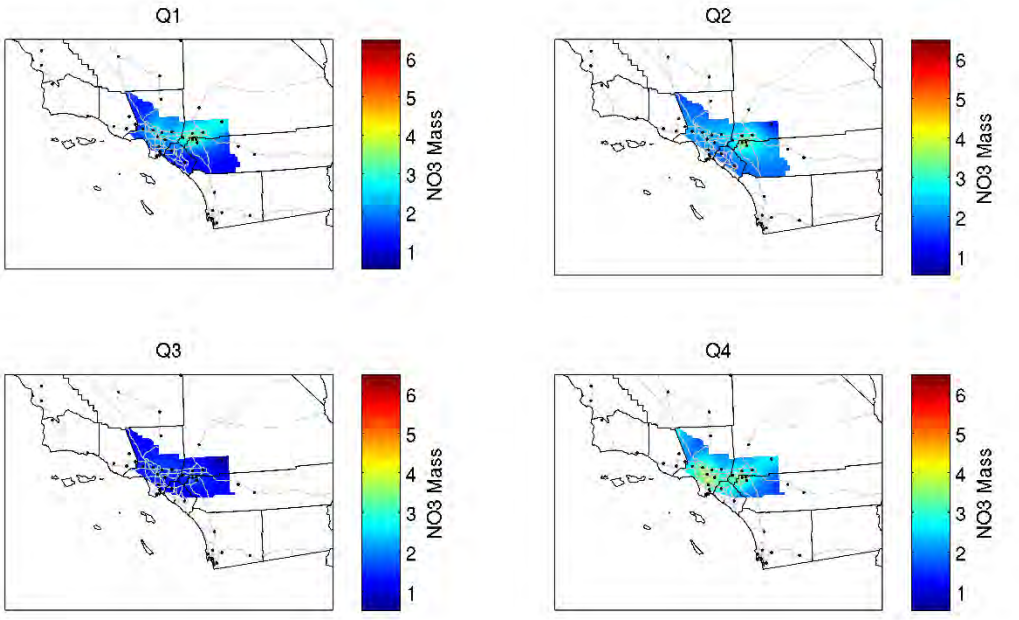

FIGURE 11

Annual quarterly-averaged nitrate mass

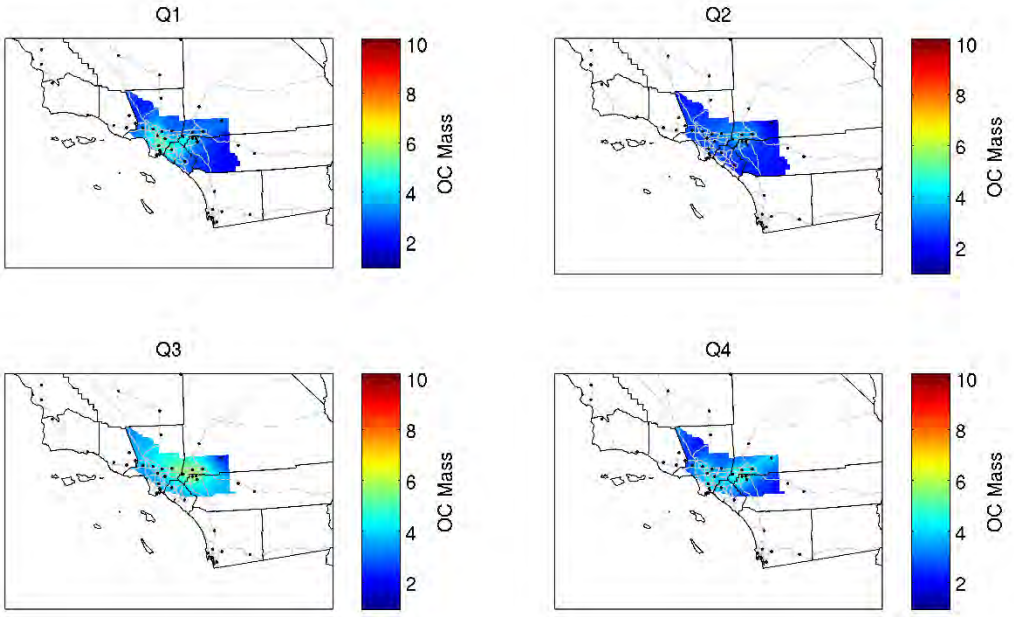

FIGURE 12

Annual quarterly-averaged organic carbon mass

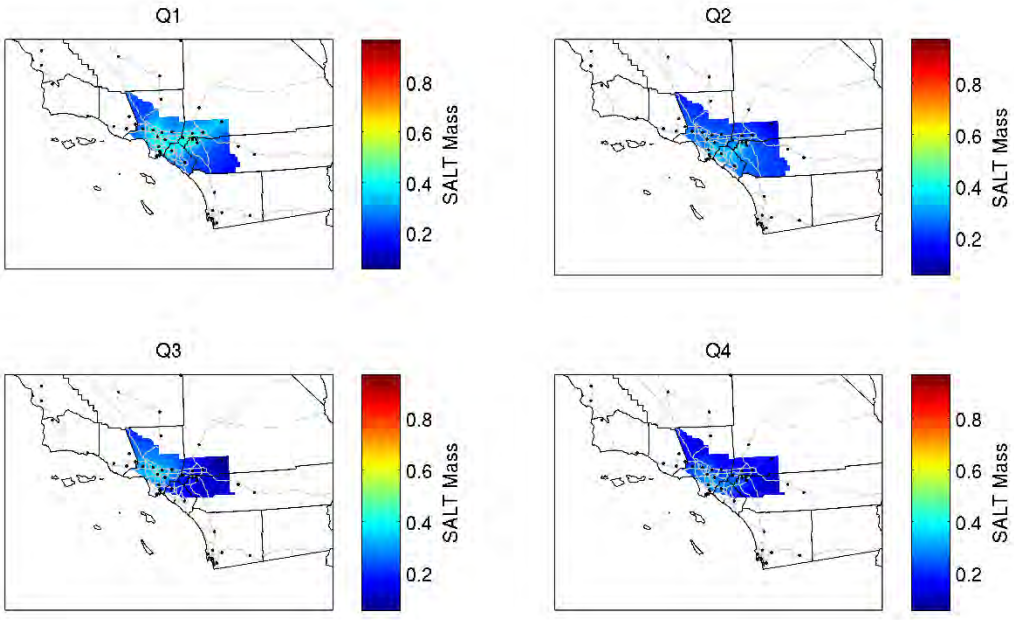

FIGURE 13

Annual quarterly-averaged sea salt mass

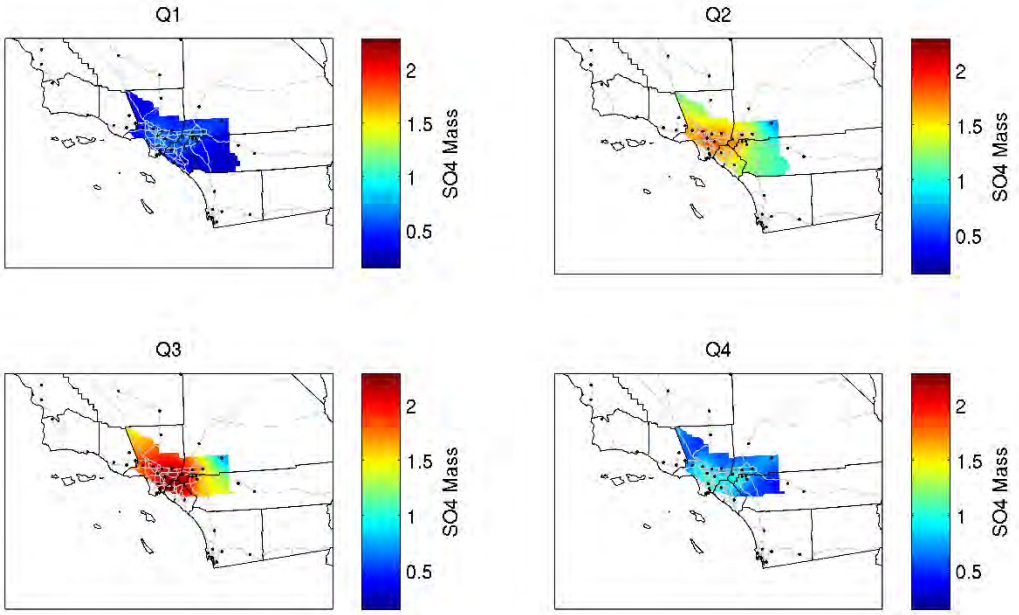

FIGURE 14

Annual quarterly-averaged sulfate mass

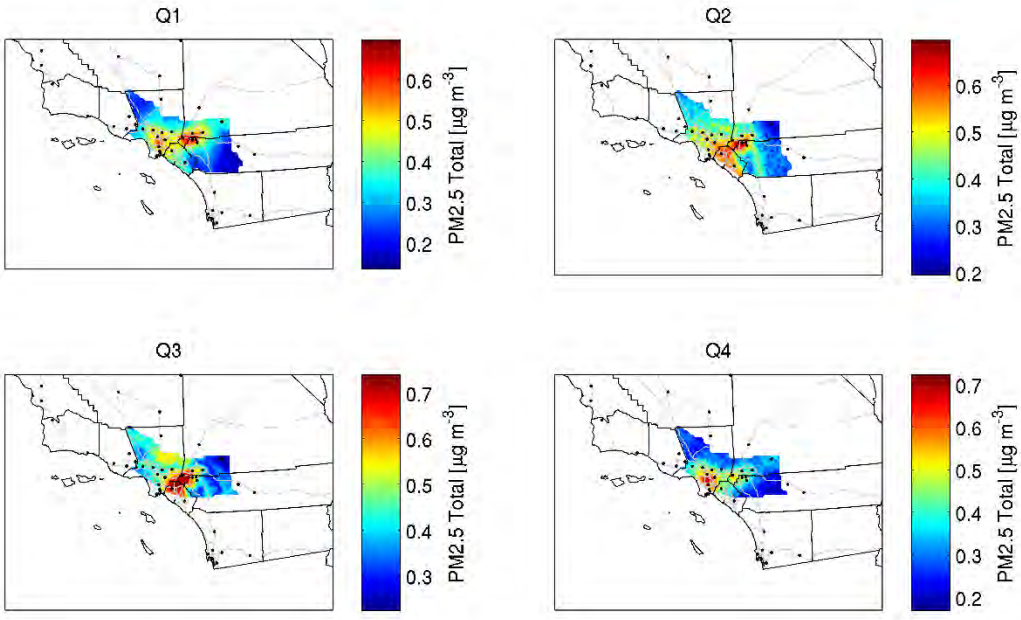

FIGURE 15

Annual quarterly-averaged 2021 uncontrolled projected design values

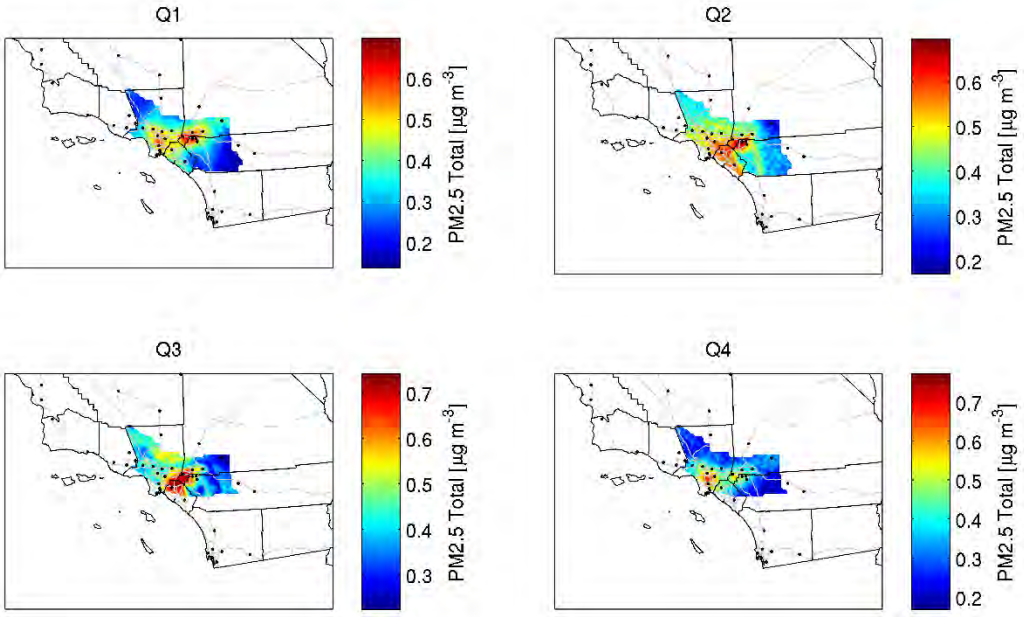

FIGURE 16

Annual quarterly-averaged 2021 controlled projected design values

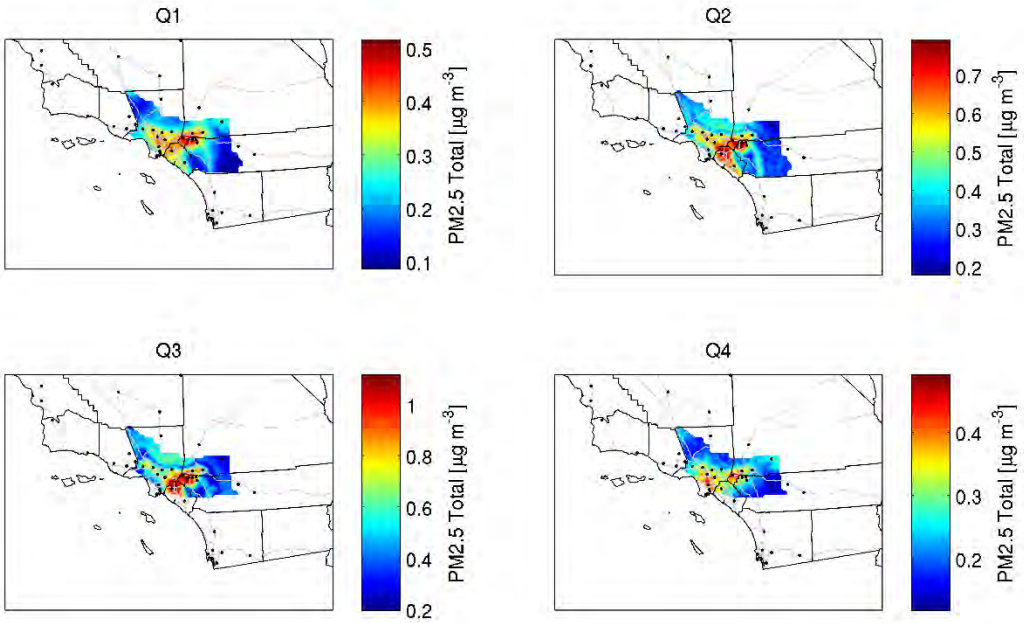

FIGURE 17

Annual quarterly-averaged 2023 ozone control projected design values

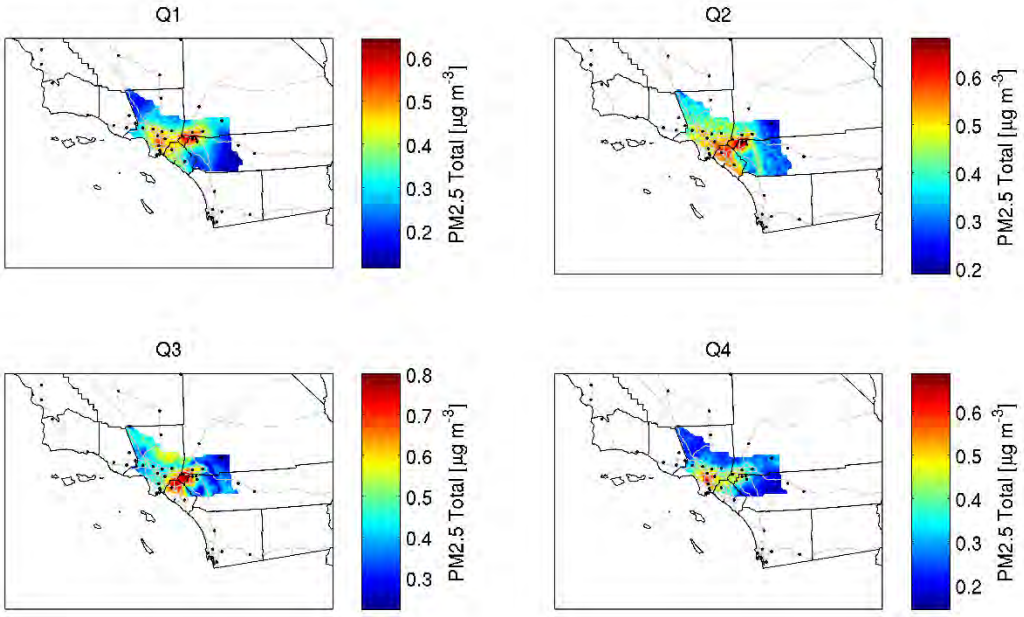

FIGURE 18

Annual quarterly-averaged 2025 uncontrolled projected design values

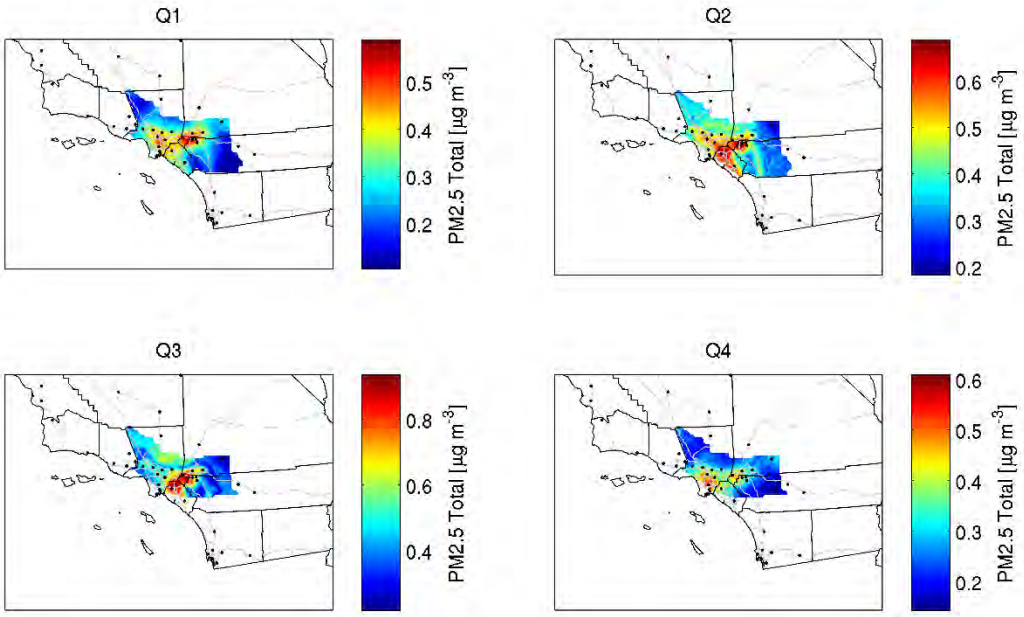

FIGURE 19

Annual quarterly-averaged 2025 controlled projected design values

Attachment 8

24-HOUR UNMONITORED AREA ANALYSIS SUPPLEMENT

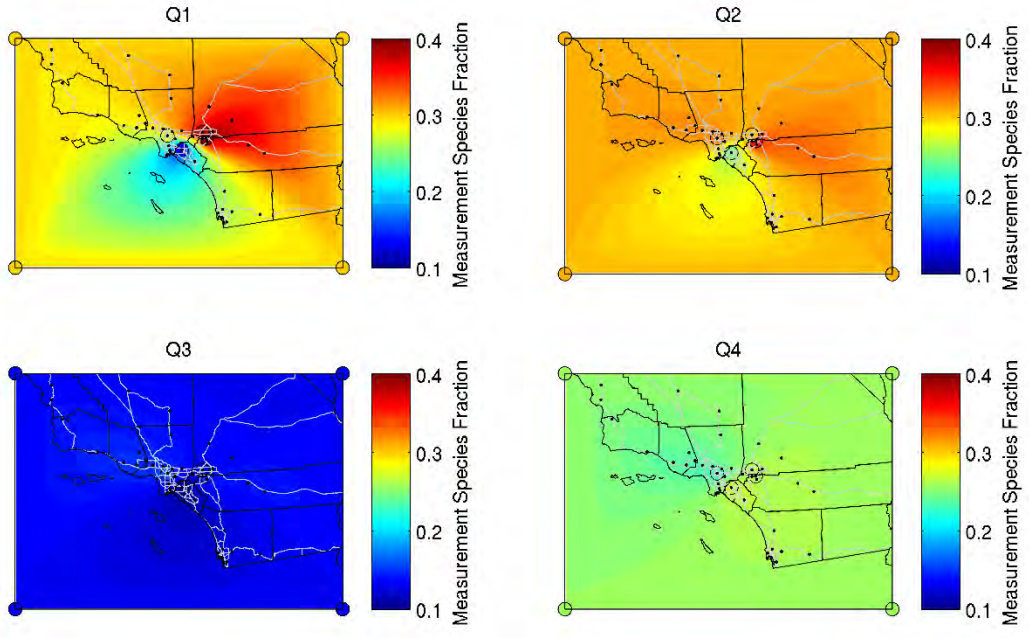

FIGURE 1

2012 Interpolated Measurement Species Fractions for Nitrate. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

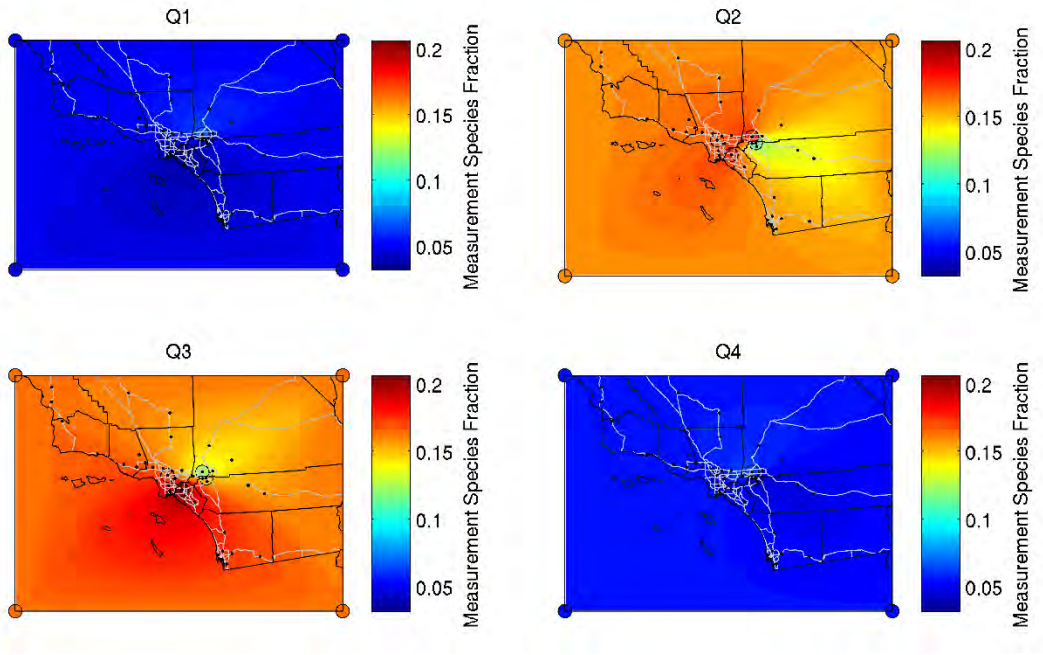

FIGURE 2

2012 Interpolated Measurement Species Fractions for Sulfate. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

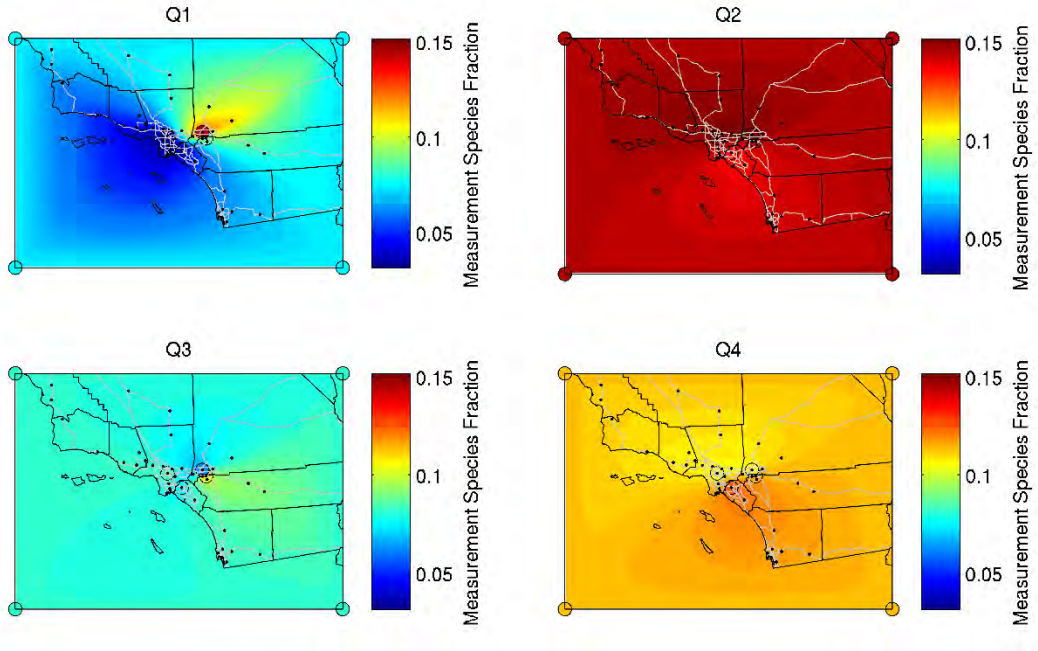

FIGURE 3

2012 Interpolated Measurement Species Fractions for Ammonium. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

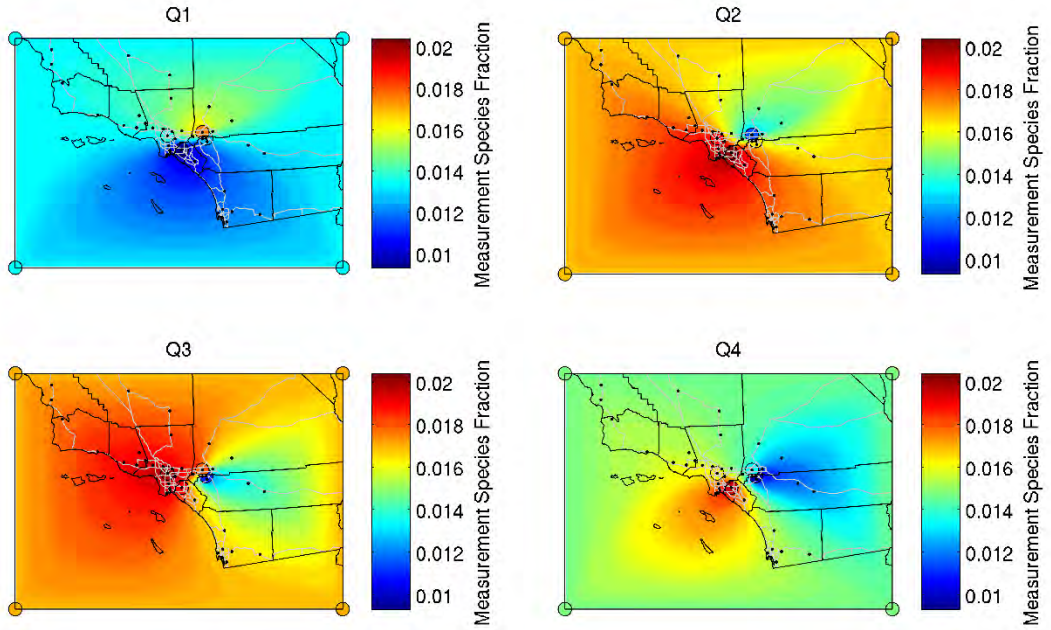

FIGURE 4

2012 Interpolated Measurement Species Fractions for Salt. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

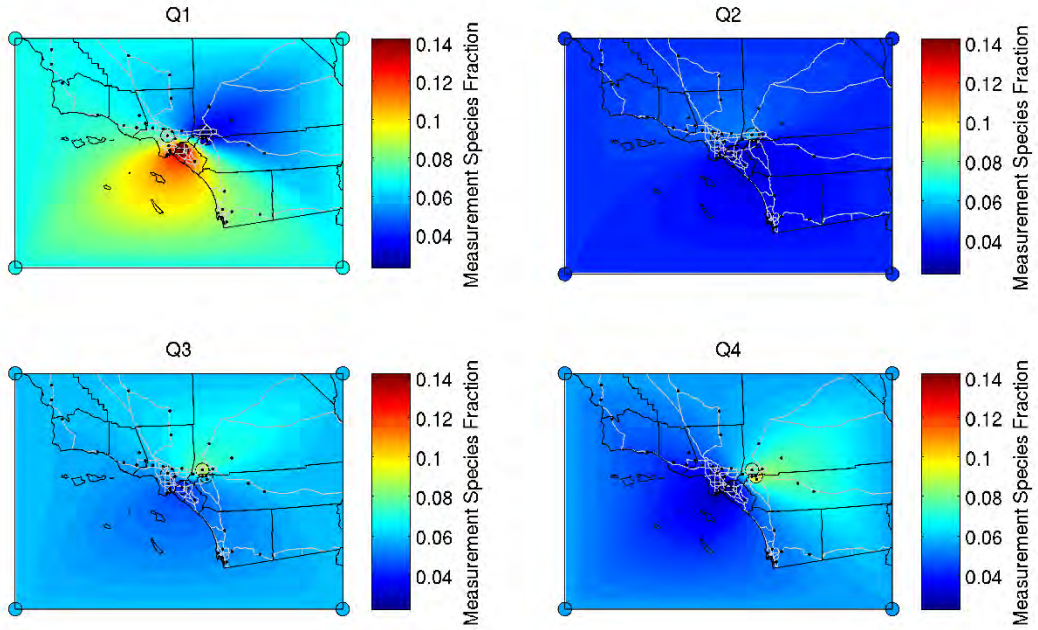

FIGURE 5

2012 Interpolated Measurement Species Fractions for Crustal. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

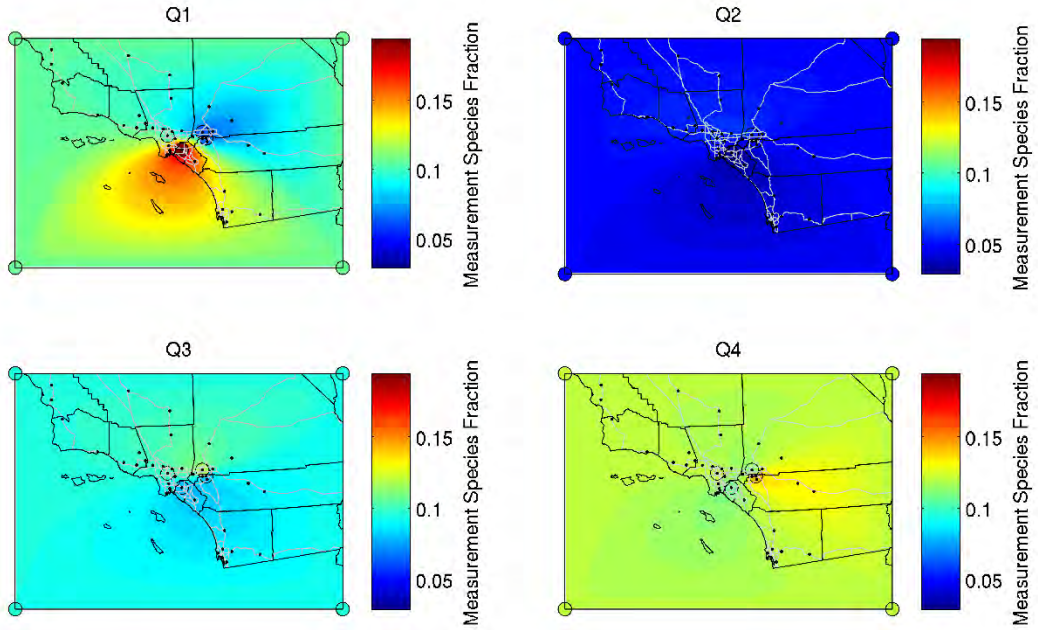

FIGURE 6

2012 Interpolated Measurement Species Fractions for Elemental Carbon. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

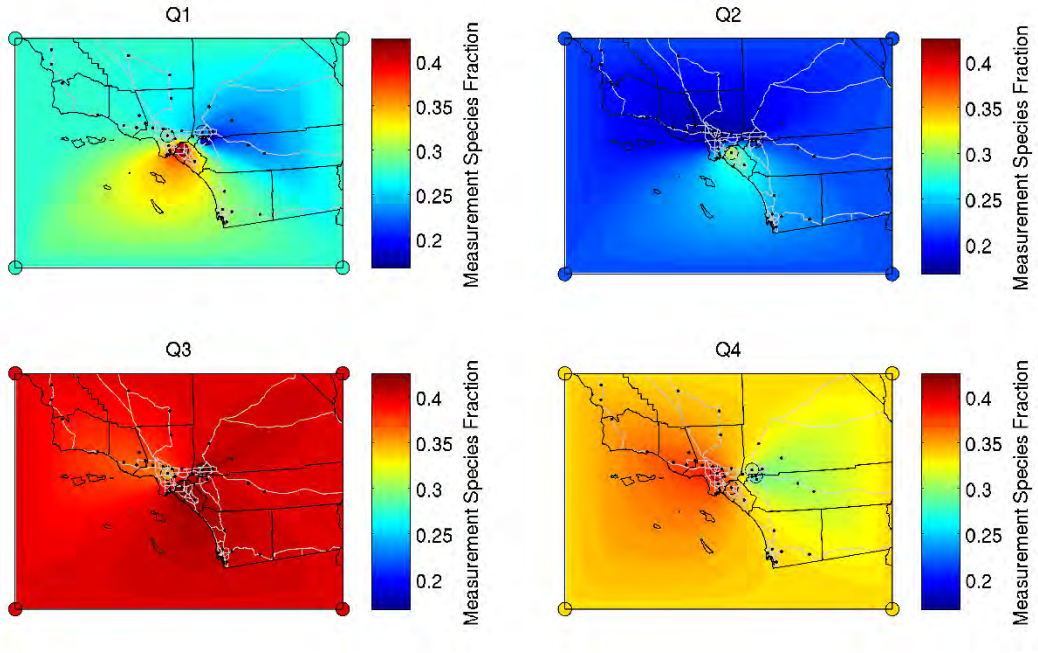

FIGURE 7

2012 Interpolated Measurement Species Fractions for Organic Carbon. FRM locations are illustrated with black dots. SASS speciation stations and "pseudo stations" are illustrated with black circles.

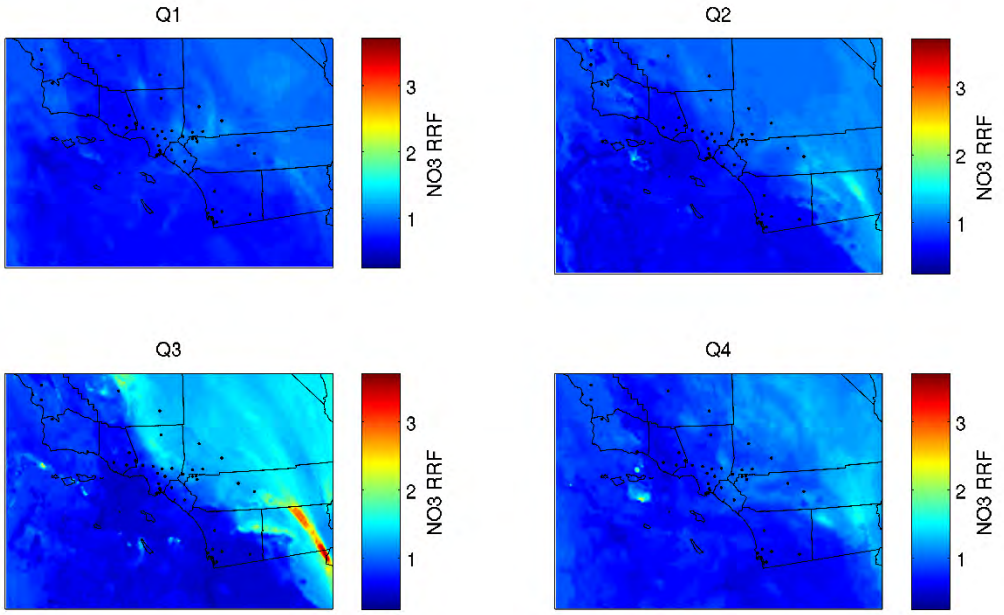

FIGURE 8

2019 Spatial RRFs for Nitrate

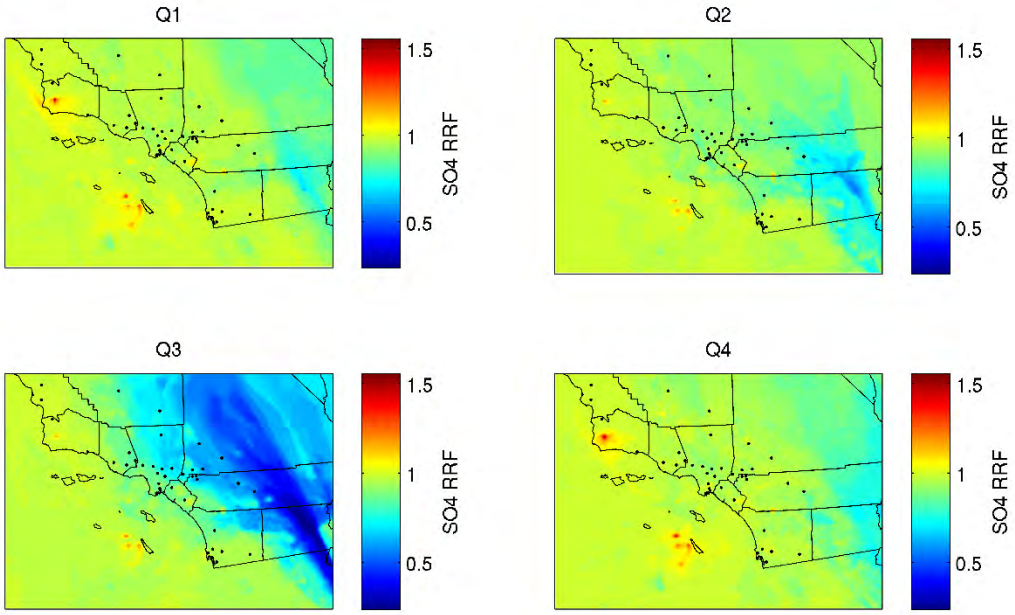

FIGURE 9

2019 Spatial RRFs for Sulfate

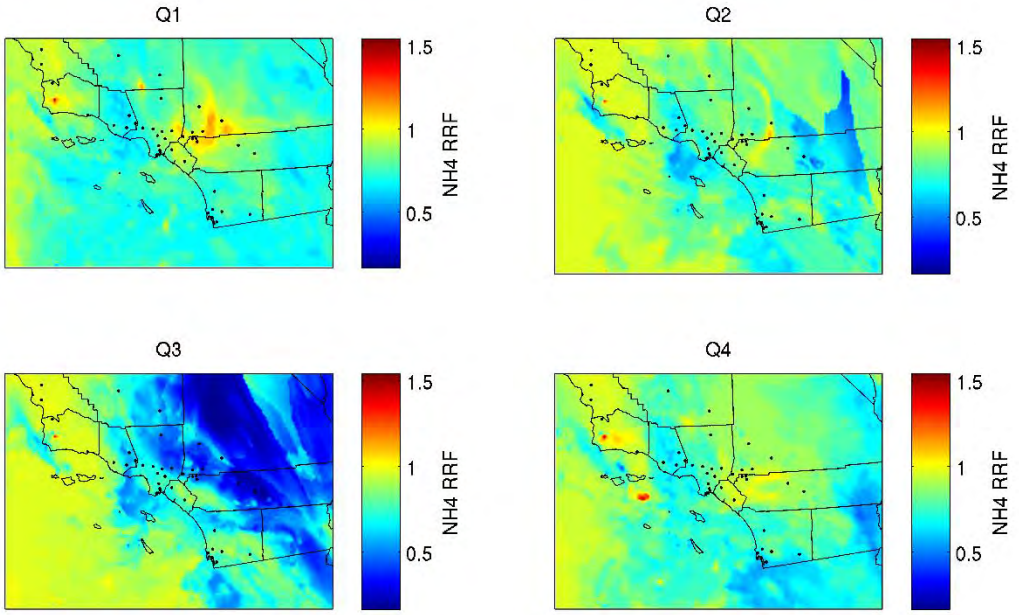

FIGURE 10

2019 Spatial RRFs for Ammonium

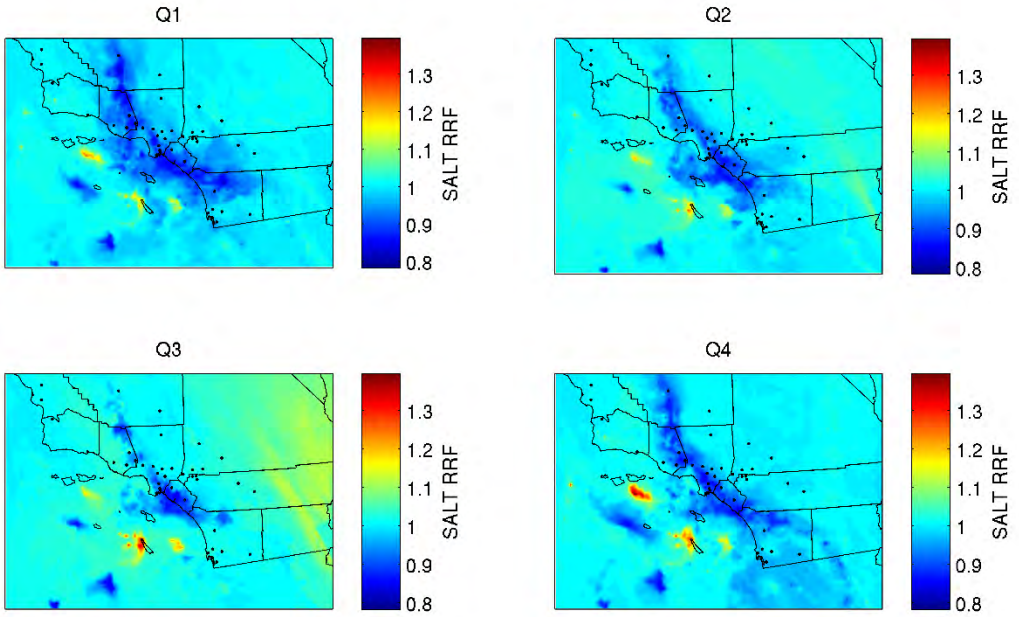

FIGURE 11

2019 Spatial RRFs for Salt

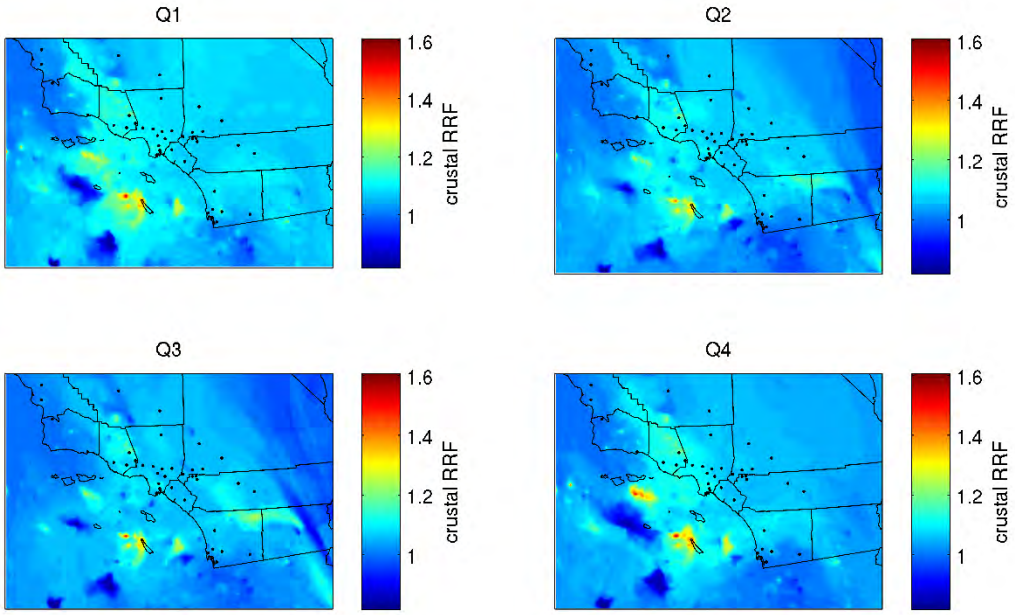

FIGURE 12

2019 Spatial RRFs for Crustal

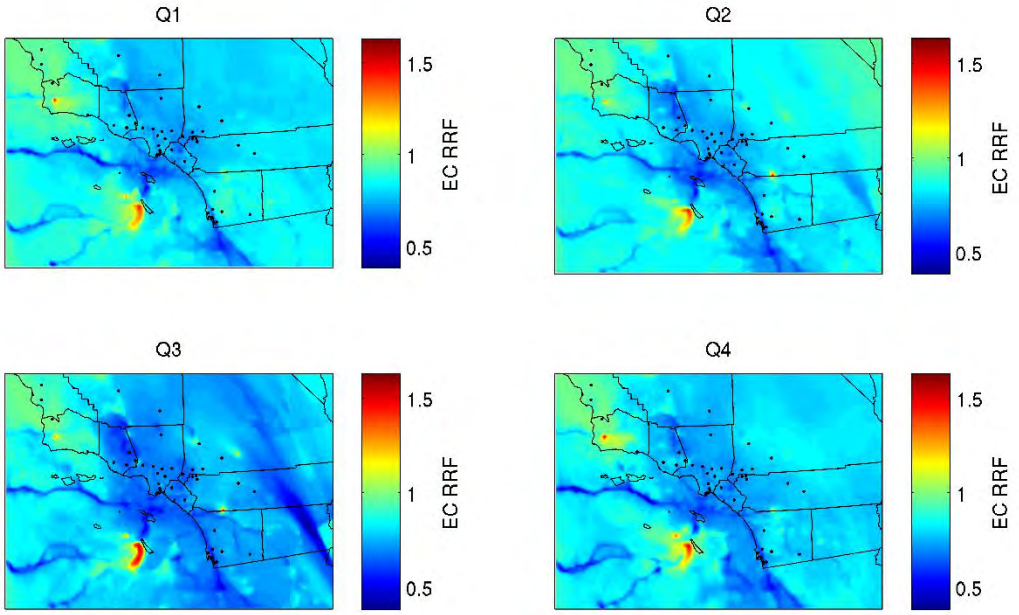

FIGURE 13

2019 Spatial RRFs for Elemental Carbon

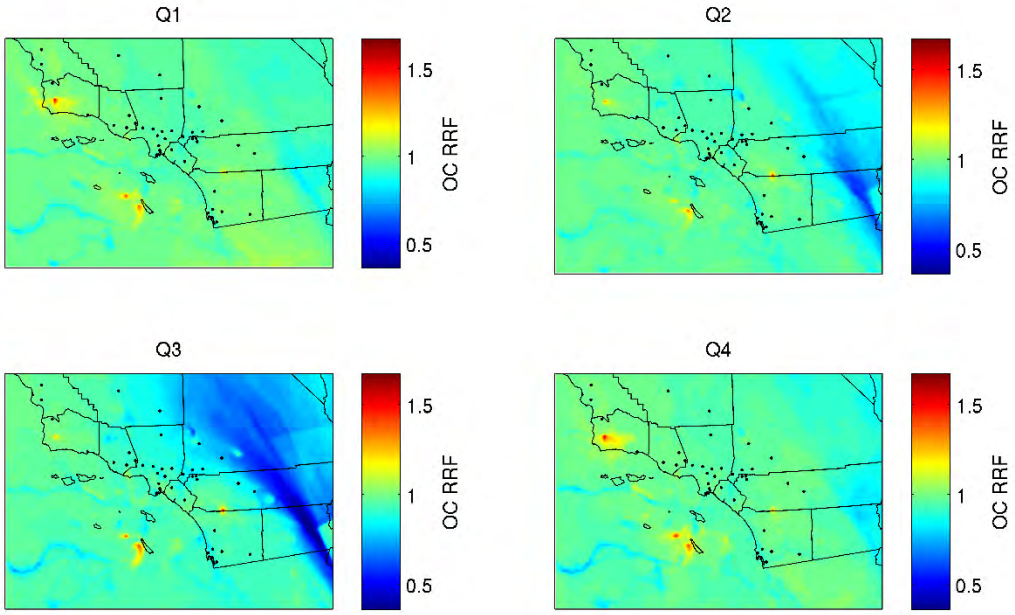

FIGURE 14

2019 Spatial RRFs for Organic Carbon

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Appendix VI

Compliance with Other Clean Air Act Requirements

2016 AIR QUALITY MANAGEMENT PLAN



January 2017

DRAFT FINAL 2016 AQMP
APPENDIX VI

COMPLIANCE WITH OTHER CLEAN AIR ACT REQUIREMENTS

JANUARY 2017

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Federal Clean Air Act Requirements for Nonattainment Areas

For areas such as the Basin that are classified nonattainment for the PM2.5 and ozone NAAQS, Section 172 of Subpart 1 of the Clean Air Act (CAA) applies. Section 172(c)(1) of the CAA requires nonattainment areas to provide for implementation of all Reasonably Available Control Measures (RACM) as expeditiously as possible, including the adoption of reasonably available control technology (RACT). Section 172(c)(2) requires that nonattainment areas demonstrate Reasonable Further Progress (RFP). A comprehensive emission inventory is required under Section 172(c)(3). Nonattainment area SIPs must include control strategies (Section 172(c)(6)), contingency measures (Section 172(c)(9)), and provisions for making demonstrations of conformity (Section 176(c)). However, EPA's March 2015 ozone implementation rule provides that "extreme" areas with approved Section 182(e)(5) commitments only had to submit contingency measures under three years before the attainment date, and not the general CAA contingency measures. Section 172(c)(5) requires the implementation of a new source review program including the use of "lowest achievable emission rate" for major sources referred to under State law as "Best Available Control Technology" (BACT) for contributors to PM2.5 and precursor emissions (i.e., precursors of secondary particulates).

Subpart 2 provides additional provisions for ozone nonattainment areas. An attainment demonstration is required under Section 182(c)(2)(A) for areas classified as "serious" or above. Areas classified as "severe" or "extreme" nonattainment are required to demonstrate that sufficient transportation control strategies and transportation control measures have been identified to offset growth in emissions due to growth in vehicle miles traveled (VMT) under Section 182(d)(1)(A). Section 182(g) requires that each nonattainment area (other than an area classified as "marginal" or "moderate") achieve specific emission reduction targets in the applicable milestone years.

Additional provisions for PM nonattainment areas are listed in Subpart 4. Section 189 requires states with nonattainment areas to submit an attainment demonstration. Section 189(c) requires the submission of quantitative milestones every three years until the attainment date. Under Section 189(e), control requirements that apply to PM2.5 are also applicable to the precursors of PM, namely NOx, SO_2, VOC and ammonia. Best Available Control Measures (BACM) are required for "serious" nonattainment areas under Section 189(b)(1)(B).

Chapter 6 describes how the 2016 AQMP demonstrates compliance with the federal CAA requirements (Tables 6-1 and 6-2). Specifically, appendices VI-A through G present the analyses / demonstrations that fulfill the CAA statutory requirements as listed in Table VI-1:

TABLE VI-1

Description of Appendices VI-A through VI-G

Appendix	Description
Appendix VI-A	The reasonably available control measures / reasonably available control technology (RACM/RACT) demonstration and the best available control measures / best available control technology (BACM/BACT) demonstration
Appendix VI-B	Impracticability demonstration for request for “serious” classification for 2012 annual PM2.5 standard
Appendix VI-C	RFP and milestone years
Appendix VI-D	General conformity and transportation conformity budget
Appendix VI-E	VMT offset demonstration
Appendix VI-F	PM precursor requirements
Appendix VI-G	New source review

DRAFT FINAL 2016 AQMP
APPENDIX VI-A

REASONABLY AVAILABLE CONTROL MEASURES (RACM) / BEST AVAILABLE CONTROL MEASURES (BACM) DEMONSTRATION

JANUARY 2017

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Introduction

The South Coast Air Basin (Basin) was classified as "moderate" nonattainment for the 2012 PM2.5 National Ambient Air Quality Standard (NAAQS) of 12 μg/m^3 annual average on April 15, 2015. The federal Clean Air Act (CAA) Section 189(a)(2)(B) requires states to submit an attainment plan that meets "moderate" area plan requirements no later than 18 months after designation to address the attainment strategies for the 2012 annual PM2.5 standard. A Reasonably Available Control Measures (RACM) analysis is required as part of the attainment plan for nonattainment areas. The CAA, Section 172(c)(1), sets the overall framework for the RACM analysis. The CAA requires the nonattainment air districts to:

> *"Provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment of the national primary ambient air quality standards."*

The U.S. EPA provided further guidance on RACM in the preamble and the final "*Clean Air Fine Particle Implementation Rule*" to implement the 1997 PM2.5 NAAQS which were published in the Federal Register in November 1, 2005 and April 25, 2007, respectively.[1, 2] The U.S. EPA's long-standing interpretation of the RACM provision stated in the 1997 PM2.5 Implementation Rule is that nonattainment air districts should consider all candidate measures that are available and technologically and economically feasible to implement within the nonattainment areas, including any measures that have been suggested; however, districts are not obligated to adopt all measures, but should demonstrate that there are no additional reasonable measures available that would advance the attainment date by at least one year or contribute to reasonable further progress (RFP) for the area. The PM2.5 Implementation Rule also requires that air districts establish RACM/RACT emission standards taking into consideration the condensable fraction of direct PM2.5 emissions after January 1, 2011. The SCAQMD has historically included condensable particulate emissions in its definition of particulate emissions. The SCAQMD's Protocol requires measurement of both condensable and filterable PM in accordance with SCAQMD/EPA Test Methods. Hence, condensable particulates are already incorporated as part of the PM2.5 inventory, and are included in the SCAQMD's evaluation of emission reduction opportunities for directly emitted PM2.5.

In addition, the U.S. EPA recognizes that each nonattainment area has its own profile of emission sources, and thus does not require specific RACM/RACT to be implemented in every nonattainment area and does not include a specific source size threshold for the RACM/RACT analysis.

In regards to economic feasibility, the U.S. EPA did not propose a fixed dollar per ton cost threshold, but recommended that air districts include health benefits in the cost analysis. As indicated in the preamble of the 1997 PM2.5 Implementation Rule:

> "*In regard to economic feasibility, U.S. EPA is not proposing a fixed dollar per ton cost threshold for RACM, just as it is not doing so for RACT…Where the severity of the nonattainment problem makes reductions more imperative or where essential reductions are more difficult to achieve, the acceptable cost of achieving those reductions could increase*. *In addition, we believe that in determining what are economically feasible emission reduction levels, the States should also consider the collective health benefits that can be realized in the area due to projected improvements."*

States have until 2021 to meet the new 2012 annual PM2.5 standard for "moderate" nonattainment areas, and if necessary, up to four additional years (2025), if the area is re-classified as "serious" nonattainment. SCAQMD's modeling analysis, as discussed in more detail in Chapter 5 and Appendix V, demonstrates that the SCAQMD cannot practically attain the 2012 annual PM2.5 standard by December 31, 2021. Acknowledging the challenges in meeting the standard, including the feasibility of proposed measures, uncertainties in drought conditions, and the potential inability to credit all ozone strategy reductions towards PM2.5 attainment if approved under CAA Section 182(e)(5), SCAQMD is requesting a voluntary bump up to the "serious" category. Modeling analysis supporting the request for reclassification is summarized in Appendices V and VI. This action will necessitate the development of a "serious" area SIP for the annual PM2.5 NAAQS, which is included as a component of the 2016 AQMP. An attainment demonstration presenting how the Basin will achieve the 2012 annual PM2.5 NAAQS as early as practicable but no later than December 31, 2025 can be found in Chapter 5 and Appendix V. A BACM/BACT demonstration is included in the following sections of this Appendix.

Regarding the 2006 24-Hour PM2.5 NAAQS, the Basin was designated as "moderate" nonattainment on December 14, 2009, with an attainment date of December 31, 2015. In accordance with the April 25, 2014 final rule "*Identification of Nonattainment Classification and Deadlines for Submission of State Implementation Plan (SIP) Provisions for the 1997 Fine Particle (PM2.5) National Ambient Air Quality Standard (NAAQS) and 2006 PM2.5 NAAQS*" (79 FR 31566), areas classified as "moderate" nonattainment or higher have to develop and submit a demonstration that their current air pollution rules fulfill the 24-hour PM2.5 RACT assessment. In February 2015, a RACT assessment update was submitted to U.S. EPA as a supplement to the 2012 AQMP.

In July 2015, the SCAQMD submitted a formal request to the U.S. EPA to reclassify the Basin as a "serious" nonattainment area for the 2006 24-hour PM2.5 NAAQS, based on the monitoring data indicating attainment is not practicable by December 31, 2015. Subsequently, EPA reclassified the Basin as "serious" nonattainment for the 2006 24-hour standard effective February 12, 2016 with an attainment date of December 31, 2019. Table VI-A-1 provides a list of nonattainment areas in California and the attainment years for meeting the standards.

TABLE VI-A-1

PM2.5 NAAQS Non-Attainment Status and Attainment Deadline

NONATTAINMENT AREA	2006 24-hour PM2.5 STANDARD		2012 Annual PM2.5 STANDARD	
	Classification	Attainment Year	Classification	Attainment Year
Los Angeles South Coast Air Basin, CA	Serious	2019	Moderate	2021
San Joaquin Valley, CA	Serious	2019	Moderate	2021
Imperial County, CA	Moderate	2015	Moderate	2021
Plumas County, CA	N/A	N/A	Moderate	2021
Chico, CA	Moderate	2015	N/A	N/A
Sacramento, CA	Moderate	2015	N/A	N/A
San Francisco Bay Area, CA	Moderate	2015	N/A	N/A

Particulate Matter ($PM_{2.5}$) Nonattainment Areas, as of 1/30/2015, are posted in www.epa.gov/airquality/greenbook/rnc.html.

Under CAA Subpart 4 Section 189(b)(1)(B), a "serious" nonattainment area attainment plan has to demonstrate provisions to assure that the Best Available Control Measures (BACM), including Best Available Control Technology (BACT) for stationary sources is implemented no later than four years after the designation (or reclassification) with the exception of source categories that U.S. EPA has determined to not contributed significantly to the levels that exceed the standard in the area. In the "*Addendum to the General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990*" issued by U.S. EPA in 1994 (59 FR 41998, 42010), BACM is defined as:

> "*The maximum degree of emission reduction achievable from a source or source category which is determined on a case-by-case basis, considering energy, economic and environmental impacts and other costs*."

The SCAQMD has prepared comparative analyses to evaluate the technical and economic feasibility of potential BACM and to identify feasible measures. The results of this work are provided in the following sections of this Appendix. Based on the comparative analysis and technological and economic feasibility, the SCAQMD has made certain conclusions regarding BACM. When the SCAQMD's rule or level of control meets the BACM/BACT definition, no further analysis was required. When a regulation or control measure from another air basin or from EPA guidance was identified as more stringent than the SCAQMD's current regulation, the measure was analyzed for technological and economic feasibility. The SCAQMD is not required to adopt a measure just because it was adopted in another region, but the SCAQMD must provide the rationale for rejecting such measures. Measures that are found to be feasible are added to the 2016 AQMP as control measures listed in Chapter 4.

With respect to the ozone NAAQS, the U.S. EPA set the 8-hour ozone standard at 0.08 parts per million (ppm) in July 1997, calculated as the annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years. On March 12, 2008, the U.S. EPA strengthened its ground-level 8-hour ozone standard from 0.08 ppm to 0.075 ppm. In May 2012, the U.S. EPA classified two areas in the State of California, the South Coast Basin and the San Joaquin Valley, as "extreme" nonattainment areas for the 2008 8-hour ozone standard.[3] The attainment dates for the Basin for the 1997 and 2008 ozone standards are June 15, 2024 and July 20, 2032, respectively. Table VI-A-2 shows the classifications and attainment dates for several nonattainment areas in the nation. While an "extreme" nonattainment area has 20 years from the date of designation to reach attainment, other areas that are classified as "severe", "serious", "moderate," and "marginal" must reach attainment in 15 years, 9 years, 6 years and 3 years after the date of designation, respectively.[4]

TABLE VI-A-2

8-Hour Ozone NAAQS State Designation for Moderate or Above Nonattainment Areas

NONATTAINMENT AREA	1997 OZONE STANDARD		2008 OZONE STANDARD	
	Classification	Attainment Year	Classification	Attainment Year
South Coast Air Basin, CA	Extreme	2024	Extreme	2032
San Joaquin Valley, CA	Extreme	2024	Extreme	2032
Los Angeles-San Bernardino Counties (West Mojave Desert), CA	Severe-15	2019	Severe-15	2027
Riverside County (Coachella Valley), CA	Severe-15	2019	Severe-15	2027
Sacramento Metro, CA	Severe-15	2019	Severe-15	2027
Houston-Galveston-Brazoria, TX	Severe-15	2019	Marginal	2015
Ventura County, CA	Serious	2013	Serious	2021
Dallas-Fort Worth, TX	Serious	2013	Moderate	2018
Baltimore, MD	Serious	2013	Moderate	2018
New York Metropolitan Area	Moderate	2010	Moderate*	2018

Note: Classifications of 8-Hour Ozone Nonattainment Areas, http://www3.epa.gov/airquality/greenbk/hindex.html, posted on 1/30/2015.

* Based on the State's request to be reclassified as a "moderate" nonattainment area

In addition to BACM/BACT requirements for PM2.5 "serious" nonattainment area, a RACM/RACT demonstration is required for ozone nonattainment areas. In the final "*Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements*" published in the Federal Register on March 6, 2015 (80 FR 12263), the U.S. EPA states that the nonattainment air districts should consider all available measures, including those being implemented in other areas, and that a state must adopt measures for an area only if those measures are economically and technologically feasible and will advance the attainment date or are necessary for RFP. On June 6, 2014, the SCAQMD adopted the RACT Demonstration for the 2008 8-hour ozone NAAQS, as a component of the 2016 AQMP.[5]

The RACT Demonstration provides a comprehensive assessment of current SCAQMD rules and regulations. The analysis indicated that SCAQMD rules and regulations closely matched those of the other agencies, and identified eight SCAQMD rules covering six source categories that could be further evaluated as areas for improvements in the 2016 AQMP RACM analysis and control measure development.

The objective of this Appendix is to demonstrate that the SCAQMD has conducted thorough a RACM/RACT and BACM/BACT analysis for the 2012 annual PM2.5 standard, a RACM/RACT analysis for the 2008 8-hour ozone standard and a BACM/BACT analysis for the 2006 24-hour PM2.5 standard to meet the requirements of the CAA consistent with U.S. EPA guidance. A 7-step analysis was conducted to identify potential control measures from various sources including an Air Quality Technology Symposium, preceding RACT/BACT analysis, EPA Technical Support Documents, other districts' control measures, control measures beyond RACM in the 2012 AQMP, EPA Menu of Control Measures, and EPA guidance documents. The potential control measures are then evaluated in the Control Measure Assessment section for feasibility. The SCAQMD's goal is to develop and incorporate all feasible control measures to meet the requirements of the CAA as expeditiously as possible. Staff commits to refine the analysis of emission inventories, emission reductions, and cost-effectiveness during the rule development process. In addition, staff commits to monitor the rule development in other air districts and conduct further analysis if necessary, and has developed Control Measure MCS-02 – Application of All Feasible Measures Assessment to facilitate this activity.

The scope of this analysis includes, but is not limited to, attainment strategies for stationary and area sources, the rules and regulations of the air districts responsible for the nonattainment areas listed in Table VI-A-1 and Table VI-A-2, and potential control measures suggested by the U.S. EPA, CARB, Advisory Committee members, technical experts in air pollution control, as well as the public and a variety of stakeholders. The rules and regulations evaluated in this analysis primarily apply to the SCAQMD jurisdiction, including the SCAB and the Coachella Valley. The RACM/BACM analysis for Transportation Control Measures conducted by SCAG is shown in Appendix IV-C and the RACM/BACM analysis for mobile sources conducted by CARB is included in Attachment VI-A-3 of this Appendix. Details of the control measures, emission reductions, cost effectiveness, prioritization and implementation schedules are discussed in Chapter 4 and Appendix IV.

List of Emission Sources

A detailed inventory of emissions sources that emit VOC, NOx, SOx, NH3, and direct PM2.5 has been prepared for the 2016 AQMP. An up-to-date and comprehensive emission inventory is essential to develop control measures that effectively reduce air pollution. Details on the methodology and development of the emission inventory are discussed in Chapter 3 and Appendix III. The 2012 annual average emission inventory, segregated by the 3-digit Equipment Identification Code (EIC), is presented in Table VI-A-3. A total of 75 major source categories are found in the base year emission inventory.

Table VI-A-3

List of Annual Average Emission Source Categories in 2012, tons per day

EIC	Description	VOC	NOx	SOx	PM2.5	NH3
10	Electric Utilities	1.06	0.44	0.32	1.20	1.99
20	Cogeneration	0.11	0.01	0.01	0.14	0.32
30	Oil and Gas Production (Combustion)	0.11	0.68	0.01	0.10	0.22
40	Petroleum Refining (Combustion)	1.01	0.00	0.00	1.49	0.91
50	Manufacturing and Industrial	3.87	11.31	0.24	1.09	2.19
52	Food and Agricultural Processing	0.03	0.16	0.00	0.03	0.04
60	Service and Commercial	4.85	11.79	1.15	1.39	3.28
99	Other (Fuel Combustion)	0.29	3.28	0.13	0.19	0.02
110	Sewage Treatment	0.34	0.01	0.03	0.00	0.23
120	Landfills	8.38	0.59	0.32	0.13	3.79
130	Incineration	0.07	1.42	0.13	0.07	0.31
140	Soil Remediation	0.00	0.00	0.00	0.00	0.00
199	Other (Water Disposal)	3.93	0.00	0.00	0.00	0.95
210	Laundering	0.13	0.00	0.00	0.00	0.00
220	Degreasing	10.11	0.00	0.00	0.00	0.00
230	Coatings and Related Processes	18.23	0.02	0.00	1.37	0.12
240	Printing	1.51	0.00	0.00	0.00	0.04
250	Adhesives and Sealants	3.43	0.00	0.00	0.00	0.00
299	Other (Cleaning and Surface Coatings)	0.69	0.04	0.00	0.04	0.26
310	Oil and Gas Production	2.31	0.02	0.06	0.00	0.00
320	Petroleum Refining	4.55	0.25	0.36	1.50	0.23
330	Petroleum Marketing	22.1	0.01	0.00	0.00	0.00
399	Other (Petroleum Production and Marketing)	0.08	0.00	0.00	0.00	0.00
410	Chemical	4.91	0.01	0.01	0.40	0.02
420	Food and Agriculture	1.15	0.00	0.01	0.10	0.02
430	Mineral Processes	0.65	0.01	0.00	2.70	0.12
440	Metal Processes	0.12	0.04	0.09	0.20	0.01
450	Wood and Paper	0.24	0.00	0.00	2.35	0.00
460	Glass and Related Products	0.00	0.00	0.00	0.10	0.00
470	Electronics	0.02	0.00	0.00	0.01	0.00
499	Other (Industrial Processes)	3.04	0.02	0.00	0.47	8.57
510	Consumer Products	86.51	0.00	0.00	0.00	0.00
520	Architectural Coatings and Related Solvent	13.31	0.00	0.00	0.00	0.00
530	Pesticides/Fertilizers	1.32	0.00	0.00	0.00	1.34
540	Asphalt Paving/Roofing	0.71	0.00	0.00	0.02	0.00
610	Residential Fuel Combustion	8.65	20.43	0.50	7.22	0.11
620	Farming Operations	2.46	0.00	0.00	0.21	12.69
630	Construction and Demolition	0.00	0.00	0.00	1.70	0.00

Table VI-A-3 (CONCLUDED)

List of Annual Average Emission Source Categories in 2012, tons per day

EIC	Description	VOC	NOx	SOx	PM2.5	NH3
640	Paved Road Dust	0.00	0.00	0.00	7.73	0.00
645	Unpaved Road Dust	0.00	0.00	0.00	0.58	0.00
650	Fugitive Windblown Dust	0.00	0.00	0.00	0.26	0.00
660	Fires	0.23	0.08	0.00	0.41	0.00
670	Waste Burning and Disposal	0.22	0.10	0.01	0.29	0.03
690	Cooking	1.73	0.00	0.00	10.39	0.00
699	Other (Miscellaneous Processes)	0.00	0.00	0.00	0.00	25.03
	RECLAIM		19.06	6.87		
710	Light Duty Passenger Auto (LDA)	65.00	47.49	0.82	4.71	7.68
722	Light Duty Trucks 1 (T1)	17.78	11.83	0.09	0.55	0.96
723	Light Duty Trucks 2 (T2)	25.52	29.83	0.40	1.67	4.12
724	Medium Duty Trucks (T3)	21.20	30.49	0.39	1.26	4.34
732	Light Heavy Duty Gas Trucks 1 (T4)	5.43	7.66	0.04	0.21	0.42
733	Light Heavy Duty Gas Trucks 2 (T5)	0.77	1.18	0.01	0.04	0.07
734	Medium Heavy Duty Gas Trucks (T6)	1.58	2.60	0.01	0.06	0.04
736	Heavy Heavy Duty Gas Trucks (HHD)	0.32	0.57	0.00	0.00	0.00
742	Light Heavy Duty Diesel Trucks 1 (T4)	0.40	16.13	0.01	0.19	0.01
743	Light Heavy Duty Diesel Trucks 2 (T5)	0.14	5.46	0.01	0.07	0.00
744	Medium Heavy Duty Diesels Truck (T6)	2.02	37.01	0.05	1.66	0.13
746	Heavy Heavy Duty Diesel Trucks (HHD)	5.47	96.36	0.14	3.09	0.22
750	Motorcycles (MCY)	9.35	2.31	0.00	0.02	0.01
760	Diesel Urban Buses (UB)	1.20	19.64	0.01	0.58	0.02
762	Gas Urban Buses (UB)	0.44	0.78	0.00	0.01	0.01
771	Gas School Buses (SB)	0.11	0.12	0.00	0.02	0.00
772	Diesel School Buses (SB)	0.16	2.25	0.00	0.13	0.00
777	Gas Other Buses (OB)	0.20	0.58	0.00	0.02	0.02
778	Motor Coaches	0.09	1.56	0.00	0.04	0.00
779	Diesel Other Buses (OB)	0.10	1.63	0.00	0.06	0.01
780	Motor Homes (MH)	0.24	1.15	0.01	0.05	0.02
810	Aircraft	3.30	13.78	1.47	0.60	0.00
820	Trains	1.23	19.72	0.01	0.39	0.01
833	Ocean Going Vessels	1.75	30.14	4.57	0.92	0.03
835	Commercial Harbor Crafts	1.15	15.84	0.00	0.68	0.00
840	Recreational Boats	30.44	5.69	0.01	1.42	0.01
850	Off-Road Recreation Vehicles	2.60	0.05	0.00	0.01	0.00
860	Off-Road Equipment	51.46	65.63	0.07	3.93	0.09
870	Farm Equipment	0.68	2.59	0.00	0.15	0.00
890	Fuel Storage and Handling	7.50	0.00	0.00	0.00	0.00
	Total	**470**	**540**	**18.4**	**66.4**	**81.1**

RACT Update

The CAA, Section 172(c)(1) and Section 182, require nonattainment areas for ozone that are designated as "moderate" nonattainment or above to adopt and maintain RACT rules for source categories emitting ozone precursors (VOCs and NOx) for which the U.S. EPA has issued a Control Techniques Guidelines (CTGs) document. In addition, such areas are required to adopt and maintain RACT rules for all other major stationary sources of VOCs and NOx (Section 182(b)(2)). Nonattainment areas classified as "serious", "severe", or "extreme" must adopt control measures above and beyond the minimum RACT levels. The U.S. EPA defines RACT as the lowest level of control specifically designed for stationary sources:

> "*Lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility*."

In July 2014, the SCAQMD submitted a RACT SIP update to the U.S. EPA as a component of the 2016 AQMP with respect to the 2008 8-hour ozone NAAQS. The Ozone RACT analysis is built upon the 2007 and 2012 RACM/RACT assessments and focuses on recently adopted rules and regulations by other agencies in California and the nation.[6,7] The 2014 RACT analysis identified eight SCAQMD rules that have potential differences with the companion rules of other California agencies. An initial assessment was completed and two rules were identified that may need to be updated. Amendment of these two rules were further evaluated.

In accordance with the April 25, 2014 final rule "*Identification of Nonattainment Classification and Deadlines for Submission of State Implementation Plan (SIP) Provisions for the 1997 Fine Particle (PM2.5) National Ambient Air Quality Standard (NAAQS) and 2006 PM2.5 NAAQS*," (79 FR 31566), areas classified as "moderate" nonattainment or above are required to develop and submit a demonstration that their current air pollution rules fulfill the 24-hour PM2.5 RACT assessment. In February 2015, a RACT assessment update was submitted as a supplement to the 2012 AQMP.

As part of the attainment plan requirement for the 2012 annual PM2.5 NAAQS, a RACT analysis update – containing up-to-date information of pending items from the previous RACM/RACT demonstration and the evaluation of recently adopted/amended rules in other California air districts – was developed for direct PM2.5 and PM2.5 precursors. It is important to note that no additional CTGs or Alternative Control Techniques (ACTs) have been released since the 2012 evaluation. Table VI-A-4 provides an updated brief discussion of the rules identified for further evaluation in the preceding demonstrations. Several SCAQMD rules have been amended to address the identified issue. This analysis updates the preceding RACM/RACT analyses. SCAQMD will be submitting the 2015 RECLAIM amendments to U.S. EPA providing necessary data and demonstration to satisfy RACT requirements.

TABLE VI-A-4

Outstanding Rule Evaluations

SCAQMD Rule(s)	Status
223	SJVAPCD Rule 4570 is more stringent regarding applicability than Rule 223 (i.e., applies to smaller facilities) for milk cows (1,000 milk cows in SCAQMD vs. 500 milk cows in SJVAPCD), and for chickens and ducks (650,000 birds in SCAQMD vs. 400,000 birds in SJVAPCD). Staff evaluated the feasibility and effectiveness of extending rule applicability to dairies and certain poultry facilities using a lower size threshold, and the assessment can be found in the Control Measure Assessment section of this Appendix.
462	Rule 462 controls emissions of volatile organic compounds (VOC) from facilities that load organic liquids. It is more stringent than the CTG and meets the core requirements for RACT but is not as stringent as BAAQMD Rule 8-33 with respect to the emissions limit for Class A facilities. SCAQMD staff evaluated the rule for potential emission reductions as part of the 2016 AQMP control development, and the assessment can be found in the Control Measure Assessment section of this Appendix.
1106	Rule 1106 regulates marine and pleasure craft coating operations. It does not meet the U.S. EPA CTG for one coating category – solvent based inorganic zinc. This type of coating is not used in major source facilities subject to Rule 1106 in the Basin.
1112/2002	BAAQMD, Regulation 9, Rule 13 (Adopted 9/17/12) controls emissions from the manufacture of Portland cement. The most recent RECLAIM amendment (version 12/2015) lowered the NOx emission limit for cement kilns from 2.73 to 0.5 lbs per ton clinker, which is more stringent than BAAQMD Regulation 9, Rule 13 (0.5 vs. 2.3 lbs per ton of clinker). At present, there is no operating Portland cement plant in SCAQMD. Any new facility will be subject to BARCT, which is 0.5 lbs per ton of clinker.
1118/1150.1	Rule 1118 controls and minimizes flaring and flaring related emissions from refineries. It was determined to be RACT from the 2007 SIP. SJVAPCD Rule 4311 (exempting municipal landfills which is regulated under SCAQMD Rule 1150.1) applies to other sources > 10 tons per year (TPY). SCAQMD has a small inventory of flare emissions from sources other than refineries and landfills. According to 2012 AER reports, flare emissions from oil and gas production and wastewater treatment plants result in 2.8 and 5.6 TPY of VOC, respectively. SCAQMD staff evaluated the rule for potential emission reductions as part of the 2016 AQMP control development, and the assessment can be found in the Control Measure Assessment section of this Appendix. Further emission reductions are proposed through CMB-03, refer to Chapter 4 and Appendix IV-A for details.

TABLE VI-A-4 (CONCLUDED)
Outstanding Rule Evaluations

SCAQMD Rule(s)	Status
1128	Rule 1128 control emissions from paper, fabric and film coating operations. It is not as stringent as the 2007 EPA CTGs (CTG 80 g/L vs. Rule 1128 265 g/L) for facilities emitting > 15 lbs/day and coating lines emitting > 25 TPY. To the best of staff's knowledge, no facilities exceed the CTG applicable threshold (25 TPY of VOC per coating line) in the Basin. In addition, Rule 1128 does not have a trigger for when it is considered implementable. Instead, the rule pertains to all paper, fabric, and film coating operations. Currently, approximately 190 facilities are subject to Rule 1128, out of which 21 are major source facilities. Rule 1128 covers more sources / facilities regardless of potential emission level and therefore in general provides RACT-level of control for this source category.
1130	Rule 1130 was amended in May 2014 to reduce fountain solution VOC content to between 16–85 g/l with optional control device efficiency of 90–95%. The rule meets current CTG specifications and achieves RACT equivalency.
1148.1/1173	VCAPCD's Rule 71.5 (Adopted 12/13/94) controls reactive organic compound (ROC) emissions from glycol dehydrators used in natural gas dehydration through condenser/vapor disposal, flare/incinerator, or emission control systems that controls glycol regenerator vent ROC emissions by at least 95%. SCAQMD emissions from glycol dehydrators are regulated under Rules 1148.1 (Oil and Gas Production Wells). The 95% control efficiency in Rule 1148.1 is as stringent as VCAPCD Rule 71.5. VOC leaks and releases from components at petroleum facilities are regulated under Rule 1173. Both Rule 1148.1 and Rule 1173 were determined to fulfill RACT requirements by the U.S. EPA in August 2011[5] and March 2010[6], respectively.

To cover the development of rules and regulations beyond those already included in the 2015 RACT supplement, staff has evaluated the recent regulatory actions in San Joaquin Valley Air Pollution Control District (SJVAPCD), Imperial County Air Pollution Control District (ICAPCD), Sacramento Metropolitan Air Quality Management District (SMAQMD), Bay Area Air Quality Management District (BAAQMD), and Ventura County Air Pollution Control District (VCAPCD). In 2015, the following rules have been amended/adopted in the aforementioned air districts:

SJVAPCD Rule 4905 Natural Gas-Fired, Fan-Type Central Furnaces

Evaluation: SJVAPCD Rule 4905 was amended on January 22, 2015 to lower the NOx emission limit for residential units from 40 ng/J to 14 ng/J and to expand the rule applicability to commercial buildings and

manufactured homes. In SCAQMD, NOx emissions from natural gas-fired, fan-type central furnaces in commercial and residential units are regulated by Rule 1111 (amended September 5, 2014). Rule 1111 is not subject to RACT because it is applicable to sources that are too small to exceed the major source threshold of 100 tpy for the 2012 annual PM NAAQS RACT analysis. Nonetheless, the requirements in SCAQMD Rule 1111 are generally as stringent as those in SJVAPCD Rule 4905.

SMAQMD Rule 442 Architectural Coatings

Evaluation: SMAQMD Rule 442 was amended on September 24, 2015 to incorporate the requirements of the Suggested Control Measure (SCM) adopted by CARB in 2007. In SCAQMD, VOC emissions from architectural coatings are regulated by Rule 1113 (amended September 6, 2013). Rule 1113 contains limits that, for some coating categories, are more stringent than the SCM. The requirements in SCAQMD Rule 1113 are generally as stringent as, or more stringent than, those in SMAQMD Rule 442.

VCAPCD Rule 74.33 Liquefied Petroleum Gas Transfer or Dispensing

Evaluation: On January 13, 2015, VCAPCD Rule 74.33 was amended to require that all containers subject to the rule have either a Low Emission Fixed Liquid Level Gauges (FLLG), which has a smaller orifice (0.025 inches instead of 0.055 inches) or transfer LPG using a fill by weight technique or alternative technology that monitors the maximum fill level without the use of an fluid liquid level gauges. In the SCAQMD, VOC emissions associated with the transfer and dispensing of liquefied petroleum gas are regulated by Rule 1177 (adopted June 1, 2012). Rule 1177 describes equipment and operation requirements, leak detection and repair program requirements, recordkeeping requirements, and reporting requirements. The requirements in SCAQMD Rule 1177 are generally as stringent as those in VCAPCD Rule 74.33.

VCAPCD Rule 74.15.1 Boilers, Steam Generators, and Process Heaters

Evaluation: VCAPCD Rule 74.15.1 was amended on June 23, 2015 to lower the NOx emission limits to 12 ppm for natural gas – atmospheric combustion, and to 9 ppm for natural gas – all others. These new limits will only apply to new or replaced boilers, steam generators, and process heaters with a rated heat input capacity greater than 2 million BTU/hr and less than 5 million BTU/hr. In SCAQMD, NOx emissions from boilers, stream generators and process heaters between 2 and 5 million BTU/hr are regulated under Rule 1146.1. The emission limit is 12 ppm for atmospheric units, 15 ppmv for digester gas, 25 ppmv for landfill gas, and 9 ppm for other units. The requirements in SCAQMD Rule 1146.1 are generally as stringent as those in VCAPCD Rule 74.15.1.

Overall, the RACT update for the 2012 annual PM2.5 NAAQS concludes that the SCAQMD's rules and regulations are, for the most part equivalent to, or more stringent than other districts' rules and regulations. Where improvements are possible, SCAQMD staff further evaluated potential emission reductions in the Control Measure Assessment of this Appendix.

BACT Evaluation

In the 1994 Addendum to the General Preamble for Implementation of Title I of the Clean Air Act Amendments of 1990 (The 1994 Addendum), U.S. EPA defines BACT similarly to BACM as an emission limitation based on the, "*maximum degree of reduction of each pollutant emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques*." To fulfill the CAA requirements of a "serious" nonattainment area for the 2006 24-hour PM2.5 standard, BACT is required for major emitting point sources. CAA Subpart 4 defines a major source threshold of 70 tons per year (TPY) of PM10 in "serious" PM10 nonattainment areas. In the Proposed Rule "*Fine Particle Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*" (80 FR 15340), EPA indicates that "*it is also reasonable to establish the threshold for PM2.5 in Serious areas at the same level as the threshold that applies to PM10 in Serious areas*." For the purpose of this BACT evaluation, point sources that emit equal to or greater than 70 TPY of SOx, NOx, VOC, NH3 or PM2.5 in 2015 are considered major stationary sources, and their applicable rules are evaluated for BACT equivalency.

To catch all the improvements in innovative control technologies and identify potential areas for improvements in SCAQMD rules and regulations, the SCAQMD staff re-evaluated all of the SCAQMD's source-specific rules and regulations, and compared the requirements in these rules with the analogous rules adopted by four other air districts in California. The four air districts were San Joaquin Valley, Sacramento Metropolitan, Ventura, and Bay Area. They are selected based on the severity of their nonattainment status and their near-term attainment dates as shown in Table VI-A-1.

The summary of this analysis is presented in Attachment VI-A-1. In this table, staff *only* listed the areas where the requirements in other air districts' rules are more stringent than those in the SCAQMD's rules and regulations. The analysis in Attachment VI-A-1 shows that in general, the SCAQMD's current rules and regulations are equivalent to or more stringent than those developed by other air districts. In several areas identified in the attachment, the existing source-specific rules may be amended to lower the emissions standards, promote cleaner technologies and add additional best management practices. Subsequently, several control measures have been developed to further study the emission reduction opportunities as discussed in greater details in the following sections.

Existing and Potential Control Measures for Key PM Source Categories

This section describes the existing control strategies for the key stationary source categories under SCAQMD jurisdiction. Potential control measures are identified by comparing existing control measures to the requirements in federal and state regulations and guidance, as well as the analogous rules in other air districts.

Since PM2.5 is a complex mixture of directly emitted primary pollutants and secondarily formed particles, many chemical species and associated precursor emissions contribute to its total mass. To estimate the contribution from PM2.5 precursors and direct PM2.5, it is useful to weight the value of the precursor emission reductions (on a per ton basis) to microgram per cubic meter improvements in ambient PM2.5 levels. The 2012 AQMP provided a set of factors to estimate the contribution of precursor emissions to PM2.5 concentration. The factors were empirical estimations based on CMAQ simulations. While similar relative contributions to PM2.5 have not been developed for ammonia, the mass contributions of ammonium sulfate and ammonium nitrate are accounted for in the SOx and NOx contributions. Yet, for the purpose of this RACM/BACM analysis, ammonia is included to make sure all of the potential control measures could be captured. Table VI-A-5 summarizes the precursor contribution factors, annual average emissions inventory for 2012 and the same emissions normalized to direct PM2.5 emissions based on the contribution factor. For instance, 15 tpd of NOx emission contributes to PM2.5 concentration as much as one tpd of directly emitted PM2.5 emissions does, indicating that NOx reductions are approximately 15 times less effective than directly emitted PM2.5 reductions.

Table VI-A-5

PM-equivalent Base Year Emission Inventory for the 24-hour PM2.5 NAAQS, tpd

	VOC	NOx	SOx	PM2.5	NH3	Total
2012 AQMP Scaling Factor [PM-eqv]	0.020	0.068	0.53	1.00	0.27	-
2012 Base Year Inventory*	473	546	18.4	66.7	81.8	-
PM-eqv Base Year Inventory	9.6	36.9	9.7	66.7	22.2	145

*Based on emission inventory in draft 2016 AQMP

It is difficult to set a threshold based on atmospheric concentration due to the complex nature of chemical mechanisms involved in PM2.5 formation and the corresponding need for complex modeling to assess any proposed emission reduction. Instead, the level of emissions are well defined at an individual source level and it is therefore straightforward to rank and categorize them. The precursor contributions were accounted for via the relative contribution factors given in Table VI-A-5. Still, in order to be more cautious and ensure all the potential major sources are included in the analysis, a 2 percent threshold was used to select key PM source categories. The total PM2.5 equivalent emission for the 2012 base year is 145 tpd as shown in Table VI-A-5. Using the 2 percent threshold sets the threshold at 2.90 tpd. A key source

category is defined when the aggregate emissions from a source category (i.e., total PM2.5 equivalent inventory) exceeds 2.90 tpd. Table VI-A-6 lists the 11 key PM source categories identified using the methodology outlined above.

Table VI-A-6

Key PM Source Categories for the 24-hour PM Standard*, PM2.5-equivalent tpd

(Source Categories under SCAQMD Authority are in Bold)

6-digit EIC	Source Category	VOC	NOx	SOx	PM25	NH3	Sum
610600	**Residential Fuel Combustion-Wood Combustion - Wood Stoves**	**0.11**	**0.02**	**0.03**	**2.84**	**0.00**	**3.00**
620618	**Farming Operations-Livestock Wastes**	**0.05**	**0.00**	**0.00**	**0.24**	**2.71**	**2.99**
640641	**Paved Road Dust-Paved Road Travel Dust - Local Streets**	**0.00**	**0.00**	**0.00**	**2.98**	**0.00**	**2.98**
690680	**Cooking-Commercial Charbroiling**	**0.03**	**0.00**	**0.00**	**7.72**	**0.00**	**7.75**
699995	Other (Miscellaneous Processes)-Other	0.00	0.00	0.00	0.00	6.80	6.80
710734	Light Duty Passenger-Catalyst Hot Stabilized	0.16	2.13	0.42	0.48	1.99	5.17
710746	Light Duty Passenger-Catalyst Brake Wear	0.00	0.00	0.00	3.52	0.00	3.52
723734	Light Duty Trucks-2 (3751 to 5750 lb.)-Catalyst Hot Stabilized	0.08	1.49	0.21	0.17	1.10	3.04
724734	Medium Duty Trucks (5751-8500 lb.)-Catalyst Hot Stabilized	0.08	1.52	0.20	0.13	1.18	3.11
744764	Medium Heavy Duty Diesel Trucks (14001-33000 lb.)-Diesel Hot Stabilized	0.04	2.46	0.03	1.39	0.03	3.95
746764	Heavy Heavy Duty Diesel Trucks (>33001 lb.)-Diesel Hot Stabilized	0.11	6.29	0.08	2.79	0.06	9.33
860887	Commercial/Industrial Mobile Equipment-Construction and Mining Equipment	0.07	1.73	0.01	1.38	0.00	3.19

*Based on emission inventory in draft 2016 AQMP

The threshold for the annual PM2.5 standard was established using the same approach as the 24-hour PM standard. The thresholds are pollutant and air quality standard specific, given the complexity of precursor chemistry and the level of air quality standard. The relative contribution of precursor emissions to the annual PM2.5 value was taken from the 2007 AQMP modeling results. After accounting for PM formation potential of the four precursors, the total PM2.5 equivalent emission for the 2012 base year is 626 tpd (Table VI-A-7). Using the 2 percent threshold, a key PM source category is defined when the aggregated emissions from a source category (i.e., total PM2.5 equivalent inventory) exceeds 12.5 tpd. Table VI-A-8 presents the 10 key PM source categories for the 2012 annual PM Standard.

Table VI-A-7

PM-equivalent Base Year Emission Inventory for the Annual PM2.5 NAAQS, tpd

	VOC	NOx	SOx	PM2.5	NH3	Total
2007 AQMP Scaling Factor [PM-eqv]	0.20	0.60	2.00	1.00	1.23	-
2012 Base Year Inventory*	473	546	18.4	66.7	81.8	-
PM-eqv Base Year Inventory	94.6	328	36.8	66.7	101	626

*Based on emission inventory in draft 2016 AQMP

Table VI-A-8

Significant BACM Source Categories for the Annual PM Standard*, PM2.5-equivalent tpd
Source Categories under SCAQMD Authority are in Bold.

6-digit EIC	Source Category	VOC	NOx	SOx	PM25	NH3	Sum
510506	Consumer Products-Phase III Consumer Products	15.72	0.00	0.00	0.00	0.00	15.72
620618	**Farming Operations-Livestock Wastes**	**0.32**	**0.00**	**0.00**	**0.24**	**12.29**	**12.85**
699995	Other (Miscellaneous Processes)-Other	0.00	0.00	0.00	0.00	30.78	30.78
710734	Light Duty Passenger-Catalyst Hot Stabilized	1.59	18.88	0.80	0.48	8.99	31.53
723734	Light Duty Trucks-2 (3751 to 5750 lb.)-Catalyst Hot Stabilized	0.76	13.23	0.00	0.17	4.97	19.92
724734	Medium Duty Trucks (5751-8500 lb.)-Catalyst Hot Stabilized	0.83	13.53	0.00	0.13	5.33	20.58
744764	Medium Heavy Duty Diesel Trucks (14001-33000 lb.)-Diesel Hot Stabilized	0.43	21.82	0.00	1.39	0.16	23.90
746764	Heavy Heavy Duty Diesel Trucks (>33001 lb.)-Diesel Hot Stabilized	1.07	55.85	0.00	2.79	0.27	60.27
833835	Ocean Going Vessels-Container Ships	0.22	10.05	1.76	0.43	0.02	14.23
860887	Commercial/Industrial Mobile Equipment-Construction and Mining Equipment	0.70	15.32	0.00	1.38	0.02	17.47

*Based on emission inventory in draft 2016 AQMP

Based on the analysis described above, the following key stationary source categories (under SCAQMD jurisdiction) are identified for the PM2.5 NAAQS:

- Residential Fuel Combustion-Wood Combustion - Wood Stoves
- Farming Operations-Livestock Wastes
- Paved Road Dust-Paved Road Travel Dust - Local Streets
- Cooking-Commercial Charbroiling

The existing control measures for these four key stationary sources are summarized below. Potential control measures are identified by comparing existing control measures to the requirements in federal and state regulations and guidance, as well as the analogous rules in other air districts.

Residential Fuel Combustion – Wood Combustion – Wood Stoves

Current control measure

Rule 445 Wood Burning Devices (Amended May 3, 2013)

Rule 445 was first adopted in 2008 to reduce the emissions of particulate matter from wood-burning devices. The rule establishes requirements for the sale, operation, and installation of wood burning devices. Under Rule 445, only gaseous-fueled hearth devices are allowed to be installed in new developments. For existing residential and commercial developments (additions, remodels, etc.), Rule 445 requires wood burning devices sold or installed to be U.S. EPA certified or equivalent. Rule 445 prohibits the burning of any product not intended for use as a fuel (e.g. trash) in a wood burning device and requires commercial firewood sellers to only sell seasoned firewood (20 percent or less moisture content) from July through February. Rule 445 also includes a mandatory winter burning curtailment program that extends from November 1 through the end of February in each winter season. In the 2011/2012 winter season when the program was first implemented, the public is required to refrain from both indoor and outdoor wood-based fuel burning in specific areas where PM2.5 air quality is forecast to exceed 35 $\mu g/m^3$ (federal 24-hour standard). The SCAQMD has also implemented the Healthy Hearths™ program that includes a comprehensive education and outreach effort as well as financial incentives to encourage the public to switch to cleaner, gaseous-fueled hearth products. On June 11, 2009, the U.S. EPA approved Rule 445 into the SIP as fulfilling BACT/BACM for PM10 (74 FR 27716). Rule 445 was last amended on May 3, 2013 to lower the curtailment threshold from 35 to 30 $\mu g/m^3$, establish criteria for a basin-wide curtailment, and set standards for solid-fuel labeling for wood and wood-based products by commercial firewood sellers. U.S. EPA approved that amendment of Rule 445 for SIP approval in June 2013.

Federal and State rules and regulations

On February 3, 2015, U.S. EPA finalized the amendments for New Source Performance Standards (NSPS) for New Residential Wood Heaters (40 CFR Part 60 Subpart AAA). The 2015 NSPS significantly lowers the certification emission limits for wood-burning heaters to 4.5 g/hr in phase 1 and 2.0 g/hr in phase 2. Rule 445 points to the NSPS for emission standards in U.S. EPA certified wood-burning heaters and is therefore as stringent as the newly promulgated NSPS. There are no other federal or state regulations applicable to this source category.

Analogous rules in other air districts

SJVAPCD Rule 4901 Wood Burning Fireplaces and Wood Burning Heaters (Amended September 18, 2014)

SJVAPCD recently lowered the No Burn threshold for high polluting wood burning heaters and fireplaces from the 30 µg/m^3 to 20 µg/m^3 in 2014. The staff report indicates that lowering the threshold level would increase the No Burn days from 35 days per wood burning season per county to 69 days per wood burning season per county. The increase in the number of curtailment days could reduce emissions by 1.5 tpd of PM2.5. Rule 4901 also requires the replacement of non-EPA Phase II certified wood burning devices upon sale or transfer of real property.

SMAQMD Rule 417 Wood Burning Appliances (Adopted October 26, 2006)

Staff evaluated the requirements of SMAQMD Rule 417 and found no requirements that were more stringent than those already incorporated in Rule 445.

BAAQMD Regulation 6 Rule 3 Wood-Burning Device (Adopted July 9, 2008)

Staff evaluated the requirements of BAAQMD Regulation 6 Rule 3 and found no requirements that were more stringent than those already incorporated in Rule 445.

Evaluation

As part of the 2016 AQMP control measure development, staff evaluated the feasibility and effectiveness of lowering the No Burn threshold and the requirement to replace non-EPA Phase II certified wood burning devices upon sale or transfer of real property. Other emission reduction opportunities for this source category could be found in BCM-09.

Farming Operations-Livestock Waste

Current control measure

Emissions from livestock waste in farming operations are regulated by Rule 223 and Rule 1127 in the SCAQMD. More details are described as follows:

Rule 223 Emission Reduction Permits for Large Confined Animal Facilities (Adopted June 2, 2006)

Rule 223 requirements apply to Large Confined Animal Facilities (LCAFs) above certain size thresholds. Dairies with at least 1,000 milking cows, poultry facilities with at least 650,000 birds, and horse facilities with at least 2,500 horses qualify as LCAFs. Pertaining to manure management, the dairy provisions require that owners/operators implement at least six of 12 corral measures, two of seven solid manure or separated solids handling measures, one of eight liquid manure handling measures, and two of four land application measures. A Poultry LCAF owner/operator must implement at least one of seven solid manure or separated solids handling measures, and one of eight liquid manure handling measures.

Rule 1127 Emission Reductions from Livestock Waste (Adopted August 6, 2004)

Rule 1127 was adopted on August 6, 2004 to reduce emissions of ammonia, VOC, and PM10 emissions from dairy livestock waste. Rule 1127 applies to dairy farms with 50 or more cows, heifers, and/or calves and to manure processing operations, such as composting operations and anaerobic digesters. The major requirements of Rule 1127 include Best Management Practices (BMPs) to minimize fugitive dust emissions, minimize excess water in corrals, pave feedlanes at least 8 feet on the corral side of the feedlane fence, clear corrals of accumulated manure, and timely remove on-dairy stockpiles. Manure disposal is permitted from the dairy only to a manure processing operation designed to reduce ammonia and VOC emissions from unprocessed manure; agricultural land within the SCAQMD approved for the spreading of manure; or a combination of the above options.

Federal and State rules and regulations

There are no federal or State regulations/policies describing RACM/BACM for this source category.

Analogous rules in other air districts

SJVAPCD Rule 4570 Confined Animal Facilities (Amended October 21, 2010)

Rule 4570 limits emissions of VOC and NH3 from Confined Animal Facilities. Rule 4570's regulatory thresholds include facilities with at least 500 milking cows, 3,500 beef cattle, 7,500 calves, heifers, or other cattle, 400,000 heads of chicken and ducks, 100,000 heads of turkey, 3,000 heads of swine and horses, and 15,000 heads of sheep, goats, or any combination of the two. Rule 4570 is more stringent regarding applicability than Rule 223 for milk cows (1,000 milk cows in SCAQMD vs 500 milk cows in SJVAPCD), and for chickens and ducks (650,000 birds in SCAQMD vs. 400,000 birds in SJVAPCD). Rule 4570 also made certain feed and housing menu items mandatory for dairies and poultry facilities. However, SCAQMD Rule 1127 has lower applicability thresholds for cows, heifers and/or calves. Rule 223 also has a lower applicability for horse facilities (2,500 in SCAQMD vs. 3,000 in SJVAPCD).

For corral mitigation measures in dairy operations, Rule 4570 has nine mitigation measures, six of which are mandatory and one additional measure that is required from the remaining three. SCAQMD Rule 223 requires at least six control measures from 10 Class One mitigation measures and two Class Two mitigation measures. For one Class One mitigation measure – inspect water pipes and troughs and repair leaks – SCAQMD Rule 223 has a higher frequency requirement than SJV Rule 4570. In addition, SCAQMD Rule 1127, which applies to dairies with 50 or more cows, requires facilities to choose at least five of the seven corral mitigation measures. Rule 4570 contains two solid waste control measures, from which facilities are required to choose at least one. SCAQMD Rule 223 has four Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least two. With regard to liquid waste mitigation measures in dairies, operators are required to choose at least one of the four mitigation measures listed in Rule 4570. SCAQMD Rule 223 has five Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least one. SCAQMD Rule 1127 requires that manure removed must be either treated at an approved manure processing operation, or applied on agricultural land with local approval.

BAAQMD Regulation 2 Rule 10 Large Confined Animal Facilities (Adopted July 19, 2006)

Rule 2-10 is a permit rule that limits emissions of precursor organic compound, NOx and PM10 from large CAFs. The applicability threshold is the same as in SCAQMD Rule 223. Rule 2-10 requires RACT to be implemented for a large CAF.

SMAQMD Rule 496 Large Confined Animal Facilities (Adopted August 24, 2006)

Rule 496 applies to large CAFs with the same regulatory threshold as SCAQMD Rule 223. Regarding corral mitigation measures in dairies, Rule 496 has 15 Class One mitigation measures and three Class Two mitigation measures from which facilities are required to choose at least six. SCAQMD Rule 223 requires the same number of control measures (at least six) from ten Class One mitigation measures and two Class Two mitigation measures. For controlling emissions from solid waste, Rule 496 requires the dairy operators to choose at least two mitigation measures from five Class One mitigation measures and three Class Two mitigation measures; SCAQMD Rule 223 has four Class One mitigation measures and three Class Two mitigation measures, from which facilities are required to choose at least two. Regarding liquid waste mitigation measures, Rule 496 has five Class One mitigation measures and five Class Two mitigation measures, from which facilities are required to choose at least one. SCAQMD Rule 223 has similar requirements at which operators are required to choose at least one measure from five Class One mitigation measures and three Class Two mitigation measures.

Evaluation

Rule 223 and 1127 together represent a BACT-level of control for this source category. No additional feasible control measures pertaining to the operational practices of the Basin's large confined animal facilities are identified. As part of the 2016 AQMP control measure development, staff evaluated the feasibility and effectiveness of extending rule applicability to dairies and certain poultry facilities using a lower size threshold. The evaluation can be found in the Control Measure Assessment section of this Appendix.

Paved Road Dust -Paved Road Travel Dust - Local Streets

Current control measure

SCAQMD Rule 1186 PM10 Emissions from Paved and Unpaved Roads and Livestock Operations (Amended July 11, 2008)

Rule 1186 controls emissions of particulate matter (PM) from paved and unpaved public roads, and livestock operations. It establishes requirements to prevent material from being deposited on roadways and also requires local jurisdictions to procure certified street sweeping equipment. Rule 1186 requires new or widened roads to be constructed with curbing or, as an alternative, paved shoulders. Local governments are also required to remove material deposited onto roads as a result of wind, water erosion, or by other means, and are also required to procure only SCAQMD Rule 1186-certified street sweepers when replacing equipment. The Rule also requires unpaved access connections and unpaved

feed lane access areas in livestock operations to be treated. All grinding activities are limited to 2 to 5 p.m. if visible emissions are detected.

SCAQMD Rule 1157 PM10 Emission Reductions from Aggregate and Related Operations (Amended September 8, 2006)

Rule 1157 requires access improvements which are intended to reduce the amount of material tracked out from a facility onto surrounding paved public roads.

SCAQMD Rule 403 Fugitive Dust (Amended June 3, 2005)

Rule 403 requires access improvements for sites greater than 5 acres and all material tracked out from applicable sources must be removed at the conclusion of the work day or at any time it extends more than 25 feet out from a site.

Federal and State rules and regulations

Staff evaluated the requirements of U.S. EPA's Fugitive Dust Background Document and Technical Information Document for BACM and found no requirements that were more stringent than those already incorporated in the SCAQMD rules for this source category.

There are no State regulations/policies describing RACM/BACM for this source category.

Analogous rules in other air districts

SJVAPCD Rule 8061 Paved and Unpaved Roads (Amended August 19, 2004)

SJVAPCD Rule 8061 requires municipalities to sweep paved roads at least once per month with PM10 efficient units. For unpaved roads, on any unpaved road segment with 26 or more Annual Average Daily Traffic (AADT), the owner/operator shall limit visible dust emission to 20 percent opacity and comply with the requirements of a stabilized unpaved road, or shall implement an APCO-approved Fugitive PM10 Management Plan; within an urban area, the Rule requires all new unpaved roads be paved. SCAQMD evaluated the rule for potential emission reductions as part of the 2016 AQMP control development.

SMAQMD Rule 403 Fugitive Dust (Adopted August 3, 1997)

Staff evaluated the requirements of SMAQMD Rule 403 and found no requirements that were more stringent than those already incorporated in the SCAQMD rules for this source category.

BAAQMD has no rule for this source category.

Evaluation

As part of the 2016 AQMP control measure development, staff evaluated the feasibility and effectiveness of establishing minimum street sweeping frequencies and enhancing street cleaning for roads with higher silt loadings. The evaluation can be found in the Control Measure Assessment section of this Appendix.

Cooking-Commercial Charbroiling

Current control measure

Rule 1138 Control of Emissions from Restaurant Operations (Adopted November 14, 1997)

SCAQMD regulates VOC and PM emissions from chain-driven charbroilers through Rule 1138. Rule 1138 covers chain-driven charbroilers cooking 875 pounds of meat or more per week, applicable to mostly large chain operations. The Rule requires the installation of flameless catalytic oxidizers, or equivalent control devices, to chain-driven charbroilers.

Federal and State rules and regulations

There are no federal or State regulations/policies describing RACM/BACM for this source category.

Analogous rules in other air districts

SJVAPCD Rule 4692 Commercial Charbroiling (Amended September 17, 2009)

Rule 4692 reduces PM emissions by requiring catalytic oxidizers for chain-driven charbroilers cooking 400 pounds of meat or more per week. This threshold is more stringent than Rule 1138 which applies to chain-driven charbroilers cooking 875 pounds of meat or more per week. In its 2012 PM2.5 Plan, SJVAPCD committed to expand Rule 4692 applicability to include under-fired charbroilers in 2016 with an anticipated compliance date of 2017.

SMAQMD has no rule for this source category.

BAAQMD Regulation 6, Rule 2 Commercial Cooking Equipment (Adopted December 5, 2007)

Rule 6-2 requires controls on chain-driven charbroilers and on under-fired charbroilers meeting the requirements of: 10 square feet of surface area; purchasing 1,000 lbs of beef or more per week; and cooking 800 lbs of beef per week. PM10 emissions are limited to no more than 1.0 pounds of PM10 per 1000 pounds of beef cooked for applicable under-fired charbroilers.

Evaluation

Staff has assessed the potential emission reduction opportunities of lowering the regulatory threshold for chain-driven charbroilers as part of the 2016 AQMP control measure development. Staff has also evaluated the ongoing technology development of under-fired charbroiler control technology and examined the feasibility of extending rule applicability to under-fired charbroilers. The evaluation can be found in the Control Measure Assessment section of this Appendix.

Identifying Potential Control Measures

Regarding the approach of identifying emission reduction programs, the U.S. EPA recommends that nonattainment air districts first identify the emission reduction programs that have already been implemented at the federal, state or local air district level. Next, the U.S. EPA recommends that air districts examine additional control measures adopted for other nonattainment areas to attain the ambient air quality standards as expeditiously as practicable. To demonstrate that the SCAQMD has considered all candidate measures that are available and technologically and economically feasible to implement within the Basin, a 7-step analysis was conducted, as described below.

Step 1 – Air Quality Technology Symposium

The 2015 Air Quality Technology Symposium was held on June 10 and 11, 2015 with participation of technical experts from a variety of areas and the public to solicit new and innovative concepts to assist the Basin in attaining the NAAQS for PM2.5 by 2019–2021 and ozone by 2024–2032. In addition, multiple internal meetings were held from March to October of 2015 to brainstorm ideas for feasible control measures. The SCAQMD also conducted on-going extensive outreach to engage a wide range of stakeholders in the process. In general, the following concepts were proposed:

- Promoting zero emission and near-zero emissions public transport fleet and freight, and providing incentives for on-road and non-road mobile sources;
- Addressing co-benefits from GHG reductions, residential weatherization and other energy efficient measures, the need for energy storage and a smart grid, and the use of outreach to promote energy efficiency measures;
- Further reducing VOC emissions for select coating, adhesive, and solvent categories by limiting the allowable VOC content in formulations or incentivizing the use of super compliant technologies;
- Further reducing NOx emissions from commercial and multi-unit residential space heating and boilers;
- Further reducing PM emissions from commercial cooking through the identification of more affordable and innovative under-fired charbroiler controls;
- Further reducing PM emissions from fugitive dust sources;
- Further reducing NH3 from manure management strategies through acidifier application and dietary manipulation;
- Further reducing PM from agricultural, prescribed, and training burning; and
- Further reducing PM from cooling towers.

Step 2 – RACT/BACT

The RACT/BACT analysis identified several SCAQMD rules that are less stringent than the EPA CTGs or the analogous rules in other air districts. SCAQMD staff's analysis is summarized in Table VI-A-9. Consequently, the SCAQMD evaluated them as candidate potential measures in the Control Measure Assessment section of this Appendix.

TABLE VI-A-9

Rules Identified for Potential Control Measures from RACT/BACT Assessment

Rule #	Evaluation
223	SJVAPCD Rule 4570 is more stringent regarding applicability than Rule 223 (i.e. applies to smaller facilities) for milk cows (1,000 milk cows in SCAQMD vs. 500 milk cows in SJVAPCD), and for chickens and ducks (650,000 birds in SCAQMD vs. 400,000 birds in SJVAPCD). Staff evaluated the feasibility and effectiveness of extending rule applicability to dairies and certain poultry facilities using a lower size threshold, and the assessment can be found in the Control Measure Assessment section of this Appendix.
462	Rule 462 controls emissions of VOC from facilities that load organic liquids. It is more stringent than the CTG and meets the core requirements for RACT but is not as stringent as BAAQMD Rule 8-33 with respect to the emissions limit for Class A facilities. SCAQMD staff evaluated the rule for potential emission reductions as part of the 2016 AQMP control development, and the assessment can be found in the Control Measure Assessment section of this Appendix.
1115	Rule 1115 is not as stringent as the 2008 EPA CTGs for a few coating processes for facilities emitting > 15 lbs/day. SCAQMD evaluated the rule for potential emission reductions as part of the 2016 AQMP control development.
1118 /1150.1	Rule 1118 was determined to be RACT from the 2007 SIP targeting flare emissions from refineries. SJVAPCD Rule 4311 (exempting municipal landfills which is regulated under Rule 1150.1) applies to other sources > 10 tons per year (TPY). SCAQMD has a small inventory of flare emissions from sources other than refineries and landfills. According to 2012 AER reports, flare emissions from oil and gas production and wastewater treatment plants result in 2.8 and 5.6 TPY of VOC, respectively. SCAQMD staff evaluated the rule for potential emission reductions as part of the 2016 AQMP control development, and the assessment can be found in the Control Measure Assessment section of this Appendix. Further emission reductions are proposed through CMB-03, refer to Chapter 4 and Appendix IV-A for details.

TABLE VI-A-9 (CONCLUDED)

Rules Identified for Potential Control Measures from RACT/BACT Assessment

Rule #	Evaluation
1138	SJVAPCD Rule 4692 has a lower applicability threshold (400 vs 875 lbs of meat or more per week in SCAQMD) for chain-driven charbroilers. BAAQMD Rule 2 of Regulation 6 applies to under-fired charbroilers with combined total grill surface area of at least 10 square feet, purchasing 1,000 lbs of beef or more per week, and cooking 800 lbs of beef per week. As part of the 2016 control measure development, staff evaluated the feasibility of lowering the regulatory threshold of chain-driven charbroilers from 875 to 400 lbs of meat or more per week and extending applicability to under-fired charbroilers.
1186	SJVAPCD Rule 8061 requires municipalities to sweep paved roads at least once per month with PM10 efficient units. For unpaved roads, on any unpaved road segment with 26 or more AADT, the owner/operator shall limit visible dust emission to 20% opacity and comply with the requirements of a stabilized unpaved road, or shall implement an APCO-approved Fugitive PM10 Management Plan; within an urban area, this rule requires all new unpaved roads be paved. SCAQMD evaluated the rule for potential emission reductions as part of the 2016 AQMP control development.

Step 3 – EPA Technical Support Documents

For newly adopted / amended rules to be incorporated into the California SIP, they have to be submitted for U.S. EPA's review and approval. U.S. EPA prepares Technical Support Documents (TSD) that review the State's submittals of rules to be approved in the SIP, outline the Clean Air Act requirements for U.S. EPA to approve such submittal, and provide evaluation and recommendation for action on the State's submittals. TSDs include U.S. EPA's suggestions for future rule revisions that could be considered as potential control measures. Below are two of the U.S. EPA's TSD recommendations that might result in potential emission reductions:

- Rule 1125 Metal Container, Closure, and Coil Coating Operations (last amended March 7, 2008). The 2009 TSD provides the following recommendations:

    1. In section (c)(1), lower the VOC content limit for three-piece can interior body sprays to 360 grams per liter. Please see for example, SJVAPCD Rule 4604 and BAAQMD Rule 8-11.

    2. In section (c)(1), lower the limit for two-piece can interior body sprays to 420 grams per liter. Please see for example, SJVAPCD Rule 4604 and BAAQMD Rule 8-11.

    3. Add a VOC limit and corresponding definition for the category of exterior body spray. Please see for example, SJVAPCD Rule 4604 and BAAQMD Rule 8-11.

- Rule 445 Wood Burning Devices (Amended May 3, 2013). The 2009 and 2013 TSD document recommends replacing non-EPA Phase II certified wood burning devices upon home sale.

Step 4 – Other Districts' Control Measures

Because the SCAQMD is classified as "extreme" nonattainment for both the 1997 and 2008 ozone standards, and nonattainment for both the 2006 and 2012 PM2.5 standards, SCAQMD staff commits to search for innovative control technologies, make improvements, and update the SCAQMD's rules and regulations as expeditiously as possible to effectively help the Basin reach the PM2.5 attainment in 2019–2021, and ozone attainment in 2024–2032. Staff will evaluate whether control technologies that are available and cost-effective within other areas in California or any other areas in the nation, would be available and cost-effective for use in the Basin in a timely manner.

In an effort to ensure that all feasible candidate control measures are considered, SCAQMD staff evaluated the control measures adopted within the period of 2012–2015 by eight nonattainment air districts (Ventura County, San Francisco Bay Area, San Joaquin Valley, Sacramento Metropolitan in California, Dallas-Fort Worth and Houston-Galveston-Brazoria in Texas, New York and New Jersey) in the nation for both PM2.5 and 8-hour ozone. A summary of this evaluation is provided below.

San Joaquin Valley

San Joaquin Valley is "extreme" nonattainment with respect to the 2008 8-hour ozone standard and nonattainment with respect to the PM2.5 standards. In 2013–2015, SJVAPCD developed three separate plans to address the 8-hour ozone standard, the 2006 PM2.5 standard, and the 1997 PM2.5 standard.

In December 2012, SJVAPCD adopted the 2012 PM2.5 Plan to addresses U.S. EPA's 24-hour PM2.5 standard of 35 µg/m³ established in 2006.[12] The plan has proposed five regulatory control measure commitments. Besides the four control measures (including SJVAPCD Rule 4308, SJVAPCD Rule 4692, SJVAPCD Rule 4905, and SJVAPCD Rule 9610) that the SCAQMD has either already implemented or developed similar control for, below is a measure that is evaluated as a potential control measure in the 2016 AQMP:

- SJVAPCD Rule 4901 Wood Burning Fireplaces and Wood Burning Heaters - Lower the threshold level for calling wood-burning curtailments from 30 µg/m³ to ≥ 20 µg/m³ (contingency threshold); Consider expanding the wood burning season to include October and/or March. SCAQMD controls wood burning emissions through Rule 445. Curtailment is mandatory when the forecast level exceeds 30 µg/m³ from November through February.

In September 2013, SJVAPCD adopted the 2013 Plan for the revoked 1-hr ozone standard.[13] The plan refers to NOx rule projects in the 2012 PM2.5 Plan as the regulatory control measure commitments. The SCAQMD has already implemented the two NOx commitments proposed in the SJVAPCD plan.

SJVAPCD adopted the 2014 Ozone RACT demonstration as part of the CAA requirements for an "extreme" nonattainment area of the 2008 8-hour ozone NAAQS.[14] It certifies RACT levels of control are being implemented for sources subject to U.S. EPA CTG and for major sources of ozone precursors. The 2014

Ozone RACT SIP verifies that SJVAPCD's regulations meet RACT levels of emission control, and no rule amendments or control measures are proposed.

SJVAPCD adopted the 2015 PM2.5 Plan for the 1997 PM2.5 Standard in April 2015.[15] This plan addresses EPA's annual PM2.5 standard of 15 µg/m^3 and 24-hour PM2.5 standard of 65 µg/m^3. In the 2015 PM2.5 Plan, SJVAPCD did not identify any additional technologically feasible and cost effective control measures beyond those already incorporated in their 2012 PM2.5 plan.

New York Metropolitan

The New York Metropolitan Area is classified as a nonattainment area for the 2008 8-Hour ozone NAAQS. To satisfy the requirement of the CAA, the New York Department of Environmental Conservation (NYDEC) submitted the 8-Hour Ozone RACT in December 2014.[16] NYDEC certified that all RACT regulations adopted to date are RACT-level controls; no control measures have been committed in their analysis.

New Jersey

In 2012, the New Jersey Department of Environmental Protection (NJDEP) submitted a SIP revision to redesignate New Jersey's 1997 annual and 2006 daily PM2.5 nonattainment areas to attainment. The 2012 Maintenance Plan includes measures that are already implemented, or adopted with future implementation dates, or have already been adopted and implemented and continue to provide additional emission reductions each year with fleet and equipment turnover. These control measures are anticipated to provide continued emissions reductions in the future of PM2.5 and its precursors, NOx and SO2, from a 2007 inventory base year to 2025, the maintenance plan year. In June 2015, NJDEP finalized the RACT determination for the 2008 8-Hour ozone NAAQS.[17] The document committed to propose and adopt, subject to public notice and comment, amendments to New Jersey rules incorporating four CTGs, if determined to be more effective than current New Jersey requirements, and to consider further limiting NOx emissions from natural gas compressor engines and turbines, which are major sources of NOx, subject of two U.S. EPA ACTs. There are no additional new measure concepts that the SCAQMD has not yet implemented or considered for this 2016 AQMP.

Others

As of January 2016, Ventura County, San Francisco Bay Area, Sacramento Metropolitan, DFW Texas, and HGB Texas have no new attainment plans since those included in the 2012 AQMP.

Step 5 – Control Measures beyond RACM in 2012 AQMP

The following four control measures were considered beyond RACM in the 2012 AQMP. They are re-considered in the 2016 AQMP using up-to-date emission inventory and improved modelling tools. The evaluation can be found in the Control Measure Assessment section of this Appendix.

Emission reduction of NH3 from usage of feed additives

In the 2012 AQMP, this control measure was developed to reduce NH3 emissions from farming operations. The cost of feed additives were relatively high. Furthermore, NH3 controls were not effective in reducing PM2.5 based on the modeling results in the last AQMP. This control strategy is re-considered using the more up-to-date emission inventory and state-of-the-art modeling tools.

Emission reduction of NH3 from NOx Controls

In Selective Catalytic Reduction (SCR), ammonia slips through the catalyst unreacted. It is often challenging to maintain NOx compliance due to NH3 slip requirements, but recent catalyst technology has resulted in the development of ammonia slip catalysts that enable a maximum control of NOx without the consequence of excess ammonia emissions. This control strategy is evaluated using the more up-to-date emission inventory and state-of-the-art modeling tools.

Emission reduction of PM from entrained road dust

Additional emission reductions could be sought by mandating street cleaning frequencies for all curb and guttered streets.

Emission reductions of VOC and ammonia PM from greenwaste composting

Chipping and grinding is a process to mechanically reduce the size of greenwaste and woodwaste. This potential control measure is examined and developed further to quantify emissions from chipping and grinding, as well as related operations, and seeks emission reductions where feasible.

Step 6 – EPA Menu of Control Measures

The Menu of Control Measures (MCM)[18] compiled by the State and Local Programs Group within U.S. EPA's Office of Air Quality Planning and Standards, was developed to provide information useful in the development of local emission reduction and NAAQS SIP scenarios, and to identify and evaluate potential control measures. U.S. EPA's list of potential control measures for PM2.5 and precursors provides a broad listing of potential emission reduction measures to assist states in identifying and evaluating potential measures. The potential measures are developed based in part on the results of a literature review of the current and proposed measures of various air quality agencies, including CARB, individual California Air Management Districts, the Ozone Transport Commission, the Lake Michigan Air Directors Consortium, and others. For each source category, one or more emission reduction measures, the respective control efficiency, and cost effectiveness are provided.

Staff has reviewed the control measures for point and nonpoint sources of PM2.5, SO_2, NOx and VOC. Staff has identified the following three control measures in U.S. EPA's Menu of Control Measures that are currently above and beyond the requirements in existing SCAQMD rules:

- Reformulation and process modification for cutback asphalt PM
- PM control measures for asphalt manufacturing

- PM control measures for wood pulp and paper

Except for the topics identified above, control measures adopted in the Basin result in similar or higher emission reductions than those listed in the menus. The control technology/measures adopted in the Basin take into account the environmental impacts as well as economic and technological feasibility. Some alternative control measures have been developed in response to requests from industry, based on the product reformulation, product substitution and production processes specific to the facility to provide compliance flexibility and pollution prevention, while resulting in equivalent or superior environmental benefits, as compared to current requirements in the menus. Staff evaluated the above listed control measures for potential emission reductions in the Basin.

Step 7 – EPA Guidance Document

In March 2013, the U.S. EPA revised its document "*Strategies for Reducing Residential Wood Smoke*[19]" to provide new information and tools to help state, tribal, and local air officials reduce fine particle pollution from residential wood smoke. The document provides a comprehensive list of strategies to help identify appropriate wood smoke reduction measures. A combination of regulatory, voluntary, and educational strategies is encouraged to ensure a successful wood smoke program with measurable emission reductions. U.S. EPA recommends that each community determines the most appropriate measures given the nature and extent of their problem. Below is a list of regulatory options outlined in the guidance document, and the corresponding control strategies (when applicable) in SCAQMD.

Table VI-A-10

U.S. EPA List of Regulatory Options for Reducing Residential Wood Smoke and SCAQMD Current Control Strategies.

EPA Suggested List of Regulatory Options	SCAQMD Control Strategies
1. Wood-Burning Curtailment Programs	Rule 445 enacts a mandatory winter wood burning curtailment when PM2.5 concentrations are forecasted to exceed 30 µg/m^3
2. Opacity and Visible Emission Limits	SCAQMD Rule 401 does not have such "no visible emissions" requirement. Rule 401 requires the Ringelmann Chart No. 1 or an equivalent (10%) opacity limit.
3. Wood Moisture Content	Rule 445 requires a commercial firewood seller to only sell seasoned wood (≤20% moisture) from July 1 through the end of February the following year.
4. Removal of Old Wood Stove Upon Resale of a Home	Currently, SCAQMD does not require the removal and destruction of old wood stoves upon the resale of a home. This regulatory option has been evaluated as a potential control measure in the 2016 AQMP; more details can be found in the next section of this Appendix.

Table VI-A-10 (CONCLUDED)

U.S. EPA List of Regulatory Options for Reducing Residential Wood Smoke and SCAQMD Current Control Strategies.

EPA Suggested List of Regulatory Options	SCAQMD Control Strategies
5. Require EPA Certification	For existing residential and commercial developments (additions, remodels, etc.), Rule 445 requires wood burning devices sold or installed to be U.S. EPA certified or equivalent.
6. Ban the Use of Non-EPA-Certified Wood Stoves	Currently, SCAQMD does not prohibit the use of non-EPA certified wood stoves that have been installed in existing homes and businesses prior to the adoption of Rule 445. This regulatory option has been evaluated as a potential control measure in the 2016 AQMP, and more details can be found in the next section of this Appendix.
7. Restrictions on Wood-Burning Devices in New Construction	Rule 445 prohibits the installation of any wood-burning hearth appliances in new construction
8. Hydronic Heater Rules	The use of hydronic heaters is very uncommon in SCAQMD.
9. Requirements for Wood-burning Fireplaces	For existing residential and commercial developments (additions, remodels, etc.), Rule 445 requires wood burning devices sold or installed to be U.S. EPA certified or equivalent. Incentives are available to replace wood burning devices with cleaner alternatives in selected neighborhoods.
10. State/Tribal/Local Wood-Heating Emission Standards	EPA's New Source Performance Standards (NSPS), revised March 2015, have the most stringent emission limit across the nation for residential wood heaters.
11. NSPS for New Residential Wood Heating Appliances	EPA strengthened its NSPS for residential wood heaters in 2015. The 2015 NSPS compliant-wood heaters are part of the requirement of Rule 445.

In addition to the regulatory programs listed in Table VI-A-10, the SCAQMD has implemented the Healthy Hearths™ program that includes a comprehensive education and outreach effort to encourage the public to switch to cleaner, gaseous-fueled hearth products. An incentive program for cleaner hearth appliances is ongoing to encourage the public to switch to cleaner hearth products, including gaseous-fueled devices that are exempt from burning curtailments. As part of the Healthy Hearths™ initiative, the "Check Before You Burn" program is designed to protect public health by reducing harmful wood smoke from residential wood burning from November 1 through the end of February. Daily air quality forecast information can be found online on the SCAQMD's "Check Before You Burn" map, through e-mail messages, or a toll free number. Rule 445 also requires commercial firewood or other wood-based fuel sellers to notify the public of the SCAQMD's Check Before You Burn program through a labeling program.

Summary of Potential Control Measures

Given the thorough review of the above listed sources, SCAQMD staff has identified the following potential control measures (PCM) for stationary sources. They will be further assessed for technological and economic feasibility in the next section of this Appendix.

Table VI-A-11

Potential Stationary Control Measures Identified for the 2016 AQMP RACM/BACM

#	Source of Information	SCAQMD Current Control	Potential Control Measure
1	Air Quality Technology Symposium	N/A	Co-benefits from GHG programs, policies and incentives
2	Air Quality Technology Symposium	N/A	Co-benefits from existing residential and commercial building energy efficiency measures
3	Air Quality Technology Symposium	N/A	Additional Enhancement in Building Energy Efficiency and Smart Grid Technology
4	Air Quality Technology Symposium	N/A	Emission reduction of NOx from commercial and multi-unit residential space heating and boilers
5	Air Quality Technology Symposium	N/A	Emission reduction of PM from cooling towers
6	Air Quality Technology Symposium	Rule 1127 Emission Reductions from Livestock Waste	Emission reduction of NH3 from manure management strategies
7	Air Quality Technology Symposium	N/A	Emission reduction of NH3 from NOx controls
8	Air Quality Technology Symposium	N/A	Emission reduction of PM from agricultural, prescribed, and training burning
-	RACT/BACT	Rule 223 Emission Reduction Permits for Large Confined Animal Facilities	Lowering the applicability threshold of Rule 223 for milk cows, chickens, and ducks; combined with PCM 6
9	RACT/BACT	Rule 462 Organic Liquid Loading	Lowering emission limit of Rule 462 for gasoline bulk terminals
10	RACT/BACT	Rule 1118 Control of Emissions from Refinery Flares	Emission reductions from non-refinery flares
11	RACT/BACT	Rule 1115 Motor Vehicle Assembly Line Coating Operations	Lowering emission limits to meet the 2008 EPA CTG for Auto and Light-Duty Truck Assembly

Table VI-A-11 (CONTINUED)

Potential Stationary Control Measures Identified for the 2016 AQMP RACM/BACM

#	Source of Information	SCAQMD Current Control	Potential Control Measure
12	RACT/BACT	Rule 1138 Control of Emissions from Restaurant Operations	Further emission reduction from commercial cooking
13	RACT/BACT	Rule 1186 PM10 Emissions from Paved and Unpaved Roads, and Livestock	Further emission reduction from fugitive dust sources
14	EPA Technical Support Document	Rule 1125 Metal Container, Closure and Coil Coating Operation	Lowering the VOC Limit of Rule 1125 for Three-piece and Two-piece can Interior Body Sprays, and Add a VOC Limit and Corresponding Definition for Exterior Body Spray
15	EPA Technical Support Document	Rule 445 Wood Burning Devices	Replace non-EPA Phase II certified wood burning devices upon home sale & ban the use of non-EPA-certified wood stoves in Rule 445
-	Other Districts' Control Measure	Rule 1138 Control of Emissions from Restaurant Operations	Extend applicability of the rule to under-fired charbroilers. Addressed in PCM # 13
16	Other Districts' Control Measure	Rule 445 Wood Burning Devices	Lower curtailment threshold in Rule 445
-	Control measures beyond RACM from 2012 AQMP	N/A	Emission reduction of NH3 from usage of feed additives. Addressed in PCM # 5
-	Control measures beyond RACM from 2012 AQMP	N/A	Emission reduction of NH3 from NOx controls; Addressed in PCM # 6.
-	Control measures beyond RACM from 2012 AQMP	N/A	Emission reduction of PM from entrained road dust; Addressed in PCM # 14
17	Control measures beyond RACM from 2012 AQMP	Rule 1133.3 Emission Reductions from Greenwaste Compositing Operations	Emission reductions of VOC and NH3 from greenwaste composting
18	EPA Menu of Control Measures	Rule 1157 PM10 Emission Reductions from Aggregate and Related Operations	Emission reduction of PM from asphalt manufacturing

Table VI-A-11 (CONCLUDED)

Potential Stationary Control Measures Identified for the 2016 AQMP RACM/BACM

#	Source of Information	SCAQMD Current Control	Potential Control Measure
19	EPA Menu of Control Measures	N/A	Emission reduction of PM from wood pulp and paper
20	EPA Menu of Control Measures	Rule 1108 Cutback Asphalt	Emission reduction of VOC and NOx through reformulation and process modification for cutback asphalt
-	EPA Guidance Document	Rule 445 Wood Burning Devices	Removal of old wood stove upon resale of a home; addressed in PCM # 16
-	EPA Guidance Document	Rule 445 Wood Burning Devices	Ban the use of non-EPA-certified wood stoves; combined with PCM # 16

In addition to the above analyses, SCAG, CARB, and the SCAQMD staff have completed the following analyses to meet the requirements of the CAA:

RACM/BACM analyses and demonstration conducted by SCAG and CARB for transportation and mobile sources control measures are included in Appendix IV-C and in Attachment VI-A-3 of this Appendix.

Costs and cost effectiveness analyses, and planning and schedule for implementation for each of SCAQMD's stationary source and mobile source control measures, if available, are provided in Chapter IV, Appendix IV-A and B.

Control Measure Assessment

The potential control measures identified in the preceding section were evaluated to advance SCAQMD's emissions control strategies. A comprehensive feasibility analysis is conducted for all potential control measures. Quantifying emissions and estimated reductions are based on a variety of data sources, including, but not limited to, SCAQMD's AER program, approved AQMP emissions inventory (Chapter 3 and Appendix III of 2016 AQMP), approved CARB's GHG reporting/inventory program emissions database, archived equipment statistics obtained from the SCAQMD's past rulemaking, and data libraries of public energy policy and planning agencies and utility businesses (e.g., CPUC, CEC, SCE, etc.). For each potential control measure with quantifiable emission reduction opportunities, their technological and economic feasibility is assessed. Assessments of the 20 potential control measures are presented in Attachment VI-A-2 of this Appendix. Staff commits to refine the analysis of emission inventories, emission reductions, and cost-effectiveness during the rule development process.

The 2006 24-Hour PM2.5 Standard – BACM Demonstration

U.S. EPA reclassified the Basin as "serious" nonattainment for the 2006 24-hour standard effective February 12, 2016 with an attainment date of December 31, 2019. More stringent "serious" nonattainment area requirements apply including implementation of Best Available Control Measures. The Final Rule of "*Fine Particle Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*" (81 FR 58010) indicates that a "serious" area attainment plan must include provisions to implement BACM on sources in a "serious" nonattainment area no later than four years after reclassification. The BACT evaluation presented in Appendix VI-A-1 provides a comparative analysis between SCAQMD's source-specific rules and the analogous rules adopted by four other air districts in California for major stationary sources. For the key stationary source categories under SCAQMD jurisdiction, potential control measures are identified by comparing existing control measures to the requirements in federal and state regulations and guidance, as well as the analogous rules in other air districts. Furthermore, a 7-step analysis was conducted to identify candidate measures that are potentially feasible to be implemented in the Basin. The source of information includes the Air Quality Technology Symposium, RACT/BACT Evaluation, EPA Technical Support Documents, other Districts' control measures, control measures beyond RACM in the 2012 AQMP, EPA menu of control measures, and EPA guidance document. The 20 potential control measures identified from the abovementioned analyses are further evaluated for technological feasibility and cost effectiveness. Details of the feasibility assessment are found in Attachment VI-A-2.

Table VI-A-12 shows a list of feasible control measures for the 2006 24-hour PM2.5 standard. PCM 4 (Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications), PCM 6 (Emission Reductions from Manure Management Strategies), PCM 10 (Emission Reductions from Non-Refinery Flares) and PCM 17 (Emission Reductions from Greenwaste Composting) are four feasible control measures with quantifiable emission reductions. By the time the State and District submit this plan to U.S. EPA in 2017, less than three years remain before the attainment date of December 31, 2019. In SCAQMD, most significant rules can take 18 months or longer to develop. Given these control measures are likely to be less socially or economically acceptable, it is likely that more than 18 months will be needed to adopt these rules and perform the environmental and socioeconomic analyses required by California law. These control measures are anticipated to be adopted in 2018/2019, with an implementation schedule of 2020. The implementation time of these control measures is beyond the statutory "serious" attainment deadline (2019) and therefore they do not qualified as BACM for the 2006 24-hour PM2.5 standard. Note that the 24-hour PM2.5 standard is expected to be met in 2019, based on air quality modeling of 2019 baseline emissions. The 2019 baseline emission is derived from the projected emissions from 2012 which includes all adopted control measures that will be implemented by December 31, 2019 (refer to Chapter 5 and Appendix 5 for details). The projected 2019 design value is 32.2 $\mu g/m^3$ at Mira Loma – the design site of PM2.5, indicating that sufficient emission reductions will be achieved for the Basin to attain the federal 24-hour PM2.5 standard in 2019 without additional controls.

Table VI-A-12

Feasible Control Measures Identified for the 2006 24-hr PM2.5 Standard

PCM	Title	Pollutant	Potential Emission Reduction by 2021	Included as Plan Commitments?
1	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives	NOx	TBD	Yes; co-benefits from other programs not included as BACM
2	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures	NOx & VOC	0.40 tpd of NOx 0.23 tpd of VOC	Yes; co-benefits from other programs not included as BACM
4	Emission Reductions from Replacement with Zero and Near-Zero NOx Appliances in Commercial and Residential Applications	NOx	1.8 tpd of NOx	Yes; implementation beyond 2019
6	Emission Reductions from Manure Management Strategies – Lowering the Regulatory Threshold for Rule 223	NH3	0.26 tpd of NH3	Yes; implementation beyond 2019
10	Emission Reductions from Non-Refinery Flares	NOx & VOC	1.2 tpd of NOx 0.4 tpd of VOC	Yes; implementation beyond 2019
16	Lowering the Curtailment Threshold in Rule 445	PM	0.9 tpd of PM	No, other consideration
17	Emission Reductions from Greenwaste Composting	VOC & NH3	1.40 tpd of VOC 0.08 tpd of NH3	Yes, implementation beyond 2019
20	Emission Reduction of VOC and NOx through Reformulation and Process Modification for Cutback Asphalt	VOC & NOx	N/A	No, other consideration

For PCM 16 and 20, although they are deemed technologically and economically feasible, there are other factors that make them impractical or unreasonable for implementation in the Basin. The section below provides additional justification for these two control measures.

Other Considerations

PCM 16 Lowering the curtailment threshold in Rule 445

The San Joaquin Valley Air Pollution Control District (SJVAPCD) recently amended the previous Rule 4901 episodic curtailment threshold (PM2.5 concentrations > 30 µg/m^3 or PM10 > 135 µg/m^3) and implemented a two-tiered curtailment program. During a Level One Curtailment, triggered when PM2.5 concentrations are forecast to be between 20 and 65 µg/m^3, operation of a wood burning fireplace or an unregistered wood burning heater is prohibited. Properly operated wood burning heaters that meet certification requirements (U.S. EPA Phase II-certified or equivalent) and have a current registration with SJVAPCD may be used during a Level One Curtailment. During a Level Two Curtailment, which is triggered when PM2.5

concentration is forecast to be above 65 µg/m^3 or PM10 > 135 µg/m^3, operation of any wood burning device is prohibited.* The staff report indicates that lowering the threshold level would increase the No Burn days from 35 days per wood burning season per County to 69 days. The increase in the number of SJVAPCD curtailment days could reduce PM2.5 emissions by 1.5 tpd.

Under SCAQMD Rule 445 (Wood Burning Devices, Amended 5/3/13), curtailment is mandatory when the forecast level exceeds 30 µg/m^3 from November to February. The SCAQMD curtailment threshold applies to all solid fuel devices, including wood-based residential cooking devices. In 2014 and 2015, none of the forecast levels exceeded 65 µg/m^3, and hence, no Level Two Curtailments would have been called if SJVAPCD's two-tiered program had been implemented in the Basin. In SCAQMD, winters are generally milder and warmer than San Joaquin Valley. In downtown Los Angeles, the daily average temperature is above 60 degree Fahrenheit on 66 days of the 120 days during the 2015 curtailment months, compared to only about 8 days in Fresno. Prohibiting wood burning on 60 percent (i.e., 72 days) of the 120 day winter season with the Basin's smaller contribution of wood smoke emissions compared to the San Joaquin Valley, however, has insignificant impact on attainment and would be considered impractical. The current thresholds in Rule 445 (30 µg/m^3) is higher than SJVAPCD's level one threshold. However, Rule 445 applies to all solid wood burning sources with no exemption on any type or technology. Also, the two-tiered systems used in SJVAPCD will introduce serious challenges in enforceability. Instead, a clear, straightforward message to the public to prohibit all wood burning during periods of poor air quality accompanied by an existing incentive program to encourage the public to switch to gaseous-fueled devices is more effective and will ultimately result in more emission reductions for this region. The impracticability of this approach combined with existing and ongoing efforts makes it infeasible.

PCM 20 Emission reduction of VOC and NOx through reformulation and process modification for cutback asphalt

As discussed in the control measurement assessment section (PCM 20), warm mix asphalt (WMA) allows the mixing and placement of asphalt mix at temperatures about 35 to 100°F lower than conventional hot mix asphalt (HMA), resulting in a reduction of fuel consumption, as well as potential reductions of emissions from the manufacturing plant and the project site where the asphalt is laid. In a white paper developed by the SCAQMD in 2008, staff concluded that lower-energy warm mix asphalt technologies were promising in reducing energy use and reducing NOx and VOC emissions. Nonetheless, the impact of mix and structural design, material processing requirements, construction procedures, and quality control specifications were not yet fully evaluated. In the last few years, WMA has been increasingly popular in the United States. Caltrans promotes the use of WMA because of its many improvements over HMA. In its April 2013 publication, Caltrans reported a 30 percent potential fuel savings and an 18 percent reduction in the overall GHG emissions associated with WMA.[8] The University of California Pavement Research Center (UCPRC) investigated the performance of rubberized WMA and found that in a controlled environment, rubberized WMA have better workability, and could result in potential energy savings and safer working conditions compared to HMA.[9] WMA suppliers reported 19–50 percent VOCs reduction

* Exemptions are provided where natural gas service is not available or where a wood burning device is the sole source of heat in a residence.

and 60–70 percent NOx reduction in plant emissions in Europe, although increased emissions of VOCs and CO were observed in the United States.[10] Although the overall performance of WMA seemed promising, mixed results were revealed on the potential emission reductions in a field test. UCPRC measured VOCs and semi-volatile organic compounds (SVOCs) emissions from WMA and HMA at the pavement surface during construction. Results showed that depending on the mix type and the temperature inside the chamber, total reactive organic gases (ROG) emission flux of WMA could be higher or lower than HMA.[11] Based on current information, the emission reduction of WMA technology is still uncertain. The potential increase in VOC emissions needs to be further investigated. Therefore, staff suggests further evaluation of the emission reduction and cost-effectiveness for WMA technology prior to being considered as RACM.

In summary, SCAQMD's existing rules and regulations are generally as stringent as, or more stringent than the analogous rules in other districts. Four cost effective and technologically feasible control measures have been identified in this AQMP. The earliest implementation time of these feasible control measures is beyond the attainment date of 2019, and therefore they do not qualify as BACM or additional feasible measures for the 2006 24-hr PM2.5 standard. Based on these analyses, SCAQMD has in place the Best Available Control Measures for the 2006 annual PM2.5 standard.

The 2012 Annual PM2.5 Standard

RACM Demonstration

The Basin was designated as a "moderate" nonattainment area for the 2012 annual PM2.5 standards on April 15, 2015. This designation sets an attainment deadline of December 31, 2021. Air quality modeling analysis, as presented in Appendix VI-B, demonstrates that the District cannot practically attain the 2012 annual PM2.5 standard by December 31, 2021. The Final Rule of "*Fine Particle Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*" (81 FR 58010) indicates that for "moderate" areas that demonstrate that attainment by the statutory attainment date is impracticable, RACM and RACT would constitute all those technologically and economically feasible measures available for sources in the area that can be implemented within four years of designation. Therefore, control measures have to be implemented by April 15, 2019 to be considered RACM/RACT for the 2012 annual PM2.5 standard. Measures that can only be implemented after the four-year deadline for RACM and RACT, but before the end of the sixth calendar year following designation, are defined in the final rule as "additional reasonable measures."

As presented earlier in this Appendix, various analyses have been conducted to identify potential control measures for direct PM2.5 and PM2.5 precursors. Table VI-A-13 shows a list of feasible control measures for the 2012 annual PM2.5 standard. PCM 4 (Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications), PCM 6 (Emission Reductions from Manure Management Strategies), PCM 10 (Emission Reductions from Non-Refinery Flares) and PCM 17 (Emission Reductions from Greenwaste Composting) are four feasible control measures with quantifiable

emission reductions. The implementation of these control measures is anticipated in 2020, resulting in 3.0 tpd of NOx reduction, 1.8 tpd of VOC reduction, and 0.34 tpd of NH3 reduction by 2021. Since the implementation of these control measures is beyond 2019, they are committed as "additional reasonable measures" for the 2012 annual PM2.5 standard. More details about the implementation of PCM 4, PCM 6, PCM 10 and PCM 17 can be found in the discussion of CMB-02 (Emission Reductions from Replacement with Zero and Near-Zero NOx Appliances in Commercial and Residential Applications), BCM-04 (Emission Reductions from Manure Management Strategies–Lowering the Regulatory Threshold of Rule 223), CMB-03 (Emission Reductions from Non-Refinery Flares) and BCM-10 (Emission Reductions from Greenwaste Composting) in Chapter 4 – Control Strategy & Implementation, respectively.

In summary, SCAQMD's existing rules and regulations are generally as stringent as, or more stringent than the analogous rules in other districts. The four cost effective and technologically feasible control measures identified, namely PCM 4, PCM 6, PCM 10 and PCM 17, are committed as "additional reasonable measures" in the 2016 AQMP. As such, SCAQMD meets the RACM requirements for the 2012 Annual PM2.5 standard.

Table VI-A-13

Feasible Control Measures Identified for the 2012 Annual PM2.5 Standard

PCM	Title	Pollutant	Potential Emission Reduction by 2021	Included as Plan Commitments?
1	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives	NOx	TBD	Yes; co-benefits from other programs not included as BACM
2	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures	NOx & VOC	0.40 tpd of NOx 0.23 tpd of VOC	Yes; co-benefits from other programs not included as BACM
4	Emission Reductions from Replacement with Zero and Near-Zero NOx Appliances in Commercial and Residential Applications	NOx	1.8 tpd of NOx	Yes, as additional reasonable measure
6	Emission Reductions from Manure Management Strategies – Lowering the Regulatory Threshold for Rule 223	NH3	0.26 tpd of NH3	Yes, as additional reasonable measure
10	Emission Reductions from Non-Refinery Flares	NOx & VOC	1.2 tpd of NOx 0.4 tpd of VOC	Yes, as additional reasonable measure
16	Lowering the Curtailment Threshold in Rule 445	PM	0.9 tpd of PM	No, other consideration
17	Emission Reductions from Greenwaste Composting	VOC & NH3	1.40 tpd of VOC 0.08 tpd of NH3	Yes, as additional reasonable measure
20	Emission Reduction of VOC and NOx through Reformulation and Process Modification for Cutback Asphalt	VOC & NOx	N/A	No, other consideration

BACM Demonstration

The Basin was designated as a "moderate" nonattainment area for the 2012 annual PM2.5 standard on April 15, 2015. Acknowledging the challenges in meeting the stringent health-based standard, including the uncertainties in drought conditions, and the potential inability to claim all ozone strategy reductions toward PM2.5 attainment, if approved under CAA Section 182 (e)(5), SCAQMD is requesting a voluntary bump up to the "serious" category for the 2012 annual PM2.5 standard. Modeling analysis supporting the request for the reclassification is described in Appendix VI-B. Upon EPA's review and approval of the impracticability demonstration, the Basin will be reclassified as a "serious" nonattainment for the 2012 annual PM2.5 standard. The attainment year for a "serious" nonattainment area is 10 years after the initial nonattainment designation, which is year 2025 for the 2012 annual PM2.5 standard. A "serious" nonattainment area is subject to the requirements to implement BACM/BACT and additional feasible measures. Four feasible control measures have been identified in the 2016 AQMP, namely PCM 4 (Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications), PCM 6 (Emission Reductions from Manure Management Strategies), PCM 10 (Emission Reductions from Non-Refinery Flares) and PCM 17 (Emission Reductions from Greenwaste Composting). The implementation of these control measures will result in in 3.0 tpd of NOx reduction, 1.8 tpd of VOC reduction, and 0.34 tpd of NH3 reduction by 2021. SCAQMD did not identify any additional feasible measures beyond the anticipated emissions reductions from these four control measures. In general, the SCAQMD's existing rules and regulations are equivalent to, or more stringent than other districts' rules and regulations. In the four areas where improvements are feasible, they are included as plan commitments. As such, SCAQMD meets the Best Available Control Measures requirements for the 2012 annual PM2.5 standard.

The 2008 8-hour Ozone Standard – RACM Demonstration

In July 2014, the SCAQMD submitted a RACT SIP update to the U.S. EPA as a component of the 2016 AQMP with respect to the 2008 8-hour ozone NAAQS. The 2014 RACT analysis identified eight SCAQMD rules that have discrepancies with the companion rules at other California agencies. These rules were further evaluated as part of RACM. Table VI-A-14 shows a list of feasible control measures for the 2008 8-hour ozone standard. PCM 4 (Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications), PCM 10 (Emission Reductions from Non-Refinery Flares) and PCM 17 (Emission Reductions from Greenwaste Composting) are the feasible control measures with quantifiable VOC and NOx emission reductions. The implementation of the three control measures is anticipated to start in 2020, resulting in 4.3 tpd of NOx reduction and 2.2 tpd of VOC reduction by 2031. More details about the implementation of PCM 4, PCM 10 and PCM 17 can be found in the discussion of CMB-02 (Emission Reductions from Replacement with Zero and Near-Zero NOx Appliances in Commercial and Residential Applications), CMB-03 (Emission Reductions from Non-Refinery Flares) and BCM-10 (Emission Reductions from Greenwaste Composting) in Chapter 4 – Control Strategy & Implementation,

respectively. In summary, SCAQMD's existing rules and regulations are generally as stringent as, or more stringent than the analogous rules in other districts. The three cost effective and technologically feasible control measures identified, namely PCM 4, PCM 10 and PCM 17, are committed in the 2016 AQMP. As such, SCAQMD meets the RACM requirements for the 2008 8-hour ozone standard.

Table VI-A-14

Feasible Control Measures Identified for the 2008 8-hour Ozone Standard

PCM	Title	Pollutant	Potential Emission Reduction by 2031	Included as Plan Commitments?
1	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives	NOx	TBD	Yes; co-benefits from other programs not included as RACM
2	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures	NOx & VOC	1.1 tpd of NOx 0.29 tpd of VOC	Yes; co-benefits from other programs not included as RACM
4	Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial Residential Application	NOx	2.84 tpd of NOx	Yes, as RACM
10	Emission Reductions from Non-Refinery Flares	NOx & VOC	1.5 tpd of NOx 0.4 tpd of VOC	Yes, as RACM
17	Emission Reductions from Greenwaste Composting	VOC & NH3	1.8 tpd of VOC	Yes, as RACM
20	Emission Reduction of VOC and NOx through Reformulation and Process Modification for Cutback Asphalt.	VOC & NOx	N/A	No, other consideration

Conclusions

Following are the SCAQMD staff's conclusions:

- As required by the CAA and the U.S. EPA's PM2.5 Implementation Rule, SCAQMD staff evaluated and analyzed all feasible control measure concepts that were currently available for inclusion in the 2016 AQMP. These concepts were either provided by the public and experts, recommended by U.S. EPA, or implemented by other air districts. From these concepts, SCAQMD staff selected and developed 25 potential stationary source control measures and 15 mobile source control measures to address attainment of the PM2.5 and the 8-hour ozone standard (more details in Appendix IV-A). SCAQMD staff also developed Control Measure MCS-02 – Application of All Feasible Measures Assessment to

facilitate the inclusion of any future innovative air pollution control technologies or ideas that can help the Basin achieve the NAAQS as expeditiously as possible.

- Following the approach recommended by the U.S. EPA, SCAQMD staff evaluated rules, regulations and control measures developed in the 2012–2015 timeframe by other nonattainment air districts in the nation. In general, the SCAQMD's existing rules and regulations are equivalent to, or more stringent than other districts' rules and regulations and the proposed control measures in their respective SIPs. In the few areas where the SCAQMD's rules can be amended, they are included as plan commitments or have been targeted for further evaluation. SCAQMD staff will monitor the rule development of other air districts, and conduct further analyses to refine the emission inventory, emission reductions, and cost-effectiveness analysis.

- The Basin is expected to meet the 24-hour PM2.5 standard in 2019 with no additional emission reductions beyond already adopted measures and regulations. The SCAQMD is projected to attain the annual PM2.5 standard in 2023 with co-benefits from the 2023 ozone strategy, but attainment was demonstrated in 2025 due to the potential inability to credit all ozone strategy reductions towards PM2.5 attainment, if approved under CAA Section 182 (e)(5).

- With regard to the early actions to achieve ozone attainment, SCAQMD staff has developed an integrated slate of controls to meet the attainment dates as expeditiously as possible. The available control measures that were not included as plan commitments would not collectively advance the attainment date or contribute to the RFP because of the uncertain or non-quantifiable amount of emission reductions that they would potentially generate.

In conclusion, the SCAQMD has conducted the RACM/RACT and BACM/BACT analysis for identifying and selecting the control measures for the 2016 AQMP in compliance with the requirements of the CAA as well as the U.S. EPA's policy and guidelines.

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17. New Jersey Department of Environmental Protection, Final 75 ppb 8-Hour Ozone Reasonably Available Control Technology (RACT) Determination. June 11, 2015.

18. U.S. EPA, Menu of Control Measures, http://www3.epa.gov/ttn/naaqs/pdfs/MenuOfControlMeasures.pdf, as of December 1, 2015.

19. U.S. EPA, Strategies for Reducing Residential Wood Smoke, http://www2.epa.gov/burnwise/burn-wise-strategies-reducing-residential-wood-smoke. March 2013.

DRAFT FINAL 2016 AQMP

APPENDIX VI-A

ATTACHMENT VI-A-1

EVALUATION OF SCAQMD RULES AND REGULATIONS

Attachment VI-A-1a

Evaluation of SCAQMD Rules and Regulations - PM Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
404	PM	Rule 404 – Particulate Concentration (Amended 2/7/86)	Atmospheric discharge from any source is required to meet the PM limits varing from 0.01gr/dscf to 0.19 gr/dscf in Rule 404 depending on exhaust flow rates.	Bay Area, Regulation 6, Rule 1 (Adopted 12/5/07) contains the following limits: · PM limit is 0.15 gr/dscf	SCAQMD Rule 404 varies in stringency when compared to other Districts' requirements. For majority of the categories, Rule 404 is as stringent as or more stringent than the other Districts' rules, and provides BACT level of control.
444	All	Open Burning (Amended 7/12/13)	Contains requirements and prohibitions for open burning to minimize emissions and smoke impacts to the public; allows open burning on permissive burn days, provided a permit and burn authorization is obtained; establishes burn plan requirements for prescribed burns; sets daily maximum burn acreage for agricultural and prescribed burning.	San Joaquin Valley Rule 4103 (Amended 4/15/10) contains additional best management practices compared to Rule 444 such as best management practices to control open burning of weeds. Bay Area, Reg 5, sets requirements for open burning, and forbids recreational burning during curtailment periods.	On April 8, 2002, EPA approved Rule 444 into the Applicable-SIP as fulfilling BACT/BACM for PM10 (67 FR 16644). In its TSD for the approval of Rule 444 into the California SIP published in 2013, EPA determined that with the exception of provisions about banning the burning of specific crops, Rule 444 is generally as stringent as or more stringent than analogous rules in other California Districts. Overall, Rule 444 provides BACT level of control for this source category.
1137	PM	PM10 Reduction From Woodworking Operations (Adopted 2/1/02)	Require that woodworking operations send sawdust emissions either directly to a baghouse filter, or to a pneumatic conveyance device that leads to a baghouse filter.	n/a*	Meets BACT.

re no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

Attachment VI-A-1a

Evaluation of SCAQMD Rules and Regulations - PM Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1138	PM	Control Of Emissions From Restaurant Operations (Adopted 11/14/97)	Require catalytic oxidizer for chain-driven charbroilers. Exemption provided for under-fired charbroilers and units cooking less than 875 lbs/week.	Ventura Rule 74.25 (Adopted 10/12/04) has equivalent requirements as in Rule 1138. Bay Area Rule 2 of Regulation 6 (12/5/07) has emission standards of 0.74 lbs PM10 and 0.32 lbs VOC per thousand pounds of meat cooked for all chain-driven charbroilers; 1.0 lbs PM10 per thousand pounds of meat cooked for all under-fired charbroilers with combined total grill surface area of at least 10 square feet. San Joaquin Rule 4692 requires catalytic oxidizers for chain-driven charbroilers cooking 400 pounds of meat or more per week. This threshold is more stringent than Rule 1138 which applies to chain-driven charbroilers cooking 875 pounds of meat or more per week.	Most BAAQMD under-fired charbroilers facilities are too small to trigger the under-fired charbroilers requirements. Note that the lower applicability threshold and the extension of rule applicability to under-fired charbroilers applies to facilities that are too small to exceed the major source threshold. Further reduce PM emission from under-fired charbroilers: Control Measure BCM-01 proposes to establish a tiered program targeting higher efficiency controls for higher use under-fired charbroilers at larger establishments, with more affordable lower efficiency controls at smaller restaurants.
1140	PM	Abrasive Blasting (Amended 8/2/85)	Set standards for the abrasives and require a visible emission evaluation to determine the impact of abrasive blasting operations on visibility.	n/a*	Rule 1140 is substantively similar to the California Code of Regulations, Title 17, Subchapter 6 — Abrasive Blasting provisions, which have been adopted by most California Air Districts. State law prohibits more stringent requirements. As such, Rule 1140 meets the BACT requirements.
1155	PM	Particulate Matter Control Devices (Amended 5/2/14)	PM standards for PM control devices at 0.01 gr/dcsf for existing large baghouses >7500 square feet. Good operational practices to reduce PM emissions	n/a*	Meets BACT.
1156	PM	PM10 Emission Reductions from Cement Manufacturing Facilities (Amended 3/6/09)	PM standards for PM control devices (0.01 gr/dcsf for existing and 0.005 gr/dcsf for new devices). Good operational practices to reduce PM emissions from aggregate and related operations	n/a*	Meets BACT.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

Attachment VI-A-1a

Evaluation of SCAQMD Rules and Regulations - PM Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1157	PM	PM10 Emissions Reductions from Aggregate and Related Operations (Amended 9/8/06)	Good operational practices to reduce PM emissions from aggregate and related operations. Establish source specific performance standards (no dust emissions exceeding 20 percent opacity, or no dust emissions exceeding 50 percent opacity, or no dust plume beyond 100 feet from any emission source, etc.) and specifying operational PM10 controls for various types of equipment, processes, storage piles, internal roadways at aggregate and related operations, and track-out of materials onto paved public roads	EPA promulgated standards for new hot mix asphalt facilities in Title 40, Chapter I, Part 60, Subpart I of the Code of Federal Regulations (40 CFR Part 60, Subpart I). Subpart I assigns a 20 percent opacity limit and a 90 mg/dscm (micrograms/dry standard cubic meter) PM content for fugitive emissions.	In its TSD for the approval of Rule 1157 into the California SIP published in 2011, EPA determined that Rule 1157 generally had the most stringent requirements and concluded that Rule 1157 fulfills CAA BACM. Overall, Rule 1157 is as stringent as or more stringent than the other Districts' rules, and meets the BACT requirements for this source category.
1186	PM	PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations (Adopted 7/11/08)	Requires good management practice such as clean-up of spills on public roadways, post-event street cleaning, routine sweeping using certified street sweeping equipment, new or widened roads to have improved road shoulders and treatment of livestock feed access lanes and cessation of hay grinding activities during high winds, etc.; Establish unpaved road treatment schedule for local jurisdictions in the Basin.	SJVAPCD Rule 8061 requires municipalities to sweep paved roads at least once per month with PM10 efficient units. For unpaved roads, on any unpaved road segment with 26 or more AADT, the owner/operator shall limit visible dust emission to 20% opacity and comply with the requirements of a stabilized unpaved road, or shall implement an APCO-approved Fugitive PM10 Management Plan; Within an urban area, requires all new unpaved roads be paved.	In its TSD for the approval of Rule 1186 into the California SIP published in 2011, EPA determined that the requirements to insure continued compliance added in the 2008 amendment further strengthens the SIP-approved version of this rule, which was determined to meet the BACM provisions. For majority of the categories, Rule 1186 is as stringent as or more stringent than the other Districts' rules, and provides BACT level of control. Further reduction of PM emission: Control Measure BCM-03 outlines possible efforts to reduce paved road dust emissions, and proposes a review of current SCAQMD Rule requirements to determine if additional emission reductions could be achieved from fugitive dust sources (e.g., temporary unpaved parking lots).

Attachment VI-A-1a

Evaluation of SCAQMD Rules and Regulations - PM Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1133, 1133.1	PM	Rule 1133 - Composting and Related Operations – General Administrative Requirements (Adopted 1/10/03) Rule 1133.1 – Chipping and Grinding Activities (Amended 7/8/11)	Rule 1133 is an administrative rule that requires composting, chipping, and/or grinding facilities to register with the District. These facilities provide information such as types and amounts of feedstocks produced, and a description of the processes used at the facility. This information is updated annually. Rule 1133.1 establishes holding or processing time requirements for green waste and food waste chipping and grinding activities. The rule's objective is to prevent inadvertent decomposition occurring during chipping and grinding activities.	n/a*	Rule 1133.1 was amended in 2011 to better manage stockpile operations associated with chipping and grinding activities, which is to be consistent with current greenwaste material processing requirements established in Title 14 of the California Code of Regulations. Rule 1133.1 meets the BACT requirements.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

Attachment VI-A-1b

Evaluation of SCAQMD Rules and Regulations - SOx Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
431.1	SOx	Sulfur Content Gaseous Fuels (Amended 6/12/98)	H_2S Limits: Natural gas (16 ppmv) Refinery Gas (40 ppmv) Landfill Gas (150 ppmv) Sewage Gas (40 ppmv) Other Gas (40 ppmv)	n/a*	Meets BACT.
431.2	SOx	Sulfur Content Liquid Fuels (Amended 9/15/2002)	Limit: 15 ppm by weight	n/a*	Meets BACT.
468	SOx	Rule 468 – Sulfur Recovery Units (Amended 10/8/76)	Rule 468 for sulfur recovery units contains emission limits of the following: · 500 ppm of sulfur compounds expressed as sulfur dioxide · 10 ppm of hydrogen sulfide · 90 kilograms (198.5 pounds) per hour of sulfur compounds expressed as sulfur dioxide Many of Rule 468 units are in RECLAIM, and RECLAIM incorporates the BARCT limit of 5 ppmv for sulfur recovery units.	Bay Area, Regulation 6, Rule 1 (Adopted 12/5/07) contains the following limits: · Sulfur Recovery Units: limit sulfur trioxide or sulfuric acid mist, or both, expressed as 100% sulfuric acid, to 0.08 gr/dscf	The BARCT emission limit in SOx RECLAIM (Rule 2002) is 5 ppmv for sulfur recovery units. Rule 468 and the RECLAIM program provide BACT level of control for this source category.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

Attachment VI-A-1b

Evaluation of SCAQMD Rules and Regulations - SOx Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1118	All	Refinery Flares (Amended 11/4/05)	· Minimize flare emissions & require smokeless operations · Specify SO2 gradually decreasing performance target to less than 0.5 tons per million barrels of crude by 2012. · If the performance target is exceeded, the operator must 1) pay mitigation fee; or 2) submit a Flare Mitigation Plan to reduce emissions. · Require Cause Analysis for event exceeding 100 lbs VOC, 500 lbs of SO2, or 500,000 scfm of vent gas, excluding planned shutdown, startup and turnarounds · Require 160 ppmv H2S, 3 hour average by 1/1/09, and no limits for NOx, VOC, PM and CO.	U.S. EPA suggested the SCAQMD to further re-evaluate Rule 1118 (FR Vol 76 No 217, Nov 9, 2011, CBE comments). San Joaquin Valley Rule 4311 (Amended 6/18/09) has VOC/NOx limits for ground-level enclosed flares; SO2 Targets (1.50 tons/million barrels of crude by 2011, and 0.5 tons/million barrels by 2012); Flare Minimization Plan for refinery flares more than 5 mmbtu/hr; and operational requirements for all flares that have potential to emit more than 10 tons/yr VOC and more than 10 tons/yr of NOx. Bay Area Rule 12-12 (Adopted 4/5/06) does not specify a declining SO2 target and does not contain a mitigation fee option.	SJVAPCD Rule 4311 (exempting municipal landfills) applies to sources other than refineries that emit > 10 TPY. Rule 1118 meets BACT for controlling flare emissions emanating from refineries.
2002	SOx	RECLAIM (Amended 12/4/15)	Include facility allocations for SOx for RECLAIM facilities. BARCT Emissions Limits: Calciner, Petroleum Coke • 10 ppmv (0.11 lbs/ton coke)Cement Kiln • 5 ppmv (0.04 lbs/ton clinker)Coal-Fired Boiler • 5 ppmv (95% reduction)Container Glass Melting Furnace • 5 ppmv (0.03 lbs/ton glass)Diesel Combustion • 15 ppmv as required under Rule 431.2 Fluid Catalytic Cracking Unit • 5 ppmv (3.25 lbs/thousand barrels feed)Refinery Boiler/Heater • 40 ppmv (6.76 lbs/mmscft)Sulfur Recovery Units/Tail Gas • 5 ppmv for combusted tail gas (5.28 lbs/hour)Sulfuric Acid Manufacturing • 10 ppmv (0.14 lbs/ton acid produced)	n/a*	BARCT emission limits are incorporated in Rule 2002, providing BACT level of control.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

Attachment VI-A-1c

Evaluation of SCAQMD Rules and Regulations - NOx Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
444	NOx	Open Burning (Amended 7/12/13)	Contains requirements and prohibitions for open burning to minimize emissions and smoke impacts to the public.	San Joaquin Valley Rule 4103 (Amended 4/15/10) contains additional best management practices compared to Rule 444 such as best management practices to control open burning of weeds.	On April 8, 2002, EPA approved Rule 444 into the Applicable-SIP as fulfilling BACT/BACM for PM10 (67 FR 16644). In its TSD for the approval of Rule 444 into the California SIP published in 2013, EPA determined that with the exception of provisions about banning the burning of specific crops, Rule 444 is generally as stringent as or more stringent than analogous rules in other California Districts. SCAQMD Rule 444 varies in stringency when compared to other Districts' requirements. For the majority of the categories, Rule 444 is as stringent as or more stringent than the other Districts' rules, and provides BACT level of control for this source category.

Attachment VI-A-1c

Evaluation of SCAQMD Rules and Regulations - NOx Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1110.2	NOx	Emissions from Gaseous and Liquid Fueled Engines (Amended 9/7/12)	Rule 1110.2 has NOx, VOC, CO limits for all stationary and portable engines over 50 brake horse power (bhp).In general, the limits applicable to 1) stationary, non-emergency engines, and 2) biogas (landfill and digester gas) engines are: • 11 ppmv NOx • 30 ppmv VOC • 250 ppmv CO Limits for new non-emergency engines driving electrical generators are: • 0.07 lbs NOx per MW-hr • 0.20 lbs CO per MW-hr • 0.10 lbs VOC per MW-hr Limits for low usage biogas engines: • 36 ppmv NOx, engines ≥ 500 bhp • 45 ppmv NOx, engines < 500 bhp • 40 ppmv VOC, landfill gas • 250 ppmv VOC, digester gas • 2000 ppmv CO. Portable and agricultural engines are not subject to the general limits listed above. Many of Rule 1110.2 engines are in RECLAIM, and RECLAIM (version 12/2015) incorporates the BARCT limit of 11 ppm of NOx @15%O2.	San Joaquin Valley Rule 4702 (Amended 8/19/11) has NOx, VOC, CO and SOx limits for engines rated over 25 bhp. For engines over 50 bhp: - By 1/1/2017, the limits for spark-ignited engines are: • 11 ppmv NOx • 250 ppmv VOC (rich-burn) and 750 ppmv VOC (lean burn), and • 2000 ppmv CO - Engines used in agricultural operations (AO), or fueled with waste gas, or limited used, or cyclic loaded and field gas fueled are subject to higher limits than the above - In general, all compression ignited engines must meet EPA Tier 4 standards. Engines between 25 bhp - 50 bhp, non AO, must meet federal standards 40CFR Part 60 Subpart IIII and JJJJ.The SOx limits are: 1) Natural gas, propane, butane, LPG, or combination, or 2) 5 grains/100 scf for gaseous fuel, or 3) 15 ppmv liquid fuel, or 4) CA reformulated gasoline for spark-ignited engines, or 5) CA reformulated diesel for compression ignited engines, or 6) 95% control.	In its TSD for the approval of Rule 1110.2 into the California SIP published in 2008, EPA concluded that the rule's emissions limits are more stringent than the corresponding limits in the guidance and policy documents (specified in the TSD) or other California District rules on internal combustion engines. The emissions limits scheduled for July 1, 2011 and July 1, 2012, are comparable to the limits expressed by the South Coast AQMD BACT Guidelines. The RECLAIM (version 12/2015) BARCT limit of 11 ppm is at least as stringent as other California District rules. Rule 1110.2 and the RECLAIM program provide BACT level of control for this source category.
1134	NOx	Emissions of Oxides of Nitrogen from Stationary Gas Turbines (Amended 8/8/97)	Standard = Reference Limit x (Unit Efficiency/25%), where reference limit depends on size of units, varying from 9 ppmv for units rating at equal to or larger than 10MW to 25 ppmv for units rating from 0.3 MW to less than 2.9 MW. RECLAIM, amended 12/2015 version, incorporates a BARCT limit of 2 ppmv.	Sacramento Rule 413 (Amended 03/24/05) has standards from 9 ppmv – 25 ppmv depending on size of units, but are independent on equipment efficiency. San Joaquin Rule 4703 (Amended 9/20/07) has standards from 5 ppmv – 50 ppmv depending on size of units. Combined cycle units > 10 MW has limit of 3 ppmv. Ventura Rule 74.9 (Amended 11/08/05) has standards from 25 – 125 ppmv depending on fuel type but are independent from equipment size and efficiency. Control efficiency 90% - 96%. In addition, all units have to meet 20 ppmv NH3.	SCAQMD Rule 1134 varies in stringency when compared to other Districts' requirements. For the majority of the categories, Rule 1134 is as stringent as or more stringent than the other Districts' rules. SCAQMD's RECLAIM program incorporates NOx limits of 2 ppmv for all units. Rule 1134 and the RECLAIM program provide BACT level of control for this source category.

Attachment VI-A-1c

Evaluation of SCAQMD Rules and Regulations - NOx Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1146	NOx	Emissions of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters (Amended 11/1/2013)	Applicable to units rating of more than 5 mmbtu/hr. Current NOx limits: • For digester gas: 15 ppmv • For landfill gas: 25 ppmv • For refinery gas: 30 ppmv (the 2008 amendment did not revise limits for refinery gas) • For other types of fuels: 5 ppmv for ≥75 mmbtu/hr, natural gas; 30 ppmv for ≥75 mmbtu/hr, other fuels; and 5 or 9 ppmv for 20–75 mmbtu/hr units CO limit: 400ppmv Many Rule 1146 units are in RECLAIM. RECLAIM (Amended 12/15 version) contains the following NOx limits: • For refinery gas:2 ppmv for units > 40 mmbtu/hr • For other units: 9 ppmv for units > 20 mmbtu/hr; and 12 ppmv for units ≥ 2 mmbtu/hr	Sacramento Rule 411 (Amended 10/27/05) limits for gaseous fuel are 9 ppmv for units greater than 20 mmbtu/hr, and 15 ppmv for units from 5 to 20 mmbtu/hr. San Joaquin Rule 4306 (Amended 10/18/08) has the following limits: NOx limits: • 30 ppmv for 5-65 mmbtu/hr units using refinery gas. For units from 40 – 100 mmbtu/hr, refer to the comparison under Rule 1109 • For other types of fuels: 9 ppmv for >20 mmbtu/hr units; 15 ppmv for ≤20 mmbtu/hr units (6 – 9 ppmv for enhanced options) • Other units: 15 – 30 ppmv CO limit: 400 ppmv. San Joaquin Valley reduced NOx, CO, SO2 and PM10 emissions by adopting Rule 4320 on 10/16/08. The limits in Rule 4320 are: NOx limits: • For refinery gas: 5 – 6 ppmv for units between 20-110 mmbtu/hr; 6 – 9 ppmv for units between 5 - 20 mmbtu/hr; and 9 ppmv for units firing of less than 50% by vol PUC quality gas. Refer to the comparison under Rule 1109 for 40 mmbtu/hr units and above using refinery gas. • For oil field generators: 5 - 7 ppmv for units greater than 20 mmbtu/hr; 6 – 9 ppmv for units larger than 5 but less than 20 mmtu/hr; and 9 ppmv for units firing of less than 50% by vol PUC quality gas • For low usage units: 9 ppmv • For units at a wastewater treatment facilities firing on less than 50% by vol PUC quality gas: 9 ppmv • For other units: 5 – 7 ppmv for units larger than 20 mmbtu/hr; and 6 – 9 ppmv for units between 5 mmbtu/hr and 20 mmbtu/hr Compliance may be mitigated with annual emission fees.	In its TSD for the approval of Rule 1146 published in 2014, EPA concluded that Rule 1146 is as stringent as other California District rules for this category. Rule 1146 and the RECLAIM program provide BACT level of control for this source category.

Attachment VI-A-1c

Evaluation of SCAQMD Rules and Regulations - NOx Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1146.1	NOx	Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (Amended 11/1/13)	Applicable to units rating from2 mmbtu/hr to 5 mmbtu/hr.NOx limits: • Atmospheric Units: 12 ppmv • Digester gas: 15 ppmv • Landfill gas: 25 ppmv • All others: 9 ppmv CO limit: 400 ppmv. Many Rule 1146.1 units are in RECLAIM, and RECLAIM (Amended 12/15 version) has a limit of 12 ppmv NOx for boilers in this size range.	Bay Area Rule 9-11 (Amended 5/17/00) has following limits for boilers using gaseous fuel 1) 10 ppmv for boilers with rated input greater than 1.75 mmbtu/hr, 2) 25 ppmv for boilers from 1.5-1.75 mmbtu/hr, 3) 30 ppmv for boilers less than 1.5 million btu/hr. Non-gaseous fuel combustion devices have higher limits than gaseous fuel devices. San Joaquin Rule 4307 (Amended 5/19/2011) has the following limits: NOx limits: For New or Replacement Units: Atmospheric Units: 12 ppmv, and Non-Atmospheric Units: 9 ppmv - For Retrofit Units: 30 ppmv burning gaseous fuels; and 40 ppmv burning liquid fuels Sulfur limits for SO2: - For natural gas, propane, butane, or LPG: 5 grains of total sulfur per 100 scf, or 9 ppmv SO2, or 95% control - For liquid fuels: 15 ppmv sulfur	In its TSD for the approval of Rule 1146.1 published in 2014, EPA concluded that Rule 1146 is as stringent as other California District rules for this category. Rule 1146.1 and the RECLAIM program provide BACT level of control for this source category.
1146.2	NOx	Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers (Amended 5/5/06)	Current limit is 20 ppmv for units less than 2 mmbtu/hr.	San Joaquin Valley Rule 4308 (Amended 11/14/13) requires: • 20 ppmv for units used PUC gas from 75,000 btu/hr – 2 mmbtu/hr • 30 ppmv for units from 400,000 btu/hr - 2 mmbtu/hr used other types of fuels • 77 ppmv for units rating from 75,000 btu/hr – 400,000 btu/hr used other types of fuels	In its TSD for the approval of Rule 1146.2 into the California SIP published in 2008, EPA concluded that the rule meets the requirements listed in the guidance and policy documents (specified in the TSD). Emission limits in Rule 1146.2 are generally as stringent as, or more stringent than other California District rules for this source category, and meet the BACT requirements.

Attachment VI-A-1c

Evaluation of SCAQMD Rules and Regulations - NOx Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1147	NOx	NOx Emissions from Miscellaneous Sources (Amended 9/9/11)	Current limits are: Gas Fired Equipment: • 60 ppmv for units operating at temperatures ≥ 1200 o F • 30 or 60 ppmv for units operating at temperatures < 1200 o F. • 40 ppmv for asphalt Liquid Fuel fired Equipment: • 40 ppmv for units operating at temperatures < 1200 o F • 60 ppmv for units operating at temperatures ≥ 1200 o F • Units less than 1 lb/day compliance delayed until 2017 Mitigation fee option for delayed compliance for multiple units	San Joaquin Valley APCD Rule 4309 (2005) has equivalent limit for asphalt. For ovens, dehydrators and dryers equal or greater than 5 MMBtu/hr, 40 ppmv with no temperature stratification	Cooking ovens, dry roasters removed from rule applicability to new Rule 1153.1 (11/7/14) In its TSD for the approval of Rule 1147 into the California SIP published in 2010, EPA concluded that Rule 1147 is as stringent as or more stringent than SJVAPCD Rule 4309 which covers some of the sources subject to Rule 1147. Overall, Rule 1147 is as stringent as or more stringent than the other Districts' rules, and meets the BACT requirements for this source category.
1153.1	NOx	Emissions of Oxides of Nitrogen from Commercial Food Ovens (Adopted 11/7/14)	• 40 ppmv for units operating at temperatures < 500 o F • 60 ppmv for units operating at temperatures ≥ 500 o F • CO capped at 800 ppmv • Exemption < 1 lb/day and low use sources • 20 year equipment life • Mitigation fee for alternate compliance plan	n/a*	Meets BACT.
2002	NOx,	RECLAIM (Amended 12/4/15)	Include facility allocations for NOx for RECLAIM facilities	Other Districts do not have RECLAIM, refer to individual rules such as Rule 1146, 1146.1, 1110.2 etc.	BARCT review completed in 2015 and revision to BARCT limits are incorporated in Rule 2002 (version 12/2015).

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

Attachment VI-A-1d

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1103	VOC	Pharmaceuticals and Cosmetics Manufacturing (Amended 3/12/99)	For reactors, distillation columns, crystallizers, or centrifuges: 15 lbs/day VOC or use surface condensers. For air dryers: 90% control efficiency or 33 lbs/day VOC. Also include other various operating requirements.	n/a*	Meets BACT.
1104	VOC	Wood Flat Stock Coating Operation (Amended 8/13/99)	2.1 lbs/gal, less water and exempt solvent. In lieu of VOC limit, use control device having 95% control efficiency (or 50 ppmv outlet) and 90% collecting efficiency	n/a*	Meets BACT.
1106	VOC	Marine Coating Operations (Amended 1/13/95)	Coating-specific emission limits from 275 – 780 g/L. In lieu of complying with specific emission limits, operator can use air pollution control system with at least 85% efficiency. Solvent cleaning operations must comply with Rule 1171.	Ventura Rule 74.24 (Amended 9/11/12) generally has the same limits as South Coast Rule 1106, except the limit for special marking of items such as flight decks, ship numbers is 420 g/L (490 g/L in Rule 1106), antenna coating (340 g/L in Rule 74.24 vs. 530 g/L in Rule 1106), solvent-based inorganic zinc coating (340 g/L in Rule 74.24 vs. 650 g/L in Rule 1106), repair and maintenance thermoplastic coating (550 g/L in Rule 74.24 vs. 340 g/L in Rule 1106). Bay Area Rule 8-43 (Amended 10/16/02) generally has the same limits as South Coast Rule 1106, except it has lower limit for pretreatment wash primer at 420 g/L (780 g/L in Rule 1106), repair and maintenance thermoplastic coating (550 g/L in Rule 8-43 vs. 340 g/L in Rule 1106), and solvent-based inorganic zinc coating (340 g/L in Rule 8-43 vs. 650 g/L in Rule 1106) EPA CTG generally has the same limits as South Coast Rule 1106 with the exception of inorganic zinc coating (340 g/L in CTG vs. 650 g/L in Rule 1106)	SCAQMD Rule 1106 varies in stringency when compared to other Districts' requirements. Although Rule 1106 does not meet the U.S. EPA CTG for one coating category – solvent based inorganic zinc, this type of coating is not used in major source facilities subject to Rule 1106 in the Basin. Additional VOC reductions from lowering emissions limits in Rule 1106 are proposed. The amendment is expected to be considered in 2017. Under the proposed amendment to Rule 1106, BACT level of control would be achieved.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

Attachment VI-A-1d

Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1107	VOC	Coating of Metal Parts and Products (Amended 1/6/06)	Coating-specific emission limits from 2.3 lbs/gal – 3.5 lbs/gal. In lieu of complying with specific emission limits, operator can use air pollution control system with at least 95% control efficiency (or 5 ppmv outlet) and 90% capture efficiency. Solvent cleaning operations must comply with Rule 1171.	Ventura Rule 74.12 (Amended 4/8/08) generally has the same coating-specific limits as South Coast Rule 1107, except in the following categories: · Limit for metallic coating is 3 lbs/gal (3.5 lbs/gal in Rule 1107); · Limit for camouflage is 3 lbs/gal (3.5 lbs/gal in Rule 1107); · Limit of pretreatment coatings is 2.3 lbs/gal (3.5 lbs/gal in Rule 1107) · Overall minimum control efficiency is 90%, higher than Rule 1107 requirement at 85% San Joaquin Valley Rule 4603 (Amended 9/17/09) has more stringent limits than Rule 1107 for baked camouflage and baked metallic coating at 360 g/L (420 g/L in Rule 1107)	SCAQMD Rule 1107 varies in stringency when compared to other Districts' requirements. For the majority of the categories, Rule 1107 is as stringent as or more stringent than the other Districts' rules, and provides BACT level of control for this source category.,
1110.2	VOC	Emissions from Gaseous and Liquid Fueled Engines (Amended 9/7/12)	Rule 1110.2 has NOx, VOC, CO limits for all stationary and portable engines over 50 brake horse power (bhp). In general, the limits applicable to 1) stationary, non-emergency engines, and 2) biogas (landfill and digester gas) engines are: • 11 ppmv NOx • 30 ppmv VOC • 250 ppmv CO Limits for new non-emergency engines driving electrical generators are: • 0.07 lbs NOx per MW-hr • 0.20 lbs CO per MW-hr • 0.10 lbs VOC per MW-hr Limits for low usage biogas engines: • 36 ppmv NOx, engines ≥ 500 bhp • 45 ppmv NOx, engines < 500 bhp • 40 ppmv VOC, landfill gas • 250 ppmv VOC, digester gas • 2000 ppmv CO. Portable and agricultural engines are not subject to the general limits listed above. Many of Rule 1110.2 engines are in RECLAIM, and RECLAIM will be amended to incorporate feasible BARCT.	San Joaquin Valley Rule 4702 (Amended 11/14/13) has NOx, VOC, CO and SOx limits for engines rated over 25 bhp. • 250 ppmv VOC (rich-burn) and 750 ppmv VOC (lean burn), and • 2000 ppmv CO - Engines used in agricultural operations (AO), or fueled with waste gas, or limited used, or cyclic loaded and field gas fueled are subject to higher limits than the above - In general, all compression ignited engines must meet EPA Tier 4 standards. Engines between 25 bhp - 50 bhp, non agricultural operations (AO), must meet federal standards 40CFR Part 60 Subpart IIII and JJJJ.	In its TSD for the approval of Rule 1110.2 into the California SIP published in 2008, EPA concluded that the rule's emissions limits are more stringent than the corresponding limits in the guidance and policy documents (specified in the TSD) or other California District rules on internal combustion engines. The emissions limits scheduled for July 1, 2011 and July 1, 2012, are comparable to the limits expressed by the South Coast AQMD BACT Guidelines. Overall, Rule 1110.2 is as stringent as or more stringent than the other Districts' rules, and meets the BACT requirements for this source category.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1113	VOC	Architectural Coatings (Amended 9/6/13)	Coating-specific emission limits from 50 g/L – 730 g/L. Exempt containers with capacity 2 fluid oz or less.	n/a*	Meets BACT.
1122	VOC	Solvent Degreasers (Amended 5/1/09)	Contain various work practice and design requirements.	n/a*	Meets BACT.
1124	VOC	Aerospace Assembly and Component Manufacturing Operations (Amended 9/21/01)	Coating-specific emission limits from 160 – 1000 g/L. Specific high transfer coating applications (e.g. HVLP spray). In lieu of complying with specific emission limits, operator can use air pollution control system with at least 95% control efficiency (or 50 ppmv outlet) and 90% capture efficiency. Solvent cleaning operations must comply with Rule 1171.	San Joaquin Valley Rule 4605 (Amended 6/16/11) has the following limits that are more stringent than those in Rule 1124: • Flight Test Coatings = 600 g/L (420 g/l for used on missiles and single use target craft, 840 g/L for other flight test coatings in Rule 1124) • Fastener Sealant = 600 g/L (675 g/L for fastener sealant and 600 g/L for other sealants in Rule 1124) Sacramento Rule 456 (Amended 10/23/08) has the following limits that are more stringent than those in Rule 1124: • Conformal Coating = 600 g/L (Rule 1124 limit is 750 g/L) • Fire Resistant Coatings = 600 g/L. (Rule 1124 limits are 650 g/L for Commercial; 800 g/L for Military) • High-Temperature Coating = 420 g/L. (Rule 1124 limit is 850 g/L) • Mold Release Coatings = 762 g/L. (Rule 1124 limit is 780 g/L) • Radiation Effect = 600 g/L. (Rule 1124 limit is 800 g/L) • Rain Erosion Resistant Coating = 600 g/L in All Other Category. (Rule 1124 limit is 800 g/L)	In its TSD for the approval of Rule 1124 into the California SIP published in 2002, EPA determined that the coating limits conform to the EPA's CTG document and Agency guidance. The rule contains adequate record keeping and test method provisions to monitor the compliance status of the regulated facilities. SCAQMD Rule 1124 varies in stringency when compared to other Districts' requirements. For the majority of the categories, Rule 1124 is as stringent as or more stringent than the other Districts' rules, and provides BACT level of control for this source category.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1127	VOC	Emission Reductions from Livestock Waste (Adopted 8/6/04)	Requires Good housekeeping practices for dairy farms with 50 or more cows, heifers and/or calves. Note: The SCAQMD adopted Rule 223 in June 2006 to reduce emission for large confined animal facilities. Rule 223 targets various types of large confined animal facilities and includes series of good management practices that are more stringent than Rule 1127.	Sacramento Rule 496 – Large Confined Animal Facilities (Adopted 8/24/06), has more stringent control and good management practices than South Coast Rule 1127 (e.g. venting to control system with at least 80% control efficiency). The more stringent requirements are targeted towards silage emissions, which is not applicable in South Coast for dry feed lot operations. San Joaquin Valley Rule 4570 has required best management practices for manure management and other areas to reduce VOC and ammonia emissions. Note that direct comparison with Rule 1127 is difficult due to the significant differences in source operations (dry feed lot in South Coast vs. flushing and lagoon operations in San Joaquin, the focus on corral waste control in SCAQMD vs. feed and silage and milk parlor in SJVAPCD, etc). In addition, SJV Rule 4570 applies to all types of large confined animal facilities, while Rule 1127 applies only to dairies with a much lower applicability threshold.	Together with Rule 223, Rule 1127 achieves BACT equivalency for this source category.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1128	VOC	Paper, Fabric and Film Coating Operations (Amended 3/8/96)	Coating-specific emission limits from 20 – 265 g/L. Specific high transfer coating applications (e.g. HVLP spray). Alternatively, operator can also use control system with at least 95% control efficiency (or 50 ppmv outlet) and 90% capture efficiency. Solvent cleaning operations must contain 15% or less VOC or 85% VOC must be collected and disposed of.	The 2007 EPA CTG requires an overall 90% control efficiency for facilities emitting > 15 lbs/day and coating lines emitting > 25 tpy. Rule 1128 is not as stringent as the 2007 EPA CTGs (85.5% overall control efficiency in Rule 1128). CTG alternative compliance emission limit of 80 g/L is also more stringent than the limit of 265 g/L in Rule 1128.	Rule 1128 is not as stringent as the 2007 EPA CTGs (CTG 80 g/L vs. Rule 1128 265 g/L) for facilities emitting > 15 lbs/day and coating lines emitting > 25 tpy. To the best of staff's knowledge, no facilities exceed the CTG applicable threshold (25 tpy of VOC per coating line) in the Basin. The incremental increase from 85% to 90%-97% in control efficiency is not cost-effective for the existing sources in the South Coast air basin. (note) In addition, Rule 1128 does not have a trigger for when it is considered implementable. The rule pertains to all paper, fabric, and film coating operations. Currently, approximately 190 facilities are subject to Rule 1128, out of which 21 are major source facilities. Rule 1128 covers more sources / facilities regardless of potential emission level. As such, Rule 1128 provides BACT level of control for this source category. Note: Per communication with Bill Milner on February 13, 2007.
1130	VOC	Graphic Arts (Amended 5/2/14)	VOC content limits: 16 g/l – 85 g/l for fountain solution, 150 g/l for adhesives, 225 g/l - 300 g/l for inks and coatings. In lieu of meeting specific emission limits, control device with overall control efficiency from 90% - 95% can be used to achieve equal or better emission reductions. VOC limits for cleaning solutions for printing presses are in Rule 1171 ranging from 25 g/l (0.21 lb/gal) for flexographic printing to 100 g/l (0.83 lb/gal) for lithographic printing.	Bay Area, Regulation 8, Rule 20 (Amended 11/19/08) requires 8% VOC content in fountain solution. In addition, the rule requires recordkeeping for digital printing, cleaning and stripping of UV or electron beam-cured inks for further study potential emission reductions in a near future.	SCAQMD Rule 1130 was recently amended (05/02/14) to be consistent with CTG requirements by amending the overall add-on control device efficiency requirements and VOC content limits for fountain solutions. Meets BACT.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1131	VOC	Food Product Manufacturing and Processing Operations (Amended 6/6/03)	VOC content limits from 120 – 200 g/L, or air pollution control system with at least 95% control efficiency and 90% capture efficiency. Solvent cleaning operations must contain 15% or less VOC or 85% VOC must be collected and disposed of.	n/a*	Meets BACT.
1136	VOC	Wood Products Coatings (Amended 6/14/96)	VOC content limits range from 2.3 – 6.3 lbs/gal VOC. Averaging provisions and add-on control are allowed. Transfer efficiency is at least 65%, or operator must use certain type of equipment (e.g. HVLP). Solvent cleaning operations must comply with Rule 1171.	Ventura Rule 74.30 (Amended 6/27/06) has more stringent limit for high-solid stains on new wood products at 2 lbs/gal (2.9 lbs/gal in Rule 1136). In lieu of coating specific limits, control equipment achieving 90% efficiency is required. No averaging provisions in Ventura. Rule 74.30 has higher emissions limits for refinishing operations. San Joaquin Valley Rule 4606 (Amended 10/16/08) is more stringent in the following areas: • Rule 1136 allows the use of a stripper with limits higher than 350 g/L if the stripper has low vapor pressure of 2 mmHg. SJV does not have this allowance; •SJV Rule 4606 requires a min overall control efficiency of 85% - 90% for flat wood paneling products, whereas Rule 1136 does not have control efficiency requirement. Rule 4606 exempts refinishing, replacement, and custom Replica Furniture Operations. SCAQMD Rule 1136 has a VOC limit of 120 g/L for low-stain barrier coat. This category is not found in SJV/Ventura and it is lower than their general limits. Bay Area, Regulation 8, Rule 32, (Amended 8/5/09) has lower limits for surface preparation and cleanup, including stripping, at 0.21 lbs/gal. Solvent cleaning operations and the storage and disposal of VOC containing materials are subject to Rule 1171 (general limit = 0.21 lbs/gal) in SCAQMD. Bay Area has higher emission limit of clear topcoat (4.6 lbs /gal vs. 2.3 lbs/gal in SCAQMD) for custom furniture Bay Area exempts refinishing, replacement, and custom Replica Furniture Operations.	SCAQMD Rule 1136 varies in stringency when compared to other Districts' requirements. For the majority of the categories, Rule 1136 is as stringent as or more stringent than the other Districts' rules, and provides BACT level of control for this source category.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1141	VOC	Control of Volatile Organic Compound Emissions from Resin Manufacturing (Amended 11/17/00)	95% - 98% control or 0.12 – 0.5 lbs/1000 lbs of resin produced	n/a*	Meets BACT.
1142	VOC	Marine Tank Vessel Operations (Amended 7/19/91)	2 lbs/1000 barrels liquid loaded or 95% emissions reduced	n/a*	Meets BACT.
1143	VOC	Consumer Paint Thinners and Multi-purpose Solvents (Amended 12/3/10)	Set VOC content of 25 g/l for consumer paint thinner and multi-purpose solvent beginning 1/1/2011	n/a*	Meets BACT.
1144	VOC	Metalworking Fluids and Direct-contact Lubricants (Amended 7/9/10)	Various limits from 50 g/L – 340 g/L. Add-on control at 90% capture efficiency, 95% control efficiency (or 5 ppmv outlet)	n/a*	Meets BACT.
1145	VOC	Plastic, Rubber, Leather and Glass Coatings (Amended 12/4/2009)	VOC limits: 50–800 lbs VOC per gallon. Avg provisions and add-on control at 95% control efficiency (50 ppmv outlet), 90% capture efficiency. High transfer coating equipment (e.g. HVLP). Solvent cleaning operations must comply with Rule 1171.	n/a*	Meets BACT.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1149	VOC	Storage Tank Degassing (Amended 5/2/08)	Degassing operations must be controlled such that the VOC concentration within the tank is reduced to less than 5,000 ppmv for a minimum time limit estimated in the rule based on volume of the gas to be freed in the tank and the flow rate through control device.	Ventura Rule 74.26, 74.27 (Adopted 10/12/04) requires degassing of crude oil, gasoline and other high TVP liquid storage tanks be controlled by vapor recovery or flare having 95% control efficiency until the vapor concentration in the tanks is less than 10,000 ppmv. Bay Area Rule 8-10 (Adopted 1/21/04) sets requirements for depressurizing process vessels at petroleum refineries and chemical plants. The gases must be vented to control devices until the vapor concentration in the tanks is less than 10,000 ppmv.	Overall, Rule 1149 is as stringent as or more stringent than the other Districts' rules, and provides BACT level of control for this source category.
1150.1	VOC	Control of Gaseous Emissions from Active Landfills (Amended 4/1/11)	98% control or 20 ppmv non methane organic compounds. 50-500 ppmv total organic compounds above background	n/a*	Meets BACT.
1151	VOC	Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations (Amended 9/5/14)	VOC content limits range from 250 – 840 grams VOC per liter. Averaging provisions are allowed. High transfer coating equipment (e.g. HVLP) is required. Solvent cleaning operations must comply with Rule 1171.	San Joaquin Valley Rule 4602 (Amended 9/17/09) is more stringent in the following areas: 1) adhesive at 250 g/L (540 g/L in Rule 1151) and 2) truck bed liner coating at 200 g/L (310 g/L in Rule 1151) Sacramento Rule 459 (Amended 8/25/11) is more stringent in the following areas: 1) multi-color coating at 520 g/L for mobile equipment driven on rails (680 g/L in Rule 1151), 2) truck bed liner coating at 200 g/L (310 g/L in Rule 1151) Bay Area, Regulation 8, Rule 45 (Amended 12/3/08) is more stringent in the following areas: 1) VOC limit for surface preparation and cleanup, including stripping, of 0.2 lbs/gal or 2) a minimum 85% overall control efficiency.	SCAQMD Rule 1151 varies in stringency when compared to other Districts' requirements. For the majority of the categories, Rule 1151 is as stringent as or more stringent than other Districts' rule, and provides BACT level of control for this source category.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1153	VOC	Commercial Bakery Ovens (Adopted 1/13/95)	Emission reduction of 70% or more is required for existing ovens emitting between 50 lbs – 100 lbs VOC/day, 95% or more for ovens emitting more than 100 lbs/day, and 95% or more for new ovens.	n/a*	Meets BACT.
1162	VOC	Polyester Resin Operations (Amended 7/8/05)	VOC limits (monomer content) from 10-48% by weight or alternatively 90% control efficiency for add-on control	Bay Area Regulation 8, Rule 50 (Amended 12/2/09) is similar to Rule 1162, except the limit for corrosion resistant resin is more stringent at 40% - 46% (48% in Rule 1162). The rule allows some usage of acetone	In its TSD for the approval of Rule 1162 into the California SIP published in 2011, EPA concluded that Rule 1162 is also generally consistent with relevant national guidance and analogous rules in other areas. For the majority of the categories, Rule 1162 is as stringent as or more stringent than other Districts' rules, and provides BACT level of control for this source category.
1164	VOC	Semiconductor Manufacturing (Amended 1/13/95)	VOC limit for cleanup solvents is 200 g/L or low vapor pressure of 0.64 psia at 68 degree F. Photoresist applications must be vented to control.	n/a*	Meets BACT.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1166	VOC	Volatile Organic Compound Emissions from Decontamination of Soil (Amended 5/11/01)	Good management practices. Requires that contaminated soil be covered and removed within 30 days. Treatment facilities using negative pressure enclosures are required to treat low VOC contaminated soil (less than 1000 ppm) within 30 days of excavation and high VOC contaminated soil (1000 ppm or more) should immediately be placed in a sealed container or trucked off-site or by any other alternative approved by the Executive Officer. Requires the following from the responsible contractors: 1.Prompt monitoring and detection of contaminated soil; 2.Mitigation of VOC emissions through spraying and prompt covering of stockpiles; 3.Prompt transport and/or treatment of soil; and 4.Maintenance of verifiable chain of custody records for the soil that is handled and treated.	Ventura Rule 74.29 – Soil Decontamination Operations (Amended 4/8/08) has standards for soil decontamination (e.g. 50 - 100 ppmv). Leaking agricultural tanks is exempted. Bay Area Rule 8-40 (Amended 6/15/05) for soil decontamination and tank degassing. All vapor exceeding the specified limit based on organic content and aeration rate must be vented to control devices with ≥ 90% efficiency until meeting 5,000 ppmv. San Joaquin Valley Rule 4651 (Amended 9/20/07) employs good management practices similar to those in SCAQMD. For ex-situ decontamination, VOC emissions must be vented to control devices with 95% efficiency or more.	SCAQMD Rule 1166 varies in stringency when compared to other Districts' requirements. Note that at the end of 1998, most excavation activities relating to gasoline underground tanks were completed in accordance to the Federal and State requirements. VOC emission emanating from current / new decontamination sites exceeding the major source threshold is unlikely.
1168	VOC	Adhesive and Sealant Applications (Amended 1/7/05)	VOC limits for solvents range from 30 – 775 lbs VOC per gallon. Require the use of high transfer efficiency equipment (e.g. HVLP spray). In lieu of meeting the VOC limits, using add-on control with 80% control efficiency is allowed.	San Joaquin Valley Rule 4653 (Amended 9/16/10) has more stringent limits in the following areas: • 100 g/L for Cellulosic Plastic Welding Adhesive, 100 g/L for Styrene Acrylonitrile Welding Adhesive, and 200 g/L for Reinforced Plastic Composite Adhesive (Rule 1168 limit is 250 g/L limits for all three categories) • Minimum overall control efficiency is 85% (80% in Rule 1168)	Staff has completed its evaluation and is proposing to reduce primer VOC limits to 250 g/L to meet the CTG. Additional VOC reductions from lowering the emissions limits are proposed. The amendment is expected to be considered in 2017. Under the proposed amendment to Rule 1168, BACT-level of control would be achieved.
1171	VOC	Solvent Cleaning Operations (Amended 5/1/09)	VOC limits for solvents are 25 g/L in general, and have a 100- 800 g/L VOC for specific cleaning operations. In lieu of meeting the VOC limits, add-on control having 90% collection efficiency and 95% destruction efficiency or meeting 50 ppmv outlet concentration can be used.	The U.S. EPA RACT published in September 2006 limit is 50 g/L or an overall control efficiency of 85%. The U.S. EPA is not recommending limits beyond 50 g/L; but also recommends states to adopt higher limits based on individual performance requirements of specific applications.	Rule 1171 is as stringent as or more stringent than other Districts' rules, and meets the BACT requirements for this source category.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1173	VOC	Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants (Amended 2/6/09)	Require to connect atmospheric PRDs to vapor recovery or add-on control by first turnaround, if the facility experiences: • a second release of more than 500 lbs VOC within any five year period, or • any release of 2,000 lbs VOC in any 24 hour period. In lieu of connecting PRDs to control, operator may elect to pay mitigation fee of $350,000 for any release exceeding the threshold. Leak Detection and Repair (LDAR) program to reduce fugitive emissions. Leak thresholds are: • for light liquid/gas/vapor service >10,000 ppmv, • for PRDs >200 ppmv, • for pumps in heavy liquid >100 ppmv	Bay Area Rule 8-28 (amended 12/21/05) requires atmospheric PRDs to be: • vented to vapor recovery or equivalent control devices that have 95% control efficiency within one year of the second release event of greater than 10 lbs VOC. • equipped with at least two or three redundant preventive measures to minimize episodic releases, and • equipped with tell-tale indicators.	In its TSD for the approval of Rule 1173 into the California SIP published in 2010, EPA concluded that Rule 1173 is more stringent than EPA's CTG and the requirements of Rule 1173 are similar to those in other California district rules. Overall, Rule 1173 is as stringent as or more stringent than other Districts' rules, and meets the BACT requirements for this source category
1174	VOC	Control of Volatile Organic Compound Emissions from the Ignition of Barbecue Charcoal (Amended 10/5/90)	VOC emissions less than 0.02 lb VOC per start.	n/a*	Meets BACT.
1175	VOC	Control of Emissions from the Manufacture of Polymeric Cellular (Foam) Products (Amended 11/5/10)	VOC limit for expandable polystyrene molding operations is less than 2.4 lbs/100 lbs of raw material processed	n/a*	Meet BACT.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1176	VOC	Sumps and Wastewater Separators (Amended 9/13/96)	• Wastewater: 500 ppmv • Sumps and wastewater separators must have floating cover with seals; or fixed cover vented to control • Sewer lines: totally enclosed • Process drains: with SCAQMD approved water seals • Junction boxes: totally enclosed • Control device: 95% efficiency or 500 ppmv leak above background • Monthly to annually inspection	Bay Area Rule 8-8 (Amended 9/15/04) in general is similar to South Coast Rule 1176, with the following exceptions: • Floating covers must have double seals; and • Semi-annual inspection is allowed.	Overall, Rule 1176 is as stringent as or more stringent than other Districts' rules, and provides BACT level of control for this source category.
1178	VOC	Further Reductions of VOC Emissions From Storage Tanks at Petroleum Facilities (Amended 4/7/06)	Applicable to high emitting facility that has 20 tpy VOC emissions or more and tanks >19,815 gals with liquids having TVP > 0.1 psia. Rule 1178 requires doming for high emitting external floating roof tanks, better seals and better control for all tanks. (Note that Rule 463 is applicable for tanks >19,815 gals at all facilities and have requirements for fixed roof tanks and floating roof tanks.)	n/a*	Meets BACT.
1179	VOC	Publicly Owned Treatment Works Operations (Amended 3/6/92)	Include recordkeeping and emission testing requirements.	n/a*	Meets BACT.
1183	VOC	Outer Continental Shelf (OCS) Air Regulations (Adopted 3/12/93)	Adopt by reference Code of Federal Regulations, Part 55, Title 40.	n/a*	Meets BACT.

* There are no analogous requirements in SJVAPCD, SMAQMD, VCAPCD, and BAAQMD, or the rules in other Districts are not more stringent than the SCAQMD rule being evaluated.

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Evaluation of SCAQMD Rules and Regulations - VOC Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1133.2, 1133.3	VOC	Rule 1133.2 - Emission Reductions from Co-Composting Operations (Adopted January 10, 2003) Rule 1133.3 - Emission Reductions from Greenwaste Composting Operations (Adopted July 8, 2011)	Rule 1133.2 establishes various performance standards. Air pollution control must have 80% control efficiency or greater. Existing operations must reduce up to 70% baseline VOC and ammonia emissions. Baseline emission factors are 1.78 lbs VOC/ton throughput and 2.93 lbs NH3/ton throughput. Rule 1133.3 establishes operational best management practices (BMPs) for greenwaste composting operations. If the facility processes more than 5,000 tons per year of foodwaste, any active phase of composting containing more than 10% foodwaste, by weight, must use an emission control device with an overall control efficiency of at least 80% by weight of VOC. For operations less than 5000 tons/year, require the composting piles to be covered, watered, and turned, or operated with measures that reduce at least 40% VOC emission and 20% NH3 emissions.	San Joaquin Rule 4565 – Biosolids, Animal Manure, and Poultry Litter Operations (Adopted 3/15/07) and Rule 4566 – Organic Material Composting Operations (Adopted 8/18/11) have various operational requirements for these operations as well as the operators who landfills, composts, or co-composts these materials. The applicability of Rules 4565/4566 is broader than the applicability of Rule 1133.2/1133.3. Rules 4565/4566 include additional mitigation measures to control VOC from composting active piles (e.g. maintain minimum oxygen concentration of 5%, moisture content of 40%-70%, carbon to nitrogen ratio of 20-1).	SCAQMD Rule 1133.2 is more stringent than San Joaquin's Rule 4565 for larger co-composting facilities and less stringent for smaller co-composting facilities. While SCAQMD Rule 1133.2 requires either 70 or 80% overall emission reductions from all parts of composting process, San Joaquin's Rule 4565 requires add-on controls to apply only to the active composting phase. Rule 1133.2 also has more stringent requirements for in-vessel composting. San Joaquin's rule does not address chipping & grinding as in Rule 1133.1. Overall, Rules 1133.2 and 1133.3 are as stringent as or more stringent than other Districts' rules, and meets the BACT requirement for this source category.

Attachment VI-A-1e

Evaluation of SCAQMD Rules and Regulations - NH3 Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
223	NH3	Emissions Reduction Permits From Large Confined Animal Facilities (Adopted 6/2/06)	Sets permit requirement for new and modified LCAF facilities. Specifics mitigation options by animal and facility type for: • Feed and silage handling, • Milk parlor operations, • Corrals and free stall barn operations, • Handling of manure and solids, • Handling of manure in liquid form • Land application of liquid or solid manure	Sacramento Rule 496 – Large Confined Animal Facilities (Adopted 8/24/06), has more stringent control and good management practices than South Coast Rule 1127 (e.g. venting to control system with at least 80% control efficiency). The more stringent requirements are targeted towards silage emissions, which is not applicable in South Coast for dry feed lot operations. SJVAPCD Rule 4570 is more stringent regarding applicability than Rule 223 for milk cows, (1,000 milk cows in SCAQMD vs 500 milk cows in SJVAPCD), and for chickens and ducks (650,000 birds in SCAQMD vs. 400,000 birds in SJVAPCD), and made certain feed and housing menu items mandatory for dairies and poultry facilities. However, that is partly mitigated by SCAQMD Rule 1127 which has a much lower applicability thresholds of 50 or more cows, heifers and/or calves. Rule 223 also has a lower applicability for horse facilities (2,500 in SCAQMD vs. 3,000 in SJVAPCD). Rule 4570 sets comparable permit requirements and mitigation measures.	Together with Rule 1127, Rule 223 achieves BACT equivalency for this source category. Further reduce NH3 emission from: Control Measure BCM-04 seeks to reduce NH3 emission from manure management strategies.
1127	NH3	Emission Reductions from Livestock Waste (Adopted 8/6/04)	Requires Good housekeeping practices for dairy farms with 50 or more cows, heifers and/or calves. Note: The SCAQMD adopted Rule 223 in June 2006 to reduce emission for large confined animal facilities. Rule 223 includes series of good management practices that are more stringent than Rule 1127.	SJVAPCD Rule 4565 and 4566 sets comparable permit requirements and mitigation measures. SJVAPCD 4570 has required best management practices for manure management and other areas to reduce VOC and ammonia emissions. Note that direct comparison with Rule 1127 is difficult due to the significant differences in source operations (dry feed lot in South Coast vs. flushing and lagoon operations in San Joaquin, the focus on corral waste control in SCAQMD vs. feed and silage and milk parlor in SJVAPCD, etc). In addition, SJV Rule 4570 applies to all types of confined animal facilities, while Rule 1127 applies only to dairies with a much lower applicability threshold.	Together with Rule 223, Rule 1127 achieves BACT equivalency for this source category.

Attachment VI-A-1e

Evaluation of SCAQMD Rules and Regulations - NH3 Rules

RULE NO.	TYPE	RULE TITLE	CURRENT RULE REQUIREMENTS	OTHER DISTRICTS' 2000-2015 RULES, CONTROL MEASURES AND FEDERAL AND STATE GUIDANCE	BACT EVALUATION
1133.2, 1133.3	NH3	Emission Reductions from Co-Composting Operations (Adopted 1/10/03)Emission Reductions from Greenwaste Composting Operations (Adopted 7/8/11)	Various performance standards. Air pollution control must have 80% control efficiency or greater. Existing operations must reduce up to 70% baseline VOC and ammonia emissions. Baseline emission factors are 1.78 lbs VOC/ton throughput and 2.93 lbs NH3/ton throughput. Rule 1133.3 establishes operational best management practices (BMPs) for greenwaste composting operations. If the facility processes more than 5,000 tons per year of foodwaste, any active phase of composting containing more than 10% foodwaste, by weight, must use an emission control device with an overall control efficiency of at least 80% by weight of VOC. For operations less than 5000 tons/year, require the composting piles to be covered, watered, and turned, or operated with measures that reduce at least 40% VOC emission and 20% NH3 emissions.	San Joaquin Rule 4565 – Biosolids, Animal Manure, and Poultry Litter Operations (Adopted 3/15/07) and Rule 4566 – Organic Material Composting Operations (Adopted 8/18/11) have various operational requirements for these operations as well as the operators who landfills, composts, or co-composts these materials. The applicability of Rules 4565/4566 is broader than the applicability of Rule 1133.3. In addition, Rules 4565/4566 include additional mitigation measures to control VOC from composting active piles (e.g. maintain minimum oxygen concentration of 5%, moisture content of 40%-70%, carbon to nitrogen ratio of 20-1).	SCAQMD Rule 1133.2 is more stringent than San Joaquin's Rule 4565 for larger co-composting facilities and less stringent for smaller co-composting facilities. While SCAQMD Rule 1133.2 requires either 70 or 80% overall emission reductions from all parts of composting process, San Joaquin's Rule 4565 requires add-on controls to apply only to the active composting phase. Rule 1133.2 also has more stringent requirements for in-vessel composting. San Joaquin's rule does not address chipping & grinding as in Rule 1133.1. Overall, Rules 1133.2 and 1133.3 are as stringent as or more stringent than other Districts' rules, and meets the BACT requirement for this source category.

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APPENDIX VI-A

ATTACHMENT VI-A-2

CONTROL MEASURE ASSESSMENT

Potential Control Measure 1

Title

Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives

Target Pollutant

All pollutants

Synopsis

Sources that emit greenhouse gases are typically sources of criteria pollutants. Significant efforts are currently being implemented and planned to reduce GHGs under the State's 2020 and 2050 targets as well as the Governor's 50-50-50 targets by 2030. As these GHG reduction efforts are undertaken across all sectors, the reductions of criteria pollutants should be considered along with any additional enhancements needed to achieve further criteria pollutant reductions under the GHG programs. Existing and future incentives, programs, and partnerships would be evaluated for reduction of emissions of both GHGs and criteria pollutants. Affected sources include stationary and transportation sources, as well as fuel providers.

Potential Emission Reduction

The 2019 baseline emission inventory is TBD[ii] for this source category. The 2021 baseline emission inventory is TBD[ii] for this source category.
The 2025 baseline emission inventory is TBD[ii] for this source category.
The 2031 planning baseline emission inventory is TBD[ii] for this source category.
Potential emission reduction is TBD[ii].

Technological Feasibility

Many different regulations, market mechanisms, and incentive programs are already being implemented in California to help achieve GHG reductions. Since these GHG reduction efforts are undertaken across all sectors, the reductions of criteria pollutants will be accounted for under this control measure.

Economic Feasibility

Because this control measure relies on other programs, incentives or measures, no additional costs are anticipated as a direct result of this control measure and thus, the economic impact from this control measure is assumed to be very small.

[ii] TBD are reductions to be determined once the inventory and control approach are identified.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	TBD[ii]	Feasible	Feasible	✓
PM-annual	RACM	TBD[ii]	Feasible	Feasible	✓
PM-annual	BACM	TBD[ii]	Feasible	Feasible	✓
Ozone	RACM	TBD[ii]	Feasible	Feasible	✓

Potential Control Measure 2

Title

Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures

Target Pollutant

NOx, VOC

Synopsis

Residential energy consumption results in direct and indirect emissions of criteria and greenhouse gas emissions. Direct emissions result from combustion fuels such as natural gas, propane, and wood. Indirect emissions are a result of energy use associated with electricity production. Improvements in residential weatherization largely provide emission reductions through reduced energy use for heating, cooling, lighting, cooking, and other needs. Weatherization and other demand side energy measures, to date, have proven to reduce the need for new power plants and additional energy infrastructure.

Potential Emission Reduction

The 2019 baseline emission inventory is 16.4 tpd for NOx for this source category.
The 2021 baseline emission inventory is 15.0 tpd for NOx for this source category.
The 2025 baseline emission inventory is 13.1 tpd for NOx for this source category.
The 2031 planning baseline emission inventory is 9.7 tpd for NOx for this source category.
Potential emission reduction is 1.1 tpd (from 2031 planning baseline) in existing buildings based on Governor's 2030 target.

The 2019 baseline emission inventory is 8.9 tpd for VOC for this source category.
The 2021 baseline emission inventory is 8.9 tpd for VOC for this source category.
The 2025 baseline emission inventory is 8.9 tpd for VOC for this source category.
The 2031 planning baseline emission inventory is 2.65 tpd for VOC for this source category.
Potential emission reduction is 0.29 tpd (from 2031 planning baseline) in existing buildings based on Governor's 2030 target.

Technological Feasibility

Energy efficiency equipment is widely produced and available.

Economic Feasibility

Weatherization and efficiency measures when appropriately applied can realize short payback periods from reduced energy costs. The economic impact from implementing energy efficiency equipment is assumed to be very small.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	0.4 tpd of NOx by 2023 0.23 tpd of VOC by 2023	Feasible	Feasible	✓
PM-annual	RACM	0.4 tpd of NOx by 2023 0.23 tpd of VOC by 2023	Feasible	Feasible	✓
PM-annual	BACM	0.4 tpd of NOx by 2023 0.23 tpd of VOC by 2023	Feasible	Feasible	✓
Ozone	RACM	1.1 tpd of NOx 0.29 tpd of VOC	Feasible	Feasible	✓

Potential Control Measure 3

Title

Additional Enhancement in Reducing Existing Residential Building Energy Use

Target Pollutant

NOx

Synopsis

Large commercial space heating furnaces are not currently regulated by the SCAQMD unless they have a heat input rating of more than 2 million BTU per hour. This control measure seeks emission reductions from unregulated commercial space heating furnaces and reductions from incentive programs to replace older boilers, water heaters and space heating furnaces with zero and near-zero emission technologies. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of residential and commercial water heaters, boilers and heating furnaces used for water or space heating. The primary focus of this control measure is on commercial and multi-family residential water and space heating appliances.

Potential Emission Reduction

The 2019 baseline emission inventory is 13.6 tpd for NOx for this source category.
The 2021 baseline emission inventory is 12.3 tpd for NOx for this source category.
The 2025 baseline emission inventory is 10.5 tpd for NOx for this source category.
The 2031 planning baseline emission inventory is 7.0 tpd for NOx for this source category.
Potential emission reduction is 2.1 tpd (2031 planning baseline).

Technological Feasibility

Combustion appliances within residences account for the majority of direct emissions within the residential sector. Appliances are considered durable goods and many appliances often last one or two decades before needing replacement. There are more efficient appliances along with zero and near-zero emitting applications that can provide significant emission reductions and efficiency benefits above most existing appliances with the typical appliance replacement rate. Many appliances such as water heaters are now available with energy factors (EF) greater than 0.8 for natural gas pilotless storage and EF levels over 2.4 for heat pump storage systems. High efficiency appliances are also available for pool heaters, furnaces, and cook stoves.

Several different technologies are being utilized for energy storage systems. Currently the most widely used storage systems utilize different battery chemistries along with using second life electric vehicle batteries. Grid scale energy storage systems are starting to be implemented that replace the need for peaking generation plants and can minimize the need for additional transmission lines along with other electrical utility infrastructure. Additionally, the California Independent System Operator (CAISO) is developing a distributed energy resource program (DERP) that allows the aggregation of several smart grid systems to bid into the wholesale electricity power market. This will provide an additional market and incentive for the installation of these systems.

Economic Feasibility

Weatherization, renewable energy, appliance efficiency and smart grid measures when appropriately applied can realize short payback periods from reduced energy costs. Staff estimates costs for a residential energy efficiency incentive program at about $230 to $700 million to reduce emissions by 2.1 tons per day by 2031. The incentive program range is dependent on the type of equipment replacements. Types of equipment identified for this measure include: water heaters, heat pump storage systems, pool heater and covers, weatherization and clothes dryers. Incentivizing the purchase of a pool cover is the most cost-effective option at the lower end of the incentive cost range while weatherizing an entire existing home or installing a solar thermal pool heating system is at the higher end of the incentive cost range. The average cost-effectiveness over the lifetime of the equipment is about $45,000 per ton. The payback period can be as short as two to three years depending on the cost of the equipment, available incentives, efficiency gains, and energy prices.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	1.7 tpd of NOx by 2023		Not feasible due to high cost; refer to ECC-03 for voluntary incentive program	No
PM-annual	RACM	1.7 tpd of NOx by 2023	Feasible		
PM-annual	BACM	1.7 tpd of NOx by 2023			
Ozone	RACM	2.1 tpd of NOx	Feasible		

Potential Control Measure 4

Title

Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications

Target Pollutant

NOx

Synopsis

This control measure seeks annual average NOx emission reductions of about 1.1 tons per day by 2023 and 2.8 tons per day by 2031 from: (1) regulations for currently unregulated commercial furnaces used for space heating; and (2) a combination of long-term regulation and shorter-term incentives to replace existing commercial and residential NOx appliances such as boilers, water heaters and space heating furnaces with new zero or near-zero emission units. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial boilers, water heaters and furnaces used for space heating.

Potential Emission Reduction

The 2019 baseline inventory is 11.4 tpd for NOx for this source category.
The 2021 baseline inventory is 10.2 tpd for NOx for this source category.
The 2025 baseline inventory is 13.6 tpd for NOx for this source category.
The 2031 planning baseline inventory is 9.5 tpd for NOx for this source category.
Emission reduction is 2.84 tpd by 2031 based on planning inventory.

Technological Feasibility

Low NOx burners are available for a variety of commercial and industrial heating and drying applications and achieve NOx emission levels of 10 to 30 ppm. Assuming a future NOx emission limit of between 20 ppm to 30 ppm, emissions from a commercial heating unit can be reduced by 60 to 80 percent.

Economic Feasibility

Based on the cost effectiveness of rules for other heating equipment (SCAQMD Rules 1111, 1121, 1146.2 and 1147), the cost effectiveness is estimated to be at $15,000 to $30,000 per ton of NOx reduced.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	1.8 tpd of NOx by 2023	Feasible	Feasible; $15,000 to $30,000/ton	✓
PM-annual	RACM	1.8 tpd of NOx by 2023			
PM-annual	BACM	1.8 tpd of NOx by 2023			
Ozone	RACM	2.84 tpd of NOx by 2031			

Potential Control Measure 5

Title

Emission Reductions from Cooling Towers

Target Pollutant

PM

Synopsis

This proposed control measure would seek reductions of PM from industrial cooling towers. This measure would require operators of cooling towers to use the latest drift eliminator technologies. The control measure would reduce PM2.5 emissions from cooling towers by requiring all units to upgrade their drift eliminators to more efficient drift eliminators that keep drift losses to less than 0.001 percent of the re-circulating water flow rate, resulting in water savings as well. Currently, industrial cooling towers not used for evaporative cooling of process water or containing chromium compounds are exempt from obtaining permits so that this control measure would need to incorporate a registration or permitting element for tracking and enforceability.

Potential Emission Reduction

The 2019 baseline inventory is TBD for PM for this source category.
The 2021 baseline inventory is TBD for PM for this source category.
The 2025 baseline inventory is TBD for PM for this source category.
Potential emission reduction is TBD.

Technological Feasibility

Newly constructed cooling towers have demonstrated ultra-low drift rate of 0.0005 percent. This drift rate has been achieved in practice and could be considered BACT for new construction.

Economic Feasibility

The amount of solid mass in each drop is dependent on the content of Total Dissolved Solid (TDS) and drift droplet size distribution. The estimated fraction of PM emissions as PM10 and PM2.5 therefore varies with TDS content. Although efficiency improvements are achievable through use of the newer drift eliminators, the proportion of PM2.5 in the overall drift is fairly small compared to the PM10 fraction (PM2.5 estimated at ~3 percent of PM10). Based on a the installation costs for a recent $1.37 million cooling tower high efficiency drift eliminator retrofit project at a local refinery and representative drift rates based on cooling tower model years, reduction in total PM, PM10 and PM2.5 were estimated at approximately 173, 11 and 0.4 tons per year. As such, cost effectiveness for this application would be roughly $15,000 per ton of PM10, but not cost effective for reducing PM2.5 (> $400K/ton).

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	Not determined	Feasible	Not feasible	No
PM-annual	RACM				
PM-annual	BACM				
Ozone	RACM	Target pollutant is not a precursor for ozone formation			

Potential Control Measure 6

Title

Emission Reductions from Manure Management Strategies

Target Pollutant

NH3, VOC

Synopsis

This control measure would seek to use manure management systems to reduce ammonia, a PM2.5 precursor. Such systems can be applied on a year-around basis; however, seasonal or episodic controls could be considered to minimize costs. SCAQMD Rule 223 (Emission Reduction Permits for Large Confined Animal Facilities, Amended 6/2/06) requirements apply to Large Confined Animal Facilities (LCAFs) above certain size thresholds. Currently, SJVAPCD Rule 4570 has a more stringent regulatory threshold than Rule 223 (1,000 milk cows in SCAQMD vs 500 milk cows in SJVAPCD, and 650,000 birds in SCAQMD vs. 400,000 birds in SJVAPCD). The feasibility of lowering the applicability threshold is evaluated.

Acidifier Application

Ammonia reducing agents would reduce ammonia emissions from fresh manure.

Dietary Manipulation/Feed Additives

Dietary manipulation such as lowering the protein content and including high-fiber ingredients is an effective method to decrease ammonia emissions from monogastric animals' and ruminants' manure. Feed additives can be considered as a seasonal or episodic control strategy when ambient ammonium nitrate concentration in the region is high.

Potential Emission Reduction

	2019		2021		2025		2031	
	VOC	NH_3	VOC	NH_3	VOC	NH_3	VOC	NH_3
Baseline (t/d)	1.10	5.93	0.95	5.20	0.73	4.00	0.49	2.69
Projected Emission Reduction (t/d)*	0.05	0.30	0.05	0.26	0.04	0.20	0.02	0.14

*For lowering the regulatory threshold in Rule 223

Technological Feasibility

Technologies used in manure management systems are already available in the dairy farms and feasible based on experimental studies.

Lowering Rule 223 thresholds results in an estimated 5% reductions in ammonia as well as in VOC (from additional 46,000 cows). The approach would be much more efficient if certain options in the mitigation menu for cows and chicken are mandated (e.g., feed accordingly to NRC guidelines) and the frequency of housing mitigation measures is increased.

Economic Feasibility

Technologies used in manure management systems are economically feasible. However, pilot tests should be conducted to determine the cost effectiveness.

Rule 223 requires applicable facilities to obtain an SCAQMD permit including a mitigation plan with measures chosen from the mitigation menu. The menu option approach in Rule 223 provides the flexibility of selecting the more cost-effective measures.

Summary Table

	Type of Analysis	Emission Reduction*	Technological Feasibility*	Economic Feasibility*	Feasible Measure*
PM-24-hr	BACM	0.30 tpd of NH3; 0.05 tpd of VOC	Feasible	Feasible	✓
PM-annual	RACM	0.26 tpd of NH3; 0.05 tpd of VOC	Feasible	Feasible	✓
PM-annual	BACM	0.20 tpd of NH3; 0.04 tpd of VOC	Feasible	Feasible	✓
Ozone	RACM	0.02 tpd of VOC	Feasible	Feasible	✓

*For lowering the regulatory threshold in Rule 223

Potential Control Measure 7

Title

Ammonia Emission Reductions from NOx Controls

Target Pollutant

NH3

Synopsis

This proposed control measure would seek reductions of ammonia from NOx controls such as selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR). Ammonia slip is the result of injection of ammonia into SCR systems that are installed on a variety of basic combustion equipment such as boilers, heaters, engines, gas turbines, and furnaces for NOx removal. Ammonia slip is subject to permit conditions for different types of source equipment. Excess ammonia that does not react to remove NOx in flue gas streams exits out of the SCR system and out of the stack into the atmosphere. Advances in catalytic technology have resulted in the production of ammonia slip catalysts (ASCs) that enable a maximum control of NOx without the consequence of excess ammonia emissions and can be added as an additional catalyst layer in newer SCR installations. Ammonia slip catalysts would enable a reduction of ammonia slip permit limits and contemporaneous achievement of NOx emission limits.

Potential Emission Reduction

The 2019 baseline emission inventory is 1.63 tpd for NH3 for this source category.
The 2021 baseline emission inventory is 1.63 tpd for NH3 for this source category.
The 2025 baseline emission inventory is 1.63 tpd for NH3 for this source category.
Potential NH3 emission reduction is 1.2 tpd.

Technological Feasibility

Recent advances in catalyst technology have resulted in the development of ammonia slip catalysts that selectively convert ammonia into nitrogen. These catalysts could be installed post-SCR and would result in less ammonia slip.

Economic Feasibility

The emission reductions that can potentially be achieved by installing ASCs on virtually every SCR control device may be quantifiable, however, they may not be economically feasible due to the high costs of replacing existing equipment that is still operating through its useful life. Many existing SCR systems are still capable of maintaining NOx emissions at the required levels. Some SCR catalyst chamber housings are incapable of accommodating additional catalyst layers and would require engineering and construction of a new housing. Depending on site restrictions, the installation costs can further rise if

there are space constraints around the equipment and within the facility. Additionally, catalysts installed by certain vendors often require that other components of the emission control system also be from the same vendor. These often include the logic control system that provides feedback to the injection nozzles based on the real time NOx levels going through the system.

To establish a basis for costs, it is assumed that the entire emission control system for each piece of equipment will be replaced with a new system with SCR catalysts as well as ASCs. This is a conservative assumption because not all of these sources would require the installation of an entire new system. According to permit records, there are currently over 300 active permits for SCRs. Recent costs for SCR systems were obtained as part of the BARCT analysis for the amendments to the NOx RECLAIM program in 2015, which affected the largest NOx sources, including those operated at petroleum refineries.

Ammonia slip emissions from these RECLAIM sources (a subset of the active SCR permits) were estimated to be 1.63 tons per day for 140 SCR installations, assuming a 5 ppm ammonia slip emission limit from each of these sources. This includes systems that are already installed and those that are projected to be installed as a result of the NOx reductions associated with the December 2015 amendments. The present worth values for each device analyzed across the different refinery and non-refinery source categories were then summated to reach a total range of $728 MM to $1,099 MM[iii]. The total project lifetime is calculated to be 25 years, consistent with current and recent practice with District rules. The estimated ammonia slip reductions based on vendor discussions is 75 percent on the conservative side, which equates to approximately 1.2 tons per day. The resulting aggregate cost effectiveness ranges from $66,000 to $100,000 per ton. This is significantly higher than the $50,000 per ton that was utilized as a guide for the RECLAIM 2010 SOx and 2015 NOx amendments to assess economic feasibility. On this basis, this control measure is not considered to be economically feasible.

Summary Table

	Type of Analysis	NH3 Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	1.2 tpd	Potentially Feasible	Not Feasible	No
PM-annual	RACM	1.2 tpd	Potentially Feasible	Not Feasible	No
PM-annual	BACM	1.2 tpd	Potentially Feasible	Not Feasible	No
Ozone	RACM	Target pollutant is not a precursor for ozone formation			

Potential Control Measure 8

Title

Further Emission Reductions from Agricultural, Prescribed, and Training Burning

[iii] SCAQMD; Staff Report for Amendments to Regulation XX, NOx RECLAIM; December 2015.

Target Pollutant

PM

Synopsis

This control measure would seek further PM emission reductions from certain categories of open burning including agricultural and prescribed (*e.g.*, forestry service) burning activities, as well as training burns. Agricultural burning involves collection and combustion of vegetative materials produced from the growing and harvesting of crops. Prescribed burning is the planned burning of vegetative materials, usually conducted by a fire protection agency or the department of forestry in order to control plant disease and pests or to reduce fire episode impacts. Training burns are hands-on activities conducted by fire protection agencies to practice suppressing fires.

This control measure would seek further PM emission reductions via the use of alternatives to agricultural burning (*e.g.*, chipping/grinding or composting) through use of incentives, with priority for eliminating burn projects located within close proximity of sensitive receptors. Additional considerations could include aligning burn prohibitions with any potential changes to the Rule 444 no burn day provisions which could further reduce open burning emissions during peak PM2.5 episodes.

Potential Emission Reduction

The 2019 baseline emission inventory is 0.68 tpd for PM for this source category.
The 2021 baseline emission inventory is 0.68 tpd for PM for this source category.
The 2025 baseline emission inventory is 0.68 tpd for PM for this source category.

If burn prohibitions were proposed to match potential changes to the Rule 444 no burn day provision, there likely would be a slight increase in the number of no-burn days under this potential control measure. However, no annual emissions reductions would be anticipated as the burning prohibited during a revised program would likely be switched to other, non-episodic times of the year. Therefore, potential emission reduction is expected to be minimal.

Technological Feasibility

Burning alternatives such as chipping/grinding or composting are widely available in the South Coast.

Economic Feasibility

The cost effectiveness of this control measure has not been estimated. However, costs to implement burning alternatives would be expected to be higher due to equipment and labor costs. The San Joaquin Valley APCD report on alternatives to agricultural burning estimated shredding and land application of vineyard material for a 20 acre site at approximately $975 per acre while open burning was estimated to cost approximately $200 per acre (SJVAPCD, 2010).

Cost impacts from an increase in burning prohibitions due to elevated PM2.5 levels are expected to be minimal as burning would likely be switched to other days or times of the year.

Since no annual emission reductions would be anticipated from increased burning prohibitions, this potential control measure is considered economically infeasible in terms of cost per ton.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	0 tpd	Feasible	Not Feasible	No
PM-annual	RACM				
PM-annual	BACM				
Ozone	RACM	Target pollutant is not a precursor for ozone formation			

Potential Control Measure 9

Title

Lowering Emission Limit of Rule 462 for Gasoline Bulk Terminals

Target Pollutant

VOC

Synopsis

Bay Area, Regulation 8, Rule 33 (Amended 4/15/09) regulates VOC emissions from gasoline bulk terminals with an emission limit of 0.04 lbs per 1000 gallons of liquid loaded. The limit in SCAQMD Rule 462 (Organic Liquid Loading, Amended 5/14/99) is 0.08 lbs per 1000 gallons of liquid loaded for a Class A facility loading 20,000 gallons or more. This limit is not applicable to small facilities (Class B and C). Rule 462 regulates emissions from additional sources, including chemical plants that load organic liquid with a vapor pressure above 1.5 psia. The feasibility of lowering the emission limit from 0.08 to 0.04 lbs per 1000 gallons of liquid loaded for gasoline bulk terminals is evaluated.

Potential Emission Reduction

The 2019 baseline emission inventory is 0.29 tpd for this source category.
The 2021 baseline emission inventory is 0.27 tpd for this source category.
The 2025 baseline emission inventory is 0.24 tpd for this source category.
The 2031 baseline emission inventory is 0.21 tpd for this source category.
Potential emission reduction is 0.09 tpd.

Technological Feasibility

In the SCAQMD, Rule 462 applies to 23 major source bulk loading terminals. Currently, nearly all gasoline bulk terminals meet the lower emission limit of 0.04 lbs per 1,000 gallons of liquid loaded. Source test results show emission rates less than 0.04 lbs per 1,000 gallons of liquid loaded in all but one gasoline bulk

terminal. However, some facilities report emission rates equal to the emission rate limits in their permit. There is one gasoline bulk terminal that would not meet the lower emission limit of 0.04 lbs per 1,000 gallons of liquid loaded as the most recent source test resulted in an emission rate of 0.042 lbs per 1,000 gallons of liquid loaded. At their current throughput, reducing emissions to meet the lower limit would result in 0.14 TPY of emission reduction.

Economic Feasibility

Any added costs for VOC reductions would result in very high cost per ton figures because of the negligible emission reductions realized. For example, for the facility described above, reducing the emission rate from 0.042 lbs per 1,000 gallons to 0.04 lbs per 1,000 gallons could cost between $100,000 for modifications to the control device to several millions of dollars to replace the control device. Using the current throughput at that facility and the lowest cost estimate annualized over a ten year period, the cost per ton of VOC reduced is approximately $95,000. In addition to the high costs, VOC reductions would likely be offset by increased NOx emissions from modifications to control devices which burn natural gas or propane to operate.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	0.09 tpd	Feasible	Not Feasible; $95,000/ton	No
PM-annual	RACM	0.09 tpd			
PM-annual	BACM	0.09 tpd			
Ozone	RACM	0.09 tpd			

Potential Control Measure 10

Title

Emission Reductions from Non-Refinery Flares

Target Pollutant

VOC, NOx

Synopsis

This proposed control measure would seek reductions of NOx and VOC from flares from non-refinery sources such as organic liquid loading stations, tank farms, oil and gas production, landfills, and composting sources. Flare NOx emissions are regulated through new source review and BACT, but there are currently no source-specific rules regulating NOx emissions from flares at these sources. This control measure proposes that, consistent with all feasible control measures, all non-refinery flares meet current BACT for NOx emissions and thermal oxidation of VOC.

Potential Emission Reduction

The 2019 baseline inventory is 2.3 tpd for NOx for this source category.
The 2021 baseline inventory is 2.4 tpd for NOx for this source category.
The 2025 baseline inventory is 2.4 tpd for NOx for this source category.
The 2031 planning baseline inventory is 2.9 tpd for NOx for this source category.
Potential emission reduction is 1.5 tpd (based on 2031 planning inventory) for NOx.

The 2019 baseline inventory is 0.6 tpd for VOC for this source category.
The 2021 baseline inventory is 0.7 tpd for VOC for this source category.
The 2025 baseline inventory is 0.7 tpd for VOC for this source category.
The 2031 baseline inventory is 0.7 tpd for VOC for this source category.
Potential emission reduction is 0.4 tpd (based on 2031 planning inventory) for VOC.

Technological Feasibility

The most stringent current BACT limit is 0.025 pounds NOx per million BTU (MMBTU) of biogas. Staff estimates an average emission reduction of about 50 percent is achievable if all flares meet the most stringent current BACT limit. Lower emission levels of up to 0.018 lbs NOx/MMBTU, or 15 ppm NOx at 3 percent oxygen would be achieved with the installation of Clean Enclosed Burners (CEB). CEBs are designed to accommodate varying gas compositions and feed rates while maintaining emissions at low levels. These devices achieve the VOC destruction of the fuel stream, while producing lower NOx emissions.

Economic Feasibility

Based on cost information used for the 2006 SCAQMD BACT determination for biogas flares, the average cost effectiveness for meeting an emission limit of 0.025 pound per million BTU of biogas is less than $20,000 per ton of NOx reduced. It is estimated that a similar cost effectiveness would pertain to other non-refinery sources.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	1.2 tpd of NOx by 2023 0.4 tpd of VOC by 2023	Feasible	Feasible; < $20,000/ton	✓
PM-annual	RACM	1.2 tpd of NOx by 2023 0.4 tpd of VOC by 2023			
PM-annual	BACM	1.2 tpd of NOx by 2023 0.4 tpd of VOC by 2023			
Ozone	RACM	1.5 tpd of NOx 0.4 tpd of VOC			

Potential Control Measure 11

Title

Lowering Emission Limits of Rule 1115 to Meet 2008 EPA CTG for Auto and Light-Duty Truck Assembly.

Target Pollutant

VOC

Synopsis

Rule 1115 is not as stringent as the 2008 EPA CTGs for a few coating processes for facilities emitting > 15 lbs/day. CTG has more stringent limits for electro-deposition primer at 84 g/L (145 g/L in Rule 1115); sprayable primer, primer-surfacer, and topcoat at 1440 g/L (1800 g/L in Rule 1115); and trunk coatings, interior coatings, sealers, and deadeners at 650 g/L (Rule 1115 provides an exemption for these categories). The feasibility of lowering the emission limit to meet 2008 EPA CTG for Auto and Light-Duty Truck Assembly is evaluated.

Potential Emission Reduction

Because VOC is a precursor to PM2.5 and the ozone strategy has proven to be effective in meeting the PM2.5 standards, the emission inventory and reductions based on the PM2.5 attainment years, along with the 2008 8-hour ozone attainment year, have been provided below. Further, the inventory is based on facility-wide VOC emissions from the two known facilities potentially using the affected coatings although the affected coatings are a subset of the total VOC emission listed. Thus, the inventory is an overestimation and actual PTE would be lower.

The 2019 baseline inventory of is 0.04 tpd for VOC for this source category.
The 2021 baseline inventory of is 0.04 tpd for VOC for this source category.
The 2025 baseline inventory of is 0.04 tpd for VOC for this source category.
The 2031 planning baseline inventory of is 0.04 tpd for VOC for this source category.
Potential VOC emission reduction is 0.002 tpd.

Technological Feasibility

Lower VOC content reformulations for electro-deposition primer and trunk coating exist but current usage is known to be limited. As such, while not known, potential future usage is not anticipated to be expand substantially. Growth factors for overall auto refinishing and coatings industry range from 1.064 in 2019 in Los Angeles County to 1.945 in 2031 in Riverside County (Table III-2-13 thru 2-18, Appendix III). Again, as noted earlier, electro-deposition primer and trunk coating usage is a subset of the overall auto refinishing and coatings inventory, so no substantial change is anticipated. Regardless, there is potential technological feasibility because the CTG has identified known uses at lower VOC content limits.

Economic Feasibility

Two known facilities could be required to change their coating operations if the VOC limits are reduced. This involves approximately a two-year process to test multiple the new coating in the spray lines, conduct performance testing of new coatings, as well as training of technicians for proper application. Thus, the costs to successfully implement new coating limits for the affected coatings would include product capital, substrate costs, and labor costs to test, quality assurance, and training. The labor wage was based on a professional level rate since an educated and experienced background would be necessary. Staff estimates the cost effectiveness is approximately $90,000 per ton based on the cost to fully implement the testing and transition compared to the very low emission reductions achieved by the small inventory of these coatings. This cost effectiveness value is three times higher than the VOC threshold of $30,000 per ton per the 2016 AQMP, thus not economically feasible to implement at this time.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	0.002 tpd	Potentially Feasible	Not Feasible	No
PM-annual	RACM	0.002 tpd	Potentially Feasible	Not Feasible	No
PM-annual	BACM	0.002 tpd	Potentially Feasible	Not Feasible	No
Ozone	RACM	0.002 tpd	Potentially Feasible	Not Feasible	No

Potential Control Measure 12

Title

Further Emission Reductions from Commercial Cooking

Target Pollutant

PM

Synopsis

Rule 1138 (*Control of Emissions from Restaurant Operations, Adopted 11/14/97)* regulates VOC and PM emissions from restaurant operations by requiring the installation of flameless catalytic oxidizers, or equivalent control devices, to chain-driven charbroilers. The Rule covers chain-driven charbroilers cooking 875 pounds of meat or more per week, applicable to mostly large chain operations. Although under-fired charbroilers are another source of emissions from restaurant operations, no cost-effective control technology was identified for this type of equipment at the time of rule adoption. The rule required a report to the Governing Board within 18 months of its adoption, on the feasibility of achieving further restaurant operations emission reductions, specifically under-fired charbroilers and potentially other commercial restaurant cooking equipment. The Board received a report in May 1999, on emerging control technology for under-fired charbroilers and an overview of the work to date by the University of California Riverside, College of Engineering, Center for Environmental Research and Technology (CE-CERT). The report pointed out that a continuing effort to find cost-effective and technologically feasible controls for the restaurant industry had been ongoing since 1991. The earlier phases of this effort

included the investment of significant resources in improving test methods and developing emission factors. In August 2000, staff reported to the Board that cost-effective controls for under-fired charbroilers were limited. Similar conclusions, that controls were infeasible, were made in a 2004 report. In 2008-09, staff reinitiated rule development for chain-driven charbroilers and held a series of working group meetings and a public workshop. Rule adoption was again concluded infeasible due to the lack of affordable control technologies.

SJVAPCD Rule 4692 reduces PM emissions by requiring catalytic oxidizers for chain-driven charbroilers cooking 400 pounds of meat or more per week. This threshold is more stringent than Rule 1138 which applies to chain-driven charbroilers cooking 875 pounds pounds of meat or more per week. In its 2012 PM2.5 Plan, SJVAPCD committed to expand Rule 4692 applicability to include under-fired charbroilers in 2016 with an anticipated compliance date of 2017.

Potential Emission Reduction

The 2019 baseline inventory is 11.7 tpd for PM for this source category.
The 2021 baseline inventory is 11.9 tpd for PM for this source category.
The 2025 baseline inventory is 12.3 tpd for PM for this source category.
Potential emission reduction is 3.3 tpd of PM for installing control devices with a higher (e.g., 80 percent) and lower (e.g., 25 percent) efficiency combined depending on the level of activity at charbroiler restaurants.

Technological Feasibility

In 2009, SCAQMD initiated a study with University of California Riverside, in partnership with the U.S. EPA and other air agencies in PM2.5 nonattainment areas, to identify cost-effective and more affordable under-fired charbroiler controls. To date, screening tests have been conducted by CE-CERT on control device configurations provided by seven manufacturers. Protocol tests were then conducted on the most promising technologies, including technologies not commercially available at this time, and draft test results have been received on five control device configurations. Potential control technology includes commercially or near-commercially available technologies, including a multi-stage filter system, an Electrostatic Precipitator (ESP), an in-hood baffle filter, ceramic filtration with microwave regeneration, and a centrifugal separator/aerosol mist nebulizer.

Economic Feasibility

The cost-effectiveness associated with achieving 2 tons per day reduction by requiring high use under-fired charbroiler restaurants to install 80 percent efficient control devices has been estimated at approximately $15,000 per ton PM2.5. The cost-effectiveness of requirements for lower activity restaurants to install lower efficiency devices has been estimated at approximately $18,000 per ton of PM2.5 reduced. SCAQMD staff continues to work with control device manufacturers and restaurants to quantify costs, especially for retrofit technologies. As expected, cost estimates for new installations represent a marginal increase in costs, whereas a retrofit device installed at an existing facility may require a complete system overhaul including fire suppression, ventilation, and electrical components, which can be significant. The added costs for retrofit installations combined with the lack of

commercially available, low-cost/emerging technology devices means this control measure is not feasible in the short-term for existing sources. To encourage continued progress in control device development, the SCAQMD is considering implementation of a PM control program for new facilities with high-use under-fired charbroilers, provided appropriate control devices can be identified. SCAQMD staff would analyze industry cost impacts as part of any potential rule development process. In addition to cost-effectiveness, given that many restaurants are small businesses, affordability will also be assessed relative to capital and installation costs, as well as ongoing operational costs.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	3.3 tpd	Not Feasible*	Not Feasible; $15,000-$18,000+/ton	No
PM-annual	RACM				
PM-annual	BACM				
Ozone	RACM	Target pollutant is not a precursor for ozone formation			

*Not feasible for retrofit installations at existing restaurants

Potential Control Measure 13

Title

Further Emission Reduction from Fugitive Dust Sources

Target Pollutant

PM

Synopsis

This control measure would seek further PM emission reductions from fugitive dust sources. Although fugitive dust emissions from agriculture and construction are primarily in the coarse size fraction (PM10-2.5), entrained road dust is still one of the major direct PM2.5 sources due to the large number of roadways and high traffic volumes in the region. SCAQMD Rule 1186 established requirements to prevent material from being deposited on roadways and also requires local jurisdictions to procure certified street sweeping equipment.

This control measure would seek to establish minimum street sweeping frequencies and enhanced street cleaning for roads with higher silt loadings. Enhanced best management practices could also be established to prevent material from being tracked out onto roads from vehicles exiting construction sites, certain industrial facilities (*e.g.*, aggregate handling facilities), and landfills. Wheel washing systems could

be required for higher activity sites with special consideration for systems that encourage use of reclaimed water or chemical stabilizers to reduce water demand.

Potential Emission Reduction

The baseline inventory of 2019 is 8.4 tpd for PM for this source category.
The baseline inventory of 2021 is 8.5 tpd for PM for this source category.
The baseline inventory of 2025 is 8.7 tpd for PM for this source category.

Currently, most cities in urban areas have regular street sweeping at the frequency of once or twice per week due to stormwater regulations. Existing National Pollution Discharge Elimination System (NPDES) permits required under the Clean Water Act currently specify street sweeping frequencies as part of a comprehensive program to reduce debris from entering the storm drain.[iv] Accordingly, regulations are currently in place to require street sweeping, at specified frequencies, with SCAQMD-certified equipment. Therefore, potential emission reduction is expected to be minimal.

Technological Feasibility

Further emission reductions could be achieved by specifying the most effective track out prevention measures, such as use of a wheel washing system, for sites with high vehicular activity exiting the site, or those with repeated track-out violations. Rule 1186 requires that certified equipment be used on public roads currently subject to routine street sweeping but does not specify frequency. Accordingly, further paved road dust PM2.5 emission reductions could be sought by specifying the frequency of street sweeping. All street sweepers in use today by local governments are considered certified devices and thus, further reductions in paved road dust emissions are technically feasible.

Economic Feasibility

Basic wheel washer system costs for a site with 100 trucks exiting a day have been estimated to range from $55,000 to $63,000 (approximately $12,500 for installation) and operational costs will vary with local utility rates. Wheel washing systems can also be leased for approximately $3,000 per month. With one time installation/removal and transportation, costs is estimated at approximately $14,000. Operational and maintenance costs will depend on site-specific conditions. Street sweeping costs vary greatly based on the number of miles and frequencies and whether the work is conducted with in-house or contracted resources. One local jurisdiction estimated twice weekly contract sweeping costs at $25 per curb mile (Riverside County, 2015). Since most cities in the Basin have regular street sweeping schedules, emission reductions from mandating street sweeping frequency is expected to be minimal and not worth the cost.

[iv] City of Fullerton, 2015. Contact with Ty Richter, Street Supervisor, City of Fullerton, September 2015.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	Minimal	Feasible	Not Feasible	No
PM-annual	RACM	Minimal	Feasible	Not Feasible	No
PM-annual	BACM	Minimal	Feasible	Not Feasible	No
Ozone	RACM	Target pollutant is not a precursor for ozone formation			

Potential Control Measure 14

Title

Lowering the VOC Limit of Rule 1125 for Three-piece and Two-piece Can Interior Body Sprays, and Add a VOC Limit and Corresponding Definition for Exterior Body Spray

Target Pollutant

VOC

Synopsis

Rule 1125 (Metal Container, Closure, and Coil Coating Operations, Amended 3/7/08) limits the emissions of VOCs from coating operations in manufacturing and/or reconditioning of metal cans, drums, pails, lids, and closures. The rule also applies to coating of the surface of flat metal sheets, strips, rolls, or coils. The analogous rules in SJVAPCD and BAAQMD have lower emission limits for three-piece can interior body sprays (360 g/l vs. 510 g/l in SCAQMD) and two-piece can interior body sprays (420 g/l vs. 440 g/l in SCAQMD). They also have a VOC limit and definition for the category of exterior body spray that is absent in Rule 1125. Thus, the feasibility of lowering the VOC content limit of Rule 1125 for three-piece can interior body sprays to 360 g/l; lowering the limit for two-piece can interior body sprays to 420 g/l; and adding a VOC limit and corresponding definition for the category of exterior body spray is examined.

Potential Emission Reduction

The 2019 baseline inventory is 0.006 tpd for VOC for this source category.
The 2021 baseline inventory is 0.006 tpd for VOC for this source category.
The 2025 baseline inventory is 0.007 tpd for VOC for this source category.
The 2031 planning baseline inventory is 0.007 tpd for VOC for this source category.
Potential VOC emission reduction is 0.0003 tpd.

Technological Feasibility

Lower VOC content reformulations for three- and two-piece can interior body sprays exist but current usage is known to be very limited. As such, while not known, potential future usage is not anticipated to be expand substantially. Growth factors for overall can, coil, metal parts and products coatings industry

range from 1.085 in 2019 in San Bernardino County to 1.419 in 2031 in Riverside County (Table III-2-13 thru 2-18, Appendix III). Three- and two-piece can interior body sprays usage is a subset of the overall can, coil, metal parts and products coatings inventory, so no substantial change is anticipated. Regardless, there is potential technological feasibility because the CTG has identified known uses at lower VOC content limits.

Economic Feasibility

Three known facilities could be required to change their coating operations if the VOC limits are reduced. Similar to Proposed Control Measure 11, this involves approximately a yearlong process to test multiple the new coating in the spray lines, conduct performance testing of new coatings, as well as training of technicians for proper application. Thus, the costs to successfully implement new coating limits for the affected coatings would include product capital, substrate costs, and labor costs to test, quality assurance, and training. The labor wage was based on a professional level rate since an educated and experienced background would be necessary. Staff estimates the cost effectiveness is approximately $200,000 per ton based on the cost to fully implement the testing and transition compared to the very low emission reductions achieved by the small inventory of these coatings. This cost effectiveness value is over six times higher than the VOC threshold of $30,000 per ton per the 2016 AQMP, thus not economically feasible to implement at this time.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	0.0003 tpd	Potentially Feasible	Not Feasible	No
PM-annual	RACM	0.0003 tpd	Potentially Feasible	Not Feasible	No
PM-annual	BACM	0.0003 tpd	Potentially Feasible	Not Feasible	No
Ozone	RACM	0.0003 tpd	Potentially Feasible	Not Feasible	No

Potential Control Measure 15

Title

Further Emission Reductions from Wood Burning Fireplaces and Wood Stoves

Target Pollutant

PM

Synopsis

Rule 445 (Wood Burning Devices, Amended 5/3/13) is designed to reduce PM emission from wood-burning devices. The rule establishes requirements for the sale, operation, and installation of wood burning devices.

SJVAPCD Rule 4901 requires the replacement of uncertified wood burning heaters (stoves and inserts) upon sale or transfer of real property. SJVAPCD Rule 4901 also allows uncertified wood heaters to be rendered permanently inoperable during the property transfer process.[v] In the SCAQMD, there was a lack of data as to the number of uncertified wood heaters, but it has been estimated that in 2005 there could have been as many as approximately 42,000 such devices in use in the Basin.[vi] Relative to the Basin, San Joaquin Valley is more rural and overall more highly impacted by wood burning. For example, January Heating Degree Days[vii] (a measure for tracking energy use) for Fresno (578) are double or nearly double the values for Long Beach (267) and Riverside (303), which increases wood stove use. In addition, residential burning is more related to ambiance than temperature for the Basin. Furthermore, based on the experiences of other agencies, public outreach and education in combination with the gas log buy-down incentive program could have a further positive impact in the sub-region. The SCAQMD has implemented the Healthy Hearths™ program that includes a comprehensive education and outreach effort to encourage the public to switch to cleaner, gaseous-fueled hearth products. An incentive program for cleaner hearth appliances is ongoing to encourage the public to switch to cleaner hearth products (with over 10,000 conversions), including gaseous-fueled devices that are exempt from burning curtailments. It was determined that for these reasons, Rule 445 allows the transfer of real estate without removal or replacement of uncertified wood heaters.

In 2006, following the donation of stoves to low-income households and cash incentives for other homes, Lincoln County, Montana passed a regulation that banned the use of uncertified wood heaters. The local government decided that each home using a “Solid Fuel Burning Device” (e.g., wood stove or fireplace) must have an operating permit. To enforce the regulation, Lincoln County air program personnel periodically look for visible emissions from chimneys. Currently, SCAQMD Rule 445 does not allow sale or installation of uncertified wood heaters but use of such devices are allowed unless a no burn day has been forecast, whereas both certified and uncertified wood heaters are subject to the no burn day provisions of the rule.

Potential Emission Reduction

The 2019 baseline inventory is 4.9 tpd for PM for this source category (all wood heaters).
The 2021 baseline inventory is 4.9 tpd for PM for this source category (all wood heaters).
The 2025 baseline inventory is 4.9 tpd for PM for this source category (all wood heaters).
Potential emission reduction is 0.1 tons per day.

[v] SJVAPCD, 2003. San Joaquin Valley Air Pollution Control District (SJVAPCD), Final Draft Staff Report, Amendments to Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters), June 19, 2003

[vi] CARB, 2011 http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-1_2011.pdf CARB, 2011. California Air Resources Board (CARB), Area Source Methodology, Section 7.1 Residential Wood Combustion (revised October 2015).

[vii] National Oceanic and Atmospheric Administration (NOAA); Degree days are the difference between the daily temperature mean, (high temperature plus low temperature divided by two) and 65 degree F. If the temperature is below 65 degrees F, the mean is subtracted from 65 and the result is Heating Degree Days.

Assumptions:

Wood burning rate – 0.95 cords per year (1.46 tons) per device (Sierra Research, 1989)

PM2.5 Emission factors – uncertified (29.5 lbs./ton) certified (17.1 lbs./ton) [viii]

Annual Reductions – 18.1 lbs./device

National rate for percentage of uncertified heaters (80 percent, U.S. EPA, 2005) is appropriate for the Basin

Household turnover rate – ten years (SJVAPCD, 2003)

PM2.5 Reductions

18.1 lbs. PM2.5 reductions/device/yr × 42,000 devices = 380.1 tons

380.1 tons × 0.1 turnover rate / 365 days per year = 0.1 ton/ annual average day

Technological Feasibility

Certified wood burning heaters are commercially available and it is technologically feasible to replace an uncertified heater with a certified (or equivalent) heater. It is also technologically feasible to render an uncertified wood heater as permanently inoperable.

Economic Feasibility

Presuming operational and maintenance costs are the same for certified devices and uncertified devices and the operational life (and emission reductions) are assumed at 20 years, a simplified cost effectiveness estimate is $23,055 per ton of PM2.5 reduced.

$4,150 uncertified to certified replacement (MARAMA, 2006):	$4,150	= $23,055/ton
18.1 lbs/yr./device × 20 years / 2000 lbs./ton:	0.18 tons	

The total capital cost based on the estimated 42,000 devices required for conversion would be roughly $174 million.

SJVAPCD has a lower number of housing units (1,331,557)[ix] relative to the Basin (5,554,896).[x] Requiring an inspection upon each property transfer will be more labor and cost intensive in the Basin. More importantly, SJVAPCD Rule 4901 is a two-tiered control program. During a Level One Curtailment, triggered when PM2.5 concentrations are forecast to be between 20 and 65 µg/m^3, U.S. EPA Phase II-certified wood burning heaters that have a current registration with SJVAPCD may be used. In contrast, SCAQMD prohibits the use of all solid fuel wood burning sources during its curtailment. The different approach between the curtailment programs of SJVAPCD and SCAQMD, combined with the higher number of housing units and the lower impact of residential wood smoke to the annual pm levels in the Basin, make this measure economically infeasible.

[viii] U.S. EPA AP-42, 1996. Average of certified catalytic (19.6 lbs./ton) and non-catalytic (14.6 lbs./ton) emission rates

[ix] U.S. Census 2010 Quick Facts http://www.census.gov/quickfacts/table/HSG030210/06031,06019,06107,06029
U.S. Census 2010 Quick Facts http://www.census.gov/quickfacts/table/HSG030210/06047,06039,06099,06077

[x] U.S. Census 2010 Quick Facts http://www.census.gov/quickfacts/table/HSG030210/06071,06065,06059,06037,00
Basin/County percentages: LA 97%, Orange 100%, Riverside and San Bernardino 77.6%

Although the banning of the use of uncertified devices has been implemented in Lincoln County Montana (11,477 housing units),[xi] it is not considered practical for the Basin due to the Basin's significantly higher number of housing units (5,554,896) compared to Lincoln County Montana and the associated issues and costs surrounding the issuance of operating permits for all of the Basin's households with wood burning devices. Furthermore, the contribution of wood smoke to wintertime PM2.5 is much higher in Lincoln County (up to 80 percent)[xii] than the Basin. Given the more diverse source composition of PM2.5 and the much higher number of housing units in the Basin, this control measure is not cost effective to be implemented.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	TBD*	Feasible	Not Feasible	No
PM-annual	RACM	0.1 tpd**	Feasible	Not Feasible	No
PM-annual	RACM	0.1 tpd**	Feasible	Not Feasible	No
Ozone	RACM	Target pollutant is not a precursor for ozone formation			

* Under R445, all devices are subject to no-burn days.

**Upon full implementation, estimated no earlier than c/y 2028.

Potential Control Measure 16

Title

Lowering the Curtailment Threshold in Rule 445

Target Pollutant

PM

Synopsis

The SJVAPCD recently amended the previous Rule 4901 episodic curtailment threshold (PM2.5 concentrations > 30 micrograms per cubic meter (µg/m^3) or PM10 > 135 µg/m^3 and now implements a two-tiered curtailment program. During a Level One Curtailment, triggered when PM2.5 concentrations are forecast to be between 20 and 65 µg/m^3, operation of a wood burning fireplace or an unregistered wood burning heater is prohibited. Properly operated wood burning heaters that meet certification requirements (U.S. EPA Phase II-certified or equivalent) and have a current registration with SJVAPCD may

[xi] U.S. Census 2014 Quick Facts, http://quickfacts.census.gov/qfd/states/30/30053.html

[xii] Ward, T.J., Rinehart, L.R., Lange, T., 2006. The 2003/2004 Libby, Montana PM2.5 source apportionment research study. Aerosol Science and Technology 40, 166–177.

be used during a Level One Curtailment. During a Level Two Curtailment, which is triggered when PM2.5 concentration is forecast to be above 65 µg/m^3 or PM10 > 135 µg/m^3, operation of any wood burning device is prohibited.[xiii] The staff report indicates that lowering the threshold level would increase the No Burn days from 35 days per wood burning season per County to 69 days per wood burning season per County. The increase in the number of SJVAPCD curtailment days could reduce emissions by 1.5 tpd of PM2.5.

Under SCAQMD Rule 445 (Wood Burning Devices, Amended 5/3/13), curtailment is mandatory when the forecast level exceeds 30 µg/m³ from November through February. The SCAQMD curtailment threshold applies to all solid fuel devices, including wood-based residential cooking devices. The threshold was lowered from 35 µg/m^3 to 30 µg/m^3 in the 2013 rule amendment to provide a margin of safety given the uncertainties associated with air quality forecasts and to be consistent with the wood smoke policies in Bay Area and Sacramento Metropolitan AQMD. It was anticipated that there may be an increase of up to 20 no-burn days with the lower threshold. San Joaquin Valley is a colder, inland climate when compared with the Basin. For example, January Heating Degree Days[xiv] (a measure for tracking energy use) for Fresno (578) are double or nearly double the values for Long Beach (267) and Riverside (303). Because of the colder climate and the more rural nature of the San Joaquin Valley, the contribution of wood smoke to overall PM2.5 levels is considered to be much higher than it is the Basin. Specifically, it was estimated that on the worst winter days, wood smoke can be responsible for up to one-third of the Valley's particulate matter air pollution[xv] (SJVAPCD, 2015) compared to <10 percent in the Basin[xvi] (SCAQMD, 2012). It is acknowledged the Basin's wood smoke contributions can be higher on stagnant winter days but the current SCAQMD control program addresses emissions to the extent feasible during these conditions.

Potential Emission Reduction

The 2019 PM2.5 emissions inventory for the Basin's residential wood combustion is estimated at approximately 4.9 tons per annual average day and approximately 10 tons per winter day. Lowering the mandatory winter burning curtailment threshold to 20 µg/m^3 would be estimated to prohibit all wood burning on approximately 60% of the winter season days (i.e., 72 days per 120 day season). Note that the 24-hour PM2.5 standard is set to protect public health from short term episodic PM2.5 levels, and the standard is based on the 98th percentile of the daily average measurements averaged over three years. The 98th percentile of any given year is always one of the eight highest days of the year. The emission reductions from the curtailments called under the current 30 µg/m^3 threshold are already incorporated in the attainment demonstration of the 24-hour PM2.5 standard. Thus, lowering the No Burn threshold

[xiii] Exemptions provided where natural gas service is not available or where a wood burning device is the sole source of heat in a residence.

[xiv] National Oceanic and Atmospheric Administration (NOAA): Degree days are the difference between the daily temperature mean, (high temperature plus low temperature divided by two) and 65°F. If the temperature mean is below 65°F, the mean is subtracted from 65 and the result is Heating Degree Days.

[xv] SJVAPCD, 2015. San Joaquin Valley Air Pollution Control District (SJVAPCD), FAQs about Residential Wood Burning, Rule 4901 and Check Before You Burn. January 5, 2015.

[xvi] SCAQMD, 2012. South Coast Air Quality Management District (SCAQMD), 2012 Air Quality Management Plan, Appendix IV-A, Districts Stationary Source Control Measures. December 2012.

to 20 µg/m^3 will have a minimal impact on reducing PM levels on episodic no-burn days. Instead, lowering the curtailment threshold to 20 µg/m^3 could be anticipated to result in approximately 48 extra curtailment days which could reduce PM2.5 emissions by 0.9 ton per annual average day if use of certified devices is allowed (or 1.0 ton per annual average day if certified device use is also prohibited).

Technological Feasibility

It is technologically feasible to establish a lower wood burning curtailment threshold or to develop a two-tier control program which would allow use of the cleanest wood burning devices when use of fireplaces would be prohibited. Given the existing mandatory curtailment exemptions provided for low income households or those not serviced by natural gas, there are alternatives to burning wood such as gaseous-fueled or electrical heating appliances.

Economic Feasibility

Increasing the number of Rule 445 curtailment days would result in relatively little cost increases to the impacted community as there are cost-effective alternatives to burning wood such as gaseous-fueled or electrical heating appliances, given the proposed control measure does not change existing mandatory curtailment exemptions provided for low income households or those not serviced by natural gas. On the other hand, the proposed control measure would increase the number of no-burn days in the Basin considerably and could potentially result in the loss of sales by the firewood sellers.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	0 tpd	Feasible	Feasible	No
PM-annual	RACM	0.9 tpd	Feasible	Feasible	✓
PM-annual	BACM	0.9 tpd	Feasible	Feasible	✓
Ozone	RACM	Target pollutant is not a precursor for ozone formation			

Potential Control Measure 17

Title

Emission Reductions from Greenwaste Composting

Target Pollutant

VOC and NH3

Synopsis

This proposed control measure would seek emissions reductions of VOC and NH3 from composting of greenwaste, foodwaste, and agricultural waste streams. Control approaches include improved emissions characterization via inventory and emission factor development, anaerobic digestion, pollution prevention technology, and restrictions for direct applications of un-composted, chipped or ground non-curbside greenwaste to public lands.

With the statewide 75 percent organic recycling goal by 2020, emissions from processing of food scraps and greenwaste is expected to grow via composting or anaerobic digestion. An emerging pollution prevention technology (*e.g.,* Regreen Technology) is in the process of becoming commercially available to process foodwaste, as well as greenwaste, into beneficial soil amendments, concurrently killing harmful pathogens and thereby minimizing VOC and ammonia generation.

Shredded non-curbside greenwaste, if un-composted, may cause air emissions or pathogen infections when used as ground cover. This control measure proposes restrictions for applying untreated greenwaste on public lands, as well as minimum compositing standards to eliminate pathogens and weed seeds prior to use. Staff previously estimated VOC emissions of 0.196 lbs/wet ton-day from curbside composting feedstock piles. Additional review may be warranted to address non-curbside waste impacts.

Potential Emission Reduction

The 2019 baseline inventory is 3.66 tpd of VOC for this source category.
The 2021 baseline inventory is 3.86 tpd of VOC for this source category.
The 2025 baseline inventory is 4.63 tpd of VOC for this source category.
The 2031 baseline inventory is 4.89 tpd of VOC for this source category.
Potential emission reduction is 1.78 tpd (based on 2031 baseline inventory).

The 2019 baseline inventory is 0.52 tpd of NH3 for this source category.
The 2021 baseline inventory is 0.54 tpd of NH3 for this source category.
The 2025 baseline inventory is 0.65 tpd of NH3 for this source category.
Potential emission reduction is 0.10 tpd (based on 2031 baseline inventory).

Technological Feasibility

A sizable amount of VOC and NH3 emissions are emitted during the first 15 days of greenwaste composting. Rule 1133.3 adopted in July 8, 2011 requires 80 percent control of VOC and NH3 emissions for a greenwaste composting pile containing greater than 10 percent foodwaste. An emerging pollution prevention technology is also in the process of becoming commercially available. This technology is able to process these waste materials without the microbial decomposition of organic materials, concurrently killing harmful pathogens in the waste materials and thereby minimizing VOC and ammonia generation from the process. This machine is currently manufactured in Germany and expected to be manufactured in the U.S. in coming years.

Economic Feasibility

Estimated equipment costs for this emerging pollution prevention technology (e.g., Regreen Technology) is expected to range between $300,000 and $400,000 for a unit of half-ton per hour of feed (i.e., restaurant size). For full scale applications, a 5 tons per hour of feed unit costs up to $3.6 million. The equipment cost is expensive for the complete 5 tons/hr system. Even a half-ton unit has relatively high cost. Cost recovery through the sale of end products and other savings was estimated by Regreen to be four years. The expensive capital cost would be a big disincentive for this machine to be widely used by entities. There may also be an indirect air quality benefit of reducing VOC and odor emissions from landfill or composting operations of foodwaste that could otherwise occur. Cost effectiveness calculation for this control measure is estimated based on the proposed best management practice (BMPs) as described in BCM-10; more details can be found in Appendix IV-A. Cost effectiveness is, on average, estimated to be $3,400 per ton of VOC reduced and $61,500 per ton of NH3 reduced as a co-benefit. Note that cost effectiveness figure for NH3 is high because emission reductions are low. However because the reductions are derived from the same control method targeted for VOC reductions, the concurrent co-benefit would not result in a net increase in overall cost for control.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	0.08 tpd of NH3 by 2021 1.4 tpd of VOC by 2021	Feasible	Feasible	✓
PM-annual	RACM	0.08 tpd of NH3 by 2021 1.4 tpd of VOC by 2021	Feasible	Feasible	✓
PM-annual	BACM	0.09 tpd of NH3 by 2025 1.68 tpd of VOC by 2025	Feasible	Feasible	✓
Ozone	RACM	1.78 tpd of VOC	Feasible	Feasible	✓

Potential Control Measure 18

Title

Emission Reduction of PM from Asphalt Manufacturing

Target Pollutant

PM

Synopsis

U.S. EPA compiled the Menu of Control Measures to provide information useful in the development of local emission reduction and NAAQS SIP scenarios, and to identify and evaluate potential control measures. U.S. EPA's list of potential control measures for PM2.5 estimates a control efficiency of 99 percent in an asphalt manufacturing facility equipped with a fabric filter, or baghouse placed in parallel inside of an enclosure. U.S. EPA also estimates the cost effectiveness to be $147–186 per ton of PM10 in

2006 dollars. Rule 1157 - PM10 Emission Reductions from Aggregate and Related Operations targets all aggregate and related operations, but does not require enclosure for all transfer points and activities. However, Rule 1155 regulates all baghouses (including those at asphalt manufacturing), except for those with a filter area less than 100 ft^2, and requires no visible emissions at any time except for start-up and shutdown.

Potential Emission Reduction

The 2019 baseline inventory is 0.01 tpd of PM for this source category.
The 2021 baseline inventory is 0.01 tpd of PM for this source category.
The 2025 baseline inventory is 0.01 tpd of PM for this source category.
Potential emission reduction is not determined.

Technological Feasibility

Enclosures and baghouses are generally technologically feasible. The standard (0.01 gr/dscf) for baghouses in asphalt manufacturing facilities was set forth in Rule 1155 and was fully implemented in 2013.

Economic Feasibility

Asphalt manufacturing in the SCAQMD is currently regulated under Rule 1157 and Rule 1155, which require the use of bag filters. Baghouses are not considered economically feasible in the areas not covered by Rule 1157 and Rule 1155 based on the low emission inventory and the relative costs for bag replacement at $27,000 every three to five years.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	<0.01 tpd	Feasible	Not Feasible	No
PM-annual	RACM	<0.01 tpd	Feasible	Not Feasible	No
PM-annual	BACM	<0.01 tpd	Feasible	Not Feasible	No
Ozone	RACM	Target pollutant is not a precursor for ozone formation			

Potential Control Measure 19

Title

Emission Reduction of PM from Wood Pulp and Paper

Target Pollutant

PM

Synopsis

The U.S. EPA compiled the Menu of Control Measures to provide information useful in the development of local emission reductions and NAAQS SIP scenarios, and to identify and evaluate potential control measures. U.S. EPA's list of potential control measures for PM2.5 estimates a control efficiency of 95 percent in wood pulp and paper facilities equipped with dry/wet electrostatic precipitators. The cost effectiveness is estimated to be $156–313 per ton of PM10 in 2006 dollars. Currently, there are five permitted paper and paperboard manufacturing facilities in SCAQMD, although all rely on recycled materials. There is no source-specific control measure targeting this source category.

Potential Emission Reduction

The 2019 baseline inventory is 2.80 tpd of PM2.5 for this source category.
The 2021 baseline inventory is 2.97 tpd of PM2.5 for this source category.
The 2025 baseline inventory is 3.16 tpd of PM2.5 for this source category.

Potential emission reduction is not determined. Emission reduction techniques may be considered on a site-specific basis where reductions are desirable.

Technological Feasibility

An ESP is predominantly used to control PM emissions from Kraft recovery furnaces used at paper manufacturing facilities that process virgin raw materials. SCAQMD has only recycled paper and paperboard manufacturing and not raw material paper manufacturing. For the recycled material manufacturing facilities, little or no PM is emitted from the pulp dryer, and control techniques for the paper machine vents are considered impractical because of the high moisture content, high volume of the vent exhaust gases, and the minimal pollutant concentrations.[xvii] As such, ESP control on PM is not technically feasible for the recycled paper and paperboard manufacturing facilities located within SCAQMD.

[xvii] A&WMA, 2000. Air Pollution Engineering Manual, Second Edition, Air & Waste Management Association, page 804.

Economic Feasibility

The control equipment for PM emissions is not expected to be cost effective for recycled paper and paperboard manufacturing because of very high air flow from the exhaust vents on the roof top of a building where paper machine is situated, and the low emission reduction potential.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	Not Determined	Not Feasible	Not Feasible	No
PM-annual	RACM	Not Determined	Not Feasible	Not Feasible	No
PM-annual	BACM	Not Determined	Not Feasible	Not Feasible	No
Ozone	RACM	Target pollutant is not a precursor for ozone formation			

Potential Control Measure 20

Title

Emission Reduction of VOC and NOx through Reformulation and Process Modification for Cutback Asphalt.

Target Pollutant

VOC and NOx

Synopsis

The U.S. EPA estimated a control efficiency of 100% based on the use of reformulated products and the modification of processes associated with cutback asphalt manufacturing to reduce fugitive VOC emissions. In addition, the proposed process would reduce natural gas use by an estimated 20 to 25 percent from reduced processing and transportation temperatures. Cost effectiveness is estimated to be $24 per ton (in 2006 dollars) of VOC reduced. Cutback asphalt is regulated under Rule 1108 (Cutback Asphalt, Amended 2/1/85). It requires that cutback asphalt contains ≤ 0.5 percent by volume organic compounds at 260°C or lower.

Potential Emission Reduction

The 2019 baseline inventory is <0.1 tpd of VOC for this source category.
The 2019 baseline inventory is 0.28 tpd of NOx for this source category.
The 2021 baseline inventory is 0.29 tpd of NOx for this source category.
The 2025 baseline inventory is 0.31 tpd of NOx for this source category.
The 2031 planning baseline inventory is 0.33 tpd of NOx for this source category.

Potential emission reduction is 0.07 tpd of NOx.

Technological Feasibility

Recent studies on warm-mix asphalt (WMA) have shown reductions in smoke and odors, lower emissions, improved workability, better working conditions and better performance.[xviii] The study findings recommend that use of WMA be encouraged and that water-based WMA technologies should be closely monitored in mix-design and quality control/quality assurance testing to avoid moisture related issues. While WMA use may result in little or no reductions in VOC emissions, the reduced temperatures associated with WMA (approximately 20 percent lower than traditional hot-mix asphalt (HMA)) has been shown to result in a 20 to 25 percent reduction in energy usage.[xix] WMA use is increasing throughout California, the U.S., and Europe. A survey by the National Asphalt Pavement Association found that nearly one third of all asphalt pavement mix production in the U.S. is WMA, an increase of 577 percent since 2009.[xx]

Economic Feasibility

The cost of plant modifications to produce WMA range from $30,000 to $50,000. Additionally, the chemistry used to bind the aggregate is approximately $3 to $5 per ton more expensive than HMA. However, many facilities realize a cost savings from the process because of reduced fuel and labor costs. The WMA makes compaction easier and the lower temperatures result in reduced transportation costs. Additionally, facilities realize a cost savings from higher reclaimed asphalt pavement content. Overall, there is no expected cost increase.

Summary Table

	Type of Analysis	Emission Reduction	Technological Feasibility	Economic Feasibility	Feasible Measure
PM-24-hr	BACM	0.07 tpd of NOx	Feasible	Feasible	✓
PM-annual	RACM	0.07 tpd of NOx	Feasible	Feasible	✓
PM-annual	BACM	0.07 tpd of NOx	Feasible	Feasible	✓
Ozone	RACM	0.07 tpd of NOx	Feasible	Feasible	✓

[xviii] D.Jones, F. Farshidi, J. Harvey; Warm-Mix Asphalt Study: Summary Report on Rubberized Warm-Mix Asphalt Research (Summary Report UCPRC-SR02013-03), March 2014.
[xix] SCAQMD, Technology Assessment – Rule 1108 Cutback Asphalt, June 2008.
[xx] National Asphalt Pavement Association, Steady Increase in Sustainability of Asphalt Pavements, http://www.asphaltpavement.org/index.php?option=com_content&view=article&id=1077:steady-increase-in-sustainability-of-asphalt-pavements&catid=24:napa-news4&Itemid=767, accessed January 19, 2016

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APPENDIX VI-A

ATTACHMENT VI-A-3

CALIFORNIA MOBILE SOURCE CONTROL PROGRAM BEST AVAILABLE CONTROL MEASURES/REASONABLY AVAILABLE CONTROL MEASURES ASSESSMENT

Overview

To fulfill Clean Air Act (CAA) control measure requirements for fine particulate matter (PM2.5) and ozone nonattainment areas, assessment of control measures in the State Implementation Plans (SIP) must be performed. For "serious" PM2.5 areas, the control measures must be shown to be Best Available Control Measures (BACM), while Reasonably Available Control Measures (RACM) are required for ozone control. Since the California Air Resources Board (CARB) is responsible for measures to reduce emissions from mobile sources needed to attain the national ambient air quality standards (standards), this chapter will discuss how California's mobile source measures meet both RACM and BACM.

Given the severity of California's air quality challenges, CARB has implemented the most stringent mobile source emissions control program in the nation. CARB's comprehensive strategy to reduce emissions from mobile sources includes stringent emissions standards for new vehicles, in-use programs to reduce emissions from existing vehicle and equipment fleets, cleaner fuels that minimize emissions, and incentive programs to accelerate the penetration of the cleanest vehicles beyond that achieved by regulations alone. Taken together, California's mobile program meets both BACM for South Coast PM2.5 attainment and RACM in the context of ozone attainment.

RACM Requirements

Subpart 1, section 172(c)(1) of the CAA requires SIPs to provide for the implementation of RACM as expeditiously as practicable. U.S. EPA has interpreted RACM to be those emission control measures that are technologically and economically feasible and when considered in aggregate, would advance the attainment date by at least one year.

CARB developed its State SIP Strategy through a multi-step measure development process, including extensive public consultation, to develop and evaluate potential strategies for mobile source categories under CARB's regulatory authority that could contribute to expeditious attainment of the standard. First, CARB developed a series of technology assessments for heavy-duty mobile source applications and the fuels necessary to power them[xxi] along with ongoing review of advanced vehicle technologies for the light-duty sector in collaboration with U.S. EPA and the National Highway Traffic Safety Administration. CARB staff then used a scenario planning tool to examine the magnitude of technology penetration necessary, as well as how quickly technologies need to be introduced to meet attainment of the standard.

CARB staff released a discussion draft Mobile Source Strategy[xxii] for public comment in October 2015. This strategy specifically outlined a coordinated suite of proposed actions to not only meet federal air quality standards, but also achieve greenhouse gas emission reduction targets, reduce petroleum consumption, and decrease health risk from transportation emissions over the next 15 years. CARB staff held a public workshop on October 16, 2015 in Sacramento, and on October 22, 2015, CARB held a public Board meeting in Diamond Bar to update the Board and solicit public comment on the Mobile Source Strategy.

Staff continued to work with stakeholders to refine the measure concepts for incorporation into related planning efforts including the 75 ppb 8-hour ozone SIPs. On May 16, 2016, CARB released an updated

[xxi] Technology and Fuel assessments http://www.arb.ca.gov/msprog/tech/tech.htm
[xxii] 2016 Mobile Source Strategy http://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm

Mobile Source Strategy and on May 17, 2016, CARB released the proposed State SIP strategy for a 45-day public comment period.

The current mobile source program and proposed measures included in the State SIP Strategy provide attainment of the ozone standard as expeditiously as practicable and meet RFP requirements.

BACM Requirements

Subpart 4, section 189(b)(1)(B) requires a BACM level of control for serious PM2.5 nonattainment areas. U.S. EPA defines BACM as more stringent than RACM and the maximum degree of emission reductions achievable from a source or source category determined on a case-by-case basis considering energy, economic, and environmental impacts.

CARB conducted a BACM assessment for mobile source categories under CARB's regulatory authority including regulations, waivers and authorizations, and incentive programs and initiatives that go beyond regulatory requirements to further reduce emissions. A BACM assessment of these programs is described below.

Waiver Approvals

While the CAA preempts most states from adopting emission standards and other emission-related requirements for new motor vehicles and engines, it allows California to seek a waiver or authorization from the federal preemption to enact emission standards and other emission-related requirements for new motor vehicles and engines and new and in-use off-road vehicles and engines that are at least as protective as applicable federal standards, except for locomotives and engines used in farm and construction equipment which are less than 175 horsepower (hp).

Over the years, California has received waivers and authorizations for over 100 regulations. The most recent California standards and regulations that have received waivers and authorizations are Advanced Clean Cars (including ZEV and LEV III) for Light-Duty vehicles, and On-Board Diagnostics, Heavy-Duty Idling, Malfunction and Diagnostics System, In-Use Off-Road Diesel Fleets, Large Spark Ignition Fleet, Mobile Cargo Handling Equipment for Heavy-Duty engines. Other authorizations include Off-Highway Recreational Vehicles and the Portable Equipment Registration Program.

Finally, CARB obtained an authorization from U.S. EPA to enforce adopted emission standards for off-road engines used in yard trucks and two-engine sweepers. CARB adopted the off-road emission standards as part of its "Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants from In-Use Heavy-Duty Diesel-Fueled Vehicles," (Truck and Bus Regulation). The bulk of the regulation applies to in-use heavy-duty diesel on-road motor vehicles with a gross vehicle weight rating in excess of 14,000 pounds, which are not subject to preemption under section 209(a) of the CAA and do not require a waiver under section 209(b).

Light- and Medium-Duty Vehicles

Light- and medium-duty vehicles are currently regulated under California's Advanced Clean Cars program including the Low-Emission Vehicle III (LEV III) and Zero-Emission Vehicle (ZEV) programs. Other California programs such as the 2012 Governor Brown Executive Order to put 1.5 million zero-emission vehicles on

the road by 2025, and California's Reformulated Gasoline program (CaRFG) will produce substantial and cost-effective emission reductions from gasoline-powered vehicles.

CARB is also active in implementing programs for owners of older dirtier vehicles to retire them early. The "car scrap" programs, like the Enhanced Fleet Modernization Program, and Clean Vehicle Rebate Project provide monetary incentives to replace old vehicles with zero-emission vehicles. The Air Quality Improvement Program (AQIP) is a voluntary incentive program to fund clean vehicles.

Taken together, California's comprehensive suite of emission standards, fuel specifications, and incentive programs for on-road light- and medium-duty vehicles represent not only all measures that are technologically and economically feasible within California, but also the most stringent level of control to achieve the maximum feasible emission reductions for this category.

Heavy-Duty Vehicles

California's heavy-duty vehicle emissions control program includes requirements for increasingly tighter new engine standards and address vehicle idling, certification procedures, on-board diagnostics, emissions control device verification, and in-use vehicles. This program is designed to achieve an on-road heavy-duty diesel fleet with 2010 engines emitting 98 percent less NOx and PM2.5 than trucks sold in 1986.

Most recently in the ongoing efforts to go beyond federal standards and achieve further reductions, CARB adopted the Optional Reduced Emissions Standards for Heavy-Duty Engines regulation in 2014 that establishes the new generation of optional NOx emission standards for heavy-duty engines.

The recent in-use control measures include On-Road Heavy-Duty Diesel Vehicle (In-Use) Regulation, Drayage (Port or Rail Yard) Regulation, Public Agency and Utilities Regulation, Solid Waste Collection Vehicle Regulation, Heavy-Duty (Tractor-Trailer) Greenhouse Gas Regulation, ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling, Heavy-Duty Diesel Vehicle Inspection Program, Periodic Smoke Inspection Program, Fleet Rule for Transit Agencies, Lower-Emission School Bus Program, and Heavy-Duty Truck Idling Requirements. In addition, CARB's significant investment in incentive programs provides an additional mechanism to achieve maximum emission reductions from this source sector.

Taken together, California's comprehensive suite of emission standards, fuel specifications, and incentive programs for heavy-duty vehicles represent not only all measures that are technologically and economically feasible within California, but also the most stringent level of control to achieve the maximum feasible emission reductions for this category.

Off-Road Vehicles and Engines

California regulations for off-road equipment include not only increasingly stringent standards for new off-road diesel engines, but also in-use requirements and idling restrictions.

The Off-Road Regulation is an extensive program designed to accelerate the penetration of the cleanest equipment into California's fleets, and impose idling limits on off-road diesel vehicles. The program goes beyond emission standards for new engines through comprehensive in-use requirements for legacy fleets.

Engines and equipment used in agricultural processes are unique to each process and are often re-designed and tailored to their particular use. Fleet turnover to cleaner engines is the focus for these engines.

Taken together, California's comprehensive suite of emission standards, fuel specifications, and incentive programs for off-road vehicles and engines represent not only all measures that are technologically and economically feasible within California, but also the most stringent level of control to achieve the maximum feasible emission reductions for this category.

Other Sources and Fuels

The emission limits established for other mobile source categories, coupled with U.S. EPA waivers and authorization of exemption from preemption establish that California's programs for motorcycles, recreational boats, off-road recreational vehicles, cargo handling equipment, and commercial harbor craft sources meet the requirements for RACM and BACM.

Cleaner burning fuels also play an important role in reducing emissions from motor vehicles and engines as CARB has adopted a number of more stringent standards for fuels sold in California, including the Reformulated Gasoline program, low sulfur diesel requirements, and the Low Carbon Fuel Standard. These fuel standards, in combination with engine technology requirements, ensure that California's transportation system achieves the most effective emission reductions possible.

Taken together, California's comprehensive suite of emission standards, fuel specifications, and incentive programs for other mobile sources and fuels represent not only all measures that are technologically and economically feasible within California, but also the most stringent level of control to achieve the maximum feasible emission reductions for this category.

Summary

California's long history of comprehensive and innovative emissions control has resulted in the most stringent mobile source control program in the nation. U.S. EPA has previously acknowledged the strength of the program in their approval of CARB's regulations and through the waiver process. In its 2011 approval of the South Coast's 8-hour ozone plan which included the State's current program and new measure commitments, U.S. EPA found that there were no further reasonably available control measures that would advance attainment of the standard in the South Coast.

In addition, U.S. EPA has provided past determinations that CARB's mobile source control programs meet RACM and BACM requirements as part of their 2004 approval of the San Joaquin Valley's 2003 PM10 Plan:

"We believe that the State's control programs constitute BACM at this time for the mobile source and fuels categories, since the State's measures reflect the most stringent emission control programs currently available, taking into account economic and technological feasibility."

Since then, CARB has continued to substantially enhance and accelerate reductions from the mobile source control programs through the implementation of more stringent engine emissions standards, in-use requirements, incentive funding, and other policies and initiatives as described in the preceding sections.

The CARB process for developing the proposed State measures included an extensive public process and is consistent with U.S. EPA RACM guidance. Through this process, CARB found that with the current mobile source control program and proposed measures, there are no additional reasonable available control measures that would advance attainment of the 75 ppb 8-hour ozone standard in the South Coast. There are no reasonable regulatory control measures excluded from use in this plan; therefore, there are no emissions reductions associated with unused regulatory control measures. As a result, California's mobile source control programs fully meet the requirements for BACM and RACM.

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APPENDIX VI-B

IMPRACTICABILITY DEMONSTRATION
FOR REQUEST FOR "SERIOUS" CLASSIFICATION FOR 2012
ANNUAL PM2.5 STANDARD

JANUARY 2017

Introduction

The South Coast Air Basin was designated a "moderate" nonattainment area for the 2012 annual PM2.5 standard of 12 µg/m^3 on April 15, 2015. This designation sets an attainment deadline of December 31, 2021. The Basin maximum 2012–2014 annual average design value was 14.6 µg/m^3, which is above the annual PM standard of 12 µg/m^3, but below 15 µg/m^3, the previous 1997 annual PM2.5 standard. Air quality modeling is used to estimate air quality benefits resulting from the SCAQMD ozone and PM control strategies outlined in Chapter 4. The future PM2.5 level is analyzed for the year 2021, the annual PM2.5 attainment date for the "moderate" nonattainment status. The modeling analysis demonstrates that the District cannot practically attain the 2012 annual PM2.5 standard by December 31, 2021. Acknowledging the challenges in meeting the stringent health-based standard, including the feasibility of proposed measures, uncertainties in drought conditions, and the potential inability to claim all ozone strategy reductions toward PM2.5 attainment, if approved under CAA Section 182 (e)(5), SCAQMD is requesting a voluntary bump up to the "serious" category. Modeling analysis supporting the request for the reclassification is summarized below. Detailed information on the modeling approach, data retrieval, model development and enhancement, model application, emissions inventory development, and interpretation of results can be found in Chapter 5 and Appendix V.

Ambient PM2.5 Level

The District began regular monitoring of PM2.5 in 1999 following the U.S. EPA's adoption of the national PM2.5 standards in 1997. In 2014, ambient PM2.5 concentrations were monitored at 27 locations throughout the Basin, although two of these stations (Burbank and Ontario Fire Station) were closed during 2014. Filter-based Federal Reference Method (FRM) PM2.5 sampling was employed at 20 of these stations and eight of those stations are also equipped with collocated continuous monitors (Federal Equivalent Method (FEM)). The FRM measurements are taken either at a daily, every third day, or every sixth day frequency depending on the level of PM2.5 at a monitoring station. Anaheim, central Los Angeles, Long Beach, Mira Loma, and Rubidoux have a daily sampling schedule due to the high PM levels observed in those areas. The rest of the stations take FRM based PM2.5 measurements in the 1-in-3 day or 1-in-6 day frequency.

The 2014 annual average PM2.5 concentrations from the FRM measurements are summarized in Table VI-B-1. The maximum annual average of 14.5 µg/m^3 was measured in the Metropolitan Riverside County area at the Mira Loma station. The Basin maximum 2012–2014 annual average design value was 14.6 µg/m^3. This indicates that the Basin is in violation of the 2012 annual PM2.5 standard (122 percent of the standard), even though it is in attainment of the previous 1997 annual PM2.5 standard.

TABLE VI-B-1

2014 Maximum Annual Average PM2.5 Concentrations and
2012–2014 Design Values by Basin and County

Basin/County	2014 Max. Annual Average ($\mu g/m^3$)*	2012–2014 PM2.5 Annual Design Value ($\mu g/m^3$)*#
South Coast Air Basin		
Los Angeles	12.6	12.3
Orange	10.5	10.5
Riverside	**14.5**	**14.6**
San Bernardino	13.2	12.8
Salton Sea Air Basin		
Riverside	8.3	8.1

* Based on FRM filter data (federal FEM waiver applied)

The federal design value is the average of annual PM2.5 averages over a three-year period

PM2.5 Modeling

The 2016 AQMP annual PM2.5 modeling employs the site- and species-specific quarterly-averaged relative response factor (RRF) approach per U.S. EPA guidance (U.S. EPA, 2014). This is similar to the methodology employed in the 2012 AQMP except for updates in the modeling platform, input databases and emissions inventory.

The annual PM2.5 design value is based on the four quarterly average PM2.5 concentrations, averaged by year over a three-year period. U.S. EPA guidance recommends the use of multiple year averages of design values, where appropriate, to dampen the effects of single year anomalies in the air quality trend due to factors such as adverse or favorable meteorology or radical changes in the local emissions profile. Consistent with U.S. EPA guidance, the 2016 AQMP relies on a five-year weighted annual average centered on 2012, the base year selected for the emissions inventory development, model simulations and the anchor year for the future year projections.

PM2.5 speciation data measured at four sites (Central Los Angeles, Anaheim, Rubidoux and Fontana) during 2012 provided the chemical characterization for evaluation and validation of the CMAQ model predictions. With one site in each county, the four sites are strategically located to represent aerosol characteristics in the four counties of the Basin. Riverside-Rubidoux was traditionally the Basin maximum location. Fontana and Anaheim experience high concentrations within their respective counties, and the Central Los Angeles site was intended to capture the emission characteristics of metropolitan LA downtown source area. The close proximity of Mira Loma to Rubidoux and the general in-Basin air flow and transport patterns enable the use of the Rubidoux speciated data as representative of the particulate speciation at Mira Loma. Both sites are directly downwind of the dairy production areas in Chino and the warehouse distribution centers located in the northwestern corner of Riverside

County. Model species predictions were compared to ammonium, nitrates, sulfates, secondary organic matter, elemental carbon, primary and total mass of PM2.5 measured at the four monitoring sites (Rubidoux, Central Los Angeles, Anaheim, and Fontana).

CMAQ simulations were conducted for 366 days from January 1st to December 31st of 2012. The simulations included 8,784 consecutive hours from which daily 24-hour average PM2.5 concentrations were calculated. A set of RRFs were generated for each future year simulation. RRFs were generated for the ammonium (NH4), nitrate (NO3), sulfate (SO4), organic carbon (OC), elemental carbon (EC), sea salts (Salt) and a combined grouping of crustal and metals (Others). A total of 16 relative response factors (RRFs) were generated for each future year simulation (4 seasons and 4 monitoring sites). Future year design values were calculated by multiplying the species- and site-specific RRFs by the corresponding quarterly mean component concentration. The quarterly mean components were summed to get quarterly mean PM2.5 levels, which were then averaged to determine the annual design values.

Future PM2.5 Air Quality

Annual PM2.5 concentrations were simulated for the base year of 2012 and the attainment deadline of 2021. For 2021, both baseline and control scenarios were included in the analysis. Mira Loma, the design site for the base year, is projected to remain as the highest PM2.5 site in 2021. The baseline case, which does not include additional controls beyond already adopted measures, projects a future design value of 12.6 $\mu g/m^3$, which is not low enough to meet the standard. The control scenario incorporating SCAQMD stationary source PM2.5 measures was simulated for 2021 as well. The Basin maximum PM2.5 concentration is projected to be 12.3 $\mu g/m^3$ at Mira Loma, thus indicates that controls for the PM2.5 emission are not sufficient to attain the standard in 2021 (Table VI-B-2). The control measures included in the future scenario are BCM-01 (Further Emission Reductions from Commercial Cooking) of 1.7 tpd of directly emitted PM and BCM-10 (Emission Reductions from Greenwaste Composting) of NH3 emissions which are a precursor to PM. The rest of the PM2.5 measures do not have significant quantified emission reductions prior to 2021. It should be noted that BCM-01 is being considered for contingency due to the technological and economic challenges in implementing in the near future, in which case the 2021 controlled presented below would result in higher concentrations than listed in Table VI-B-2. Thus, the scenario below is a “best case” scenario proving a 2021 attainment demonstration is impracticable.

TABLE VI-B-2

Annual Average PM2.5 Design Concentrations (µg/m^3)

Station	2012	2021 Baseline	2021 Controlled
Los Angeles	12.4	10.9	10.6
Anaheim	10.6	9.4	9.1
Rubidoux	13.2	11.2	10.9
Mira Loma	14.9	12.6	12.3
Fontana	12.6	10.6	10.4

Figures VI-B-1 and VI-B-2 provide the Basin-wide spatial extent of annual PM2.5 projected for 2021 baseline and controlled scenarios. With and without additional controls in 2021, the number of grid cells with concentrations exceeding the federal standard is restricted to a small region around the Mira Loma monitoring station in northwestern Riverside County.

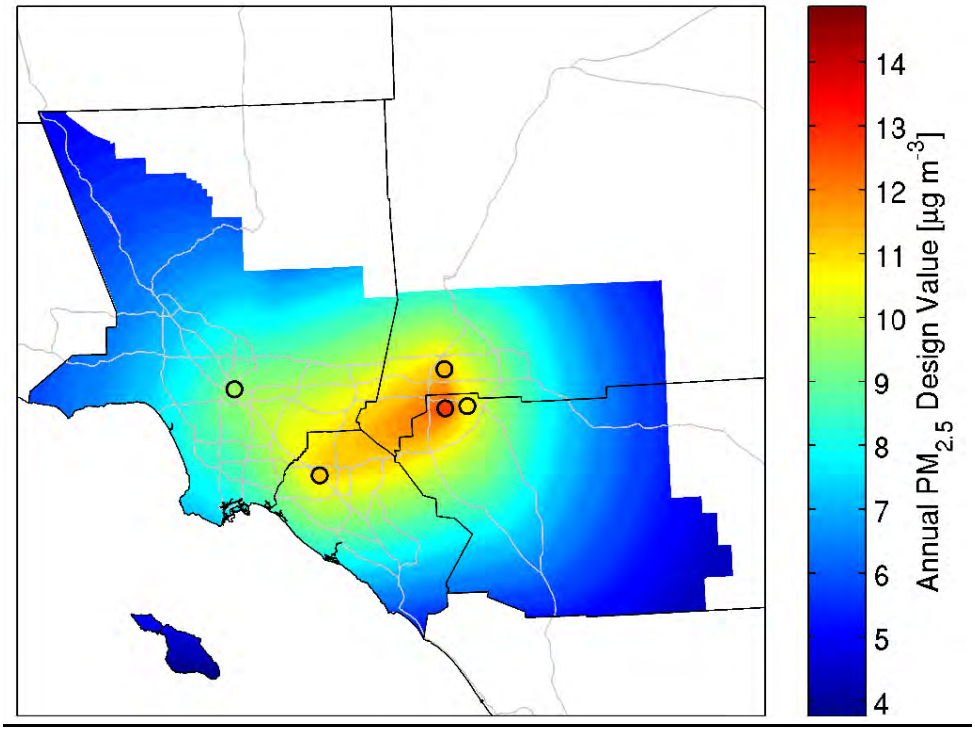


FIGURE VI-B-1

2021 Uncontrolled Annual PM2.5 Design Concentrations (µg/m3)

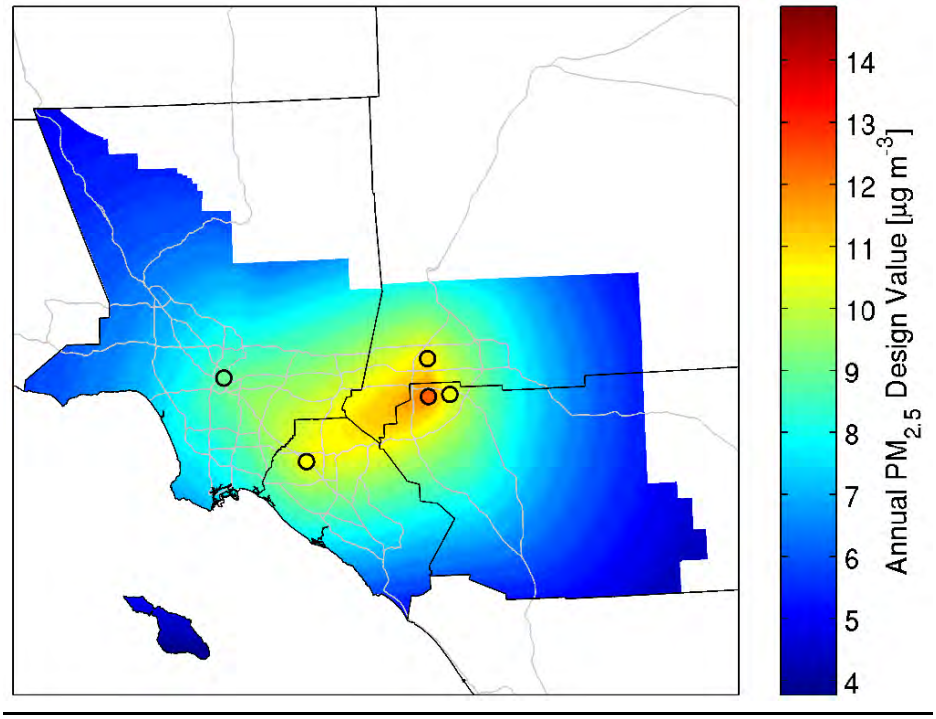


FIGURE VI-B-2

2021 Controlled Annual PM2.5 Design Concentrations (µg/m3)

To assess co-benefits of the ozone strategy on PM attainment and the practicability of an earlier PM2.5 attainment date, a series of control scenarios were developed using the SCAQMD VOC and NOx control measures proposed in Chapter 4 and Appendix IV.

First, a scenario with a full ozone attainment strategy for 2023 to attain the 1997 8-hour ozone standard (80 ppb) was evaluated. The 2023 ozone attainment scenario includes 45 percent of additional NOx reduction from the baseline. This scenario yields a PM2.5 annual design value of 11.1 µg/m^3 in 2023, indicating attainment of the standard. However, the ozone strategy may include 182(e)(5) measures that are allowed in the SIP for ozone "extreme" nonattainment area, but are counted towards PM2.5 attainment. Thus, only a portion of emission reductions, identified as non-182(e)(5) measure reductions, were incorporated in the PM2.5 simulation for 2023 (23 TPD of NOx reductions and accompanying VOC reductions). See Chapter 4 and Appendix IV for detailed control measure categories eligible for 182(e)(5) and Chapter 5 and Appendix V for the detailed emission control scenario and its incorporation in the CMAQ modeling. The resulting PM2.5 level is 12.2 µg/m^3 at Mira Loma, which is still above the standard. Lastly, PM2.5 concentrations were evaluated for 2025, the final attainment year for "serious" nonattainment status. Similar to the 2023 simulation, emission reductions associated with only non-182(e)(5) measures (37 TPD of NOx reduction) were included. With this, the annual PM2.5 concentration was projected to be 11.8 µg/m^3, ensuring the attainment of the annual PM2.5 standard in 2025.

This concludes the impracticability to demonstrate attainment in 2021, even though annual PM2.5 attainment will occur with the full implementation of the ozone strategy in 2023. The Annual PM2.5

standard is expected to be attained in 2025 with non-182(e)(5) measures only, as discussed in a greater detail in Appendix V. Implementation of the full ozone attainment strategy should result in attainment of the annual PM2.5 standard by 2023 or earlier.

Effects of Extreme Weather Conditions

Southern California has experienced a severe drought for the past several years with 2013 annual rainfall total measured at Downtown Los Angeles of 3.6 inches, far below the 14.9 inch long-term average. Rainfall events of 0.01 inches of rain or more were 25 percent lower than the average of 28 days typically occurring during the 1st and 4th quarters of the year. Limited rain means there is less crusting and wetting of soil and road surfaces. Thus, more road dust and fugitive dust emissions are generated. A reduced frequency of storms translates to fewer days of enhanced pollution dispersion. Without such dispersion, there is no deep mixing of the atmosphere, rainfall induced deposition of particulate matter or wind to transport the pollution away from the region.

The three-year weighted design value was intended to reduce the impact of meteorological anomalies prone to a single year, but meteorological variables used in the attainment demonstration are single year data. The Weather Research and Forecasting (WRF) model provided meteorological data that facilitated chemical reactions, dispersion and transport of air pollutant for both 2012 base year and future years. In other words, the 2021 projected PM2.5 design value for Mira Loma assumed the same frequency of precipitation events and rainfall totals as in 2012. Since 2012 is not as severely impacted by the drought conditions as 2013 or 2014, the future year design values calculated in the above demonstration do not fully capture the impact of the severe drought observed in the 2013–2014 period. It is estimated that drought conditions could elevate annual PM levels by approximately 0.5 $\mu g/m^3$ (more details in Appendix V). As such, the projected PM design levels could be underestimated in the case of an extended period of dry weather, leading to a higher PM2.5 annual average in 2021 than the current projection of 12.3 $\mu g/m^3$. This supports the need for a bump up to "serious" nonattainment and the later attainment date.

Conclusions

In summary, the proposed SCAQMD control measures will not lead to attainment of the 2012 Annual PM standard by the "moderate" attainment date of December 31, 2021. Staff proposes to request that U.S. EPA reclassify the Basin as a "serious" PM2.5 nonattainment area based on the impracticability of attaining the 2012 Annual PM2.5 standard by the "moderate" attainment deadline. This action necessitates the development of a "serious" area SIP for the annual PM2.5 NAAQS, which is included in the 2016 AQMP. An attainment demonstration presenting how the region will achieve the 2012 annual PM2.5 NAAQS as early as practicable but no later than December 31, 2025 can be found in Chapter 5 and Appendix V. A BACM/BACT demonstration, a CAA requirement for a "serious" nonattainment SIP, is included in Appendix VI-A, and the RFP is presented in Appendix VI-C. The PM precursor analysis can be found in Appendix VI-F. Furthermore, the "serious" classification will require SCAQMD rule amendments to lower the New Source Review (NSR) threshold for PM2.5 and precursor emissions from 100 tons per year (TPY) to 70 TPY within 12 months after reclassification is finalized. This requirement is addressed in Appendix VI-G.

DRAFT FINAL 2016 AQMP
APPENDIX VI-C

REASONABLE FURTHER PROGRESS (RFP) AND MILESTONE YEARS

JANUARY 2017

Reasonable Further Progress (RFP) and Milestone Years

The CAA requires that SIPs for most nonattainment areas demonstrate reasonable further progress (RFP) towards attainment through emission reductions phased in from the time of the SIP submission until the attainment date. The RFP requirements in the CAA are intended to ensure that there are sufficient PM2.5/ozone and precursor emission reductions in each nonattainment area to attain the NAAQS by the applicable attainment date.

Per CAA Section 171(1), RFP is defined as "such annual incremental reductions in emissions of the relevant air pollutant as are required by this part or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date." As stated in subsequent federal regulation, the goal of the RFP requirements is for areas to achieve generally linear progress toward attainment. To determine RFP for the attainment date, EPA guidance states that the plan should rely only on emission reductions achieved from sources within the nonattainment area.

Section 172(c)(2) of the CAA requires that nonattainment area plans show ongoing annual incremental emissions reductions toward attainment, which is commonly expressed in terms of benchmark emissions levels or air quality targets to be achieved by certain interim milestone years. The U.S. EPA recommends that the RFP inventories include direct PM2.5, and also PM precursors (such as SOx, NOx, and VOCs) that have been determined to be significant.

Ozone

Subpart 2 sections 182 (b)(1) and 182(c)(2)(B) contain specific emission reduction targets to ensure that each ozone nonattainment area provides for sufficient precursor emission reductions to attain the ozone national ambient air quality standard. Section 182(b)(1)(A) requires that each "moderate" or above area provide for VOC reductions of at least 15 percent from baseline emissions within six years after November 15, 1990. The U.S. EPA final rule of "*Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements*" (80 FR 12263) states that if an area has already met the 15 percent requirement for VOC under either the 1-hour ozone NAAQS or the 1997 ozone NAAQS, such requirement under 182(b)(1) would not have to be fulfilled again. Instead, such areas would need to meet the CAA requirements under Section 182(c)(2)(B), which requires that "serious" and above areas provide VOC and/or NOx reductions (CAA, Section 182(c)(2)(C)) of 18 percent over the first 6 years after the baseline year for the 2008 ozone NAAQS, and an additional 3 percent per year averaged over each consecutive 3-year period until the attainment date. Tables VI-C-1A and VI-C-1B summarize the RFP calculations. Figure 6-1A depicts the target level and projected baseline VOC emissions for the RFP demonstration. For each of the milestone years, the District is able to show that the required progress is met on the basis of reductions from the existing regulatory program using a combination of VOC and NOx reductions. No reductions from the proposed control measures in the Plan are needed for RFP purposes. Up until the year 2018, projected VOC baseline emissions are sufficient to meet the CAA

requirements. For the milestone years 2021, 2024, 2027, 2030 and 2031, the baseline VOC emission levels are below the target levels. Beginning in 2021, projected NOx baseline emission reductions are needed to show compliance with the targeted VOC thresholds. For the attainment years 2022 (1979 1-hour NAAQS; 0.12 ppm) and 2023 (1997 8-hour NAAQS; 0.08 ppm), compliance is shown using projected NOx baseline emission reductions. The CAA, Section 182(c)(2)(C) provides for NOx reductions to substitute for RFP reductions not achieved by VOC emissions. The following demonstration will take advantage of that allowance and show compliance with RFP requirements as well as contingency requirements.

TABLE VI-C-1A

Summary of Reasonable Further Progress Calculations - VOCs

ROW	CALCULATION STEP [a]	2012 [b]	2018	2021	2022 [c]	2023 [c]	2024 [d]	2027 [e]	2030 [e]	2031 [c]
1	Baseline VOC Emissions (tpd)	499.6	405.2	386.2	382.7	378.7	375.5	368.6	364.4	361.5
2	Required Percent Change Since Previous Milestone Year (%)	--	18	9	3	3	3	9	9	3
3	Target VOC Level (tpd)	--	409.7	372.8	361.6	350.8	340.3	309.6	281.8	273.3
4	Cumulative Milestone Year Shortfall (tpd)	--	-4.5	13.4	21.0	27.9	35.3	58.9	82.6	88.2
5	Cumulative Shortfall in VOC (%)	--	-0.90	2.7	4.2	5.6	7.1	11.8	16.5	17.7
6	Incremental Milestone Year Shortfall (%)	--	0	2.7	1.5	1.4	1.5	4.7	4.7	1.1

[a] Units are in tons per day (summer planning) unless otherwise noted
[b] Base Year (2012)
[c] Attainment Year
[d] Emissions derived from linear interpolation between the modeled emissions of 2023 and 2025
[e] Emissions derived from linear interpolation between the modeled emissions of 2026 and 2031

ROW 1: Projected baseline emissions shown in Appendix III taking into account existing rules and projected growth
ROW 2: Required 18% reduction 6 years after Base Year; future milestone years are every 3 years until attainment year; and required reductions are 3% per year for each milestone year (e.g., for every 3 years, required 9% reduction)
ROW 3: [(1-Row 2/100) x Row 1 or Row 3] – Base Year Row 1 for first milestone year, and previous milestone year's target level (Row 3) for remaining milestone years
ROW 4: [(Row 1) – (Row 3)] or (Baseline – Target) – negative number meets target level and positive number is shortfall of target level
ROW 5: [(Row 4) / (Base Year Row 1) x 100]
ROW 6: Negative (Row 5) is zero shortfall; positive number is a shortfall. Incremental milestone year shortfall is determined by subtracting the previous year's shortfall from the cumulative (e.g., for 2023, cumulative 5.6 - previous shortfall 4.2 = 1.4)

FIGURE VI-C1A

Reasonable Further Progress - VOC

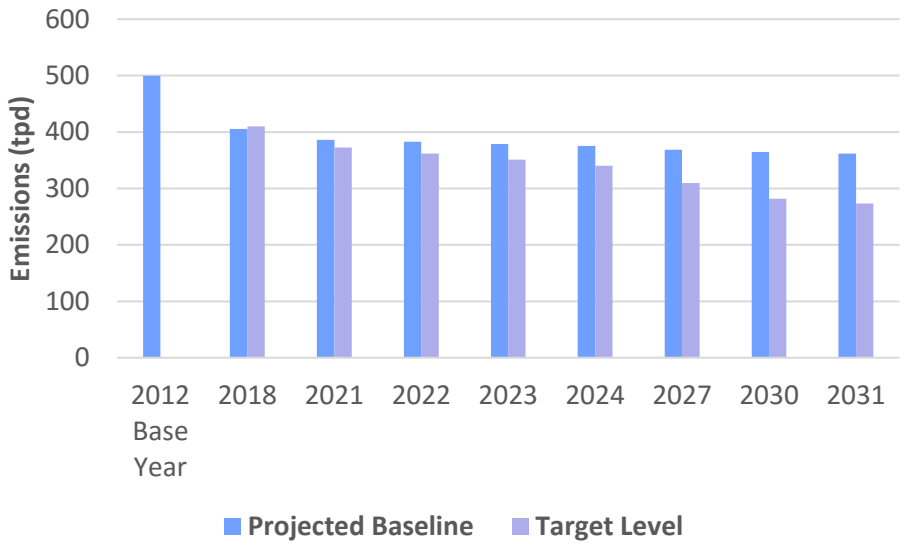


TABLE VI-C-1B

Summary of Reasonable Further Progress Calculations - NOx

ROW	CALCULATION STEP [a]	2012[b]	2018	2021	2022[c]	2023[c]	2024[d]	2027[e]	2030[e]	2031[c]
1	Baseline NOx Emissions (tpd)	522.4	366.2	305.2	286.8	254.6	247.2	228.5	217.3	213.7
2	Reductions in NOx Emissions since Base Year (tpd)	--	156.2	217.2	235.6	267.8	275.2	293.9	305.1	308.7
3	Percent Reductions in NOx Emissions since Base Year (%)	--	29.9	41.6	45.1	51.3	52.7	56.3	58.4	59.1
4	Contingency plus previous NOx substitution (%)	--	3	3	5.7	7.2	8.6	10.1	14.8	19.5
5	Percent Available for NOx Substitution (%)	--	26.9	38.6	39.4	44.1	44.1	46.2	43.6	39.5
6	Incremental Milestone Year VOC Shortfall (%)	--	0	2.7	1.5	1.4	1.5	4.7	4.7	1.1
7	Percent Surplus Reduction (%)	--	26.9	35.9	37.9	42.7	42.6	41.5	38.9	38.4
8	RFP Compliance	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	Contingency Compliance	--	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

[a] Units are in tons per day (summer) unless otherwise noted
[b] Base Year (2012)
[c] Attainment Year
[d] Emissions derived from linear interpolation between the modeled emissions of 2023 and 2025
[e] Emissions derived from linear interpolation between the modeled emissions of 2026 and 2031
ROW 1: Projected baseline emissions shown in Appendix III taking into account existing rules and projected growth
ROW 2: Reductions achieved in Baseline: [(Row 1 Base Year) – (Row 1 – milestone year)] – e.g., for 2018: 528.8 – 376.5 = 152.3
ROW 3: % Reductions achieved since Base Year: [(Row 2) / (Row 1- Base Year)] x 100 – e.g., for 2018: (152.3/528.8) x 100 = 28.8
ROW 4: Reserves 3% (1 year worth of CAA RFP reductions) for contingency measure implementation plus the previous year(s)'s incremental milestone year VOC shortfall from Table VI-C-1A
ROW 5: [(Row 3) - (Row 4)]
ROW 6: Incremental milestone year VOC shortfall from Table VI-C-1A
ROW 7: Surplus reductions achieved [(Row 5) - (Row 6)]
ROW 8: Positive number in Row 7 is percent surplus for each milestone year, thus meeting RFP target levels
ROW 9: Surplus includes 3% contingency carryover and VOC shortfall, and still meets RFP target levels

Baseline emissions, as shown in Tables VI-C-1A and VI-C-1B, incorporate emission reductions generated from control measures that are already adopted. For example, baseline emissions in 2018 is derived from the projected emissions from 2012 which includes all adopted control measures that will be implemented (partially or fully) by December 31, 2018. Therefore, the difference between baseline emissions of 2012 and 2018 is driven by control measures that are either partially implemented in 2012 or control measures with implementation date after 2012. Table VI-C-2 provides a list of the SCAQMD adopted rules and regulations for stationary sources that is scheduled to be implemented from 2012, accounting for the emission reductions in the baseline emissions of the future milestone/attainment years. The corresponding information for CARB's mobile source control measures can be found in the Attachment of this Appendix (Attachment VI-C-1).

TABLE VI-C-2

Implementation Schedule of SCAQMD Adopted Rules and Regulations for Reasonable Further Progress Per Milestone/Attainment Year

	2018	2021	2022	2023	2024	2027	2030	2031
NOx	R1110.2*							
	R1110	R1110	R1110	R1110	R1110	R1110	R1110	R1110#
	R1121*							
	R1146*							
	R1146.1*							
	R1146.2*	R1146.2^						
	R1147	R1147	R1147	R1147				
VOC	R1113*							
	R1114							
	R1177*							

* Partial implementation from 2006-2016 with full implementation achieved in 2014, 2015 or 2016

^ Partial implementation from 2018 with full implementation achieved in 2020

Reductions achieved annually with full implementation in 2035

PM2.5

For PM2.5 nonattainment areas, in addition to the CAA Title I, Part D, Subpart 1 (*General Requirements*) RFP requirements, Subpart 4 (*Provisions for PM*) §189(c)(1) introduces the requirement for states to submit quantitative milestones for both "moderate" and "serious" areas. Milestones are to be achieved every three years until the area is re-designated attainment and demonstrate reasonable further progress. As stated in the U.S. EPA's final rule for "*Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*" (81 FR 58010), the statutory "serious" area attainment plan would have to contain quantitative milestones to be achieved by 7.5 years from the area's date of designation of nonattainment. This date would be three years after the first quantitative milestones for the area to be met 4.5 years from the designation date. In the case of the 2006 24-hour PM2.5, the milestone year is 2017. For the 2012 annual PM2.5 NAAQS, the first quantitative milestones is 4.5 years after the designation date of April 2015, or the year 2019. The next quantitative milestone is 7.5 years after the designation date or three years after the first quantitative milestone, or the year 2022. The next quantitative milestone is three years later or year 2025, which is also the same year as attainment for a "serious" nonattainment area for the annual PM2.5.

The final rule (81 FR 58010) also requires that all "serious" area attainment plans to contain one additional quantitative milestone to be met in the 3-year period beyond the attainment date. As a result, the year 2022 is added as a milestone year for the 24-hour PM2.5 standard and the year 2028 is added as a milestone year for the annual PM2.5 standard.

Emission reductions required under an RFP plan for PM2.5 may be either directly emitted PM2.5 or an applicable precursor air pollutant such as NOx or SOx. The base year for purposes of tracking RFP is 2012,

which is the same base year as the 2016 AQMP emission inventory. The 2006 24-hour PM2.5 NAAQS baseline emissions for milestones years are shown in Table VI-C-3. Table VI-C-3A summarizes the RFP calculations.

Table VI-C-3
24-hr PM2.5 Baseline Emissions for Base Year and Milestone Years
(Annual Average - Tons per Day)

Pollutant	2012	2017 (Quantitative Milestone)	2019 (Attainment Deadline)	2020 (Quantitative Milestone)
PM2.5	66.4	63.8	63.9	63.9
NOx	540	398	353	330
SOx	18.4	17.1	16.6	16.7
VOC	470	392	376	370
NH3	81.1	75.5	74.0	73.3

TABLE VI-C-3A

Summary of 24-hour PM2.5 Reasonable Further Progress Calculations

ROW	CALCULATION STEP	PM2.5	NOx	SOx	VOC	NH3
1	2012 Base Year Emissions (tpd)	66.4	540	18.4	470	81.1
2	Annual Percent Change Needed to Show Linear Progress (%)	0.55	4.9	1.4	2.9	1.2
3	2017 Target Needed to Show Linear Progress (tpd)	64.6	406	17.1	403	76.0
4	2017 Baseline Emissions* (tpd)	63.8	398	17.1	392	75.5
5	Projected Shortfall (tpd)	0	0	0	0	0
6	Surplus in 2017 (tpd)	0.85	8.6	0.05	10.4	0.48
7	Emissions Equivalent to 1 Year Worth of RFP (tpd)	0.36	26.7	0.25	13.5	1.0
8	2019 Baseline Emissions (tpd)	63.9	353	16.6	376	74.0

ROW 1: The 2012 Base Year emissions can be found in Appendix III taking into account existing rules and projected growth
ROW 2: [[(Row 1) -(Row 9)]/(Row 1)]/7
ROW 3: (Row 1) - ((Row 1) x (Row 2) x 5))
ROW 4: The projected 2017 quantitative milestone baseline emissions can be found in Appendix III taking into account existing rules and projected growth
ROW 5: (Row 4) – (Row 3); Negative numbers are denoted as zeros, representing no shortfall
ROW 6: (Row 3) – (Row 4)
ROW 7: (Row 1) x (Row 2)
ROW 8: The projected 2019 attainment deadline baseline emissions can be found in Appendix III taking into account existing rules and projected growth

Table VI-C-4 provides a list of the SCAQMD adopted rules and regulations for stationary sources that is scheduled to be implemented from 2012, accounting for the emission reductions in the baseline emissions of the future milestone/attainment years of the 24-hour PM2.5 standard. The corresponding information for CARB's mobile source control measures can be found in Attachment VI-C-1.

TABLE VI-C-4

Implementation Schedule of SCAQMD Adopted Rules and Regulations for Reasonable Further Progress Per Milestone/Attainment Year

	2017	2019	2020
NOx	R1110.2[a]		
	R1110	R1110	R1110[c]
	R1121[a]		
	R1146[a]		
	R1146.1[a]		
	R1146.2[a]	R1146.2	R1146.2
	R1147	R1147	R1147[d]
VOC	R1113a		
	R1114	R1114[b]	
	R1177		
PM	R444[a]		

[a] Partial implementation from 2006-2016 with full implementation achieved in 2014, 2015 or 2016

[b] Partial implementation from 2013 with full implementation achieved in 2018

[c] Reductions achieved annually from 2013 with full implementation in 2035

[d] Partial implementation from 2010 with full implementation in 2023

Table VI-C-5 provides the emissions for milestones years for the 2012 annual PM2.5 and corresponding RFP calculations are summarized in Table VI-C-5A. The tables demonstrate RFP compliance for both PM2.5 standards based on projected emission inventory incorporating emission reductions from the non 182(e)(5) control measures committed in the 2016 AQMP.

TABLE VI-C-5

Annual PM2.5 Emissions for Base Year and Milestone Years

(Annual Average - Tons per Day)

Pollutant	2012 Baseline	2019 Baseline (Quantitative Milestone)	2022* (Quantitative Milestone)	2025* (Attainment Deadline)	2028*# (Quantitative Milestone)
PM2.5	66.4	63.9	64.1	64.1	64.7
NOx	540	353	275	206	180
SOx	18.4	16.6	17.0	17.4	17.8
VOC	470	376	348	336	325
NH3	81.1	74.0	72.6	72.3	72.7

*Based on controlled emissions with emission reductions from non 182(e)(5) control measures committed in the 2016 AQMP

Emissions derived from linear interpolation between the modeled emissions of 2025 and 2031

TABLE VI-C-5A

Summary of Annual PM2.5 Reasonable Further Progress Calculations

ROW	CALCULATION STEP	PM2.5	NOx	SOx	VOC	NH3
1	2012 Base Year Emissions (tpd)	66.4	540	18.4	470	81.1
2	Annual Percent Change Needed to Show Linear Progress (%)	0.27	4.8	0.43	2.2	0.83
3	2019 Target Needed to Show Linear Progress (tpd)	65.2	360	17.8	398	76.4
4	2019 Baseline Emissions (tpd)	63.9	353	16.6	376	74.0
5	Projected Shortfall (tpd)	0	0	0	0	0
6	Surplus in 2019 (tpd)	1.3	6.8	1.2	22.2	2.4
7	2022 Target Needed to Show Linear Progress (%)	64.6	283	17.6	367	74.4
8	2022 Emissions (tpd) *	64.1	275	17.0	348	72.6
9	Projected Shortfall (tpd)	0	0	0	0	0
10	Surplus in 2022 (tpd)	0.56	8.0	0.59	18.5	1.7
11	2025 Emissions (tpd) *	64.1	206	17.4	336	72.3

* Based on controlled emissions with emission reductions from non 182(e)(5) control measures committed in the 2016 AQMP

ROW 1: The 2012 Base Year emissions can be found in Appendix III taking into account existing rules and projected growth
ROW 2: [[(Row 1) -(Row 11)]/(Row 1)]/1316
ROW 3: (Row 1) – [(Row 1) x (Row 2) x 7)]
ROW 4: The projected 2019 quantitative milestone baseline emissions can be found in Appendix III taking into account existing rules and projected growth
ROW 5: (Row 4) – (Row 3); Negative numbers are denoted as zeros, representing no shortfall
ROW 6: (Row 3) – (Row 4)
ROW 7: (Row 1) – [(Row 1) x (Row 2) x 10)]
ROW 8: The projected 2022 quantitative milestone emissions can be found in Table VI-C-8
ROW 9: (Row 8) – (Row 7); Negative numbers are denoted as zeros, representing no shortfall
ROW 10: (Row 7) – (Row 8)
ROW 11: The projected 2025 attainment deadline emissions can be found in Table VI-C-9

More details about the adoption and implementation of the 2016 AQMP control measures can be found in Chapter 4 – Control Strategy and Implementation. The SCAQMD proposed contingency measures for the PM2.5 NAAQS are also presented in Chapter 4. Table 4-8 in Chapter 4 provides a list of the emission reduction commitment to be achieved by 2025 for the annual PM2.5 standard. Table 4-11 in Chapter 4 provides the corresponding information for the 2008 8-hour Ozone standard, presenting the emission reduction commitment of SCAQMD regulatory programs to be achieved by 2031. These reductions account for the reductions of the future milestone/attainment years through SCAQMD regulatory programs. Tables 4-8 ad 4-11 are reproduced below as Table VI-C-6 and Table VI-C-7, respectively. The implementation schedule for CARB's proposed mobile source control measures can be found in Table 4-5 and 4-12 from Chapter 4 and Appendix IV-B.

TABLE VI-C-6[#]

Annual PM2.5 (12 µg/m^3) SIP Basin-wide Emission Reduction Commitment
to be Achieved by 2025 through SCAQMD Regulatory Programs
(Annual Average Inventory, tons per day)

YEAR	PM2.5		NOx**	
	Based on Adoption Date	Based on Implementation Date[a]	Based on Adoption Date	Based on Implementation Date[a]
2016				
2017			MOB-10 (1.9) MOB-11 (2.9) MOB-14 (11) **15.8**	
2018	BCM-01 (3.3)		CMB-01 (2.5) CMB-02 (1.1) CMB-03 (1.4) CMB-04 (0.8) ECC-02 (0.3) ECC-03 (1.2) **7.3**	
2019	BCM-04 (0.2)[Δ] BCM-10 (0.1)[Δ]			
2020		BCM-04 (0.2)[Δ] BCM-10 (0.1)[Δ]		CMB-03 (1.4) CMB-02 (1.1) **2.5**
2021				
2022				CMB-04 (0.8)
2023				ECC-02 (0.3) ECC-03 (1.2) CMB-01 (2.5) MOB-10 (1.9) MOB-11 (2.9) MOB-14 (11) **19.8**
2024				
2025		BCM-01 (3.3)		
TOTAL	**3.3***	**3.3***	**23**	**23**

[#] Table is from Table 4-8 in the 2016 AQMP

[a] Represents the final, full implementation date; typically a rule contains multiple implementation dates

[Δ] NH3 measure as PM2.5 precursor

* For contingency measure purposes only

** Summer planning inventory

TABLE VI-C-7[#]

2008 8-hour Ozone (75 ppb) SIP Emission Reduction Commitment to be Achieved by 2031 through SCAQMD Stationary and Mobile Source Regulatory Programs
(Summer Planning Inventory, tons per day)

YEAR	VOC		NOx	
	Based on Adoption Date	Based on Implementation Date[a]	Based on Adoption Date	Based on Implementation Date[a]
2016				
2017			MOB-10 (1.9) MOB-11 (1.0) MOB-14 (7.8) **10.7**	
2018	ECC-02 (0.3) ECC-03 (0.3) CMB-01 (2.8) CMB-03 (0.4) **3.8**		CMB-04 (1.6) ECC-02 (1.1) ECC-03 (2.1) CMB-01 (6.0) CMB-02 (2.8) CMB-03 (1.5) **15.1**	
2019	FUG-01 (2) BCM-10 (1.8) **3.8**			
2020		CMB-03 (0.4)		CMB-03 (1.5)
2021	CTS-01 (2)			
2022		FUG-01 (2)	CMB-05 (5)	CMB-04 (1.6)
2023		ECC-02 (0.3)		ECC-02 (1.1)
2024–2030				
2031		ECC-03 (0.3) CMB-01 (2.8) BCM-10 (1.8) CTS-01 (2) **6.9**		ECC-03 (2.1) CMB-01 (6.0) CMB-02 (2.8) CMB-05 (5) MOB-10 (1.9) MOB-11 (1.0) MOB-14 (7.8) **26.6**
TOTAL	9.6	9.6	31.0	31.0

[#] Table is from Table 4-11 in the 2016 AQMP

[a] Represents the final, full implementation date; typically a rule contains multiple implementation dates

Tables VI-C-8, VI-C-9 and VI-C-10 present the controlled emission inventory, segregated by source types, in the quantitative milestone/attainment years of 2022, 2025 and 2028 for the 2012 annual PM2.5 standard. Emission reductions from the non-182(e)(5) control measures, as presented in Chapter 4 – Control Strategy and Implementation, are incorporated in the inventory.

TABLE VI-C-8

2022 Emission Inventory Incorporating Emission Reductions from Non-182(e)(5) Control Measures Committed in the 2016 AQMP

	VOC	NOx	SOx	PM2.5	NH3
Point source	28.0	4.9	2.5	8.5	7.6
Area source	186	26.0	1.3	39.6	52.1
RECLAIM	0	14.5	6.1	0	0
On-road	68.0	118	1.7	10.2	12.7
Off-road	62.4	94.4	3.5	5.1	0.17
Aircraft	3.9	16.9	2.0	0.7	0
TOTAL (TPD)	**348**	**275**	**17.0**	**64.1**	**72.6**

TABLE VI-C-9

2025 Emission Inventory Incorporating Emission Reductions from Non-182(e)(5) Control Measures Committed in the 2016 AQMP

	VOC	NOx	SOx	PM2.5	NH3
Point source	28.5	4.8	2.5	8.6	7.7
Area source	187	22.3	1.3	40.2	52.5
RECLAIM	0	13.3	6.1	0	0
On-road	57.4	73.5	1.6	10.0	12.0
Off-road	58.8	73.6	3.7	4.6	0.18
Aircraft	4.2	18.2	2.2	0.7	0.0
TOTAL (TPD)	**336**	**206**	**17.4**	**64.1**	**72.3**

TABLE VI-C-10

2028 Emission Inventory Incorporating Emission Reductions from Non-182(e)(5) Control Measures Committed in the 2016 AQMP*

	VOC	NOx	SOx	PM2.5	NH3
Point source	28.9	4.7	2.6	8.7	7.7
Area source	187	18.8	1.3	40.8	53.0
RECLAIM	0	11.4	6.1	0	0
On-road	50.1	60.1	1.5	10.0	11.8
Off-road	55.4	68.3	4.0	4.5	0.19
Aircraft	4.3	19.2	2.3	0.8	0.0
TOTAL (TPD)	**325**	**180**	**17.8**	**64.7**	**72.7**

[#] Emissions derived from linear interpolation between modeled emissions of 2025 and 2031

DRAFT FINAL 2016 AQMP

APPENDIX VI-C

ATTACHMENT VI-C-1

CALIFORNIA EXISTING MOBILE SOURCE CONTROL PROGRAM

Key Mobile Source Regulations and Programs Providing Emission Reductions

Given the severity of California's air quality challenges and the need for ongoing emission reductions, the Air Resources Board (ARB) has implemented the most stringent mobile source emissions control program in the nation. ARB's comprehensive program relies on four fundamental approaches:

- stringent emissions standards that minimize emissions from new vehicles and equipment;
- in-use programs that target the existing fleet and require the use of the cleanest vehicles and emissions control technologies;
- cleaner fuels that minimize emissions during combustion; and,
- incentive programs that remove older, dirtier vehicles and equipment and pay for early adoption of the cleanest available technologies.

This multi-faceted approach has spurred the development of increasingly cleaner technologies and fuels and achieved significant emission reductions across all mobile source sectors that go far beyond national programs or programs in other states. These efforts extend back to the first mobile source regulations adopted in the 1960s, and pre-date the federal Clean Air Act Amendments (Act) of 1970, which established the basic national framework for controlling air pollution. In recognition of the pioneering nature of ARB's efforts, the Act provides California unique authority to regulate mobile sources more stringently than the federal government by providing a waiver of preemption for its new vehicle emission standards under Section 209(b). This waiver provision preserves a pivotal role for California in the control of emissions from new motor vehicles, recognizing that California serves as a laboratory for setting motor vehicle emission standards. Since then, the ARB has consistently sought and obtained waivers and authorizations for its new motor vehicle regulations. ARB's history of progressively strengthening standards as technology advances, coupled with the waiver process requirements, ensures that California's regulations remain the most stringent in the nation. A list of regulatory actions ARB has taken since 1985 is provided at the end of this analysis to highlight the scope of ARB's actions to reduce mobile source emissions.

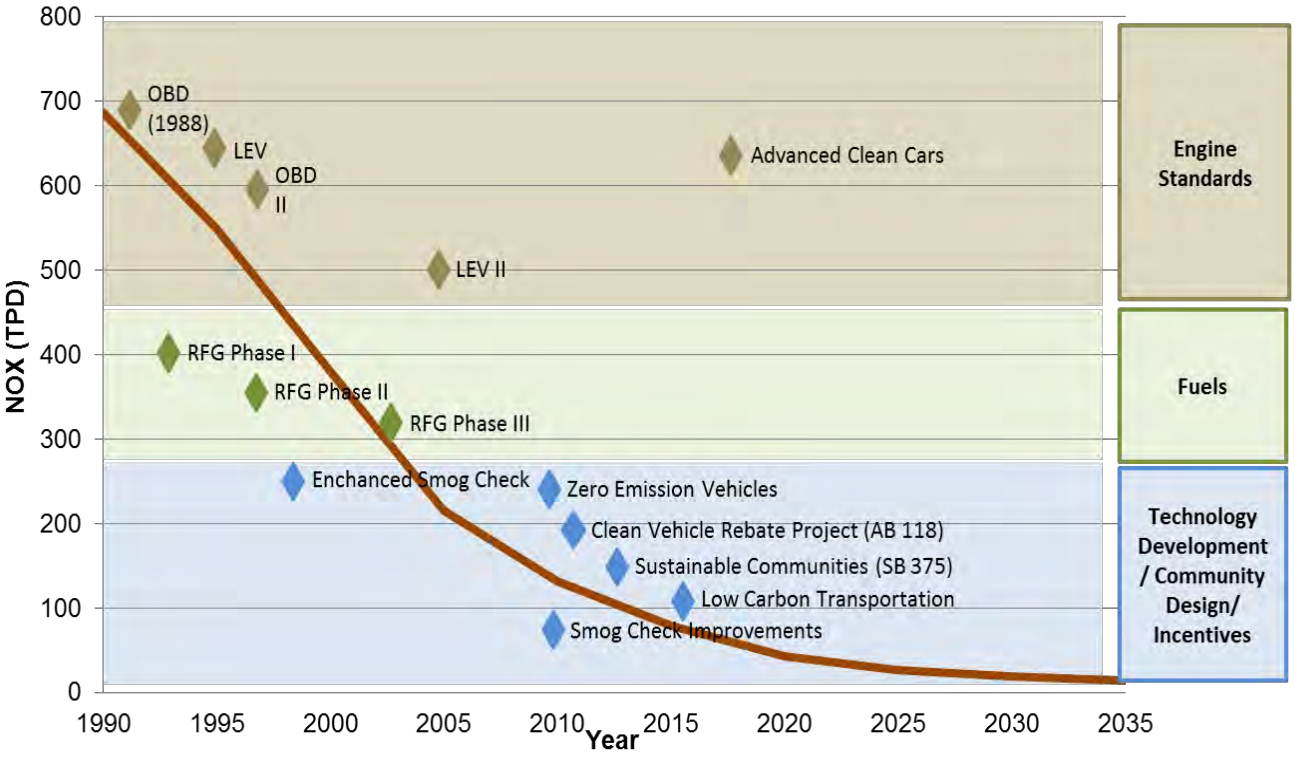
Recently, ARB adopted numerous regulations aimed at reducing exposure to diesel particulate matter and oxides of nitrogen, from freight transport sources like heavy duty diesel trucks, transportation sources like passenger cars and buses, and off-road sources like large construction equipment. Phased implementation of these regulations will produce increasing emission reduction benefits from now until 2031 and beyond, as the regulated fleets are retrofitted, and as older and dirtier portions of the fleets are replaced with newer and cleaner models at an accelerated pace.

Further, ARB and the South Coast Air Management District (SCAQMD) staff work closely on identifying and distributing incentive funds to accelerate cleanup of engines. Key incentive programs include: the Carl Moyer Program; the Goods Movement Program; the Lower-Emission School Bus Program; and the Air Quality Improvement Program (AQIP). These incentive-based programs work in tandem with regulations to accelerate deployment of cleaner technology.

Light-Duty Vehicles

Figure 1 illustrates the trend in NOx emissions from light-duty vehicles and key programs contributing to those reductions. As a result of these efforts, light-duty vehicle emissions in the SCAQMD have been reduced significantly since 1990 and will continue to go down through 2022 due to the benefits of ARB's longstanding light-duty mobile source program. From today, light-duty vehicle NOx emissions are reduced by about 50 percent in 2022. Key light-duty programs include Advanced Clean Cars, On-Board Diagnostics, Reformulated Gasoline, Incentive Programs, and the Enhanced Smog Check Program.

Figure 1
Key Programs to Reduce Light-Duty NOx Emissions



Since setting the nation's first motor vehicle exhaust emission standards in 1966 that led to the first pollution controls, California has dramatically tightened emission standards for light-duty vehicles. Through ARB regulations, today's new cars pollute 99 percent less than their predecessors did thirty years ago. In 1970, ARB required auto manufacturers to meet the first standards to control NOx emissions along with hydrocarbon emissions. The simultaneous control of emissions from motor vehicles and fuels led to the use of cleaner-burning reformulated gasoline (RFG) that has removed the emissions equivalent of 3.5 million vehicles from California's roads. Since ARB first adopted it in 1990, the Low Emission Vehicle Program (LEV and LEV II) and Zero-Emission Vehicle (ZEV) Program have resulted in the production and sales of hundreds of thousands of zero-emission vehicles (ZEVs) in California.

Advanced Clean Cars

ARB's groundbreaking Advanced Clean Cars (ACC) program is now providing the next generation of emission reductions in California, and ushering in a new zero emission passenger transportation system. The success of these programs is evident: California is the world's largest market for Zero Emission Vehicles (ZEVs), with over 21 models available today, and a wide variety are now available at lower price points, attracting new consumers. As of January 2015, Californians drive 40 percent of all ZEVs on the road in the United States, while the U.S. makes up about half of the world market. This movement towards commercialization of advanced clean cars has occurred due to ARB's ZEV regulation, part of ACC, which affects passenger cars and light-duty trucks.

ARB's ACC Program, approved in January 2012, is a pioneering approach of a 'package' of regulations, that although separate in construction, are related in terms of the synergy developed to address both ambient air quality needs and climate change. The ACC program combines the control of smog, soot causing pollutants and greenhouse gas emissions into a single coordinated package of requirements for model years 2015 through 2025. The program assures the development of environmentally superior cars that will continue to deliver the performance**,** utility, and safety vehicle owners have come to expect.

The ACC program approved by ARB in January 2012 also included amendments affecting the current ZEV regulation through the 2017 model year in order to enable manufacturers to successfully meet 2018 and subsequent model year requirements. These ZEV amendments are intended to achieve commercialization through simplifying the regulation and pushing technology to higher volume production in order to achieve cost reductions. The ACC Program benefits will increase over time as new cleaner cars enter the fleet displacing older and dirtier vehicles.

On Board Diagnostics

California's first OBD regulation required manufacturers to monitor some of the emission control components on vehicles starting with the 1988 model year. In 1989, ARB adopted OBD II, which required 1996 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines to be equipped with second generation OBD systems. OBD systems are designed to identify when a vehicle's emission control systems or other emission-related computer-controlled components are malfunctioning, causing emissions to be elevated above the vehicle manufacturer's specifications. ARB subsequently strengthened OBD II requirements and added OBD II specific enforcement requirements for 2004 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles and engines.

Reformulated Gasoline

Since 1996, ARB has been regulating the formulation of gasoline resulting in California gasoline being the cleanest in the world. California's cleaner-burning gasoline regulation is one of the cornerstones of the State's efforts to reduce air pollution and cancer risk. Reformulated gasoline is fuel that meets specifications and requirements established by ARB. The specifications reduced motor vehicle toxics by about 40 percent and reactive organic gases by about 15 percent. The results from cleaning up fuel can have an immediate impact as soon as it is sold in the State. Vehicle manufacturers design low-emission emission vehicle to take full advantage of cleaner-burning gasoline properties.

Incentive Programs

There are a number of different incentive programs focusing on light-duty vehicles that produce extra emission reductions beyond traditional regulations. The incentive programs work in two ways, encouraging the retirement of dirty older cars and encouraging the purchase of a cleaner vehicle.

Voluntary accelerated vehicle retirement or "car scrap" programs provide monetary incentives to vehicle owners to retire older, more polluting vehicles. The purpose of these programs is to reduce fleet emissions by accelerating the turnover of the existing fleet and subsequent replacement with newer, cleaner vehicles. Both State and local vehicle retirement programs are available.

California's voluntary vehicle retirement program is administered by the Bureau of Automotive Repair (BAR) and provides $1,000 per vehicle and $1,500 for low-income consumers for unwanted vehicles that have either failed or passed their last Smog Check Test and that meet certain eligibility guidelines. This program is referred to as the Consumer Assistance Program.

The Enhanced Fleet Modernization Program (EFMP) was approved by the AB 118 legislation to augment the State's existing vehicle retirement program. Approximately $30 million is available annually through 2015 to fund the EFMP via a $1 increase in vehicle registration fees. ARB developed the program in consultation with BAR. The program is jointly administered by both BAR for vehicle retirement, and local air districts for vehicle replacement.

Other programs, in addition to vehicle retirement programs, help to clean up the light-duty fleet. The AQIP, established by AB 118, is an ARB voluntary incentive program to fund clean vehicle and equipment projects. The Clean Vehicle Rebate Project (CVRP) is one of the current projects under AQIP. CVRP, started in 2009, is designed to accelerate widespread commercialization of zero-emission vehicles and plug-in hybrid electric vehicles by providing consumer rebates up to $2,500 to partially offset the higher cost of these advanced technologies. The CVRP is administered statewide by the California Center for Sustainable Energy. In Fiscal Years 2009–2012, $26.1 million, including $2 million provided by the California Energy Commission, funded approximately 8,000 rebates. In June 2012, the ARB allocated up to $15–21 million to the CVRP as outlined in the AQIP FY2012–2013 Funding Plan.

California Enhanced Smog Check Program

BAR is the state agency charged with administration and implementation of the Smog Check Program. The Smog Check Program is designed to reduce air pollution from California registered vehicles by requiring periodic inspections for emission-control system problems, and by requiring repairs for any problems found. In 1998, the Enhanced Smog Check program began in which Smog Check stations relied on the BAR-97 Emissions Inspection System (EIS) to test tailpipe emissions with either a Two-Speed Idle (TSI) or Acceleration Simulation Mode (ASM) test depending on where the vehicle was registered. For instance, vehicles registered in urbanized areas received an ASM test, while vehicles in rural areas or received a TSI test.

In 2009, the following requirements were added in to improve and enhance the Smog Check Program, making it more inclusive of motor vehicles and effective on smog reductions:

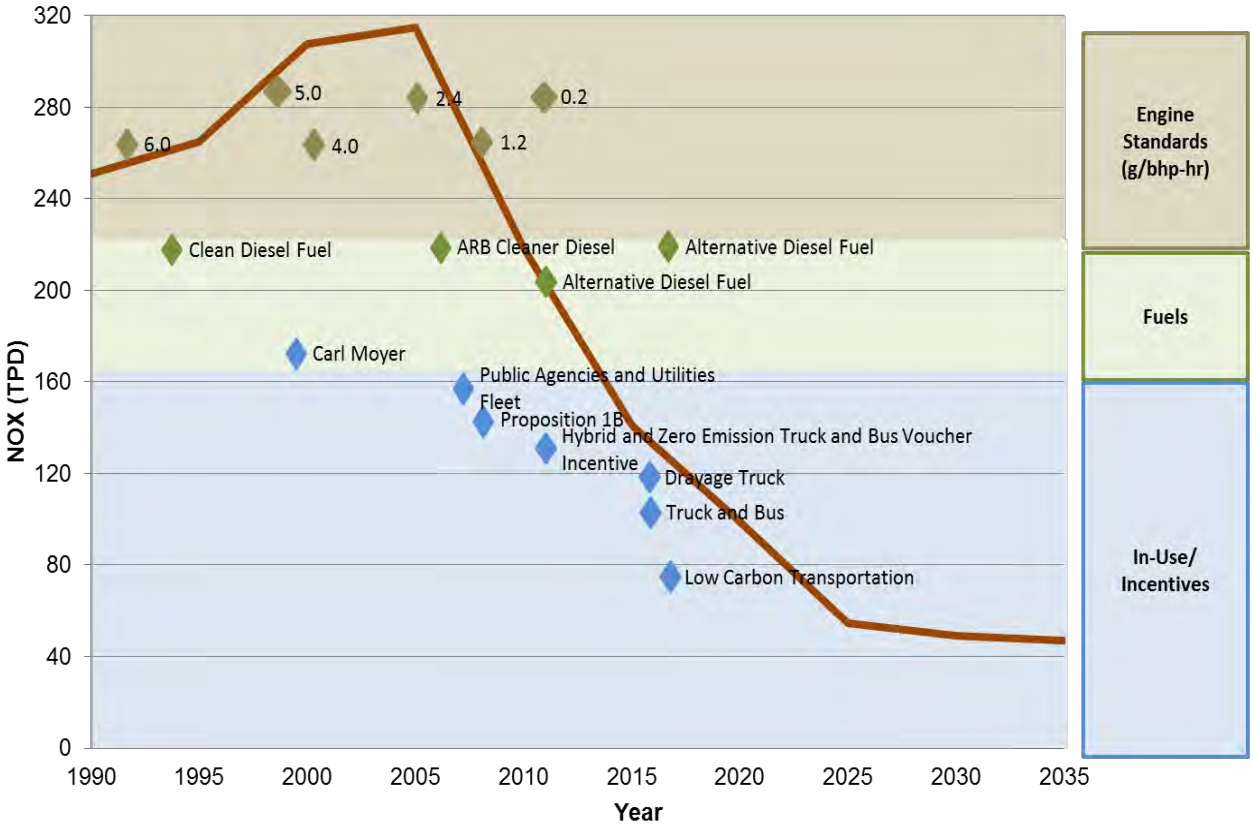
- Low pressure evaporative test;
- More stringent pass/fail cutpoints;
- Visible smoke test; and
- Inspection of light- and medium-duty diesel vehicles.

The next major change was due to AB 2289, adopted in October 2010, a new law restructuring California's Smog Check Program, streamlining and strengthening inspections, increasing penalties for misconduct, and reducing costs to motorists. This new law sponsored by ARB and BAR, promised faster and less expensive Smog Check inspections by talking advantage of OBD software installed on all vehicles since 2000. The new law also directs vehicles without this equipment to high-performing stations, helping to ensure that these cars comply with current emission standards. This program will reduce consumer costs by having stations take advantage of diagnostic software that monitors pollution-reduction components and tailpipe emissions. Beginning mid-2013, testing of passenger vehicles using OBD was required on all vehicles model years 2000 or newer.

Heavy-Duty Trucks

Figure 2 illustrates the trend in NOx emissions from heavy-duty vehicles and key programs contributing to those reductions. As a result of these efforts, heavy-duty vehicle emissions in the SCAQMD have been reduced significantly since 1990 and will continue to go down through 2022 due to the benefits of ARB's longstanding heavy-duty mobile source program. From today, heavy-duty NOx emissions are reduced by about 40 percent in 2022. Key programs include Heavy-Duty Engine Standards, Clean Diesel Fuel, Truck and Bus Regulation and Incentive Programs.

Figure 2
Key Programs to Reduce Heavy-Duty Emissions



Heavy-Duty Engine Standards

Since 1990, heavy-duty engine NOx emission standards have become dramatically more stringent, dropping from 6 grams per brake horsepower-hour (g/bhp-hr) in 1990 down to the current 0.2 g/bhp-hr standard, which took effect in 2010. In addition to mandatory NOx standards, there have been several generations of optional lower NOx standards put in place over the past 15 years. Most recently in 2015, engine manufacturers can certify to three optional NOx emission standards of 0.1 g/bhp-hr, 0.05 g/bhp-hr, and 0.02 g/bhp-hr (i.e., 50 percent, 75 percent, and 90 percent lower than the current mandatory standard of 0.2 g/bhp-hr). The optional standards allow local air districts and ARB to preferentially provide incentive funding to buyers of cleaner trucks, to encourage the development of cleaner engines.

Clean Diesel Fuel

Since 1993, ARB has required that diesel fuel have a limit on the aromatic hydrocarbon content and sulfur content of the fuel. Diesel powered vehicles account for a disproportionate amount of the diesel particulate matter which is considered a toxic air contaminant. In 2006, ARB required a low-sulfur diesel fuel to be used not only by on-road diesel vehicles but also for off-road engines. The diesel fuel regulation allows alternative diesel formulations as long as emission reductions are equivalent to the ARB formulation.

Cleaner In-Use Heavy-Duty Trucks (Truck and Bus Regulation)

The Truck and Bus Regulation was first adopted in December 2008. This rule represents a multi-year effort to turn over the legacy fleet of engines and replace them with the cleanest technology available. In December 2010, ARB revised specific provisions of the in-use heavy-duty truck rule, in recognition of the deep economic effects of the recession on businesses and the corresponding decline in emissions.

Starting in 2012, the Truck and Bus Regulation phases in requirements applicable to an increasingly larger percentage of the truck and bus fleet over time, so that by 2023 nearly all older vehicles would need to be upgraded to have exhaust emissions meeting 2010 model year engine emissions levels. The regulation applies to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds that are privately or federally owned, including on-road and off-road agricultural yard goats, and privately and publicly owned school buses. Moreover, the regulation applies to any person, business, school district, or federal government agency that owns, operates, leases or rents affected vehicles. The regulation also establishes requirements for any in-state or out-of-state motor carrier, California-based broker, or any California resident who directs or dispatches vehicles subject to the regulation. Finally, California sellers of a vehicle subject to the regulation would have to disclose the regulation's potential applicability to buyers of the vehicles. Approximately 170,000 businesses in nearly all industry sectors in California, and almost a million vehicles that operate on California roads each year are affected. Some common industry sectors that operate vehicles subject to the regulation include: for-hire transportation, construction, manufacturing, retail and wholesale trade, vehicle leasing and rental, bus lines, and agriculture.

ARB compliance assistance and outreach activities that are key in support of the Truck and Bus Regulation include:

- The Truck Regulations Upload and Compliance Reporting System, an online reporting tool developed and maintained by ARB staff;
- The Truck and Bus regulation's fleet calculator, a tool designed to assist fleet owners in evaluating various compliance strategies;

- Targeted training sessions all over the State; and
- Out-of-state training sessions conducted by a contractor.

ARB staff also develops regulatory assistance tools, conducts and coordinates compliance assistance and outreach activities, administers incentive programs, and actively enforces the entire suite of regulations. Accordingly, ARB's approach to ensuring compliance is based on a comprehensive outreach and education effort.

Incentive Programs

There are a number of different incentive programs focusing on heavy-duty vehicles that produce extra emission reductions beyond traditional regulations. The incentive programs encourage the purchase of a cleaner truck.

Several State and local incentive funding pools have been used historically -- and remain available -- to fund the accelerated turnover of on-road heavy-duty vehicles. Since 1998, the Carl Moyer Program (Moyer Program) has provided funding for replacement, new purchase, repower and retrofit of trucks. Beginning in 2008, the Goods Movement Emission Reduction Program funded by Proposition 1B has funded cleaner trucks for the region's transportation corridors; the final increment of funds will implement projects in through 2018.

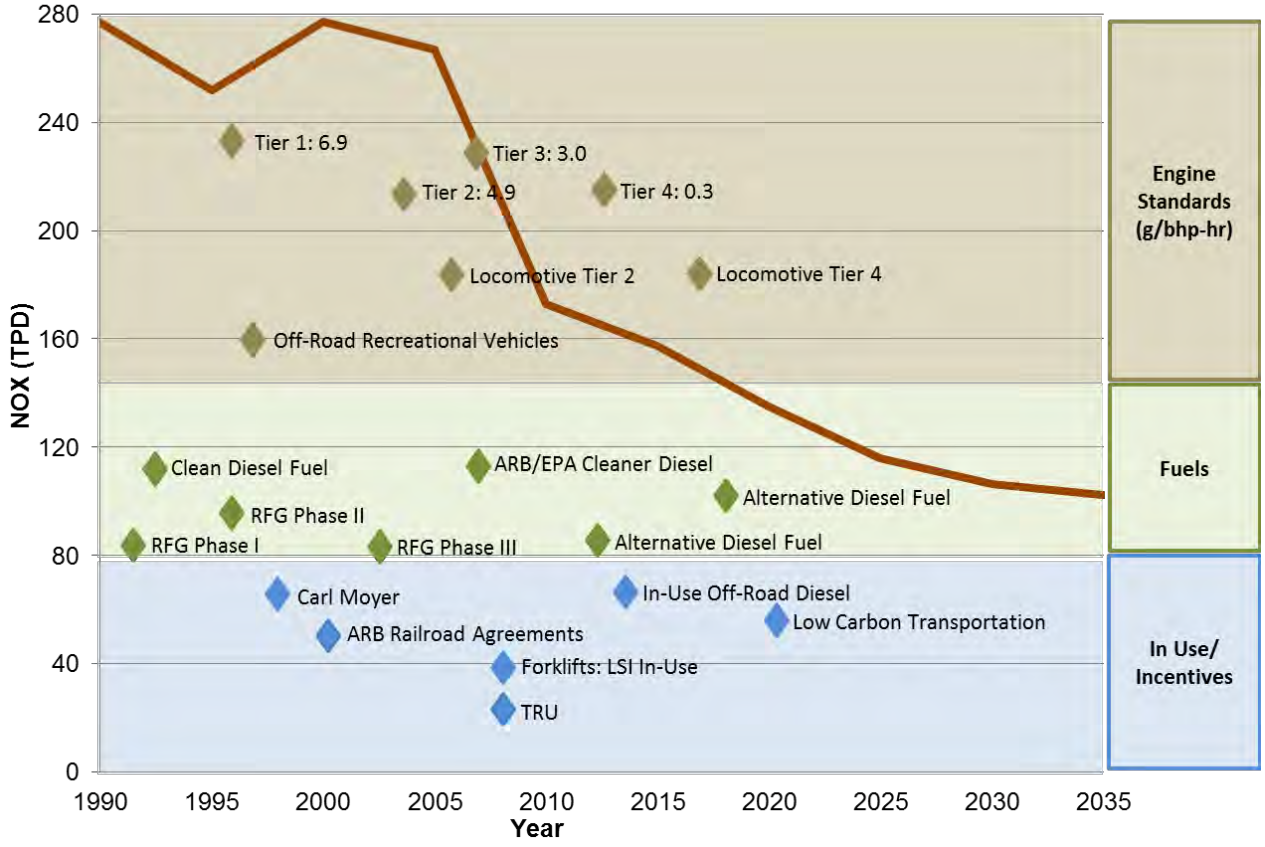
The Air Quality Improvement Program has funded the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) since 2010, and continued San Joaquin Valley participation is expected. ARB has also administered a Truck Loan Assistance Program since 2009.

Off-Road Sources

Off-road sources encompass equipment powered by an engine that does not operate on the road. Sources vary from ships to lawn and garden equipment and for example, include sources like locomotives, aircraft, tractors, harbor craft, off-road recreational vehicles, construction equipment, forklifts, and cargo handling equipment.

Figure 3 illustrates the trend in NOx emissions from off-road equipment and key programs contributing to those reductions. As a result of these efforts, off-road emissions in the SCAQMD have been reduced significantly since 1990 and will continue to go down through 2022 due to the benefits of ARB's and U.S. EPA longstanding programs. From today, off-road NOx emissions are reduced by about 20 percent in 2022. Key programs include Off-Road Engine Standards, Locomotive Engine Standards, Clean Diesel Fuel, Cleaner In-Use Off-Road Regulation and In-Use LSI Fleet Regulation.

Figure 3
Key Programs to Reduce Off-Road Emissions



Off-Road Engine Standards

The Clean Air Act preempts states, including California, from adopting requirements for new off-road engines less than 175 HP used in farm or construction equipment. California may adopt emission standards for in-use off-road engines pursuant to Section 209(e)(2), but must receive authorization from U.S. EPA before it may enforce the adopted standards.

The Board first approved regulations to control exhaust emissions from small off-road engines (SORE) such as lawn and garden equipment in December 1990 with amendments in 1998 and 2003. These regulations were implemented through three tiers of progressively more stringent exhaust emission standards that were phased in between 1995 and 2008.

Manufacturers of forklift engines are subject to new engine standards for both diesel and Large Spark Ignition (LSI) engines. Off-road diesel engines were first subject to engine standards and durability requirements in 1996 while the most recent Tier 4 Final emission standards were phased in starting in 2013. Tier 4 emission standards are based on the use of advanced after-treatment technologies such as diesel particulate filters and selective catalytic reduction. LSI engines have been subject to new engine standards that include both criteria pollutant and durability requirements since 2001 with the cleanest requirements phased-in starting in 2010.

Locomotive Engine Standards

The Clean Air Act and the U.S. EPA national locomotive regulations expressly preempt states and local governments from adopting or enforcing "any standard or other requirement relating to the control of emissions from new locomotives and new engines used in locomotives" (U.S. EPA interpreted new engines in locomotives to mean remanufactured engines, as well). U.S. EPA has approved two sets of national locomotive emission regulations (1998 and 2008). In 1998, U.S. EPA approved the initial set of national locomotive emission regulations. These regulations primarily emphasized NOx reductions through Tier 0, 1, and 2 emission standards. Tier 2 NOx emission standards reduced older uncontrolled locomotive NOx emissions by up to 60 percent, from 13.2 to 5.5 g/bhphr.

In 2008, U.S. EPA approved a second set of national locomotive regulations. Older locomotives upon remanufacture are required to meet more stringent particulate matter (PM) emission standards which are about 50 percent cleaner than Tier 0-2 PM emission standards. U.S. EPA refers to the PM locomotive remanufacture emission standards as Tier 0+, Tier 1+, and Tier 2+. The new Tier 3 PM emission standard (0.1 g/bhphr), for model years 2012–2014, is the same as the Tier 2+ remanufacture PM emission standard. The 2008 regulations also included new Tier 4 (2015 and later model years) locomotive NOx and PM emission standards. The U.S. EPA Tier 4 NOx and PM emission standards further reduced emissions by approximately 95 percent from uncontrolled levels.

Clean Diesel Fuel

Since 1993, ARB has required that diesel fuel have a limit on the aromatic hydrocarbon content and sulfur content of the fuel. Diesel powered vehicles account for a disproportionate amount of the diesel particulate matter which is considered a toxic air contaminant. In 2006, ARB required a low-sulfur diesel fuel to be used not only by on-road diesel vehicles but also for off-road engines. The diesel fuel regulation allows alternative diesel formulations as long as emission reductions are equivalent to the ARB formulation.

Cleaner In-Use Off-Road Equipment (Off-Road Regulation)

The Off-Road Regulation which was first approved in 2007 and subsequently amended in 2010 in light of the impacts of the economic recession. These off-road vehicles are used in construction, manufacturing, the rental industry, road maintenance, airport ground support and landscaping. In December 2011, the Off-Road Regulation was modified to include on-road trucks with two diesel engines.

The Off-Road Regulation will significantly reduce emissions of diesel PM and NOx from the over 150,000 in-use off-road diesel vehicles that operate in California. The regulation affects dozens of vehicle types used in thousands of fleets by requiring owners to modernize their fleets by replacing older engines or vehicles with newer, cleaner models, retiring older vehicles or using them less often, or by applying retrofit exhaust controls.

The Off-Road Regulation imposes idling limits on off-road diesel vehicles, requires a written idling policy, and requires a disclosure when selling vehicles. The regulation also requires that all vehicles be reported to ARB and labeled, restricts the addition of older vehicles into fleets, and requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing verified exhaust retrofits. The requirements and compliance dates of the Off-Road Regulation vary by fleet size.

Fleets will be subject to increasingly stringent restrictions on adding older vehicles. The regulation also sets performance requirements. While the regulation has many specific provisions, in general by each compliance

deadline, a fleet must demonstrate that it has either met the fleet average target for that year, or has completed the Best Available Control Technology requirements. The performance requirements of the Off-Road Regulation are phased in from January 1, 2014 through January 1, 2019.

Compliance assistance and outreach activities in support of the Off-Road Regulation include:

- The Diesel Off-road On-line Reporting System, an online reporting tool developed and maintained by ARB staff.
- The Diesel Hotline (866-6DIESEL), which provides the regulated public with questions about the regulations and access to ARB staff. Staff is able to respond to questions in English, Spanish and Punjabi.
- The Off-road Listserv, providing equipment owners and dealerships with timely announcement of regulatory changes, regulatory assistance documents, and reminders for deadlines.

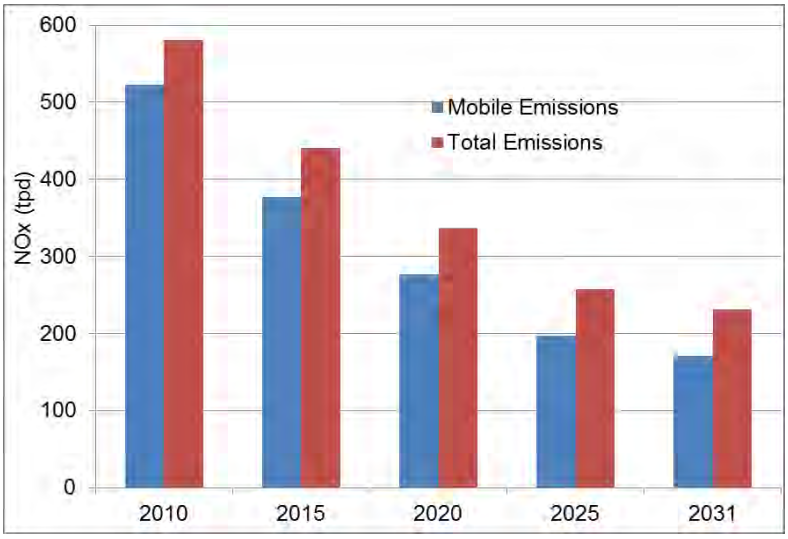
LSI In-Use Fleet Regulation

Forklift fleets can be subject to either the LSI fleet regulation, if fueled by gasoline or propane, or the off-road diesel fleet regulation. Both regulations require fleets to retire, repower, or replace higher-emitting equipment in order to maintain fleet average standards. The LSI fleet regulation was originally adopted in 2007 with requirements beginning in 2009. While the LSI fleet regulation applies to forklifts, tow tractors, sweeper/scrubbers, and airport ground support equipment, it maintains a separate fleet average requirement specifically for forklifts. The LSI fleet regulation requires fleets with four or more LSI forklifts to meet fleet average emission standards.

I. Emission Reduction Benefits of Existing Mobile Source Control Program

Air quality modeling has demonstrated that the substantial reductions from implementation of the existing mobile source control program will provide the majority of the NOx reductions needed for attainment of both the 80 ppb ozone standard in 2023, and the 75 ppb ozone standard in 2031. As shown in Figure 4, these programs will reduce NOx emissions in the South Coast Air Basin over 200 tpd of NOx between 2015 and 2031.

Figure 4
South Coast Air Basin NOx Emission Reduction Trend



Board Action	Hearing Date
Amendments to the Portable Fuel Container Regulation Amendments to the Portable Fuel Container (PFC) regulation, which include requiring certification fuel to contain 10 percent ethanol, harmonizing aspects of the Board's PFC certification and test procedures with those of the U.S. EPA, revising the ARB's certification process, and streamlining, clarifying, and increasing the robustness of ARB's certification and test procedures.	2/18/16
Technical Status and Proposed Revisions to On-Board Diagnostic System Requirements and Associated Enforcement Provisions for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II) Amendments to the OBD II regulations that update requirements to account for LEV III applications and monitoring requirements for gasoline and diesel vehicles, and clarify and improve the regulation; also, updates to the associated OBD II enforcement regulation to align it with the proposed amendments to the OBD II regulations and a minor amendment to the definition of "emissions-related part" in title 13, CCR section 1900.	9/25/15
2015 Low Carbon Fuel Standard (LCFS) Amendments (2 of 2) Re-adoption of the Low Carbon Fuel Standard, which includes updates and revisions to the regulation now in effect. The proposed regulation was first presented to the Board at its February 2015 public hearing, at which the Board directed staff to make modifications to the proposal.	9/24/15
Proposed Regulation on the Commercialization of Alternative Diesel Fuels (2 of 2) Regulation governing the introduction of alternative diesel fuels into the California commercial market, including special provisions for biodiesel.	9/24/15
CA Cap on GHG Emissions and Market-Based Compliance Mechanisms (2 of 2) Amendments to the Cap and Trade Regulation to include a new Rice Cultivation Compliance Offset Protocol and an update to the United States Forest Compliance Offset Protocol that would include project eligibility in parts of Alaska.	6/25/15
Intermediate Volume Manufacturer Amendments to the Zero Emission Vehicle Regulation Amendments regarding intermediate volume manufacturer compliance obligations under the Zero Emission Vehicle regulation.	5/21/15
2015 Amendments to Certification Procedures for Vapor Recovery Systems at Gasoline Dispensing Facilities—Aboveground Storage Tanks and Enhanced Conventional Nozzles Amendments would establish new performance standards and specifications for nozzles used at fleet facilities that exclusively refuel vehicles equipped with onboard vapor recovery systems, would provide regulatory relief for owners of certain existing aboveground storage tanks, and would ensure that mass-produced vapor recovery equipment matches the specifications of equipment evaluated during the ARB certification process.	4/23/15
Proposed Regulation for the Commercialization of Alternative Diesel Fuels (1 of 2) Regulation governing the introduction of alternative diesel fuels into the California commercial market, including special provisions for biodiesel. This is the first of two hearings on the item, and the Board will not take action to approve the proposed regulation.	2/19/15
Evaporative Emission Control Requirements for Spark-Ignition Marine Watercraft Regulation for controlling evaporative emissions from spark-ignition marine watercraft. The proposed regulation will harmonize, to the extent feasible, with similar federal requirements, while adding specific provisions needed to support California's air quality needs.	2/19/15
2015 Low Carbon Fuel Standard (LCFS) Amendments (1 of 2) Regulation for a Low Carbon Fuel Standard that includes re- adoption of the existing Low Carbon Fuel Standard with updates and revisions. This is the first of two hearings on the item, and the Board will not take action to approve the proposed regulation.	2/19/15
CA Cap on GHG Emissions and Market-Based Compliance Mechanisms to Add the Rice Cultivation Projects and Updated U.S. Forest Projects Protocols (1 of 2) Updates to the Cap and Trade Regulation to include a new Rice Cultivation Compliance Offset Protocol and an update to the United States Forest Compliance Offset Protocol that would include project eligibility in parts of Alaska.	12/18/14
2014 Amendments to ZEV Regulation Additional compliance flexibility to ZEV manufacturers working to bring advanced technologies to market.	10/23/14
LEV III Criteria Pollutant Requirements for Light- and Medium-Duty Vehicles the Hybrid Electric Vehicle Test Procedures, and the HD Otto-Cycle and HD Diesel Test Procedures Applies to the 2017 and subsequent model years.	10/23/14
Amendments to Mandatory Reporting Regulation for Greenhouse Gases Further align reporting methods with U.S. EPA methods and factors, and modify reporting requirements to fully support implementation of California's Cap and Trade program.	9/19/14

Board Action	Hearing Date
Amendments to the California Cap on Greenhouse Gas Emissions and Market Based Compliance Mechanisms Technical revisions to Mandatory Reporting of Greenhouse Gas Emissions Regulation to further align reporting methods with U.S. EPA update methods and factors, and modify reporting requirements to fully support implementation of California's Cap and Trade program.	9/18/14
Amendments to the AB 32 Cost of Implementation Fee Regulation Amendments to the regulation to make it consistent with the revised mandatory reporting regulation, to add potential reporting requirements, and to incorporate requirements within the mandatory reporting regulation to streamline reporting.	9/18/14
Low Carbon Fuel Standard 2014 Update As a result of a California Court of Appeal decision, ARB will revisit the LCFS rulemaking process to meet certain procedural requirements of the APA and CEQA. Following incorporation of any modifications to the regulation, the Board will consider the proposed regulation for adoption at a second hearing held in the spring of 2015.	7/24/14
Revisions to the Carl Moyer Memorial Air Quality Standards Attainment Program Guidelines for On-Road Heavy-Duty Trucks Revisions to 1) reduce surplus emission reduction period, 2) reduce minimum CA usage requirement, 3) prioritize on-road funding to small fleets, 4) include light HD vehicles 14000-19500 libs, and 5) clarify program specifications.	7/24/14
Amendments to Enhanced Fleet Modernization (Car Scrap) Program Amendments consistent with SB 459 which requires ARB to increase benefits for low-income California residents, promote cleaner replacement vehicles, and enhance emissions reductions.	6/26/14
Proposed Approval of Amendments to CA Cap on GHG Emissions and Market-Based Compliance Mechanisms Second hearing of two, continued from October 2013.	4/24/14
Truck and Bus Rule Update Amendments to the Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen, and Other Criteria Pollutants From In-Use On-Road Diesel-Fueled Vehicles: increasing low-use vehicle thresholds, allowing owners to newly opt-in to existing flexibility provisions, adjusting "NOx exempt" vehicle provisions, and granting additional time for fleets in certain areas to meet PM filter requirements.	4/24/14
Heavy-Duty GHG Phase I: On-Road Heavy-Duty GHG Emissions Rule, Tractor-Trailer Rule, Commercial Motor Vehicle Idling Rule, Optional Reduced Emission Standards, Heavy-Duty Hybrid-Electric Vehicles Certification Procedure New GHG standards for MD and HD engines and vehicles identical to those adopted by the U.S. EPA in 2011 for MYs 2014-18.	12/12/13
Agricultural equipment SIP credit rule Incentive-funded projects must be implemented using Carl Moyer Program Guidelines; must be surplus, quantifiable, enforceable, and permanent, and result in emission reductions that are eligible for SIP credit.	10/25/13
Mandatory Report of Greenhouse Gas Emissions Approved a regulation that establishes detailed specifications for emissions calculations, reporting, and verification of GHG emission estimates from significant sources.	10/25/13
CA Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Technical revisions to the Mandatory Reporting of Greenhouse Gas Emissions Regulation to further align reporting methods with U.S.EPA, update factors, and modify definitions to maintain consistency with the Cap and Trade program.	10/25/13
Zero emission vehicle test procedures Existing certification test procedures for plug-in hybrid vehicles need to be updated to reflect technology developments. The ZEV regulation will require minor modifications to address clarity and implementation issues.	10/24/13
Consumer Products: Antiperspirants, Deodorants, Test Method 310, Aerosol Coatings, Proposed Repeal of Hairspray Credit) Amendments to require various consumer products to reformulate to reduce VOC or reactivity content to meet specified limits, and to clarify various regulatory provisions, improve enforcement, and add analytical procedures.	9/26/13
Alternative fuel certification procedures Amendments to current alternative fuel conversion certification procedures for motor vehicles and engines that will allow small volume conversion manufacturers to reduce the upfront demonstration requirements and allow systems to be sold sooner with lower certification costs than with the current process, beginning with MY 2018.	9/26/13

Board Action	Hearing Date
Vapor Recovery for Gasoline Dispensing Facilities Amendments to certification and test procedures for vapor recovery equipment used on cargo tanks and at gasoline dispensing facilities.	7/25/13
Off-highway recreational vehicle evaporative emission control Staff proposes to set evaporative emission standards to control hydrocarbon emissions from Off-Highway Recreational Vehicles. The running loss, hot soak, and diurnal performance standards can be met by using proven automobile type control technology.	7/25/13
Gasoline and diesel fuel test standards Adopted amendments to add test standards for the measurement of prohibited oxygenates at trace levels specified in existing regulations.	1/25/13
LEV III and ZEV Programs for Federal Compliance Option Adopted amendments to deem compliance with national GHG new vehicle standards in 2017-2025 as compliance with California GHG standards for the same model years.	11/15/12 12/6/12 EO
Consumer products (automotive windshield washing fluid) Adopted amendments to add portions of 14 California counties to the list of areas with freezing temperatures where 25% VOC content windshield washing fluid could be sold.	10/18/2012 EO 03/15/13
GHG mandatory reporting, Fee Regulation, and Cap and Trade 2012 Adopted amendments to eliminate emission verification for facilities emitting less than 25,000 MTCO2e and make minor changes in definitions and requirements.	9/20/12 11/2/12 EO
Amendments to Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines Approved amendments to the verification procedure used to evaluate diesel retrofits through emissions, durability, and field testing. Amendments will lower costs associated with required in-use compliance testing, streamline the in-use compliance process, and will extend time allowed to complete verifications.	8/23/2012 EO 07/02/13
Amendments to On-Board Diagnostics (OBD I and II) Regulations Approved amendments to the light- and medium-duty vehicle and heavy-duty engine OBD regulations.	8/23/2012 EO 06/26/13
Cap and Trade: Amendments to CA Cap on GHG Emissions and Market-Based Compliance Mechanisms, and Amendments Allowing Use of Compliance Instruments Issued by Linked Jurisdictions Amends Cap-and-Trade and compliance mechanisms to add security to the market system and to aid staff in implementation. Amendments include first auction rules, offset registry, market monitoring provisions, and information gathering necessary for the financial services operator.	6/28/12 7/31/12 EO
Vapor recovery defect list Adopted amendments to add defects and verification procedures for equipment approved since 2004, and make minor changes to provide clarity	6/11/12 EO
Tractor-Trailer GHG Regulation: Emergency Amendment Adopted emergency amendment to correct a drafting error and delay the registration date for participation in the phased compliance option	2/29/2012 2/29/12 EO
Advanced Clean Cars (ACC) Regulation: Low-Emission Vehicles and GHG Adopted more stringent criteria emission standards for MY 2015-2025 light and medium duty vehicles (LEV III), amended GHG emission standards for model year 2017-2025 light and medium duty vehicles (LEV GHG), amended ZEV Regulation to ensure the successful market penetration of ZEVs in commercial volumes, amended hydrogen fueling infrastructure mandate of the Clean Fuels Outlet regulation, and amended cert fuel for light duty vehicles from an MTBE-containing fuel to an E10 certification fuel.	1/26/12
Zero Emission Vehicle (ZEV) Adopted amendments to increase compliance flexibility, add two new vehicle categories for use in creating credits, increase credits for 300 mile FCVs, increase requirements for ZEVs and TZEVs, eliminate credit for PZEVs and AT PZEVs, expand applicability to smaller manufacturers, base ZEV credits on range, and make other minor changes in credit requirements	1/26/12
Amendments to Low Carbon Fuel Standard Regulation The amendments address several aspects of the regulation, including: reporting requirements, credit trading, regulated parties, opt-in and opt-out provisions, definitions, and other clarifying language.	12/16/11 10/10/12 EO

Board Action	Hearing Date
Amendments to Small Off-Road Engine and Tier 4 Off-Road Compression-Ignition Engine Regulations And Test Procedures; also "Recreational Marine" Spark-Ignition Marine Engine Amendments (Recreational Boats) adopted. Aligns California test procedures with U.S. EPA test procedures and requires off-road CI engine manufacturers to conduct in-use testing of their entire product lines to confirm compliance with previously established Not-To-Exceed emission thresholds.	12/16/2011 10/25/12 EO
Regulations and Certification Procedures for Engine Packages used in Light-Duty Specially Constructed Vehicles (Kit Cars) Ensures that certified engine packages, when placed into any Kit Car, would meet new vehicle emission standards, and be able to meet Smog Check requirements.	11/17/11 9/21/12 EO
Amendments to the California Reformulated Gasoline Regulations Corrects drafting errors in the predictive model, deletes outdated regulatory provisions, updates the notification requirements, and changes the restrictions on blending CARBOB with other liquids.	10/21/11 8/24/12 EO
Amendments to the In-Use Diesel Transport Refrigeration Units (TRU) ATCM Mechanisms to improve compliance rates and enforceability.	10/21/11 8/31/12 EO
Amendments to the AB 32 Cost of Implementation Fee Regulation Clarifies requirements and regulatory language, revises definitions.	10/20/11 8/21/12 EO
Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation, Including Compliance Offset Protocols Greenhouse Gas Emissions Cap-and-Trade Program, including compliance offset protocols and multiple pathways for compliance.	10/21/11 8/21/12 EO
Amendments to the Regulation for Cargo Handling Equipment (CHE) at Ports and Intermodal Rail Yards (Port Yard Trucks Regulation) Provides additional compliance flexibility, and maintains anticipated emissions reductions. As applicable to yard trucks and two-engine sweepers.	9/22/11 8/2/12 EO
Amendments to the Enhanced Vapor Recovery Regulation for Gasoline Dispensing Facilities New requirement for low permeation hoses at gasoline dispensing facilities.	9/22/11 7/26/12 EO
Amendments to Cleaner Main Ship Engines and Fuel for Ocean-Going Vessels Adjusts the offshore regulatory boundary. Aligns very low sulfur fuel implementation deadlines with new federal requirements.	6/23/11 9/13/12 EO
Particulate Matter Emissions Measurement Allowance For Heavy-Duty Diesel In-Use Compliance Regulation Emission measurement allowances provide for variability associated with the field testing required in the regulation.	6/23/11
Low Carbon Fuel Standard Carbon Intensity Lookup Table Amendments Adds new pathways for vegetation-based fuels	2/24/11
Amendments to Cleaner In-Use Heavy-Duty On-Road Diesel Trucks and LSI Fleets Regulations Amends five regulations to provide relief to fleets adversely affected by the economy, and take into account the fact that emissions are lower than previously predicted.	12/16/10 9/19/11 EO
Tractor-Trailer GHG Regulation Amendment Enacts administrative changes to increase compliance flexibility and reduce costs	12/16/10
Amendments to Cleaner In-Use Off-Road Diesel-Fueled Fleets Regulation Amendments provide relief to fleets adversely affected by the economy, and take into account the fact that emissions are lower than previously predicted.	12/16/10 10/28/11 EO
In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks at Ports and Rail Yard Facilities Amendments add flexibility to fleets' compliance schedules, mitigate the use of noncompliant trucks outside port and rail properties, and provide transition to the Truck and Bus regulation.	12/16/10 9/19/11 EO
Amendments to the Regulation for Mandatory Reporting of Greenhouse Gas Emissions Changes requirements to align with federal greenhouse gas reporting requirements adopted by US EPA.	12/16/10 10/28/11 EO
Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms Regulation Establishes framework and requirements for Greenhouse Gas Emissions Cap-and-Trade Program, including compliance offset protocols.	12/16/10 10/26/11 EO
Amendments to the Consumer Products Regulation Amendments set new or lower VOC limits for some categories, prohibit certain toxic air contaminants, high GWP compounds, and surfactants toxic to aquatic species. Also changes Method 310, used to determine aromatic content of certain products.	11/18/10 9/29/11 EO
Amendment of the ATCM for Diesel Transportation Refrigeration Units (TRU) Amendments expand the compliance options and clarify the operational life of various types of TRUs.	11/18/10 2/2/11 EO
Amendments to the ATCM for Stationary Compression Ignition Engines Approved amendments to closely align the emission limits for new emergency standby engines in the ATCM with the emission standards required by the federal Standards of Performance.	10/21/10 3/25/11 EO

Board Action	Hearing Date
Diesel Vehicle Periodic Smoke Inspection Program Adopted amendments to exempt medium duty diesel vehicles from smoke inspection requirements if complying with Smog Check requirements.	10/21/10 8/23/11 EO
Renewable Electricity Standard Regulation Approved a regulation that will require electricity providers to obtain at least 33% of their retail electricity sales from renewable energy resources by 2020.	9/23/10
Energy Efficiency at Industrial Facilities Adopted standards for the reporting of GHG emissions and the feasibility of emissions controls by the largest GHG-emitting stationary sources.	7/22/10 5/9/11 EO
Accelerated Introduction of Cleaner Line-Haul Locomotives Agreement with railroads sets prescribed reductions in diesel risk and target years through 2020 at four major railyards.	6/24/10
Amendments to Commercial Harbor Craft Regulation Approved amendments to require the use of cleaner engines in diesel-fueled crew and supply, barge, and dredge vessels.	6/24/10 4/11/11 EO
Amendments to New Passenger Motor Vehicle Greenhouse Gas Emission Standards Approved amendments deeming compliance with EPA's GHG standards as compliance with California's standards in 2012 through 2016 model years.	2/25/2010 03/29/10
Sulfur Hexafluoride (SF6) Regulation Regulation to reduce emissions of sulfur hexafluoride (SF6), a high-GWP GHG, from high-voltage gas-insulated electrical switchgear.	2/25/10 12/15/10 EO
Amendments to the Statewide Portable Equipment Registration Regulation and Portable Engine ATCM Approved amendments that extend the deadline for removal of certain uncertified portable engines for one year.	1/28/10 8/27/10 EO 12/8/10 EO
Diesel Engine Retrofit Control Verification, Warranty, and Compliance Regulation Amendments Approved amendments to require per-installation compatibility assessment, performance data collection, and reporting of additional information, and enhance enforceability.	1/28/10 12/6/10 EO
Stationary Equipment High-GWP Refrigerant Regulation Approved a regulation to reduce emissions of high-GWP refrigerants from stationary non-residential equipment.	12/1/09 9/14/10 EO
Amendments to Limit Ozone Emissions from Indoor Air Cleaning Devices Adopted amendments to delay the labeling compliance deadlines by one to two years and to make minor changes in testing protocols.	12/9/09
Emission Warranty Information Reporting Regulation Amendments Repealed the 2007 regulation and readopted the 1988 regulation with amendments to implement adverse court decision.	11/19/09 9/27/10 EO
Amendments to Maximum Incremental Reactivity Tables Added many new compounds and modified reactivity values for many existing compounds in the tables to reflect new research data.	11/3/09 7/23/10 EO
AB 32 Cost of Implementation Fee Regulation AB 32 authorizes ARB to adopt by regulation a schedule of fees to be paid by sources of greenhouse gas emissions regulated pursuant to AB 32. ARB staff will propose a fee regulation to support the administrative costs of AB 32 implementation.	9/24/2009 05/06/10 EO
Passenger Motor Vehicle Greenhouse Gas Limits Amendments Approved amendments granting credits to manufacturers for compliant vehicles sold in other states that have adopted California regulations.	9/24/09 2/22/10 EO
Consumer Products Amendments Approved amendments that set new VOC limits for multi-purpose solvent and paint thinner products and lower the existing VOC limit for double phase aerosol air fresheners.	9/24/09 8/6/10 EO
Amendments to In-Use Off-Road Diesel-Fueled Fleets Regulation Approved amendments to implement legislatively directed changes and provide additional incentives for early action.	7/23/09 12/2/09 EO 6/3/10 EO
Methane Emissions from Municipal Solid Waste Landfills Approved a regulation to require smaller and other uncontrolled landfills to install gas collection and control systems, and also requires existing and newly installed systems to operate optimally.	6/25/09 5/5/10 EO
Cool Car Standards Approved a regulation requiring the use of solar management window glass in vehicles up to 10,000 lb GVWR.	6/25/09

Board Action	Hearing Date
Enhanced Fleet Modernization (Car Scrap) Approved guidelines for a program to scrap up to 15,000 light duty vehicles statewide.	6/25/09 7/30/10 EO
Amendments to Heavy-Duty On-Board Diagnostics Regulations Approved amendments to the light and medium-duty vehicle and heavy duty engine OBD regulations.	5/28/2009 4/6/10 EO
Smog Check Improvements BAR adopted amendments to implement changes in state law and SIP commitments adopted by ARB between 1996 and 2007.	5/7/09 by BAR 6/9/09 EO
AB 118 Air Quality Improvement Program Guidelines The Air Quality Improvement Program provides for up to $50 million per year for seven years beginning in 2009-10 for vehicle and equipment projects that reduce criteria pollutants, air quality research, and advanced technology workforce training. The AQIP Guidelines describe minimum administrative, reporting, and oversight requirements for the program, and provide general criteria for how the program shall be implemented.	04/23/09 08/28/09 EO
Pesticide Element Reduce volatile organic compound (VOC) emissions from the application of agricultural field fumigants in the South Coast, Southeast Desert, Ventura County, San Joaquin Valley, and Sacramento Metro federal ozone nonattainment areas.	4/20/09 10/12/09 EO (2) 8/2/11 EO
Low Carbon Fuel Standard Approved new standards to lower the carbon content of fuels.	4/20/09 11/25/09 EO
Pesticide Element for San Joaquin Valley DPR Director approved pesticide ROG emission limit of 18.1 tpd and committed to implement restrictions on non-fumigant pesticide use by 2014 in the San Joaquin Valley.	4/7/09 DPR
Tire Pressure Inflation Regulation Approved a regulation requiring automotive service providers to perform tire pressure checks as part of every service.	3/26/09 2/4/10 EO
Sulfur Hexafluoride from Non-Utility and Non-Semiconductor Applications Approved a regulation to phase out use of Sulfur Hexafluoride over the next several years.	2/26/09 11/12/09 EO
Semiconductor Operations Approved a regulation to set standards to reduce fluorinated gas emissions from the semiconductor and related devices industry.	2/26/09 10/23/09 EO
Plug-In Hybrid Electric Vehicles Test Procedure Amendments Amends test procedures to address plug-in-hybrid electric vehicles.	1/23/09 12/2/09 EO
In-Use Off-Road Diesel-Fueled Fleets Amendments Makes administrative changes to recognize delays in the supply of retrofit control devices.	1/22/09
Small Containers of Automotive Refrigerant Approved a regulation to reduce leakage from small containers, adopt a container deposit and return program, and require additional container labeling and consumer education requirements.	1/22/09 1/5/10 EO
Aftermarket Critical Emission Parts on Highway Motorcycles Allows for the sale of certified critical emission parts by aftermarket manufacturers.	1/22/09 6/19/09 EO
Heavy-Duty Tractor-Trailer Greenhouse Gas (GHG) Reduction Approved a regulation to reduce greenhouse gas emissions by improving long haul tractor and trailer efficiency through use of aerodynamic fairings and low rolling resistance tires.	12/11/08 10/23/09 EO
Cleaner In-Use Heavy-Duty Diesel Trucks (Truck and Bus Regulation) Approved a regulation to reduce diesel particulate matter and oxides of nitrogen through fleet modernization and exhaust retrofits. Makes enforceability changes to public fleet, off-road equipment, and portable equipment regulations.	12/11/08 10/19/09 EO 10/23/09 EO
Large Spark-Ignition Engine Amendments Approved amendments to reduce evaporative, permeation, and exhaust emissions from large spark-ignition (LSI) engines equal to or below 1 liter in displacement.	11/1/08 3/12/09 EO
Small Off-Road Engine (SORE) Amendments Approved amendments to address the excessive accumulation of emission credits.	11/21/08 2/24/10 EO
Proposed AB 118 Air Quality Guidelines for the Air Quality Improvement Program and the Alternative and Renewable Fuel and Vehicle and Technology Program. The California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007 (AB 118) requires ARB to develop guidelines for both the Alternative and Renewable Fuel and Vehicle Technology Program and the Air Quality Improvement Program to ensure that both programs do not adversely impact air quality.	09/25/08 EO 05/20/09

Board Action	Hearing Date
Portable Outboard Marine Tanks and Components (part of Additional Evaporative Emission Standards) Approved a regulation that establishes permeation and emission standards for new portable outboard marine tanks and components.	9/25/08 7/20/09 EO
Cleaner Fuel in Ocean Going Vessels Approved a regulation that requires use of low sulfur fuel in ocean-going ship main engines, and auxiliary engines and boilers.	7/24/08 4/16/09 EO
Spark-Ignition Marine Engine and Boat Amendments Provides optional compliance path for > 500 hp sterndrive/inboard marine engines.	7/24/08 6/5/09 EO
Consumer Products Amendments Approved amendments that add volatile organic compound (VOC) limits for seven additional categories and lower limits for twelve previously regulated categories.	6/26/08 5/5/09 EO
Zero emission vehicles Updated California's ZEV requirements to provide greater flexibility with respect to fuels, technologies, and simplifying compliance pathways. Amendments give manufacturers increased flexibility to comply with ZEV requirements by giving credit to plug-in hybrid electric vehicles and establishing additional ZEV categories in recognition of new developments in fuel cell vehicles and battery electric vehicles.	3/27/08 12/17/08 EO
Amendments to the Verification Procedure, Warranty, and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines Adds verification requirements for control technologies that only reduce NOx emissions, new reduction classifications for NOx reducing technologies, new testing requirements, and conditional extensions for verified technologies.	1/24/08 12/4/08 EO
Mandatory Report of Greenhouse Gas Emissions Approved a regulation that establishes detailed specifications for emissions calculations, reporting, and verification of GHG emission estimates from significant sources.	12/6/07 10/12/08 EO
Gaseous Pollutant Measurement Allowances for In-Use Heavy-Duty Diesel Compliance Measurement accuracy margins are to be determined through an ongoing comprehensive testing program performed by an independent contractor. Amendments include these measurement accuracy margins into the regulation.	12/6/07 10/14/08 EO
Ocean-Going Vessels While at Berth (aka Ship Hoteling) - Auxiliary Engine Cold Ironing and Clean Technology Approved a regulation that reduces emissions from auxiliary engines on ocean-going ships while at-berth.	12/6/07 10/16/08 EO
In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks at Ports and Rail Yard Facilities Approved a regulation that establishes emission standards for in-use, heavy-duty diesel-fueled vehicles that transport cargo to and from California's ports and intermodal rail facilities.	12/6/07 10/12/08 EO
Commercial Harbor Craft Approved a regulation that establishes in-use and new engine emission limits for both auxiliary and propulsion diesel engines on ferries, excursion vessels, tugboats, and towboats.	11/15/07 9/2/08 EO
Suggested Control Measure for Architectural Coatings Amendments Approved amendments to reduce the recommended VOC content of 19 categories of architectural coatings.	10/26/07
Aftermarket Catalytic Converter Requirements Approved amendments that establish more stringent emission performance and durability requirements for used and new aftermarket catalytic converters offered for sale in California.	10/25/07 2/21/08 NOD
Limiting Ozone Emissions from Indoor Air Cleaning Devices Approved ozone emission limit of 0.050 ppm for portable indoor air cleaning devices in response to requirements of AB 2276 (2006).	9/27/07 8/7/08 EO
Pesticide Commitment for Ventura County in 1994 SIP Approved substitution of excess ROG emission reductions from state motor vehicle program for 1994 SIP reduction commitment from pesticide application in Ventura County.	9/27/07 11/30/07 EO
In-Use Off-Road Diesel Equipment Approved a regulation that requires off-road diesel fleet owners to modernize their fleets and install exhaust retrofits.	7/26/07 4/4/08 EO
Emission Control and Environmental Performance Label Regulations Approved amendments to add a Global Index Label and modify the formal of the Smog Index Label on new cars.	6/21/07 5/2/08 EO
Vapor Recovery from Aboveground Storage Tanks Approved a regulation to establish new performance standards and specifications for the vapor recovery systems and components used with aboveground storage tanks.	6/21/07 5/2/08 EO

Board Action	Hearing Date
CaRFG Phase 3 amendments Approved amendments to mitigate the increases in evaporative emissions from on-road motor vehicles resulting from the addition of ethanol to gasoline.	6/14/07 4/25/08 EO 8/7/08 EO
Formaldehyde from Composite Wood Products Approved an ATCM to limit formaldehyde emissions from hardwood plywood, particleboard, and medium density fiberboard to the maximum amount feasible.	4/26/07 3/5/08 EO
Portable equipment registration program (PERP) and airborne toxic control measure for diesel-fueled portable engines Approved amendments to allow permitting of Tier 0 portable equipment engines used in emergency or low use duty and to extend permitting of certain Tier 1 and 2 "resident" engines to 1/1/10.	3/22/07 7/31/07 EO
Perchloroethylene Control Measure Amendments Approved amendments to the Perchloroethylene ATCM to prohibit new Perc dry cleaning machines beginning 2008 and phase out all Perc machines by 2023.	1/25/07 11/7/07 EO
Amendments to Emission Warranty Information Reporting & Recall Regulations Approved amendments that tighten the provisions for recalling vehicles for emissions-related failures, helping ensure that corrective action is taken to vehicles with defective emission control devices or systems.	12/7/06 3/22/07 10/17/07 EO
Voluntary accelerated vehicle retirement regulations Approved amendments that authorize the use of remote sensing to identify light-duty high emitters and that establish protocols for quantifying emissions reductions from high emitters proposed for retirement.	12/7/06
Emergency regulation for portable equipment registration program (PERP), airborne toxic control measures for portable and stationary diesel-fueled engines	12/7/06
Amendments to the Hexavalent Chromium ATCM Approved amendments that require use of best available control technology on all chrome plating and anodizing facilities.	12/7/06
Consumer Products Regulation Amendments Approved amendments that set lower emission limits in 15 product categories.	11/17/06 9/25/07 EO
Requirements for Stationary Diesel In-Use Agricultural Engines Approved amendments to the stationary diesel engine ATCM which set emissions standards for in-use diesel agricultural engines.	11/16/06 7/3/07 NOD
Ships - Onboard Incineration Approved amendments to cruise ship incineration ATCM to include all oceangoing ships of 300 gross registered tons or more.	11/16/06 9/11/07 EO
Zero Emission Bus Approved amendments postponing the 15 percent purchase requirement three years for transit agencies in the diesel path and one to two years for transit agencies in the alternative fuel path, in order to keep pace with developments in zero emission bus technology, and adding an Advanced Demonstration requirement to offset emission losses.	10/19/06 8/27/07 EO
Distributed generation certification Approved amendments improving the emissions durability and testing requirements, adding waste gas emission standards, and eliminating a redundant PM standard in the current 2007 emission standards.	10/19/06 5/17/07 NOD
Heavy-Duty Diesel In-Use Compliance Regulation Approved amendments to the heavy-duty diesel engine regulations and test procedures to create a new in-use compliance program conducted by engine manufacturers. The amendments would help ensure compliance with applicable certification standards throughout an engine's useful life.	9/28/06 7/19/07 NOD
Revisions to OBD II and the Emission Warranty Regulations Approved amendments to the OBD II regulation to provide for improved emission control monitoring including air-fuel cylinder imbalance monitoring, oxygen sensor monitoring, catalyst monitoring, permanent fault codes for gasoline vehicles and new thresholds for diesel vehicles.	9/28/06 8/9/07 EO
Off-Highway Recreational Vehicle Amendments Approved amendments to the Off-Highway Recreational Vehicle Regulations including harmonizing evaporative emission standards with federal regulations, expanding the definition of ATVs, modifying labeling requirements, and adjusting riding seasons.	7/20/06 6/1/07 EO
Portable Equipment Registration Program (PERP) Amendments Approved amendments to the Statewide Portable Equipment Registration program that include installation of hour meters on equipment, and revisions to recordkeeping, reporting, and fees.	6/22/06 11/13/06 NOD
Heavy Duty Vehicle Service Information Approved amendments to the Service Information Rule to require manufacturers to make available diagnostic equipment and information for sale to the aftermarket.	6/22/06 5/3/07 EO

Board Action	Hearing Date
LEV II technical amendments Approved amendments to evaporative emission test procedures, four-wheel drive dynamometer provisions, and vehicle label requirements.	6/22/06 9/27/06 NOD
Dry Cleaning ATCM Amendments Approved amendments to the Dry Cleaning ATCM to limit siting of new dry cleaners, phase out use of Perc at co-residential facilities, phase out higher emitting Perc sources at other facilities, and require enhanced ventilation at existing and new Perc facilities.	5/25/06
Forklifts and other Large Spark Ignition (LSI) Equipment Adopted a regulation to reduce emissions from forklifts and other off-road spark-ignition equipment by establishing more stringent standards for new equipment, and requiring retrofits or engine replacement on existing equipment. Adopts EPA's standards for 2007; adopts more stringent standards for 2010.	5/25/06 3/2/07 EO
Enhanced Vapor Recovery Amendments Approved amendments to the vapor recovery system regulation and adopted revised test procedures.	5/25/06
Diesel Retrofit Technology Verification Procedure Approved amendments to the Diesel Emission In-use Control Strategy Verification Procedure to substitute a 30% increase limit in NOx concentration for an 80% reduction requirement from PM retrofit devices.	3/23/06 12/21/06 NOD
Heavy duty vehicle smoke inspection program amendments Approved amendments to impose a fine on trucks not displaying a current compliance certification sticker.	1/26/06 12/4/06 EO
Ocean-going Ship Auxiliary Engine Fuel Approved a regulation to require ships to use cleaner marine gas oil or diesel to power auxiliary engines within 24 nautical miles of the California coast.	12/8/05 10/20/06 EO
Diesel Cargo Handling Equipment Approved a regulation to require new and in-use cargo handling equipment at ports and intermodal rail yards to reduce emissions by utilizing best available control technology.	12/8/05 6/2/06 EO
Public and Utility Diesel Truck Fleets Approved a regulation to reduce diesel particulate matter emissions from heavy duty diesel trucks in government and private utility fleets.	12/8/05 10/4/06 EO
Cruise ships – Onboard Incineration Adopted an Air Toxic Control Measure to prohibit cruise ships from conducting onboard incineration within three nautical miles of the California coast.	11/17/05 2/1/06 NOD
Inboard Marine Engine Rule Amendments Approved amendments to the 2001 regulation to include additional compliance options for manufacturers.	11/17/05 9/26/06 EO
Heavy-Duty Diesel Truck Idling Technology Approved a regulation to limit sleeper truck idling to 5 minutes. Allows alternate technologies to provide cab heating/cooling and power.	10/20/05 9/1/06 EO
Automotive Coating Suggested Control Measure Approved an SCM for automotive coatings for adoption by air districts. The measure will reduce the VOC content of 11 categories of surface protective coatings.	10/20/05
2007-09 Model-year heavy duty urban bus engines and the fleet rule for transit agencies Adopted amendments to align urban bus emission limits with on-road heavy duty truck emission limits and allow for the purchase of non- complying buses under the condition that bus turnover increase to offset NOx increases.	10/20/05 10/27/05 7/28/06 EO
Portable fuel containers (part 2 of 2) Approved amendments to revise spout and automatic shutoff design.	9/15/05 7/28/06 EO
Portable Fuel Containers (part 1 of 2) Approved amendments to include kerosene containers in the definition of portable fuel containers.	9/15/05 11/9/05 NOD
2007-09 Model-year heavy duty urban bus engines and the fleet rule for transit agencies Adopted amendments to require all transit agencies in SCAQMD to purchase only alternate fuel versions of new buses.	9/15/05 Superceded by 10/20/05
Reid vapor pressure limit emergency rule Approved amendments to relax Reid vapor pressure limit to accelerate fuel production for Hurricane Katrina victims.	9/8/05 Operative for September and October 2005 only

Board Action	Hearing Date
Heavy-Duty Truck OBD Approved a regulation to require on-board diagnostic (OBD) systems for new gas and diesel trucks, similar to the systems on passenger cars.	7/21/05 12/28/05 EO
Definition of Large Confined Animal Facility Adopted a regulation to define the size of a large CAF for the purposes of air quality permitting and reduction of ROG emissions to the extent feasible.	6/23/05 4/13/06 EO
ATCM for stationary compression ignition engines Approved emergency amendments (3/17/05) and permanent amendments (5/26/05) to relax the diesel PM emission limits on new stationary diesel engines to current off-road engine standards to respond to the lack of availability of engines meeting the original ATCM standard.	3/17/05 5/26/05 7/29/05 EO
Transit Fleet Rule Approved amendments to add emission limits for non-urban bus transit agency vehicles, require lower bus and truck fleet-average NOx and PM emission limits, and clarify emission limits for CO, NMHC, and formaldehyde.	2/24/05 10/19/05 NOD
Thermal Spraying ATCM Approved a regulation to reduce emissions of hexavalent chromium and nickel from thermal spraying operations.	12/9/04 7/20/05 EO
Tier 4 Standards for Small Off-Road Diesel Engines (SORE) Approved new emission standards for off-road diesel engines to be phased in between 2008 and 2015.	12/9/04 10/21/05 EO
Emergency Regulatory Amendment Delaying the January 1, 2005 Implementation Date for the Diesel Fuel Lubricity Standard Adopted an emergency regulation delaying the lubricity standard compliance deadline by five months to respond to fuel pipeline contamination problems.	11/24/04 12/10/04 EO
Enhanced vapor recovery compliance extension Approved amendments to the EVR regulation to extend the compliance date for onboard refueling vapor recovery compatibility to the date of EVR compliance.	11/18/04 2/11/05 EO
CaRFG Phase 3 amendments Approved amendments correcting errors and streamlining requirements for compliance and enforcement of CaRFG Phase 3 regulations adopted in 1999.	11/18/04
Clean diesel fuel for harborcraft and intrastate locomotives Approved a regulation that required harborcraft and locomotives operating solely within California to use clean diesel fuel.	11/18/04 3/16/05 EO
Nonvehicular Source, Consumer Product, and Architectural Coating Fee Regulation Amendment Approved amendments to fee regulations to collect supplemental fees when authorized by the Legislature.	11/18/04
Greenhouse gas limits for motor vehicles Approved a regulation that sets the first ever greenhouse gas emission standards on light and medium duty vehicles starting with the 2009 model year.	9/24/04 8/4/05 EO
Gasoline vapor recovery system equipment defects list Approved the addition of defects to the VRED list for use by compliance inspectors.	8/24/04 6/22/05 EO
Unihose gasoline vapor recovery systems Approved an emergency regulation and an amendment to delay the compliance date for unihose installation to the date of dispenser replacement.	7/22/04 11/24/04 EO
General Idling Limits for Diesel Trucks Approved a regulation that limits idling of heavy-duty diesel trucks operating in California to five minutes, with exceptions for sleeper cabs.	7/22/04
Consumer Products Approved a regulation to reduce ROG emissions from 15 consumer products categories, prohibit the use of 3 toxic compounds in consumer products, ban the use of PDCB in certain products, allow for the use of Alternative Control Plans, and revise Test Method 310.	6/24/04 5/6/05 EO
Urban bus engines/fleet rule for transit agencies Approved amendments to allow for the purchase of hybrid diesel buses and revise the zero emission bus demonstration and purchase timelines.	6/24/04
Engine Manufacturer Diagnostics Approved a regulation that would require model year 2007 and later heavy duty truck engines to be equipped with engine diagnostic systems to detect malfunctions of the emission control system.	5/20/04

Board Action	Hearing Date
Chip Reflash Approved a voluntary program and a backstop regulation to reduce heavy duty truck NOx emissions through the installation of new software in the engine's electronic control module.	3/25/04 3/21/05 EO
Portable equipment registration program (PERP) Approved amendments to allow uncertified engines to be registered until December 31, 2005, to increase fees, and to modify administrative requirements.	2/26/04 1/7/05 EO 6/21/05 EO
Portable Diesel Engine ATCM Adopted a regulation to reduce diesel PM emissions from portable engines through a series of emission standards that increase in stringency through 2020.	2/26/04 1/4/05 EO
California motor vehicle service information rule Adopted amendments to allow for the purchase of heavy duty engine emission-related service information and diagnostic tools by independent service facilities and aftermarket parts manufacturers.	1/22/04 5/20/04
Transportation Refrigeration Unit ATCM Adopted a regulation to reduce diesel PM emissions from transport refrigeration units by establishing emission standards and facility reporting requirements to streamline inspections.	12/11/03 2/26/04 11/10/04 EO
Diesel engine verification procedures Approved amendments that reduced warranty coverage to the engine only, delayed the NOx reduction compliance date to 2007, added requirements for proof-of-concept testing for new technology, and harmonized durability requirements with those of U.S. EPA.	12/11/03 2/26/04 10/17/04
Chip Reflash Approved a voluntary program and a backstop regulation to reduce heavy duty truck NOx emissions through the installation of new software in the engine's electronic control module.	12/11/03 3/27/04 3/21/05 EO
Revised tables of maximum incremental reactivity values Approved the addition of 102 more chemicals with associated maximum incremental reactivity values to existing regulation allowing these chemicals to be used in aerosol coating formulations.	12/3/03
Stationary Diesel Engines ATCM Adopted a regulation to reduce diesel PM emissions from stationary diesel engines through the use of clean fuel, lower emission standards, operational practices.	11/20/03 12/11/03 2/26/2004 9/27/04 EO
Solid waste collection vehicles Adopted a regulation to reduce toxic diesel particulate emissions from solid waste collection vehicles by over 80 percent by 2010. This measure is part of ARB's plan to reduce the risk from a wide range of diesel engines throughout California.	9/25/03 5/17/04 EO
Small off-road engines (SORE) Adopted more stringent emission standards for the engines used in lawn and garden and industrial equipment, such as string trimmers, leaf blowers, walk-behind lawn mowers, generators, and lawn tractors.	9/25/03 7/26/04 EO
Off-highway recreational vehicles Changes to riding season restrictions.	7/24/03
Clean diesel fuel Adopted a regulation to reduce sulfur levels and set a minimum lubricity standard in diesel fuel used in vehicles and off-road equipment in California, beginning in 2006.	7/24/03 5/28/04 EO
Ozone Transport Mitigation Amendments Adopted amendments to require upwind districts to (1) have the same no-net-increase permitting thresholds as downwind districts, and (2) Adopt "all feasible measures."	5/22/03 10/2/03 NOD
Zero emission vehicles Updated California's ZEV requirements to support the fuel cell car development and expand sales of advanced technology partial ZEVs (like gasoline-electric hybrids) in the near-term, while retaining a role for battery electric vehicles.	3/27/03 12/19/03 EO
Heavy duty gasoline truck standards Aligned its existing rules with new, lower federal emission standards for gasoline-powered heavy-duty vehicles starting in 2008.	12/12/02 9/23/03 EO
Low emission vehicles II Minor administrative changes.	12/12/02 9/24/03 EO
Gasoline vapor recovery systems test procedures Approved amendments to add advanced vapor recovery technology certification and testing standards.	12/12/02 7/1/03 EO 10/21/03 EO
CaRFG Phase 3 amendments Approved amendments to allow for small residual levels of MTBE in gasoline while MTBE is being phased out and replaced by ethanol.	12/12/02 3/20/03 EO

Board Action	Hearing Date
School bus Idling Adopted a measure requiring school bus drivers to turn off the bus or vehicle engine upon arriving at a school and restart it no more than 30 seconds before departure in order to limit children's exposure to toxic diesel particulate exhaust.	12/12/02 5/15/03 EO
California Interim Certification Procedures for 2004 and Subsequent Model Year Hybrid-Electric Vehicles in the Urban Transit Bus and Heavy-Duty Vehicle Classes Regulation Amendment Adopted amendments to allow diesel-path transit agencies to purchase alternate fuel buses with higher NOx limits, establish certification procedures for hybrid buses, and require lower fleet-average PM emission limits.	10/24/02 9/2/03 EO
CaRFG Phase 3 amendments Approved amendments delaying removal of MTBE from gasoline by one year to 12/31/03.	7/25/02 11/8/02 EO
Diesel retrofit verification procedures, warranty, and in-use compliance requirements Adopted regulations to specify test procedures, warranty, and in-use compliance of diesel engine PM retrofit control devices.	5/16/02 3/28/03 EO
On-board diagnostics for cars Adopted changes to the On-Board Diagnostic Systems (OBD II) regulation to improve the effectiveness of OBD II systems in detecting motor vehicle emission-related problems.	4/25/02 3/7/03 EO
Voluntary accelerated light duty vehicle retirement regulations Establishes standards for a voluntary accelerated retirement program.	2/21/02 11/18/02 EO
Residential burning Adopted a measure to reduce emissions of toxic air contaminants from outdoor residential waste burning by eliminating the use of burn barrels and the outdoor burning of residential waste materials other than natural vegetation.	2/21/02 12/18/02 EO
California motor vehicle service information rule Adopted regulations to require light- and medium-duty vehicle manufacturers to offer for sale emission-related service information and diagnostic tools to independent service facilities and aftermarket parts manufacturers.	12/13/01 7/31/02 EO
Vapor recovery regulation amendments Adopted amendments to expand the list of specified defects requiring equipment to be removed from service.	11/15/01 9/27/02 EO
Distributed generation guidelines and regulations Adopted regulations requiring the permitting by ARB of distributed generation sources that are exempt from air district permitting and approved guidelines for use by air districts in permitting non-exempt units.	11/15/01 7/23/02 EO
Low emission vehicle regulations (LEV II) Approved amendments to apply PM emission limits to all new gasoline vehicles, extend gasoline PZEV emission limits to all fuel types, and streamline the manufacturer certification process.	11/15/01 8/6/02 EO
Gasoline vapor recovery systems test methods and compliance procedures Adopted amendments to add test methods for new technology components, streamline test methods for liquid removal equipment, and***.	10/25/01 7/9/02 EO
Heavy-duty diesel trucks Adopted amendments to emissions standards to harmonize with EPA regulations for 2007 and subsequent model year new heavy-duty diesel engines.	10/25/01
Automotive coatings Adopted Air Toxic Control Measure which prohibits the sale and use in California of automotive coatings that contain hexavalent chromium or cadmium.	9/20/01 9/2/02 EO
Inboard and sterndrive marine engines Lower emission standards for 2003 and subsequent model year inboard and sterndrive gasoline-powered engines in recreational marine vessels.	7/26/01 6/6/02 EO
Asbestos from construction, grading, quarrying, and surface mining Adopted an Airborne Toxic Control Measure for construction, grading, quarrying, and surface mining operations requiring dust mitigation for construction and grading operations, road construction and maintenance activities, and quarries and surface mines to minimize emissions of asbestos-laden dust.	7/26/01 6/7/02 EO
Zero emission vehicle infrastructure and standardization of electric vehicle charging equipment Adopted amendments to the ZEV regulation to alter the method of quantifying production volumes at joint-owned facilities and to add specifications for standardized charging equipment.	6/28/01 5/10/02 EO

Board Action	Hearing Date
Enhanced vapor recovery emergency regulation Adopted a four-year term for equipment certifications.	5/22/01 EO
Pollutant transport designation Adopted amendments to add two transport couples to the list of air basins in which upwind areas are required to adopt permitting thresholds no less stringent than those adopted in downwind areas.	4/26/01
Zero emission vehicle regulation amendments Adopted amendments to reduce the numbers of ZEVs required in future years, add a PZEV category and grant partial ZEV credit, modify the ZEV range credit, allow hybrid-electric vehicles partial ZEV credit, grant ZEV credit to advanced technology vehicles, and grant partial ZEV credit for several other minor new programs.	1/25/01 12/7/01 EO 4/12/02 EO
Heavy duty diesel engines supplemental test procedures Approved amendments to extend "Not-To-Exceed" and EURO III supplemental test procedure requirements through 2007 when federal requirements will include these tests.	12/7/00
Light and medium duty low emission vehicle alignment with federal standards Approved amendments that require light and medium duty vehicles sold in California to meet the more restrictive of state or federal emission standards.	12/7/00 12/27/00 EO
Exhaust emission standards for heavy duty gas engines Adopted amendments that establish 2005 emission limits for heavy duty gas engines that are equivalent to federal limits.	12/7/00 12/27/00 EO
CaRFG Phase 3 amendments Approved amendments to regulate the replacement of MTBE in gasoline with ethanol.	11/16/00 4/25/01 EO
CaRFG Phase 3 test methods Approved amendments to gasoline test procedures to quantify the olefin content and gasoline distillation temperatures.	11/16/00 7/11/01 EO 8/28/01 EO
Antiperspirant and deodorant regulations Adopted amendments to relax a 0% VOC limit to 40% VOC limit for aerosol antiperspirants.	10/26/00
Diesel risk reduction plan Adopted plan to reduce toxic particulate from diesel engines through retrofits on existing engines, tighter standards for new engines, and cleaner diesel fuel.	9/28/00
Conditional rice straw burning regulations Adopted regulations to limit rice straw burning to fields with demonstrated disease rates reducing production by more than 5 percent.	9/28/00
Asbestos from unpaved roads Tightened an existing Air Toxic Control Measure to prohibit the use of rock containing more than 0.25% asbestos on unsurfaced roads.	7/20/00
Aerosol Coatings Approved amendments to replace mass-based VOC limits with reactivity-based limits, add a table of Maximum Incremental Reactivity values, add limits for polyolefin adhesion promoters, prohibit use of certain toxic solvents, and make other minor changes.	6/22/00 5/1/01 EO
Consumer products aerosol adhesives Adopted amendments to delete a 25% VOC limit by 2002, add new VOC limits for six categories of adhesives, prohibit the use of toxic solvents, and add new labeling and reporting requirements.	5/25/00 3/14/01 EO
Automotive care products Approved an Air Toxic Control Measure to eliminate use of perchloroethylene, methylene chloride, and trichloroethylene in automotive products such as brake cleaners and degreasers.	4/27/00 2/28/01 EO
Enhanced vapor recovery Adopted amendments to require the addition of components to reduce spills and leakage, adapt to onboard vapor recovery systems, and continuously monitor system operation and report equipment leaks immediately.	3/23/00 7/25/01 EO
Agricultural burning smoke management Adopted amendments to add marginal burn day designations, require day-specific burn authorizations by districts, and smoke management plans for larger prescribed burn projects.	3/23/00 1/22/01 EO
Urban transit buses Adopted a public transit bus fleet rule and emissions standards for new urban buses that mandates a lower fleet-average NOx emission limit, PM retrofits, lower sulfur fuel use, and purchase of specified percentages of zero emission buses in future years.	1/27/00 2/24/00 11/22/00 EO 5/29/01 EO

Board Action	Hearing Date
Small Off-Road (diesel) Equipment (SORE) Adopted amendments to conform with new federal requirements for lower and engine power-specific emission limits, and for the averaging, banking, and trading of emissions among SORE manufacturers.	1/28/00
CaRFG Phase 3 MTBE phase out Adopted regulations to enable refiners to produce gasoline without MTBE while preserving the emissions benefits of Phase 2 cleaner burning gasoline.	12/9/99 6/16/00 EO
Consumer products – mid-term measures II Adopted a regulation which adds emission limits for 2 new categories and tightens emission limits for 15 categories of consumer products.	10/28/99
Portable fuel cans Adopted a regulation requiring that new portable fuel containers, used to refuel lawn and garden equipment, motorcycles, and watercraft, be spill-proof beginning in 2001.	9/23/99 7/6/00 EO
Clean fuels at service stations Adopted amendments rescinding requirements applicable to SCAB in 1994-1995, modifying the formula for triggering requirements, and allowing the Executive Officer to make adjustments to the numbers of service stations required to provide clean fuels.	7/22/99
Gasoline vapor recovery Adopted amendments to certification and test methods.	6/24/99
Reformulated gasoline oxygenate Adopted amendments rescinding the requirement for wintertime oxygenate in gasoline sold in the Lake Tahoe Air Basin and requiring the statewide labeling of pumps dispensing gasoline containing MTBE.	6/24/99
Marine pleasurecraft Adopted regulations to control emissions from spark-ignition marine engines, specifically, outboard marine engines and personal watercraft.	12/11/98 2/17/00 EO 6/14/00 EO
Voluntary accelerated light duty vehicle retirement Adopted regulation setting standards for voluntary accelerated retirement program.	12/10/98 10/22/99 EO
Off-highway recreational vehicles and engines Approved amendments to allow non-complying vehicles to operate in certain seasons and in certain ORV-designated areas.	12/10/98 10/22/99 EO
On-road motorcycles Amended on-road motorcycle regulations, to lower the tailpipe emission standards for ROG and NOx.	12/10/98
Portable equipment registration program (PERP) Approved amendments to exclude non-dredging equipment operating in OCS areas and equipment emitting hazardous pollutants, include NSPS Part OOO rock crushers, require SCR emission limits and onshore emission offsets from dredging equipment operating in OCS areas, set catalyst emission limits for gasoline engines, and relieve certain retrofitted engines from periodic source testing.	12/10/98
Liquid petroleum gas motor fuel specifications Approved amendment rescinding 5% propene limit and extending 10% limit indefinitely.	12/11/98
Reformulated gasoline Approved amendments to rescind the RVP exemption for fuel with 10% ethanol and allow for oxygen contents up to 3.7% if the Predictive Model weighted emissions to not exceed original standards.	12/11/98
Consumer products Adopted amendments to add new VOC test methods, to modify Method 310 to quantify low vapor pressure VOC (LVP-VOC) constituents, and to exempt LVP-VOC from VOC content limits	11/19/98
Consumer products Approved amendments to extend the 1999 VOC compliance deadline for several aerosol coatings, antiperspirants and deodorants, and other consumer products categories to 2002, to exempt methyl acetate from the VOC definition, and make other minor changes.	11/19/98
Low-emission vehicle program (LEV II) Adopted regulations adding exhaust emission standards for most sport utility vehicles, pick-up trucks and mini-vans, lowering tailpipe standards for cars, further reducing evaporative emission standards, and providing additional means for generating zero-emission vehicle credits.	11/5/98 9/17/99 EO
Off-road engine aftermarket parts Approved implementation of a new program to test and certify aftermarket parts in gasoline and diesel, light-duty through heavy duty, engines used in off-road vehicles and equipment.	11/19/98 10/1/99 EO 7/18/00 EO

Board Action	Hearing Date
Off-road spark ignition engines Adopted new emission standards for small and large spark ignition engines for off-road equipment, a new engine certification program, an in-use compliance testing program, and a three-year phase-in for large LSI.	10/22/98
Gasoline deposit control additives Adopted amendments to decertify pre-RFG additives, tighten the inlet valve deposit limits, add a combustion chamber deposit limit, and modify the test procedures to align with the characteristics of reformulated gasoline formulations.	9/24/98 4/5/99 EO
Stationary source test methods Adopted amendments to stationary source test methods to align better with federal methods.	8/27/98 7/2/99 EO
Locomotive MOA for South Coast Memorandum of agreement (MOA) signed by ARB, U.S. EPA and major railroads to concentrate cleaner locomotives in the South Coast by 2010 and fulfill 1994 ozone SIP commitment.	7/2/98
Reformulated gasoline Approved amendments to rescind the wintertime oxygenate requirement, allow for sulfur content averaging, and make other minor technical amendments.	8/27/98
Gasoline vapor recovery Adopted amendments to certification and test methods to add methods for onboard refueling vapor recovery, airport refuelers, and underground tank interconnections, and make minor changes to existing methods.	5/21/98 8/27/98
Ethylene oxide sterilizers Adopted amendments to the ATCM to streamline source testing requirements, add EtO limits in water effluent from control devices, and make other minor changes.	5/21/98
Chrome platers Adopted amendments to ATCM to harmonize with requirements of federal NESHAP standards for chrome plating and chromic acid anodizing facilities.	5/21/98
On-road heavy-duty vehicles Approved amendments to align on-road heavy duty vehicle engine emission standards with EPA's 2004 standards and align certification, testing, maintenance, and durability requirements with those of U.S. EPA.	4/23/98 2/26/99 EO
Small off-road engines (SORE) Approved amendments to grant a one-year delay in implementation, relaxation of emissions standards for non-handheld engines, emissions durability requirements, averaging/banking/trading, harmonization with the federal diesel engine regulation, and modifications to the production line testing requirements.	3/26/98
Heavy duty vehicle smoke inspection program Adopted amendments to require annual smoke testing, set opacity limits, and exempt new vehicles from testing for the first four years.	12/11/97 3/2/98 EO
Consumer products (hairspray credit program) Adopted standards for the granting of tradable emission reduction credits achieved by sales of hairspray products having VOC contents less than required limits.	11/13/97
Light-duty vehicle off-cycle emissions Adopted standards to control excess emissions from aggressive driving and air conditioner use in light duty vehicles and added two light duty vehicle test methods for certification of new vehicles under these standards.	7/24/97 3/19/98 EO
Consumer products Adopted amendments to add VOC limits to 18 categories of consumer products used in residential and industrial cleaning, automobile maintenance, and commercial poisons.	7/24/97
Enhanced evaporative emissions standards Adopted amendments extending the compliance date for ultra-small volume vehicle manufacturers by one year.	5/22/97
Emission reduction credit program Adopted standards for District establishment of ERC programs including certification, banking, use limitation, and reporting requirements.	5/22/97
Lead as a toxic air contaminant Adopted an amendment to designate inorganic lead as a toxic air contaminant.	4/24/97
Consumer products (hair spray) Adopted amendments to (1) delay a January 1, 1998, compliance deadline to June 1, 1999, (2) require progress plans from manufacturers, and (3) authorize the Executive Officer to require VOC mitigation when granting variances from the June 1, 1999 deadline.	3/27/97

Board Action	Hearing Date
Portable engine registration program (PERP) Adopted standards for (1) the permitting of portable engines by ARB and (2) District recognition and enforcement of permits.	3/27/97
Liquefied petroleum gas Adopted amendments to extend the compliance deadline from January 1, 1997, to January 1, 1999, for the 5% propene limit in liquefied petroleum gas used in motor vehicles.	3/27/97
Onboard diagnostics, phase II Adopted amendments to extend the phase-in of enhanced catalyst monitoring, modify misfire detection requirements, add PVC system and thermostat monitoring requirements, and require manufacturers to sell diagnostic tools and service information to repair shops.	12/12/96
Consumer products Adopted amendments to delay 25% VOC compliance date for aerosol adhesives, clarify portions of the regulation, exempt perchloroethylene from VOC definition, extend the sell-through time to three years, and add perchloroethylene reporting requirements.	11/21/96
Consumer products (test method) Adopted an amendment to add Method 310 for the testing of VOC content in consumer products.	11/21/96
Pollutant transport designation Adopted amendments to modify transport couples from the Broader Sacramento area and add couples to the newly formed Mojave Desert and Salton Sea Air Basins.	11/21/96
Diesel fuel certification test methods Approved amendments specifying the test methods used for quantifying the constituents of diesel fuel.	10/24/96 6/4/97 EO
Wintertime requirements for utility engines & off-highway vehicles Optional hydrocarbon and NOx standards for snow throwers and ice augers, raising CO standard for specialty vehicles under 25hp.	9/26/96
Large off-road diesel Statement of Principles National agreement between ARB, U.S. EPA, and engine manufacturers to reduce emissions from heavy-duty off-road diesel equipment four years earlier than expected in the 1994 SIP for ozone.	9/13/96
Regulatory improvement initiative Rescinded two regulations relating to fuel testing in response to Executive Order W-127-95.	5/30/96
Zero emission vehicles Adopted amendments to eliminate zero emission vehicle quotas between 1998 and 2002, and approved MOUs with seven automobile manufacturers to accelerate release of lower emission "49 state" vehicles.	3/28/96 7/24/96 EO
CaRFG variance requirements Approved amendments to add a per gallon fee on non-compliant gasoline covered by a variance and to made administrative changes in variance processing and extension.	1/25/96 2/5/96 EO 4/2/96 EO
Utility and lawn and garden equipment engines Adopted an amendment to relax the CO standard from 300 to 350 ppm for Class I and II utility engines.	1/25/96
National security exemption of military tactical vehicles Such vehicles would not be required to adhere to exhaust emission standards.	12/14/95
CaRFG regulation amendments Approved amendments to allow for downstream addition of oxygenates and expansion of compliance options for gasoline formulation.	12/14/95
Required additives in gasoline (deposit control additives) Terms, definitions, reporting requirements, and test procedures for compliance are to be clarified.	11/16/95
CaRFG test method amendments Approved amendments to designate new test methods for benzene, aromatic hydrocarbon, olefin, and sulfur content of gasoline.	10/26/95
Motor vehicle inspection and maintenance program Handled by BAR.	10/19/95 by BAR
Antiperspirants and deodorants, consumer products, and aerosol coating products Ethanol exemption for all products, modifications to aerosol special requirements, modifications for regulatory language consistency, modifications to VOC definition.	9/28/95
Low emission vehicle (LEV III) standards Reactivity adjustment factors, introduction of medium-duty ULEVs, window labels, and certification requirements and test procedures for LEVs.	9/28/95

Board Action	Hearing Date
Medium- and heavy-duty gasoline trucks Expedited introduction of ultra-low emission medium-duty vehicles and lower NOx emission standards for heavy-duty gasoline trucks to fulfill a 1994 ozone SIP commitment.	9/1/95
Retrofit emission standards: all vehicle classes to be included in the alternate durability test plan, kit manufacturers to be allowed two years to validate deterioration factors under the test plan, update retrofit procedures allowing manufacturers to disable specific OBDs if justified by law.	7/27/95
Gasoline vapor recovery systems Adopts revised certification and test procedures.	6/29/95
Onboard refueling vapor recovery standards 1998 and subsequent MY engine cars, LD trucks, and MD trucks less than 8500 GVWR.	6/29/1995 4/24/96 EO
Heavy duty vehicle exhaust emission standards for NOx Amendments to standards and test procedures for 1985 and subsequent MY HD engines, amendments to emission control labels, amendments to Useful Life definition and HD engines and in-use vehicle recalls.	6/29/95
Aerosol coatings regulation Adopted regulation to meet California Clean Air Act requirements and a 1994 ozone SIP commitment.	3/23/95
Periodic smoke inspection program Delays start of PSIP from 1995 to 1996.	12/8/94
Onboard diagnostics phase II Amendments to clarify regulation language, ensure maximum effectiveness, and address manufacturer concerns regarding implementation.	12/8/94
Alternative control plan (ACP) for consumer products A voluntary, market-based VOC emissions cap upon a grouping of consumer products, flexible by manufacturer that will minimize overall costs of emission reduction methods and programs.	9/22/94
Diesel fuel certification: new specifications for diesel engine certification fuel, amended oxygen specification for CNG certification fuel, and amended commercial motor vehicle liquefied petroleum gas regulations.	9/22/94
Utility and lawn and garden equipment (UGLE) engines Modification to emission test procedures, ECLs, defects warranty, quality-audit testing, and new engine compliance testing.	7/28/94
Evaporative emissions standards and test procedures Adopted evaporative emissions standards for medium-duty vehicles.	2/10/94
Off-road recreational vehicles Adopted emission control regulations for off-road motorcycles, all-terrain vehicles, go-karts, golf carts, and specialty vehicles.	1/1/94
Perchloroethylene from dry cleaners Adopted measure to control perchloroethylene emissions from dry cleaning operations.	10/1/93
Wintertime oxygenate program Amendments to the control time period for San Luis Obispo County, exemption for small retailers bordering Nevada, flexibility in gasoline delivery time, calibration of ethanol blending equipment, gasoline oxygen content test method.	9/9/93
Onboard diagnostic phase II	7/9/93
Urban transit buses Amended regulation to tighten state NOx and particulate matter (PM) standards for urban transit buses beyond federal standards beginning in 1996.	6/10/93
1-year implementation delay in emission standards for utility engines	4/8/93
Non-ferrous metal melting Adopted Air Toxic Control Measure for emissions of cadmium, arsenic, and nickel from non-ferrous metal melting operations.	1/1/93
Certifications requirements for low emission passenger cars, light-duty trucks & medium duty vehicles	1/14/93
Airborne toxic control measure for emissions of toxic metals from non-ferrous metal melting	12/10/92
Periodic self-inspection program Implemented state law establishing a periodic smoke self-inspection program for fleets operating heavy-duty diesel-powered vehicles.	12/10/92
Notice of general public interest for consumer products	11/30/92
Substitute fuel or clean fuel incorporated test procedures	11/12/92

Board Action	Hearing Date
New vehicle testing using CaRFG Phase 2 gasoline Approved amendments to require the use of CaRFG Phase 2 gasoline in the certification of exhaust emissions in new vehicle testing.	8/13/92
Standards and test procedures for alternative fuel retrofit systems	5/14/92
Alternative motor vehicle fuel certification fuel specification	3/12/92
Heavy-duty off-road diesel engines Adopted the first exhaust emission standards and test procedures for heavy-duty off-road diesel engines beginning in 1996.	1/9/92
Consumer Products - Tier II Adopted Tier II of regulations to reduce emissions from consumer products.	1/9/92
Wintertime oxygen content of gasoline Adopted regulation requiring the addition of oxygenates to gasoline during winter to satisfy federal Clean Air Act mandates for CO nonattainment areas.	12/1/91
CaRFG Phase 2 Adopted CaRFG phase 2 specifications including lowering vapor pressure, reducing the sulfur, olefin, aromatic, and benzene content, and requiring the year-round addition of oxygenates to achieve reductions in ROG, NOx, CO, oxides of sulfur (SOx) and toxics.	11/1/91
Low emissions vehicles amendments revising reactivity adjust factor (RAF) provisions and adopting a RAF for M85 transitional low emission vehicles	11/14/91
Onboard diagnostic, phase II	11/12/91
Onboard diagnostics for light-duty trucks and light & medium-duty motor vehicles	9/12/91
Utility and lawn & garden equipment Adopted first off-road mobile source controls under the California Clean Air Act regulating utility, lawn and garden equipment.	12/1/90
Control for abrasive blasting	11/8/90
Roadside smoke inspections of heavy-duty vehicles Adopted regulations implementing state law requiring a roadside smoke inspection program for heavy-duty vehicles.	11/8/90
Consumer Products Tier I Adopted Tier I of standards to reduce emissions from consumer products.	10/11/90
CaRFG Phase I Adopted CaRFG Phase I reformulated gasoline regulations to phase-out leaded gasoline, reduce vapor pressure, and require deposit control additives.	9/1/90
Low-emission vehicle (LEV) and clean fuels Adopted the landmark LEV/clean fuel regulations which called for the gradual introduction of cleaner cars in California. The regulations also provided a mechanism to ensure the availability of alternative fuels when a certain number of alternative fuel vehicles are sold.	9/1/90
Evaporative emissions from vehicles Modified test procedure to include high temperatures (up to 105 F) and ensure that evaporative emission control systems function properly on hot days.	8/9/90
Dioxins from medical waste incinerators Adopted Airborne Toxic Control Measure to reduce dioxin emissions from medical waste incinerators.	7/1/90
CA Clean Air Act guidance for permitting Approved California Clean Air Act permitting program guidance for new and modified stationary sources in nonattainment areas.	7/1/90
Consumer products BAAQMD	6/14/90
Medium duty vehicle emission standards Adopted three new categories of low emission MDVs, required minimum percentages of production, and established production credit and trading.	6/14/90
Medium-duty vehicles Amended test procedures for medium-duty vehicles to require whole-vehicle testing instead of engine testing. This modification allowed enforcement of medium-duty vehicle standards through testing and recall.	6/14/90
Ethylene oxide sterilizers Adopted Airborne Toxic Control Measure to reduce ethylene oxide emissions from sterilizers and aerators.	5/10/90
Asbestos in serpentine rock Adopted Airborne Toxic Control Measure for asbestos-containing serpentine rock in surfacing applications.	4/1/90

Board Action	Hearing Date
Certification procedure for aftermarket parts	2/8/90
Antiperspirants and deodorants Adopted first consumer products regulation, setting standards for antiperspirants and deodorants.	11/1/89
Residential woodstoves Approved suggested control measure for the control of emissions from residential wood combustion.	11/1/89
On-Board Diagnostic Systems II Adopted regulations to implement the second phase of on-board diagnostic requirements which alert drivers of cars, light-trucks and medium-duty vehicles when the emission control system is not functioning properly.	9/1/89
Cars and light-duty trucks Adopted regulations to reduce ROG and CO emissions from cars and light trucks by 35 percent.	6/1/89
Architectural coatings Approved a suggested control measure to reduce ROG emissions from architectural coatings.	5/1/89
Chrome from cooling towers Adopted Airborne Toxic Control Measure to reduce hexavalent chromium emissions from cooling towers.	3/1/89
Reformulated Diesel Fuel Adopted regulations requiring the use of clean diesel fuel with lower sulfur and aromatic hydrocarbons beginning in 1993.	11/1/88
Vehicle Recall Adopted regulations implementing a recall program which requires auto manufacturers to recall and fix vehicles with inadequate emission control systems (Vehicles are identified through in-use testing conducted by the ARB).	9/1/88
Suggested control measure for oil sumps Approved a suggested control measure to reduce emissions from sumps used in oil production operations.	8/1/88
Chrome platers Adopted Airborne Toxic Control Measure to reduce emissions of hexavalent chromium emissions from chrome plating and chromic acid anodizing facilities.	2/1/88
Suggested control measure for boilers Approved suggested control measure to reduce NOx emissions from industrial, institutional, and commercial boilers, steam generators and process heaters.	9/1/87
Benzene from service stations Adopted Airborne Toxic Control Measure to reduce benzene emissions from retail gasoline service stations (Also known as Phase II vapor recovery).	7/1/87
Agricultural burning guidelines Amended existing guidelines to add provisions addressing wildland vegetation management.	11/1/86
Heavy-duty vehicle certification Amended certification of heavy-duty diesel and gasoline-powered engines and vehicles to align with federal standards.	4/1/86
Cars and light-duty trucks Adopted regulations reducing NOx emissions from passenger cars and light-duty trucks by 40 percent.	4/1/86
Sulfur in diesel fuel Removed exemption for small volume diesel fuel refiners.	6/1/85
On-Board Diagnostics I Adopted regulations requiring the use of on-board diagnostic systems on gasoline-powered vehicles to alert the driver when the emission control system is not functioning properly.	4/1/85
Suggested control measure for wood coatings Approved a suggested control measure to reduce emissions from wood furniture and cabinet coating operations.	3/1/85
Suggested control measure for resin manufacturing Approved a suggested control measure to reduce ROG emissions from resin manufacturing.	1/1/85

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APPENDIX VI-D

GENERAL CONFORMITY
AND TRANSPORTATION CONFORMITY BUDGET

JANUARY 2017

General Conformity Budget

U.S. EPA's General Conformity rule (40 CFR part 93, Subpart B, and 40 CFR Part 51, Subpart W, as adopted by reference in SCAQMD Rule 1901, September 1994) establishes an applicability test for determining which Federal actions are subject to the conformity requirement for the nonattainment or maintenance areas. If a proposed action results in emission increases which are less than the de minimis thresholds for the relevant pollutants or precursors, no conformity determination needs to be made. If the emissions from a proposed action exceed the de minimis threshold for any given pollutant (or precursor) for which the area is designated as maintenance or in nonattainment, the Federal agency must make a positive conformity determination for that pollutant(s) on the basis of one of the criteria listed in 40 CFR 93.158 before the project can proceed. The conformity determination must demonstrate that the emissions from the proposed project are accounted for in the most recently approved SIP. The South Coast Air Basin is designated as an "extreme" nonattainment area for ozone and as a nonattainment area for PM2.5. The general conformity de minimis thresholds are 10 tons per year of VOC and 10 tons per year of NOx for the "extreme" ozone nonattainment areas; and 70 tons per year of PM2.5 and the applicable precursors for the "serious" PM2.5 nonattainment areas.

To streamline the review process and to facilitate the conformity determination, two separate VOC and NOx general conformity budgets were established in the 2012 AQMP, which were 1 ton per day (tpd) of NOx and 0.2 tpd of VOC, for every year from 2013 to 2030. This set-aside account was revised in the 2016 AQMP based on economic growth projections and the number of potential projects planned to take place in near future years. The SIP set-aside account include three subjects. They are VOC emissions from phase-out of toxics, SIP reserve for potential technology assessments and general conformity. The general conformity account was re-evaluated in the 2016 AQMP based on expected growth and the number of projects that are planned to take place in near future years. The revised set-aside budgets to accommodate projects subject to general conformity determination are: 2.0 tpd of NOx and 0.5 tpd of VOC each year from 2017 to 2030, and then reduced to 0.5 tpd of NOx and 0.2 tpd of VOC in 2031. Emissions from general conformity projects will be tracked by the District tracking system and be debited from this set-aside on a first-come-first-serve basis. Any unused portion cannot be carried forward to the following year. For those projects that come in after the conformity budget is exhausted, the corresponding federal agency will have to go through the regular general conformity determination process to demonstrate that these emissions are accounted for in the SIP. The set-aside accounts will be revised and updated via future AQMP/SIP revisions. Details of this set-aside account and the list of projects that were accommodated under this set-aside account are provided in Appendix III.

Transportation Conformity Budget

Background

Section 176(c) of the Federal Clean Air Act (CAA) establishes transportation conformity requirements which are intended to ensure that transportation activities do not interfere with air quality progress. The CAA requires that transportation plans, programs, and projects that obtain federal funds or approvals be consistent with, or *conform to* applicable state implementation plans (SIP) before being approved by a Metropolitan Planning Organization (MPO). Conformity to the SIP means that proposed transportation activities must not:

(1) Cause or contribute to any new violation of any standard,
(2) Increase the frequency or severity of any existing violation of any standard in any area, or
(3) Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

A SIP analyzes the region's total emissions inventory from all sources necessary to demonstrate reasonable further progress (RFP), attainment, or maintenance of the National Ambient Air Quality Standards (NAAQS). The portion of the total emissions inventory from on-road highway and transit vehicles which provides RFP and attainment of the NAAQS in these analyses becomes the "motor vehicle emissions budget."[1] Motor vehicle emissions budgets are the mechanism for ensuring that transportation planning activities conform to the SIP. Budgets are set for each criteria pollutant or its precursors that the area does not attain and it is set for each RFP milestone year and the attainment year.

Requirements for Demonstrating Conformity

The Southern California Association of Governments (SCAG), the MPO in Southern California, prepares a long range regional transportation plan (RTP) at least every four years and a short range funding program, or regional transportation improvement program (RTIP), every two years. Contents of both the RTP and RTIP are specified in federal transportation law found at Titles 23 and 49 of the federal code of regulations and applicable sections of state transportation planning law.

Before adopting the RTP/RTIP, SCAG prepares a regional emissions analysis using the proposed plan and program as specified in the federal conformity regulation and compares those emissions to the emission budgets in the SIP. The MPO may determine the RTP/RTIP conforms if the emissions from the proposed actions are less than the emissions budgets in the SIP. The conformity determination also signifies that

[1] Federal transportation conformity regulations are found in 40 CFR Part 51, subpart T – Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. of the Federal Transit Laws. Part 93, subpart A of this chapter was revised by the EPA in the August 15, 1997 Federal Register.

the MPO has met other transportation conformity requirements such as interagency consultation and financial constraint.

Conformity Budgets in the 2016 AQMP

The 2016 AQMP establishes transportation conformity emissions budgets for ozone in the South Coast Air Basin and the Coachella Valley. The AQMP also establishes conformity budgets and emissions trading mechanisms for both the annual and 24-hour PM2.5 nonattainment areas in the South Coast Air Basin. The emissions budgets presented below use EMFAC2014 with SCAG modeled VMT and speed distributions. The VMT and speed distribution data are from the 2016 RTP/SCS adopted by SCAG in April 2016. Air Resources Board (ARB) staff released a revised emission rate program, EMFAC2014, which updates the emission rates and planning assumptions used in calculating conformity budgets. EMFAC2014 was approved for use in SIPs and transportation conformity by U.S. EPA on December 14, 2015.

Calculation Methodology

All the budgets in this plan have been constructed in consultation with SCAG and U.S. EPA using emissions for a summer average day consistent with the ozone attainment and progress demonstrations, and average annual emissions for the PM2.5 budgets consistent with the progress and attainment demonstrations for the annual and 24-hour PM2.5 standards, using the following method[2]:

1) Calculate the on-road motor vehicle emissions totals for the appropriate pollutants (VOC, NOx and PM2.5) from EMFAC2014.
2) For the PM2.5 budgets, obtain the re-entrained paved road dust, re-entrained unpaved road dust and road construction dust emissions from the planning inventory which can be found in the Appendix III of the 2016 AQMP.
3) Sum each pollutant and round each total up to the nearest ton for VOC, NOx and PM2.5.

Tables VI-D-1 through VI-D-4 below contain the emissions budgets for the South Coast Air Basin and the Coachella Valley.

[2] ARB and SCAQMD use the same vehicle activity data. The minor variations in emissions result from slight differences in the methodology used to allocate SCAG activity by the vehicle classes used in the EMFAC model.

Table VI-D-1. Transportation Conformity Budgets* for the 2008 8-hour Ozone standard in the South Coast Air Basin

South Coast Air Basin (tons per summer day)	2018		2021		2024		2027		2030		2031	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
Baseline Emissions	92.97	168.93	75.13	127.58	64.27	84.79	57.22	74.13	51.49	67.48	49.49	65.73
Total	92.97	168.93	75.13	127.58	64.27	84.79	57.22	74.13	51.49	67.48	49.49	65.73
Conformity Budget	**93**	**169**	**76**	**128**	**65**	**85**	**58**	**75**	**52**	**68**	**50**	**66**

*Budgets calculated with EMFAC2014 using SCAG 2016 RTP activity. Budgets are rounded up to the nearest ton.

Table VI-D-2. Transportation Conformity Budgets* for the 2008 8-hour Ozone standard in the Coachella Valley

Coachella Valley (tons per summer day)	2018		2021		2024		2026	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
Baseline Emissions	4.24	9.98	3.46	7.47	3.10	4.37	2.93	4.12
Total	4.24	9.98	3.46	7.47	3.10	4.37	2.93	4.12
Conformity Budget	**5**	**10**	**4**	**8**	**4**	**5**	**3**	**5**

*Budgets calculated with EMFAC2014 using SCAG 2016 RTP activity. Budgets are rounded up to the nearest ton.

Table VI-D-3. Transportation Conformity Budgets* for the 2012 Annual PM2.5 standard in the South Coast Air Basin

South Coast Air Basin Tons per Annual Day	**2019**			**2022**			**2025**			**2028**		
	VOC	**NOx**	**PM2.5**	**VOC**	**NOx**	**PM2.5**	**VOC**	**NOx**	**PM2.5**	**VOC**	**NOx**	**PM2.5**
Baseline Emissions: Exhaust, Tire and Brake Wear	82.52	168.13	10.82	68.22	126.26	10.25	58.51	86.26	10.05	52.68	76.28	10.00
Paved Road Dust			8.15			8.38			8.53			8.63
Unpaved Road Dust			0.59			0.59			0.59			0.58
Road Construction Dust			0.25			0.27			0.28			0.29
Total	82.52	168.13	19.81	68.22	126.26	19.48	58.51	86.26	19.44	52.68	76.28	19.50
Conformity Budget	**83**	**169**	**20**	**69**	**127**	**20**	**59**	**87**	**20**	**53**	**77**	**20**

*Budgets calculated with EMFAC2014 using SCAG 2016 RTP activity. Budgets are rounded up to the nearest ton. **Bold** figures indicate a budget number. Paved, unpaved and road construction dust are from the planning inventory in the Appendix III of the 2016 AQMP

Emissions Trading Mechanism for the 1997 Annual PM2.5 Standard

This Plan continues the emissions trading mechanism established by the 2007 AQMP as revised in 2011. That trading mechanism established per Section 93.124 of the conformity regulations allow transportation

conformity analyses using these budgets in analysis years beyond 2014, to use future decreases in NOx emissions from on-road mobile sources to offset any on-road increases in PM2.5 using a NOx:PM2.5 ratio of 10:1. This trading mechanism will only be used, if needed, for conformity analyses for years after 2014. To ensure that the trading mechanism does not impact the ability to meet the NOx budget, the NOx emission reductions available to supplement the PM2.5 budget shall only be those remaining after the 2014 NOx budget has been met. Clear documentation of the calculations used in the trading should be included in the conformity analysis. This trading mechanism was approved by U.S. EPA on November 9, 2011. (See 76 Fed. Register 69928).

Table VI-D-4. Transportation Conformity Budgets* for the 2006 24-hour PM2.5 standard in the South Coast Air Basin

South Coast Air Basin Tons per Annual Day	2017			2019			2020		
	ROG	NOx	PM2.5	ROG	NOx	PM2.5	ROG	NOx	PM2.5
Baseline Emissions: Exhaust, Tire and Brake Wear	98.55	199.09	11.19	82.52	168.13	10.82	76.27	151.64	10.52
Paved Road Dust			8.02			8.15			8.22
Unpaved Road Dust			0.59			0.59			0.59
Road Construction Dust			0.23			0.25			0.26
Total	98.55	199.09	20.03	82.52	168.13	19.81	76.27	151.64	19.59
Conformity Budget	**99**	**200**	**21**	**83**	**169**	**20**	**77**	**152**	**20**

*Budgets calculated with EMFAC2014 using SCAG 2016 RTP activity. Budgets are rounded up to the nearest ton. **Bold** figures indicate a budget number. Paved, unpaved and road construction dust are from the planning inventory in the Appendix III of the 2016 AQMP

Emissions Trading Mechanism for the 24-hour PM2.5 Standard

The emissions trading mechanism for the 24-hour standard is not being revised in this plan from what was submitted in the Final 2012 AQMP. The trading mechanism in the 2012 AQMP established the approximate weighting ratios of the precursor emissions for 24-hour PM2.5 formation in equivalent tons per day of NOx as: VOC: 0.3 (reducing one ton of VOC is equivalent to reducing 0.3 ton of NOx), NOx: 1.0, and PM2.5: 14.8 (i.e., reducing one ton of PM2.5 is equivalent to reducing 14.8 tons of NOx). This mechanism allows emissions below the budget for one pollutant to be used to supplement another pollutant exceeding the budget based on the ratios established above. Clear documentation of the calculations used in the trading should be included in the conformity analysis.

As outlined in the 2012 AQMP, this trading approach is consistent with what U.S. EPA approved in 2011, and uses the basic trading ratios defined by the 24-hour PM2.5 regional modeling attainment

demonstration. Briefly, NOx emissions reductions are scaled to the reduction of Basin ammonium nitrate (including water bonding). Similarly, reductions of VOC are scaled to changes in the organic carbon species while reductions in directly emitted particulates are scaled to the projected changes in the elemental carbon and "others" portions of the PM2.5 mass. Table 6-7 from the 2012 AQMP is reproduced below as Table VI-D-5 and summarizes the trading equivalencies in TPD.

Table VI-D-5. Trading Equivalencies for 24-hour PM2.5 Motor Vehicle Emissions Budgets*.

One Ton of:	Is Equivelent in terms of PM2.5 Formation to this many tons of:		
	NOx	**VOC**	**PM2.5**
NOx	1	3.151	0.067
VOC	0.317	1	0.021
PM2.5	14.833	46.792	1

*Table is from Table 6-7 in the 2012 AQMP

An example of how the trading mechanism would work follows; if the amount of NOx calculated exceeds the budget by 0.75 TPD, then that overage could be offset by trading 2.36 TPD of excess VOC emissions reductions (e.g., 3.151 VOC/1 ton of NOx × 0.75 TPD NOx required = 2.36 TPD VOC). In this case, "excess" VOC emission reductions would be those beyond what are needed to meet the VOC budget. Similarly 0.050 TPD of directly emitted PM2.5 emissions below the budgeted amount could also be traded to the NOx emissions category and subtracted from the NOx total to allow NOx to meet its budget. In other words, the trading mechanism can be multi-pollutant and multi-directional. It should be noted that the trading calculations are performed prior to the final rounding to demonstrate conformity with the budgets.

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APPENDIX VI-E

VMT OFFSET DEMONSTRATION

JANUARY 2017

Background

In 1979, U.S. EPA established a primary health-based national ambient air quality standard (NAAQS) for ozone at 0.12 parts per million (ppm) averaged over a 1-hour period. See 44 Fed.Reg. 8220 (February 9, 1979). The Clean Air Act (CAA), as amended in 1990, classified areas that had not yet attained that standard, based on the severity of their ozone problem, ranging from "marginal" to "extreme." "Extreme" areas were provided the most time to attain, until November 15, 2010, but were also subject to the most stringent requirements. In particular, "severe" and "extreme" areas were subject to CAA Section 182(d)(1)(A), which requires state implementation plans to adopt "specific enforceable transportation control strategies and transportation control measures to offset any growth in vehicle miles traveled (VMT) or numbers of vehicle trips in such area…." U.S. EPA designated the South Coast Air Basin as "extreme" on November 6, 1991 (56 Fed.Reg. 56694), and thus the South Coast Air Basin was subject to this requirement. The U.S. EPA has historically interpreted this provision of the CAA (now called "VMT emissions offset requirement") to allow areas to meet the requirement by demonstrating that emissions from motor vehicles decline each year through the attainment year. See, e.g., 57Fed.Reg. 13498, at 13521–13523 (April 16, 1992).

In 1997, U.S. EPA replaced the 1-hour ozone standard with an 8-hour standard of 0.08 ppm [62 Fed.Reg. 38856 (July 18, 1997)]. The U.S. EPA promulgated rules implementing this standard with the "Phase 1" rule issued on April 30, 2004 (69 Fed.Reg. 23951), and the Phase 2 rule issued on November 29, 2005 (70 Fed. Reg. 71612). These implementation rules required that areas classified as "severe" or "extreme" under the 1997 8-hour standard would also be subject to the VMT offset requirement.

2008 Ozone Standard

In 2008, U.S. EPA revised the 8-hour ozone NAAQS to a level of 0.075 parts per million. (73 Fed.Reg 16436, March 27, 2008). The South Coast Air Basin was subsequently designated non-attainment for the 2008 standard on May 21, 2012 and classified as an extreme non-attainment area (77 Fed.Reg 30087), making the South Coast Air Basin subject to the requirements of CAA Section 182(d)(1)(A) for the 2008 8-hour ozone NAAQS.

U.S. EPA Guidance ON VMT Offset Requirement

In August 2012, U.S. EPA issued guidance titled "Implementing Clean Air Act Section 182(d)(1)(A): Transportation Control Measures and Transportation Control Strategies to Offset Growth in Emissions Due to Growth in Vehicle Miles Travelled." Among other things, U.S. EPA's guidance points out that subsequent court decisions regarding previous VMT offset demonstrations omitted any reference to "transportation control strategies" (TCS). TCSs, which are not defined in the CAA or U.S. EPA regulation, are eligible to offset growth in emissions due to growth in VMT. The U.S. EPA's new guidance indicates that technology improvements such as vehicle technology improvements, motor vehicle fuels, and other control strategies that are transportation-related could be used to offset increases in emissions due to

VMT. U.S. EPA's revised guidance sets forth a method of calculating the actual growth in emissions due to growth in VMT. Essentially, the state compares projected attainment year emissions assuming no new control measures and no VMT growth with projected actual attainment year emissions (including new control measures and VMT growth). If the latter number is smaller than the former, no additional transportation control measures or strategies are required. If additional transportation control measures and transportation control strategies are required, they should be clearly identified and distinguished from the measures included in the initial calculations for the base year and the three scenarios identified for the attainment year.

In addition, the guidance recommends that the base year used in the demonstration is the base year used in the attainment demonstration for the ozone standard. To address U.S. EPA's guidance, 2012 is used in this demonstration as the base year for the 2008 8-hour standard and for the 1979 1-hour standard. Consistent with U.S. EPA guidance, emissions of VOC are used to determine compliance with the VMT offset requirement.

Transportation Control Strategies and Transportation Control Measures

The Clean Air Act [CAA §182(d)(1)(A)] differentiates between transportation control strategies (TCS) and transportation control measures (TCM), and thus provides for a wide range of strategies and measures as options to offset growth in emissions from VMT growth. In addition, the example TCMs listed in Section 108(f)(1)(A) of the CAA include measures that reduce emissions by reducing VMT, reducing tailpipe emissions, and removing dirtier vehicles from the fleet. California's motor vehicle control program includes a variety of strategies and measures including new engine standards and in-use programs (e.g., smog check, vehicle scrap, fleet rules, idling restrictions). TCMs developed by SCAG provide additional reductions. In addition, SCAG prepares a report every two years that reports on the status of implementation of TCMs.

Based on the provisions in Section 182(d)(1)(A) and the clarifications provided in the U.S. EPA guidance, any combination of transportation control strategies and TCMs may be used to meet the requirement to offset growth in emissions resulting from VMT growth. Since 1990 when this requirement was established, California has adopted more than sufficient enforceable transportation strategies and measures to meet the requirement to offset the growth in emissions from VMT growth. For the 2008 8-hour standard offset demonstration, 2012 controls are used as the base case control level since 2012 is the base year of the SIP.

A list of the State's mobile source control program adopted since 1990 is provided in Attachment VI-E-1. In addition, a list of TCMs implemented in the South Coast Air Basin is provided in Attachment VI-E-2.

Emissions Due to VMT Growth

As discussed above, the U.S. EPA guidance provides a recommended calculation methodology to determine if sufficient transportation control strategies and TCMs have been adopted and implemented to offset the growth in emissions due solely to growth in VMT. As such, any increase in emissions solely from VMT increases in the future attainment year from the base year (assuming that there are no further motor vehicle control programs implemented after the base year) would need to be offset. In addition, a calculation is needed to show the emission levels if VMT had remained constant from the base year to the future attainment year. As discussed earlier, a comparison of the projected attainment year emissions assuming no new control measures and no VMT growth with projected actual attainment year emissions (including new control measures and VMT growth) is made. If the latter number is smaller than the former, no additional transportation control measures or strategies would be required.

Methodology

The following calculations are based on the U.S. EPA guidance recommended calculation methodology. As shown for the 8-hour ozone standard, 2012 is the base year used for the attainment demonstration and 2031 is the attainment year. For the 1-hour ozone national ambient air quality standard demonstration, 2012 serves as the base year and 2022 is the projected attainment year.

Analysis Tool

This analysis uses California's approved motor vehicle emissions model, EMFAC2014.

The EMFAC model estimates the emissions from two combustion processes: running exhaust and start exhaust, and four evaporative processes: hot soak, running losses, diurnal, and resting losses.

Emissions from running exhaust, start exhaust, hot soak, and running losses are a function of how much a vehicle is driven. Emissions from these processes are directly related to VMT, trips, and vehicle starts. These processes are included in the calculation of the emissions levels used in the VMT offset demonstration. Emissions from resting loss and diurnal loss processes are not related to VMT, trips or vehicle starts and are not included in the analysis because these emissions occur regardless if the vehicle makes a trip (i.e., a start) or not.

EMFAC combines trip-based VMT from the regional transportation planning agencies, starts data based on household travel surveys, and vehicle population data from the Department of Motor Vehicles with corresponding emission rates to calculate emissions.[1]

[1] More information on data sources can be found in the EMFAC technical document which is located on the web at: http://www.arb.ca.gov/msei/emfac2011-technical-documentation-final-updated-0712-v03.pdf

With the EMFAC model, the calculation of emissions growth and whether it is offset is simplified to a comparison of future year emissions with "no growth" in VMT or new control strategies to future emissions with VMT growth and new control strategies. This follows U.S. EPA's 2012 guidance and is consistent with the court's interpretation of CAA section 182(d)(1)(A).

The following text and tables show the steps taken for the analysis of the emission calculations.

Analysis Using 2012 as the Base Year for the 2008 8-hour Ozone Standard with Attainment Year of 2031.

Step 1. Provide the emissions level for the base year.

The following table shows the VOC emissions, VMT, starts, and vehicle population for calendar year 2012 from the EMFAC2014 model.

Summary of 2012 Base Year – South Coast Air Basin

	VMT (thousand miles/day)	Starts (thousands/day)	Vehicle Population (thousands)	VOC Emissions* (tons/day)
2012 Base Year	380,248	69,789	11,123	138

* Does not include diurnal or resting loss emissions.

Step 2. Calculate three emissions levels in the attainment year.

For the attainment year,

(1) Calculate emissions level with the motor vehicle control program frozen at 2012 levels and with projected VMT, starts, and vehicle population for the attainment year. This represents what the emissions in the attainment year would have been if transportation control strategies and TCMs had not been implemented after 2012;

(2) Calculate emissions level with the motor vehicle control program frozen at 2012 levels and assuming VMT, starts, and vehicle population do not increase from 2012 levels; and

(3) Calculate an emissions level that represents emissions with full implementation of all transportation control strategies and TCMs since 2012 and which represents the projected future year baseline emissions inventory using the VMT, starts, and vehicle population for the attainment year.

***Calculation 1*. Calculate the emissions in the attainment year assuming no new measures since the base year, and including growth in VMT, starts, and vehicle population.**

To perform this calculation, California Air Resources Board (CARB) staff identified the on-road motor vehicle control programs adopted since 2012 and adjusted EMFAC2014 to reflect the VOC emissions levels in 2031 without the benefits of the post-2012 control programs. The projected VOC emissions are 64 tons/day.

Calculation 2. Calculate the emissions with no growth in VMT, starts, or vehicle population.

In this calculation, the VOC emission levels in 2031 without benefit of the post-2012 control program are calculated. EMFAC2014 allows a user to input different VMT, starts, and vehicle population than the default values. For this calculation, EMFAC2014 was run without the benefit of the post-2012 control program for the year 2031 with the 2012 level of VMT of 380,247,973 miles per day, the 2012 level of starts at 69,788,908 per day, and the 2012 level of population at 11,122,867 vehicles. The VOC emissions associated with 2012 VMT, starts, and vehicle population in calendar year 2031 are 61 tons/day.

Calculation 3. Calculate emission reductions with full Implementation of Transportation Control Strategies & TCMs.

The VOC emission levels for 2031 assuming the benefits of the post-2012 motor vehicle control program and the projected VMT, starts, and vehicle population in 2031 are calculated using EMFAC2014. The projected VOC emissions level is 40 tons/day. VOC emissions for the three sets of calculations described above are summarized in the following table.

Summary of 2031 Attainment Year Emissions Levels in the South Coast Air Basin

	Description	VMT* (miles/day, thousands)	Starts (thousands/day)	Vehicle Population (thousands)	VOC Emissions** (tons/day)
(1)	**Emissions with Motor Vehicle Control Program Frozen at 2012 Levels.** (VMT, starts and vehicle population at 2031 levels.)	408,964	78,894	12,742	64
(2)	**Emissions with Motor Vehicle Control Program Frozen at 2012 Levels.** (VMT, starts, and vehicle population at 2012 levels)	380,248	69,789	11,123	61
(3)	**Emissions with Full Motor Vehicle Control Program in Place** (VMT, starts and vehicle population at 2031 levels)	408,964	78,894	12,742	40

* CY 2031 VMT based on the SCAG 2016 RTP

** Does not include diurnal or resting loss emissions.

As provided in the U.S. EPA guidance, to determine compliance with the provisions of Section 182(d)(1)(A) of the federal Clean Air Act, the emissions levels calculated in Calculation 3 should be less than the emissions levels in Calculation 2:

VOC: 40 < 61 tons/day

Analysis Using 2012 as the Base Year for the 1-hour Ozone Standard with Attainment Year of 2022.

Step 1. Provide the emissions levels for the base year.

The following table shows the VOC emissions, VMT, starts, and vehicle population for calendar year 2012 from the EMFAC2014 model.

Summary of 2012 Base Year

	VMT (thousand miles/day)	Starts (thousands/ day)	Vehicle Population (thousands)	VOC Emissions (tons/day)
2012 Base Year	380,248	69,789	11,123	138

Step 2. Calculate three emissions levels in the attainment year.

For the attainment year,

(1) Calculate emissions level with the motor vehicle control program frozen at 2012 levels and with projected VMT, starts, and vehicle population for the attainment year. This represents what the emissions in the attainment year would have been if transportation control strategies and TCMs had not been implemented after 2012;

(2) Calculate emissions level with the motor vehicle control program frozen at 2012 levels and assuming VMT, starts, and vehicle population do not increase from 2012 levels; and

(3) Calculate an emissions level that represents emissions with full implementation of all transportation control strategies and TCMs since 2012 and which represents the projected future year baseline emissions inventory using the VMT, starts, and vehicle population for the attainment year.

Calculation 1. Calculate the emissions in the attainment year assuming no new measures since the base year, and including growth in VMT, starts, and vehicle population.

To perform this calculation, staff identified the on-road motor vehicle control programs adopted since 2012 and adjusted the EMFAC2014 model to reflect the VOC emissions levels in 2022 without the benefits of the post-2012 control programs. The projected VOC emissions are 83 tons per day.

Calculation 2. Calculate the emissions with no growth in VMT, starts, or vehicle population.

EMFAC2011 allows the user to input different VMT, starts, and vehicle population than default. As such, for this calculation, the EMFAC2011 model was run without the benefit of the post-2012 control program for calendar year 2022 with the 2012 level of VMT of 404,315,909 miles per day, the 2012 level of starts at 69,788,908 per day, and the 2012 level of population at 11,122,867. The VOC emissions associated with 2012 VMT, starts, and vehicle population are 79 tons/day.

Calculation 3. Calculate emission reductions with full implementation of Transportation Control Strategies and TCMs.

The VOC emission levels for 2022 assuming the benefits of the post-2012 motor vehicle control program and the projected VMT, starts, and vehicle population in 2022 are calculated using EMFAC2014. The projected VOC emissions level is 58 tons/day. VOC emissions for the three sets of calculations described above are provided in the following table.

Summary of 2022 Attainment Year Emissions Levels

	Description	VMT* (miles/day, thousands)	Starts (thousands/ day)	Vehicle Population (thousands)	VOC Emissions** (tons/day)
(1)	**Emissions with Motor Vehicle Control Program Frozen at 2012 Levels.** (VMT, starts, and vehicle population at 2022 levels.)	404,316	72,244	11,603	83
(2)	**Emissions with Motor Vehicle Control Program Frozen at 2012 Levels.** (VMT, starts, and vehicle population at 2012 Levels)	380,248	69,789	11,123	79
(3)	**Emissions with Full Motor Vehicle Control Program in Place** (VMT, starts, and vehicle population at 2022 Levels)	404,316	72,244	11,603	58

* CY 2022 VMT based on SCAG 2016 Regional Transportation Plan/SCS
** Does not include resting or diurnal loss emissions.

As provided in the U.S. EPA guidance, to determine compliance with the provisions of Section 182(d)(1)(A) of the federal Clean Air Act, the emissions levels calculated in Calculation 3 should be less than the emissions levels in Calculation 2:

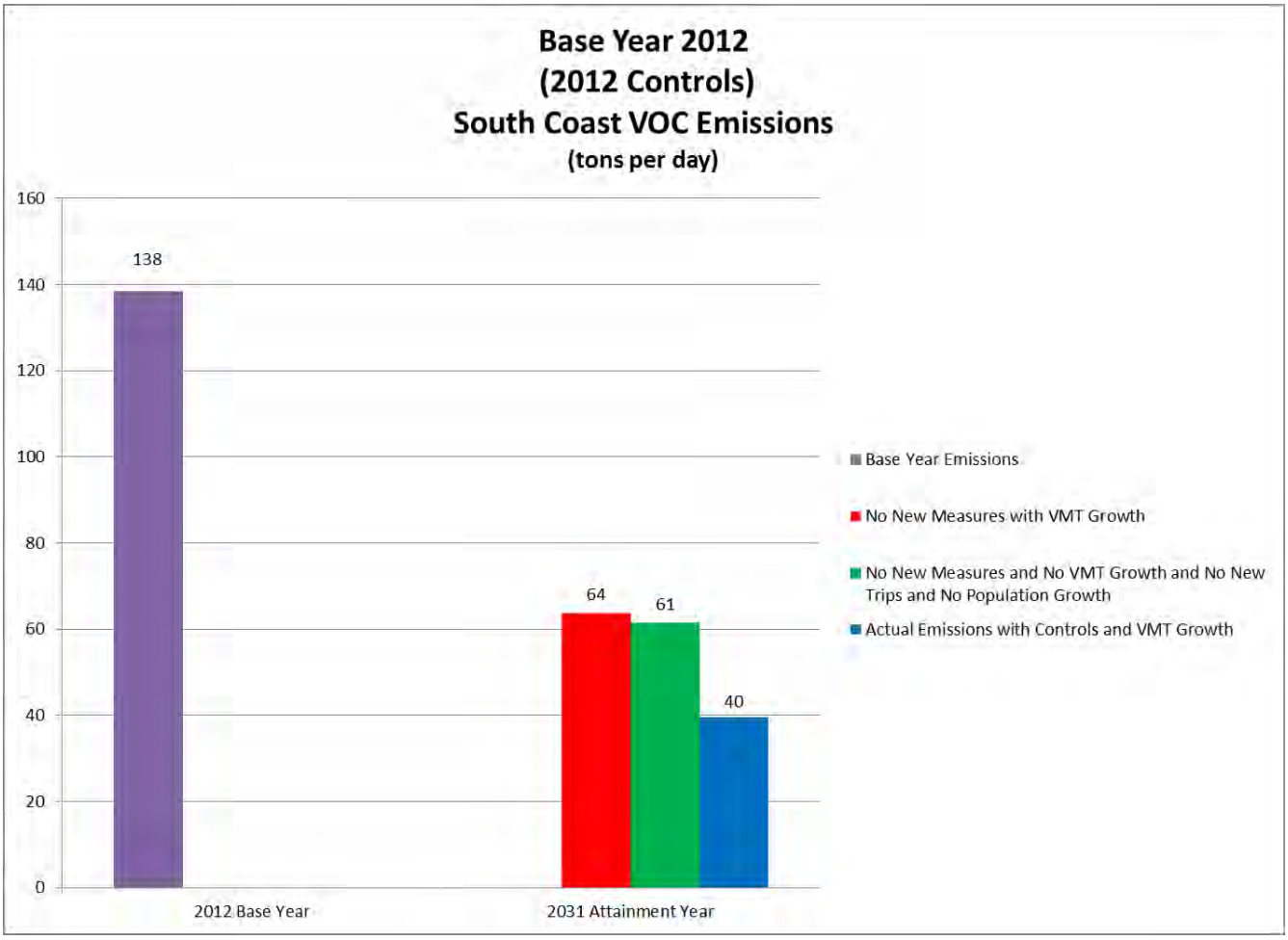
VOC: 58 < 79 tons/day

Summary

The previous sections provide an analysis to demonstrate compliance with the provisions of Section 182(d)(1)(A) of the federal Clean Air Act. To further illustrate the demonstration, Figure VI-E-1 shows graphically the emissions benefits of the motor vehicle control programs in offsetting VOC emissions due to increased VMT, starts, and vehicle population in the South Coast Air Basin for the 2008 8-hour ozone standard (2012 base year). The left bar (in purple) shows the emissions in the base year with base year controls. The three bars on the right show the emissions levels in the attainment year for the three calculations identified above: the red bar shows attainment year emissions with base year controls and attainment year VMT, starts, and vehicle population, the green bar shows attainment year emissions with base year controls, VMT, starts, and vehicle population, and the blue bar shows attainment year emissions with attainment year controls, VMT, starts, and vehicle population. Based on the U.S. EPA guidance, if the actual emission projected with controls and VMT growth (blue bar) is lower than the projected emission with no new measure, no VMT growth, no new trips and no population growth (green bar), then the identified transportation control strategies and TCMs are sufficient to offset the growth in emissions.

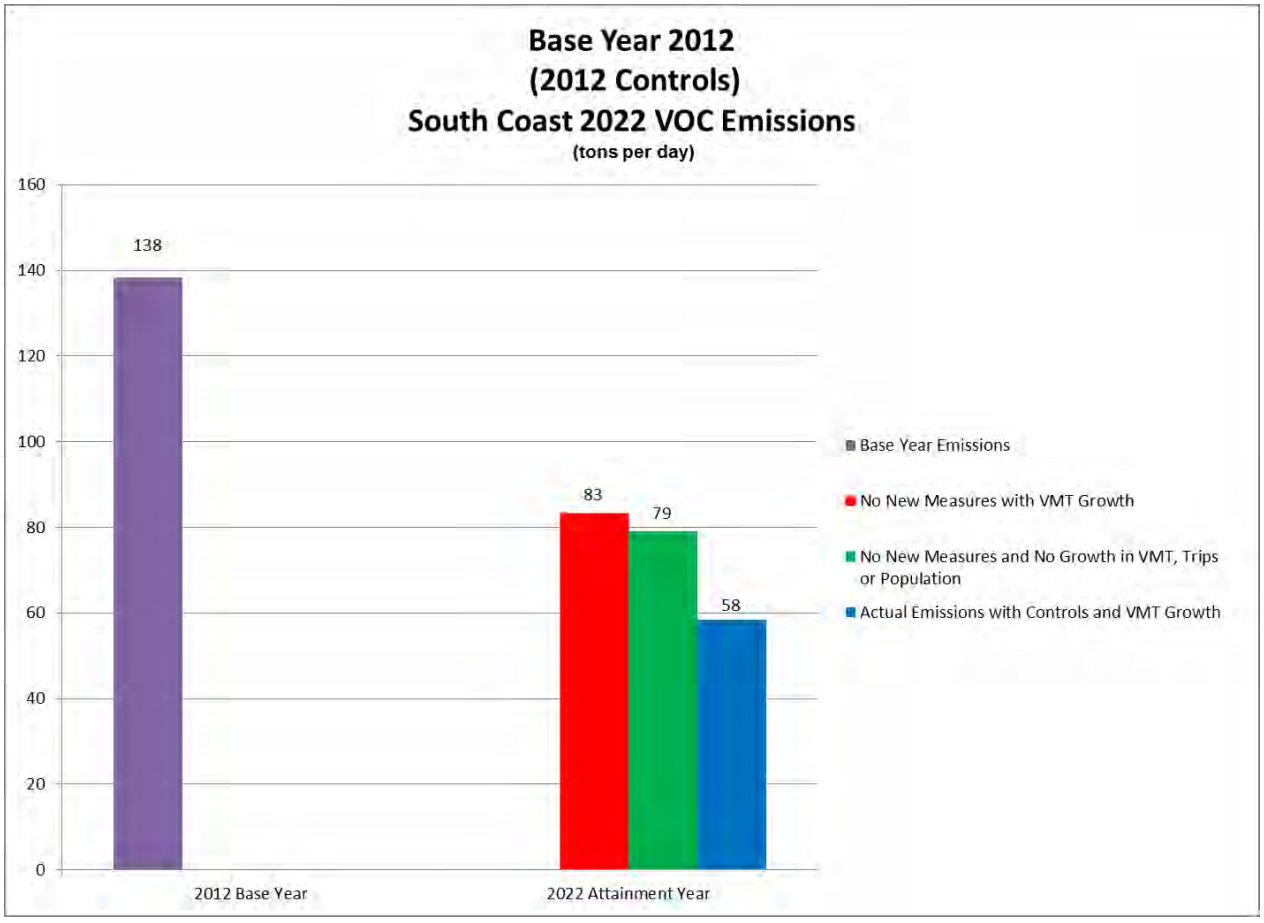
Figure VI-E-2 below shows graphically the emissions benefits of the motor vehicle control programs in offsetting VOC emissions due to increased VMT, starts, and vehicle population in the South Coast Air Basin for the 1-hour ozone standard (1990 base year). The left bar (in purple) shows the emissions in the base year with base year controls. The three bars on the right show the emissions levels in the attainment year for the three calculations identified above: the red bar shows attainment year emissions with base year controls and attainment year VMT, starts, and vehicle population, the green bar shows attainment year emissions with base year controls, VMT, starts, and vehicle population, and the blue bar shows attainment year emissions with attainment year controls, VMT, starts, and vehicle population. Based on the U.S. EPA guidance, if the blue bar is lower than the green bar, then the identified transportation control strategies and TCMs are sufficient to offset the growth in emissions.

Figure VI-E-1. VOC Emissions* from On-Road Mobile Sources in the South Coast Air Basin (2012 Base Year)



* Does not include resting or diurnal loss emissions

Figure VI-E-2. VOC Emissions* from On-Road Mobile Sources in the South Coast Air Basin (2012 Base Year)



* Does not include resting or diurnal loss emissions

Attachment VI-E-1
State of California Motor Vehicle Control Program (1990–Present) Transportation Control Strategies Adopted by the California Air Resources Board since 1990

Measure	Hearing Date	Category
California Reformulated Gasoline (CaRFG), Phase I. T 13, CCR, 2251.5	9/27/1990	Fuels
California Reformulated Gasoline, Phase II. T 13, CCR, 2250, 2255.1, 2252, 2260 - 2272, 2295	11/21/1991	Fuels
Wintertime Gasoline Program. T 13, CCR, 2258, 2298, 2251.5, 2296	11/21/1991	Fuels
Wintertime Oxygenate Program. T 13, CCR, 2258, 2251.5, 2263(b), 2267, 2298, 2259, 2283, 2293.5	9/9/1993	Fuels
Diesel Fuel Certification Test Methods. T 13, CCR, 1956.8(b), 1960.1(k), 2281(c), 2282(b), (c) and (g)	10/24/1996	Fuels
Diesel Fuel Test Methods. T 13, CCR, 1956.8(b), 1960.1(k), 2281(c), 2282(b), (c) and (g)	10/24/1996	Fuels
Low Emission Vehicles Standards (LEV 2) and Compliance Assurance Program (CAP 2000). T 13, CCR,1961 & 1962 (both new); 1900, 1960.1, 1965, 1968.1, 1976, 1978, 2037, 2038, 2062, 2101, 2106, 2107, 2110, 2112, 2114, 2119, 2130, 2137-2140, 2143-2148	11/5/1998	On-road
Exhaust Standards for (On-Road) Motorcycles. T 13, CCR, 1900, 1958, 1965	12/10/1998	On-road
Light-and Medium Duty Low Emission Vehicle Alignment with Federal Standards. Exhaust Emission Standards for Heavy Duty Gas Engines. T 13, CCR, 1956.8 &1961	12/7/2000	On-road
Heavy Duty Diesel Engine Standards for 2007 and Later. T 13, CCR, 1956.8 and incorporated test procedures	10/25/2001	On-road
Low Emission Vehicle Regulations. T 13, CCR, 1960.1,1960.5, 1961, 1962 and incorporate test procedures and guidelines	11/15/2001	On-road
CaRFG Phase 3 Amendments. T 13, CCR, 2261, 2262, 2262.4, 2262.5, 2262.6, 2262.9, 2266.5, 2269, 2271, 2272, 2265, and 2296	7/25/2002	Fuels
Adoption of Minor Amendments to the Low-Emission Vehicle Regulations. T 13, CCR, 1961, 1965, 1978, and the incorporate test procedures	12/12/2002	On-road
Incorpation of Federal Exhaust Emission Standards for 2008 and Later Model-Year Heavy Duty Gasoline Engines and the Adoption of Minor Amendments to the Low-Emission Vehicle Regulations. T 13, CCR, 1956.8 and documents incorporated by reference	12/12/2002	On-road
CaRFG Phase 3 Amendments (specifications for De Minimis Levels of Oxygenates and MTBE Phase Out Issues). T 13, CCR, 2261, 2262.6, 2263, 2266.5, 2272, 2273, 2260, 2273.5	12/12/2002	Fuels
Specifications for Motor Vehicle Diesel Fuel. T 13 & T17, CCR, 1961, 2281, 2282, 2701, 2284, 2285, 93114, and incorporated test procedures	7/24/2003	Fuel
California Reformulated Gasoline, Phase 3. T 13, CCR, 2260, 2262, 2262.4, 2262.5, 2262.6, 2262.9, 2263, 2265 (and the incorporated “California Procedures”), and 2266.5	11/18/2004	Fuels
On-Board Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines (HD OBD). T 13, CCR, 1971.1	7/21/2005	On-road
Requirements to Reduce Idling Emissions from New and In-Use Trucks, Beginning in 2008. T 13, CCR, 1956.8, 2404, 2424, 2425, and 2485 and the incorporated document	10/20/2005	On-road
Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yard. T 13, CCR, 2479	12/8/2005	On-road and Off-road

Measure	Hearing Date	Category
Evaporative and Exhaust Emission Test Procedures. T 13, CCR, 1961, 1976, 1978	6/22/2006	On-road
Phase 3 Reformulated Gasoline (Ethanol Permeation) T 13, CCR, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2270, 2271, and 2273	6/14/2007	Fuel
Port Truck Modernization T 13, CCR, 2027	12/6/2007	On-road
Cleaner In-Use Heavy-Duty Trucks (Truck and Bus Reg) T 13, CCR, 2025	12/11/2008	On-road
2010 Amendments to On-Board Diagnostic System Requirements for Heavy-Duty Engines (HD OBD). T 13, CCR, 1971.1 and 1971.5	5/28/2009	On-road
Truck and Bus Regulation 2010. T13, CCR, 2025	12/16/2010	On-road
Amendments to Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yard. T 13, CCR, 2479	9/22/2011	On-road
Advanced Clean Cars T 13, CCR, 1900, 1956, 1960, 1961, 1962, 1965, 1968, 1976, 1978, 2037, 2038, 2062, 2112, 2139, 2140, 2145, 2147, 2235, 2300, 2302, 2303, 2304, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, and 2318	1/26/2012	On-road
Zero Emission Vehicle Standards for 2009 through 2017 models. T 13, CCR, 1962.1, 1962.3	1/26/2012	On-road
Low Emission Vehicle III Greenhouse Gas and Zero Emission Vehicle Regulation Amendments for Federal Compliance Option T 13, CCR, 1900, 1956.8, 1960.1, 1961, 1961.2, 1961.3, 1962.1, 1962.2, 1976	11/15/2012	On-road
1997 Amendments to Onboard Diagnostics, Phase II, Technical Status. T 13, CCR, 1968.1, 2030, 2031	12/12/1996	On-road
2003 Amendments to On-Board Diagnostic II Review Amendments. T 13, CCR, 1968.1, 1968.2, 1968.5	4/25/2002	On-road
Heavy-Duty In-Use Compliance Regulation. T 13, CCR, 1956.1, 1956.8, and documents incorporated by reference	9/28/2006	On-road
2007 Amendments to On-Board Diagnostic II. T 13, CCR, 1968.2, 1968.5, 2035, 2037 and 2038	9/28/2006	On-road
2007 Amendments to Heavy-Duty In-Use Compliance Regulation. T 13, CCR, 1956.1, 1956.8, and documents incorporated by reference	12/6/2007	On-road
2010 Amendments to On-Board Diagnostic II. T 13, CCR, 1968.2, 1968.5, 2035, 2037 and 2038	5/28/2009	On-road
Plug-In Hybrid Electric Vehicle Test Procedure Amendments. T 13, CCR, 2032, 1900, 1962, 1962.1	5/28/2009	On-road
2011 Amendments to Heavy-Duty In-Use Compliance Regulation. T 13, CCR, 1956.1, 1956.8, and documents incorporated by reference	6/23/2011	On-road
2012 Amendments to On-Board Diagnostic II. T 13, CCR, 1968.2, 1968.5, 2035, 2037 and 2038	1/26/2012	On-road
Emergency Regulatory Amendments to the Tractor-Trailer Greenhouse Gas Regulation T 17, CCR, 95307	2/29/2012	On-Road
2013 Amendments to On-Board Diagnostics (OBD I and II) Regulations T 13, CCR, 1968.2, 1971.1	8/23/2012	On-road
2013 Amendments to Heavy Duty On Board Diagnostic Requirements	8/23/2013	On-road
Heavy-Duty Greenhouse Gas Phase 1: On-Road Heavy Duty Greenhouse Gas Emissions Rule, Tractor-Trailer Rule, Commercial Motor Vehicle Idling Rule, Optional Emission Standards, Heavy-Duty Hybrid-Electric Vehicle Certification Procedure T 13, CCR, 1900, 1956.	12/12/2013	On-road

Measure	Hearing Date	Category
Heavy−Duty Hybrid-Electric Vehicle Certification Procedure T 13, CCR, 1900, 1956.8, 2036, 2037, 2112, 2139, 2140, 2147, 2485, T 17, CCR, 95300, 95301, 95302, 95303, 95305, 95660, 95661, 95662, 95663, 95664	12/12/2013	On-road
2014 Amendments to Zero Emission Vehicle Regulation T 13, CCR, 1962.1, 1962.2	10/23/2014 5/21/2015	On-road
Amendments to Low Emission Vehicle III Criteria Pollutant Requirements for Light-and Medium-Duty Vehicles the Hybrid Electric Vehicle Test Procedures, and the Heavy-Duty Otto-Cycle and Heavy-Duty Diesel Test Procedures T 13, CCR, 1900, 1956.8, 1961.2, 1962.2, 1965, 1976, 1978	10/23/2014	On-road

LOS ANGELES COUNTY

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
BALDWIN PARK	LAF3507	SOUTH BALDWIN PARK COMMUTER BIKEWAY PROJECT. CONSTRUCT 3-MILE COMMUTER CLASS I BIKE PATH ALONG SAN GABRIEL RIVER AND WALNUT CREEK CONNECTING TO MAJOR EMPLOYMENT CENTERS ON BALDWIN PARK BLVD.	9/30/2015	9/30/2015	9/30/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
BURBANK	LAF1502	SAN FERNANDO BIKEWAY. IMPLEMENT A CLASS I BIKEWAY ALONG SAN FERNANDO BLVD, VICTORY PLACE AND BURBANK WESTERN CHANNEL TO COMPLETE THE BURBANK LEG OF A 12 MILE BIKEWAY.	2014	6/30/2015	10/30/2017	OBSTACLES ARE BEING OVERCOME. PROJECT SCHEDULE IS CONTINGENT ON ADVANCE OF ADJACENT INTERSTATE 5 HOV / EMPIRE INTERCHANGE PROJECT WITHIN SAME RIGHT-OF-WAY. DELAY ALSO DUE TO NEPA ENVIRONMENTAL REVIEW OF COMPLETED 30% DESIGN WORK. CALTRANS COMPLETED FINAL DESIGN AND UTILITY RELOCATION OF ADJACENT FREEWAY PROJECT. CITY CAN NOW BEGIN 100% DESIGN.
CALTRANS	LA000357	ROUTE 5: FROM ROUTE 170 TO ROUTE 118 ONE HOV LANE IN EACH DIRECTION (10 TO 12 LANES) INCLUDING THE RECONSTRUCTION OF THE I-5/SR-170 MIXED FLOW CONNECTOR AND THE CONSTRUCTION OF THE I-5/SR-170 HOV TO HOV CONNECTOR (CFP 345) (2001 CFP 8339; CFP2197).	2008/2010	12/31/2013	6/30/2015	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO UTILITIES RELOCATION COMPLICATIONS DURING CONSTRUCTION. UNDER CONSTRUCTION.

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
CALTRANS	LA000358	ROUTE 5: – FROM ROUTE 134 TO ROUTE 170 HOV LANES (8 TO 10 LANES) (CFP 346)(2001 CFP 8355). (EA# 12180, 12181,12182,12183,12184, 13350 PPNO 0142F,151E,3985,3986,3987) SAFETEA LU # 570. CONSTRUCT MODIFIED IC @ I-5 EMPIRE AVE, AUX LNS NB & SB BETWEEN BURB	2012/2010	12/31/2014	12/31/2016	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO UTILITIES RELOCATION COMPLICATIONS. ALL PROGRAMMED FUNDS ARE OBLIGATED.
CALTRANS	LA000548	ROUTE 10: FROM PUENTE TO CITRUS HOV LANES FROM 8 TO 10 LANES (C-ISTEA 77720) (EA# 117080, PPNO# 0309N)	2030/2015	2/12/2016	10/31/2018	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO RIGHT OF WAY COMPLICATIONS FOR ACQUIRING PROPERTIES FROM CITY REDEVELOPMENT AGENCY. ALL PROGRAMMED FUNDS ARE OBLIGATED.
CALTRANS	LA01342	ROUTE 10: RT 10 FROM RT 605 TO PUENTE AVE HOV LANES (8+0 TO 8+2) (EA# 117070, PPNO 0306H) PPNO 3333 3382 AB 3090 REP (TCRP #40)	2008/2010	10/28/2013	10/28/2014	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO DESIGN CHANGE/DEVIATION FROM CONTRACT PLANS AS A RESULT OF DIFFERING SITE CONDITIONS. UNDER CONSTRUCTION AND ALL FUNDS HAVE BEEN OBLIGATED.
CALTRANS	LA0B875	ROUTE 10: HOV LANES FROM CITRUS TO ROUTE 57/210 – (EA# 11934, PPNO# 0310B)	2015	3/15/2016	1/4/2018	OBSTACLES ARE BEING OVERCOME. DELAY IS DUE TO COMBINING TWO PROJECTS (EAS 11934 AND 28900) AND REQUIRED ADDED CONSTRUCTION STAGES.
CALTRANS	LA0D73	ROUTE 5: LA MIRADA, NORWALK & SANTA FE SPRINGS-ORANGE CO LINE TO RTE 605 JUNCTION. WIDEN FOR HOV & MIXED FLOW LNS, RECONSTRUCT VALLEY VIEW (EA 2159A0, PPNO 2808). TCRP#42.2&42.1	2014	12/1/2016	12/1/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
GARDENA	LAF3306	GARDENA MUNICIPAL BUS LINES LINE #1X TSP (TRANSIT SIGNAL SYNCHRONIZATION PROJECT 21-SIGNALS). PROJECT WILL IMPLEMENT TRANSIT SIGNAL PRIORITY ALONG ITS LINE #1X TO REDUCE TRANSIT TRAVEL TIMES AND ENHANCE ON-TIME PERFORMANCE. CITY OF GARDENA: MARINE AVENUE: FROM YUKON AVENUE TO WESTERN AVENUE WESTERN AVENUE: FROM MARINE AVENUE TO 166TH STREET NORMANDIE AVENUE: FROM 166TH STREET TO GARDENA BOULEVARD VERMONT AVENUE: FROM GARDENA BOULEVARD TO 153RD STREET; UP TO 21 LOCATIONS.	6/30/2016	6/30/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. MOU SCHEDULED TO BE EXECUTED BY DEC 2014. PROJECT TO COMMENSE IN 2014-15.
GLENDALE	LA0G202	TRAFFIC LIGHT SYNCHRONIZATION ALONG THREE MAJOR ARTERIIALS , GLENDALE AVE, BRAND BLVD.,SAN FERNANDO RD., AND COLORADO ST.	12/1/2014	12/1/2014	12/1/2014	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. NEAR COMPLETION.
GLENDALE	LA0G406	FAIRMONT AVE. PARK-N-RIDE FACILITY (83 PARKING SPACES) TO SERVE COMMUTERS USING SR-134, I-5. THE LOCATION OF THE PARK-N-RIDE IS FAIRMONT AVENUE AND SAN FERNANDO RD.	12/30/2012	12/30/2014	12/30/2014	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LONG BEACH	LAE0332	LONG BEACH PARK AND RIDE FACILITY AT 3RD STREET AND PACIFIC AVE SOUTH OF THE MTA BLUE LINE PACIFIC STATION. 300 TO 500 SPACE AND INCLUDE RESIDENTIAL AND COMMERCIAL DEVELOPMENT		10/1/2011		TCM SUBSTITUTION HAS BEEN INITIATED.
LONG BEACH	LAE1296	LONG BEACH INTELLIGENT TRANSPORTATION SYSTEM	2011	9/30/2013	9/30/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO CONSTRUCTION AND RELOCATION OF CITY'S TRAFFIC MANAGEMENT CENTER FROM 1600 SAN FRANCISCO AVENUE TO CITY HALL (COMPLETED IN MARCH OF 2014) AND RECONFIGURATION OF CITY'S FIBER COMMUNICATIONS SYSTEM (DUE TO BE COMPLETED IN JUNE OF 2014). BOTH TASKS ARE NECESSARY FOR THIS GRANT FUNDED PROJECT TO MOVE FORWARD.
LONG BEACH	LAF1341	OCEAN BL. SIGNAL SYNCHRONIZATION AND ENHANCEMENT PROJECT. INSTALLATION OF NEW SIGNALS, INTERCONNECT, PEDESTRIAN SAFETY ENHANCEMENTS, ADA ACCESS RAMPS, TRANSIT INFORMATION SYSTEMS, AND TRAFFIC SIGNAL UPGRADES AND RECONSTRUCTION. OCEAN BL,ALAMITOS TO LIVINGSTON	10/1/2013	10/1/2013	12/31/2014	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO COORDINATION WITH AN EXISTING CITY PROJECT IN THE AREA.
LONG BEACH	LAF1530	BICYCLE SYSTEM GAP CLOSURES & IMPROVED LA RIVER BIKE PATH. PROJECT WILL CONSTRUCT PRIORITY CLASS I & III BICYCLE SYSTEM GAP CLOSURES IN LONG BEACH AND IMPROVE CONNECTION TO LA RIVER.	2014	10/1/2014	6/30/2015	OBSTACLES ARE BEING OVERCOME. CONSTRUCTION WAS PUSHED BACK SINCE ADDITIONAL DESIGN WAS REQUIRED AFTER FEEDBACK WAS RECEIVED FROM THE COMMUNITY.

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LOS ANGELES COUNTY	LA0C8120	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN & CONSTRUCTION OF MULTI JURISDICTIONAL, SIGNAL SYSTEM IMPROVEMENTS ON REGIONAL ARTERIALS & ADVANCED ITS TECHNOLOGY. (APROX. 770 INTERSECTIONS)	12/31/2015	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. UNDER CONSTRUCTION.
LOS ANGELES COUNTY	LAF1511	EASTSIDE LIGHT RAIL BIKE INTERFACE PROJECT. PROJECT INCLUDES DESIGN AND CONSTRUCTION OF BIKE ROUTES WITH APPROPRIATE SIGNAGE AND STRIPING TO ACCESS METRO GOLD LINE STATIONS.	10/21/2014	10/21/2014	10/30/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO RESCOPE.
LOS ANGELES COUNTY	LAF1514	EMERALD NECKLACE BIKE TRAIL PROJECT. DESIGN AND CONSTRUCT 1.1 MILES OF CLASS I BIKE PATH TO CONNECT DUARTE ROAD TO THE SAN GABRIEL RIVER BICYCLE TRAIL.	2011	6/30/2013	6/1/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO REQUIREMENTS AND PERMITS FROM CORPS OF ENGINEER FOR PORTION OF BIKE PATH THROUGH FLOOD CONTROL CHANNEL. PROJECT DESIGN FUNDS HAVE BEEN OBLIGATED.
LOS ANGELES COUNTY	LAF3308	SAN GABRIEL VALLEY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN AND CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCH, INTERSECTION OPERATIONAL IMPROVEMENTS, AND INTELLIGENT TRANSPORTATION SYSTEM COMPONENTS ON REGIONAL ARTERIALS. APROX. 183 SIGNALS TOTAL.	6/30/2016	6/30/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LOS ANGELES COUNTY	LAF3310	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN AND CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, OPERATIONAL IMPROVEMENTS & ITS COMPONENTS ON ARTERIALS IN THE SOUTH BAY AREA OF LA COUNTY. (APROX 40+ SIGNALS)	6/30/2016	6/30/2016	6/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
LOS ANGELES COUNTY MTA	LA0C8114	LA CITY RIDESHARE SERVICES; PROVIDE COMMUTE INFO, EMPLOYER ASSISTANCE AND INCENTIVE PROGRAMS THROUGH CORE & EMPLOYER RIDESHARE SERVICES & MTA INCENTIVE PROGRAMS. PPNO 9003	2009	12/30/2016	12/30/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. ONGOING PROJECT.
LOS ANGELES COUNTY MTA	LA0D198	CRENSHAW TRANSIT CORRIDOR	12/31/2018	12/31/2018	4/30/2021	ORIGINAL SCOPE ON SCHEDULE. FINAL PROJECT COMPLETION DATE HAS BEEN UPDATED TO ACCOMODATE CONSTRUCTION OF TWO OPTIONAL STATIONS: CRENSHAW/VERNON STATION (LEIMERT PARK VILLAGE) AND FLORENCE/HINDRY STATION.
LOS ANGELES COUNTY MTA	LA0F021	EXPOSITION LIGHT RAIL TRANSIT SYSTEM PHASE II – FROM CULVER CITY TO SANTA MONICA		12/31/2017	12/31/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
LOS ANGELES COUNTY MTA	LA0F075	LIGHT RAIL TRANSIT FLEET-UP TO 78 NEW CARS SYSTEMWIDE. THESE EXPANSION RAIL CARS WILL BE ASSIGNED TO EXPO I, EXPO II AND GOLD LINE FOOTHILL.	3/30/2018	3/30/2018	3/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. FUNDS HAVE BEEN OBLIGATED.

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LOS ANGELES COUNTY MTA	LA0G010	REGIONAL CONNECTOR – LIGHT RAIL IN TUNNEL ALLOWING THROUGH MOVEMENTS OF TRAINS, BLUE, GOLD, EXPO LINES. FROM ALAMEDA / 1ST STREET TO 7TH STREET/METRO CENTER	12/31/2019	12/31/2019	5/31/2021	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO: 1) LONGER CONTRACT C0980 PROCUREMENT AND ENVIRONMENTAL, APPROVAL AND AUTHORIZATION PROCESSES THAN ORIGINALLY ESTIMATED; 2) FTA REQUIREMENT TO BUILD A NINE-MONTH BUFFER INTO THE SCHEDULE. CONTRACT C0980 PROCUREMENT COMPLETED AND METRO BOARD APPROVED AWARD OF DESIGN/BUILD CONTRACT TO REGIONAL CONNECTOR CONSTRUCTORS. THIRD PARTY UTILITY RELOCATIONS ARE PROGRESSING.
LOS ANGELES COUNTY MTA	LA0G447	METRO PURPLE LINE WESTSIDE SUBWAY EXTENSION SECTION 1 - WILSHIRE/WESTERN TO LA CIENEGA	12/31/2019	2019/2023	12/31/2023	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
LOS ANGELES COUNTY MTA	LA29202W	MID -CITY TRANSIT CORRIDOR: WILSHIRE BLVD. FROM VERMONT TO SANTA MONICA DOWNTOWN- MID-CITY WILSHIRE BRT INCL. DIV. EXPANSION AND BUS ONLY LANE	2009/2010	12/31/2014	6/30/2016	OBSTACLES ARE BEING OVERCOME. FUNDS HAVE BEEN OBLIGATED. DELAY DUE TO 1) LONGER ENVIRONMENTAL REVIEW AS A RESULT OF COMMUNITY CONCERNS; 2) LONGER DESIGN AND ENGINEERING BY CITY AND COUNTY; 3) NEW REQUIREMENT TO OBTAIN A LONG-TERM REVOCABLE PERMIT FROM THE VETERAN'S ADMINISTRATION FOR THE USE OF A SMALL STRIP OF THEIR PROPERTY.

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LOS ANGELES, CITY OF	LA0B7330	SAN FERNANDO RD ROW BIKE PATH PHSE II – CONSTRUCT 2.75 MILES CLAS I FRM FIRST ST TO BRANFORD ST,ON MTA-OWND ROW PARLEL TO SAN FERNANDO RD. LINK CYCLSTS TO NUMEROUS BUS LNE. PPNO 2868.	2005	3/30/2014	3/30/2014	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
LOS ANGELES, CITY OF	LA0C8164	EXPOSITION BLVD RIGHT-OF-WAY BIKE PATH-WESTSIDE EXTENSION. DESIGN AND CONSTRUCTION OF 2.5 MILES OF CLASS 1 BIKEWAY, LIGHTING, LANDSCAPING & INTERSECTION IMPROVEMENTS. (PPNO# 3184)	2009	2018	2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
LOS ANGELES, CITY OF	LA0G182	THE CENTRAL CITY EAST PROJECT WILL PROVIDE A FULLY TRAFFIC RESPONSIVE SIGNAL CONTROL SYSTEM TO APPROXIMATELY 150 INTERSECTIONS CURRENTLY OPERATIONAL WITH ATSAC CAPABILITY.	5/1/2014	5/1/2014	12/31/2016	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO NEED FOR COMPLETON OF ATSAC SYSTEM. ATSAC SYSTEM IS NOW COMPLETE.
LOS ANGELES, CITY OF	LAF1524	SAN FERNANDO RD. BIKE PATH PH. IIIA/IIIB – CONSTRUCTION. RECOMMEND PHASE IIIA-CONSTRUCTION OF A CLASS I BIKE PATH WITHIN METRO OWNED RAIL RIGHT-OF-WAY ALONG SAN FERNANDO RD. BETWEEN BRANFORD ST. AND TUXFORD ST INCL BRIDGE.	10/1/2015	10/1/2015	10/1/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LOS ANGELES, CITY OF	LAF1708	HOLLYWOOD INTEGRATED MODAL INFORMATION SYSTEM. INSTALLATION OF ELECTRONIC, DIRECTION AND PARKING AVAILABILITY SIGNS WITH INTERNET CONNECTIVITY TO PROVIDE ADVANCE AND REAL-TIME INFORMATION INTENDED TO INCREASE TRANSIT RIDERSHIP	2015	9/21/2015	9/21/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
LOS ANGELES, CITY OF	LAF1725	WIFI ON THE GOLD LINE. WIFI INTERNET INSTALLED ON GOLD LINE TRAINS, POLES & STATIONS, EASTSIDE EXTENSION, CHINATOWN & LITTLE TOKYO/ARTS DISTRICTS.	12/31/2014	12/31/2014	12/31/2014	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
LOS ANGELES, CITY OF	LAF3171	DE SOTO AVE WIDENING: RONALD REAGAN FWY TO DEVONSHIRE ST.. WIDEN DE SOTO AVE FR SR-118 TO DEVONSHIRE ST TO PROVIDE 3 LANES IN EACH DIRECTION & UNIFORM ROADWAY WIDTH. EXISTING ASPHALT BERMS TO BE REPLACED WITH CURB, GUTTER, & 10' SIDEWALK. SIDEWALK IS 1.42 MILES, 90% OF THE SIDEWALKS ALONG THE PROJECT LIMITS WILL BE NEW.	12/1/2015	12/1/2015	12/31/2017	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO PROGRAMMING ISSUE. PROGRAMMING ISSUE RESOLVED. CURRENTLY IN DESIGN PHASE WHICH WILL COMPLETE BY JUNE 2015.

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LOS ANGELES, CITY OF	LAF3314	INTELLIGENT TRANSPORTATION SYSTEM (ITS) COMMUNICATION SYSTEM. UPGRADE AND REPLACE UNDER CAPACITY COMMUNICATION SYSTEM HARDWARE IN ORDER TO PROVIDE A VIABLE AND COST EFFECTIVE COMMUNICATION LINK BETWEEN TRAFFIC CORRIDORS AND THE LA COUNTY IEN.	12/31/2015	12/31/2015		ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
LOS ANGELES, CITY OF	LAF3513	DESIGN AND CONSTRUCT 3.85 MILE BIKEWAY ALONG FUTURE EXPOSITION LIGHT RAIL CORRIDOR BETWEEN VENICE/ROBERTSON BLVDS. AND SANTA MONICA CITY LIMITS AT CENTINELA. CLASS I AND CLASS II BIKEWAYS.	12/31/2015	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
LOS ANGELES, CITY OF	LAF3731	DOWNTOWN LA INTER-MODAL TRANSIT INFORMATION AND WAYFINDING. INSTALL TRANSIT INFORMATION MONITORS, VARIABLE MESSAGE SIGNS, INTERACTIVE KIOSKS & PARKING AVAILABILITY SIGNAGE ALONG BROADWAY CORRIDOR TO OLYMPIC.	12/31/2014	12/31/2014	12/31/2014	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
MONROVIA	LAE0039	TRANSIT VILLAGE – PROVIDE A TRANS. FACILITY FOR SATELLITE PARKING FOR SIERRA MADRE VILLA GOLD LINE STA, P-N-R FOR COMMUTERS, A FOOTHILL TRANSIT STORE.	2010	12/31/2012	12/31/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO 1) CONSIDERATION OF AN ALTERNATIVE SITE; AND 2) COORDINATION WITH GOLD LINE AUTHORITY. DESIGN CONCEPTS AND COST ESTIMATES ARE DEVELOPED. CONSTRUCTION BID DOCUMENT IS ALMOST COMPLETE AND WILL BE ON THE STREET IN JUNE OR JULY 2014. CITY EXPECTS TO AWARD CONTRACT IN AUGUST AND BEGIN CONSTRUCTION IN SEPTEMBER. THE PROJECT IS NOW ON A FAST TRACK.
PASADENA	LAE3790	THE PASADENA ITS INTEGRATES 3 COMPONENTS; TRAFFIC SIGNAL COMMUNICATION AND CONTRL, TRANSIT VEHICLE ARRIVAL INFO AND PUBLIC PARKING AVAILABILITY INFO. SAFETEA-LU PRJ #3790 AND #399	2010	6/30/2013	6/30/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO BID HIGHER THAN CONSTRUCTION ESTIMATE. CITY IS PREPARING TO RE-ADVERTISE PROJECT REMOVING EXPENSIVE NON-TCM PORTION OF PROJECT.
PASADENA	LAF3501	DETECTION OF BICYCLES AT SIGNAL CONTROLLED INTERSECTIONS. BICYCLE DETECTION SYSTEMS AT INTERSECTIONS CONTROLLED BY TRAFFIC SIGNALS ALONG BIKE CORRIDORS. PROJECT CORRIDOR LENGTH IS 15.5 MILES.	5/1/2016	5/1/2016		ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
PORT OF LOS ANGELES	LAF3170	PORT TRUCK TRAFFIC REDUCTION PROGRAM: WEST BASIN RAILYARD. INTERMODAL RAILYARD CONNECTING PORT OF LA WITH ALAMEDA CORRIDOR TO ACCOMMODATE INCREASED LOADING OF TRAINS AT THE PORT, THEREBY REDUCING TRUCK TRIPS TO OFF-DOCK RAILYARDS.	12/1/2014	12/1/2014	12/1/2014	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
RANCHO PALOS VERDES	LAF1506	BIKE COMPATIBLE RDWY SAFETY AND LINKAGE ON PALOS VERDES DR. THE PROJECT WILL HAVE A CLASS II BIKE LANE ON BOTH SIDES OF PALOS VERDES DRIVE SOUTH, WITH AN UNPAVED SHOULDER FOR EMERGENCY USE.	2014	10/9/2014	10/9/2014	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT
RANCHO PALOS VERDES	LAF1605	PEDESTRIAN SAFE BUS STOP LINKAGE. LINKING 11 BUS STOPS CURRENTLY INACCESSIBLE BECAUSE OF LACK OF SIDEWALKS ON BOTH THE EAST AND WEST SIDE OF HAWTHORNE BLVD. FROM CREST RD. TO PALOS VERDES DR. SOUTH (ABOUT 13,000')	2013	12/9/2013	12/9/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO ACCOMMODATING CONSTRUCTION OF AN OVERLAYING TRAFFIC SIGNAL SYNCHRONIZATION PROJECT. SIDEWALK NEEDS TO BE INSTALLED AFTER INSTALLING UNDERGROUND CONDUIT FOR THE TRAFFIC SIGNAL SYNCHRONIZATION PROJECT. FINAL DRAFT PLANS COMPLETED AND WILL PREPARE REQUEST FOR E-76.
SAN GABRIEL VALLEY COG	LA990359	GRADE SEP XINGS SAFETY IMPR; 35- MI FREIGHT RAIL CORR. THRGH SAN.GAB. VALLEY – EAST. L.A. TO POMONA ALONG UPRR ALHAMBRA &L.A. SUBDIV – ITS 2318 SAFETEA #2178;1436 #1934 PPNO 2318	2003/2009	6/30/2018	6/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. UNDER CONSTRUCTION.

TABLE III-1.1 LOS ANGELES COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
SANTA MONICA	LAF1728	CITY OF SANTA MONICA ITS IMPROVEMENTS. SANTA MONICA REAL TIME BEACH PARKING SIGNS. THIS PROJECT WILL MAKE INFORMATION REGARDING BEACH PARKING AVAILABLE TO MOTORISTS DESTINED FOR SANTA MONICA BEACH PARKING LOTS.	6/30/2013	6/30/2013	6/30/2014	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO LONGER COORDINATION AND PERMIT/APPROVAL. E-76 APPROVED BY CALTRANS ON 12/11/12. COASTAL COMMISSION PERMIT APPROVED ON 7/9/13. BID ADVERTISED ON 9/25/13. BIDS RECEIVED ON 10/30/13. 1 BID RECEIVED AND REJECTED DUE TO DBE REQUIREMENT. PROJECT RE-BID ON 11/27/13.
SANTA MONICA	LAF3703	A 'NO NET NEW TRIPS' RIDESHARE TOOLKIT. DEVELOP A TDM TOOLKIT WITH ONLINE MULTI-MODAL MOBILITY INFORMATION, BIKE ACCOMMODATIONS, 300 WALKING-ROLLING CARTS, 75 BIKE LOCKERS & INCENTIVE PROGRAMS FOR EMPLOYERS, SCHOOLS & NEIGHBORHOODS. WITHIN THE CITY OF SANTA MONICA IN DEMAND MANAGEMENT AREAS AS DEFINED IN THE LAND USE AND CIRCULATION ELEMENT (LUCE) ADOPTED JULY 2010.	6/30/2014	6/30/2014	6/30/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO 1) TWO CITY PROJECT MANAGERS RETIRING, 2) HIRING REPLACEMENT PROJECT MANAGERS, AND 3) COORDINATING WITH COMMUNITY LEADERS, SCHOOL DISTRICTS, MAJOR EMPLOYERS ALONG THE PROPOSED PROJECT AREA. COORDINATION WITH STAKEHOLDERS HAS BEEN MOSTLY RESOLVED. PROJECT IN IMPLEMENTATION STAGE. PROJECT IS ABOUT 50% COMPLETED.
TORRANCE	LA0G358	SOUTH BAY REGIONAL INTERMODAL TRANSIT CENTER PROJECT. THE LAND IS IN THE PROCESS OF BEING PURCHASED AND ESCROW WILL CLOSE ON DECEMBER 17, 2009. PRESENTLY, THE LOT IS VACANT/OPEN LAND WITH NO EXISTING STRUCTURE UPON IT. THE ADDRESS IS 465 N. CRENSHAW BLVD., TORRANCE, CA 90503.	12/31/2015	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT

TABLE III-1.2 LOS ANGELES COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
ARTESIA	LAF1607	SOUTH STREET PEDESTRIAN, BIKEWAY AND TRANSIT IMPROVEMENT. IMPROVE PEDESTRIAN ENVIRONMENT AND TRANSIT STOP LOCATIONS WITH LANDSCAPED MEDIANS, TRANSIT SHELTERS, BENCHES, SIDEWALK ENHANCEMENTS AND LIGHTING. CLOSE EXISTING BIKE LANE GAP.	2014	10/1/2014	COMPLETE	
AVALON	LAF1501	COUNTY CLUB DRIVE BIKEWAY IMPROVEMENT PROJECT. CONSTRUCTION OF A 4-FOOT WIDE CLASS II BIKE LANE IN BOTH DIRECTIONS ALONG A ONE MILE SECTION OF COUNTRY CLUB DRIVE.	2013	10/1/2013		FOR RECREATIONAL PURPOSES - NOT A COMMITTED TCM.
AZUSA	LAF3434	AZUSA INTERMODAL TRANSIT CENTER. CONSTRUCT REGIONAL AZUSA INTERMODAL TRANSIT CENTER TO ACCOMMODATE EXISTING AND FUTURE PARKING DEMAND AND SUPPORT EFFECTIVE TRANSIT USE.	6/30/2015	6/30/2015		MISTAKENLY MARKED AS A COMMITTED TCM IN 2013 FTIP A#13-24
BALDWIN PARK	LAE0076	CONSTRUCT ADD'L VEHICLE PARKING (200 TO 400 SPACES), BICYCLE PARKING LOT AND PEDESTRIAN REST AREA AT THE TRANSIT CENTER	2010	12/31/2014	COMPLETE	

TABLE III-1.2 LOS ANGELES COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
CALTRANS	LA996134	ROUTE 5: RTE. 5/14 INTERCHANGE & HOV LNS ON RTE 14 – CONSTRUCT 2 ELEVATED LANES – HOV CONNECTOR (DIRECT CONNECTORS) (EA# 16800)(2001 CFP 8343) (PPNO 0168M)	2014/2009	5/24/2013	COMPLETE	
FOOTHILL TRANSIT ZONE	LA0B311	PARK AND RIDE FACILITY TRANSIT ORIENTED NEIGHBORHOOD PROGRAM SAFETEA-LU # 341 (E-2006-BUSP-092) (E-2006-BUSP-173)	2003/2005	12/31/2013	COMPLETE	AZUSA AND WEST COVINA WERE ENTERED ERRONEOUSLY IN THIS TIP SHEET. AZUSA IS UNDER LAF3434. INDUSTRY - CONSTRUCTION OF THE INDUSTRY PARK AND RIDE PARKING STRUCTURE WAS COMPLETED. FROM LAOB311.INDUSTRY NUMBER OF PARKING SPACES #622 WEST COVINA - CITY OF WEST COVINA STILL WAITING FOR RESPONSE FROM CALIFORNIA DEPARTMENT OF FINANCE (DOF) FOR FINAL REVIEW AND APPROVAL TO TRANSFER ALL PROPERTIES OF FORMER REDEVELOPMENT BOARD AGENCY AT THE WESTFIELD MALL TO THE CITY PARKING AUTHORITY.
FOOTHILL TRANSIT ZONE	LA0G142	LACRD - 12 BUSES FOR THE I-10 EL MONTE BUSWAY. HOT LANE. (RTP# 1TR08D08 & 1TR08D07A)		12/31/2012	COMPLETE	
INDUSTRY	LAF3303	INDUSTRY-ATMS SIGNAL UPGRADE/CCTV VIDEO SURVEILLANCE SYSTEM. DESIGN & IMPLEMENT 20 ATMS SIGNAL UPGRADE, 6 CCTV VIDEO SURVEILLANCE SYSTEM, WIRELESS COMMUNICATIONS & LOCAL CONTROL CENTER (LCC) VIDEO SCREEN SYSTEM.	3/30/2014	3/30/2014	COMPLETE	

TABLE III-1.2 LOS ANGELES COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LONG BEACH	LA0C8237	LONG BEACH PARK AND RIDE FACILITY AT 4TH AND PACIFIC, SOUTH OF THE MTA BLUE LINE PACIFIC STATION. 100 DEDICATED, TRANSIT ORIENTED SPACES IN MIXED USE DEVELOPMENT	6/30/2014	6/30/2014		A DUPLICATE OF LAE0332.
LONG BEACH	LA996322	DWNTWN. SHORELINE DR. TRAFFIC MGMT. SYSTEM: DEPLOYMENT OF ITS ELEMENTS IN THE DWNTWN AREA TO RESPOND TO SPECIAL GENERATOR TRAFFIC.	3/31/2013	3/31/2013	COMPLETE	
LONG BEACH	LAF1334	ATLANTIC AVE SIGNAL SYNCHRONIZATION & ENHANCEMENT PROJECT. TRAFFIC SIGNAL UPGRADES AND RECONSTRUCTION, INTERCONNECT, BUS PRIORITY TRAFFIC SIGNAL EQUIPMENT, EMERGENCY VEHICLE PREEMPTION, AND ENHANCEMENTS FOR BUS STOPS AND PEDESTRIAN SAFETY.	12/1/2013	12/1/2013	COMPLETE	
LOS ANGELES, CITY OF	LA0D272	SOUTH SAN FERNANDO VALLEY REGIONAL PARK AND RIDE. ADD 50 NEW PARKING SPACES TO EXISTING COMMUTER EXPRESS PARK AND RIDE LOT WITHIN EXISTING AREA.		12/31/2012	COMPLETE	

TABLE III-1.2 LOS ANGELES COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LOS ANGELES, CITY OF	LA0G181	ATCS - CENTRAL BUSINESS DISTRICT. DEVELOP A FULLY TRAFFIC RESPONSIVE SIGNAL CONTROL SYSTEM TO APPROXIMATELY 180 INTERSECTIONS CURRENTLY OPERATIONAL WITH ATSAC CAPABILITY.	2/1/2014	2/1/2014		SYSTEM REPLACEMENT, NOT A TCM.
LOS ANGELES, CITY OF	LAF1450	ENCINO PARK-AND-RIDE FACILITY RENOVATION. RENOVATION OF THE ENCINO PARK-AND-RIDE FACILITY IN ORDER TO ADDRESS PHYSICAL AND STRUCTURAL DEFICIENCIES AND ADD CAPACITY TO THIS HEAVILY UTILIZED FACILITY. INCLUDES 50 NEW PARKING SPACES AND BIKE LOCKERS.	2013	10/1/2013	COMPLETE	
LOS ANGELES, CITY OF	LAF1527	MANCHESTER AVENUE BIKE LANES & ISLAND REDUCTION. THE PROJECT CONSISTS OF THE INSTALLATION OF ONE MILE OF BIKE LANES AND THE REDUCTION OF THE LANDSCAPED MEDIAN ISLAND ON MANCHESTER BL BETWEEN SEPULVEDA BL AND OSAGE AV	10/1/2015	10/1/2015	COMPLETE	
LOS ANGELES, CITY OF	LAF1720	EXPERIENCELA.COM WEB 2.0 INTERACTIVE TRANSIT MAPPING. PROVIDE INTERACTIVE MAPPING, WIFI AND MOBILE INTERFACE, AND WEB 2.0 TECHNOLOGY AS NEW SERVICES ON EXPERIENCELA.COM.		6/30/2013	COMPLETE	

TABLE III-1.2 LOS ANGELES COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
LOS ANGELES COUNTY MTA	LA0C10	MID-CITY/EXPOSITION CORRIDOR LIGHT RAIL TRANSIT PROJECT PHASE I TO VENICE-ROBERTSON STATION	2011/2012	12/31/2012	COMPLETE	
LOS ANGELES COUNTY MTA	LA0G154	LACRD – EL MONTE TRANSIT CENTER IMPROVEMENTS AND EL MONTE BUSWAY IMPROVEMENTS, INCLUDING BIKE LOCKERS, TICKET VENDING MACHINES AT EL MONTE BUSWAY STATIONS AND UP TO 10 BUS BAYS.	12/31/2010	12/31/2012	COMPLETE	
LOS ANGELES COUNTY MTA	LA0G694	LOS ANGELES - SAN FERNANDO VALLEY BRT TRANSIT EXTENSION CANOGA		12/31/2013	COMPLETE	
LOS ANGELES COUNTY MTA	LA963542	ACQUISITION REVENUE VEHICLES – 2,513 CLEAN FUEL BUSES: LEASED VEH, FY02 (370) FY03 (30 HC) + FY04 (70 HC) + (200 ARTICS); FY05-FY10 TOTAL OF 1000 BUSES.	2005	6/30/2014	COMPLETE	
ROLLING HILLS ESTATE	LAF1529	PALOS VERDES DRIVE NORTH BIKE LANES. CONSTRUCTION OF CLASS II BIKE LANE AND RELATED IMPROVEMENTS ON PALOS VERDES DRIVE NORTH	12/31/2012	12/31/2013	COMPLETE	
SANTA CLARITA	LAF1424	MCBEAN REGIONAL TRANSIT CENTER PARK AND RIDE. PURCHASE LAND, DESIGN, AND CONSTRUCT A REGIONAL PARK-AND-RIDE LOT ADJACENT TO THE MCBEAN REGIONAL TRANSIT CENTER IN THE CITY OF SANTA CLARITA.	2012	10/1/2013	COMPLETE	

TABLE III-1.2 LOS ANGELES COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
SANTA FE SPRINGS	LA0F096	NORWALK SANTA FE SPRINGS TRANSPORTATION CENTER PARKING EXPANSION AND BIKEWAY IMPROVEMENTS. PROVIDE ADDITIONAL 250 PARKING SPACES FOR TRANSIT CENTER PATRONS AND IMPROVE BICYCLES ACCESS TO THE TRANSIT CENTER	2011	6/30/2012	COMPLETE	
SANTA FE SPRINGS	LAF3402	NORWALK/SANTA FE SPRINGS TRANSPORTATION CTR PHASE II PARKING. CONSTRUCT A TOTAL OF APPROX. 160 PARKING SPACES ON A SITE ADJACENT TO THE METROLINK STATION.	6/30/2014	6/30/2014	COMPLETE	PHASE 2 OF LA0F096 WHICH IS COMPLETE. MISTAKINGLY CARRIED OVER TO BE A NEW COMMITTED TCM IN 2013 FTIP.
SANTA MONICA	LA0F062	DESIGN AND CONST. OF REAL-TIME PARKING INF./GUIDANCE SYSTEM. PHASE I COVERS SANTA MONICA AREA, BOUNDED BY COLORADO AVE., OCEAN AVE., WILSHIRE BLVD AND LINCOLN BLVD.	6/30/2013	6/30/2013		PARKING INFORMATION/GUIDANCE SYSTEM NOT A TCM.
SANTA MONICA	LAF1343	OCEAN PARK BL, MAIN ST, NEILSON WY SIGNAL SYSTEM. INSTALL COMMUNICATION & SIGNAL MODIFICATIONS NEEDED TO BRING INTERSECTIONS ONTO THE SIGNAL CONTROL SYSTEM ALONG THE OCEAN PARK BL, MAIN ST, AND NEILSON WY CORRIDORS. INCLUDES 26 INTERSECTIONS ON 3 CORRIDORS.	6/30/2015	6/30/2015	COMPLETE	

TABLE III-1.2 LOS ANGELES COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
TEMPLE CITY	LA0G668	ROSEMEAD BLVD SAFETY ENHANCEMENTS & BEAUTIFICATION PROJECT: INSTALLATION OF BICYCLE LANES, SIDEWALK IMPROVEMENTS, LANDSCAPING, WAYFINDING SIGNAGE FROM PENTLAND TO CALLITA (1.7 MI).	10/31/2013	10/31/2013	COMPLETE	
TORRANCE	LA0G615	TORRANCE TRANSIT SYSTEM BUS RAPID PROJECT (REDONDO BEACH TO LONG BEACH) - FOR THE ACQUITIONS OF EIGHT (8) EXPANSION BUSES ($6,400,000), AND INCLUDES TWO (2) YEARS OF OPERATING ASSISTANCE TO OPERATE THE NEW RAPID SERVICE ($1,500,000).		7/1/2013	COMPLETE	
WHITTIER	LAE0191	DESIGN,RIGHT-OF-WAY, AND CONSTRUCT 2.8 MILE BIKEWAY AND PEDESTRIAN PATH FROM MILLS AVE. TO VALLEY HOME IN WHITTIER.		11/30/2013	COMPLETE	

TABLE III-1.3 LOS ANGELES COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
AZUSA	LAF5309	CITY OF AZUSA TRAFFIC MANAGEMENT SYSTEM. THIS PROJECT WILL UPGRADE TRAFFIC SIGNALS AT 43 INTERSECTIONS IN THE CITY OF AZUSA. THE PROJECT WILL FUND THE DESIGN AND CONSTRUCTION/IMPLEMENTATION OF CONTROLLERS, WIRING, DETECTION, CONDUIT, FIBER OPTIC, COUNTDOWN PEDESTRIAN HEADS, SIGNALS, VIDEO DETECTION, CCTV CAMERAS AND TRAFFIC CONTROL AND MONITORING UPGRADES AT THE 43 INTERSECTIONS.	12/1/2017
BURBANK GLENDALE PASADENA AIRPORT	LA000789A	BURBANK-GLENDALE-PASADENA AIRPORT INTERMODAL GROUND ACCESS LINK: CONSTRUCTION OF A LINK BETWEEN THE AIRPORT AND OTHER TRANSPORTATION SERVICES, INCLUDING CONSTRUCTION OF A NEW METROLINK STATION AT HOLLYWOOD WAY/SAN FERNANDO ROAD ON THE ANTELOPE VALLEY LINE AND A LINK BETWEEN THE AIRPORT AND OTHER TRANSPORTATION SERVICES. (CONSTRUCTION OF LA000789)	3/31/2017
CALTRANS	LA0G440	ROUTE 005: PHASE 2,FROM SR-14 TO PARKER ROAD, CONSTRUCT HOV/HOT, TRUCK & AUX LANES (EA 2332C, PPNO 3189A & EA 2332E PPNO 3189B), SAFTETEA-LU#465. PE & RW $ ARE PROGRAMMED FOR EA 2332E ONLY.	6/11/2018
CULVER CITY MUNI BUS LINES	LAF3317	BUS SIGNAL PRIORITY IN CULVER CITY. DESIGN, DEVELOP & INSTALL WIRELESS BUS SIGNAL PRIORITY SYSTEM ON CULVER CITY BUS FLEET AND AT INTERSECTIONS TO INCREASE OPERATION EFFICIENCY & TRAVEL TIME SAVINGS. THE PROJECT INCLUDES INTERSECTIONS WITH TRANSIT SERVICE WITHIN THE BOUNDARY OF THE CITY OF CULVER CITY.	6/30/2017
CULVER CITY	LAF3318	TRAFFIC MONITORING AND SURVEILLANCE SYSTEM GAP CLOSURE. DESIGN AND IMPLEMENTATION OF 14 CCTV CAMERA TRAFFIC MONITORING AND SURVEILLANCE SYSTEM, HUB SWITCHING EQUIPMENT AND APPROX. 4 MI OF FIBER OPTIC COMMUNICATION CABLES, AND EOC VIDEO.	12/30/2016
CULVER CITY	LAF5302	PROJECT WILL UPGRADE THE CURRENT TRAFFIC CONTROL SYSTEM TO AN ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS). PROJECT WILL REPLACE 90 TYPE 170 CONTROLLERS WITH TYPE 2070, ADD ADDITIONAL VEHICLE DETECTORS AT 102 LOCATIONS, AND UPGRADE COMMUNICATIONS EQUIPMENT AND CONNECTION TO FIBER-OPTIC BACKBONE. THE ATCS WILL CONTROL 102 INTERSECTIONS THROUGHOUT CULVER CITY.	3/1/2019
DIAMOND BAR	LAF7300	DIAMOND BAR ADAPTIVE TRAFFIC CONTROL SYSTEM PROJECT : INSTALLS ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS) AT SIGNALIZED INTERSECTIONS ON DIAMOND BAR BL, GOLDEN SPRINGS DR, AND GRAND AV. (2) PROVIDES FULLY TRAFFIC RESPONSIVE SIGNAL CONTROL SYSTEM BASED ON TRAFFIC DEMANDS.	6/30/2019
DOWNEY	LAF5114	TELEGRAPH ROAD TRAFFIC THROUGHPUT AND SAFETY ENHANCEMENT BETWEEN THE RIO HONDO RIVER CHANNEL TO THE SAN GABRIEL RIVER CHANNEL, A DISTANCE OF 2.2 MILES. PROJECT INVOLVES THE CONSTRUCTION OF RAISED MEDIAN ISLANDS, MINOR WIDENING AT INTERSECTIONS, TRANSIT PRIORITY SYSTEM AND BIKE (2.2 MILES IN LENGTH) AND PEDESTRIAN CIRCULATION IMPROVEMENTS.	6/30/2018

TABLE III-1.3 LOS ANGELES COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
EL MONTE	LAF5705	SHARED PARKING PROGRAM/SMART PARKING DETECTION SYS IN DOWNTOWN AREA; I-10 FWY, EL MONTE BUSWAY, EL MONTE TRANSIT CTR, TRANSIT VILLAGE, AND EL MONTE METROLINK STATION. COMPREHENSIVE PARKING STRATEGY PLAN. INCLUDES SMART PARKING DETECTION SYSTEM AND SHARED PARKING PROGRAM. UTILIZE MOBILE COMMUNICATION DEVICES TO ASSESS THE PARKING AVAILABILITY AT MULTIPLE PARKING LOTS. PROVIDE REAL-TIME INVENTORY OF PARKING SPACES.	6/30/2017
GLENDALE	LA0G809	CONSTRUCTION OF CITYWIDE BIKEWAY FACILITY THIS PROJECT INCLUDES CONSTRUCTION OF CLASS II, AND SHARROWS RECOMMENDED IN THE GLENDALE BICYCLE MASTER PLAN AND INSTALLATION OF CITYWIDE BIKE RACKS, AND OTHER AMENITIES RELATED TO BICYCLE. THE PROJECT LENGTH MAY INCLUDE OVER 12 MILES OF BIKE LANES.	12/1/2018
GLENDALE	LAF3714	ARROYO VERDUGO COMMUTE MANAGER SYSTEM. DEVELOPMENT OF A CUSTOMIZED TDM-SPECIFIC GEOGRAPHICALLY BASED WEBSITE.	12/30/2017
INGLEWOOD	LA0G843	MEASURE R ITS PHASE IV - PART A OF A TWO PART ITS IMPROVEMENT PROJECT. DESIGN AND CONSTRUCTION OF APPROXIMATELY 2.7 MILES OF COMMUNICATION INFRASTRUCTURE ALONG LA BREA, FLORENCE, CRENSHAW, MANCHESTER AND CENTINELA. SIGNAL SYNCHRONIZATION (APPROX. 20 LOCATIONS); DESIGN AND CONSTRUCTION OF SYSTEM DETECTION (APPROX. 40 INTERSECTIONS); CHANGEABLE MESSAGE SIGNS (2 LOCATIONS); CCTV CAMERAS (APPROX. 6 LOCATIONS) AND TRAFFIC MANAGEMENT CENTER EQUIPMENT AND COMMUNICATION NETWORK INTEGRATION.	6/30/2016
LAWNDALE	LA0G954	THIS PROJECT WILL IMPROVE OUTDATED AND NON-ACTUATED TRAFFIC SIGNAL SYSTEMS WITHIN LAWNDALE AND WILL INCLUDE: FULL ACTUATION, INADEQUATE BICYCLE & PEDESTRIAN ACCOMMODATION, LIMITED TIMING PLANS, NEW CONTROLLERS/CABINETS WHERE NEEDED, AND NEW WIRING/LOOPS WHERE NEEDED AT ALL INTERSECTIONS.	12/1/2015
LAWNDALE	LAF7500	HAWTHORNE BOULEVARD CLASS II BICYCLE LANES: (1) INSTALLS 1.0 MILE OF CLASS 2 BIKE LANES ON HAWTHORNE BLVD FOR BOTH DIRECTIONS. (2) PROVIDES BICYCLE PARKING.	10/31/2019
LONG BEACH	LA0G830	I-710 IMPROVEMENTS/SHOEMAKER BRIDGE - DOWNTOWN EXITS. THE PROJECT MAKES BICYCLE, PEDESTRIAN, AND STREETSCAPE IMPROVEMENTS ON MAJOR THOROUGHFARES.	12/31/2020
LONG BEACH	LAF5609	DOWNTOWN LONG BEACH PINE AVENUE STREETSCAPE IMPROVEMENT. THIS PROJECT IS LOCATED ON PINE AVE BETWEEN SEASIDE WY AND ANAHEIM ST. IT WILL IMPLEMENT STREET IMPROVEMENTS, SUSTAINABLE DESIGN FEATURES, AND PEDESTRIAN ENHANCEMENTS ALONG A MAJOR TRANSIT NODE INCLUDING: PEDESTRIAN LIGHTING, CROSSWALK ENHANCEMENTS, DIAGONAL CROSSWALKS, STREET FURNITURE, BIKE RACKS, STREET TREES, LANDSCAPING, BOLLARDS TO FACILITATE STREET CLOSURE FOR COMMUNITY EVENTS AND REMOVAL OF OBSTRUCTIONS FROM THE WALKWAY.	7/1/2016

TABLE III-1.3 LOS ANGELES COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
LONG BEACH	LAF7316	ARTESIA CORRIDOR ATCS ENHANCEMENT PROJECT: (1) UPGRADES TRAFFIC SIGNALS ALONG ARTESIA BL BETWEEN LONG BEACH BL AND DOWNEY AV TO CONNECT WITH ADAPTIVE TRAFFIC CONTROL SYSTEM (ATCS). (2) INSTALLS CCTV AND CMS ON ARTESIA BL. (3) INSTALLS FIBER OPTIC CABLE AND DEVICES TO CONNECT SIGNALS TO EACH OTHER AND TRAFFIC MANAGEMENT CENTER (TMC). (4) TWO NEW TRAFFIC SIGNALS IN COMPTON (5) INSTALLS CLASS II BIKE LANE IN BOTH DIRECTIONS FROM ATLANTIC AV TO SUSANA RD. (6) PEDESTRIAN IMPROVEMENTS.	1/1/2019
LOS ANGELES, CITY OF	LAF1612	CENTURY CITY URBAN DESIGN AND PEDESTRIAN CONNECTION PLAN. PROJECT WILL IMPLEMENT SIDEWALK IMPROVEMENTS, DECORATIVE CROSSWALKS, MEDIAN ISLAND, CURB RAMPS, PEDESTRIAN LIGHTING, SHELTERS, BENCHES, TRASH RECEPTACLES & STREET TREES. THE PHYSICAL IMPROVEMENTS WILL CONSIST OF A MEANDERING PEDESTRIAN WALKWAY, SOLAR-POWERED PEDESTRIAN SCALE LIGHTING, STREET LIGHTING, TRASH RECEPTACLES, BUS BENCHES, (10)BICYCLE RACKS.	12/31/2016
LOS ANGELES, CITY OF	LAF1704	DOWNTOWN L.A. ALTERNATIVE GREEN TRANSIT MODES TRIAL PROGRAM. OFFER SHARED RIDE-BICYCLE AND NEIGHBORHOOD ELECTRIC VEHICLE TRANSIT SERVICES TO LA CITY HALL AS AN ALTERNATIVE TO OVERCROWDED DASH SERVICE	6/27/2016
LOS ANGELES, CITY OF	LAF3315	CITY/COUNTY TRAFFIC MANAGEMENT INTEGRATION PHASE 2 PROJECT. INTEGRATE THE IEN TRAFFIC SIGNAL TIMING DATA AS SECOND LEVEL INPUTS INTO ATCS AND MAKE REVISIONS FROM 2007 CALL APPLICATION TO THIS PROJECT.	6/30/2015
LOS ANGELES, CITY OF	LAF3515	SAN FERNANDO RD. BIKE PATH PH. IIIB CONSTRUCTION. CONSTRUCT 2.75 MILE CLASS I BIKE PATH WITHIN METRO RIGHT-OF-WAY ALONG SAN FERNANDO RD. BETWEEN TUXFORD ST. AND COHASSET ST. TO COMPLETE 12-MILE BIKEWAY.. THE PROJECT IS LOCATED WITHIN THE CITY OF LOS ANGELES, IN THE COMMUNITY OF SUN VALLEY. THE PROJECT CONSISTS OF A CLASS I FACILITY 12 FEET IN WIDTH AND 2.75 MILES IN LENGTH BETWEEN TUXFORD ST. AND COHASSET ST. (BURBANK CITY LIMIT).	1/1/2016
LOS ANGELES, CITY OF	LAF3646	ARTS DISTRICT/LITTLE TOKYO GOLD LINE STATION LINKAGES. PEDESTRIAN ENHANCEMENTS INCLUDING SIDEWALK/PATH PAVING; PED LIGHTS; STREET TREES/PLANTING; DISTRICT SIGNAGE; ENTRY ELEMENTS; STREET FURNITURE; CROSSWALK PAVING; AND BIKE PARKING. (10 BIKE RACKS)	12/31/2016
LOS ANGELES, CITY OF	LAF5519	THIS PROJECT IS LOCATED IN THE CITY OF LOS ANGELES. CONSTRUCTION OF BICYCLE FRIENDLY STREET TREATMENTS: AT LEAST 100 DIRECTIONAL SIGNS, AT LEAST 500 SHARED LANE MARKINGS, AND BICYCLE DETECTORS AND MARKINGS PROVIDED TO AT LEAST 15 SIGNALIZED INTERSECTIONS. OTHER TREATMENTS WILL INCLUDE TRAFFIC CALMING DEVICES AND DIVERSION, WHICH INCLUDE AT LEAST ONE DIVERTER AND ROUNDABOUT.	12/31/2018
LOS ANGELES, CITY OF	LAF5525	TO DESIGN AND CONSTRUCT CURB-SIDE BICYCLE PARKING (BICYCLE CORRAL) THAT WILL SERVE EACH COUNCIL DISTRICT. THE PROJECT REQUIRES SURFACE MODIFICATIONS TO CURBSIDE PARKING AREAS FOR INSTALLING AT LEAST 150 BIKE RACKS.	1/1/2018

TABLE III-1.3 LOS ANGELES COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
LOS ANGELES, CITY OF	LAF5710	EXPERIENCE LA HISTORIC CULTURAL NEIGHBORHOOD CONNECTIONS. INSTALLATION OF 22 KIOSKS AT TRANSIT HUBS IN ACTIVITY CENTERS THROUGHOUT THE CITY OF LOS ANGELES. BY UTILIZING SMART TECHNOLOGY TRANSIT USERS WILL BE ABLE TO USE CELL PHONES OR THE KIOSK TO FIND INFORMATION THAT WILL MAKE THE TRANSFER MORE SEAMLESS TO THEIR FINAL DESTINATION.	6/1/2019
LOS ANGELES, CITY OF	LAF7628	WATTS STREETSCAPE IMPROVEMENTS PHASE 2: INSTALLS ADA RAMPS, LANDSCAPING STREET TREES, STREET FURNITURE, PED LIGHTING, CROSSWALK ENHANCEMENTS, CURB EXTENSIONS, SHARROWS, AND PED & BIKE WAYFINDING SIGNAGE.	12/31/2019
LOS ANGELES, CITY OF	LAF7707	LAST MILE FOLDING BIKE INCENTIVE PROGRAM: PROVIDES FINANCIAL INCENTIVES TO TRANSIT RIDERS TOWARDS THE PURCHASE OF 1,800 COLLAPSIBLE OR ELECTRIC BIKES TO USE IN CONJUNCTION WITH BUS AND RAIL SYSTEMS.	12/31/2018
LOS ANGELES COUNTY	LA0D461	RECONSTRUCT- THE OLD ROAD FROM HILLCREST PARKWAY TO LAKE HUGHES RD & WIDEN FROM 40' TO 68', 2 VEH. LANES AND A 5' CLASS II BIKELANE IN EA DIR & STRIPPED MEDIAN (FROM 2 TO 4 LNS 2 EA DIR) FOR 2.1 MILES.	6/30/2021
LOS ANGELES COUNTY	LAF1311	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN & CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, INTERSECTION OPERATIONAL IMPROVEMENTS, AND INTELLIGENT TRANSP. SYSTEM COMPONENTS ON REGIONAL ARTERIALS. SYNCHRONIZES 50 CONSECUTIVE INTERSECTIONS.	10/1/2015
LOS ANGELES COUNTY	LAF1321	SAN GABRIEL VALLEY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. DESIGN & CONSTRUCTION OF MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, INTERSECTION OPERATIONAL IMPROVEMENTS, AND INTELLIGENT TRANSPORTATION SYSTEM COMPONENTS. SYNCHRONIZES 83 CONSECUTIVE INTERSECTIONS.	10/1/2015
LOS ANGELES COUNTY	LAF3309	GATEWAY CITIES FORUM TRAFFIC SIGNAL CORRIDORS PROJ, PHASE VI. DESIGN AND CONSTRUCT MULTIJURISDICTIONAL TRAFFIC SIGNAL SYNCHRONIZATION, INTERSECTION OPERATIONAL IMPROVEMENTS & ITS COMPONENTS ON REGIONAL ARTERIALS IN GATEWAY CITES AREA. (APROX. 126 SIGNALS)	6/30/2016
LOS ANGELES COUNTY	LAF5310	RAMONA BOULEVARD/BADILLO STREET/COVINA BOULEVARD TSSP/BSP. IMPLEMENTION OF A TRAFFIC SIGNAL SYNCHRONIZATION PROJECT (TSSP) ON RAMONA BL/BADILLO ST/COVINA BL FROM SANTA ANITA AV TO THE 57 FREEWAY. A BUS SIGNAL PRIORITY (BSP) PROJECT WILL BE IMPLEMENTED ON RAMONA BL/BADILLO ST FROM TYLER AV TO GRAND AV TO GIVE TRANSIT PRIORITY FOR FOOTHILL TRANSIT OPERATIONS (APROX. 48 SIGNAL LOCATIONS)	6/30/2019

TABLE III-1.3 LOS ANGELES COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
LOS ANGELES COUNTY	LAF5314	GATEWAY CITIES FORUM TRAFFIC SIGNAL CORRIDORS PROJECT - IMPROVE TRAFFIC SIGNAL OPERATIONS BY UPGRADING EACH TRAFFIC SIGNAL TO FEDERAL AND STATE STANDARDS, PROVIDING ADDITIONAL VEHICLE DETECTION TO ENABLE OPERATION AS A FULLY TRAFFIC-ACTUATED SIGNAL, INSTALLING THE APPROPRIATE COMPONENTS TO ENABLE EACH SIGNAL TO BE CAPABLE OF TIME-BASED COORDINATION AND RETIMING SIGNALS TO IMPROVE THE OVERALL PROGRESSION OF TRAFFIC.(APROXIMATLY 17 SIGNALS INCLUDED)	6/30/2019
LOS ANGELES COUNTY	LAF5315	SAN GABRIEL VALLEY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT. THIS PROJECT INCLUDES 6 INTERSECTIONS AT MYRTLE AV/PECK RD BETWEEN HUNTINGTON DR AND CLARK ST AND PROVIDES FOR SYSTEM WIDE COORDINATION, TIMING AND OPERATIONAL IMPROVEMENTS AND TRAFFIC SIGNAL SYNCHRONIZATION, EQUIPMENT UPGRADES AND INTERSECTION OPERATIONAL IMPROVEMENTS. (APROX. 20+ SIGNALS)	6/30/2019
LOS ANGELES COUNTY	LAF5316	SOUTH BAY FORUM TRAFFIC SIGNAL CORRIDORS PROJECT - SYSTEMWIDE COORDINATION, TIMING AND OPERATIONAL IMPROVEMENTS AND TRAFFIC SIGNAL SYNCHRONIZATION, EQUIPMENT UPGRADES AND INTERSECTION OPERATIONAL IMPROVEMENTS IN SOUTH BAY REGION. 25 SIGNALS SYSTEM WIDE. ADDITIONALLY, THIS PROJECT WILL INSTALL ANY WARRANTED AND FEASIBLE ROADWAY IMPROVEMENTS ALONG THE ROUTES TO IMPROVE OVERALL PROGRESSION.	6/30/2019
LOS ANGELES COUNTY	LAF5514	VERMONT AVE BIKE LANE - MANCHESTER BLVD TO EL SEGUNDO BLVD. FUNDS ARE REQUESTED TO DESIGN AND CONSTRUCT CLASS II BIKE LANES ON VERMONT AV (3.0 MILES). MEDIANS WILL BE REDUCED TO INSTALL BIKE LANES AND BICYCLE RACKS (20) WILL BE PROVIDED AT KEY DESTINATIONS.	2/26/2019
LOS ANGELES COUNTY	LAF7703	EXPERIENCELA 3.0-MOBILITY IN THE CLOUD : DEVELOPS AND IMPLEMENTS CLOUD COMPUTING BASED SOFTWARE TECHNOLOGY TO PROVIDE TRANSIT USERS LOCATION SPECIFIC INFORMATION VIA PERSONAL MOBILE DEVICES AND INTERACTIVE KIOSKS AT KEY TRANSPORTATION FACILITIES.	6/30/2019
LOS ANGELES COUNTY MTA	LA0B408	ROUTE 405: ADD A 10-MILE HOV LANE ON THE NORTHBOUND 405 BETWEEN I-10 AND U.S. 101 IN LA FROM RTE 10 TO RTE 101 WIDEN FOR HOV LANE & MODIFY RAMPS, & HOV INGRESS/EGRESS AT SANTA MONICA BLV(EA 12030, PPNO 0851G, SAFETLU SECTION 1302 #18, 1934 #20)	5/24/2016
LOS ANGELES COUNTY MTA	LA0G1048	ACTON SIDING AND SECOND PLATFORM. LENGTHEN AN EXISTING SIDING WEST OF CP QUARTZ BY APPROX. 4,000 FEET, AND ADD A SECOND STATION PLATFORM AT VINCENT GRADE/ ACTON STATION. THE PROJECT WILL PROVIDE BENEFITS TO FREIGHT AND COMMUTER RAIL WITH IMPROVED OVERALL CAPACITY, TRACK OPERATIONS, AND SAFETY ALONG A VITAL SEGMENT OF THE ANTELOPE VALLEY LINE.	12/31/2016

TABLE III-1.3 LOS ANGELES COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
LOS ANGELES COUNTY MTA	LA0G1051	EXTEND SEVERAL OF THE STUB-END TRACKS IN UNION STATION TO CONNECT WITH EXISTING MAINLINE TRACKS. THE PROJECT WILL SERVE THE EXISTING METROLINK, AMTRAK, AND NEW HIGH SPEED TRAIN PROJECT IN THIS CORRIDOR. IT WILL INCLUDE THE PREPARTION OF AN UPDATED ENVIRONMENTAL REPORT AND CLEARANCE, PREPARATION OF THE P/E DOCUMENTATION, PREPARATION OF FINAL PLANS, SPECIFICATIONS AND ESTIMATES, AND THE CONSTRUCTION OF THE PROJECT.	2/28/2019
LOS ANGELES COUNTY MTA	LA0G635	DESIGN AND CONSTRUCTION OF PEDESTRIAN AND TRANSIT ENHANCEMENTS ALONG THE PUBLIC RIGHT-OF-WAY OF THE METRO GOLD LINE EASTSIDE EXTENSION TO SURROUNDING NEIGHBORHOOD.TRANSIT ENHANCEMENTS ARE WITHIN 3 MILES OF EASTSIDE GOLDLINE EXTENSION STATION.	6/30/2020
LOS ANGELES COUNTY MTA	LA0G640	PACIFIC SURFLINER CORRIDOR - RAYMER/BERNSON DOUBLE TRACK IMPROVEMENTS - UPGRADE THE RAIL CORRIDOR FROM A SINGLE TRACK TO A DOUBLE TRACK, INSTALLING CONCRETE TIES ON BOTH TRACKS, INSTALL FOUR NEW SPECIAL TRACKWORK TURNOUTS, NINE AT-GRADE CROSSINGS, FOUR BRIDGES, A NEW SECOND PLATFORM AT NORTHRIDGE, OTHER ENHANCEMENTS INCLUDE SIGNAL RELOCATION, UTILITY RELOCATION AND DRAINAGE IMPROVEMENTS.	12/31/2018
MALIBU	LA0G910	PACIFIC COAST HIGHWAY REGIONAL TRAFFIC MESSAGE SYSTEMS. THE PROJECT WILL ENABLE THE CITY OF MALIBU AND OTHER AGENCIES TO NOTIFY TRAVELERS OF CRITICAL REGIONAL TRAFFIC AND SAFETY INFORMATION AND FACILITATE TRAFFIC FLOW THROUGHOUT THE REGION. 6 PERMANENT AND 2 MOBILE CHANGEABLE MESSAGE SIGNS WILL BE INSTALLED AT STRATEGIC LOCATIONS ALONG PCH/SR-1 CORRIDOR IN THE CITY OF MALIBU.	1/31/2017
MONTEBELLO	LA0G862	PURCHASE OF SEVEN (7) ALTERNATIVE FUEL EXPANSION TRANSIT BUSES	12/31/2016
PASADENA	LAF3301	METRO GOLD LINE AT-GRADE CROSSING MOBILITY ENHANCEMENTS. DEPLOYMENT OF ITS AT SIGNALIZED INTERSECTIONS ADJACENT TO METRO GOLD LINE AT-GRADE CROSSINGS TO PROVIDE ADAPTIVE TRAFFIC SIGNAL CONTROL TO IMPROVE MOBILITY & ENHANCE SAFETY. PROJECT INCLUDES 14 INTERSECTIONS.	5/1/2016
PASADENA	LAF3302	INTELLIGENT TRANSPORTATION SYSTEM (ITS) PHASE III (SIGNAL SYNCHRONIZATION PROJECT 3+ SIGNALS). COMPLETE THE MAIN COMMUNICATION INFRASTRUCTURE SYSTEM OF THE ITS COMMUNICATION MASTER PLAN BY CLOSING ALL GAPS IN THE EXISTING FIBER COMMUNICATION NETWORK. AS STATED IN THE PROJECT DESCRIPTION, THIS PROJECT TARGETS CRITICAL EXISTING GAPS WITHIN THE CITY'S ITS FIBER MASTER PLAN.	5/1/2016
PASADENA	LAF3710	PASADENA'S WAYFINDING SYSTEM. IMPLEMENT WAYFINDING SYSTEM INCLUDING TRANSIT INFORMATION AND CONNECTIVITY TO ADJACENT DESTINATIONS AT TRANSIT STOPS AND PARKING LOTS.	5/1/2016

TABLE III-1.3 LOS ANGELES COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
REDONDO BEACH	LA0D29	HEART OF THE CITY BUS TRANSFER STATION AMENITIES. RELOCATE THE EXISTING INTERMODAL TRANSIT TERMINAL AND CONSTRUCT A NEW TRANSIT CENTER WITH 12 BUS BAYS, PASSENGER WAITING AREA AND INFORMATION CENTER, AND A DRIVER OPERATOR LOUNGE. THE PROPERTY WILL ALSO PROVIDE 339 PUBLIC PARKING SPACES (PLUS 2 FOR STAFF: MAINTENANCE & SECURITY) AND BICYCLE FACILITIES. LOCATION - 1521 KINGSDALE AVENUE, REDONDO BEACH, CA 90278	12/31/2016
REDONDO BEACH	LAF3502	REDONDO BEACH BICYCLE TRANSPORTATION PLAN IMPLEMENTATION. IMPLEMENT CLASS II AND III BIKE FACILITIES IDENTIFIED IN THE CITY OF REDONDO BEACH'S ADOPTED BICYCLE TRANSPORTATION PLAN. APPROXIMATELY 2.1 CENTERLINE MILES OF BIKE LANES AND 15.8 CENTERLINE MILES OF BIKE ROUTES THROUGHOUT THE CITY OF REDONDO BEACH.	12/31/2015
SANTA CLARITA	LAF3300	ITS PHASE IV INTERCONNECT GAP CLOSURE AND SIGNAL SYNCH. THIS PROJECT INVOLVES RE-SYNCHRONIZING TRAFFIC SIGNALS ON ARTERIALS, DEPLOYING AN ADAPTIVE SIGNAL SYSTEM, AND A REDUNDANT FIBER-OPTIC INTERCONNECT SYSTEM. (APROX. 40+ SIGNALS)	12/31/2017
SANTA CLARITA	LAF5502	DESIGN AND CONSTRUCT CLASS II BIKE LANES ON TOURNEY ROAD FROM VALENCIA TO MAGIC MOUNTAIN PKWY (1.1 MILES), AND CLASS III BIKE ROUTES ON ORCHARD VILLAGE RD FROM MCBEAN PKWY TO LYONS (1.35 MILES). THE PROJECT WILL INCLUDE BIKE DETECTION AT ALL INTERSECTIONS AND BICYCLE WAYFINDING AND SIGNAGE.	12/1/2017
SANTA MONICA	LAF3505	BIKE NETWORK LINKAGES TO EXPOSITION LIGHT RAIL PROJECT. BIKE NETWORK ENHANCEMENTS TO SUPPORT EXPOSITION LINE. INCREASED SAFETY AND CONVENIENCE WITH SIGNAL DETECTION, HIGHLY VISIBLE LANE MARKINGS AND NEW BIKE RACKS. THE PROJECT AREA IS LOCATED THROUGHOUT THE CITY OF SANTA MONICA AND NO MORE THAN TWO MILES FROM THE PROPOSED EXPOSITION LIGHT RAIL LINE STATIONS.	12/31/2016
SANTA MONICA	LAF5524	IMPLEMENTATION OF A SANTA MONICA BIKE-SHARE PROGRAM, INCLUDING THE PURCHASE AND INSTALLATION OF 250 BIKES AND 25 DOCKING STATIONS TO BE LOCATED AT ACTIVITY NODES AND TRANSIT STATIONS (INCLUDING EXPO LRT STATIONS). TWO VEHICLES WILL BE ACQUIRED AND OUTFITTED TO TRANSPORT AND REDISTRIBUTE BICYCLES BETWEEN STATIONS AS NEEDED. THE BIKE-SHARE DOCKING STATIONS WILL BE SOLAR POWERED WHERE APPROPRIATE AND INCLUDE A TECHNOLOGY PLATFORM FOR SYSTEM OPERATION THROUGH THE WEB AND SMART PHONE APPLICATIONS.	6/30/2019
TORRANCE	LAF3312	CITY OF TORRANCE ITS & TRAFFIC IMPROVEMENTS. IMPLEMENT ITS COMPONENTS AT LOCATIONS NOT COVERED BY '95 METRO CFP SOUTH BAY SIGNAL SYNCH PROJECT, TO PROVIDE EFFECTIVE CITYWIDE AND MULTI-JURISDICTIONAL TRAFFIC MANAGEMENT. *CRENSHAW BLVD BETWEEN PCH AND THE MOST SOUTH CITY CONTROLLED SIGNALIZED INTERSECTION.(APROX. 3 SIGNALS)	12/31/2016

TABLE III-1.3 LOS ANGELES COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
VARIOUS AGENCIES	LA0G772	VALLEY VILLAGE - PURCHASE OF 7 SERVICE EXPANSION SMALL BUS 8 AP, 2 WC...	12/1/2015

ORANGE COUNTY

TABLE III-2.1 ORANGE COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
CALTRANS	ORA000193	HOV CONNECTORS FROM SR-22 TO I-405, BETWEEN SEAL BEACH BLVD. (I-405 PM 022.558) AND VALLEY VIEW ST. (SR-22 PM R000.917), WITH A SECOND HOV LANE IN EACH DIRECTION ON I-405 BETWEEN THE TWO DIRECT CONNECTORS.	2010	2/1/2015	10/1/2014	AHEAD OF SCHEDULE.
CALTRANS	ORA000194	HOV CONNECTORS FROM I-405 TO I-605, BETWEEN KATELLA AVE. (I-605 PM R001.104) AND SEAL BEACH BLVD. (I-405 PM 022.643), WITH A SECOND HOV LANE IN EACH DIRECTION ON I-405 BETWEEN THE TWO DIRECT CONNECTIONS.	2010	7/1/2015	6/30/2014	AHEAD OF SCHEDULE.
OCTA	ORA020820	METROLINK SERVICE TRACK EXPANSION AND GRADE CROSSING IMPROVEMENTS. PART OF A PLAN TO IMPLEMENT 30 MINUTE HEADWAYS COULD INCLUDE TURNBACK FACILITIES, LAYOVER FACILITIES, AND OR RELIABILITY IMPROVEMENTS FOR HIGH FREQUENCY METROLINK SERVICE OPERATIONS BETWEEN FULLERTON AND LAGUNA NIGUEL/MISSION VIEJO	1/1/2015	1/1/2015	1/1/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.

TABLE III-2.1 ORANGE COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
OCTA	ORA085004	ANAHEIM CANYON STATION PROJECT WILL ADD DOUBLE TRACK AND ANOTHER PLATFORM AS WELL AS EXTEND THE EXISTING PLATFORM TO BE IN CONFORMANCE WITH THE METROLINK STANDARDS FOR PASSENGER PLATFORM LENGTH. (MAY USE TOLL CREDIT IF CMAQ REQUIRES A MATCH)	6/1/2014	6/1/2014	12/31/2016	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO PROJECT SCOPE AND RIGHT OF WAY ISSUES. THE PROJECT SCOPE AND RIGHT OF WAY ISSUES HAVE BEEN RESOLVED AND A COOPERATIVE AGREEMENT IS GOING TO OCTA BOARD IN AUGUST 2014.
OCTA	ORA111001	INTERSTATE 5 ADD 1 HOV IN EACH DIRECTION FROM SOUTH OF PACIFIC COAST HIGHWAY TO SAN JUAN CREEK ROAD. PPNO:2531F	11/1/2016	11/1/2016	11/1/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.
OCTA	ORA111002	INTERSTATE 5 ADD 1 HOV IN EACH DIRECTION FROM SOUTH OF AVENIDA VISTA HERMOSA TO SOUTH OF PACIFIC COAST HIGHWAY. PPNO 2531E	10/1/2016	10/1/2016	10/1/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.
OCTA	ORA65002	RIDESHARE SERVICES RIDEGUIDE, DATABASE, CUSTOMER INFO, AND MARKETING (ORANGE COUNTY PORTION).	2010	12/30/2020	12/30/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. ONGOING INFORMATION FOR RIDESHARE SERVICES
OCTA	ORA990929	INTERSTATE 5 ADD 1 HOV IN EACH DIRECTION FROM SOUTH OF AVENIDA PICO TO SOUTH OF AVENIDA VISTA HERMOSA AND RECONFIGURE AVENIDA PICO INTERCHANGE. PPNO:2531D	7/1/2017	7/1/2017	7/1/2017	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.

TABLE III-2.1 ORANGE COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
TRANSPOR-TATION CORRIDOR AGENCIES (TCA)	10254	SJHC, 15 MI TOLL RD BETWEEN I-5 IN SAN JUAN CAPISTRANO & RTE 73 IN IRVINE, EXISTING 3/M/F EA.DIR.1 ADD'L M/F EA DIR, PLUS CLIMBING & AUX LNS AS REQ, BY 2020 PER SCAG/TCA MOU 4/5/01	2015/2008	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. ONGOING IMPLEMENTATION PER SCAG/TCA MOU.
TCA	ORA050	ETC (RTE 241/261/133) (RTE 91 TO I-5/JAMBOREE) EXISTING 2 M/F EA.DIR, 2 ADD'L M/F IN EA. DIR, PLUS CLIMB AND AUX LNS AS REQ, BY 2020 PER SCAG/TCA MOU 4/05/01.	2015/2010	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. ONGOING IMPLEMENTATION PER SCAG/TCA MOU.
TCA	ORA051	(FTC-N) (OSO PKWY TO ETC) (13MI) EXISTING 2 MF IN EA. DIR, 2 ADDITIONAL M/F LANES, PLS CLMBNG & AUX LANS AS REQ BY 2020 PER SCAG/TCA MOU 4/05/01.	2015/2010	12/31/2020	12/31/2020	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. ONGOING IMPLEMENTATION PER SCAG/TCA MOU.

TABLE III-2.1 ORANGE COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
TCA	ORA052	(FTC-S) (I-5 TO OSO PKWY) (15MI) 2 MF EA. DIR BY 2013; AND 1 ADDITIONAL M/F EA. DIR. PLS CLMBNG & AUX LANES AS REQ BY 2030 PER SCAG/TCA MOU 4/05/01.	2015/2010	6/15/2030	2021/2030	TIMELY IMPLEMENTATION OF THE TCM IS PREDICATED UPON TCA MEETING THE SCHEDULE OF TWO CRITICAL MILESTONES AS REFERENCED BY TCA IN ITS INFORMATIONAL SUBMITTAL TO SCAG (DATED APRIL 21, 2014)[4]. SPECIFICALLY, TCM TIMELY IMPLEMEMENTATION IS DEMONSTRATED ONLY IF: 1) A POSITIVE DECISION IS RENDERED BY THE STATE WATER RESOURCES CONTROL BOARD REGARDING TCA'S PENDING APPEAL OF THE SAN DIEGO REGIONAL WATER QUALITY BOARD'S DENIAL OF THE WASTEWATER DISCHARGE REQUIREMENTS PERMIT; FURTHER, THE PERMIT AND THE CURRENTLY PENDING BIOLOGICAL OPINION FROM THE U.S. FISH AND WILDLIFE SERVICE ARE BOTH RECEIVED IN ADEQUATE TIME TO MEET THE TESORO EXTENSION CONSTRUCTION SCHEDULE; AND 2) CONSTRUCTION OF THE TESORO EXTENSION BEGINS IN JUNE 2015. IF EITHER CONDITION IS NOT MET, SUBSTITUTION OF THE SR-241 TCM SHALL BE REQUIRED AND COMMENCE ACCORDINGLY.

[4] The TCA's informational submittal and SCAG's review letter dated May 27, 2014 are available upon request.

TABLE III-2.2 ORANGE COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
ANAHEIM	ORA000100	GENE AUTRY WAY WEST @ I-5 (I-5 HOV TRANSITWAY TO HASTER) ADD OVERCROSSING ON I-5 (S)/MANCHESTER AND EXTEND GENE AUTRY WAY WEST FROM I-5 TO HASTER (3 LANES IN EA DIR.)	2004	01/2013	COMPLETE	
ANAHEIM	ORA100508	DEVELOP AND IMPLEMENT AN ITS MASTER PLAN IN ANAHEIM. INCLUDES NEW CCTV CAMERAS (3) AND MODIFICATIONS TO FIBER OPTICS	6/30/2013	6/30/2013	COMPLETE	
FULLERTON	ORA020113	FULLERTON TRAIN STATION – PARKING STRUCTURE, PHASE I AND II. TOTAL OF 800 SPACES (PPNO 2026)	2004	6/11/2012	COMPLETE	
ORANGE COUNTY TRANS AUTHORITY (OCTA)	ORA041501	PURCHASE (71) STANDARD 30FT EXPANSION BUSES – ALTERNATIVE FUEL – (31) IN FY08-09, (9) IN FY09-10, (7) IN FY11-12, (6) IN FY12-13 AND (18) IN FY13-14	2012	6/30/2016		SUBSTITUTED WITH ORA131108
OCTA	ORA0826016	PURCHASE (72) PARATRANSIT EXPANSION VANS – (21) IN FY09/10, (51) IN FY10/11.	6/30/2016	6/30/2016	COMPLETE	
OCTA	ORA082618	PURCHASE PARATRANSIT VEHICLES EXPANSION (MISSION VIEJO) (11) IN FY09/10.	6/30/2030	6/30/2030	COMPLETE	

TABLE III-2.2 ORANGE COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
OCTA	ORA085001	ORANGE TRANSPORTATION CENTER PARKING EXPANSION - PROJECT WILL PROVIDE APPROXIMATLY 1,100 ADDITIONAL TRANSIT PARKING SPACES AT THE ORANGE STATION PARKING CENTER.	9/1/2015	9/1/2015		SUBSTITUTED WITH ORA131108
OCTA	ORA120357	ORANGE COUNTY. TRAFFIC SIGNAL SYNCHRONIZATION FOR BUS RAPID TRANSIT CORRIDORS		12/31/2012	COMPLETE	
OCTA	ORA120536	TUSTIN RAIL STATION PARKING EXPANSION - CONSTRUCTION OF 191 NEW SPACES (281 EXISTING SPACES + 191 NEW SPACES = 472 TOTAL SPACES) PPNO 9510		12/15/2012	COMPLETE	
OCTA	ORA131108	2011 CTFP REGIONAL TRAFFIC SIGNAL SYNCHRONIZATION PROGRAM. 102 MILES AND 355 SIGNALIZED INTERSECTIONS ALONG 10 HIGH VOLUME REGIONAL TRAFFIC CORRIDORS.	6/30/2014	6/30/2014	COMPLETE	PROJECT IS TCM SUBSTITUTION FOR ORA085001, ORA41501.

TABLE III-2.2 ORANGE COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
ORANGE COUNTY	ORA112001	MOULTON PARKWAY SMART STREET SEGMENT 3 PHASE II - FROM APPROXIMATELY 400' NORTH OF EL TORO ROAD TO 500' NORTH OF SANTA MARIA AVENUE (0.7 MILES) - IMPROVE ROADWAY TRAFFIC CAPACITY AND SMOOTH TRAFFIC FLOW THROUGH TRAFFIC SIGNAL SYNCHRONIZATION (3), BUS TURNOUTS, INTERSECTION IMPROVEMENTS, ADDITIONAL SIDEWALK, ADDITIONAL TURNING LANES AND ON-ROAD BIKE LANES WITHIN THE PROJECT LIMITS.	9/30/2013	9/30/2013	COMPLETE	

TABLE III-2.3 ORANGE COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2013 FTIP COMPLETION DATE**
ANAHEIM	ORA112622	BROOKHURST ST (600' NORTH OF I-5 TO SR-91). ADD ONE LANE EACH DIRECTION. FROM 4 TO 6 LANE FACILITY WITH RAISED MEDIAN. THE PROJECT WILL INCLUDE SIX-FOOT-WIDE CLASS II BIKEWAYS, TEN-FOOT WIDE PARKWAYS/SIDEWALKS AND CONCRETE SOUNDWALLS ALONG THE EAST AND/OR WEST SIDES OF BROOKHURST ST. CONSISTENT WITH THE 2012 RTP	6/30/2017
ANAHEIM	ORA120318	ANAHEIM REGIONAL TRANS INTERMODAL CENTER (ARTIC) PHASE I - INCLUDE EXPAND OF EXIST AMTRAK/METROLINK STATION AT ANA STAD TO PROVIDE ACCESS W/ TRANS SVC. TOLL CREDITS FTA 5337 FY 12/13 FOR $1,600. TOLL CREDITS FOR FTA 5309C FY12/13 FOR $1,500. TOLL CREDITS FOR CMAQ FY 13/14 FOR $2,747.	6/30/2018
OCTA	ORA030605	I-405 FROM SR-73 TO I-605 ADD 1 MF LANE IN EACH DIRECTION, AND ADDITIONAL CAPITAL IMPROVEMENTS. COMBINED WITH ORA045, ORA151, ORA100507 AND ORA120310	9/30/2022
OCTA	ORA030612	PLACENTIA TRANSIT STATION - E OF SR-57 AND MELROSE ST AND N OF CROWTHER AVE. CONSTRUCT NEW METROLINK STATION AND RAIL SIDEING PPNO 9514	4/30/2016
OCTA	ORA081619	STATION REHABILITATION AND REPAIR IMPROVMENTS FOR ORANGE COUNTY METROLINK STATIONS	5/11/2015
OCTA	ORA110304	GOLDENWEST TRANSPORTATION CENTER. CONSTRUCT A SURFACE PARKING LOT (300 SPACES)	4/30/2016
OCTA	ORA111210	I-5 FROM SR 55 TO SR 57 - ADD 1 HOV LANE EACH DIRECTION	12/1/2018
OCTA	ORA112005	IMPLEMENT BIKE STATIONS AND BIKE SHARING PROGRAM IN ORANGE COUNTY	10/30/2015
OCTA	ORA112702	RIDESHARE VANPOOL PROGRAM - CAPITAL LEASE COST FY12/13 - FY16/17. (USE TOLL CREDITS FOR $1.338 IN FY12/13)	1/31/2017
VARIOUS AGENCIES	ORA990906	GROUPED PROJECTS FOR BICYCLE AND PEDESTRIAN FACILITIES FUNDED WITH TE - SCOPE: PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126 EXEMPT TABLES 2 AND TABLE 3 CATEGORIES - BICYCLE AND PEDESTRIAN FACILITIES (BOTH MOTORIZED AND NON-MOTORIZED)	12/30/2014

RIVERSIDE COUNTY

TABLE III-3.1 RIVERSIDE COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	PROJECT ID	PROJECT DESCRIPTION	ORIGINAL COMPLETION DATE	2013 FTIP COMPLETION DATE	2013 FTIP COMPLETION DATE	2015 FTIP PROJECT STATUS
MORENO VALLEY	RIV071240	IN THE CITY OF MORENO VALLEY - EAST BOUND CACTUS AVE WIDENING BETWEEN VETERANS WAY & HEACOCK: WIDENING OF EAST BOUND CACTUS AVE FROM 2 TO 3 LANES, INCLUDING TRAFFIC SIGNAL MODIFICATIONS WITHIN THE PROJECT REACH, CHANNELIZATION, AND SIGNAL INTERCONNECT SYSTEM (6 SIGNALS).	6/1/2013	6/1/2013	2/28/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO 1) OBTAINING EASEMENTS AND RIGHTS-OF-WAY; 2) UPDATING DESIGN, PLANS, AND SPECIFICATIONS; 3) UTILITY RELOCATION; AND 4) FINDING A SOLUTION BETWEEN CITY'S TRAFFIC CENTER SOFTWARE COMMUNICATING WITH EXISTING TRAFFIC CONTROLLERS IN FIELD.
RCTC	RIV071250	ON SR-91/I-15: SR91 - CONST 1 MF LN (SR71-I15)/1 AUX LN VAR LOCS(SR241-PIERCE) (OC PM 14.43-18.91), CD SYSTEM (2/3/4 LNS MAIN-I15), 1 TOLL EXPR LN (TEL) & CONVERT HOV TO TEL EA DIR (OC-I15); I15- CONST TEL MED DIR CONNCT NB15 TO WB91 AND EB91 TO SB15, 1 TEL EA DIR SR91 DIR CONNCT-ONTARIO IC (I15 PM 37.56-42.94).	7/31/2017	7/31/2017	9/4/2017	OBSTACLES ARE BEING OVERCOME. MINOR ADJUSTMENT TO CONSTRUCTION SCHEDULE. PROJECT WAS AWARDED DESIGN BUILD CONTRACT AND NTP 1 AND 2 HAVE BEEN ISSUED. DESIGN BUILD CONTRACTOR IS CURRENTLY WORKING THROUGH DESIGN AND CONSTRUCTION BEGAN IN MAY 2013.
RCTC	RIV111207	IN WESTERN RIVERSIDE COUNTY - CONTINUE THE IMPLEMENTATION OF PARK-N-RIDE FACILITIES THROUGH PROPERTY LEASES (VARIOUS LOCATIONS THROUGHOUT THE WESTERN COUNTY).	12/30/2018	12/30/2018	12/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. PARK-N-RIDE LEASES ARE A CONTINUING PROGRAM IN WESTERN RIVERSIDE COUNTY.

TABLE III-3.1 RIVERSIDE COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
RCTC	RIV520109	RECONSTRUCT & UPGRADE SAN JACINTO BRANCH LINE FOR RAIL PASSENGER SERVICE (RIVERSIDE TO PERRIS) (PERRIS VALLEY LINE) (FY 07 5307) (UZA: RIV-SAN)	2012	2014	12/31/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO LITIGATION AND DELAYED SIGNING OF SMALL START GRANTS AGREEMENT. UNDER CONSTRUCTION.
RCTC	RIV520111	REGIONAL RIDESHARE – CONTINUING PROGRAM.	2009	6/30/2018	6/30/2018	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. ONGOING PROGRAM.
RIVERSIDE TRANSIT AGENCY	RIV041030	IN THE CITY OF HEMET – CONSTRUCT NEW HEMET TRANSIT CENTER (WITH APPROXIMATELY 4 BUS BAYS) AT 700 SCARAMELLA CR., HEMET, CA (5309C FY 04 + 05 EARMARKS).	6/30/2010	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.
RIVERSIDE TRANSIT AGENCY	RIV050553	IN TEMECULA – CONSTRUCT NEW TEMECULA TRANSIT CENTER AT 27199 JEFFERSON AVE. (SW OF JEFFERSON AVE & SE OF CHERRY ST) (04, 05, 06, 07, E-2006-091, E-2007-0131, & 2008-BUSP-0131, SAFETEA-LU).	12/30/2010	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.
RIVERSIDE TRANSIT AGENCY	RIV090609	IN WESTERN RIVERSIDE COUNTY FOR RTA: INSTALL ADVANCE TRAVELER INFORMATION SYSTEMS (ATIS) ON VARIOUS FIXED ROUTE VEHICLES AND INSTALLATION OF ELECTRONIC MESSAGE SIGNS AT APPROX. 60 BUS STOPS (FY 'S 05, 07, 08, 09, AND 10 – 5309).	2011	12/30/2015	12/30/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.

TABLE III-3.1 RIVERSIDE COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
TEMECULA	RIV62029	AT HWY 79 SO AND LA PAZ ST: ACQUIRE LAND, DESIGN AND CONSTRUCT PARK-AND-RIDE LOT – 250 SPACES (FY 05 HR4818 EARMARK)	2004/2007	12/31/2015	12/31/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.

TABLE III-3.2 RIVERSIDE COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
RIVERSIDE COUNTY TRANSPOR-TATION COMMISSION (RCTC)	RIV010212	ON SR91 – ADAMS TO 60/215 IC: ADD ONE HOV LN IN EACH DIRECTION, RESTRIPE TO EXTEND 4TH WB MIXED FLOW LANE FROM 60/215 IC TO CENTRAL OFF-RAMP, RESTRIPE TO EXTEND 5TH WB MIXED FLOW LANE FROM 60/215 IC TO 14TH ST OFF-RAMP, AUX LNS (MADISON-CENTRAL), BRIDGE WIDENING & REPLACEMENTS, EB/WB BRAIDED RAMPS, IC MOD/RECONSTRUCT + SOUND/RETAINING WALLS	2002	8/3/2015	COMPLETE	
RCTC	RIV050555	ON I-215 (N/O EUCALYPTUS AVE TO N/O BOX SPRINGS RD) & SR60 (E/O DAY ST TO SR60/I-215 JCT): RECONSTRUCT JCT TO PROVIDE 2 HOV DIRECT CONNECTOR LNS (SR60 PM: 12.21 TO 13.6) AND MINOR WIDENING TO BOX SPRINGS RD FROM 2 TO 4 THROUGH LANES BETWEEN MORTON RD AND BOX SPRINGS RD/FAIR ISLE DR IC (EA: 449311)	2011	4/29/2013	COMPLETE	

TABLE III-3.3 RIVERSIDE COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
CITY OF EASTVALE	RIV151201	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF EASTVALE - TRAFFIC SYCHRONIZATION OF SIX TRAFFIC SIGNALIZED INTERSECTIONS ALONG HAMNER AVENUE FROM SCHLEISMAN ROAD TO EASTVALE GATEWAY	12/31/2015
MORENO VALLEY	RIV151202	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF MORENO VALLEY - DESIGN AND CONSTRUCTION OF ITS, INCLUDING AN ETHERNET FIBER-OPTIC BACKBONE SYSTEM, CCTV CAMERAS AT 16 KEY INTERSECTIONS, AND NEW TRAFFIC SIGNAL CONTROLLERS AT EXISTING 45 SIGNALIZED INTERSECTIONS	12/31/2016
RIVERSIDE, CITY OF	RIV151205	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE - INSTALL FIBER-OPTIC SIGNAL INTERCONNECT IMPROVEMENTS ON MARKET ST/MAGNOLIA AVE FROM FIRST ST TO BUCHANAN ST AND INSTALL MISSING CONDUITS ON MAGNOLIA AVE FROM LA SIERRA AVE TO PIERCE ST UPDATING 49 SIGNALIZED INTERSECTIONS	12/31/2016
RIVERSIDE, CITY OF	RIV151209	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE - INSTALL UP TO FOUR BICYCLE STATIONS AND PROVIDE FORTY BICYCLES, TEN AT EACH STATION, TO IMPLEMENT A BIKE SHARE PROGRAM IN THE VICINITY OF DOWNTOWN RIVERSIDE, RIVERSIDE METROLINK STATION AND UNIVERSITY OF CALIFORNIA IN RIVERSIDE.	12/31/2015
RIVERSIDE, CITY OF	RIV151215	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF RIVERSIDE - CONSTRUCTION OF SIDEWALK ON ONE SIDE OF BRUCE STREET FROM ADAIR AVE TO LAKE AVE. IMPROVEMENTS INCLUDE A TOTAL OF 2,100 LF OF NEW SIDEWALK	12/31/2015
RIVERSIDE COUNTY	RIV151210	IN WESTERN RIVERSIDE COUNTY FOR THE COUNTY OF RIVERSIDE - CONSTRUCTION OF A 7.2 MILE MULTI-MODAL URBAN TRAIL ALONG THE SALT CREEK FLOOD CONTROL CHANNEL BETWEEN THE COMMUNITIES OF HEMET, MENIFEE AND CANYON LAKE. THE MULTI-MODAL TRAIL WILL INCLUDE A 16 FT WIDE CLASS I BIKEWAY AND 12 FT WIDE DECOMPOSED GRANITE PEDESTRIAL TRAIL	12/31/2018
RIVERSIDE COUNTY TRANS COMMISSION (RCTC)	RIV071267	I-15 IN RIVERSIDE COUNTY: CONSTRUCT 4 TOLL EXPR LNS (TEL) (2 TE EA DIR) FROM SR60 (PM 51.4) TO HIDDEN VALLEY PKWY (PM 42.9) AND CONS 2 TE LNS (1 TE EA DIR) FROM HIDDEN VALLEY PKWY (PM 42.9) TO CAJALCO RD (PM 36.8). ADVANCE SIGNAGE WILL BE INSTALLED A THE SOUTH END BETWEEN PM 34.7 TO PM 36.8 (CAJALCO RD) AND AT THE NORTH END BETWEEN PM 51.4 (SR60) TO PM 52.28 (PM 1.3 IN SAN BERNARDINO COUNTY),	12/31/2020

TABLE III-3.3 RIVERSIDE COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
RIVERSIDE TRANSIT AGENCY	RIV151211	IN WESTERN RIVERSIDE COUNTY FOR RTA - IMPLEMENTATION OF LIMITED-STOP SERVICE ALONG ROUTE 1 SERVICE AREA DURING WEEKDAY PEAK COMMUTE PERIODS ALONG UNIVERSITY AND MAGNOLIA AVENUES (RIVERSIDE/CORONA CORRIDOR). SERVICE WILL BE BETWEEN UCR AND THE GALLERIA AT TYLER. THIS INCLUDES PURCHASE OF 14 NEW BUSES (40 FT) AND OPERATING ASSISTANCE FOR THE FIRST THREE YEARS OF SERVICE.	12/31/2020
WILDOMAR	RIV151213	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF WILDOMAR - WIDENING OF GRAND AVE (CLINTON KEITH RD TO DAVID BROWN MIDDLE SCHOOL) TO INCLUDE A CLASS II BIKE LANE AND MINIMAL WORK TO INCORPORATE CLASS II/III BIKE LANES ON CLINTON KEITH RD FROM GRAND AVE TO GEORGE AVE. IMPROVEMENTS INCLUDE A TOTAL OF 7,300 LF OF NEW BIKE LANES	12/31/2015
WILDOMAR	RIV151214	IN WESTERN RIVERSIDE COUNTY IN THE CITY OF WILDOMAR - WIDENING OF GRAND AVE (CORYDON RD TO DAVID BROWN MIDDLE SCHOOL) TO INCLUDE A CLASS II BIKE LANES. IMPROVEMENTS INCLUDE A TOTAL OF 12,000 LF OF NEW BIKE LANES	12/31/2016

SAN BERNARDINO COUNTY

TABLE III-4.1 SAN BERNARDINO COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
RIALTO	200450	RIALTO METROLINK STATION – INCREASE PARKING SPACES FROM 225-775	2006	12/1/2015	12/1/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.
SANBAG	200074	LUMP SUM – TRANSPORTATION ENHANCEMENT ACTIVITIES PROJECTS FOR SAN BERNARDINO COUNTY-BIKE/PED PROJECTS (PROJECTS CONSISTENT W/40CFR PART 93.126,127,128, EXEMPT TABLE 2 & 3).	2004	12/1/2015	12/1/2015	ONGOING PROJECT. PAST PROJECTS HAVE BEEN COMPLETED AND NEW PROJECTS HAVE BEEN AWARDED FUNDING
SANBAG	20061012	DOWNTOWN S.B. PASSENGER RAIL – FROM SAN BERNARDINO METROLINK STATION TO APPROX. 1 MILE EAST TO A NEW METROLINK STATION AT RIALTO AVE AND E ST. IN DOWNTOWN SAN BERNARDINO	10/10/2014	10/10/2014	6/30/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO LONGER FINAL ENVIRONMENTAL APPROVAL AND BUY AMERICA REQUIREMENTS. CONSTRUCTION CONTRACT IS AWARDED AND CONSTRUCTION IS UNDERWAY
UPLAND	20040825	UPLAND METROLINK STATION - ADDITIONAL PARKING FROM 200 TO 500 spaces	12/1/2013	12/1/2013		TCM SUBSTITUTION HAS BEEN INITIATED.

TABLE III-4.2 SAN BERNARDINO COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
OMNITRANS	981118	BUS SYSTEM – PASSENGER FACILITIES: DESIGN AND BUILDING OF ONTARIO TRANSCENTER	2005/2002	9/30/2012	COMPLETE	
OMNITRANS	200101	BUS SYSTEM - PASSENGER FACILITIES: DEVELOPMENT OF SAN BERNARDINO TERMINAL LOCATED ON RIALTO AND E STREET. TRANSFER POINT CENTER		12/1/2014	COMPLETE	
OMNITRANS	200625	E STREET TRANSIT CORRIDOR- FROM SAN BERNARDINO TO LOMA LINDA (INCLUDES 14 ARTIC BUSES AND PARK AND RIDES)		1/1/2014	COMPLETE	
VARIOUS AGENCIES	713	I-215 CORRIDOR NORTH – IN SAN BERNARDINO, ON I-215 FROM RTE 10 TO RTE 210 – ADD 2 HOV & 2 MIXED FLOW LNS (1 IN EA. DIR.) AND OPERATIONAL IMP INCLUDING AUX LANES AND BRAIDED RAMP	2013	9/1/2013	COMPLETE	

TABLE III-4.3 SAN BERNARDINO COUNTY NEW TCMS			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2013 FTIP COMPLETION DATE**
HIGHLAND	20061015	GREENSPOT ROAD BRIDGE AT SANTA ANA RIVER - GREENSPOT RD.CONSTRUCT NEW 4 LANE BRIDGE (STRIPING FOR 2 LANES) AT SAR W/ CHANNEL IMPROVMENTS-REALIGN APPROX 2400 FT OF 2 LANE RD.(54C0368) - EXISTING BRIDGE WILL BE PRESERVED AND REHABILITATED FOR PEDESTRIAN, BICYCLE, AND EQUESTRIAN USES.	12/30/2014
HIGHLAND	201186	AT SR-210/BASE LINE IC: RECONSTRUCT/WIDEN BASE LINE BETWEEN CHURCH AVE AND BOULDER AVE FROM 4 TO 6 THROUGH LANES AND EXTEND LEFT TURN LANES, WIDEN RAMPS – WB EXIT 1 TO 3 LANES, WB AND EB ENTRANCES 1 TO 3 LANES INCLUDING HOV PREFERENTIAL LANES (EA 1C970)	10/1/2017
SANBAG	SBD031505	GROUPED PROJECTS FOR LTF ARTICLE 3 PROJECTS LTF, ARTICLE 3 BICYCLE/PEDESTRIAN PROJECTS AT VARIOUS LOCATIONS (PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126, 127,128, EXEMPT TABLES 2 & 3)	12/1/2015

VENTURA COUNTY

TABLE III-5.1 VENTURA COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION

LEAD AGENCY	PROJECT ID	PROJECT DESCRIPTION	ORIGINAL COMPLETION DATE	2013 FTIP COMPLETION DATE	2015 FTIP COMPLETION DATE	2015 FTIP PROJECT STATUS
CALTRANS	VEN070201[5]	NEAR MUSSEL SHOALS ADD 1 HOV LANE EACH DIR FROM MOBILE PIER ROAD UC TO S/O CASITAS PASS RD IN SANTA BARBARA CO. (PM R 39.8 TO 2.2). HOV LANES ARE PROPOSED TO BE PART-TIME (AM & PM PEAK PERIODS) ONLY. EXTEND ON/OFF-LANES AT MUSSEL SHOALS & LA CONCHITA FOR BETTER ACCEL AND DECEL; KEEP AS SINGLE LANES. CLOSE EXISTING 3 MEDIAN OPENNINGS LOCATED NEAR LA CONCHITA AND MUSSEL SHOALDS AND TANK FARM.		8/22/2016	8/22/2016	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT.
CAMARILLO	VEN040502	SANTA ROSA ROAD FROM UPLAND ROAD TO WOODCREEK ROAD WIDEN FROM TWO TO FOUR LANES AND ADD BIKE LANES	9/30/2008	7/1/2014	7/1/2015	REPLACEMENT HAS BEEN INITIATED PER FINAL 2015 FTIP GUIDELINES.
CAMARILLO	VEN110106	CALLEGUAS CREEK BIKE PATH PHASE 4 - SOUTH SIDE OF ROUTE 101 FROM PETIT STREET TO CALLEGUAS CREEK / VILLAGE AT THE PARK DRIVE - CONSTRUCT APPROXIMATELY 3500 FOOT CLASS I BIKE PATH	1/31/2013	1/31/2013	1/31/2015	OBSTACLES ARE BEING OVERCOME. DELAY DUE TO ROW ACQUISITION. CITY IS WORKING WITH PROPERTY OWNERS ON EASEMENT.

[5] VEN070201 will be corrected to be as a committed TCM via 2015 FTIP Amendment #15-01.

TABLE III-5.1 VENTURA COUNTY TCMS SUBJECT TO TIMELY IMPLEMENTATION						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
OJAI	VEN010203	OJAI VALLEY BIKE TRAIL EXTENSION/FULTON ST EXTENSION.	2002/2004	12/31/2012	12/31/2014	OBSTACLES OVERCOME. PROJECT IS CURRENTLY IN CLOSEOUT.
OXNARD	VEN110112[6]	VICTORIA AVENUE FROM GUM TREE ST TO GONZALES RD SIDEWALK AND DRAINAGE IMPROVEMENTS, RESTRIPING TO PROVIDE THREE NB THROUGH LANES AND BIKE LANE		12/31/2012	8/31/2014	OBSTACLES ARE BEING OVERCOME. UNDER CONSTRUCTION.
THOUSAND OAKS	VEN110308	ERBES ROAD FROM FALMOUTH TO THOUSAND OAKS BLVD (3900') CONSTRUCT CLASS II BIKE LANES, SIDEWALK/DRAINAGE IMPROVEMENTS, EXTEND TURN LANES AT INTERSECTION OF ERBES/HILLCREST	7/1/2015	7/1/2015	7/1/2015	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FROM 2013 FTIP TCM REPORT. UNDER CONSTRUCTION.
VCTC	VEN93017	REGIONAL RIDESHARE PROGRAM – LUMP SUM, INCL RIDESHARING PROGRAM FOR 08/09, 09/10, 10/11, 11/12, 12/13 – INCLUDES VENTURA COUNTY BIKE MAP UPDATE	2010	6/30/2018	6/30/2019	ON SCHEDULE. NO CHANGE IN COMPLETION DATE FOR ORIGINAL TCM SCOPE FROM 2013 FTIP TCM REPORT. ONGOING PROJECT.

[6] VEN110112 will be identified as a committed TCM via 2015 FTIP Amendment #15-01.

TABLE III-5.2 VENTURA COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
OJAI	VEN54164	BICYCLE & PEDESTRIAN TRAIL EXTENSION: FOX CYN BARRANCA FROM RT 150 TO OJAI VALLEY TRAIL	2003/2006	12/31/2013		REPLACED BY VEN130101 AND VEN130102 PER FINAL 2013 FTIP GUIDELINES.
OXNARD	VEN053403	EAST VENTURA BOULEVARD FROM NYLAND AVENUE TO EAST OF ALMOND DRIVE - LANDSCAPE ENHANCEMENT, PEDESTRIAN AND BICYCLE FACILITIES, DRAINAGE IMPROVEMENT AND PAVEMENT REHABILITATION	12/31/2008	12/31/2013	COMPLETE	
OXNARD	VEN990317	OXNARD BLVD 5TH/VINEYARD & ON 5TH ST (RT 34) OXNARD BLVD/ROSE AVE CONSTRUCT NEW BICYCLE & PEDESTRIAN FACILITIES	2003/2008	4/1/2013		REPLACED BY VEN130101 AND VEN130102 PER FINAL 2013 FTIP GUIDELINES.
SAN BUENAVEN-TURA	VEN061007	MILLS ROAD AT MAPLE ADJACENT TO PACIFIC VIEW MALL – BUS TURNOUTS WITH BUS SHELTERS, AND OTHER BUS STOP AMENITIES	2008	12/31/2012		AMENITY ENHANCEMENT. NOT A COMMITTED TCM.
SIMI VALLEY	VEN051201	WEST LOS ANGELES AVENUE FROM WEST CITY LIMIT TO EASY STREET CLASS II BIKE LANES	2010	12/31/2012	COMPLETE	
SIMI VALLEY	VEN055401	EXPAND TRANSIT MAINTENANCE FACILITY TO ACCOMMODATE SYSTEM EXPANSION		10/1/2011	COMPLETE	
THOUSAND OAKS	VEN056407	HILLCREST DRIVE FROM TELLER ROAD TO CONEJO BLVD – CLASS II BIKE LANES	2009	3/31/2013		REPLACED BY VEN130401 PER FINAL 2013 FTIP GUIDELINES.

TABLE III-5.2 VENTURA COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
THOUSAND OAKS	VEN090503	LYNN ROAD FROM HILLCREST DRIVE TO AVENIDA DE LOS ARBOLES CONSTRUCT CLASS II BIKE LANES FOR 3 MILES (TEA21#221).	12/31/2010	4/1/2013	COMPLETE	
THOUSAND OAKS	VEN110109	THOUSAND OAKS TRANSIT CENTER PARKING LOT EXPANSION AND OTHER IMPROVEMENTS - EXPAND PARKING LOT BY APPROXIMATELY 77 SPACES, INSTALL ASSOCIATED LANDSCAPING, AND UPGRADE TRANSIT CENTER LIGHTING	7/1/2013	7/1/2013	COMPLETE	
THOUSAND OAKS	VEN110111	EXTEND OPERATING HOURS FOR THOUSAND OAKS FIXED ROUTE AND DIAL A RIDE SYSTEMS. Service ends 7/1/2014.	7/1/2014	7/1/2014		A DEMONSTRATION PROJECT, NOT A COMMITTED TCM.
VENTURA COUNTY	VEN110303	NEAR EL RIO ON SANTA CLARA AVENUE FROM CENTRAL TO ROUTE 118 CONSTRUCT 2.98 MILES OF CLASS II BIKE LANES	7/1/2013	7/1/2013	COMPLETE	
VENTURA COUNTY	VEN110306	IN MEINERS OAKS ON LOMITA AVENUE FROM RICE RD TO S LOMITA AVE CONSTRUCT 1.5 MILE CLASS III BIKE ROUTE	1/1/2013	1/1/2013	COMPLETE	
VENTURA COUNTY	VEN130401	ON PLEASANT VALLEY ROAD BETWEEN RICE AVE AND LAS POSAS RD (5 CENTERLINE MILES) INSTALL CLASS III BIKE LANES. INCLUDES RESTRIPING AND SIGNAGE.	4/30/2014	4/30/2014	COMPLETE	

TABLE III-5.2 VENTURA COUNTY COMPLETED/CORRECTED TCMS						
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**ORIGINAL COMPLETION DATE**	**2013 FTIP COMPLETION DATE**	**2015 FTIP COMPLETION DATE**	**2015 FTIP PROJECT STATUS**
VENTURA COUNTY TRANS COMMISSION (VCTC)	VEN070204	SMARTCARD UPGRADE	2008	11/1/2012		UPGRADE/REPLACEMENT PROJECT, NOT A COMMITTEED TCM.

TABLE III-5.3 VENTURA COUNTY NEW TCMS[7]			
LEAD AGENCY	**PROJECT ID**	**PROJECT DESCRIPTION**	**2015 FTIP COMPLETION DATE**
OXNARD	VEN130101	IN THE NORTHEAST COMMUNITY OF THE CITY OF OXNARD, NORTHEAST OF OXNARD TRANSPORTATION CENTER. INSTALL 1.9 MI CLASS II BIKE LANES, 6.3 MI CLASS III BIKE LANES AND IMPROVEMENTS TO 3.69 MI OF EXISTING BIKE LANES.	5/31/2015
OXNARD	VEN130102	ON C STREET FROM VINEYARD AVE TO CHANNEL ISLANDS BLVD, CONSTRUCT 4.9 MI OF CLASS II BIKE LANES. CONSTRUCT CLASS III BIKE LANES ON GUAVA ST/HEMLOCK AVE AND ALONG HILL ST.	3/1/2015
SANTA PAULA	VEN111102	SANTA PAULA BIKE TRAIL IMPROVEMENTS INCLUDING BIKE/PEDESTRIAN IMPROVEMENTS AT 16 ADJACENT INTERSECTIONS AND CONSTRUCTION OF ONE REST AREA SHADE STRUCTURE	6/1/2015
SIMI VALLEY	VEN120417	WEST LOS ANGELES AVE IN SIMI VALLEY, WIDEN 10 FT TO ADD BIKE LANES AND SIDEWALK FROM THE PUBLIC SERVICES CENTER TO WEST CITY LIMIT (1 MILE). (CMAQ IN FY12/13 INCLUDES $15 OF TOLL CREDITS FOR ENG IN FY 14/15, $5 FOR RW, AND $234 FOR CON).	12/31/2014
VENTURA COUNTY	VEN130103	ON LAS POSAS RD FROM PLEASANT VALLEY RD TO LAGUNA RD, CONSTRUCT 2.05 MI CLASS III BIKE LANE. (CMAQ IN FY 14/15 INCLUDES $28 IN TOLL CREDITS.)	11/1/2015
VENTURA COUNTY TRANS COMMISSION (VCTC)	VEN040405	NEXT BUS UPGRADE FOR REAL-TIME BUS STOP SIGNAGE (TRANSIT ENHANCEMENTS)	7/1/2018
VCTC	VEN121002	FARE COLLECTION AND RIDERSHIP MONITORING EQUIPMENT AND MAINTENANCE	7/1/2018

[7] VEN130103 listed in the table is not a TCM because a Class III bike lane is not a TCM per Final 2015 FTIP Guidelines. The project's TCM designation will be removed via 2015 FTIP Amendment #15-01.

DRAFT FINAL 2016 AQMP
APPENDIX VI-F

PM PRECURSOR REQUIREMENTS

JANUARY 2017

Background

PM2.5 has four major precursors, other than direct PM2.5 emissions, that may contribute to the formation of the ambient PM2.5 levels: ammonia, NOx, SOx, and VOC. Historically, U.S. EPA's approach to the evaluation and regulation of PM2.5 precursors was pursuant to Subpart 1, Part D, Title 1 of the Clean Air Act (CAA). As described in the 2007 PM2.5 Implementation Rule (72 FR 20586) and the 2008 PM2.5 New Source Review Rule (73 FR 28231), control measures for volatile organic compounds (VOCs) and ammonia are not required to be evaluated unless a state or the U.S. EPA provides an appropriate technical demonstration that their emissions significantly contribute to PM concentration in the nonattainment area. In January 2013, the U.S. Court of Appeals, D.C. Circuit, ruled that the U.S. EPA erred in implementing the 1997 PM2.5 National Ambient Air Quality Standards (NAAQS) pursuant solely to the general implementation provisions of Subpart 1, without considering the particulate matter specific provisions of Subpart 4. Although Subpart 4 relates to PM10, the Court reasoned that the plain meaning of the CAA requires implementation of the 1997 PM2.5 standards under Subpart 4 because PM2.5 particles fall within the statutory definition of PM10 and are thus subject to the same statutory requirements as PM10. Subpart 4 has specific provisions regarding regulation of precursors of PM emissions that are not present in Subpart 1. Subpart 4 presumptively requires regulation of all PM2.5 precursors, except under certain circumstances. In August 2016, U.S. EPA issued the Final Rule of "*Fine Particle Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*" (81 FR 58010) that provides a planning requirement framework for the 2012 and future PM2.5 NAAQS pursuant to Subpart 4. States must evaluate and adopt control measures for direct PM2.5 and all four PM2.5 precursors from stationary, mobile and area sources, unless states could make the appropriate precursor demonstration to demonstrate that contribution of a precursor is insignificant.

The U.S. EPA issued final designations for the primary annual PM2.5 standard on December 18, 2014, designating the Basin as nonattainment. However, consistent with a court ruling, all areas that were previously classified nonattainment were subsequently reclassified as "moderate" nonattainment (79 FR 31566). For the 2006 24-hour PM2.5 standard, the Basin was initially designated as nonattainment in December 2009. Effective February 12, 2016, at the request of the SCAQMD, the U.S. EPA reclassified the Basin as a "serious" nonattainment area for the 2006 PM2.5 24-hour standard with an attainment date of December 31, 2019. A "serious" area attainment plan needs to be submitted no later than 18 months after the effective date, hence, by August 12, 2017. More stringent "serious" nonattainment area requirements apply including implementation of Best Available Control Measures / Best Available Control Technology (BACM/BACT), a lower major source emissions threshold (from 100 tons per year to 70 tons per year), and an update to the reasonable further progress (RFP) analysis given the longer attainment time frame. In the 2016 AQMP, all four PM2.5 precursors, namely ammonia, NOx, SOx, and VOC, are considered in the evaluation of control measures. Data and analyses of the four PM2.5 precursors are included in various elements of the 2016 AQMP, including:

- Emissions inventories (Chapter 3 and Appendix III)
- Attainment demonstration/impracticability demonstration (Chapter 5, Chapter 7 and Appendix V)
- The reasonably available control measures/reasonably available control technology (RACM/RACT) demonstration (Appendix VI-A)
- The best available control measures/best available control technology (BACM/BACT) demonstration (Appendix VI-A)
- Control strategies and other measures (Chapter 4 and Appendix IV)
- The reasonable further progress and quantitative milestone demonstration (Appendix VI-C), and
- Nonattainment new source review (NSR) (Appendix VI-G)

Section 189(e)

Section 189(e) of Subpart 4 also states that control requirements applicable to plans in effect for major stationary PM sources shall also apply to major stationary sources of PM precursors, except where such sources do not contribute significantly to PM levels which exceed the standard in the area. According to the U.S. EPA, a major source in a nonattainment area is a source with emission of any one air pollutant greater than or equal to the major source thresholds in a nonattainment area. This threshold is 100 TPY for a "moderate" nonattainment area and 70 TPY for a serious nonattainment area. Emissions are based on "potential to emit" and include the effect of add-on emission control technology, if enforceable (*must be able to show continual compliance with the limitation or requirement*). Major stationary sources of NOx and SOx are already subject to emission offsets and BACT requirements under Regulation XX (RECLAIM) and Regulation XII (New Source Review). Both VOC and ammonia are subject to requirements for BACT under existing NSR. VOC emissions are also required to be offset when a new or modified source will emit 4 TPY or more of VOC. The only practical difference between the existing control program for NSR and a program that expressly applies to VOC and ammonia as PM2.5 precursors is that any new or modified source of 70 TPY or more of ammonia will need offsets. To comply with the federal requirements for "serious" nonattainment areas, SCAQMD's NSR program (Rules 1302, 1325) are currently being amended to include VOC and ammonia as PM precursors and to incorporate the changes in defining the major source threshold.

DRAFT FINAL 2016 AQMP
APPENDIX VI-G

NEW SOURCE REVIEW

JANUARY 2017

Background

The federal Clean Air Act (CAA) requires permits for the construction and operation of new or modified major stationary sources (Title 1, Part D, Subpart 1, Section 172(c)). New Source Review (NSR) for major and in some cases minor sources of PM2.5 and its precursors is presently addressed through the District's NSR and RECLAIM programs (Regulations XIII and XX, respectively). Both of these programs are applicable to sources located in the SCAQMD jurisdiction, including the South Coast Air Basin and the Coachella Valley. Regulation XIII establishes the federal and State mandated pre-construction review program for new, modified, or relocated sources in the SCAQMD jurisdiction. The NSR program is a critical component of the SCAQMD's attainment strategy and ensures that all new and modified sources install Best Available Control Technology (BACT) and their emission increases are fully offset with creditable emission reductions. Rule 1302 specifies the definitions used in Regulation XIII. Rule 1325 was adopted June 3, 2011 to incorporate U.S. EPA's requirements for PM2.5 into Regulation XIII. The rule mirrors federal requirements which include the definition of major source, significant emissions rate, offset ratios, and the applicability requirements of Lowest Achievable Emission Rate (LAER), facility compliance, offsets, and control of PM2.5 precursors. Under existing NSR and RECLAIM programs, major stationary sources of NOx and SOx are already subject to emission offsets. Both VOC and ammonia emissions are subject to Best Available Control Technology (BACT) under the existing NSR at a zero threshold. VOC emissions are also required to be offset when a new or modified source has the potential to emit 4 tons per year or more of VOC. Ammonia emission sources have not historically been subject to NSR offset requirements. However, for permitted ammonia sources, SCAQMD Rule 1303 (NSR Requirements) requires denial of "the Permit to Construct for any relocation, or for any new or modified source which results in an emission increase of any nonattainment air contaminant, any ozone depleting compound, or ammonia, unless BACT is employed for the new or relocated source or for the actual modification to an existing source." BACT shall be at least as stringent as LAER as defined in the federal Clean Air Act Section 171(3) [42 U.S.C. Section 7501(3)]).

Major Source Threshold

The NSR permitting program relies on emissions thresholds to determine when certain requirements apply to new stationary sources and to modifications of existing stationary sources. If a new or modified facility will emit PM2.5 or PM2.5 precursor emissions greater than the major source threshold, the facility is considered a major source. Under the CAA, sources in a "moderate" PM2.5 nonattainment area are defined as major sources for nonattainment NSR provisions if they have a potential to emit 100 or more tons per year of PM2.5 or PM2.5 precursors. Under a "serious" nonattainment classification the threshold is reduced to a potential to emit 70 or more tons per year of PM2.5 or PM2.5 precursors. On December 18, 2014, the U.S. EPA issued final designations for the primary annual PM2.5 standard, designating the Basin as nonattainment. However, consistent with a court ruling, all areas that were previously classified nonattainment were subsequently reclassified as "moderate" nonattainment (79 FR 31566). For the 2006 24-hour PM2.5 standard, the Basin was initially designated as nonattainment in December 2009. Effective February 12, 2016, at the request of the SCAQMD, the U.S. EPA reclassified the Basin as a "serious" nonattainment area for the 2006 PM2.5 24-

hour standard with an attainment date of December 31, 2019. Serious nonattainment classification redefines the major source threshold to 70 TPY which affects SCAQMD Regulation XIII.

PM Precursor Requirement in Nonattainment NSR

Section 189(e) of Subpart 4 states that control requirements applicable to plans in effect for major stationary PM sources shall also apply to major stationary sources of PM precursors, except where such sources do not contribute significantly to PM levels which exceed the standard in the area. In August 2016, U.S. EPA issued the Final Rule of "*Fine Particle Matter National Ambient Air Quality Standards: State Implementation Plan Requirements*" (81 FR 58010) that requires states to evaluate and adopt control measures for direct PM2.5 and all four PM2.5 precursors from stationary, mobile and area sources, unless states could make the appropriate precursor demonstration to demonstrate that contribution of a precursor insignificant. Specifically, a "nonattainment new source review (NNSR) demonstration" is required in order to establish that sources of the particular precursors need not be regulated for the purpose of the NNSR permitting program.

Regulation XIII Amendments

To comply with federal requirements for "serious" nonattainment areas, Rule 1325 has been amended on November 4, 2016 to modify the Major Polluting Facility definition to align the associated major source emission threshold from 100 to 70 tons per year for PM2.5 and PM2.5 precursors. VOC and ammonia are also being proposed to be added to the Rule 1325 definition of Precursors and a VOC and ammonia threshold is proposed at 40 tons per year as part the definition of Significant. SCAQMD staff also corrected the SOx Major Polluting Facility threshold identified in Rule 1302 by lowering it from 100 to 70 tons per year. All of the rule amendments became effective upon adoption, with the exception of the Rule 1325 major source thresholds which will become effective August 14, 2017 or upon approval of the November 4, 2016 amendments to this rule by U.S. EPA, whichever is later.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Comments and Responses to Comments

2016 AIR QUALITY MANAGEMENT PLAN



JANUARY 2017

DRAFT FINAL 2016 AQMP

COMMENTS AND RESPONSES TO COMMENTS ON THE 2016 AQMP

JANUARY 2017

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
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PREFACE

A total of one hundred nine (109) comment letters have been received in the course of the 2016 AQMP development, including eight (8) comment letters received on the preliminary draft control measures for SCAQMD's stationary and mobile sources, 69 comment letters received on the Draft 2016 AQMP, and 32 comment letters received on the Revised Draft 2016 AQMP.

This document consists of three sections. Section 1 includes eight comment letters received on the preliminary draft control measures for stationary and mobile sources that were released to the public in April 2016. Section 2 includes 69 comment letters received on the Draft 2016 AQMP that was released on June 30, 2016. Section 3 has 32 comment letters received on the Revised Draft 2016 AQMP that was released on October 7, 2016. All comment letters received by December 23, 2016 were responded to and included in this Responses to Comments document.

Any comment letters received on the Draft Final 2016 AQMP, which was released on December 2, 2016, after December 23, 2016 will be provided with Final Plan at the February Governing Board Meeting scheduled on February 3, 2017.

Written comment letters are included in this document along with staff responses to the specific comments.

For some comments similar remarks have been previously made in other comment letters so the response may indicate where the reader can locate the appropriate previous response(s). Modifications have been made in the various versions of the Plan and/or Appendices in response to key comments received.

SECTION 1

COMMENTS AND RESPONSES TO COMMENTS ON THE PRELIMINERY DRAFT CONTROL MEASURES FOR STATIONARY AND MOBILE SOURCES

COMMENT LETTER NUMBER

AGENCY/ COMPANY	DATE	Comment Letter Number
American Coatings Association (ACA)	5/27/16	C
California Small Business Alliance (CSBA)	6/13/16	G
Michael Salman	4/20/16	A
Southern California Alliance of Publicly Owned Treatment Works (SCAP)	6/2/16	E
Southern California Gas Company (SoCalGas), Sempra Utilities	5/20/16	B
PITCO/MagiKitch'n/ANETS/PERFECT FRY COMPANY	5/31/16	D
Public Solar Power Coalition	6/15/16	H
Western States Petroleum Association (WSPA)	6/10/16	F

Michael Salman, April 20, 2016

Comment Letter A

From: Michael Salman <salman@history.ucla.edu>
Sent: Wednesday, April 20, 2016 1:49 PM
To: Michael Krause
Cc: Naveen Berry; Al Baez; Philip Fine
Subject: draft AQMP for stationary sources
Attachments: 2015-12-28_CalEPA_Letter_to_The_World_Bank_Group_Support_of_Zero_Routine.pdf; U.S.-Canada Joint Statement on Climate, Energy, and Arctic Leadership _ whitehouse.pdf

Dear Mr Krause,

Last Thursday, April 14, I had a meeting with Naveen Berry, Al Baez, and Phil Fine to discuss well site flaring and to advocate for demonstration project support for the use of fuel cells rather than a flare at the Murphy Drill Site in Los Angeles. I have been in touch with Naveen and Phil since last summer about this matter, and spoke at the September 2015 Board meeting about the Murphy case, the idea of a demonstration project using fuel cells, and also a request that SCAQMD write a rule prohibiting routine flaring at well sites.

Naveen brought up the AQMP process and was surprised that I had not received any e-mails about it since he thought he had put me on the e-mail list. That evening Celia Diamond sent me the preliminary draft AQMP measures for stationary sources. I am still reading and processing the document, but my preliminary sense is that I am very glad to see the emphasis on making beneficial use of well site gas that might otherwise be flared.

I'm writing to introduce myself, and also to tell you a little about my work in this area in which I have informally collaborated with the World Bank's Zero Routine Flaring Initiative, as well as being focused on local well sites in the City of Los Angeles. A-1

At the meeting with Naveen, Al, and Phil last Thursday I was accompanied by Martyn Howells, a petroleum engineer who is on the staff of the World Bank's Zero Flaring Initiative. In December 2015, the State of California signed on to the World Bank initiative, committing the State to the policy goals of: 1) not approving new routine flaring at well sites, and 2) eliminating legacy routine flaring at well sites as quickly as possible and by 2030 at the latest. I am attaching a copy the State's letter of commitment to the World Bank, signed by Matthew Rodriguez of CAL EPA.

I am also attaching a copy of the White House press release from March 10, 2016, in which the US and Canadian federal governments announced their commitments to sign on to the World Bank Zero Flaring Initiative.

In light of these developments, I want to reiterate my request that SCAQMD prohibit routine flaring at well sites, much as it already prohibits routine flaring at refineries. Please pardon me if that is not suitable for the AQMP process, as I am new to the process. A-2

I also want to reiterate my request that SCAQMD do whatever it can to provide incentives for zero or near zero emission beneficial use of well site gas, and specifically that SCAQMD please advance support for a demonstration project using fuel cells to handle well site waste gas. A-3

As the draft AQMP report already emphasizes, there are many options for beneficial use of well site gas in the Basin: sale through SoCalGas, generation of electricity through microturbines or fuel cells, gas-to-liquids, and A-4

use as CNG for vehicles.

In addition, some drill sites already have gas injection wells. For example, the Murphy Drill Site in Los Angeles, for which FMOG has proposed installation of a CEB 800 flare, has long had a gas injection well. In the 1970s and early 1980s the injection well handled far more than 1 mmcf/day, until sales through SoCalGas started after 1986. Since then the injection well has hardly been used at all. In 2011-12 it was worked-over, so it could be used. Other drill sites could add a new injection well if needed.

The modern Controlled Drill Sites in the City of Los Angeles did not have flares until one was first installed at Wilmington when that site was established in 2006. All the other Controlled Drill Sites date from the late 1950s and 1960s, and they have never used flares. The Murphy Drill Site and its two sibling drill sites at Jefferson and 4th Ave have never had flares. Gas was either sold or re-injected, and there was no flare for back-up. If sale or re-injection temporarily went off line, pumping stopped.

Unlike refineries, there is no safety argument for emergency or back-up flaring at well sites during normal production operations. Drilling might be different, but 1) that can be handled by a temporary mobile flare if it is truly necessary, and 2) to the best of my knowledge no modern Controlled Drill Site in the City of Los Angeles has ever employed a flare during drilling.

A-4 Con't

For all of these reasons plus the fact that beneficial use of the gas is possible, I want to urge SCAQMD to prohibit at least all routine flaring at wells sites and then either prohibit or set extremely strict controls for emergency flaring at well sites.

Beneficial use of the gas is not only readily possible, it would also be lucrative. That was one of the main points of my meeting last week with SCAQMD staff. In the Murphy case, off-spec gas can be used in fuel cells and get a 16% average annual rate of profit over 20 years ***without SGIP funding, without sale of hydrogen from trigen or any subsidies or credits for hydrogen production, and without any demonstration project funding.*** Add in any of those perks and the profit rate pops.

I should add, too, that the clean-up needed for off-spec gas at well sites in Los Angeles is far simpler than the clean-up needed for bio-gas. The gas profile is more consistent and contaminants much lower than with bio-gas.

These are subjects that we discussed at some length with Naveen, Al, and Phil.

Please let me know if there is more information I can provide. I look forward to meeting you at some point during this process.

Yours

Michael Salman

Responses to Comment Letter from Michael Salman (Comment Letter A)
April 20, 2016

Response to Comment A-1:

Thank you for your interest in this AQMP process and for bringing your comments to our attention.

Response to Comment A-2:

Proposed control measure CMB-03 addresses reductions of NOx and VOC emissions from flare gas handling at non-refinery sources, such as organic liquid loading stations, tank farms, oil and gas production facilities, landfills, and wastewater treatment facilities. Flare NOx emissions, as well as VOC, CO and PM emissions, are currently regulated through the Best Available Control Technology (BACT) determination process in SCAQMD Rules 1303 and 1701, but there are currently no source-specific rules regulating NOx emissions from flares at these sources. Flares have been identified as significant emitters of NOx. Additionally, these efforts will coincide with the Zero Routine Flaring by 2030 initiative being undertaken by the World Bank, as the commenter originally mentioned. In the proposed control measure, two levels of proposed method of control would be considered: 1) routing the gas that would typically be flared and directing it to equipment that can convert or clean the gas into an acceptable renewable energy source; and 2) the installation of newer flares implementing the best available control technology. The details of the proposed control methods can be found in Appendix IV-A of the 2016 AQMP.

Response to Comment A-3:

Proposed control measure CMB-01 would seek emission reductions of NOx and VOC from traditional combustion sources by replacement with zero and near-zero emission technologies. Fuel cells, as one of the zero and near-zero emission technologies, are one way to shift away from combustion sources generating NOx emissions including flares. SCAQMD would seek to incentivize emission reductions from various stationary and area sources through incentive programs for the use of zero and near-zero emission technologies (e.g., fuel cells) as an effective approach in achieving immediate NOx reductions. Details on the incentive programs regarding CMB-01 can be found in Appendix IV-A of the 2016 AQMP.

Response to Comment A-4:

CMB-03 of the 2016 AQMP seeks various pathways to control flare gas from non-refinery sources, which includes initial efforts for beneficial gas use such as transportation fuel, microturbines, fuel cells, gas cleanup for sale, and/or gas cleanup for pipeline injection, then installation and operation of BACT clean enclosed burners. Cleaning up waste gas for sale or for pipeline injection would produce near-zero emissions. NOx reduction would also be achievable for source categories such as oil and gas production wells, tank farms, and even with the replacement of traditional thermal oxidizers.

Southern California Gas Company (SoCalGas), Sempra Utilities, May 20, 2016

Comment Letter B

SoCalGas
A Sempra Energy utility

Noel Muyco
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Environmental Affairs

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May 20, 2016

Dr. Philip Fine
Deputy Executive Officer
Planning, Rule Development, And Area Sources
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Draft 2016 Air Quality Management Plan (AQMP) Control Measures

Dear ~~Dr. Fine~~ Phil:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide feedback on the recently released draft Stationary and Mobile Source Control Measures for the 2016 AQMP. SoCalGas strongly supports the South Coast Air Quality Management District's (SCAQMD) efforts to develop an integrated AQMP to update the 80 ppb 8-hour ozone standard and plan for the challenging 75 ppb 8-hour ozone standard in addition to the annual and 24-hour PM 2.5 standards.

The attainment of the Clean Air Act standards is vitally important to those communities in which SoCalGas operates and provides natural gas service. SoCalGas has demonstrated its support of SCAQMD's efforts to plan for attainment of these challenging standards through its participation in the early stages of the AQMP process, including providing input to assist with White Paper development, participating in the Advisory Group, and through our ongoing commitment to provide productive feedback by engaging with staff and subject matter experts. At this critical juncture in the drafting process, we respectfully submit the following comments and hope to continue our valuable dialogue with SCAQMD. B-1

I. Stationary Combustion Sources: CMB-01

As discussed in our May 3, 2016 meeting, SoCalGas is concerned about the scope of CMB-01 (Transition to Zero and Near-Zero Emission Technologies for Stationary Sources). In its current form, CMB-01 is broadly defined to include engines, turbines, microturbines, boilers, and flares at commercial, industrial, residential, and transportation sources. SoCalGas also remains concerned about the top-down process of committing to reduce 30% of emissions by 2023 and 60% of emissions by 2031 without identifying specific emissions inventories. Rather, we would suggest developing an emissions reduction commitment based on a bottom-up B-2

approach starting with existing inventory profiles, with an additional filtering analysis that considers feasibility and cost-effectiveness before committing to an across-the-board percentage reduction. The newly revised AER reporting tool has the potential to assist in such an approach to develop an enforceable emission reduction estimate for this control measure. However, it is just now being implemented, and the results must be verified in the field before enforceable commitments can be developed using this new tool.

B-2 Con't

By focusing efforts on feasible, cost effective categories or groups of equipment, SCAQMD could leverage cost-effective technologies and incentive funding to achieve significant emission reductions. SoCalGas supports the concept of a Phase I Implementation Schedule that would further inform this task. However, the current approach to calculate an emission reduction requirement relying on the Fair Share reduction strategy may result in committing the District to emission reductions from stationary sources that are neither cost effective, nor feasible. Moreover, stationary sources are such a small share of the emissions inventory that setting a top-down reduction target is not appropriate until we gain a better understanding of the emissions reductions that can be achieved from mobile sources.

B-3

Our concerns are reinforced by an examination of the 2012 AQMP inventory for stationary sources, compared to the 2016 inventory shared with us. In particular, we note a significant difference in the estimates for industrial and commercial natural gas fired IC engines.

	NOx Estimate 2023 Baseline (2012 AQMP)	NOx Estimate 2023 Baseline (2016 AQMP)	Difference – 2023 Baseline (2016 AQMP) vs. 2023 Baseline (2012 AQMP)
Industrial Stationary ICE - Natural Gas (NOx) (CES 66787)	0.3421 tpd	1.278 tpd	+0.9359 tpd
Commercial Natural Gas ICE (NOx) (CES 95024).	0.1921 tpd	2.627 tpd	+2.4349 tpd

B-4

The "NOx Estimate 2023 Baseline (2012 AQMP)" was analyzed for SoCalGas by Ramboll Environ, and we submitted it to the District in 2012. We have attached that document to these comments for your reference (see Attachment 1). There may be differences in inventory protocols and classifications that have occurred since 2012, and we look forward to further discussions to understand the differences. However, these examples give us reason to urge further investigation of the feasibility and cost effectiveness of actual emission reduction technology applications, i.e. a bottom-up approach instead of a top-down approach. We suspect that there may be other areas that offer more certainty upon which to base an enforceable commitment in the AQMP.

Additionally, while fuel cells are an attractive advanced technology to incentivize, we caution mandating a technology-specific approach. Fuel cells may emit less on a megawatt-hour basis than a combined heat and power (CHP) system and, at first glance, may appear to be less costly to operate, but when boiler fuel costs are taken into account, they are actually more expensive. While natural gas prices do fluctuate, at a fully bundled price of $0.50/therm (commodity plus transportation), fuel cells can cost an additional $1.50/hr to $7.50/hr to operate compared to a natural gas engine. This would be in addition to the $7,000/kW price a customer will have to pay for a new system. Still, SoCalGas believes that the SCAQMD is on the right track. While replacing CHP with fuel cells may cost a customer additional money, new fuel cells and CHP projects will provide a customer savings on their utility bills all while emitting no more than 0.07lbs NOx/MWh. This would provide a cost effective situation for a customer, while lowering NOx emissions from the grid (i.e. in Southern California Edison's Utility Owned Generation had a NOx emission factor of 0.1 lbs/MWh, as described in their 2014 Corporate Responsibility Report). B-5

Once categories of equipment are identified as emission reduction targets, SoCalGas would welcome the opportunity to partner in leveraging incentive dollars to achieve the reductions needed for CMB-01, CMB-02 (Emission Reductions from Commercial and Multi-Unit Residential Space and Water Heating), CMB-04 (Emission Reductions from Restaurant Burners and Residential Cooking), and BCM-01 (Further Emission Reductions from Commercial Cooking). B-6

II. Space and Water Heating: CMB-02

SoCalGas supports a fuel neutral approach in order to achieve emissions reductions from commercial space heating furnaces, boilers, and water heaters. While we support the application of lower NOx units to replace commercial central furnaces, we urge SCAQMD to work with manufacturers to set manageable timelines for development and commercialization. Given manufacturers' recent reliability, durability, and safety concerns regarding the new 14 ng/joule NOx residential central furnaces, we recommend that the SCAQMD work closely with industry to resolve these design and safety issues before proposing similar mandatory emission limits on commercial size space heating equipment. To help create a path forward, SoCalGas could partner with SCAQMD and the manufacturers to invest in research, and to conduct longer-term field demonstrations. B-7

SoCalGas encourages the development of an incentive program that is designed to take advantage of existing energy efficiency programs targeting higher efficiency water and condensing gas space-heating products. Again, the SCAQMD should focus valuable incentive dollars on replacing older units with near zero and zero technologies (e.g. replacing 40 ng/joule NOx units with newer, less polluting 10 ng/joule NOx water heaters and 14 ng/joule NOx space heaters). In determining cost effectiveness, we recommend considering the length of useful life left. Early replacement programs should evaluate the optimum remaining useful life for replacement candidates. B-8

III. Restaurant and Cooking Operations: CMB-04, BCM-01

With regard to the control measures addressing residential and commercial cooking emissions, CMB-04 and BCM-01, SoCalGas encourages SCAQMD to work with manufacturers to set manageable timelines for development and commercialization of new equipment. SoCalGas would be happy to facilitate a meeting at the Foodservice Equipment Center between commercial food service equipment manufacturers, restaurant owners, and SCAQMD staff so as to assist with the identification of priority sources targeted for emissions reductions. Further, since these categories of equipment have never before been subject to regulation, SoCalGas recommends conducting an initial study to investigate NOx emissions profiles. Collaboration between SCAQMD and SoCalGas on such a study and the subsequent research and development to identify new, low NOx burner technologies could provide pathways to demonstrate new technologies for use in actual restaurant operations. Such a collaborative effort could result in engagement with over 60 manufacturers and suppliers, and over 25 business and trade organizations. We are taking the first step towards a large-scale collaborative effort by facilitating a meeting between regulators and manufacturers of restaurant equipment at SoCalGas' Energy Resource Center in early June. B-9

IV. Mobile Source Measures: MOB-08

In addition, SoCalGas strongly supports the use of incentives in the Mobile Source Control Measures to drive the introduction of natural gas, near zero transportation solutions. The CARB Mobile Source Strategy Control Measure "Further Deployment of Cleaner Technology: On-Road Heavy-Duty Vehicles" seems to cover the same population of on road heavy duty trucks as MOB-08 (Accelerated Retirement of Older On-Road Heavy-Duty Vehicles). We would ask that SCAQMD and CARB provide an explanation about how the two control measures will work together. For example, MOB-08 emission reductions are listed as "TBD." Although SCAQMD staff has explained that those measures labeled "TBD" are not necessary for attainment, SoCalGas believes that cost effective and feasible emissions reductions can be identified for MOB-08 for inclusion in the attainment strategy. The similar measure proposed by the California Air Resources Board (CARB) in the Mobile Source Strategy (MSS) has a commitment for a 34 ton per day reduction by 2023. MOB-08 provides a clear pathway for emissions reductions and should be implemented in coordination with the corresponding MSS measure. B-10

Moreover, inclusion of MOB-08 in the attainment strategy will send the right signal to engine manufacturers and other market participants. As SCAQMD is well-aware, in 2015, Cummins Westport Inc. (CWI) certified the world's first heavy-duty engine at near-zero emission levels—90 percent below the existing federal standard, and certified to meet ARB's lowest-tier optional low-NOx emission standard at 0.02 g/bhp-hr NOx. This "next generation" heavy-duty natural gas engine is now commercially available for transit bus, refuse, school bus, and medium-duty truck applications. Additional near-zero-emission heavy-duty natural gas engines are expected to follow by 2018, addressing a wider array of medium- and heavy-duty on-road applications. The tailpipe emissions of HDVs running on these engines are as low as emissions associated with generating the electricity used to charge heavy-duty battery-electric vehicles (BEVs) with a state of the art generation plant. When paired with RNG, which provides B-11

the lowest carbon intensity of any transportation fuel available today, this technology can provide significant GHG emissions reductions (80 percent or greater). Further detail on this technology and associated benefits are provided in the "Game Changer Technical Report," prepared by Gladstein, Neandross & Associates (GNA) (see Attachment 2 for the Executive Summary). B-11 Con't

SoCalGas appreciates the opportunity to provide these comments and we look forward to further clarifying these issues as we continue our dialogue with SCAQMD staff. Please do not hesitate to contact me to discuss any questions or concerns. B-12

Best Regards,

Noel Muyco

Attachments
1- Environ NOx Estimate 2023 Baseline (2012 AQMP)
2- Game Changer Executive Summary

Responses to Comment Letter from SoCalGas (Comment Letter B)
May 20, 2016

Response to Comment B-1:

SCAQMD staff appreciates your comments on the preliminary draft stationary and mobile source control measures for the 2016 AQMP.

Response to Comment B-2:

The proposed control measure CMB-01 of the Draft 2016 AQMP released on June 30, 2016 has been updated from the preliminary draft version released on April 8, 2016. Emission reductions have been updated, for which about 14 and 27 percent of reductions are estimated to achieve by 2023 and 2031, respectively. Although the AQMP can use a top down approach in estimating emission reductions for planning purposes, more detailed analyses will be conducted during actual rulemaking, including the refinement of existing inventory, feasibility and cost-effectiveness.

Response to Comment B-3:

Incentive funding for zero- and near-zero emission technologies is one of the 2016 AQMP approaches. Feasibility and cost-effectiveness of the technology will be considered when selecting incentives. The emission reduction requirement was initially calculated relying on the fair share reduction strategy; however, the proposed emission reductions in the 2016 AQMP are based on the reductions from both stationary and mobile sources and surpass the required reductions.

Response to Comment B-4:

The 2016 AQMP uses the latest inventory for emission sources. The NOx estimates 2023 baseline (2012 AQMP) for CES 66787 and 95024 provided in the comment are not correct numbers. For CES 66787, the 2023 baseline NOx estimate in 2012 AQMP was 1.010 tpd (versus 1.278 tpd in 2016 AQMP). There is no CES 95024 in 2012 AQMP. CES 47167 (*Commercial Natural Gas Combustion – Other; 5.336 tpd*) exists in 2012 AQMP, however, in the 2016 AQMP that category is split into two new categories - CES 95024 (2.627 tpd) and 95025 (2.578 tpd), thus totally 5.205 tpd. Higher NOx estimate 2023 baseline (2016 AQMP) inventories for CES 66787 resulted from updated inventories for the existing source categories since the 2012 AQMP. The feasibility and cost-effectiveness of emission reduction technology applications will be considered when actual rulemaking process takes place.

Response to Comment B-5:

Fuel cells are one of the attractive advanced technologies and are not mandated, but considered as a near-zero emission technology. As the commenter stated, replacing the combined heat and power (CHP) with fuel cells could bring a customer savings on their utility bills while emitting less NOx emissions from the grid. SCAQMD staff will continue to research ways to lowering operational costs.

Response to Comment B-6:

SCAQMD staff would welcome the opportunity to partner with SoCalGas in leveraging incentive dollars of equipment identified to achieve reductions needed for CMB-01, CMB-02, CMB-04, and BCM-10.

Response to Comment B-7:

SCAQMD Rule 1111 amended in September 5, 2014 requires the new 14 ng/J NOx emission limit for residential and commercial central fan-type water heaters. This low NOx limit requirement has already been implemented for natural gas water heaters manufactured and installed in the Basin. Continuous implementation of this 14 ng/J NOx emission limit is part of the proposed control methods for CMB-02.

Response to Comment B-8:

As part of CMB-02 control methods, SCAQMD staff would develop an incentive program to replace existing, older water and space heating units with new, lower NOx units. Several factors including the length of useful life of the equipment would be considered in determining the cost-effectiveness of a replacement unit.

Response to Comment B-9:

SCAQMD staff would welcome an opportunity of collaboration between SCAQMD and SoCalGas on such a study and subsequent research and technical assessment to determine the current NOx emission level of various appliance types in each of the equipment categories for CMB-04 and BCM-01. Staff is also going to work with manufacturers to set manageable timelines for development and commercialization of new, low NOx burner technologies.

Response to Comment B-10:

CARB's "Further Deployment of Cleaner Technology" for on-road heavy duty vehicles does cover the population considered in the SCAQMD MOB-08 mobile source control measure which is why the emission reductions already claimed under the CARB measure are not repeated under the SCAQMD measure. This avoids over-counting emission reductions and why the MOB-08 is listed as "to be determined" for emission reductions. The concept is that the CARB measure is the overarching goal in deploying cleaner on-road heavy duty vehicles and MOB-08 is focused on the local regional effort in accelerating the retirement of older on-road heavy duty vehicles. This can be done, for example, through the existing SCAQMD fleet rules, thus the implementation of this measure would be conducted locally by the SCAQMD. Once the local reductions are determined, the reductions can be credited toward the commitment under the CARB "Further Deployment of Cleaner Technology" for on-road heavy duty vehicles.

Response to Comment B-11:

SCAQMD staff agrees with your comments and thanks for providing additional documentation. In fact, a new set of optional NOx emission standards (0.1, 0.05, and 0.02 g/bhp-hr) for on-road heavy-duty engines not only provides greater emission reductions than engines simply meeting the current mandatory standard, but also the ability to access incentives funding for engine manufacturers and other market participants. As part of the control measure MOB-08, SCAQMD would be seeking to generate and/or develop public funding programs that more incentive funding may be available to accelerate the retirement of older on-road heavy-duty vehicles with the deployment of newer, lower-emitting heavy-duty engines in the market.

Response to Comment B-12:

SCAQMD staff appreciates your comments and looks forward to continuing to work with SoCalGas.

American Coatings Association (ACA) – David Darling, May 27, 2016

Comment Letter C

From: David Darling <ddarling@paint.org>
Sent: Friday, May 27, 2016 6:45 AM
To: Philip Fine; Heather Farr; Diana Thai
Cc: Pierce Wiegard
Subject: CTS-01 Comments

Phil, Heather and Diana,

I appreciate your willingness to share a copy of the draft CTS-01 language and taking into account our comments from our meeting earlier this month. While ACA sees your changes as an improvement from the initial preliminary draft CTS-01, we still have several outstanding concerns with the current language. To address these concerns we offer the following comments and suggestions on behalf of ACA's Architectural and Industrial Maintenance Committee members. C-1

Regulatory History

While we appreciated the advanced notice the District gave us of your intent to add Rules 1107 and 1136 to the CTS-01, we are still concerned that the District is adding more rules than are necessary to achieve the District's CTS-01 VOC reduction goals. Based on the last CTS-01 version and our meeting, it was our understanding that the District believes that the approximately 1 ton per day of the reductions called for will potentially come from amendments to Rule 1168. However, as drafted the current CTS-01 is including many more coatings rules. While we appreciate that the District is including these rules that could be amended as fallbacks should reductions not result from anticipated action, we believe some of these rules should not be included in the CTS-01 or amended at this time. C-2

Marine Coatings Rule 1106/Aerospace Assembly and Component Manufacturing Operations Rule 1124

While we believe that including Rule 1124 may make sense given the lower limits in Ventura County Air Pollution Control District's Aerospace rule, we do not agree with including Rule 1106 as a source of potential VOC reductions. Just last year the District proposed amendments to Rule 1106 that would not have lower the VOC limits. Yet proposing to evaluate the sufficiency of RACT for 1106 in CTS-01 seems at odds with that past proposal. Without sufficient new reasons or circumstances to change the Districts past reluctance to amend the limits in Rule 1106, we ask that you consider dropping Rule 1106 from CTS-01. C-3

Metal Parts and Products Coatings Rule 1107

We believe that Rule 1107 should not be included in the CTS-01, if inclusion is solely based on potential resolution of the Health Risk Assessment (HRA) for TBAC. There are other technological issues that go well beyond waiting for a final HRA determination on TBAC that make further VOC reductions from this category infeasible at this time. In particular, we are concerned that metal parts product coatings have different attributes than architectural and industrial maintenance coatings in that low VOC architectural and industrial maintenance coatings can't necessarily be used on metal parts that may have to be shortly after application. Therefore, the metal parts and products category has less proven low VOC compliance options potentially making further reductions in this category infeasible at this time. Thus we suggest dropping Rule 1107 from CTS-01. C-4

Wood Products Coatings Rule 1136 C-5

We also suggest that SCAQMD remove Rule 1136 from the CTS-01. The EPA and California Department of Toxic Substances Control are currently weighing actions on Methylene Chloride (DCM) commonly used in paint stripper. These rulemakings could alter the wood products coatings industry. In turn this would mean premature amendments to this category could have unintended consequence or necessitate further amendments unnecessarily stressing industry and government resources. Therefore, we ask the District to wait until EPA, DTSC complete their work before considering additional reductions from this category. C-5 Con't

Architectural Rule 1113

We appreciate your willingness to move Rule 1113 to the bottom of the list of potentially impacted rules and grouping it with Rule 314 as we discussed earlier this month. However, we would like to reiterate our position that since the section containing Rule 314 and Rule 1113 contemplates actions that will likely be taken solely under Rule 314 verification and reporting programs as originally included in the 2007 AQMP, including Rule 1113 in the CTS-01 is not necessary. Further, as we have noted, the District only just finished amending Rule 1113. Thus, we again suggest linking the coating certification program solely to Rule 314 and dropping Rule 1113 altogether from CTS-01. C-6

Proposed Method of Control Section

We have some concerns with the language in the first sentence of the propose method of control section: "Reductions would be achieved by tightening regulatory exemptions that may be used as loopholes and lowering the VOC content for a select few categories where most products are already meeting lower VOC limits." The language could be construed as a place marker for further reducing or doing away with the "Small Container Exemption" (SCE) in Rule 1113. While targeted compliance and enforcement efforts may be beneficial to maximizing the benefits of existing regulation, we believe it is critical that the District keep compliance options such as the SCE. ACA supports efforts to prevent true circumvention of the regulations through modification of the rules while maintaining compliance options like the SCE. C-7

To reflect the scope of these proposed control methods in the 2016 AQMP, we respectfully request that the District consider making the following changes: "Reductions would be achieved by lowering VOC content limits for a select few coating categories in rules that have not been updated within the past ten years (including Rule 1124 (Aerospace Coatings) – last amended 9/21/2001, and Rule 1168 (Adhesives) – last amended 1/7/2005) and also addressing potential regulatory loopholes."

Exempt Compounds and TBAC Report

During our meeting earlier this month you expressed that it was the intention of staff to prepare a TBAC report to present to the Board this summer. It was our understanding that the report would outline how the Board should act if OEHHA finds TBAC is a toxic air contaminant. Our members are very concerned with this report process, and its implications for formulation and compliance options for VOC limits across multiple categories. In particular, ACA believes that a move to withdraw exemptions without recommendations from OEHHA, a final report from CARB, approval by the Scientific Review Panel on Toxic Air Contaminants and a robust weighing of input from industry would be improper and lead to unnecessary disruptions. As such we suggest multiple stakeholder meetings—at least one in the early stage to go over what is going to be covered in the report and a second when the draft report is released. An open process will allow the Board to make an informed decision on how to proceed further with input from stakeholders. Our member would also request confirmation of the extent to which the District plans to engage stakeholder in the TBAC report process. C-8

ACA also urges the District, should it move forward with the report, to investigate raising VOC limits for industrial maintenance coatings and auto refinish coatings, since many formulations that comply with the current limits can only do so with the use of TBAC. Further, should the District eventually modify any exemptions or limits, we request the District include an adequate implementation timeframe to allow C-9

manufacturers to adjust their formulations.

In conclusion, we are concerned that the District is including more coatings rules than necessary to achieve the District's CTS-01 VOC reduction goals of 1-2 tons. We also suggest including Rule 314 in CTS-01 without reference to Rule 1113. Finally, we suggest multiple TBAC report stakeholder meetings, and an adequate implementation timeframe especially since any changes that result from this report could have a great impact on the coatings industry. C-10

Thanks

David Darling, P.E.
Managing Director, Health, Safety and Environment
American Coatings Association
1500 Rhode Island Ave., NW
Washington, DC 20005
202-719-3689

Responses to Comment Letter from American Coatings Association, David Darling (Comment Letter C)
May 27, 2016

Response to Comment C-1:

Staff thanks for your participation in this process, as well as for your comments and suggestions.

Response to Comment C-2:

SCAQMD staff's responses are provided below as to why these rules should be included in CTS-01. These rules listed in the Regulatory History section of the control measure description in Appendix IV-A are potentially likely to be affected by this control measure due to toxicity concerns, RACT evaluations and potential loophole elimination. However, the applicability and effects to these rules would be determined in the actual rulemaking process.

Response to Comment C-3:

Staff has modified the Regulatory History of the control measure CTS-01 in the Draft Plan to clarify why Rule 1106 has been included for consideration as a source of potential VOC reductions. Staff intends to combine Rules 1106 and 1106.1 to promote clarity and evaluate whether the rules satisfy RACT requirements. The commenter is also referred to read the latter part of Response to Comment C-2.

Response to Comment C-4:

Inclusion of Rule 1107 in the control measure has also been clarified in the Regulatory History of the control measure CTS-01 in the Draft Plan. The commenter is also referred to read the latter part of Response to Comment C-2.

Response to Comment C-5:

Similarly to Rule 1106 and 1107, reasoning for including Rule 1136 in control measure CTS-01 has been explained in the Regulatory History of the control measure CTS-01 in the Draft Plan. The commenter is also referred to read the latter part of Response to Comment C-2.

Response to Comment C-6:

The coatings certification program to assess the potential SIP reductions has been included in the Regulatory History of the control measure CTS-01 in the Draft Plan.

Response to Comment C-7:

As the commenter acknowledged, some of regulatory exemptions may be used as loopholes. To respond to the concern, existing exemptions will be reviewed if there exists potential regulatory loopholes. This statement will stay in the control measure.

Response to Comment C-8:

SCAQMD staff has prepared a review of the existing limited exemption for tBAc and analyze the health risks using the new draft inhalation cancer potency factor established by the Office of Environmental

Health Hazard Assessment (OEHHA) in August 2015 that is higher (more carcinogenic) than previously estimated. A preliminary draft white paper has been prepared by the SCAQMD that discusses the regulatory history, health risk analysis, and staff recommendations for the exemption of tBAc. The preliminary draft tBAc paper can be accessed at http://www.aqmd.gov/docs/default-source/planning/tbac/tbac-preliminary-draft-paper.pdf?sfvrsn=2 A stakeholder meeting was held on November 1, 2016 to discuss the preliminary draft white paper and was presented to the SCAQMD Stationary Source Committee meeting on November 18, 2016. Both meetings provided the public an opportunity to comment and participate in the recommendations made in the white paper.

Response to Comment C-9:

As discussed in the tBAc Assessment White Paper, no changes to the current existing rules including VOC limits and exemptions, are being proposed to change.

Response to Comment C-10:

Rule 314 has been added to the Regulatory History in the control measure CTS-01 as part of the Draft Plan. In addition, clarification has been added as to the purpose of the proposed rule amendment. In addition, clarification as to the intent of the amendments for other VOC rules has been added noting that some of the rules are not anticipated to generate substantial emission reductions. Thus, SCAQMD staff is confident that the committed emission reductions from the implementation of CTS-01 will be achieved within the given timeframe.

PITCO/MagiKitch'n/ANETS/PERFECT FRY COMPANY, May 31, 2016

P.O. Box 501
Concord, NH 03302
603.225.6684
fax 603.225.8472

May 31, 2016

Comment Letter D

Melisa Marks, CFSP
Southern California Gas Co.
Energy Resource Center
9240 Firestone
Downey, CA 90241

Subject: Meeting – "Overview of Foodservice Equipment Industry for the South Coast AQMD"

Dear Ms. Marks:

Thank you for the invitation to the meeting hosted by the Southern California Gas Co. titled "Overview of Foodservice Equipment Industry for the South Coast AQMD" being held at y our facility on June 1st. Unfortunately, I will be unable to attend. I did, however, want to take this opportunity to share with you my concerns regarding proposed SCAQMD regulations governing NOx and PM from Commercial Restaurant Equipment. D-1

As a manufacturer of commercial cooking equipment, Pitco/MagiKitch'n/Anets/Perfect Fry is committed to providing our customers with innovative and cost effective solutions to their cooking equipment needs. We understand that the AQMD is challenged to achieve emission reduction levels to comply with National Ambient Air Quality Standards. It is our belief that, in order to set targets that are achievable, there first needs to be an understanding of the current NOx emission levels being produced by existing equipment in the marketplace. This can then lead to planning to either promote existing equipment technologies that are low NOx emitters, or the development of new low NOx technologies applied to commercial cooking equipment. Since NOx is not currently regulated on the equipment covered by CM # CMB-04, we do not believe that, at this point, there is a thorough understanding of the existing state of the industry as it relates to NOx. Our concern is that the AQMD will set targets or mandatory emission limits that are either unattainable, or will require considerable added expense to achieve. D-2

With that in mind, we would ask that the AQMD engage Manufacturers and Gas Industry Representatives to undertake a study to determine the current NOx emission levels of various appliance types in each of the equipment categories covered by CMB-04. Considering that each of these appliances, e.g. ovens, ranges, fryers, and charbroilers, potentially uses different burner designs and each has unique design challenges that need consideration, we feel that each appliance may need to be evaluated independently. Certainly any investment that the AQMD can make in supporting such a study would be helpful to achieving the allocation of resources to completing it in a timely fashion. D-3

Given the current lack of knowledge of current emission levels from commercial cooking equipment, and a lack of understanding of the details of what SCAQMD is proposing in CMB-04, it is difficult to estimate the costs and times that would be needed for compliance. It is possible, if levels are set without a viable baseline, that they levels may be unrealistic and our ability to sell gas fired equipment into this region would be severely limited or outright banned for an extended period. Until we have a better understanding of both current emission levels and the targets that SCAQMD is proposing, we can only say that a considerable amount of resources and time will likely be required to achieve NOx reduction. D-4

In recent years, there has been a considerable industry drive toward energy efficient equipment in commercial cooking equipment. In understanding that energy efficiency and low NOx production are often at odds with each other when it comes to burner and combustion system design, we want to be cautious to maintain the strides that have been made in energy efficiency while searching for solutions D-5

to NOx reduction. We would expect that the AQMD's interests would be aligned, since an increase in overall fuel usage, even if it achieved lower NOx, would likely run counter to the AQMD's goals. D-5 Con't

In general, we would ask that the SCAQMD undertake to understand the current state of the industry and exercise prudence in setting equipment standards that are both achievable and cost effective. This has the potential to minimize the effect on end users and consumers while still helping achieve emission reductions. D-6

Please share with me any notes or comments from the meeting, if you would. We obviously have an interest in how this subject develops.

Thank you,

Mark McCabe

Mark McCabe
Vice-President of Key Accounts

Responses to Comment Letter from PITCO et al. (Comment Letter D)
May 31, 2016

Response to Comment D-1:

SCAQMD staff appreciates your participation in this process and comments for CMB-04 – *Emission Reductions from Restaurant Burners and Residential Cooking*.

Response to Comment D-2:

Proposed control measure # CMB-04 suggests broad categories of restaurant burners and residential cooking equipment in nature that are currently unregulated NOx emission sources. Comprehensive research would be conducted for attainable emission limits and cost-effectiveness of the equipment in actual rulemaking.

Response to Comment D-3:

Studies were undertaken to determine NOx emissions from various cooking appliances, of which results are provided in Proposed Method of Control section of CMB-04 located in Appendix IV-A of the Draft Plan. The SCAQMD could support development of low NOx burner technologies for some types of equipment that could not be readily replaced by high efficiency equipment.

Response to Comment D-4:

The 2016 AQMP emissions inventory identifies NOx emissions from fuel combustion in residential, service and commercial operations. The emission inventory at various attainment years can be found in Appendix III of the 2016 AQMP. Further detailed inventory reviews will be performed during the rulemaking process.

Response to Comment D-5:

Achieving energy efficiency and low-NOx production are not necessarily at odds with each other. High efficiency cooking equipment consumes less therms of natural gas, which consequently emits less amount of NOx emissions to the atmosphere. SCAQMD staff will continue to seek energy efficient, low-NOx emitting equipment for restaurant and residential cooking.

Response to Comment D-6:

Technical feasibility and cost-effectiveness are two prime aspects to consider when implementing a new control technology in air pollution emitting sources, including cooking equipment. SCAQMD staff will continue to undertake understanding the current state of the cooking industry and currently available high efficiency cooking equipment in setting equipment standards that are both achievable and cost effective.

Southern California Alliance of Publicly Owned Treatment Works (SCAP), June 2, 2016

Comment Letter E

SCAP
SOUTHERN CALIFORNIA ALLIANCE OF PUBLICLY OWNED TREATMENT WORKS

June 2, 2016

Mr. Wayne Nastri, Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Dear Mr. Nastri:

Re: Comments on the Preliminary Draft of SCAQMD 2016 AQMP Stationary Source Measures

The Southern California Alliance of Publicly Owned Treatment Works (SCAP) appreciates this opportunity to provide comments on the Preliminary Draft of SCAQMD 2016 AQMP Stationary Source Measures. SCAP represents 83 public agencies that provide essential water supply and wastewater treatment to nearly 19 million people in Los Angeles, Orange, San Diego, Santa Barbara, Riverside, San Bernardino and Ventura counties. SCAP's wastewater members provide environmentally sound, cost-effective management of more than two billion gallons of wastewater each day and, in the process, convert wastes into resources such as recycled water and biogas.

SCAP would like to thank SCAQMD staff for meeting with our Air Quality Committee on April 26th. The primary purpose of this transmittal is to memorialize our comments on the preliminary draft control measures expressed to staff at this meeting. Overall our members are concerned that some of the preliminary control measures could negatively impact the beneficial use of biogas produced from municipal wastewater treatment plants and landfills. Rather than flaring this renewable resource, we strongly believe biogas should be used to produce energy or low-carbon transportation fuel. We would greatly appreciate your support for legislation and policies that provide financial incentives encouraging the use of biogas as a resource.

E-1

As stationary sources in the South Coast Air Basin, our members appreciate the challenge posed by this AQMP. SCAQMD is required to determine how to achieve clean air without the ability to control mobile or federal sources, which constitute the vast majority of the emissions to be controlled. SCAP objects to the proposed "fair share" concept where SCAQMD, CARB and EPA

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would each reduce emission sources under their control by 50 percent. We believe that stationary sources are already well-controlled and achieving our "fair share" is not feasible without a significant infusion of incentive funding. We respectfully request that SCAQMD specifically quantify the required funding, by sector, and to identify how these funds will be secured. In the event that funding cannot be guaranteed, SCAP requests that CARB and EPA be assigned a greater share of the reductions required to achieve attainment.

E-1 Con't

The following outlines our specific comments on draft preliminary control measures as discussed during our April 26th meeting with your staff:

CMB-01 Transition to Zero and Near-Zero Emission Technologies for Stationary Sources:

While SCAP appreciates that this control measure uses an incentive-based approach, we are concerned that insufficient funding will be available to achieve the proposed NOx emission reductions. It is our understanding that the EPA has requested that such a control measure be supported by an enforceable commitment, so we would like SCAQMD to clarify that this control measure will not morph into command and control requirements, if funding cannot be secured.

This control measure seeks to replace traditional combustion sources with zero and near-zero emission technologies including electrification or fuel cells. The background section for this preliminary control measure explains that biogas from wastewater treatment plants and landfills can be processed and cleaned for the use in fuel cells or transportation fuels. While our SCAP membership embraces these goals, we would like to respectfully remind staff that biogas cleanup is not usually cost-effective and fuel cells have consistently failed prematurely due to stack failures, which then requires flaring in order to continue providing necessary management of the biogas. Clearly, without substantial funding incentives and performance guarantees, our members will be unable to justify biogas fuel cell or transportation fuel projects.

E-2

While we seek SCAQMD's support in incentivizing zero and near-zero biogas technologies, we do not believe these biogas technologies are truly commercially available, reliable or cost-effective yet. Due to these inherent challenges, we request that biogas not be included in this control measure.

CMB-03 Emission Reductions from Non-Refinery Flares:

We appreciate SCAQMD staff's clarification that this preliminary control measure will not be applicable to emergency or backup flares. Subsequent to our meeting, SCAQMD provided a detailed summer planning inventory that clarified that the wastewater sector contributes only 0.01 tons per day of NOx. Considering wastewater flares are an insignificant source of NOx and they are normally used for emergency or backup purposes, SCAP requests that the wastewater sector be excluded from this control measure.

E-3

We are also concerned that the draft control measure discussion omits the technological and financial challenges associated with biogas pipeline injection or vehicle fuel projects. The following briefly outlines our concerns regarding the language contained in this control measure: (1) compost facilities aerobically process waste materials, so flaring should not be applicable to this sector, (2) landfills flares are regulated by Rule 1150.1 and the CARB Methane Reduction Regulation, so the discussion should not suggest these flares are only regulated through NSR and BACT, (3) our

E-4

members strive to utilize biogas as a renewable resource. Nevertheless, flaring capacity at wastewater treatment plants is needed for emergency and backup purposes. Unlike wastewater treatment plants, biogas continually declines in flow and methane concentration at landfills after closure. The heating value of such dilute biogas cannot support most energy production applications, so facilities will need to maintain the ability to flare. Consequently, this control measure should not suggest that biogas can always be used as a renewable fuel, and (4) the discussion suggests that biogas can be used cost-effectively as transportation fuel, but in reality such projects are not currently financially viable. E-4 Con't

We respectfully requests that this draft control measure exclude the wastewater sector and include a discussion regarding the technological and financial barriers limiting our ability to pursue pipeline injection and vehicle fuel projects. E-5

MCS-01 Improved Breakdown Procedures and Process Re-Design:

Considering no SIP-creditable reductions would be obtained, SCAP does not understand the value of this proposed control measure. We acknowledge that EPA expressed concerns regarding Rule 430 due to Startup Shutdown Malfunction (SSM) litigation and the resulting SIP Call [Federal Register / Vol. 80, No. 113 / June 12, 2015]. However, Rule 430 has not been disapproved by EPA and litigation challenging the SIP Call is ongoing.

Based upon our conversations with EPA, we believe that there may be various approaches to address EPA's new SSM policy. In fact, EPA's SIP Call indicates that states and local agencies are allowed to issue their own enforcement discretion criteria, but such criteria cannot be binding on the United States or any citizens group. Unfortunately, EPA didn't provide much guidance explaining how to implement this new policy. In fact, the situation is further complicated by litigation challenging EPA's new SSM policy. What is clear though is that this major national policy is intended to address bad actors in states with weak pollution control requirements. SCAQMD has adopted the most restrictive air pollution rules in the United States, including a comprehensive breakdown rule, so we cannot believe that breakdowns in the South Coast Air Basin could cause significant emissions like those outlined by the Sierra Club's petition to the EPA. We recommend that this proposed control measure be excluded from the AQMP and allow legal proceedings to conclude prior to consideration of any rulemaking. E-6

BCM-10 Emission Reductions from Greenwaste Composting:

While we understand that this proposed control measure is intended to reduce VOC and NH3 emissions from chipping and grinding, we are concerned about specifically identifying vendors with non-commercial technology. In the past, our members have retained vendors with this type of technology, which were unable to achieve claimed emission levels in real-world practice. SCAP respectfully requests that developing technology not be specifically discussed in the AQMP unless the actual performance can be demonstrated and validated in commercial and sector specific applications. E-7

Our members are also confused by the focus on food waste emission reductions in association with greenwaste composting. SCAQMD Rule 1133.3 already limits the amount of food waste in greenwaste composing without triggering an overall system control efficiency of at least 80 percent. E-8

It is unclear whether SCAQMD is proposing additional control for operations beneath this threshold or the control measure is intended to restrict other sources of potential food waste emissions. Please clarify the intent of this proposed control measure. E-8 Con't

BCM-05 Ammonia Emission Reductions from NOx Controls:

We appreciate staff's clarification that this proposed control measure is only intended for large-scale projects. To avoid potential confusion, SCAP recommended that this control measure be revised to indicate biogas and other small-scale projects would not be subject to ammonia emission reductions. E-9

Thank you for the opportunity to comment on the Preliminary Draft of SCAQMD 2016 AQMP Stationary Source Measures. At your convenience, we would like to meet with you and discuss potential incentives and legislative support strategies needed to develop renewable biogas pipeline injection and vehicle fuel projects. Please do not hesitate to contact Mr. David Rothbart of the Los Angeles County Sanitation Districts, SCAP Air Quality Committee Chair, should you have any questions regarding this transmittal at (562) 908-4288, extension 2412. E-10

Sincerely,

John Pastore, Executive Director

cc:
Dr. Philip Fine, SCAQMD

Responses to Comment Letter from SCAP (Comment Letter E)
June 2, 2016

Response to Comment E-1:

Thank you for taking the opportunity to being involved in and making comments to the 2016 AQMP. The U.S. EPA, CARB and SCAQMD mutually understand the need to seek reductions from all sectors, thus, a "fair share" reduction. The target for reductions from each entity would parallel the emission reductions needed to meet the standards. For example, according to the latest modeling data and attainment demonstrations, to meet the federal 1997 and 2008 8-hour ozone standards there is a need to reduce NOx emissions, respectively, 45 percent by 2023 and 55 percent by 2031. Reductions from federal sources include aircraft, locomotives and ocean-going vessels and can be found as part of the State SIP Strategy along with reductions from on-road vehicles and off-road equipment under the authority of CARB. SCAQMD proposes reductions from stationary and mobile sources under the District's control for the 2016 AQMP in the form of regulatory, incentive and co-benefit approaches.

Response to Comment E-2:

SCAQMD is developing an Incentive Funding Action Plan that will discuss existing sources of funding and potential new funding sources. Staff is prepared to work to secure the funding necessary for a successful incentive program. While there is no intent to morph into a command and control requirement if funding is not secured, staff is considering future rulemaking when the new technology has been achieved in practice, more widely accepted, commercially available, and cost effective.

Staff acknowledges the concerns and previous problems with the operation of fuel cells in their industry. The proposed control measure CMB-01 in Appendix IV-A of the Draft Plan focuses on internal combustion engines, ovens, boilers, landfills, and municipal solid waste facilities in addition to wastewater treatment facilities. Thus, various types of technologies including electrification or fuel cells could potentially be utilized to achieve lower emissions from these sources. Please note that use of biogas from wastewater treatment plants and landfills remains one of the SCAQMD's potential proposals. Staff can analyze whether emission reductions can be achieved through replacement equipment with zero or near-zero emission technology and/or diversion of waste streams that can be cleaned up or processed, and routed to pipelines or used for transportation fuels. Any potential exemptions from future requirements will be considered during the rulemaking process.

Response to Comment E-3:

In CMB-03 staff proposes routing the gas from landfills and wastewater plants that would typically be flared to equipment that can convert or clean the gas into an acceptable renewable energy source. If it is not feasible, the installation of newer flares classified as the best available control technology (BACT) would be considered. As noted in Comment E-2, any potential exemptions from future requirements or exclusion of a particular affected industry will be considered during the rulemaking process.

Response to Comment E-4:

Staff agrees that flaring is not applicable for aerobically processes so flares at composting facilities have been removed from the control measure CMB-03 in Appendix IV-A of the Draft Plan. In addition, staff agrees that landfill flares are regulated by Rule 1150.1 so such information has been added to Regulatory History for control measure CMB-03. However, staff disagrees that biogas cannot always be used as a

renewable fuel. If using the excess gas as a renewable fuel is not feasible, newer flares installation with BACT would be proposed.

Response to Comment E-5:

Technological opportunities are discussed in Proposed Method of Control section of the control measure CMB-03 in Appendix IV-A of the Draft Plan. As noted in Comment E-2, any potential exemptions from future requirements or exclusion of a particular affected industry will be considered during the rulemaking process.

Response to Comment E-6:

The commenter's opinion about this measure is appreciated, but as noted in the comment, U.S. EPA has expressed concerns with Rule 430, has not provided much guidance explaining a possible new policy, and there is litigation challenging the current policy. It is necessary for staff to keep control measure MCS-01 in the Draft 2016 AQMP Stationary Source control strategy as it is foreseen the rule will need to be amended when these decisions and direction from U.S. EPA is provided. Staff agrees that the rulemaking process would be challenging if taken place before the legal proceedings are concluded.

Response to Comment E-7:

Being an area in nonattainment of the standards and subject to U.S. EPA requirement for any Reasonably Available Control Technology, we are seeking any input on new technologies and emission reduction opportunities. Although this technology is not yet fully in the U.S. market, their machines are available for purchase. This technology was introduced as one of the potential control methods in BCM-10 but does not preclude other technology from consideration. Nevertheless, emission reductions for this control measure do not rely on this technology, but rely on composting. In addition, the control measure write-ups are broad and general in nature allowing for the requirement specifics to be discussed and debated in detail during the rulemaking process.

Response to Comment E-8:

Foodwaste composting covered in Rule 1133.3 was addressed with limited conditions due to the lack of related emissions test data during the time of rule development. Therefore, there is a potential to propose additional control for foodwaste composting operations when more related emissions data become available. More research would be needed to study effects of emissions from increased foodwaste in greenwaste composting and to review the current requirements to determine if additional emission reductions are needed. No additional controls or restrictions on other sources of potential foodwaste emissions are proposed in this control measure at this time.

Response to Comment E-9:

The proposed control measure BCM-05 is intended for both major and non-major polluting facilities as described in the Draft 2016 AQMP, Appendix IV-A. However, it is targeting large ammonia uses, so could be subject to only large projects. These details will be vetted, discussed and debated during the rulemaking process. As noted in Comment E-2, any potential exemptions from future requirements or exclusion of a particular affected industry will be considered during the rulemaking process.

Response to Comment E-10:

Staff thanks for providing comments to the preliminary draft of the 2016 AQMP stationary source control measures.

Western States Petroleum Association (WSPA), June 10, 2016

Comment Letter F

Western States Petroleum Association
Credible Solutions • Responsive Service • Since 1907

Sue Gornick
Manager, Southern California Region

VIA ELECTRONIC MAIL

June 10, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

SUBJECT: WSPA COMMENTS 2016 AQMP Stationary Source Control Measures

Dear Dr. Fine:

Western States Petroleum Association (WSPA) is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California, Arizona, Nevada, Oregon, and Washington. WSPA-member companies operate petroleum refineries and other facilities in the South Coast Air Basin that will potentially be affected by the 2016 Air Quality Management Plan (AQMP) Stationary Source Control Measures.

WSPA provides this letter summary of our comments, as well as specific edits of the SCAQMD's draft Stationary Source Control Measures in Attachment 1, attached hereto and incorporated herein by reference. We appreciate the opportunity to do this prior to release of the 2016 AQMP first draft scheduled in late June. WSPA will be making comments on other aspects of the AQMP once it is released but wanted to provide comments on the Stationary Source Measures as soon as practicable. F-1

ECC-01: Co-benefit emission reductions from GHG programs

WSPA understands from our recent meeting that the emission reduction programs are already in place at the state level for this measure (i.e. LCFS, AB32, etc.) and that emission reductions have already been quantified. However, the control measure appears to focus on additional direct control measures (i.e. described as "additional enhancements needed to achieve further criteria pollutant reductions") for further reductions of GHG and criteria pollutant reductions rather than co-benefits. Therefore, WSPA requests that this language be removed from the control measure. F-2

CMB-01: Transition to zero and near-zero technologies

WSPA has several comments and concerns on this control measure and for more details, directs SCAQMD to Attachment 1, pages 19 to 27. As an overview, some concerns are discussed below:

- According to the "Draft Emission Inventory for 2016 AQMP Advisory Group – Discussion Purposes (March 2016)," the entire 2012 Summer Planning Fuel Combustion category (excludes RECLAIM)only had 29 TPD of NOx emissions. This measure would be focused on 22.3 TPD of that, with projected reductions of 10.9 TPD. Given the large amount of reductions targeted under this measure, we suggest the Description of Source Category discussion be revised to explicitly detail the sources intended to be covered. F-3
- The noted power generation sources are currently subject to RECLAIM. Since RECLAIM sources are not (as we understand it) covered by this measure, the discussion is outside the scope of the measure. This would also apply to the entire section under "Energy Sector". WSPA requests that SCAQMD clearly specify that RECLAIM sources are not covered by this measure. F-4
- Under the section entitled "Co-Benefits from Energy Storage and Smart Grid", SCAQMD states that zero emission technologies are becoming more prevalent to be considered as Best Available Control Technology (BACT). Additionally, WSPA notes that SCAQMD's recent BACT guidelines draft (April 2016) also refers to various clean fuels technologies, including electrification, as BACT. However, WSPA requests that more detail be provided on these determinations, such as data used to determine what has been Achieved in Practice for specific equipment and industry categories, before being included in a control measure. F-5
- While cost effectiveness may not be determinable, the range of potential costs for this measure would greatly improve decision makers understanding of how much funding might be needed to deliver the large amount of reductions proposed. Furthermore, the amount of potential funding needed could be important for determining how much of this measure will be SIP creditable. F-6

CMB-03: Emission reductions from Non-Refinery Flares

An equipment survey is referenced in the control measure and NOx emission rates that are presented as achievable. WSPA requests a source for this survey and more details on whether these rates are Achieved in Practice or vendor representations. F-7

CMB-05: RECLAIM

At our recent meeting, you asked WSPA to provide an estimate of a tons/day reduction to be included in the control measure in lieu of SCAQMD's estimate of 5 tpd by 2031. However, WSPA is unable to provide an estimate at this time because the December 2015 RECLAIM amendments have just begun to be implemented. WSPA believes that there is much uncertainty in those amendments with regard to future impact on the RECLAIM trading credit market. Some of the provisions, such as the opt-out for power generators under certain circumstances and the RTC floor price trigger, could cause unforeseen consequences in the later years of implementation. Additionally, SCAQMD staff is working on facility shutdown provisions that are unclear as of this writing, and we understand that CARB is currently reviewing the December 2015 RECLAIM amendments. All of the above make it difficult to estimate further allocation reductions from the RECLAIM program at this time. F-8

WSPA offers the following edits to the control measure (see pages 40 to 42 of Attachment 1 for these and others not summarized here): F-9

- Consider command-and-control regulation overlays to certain RECLAIM facilities. For some RECLAIM facilities a command-and-control overlay may be the best way to reduce NOx

emissions while maintaining the required equivalency with command and control. Such command-and-control overlays would be at odds with market-based design intent of the RECLAIM program. F-9 Con't

- Assess facility and equipment shutdowns and the removal of associated RTCs from the market. Under command-and-control rules, shutdown emission credits are heavily discounted to BACT, based on the last 2 years of operation. While ~~Currently, for a RECLAIM facility or equipment shutdown,~~ there is no discount of credits for a RECLAIM facility or equipment shutdown, the overall RTCs available to RECLAIM facilities have been reduced multiple times to reflect the advancement of BARCT (i.e., command-and-control equivalency). In some cases these BARCT levels are equal to, or more stringent than, BACT determinations. These credits, if not removed from the program, could reduce the incentive to implement cost-effective controls that would otherwise be required under command-and-control. California Health & Safety Code Section 39616(c) requires that RECLAIM, a market-based program, will result in an equivalent or greater reduction in emissions at equivalent or less cost compared with current command and control regulations. F-10
- Assessment of whether the cost-effectiveness benefits that the RECLAIM market was intended to provide still exist given the need for all feasible NOx reductions and the potential lack of lower-cost control options. Conversely, such assessment should consider whether further reductions are unnecessary to demonstrate attainment given the large emission reductions associated with proposed State- and District- mobile source control measures. F-11

MCS-01: Improved breakdown procedures

WSPA understands from our recent meeting that this measure is included in the AQMP as a signal to USEPA that SCAQMD will be working to resolve the issues that USEPA has with Rule 430. However, since there are no SIP-creditable emissions from this measure, WSPA requests that it be removed from the draft AQMP. F-12

FUG-01: Leak detection and repair

- The District should clarify whether it is proposing Smart LDAR instead of traditional LDAR techniques. It would not be less time consuming or labor intensive unless the District is proposing to allow Smart LDAR instead of traditional LDAR techniques. Otherwise, the addition of Smart LDAR on top of traditional LDAR would actually be more time consuming and more labor intensive. The proposed measure would not necessarily result in faster repairs. F-13
- Optical Remote Sensing technology has not been proven to quantify emissions. This statement leads the reader to believe that these other technologies are more accurate and have been proven to quantify emissions. The SCAQMD needs to clarify this. F-14
- WSPA requests that SCAQMD provide a more detailed basis for both the emission reductions and cost effectiveness of this control measure. F-15

BCM-02: Cooling Towers

Clarifications were made in the Background (i.e. regarding cooling tower size) and Regulatory (i.e. regarding chromium emissions) sections. As discussed in our recent meeting with you, use of chromium in cooling tower chemicals is no longer permitted so it is unlikely that there will be chromium emissions from cooling towers. Therefore, we request the language be modified to reflect this. F-16

We look forward to continuing to work with you during the 2016 AQMP process. If you have any questions, please contact me at (562) 307-6353 or by email at sue@wspa.org. F-17

Sincerely,

Suzanne E. Jaricke

cc: Jill Whynot, SCAQMD

Responses to Comment Letter from WSPA (Comment Letter F)
June 10, 2016

Response to Comment F-1:

Staff thanks you for providing your letter of comments to the preliminary draft control measures.

Response to Comment F-2:

Staff concurs and the description of "additional enhancements needed to achieve further criteria pollutant reductions" has been removed from ECC-01 and was added to ECC-02.

Response to Comment F-3:

Sources intended to be covered in CMB-01 have been described in the Description of Source Category of the control measure CMB-01 in Appendix IV-A of the Draft Plan.

Response to Comment F-4:

The intent of proposed CMB-01 is to lower NOx emissions from traditional combustion sources by replacement with zero and near-zero emission technologies, including electrification of NOx sources. Such NOx sources include internal combustion engines, ovens, boilers, landfills, wastewater treatment facilities and municipal solid waste facilities. RECLAIM facilities were not considered to be covered in this control measure.

Response to Comment F-5:

The section entitled "Co-Benefits from Energy Storage and Smart Grid" has been deleted in the proposed CMB-01.

Response to Comment F-6:

The average and total amount of potential incentive costs are included in the proposed control measure CMB-01 in the Appendix IV-A of the Draft 2016 AQMP.

Response to Comment F-7:

The equipment survey showed an emission rate of 0.025 pounds of NOx per million BTU is achievable by non-refinery flares. This survey is based on the SCAQMD-permitted equipment data for landfill and wastewater treatment plant flares. There are new units capable of achieving mass emissions of 0.011 pounds of NOx per million BTU, and concentrations of 6.69 ppm NOx at 3 percent oxygen, when firing on biogas from a wastewater facility or process gas from oil and gas production facilities. These emission rates were verified through District-approved source tests for which references are presented in the control measure.

Response to Comment F-8:

A list of possible actions that could be taken to achieve a further reduction of 5 tons per day of NOx emissions by 2031 from the RECLAIM program are listed and explained in the control measure CMB-05 in

Appendix IV-A of the Draft Plan. Staff agrees that there is currently a lot of activity with the RECLAIM program due to the latest amendments including approval from CARB. As such, staff is not proposing any near-term reductions from CMB-05 by 2023 and instead focused on long-term reductions that could be achieved.

Response to Comment F-9:

The first bullet of the comment stated that such command-and-control overlays would be at odds with market-based design intent of the RECLAIM program. However, it is not true if the intent of the program changes in the future. Therefore, there would be no change, but this section has been slightly modified for clarification purposes in the control measure CMB-05 in Appendix IV-A of the Draft Plan.

Response to Comment F-10:

The second bullet of the comment (which is the fourth bullet in the Proposed Method of Control of the CMB-05) was slightly modified in response to this comment and included in the control measure CMB-05 in Appendix IV-A of the Draft Plan. The California Health & Safety Code Section 39616(c)(1) statement was initially included in the control measure write-up, but was inadvertently omitted from the Draft Plan Appendix IV-A. It has been put back into the control measure write-up in the Revised Draft of the 2016 AQMP.

Response to Comment F-11:

The third bullet of the comment does not reflect the process that occurs during the control strategy development of the Plan. Control measures are proposed that seek further reduction in order to assist in attainment of the air quality standards and are not considered as to whether necessary. If unnecessary, then the control measure would not be proposed. Federal, state and local control measures are considered together in order to achieve the standards.

Response to Comment F-12:

The intent of MCS-01 is to revise Rule 430 – Breakdown Provisions, to comply with U.S. EPA's policy for startups, shutdowns, and malfunctions (SSM). The proposed revisions to Rule 430 would consider improved breakdown procedures and/or process re-designs that would apply to breakdowns from all emission sources. Thus, this control measure has been included in the 2016 AQMP although there are no SIP-credited emissions from this measure due to the nature of the measure.

Response to Comment F-13:

The District proposes to use smart leak detection and repair (LDAR) instead of traditional LDAR because it is more efficient, less time consuming and less labor intensive than traditional technique.

Response to Comment F-14:

SCAQMD staff explores new detection technologies as they become available. Remote sensing technology has continuously been explored for its usability in the previous District's rule projects and it was proven to be successfully adoptable as an alternative method. Currently, staff is in progress of analyzing the collected data. For new detection technology, a pilot Smart LDAR program (Phase I) will be implemented

to demonstrate its feasibility. Based on the results, fugitive VOC rules will be amended as appropriate (Phase II).

Response to Comment F-15:

Estimated emission reduction and the latest cost effective values have been added to the control measure FUG-01 in the Appendix IV-A of the Draft and Revised Plan. More details regarding the technology and anticipated affected facilities have also been added.

Response to Comment F-16:

Clarifications were made in the Background (i.e., regarding cooling tower size) and Regulatory History (i.e., regarding chromium emissions) sections in the control measure BCM-02 (Cooling Towers) in the Appendix IV-A in the Draft 2016 AQMP.

Response to Comment F-17:

SCAQMD staff appreciates your comments and look forward to continuing to work with you.

California Small Business Alliance (CSBA), June 13, 2016

CALIFORNIA Small Business Alliance
Dedicated to Environmental Progress and Economic Growth

Comment Letter G

June 13, 2016

Mr. Wayne Nastri, Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

COMMENTS ON THE DRAFT 2016 AIR QUALITY MANAGEMENT PLAN

Dear Mr. Nastri:

The California Small Business Alliance (Alliance) is a non-partisan coalition of California trade associations committed to providing small businesses with a single constructive voice before air quality management districts and other environmental regulatory agencies. As active participants in the 2016 Air Quality Management Plan (AQMP) Advisory Group, Alliance members have been consistent contributors in the development of the plan. An Alliance representative has also been designated by the Home Rule Advisory Group to participate in the review of the health impacts of particulate matter air pollution in the South Coast Air Basin (SCAB) during the development of the AQMP. Finally, Alliance members have been actively engaged in the ongoing dialog with other stakeholders representing a broad cross section of business interests, neighborhood community organizations, and local, state and federal agencies. Now, with the draft plan about to be released for public comment, we want to take this opportunity to offer our comments for your consideration.

A Fair Share Approach to Clean Air

Those who represent Southern California's business community have long understood that complying with clean air standards, as mandated by the Clean Air Act, may be required by law, but in reality is unachievable by relying on emission reductions from stationary sources alone. If our region is to have any hope of meeting or exceeding current national ambient air quality standards for Ozone and PM 2.5, it will require more cooperation and commitment by the California Air Resources Board (CARB) and U. S. Environmental Protection Agency (EPA) to take decisive action to reduce emissions from the sources under their control. G-1

With each revision of the AQMP, emissions from stationary sources – particularly small businesses – have become less of a factor in solving the overall complex problem of improving air quality in the SCAB. It should be common knowledge that timely attainment of federal standards can be achieved only when all agencies - not just the SCAQMD - assume their fair share of reducing emissions from the sources under their control.

273 North Spruce Drive • Anaheim, CA 92805
Telephone: (714) 778-0763 • Web: www.calsmallbusinessalliance.org

CTS-01 Further Emission Reductions from Coatings, Solvents, Adhesives, and Lubricants (VOC)

Many small manufacturing businesses are particularly anxious about this control measure, notwithstanding the nominal emission reduction projection of 1 to 2 tons per day.

Since the late 1980s, and through the mid-1990s, industrial users of coatings, inks, and adhesives have faced strict environmental regulations on their operations because of the large amount of solvents released in the surface coating process. While coatings manufacturers and suppliers have often responded with innovative solutions, VOC limits do vary from industry to industry, and since the regulations are often in a state of flux, strict compliance methodologies cannot be provided for each industry.

G-2

Giving consideration to the use of incentives to promote the use of super-compliant products containing little or no VOCs might prove practical in some instances for certain industry segments. But, when the District staff suggests that by putting conditions on when certain coatings, solvents, adhesives, and lubricants can be used (i.e., May 1 – October 31, the Ozone season), it reveals a disturbing lack of concern or awareness of the additional operational and financial burdens that such conditions would inflict on thousands of small businesses that would have to make substantial adjustments because of the new requirements.

When contemplating rulemaking to achieve a modest 1 to 2 tons per day of VOC emissions in the 2023-2031 time period, the District staff would do well to remember the hundreds of small businesses, and thousands of middle class jobs, that are no longer a part of the Southern California economy, because they were either lost to other states and other countries or simply disappeared forever due in large part to decades of draconian rulemaking involving these products.

FLX-02 Stationary Source VOC Incentives

Alliance members are acutely aware of the challenges posed by the 2016 AQMP, and we applaud the District staff for considering using carrots rather than sticks as a way to encourage businesses to make choices that will reduce emissions while minimizing cost impacts.

G-3

As addressed earlier in these comments, not only is it essential that the District obtain firm "fair share" commitments to reduce specific amounts of emissions by CARB and EPA, it is equally essential that the District specifically quantifies the amount of funding required for the financial incentives it proposes to offer stationary and other sources before the AQMP is approved at the local level. It is no less imperative for the District to certify to its stationary and other sources that the incentive funding is guaranteed, and will be available to businesses when they need it. And, in the event that funding cannot be guaranteed, the Alliance requests that CARB and EPA be assigned a greater share of the emission reductions required to achieve attainment.

Thank you for the opportunity to comment on the preliminary draft of 2016 AQMP Stationary Source Measures. Please do not hesitate to contact me should you have any questions regarding this transmittal at (714) 778-0763. G-4

Sincerely,

Bill La Marr
Executive Director

cc: Philip Fine, Ph.D., Deputy Executive Officer, Planning, Rule Development and Area Sources

Responses to Comment Letter from CSBA (Comment Letter G)
June 13, 2016

Response to Comment G-1:

As the commenter stated, attainment of federal ambient air quality standards cannot be achieved only at local level, but achieved when cooperation occurs at federal, state, and local levels. A fair share approach is a mutually understanding among the three agencies, U.S. EPA, CARB, and SCAQMD that reductions from sources under each agency's control is necessary to achieve emission reductions to meet the standards. Control of stationary sources alone cannot achieve the fair share reduction commitment in the region and thus, mobile sources should also be controlled. The 2016 AQMP proposes potential emission reductions from both stationary and mobile sources under the District's control in the form of regulatory, incentive and co-benefit approaches.

Response to Comment G-2:

Seasonal control, such as more control during the summer or high ozone season, was a consideration in past AQMPs, however, this is not being considered in the 2016 AQMP. Staff agrees that in addition to the year round need for reductions, undue burden could be placed on businesses that seek steady state environments as opposed to fluctuating operations to meet the needs of the District.

Response to Comment G-3:

Incentivizing the use of super-compliant technologies is one of the concept proposed in FLX-02. The amount of funding required for the financial incentives has not been determined in this control measure at this time. SCAQMD staff will seek to garner funding and how one would apply for such funding. However, no reductions from incentives for the use of super-compliant technologies have been quantified, used in the attainment demonstration, or committed into the SIP.

Response to Comment G-4:

SCAQMD staff appreciates your comments on the Preliminary Draft of 2016 AQMP Stationary Source Measures.

Public Solar Power Coalition – Harvey Eder, June 15, 2016

Comment Letter H

The commentator provided printed copies of the following series of published papers from the United States Department of Energy's National Renewable Energy Laboratory called ***On The Path to SunShot***[1] (May 2016). As noted on their website, *On the Path to SunShot* is a series of eight reports that examines the lessons learned in the first five years of the initiative and the challenges and opportunities the industry faces in the final five. It identifies the key research, development and market opportunities that can help ensure that solar energy technologies are widely affordable and available to more American homes and businesses.

Since these papers are copyrighted materials (e.g. published papers or books), these copyrighted materials are not reprinted here, and instead, we are providing a list of the papers received, and links to websites where such materials may be available for viewing and download.

- **Emerging Issues and Challenges in Integrating High Levels of Solar into the Electrical Generation and Transmission System**
- **Emerging Issues and Challenges in Integrating Solar with the Distribution System**
- **The Role of Advancements in Solar Photovoltaic Efficiency, Reliability, and Costs**
- **Advancing Concentrating Solar Power Technology, Performance, and Dispatchability**
- **Emerging Opportunities and Challenges in U.S. Solar Manufacturing**
- **Emerging Opportunities and Challenges in Financing Solar**
- **Utility Regulatory and Business Model Reforms for Addressing the Financial Impacts of Distributed Solar on Utilities**
- **The Environmental and Public Health Benefits of Achieving High Penetrations of Solar Energy in the United States**

[1] http://energy.gov/eere/sunshot/path-sunshot

Response to Comment Letter from Harvey Eder (Comment Letter H)
June 15, 2016

Thank you for the comment letter and providing documentation in regards to solar energy.

The Draft 2016 Air Quality Management Plan (AQMP) Chapter 10 – Climate and Energy has a lengthy discussion on moving towards high levels of power from renewable resources. As mentioned in the title of several of the documents provided, there are many opportunities with solar renewable energy along with many challenges. A section within Chapter 10 titled, "Challenges and Opportunities in Moving Towards 100 Percent Renewable Power" discusses in detail many of these issues that are being addressed with the development of new technologies, implementing transportation onto the grid, and along with changing how the grid traditionally operates. The transition to increasingly higher amounts of renewable energy is occurring rapidly, especially with the increasing renewable mandates established by the State. However, this transition needs to address the instabilities associated with variable and intermittent renewable generation, otherwise, the addition of large of amounts of renewables creates an instable grid system that can increase the need for traditional fossil based power plants. Many of the documents provided in the above comment letter were reviewed and similar documents specific to California were referenced during the development of the Draft 2016 AQMP Chapter 10.

SECTION 2

COMMENTS AND RESPONSES TO COMMENTS ON THE DRAFT 2016 AQMP

COMMENT LETTER NUMBER

AGENCY/ COMPANY	DATE	Comment Letter Number
Air-Conditioning, Heating, & Refrigeration Institute (AHRI)	8/19/2016	29
Airlines for America	8/19/2016	30
Altergy Systems (Corinne Vita)	9/27/2016	68
American Chemistry Council (ACC)	8/18/2016	21
Association of American Railroads (AAR)	8/19/2016	31
Association of California Cities Orange County (ACCOC)	8/10/2016	6
Building Industry Association of Southern California, Inc. (BIA)	8/19/2016	32
BYD Heavy Industries (BYD)	8/19/2016	33
California Construction and Industrial Materials Association (CalCIMA)	8/19/2016	34
California Council for Environmental and Economic Balance (CCEEB)	8/19/2016	35
California Hydrogen Business Council	8/19/2016	36
California Trucking Association (CTA)	8/19/2016	37
CalRecycle	8/5/2016	4
City of Irvine	8/19/2016	38
City of Mission Viejo	8/19/2016	39
City of Moreno Valley	8/17/2016	18
Clean Energy	9/9/2016	66
Climate Resolve (David Fink)	8/19/2016	40
Constance Hughes	8/15/2016	12
Construction Industry Air Quality Coalition (CIAQC)	8/18/2016	64
Consumer Specialty Products Association (CSPA)	8/16/2016	15
David W. Brown	8/31/2016	69
Del Amo Action Committee (Florence Gharibian)	8/19/2016	41
Del Amo Action Committee (Florence Gharibian)	8/19/2016	65
Earthjustice	9/9/2016	67

COMMENT LETTER NUMBER (CONTINUED)

AGENCY/ COMPANY	DATE	Comment Letter Number
Electratherm (Paul Hughes)	8/17/2016	19
Gateway Cities Council of Governments	8/19/2016	42
Gatzke Dillon & Ballance LLP (GDB) on behalf of John Wayne Airport	8/19/2016	43
Gloria Sefton	8/17/2016	20
HDL/GGS, Inc. (Snake змія 蛇)	8/12/2016	9
Health Advocates	7/27/2016	2
ITERIS, Inc.	7/19/2016	1
Jacques Jougla	8/15/2016	13
Julie Stoll	8/16/2016	16
Lennox International Inc. (Lennox)	8/19/2016	44
Loraine Lundquist	8/13/2016	11
Los Angeles Area Chamber of Commerce	8/19/2016	45
Los Angeles County Board of Supervisors	8/19/2016	28
Los Angeles County Business Federation (BizFed)	8/18/2016	23
Los Angeles County Metropolitan Transportation Authority (Metro)	8/18/2016	24
Los Angeles Department of Water & Power (LADWP)	8/19/2016	46
Los Angeles World Airports (LAWA)	8/19/2016	47
Michael Salman	8/18/2016	22
National Fuel Cell Research Center (NFCRC)	8/22/2016	61
Orange County Council of Governments (OCCOG)	8/19/2016	48
Orange County Transportation Authority (OCTA)	8/10/2016	7
Pacific Merchant Shipping Association (PMSA)	8/19/2016	49
Peter Berg	8/15/2016	14
Ports of Long Beach & Los Angeles (San Pedro Bay Ports)	8/19/2016	50
PTS Staffing (Ronald Stein)	8/21/2016	60

COMMENT LETTER NUMBER (CONCLUDED)

AGENCY/ COMPANY	DATE	Comment Letter Number
Public Solar Power Coalition (Harvey Eder)	8/12/2016	10
RadTech	8/19/2016	51
Rafael Yanez	7/29/2016	3
Ramboll Environ	8/19/2016	52
REALTORS Committee on Air Quality (RCAQ)	8/22/2016	62
Richard Luczyski	8/24/2016	63
Riverside County Transportation Commission	8/19/2016	53
San Bernardino Associated Governments (SANBAG)	8/18/2016	25
Senator Jim Dabakis	8/8/2016	5
Southern California Alliance of Publicly Owned Treatment Works (SCAP)	8/19/2016	54
Southern California Edison (SCE)	8/19/2016	55
Southern California Gas Company (SoCalGas)	8/19/2016	56
Southern California Leadership Council (SCLC)	8/19/2016	57
Stephanie Pincetl (UCLA)	8/16/2016	17
Steve Milloy (JunkScience.com)	8/11/2016	8
Truck and Engine Manufacturers Association (EMA)	8/19/2016	58
U.S. EPA	8/19/2016	27
Valley Industry and Commerce Association (VICA)	8/19/2016	59
Western States Petroleum Association (WSPA)	8/18/2016	26

Comment Letter from ITERIS, Inc. (Comment Letter #1)

From: John A. Lower <jal@iteris.com>
Sent: Tuesday, July 19, 2016 4:30 PM
To: Michael Krause; Henry Hogo
Cc: aravind.kailas@volvo.com
Subject: Comments on the draft AQMP

Thanks for the opportunity to comment on this important document. We strongly support the stated intent to "Invest in strategies and technologies meeting multiple objectives regarding air quality, climate change, air toxic exposure, energy, and transportation". 1-1

Truck platooning is requested to be added as a safe and economic option to lower fuel consumption and reduces CO2 emissions. It also helps the traffic flow by reducing congestion.

Pages 4-36 and 4-37 detail the Final 2016 RTP/SCS TSM strategies, and summarize Transportation Control Measures into three main categories of 1) transit, intermodal transfer, and active transportation measures; 2) HOV lanes, HOT lanes, and their pricing alternatives; and 3) information-based transportation strategies. It is requested that reference also be given in this section to the other TSM improvements that are in the Final 2016 RTP/SCS TSM strategies, including: 1-2

- Advanced ramp metering
- Expansion and integration of the traffic signal synchronization network
- Other ITS improvements

Thanks,

ITERIS

John A. Lower
Associate Vice President
Iteris, Inc.
1700 Carnegie Avenue | Suite 100
Santa Ana | CA | 92705-5551
tel 949.270.9682 | fax 949.270.8401
jal@iteris.com | www.iteris.com

Responses to Comment Letter from ITERIS, Inc.
(Comment Letter #1)

Response to Comment 1-1:

Thank you for participating in this AQMP public process, your comments, and your strong support for the comprehensive Plan.

Truck platooning and other operational efficiencies will be considered during implementation of the "Further Deployment of Cleaner Technologies" measures in the State Mobile Source Strategy.

Response to Comment 1-2:

Chapter 4 of the Draft 2016 AQMP includes a broad overview of the integrated land use and transportation strategies including transportation control measures (TCMs) in the Final 2016 RTP/SCS and does not include or highlight individual intelligent transportation system (ITS) or transportation system management (TSM) measures. However, advanced ramp metering, and expansion and integration of the traffic signal synchronization network have been added in the Revised Draft 2016 AQMP per the request. More information on these measures can be found in the Final 2016 RTP/SCS available online at http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx. It should be noted a more robust discussion of SCAG's TCMs are included in Appendix IV-C of the 2016 AQMP and their corresponding reductions are included in baseline emissions.

Comment Letter from Health Advocates (Comment Letter #2)



















July 27, 2016
South Coast Air Quality Management Governing Board
Attn: Board Chair William Burke
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Dear Governing Board Chair Burke and Governing Board Members,

The 2016 South Coast Air Quality Management District's (South Coast AQMD) Air Quality Management Plan (AQMP) provides an integral opportunity for the South Coast AQMD to bring clean air to a region plagued with dirty air for decades. While air quality has improved in the region, more than 5,000 people die prematurely each year due to unsafe air. In fact, progress in reducing ozone pollution has leveled off in recent years. To make matters worse, the communities bearing the heaviest burden of the region's air quality crisis are disproportionately low-income people of color.

While the organizations represented in this letter are reviewing the draft AQMP and preparing more detailed comments, we write now to provide some immediate feedback on the draft, stipulating seven principles that should frame revisions to the final plan. In sum, these principles reflect a range of policy considerations which will help make the final plan just and equitable and help bring clean air back to the South Coast region and its more than 17 million residents, particularly the region's most vulnerable communities. The seven principles are: 2-1

1) The 2016 plan must demonstrate a measurable, enforceable pathway into compliance with the Clean Air Act and eliminate the "black box," which just defers tough decisions.

Southern California constantly receives an "F" for air quality and, despite progress, air quality continues to plague communities, particularly communities of color. This is unacceptable. The 2016

Air Quality Management Plan must provide a detailed set of enforceable measures that achieve the 2022, 2023 and 2032 deadlines for attainment. Reliance on black box measures presents an unfavorable trade-off for those who breathe in the South Coast Air Basin. While it may provide additional time to identify the strategies to attain an ozone standard, the track record of failing to actually identify these measures has resulted in decades of South Coast residents breathing smog-polluted air. We need a plan that reflects the urgency on the health impacts felt by Southern Californians, which means actually articulating the measures to meet clean air standards.

2-1 Con't

2) The 2016 plan should have early nitrogen oxide ("NOx") reductions, as the South Coast AQMD promised the public at the February 2015 Governing Board meeting.

During the long deliberation over the prior PM2.5 plan for the South Coast and the monitors in the Inland Empire still showing violations, the Governing Board promised it would explore bringing back measures with early NOx reductions. To date, this has not happened, and residents, particularly those residing in close proximity to polluters, need relief from the heavily polluted air. In fact, the Governing Board wasted an opportunity to fix the NOx RECLAIM program, which could have provided an opportunity for early NOx reductions. Instead, the Governing Board opted to approve a Western States Petroleum proposal that cut fewer credits out of the system on a more prolonged timeline. As people continue to suffer and die from air pollution, we call on the South Coast AQMD not to waste any more time or opportunities. Thus, the plan should include enforceable regulatory measures that reduce NOx in the near term to meet the 2023 deadline.

2-2

3) The 2016 plan must be just and address long standing inequities in air quality that disproportionately harms low income communities of color.

Recognizing the inequality in air quality that falls along demographic lines of race, ethnicity, and class in Southern California, the AQMP's measures must prioritize regulations, strategies, and investments that frontload reductions in communities ranked in the top 25% most over-burdened communities as designated by CalEPA's CalEnviroScreen tool. There is immense urgency to bring clean air to the communities most harmed by polluting fossil fuels, and the AQMP should demonstrate how it will address this inequity.

2-3

4) We need an enforceable clean air plan, not an incentive dollar wish list.

The draft AQMP recently released by the South Coast AQMD staff relies too heavily on unsecured incentive funding. More than 90% of proposed future reductions are dependent on incentive-based programs – many funded with unidentified dollars. While incentives can be helpful in pushing clean air gains, it is important that the financial responsibility of paying for clean air not be borne by those who can least afford it. Taxpayers should not be required to subsidize large polluting industries. Furthermore, the strategy to raise much of the money relies on actions well beyond the control of the South Coast AQMD and will not withstand scrutiny by the California Air Resources Board or the Environmental Protection Agency. It is a not a viable strategy to assume this money will be made available by Congress, for example. Such unfunded "incentives" are, similar to the

2-4

"black box," an ill-conceived way to avoid legal mandates to impose enforceable control measures. Rather, we need strict regulatory programs to help spur innovation and drive pollution reductions, clean vehicles and clean energy. 2-4 Con't

5) The AQMP should prioritize zero-emission technologies that maximize co-pollutant and greenhouse gas reduction benefits. 2-5

Through legislative, administrative, and local actions, California is pursuing strategies to solve the serious problems created by burning fossil fuels, from climate change to unhealthy air and more. Wherever feasible, AQMP measures must require and/or spur zero-emission technologies powered by clean energy.

6) The AQMP needs to commit to adopting clean energy measures for stationary and area sources.

There are a panoply of regulations that are excluded from the draft list of measures produced by South Coast AQMD staff. For example, the plan should include a requirement for solar or electric water heaters in all new development. It should require point of sale transition to electric hot water heaters. In addition, there should be a requirement that diesel backup generators are no longer permitted. The advent of clean energy like solar and storage provides important opportunities that do not appear in the current list of measures. The plan should also make sure it is not permitting the construction of new fossil fuel power plants. In particular, the draft measures seek to take credit for many programs designed to reduce energy demand. It is antithetical to take credit for these programs while simultaneously allowing the construction of new power plants. 2-6

7) While the authority over mobile sources of pollution is generally with the California Air Resources Board and the Environmental Protection Agency, the South Coast AQMD does have authority to clean up dirty vehicles. It must use this authority in this Plan.

The plan should commit to an overhaul of the Fleet Rules, which are purchasing requirements for fleets of vehicles. The plan should also commit to expanding the fleet rules to a broader set of fleets. In addition to fleet rules, the plan should also make use of its indirect source authority. The federal Clean Air Act and California's Health & Safety Code provide authority for local entities like the South Coast AQMD to advance clean vehicles through indirect source authority and transportation control measures. Under the Clean Air Act, the term "indirect source" means "a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution." 42 U.S.C. § 7410(a)(5)(C). 2-7

Particular focus should be placed on indirect sources in the Inland Empire, such as warehouses, where the majority of those displaced and burdened by under regulated logistics sprawl are low-income communities of color. We need this type of regulation to ensure that the massive tidal wave of new warehouses does not worsen air quality in what is already the most polluted area of the South Coast. Incidentally, this type of regulation could also be used to require clean energy at these facilities, including solar panels, microgrids, and other clean technologies.

In sum, these principles provide the framework for an equitable clean air plan that reflects the urgency so many Southern Californians feel when confronted daily with the air pollution killing so many and impairing the quality of life of so many more. We look forward to discussing this with you further in the coming weeks and months.

Sincerely,

Martha Arguello
Physicians for Social Responsibility – Los Angeles

Tom Dolan
Inland Congregations United for Change

Bahram Fazeli
Communities for a Better Environment

Evan Gillespie
Sierra Club

Michele Hassan
Center for Community Action and Environmental Justice

Maya Golden Krasner
Center for Biological Diversity

Fabi Lao
Coalition for Clean Air

Adrian Martinez
Earthjustice

David Pettit
Natural Resources Defense Council

John Yi
American Lung Association

CC:
Wayne Nastri, Acting Executive Officer
Jill Whynot, Chief Operating Officer
Philip Fine, Deputy Executive Officer

Responses to Comment Letter from Health Advocates (Comment Letter #2)

Response to Comment 2-1:

A primary goal of the 2016 AQMP is to eliminate reliance on the "black box" [CAA §182(e)(5)] to the maximum extent feasible. "Black box" measures are not needed for attainment of the 1-hour ozone standard. This is the first time any ozone attainment plan for the South Coast Air Basin has not relied on CAA §182(e)(5). Such reliance is still needed for the 8-hour ozone standards.

Response to Comment 2-2:

Already adopted rules and regulations will achieve significant NOx reductions prior to 2023, including recent RECLAIM amendments. As noted in Chapter 4, the 2016 AQMP does commit to adopt and implement regulations that will achieve NOx reductions prior to 2023.

Response to Comment 2-3:

A full Environmental Justice analysis is included as part of the Socioeconomic Assessment, whereby any disproportionate community impacts of the Plan will be assessed. Furthermore, nine toxic control measures are proposed in Chapter 9 of the Plan to address local health risk impacts of stationary sources in neighborhoods impacted by toxic sources.

Response to Comment 2-4:

From base year (2012), adopted existing regulations contribute to 68 percent NOx reductions by 2023 and 80 percent NOx reductions by 2031. The incentives approach is designed to help implement the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures and some stationary source measures. As other actions are identified, the needed funding levels will decrease. Staff is not aware of any additional feasible regulatory measures that could be included in the 2016 AQMP.

Response to Comment 2-5:

The 2016 AQMP prioritizes maximizing emission reductions utilizing zero-emission technologies when feasible and cost-effective for the attainment timeframes. However, in the near-term (i.e., on a schedule to attain the 1997 ozone standard by 2023) there may not be sufficient zero emission technologies available for all sources. As such, near-zero emission technologies will be needed. Attainment and significant health benefits will be realized in the short-term through low-NOx and near-zero transition technologies. It should be noted that ECC-01 is aimed at seeking co-benefits from existing greenhouse gas (GHG) reduction legislation. ECC-02 accounts for the co-benefits from existing energy efficiency regulations and ECC-03 seeks further efficiency gains that will reduce energy use or need while achieving NOx benefits.

Response to Comment 2-6:

Currently, there is no proposed control measure to mandate electric or solar water heaters in new developments or at point of sale; however, the current draft AQMP includes ECC-03 and CMB-02, which outline incentive programs along with future rulemaking to transition to zero and near-zero high efficiency water heaters that, in part, include solar electric water heaters, heat pumps, solar thermal pool heaters,

electric clothes washers and home weatherization. The proposed ECC-03 and CMB-02 control measures are additional and surplus to Rule 1121 and would maximize emissions benefits by incentivizing the coupling of renewables with the electric appliances. The potential for electric or solar water heaters will be considered during the rulemaking process for CMB-02.

CMB-01 seeks emission reductions with zero and near-zero emission technologies. Facility modernization efforts in CMB-01 consider energy storage for applications including replacement of backup generation combustion sources and/or serve as smaller onsite backup generation resources. SCAQMD anticipates this measure to help move away from traditional diesel generators and instead incorporate sustainable renewable technologies and help manage the grid. SCAQMD relies on the PUC and municipal utilities to evaluate the need for additional power plant construction, but SCAQMD rules ensure that any new or modified power plant will emit at the best available control technology levels. Additionally, there are several regulations which have stringent GHG reduction goals for power plants including the Federal Clean Power Plan which sets a statewide aggregate emissions target (CO2) for all affected electricity generating units by 2030, the California Cap-and-Trade regulation, and renewable portfolio standards.

Response to Comment 2-7:

The draft AQMP facility-based measures include new development and warehouses as mentioned by the commentator. The facility-based measures and MOB-08, that affects fleet vehicles, discuss an approach to identify actions that can be quantified and SIP creditable. The measures include language to develop an enforceable mechanism including potential rule development within the SCAQMD authority. Expansion of the fleet rules to private fleets would require EPA to grant a waiver under the Clean Air Act.

Comment Letter from Rafael Yanez (Comment Letter #3)

From: RY <ryin213@gmail.com>
Sent: Friday, July 29, 2016 2:38 PM
To: Michael Krause
Subject: Re: Comments for Draft 2016 Air Quality Management Plan

Mike, with regard to the rule review, there are rules on methane, cabin dioxide, VOC and PM emissions that "grandfather in" industries from having to upgrade and that's what I've been finding as well as the rule itself not going far enough due to being outdated and not current with current technologies that have been out for the past 5-10 years.

> On Jul 29, 2016, at 2:32 PM, RY <ryin213@gmail.com> wrote:
>
> Comments for Draft 2016 Air Quality Management Plan
>
> Issues faced by AQMD:
> Permit updating on methane, carbon dioxide and VOC emitting industries. When permits are being re-issued, no new permitting constrains are really being addressed.
> Additional staff or outsourcing the permit rule review to look at each of the major rules governing the release of methane, carbon dioxide and VOC gases such as the ones plaguing Terminal Island (off loading of ship waste), Wilmington (flaring of hydrocarbon emissions), Boyle Heights (plating companies, industrial sources like rendering plants, goods movement and rail yards) and City Terrace (Industrial Coatings) will be key to coming into compliance. 3-1
>
> With the need for 100% bypassing of solid waste and the need to separate food waste, the public and agencies alike need to ensure that "oxygenation" is ensure so that those bacterial don't become anaerobic which will produce more nitrogen oxides and methane gases. US EPA shows (https://www3.epa.gov/climatechange/ghgemissions/gases/n2o.html) that overall, it is Agricultural Soil Management is the major source of pollutants. With larger cities in the US being faced with having to compost and recycle up to 100% diversion from landfills by 2025, this will be the new source. Best to mitigate this now. 3-2
>
> Education is needed in the schools now to have full implementation so that we're not reliant on technologies to "clean up" the air, instead BMP's are key early on. Just like the need to teach the youth of today so that it translate at home. 3-3
>
> As far as PM2.5 reduction, dust management (Construction, Industrial and Street Cleaning / Maintenance) will be key as well as storm water runoff. Multi agency and regulatory bodies will need to get together and get water companies, while renewing their infrastructure in the coming years (new focus by federal government in job creation being campaigned on now), 3-4

install a greater network of reclaimed water for the purpose of dust control, but then we need to deal with the storm water runoff to curtail pollution to rivers and streams and ultimately the ocean. 3-4 Con't
>
> This would divert a large number of dollars from healthcare to new jobs and to better health for all as well as provide a revenue source for funding these 3 program targets listed above.

Responses to Comment Letter from Rafael Yanez
(Comment Letter #3)

Response to Comment 3-1:

The 2016 AQMP seeks the most effective pathway to ozone attainment by focusing on NOx reductions and includes control measures to make those NOx reductions. The Plan also includes measures to directly reduce VOC emissions to assist in meeting ozone attainment. With regard to the permitting, and compliance with those permit conditions, all facilities must comply with any existing and newly adopted rules and regulations. The 2016 AQMP includes a full analysis of all emissions and sources in all areas, and applies all feasible measures to those sources to achieve emissions reductions.

Response to Comment 3-2:

The 2016 AQMP proposes a measure (BCM-10) that will focus on composting of greenwaste and other foodwaste reduction technologies, including anaerobic digestion which could also reduce emissions.

Response to Comment 3-3:

The 2016 AQMP proposes a measure (FLX-01) that seeks to improve education and public outreach.

Response to Comment 3-4:

The 2016 AQMP includes a series of PM2.5 reduction strategies including one focused on reducing paved road dust (BCM-03). In particular, BCM-03 proposes further paved road dust PM2.5 emission reductions through specifying the frequency of street sweeping.

Comment Letter from CalRecycle (Comment Letter #4)

From: Reul-Chen, Crystal@CalRecycle <Crystal.Reul-Chen@calrecycle.ca.gov>
Sent: Friday, August 5, 2016 2:28 PM
To: Michael Krause; Jong Hoon Lee
Cc: Pogue, Kyle@CalRecycle
Subject: CalRecycle's Comments on SCAQMD's 2016 Draft AQMP

Dear Mr. Michael Krause and Jong Hoon Lee,

Thank you for the opportunity to comment on the preliminary draft 2016 Air Quality Management Plan (AQMP). CalRecycle would like participate in the finalization of the AQMP, and throughout the development of control measure (CM) BCM-10. Please put me, Dr. Crystal Reul-Chen (Crystal.Reul-Chen@calrecycle.ca.gov), on any pertinent contact lists for this process.

In the meantime, we would like to submit a few comments on CM# BCM-10 from the AQMP. Our comments are detailed here:

Technology neutral and performance-based specifications: We offer our comments specifically on CM# BCM-10 "Emissions Reductions from Green Waste Composting [VOC, NH3]" in the hopes of fostering technology-neutral and performance-based control measures from which to manage organic materials in the District. We caution against supporting any one technology over another. It is important with any of these technologies to have a comprehensive understanding of the air and water quality impacts of the storage, processing, and application or disposal of any feedstock or product. In lieu of supporting any one technology, we would recommend performance-based specifications for organic materials processing technologies. As California moves to achieve mandated organic materials management goals, we envision a variety of technologies being proposed to manage organic feedstocks, and a performance-based approach would be most effective regardless of the type of technology used to manage the organic materials. 4-1

Uncomposted Green Materials: The other concept that was suggested in BCM-10 was to restrict the use of uncomposted chipped and ground greenwaste on public lands within the air district based on one study (Burger et al., 2015). As SCAQMD proceeds with this proposed control measure we encourage alignment with current CalRecycle regulations, including those related to pathogen density limits. Also, it is extremely important to clearly define the terms "mulch", "uncomposted chipped and ground greenwaste", and "direct land application" as there are several different types of organic materials that fit these broad descriptions without all requiring composting. The potential positive roles these materials can play in supporting 2016 AQMP's reduction of PM-10 emissions within the District should also be accounted for. CalRecycle has references that can help SCAQMD align with our regulations, clarify definitions, and demonstrate PM-10 emissions reductions through the use of organic materials. 4-2

We look forward to working with your staff to further explore these issues as you proceed with your proposed rulemakings, and to helping SCAQMD achieve its air emissions goals. In the meantime, please don't hesitate to contact me at 916.341.6026, or Crystal.Reul-Chen@calrecycle.ca.gov to further discuss these comments.

Sincerely,

Crystal

Dr. Crystal Reul-Chen
Senior Environmental Scientist
Organic Materials Management

Responses to Comment Letter from CalRecycle
(Comment Letter #4)

Response to Comment 4-1:

The 2016 AQMP proposes a measure (BCM-10) that explores emerging technologies and performance-based specifications to be considered during rulemaking.

Response to Comment 4-2:

SCAQMD staff will align with CalRecycle regulations as was done for the previous organic materials rulemaking. Impacts of uncomposted green materials will be reviewed in detail during rulemaking.

Comment Letter from Senator Jim Dabakis (Comment Letter #5)

From: jim.dabakis@gmail.com on behalf of Jim Dabakis <jdabakis@le.utah.gov>
Sent: Monday, August 8, 2016 8:19 PM
To: James E. Enstrom; AQMP Inquiries
Subject: Re: BYU Professor Pope and the $38.2 Billion Question

Dear Dr Enstrom

As you are asking the greatly respected Professor Pope, Yes or No questions, let me ask you the same.

Are you the James Enstrom who In 1996, requested that the tobacco industry provide you with funds to conduct research into the health effects of passive smoking. Who in 1997 to 1998, received three tobacco industry grants, the combined value of which was $700,000; most of this money dedicated to the study of passive smoking. This study, published in BMJ in 2003, concluded that "The association between exposure to environmental tobacco smoke and coronary heart disease and lung cancer may be considerably weaker than generally believed. This study where a Dr Enstrom, used data from one of the American Cancer Society's databases, which had requested and received from the society.
Are you the Dr Enstrom that Michael Thun of the American Cancer Society criticize for not informing the ACS that he had requested or received funding from the tobacco industry? Are you the Enstrom who, in September 2006, the ACS sent the University of California, Los Angeles a letter charged with misrepresenting scientific evidence to deny that passive smoking was harmful? 5-1

Are you the same man who, In 2006, prosecutors in a federal racketeering case filed documents which stated that you had received $94,500 from the tobacco industry between 1992 and 1997? The following year, the judge in this case, Gladys Kessler, ruled that major tobacco companies were guilty of racketeering and misleading the public regarding the dangers of second-hand smoke, citing the paper co-authored by a James Enstrom, in the BMJ as evidence of this. Is that you?

Are you the Enstrom who in 2010, the University of California, Los Angeles School of Public Health announced it would not be rehiring because it felt his research was "not aligned with the academic mission" of their department? The Enstrom who in 2012, filed a lawsuit in federal court against UCLA in response to them terminating a position there?Are you the Enstrom that said UCLA administrators "discriminated against Dr. Enstrom based on his ideological and political affiliations and sought to purge an academic dissenter from their ranks? That in 2015, settled the case, with UCLA allowing to use the title "retired researcher" and continue to access university resources?

Is that you?

Most importantly, are you currently receiving any funding from polluters as you ask Dr Pope questions?

Senator Jim Dabakis

CC: Members of Legislature

On Mon, Aug 8, 2016 at 6:05 PM, James E. Enstrom <jenstrom@ucla.edu> wrote:

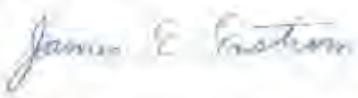
> August 8, 2016
>
> Utah State Legislators
>
> Salt Lake City, Utah
>
> Re: BYU Professor Pope and the $38.2 Billion Question
>
> Dear Utah State Legislators,
>
> I am an environmental epidemiologist and physicist who has had a long academic career at UCLA and I am an expert on the health effects of air pollution in California. I am writing to you because research findings and claims that fine particulate matter (PM2.5) *causes* premature deaths by Brigham Young University Professor of Economics C. Arden Pope, III, are being used by the South Coast Air Quality Management District (SCAQMD) to justify proposed new $38.2 billion air pollution regulations in Southern California. However, the scientific validity of Dr. Pope's findings has been continuously challenged since they were first published in 1995. Recently a very strong case has been made by nine accomplished experts, including myself, that "Particulate Matter Does Not *Cause* Premature Deaths" (https://www.nas.org/articles/nas_letter). In addition, there is overwhelming evidence from over a dozen sources, including both Dr. Pope and me, that PM2.5 is NOT related to total mortality in California (http://scientificintegrityinstitute.org/NoPMDeaths112215.pdf). Finally, in a June 12, 2013 letter to EPA, Congressmen Lamar Smith and Chris Stewart described the urgent need for transparency and reproducibility regarding Dr. Pope's research findings and they (unsuccessfully) requested the underlying data for his 1995, 2002, 2005, 2009, and 2009 research papers.

Since Dr. Pope is widely regarded as "The World's Leading Expert on the Effects of Air Pollution on Health," and since his extensive advice to CARB and SCAQMD is taken very seriously, I now ask Dr. Pope for a YES or NO answer to the following question: "In light of the above challenges to your PM2.5-mortality findings, do you support the way that the SCAQMD has used three studies co-authored by you (Jerrett et al. 2005, Krewski et al. 2009, and Jerrett et al. 2013) to calculate their 'Preliminary Health Impacts – Mortality', knowing that that these preliminary mortality impacts are the primary public health justification for a Draft 2016 Air Quality Management Plan (AQMP) that will impose an estimated $38.2 billion in compliance costs on the South Coast Air Basin economy?" The July 28, 2016 SCAQMD tables containing the preliminary mortality impacts and the preliminary AQMP costs are attached to this letter, with full details available at this weblink (http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPRSocio_072816). A table summarizing all studies of PM2.5 and total mortality in California, with the 2005, 2009, and 2013 studies highlighted in red, is also attached. Relative risk of unity (RR = 1.00) means no relationship between PM2.5 and mortality. Finally, the 2013 letter by Congressmen Smith and Stewart is attached.

Because his findings will be discussed at an SCAQMD AQMP meeting next week, I request an answer from Dr. Pope by August 15, 2016. Until I receive a response to the contrary, I will assume that his answer to my question is YES. If you have the time to examine this matter, I request that you send your own answer to the above question to me (jenstrom@ucla.edu) and/or to SCAQMD (aqmp@aqmd.gov). Please let me know if you would like to discuss any aspect of this request with me.

Thank you very much for your consideration of this important matter.

Sincerely yours,



James E. Enstrom, Ph.D., M.P.H.

UCLA and Scientific Integrity Institute

jenstrom@ucla.edu

(310) 472-4274

Responses to Comment Letter from Senator Jim Dabakis
(Comment Letter #5)

Response to Comment 5-1:

Comment letter 5 is erroneously identified as an AQMP comment letter and has been deleted.

Comment Letter from Association of California Cities Orange County (Comment Letter #6)



300 S. Main Street, #410, Orange, CA 92868 | P: 714.953.1500 | F: 714.953.1502 | www.ACCOC.org

August 10, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

RE: Association of California Cities – Orange County Comments on AQMP

Dear Dr. Fine -

Thank you for preparing and providing for public review the 2016 Air Quality Management Plan. The Association of California Cities – Orange County has spent considerable time evaluating this draft on behalf of our region's 34 cities and numerous local governments.

The ACC-OC was also part of a technical working group composed of the Orange County Transportation Authority, Orange County Council of Governments, Transportation Corridor Agencies and several local jurisdictions. This group has collaborated on numerous technical and policy-level comments to the Draft. The ACC-OC firmly stands by these comments and urges AQMD to implement the recommendations.

But we also have several comments we are compelled to emphasize on behalf of our members and city governments. These comments focus on proposed Control Measures and offer recommended changes to make the overall Draft more effective, reasonable and beneficial for our shared constituencies. 6-1

EGM-01: EMISSION REDUCTIONS FROM NEW OR REDEVELOPMENT PROJECTS

This proposed measure is overly broad and could be interpreted to add a new fee to new development or redevelopment in AQMD's service area. The ACC-OC is strongly opposed to such a fee and requests clarifying language to EGM-01 that clearly states AQMD's intent with its evaluation of Rule 9510 from the San Joaquin Valley.

The well-documented housing affordability crisis is driving residents, businesses and employers out of our region. Fees for a new home in Southern California can

exceed hundreds of thousands of dollars per home! What's more, it is highly unclear what the impact and requirements from local jurisdictions would be with such a fee. The consideration of a new development and redevelopment fee is significant public policy. It should be debated as part of overall public policy debates, like the AQMP, and not in more obscure rulemaking processes. Therefore, as the 2016 AQMP is well underway, it is prudent that discussion of implementation of a similar rule to Rule 9510 be deferred to future AQMP developments.

6-1 Con't

BCM-03 FURTHER EMISSION REDUCTIONS FROM PAVED ROAD DUST SOURCES

Roughly 12 Orange County cities carry NPDES permits. Another several dozen organizations and local governments also hold these permits. An NPDES permit is among the most difficult to obtain from the U.S. Environmental Protection Agency. There are extraordinarily strict mandates, review and renewal processes administered by regional water quality control boards. AQMD currently does not have jurisdiction over the issuance, maintenance or mandates required of NPDES permits.

That is why we are concerned and confused that AQMD would suggest the "review existing NPDES mandates" as part of the BCM-03. The mandates and processes associated with NPDES permits should be left to regional water quality control boards. We urge AQMD staff to remove reference to NPDES mandate review as to not confuse jurisdictional and implementation issues related to these permits.

6-2

Again, the ACC-OC fully supports the additional technical and policy positions put forward in the Orange County Council of Governments letter. The aforementioned issues are of particular concern to the ACC-OC and we respectfully request the requested actions are completed.

Please contact me at (715) 953-1300 or hstratman@accoc.com with any questions on these requests and concerns.

Thank you,

Heather Stratman

Heather Stratman
Chief Executive Officer
Association of California Cities – Orange County

Responses to Comment Letter from Association of California Cities Orange County (ACCOC) (Comment Letter #6)

Response to Comment 6-1:

The proposed EGM-01 working group process will solicit feedback and input from affected stakeholders to determine the most efficient and cost-effective pathway of mitigating and potentially identifying additional air pollutant emission reductions from new or redevelopment projects, while minimizing economic impacts on businesses and residents in the region. San Joaquin Valley Rule 9510 allows the payment of fees in lieu of emission reductions at the developer's options. EGM-01 does not propose any mandatory fees.

Response to Comment 6-2:

The 2016 AQMP BCM-03 proposes further paved road dust PM2.5 emission reductions through specifying the frequency of street sweeping. To clarify, text in BCM-03 relative to NPDES permits was modified in the Final Draft of the 2016 AQMP to read as follows: "Street sweeping as part of routine roadway and highway maintenance may be included in a state, regional and/or local jurisdiction's National Pollutant Discharge Elimination System (NPDES) permits as part of federal Clean Water Act provisions to reduce debris from entering the storm drain system. NPDES permits are governed by the U.S. EPA and issued and maintained by regional water quality control boards. SCAQMD will coordinate with NPDES permittees and regional water quality control boards to ensure rules of this Plan or future Plans do not conflict with or otherwise compromise NPDES permit requirements. This review is not intended to be a part of the NPDES permit approval process or a reevaluation of existing NPDES permits, but is intended to determine current street sweeping or highway maintenance requirements and practices to ensure that any SCAQMD rulemaking would not be in conflict with existing NPDES permit requirements."

Comment Letter from Orange County Transportation Authority (Comment Letter #7)

OCTA

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August 9, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: **Draft 2016 Air Quality Management Plan**

Dear Dr. Fine:

The Orange County Transportation Authority (OCTA) appreciates the opportunity to provide comments on the Draft 2016 Air Quality Management Plan (AQMP). In addition, OCTA appreciates your diligent efforts to include a wide variety of stakeholders in your process as the final 2016 AQMP is developed.

Consistent with many of the strategies proposed in the AQMP, OCTA is currently taking actions that benefit air quality. These include upgrades to our bus fleet, such as: utilizing renewable natural gas, repowering 199 buses with 0.2 grams per brake horse-power engines (down from 2.0 grams per brake horse-power), ordering 0.02 gram per brake horse-power engines for 98 buses in our fleet, and acquiring a hydrogen fuel-cell bus, with another ten hydrogen fuel-cell buses and five electric buses pending a grant award. Other actions by OCTA that benefit sustainability include implementation of a regional network of bikeways, reallocation of transit resources to more efficiently serve high-demand areas, studying opportunities for transit-oriented development, and improving active transportation connectivity to transit services. 7-1

Furthermore, OCTA has a voter-approved sales tax measure to fund a multi-modal set of programs and projects that improve mobility in the region, reduce emissions, and preserve and enhance the environment. These include signal synchronization, system preservation, a new streetcar line, enhanced commuter rail services, freeway congestion management, an advanced-mitigation program that has set aside over 1,300 acres as permanent open space in Orange County, and a competitive funding program to mitigate water runoff beyond required standards.

OCTA does, however, have several concerns that we believe deserve further consideration prior to finalizing the AQMP. These concerns are outlined in the discussion below.

Orange County Transportation Authority
550 South Main Street / P.O. Box 14184 / Orange / California 92863-1584 / (714) 560-OCTA (6282)

Advanced Clean Transit

The California Air Resources Board's (CARB's) Advanced Clean Transit Regulation is included in the AQMP. This is intended to ensure that nearly every heavy-duty vehicle operated in California in 2023 will meet the 2010 heavy-duty engine emission standard. However, even a highly aggressive full-fleet penetration of 2010-compliant engines would not provide sufficient nitrous oxide (NOx) reductions to attain the federal ozone standard in the timeframe required. This proposed rulemaking also requires transit operators to replace their entire bus fleets with zero-emission technologies between 2018 and 2040.

The basic requirement to update bus fleets does not appear to be cost-effective, considering a battery electric or hydrogen fuel-cell bus costs between $900,000 and $1.5 million, plus the cost of fueling/charging infrastructure. A conventional compressed natural gas bus costs about $600,000. As such, implementation of the CARB regulation for buses could potentially lead to less funding for bus operations, which would likely result in reduced service levels and discretionary transit uses, which would disproportionately affect transit dependent populations in Orange County and the South Coast Air Quality Management District (SCAQMD) region. Given this, OCTA proposes that the Advanced Clean Transit regulation be performance based and technology neutral. This would help to reduce potential service impacts, and account for emission reduction efforts already underway, such as the current OCTA initiatives noted earlier. 7-2

Further, this level of investment by all of the transit operators throughout the region is only estimated to reduce NOx emissions by less than 200 pounds per day by 2023, and about 200 pound per day by 2031. This contributes extremely little to the 115 tons per day (tpd) reduction that is targeted for 2023, or the 124 tpd reduction targeted for 2031.

EGM-01 – Emission Reductions from New Development and Redevelopment Projects

The purpose of this measure is to mitigate and reduce emissions from new development and redevelopment projects. However, the description of EGM-01 is overly broad, and OCTA suggests that SCAQMD work with stakeholders to narrow this description or eliminate the strategy prior to finalizing the 2016 AQMP. Further, there are no quantifiable emission reductions associated with this measure, nor is there a cost-effectiveness analysis. 7-3

An EGM-01 working group consisting of affected stakeholders from local governments, the building industry, developers, realtors, other business representatives, environmental/community organizations, and other stakeholders, was established as part of the 2007 AQMP. OCTA respectfully requests inclusion in the working group when, and if, it is reconstituted.

7-3 Con't

In addressing indirect sources, the SCAQMD should develop implementation and compliance methods that will not unduly restrict local or regional jurisdictions' prerogatives with respect to land use approvals. During rule development, special consideration should be given to assure that any rule adopted will integrate with, and enhance, the California Environmental Quality Act (CEQA) process, and not impede the project approval process in light of CEQA timelines.

Incentive Strategies

The 2016 AQMP contains a number of measures that are designed to provide incentives to accelerate the penetration of zero- and near-zero emission technologies. Many of the measures target mobile sources that are regulated by the CARB and the United States Environmental Protection Agency (U.S. EPA).

It is therefore important to demonstrate within the 2016 AQMP that CARB and U.S. EPA are committed to these strategies, since they will likely be the implementing agencies. If they are not committed, these strategies should not be included in the 2016 AQMP, due to SCAQMD's inability to delegate to these agencies.

7-4

The Draft 2016 AQMP also notes that as much as $14 billion in funding must be identified in order to implement the "incentive strategies." Without identification of funding sources, these measures do not seem to be any more useful than the "black box" strategies that were included in previous AQMPs. OCTA is also concerned about the types of funding sources that could be considered and would appreciate involvement in making these determinations. OCTA's primary concern is related to potential increases in regulatory fees, or potential diversion of funds that OCTA depends on to deliver transit service, and the other programs mentioned earlier that contribute toward sustainability and quality of life.

Unquantified Measures

There are a number of measures that have not been quantified in the Draft 2016 AQMP. These are often referred to as "to-be-determined" or "TBD" measures. It may not be appropriate to include these types of measures in the 2016 AQMP, since the inclusion of measures implies some level of commitment toward delivering those measures. This could become problematic, considering an economic analysis cannot be performed without the quantified benefits.

Currently, it appears as though these measures could easily be put in place of the other quantified and committed measures by SCAQMD staff after the 2016 AQMP is approved. This kind of transfer of commitment should not be an action that can be implemented as an administrative change. OCTA also understands that the TBD measures may prove to be more cost effective than some of the other measures, and so it would make sense to pursue them. However, until the time that either a backstop measure is needed or a TBD measure is identified to be more cost effective than one of the currently quantified measures, OCTA requests that the TBD measures either be removed from the plan, or clearly separated from the quantified measures, and called out as uncommitted measures that require further development and evaluation. 7-5

Furthermore, should the TBD measures remain in the AQMP, OCTA requests that the 2016 AQMP include a discussion that clearly states the purpose for including these strategies and the process required to incorporate these strategies. This process would preferably include action by the SCAQMD Governing Board and opportunities for public review and comment.

Thank you once again for the opportunity to provide input on the Draft 2016 AQMP. Should you have any questions regarding the comments above, please contact Greg Nord, Principal Transportation Analyst, at 714-569-5885, or gnord@octa.net.

Sincerely,

Kia Mortazavi
Executive Director, Planning

KM:gn

c: Board of Directors
Executive Staff

Responses to Comment Letter from Orange County Transportation Authority (OCTA)
(Comment Letter #7)

Response to Comment 7-1:

SCAQMD appreciates the participation in the development of the 2016 AQMP and the efforts taken by OCTA to benefit air quality including upgrades to the bus fleet.

Response to Comment 7-2:

Comments regarding the Advanced Clean Transit regulation have been provided to CARB since the measure is part of the State Mobile Source Strategy. It is not the intent of the control measure to result in reduced service levels but CARB has not released specific proposals for the rule amendment at this time. However, CARB has discussed concepts for a proposed regulation, which includes consideration of near-zero emission buses as a transition to zero-emission buses.

Response to Comment 7-3:

San Joaquin Valley Air Pollution Control District has an adopted rule, Rule 9510, that is approved by U.S. EPA. Rule 9510 achieves emission reductions from development and re-development projects (e.g., residential, commercial, industrial). Under State law, as a nonattainment area, the SCAQMD must evaluate all feasible measures to determine if other areas have passed rules more stringent than our own to be adopted and implemented in the South Coast Air Basin and Coachella Valley. San Joaquin's Rule 9510 covers a broad sector of development projects and these project types will be evaluated through a public process.

As noted, a working group will be established to develop EGM-01 and we encourage participation. The intent of EGM-01 is to seek emission reductions through greater deployment of cleaner technologies and not restrict local government prerogatives with land use approvals.

Response to Comment 7-4:

The SCAQMD has been in discussions with CARB regarding implementation of the State Mobile Source Strategy. The emission reductions associated with the State Mobile Source Strategy are primarily the responsibility of CARB and U.S. EPA. For the "Further Deployment" measures, the SCAQMD has a shared responsibility to help implement the measures and incentive funding is one of the implementation components.

Staff has developed a Financial Incentive Funding Action Plan as a companion document to the 2016 AQMP. Staff will explore potential funding opportunities and will seek input from stakeholders and the public. Opportunities may include new sources of funding on the federal, state and local level. Staff does not intend for these measures to divert existing funds.

Response to Comment 7-5:

The "TBD" (to be determined) measures require further technical and feasibility evaluations and the attainment demonstration is not dependent on these measures. However, they are included in the AQMP as part of a comprehensive plan with all feasible measures in case there is a possible need for additional measures and a shortfall in reductions. As emission reductions are realized and to the extent that the

reductions can be SIP creditable, the reductions will be taken as part of future rate-of-progress reporting or as part of future AQMP revisions. For the SCAQMD TBD mobile source measures, emission reductions are accounted for under the CARB SIP Strategy so emission reductions are not listed to avoid overlap. These emission reductions will take place locally and will be determined when the programs, such as facility-based measures, are implemented.

Clarification of the TBD measures has been added in Chapter 4 of the Revised Draft Plan.

Comment Letter from Steve Milloy (Comment Letter #8)

Particulate Matter in Outdoor Air Is Not Associated With Mortality

By Steve Milloy MHS, JD, LLM
JunkScience.com

The Claim. Since the 1990s, the U.S. Environmental Protection Agency (EPA) and others have claimed that fine particulate matter in outdoor air (PM2.5) is associated with and causes death.

The EPA's position is that that:

- ANY inhalation of PM2.5 can cause death;
- Death from PM2.5 may occur within hours of inhalation (i.e., "short-term" or literally "sudden death") and that;
- Long-term (i.e., years or decades) exposure to PM2.5 can cause premature death.

EPA claims that natural and manmade PM2.5 causes as many as 500,000 deaths annually.[1]

In support its claim that PM2.5 kills, EPA points to "thousands" of epidemiologic (statistical studies of human populations), toxicologic (experiments on animals) and clinical (experiments on humans) studies.[2] EPA further claims that the agency's conclusions have been endorsed by its Clean Air Act Scientific Advisory Council (CASAC), a board of outside science advisors.[3] 8-1

Scientific Reality: PM2.5 does not kill anyone. The EPA's claims of PM2.5 lethality rank among the most nonsensical, fraudulent and readily disprovable scientific claims ever.

EPA's three bodies of research. EPA claims the PM2.5-mortality hypothesis is supported by existing epidemiology, toxicology and clinical studies. This is false.

- **Epidemiology.** EPA admitted in federal court that its epidemiologic studies on PM2.5 prove nothing by themselves. In 2012 litigation in which EPA attempted to justify its experiments on humans with PM2.5, EPA admitted doing the experiments because: "epidemiologic studies do not generally provide evidence of direct causation." The purpose of the human experiments, according to EPA, was to develop a medical or biological explanation (i.e., the direct causation) that would support the merely statistical (and, by the way, controversial) results of the PM2.5 epidemiology studies.[4]
- **Toxicology.** No laboratory animal has ever died from PM2.5 in an experimental setting — even though animals have been exposed to levels of PM2.5 as much as 100+ times greater than human exposures to PM2.5 in outdoor air.[5]
- **Clinical studies.** EPA has tested a variety of air pollutants — including very high exposures to PM2.5 — on over 6,000 human volunteers. Many of these volunteers were

elderly or already health-compromised — the very groups EPA claims are most susceptible to dying from PM2.5 exposures. EPA has admitted that there have been no deaths or any dangerous adverse events clearly caused by these PM2.5 exposures.[6] PM2.5 exposures in these experiments have been as high as 21 times greater than allowable by EPA's own air quality rules.

EPA's claim about PM2.5 causing death is not supported by the results from these research disciplines, individually or collectively.

Real-world evidence that PM2.5 does not cause sudden or long-term death. Everyone is constantly and unavoidably exposed to PM2.5 from both natural and manmade sources. Natural sources include dust, pollen, mold, pet dander, forest fires, sea spray and volcanoes. Manmade sources primarily are smoking, fossil fuel burning, industrial processes, wood stoves, fireplaces and indoor cooking. Indoor exposures to PM2.5 can easily exceed outdoor exposures — by as much as a factor of 100.[7]

Although EPA claims that almost 25% of annual U.S. deaths are caused by PM2.5, no death has ever been medically attributed to PM2.5.

Despite much research, there is no generally accepted medical or biological explanation for how PM2.5 could possibly cause death.

8-1
Con't

Much higher exposures to PM2.5 than exist even in the "worst" outdoor air are not associated with sudden death. The level of PM2.5 in average U.S. outdoor air — air that EPA claims can cause sudden death — is about 10 millionths of a gram (microgram) per cubic meter. In one day, a person breathing such air would inhale about 240 micrograms of PM2.5. In contrast, a cigarette smoker inhales approximately 10,000 to 40,000 micrograms of PM2.5 per cigarette.[8] A marijuana smoker inhales 3.5-4.5 times more PM2.5 — i.e., 35,000 to 180,000 micrograms of PM2.5.[9] Typical water pipe or "hookah" smokers inhale the equivalent PM2.5 of 100 cigarettes per session.[10] There is no example in published medical literature of these various types of short-term smoking causing sudden death despite the very high exposures to PM2.5.[11] Sudden death is also not associated with other high PM2.5 exposures and environments like mines,[12] indoor wood burning, smoking areas[13] or extremely poor quality urban air, for example, in Chinese cities.[14]

The EPA's claim that PM2.5 causes long-term death is grounded in two long-term epidemiologic studies: the "Harvard Six Cities' Study and the "American Cancer Society" (ACS) study. Both studies are controversial for many methodological reasons.[15] The controversy cannot be resolved as EPA refuses to release and/or refuses to compel release of key data used in the studies to independent researchers for purposes of re-analysis and replication.[16] For results to be considered to be scientifically credible, they must be capable of being independently replicated.

A large analysis of the recent daily air quality and daily death data from California for 2007-2010 reports no association between PM2.5 and death.[17]

Finally, if EPA really believed that PM2.5 was as deadly as the agency claims, then the agency would be legally and ethically compelled to stop conducting experiments in which human

subjects, including the elderly and health compromised, are made to inhale PM2.5 at levels up to 21 times higher than EPA air pollution standards allow.[18] The agency, however, has refused to cease conducting these experiments.[19]

8-1 Con't

But hasn't EPA's CASAC reviewed and approved EPA's claims about PM2.5 and death? As pointed out by House Space, Science and Technology Committee chairman Lamar Smith (R-Tex.), "The EPA's regulatory process today is a closed loop. The agency funds the scientific research it uses to support its regulations, and it picks the supposedly independent (but usually agency-funded) scientists to review it."[20] These "independent" reviewers are on the EPA payroll in amounts of tens of million of dollars.[21] EPA's refusal to make its key data available to the public and the obvious conflicts of interest render CASAC review not credible.

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[1] A summary of What EPA claims about the lethality of PM2.5, including links to original documents, is at: http://epahumantesting.com/the-most-toxic-substance-on-earth/. The 500,000 deaths estimate is on p. G-7 of the EPA's quantitative risk assessment for particulate matter, http://www.epa.gov/ttn/naaqs/standards/pm/data/PM_RA_FINAL_June_2010.pdf,

[2] http://www2.epa.gov/shttp://epahumantesting.com/the-most-toxic-substance-on-earth/. ites/production/files/2014-06/documents/20140602ria-clean-power-plan.pdf, p. 4-19.

[3] *Ibid.*

[4] https://junksciencecom.files.wordpress.com/2014/07/epa-memo-in-opp-to-tro-062614-copy.pdf

[5] http://www.epa.gov/ncea/pdfs/partmatt/Dec2009/PM_ISA_full.pdf,

[6] https://junksciencecom.files.wordpress.com/2014/06/epa-irb-app-6000-volunteers.pdf.

[7] http://www.epa.gov/air/basic.html.

[8] http://www.atsjournals.org/doi/full/10.1164/rccm.200802-334OC - .U7QmVhaHffg.

[9] http://www.drugscience.org/Petition/C2B.html,

[10] http://www.fic.nih.gov/News/GlobalHealthMatters/march-april-2014/Pages/nih-hookah-waterpipe-tobacco-smoking.aspx,

[11] http://www.washingtontimes.com/news/2012/nov/30/whats-epa-smoking/,

[12] http://www.msha.gov/S&HINFO/BlackLung/2011-172NIOSH.pdf,

[13] https://junksciencecom.files.wordpress.com/2014/07/hook-bar-pm-study.pdf,

[14] http://www.washingtontimes.com/news/2013/jan/22/chinas-bad-air-puts-the-lie-to-epa-scare-tactics/.

[15] http://www.foxnews.com/story/2001/02/02/epa-secret-science/.

[16] http://science.house.gov/press-release/smith-subpoenas-epa-s-secret-science,

[17] http://junkscience.com/2013/12/26/epa-air-pollution-scare-debunked-by-best-data-set-ever-assembled-on-particulate-matter-deaths/,

[18] http://www.washingtontimes.com/news/2012/apr/24/did-obamas-epa-relaunch-tuskegee-experiments/,

[19] http://www.washingtontimes.com/news/2013/feb/13/milloy-federal-judge-overturns-epa-human-experimen/,

[20] http://online.wsj.com/articles/lamar-smith-what-is-the-epa-hiding-from-the-public-1403563536.

[21] http://www.washingtontimes.com/news/2012/mar/7/clearing-the-air-on-the-epa/.

Responses to Comment Letter from Steve Milloy (JunkScience.com)
(Comment Letter #8)

Response to Comment 8-1:

The U.S. EPA is tasked with assessing new and emerging air quality science, including health studies, as part of the process of setting the federal air quality standards. This is an extensive, multi-year, public process that is described briefly in the Draft AQMP, Chapter 8. SCAQMD's role under the Clean Air Act is to develop and implement an emission reduction strategy that will bring the area into attainment in a timely manner.

The SCAQMD Board's current position is that the U.S. EPA has the primary role in assessing the science linking air pollutants and health effects. The U.S. EPA has concluded that both short-term and long-term exposure to PM2.5 cause mortality. It is then the role of SCAQMD to describe the public health impacts of poor air quality in our region, as well as to implement measures to attain the federal and state ambient air quality standards. It should be noted that the California Air Resources Board has also determined that there are significant mortality and morbidity effects from exposure to PM2.5.

More details on the U.S. EPA's review and causal determination for PM2.5 and mortality can be found in the U.S. EPA Integrated Science Assessment of Particulate Matter (74 FR 66353) and in Appendix I – Health Effects to this AQMP.

Comment Letter from HDL/GGS, Inc. (Snake змія 蛇) (Comment Letter #9)

From: Snake змія 蛇 <Snake@hdltd.com>
Sent: Friday, August 12, 2016 1:06 PM
To: Angela Kim
Subject: Totally Aerobic Nitrogen Cycle
Attachments: White Paper – The Hiatt 24Hr Totally Aerobic Nitrification Cycle.pdf

Importance: High

HDL/GGS,Inc PO 7475 Long Beach, California 90807 Snake@HDltd.com

I hold Patents on a **totally AEROBIC NITROGEN CYCLE**. Our method after primary scrubbing would capture NOx from industrial sources such as power plants, industrial boilers, cement kilns, and turbines and place the NOx into an aqueous solution. Then reduce the NOx into N2 and CO2. At the same time scale down hydrocarbons and VOC emissions. There are NO toxic gases such as H2S, SO2 or CH4 produced. Neither Gas is harmful to the environment. The N2 and CO2 may be captured and utilized for other manufacturing uses. 9-1

We have developed a registered fertilizer which increases plant growth between 25 to 1000 times faster. The CO2 uptake from the rapid growth allows the Carbon Cycle to accelerate and remove not only CO2 but other gases from the atmosphere as the plants perform respiration. I shall send the OMG Fertilizer files to the AQMD via email.

Respectfully submitted

Snake
562 428 9973

From: Snake змія 蛇 <Snake@hdltd.com>
Sent: Friday, August 12, 2016 2:21 PM
Subject: Plants and CHNO
Attachments: OMG Label 1 Gallon.docx

It was pleasurable conversing with you today.

These are the photos I promised using the OMG FERTILIZER. This is the label . Notice the NKP is very low before you dilute. At the end of this email is the CHNO which I know you will find very interesting. **It also reduces air pollution.** Shall also send my flyer on Jujitsu as promised Also a few more photos in following emails

Any questions, call 562 428 9973 M-F 0930-1700 PST

Respectfully submitted

Snake

Please click on the following link for more plant photos.

http://www.globalgreeningsolutions.com/data/VestigeElementsExperiments.pdf

1

Lime tree, brought in by a customer on Friday to "Just add water" First photo shows how it was upon arrival. Second photo was on the following Monday **four days later** after application of our fertilizer. MN









Right Photo before treatment. Left photo taker **week later after one treatment.** The flag pole was removed for painting. MN

Slawek's orange tree. Notice how bad the leaves are in the first photo to the left. NEW growth photo on the right two weeks after one application. Flourishing with good looking leaves.



This peach tree on the left appeared like this for two years. **Two months later** the photo on the right indicates the results with one application. CA

fertilizer and 1800 mg of Heavy Harvest, **three days later the one on the right has grown,**





Trees at General Bottle in Los Angeles CA **All trees were 6 foot tall when planted.** This is a three year photo. The two large trees were treated only once. They also have been pruned 3 times because of their rapid growth. **Their trunk is 8 - 9 inches across** whereby the others are only 2 inches in D. The smaller trees now are between 7 - 8 feet



Apricot Tree. **The fruit is on NEW growth** which occurred in November, not old growth as it should be. **Apricots clustered like grapes** and the fruit was larger, very sweet. CA





Photo taken in Canada whereby with Canadian government permit. I myself am against drugs. Client also sells to regular farmers but decided to send these photos to show growth patters in a short period of time. Both plants were like the one on the left. Treated with our

Peyton's tomatoes, Texas. 1 photo untreated 2nd 24 hours after treatment 3rd one week 4th 2 weeks



CHNO – A Fully Aerobic Denitrification System The Future in Green Technology

Global Greening Solutions

We founded Global Greening Solutions, Inc. because we fundamentally believe in a better, cleaner world for everyone. We think that, regardless of belief or political ideology, everyone in the world can immediately benefit from innovative, scalable, and *clean* ways to dispose of almost any type of waste - and we're not talking about landfills.

Global Greening solutions is a technology-focused company of people committed to developing and providing technologically-based solutions to several of our world's most vexing ecological challenges.

We think that our first product, CHNO, is a strong first step to fulfilling our vision.

CHNO Product Overview

CHNO is a Green Technology System that converts many types of waste into non-pathogenic composted materials safely in a matter of hours. Utilizing a proprietary process, these reduced materials are completely safe for disposal and

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can be used as highly desirable organic fertilizers and compounds.

The incoming waste can contain the following materials:

- Food wastes
- Animal remains and body parts
- Manure
- Plastics
- Yard wastes
- Paper and cardboard
- Glass (<2% by weight)
- MSW (Municipal Solid Waste) i.e. Soil and rocks (< 2% by weight, up to golf ball size)
- Metal (light metal like tin/aluminum cans, <1% by weight)
- Construction waste (except bricks, cement blocks, asbestos, concrete)
- Hydro-carbons such as oil and fuels (requires pretreatment)

The system uses a proprietary process of accelerated bacterial, chemical and mechanical action to reduce the waste material into 3 main components:

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- CO_2 & N_2 gas which can be discarded to the atmosphere or captured for sale.
- Mature organic compost ready for sale. The volume of this material is as little as 5-10% of the input waste material and the weight is only 15 to 50% depending on moisture content.
- Liquid effluent with <1% nitrogen content and rich in trace minerals which is safe to be discarded to sewer or processed into a high nitrogen fertilizer via an optional stage in the system.

Each of these components is ready for sale to a variety of customers after suitable packaging.

- The output solids (cake) are excellent compost material and can be sold to a variety of customers such as Home Depot for home gardeners or farmers or government areas for uses such as reforestation of burnt areas.
- The CO_2 and N_2 gas mixture can be captured and bottled for sale to facilities such as algae farms for bio-fuel.
- The excess effluent can be processed through an optional stage which elevates the nitrogen content from <1% to as high as 25%. This is a high quality organic fertilizer which is also rich in trace minerals. It is suitable for a large variety of customers from home gardeners, nurseries and farmers.

The system requires the following resources for operation:

- Electricity - (480 volts 3 phase + 220/110 1 phase) for running pumps, heaters and electronics
- Natural Gas/Propane - for heating
- Water
- Various standard and proprietary compounds to regulate and control bacterial action

The operation of the system is fully automated to minimize overhead. This includes:

25

- Stage to stage transfer and timing
- Dispensing of bacteria and other chemicals and agents
- Temperature control
- Disposal of excess effluent
- Conveyer movement

The loading station can have an option for 2 conveyer systems with a storage station in between. The first conveyer will move slowly to allow manual sorting. The second conveyer will move material quickly from the storage station into the Shredder Chute one load at a time.

The system can be constructed in a range of models with capacities suitable for large plants such as a waste transfer station and sewage plants, or operations such as live stock farms or slaughter houses. A small size model is also possible for rural homes and green enthusiasts as well as a mobile station for on demand remediation tasks. It can also be used for bio-remediation of aquatic or soil hydro-carbon contamination such as oil spills and fuel spills with simple pretreatment.

System Overview

CHNO consists of 3 stations. Each of these stations can be operated at the same time so that the input material is processed in a pipeline fashion. The production system will be mostly automated so as to streamline and optimize the processing capacity of the input material.

In the #1 station, material can be loaded through a chute that feeds the primary processor using a conveyer belt or skip loader. A variety of compounds can be automatically added to the vat based on various parameters that are automatically sensed to achieve optimal organic reaction of the material.

After the primary processing is completed in approximately 5-15 minutes, it is transferred to the #2 station automatically. This station basically prepares the input material with the correct parameters so that it is ready for processing in the next stage.

The #2 Station provides an environment in which all pathogens for compost and liquid fertilizer are destroyed and also optimizes that environment for accelerated bacteria action, which digests the input material and breaks it down into the 3 basic components. Chemistry is continuously monitored and adjusted automatically for optimal bacterial action. The combination of the mechanical, chemical and bacteria action serves to reduce the waste material to a small size and allows the bacteria to consume all the dead pathogens. The bacteria action produces N_2 (nitrogen) and CO_2 (carbon dioxide) gases without any sulfur gasses expelled. These are separated by a gas/water separator within the station and can be expelled to the atmosphere or captured and bottled for sale. Dwell time in this station is expected to be around 30 minutes. Our system will exceed government requirements to provide a safety margin for pathogen destruction.

The #3 station consists of a storage tank for the output of the broken down material, a dewaterer, and a storage tank for the separated effluent. The Storage Tank serves to receive the fully digested material from the #2 station quickly so as to free it for the next batch. The slurry in the storage tank is slowly fed to the dewaterer which separates the solids from the effluent. The solids are mature non-pathogenic compost and can be packaged for sale. The effluent is saved in another storage tank for reuse in the #1 station so as to minimize both water and energy usage for the #1 station. Excess effluent can be safely discarded into city sewage or processed for sale.

The system has an optional stage in the #3 station for processing the excess effluent into a high quality organic

fertilizer instead of discarding it to the sewer drain. This stage treats the effluent and allows the NKP levels to increase. This can elevate the available fertilizer content from <1% to as much as 25% depending on processing parameters. This makes it a high quality organic fertilizer without boosting. This stage is also fully automated so that processed effluent is accumulated in a fertilizer tank ready to be pump out.

Capacity

The system is composed of 3 modular components: #1 Station, #2 Station and #3 Station, with or without the Fertilizer Processing Option Each one of these components is currently targeted to process 25 tons of raw waste in a 10 hour day. For higher capacity applications, each of the stations can be replicated and connected such that each station can feed more than one down line station to provide redundancy and the ability to put any individual station offline for maintenance without disruption to the operation.

Resource Consumption

This system uses a proprietary chemical, mechanical and bacteria action to reduce the waste. This process requires the material to be mechanically processed and mixed with a fair amount of water. To minimize the consumption of water, this system is designed to recycle the output effluent so that water usage is required only for the first few loads.

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Current Status

Global Greening Solutions is a startup company currently in the process of obtaining first round financing. Conceptual and physical design is currently in progress. We plan to initially fabricate a scaled down version to serve as a prototype to demonstrate feasibility as well as a vehicle for demonstrations. It will not be fully automated as in the full scale production system. The capacity of this demo system is yet to be determined pending design progress. We are targeting it to be at once portable and can be operated independently with a generator.

Glossary of Acronyms

CO_2 Carbon Dioxide N_2 Nitrogen CHNO Carbon, Hydrogen, Nitrogen and Oxygen, the building block elements of all organics MSW Municipal Solid Waste NKP Nitrogen, Potassium and Phosphorous, the 3 main components in fertilizer

Closing

Use of the CHNO reduces landfills, air pollution, aquifer pollution and ground pollution with a payback of a resalable product. It can also be employed for sewage, soil and bio

Responses to Comment Letter from HDL/GGS, Inc. (Snake змія 蛇)
(Comment Letter #9)

Response to Comment 9-1:

Thank you for participating in the 2016 AQMP process and providing the NOx reduction technology information. Various technologies, including those provided, will be considered during the actual rulemaking process. Staff encourages interested parties to participate in the rulemaking process that will include working group meetings when ideas are shared and discussed for consideration in rule and incentive program development.

Comment Letter from Public Solar Power Coalition (Comment Letter #10)

From: Harvey Eder <harveyederpspc@yahoo.com>
Sent: Friday, August 12, 2016 5:29 PM
To: Jillian Wong; pfine@aqmp.gov; harveyederpspc@yahoo.com
Cc: harveyederpspc@yahoo.com; Jillian Wong
Subject: comments on nop ceqa aqmp 2016 by Harvey Eder for self & PSPC Public Solar Power Coalition 8/12/16 per MKrause phone 8/4/16 ITSC

Hello AQMP 2016 folks ie. Jillian Wong (Dr.) , Phil Fine (Dr.) and Mike Krause, 8/12/16

This document is copyrighted by Harvey Mark Eder all rights reserved. August 12,2016 2:30 pm

Due to the cite in 10 2 and 10-3 in the June 30,2016 Draft Plan that says there has been a 30% increase
in ch4/methane over the last 10 years and the new 84, 86 gwp used by IPCC AR5 2013 I brought this up with Dr. Arron Katsenstein who chap 10 and is staff lead in Climate Change and GHG etc, the current number using radiative
forcing for 1800 (2016 is 1841ppb ch4) ppb is 274 ppm co2equivilent ch4 emissions in the atmosphere +- 10%
ch4 gwp over 20 yrs is 84,or 86 gwp compared to co2, plus ~100 ppm N2O co2 equilivent (using 300gwp for N2O)
pous 406 ppm co2 Totals to at least

10-1

co2 406 ppm
ch4 274 ppm co2e (+- 10%)
n2o ~100 ppm co2e (calcs needed)

Equals at least 780 ppm co2 now

Therefor what is needed is ITSC Immediate Total Solar Conversion the corredt best science numbers on co2e at over 2 times preindustrial co2 280 ppm co2 times 2 is 560 ppm co2e and 3 times 280 ppm co2 is 840
which is apx where we are now ! These numbers were not supposted to be fact until 2050 to 2100'
Its on now folks.

The entire record of my and PSPC record in and out of litigation is incorporated into the record herein in the CEQ!A nop etc and the Draft 2016 AQMP. Also incorporated into the

record herein as cited here by reference is the 2014 Jacobson et. al. Plan For Converting California to 80-85% solar renewables by 2030 or more and 100% by 2050 or sooner,,,,,California is the World lead in Solar Renewables not Germany anymore with its nucs (which is being phased
out after fukashema in Japan) and the coal plants /mines. The Federal CAA and Ca caa require solar cost effective
energy be implemented ie Deployed as cited inar5 chapt 8 "solar renewable energy " is cost effective now and has been
and is being "deployed". We must lead the usa and the world. I/We submitted the 8 reports to the Dist Advisory
Group with the US DOE May 18,2016 SunShot Documents including PV and CSP (Concentrated Solar Power) as well as Health benefits from solar etc and Fianceing Solar which can reduce solar by "30-60%", The origional PV andf CSP 2012 were in the State law wuit filed in January of 2013 etc the origional suit s were filed in 1992...

This is submission number 1 or many

Also since the Dist has ignored solar conversion and not covering ITSC Ithe alternative project in the CEQA Document EIR must be ITSC II as "expediously as practiable" like our Father and Mothers did in WW2 against
the Naziesw/Facists/ and Japan etc. we can and must to this now...

Either there has been a conspirancy or at best gross neglience to ignore solar most likely criminal""
It's now or never.....

Solarly,

Harvey Eder for self and for the PSPC Public Solar Coalition.
August 12,2016 as per K w/ Mr. Mike Krausde

The sun makes the wind blow , the water flow and the plants grow
It's the engine of our ecosystem
The Way The World Works.....

1223 Wilshire Blvd. #667
Santa Monica, CA. 90403
(310) 3932589

PS The little ditti is from cited in responce yo Dist Demur in lit 2013 . I was the first registerurd Environmental Studies Student at the University of California in the Fall of 1970 at UCSC with my Professor Dr. Richard Cooley who told me that its Solar Energy not appropriate or alernative energy or "clean energy " cause thats what you Dist call your Dirty Gas a Fossil Fuel which is against Ca Hand SC to Import into the state 88% of DG is imporated in Ca.breaking state law etc

Responses to Comment Letter from Public Solar Power Coalition
(Comment Letter #10)

Response to Comment 10-1:

The draft 2016 AQMP Chapter 10 – *Climate and Energy*, has a lengthy discussion on moving towards high levels of power from renewable resources. As mentioned in the title of several of the documents provided, there are many opportunities with solar renewable energy along with many challenges. A section within Chapter 10 titled, "Challenges and Opportunities in Moving Towards 100 Percent Renewable Power" discusses in detail many of these issues that are being addressed with the integration of renewables, implementing transportation onto the grid, and changing how the grid traditionally operates to accommodate renewables and new technologies. The transition to increasingly higher amounts of renewable energy is occurring rapidly, especially with the increasing renewable mandates established by the state. However, this transition to reliance on higher renewable generation needs to address the grid instabilities associated with variable and intermittent renewable generation. Otherwise, the addition of large of amounts of renewables creates an instable grid system that can increase the need and/or reliance on traditional fossil based power plants. Many of the documents provided in the above comment letter were reviewed and similar documents specific to California were referenced during the development of the draft 2016 AQMP Chapter 10. However, staff is unable to respond to "the entire of my and PSPC record in and out of litigation" since it is uncertain what documents are referred to.

Comment Letter from Loraine Lundquist (Comment Letter #11)

From: Loraine Lundquist [mailto:loraine.lundquist@gmail.com]
Sent: Saturday, August 13, 2016 10:53 PM
To: Public Advisor <publicadvisor@aqmd.gov>
Subject: we need a better clean air proposal

Dear AQMD,

I never realized until a recent data release from the American Thoracic Society, I never knew how many deaths were caused in our city from air pollution. Our city has nearly 5 times more deaths than New York, and the number of deaths rivals deaths from alcohol. 11-1

Given these realities, I am profoundly disappointed in the draft plan you've released for clean air. Why are you putting forward an unfunded proposal? Why are you abandoning strong, useful regulations? 11-1 Con't

Please don't give into corporate interests. Protect our community and our health by creating a real clean air plan with the teeth required to make real change.

thank you,
Loraine Lundquist
16908 Kinzie St.
Northridge, CA

Responses to Comment Letter from Loraine Lundquist
(Comment Letter #11)

Response to Comment 11-1:

The 2016 AQMP does not abandon any regulations and in fact proposes a number of regulatory measures aimed at reducing NOx and VOC emissions from a variety of stationary and mobile sources. These regulatory measures were established after a thorough analysis of all ozone-emitting sources and available methods and technologies to further reduce emissions. Incentive-based approaches are focused on accelerating high-emitting sources to transition to cleaner technologies sooner than would take place under regulations. Some sources are beyond the authority of the SCAQMD. Incentives are one way to gain emission reductions sooner than natural turnover of vehicles and equipment. Accelerating the deployment of cleaner technologies before future rulemaking is established allows the new technology to be commercially available, achieved in practice, feasible in more applications, cost effective, as well as publicly acceptable. The specific sources of funding have yet to be finalized, but staff has developed the Financial Incentive Funding Action Plan that maps out the possible opportunities to ensure the proposals have secured funding. Such funding is being sought on a federal, state and local level. To ensure the reductions are creditable in the SIP, the U.S. EPA does require these reductions to be quantifiable, surplus (beyond regulations), permanent and enforceable. With such integrity elements in place, the incentive actions can be effective and provide lasting improvements.

Comment Letter from Constance Hughes (Comment Letter #12)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Form Informtion

Date Created	Time Created	AQMP Year
08/15/2016	11:30 AM	2016

Commentor Contact Information

Commentor's Name *	Organization *	City	State	Zip Code
CONSTANCE HUGHES	NO AFFILIATION If not representing a specific organization, please enter "No Affiliation".	LAKE FOREST	CA	92630

Comments (Unlimted Size)

While I applaud AQMD effort to control air pollution, I am concerned that AQMD is primarily relying on incentive funds and encouragement (would that that approach might be enough). Our air quality is among some of the worst in the entire nation; we cannot achieve significant improvement without enforcement mechanisms. Such mechanisms need to be spelled out and absolutely clear to all. Penalties for violations need to be immediate--not a slap on the hand, wink wink. 12-1

I urge AQMD to be more proactive and lead the nation in setting goals w/a plan to enforce it. Taxpayers should not bear all the financial responsibilities--major work calls for collaboration of all parties. 12-2

Upload Additional Comment and Supporting Files (30 Mb Maximum per file)

AQMP Comments Files

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature *



For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from Constance Hughes
(Comment Letter #12)

Response to Comment 12-1:

Please see Response to Comment 11-1 with regard to reliance on incentive measures and enforcement.

Response to Comment 12-2:

As noted in Response to Comment 11-1, staff is developing the Financial Incentive Funding Action Plan that maps out the possible opportunities to ensure the proposed measures are funded. Such funding is being sought on a federal, state and local level. Staff intends to create partnerships and align with existing programs such as energy efficiency and rebate offers. There is no intent for taxpayers to bear all financial responsibilities but depending on the source of the funding, taxpayers might be contributing to the program. For example, since mobile sources contribute by far the greatest amount of NOx, operators of mobile sources may contribute to the funding.

Comment Letter from Jacques Jougla (Comment Letter #13)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Form Informtion

Date Created	Time Created	AQMP Year
08/15/2016	11:55 AM	2016

Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
JACQUES JOUGLA	NO AFFILIATION If not representing a specific organization, please enter "No Affiliation".	CARPIN TERIA	CA	93013

Comments (Unlimted Size)

Regulations should not be cut. Giving companies leniency will allow them to choose the most cost effective strategy for transportation and energy production, which is often the worst possible option for the environment. Putting the requirement on the tax payer to offset the cost of utilizing environmentally friendly technologies is forcing billions out of the pockets of small business owners and families rather than out of the profit margins of the largest corporations. The idea of incentives is a good one in some cases, but terrible in others. Ethanol subsidies have cost tax payers billions to develop a fairly neutrally beneficial technology. Allowing the market to find the best solutions to technological problems on its own is essential and so are the regulations that keep our air clean. Please, do not rely on subsidies. Rely on quantitative restrictions on what can and cannot be allowed in out atmosphere. Thank you. -Jacques Jougla

13-1

13-2

13-3

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Commentor Signature*



For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from Jacques Jougla
(Comment Letter #13)

Response to Comment 13-1:

The 2016 AQMP does not cut any regulations. Please see Comment 11-1 with regard to the regulatory measures proposed in the 2016 AQMP.

Response to Comment 13-2:

Please see Comment 12-2 with regard to the taxpayer funding of the incentive-based measures.

Response to Comment 13-3:

There are a number of proposed measures in the 2016 AQMP that provide flexibility to comply and considers the importance of technology and new processes that are cost-effective and technologically feasible.

Comment Letter from Peter Burg (Comment Letter #14)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Form Informtion

Date Created	Time Created	AQMP Year
08/15/2016	5:23 AM	2016

Commentor Contact Information

Commentor's Name *	Organization *	City	State	Zip Code
PETER BERG	NO AFFILIATION If not representing a specific organization, please enter "No Affiliation".	BURBANK	CA	

Comments (Unlimted Size)

I wanted to comment on the 2016 Air Quality Management Plan. I have some serious concerns about it and would like to see some major changes to the plan.

My biggest concern is regarding the reliance on Incentives to help reach our air quality goals. I do support incentives and think they can be effective to change the behaviors of industry, business, and citizens, I also feel that this plan is lacking in tougher regulations, which are even more important and needed than new incentives.

I firmly believe that most people and industries will not just change their polluting patterns unless there is a strong motivator to do so. An incentive can sometimes work if there are strong financial reasons to make a change. But in most cases, I would argue that it is not always Financially beneficial to reduce ones pollution. So for the good of all and for the public health, firm regulations must be implemented, to achieve our needed reductions in pollution. I feel the current and proposed rules are not strict enough. That is actually pretty obvious, with our failing grades for our air quality. We don't even meet the federal air quality levels on many days. That is shameful! 14-1

I am very dismayed by the fact that our air quality is still very poor and unhealthy in many cases. I believe it's our responsibility to do much more to reduce pollution. We are subjecting our children to air that is truly harming them. That is wrong and we should not rest until air quality is brought to healthy levels. I support stronger regulations, with corresponding stronger penalties for polluting our air. I truly feel that we can not reduce our harmful pollution without strong regulations and penalties. Incentives are again helpful, but not enough of a motavator (even if funding can be found for the amount of incentives needed to make our air healthy again) to bring the change we need.

I am glad to see stronger rules on Flaring. This is a horrible practice that should be stopped. It's inefficient and clearly a direct contributor to unhealthy pollutions levels here in California. It clearly can be reduced and thus will help us achieve cleaner air for all. I do think that mobile sources of pollution should be required to emit less pollution.. but stationary sources are a serious part of the problem as well. Fracking is another area that needs stronger mandatory regulations. Methane should be constantly monitored and leaks should not be allowed. This is an area where penalties would be needed... not incentives. 14-2

I was glad to see the report was quite detailed and it's clear that we know where many of the sources of air pollution are coming from. It's is now necessary to put in strong rules and penalties to reduce or eliminate those sources. To enact this plan as written, would be weak and shameful for the AQMD. You are here to protect the citizens from harmful pollution. We know we have a very serious problem on our hands and strong action must be taken. Relying on unfunded incentives would be a weak answer to this serious and life saving responsibility. You literally have the lives of the citizens in your hands, and the public is watching. Stand up and take steps to ensure the air gets cleaner for all of us. It's the reason your body even exists. Thank you.

-Peter Berg

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Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature *



Responses to Comment Letter from Peter Berg
(Comment Letter #14)

Response to Comment 14-1:

Please see Response to Comment 11-1 regarding proposed regulatory measures in the 2016 AQMP and the reason for the proposed incentive measures. Staff agrees that more work needs to be done to achieve healthy clean air communities and accomplish what is required under the Clean Air Act.

Response to Comment 14-2:

Staff appreciates the support of CMB-03 (Non-Refinery Flares) and will continue to adopt strong regulation on stationary and mobile sources. Staff also recognizes the need for sufficient penalties for those who violate air pollution rules.

Comment Letter from Consumer Specialty Products Association (Comment Letter #15)

CSPA
Representing Household & Institutional Products
Aerosol · Air Care · Cleaners · Polishes
Automotive Care · Antimicrobial · Pest Management

August 16, 2016 *via* electronic transmission

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Subject: CSPA Comments on Draft 2016 Air Quality Management Plan (June 2016)[1]

Dear Sir or Madam:

The Consumer Specialty Products Association (CSPA)[2] appreciates the opportunity to offer comments on the Draft 2016 Air Quality Management Plan (AQMP) dated June 2016. We understand that the South Coast Air Quality Management District (AQMD) intends to consider all comments received on this initial draft AQMP and release a revised draft in September for further comment, along with a response to previous comments in October, prior to releasing a draft final AQMP in November. The AQMD plans to adopt a final 2016 AQMP in December for subsequent approval by the California Air Resources Board (ARB), after which it will be combined with the 2016 State Strategy for submission to the U.S. Environmental Protection Agency (EPA) as an update to the California State Implementation Plan (SIP) for Ozone and $PM_{2.5}$. 15-1

CSPA has participated as an active stakeholder representing the consumer products industry in all of the California ozone SIP updates since the 1980s, and has worked cooperatively with ARB in the implementation of SIP measures seeking to reduce the emissions of volatile organic compounds (VOCs) from the use of consumer products in the state. Those efforts have resulted in more than 50% reduction in VOC emissions from consumer products during the past 25 years, which has contributed to the improvement in air quality throughout California.[3]

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[1] Hereinafter referred to as "Draft 2016 AQMP." The full text of this document is posted on the AQMD website at: http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/Draft2016AQMP.

[2] CSPA is a voluntary, non-profit national trade association representing approximately 250 companies engaged in the manufacture, formulation, distribution, and sale of products for household, institutional, commercial and industrial use. CSPA member companies' wide range of products includes home, lawn and garden pesticides, antimicrobial products, air care products, automotive specialty products, detergents and cleaning products, polishes and floor maintenance products, and various types of aerosol products. Through its product stewardship program Product Care®, and scientific and business-to-business endeavors, CSPA provides its members a platform to effectively address issues regarding the health, safety, sustainability and environmental impacts of their products.

[3] ARB regulations have set VOC limits for 129 broad categories of consumer product; when fully effective, these regulations will reduce VOC emissions by about 50 percent compared to 1990 levels. *See* "Staff Report: Initial Statement of Reasons for Proposed Rulemaking Proposed Amendments to the

1667 K Street NW, Suite 300 | Washington, DC 20006 | www.cspa.org | 202-872-8110

The Draft 2016 AQMP relies primarily on NOx reductions to be obtained through measures outlined in the AQMP and in the ARB's 2016 Mobile Source Strategy. CSPA strongly supports this aspect of the AQMP as consistent with compelling scientific evidence that NOx reductions are the best strategy, indeed the only strategy that can provide significant further reductions in ambient ozone, ambient $PM_{2.5}$, and greenhouse gas (GHG) emissions in the South Coast Air Basin (SCAB or Basin) and elsewhere in California. The AQMP seeks to obtain 43% additional NOx reductions by 2023, and an additional 55% NOx reductions by 2031 in the Basin.[4] In all, the AQMP and ARB's Mobile Source Strategy seeks to obtain 80% reduction in ozone and PM precursors (NOx and VOCs), 45% reduction in GHG emissions, 50% reduction in petroleum usage, and 45% reduction in diesel PM emissions in the state.[5] The Draft AQMP and State Strategy are based on modeling that demonstrate that these levels of reductions are sufficient to meet the relevant federal ozone and $PM_{2.5}$ standards.

15-1 Con't

The Draft 2016 AQMP includes numerous measures proposed to be adopted by AQMD that, together with reductions from the 2016 State Strategy, will obtain the NOx reductions required. These measures include many that provide VOC reductions along with the NOx reductions that are their primary goal. However, the Draft 2016 AQMP also includes one single new control measure to further reduce VOCs from formulated products used by commercial facilities. The measure is described as follows:

> **CTS-01 – FURTHER EMISSION REDUCTIONS FROM COATINGS, SOLVENTS, ADHESIVES, AND SEALANTS:** This control measure seeks limited VOC emission reductions by focusing on select coating, adhesive, solvent and sealant categories by further limiting the allowable VOC content in formulations or incentivizing the use of super-compliant technologies. Examples of the categories to be considered include, but are not limited to, coatings used in aerospace applications, adhesives used in a variety of sealing applications, solvents for graffiti abatement activities. Reductions could be achieved by lowering the VOC content of a few categories within SCAQMD source-specific Rules 1113, 1124, 1144, 1168, and 1171 where possible, especially where the majority of products already meet lower limits. For solvents, reductions could be achieved by promoting the use of alternative low-VOC products or non-VOC product/equipment at industrial facilities. The tightening of regulatory exemptions can also lead to reduced emissions across multiple use categories.[6]

15-2

CTS-01 would include rules adopted in 2017-2021 and implemented in 2020-2031 that would be required to obtain a total of one ton-per-day of VOC reductions in the district by 2023 and two tons-per-day by 2031.[7] While CSPA recognizes the need to consider all emission sources, we will express concerns in these comments regarding the need to include new measures targeting further VOC emission reductions from sources not associated with NOx emissions. Information provided throughout the 2016 AQMP as well as the 2016 State Strategy make it very clear that

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Antiperspirants and Deodorants Regulation, the Consumer Products Regulation, the Aerosol Coating Products Regulation, the Tables of MIR Values, Test Method 310, and Proposed Repeal of the Hairspray Credit Program" (August 7, 2013) at Executive Summary–2.

[4] Draft 2016 AQMP at p. ES-2.

[5] Proposed 2016 State Strategy at p. 2.

[6] Draft 2016 AQMP at p. 4-19.

[7] Draft 2016 AQMP at p. 4-12.

there is no need for further VOC reductions (beyond those obtained through implementation of NOx controls) for maintaining the ozone and $PM_{2.5}$ standards in South Coast or elsewhere in California. We therefore urge that CTS-01 be removed from this AQMP. 15-2 Con't

In the following sections, we will comment on various specific sections of the Draft 2016 AQMP.

Chapter 1

This chapter provides an excellent overview of the successful history of SCAQMD and ARB efforts to improve air quality in the South Coast. CSPA and the consumer products industry is proud to have played a role in helping achieve this improved air quality through reducing VOC emissions from consumer products by more than 50% over the past 25 years.

Nevertheless, the period when further reductions in low-reactivity VOCs such as those in consumer and commercial products will further lower ozone formation is now past, as we documented at great length to the ARB in response to their Proposed 2016 State Strategy.[8] We therefore recommend that AQMD take this opportunity to reconsider the need for all VOC reduction measures not associated with NOx reductions in this AQMP, and also reconsider the necessity of the measures from the 2012 AQMP whose rulemakings have not been completed (including CTS-02 and CTS-03).[9] 15-3

Among the White Papers noted in this chapter[10] is the VOC Controls White Paper, which provides cogent evidence that VOC emission reductions have a very minor role to play in ozone attainment strategies in the South Coast. Indeed, the only need for further VOC reductions is in the short term to prevent modest increases in ozone formation in west Los Angeles, and CSPA believes that these reductions are best obtained by the reductions in high-reactivity VOCs obtained by measures in this AQMP and the ARB State Strategy that are primarily focused on NOx reduction.

Chapter 3

The tables of VOC and NOx emissions per source category in this chapter show consumer products as among the largest VOC emission sources in the base year of 2012. It is important to understand, however, that the very low reactivity VOC emissions from consumer products did not have a significant impact on ozone formation even in 2012, and are having a diminishing impact as NOx emissions are reduced and air quality improves. By the time South Coast is in attainment of the 75 ppb ozone standard, the region will be "NOx-limited" and consumer product and other low-reactivity VOC emissions will have virtually no impact on ozone formation. 15-4

Chapter 4 and Appendix IV-A

The description in the State and Federal Control Measures section[11] cites reductions to be obtained from the Proposed 2016 State Strategy for the SIP that was released for comment on 15-5

[8] *See* CSPA Comments to ARB on the Proposed 2016 State Strategy, dated July 6, 2016; available on request.

[9] Draft 2016 AQMP at p. 1-13.

[10] Draft 2016 AQMP at pp. 1-15 to 1-17.

[11] Draft 2016 AQMP at p. 4-28 to 4-30.

May 17, 2016. That proposed state strategy includes for the South Coast 107 tons-per-day in NOx by 2023, and 97 additional tons-per-day NOx reductions by 2031. The proposed state strategy also includes 48 tons-per-day VOC reductions by 2023 and an additional 60 tons-per-day VOC reductions by 2031, with almost all of those VOC reductions coming from the same measures whose primary goal are NOx reductions. The lone exception is the 5 tons-per-day from the Consumer Products Program measure, which CSPA believes is unnecessary for attainment of federal and state air quality standards, and therefore outside of state authority to regulate. This was documented in some detail in CSPA's comments to the ARB last month.[12] We believe that there is clear evidence in the VOC Controls White Paper and this Draft 2016 AQMP as well that those 5 tons-per-day in VOC emissions by 2031 would not contribute to ozone attainment in South Coast.

Table 4-2 lists a significant number of proposed stationary source measures aimed at NOx reductions, and some of those measures also have corresponding VOC reductions associated with them. These measures are further detailed in Appendix IV-A. CSPA concurs that these measures, if feasible, could contribute to ozone and $PM_{2.5}$ attainment, and in some cases might help provide the small short term VOC reductions needed to prevent temporary ozone increases in west Los Angeles as NOx is further reduced. The final three measures—FUG-01, CTS-01 and FLX-02—were identified as means to achieve limited, strategic VOC controls. CSPA are in agreement that VOC controls should be limited and strategic, and that efforts should be made to apply the latest advances in technology to detect and minimize VOC emissions. However, given that these measures have no associated NOx reductions, and are unlikely to contribute significantly to attainment, specific emissions reductions should be delayed until both feasibility (*e.g.*, the use of new technology like LDAR under Phase I of FUG-01) and necessity have been demonstrated. We therefore recommend that the reductions targeted for these VOC-only measures be eliminated from the AQMP.

15-5 Con't

Specifically, in Appendix IV-A the description of CTS-01, which seeks "Further Emission Reductions From Coatings, Solvents, Adhesives and Sealants" cites the VOC Controls White Paper (released in 2015) and professes a need for modest additional VOC controls to "help avoid temporary increases in ozone concentrations in the western side of the Basin."[13] However, the description fails to provide any reason to believe that further reductions in these low-reactivity VOCs would actually help in this regard, or why the high-reactivity VOC reductions associated with NOx measures would not be sufficient for that purpose. The description goes on to note other recommendations from the White Paper, including that VOC reductions should be favored that gain those reductions as co-benefits from NOx, greenhouse gas, and air toxics control measures, but does not justify why this and two other measures are proposed that are not consistent with that policy goal.

The proposed method of control for CTS-01 is proposed to be achieved by closing loopholes and lowering VOC content for a select few categories where most products already meet lower VOC limits. However, without defining which loopholes and categories are under question, it is not feasible to know whether such measures would contribute measurably toward meeting the AQMP objectives, nor can the cost-effectiveness--ranking third—be independently assessed.

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[12] *See* CSPA Comments to ARB on the Proposed 2016 State Strategy, dated July 6, 2016; available on request.

[13] Draft 2016 AQMP, Appendix IV-A at p.IV-A-85.

Until these specifics are defined, CSPA recommends that the cost-effectiveness estimate be revised to be "TBD," consistent with other measures.

CSPA once again recommends that AQMD remove all VOC-only reduction targets from this AQMP, and rely on co-benefits from other measures to obtain the short-term VOC reductions needed to avoid temporary ozone increases. In particular, CSPA recommends that the rulemaking to amend Rule 1168 on adhesive and sealant applications remain indefinitely suspended. 15-5 Con't

Chapter 5 and Chapter 8

These chapters include a "first look" at what additional reductions will be needed to attain the 70 ppb 2015 ozone standard by 2037, concluding that NOx emissions in the South Coast will need to be reduced from the 100 tons-per-day (needed for the 75 ppb standard) to 75 tons-per-day.[14] There is no mention of any need for further VOC reductions. We believe that this result is consistent with the attainment modeling results we have seen to date, since the region will remain NOx-limited throughout that period. 15-6

Chapter 6

The cost-effectiveness assessment of stationary source measures estimates that CTS-01, which only targets VOC emissions for reduction, would be the fourth most cost-effective measure in terms of cost per ton of emission reduced. We believe that this is misleading, since the associated VOC reductions would have essentially no impact on ozone reduction. CSPA believes that the appropriate and most relevant form for estimating cost effectiveness should be the cost for a given improvement in air quality. In this case, the cost effectiveness would be estimated in terms of cost per ozone reduction, which would rank CTS-01 and other VOC control measures far lower in cost effectiveness. Furthermore, it is also misleading to provide a cost estimate given that the mechanisms by which further reductions could be accomplished have not yet been defined. 15-7

Appendix III

The baseline and future-year inventories shown here estimate that consumer products will grow from 20% of VOC emissions in 2012 to 29% in 2031.[15] This result is caused primarily by the continued reductions of high-reactivity VOCs associated with already-adopted measures aimed at NOx whose reductions are being phased in during that period. This should not be interpreted to indicate that consumer product VOC emissions are contributing an increasing amount to ozone formation. The low-reactivity VOCs in consumer products had little or no impact on ozone formation in 2012, and that impact will only be further decreasing during future years. 15-8

Appendix IV-B

ARB's Mobile Source Strategy for South Coast as described at length in this appendix would provide South Coast 81% reduction in NOx emissions from on-road and off-road measures.[16] In 15-9

[14] Draft 2016 AQMP at p. 5-28 and pp. 8-3 to 8-5.

[15] Draft 2016 AQMP, Appendix III at p. III-2-57 and p. III-2-69.

[16] Draft 2016 AQMP, Appendix IV-B at p. IV-B-5.

addition, the state strategy would supply 48 tons-per-day in additional ROG (VOC) emissions by 2023 and 55 additional tons-per-day by 2031 from those on-road and off-road measures.[17] CSPA believes that that those high-reactivity ROG/VOC reductions alone are more than sufficient to prevent any temporary increases in ozone in the western basin. 15-9

Appendix V

This appendix on the results of South Coast attainment modeling has not been posted for review. CSPA will review this information and file supplemental comments when Appendix V becomes available. 15-10

Summary and Conclusions

CSPA appreciates the opportunity to comment on this Draft 2016 AQMP. In these comments we are recommending that the measure CTS-01 and other measures not associated with NOx reductions be removed from the AQMP, since those measures have not been shown to be necessary for attainment of the air quality standards that are the purpose of the AQMP. If you have any questions, please contact us at (202) 872-8110.

Respectfully submitted,

D. Douglas Fratz
Senior Science Fellow

Joseph T. Yost
Senior Director, Strategic Issues Advocacy

Kristin Power
Vice President, State Affairs

Steven Bennett, Ph.D.
Senior Director, Scientific Affairs & Sustainability

cc: CSPA Air Quality Committee and Task Forces

[17] Draft 2016 AQMP, Appendix IV-B at p. IV-B-9.

Responses to Comment Letter from Consumer Specialty Products Association (CSPA)
(Comment Letter #15)

Response to Comment 15-1:

Staff appreciates the commenter for being an active stakeholder for past decades and cooperating with SCAQMD and CARB in implementing ozone SIP measures to reduce VOCs from consumer products.

Response to Comment 15-2

Volatile organic compounds (VOCs) contribute to ozone formation and PM2.5 levels through secondary organic aerosols. The Basin does not currently meet federal and State standards for ozone and PM2.5.

The modeling analysis suggests that approximately 55 percent NOx reduction is needed in 2031 to meet the 75 ppb ozone standard. The reduction is beyond the projected baseline, which reflects reductions due to already adopted measures. Still, on the course to attainment, if the AQMP were to rely on NOx reductions alone, certain parts of the western Basin surrounding central Los Angeles are expected to experience inadvertent increases in ozone concentration. VOC reductions, whether they are concurrent reductions from the NOx strategy or result from stand-alone controls such as the consumer products program, should be achieved, if not avoid completely, the inadvertent increase of ozone. Several million people are estimated to be subject to this inadvertent increase of ozone. Also, VOC is effective for meeting the 1-hour ozone standard.

While some PM2.5 is emitted directly from sources, the majority of ambient PM2.5 in certain parts of the Basin is from gas to particle formation in the atmosphere. The secondary organic particulate formation results largely from atmospheric reactions on VOCs. In order to develop an effective control strategy, one must consider the composition and by extension, the sources of PM2.5 in the Basin. In the Basin, approximately 30 to 50 percent of the PM2.5 mass is composed of organic compounds. Therefore, a VOC and NOx combined strategy would aid in mitigating interim increases in ozone, especially in the highly populated western side of the Basin, while potentially providing additional benefits for PM2.5, toxics, and greenhouse gases. A control strategy that focuses primarily on NOx reductions, with additional strategic and cost-effective VOC reductions, is the most desirable way to minimize the general public's exposure to unhealthy ozone pollution not only in the target attainment year, but also during the course of the control effort. Strategic VOC reductions will be developed in the most economically feasible way including VOC reactivity to yield ozone and PM2.5 formation potential.

Response to Comment 15-3:

Please see Response to Comment 15-2 with regard to the need for further VOC reductions.

Response to Comment 15-4:

Different chemical reactions are responsible for the formation of ozone and secondary organic aerosols (SOAs) from volatile organic compounds (VOCs). Since both ozone and PM2.5 formation are largely dominated by atmospheric reactions, we must consider the potential for a VOC to contribute to both ozone and PM2.5 levels. Organic compounds with large ozone formation potentials may or may not contribute significantly to PM2.5 mass. Similarly, many gaseous organic compounds classified as VOCs, intermediate-VOCs (IVOCs), or Semi-VOCs (SVOCs) that contribute to SOA may or may not play a significant role in the formation of ozone.

Therefore, a VOC and NOx combined strategy would aid in mitigating interim increases in ozone, especially in the highly populated western side of the Basin, while potentially providing additional benefits for PM2.5, toxics, and greenhouse gases. A control strategy that focuses primarily on NOx reductions, with additional strategic and cost-effective VOC reductions, is the most desirable way to minimize the general public's exposure to unhealthy ozone pollution not only in the target attainment year, but also during the course of the control effort.

Response to Comment 15-5:

Please see Response to Comment 15-2 regarding VOC controls in FUG-01, CTS-01, and FLX-02 measures.

The chemical reactions that form ozone are highly complex and depend not only on NOx and VOC levels, but also on the ratio of VOC to NOx concentrations. NOx emissions can even reduce ozone concentrations in the immediate vicinity of an emission source, but will contribute to more ozone formation downwind. A decrease in ambient VOC concentrations generally leads to a decrease in ozone. However, because of the complex chemistry involved, a decrease in NOx concentrations may lead to a decrease or an increase in ambient ozone depending on the local VOC concentration. The local VOC concentration is a mixture of many distinct compounds, each with unique impacts on ozone formation. This complex dependence on NOx and VOC concentrations leads to interesting policy implications, which can be explored using comprehensive air quality models.

The Community Multiscale Air Quality (CMAQ) model has been used to investigate the ozone concentrations as a result of various levels of VOC and NOx emissions under different control strategies. The CMAQ model, which is the U.S. EPA recommended regulatory model, is considered the preeminent, state-of-the-science air quality model for analyzing air quality improvement strategies. Since ozone concentrations are a complex function of both NOx and VOCs concentrations, we use a three-dimensional plot to visualize this dependency. The Empirical Kinetics Modeling Approach (EKMA) ozone "isopleths" diagrams illustrate the outcomes of this complicated chemistry.

The modeling analysis suggests that approximately 55 percent NOx reduction is needed in 2031 to meet the 75 ppb ozone standard. The reduction is beyond the projected baseline, which reflects reductions due to already adopted measures. Still, if the AQMP were to rely solely on NOx reductions on the course to attainment, certain parts of the western Basin surrounding central Los Angeles are expected to experience inadvertent increase in ozone concentration. VOC reductions, whether they are concurrent reductions from NOx strategy or resulted from stand-alone control such as the consumer products program, should reduce, if not avoid completely, the inadvertent increase of ozone in the western side of the Basin where millions of people may be subject to the exposure. Geographical location of such VOC sources that are subject to the strategic VOC controls are an important consideration to develop VOC control measures to minimize such inadvertent exposure.

In addition, CTS-01 does contribute toward the AQMP objectives since VOC reductions are one of the AQMP objectives. Cost effectiveness is assessed by comparing the control measure costs to VOC reductions, not ozone reductions.

Response to Comment 15-6:

Please see Response to Comment 15-2 with regard to the need for additional VOC reductions.

Response to Comment 15-7:

Please see Responses to Comments 15-2 and 15-5 regarding cost-effectiveness of CTS-01 and associated VOC reductions. Additionally, the majority of the VOC emission reductions are projected to come from continuing the Rule 1168 amendment that was suspended in 2014.

Response to Comment 15-8:

Please see Response to Comment 15-2 regarding the impact of VOC emissions on ozone formation. The increased percentage of VOC emissions shows that consumer products play a significant role in ozone formation and should be at the forefront when considering further VOC reductions. In addition, given that the VOC emissions associated with consumer products occur in densely populated urban centers, the ozone and PM2.5 formed from the VOCs, even if they have low reactivity, still increase the level of exposure to millions of population, therefore, the strategic but limited VOC reductions are still needed and included in the AQMP.

Response to Comment 15-9:

Simulations with incremental VOC and NOx emission reductions from 2023 and 2031 baseline emissions were generated to create ozone isopleths for each station in the Basin. The ozone isopleths provide guidance in developing control strategies by depicting ozone concentrations as a function of both NOx and VOC reductions. They provide the basis for estimating the Basin carrying capacity and the maximum allowable emissions of NOx and VOC to reach attainment. Both 2023 and 2031 baseline scenarios without any additional reduction beyond already adopted measures do not lead to attainment, indicating additional emission reductions are necessary to meet the standards. Additional limited VOC reductions will avoid any increases in western Basin ozone exposure above the 2023 attainment target. A "weekend effect", typically experienced in urban areas, results from reduced NOx emissions on weekends leading to higher ozone and consequently more weekend days exceeding the standard. This indicates a benefit of VOC reductions to minimize inadvertent ozone increases during the course of NOx reduction. In addition, the weekend effect is stronger in the western part of the Basin. Given that the majority of the VOC emissions from consumer products are located in urban population center, the emission reductions on that category provides significant benefit to reduce ozone and PM2.5 exposure despite of the low reactivity.

In addition, the model demonstrated that the 2022 one-hour ozone standard is sensitive to VOC reductions; therefore, early VOC reductions are crucial for reaching attainment.

Response to Comment 15-10:

Please see Response to Comment 15-2 with regard to the need for CTS-01 and other VOC measures not associated with NOx reductions.

Comment Letter from Julie Stoll (Comment Letter #16)

From: Julie Stoll [mailto:jeffersonstoll@hotmail.com]
Sent: Tuesday, August 16, 2016 4:10 PM
To: Public Advisor <publicadvisor@aqmd.gov>
Subject: Clean Air Plan

SCAQMD:

It is absolutely imperative that your agency address the appalling air pollution levels in Southern California. Therefore, I would like to commend you for drafting a plan to clean our dirty Southern California Air. However, the plan is lacking is several areas. 16-1

The main problem with CalARP plan is that it does not require big polluters like refineries to do anything. Rather, the language seems to just encourage refineries to make important, safer changes. I would like to see requirements imposed and enforced on refineries. They make billions of dollars of profits, yet are not held accountable for air pollution.

One issue that is of particular importance to those who work or reside in Torrance is the fact that the Torrance Refining Company uses hydrofluoric acid (they call it modified, however there is only a 10% additive). This absolutely must be banned. The language in the plan should clearly ban it with absolutely no way for the refinery to continue using this deadly substance that could kill thousands. 16-2

Speaking as a representative of what many other citizens are feeling, we are fed up. I am seriously considering moving away. The days where refineries heavily influence agencies like yours because of the money they acquire endangering our lives must end. Please stand up for what is right. Impose strict regulations on refineries - especially refineries that operate in densely populated areas like Torrance.

Sincerely,
Julie Stoll

Responses to Comment Letter from Julie Stoll
(Comment Letter #16)

Response to Comment 16-1:

The December 2015 amendments to the RECLAIM program established a NOx RECLAIM Trading Credit (RTC) allocation shave of 56 percent to the largest emitters in the program, which include the refineries. This reduction in allocations will result in the installation of the Best Available Retrofit Control Technology (BARCT) at most of these facilities. Otherwise, these facilities will be in violation of SCAQMD rules for having their emissions exceed their allocations.

Response to Comment 16-2:

The SCAQMD recognizes the potential hazards of using HF at refineries. It is used as an alkylating agent to boost the octane of gasoline. An alkylation technology study was conducted by Norton Engineering Consultants and the final report was completed on September 9, 2016. This report looked at possible alternative technologies for the use of HF at refineries, and it was determined that the most viable and commercially available option is sulfuric acid alkylation. Although this method is commercially available, there has not been any documented conversion of an alkylation unit from HF to sulfuric acid. There are also inherent risks in the transportation of concentrated sulfuric acid, and such a conversion would cost in the $100 million dollar range. Another alternative that was identified was solid acid alkylation and the costs for conversion were estimated to also be in the $100 million dollar range. Hydrofluoric acid is not a precursor to ozone or PM2.5 so there are no control measures for it in the AQMP. However, the SCAQMDS's Rule Forecast Report (Agenda Item 19 from the December 2, 2016 Governing Board agenda) lists a potential rulemaking applying to the use of hydrogen fluoride at refineries, tentatively scheduled for December 2017.

Comment Letter from Stephanie Pincetl (UCLA) (Comment Letter #17)

Stephanie Pincetl
Professor in Residence
UCLA Institute of the Environment and Sustainability
(attribution for information only)

August 16, 2016

Air Quality Management Plan Draft 2016.
South Coast Air Quality Management District

Comments on Chapters Four and Ten

Chapter Four: Control Strategy and Implementation.

Chapter Four provides insight into the AQMD proposed path to achieving emission reductions to meet air quality goals. The most prevalent strategy is to provide incentive funding and supporting infrastructure.

Comments on Incentive funding
Incentive funding is an alternative to setting command and control standards and imposing fines for non-compliance. Often the two strategies are coupled, and/or can be coupled to ensure best implementation of change, ensuring that smaller businesses, companies that are less well capitalized or other entities are provided sufficient assistance so they can implement change. This approach does not seem to be what is present in the AQMD, rather all entities are treated similarly and encouraged to access incentives.

For incentive funding to be viable the following are necessary:

- High levels of funding by the regulator
- High levels of staffing to implement
- Knowledgeable staff to ensure no fraud
- Full customer information
    - Strong outreach and education
    - Nondiscriminatory rules and regulations (e.g. ability of small undercapitalized entities to access funding)
    - Regional networks
- Straightforward, flexible and easy access to the funding
- Level playing field
- Sufficient funding to make programs worthwhile for the customer of the incentive
- Tracking implementation
- Tracking savings

Often one of more of these necessary attributes for incentive programs are absent, and programs fail. Incentive programs also suffer due to requirements for recipients to have certain types of credit to qualify, and/or ability to repay, a way to protect the incentive-provider but

17-1

1

which can discourage participation. If there are intermediaries who handle the programs, they may also have requirements. The burden of obtaining an incentive can be quite high.

Further incentive programs put the burden on the public to be knowledgeable and to be proactive. This is a cost that is rarely included in cost/benefit assessments.

Neither the report nor the appendices provide detail amount of funding to be available, exact programs and funding for each. There does not seem to be a prioritization scheme for who gets the funding, nor mechanisms to ensure fairness among sectors and sizes of market participants in sectors.

No quantification of potential savings that could accrue by sector, nor penetration needed for the potential savings. No cost estimates for achieving significant penetration.

17-1 Con't

Specific Comments
Pg. 4-6
Why is it unfair that stationary sources should bear "fair-share" since AQMD has most jurisdiction over stationary sources. This is not explained. What is the basis for fairness?

17-2

4-8
If NOx is one of the major air quality issues in the region relative to attaining the federal ozone standards, reliance on more natural gas (instead of diesel), simply pushes the problem off into the future, natural gas still pollutes. Using natural gas as an ozone and NOx emissions reductions strategy reinforces an infrastructure that will create path dependencies and lock-in, involving large costs to unravel in a renewable electricity future. Those interests who invested in natural gas will resist the change and it will involve losses for those interests. The Plan creates a pathway that will costly to shift in the future.
Further, while it is true that natural gas emits less CO2 and NOx, this does not take into account supply chain emissions. While AQMD's purview is air quality in the basin, climate impacts of drilling and extraction of natural gas from wells and its transportation in pipelines (as well as leaks as with Aliso Canyon) contribute substantially to emissions that are climate changing. Thus AQMD should add the supply chain emissions in its analysis of natural gas, as the basin is impacted by global GHG and methane emissions

17-3

4-9
Measures are cast as costs; there are no benefits discussed. Health benefits are a major driver of the new ozone standard. While there is a mention of negative public health consequences from failure to meet air quality standards, improving public health is a major benefit thus transitioning to cleaner transportation technologies will also have significant benefits, not just costs. The paragraph should also acknowledge that any mitigation of climate change is a benefit for the region.

17-4

Tables 4-2 on 4-10 & 4-11
Very difficult to know what is going to be done.

17-5

For existing buildings there is no data base that tracks energy efficiency program effectiveness other than by using modeled, sampled or self-reported data. This means that the rebound effect is rarely captured, and, at the same time, the modeled savings are very modest, as the **Technical Appendix IV-A-31** shows. The UCLA Energy Atlas (www.energyatlas.ucla.edu), shows, for example, a significant rebound effect in new residences in wealthy areas. While very efficient per square foot of new construction, per capita energy consumption in Malibu, for example, is ten times greater than that of residents in South Los Angeles. Relying on energy efficiency investments will likely not be enough to reduce total consumption.
The deployment of EE programs to date have not been systematic, have not been data driven, rely on customers to know about the program, be willing to fill out arcane paperwork, and to pay a portion of the retrofit – whether for weatherization, or a refrigerator. (Have you looked at Gas Company rebates? $75/50 for a clothes washer, $200/150 for a tankless water heater, $0.15/sq.ft. for insulation, not to mention the restrictions: -- existing insulation must be R-11 or less. The final insulation level must be R-38 or R-19 if there is less than 24 inches of attic clearance, and so on). Realistically, this strategy will not yield the kinds of turn-over of the building stock to more savings that is needed, the rebate programs are complex to access and qualify for, and the rebate amounts are too small for widespread transformation.

17-6

No state agency currently has sufficient data to determine energy use by buildings across AQMD territory, nor the actual implementation effectiveness of past EE programs by the utilities. Thus it is not possible to know hot-spots of energy inefficiency, the rebound effect, as mentioned earlier, nor what programs have worked where. It is strongly recommended that the agency avail itself of data driven analytics such as the UCLA Energy Atlas. As IV-A-27 states, 64 % of residential structures were built before 1979, these are where the savings will be. Since 48% of the residential properties are occupied by tenants, there also must be concerted new ways to target landlords. I suggest that there a requirement for energy upgrades for the renewal of any permit tied to rental properties. If the landlord cannot afford the upgrade then they can apply for a rebate, but all rental properties must upgrade.

In addition, the co-benefits from existing residential and commercial building energy efficiency measures and possible additional ones need to be explained (they are implicit in table 4-2, but could be made more clear).

Cool roofs should be mandatory and dark colored roofs forbidden in all zones of the region as well as for retrofits and all reroofing. The easiest strategy would be to forbid suppliers of roofing to carry dark colored roofing materials and to require solar reflectance of all roofing materials, a similar strategy as AWMD employed for low to zero VOC paints. It is useful to remember that at first the requirement for low flush toilets was seen as intrusive and was opposed; today they have been normalized.

Please define near-zero emissions.

Business Case for Clean Air Strategies

Shifting from the status quo to other technologies, practices and methods is never frictionless. Change may favor some interests over others, that is the nature of change – the status quo is disrupted. Thus the question becomes, when creating a business case for near zero emissions (not defined), what does this mean and for which businesses, all existing ones? Further, enhancing clean air has indirect benefits for businesses by improving health. Hence the definition of business case must include public health benefits – less sick days, less absenteeism, less doctors and hospital visits, and, for children, better lung development, better school attendance, better future workforce. 17-7

Further, new equipment can be counted as a cost, or a benefit. If it is manufactured locally, it is a benefit for jobs and manufacturing while being a cost for the purchaser.

Appendix IV –A-45
Are all of these measures commensurable in impact on air quality? Should they not be prioritized and rank ordered?
What is the rationale for regulatory relief and how has it affected compliance?

How will AQMD work with agencies, utilities, businesses and other stakeholders to accomplish all that is listed at the bottom of IV-A 46?
It would seem that AQMD would be best off establishing standards and if businesses needed help meeting them, then an incentive program could be developed. I see no standard for performance in this discussion. 17-8
Mechanisms will be explored to incentivize businesses and facilities to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these technologies sooner. Although replacement of older, higher emitting sources is expected to have the greatest potential for emission reductions, providing incentives and eliminating barriers for new sources to manufacture and use ultra clean technologies is also important. IV-A-47
This is an example of the need for standards. What is cleanest? Who decides? What is clean enough?

IV-A-48: Record keeping sentence makes no sense. 17-9

What are the enforcement mechanisms?

Incentive effectiveness
"Given the potential variety of programs and projects that will be developed, the incentive effectiveness is only an estimate based on the specific equipment and facilities identified. Once a **working group** is established, staff expects additional types of equipment and processes improvements to be identified for facility modernization. The equipment/industries identified are only an example of a pathway to the five tpd reductions based on the data in the AER and permitting systems. Upon implementing the VIP, the incentives will be allocated based on pre-defined criteria developed by the working group (e.g. incentive effectiveness, funding partnership opportunities, capital cost of equipment, maximum NOx reductions, location in or 17-10

4

near EJ areas, small business, etc.). The incentive effectiveness for specific incentive programs will be determined as they are developed and implemented by the SCAQMD. It is anticipated that $450 million dollars will be allocated to achieve five tpd of NOx emission reductions from this incentive programs. Incentives may include grants for the new purchase of equipment as well as loan programs in areas where capital costs are high but long-term cost savings from increased efficiency are achieved. **Public funding or public-private partnerships** can be used to tip the balance towards a business case for investments when equipment upgrades do not offer sufficient returns for private investment. The SCAQMD will work together with businesses, other government agencies, and public utilities to implement incentive programs that will reduce the most emissions with the least amount of cost." IV-A-56

17-10 Con't

The public is missing from this stakeholder working group discussion especially if there is to be public funding involved.
Further, this approach has very high transaction costs and will skew the discussion toward entities with staff that can be devoted to the discussion.

In Chapter 4, additional comments beyond buildings
CMB-05- The RECLAIM assessment discussion is unclear, need to expand on the statement that it included more RTCs than necessary and how that is being redressed, particularly in light of cap and trade.

17-11

BCM-10
What is the cost of implementation and who will bear it? How much VOC and ammonia will be avoided and how does it fit with city led increased composting targets?

17-12

FUG-01 Smart LDAR, FTIR etc. . . self-reporting These new technologies will be paid for through incentives? Is there spot checking by AQMD? What is the cost benefit of having the agency do this itself as it is essentially remote sensing? It could also be contracted out to a university.

17-13

FLX-02 seems like a great deal more work for agency staff: develop incentive funding, permitting and fee incentives and enhancements, NSR incentives and enhancements, branding incentives, record keeping and reporting. Would AQMD do the branding, or is this a consultant's role?

17-14

Emissions Growth Management
EGM 01
Discussion, no action.

17-15

Facilities-based mobile sources/ warehouses
Should require electrification at rail yard and intermodal facilities and electrify short-haul entirely.
Stakeholder should include nearby residents.

Goals seem modest for dirty vehicle retirements

MOB-11

If this extended exchange program for the lawnmower and leaf blower exchanges (55,000 lawn mowers), is seen as success, then it would be useful to have a definition from the agency of what success means. The penetration of this program is woefully inadequate, and is hopefully not an example of what is desired for, say, building retrofits. 17-16

Chapter 10

The most striking part of this chapter is 10-12 and the projection that electricity use will grow 20 percent from 2012 – 2031, an average of 1.1 percent a year. Does this take into account SB 805 targets and other statewide goals?

AQMD has an obligation to ensure that conservation efforts, like some of those discussed above, are successful. If SB 805 is not included in the 1.1 a year, then there is no reason why existing building energy use cannot be reduced to counter balance 1.1 percent energy use each year. However, if it is, then incentive programs will likely be insufficient to address increased energy increases, and most of the programs described in the Plan will be inadequate. 17-17

The goals for the region must be the reduction of energy use, efficiency is only one strategy. While AQMD cannot infringe on the existing authority of counties and cities to plan or control land use, with AB 32 and SB 375, AQMD has a strong role to play in providing critical air quality analysis for land use decisions. Developing stronger alliances with cities and counties around the air quality implications of land use decisions and incentives for land uses that are less transportation dependent and building patterns that are conducive to low emissions should also be part of the AQMD tool kit for addressing air quality.

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Responses to Comment Letter from Stephanie Pincetl (UCLA)
(Comment Letter #17)

Response to Comment 17-1:

Staff appreciates the insight and suggestions regarding implementing a viable incentive program. These will be considered when the individual incentive program and guidelines are being developed. The guidelines are expected to address detailed implementation specific to the different incentive programs. A Financial Incentive Funding Action Plan is currently under development that will provide more detail as to the possible sources of funding available.

Response to Comment 17-2:

The SCAQMD has primary responsibility in developing a control strategy to demonstrate attainment of the air quality standards and has primary authority over stationary sources. So, if the control strategy fails to reach attainment, it would be likely more reductions would need to occur from stationary sources unless an agreement is reached with state to commit to more reductions. Because most of the stationary sources are already subject to the most stringent controls in the nation, the statement in the Draft Plan that it is unfair that stationary sources alone should bear emission reduction burden without an adequate and fair-share level of reductions from all sources would be a valid statement. This clarification has been added to the Revised Draft 2016 AQMP.

Response to Comment 17-3:

The SCAQMD has a long-standing policy of technology and fuel neutrality; however, staff also recognizes the benefits of cleaner technologies to reduce air pollution given multiple environmental goals. One of the objectives for the 2016 AQMP is to prioritize maximizing emission reductions utilizing zero-emitting technologies when cost-effective and feasible, and near-zero technologies in all other applications. In some cases near-zero technology may rely on natural gas, but zero-emitting technology will be useful when feasible. Also, SCAQMD must obtain NOx reductions to meet the 1-hr and the 80 ppb 8-hr ozone standards which may require near-zero technology where zero-emission technology is not yet feasible.

Response to Comment 17-4:

Thank you for your comments. Benefits to public health and climate change mitigation have been added to this paragraph.

Response to Comment 17-5:

Because Table 2 is too big to be fit in one page, control measures in the table are grouped by target pollutant, such as NOx or VOC, and then are re-grouped by nature of measures, either regulatory, co-benefits, incentive-based, or other measures.

Response to Comment 17-6:

We support the development of energy efficiency metrics that directly measure efficiency programs effectiveness, not only encouraging and tracking energy savings, but also to track emission reductions.

Rental properties are eligible to apply for rebates and incentive programs. This would be difficult for SCAQMD to enforce, but will look into this further.

In addition, ECC-04 proposes the implementation of similar standards. Ongoing meteorological and chemical transport modeling will help determine if these measures lead to improvements in air quality.

Response to Comment 17-7:

If equipment cannot be replaced with a technology or a facility cannot be modernized to zero emissions, then a near-zero technology or design would be expected. There is no formal definition of "near-zero" but for the purposes of this AQMP, "near-zero" is defined as at least 90 percent decrease in NOx emissions compared to current emission standards. Different technology exists for different types of equipment. Some technology and equipment replacements have greater emissions reductions or are lower emitting than others. The purpose of the control measure CMB-01 is to adopt regulations and incentives to more facilities and businesses towards technologies with zero and near-zero emissions that may have been less cost-effective in the past. The SCAQMD will establish working groups to include all stakeholders and determine the most effective methods, balancing factors such as costs, emissions reductions, small businesses, Environmental Justice areas, etc.

Response to Comment 17-8:

Staff will form working groups to facilitate a dialogue between agencies, utilities, businesses, and other stakeholders to accomplish the proposed controls. Working group meetings could help affected or interested stakeholders address potential concerns that may arise from new technology and equipment replacement. An example could be coordinating a landfill facility with a city to provide biogas as a transportation fuel. Also the potential incentive concepts listed in CMB-01 can be discussed in the working groups to better coordinate between all entities.

Response to Comment 17-9:

One method inspection staff ensures compliance is through verification of operational or maintenance records. Recordkeeping and reporting requirements may be reduced for equipment that meets specific zero and near-zero emission technologies as an incentive. An example of a recordkeeping and reporting incentive can come from replacing a diesel internal combustion engine (ICE) with a fuel cell or battery storage. This diesel ICE may currently be required to keep fuel usage records, operation and weekly maintenance logs, and/or a fuel meter; however, if the facility changed to a fuel cell or battery storage fuel usage records, hour meter records, and operation logs may no longer be needed to be maintained and reported to enforcement to ensure compliance because the technologies are inherently clean.

Response to Comment 17-10:

Staff agrees all interested stakeholders including the public should participate in working group meetings and discussions. Staff will ensure outreach is conducted for all interested parties.

Response to Comment 17-11:

The RECLAIM program establishes a programmatic cap for the entire universe of facilities and investors. In order to maintain market liquidity and to allow opportunity for facility and industry growth, the allocations of RECLAIM Trading Credits must be greater than the programmatic emissions. At the same

time, however, the programmatic level of allocations must be equivalent to what would be achieved under command-and-control regulations and the SCAQMD is required under State law to perform periodic BARCT assessments to ensure equivalency.

Response to Comment 17-12:

BCM-10 discusses the affected industry, estimated amount of VOC and NH3 reduced, and cost effectiveness of the proposed method of control. Increased diversion to composting is already considered and included in the inventory. The cost of implementation is estimated in the AQMP Socioeconomic Assessment Report.

Response to Comment 17-13:

It is undetermined to which technologies will be deployed, but once successful demonstration of technology is completed, it is anticipated that facilities would be required to pay for, maintain, and report on such systems, with SCAQMD oversight.

Response to Comment 17-14:

SCAQMD acknowledges the level of work to establish and implement an incentive program but also recognizes the benefits from encouraging and supporting transitions to cleaner technologies outside the regulatory framework, in particular for the short-term. SCAQMD staff has experience with developing incentive program guidelines, outreach, contracts, and enforcement. The SCAQMD in the past has awarded certifications to facilities and provided labeling for products. Staff is open to new ideas and depending on availability of staff resources, there could be consideration of securing assistance from a consultant.

Response to Comment 17-15:

The SCAQMD Mobile Source Measures are intended to help implement the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures found in Appendix IV-B. One of the objectives of the measures is seeking greater deployment of zero-emission technologies wherever possible and near-zero emission technologies everywhere else.

The State Mobile Source Strategy contains a measure calling for zero-emission last mile delivery, which seeks to deploy zero-emission vehicles for short-haul deliveries.

For the facility-based measures and emissions growth management measure, the SCAQMD staff will work with all affected stakeholders to seek approaches to maximize the penetration of zero-emission technologies as early as possible.

The SCAQMD intends to include community organizations and interested nearby residents in the public process. SCAQMD staff believes that the goals of the facility-based measures and the emission growth management measures will be aggressive in nature since the measures call for identification of actions that go beyond regulation requirements. These actions will help meet the State SIP Strategy “Further Deployment of Clean Technologies” measures. The “Further Deployment” measures when fully implemented will result in over 100 tons/day of NOx reductions by 2023. The SCAQMD measures are proposed to help meet a large portion of these measures through early actions.

Response to Comment 17-16:

The focus of MOB-11 is on larger diesel-powered lawn and garden equipment such as riding lawnmowers and chipping and grinding equipment. The population of these types of equipment is much smaller and usage is much greater compared to the number of handheld equipment and smaller lawn and garden equipment used primarily at residential locations.

Staff believes that it is more cost-effective to focus on this sector to achieve greater emission reductions, while continuing the existing lawnmower and leaf blower exchange program to encourage consumers to use zero-emission technologies.

Response to Comment 17-17:

Electricity use is estimated based on the California Energy Commission Demand Forecast Mid Demand Baseline Case. This table includes retail sales and other deliveries only measured at the customer level. Losses and consumption served by self-generation are excluded. Certain existing statewide goals are included in the projections if they were adopted/implemented in time to be included in the CEC Demand Forecast. The table was developed based on actual 2013 data. The table includes sales from entities outside of California control areas.

Comment Letter from City of Moreno Valley (Comment Letter #18)

Community Development Department
Planning Division
14177 Frederick Street
P. O. Box 88005
Moreno Valley CA 92552-0805
Telephone: 951.413-3206
FAX: 951.413-3210

August 17, 2016

South Coast Air Quality Management Plan
Mr. Michael Krause
Planning and Rules Manager
21865 Copley Drive
Diamond Bar, CA 91765-4182

Re: Notice of Availability of the Draft 2016 Air Quality Management Plan

Dear Mr. Krause,

The City of Moreno Valley appreciates the opportunity to comment on the 2016 Draft Air Quality Management Plan (DAQMP).

A number of plan objectives are provided within the DAQMP. It is understood that a key element of Plan implementation will be private and public funding to help further development and deployment of the advanced technologies and emission reductions highlighted in the document. The DAQMP did not provide specific details on funding sources and incentives to carry out the goals and objectives of the Plan. 18-1

The DAQMP did not include details on sanctions to meet strict air quality strategies. The City asks that local jurisdictions have adequate time to review any sanction proposals if included with the future implementation of the Plan. 18-2

It is understood that there may be future opportunities for local jurisdiction training and review regarding key implementation strategies. The City asks that local agencies are notified and receive ample time to act on any training opportunities when they become available.

We look forward to receiving a copy of the Final 2016 AQMP once it becomes available. Please include the City on any mailing lists regarding final documents as well as for future notifications of meetings/public hearings associated with the project. 18-3

Should you have any questions or concerns, please contact Mark Gross, Senior Planner at (951) 413-3215.

Sincerely,

Mark Gross, AICP
Senior Planner

c: Richard J. Sandzimier, Planning Official

Responses to Comment Letter from City of Moreno Valley
(Comment Letter #18)

Response to Comment 18-1:

As part of the 2016 AQMP, a Financial Incentive Funding Action Plan is currently under development that will provide more detail as to the potential source of funding available. Part of this Financial Incentive Funding Action Plan was presented at the Mobile Source Committee Meeting on October 21 and at the 2016 AQMP Advisory Group Meeting #14 on October 27, 2016. The Revised Draft 2016 AQMP also discusses the level of funding incentives needed to help achieve NOx emission reduction associated with the State SIP Strategy "Further Deployment of Cleaner Technologies" measures.

Response to Comment 18-2:

The comment is not clear as to the "sanctions" to "meet the strategies." Failure to submit or implement a Plan could result in federal sanctions and consequences pursuant to the Clean Air Act (CAA). The U.S. EPA Administrator would need to make a finding of failure to submit a Plan, disapprove a portion of the Plan, or failure to implement an approved Plan. The state would be given 18 months after the finding or disapproval to correct the deficiency. If still not satisfied, sanctions such as prohibition of highway funds for local projects and increased emissions offset requirements could be triggered. Further, the U.S. EPA could develop and require a Federal Implementation Plan (FIP) that would likely not fully consider local needs.

Strategies in the AQMP are intended to be developed into rules or programs that would be established through a public process such as working group meetings, workshops, reports and public comment periods. Rules and programs typically include enforcement elements to ensure the rules are properly complied with and programs are properly implemented. Again, there will be adequate time for interested parties to participate and comment.

Response to Comment 18-3:

Similar to the development of the rules and programs, the SCAQMD hosts workshops and training classes for new programs and ample information is provided online to educate the public and interested parties. It is suggested the commenter take advantage of the SCAQMD website (www.aqmd.gov) that provides an ongoing rule development schedule, upcoming working group meetings and public workshops, as well as available documents on the interested subjects.

Comment Letter from Electratherm (Comment Letter #19)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Form Informtion

Date Created	Time Created	AQMP Year
08/17/2016	11:13 AM	2016

Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
PAUL HUGHES	ELECTRATHERM	RENO	NV	89502

If not representing a specific organization, please enter "No Affiliation".

Comments (Unlimted Size)

We would like to provide information and a solution for biogas utilization which can meet or exceed emission requirements with an available commercialized technology called the Power+ manufactured out of Reno, Nevada. Hot water is it's fuel and it has ZERO emissions. This is not a black box technology and can be implemented now without delay, trials, or testing. The Power+ generator has been proven with installations around the world with over 60 years of cumulative runtime. The Power+ simply utilizes hot water from a low emissions biogas boiler (already in use, proven, and permitted at wastewater plants in California) to make onsite power. This technology has also been proven in reducing emissions at oil wells. It is a very cost effective solution compared to other options and can be implemented at wastewater plants, landfills, and oil well sites immediately. 19-1

Upload Additional Comment and Supporting Files (30 Mb Maximum per file) (1)

AQMP Comments Files

PLN - AQMP Comments - 8/17/2016 - Comment Type: - Author: PAUL HUGHES - Agency: - N

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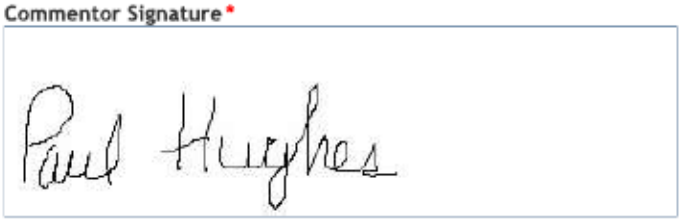
Commentor Signature*



For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

8/17/2016

Information and application of the ElectraTherm Power+ Generator to reduce emissions at wastewater treatment plants and landfills generating biogas

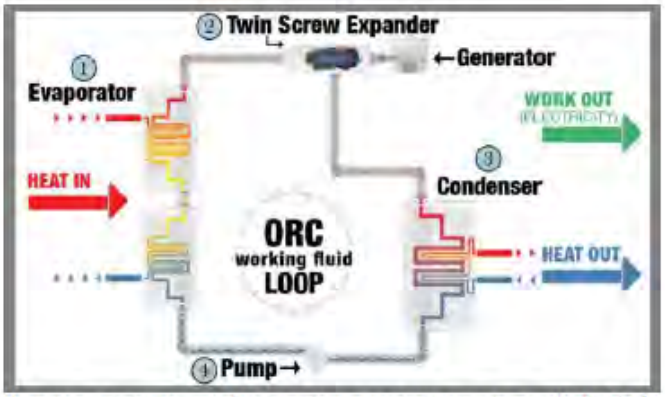
Process: Biogas > Low emission boiler > Power+ Generator

Key Benefits:

1. **Make onsite power in an emission free generator. The Power+ itself has no combustion, and zero emissions.**
2. Meet or exceed current & proposed AQMD & EPA emissions levels with no need for delays or extensions.
3. Dramatically lower emissions compared to engines. The Power+ system works in tandem with low emission boilers already permitted and in place at most wastewater plants in Southern California.
4. Utilize all the biogas being produced and/or flared. A renewable resource, and of great interest to Utility customers, and neighbors.
5. Dramatically lower capital investment, O&M, and footprint compared to an engine
6. Simplified biogas power generation solution.
7. Eliminate the need for biogas conditioning systems and the often overlooked electrical parasitic loads they require.
8. Eliminate the need for large volumes of onsite biogas storage. A maintenance item, safety concern, and in today's world a security risk.
9. Dramatically reduce the fugitive methane leak points typically associated with biogas conditioning systems and storage. Methane is a potent greenhouse gas, around 25 times more damaging than carbon dioxide.
10. Provides a variable-load solution that can follow the wastewater plants' varying biogas production. No need to recalibrate the Power+. Engines, microturbines, or fuel cells will struggle without adequate volume and stable flow of clean biogas.
11. The Power+ flexibility means the boiler can run continuously and stay hot which substantially increases boiler life and decreases boiler O&M costs and power usage.
12. Reduce natural gas use. Natural gas is typically used in bringing a boiler up to condensing temperature before switching to biogas. Also, natural gas is often blended in biogas when running engines to increase efficiency and stable operation.
13. Proximity to manufacturer for support and service. We are located in USA out of Reno, Nevada. The Power+ Generator has been installed in 14 countries with over 60 years cumulative runtime with a 97% availability. With only 3 major moving parts we pride ourselves on reliability.

ElectraTherm's Power+ Generators generate fuel-free, emission-free electricity from low grade waste heat (170-240°F/77-116°C), utilizing Organic Rankine Cycle (ORC) and proprietary technologies. **Hot water fuels ElectraTherm products**. ElectraTherm machines are fully packaged with outputs up to 110kWe per module (<7'x11') for distributed power generation.

8/17/2016





No gearbox, combustion, air filters, or exhaust stack. Low temperature (170F-252F) hot water is the fuel.

ElectraTherm Power+ Generators use a closed-loop Organic Rankine Cycle (ORC) to create pressure by boiling a working fluid into a gas. The gas expands and turns a twin screw expander, our power block, which drives a generator to produce electricity. It is very similar to the Rankine (steam) cycle, but replaces water with a much lower boiling point working fluid (boiling point of 57F). ElectraTherm combines traditional components with patented technology to create electricity from waste heat.

ElectraTherm has the largest fleet of low temperature ORC installations in the world. To attain this goal, ElectraTherm adapted its core power generating technology to a number of different applications. Current deployments and demonstrations include, flare to power, engine heat recovery from a variety of engine models, waste biomass and biogas, industrial waste heat, geothermal fluids and solar thermal energy.

Hot water fuels ElectraTherm products. Boilers at anaerobic wastewater treatment plants create hot water from the biogas to heat the digesters. The Power+ twin screw expander allows the generator to ramp up and down as well as start and stop based on temperature and flow always generating the maximum power. Using a turbine technology does not allow for these fluctuations and is unforgiving to changing biogas volumes which wastewater plants can experience.

Due to the fact that emission reduction, beneficial methane use, and power generation are major issues for plants in the US, ElectraTherm sees the potential for a new paradigm and an easier solution to the age old problem of what to do with produced biogas. The slides below show the current methodology for using methane to create power with the Power+ being an alternative with a much smaller, simpler, less capital and maintenance intensive solution.

8/17/2016

Current Paradigm for Biogas-Fired Combined Heat & Power



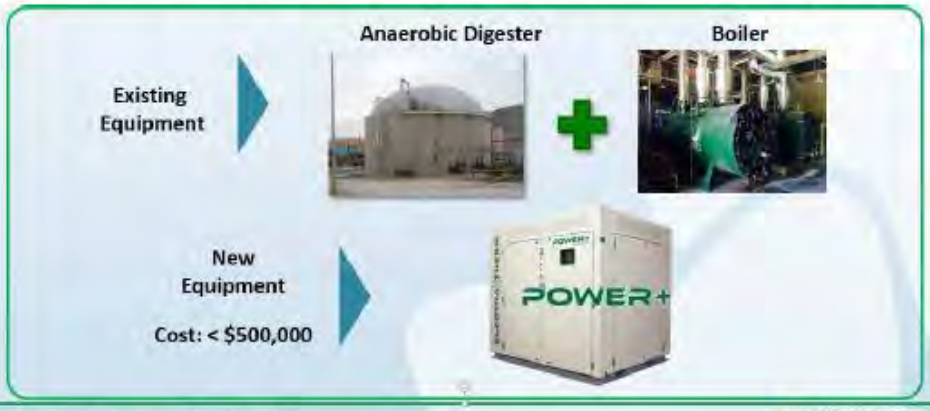
RESULTS: Power production and less flaring but...

- ✗ High capital cost
- ✗ Intensive annual maintenance
- ✗ Complex installation and large footprint
- ✗ Flare flame typically remains
- ✗ Emissions
- ✗ Power use of biogas treatment system



OR....

Lower emission power generation solution. And can eliminate flaring!



RESULTS: Power production with...

- ✓ Much lower capital cost
- ✓ Flare greatly reduced or eliminated
- ✓ Offset onsite power use
- ✓ No gas treatment or storage
- ✓ Greatly reduced maintenance
- ✓ Reduced emissions
- ✓ Simple installation and small footprint



THIS IS SMART POWER®

3

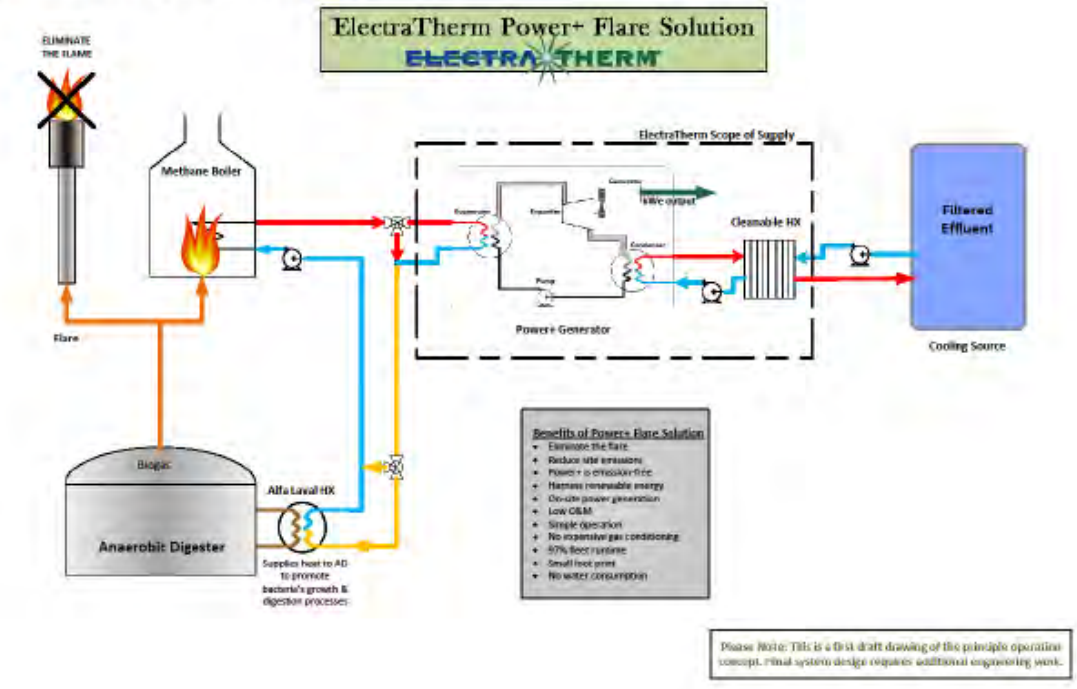
8/17/2016

Our application is at wastewater plants with Anaerobic digestion typically start at plants treating >3 MGD. Specifically plants that are flaring off greater than 40,000 ft2/day will be able to utilize a Power+ generator. Our largest Power+ 6500 (110kW) generator will max out at 243,000 ft2/day of biogas, larger biogas volumes will require multiple machines effectively multiplying power output as well. Many California wastewater plants already have existing dual fuel low emission boilers capable of burning all or majority of the biogas currently being flared.

Another benefit of utilizing existing low emission boiler technology is that these boilers are already proven, operators are familiar with them, already approved with AQMD, readily available, and relatively low cost. Also, they do not require the extensive biogas conditioning which is required for engines, microturbines, and fuel cells. Boilers can typically handle much higher levels of H2S (<1000ppm H2S) and are very efficient at 80% or greater. Many wastewater plants only utilize the boilers to heat the digesters on demand, and when these boilers come online they usually require natural gas usage to ramp the boiler up to condensing temperature before switching over to biogas. Also, operators understand that keeping a boiler hot will extend boiler life, lower O&M, and help keep biogas feed lines from plugging.

Installation options diagrams:

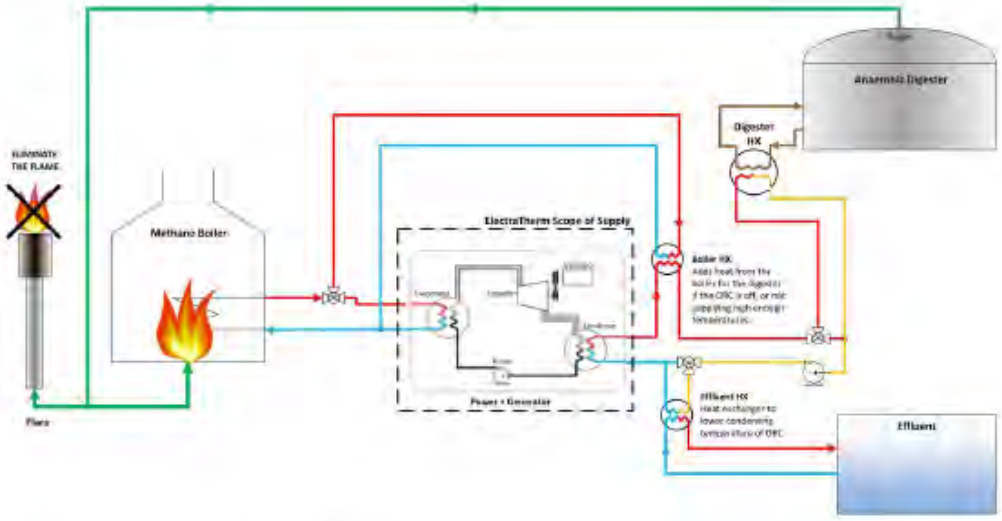
Eliminate flaring and generate power



4

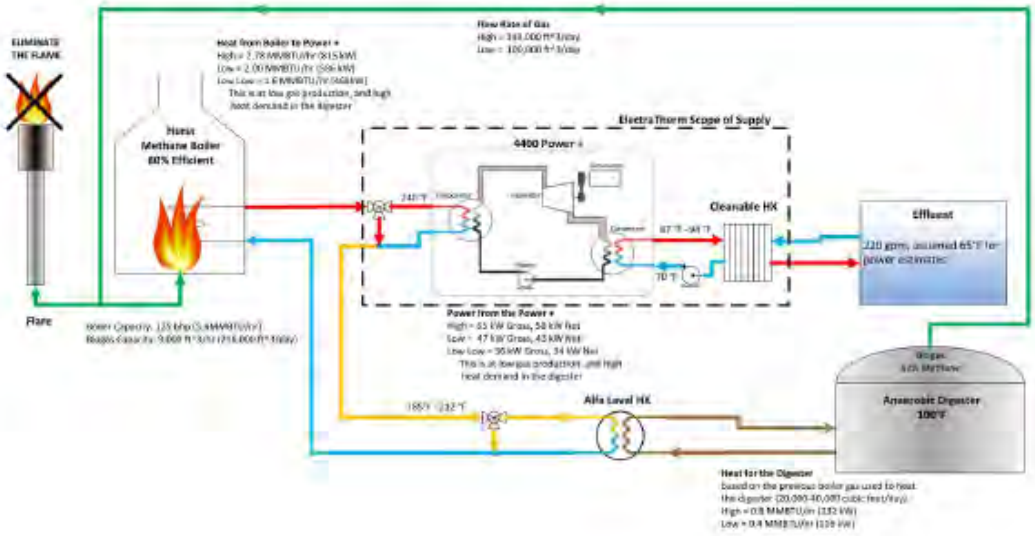
8/17/2016

Utilize biogas to make Power and provide heat to be used in digester (CHP)



Costs of implementing the Power+:

Example: Plant is flaring 140,000 ft2/day of 62% methane



8/17/2016

On an installed basis without any increase in cost of power and including all Power+ O&M costs this facility would have a 4 year payback. The estimated total capital expenditure including estimated installation would be $327,617.00. They would eliminate all flaring and lower their emissions by utilizing existing Hurst low emission boiler(s) and make >$0.05 power including all O&M costs for Power+ generator. The internal rate of return for the life of equipment would be >23%.

ElectraTherm Power+ Generator Pricing:

Power+ 4200 (35 kW) $173,587.00

Power+ 4400 (65 kW) $200,724.00

Power+ 6500 (110 kW) $297,200.00

*Freight & start up are not included

**Cleanable heat exchanger with pump skid not included (added if plant effluent has free chlorine or high solids).

Proven flare emission reduction and power generation

In the summer of 2015 ElectraTherm partnered with Hess Corporation to commission a Power+ Generator at a North Dakota oil well. The Power+ captured the natural gas that would otherwise be flared to generate electricity and reduce or eliminate onsite flaring. In collaboration with distributor Gulf Coast Green Energy, the project successfully demonstrated an effective means of flare reduction, and changes the landscape for industries where flaring or very capital intensive and maintenance intensive power generation were previously believed to be the only options. Funding for the project was provided by the Department of Energy's Research Partnership to Secure Energy for America (REPSEA) program and the Houston Advanced Research Center's (HARC) Environmentally Friendly Drilling Program. A short video on the project is https://youtu.be/4IJEZ1e-PRA or

https://electratherm.com/flare-elimination-system-video/.

Currently North Dakota state regulations require that oil and gas companies significantly reduce the amount of natural gas that is burned in flares over the next several years or face steep penalties and potential curtailment of oil production at offending wells. ElectraTherm's Power+ captured the waste heat and provided beneficial and clean methane utilization without capital intensive gas clean-up, storage, engine or micro turbine capital costs, and the heavy maintenance associated.

At the oil well, natural gas that would otherwise be flared was instead used to fuel an industrial boiler. The boiler heated water to run the Power+ Generator, and produces clean energy that is used onsite displacing the retail cost of power.

This demonstration showed that we could capture a wasted fuel source that was being flared to the atmosphere, and put that fuel to use in remote oil fields. The emissions profile of the site is greatly improved, the power is consumed on site and the equipment is easy to install and maintain. Beyond oil

and gas, ElectraTherm sees potential for other applications where flaring is a major concern, such as at landfills and waste water treatment plants.

Texas A&M was recruited by HARC to provide emissions reductions results of a raw flare as compared to the boiler emissions onsite. According to the report, "It is important to note that the emissions from the Power+ Generator system's boiler are lower (comparatively less harmful to the environment) and would provide the added utility of power generated for use from the raw gas or fuel gas which would otherwise be wasted." The report includes the percentage of reduced emissions as a result of the Power+ Generator, with an 89% reduction in CO, 48% reduction in NOX and 93% reduction in VOCs.

Percent Reduction in Emissions

CO ↓	89%
NO_x ↓	48%
VOCs ↓	93%

The report concludes "The real benefit is the power generated by raw gas or fuel gas which would otherwise be wasted by open flaring. Furthermore, this new technology would meet the goals of the US EPA and North Dakota."

Papers, Publications, and Proceedings

Feb 23, 2016
Midstream Magazine published a by-line from John Fox on how waste heat from gas compression can provide site power and increase engine efficiency.
https://electratherm-electratherm.netdnassl.com/wpcontent/uploads/2016/02/MidStreamMagFeb2016.pdf

Nov 25, 2015
The Bakken Magazine wrote a story on the Texas A&M report that showed ElectraTherm's flare elimination technology can significantly reduce well site emissions.
http://thebakken.com/articles/1371/report-gas-capture-technology-significantly-reduces-emissions

Sept 16, 2015
A white paper on the Organic Rankine Cycle (ORC) and benefits for reciprocating engines was published in the September issue of **Power Engineer Magazine**.
https://electratherm-electratherm.netdna-ssl.com/wp-content/uploads/2015/09/ejournal_Vol19Issue3_Sep2015_ET.pdf

May 28, 2015
ElectraTherm's partnership with Air Burners to commission the PGFireBox was included in Biomass Magazine.
http://biomassmagazine.com/articles/11991/electratherm-commissions-whole-log-woody-biomass-power-plant

8/17/2016

April 16, 2015
ElectraTherm was featured in Compressor Tech 2 Magazine's April 2015 publication.
https://electratherm-electratherm.netdna-ssl.com/wp-content/uploads/2015/04/Compressor_Article_2015.pdf

April 14, 2015
Diesel and Gas Turbine Worldwide covered the 2015 Energy Company of the Year award given to ElectraTherm by Nevada's Center for Entrepreneurship and Technology (NCET).
http://www.dieselgasturbine.com/April-2015/ElectraTherm-Wins-Energy-Company-of-the-Year/#.VyqBaZrmpCp

May, 2016
Pending publication of ~70 page report detailing the efficiency gains witnessed by Southern Research on ElectraTherm's second Dept. of Defense contract. ElectraTherm replaced the radiator on a 1.1MW Cummins diesel fired reciprocating engine and reduced fuel consumption up to 14%. The increase was due to capturing the jacket water and exhaust energy and converting that to addition electricity production and the removal of the cooling load parasitics on the engine. ElectraTherm has created the world's first radiator with a payback.

Reference videos:
ElectraTherm Power+ Intro: https://youtu.be/jolldSWMShE
Media highlights /Presidents visit: https://electratherm.com/news-room/in-the-news/

For more information please contact:
Paul Hughes – North American Business Development
M. 559.298.5558
W. 775.398.4680 ext.151
phughes@electratherm.com | www.electratherm.com

Responses to Comment Letter from Electratherm
(Comment Letter #19)

Response to Comment 19-1:

Staff appreciates the information on this technology and included it as an example of emission reductions that can be utilized as an alternative to flaring (CMB-03) and for reducing emissions from biogas usage at landfills and waste water treatment facilities (CMB-01).

Comment Letter from Gloria Sefton (Comment Letter #20)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Form Informtion

Date Created	Time Created	AQMP Year
08/17/2016	10:45 AM	2016

Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
GLORIA SEFTON	NO AFFILIATION If not representing a specific organization, please enter "No Affiliation".	TRABUCO CANYON	CA	92678

Comments (Unlimted Size)
I delivered the following content in testimony to the AQMD Board at its hearing on July 8, 2016. Please include this in the administrative record for this matter.

Mr. Chairman and members of the Board, good morning. My name is Gloria Sefton. I'm an attorney in the medical device industry (a highly regulated industry, needless to say) and a resident of Trabuco Canyon in Orange County. I'm also a lifetime member of the Sierra Club and a board member of Friends of Harbors, Beaches and Parks in Orange County. I am speaking today as an individual.

I took this morning off from work because I am disturbed about the direction the AQMD appears to be going.

I was born in LA and grew up in the San Fernando Valley in the 60s and 70s. I remember well the brown, smoggy days – days when you couldn't play outside or see the Santa Susana Mountains that were only a few miles away.

Through regulation, the quality of our air has improved year over year since.

I'm very concerned that this board would consider taking us back to those days. An incentive-based plan puts business interests above public health and safety and is wrong-headed and dangerous. Allowing the Department of Water of Power to run its antique diesel generators this summer is one example of these relaxed standards that will hurt our citizens. 20-1

In LA County alone, population has grown by more than 3.5 million since the 60s when I grew up, making it even more critical that regulation of emissions, not incentive-based favors to business, be in place to ensure that our air is clean and safe to breathe.

When the Department of Transportation imposed fuel economy standards on cars and light trucks, the auto industry complained bitterly that it couldn't be done and that they'd be driven out of business. But what happened? They rose to the occasion, in healthy competition with one another, inventing new technologies to reduce fuel consumption and emissions before their deadlines. The result? Cleaner air.

So please, continue to do the job that AQMD has done so well. Don't let political ideology create a false choice between clean air and a favorable business climate. Clean air is important not only for our health and quality of life, but for our region's tourism and desirability.

Technology-forcing regulations can create clean air and healthy businesses too.

Upload Additional Comment and Supporting Files (30 Mb Maximum per file)

AQMP Comments Files

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature *



For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from Gloria Sefton
(Comment Letter #20)

Response to Comment 20-1:

The 2016 AQMP includes aggressive new regulations as well as development of incentive funding and supporting infrastructure for early deployment of advanced control technologies. Technology-forcing regulations can drive development and commercialization of clean technologies, with future year requirements for new or existing equipment. Incentives can then accelerate deployment and enhance public acceptability of new technologies. Please see Response to Comment 11-1 regarding the intent of the incentive measures and their important role in meeting fast approaching ozone standard deadlines. In addition, since the release of the Draft Plan, two of the three incentive-only measures have been modified to include future rulemaking.

Comment Letter from American Chemistry Council (Comment Letter #21)



BY ELECTRONIC MAIL

August 18, 2016

Philip Fine, Ph.D.
Deputy Executive Officer
Planning, Rule Development & Area Sources
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4182

Re: Draft 2016 Air Quality Management Plan

Dr. Fine:

The Hydrocarbon Solvents Panel (HSP) and Solvents Industry Group (SIG) of the American Chemistry Council (ACC) appreciate the opportunity to comment on the District's draft air quality management plan. ACC is concerned about the proposal for further reductions of two tons per day of volatile organic compound (VOC) emissions from coatings, solvents, adhesives, and sealants by 2031 (CTS-01). The proposal appears to be a carryover from the 2012 Air Quality Management Plan (AQMP), which the District indicates was not implemented as a result of "technical and policy challenges."[1] The 2016 draft AQMP identifies a number of stationary source rules that could be affected by CTS-01 - in particular Rule 1168 pertaining to adhesive and sealant applications.

Ozone levels in the South Coast Air Basin have declined significantly over the past few decades, but have begun to level off in recent years.[2] AQMD's modeling results suggest that this is the result of the complex interaction between VOC and nitrogen oxide (NOx) concentrations in the troposphere and that further reductions in ozone concentrations require reductions in NOx. The modeling also suggests that further progress on ozone levels is largely independent of additional reductions in VOCs. Consequently, the proposed 2016 AQMP focuses largely on measures to reduce NOx levels. Yet the data presented in the draft 2016 Plan indicate no overall change in NOx emissions over the last 4 years, while VOC emissions have continued to decline – as a result of continued emissions reductions from stationary sources.[3] It is curious therefore that the draft plan continues to propose reductions in VOC emissions from adhesive and sealant and other applications. 21-1

The description of CTS-01 in Appendix IV-A of the draft AQMP notes that the District proposes to adopt a "NOx-heavy strategy accompanied by more modest VOC reductions" to help avoid temporary increases in ozone concentrations in the western side of the Basin. The draft Plan further explains that the VOC control program is intended to prioritize controls that maximize the co-benefits of NOx, greenhouse gases (GHG), and air toxic reductions, followed by controls that could create a "win-win" for

[1] SCAQMD. Draft 2016 Air Quality Management Plan (2016 AQMP), at 1-11 (June 2016).

[2] SCAQMD. 2016 AQMP White Paper - VOC Controls (October 2015).

[3] 2016 AQMP. Appendix III – Base and Future Year Emission Inventory, at III-2-2 (June 2016).

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the affected entities. Unlike most of the other proposed measures, however, CTS-01 does not result in co-benefits for NOx, GHG, or air toxic reduction. Furthermore, in the absence of details on precisely how CTS-01 would be implemented,[4] it is impossible to determine whether it would create a "win-win" for the affected entities. Finally, while the rationale for proposing CTS-01 appears to be the avoidance of temporary increases in the western side of the Basin, the District projects a reduction of 120 tons per day of VOCs by 2023[5] - well in excess of the 30 to 40 tons/day the District suggests it needs to avoid increases in ozone exposure.[6] 21-1 Con't

ACC also wishes to express its concern with the cost estimate of $8,000 to $12,000 per ton of VOC reduction for CTS-01.[7] Without additional details on how the VOC reductions from stationary sources are to be achieved, it is impossible to determine whether the estimate is accurate. While the value represents the District's estimate of the cost for VOC reduction, moreover, it does not reflect the "cost effectiveness" of the measure in achieving the ultimate goal of reduced ozone levels. In order to determine the true cost effectiveness the District would have to consider, not only the cost to reduce VOC emissions, but also the resulting impact of this reduction on ozone levels. As described in the White Paper on VOC Controls, and as summarized above, the District's modeling results confirm that VOC reductions in the absence of a decrease in NOx emissions will have negligible impact on ozone. When measured against the impact on ozone levels, therefore, the true cost of implementing CTS-01 will be considerably higher. 21-2

Based on SCAQMD's own modeling results, significant progress towards achieving the federal ozone standard can only be achieved by reducing NOx emissions. ACC strongly encourages the District to defer any decision about further reduction in VOC emissions from stationary sources until such reductions are a cost-efficient means to achieve the desired air quality objectives in the South Coast Basin.

If you have any questions, please contact us (Jon_Busch@americanchemistry.com, 202 249-6725; Steve_Risotto@americanchemistry.com, 202 249-6727).

Sincerely,

Jonathon T. Busch

Jonathon T. Busch
Director

Stephen P. Risotto

Stephen P. Risotto
Senior Director

[4] For example – which exemptions would be tightened; which product categories would be subject to lowered limits.

[5] 2016 AQMP. Appendix III, at III-2-66. The District's 2023 emission inventory projects 379 tons of VOC/day in 2023, compared to baseline emission of 502 tons/day of VOCs.

[6] 2016 AQMP White Paper - VOC Controls, at 10.

[7] 2016 AQMP, at 6-20 (Table 6-5).

Responses to Comment Letter from American Chemistry Council (ACC)
(Comment Letter #21)

Response to Comment 21-1:

Please see Response to Comment 15-2 with regard to the need for CTS-01 measure in the 2016 AQMP.

Response to Comment 21-2:

Please see Responses to Comments 15-2 with regard to VOC reductions not associated with NOx reductions, 15-5 with regard to cost-effectiveness of CTS-01, and 15-7 with regard to VOC emission reductions from stationary sources, respectively.

Comment Letter form Michael Salman (Comment Letter #22)

2533 4th Ave
Los Angeles, CA 90018
salman@history.ucla.edu
323-402-0840
August 18, 2016

Dr. Philip Fine,
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: Comments on CMB-01 and CMB-03, especially as concerns oil and gas production flaring.

Dear Dr. Fine

Thank you for allowing me to speak at the May 4, 2016 meeting of the AQMP Advisory Group for being responsive on the subject of non-refinery flaring. I am writing to follow up on the exchange I had with you and Executive Director Nastri at the May 4 meeting, which focused on the following areas:

1) More consistent emphasis on beneficial use as the preferred method of control over flaring.
2) Disaggregating the category of "non-refinery flares" because the gas composition and potential for beneficial use to avoid flaring varies considerably between different sources. Landfills, solid waste plants, and oil & gas production sites are quite different from each other. They pose different challenges and opportunities.
3) I requested that SCAQMD should take a firmer and more direct regulatory stand against routine flaring at oil and gas well sites – that is, to prohibit routine flaring at well sites - for two reasons:
    a. The Governor's office has, through CAL EPA Secretary Rodriguez, committed to the World Bank's Zero Routine Flaring by 2030 Initiative that seeks to prohibit the introduction of any more new flares and promises to end all existing routine flaring at well sites by 2030 at the latest.
    b. Oil and gas well sites have numerous alternatives to flaring to handle stranded gas, tail gas, and any other gas that cannot be sold. Most of these solutions are already tested. They are all lower in Criteria Pollutant emissions than flaring, and they would all either make beneficial use of the gas or store the gas for later use (i.e., re-injection). All are far superior to flaring in terms of Greenhouse gas emissions. Beneficial use alternatives would earn the operators profits, whereas flaring produces no revenue.
4) Last, I asked SCAQMD to please take an active role in lobbying for incentives to promote early adoption of beneficial use alternatives to flaring.

22-1

1

I will discuss these four themes in order.

More consistent emphasis on beneficial use: Thank You.

I am pleased to see that the June 2016 Appendix IV-A on "SCAQMD'S STATIONARY AND MOBILE SOURCE CONTROL MEASURES" uses more consistent language to emphasize a preference for beneficial use over flaring. 22-1 Con't

Disaggregating the category of "non-refinery flares": Need to Do More

It seems a little bit of new language has been inserted into CMB-01 about the particular problems of landfills and municipal solid waste facilities.

Indeed, there are some challenges for those facilities to make beneficial use of their bio-gas, and so it is an appropriate step to introduce the idea of forming a "working group" to that "will strive to overcome obstacles and include interested parties such as The Gas Company, Sanitation District, Landfills, and CPUC." (see p. IV-A-47)

But it also seems to me that the language concerning oil and gas production sites remains unchanged and continues to confuse and conflate the gas from production well sites with the bio-gas from landfills and waste treatment plants. Not only is the gas composition and quality radically dissimilar at these different sources, so too is the range of beneficial use alternatives, plus long term storage through re-injection is a way to store gas at production well sites.

This point merits explication.

22-2

First, the gas quality differs radically at bio-gas generating sites as compared to oil and gas production sites.

Landfills and sewage plants tend to produce lower Btu gas with many impurities and a lack of consistency since feedstock for producing the gas fluctuates.

In contrast, the Btu rating of gas at production well sites is much higher, often higher than pipeline quality gas. The composition of the gas is far more consistent overall especially on a site by site basis. And in the LA Basin most of the production well sites produce low sulfur "sweet" gas that needs only modest sulfur removal by means like iron sponge adsorbers or other filtering (relatively simple solutions already used for decades).

SCAQMD has in its file gas composition reports from the Wilmington Controlled Drill Site operated by Warren E & P and a gas composition report from the Murphy Drill Site operated by FMOG. I have copies of both of those reports and I will attach copies to this submission.

I suspect that SCAQMD probably also has gas composition reports from other oil production sites, including the Baldwin Hills and Santa Fe Springs because flares have been permitted for both facilities.

The Wilmington Site has been flaring the majority of its produced gas because up until now it has not had processing equipment and an arrangement to sell any gas to SoCalGas. The Btu rating of gas at Wilmington has clocked in between 1019 and 1032, which is in the range of pipeline gas. It is low in sulfur and other impurities. However, now that Wilmington is supposed to start selling gas to SoCalGas sometime soon, the gas that Wilmington will send to its flares will have a different composition likely to include heavier hydrocarbons and a higher Btu, but not more impurities.

Since 1986, the Murphy site has sold almost all of its gas through SoCalGas's distribution system (along with gas from its sibling Jefferson and 4th Ave sites, though 4th Ave has been idle since 2010). Before 1986 all gas from all three sites was reinjected at Murphy. The Murphy site has never had a flare. In 2011, however, SoCalGas applied to CPUC for a change to SoCalGas Rule 30 that would end historical exemptions from non-H2S gas composition requirements; this rule turns on the Wobbe index and essentially prohibits gas with a Btu higher than 1150 from being input into the distribution system. In 2014 the CPUC approved the rule change, to be implemented by the end of 2016. Largely because of the proposal to change Rule 30 that was submitted to CPUC in 2011, the operator of Murphy applied to SCAQMD in 2012 for a permit to install a flare for the first time ever. In that application the operator submitted a study of the tail gas it was already burning in microturbines as indicative of the gas that it would be burning in the flare it desired to install: 1463 Btu, and low in impurities.

22-2 Con't

Second, there are a wider range of alternative solutions for oil & gas production sites as compared to bio-gas sites.

Only oil and gas production sites would be suitable for gas injection wells to store gas in the hydrocarbon geology from which it was pumped up. Gas injection wells have been used for many decades. In addition to storing the gas for later use, re-injection is a form of secondary recovery for oil, which increases oil production. The Murphy Site has a permitted and operational gas injection well that was given an extensive workover in 2011-12. Well sites that do not currently have a gas injection well could add one. Reinjection has costs and produces no direct revenue, much like the reinjection of produced water. But it does have some value in secondary recovery of oil and a clean solution to the problems of produced water and gas that cannot be sold is simply a necessity.

Oil and gas production sites are far more suitable for Gas-to-Liquids (GTL) platforms that convert gas into liquid fuel that can be mixed with crude and piped to refineries. The GTL process is 90 years old and proven. In recent decades several companies have focused on reducing the scale of GTL platforms to make them viable as solutions to avoid flaring at isolated well sites. Several manufacturers now make mini-GTL platforms that would be suitable for well sites in the LA Basin. For example, Greyrock Energy based in Sacramento makes platforms that can process 250 mcf/day into 20 barrels of liquid fuel, and platforms that turn 500 mcf/day into 40 barrels of liquid fuel. This GTL platform steam reforms natural gas into syn-gas, a process that burns a small quantity of gas to create the needed heat; burning a few mcf/day will produce far less in emissions than flaring 500 mcf/day.

3

Microtrubine and fuel cell solutions are also easier to implement at production well sites than at bio-gas sites because the gas quality is more consistent and there is no need to raise the Btu level of the gas. CARB certified microturbines from Capstone outperform CEB flares in emissions, and fuel cells can be near zero emission.

But CMB-03 continues to treat all sources of waste gas as if they are the same.

When CMB-03 discusses the potential use of waste gas as transportation fuel, it assumes the Btu level will need to be raised: "Utilization of waste gas as a transportation fuel can be both economically and environmentally beneficial. The gas would be required to undergo treatment to remove any impurities, such as sulfur and siloxanes, and to raise the heating value to specification." (IV-A-69) The assumption that the Btu level would need to be raised clearly comes from focusing on landfills and sewage plant sources. It is not a problem with gas from production well sites.

CMB-03 also emphasizes the need to clean gas before it is used in fuel cells. Indeed, fuel cells are sensitive to impurities, but CMB-03 still does not distinguish between very impure and inconsistent gas from bio-gas sources as opposed to the already much cleaner and much more consistent gas from production wells.

22-2
Con't

Third, bio-gas sources and production wells are very different operationally, and they have different social, political, and legal contexts.

Bio-gas production is biologically unavoidable. Landfills and solid waste treatment facilities are typically public operations run for public service out of necessity, not for profit. In contrast, gas from oil production is a function of historically developing technologies and choices (both economic and political). Oil production facilitates social uses and social goods, but it a privately run and historically profitable industry.

More crucially at this moment, the sensible change to SoCalGas Rule 30 stands to prompt an increase in flaring at production well sites because the rule change makes a substantial portion of locally produced gas unmarketable through the SoCalGas distribution system. At the Murphy Site, the operator wants to flare off 400MCF/day of gas, which is about 40% of the total peak daily production from Murphy and Jefferson combined.

SoCalGas and the CPUC passed the Rule 30 change to protect end users and the environment. They never thought of the unintended consequence that this would lead to a big increase in flaring. CPUC staff were shocked when I told them that flaring was the proposed solution for the newly off-spec gas at Murphy.

Oil and gas production sites will also be facing further gas composition restrictions designed to reduce corrosive agents in the gas stream that degrade pipelines and cause fugitive leaks. The future will make more and more of the associated gas produced from oil wells unmarketable. Without action, oil companies will want to flare it off because flaring is the solution most convenient and most familiar to them.

Oil and Gas production sites have entered a critical phase in which flaring will increase and indeed begin for the first time at sites like Murphy, unless substantial pressures and/or incentives persuade companies to use better technologies. 22-2 Con't

A firmer and more direct regulatory stand against routine flaring at oil and gas well sites is needed and warranted.

I urge you to consider a direct regulatory prohibition of routine flaring at oil and gas production sites. A similar prohibition has been highly successful at refineries.

Refineries have a much more substantial and legitimate need for flares than production sites. Refinery flares have emergency and safety functions; most well sites in the Basin have not had flares at all. Keeping refineries online fulfills a social need; a refinery going off line raises gasoline prices noticeably. The same cannot be said for individual well sites, plus they can achieve any needed redundancy by using a gas injection well to back up the main beneficial use technology for handling gas.

There is simply no necessity for flares at well sites.

Since the early 2000's the California Energy Commission and CARB have talked about creating incentives to substitute microturbines for flares and to use recovered heat from the microturbines to replace boilers. (see attached CEC and CARB studies) But it has not happened. Incentives to reduce flaring at well sites have not moved forward. In fact, available incentives are being reduced.

The Governor's office has committed to eliminating routine flaring at well sites. The June 2016 Appendix on Control Measures now mentions the World Bank initiative, but not the fact that the Governor's office has signed onto the initiative. See the attached copy of Matt Rodriguez's commitment letter to the World Bank. 22-3

Last but not least, the beneficial use alternatives to flaring are profitable. Microturbines and GTL are proven technologies and proven to be profitable. Fuel Cells await their first demonstration use to handle stranded or otherwise unmarketable gas at well sites, but they are proven in far worse environments with poor quality bio-gas.

The oil industry is characterized by boom-bust cycles that tend to devastate the small and medium sized well operators that predominate in the LA Basin region. It has been in a bust phase for the past two years. Beneficial use of waste gas offers the industry a new business model with financial ballast. Well sites use a lot of electricity. The annual bill at Murphy is more than $1 million. Rather than flaring off-spec gas because that is the easiest solution to a problem (as long as it is allowed), oil companies could instead choose a profitable solution. Microturbines would eliminate a well sites electric bill. Fuel cells produce electricity much more efficiently from the same quantity of gas and thus would return more revenue than microturbines. Similarly, the revenue from a GTL system is easy to calculate: a 500 mcf system producing 40 barrels a day would generate fuel worth about $730,000 per year at $50/barrel oil rpices.

5

While flares have zero return on capital because they produce nothing except pollutants and greenhouse gases, all of the beneficial use solutions discussed here would easily reach the break even point within about seven years with no new or special incentive funding.

I understand that the SCAQMD Board is trying to emphasize use of incentives rather than new regulations to meet attainment goals. One does not have to fight against that vision to see that there are some instances where a regulatory prohibition would not only be most cost-effective for meeting air quality goals, but also would be the surest way to produce effective lobbying to get new incentives to offset costs for businesses. Furthermore, in the case of beneficial use alternatives to well site flaring, the beneficial alternatives are economical for the companies, but they need a push to move forward. 22-3

Please take an active role in lobbying for incentives to promote early adoption of beneficial use alternatives to flaring.

The SCAQMD Board's preference to use incentives should increase the importance of lobbying for incentives.

As I mentioned on May 4, the CPUC is in the process of reducing its SGIP rebates for microturbines and fuel cells that use natural gas. The SGIP program makes no distinction between pipeline quality gas and off-spec gas that would be flared. Gas that cannot be sold should be classified (with proper restrictions) as a form of waste gas that is eligible for a higher level of incentives and other credits. 22-4

If regulations prohibiting flaring are not put in place AND if incentives are not provided to push companies toward beneficial use, the flared gas will increase in volume. Flared gas is a pure waste and a pure source of pollutants and greenhouse gases. If used beneficially in microturbines, fuel cells, and/or GTL, there would be lower emissions than would be achieved from the use of CEB flares, and there would be carbon savings from other fuels that would be displaced.

Everyone loses with flaring. Beneficial use alternatives are win-win.

Yours

Michael Salman

Attachment A to Comment Letter #22.:

CalEPA
California Environmental Protection Agency

Edmund G. Brown Jr.
Governor
Matthew Rodriquez
Secretary for Environmental Protection

December 28, 2015

Ms. Anita Marangoly George
Senior Director, Energy and Extractives Global Practice
The World Bank Group
1818 H Street, NW
Washington, DC 20433

Re: Invitation for the State of California to join the "Zero Routine Flaring by 2030" Initiative

Dear Ms. George,

Congratulations on the success of the "Zero Routine Flaring by 2030" Initiative in Paris. On behalf of the State of California, I am pleased to submit this letter as confirmation of California's endorsement of the initiative. We look forward to working with the World Bank to commit to eliminating existing legacy routine flaring no later than by 2030, and to help ensure that new oil fields are developed with plans that include a gas utilization solution without routine flaring or venting.

My agency will be the focal point for further coordination in support of this initiative.

Sincerely,

Matthew Rodriquez
Secretary for Environmental Protection

Attachment

Cc: Mr. Ken Alex
Senior Advisor
California Governor's Office of Edmund G. Brown Jr.

Ms. Aimee Barnes
Deputy Secretary for Border and Intergovernmental Affairs
California Environmental Protection Agency

Richard Corey
Executive Officer
California Air Resource Board



ANITA MARANGOLY GEORGE
Senior Director
Energy and Extractives Global Practice

December 2, 2015

Mr. Matthew Rodriquez
California Secretary for Environmental Protection
1001 I Street, P.O. Box 2815
Sacramento, CA

Dear Mr. Rodriguez,

Initiative to Reduce Global Gas Flaring:
"Zero Routine Flaring by 2030"

Early this year, United Nations Secretary-General Ban Ki-moon and World Bank President Jim Kim launched a global initiative to end the oil and gas industry practice of wastefully and routinely flaring gas at oil production sites around the world. The "Zero Routine Flaring by 2030" Initiative (attached) aims to eliminate existing "legacy" routine flaring no later than by 2030, and to help ensure that new oil fields are developed with plans that include a gas utilization solution without routine flaring or venting.

We are requesting the State of California join 42 other governments, oil companies, and development institutions (attached with Initiative text) who have endorsed this Initiative. Our ambition is to garner the broadest coalition of leading oil-producing countries and oil companies, thereby establishing its principles as a global industry standard. While the United States government has yet to endorse the Initiative, we believe California could lead the way to a subsequent national endorsement, given the State's climate change mitigation goal of reducing greenhouse gas emissions by 40 percent below 1990 levels by 2030 and further eliminating methane and black carbon from the oil and gas sector.

The "Zero Routine Flaring by 2030" Initiative addresses a major climate change and resource management issue. Flaring at oil production sites around the world causes about 350 million tons of CO_2 emissions every year, and there are also negative impacts from black carbon emissions and un-combusted methane. Furthermore, gas flaring is a waste of energy resources that the world can ill afford. If the gas that is flared globally every year were used for power generation, it could provide about 750 billion kWh of electricity, or more than the African continent's current annual electricity consumption.



We plan to bring a powerful message on climate action through gas flaring reduction to the COP21 and will announce and recognize recent endorsers of the Initiative at an event there on December 7.

Although the Initiative is not a legally binding document, oil companies have already made it clear that it will have real impact on their upstream business going forward. The many leading international oil companies that already have a no-flaring policy for new field developments consider the Initiative a positive contribution because it will level the playing field: other companies would adopt the same practice and governments would require it.

We would like to confirm the Initiative focuses solely on routine flaring. Thus, non-routine flaring such as during startup, malfunction or maintenance, as well as safety flaring, is not within its scope. Furthermore, routine flaring, as applicable to this Initiative, excludes combustion of hazardous or polluting emissions such as volatile organic compounds and hydrogen sulfide. Nevertheless, these emissions should be minimized.

Please let us know if you have questions or would like additional information about the Initiative, by email, teleconferencing or visit by our experts.

We remain hopeful that California will endorse this important Initiative and look forward to hearing from you soon.

Sincerely,

Anita George

Anita Marangoly George
Senior Director
Energy and Extractives Global Practice

Attachment: "Zero Routine Flaring by 2030" Initiative with list of current endorsers

Website: www.worldbank.org/zeroroutineflaring

Contact: Francisco J. Sucre
World Bank
fsucre@worldbank.org
202-473-5479

Initiative to Reduce Global Gas Flaring: "Zero Routine Flaring by 2030"

During oil production, associated gas is produced from the reservoir together with the oil. Much of this gas is utilized or conserved because governments and oil companies have made substantial investments to capture it; nevertheless, some of it is flared because of technical, regulatory, or economic constraints. As a result, thousands of gas flares at oil production sites around the globe burn approximately 140 billion cubic meters of natural gas annually, causing more than 300 million tons of CO_2 to be emitted to the atmosphere.

Flaring of gas contributes to climate change and impacts the environment through emission of CO_2, black carbon and other pollutants. It also wastes a valuable energy resource that could be used to advance the sustainable development of producing countries. For example, if this amount of gas were used for power generation, it could provide about 750 billion kWh of electricity, or more than the African continent's current annual electricity consumption. While associated gas cannot always be used to produce power, it can often be utilized in a number of other productive ways or conserved (re-injected into an underground formation).

This "Zero Routine Flaring by 2030" initiative (the Initiative), introduced by the World Bank, brings together governments, oil companies, and development institutions who recognize the flaring situation described above is unsustainable from a resource management and environmental perspective, and who agree to cooperate to eliminate routine flaring no later than 2030.

The Initiative pertains to routine flaring and not to flaring for safety reasons or non-routine flaring, which nevertheless should be minimized. Routine flaring of gas is flaring during normal oil production operations in the absence of sufficient facilities or amenable geology to re-inject the produced gas, utilize it on-site, or dispatch it to a market. Venting is not an acceptable substitute for flaring.

Governments that endorse the Initiative will provide a legal, regulatory, investment, and operating environment that is conducive to upstream investments and to the development of viable markets for utilization of the gas and the infrastructure necessary to deliver the gas to these markets. This will provide companies the confidence and incentive as a basis for investing in flare elimination solutions. Governments will require, and stipulate in their new prospect offers, that field development plans for new oil fields incorporate sustainable utilization or conservation of the field's associated gas without routine flaring. Furthermore, governments will make every effort to ensure that routine flaring at existing oil fields ends as soon as possible, and no later than 2030.

Oil companies that endorse the Initiative will develop new oil fields they operate according to plans that incorporate sustainable utilization or conservation of the field's associated gas without routine flaring. Oil companies with routine flaring at existing oil fields they operate will seek to implement economically viable solutions to eliminate this legacy flaring as soon as possible, and no later than 2030.

Development institutions that endorse the Initiative will facilitate cooperation and implementation, and consider the use of financial instruments and other measures, particularly in their client countries. They will endeavor to do so also in client countries that have not endorsed the Initiative.

Governments and oil companies that endorse the Initiative will publicly report their flaring and progress towards the Initiative on an annual basis. They also agree to the World Bank aggregating and reporting the same.

The parties that endorse the Initiative acknowledge that its success requires all involved – governments and oil companies, with the support of development institutions – to fully cooperate and take the action described herein to eliminate routine flaring no later than 2030.

The following governments endorse the Initiative:

Angola
Cameroon
Republic of Congo
France
Gabon
Germany
Kazakhstan
Mexico
Netherlands
Norway
Peru
Russian Federation
Turkmenistan
Uzbekistan

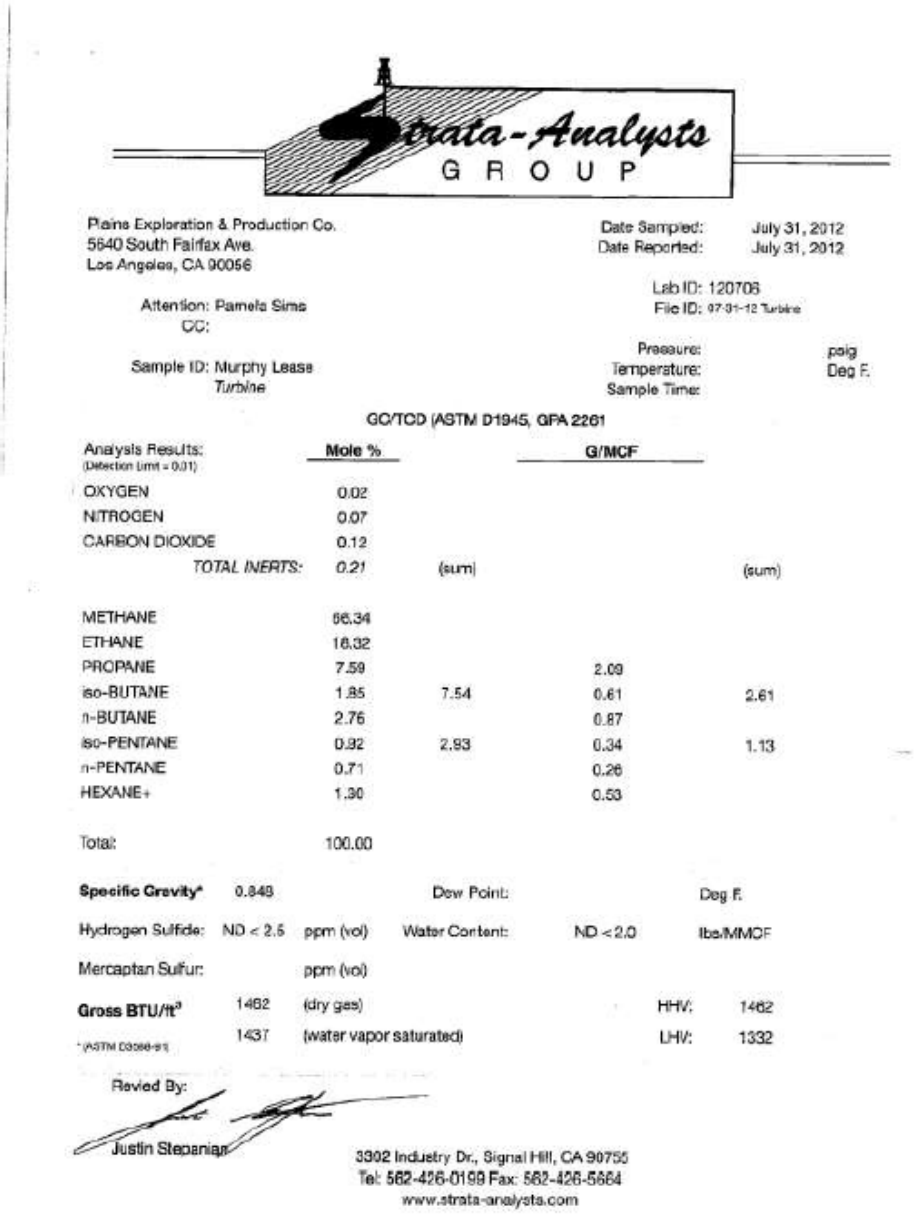
The following oil companies endorse the Initiative:

BG Group
BP
Eni
Entreprise Tunisienne d'Activités Pétrolières (ETAP – Tunisia)
KazMunayGaz (Kazakhstan)
Kuwait Oil Company
Niger Delta Petroleum Resources Ltd. (Nigeria)
ONGC (India)
Petroamazonas EP (Ecuador)
Royal Dutch Shell
Societé Nationale des Hydrocarbures (SNH – Cameroon)
Societé Nationale des Petroles du Congo (SNPC)
Sonangol (Angola)
State Oil Company of the Azerbaijan Republic (SOCAR)
Statoil
TOTAL
Wintershall

The following development institutions endorse the Initiative:

African Development Bank (AfDB)
Agence Française de Développement (AFD)
Asian Development Bank (ADB)
ECOWAS Bank for Investment and Development (EBID)
European Bank for Reconstruction and Development (EBRD)
Inter-American Development Bank (IDB)
Islamic Development Bank (IsDB)
OPEC Fund for International Development (OFID)
United Nations Sustainable Energy for All (SE4ALL)
West African Development Bank (BOAD)
World Bank Group

Attachment B to Comment Letter #22:



Strata-Analysts GROUP

Plains Exploration & Production Co.
5640 South Fairfax Ave.
Los Angeles, CA 90056

Date Sampled: July 31, 2012
Date Reported: July 31, 2012

Lab ID: 120706
File ID: 07-31-12 Turbine

Attention: Pamela Sims
CC:

Sample ID: Murphy Lease
Turbine

Pressure: psig
Temperature: Deg F.
Sample Time:

GC/TCD (ASTM D1945, GPA 2261

Analysis Results: (Detection Limit = 0.01)	Mole %		G/MCF	
OXYGEN	0.02			
NITROGEN	0.07			
CARBON DIOXIDE	0.12			
TOTAL INERTS:	*0.21*	(sum)		(sum)
METHANE	66.34			
ETHANE	16.32			
PROPANE	7.59		2.09	
iso-BUTANE	1.85	7.54	0.61	2.61
n-BUTANE	2.76		0.87	
iso-PENTANE	0.92	2.93	0.34	1.13
n-PENTANE	0.71		0.26	
HEXANE+	1.30		0.53	
Total:	100.00			

Specific Gravity* 0.848 Dew Point: Deg F.

Hydrogen Sulfide: ND < 2.5 ppm (vol) Water Content: ND < 2.0 lbs/MMCF

Mercaptan Sulfur: ppm (vol)

Gross BTU/ft³ 1462 (dry gas) HHV: 1462

1437 (water vapor saturated) LHV: 1332

* (ASTM D3588-91)

Revied By:

Justin Stepanian

3302 Industry Dr., Signal Hill, CA 90755
Tel: 562-426-0199 Fax: 562-426-5664
www.strata-analysts.com

Attachment C to Comment Letter #22: OffGases Project Oil-Field Flare Gas Electricity System, PEIR Final Project Report, California Energy Commission, December 2008, CEC-500-2008-084. (Hyperlink inserted)

Attachment D to Comment Letter #22:

1.0 INTRODUCTION (Continued)

Table 1-2
SUMMARY OF TEST RESULTS
Warren E&P
WTU Flare
January 18, 2012

PARAMETER	INLET	EXHAUST	PERMIT LIMIT
		As Found	
O_2, %	[illegible]	[illegible]	
CO_2, %	[illegible]	[illegible]	
N_2, %	[illegible]	[illegible]	
H_2O, %		[illegible]	
Flow Rate, wt/cm (Facility flow monitor)	[illegible]	[illegible]	
Flow Rate, dt/cm (Facility flow monitor)	[illegible]	[illegible]	
Temperature, °F (as measured at hydrocarbon inlet)	[illegible]	[illegible]	
Temperature, °F (as measured at hydrocarbon inlet)		[illegible]	[illegible]
lbs/scf	[illegible]		
MMBtu/hr	[illegible]		[illegible]
NOx:			
ppm		[illegible]	
ppm @ 3% O_2		[illegible]	[illegible]
lb/hr (as NO_2)		[illegible]	
lb/day (as NO_2)		[illegible]	
lb/MMBtu (as NO_2)		[illegible]	
lb/MMCF (as NO_2)		[illegible]	
CO:			
ppm		[illegible]	
ppm @ 3% O_2		[illegible]	[illegible]
lb/hr		[illegible]	
lb/day		[illegible]	
lb/MMBtu		[illegible]	
lb/MMCF		[illegible]	
Hydrocarbons:			
CH_4, ppm	[illegible]	[illegible]	
TGNMO, ppm (as CH_4)	[illegible]	[illegible]	
TGNMO, lb/hr (as CH_4)	[illegible]	[illegible]	
TGNMO, lb/MMBtu (as CH_4)		[illegible]	
TGNMO, lb/day (as CH_4)	[illegible]	[illegible]	
TGNMO, ppm @ 3% O_2 (as CH_4)		[illegible]	[illegible]
Destruction Eff. % (DRE)		[illegible]	[illegible]
lb/MMCF		[illegible]	[illegible]
Particulate (as PM₁₀):			
gr/dscf		[illegible]	[illegible]
lb/hr		[illegible]	
lb/MM Btu		[illegible]	
lb/day		[illegible]	
lb/MMCF		[illegible]	
Total Sulfur Compounds:			
Total Reduced Sulfur Inlet, ppm	[illegible]		
SO₂ Exhaust, lb/hr (as H_2S)[2]		[illegible]	
SO₂ Exhaust, lb/day (as H_2S)[2]		[illegible]	[illegible]
lb/MMCF		[illegible]	

Notes:
The results in this table are the averages of all measurements.
(1) Values presented fall below 20% of the selected analyzer range. A low-level [illegible] was measured [illegible] analyzer to quantify measurement below 20% of scale.
(2) The exhaust SO₂ lb/hr and lb/day results are calculated from the measured sulfur concentrations.

Attachment E to Comment Letter #22:

Draft White Paper
Potential GHG Reductions from Clean Distributed Generation Technologies at Oil and Natural Gas Facilities

The purpose of this paper is to present staff's draft findings regarding the potential to use clean distributed generation (DG) technologies to generate electricity from fuel that currently is being flared in the production of oil and natural gas and to estimate the corresponding potential for emission reductions. Staff utilized existing data that Air Resources Board (ARB) has collected from oil and natural gas facilities via a survey of these facilities that was conducted in 2009. The survey was not designed to address the issue of using clean DG technologies in lieu of flaring. As such, the analysis has some limitations due to the nature of the data that was available. The assumptions used in the calculations and some of the data limitations are addressed further in the body of the paper.

Background

Gas, mainly methane and carbon dioxide (CO_2) is typically produced when oil is extracted from oil fields. This associated gas is separated from the oil and depending upon the quality and quantity of the gas, can be processed to be added to a natural gas pipeline, used as fuel for equipment at the facility, flared, or re-injected into the oil field. For the gas that is flared, staff evaluated the potential for using clean DG technologies in place of flaring thus harnessing this energy for a useful purpose (thermal or electricity) with a corresponding reduction in emissions. The evaluation also includes an estimate of the electricity potentially produced from combusting the gas that would otherwise be flared, as well as the associated impact on emissions of greenhouse gas and criteria pollutants. Additionally, natural gas is flared at some natural gas facilities. Thus, in addition to considering the potential to utilize flared gas from oil fields, staff also considered the potential for redirecting flared gas from natural gas facilities for use with clean DG technologies.

Clean DG technologies are electrical generating technologies that have very low criteria pollutant emissions[1]. Examples of clean DG technologies include microturbines, fuel cells, and a thermal oxidizer integrated with a microturbine. The estimates given in this paper are based on the best available information. Additional research including site-specific field data would be needed to refine the assumptions used in the analysis.

[1] Many of the technologies have been certified via ARB's Distributed Generation Program (sections 94200-94214 of the California Code of Regulations) to have emissions that are no greater than the emissions that would be emitted by a new combined cycle power plant equipped with Best Available Control Technology

Basis of Data Used For Analysis

This analysis is based on the results of a comprehensive ARB survey (2009) regarding oil and gas drilling and production activity during 2007[2]. The survey was completed by 325 companies representing over 1,600 facilities, and represents all activities associated with finding, producing, processing, transporting, and storing oil and natural gas.

Staff used the survey results from facilities using vapor recovery and flares. The survey requested information on the type of control device and the amount of gas that is burned in flares, thermal oxidizers, and incinerators. Based on the survey results, there are a total of 255 control devices (flares, thermal oxidizers, incinerators, carbon adsorbers, etc.) located at 178 facilities.

Staff evaluated the survey results to establish the possible sources of gas to fuel DG technologies from these facilities. Sources of gas were grouped according to facility type and control device technology for evaluation. Staff found that many of the types of facilities or control devices reported in the survey were not suitable for supplying gas to clean DG technologies. In these cases, these facilities or control devices were excluded from the DG evaluation. For example, staff evaluated the likelihood that the flared gas is either an intermittent flow or constant flow. Flared gas that is expected to be intermittent was excluded from the DG evaluation because most clean DG units require a constant flow of fuel to operate efficiently. Table 1 lists the facility types and control devices that are included in the survey results, but excluded from staff's DG evaluation and the reason for the exclusion.

DRAFT

[2] http://arb.ca.gov/cc/oil-gas/oil-gas.htm

Table 1
Categories Excluded From Oil and Natural Gas Clean DG Evaluation

Category Excluded From Evaluation	Reason for Exclusion
Carbon absorbers	Gas collected is typically not flared
Utility natural gas transmission stations	Flaring activity is intermittent, based on maintenance needs or emergency event; need steady flow of gas for DG
Natural gas storage facilities	Flaring is intermittent, based on maintenance needs or emergency event; need steady flow of gas for DG
Crude oil storage facilities	Gas associated with the oil is removed before reaching storage facilities; limited flaring of gas
Gas Plants	Flaring activity is intermittent, based on maintenance needs or emergency event; need steady flow of gas for DG
Off-shore facilities	Infrastructure needed to connect from platform to grid not cost effective
Flares with no reported gas usage	Assume activity would not provide steady gas flow needed for DG

Staff notes that the gas plants, as a category, flared the largest amounts of gas; however, most of the flared gas was the result of normal maintenance, which occurs infrequently, and therefore, would not be a good candidate for DG applications.

After excluding the above facilities and control devices, staff focused its evaluation on 124 combustion devices located at 88 facilities for suitability of using clean DG in lieu of flaring. The amount of gas flared by this group represents about 1/3 of the total gas flared for all sources documented to flare gas in the survey. Based on the limitations of the available data, staff views this as an approximation of the gas potentially available for DG applications. Refining the estimate would require more detailed site-specific information which is the beyond the scope of this evaluation.

Results

Using ARB Oil and Gas Field Survey results, staff determined whether there was sufficient gas flow, in terms of British thermal units (Btus) per hour, at each location identified in the survey to support at least one clean DG unit operating at 85 percent of its capacity. Staff assumed this to be the typical operating capacity for DG-sized generating equipment over the course of one year. If there was not enough gas to support the DG unit, then for the purposes of this analysis, the gas would continue to be flared. By considering the application of relatively small DG systems, such as a 65 kW microturbine, staff determined that half of the 124 flares could support that technology at 40 different facilities. However, only about a third of the flares processed enough associated gas to support one of the larger clean DG units shown in Table 2 below.

Overall, if clean DG units are used instead of the flares, about 100,000 to 200,000 megawatt-hours (MWh) of electricity could be generated from 14 to 28 megawatts (MW) of total potential generation capacity. This amount of electricity is equivalent to serving between 15,000 and 30,000 homes[3]. The lower end of the range is based on the assumption that all the gas is utilized in thermal oxidizer-microturbine hybrid devices, while the upper end of the range is based on using more efficient 400 kW fuel cell devices.

Table 2 estimates the potential emission reductions for two cases: 1) electrical generation only and 2) combined heat and power (CHP) applications using a variety of clean DG technologies. Additional reductions resulting from more efficient CHP applications are only considered for those locations that have onsite thermal needs based on responses to the survey. For CHP applications, staff assumed clean DG can only be used to displace onsite heating applications that do not require steam. For example, staff assumed the heat from a CHP application can be used in place of the heat provided by heater treaters or oil heaters.

In the table, the potential emission reductions of oxides of nitrogen (NO_x), volatile organic compounds (VOC), and greenhouse gases (GHGs) are reported for each type of clean DG system. For example, the first row reflects estimates for the potential reductions if only 65 kW microturbines are used to generate electricity and provide CHP at the sites that can support this size turbine. The lower emission reduction estimate is for electrical production only and the higher estimate includes CHP. Criteria pollutant emission reductions are based on the difference between emissions from the flaring/burning of the associated gas and the emissions from the clean DG system and the emissions from any remaining associated gas that would be flared/burned. Additional reductions would come from CHP if there are heater treaters or oil heaters at the location and electricity is displaced from the grid. GHG emission reductions are based on the difference in GHG emissions between the flare and clean DG unit, the potential for CHP application (e.g., replacement of heater treaters), and the displacement of electricity from the grid.

[3] Based on United States Energy Information Administration estimate for the electricity used by an average California home

The estimates are based on the assumption that the gas flows are constant (the survey results provided the annual amount of gas flared). If the flows vary, which is likely, then the DG units, particularly fuel cells, may need to be sized to match the lowest flow rate or provide for storage, which would lower the energy production and emission reductions shown in the table below. Additionally, site specific issues may also reduce the available amount of gas that can be used in a clean DG unit.

Table 2
Potential Emission Reductions of Different Clean DG Technologies to Utilize Gas that is Currently Flared*

Equipment	Size (kW)	Potential DG Sites / Units	NO_x (TPY[4])	VOC (TPY)	GHG (kMT/yr)[5]
Microturbine	65	40 / 282	53 – 65	10 – 12	62 – 102
Microturbine	250	17 / 60	49 – 58	<1 – 2	51 – 83
Thermal Oxidizer / microturbine	250	17 / 56	54 – 54	3 – 3	49 – 49
Fuel Cell	300	22 / 93	70 – 74	5 – 6	108 – 122
Fuel Cell	400	17 / 56	56 – 63	2 – 4	72 – 96

* Lower end of ranges based on electricity generation only, while the higher end is based on potential for CHP applications.

Staff understands that significant amounts of gas may be re-injected back into the underground reservoir from which the oil or gas came. Using this gas instead for power generation and thermal load could result in additional reductions. Finally, ARB is considering developing a measure for controlling storage tanks that are currently exempt from emission control requirements. If this measure was developed, additional gas could be available to power clean DG units that could garner additional emission reductions.

Summary

This paper presents staff's draft findings regarding the potential to use clean DG to generate electricity from fuel that is flared in the production of oil and natural gas and the resulting potential for emission reductions of GHG and criteria pollutants. Staff utilized existing data from an oil and natural gas facilities survey conducted in 2009. However, the survey was not designed to address the issue of using clean DG technologies in lieu of flaring. As such, the analysis had some limitations due to the nature of the data that was available. Additionally, staff did not estimate the cost or the

[4] TPY stands for standard tons per year
[5] kMT/yr stands for thousand metric tons of CO_2 equivalent emissions per year

cost effectiveness of using clean DG as costs are highly site-specific due to the nature of capturing/directing gas to DG technologies.

If clean DG units are used to combust associated gas from oil and natural gas production, the amount of gas flared is estimated to support between 14 to 28 MW of DG generating about 100,000 to 200,000 MWh per year. This is equivalent to the amount of electricity that could serve between 15,000 and 30,000 homes.

Utilizing these DG units would also result in reductions in NO_x (50 to 75 TPY), VOC (up to 12 TPY) and GHG (50 to 122 kMT/yr) emissions. These emission reductions would be equivalent to removing about 15,000 to 35,000 new cars from the road.

DRAFT

Responses to Comment Letter from Michael Salman
(Comment Letter #22)

Response to Comment 22-1:

Thank you for supporting CMB-03 which is proposed as a regulatory measure to address non-refinery flaring.

Response to Comment 22-2:

Staff acknowledges that there are different technology options and challenges with the different source categories included in CMB-03 (oil and gas, landfill, and wastewater treatment). Each source category may require a different approach with the overall goal of reducing NOx and other emissions from non-refinery flares. Once a working group is established, a more detailed discussion on the different methods or alternatives to flaring waste gas from each source category will be determined and addressed.

Response to Comment 22-3:

Staff will be pursuing paths to reduce routine flaring at oil and gas facilities and require any flaring that does occur to have the most stringent emissions limits feasible.

Response to Comment 22-4:

Staff will lobby for incentive funding to ensure the success of incentive measures. These incentive measures are designed to encourage facilities to transition to zero and near-zero emission technologies. A Financial Incentive Funding Action Plan is currently under development that will provide more detail as to the possible sources of funding available.

Comment Letter from Los Angeles County Business Federation (Comment Letter #24)

Biz Fed Los Angeles County Business Federation

Strengthening the Voice of Business

August 18, 2016

Michael Krause
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765

Re: Draft 2016 Air Quality Management Plan

Dear Mr. Krause:

We are writing on behalf of the Los Angeles County Business Federation (BizFed) - a grassroots alliance of more than 155 top business groups representing 275,000 employers with 3 million employees throughout Los Angeles County. Our members include large and small employers, minority business owners, and job creators from a wide range of industries.

We appreciate the opportunity that the South Coast Air Quality Management District (SCAQMD or District) gave our members to participate in working groups that led to the development of White Papers for the 2016 Air Quality Management Plan (AQMP or Plan). Now that the District has released its Draft 2016 AQMP, we take this opportunity to comment formally on the Plan's proposed programs and control measures. 23-1

SCAQMD Should Prioritize Technical Improvements to Enhance the Accuracy of its Photochemical Modeling Ozone Reduction Predictions

Community Multi-scale Air Quality (CMAQ) photochemical modeling is the cornerstone of the 2016 State Implementation Plan (SIP) Strategy, and "ARB and the South Coast have been collaborating on air quality modeling to provide estimates of the reductions needed to attain the ozone and PM2.5 standards" (ARB 2016 SIP Strategy, p. 12). Recent studies by Ramboll Environ (26th CRC Real World Emissions Conference) comparing ozone model and monitoring results have shown that the current CMAQ modeling may appreciably underestimate past and future ozone reductions in the South Coast Air Basin. Therefore, we believe it is of critical importance to enhance the accuracy of the District's predictive modeling tools. 23-2

Specifically, the Ramboll Environ analysis that has been discussed with ARB and SCAQMD staff over the last few months shows that, dating back to 1990, monitored ozone levels have declined at a rate (ppb/year) that is 2 times faster than the CMAQ-modeled levels. Over a more recent time period (2008-2014), the observed and monitored trend in the reduction of ozone (again, on a ppb/year basis) has been 2 to 8 times faster than the CMAQ-predicted trend. As a result, the 2012 and 2007 AQMPs have under-predicted reductions in ozone between their respective baseline years and 2015 (i.e., they have over predicted absolute ozone levels when compared against measured 2015 levels). Based on the documented, historical inaccuracies of the CMAQ modeling, the ability of the 2016 AQMP to make accurate predictions of ozone reductions between 2012 and 2023 (or 2031) should be carefully considered; and, needed technical improvements should be identified and implemented as soon as possible. Validation of models against past measured ozone levels should be seriously considered.

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While likely evident, we must underscore that this is not simply an academic concern. The costs of further under-predicted reductions would be extremely high. SCAQMD's preliminary cost summary for the Draft 2016 AQMP's control measures is $38 billion (2017 present value), which includes almost $14 billion in incentives, between 2017 and 2031. If future ozone reductions are under-estimated (leading to an over-estimation in needed reductions), perhaps dramatically, then standards imposed on the regulated community and incentive funds may be unnecessarily large.

The District has a well-earned reputation of being on the forefront of regulatory emissions and photochemical modeling science. BizFed recommends that SCAQMD dedicate funding and staff resources to work with ARB and industry technical experts on an expedited basis, with resolution of these issues in 2017 being a priority. Ultimately, these issues may not be resolved in the timeframe of the 2016 AQMP development; at a minimum, however, they should be acknowledged in control strategy commitments to USEPA. In addition, the public should be allowed at least one-month (30 days) to review and comment on Appendix V, entitled "Modeling and Attainment Demonstrations," of the Draft AQMP upon its issuance. 23-2 Con't

The Overall Policy Framework Should Prioritize Cost-Effective, Non-Regulatory, and Innovative Approaches to Emission Reductions

BizFed is supportive of an AQMP establishing a policy framework that prioritizes non-regulatory, innovative approaches to emission reductions that are cost-effective and minimize operational disruptions. Programs or control measures must allow for and should incentivize voluntary and collaborative approaches to achieving air quality goals. Furthermore, we believe that an AQMP should not be punitive, especially as the region has made tremendous strides lowering emissions from stationary and mobile sources. To this end, the Draft 2016 AQMP includes incentives to encourage the accelerated transition of vehicles, buildings, and industrial facilities to cleaner technologies in a manner that benefits air quality and the local economy. We support this approach and appreciate the District's efforts to partner with industry. 23-3

Currently, the Plan estimates that the amount of incentive funding needed is approximately $11 – 14 billion over a seven to fifteen-year period. We urge the District to provide additional information as to how much funding has been secured, how much funding has yet to be obtained, and the timeline over which the balance of funds is expected to be received and become available for use. BizFed is committed to collaborating proactively with the District to help develop solutions for obtaining the needed funding. We understand that this will take a strong public-private effort, and we look forward to working with SCAQMD on this matter.

BizFed Has Serious Concerns About SCAQMD's Proposals to Control Growth and Indirect Sources

SCAQMD proposes one growth management measure, EGM-01 - Emission Reductions from New Development and Redevelopment Projects, and four "facility-based" mobile source measures: MOB-01 - Emission Reductions at Commercial Marine Ports, MOB-02 - Emission Reductions at Rail Yards and Intermodal Facilities, MOB-03 - Emission Reductions at Warehouse Distribution Centers, and MOB-04 - Emission Reductions at Commercial Airports. These control measures seek to reduce emissions from on- and off-road sources, which are within the exclusive purview of ARB and the U.S. EPA. Importantly, both ARB and the U.S. EPA already have rules and regulations in place for these sources to significantly reduce NOx emissions. According to the Draft 2016 AQMP, "[t]he effect of the rules and regulations are significant, showing reductions of over 67 percent in NOx emissions and close to 60 percent in VOC emissions between 2012 and 2023, even with increases in fleet population." (Draft 2016 AQMP, Chapter 3, p. 3-4.) 23-4

BizFed has serious concerns about the SCAQMD making commitments to the state and federal governments that it will control growth and indirect sources because SCAQMD lacks authority to control growth or overrule local land use decisions, and land use is within the exclusive purview of

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local cities and counties. Furthermore, not only does SCAQMD lack the authority to adopt indirect source rules, such rules would likely have a chilling effect on business development.

Critically, both the District and ARB have acknowledged that the growth management and indirect source control measures are not necessary to meet the requirements of the federal Clean Air Act. Further, there is no emission reduction target for these control measures in the Draft 2016 AQMP, and there is little to no emission reduction benefit from the indirect source control measures. Instead, additional mobile source emission reductions will come from new measures that call for greater emission reductions through accelerated turnover of older vehicles to the cleanest vehicles and equipment currently available and increased penetration of commercially-available near-zero and zero-emission technologies through existing incentives programs. 23-4 Con't

Measures MOB-1 through MOB-4, and MOB-8 Will Negatively Impact Regional Goods Movement and Goods Movement Dependent Industries

We have serious concerns about the effects that the proposed control measures MOB-1 through MOB-4 ("Facility Measures") and portions of MOB-8 ("Fleet Rules") will have on goods movement and goods movement-dependent industries.

BizFed has repeatedly opposed freight facility emission caps and performance targets. The proposed Facility Measures may leave the door open for the adoption of such regulations. These concepts would represent an unprecedented, and legally questionable, expansion of the SCAQMD's regulatory authority of the freight industry at a time when the industry is spending billions of dollars to reduce key pollutants by as much as 99 percent.

We are also concerned about any expansion of the District's Fleet Rules to private trucking fleets, which was already struck down by the United States Supreme Court. 23-5

Facility Measures and Fleet Rules put the region at a competitive disadvantage with the rest of the country because they:

- Push private investments in freight facilities and infrastructure outside of the region.
- Negatively impact wage growth and job creation in a sector that is one of the region's largest providers of working class jobs.
- Create inefficiencies by creating incentive to cite freight facilities outside the region, thereby lengthening vehicle miles traveled to reach Southern California population centers and increasing emissions.
- Create an unnecessary patchwork of regulations as California has already adopted the strictest fleet regulations in the country to meet the basin's needs.

Measure CMB-05 Is Not Needed Due to the December 2015 Amendments to the RECLAIM Program, and Its Reductions Are Unsubstantiated

The Draft AQMP, in control measure CMB-05, proposes a reduction target of 5 tpd from the NOx RECLAIM program by 2031. The presented basis for this measure is to address "issues that arose during recent NOx RECLAIM amendments." (Draft 2016 AQMP, Appendix IV, p. IV-A-77.) 23-6

However, all of the so-called "issues" were addressed by the December 2015 amendments to the RECLAIM program or about to be moot based on pending rulemaking. For example, by its very design, the December 2015 RECLAIM rulemaking will essentially eliminate all previously "unused" RTCs once fully implemented by 2023. The December 2015 rulemaking also features an "off-ramp" for Electrical Generating Facilities at BACT or BARCT, so that remaining RECLAIM facilities will have to meet the Staff's BARCT levels (found in Rule 2002) on a programmatic basis. Staff also is now proposing

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RECLAIM amendments for confiscation of RTCs from shutdown facilities. Further, several other "issues" are no longer valid concerns given the 2015 amendments to RECLAIM. And several of the other concepts (e.g., command-and-control overlays, the role of investors, etc.) are matters of District policy and/or State law, and should be considered beyond the scope of this AQMP.

Given the substantial emission reductions already achieved by the RECLAIM program, and the very large pending reductions being required under the December 2015 amendments, we are very concerned about proposed CMB-05 and the cost burden it would impose on the Southern California economy. Furthermore, Staff has provided no factual basis to support taking 5 tpd of additional reductions out of the NOx RECLAIM program. We strongly recommend this measure be removed from the AQMP. If the district insists on including a RECLAIM control measure in this AQMP, it should be a range since what is included in the AQMP is the minimum commitment to USEPA that must be met. We recommend a range of 0-3 tpd. 23-6 Con't

In closing, as the District moves forward to finalize the 2016 AQMP, the business community that we represent and, we believe, the business community at large remain committed to working with SCAQMD to ensure the Plan fulfills its legal requirements while also protecting and promoting job creation and economic success for Southern California. Thank you for allowing us the opportunity to provide our comments on this important matter.

Sincerely,

Gilbert F. Ivey
BizFed Chair
Former CAO,
Metropolitan Water District

David Fleming
BizFed Founding Chair

Tracy Hernandez
BizFed Founding CEO
IMPOWER, Inc.

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Responses to Comment Letter from Los Angeles County Business Federation (BizFed)
(Comment Letter #23)

Response to Comment 23-1:

Staff thanks for your participation in the development of 2016 AQMP and your comments on the Plan's proposed control measures.

Response to Comment 23-2:

The 2016 AQMP uses a state-of-the-science modeling platform, the most updated emissions inventory and U.S. EPA guidance. The underestimation from the 2012 AQMP has been improved upon based on the newest attainment guidance by U.S. EPA. In addition, EPA requires to use 5-year weighted design value to demonstrate attainment, however, the analysis conducted by other private institutes failed to use the recommended 5-year weighted design value and mislead the results.

Appendix V was released in September 2016 and provided more than 30 days for public review and comment.

Response to Comment 23-3:

Staff appreciates support for the incentives approach. A Financial Incentive Funding Action Plan is currently under development that will provide more detail as to the possible sources of funding available.

Response to Comment 23-4:

The SCAQMD Mobile Source Measures are intended to help implement the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures found in Appendix IV-B. The SCAQMD is identified as an implementing agency under these measures. As such, the SCAQMD staff is providing the proposed measures to initiate discussions through a public process to identify actions or develop mechanisms to achieve additional emission reductions.

With regard to the facility-based measures, during the public process, SCAQMD staff will seek input and comments on identifying actions that could be voluntary or regulatory nature. The SCAQMD staff will report to the SCAQMD Governing Board on progress in identifying actions. However, if actions are not identified or incentive funding is not sufficient to achieve additional emission reductions, the SCAQMD staff will recommend to the SCAQMD Governing Board the development of rules within the SCAQMD authority or other enforceable mechanisms. Staff is proposing that a recommendation be made within one year from the adoption of the Final 2016 AQMP. See Response to Comment 23-5 regarding the need for the proposed measures.

Response to Comment 23-5:

As noted in response to Comment 23-4, the proposed measures seek to implement the State Mobile Source Strategy "Further Deployment" measures. The proposed measures do not set a "cap" and the overall AQMP emission reductions needed for attainment is proposed to be used as a goal to initiate discussions on identifying actions to achieve additional emission reductions. While these measures are not assigned specific emission reduction goals, staff believes they are still necessary to help implement the State SIP Strategy "Further Deployment" measures in the AQMP. Identified emission reductions will

be credited in the SIP as part of future Rate-of-Progress reporting and future AQMP revisions if the emission reductions are considered surplus, quantifiable, and permanent. If the emission reductions are to be placed into the SIP, U.S. EPA requires that an enforceable commitment be made to ensure that the reductions are permanent.

As part of the public process, the SCAQMD staff will be evaluating the need to adopt rules to help implement this measure.

SCAQMD staff appreciates the comments regarding competitiveness. It is for these reasons that staff believes that a public process to identify actions, including those that are already being implemented by businesses and industry, that potentially have criteria pollutant emission reduction benefits and providing funding incentives to assist fleets to replace older vehicles and equipment will help reduce any potential competitiveness concerns. Conversely, the region bears the health costs of serving as the nation's key gateway for imported goods, and it is important to reduce these impacts to the extent feasible without undue socioeconomic impact. The socioeconomic impact assessment details anticipated impacts and benefits from implementing the 2016 AQMP.

Response to Comment 23-6:

Under state law, the SCAQMD is required to conduct periodic BARCT assessments as pollution control technologies advance over time. Under the proposed control measure, this BARCT re-assessment would occur out into the future and well beyond the recent 2015 amendments to the program. Potential technologies that were identified in the December 2015 amendments would have further matured and based on past amendments, the control measure's emission reduction target is reasonable. This notwithstanding, the control measure also proposes a serious consideration for an orderly sunsetting of the RECLAIM program in order to create more regulatory certainty, reduce compliance burdens for facilities, and achieve more SIP-creditable emission reductions.

Comment Letter from Los Angeles County Metropolitan Transportation Authority (Comment Letter #24)

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

August 18, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copely Drive
Diamond Bar, CA 91765

Re: Draft 2016 Air Quality Management Plan

Dear Dr. Fine:

Thank you for the opportunity to review the South Coast Air Quality Management District (AQMD) Draft 2016 Air Quality Management Plan (AQMP). We have been pleased to have participated in the AQMP Advisory Group over the last several years as the AQMD has worked to address the challenging air quality issues facing our air basin.

Metro is pleased to be a partner in working toward the attainment of air quality and greenhouse gas reduction goals through an ambitious long range planning effort that includes significant transit, active transportation, and demand management programs. These programs have been major contributors to the region's efforts to attain both federal air quality conformity requirements and state greenhouse gas reduction goals of SB 375. Additionally, Metro is a leader in operating clean fuel transit vehicles, currently operating the largest clean fuel fleet in the North America, with over 2,000 clean fuel buses. 24-1

We commend the AQMD for a Draft AQMP that is generally well written. As you have stated in this Draft AQMP, it is clear that fair-share emission reductions at the federal and state levels are important in reaching federal air quality requirements. Our comments on the Draft 2016 AQMP are as follows:

- In Appendix IV-B, page 30 (incorporated from the Advanced Clean Transit Measure (ACT) from the Air Resources Board's 2016 Mobile Source Strategy) – We support the "flexibility to allow transit fleets to implement advanced technology in ways that are synergistic with their operations." If the rule that results from the ACT measure restricts transit agencies to turnover their clean CNG fleets to electric or fuel-cell buses, the cost of doing so would significantly reduce service, impacting disadvantaged communities that we serve as well as our ability to meet federal air quality conformity requirements. There are also operational considerations associated with a mandate for specific fleet technologies given the demands of our extensive territory and the current state of technology. 24-2

- Page ES-8 of the Draft AQMP begins the discussion of using public funding incentives to meet the NOx emission reductions needed to attain federal ozone air quality standards (estimated at $11 billion to $14 billion over a seven to fifteen year period). Incentive funding and other dedicated funding programs are necessary in order to meet requirements for increasingly cleaner transit vehicles, infrastructure and training. 24-3

If you have any questions, please contact Brad McAllester, Executive Officer, Long Range Planning at 213 922-2814.

Sincerely,

Therese McMillan
Chief Planning Officer

cc: Hasan Ikhrata, SCAG Executive Director

Responses to Comment Letter from Los Angeles County Metropolitan Transportation Authority (Metro) (Comment Letter #24)

Response to Comment 24-1:

Staff appreciates the comment and will work closely with the transit agencies to help attain air quality standards for the region.

Response to Comment 24-2:

Staff appreciates the comment and looks forward to working with the transit agencies as CARB develops the Advanced Clean Transit regulation. Your comments will be forwarded to CARB.

Response to Comment 24-3:

Staff appreciates the comment. We look forward to working with Metro and other stakeholders in identifying additional incentives funding. Staff is preparing the Funding Plan to accompany the 2016 AQMP which further identifies potential incentive funding sources.

Comment Letter from San Bernardino Associated Governments (Comment Letter #25)

Governments
SANBAG
Working Together

San Bernardino Associated Governments
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TRANSPORTATION MEASURE I

- San Bernardino County Transportation Commission
- San Bernardino County Transportation Authority
- San Bernardino County Congestion Management Agency
- Service Authority for Freeway Emergencies

August 18, 2016

Mr. Wayne Nastri
Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: San Bernardino Associated Governments' (SANBAG's) comments on the draft 2016 Air Quality Management Plan (AQMP)

Dear Mr. Nastri:

This letter is in response to the opportunity being provided by the South Coast Air Quality Management District (SCAQMD) for comment on the draft 2016 AQMP released on June 30, 2016. SANBAG greatly appreciates the effort that went into the preparation of the draft AQMP by SCAQMD, the California Air Resources Board (ARB), and the Southern California Association of Governments (SCAG).

The first part of the letter provides some general comments on the objectives of the AQMP, followed by several comments on selected sections. It is our understanding that a second draft will be provided following this initial comment period and that there will be additional opportunity for comment on that draft.

As you are aware, southwestern San Bernardino County has some of the worst air quality in the United States. Like other counties in the South Coast Air Basin, we are very concerned about air quality and are committed to making further improvements together with SCAQMD, ARB, and the private sector. SCAQMD and your partners in the region have made tremendous progress in improving air quality in the last several decades, especially for the most impacted areas such as San Bernardino County. This progress needs to continue. 25-1

At the same time, air quality standards and timelines need to be achievable in ways that do not set back the San Bernardino County economy. Over 20 percent of our labor force derives its living from the logistics sector, which is often cited as a primary source of the NOx emissions that contribute to ground-level ozone concentrations. As we move forward with air quality improvements, we must pay attention to the dual objectives of cleaning the air while also promoting a vibrant economy. A vibrant economy is needed to support the technology advancements and their adoption into the marketplace in a way that will make the air quality improvements possible.

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Comments on Plan Objectives

SANBAG concurs with the Plan objectives as expressed on pages ES-4 through ES-6, and would like to emphasize the following points:

- For objective ***"Eliminate reliance on future technologies (CAA §182(e)(5)) measures to the extent feasible."*** - We agree with the statement that "Some CAA §182(e)(5) flexibility may be needed for Plan approval by U.S. Environmental Protection Agency (EPA) given the need for continued technological and cost improvements and new funding and incentive programs." SCAQMD rightly recognizes that there is a potential need to include some of the incentive-based measures in the "black box" (CAA §182(e)(5)) if EPA determines that the funding for these measures is too questionable.

  On the broader topic of flexibility, we recognize that major technological advancements have occurred and commercialization of key technologies (e.g. ultra-low NOx truck engines) appears within reach. However, unknowns still exist in the cost and performance characteristics of some of the technologies. While we recognize that SCAQMD and ARB must prepare an approvable State Implementation Plan (SIP), it is also important that the marketplace have confidence in the performance of the cleaner technologies being made available. We trust that the federal regulators will work with us on the long term pathway to attainment and not put SCAQMD and ARB in the position of having to adopt measures in the short term that are not as cost-effective and that potentially have greater impacts on business when the most effective measures are within reach. Perhaps the need for flexibility could come into play if, for example, commercialization of some of these key technologies should lag behind the anticipated timeline. 25-2

  We recognize that the attainment timelines are tight, but flexibility and a cooperative spirit at all levels will be important as we get closer to the attainment dates. All the agencies in the region are working extremely hard to improve air quality, and our success has been evident. The AQMP acknowledges the dual goals of both attaining air quality standards and supporting the economy, and the type of flexibility suggested in this objective is a good example of this balance in action.

- For objective ***"Develop a strategy with fair-share emission reductions at the federal, state, and local levels."*** – Our reading of the draft AQMP suggests that the South Coast Air Basin cannot achieve the NOx reductions for timely attainment of federal ozone standards alone, even together with actions by ARB. This objective references the importance of federal action, including a new ultra-low NOx engine emission standard for heavy duty trucks. SANBAG has signed on to SCAQMD's "Petition to EPA for Rulemaking to Adopt Ultra-Low NOx Exhaust Emission Standards for On-Road Heavy-Duty Trucks," as documented in our letter to EPA's Gina McCarthy dated July 18, 2016. The need for federal action is clearly identified in Figure ES-2 of the AQMP Executive Summary, and the graphic shows that the importance of federal action increases over time. Although ARB may adopt its own ultra-low NOx standard, it will be much better for California and the region if EPA carries out its responsibility by adopting this 25-3

standard, which will be key to attaining the ozone standard that EPA, itself, has set. Federal action more than doubles the NOx reduction of a state-only action. Adopting only a state standard will also put California at an even greater competitive disadvantage, which is contrary to the intent of the Governor's Executive Order B-32-15. We were glad to see that the EPA has signaled its intent to begin discussions on a lower NOx standard in its August 16, 2016 Final Rule on "Standards to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles." The EPA clearly understands the importance of such an action and we are optimistic that they will move the process forward. 25-3 Con't

- For objective **"Invest in strategies and technologies meeting multiple objectives regarding air quality, climate change, air toxics exposure, energy, and transportation."** – As we stated in our comment letter on the AQMP white papers last year, we support strategies for reducing criteria pollutants that have co-benefits for Green House Gas (GHG) reduction. However, this may not always be practical if we are to meet the more pressing deadlines for attaining the 8-hour ozone standard. ARB indicated at the AQMP Advisory Group meeting on June 15 that their strategy for mobile sources involved beginning with measures for GHG reduction and then adding control measures needed to attain federal standards for criteria pollutants. This seems logical, except that it could result in an overall strategy that is suboptimal for achieving federal standards for criteria pollutants within the prescribed timelines for 2023 and 2031. It would seem that meeting federally mandated criteria pollutant attainment deadlines should take priority. 25-4

  Additional clarification is needed regarding how the GHG reduction goals for mobile sources interact with the attainment of criteria pollutant standards. The extent to which the GHG goals influenced the attainment strategy is unclear, and whether/how the costs associated with GHG reduction strategies are included in the costs for attainment. The costs identified in the AQMP for attaining federal standards are extraordinary, and we would just want to make sure that the path to attainment is not unintentionally more costly than it needs to be. We would request that SCAQMD and ARB more thoroughly explain the cost and timeline implications of the way in which they approached the co-objectives of GHG and criteria pollutant reduction. If the path to attainment for criteria pollutants is less than optimal from a timing and cost perspective, this is another reason for the regulatory agencies to provide flexibility to the South Coast, per the first objective in the AQMP. In other words, the District and its partners should not incur greater costs in its path to timely attainment by virtue of also striving to help the state achieve its GHG reduction goals. It is not clear from the documentation whether this is the case, but the question needs to be raised.

- For objective **"Seek significant funding for incentives to implement early deployment and commercialization of zero and near-zero technologies."** – As the draft Plan points out, incentive funding will be critical to the rate at which auto and truck vehicle fleets can be turned over to achieve air quality standards within the prescribed timelines. We appreciate that SCAQMD has consistently made this point with ARB and EPA, and the dialogue between the agencies has been helpful with regard to how incentives may be considered in the SIP. The point is that this region will need significant financial help 25-5

from the state and federal levels, and any failure to receive the necessary help from state and federal agencies should not result in the imposition of control measures that carry with them local costs and economic disadvantages that would make it even more difficult to raise the capital necessary to comply. A robust economy is needed to generate the funding stream that will enable investment in these technological improvements. The San Bernardino County economy is particularly vulnerable to this possibility, given the extent of disadvantaged communities in our area and our dependence on the logistics sector for economic growth. 25-5 Con't

- For objective **"Enhance the socioeconomic analysis and pursue the most efficient and cost-effective path to achieve multi-pollutant and multi-deadline targets. " –** We appreciate the significant work that has gone into the economic analyses for the draft AQMP and the ARB Mobile Source Strategy and SIP Strategy, and we look forward to seeing the additional detail that AQMD and ARB have developed. The overall conclusion of the economic analysis for mobile sources is that "*the Mobile Source Strategy is estimated to have a negligible impact on the California economy resulting in an average slowing in the growth of the gross state product … of 0.051 percent from 2023 to 2031*" (source: page A-2 of the *ARB Mobile Source Strategy Appendix A: Economic Impact Analysis*). While this may be true of the impact on the economy overall, based on the REMI modeling, we would urge ARB to highlight more of the potential sector-based and geographically-based impacts. For example, the forecast cost for conversion of truck fleets to cleaner vehicles is extraordinarily high, and we have to imagine that this will hit logistics-based economies like San Bernardino County most heavily. We recognize that our citizens will receive the important benefit of improved air quality, but the differential impact of the costs of implementation need to be more fully explained. It will be little consolation to individuals and families working in the logistics industry in San Bernardino County if we are put at a more competitive disadvantage because of the costs we will be required to bear. A viable incentives program can go a long way toward minimizing these impacts, and the case for incentives needs to be made proactively in Sacramento and Washington. We look forward to working with AQMD and ARB to see that this case is made. 25-6

Additional Comments

- Page ES-10 – SANBAG concurs with SCAQMD's desire to reclassify the South Coast Air Basin as a "serious" nonattainment area for PM2.5. This will provide the time needed to reach attainment for the annual PM2.5 standard in 2023, given that demonstrating attainment is impracticable for 2021, the "moderate" PM 2.5 nonattainment area deadline.
- Page 4-9, top paragraph – SANBAG concurs with the statement "Air quality regulatory agencies have traditionally set policies and requirements that are performance-based, and thus technology- and fuel-neutral. This is a policy that the SCAQMD intends to continue. All technologies and fuels should be able to compete on an equal footing to meet environmental needs." 25-7

- Pages 4-61 and 4-62 – We appreciate the efforts undertaken to estimate the cost of turning over mobile source fleets at a level that will achieve air quality standards. As indicated, the magnitude of the cost is large, and the required scale of incentives is unprecedented. Yet the pathway to attainment expressed in the AQMP has become clearer as technology has progressed. SANBAG is prepared to work with SCAQMD and ARB to help secure the needed resources at the state and federal levels. At the same time, these funds should not come at the expense of the funding streams we have traditionally relied upon for operating and maintaining our transit and transportation infrastructure and systems.

- There are a number of measures that have not been quantified in the Draft AQMP and are put into a "to be determined" category. Our understanding is that these are not needed to demonstrate attainment, so we would question why they are included alongside the quantified measures. More information is needed as to how these "TBD" measures are intended to be used, and any process for later quantifying and adopting these measures should be further explained. These should receive the same level of scrutiny, analysis, and public review as the quantified measures in the AQMP.

25-7 Con't

Again, we appreciate the opportunity to work with you on the 2016 AQMP and look forward to further discussions.

Regards,

Raymond W. Wolfe
Executive Director

Responses to Comment Letter from San Bernardino Associated Governments (SANBAG)
(Comment Letter #25)

Response to Comment 25-1:

Staff appreciates comments and your participation in the 2016 AQMP public process. We are aware of the dual objectives of cleaning the air while promoting a vibrant economy.

Response to Comment 25-2:

Staff agrees that certain technologies will need time to be developed and made commercially available, thus flexibility in the control strategy is warranted. The objective in the Plan to eliminate the reliance on future new technology is intended to advance deployment of known cleaner technologies coupled with incentives to assist in making actions cost-effective for some sources where technologically feasible. This is particularly important because of the fast-approaching ozone standard deadlines. Over time, the cleaner technology will be more commercially available, achieved in practice, feasible in more applications, etc. so as to provide a less burdensome transition in future rulemaking. Staff plans to develop the incentive program in accordance to U.S. EPA requirements for SIP credit, ensure appropriate funding, and achieve the committed reductions.

Response to Comment 25-3:

Staff appreciates the comment and support for the petition to U.S. EPA on adopting ultra-low NOx engine emission standards.

Response to Comment 25-4:

In order to get emission reduction credit from the co-benefits of existing GHG programs, it is critical to conduct proper tracking and reporting. Staff plans to ensure those calculations are conducted and reporting is properly submitted to U.S. EPA for SIP credit.

The comment letter asks if GHG goals and associated costs affect the AQMP attainment strategy and total cost. Staff has discussed this issue with CARB and both agencies recognize that a very large part of the cost initially identified for the AQMP was due to the light-duty vehicle measure, which is primarily a GHG reduction measure and will be implemented anyway to attain GHG goals. Staff has therefore removed the costs of this measure from the 2016 AQMP costs and treated the measure as a GHG measure with NOx co-benefits.

Response to Comment 25-5:

Staff appreciates the comments and will be working closely with CARB to ensure that funding for deployment of zero and near-zero emission vehicles and equipment will be prioritized for the region to help meet air quality standards.

Response to Comment 25-6:

As part of the socioeconomic impact analysis for the 2016 AQMP, there will be further detailed information on potential economic impacts broken down by sector and geography. CARB has provided the assumptions for the SCAQMD to conduct the analysis of their proposed measures.

Response to Comment 25-7:

Staff agrees that there should not be a competition for the limited existing funding. As such, staff will be working with all interested stakeholders to identify new sources of funding. Please see Responses to Comments 11-1 and 12-2 for further discussion on the incentive programs, and Response to Comment 7-5 regarding TBD measures.

Comment Letter from Western States Petroleum Association (Comment Letter #26)

Western States Petroleum Association
Credible Solutions • Responsive Service • Since 1907

Sue Gornick
Manager, Southern California Region

VIA ELECTRONIC MAIL

August 18, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comments on the Draft 2016 Air Quality Management Plan (AQMP)

Dear Dr. Fine:

Western States Petroleum Association (WSPA) is a non-profit trade association representing twenty-five companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California, Arizona, Nevada, Oregon, and Washington. WSPA has been an active participant in air quality planning issues for over 30 years. WSPA-member companies operate petroleum refineries and other facilities in the South Coast Air Basin and thus have a major stake in the Air Quality Management Plan (AQMP) being prepared by the South Coast Air Quality Management District (SCAQMD or District), and any rule developments that might stem from the final AQMP as adopted by the District's Governing Board. 26-1

WSPA appreciates the opportunity to submit these comments on the Draft 2016 Air Quality Management Plan (AQMP) and continues to support the South Coast regional air quality planning process and the successes achieved to date. Over the last two decades, Southern California's industrial facilities (i.e., stationary sources including the region's petroleum refineries) have reduced their emissions by over 70 percent for most criteria pollutants including nitrogen oxides (NO_X) and sulfur oxides (SO_X).

Our general comments are as follows:

1. **The AQMP control strategy should exclude all measures not needed to minimally achieve the region's carrying capacity targets for attainment of the National Ambient Air Quality Standards (NAAQS).** 26-2

As presented in the Draft AQMP,[1] the Staff's proposal includes a large number of control measures which do not appear to be necessary for meeting the AQMP objectives. This situation is possible due to the significant emission reductions projected under the 2016 State Strategy. However, the Draft AQMP includes dozens of additional control measures which have not been shown to be necessary for reaching the region's so-called "carrying capacity." In fact, most of these "extra" measures have no quantified emission benefits yet would impose considerable costs on the Southern California economy. 26-2 Con't

WSPA provides our comments on the ARB Proposed 2016 State Strategy for the State Implementation Plan in Attachment 1, attached hereto and incorporated herein by reference for your consideration.

2. **The AQMP control strategy should prioritize non-regulatory, incentive based approaches to reducing emissions outside the State Strategy. Such incentive based measures should be cost effective and limited to reasonably anticipated funding levels and sources.**

To the extent they are needed to demonstrating attainment, WSPA is supportive of the Draft AQMP's inclusion of control measures based on incentives and other non-regulatory approaches intended to accelerate the transition of vehicles, buildings, and industrial facilities to cleaner technologies. Southern California's industrial facilities (i.e., stationary sources including the region's petroleum refineries) have dramatically reduced their emissions by over 70 percent for most criteria pollutants over the last two decades. This includes emissions of NO_X and SO_X. These facilities may not be able to further reduce emissions in a cost effective manner absent some form of incentive. 26-3

WSPA is concerned that these Draft AQMP measures may have gone beyond what might reasonably be able to be funded. AQMD Staff are suggesting the amount of incentive funding needed for these control measures (i.e., $14 billion over a 15 year period, present value)[2] that is without precedent. The AQMP needs to demonstrate how this level of funding might actually be accomplished.

3. **Proposed Control Measure CMB-05 (Further NOX Reductions from RECLAIM Assessment) is unreasonable and should be removed from the AQMP.**

In December 2015, the AQMD Governing Board approved the single largest adjustment of NOx RECLAIM since the program began in 1994. When fully implemented, those amendments will remove at least 12 tons per day (tpd) from the NOx RECLAIM market; a 45% reduction.[3] This is on top of the nearly 70% reduction in NOx emissions achieved under RECLAIM since 1994. 26-4

The 2015 rulemaking, which implemented Control Measure CMB-01 from the 2012 AQMP, proposed market adjustments due to the advancement of NOx Best Available Retrofit Control

[1] SCAQMD, Draft 2016 AQMP, Table ES-2 (June 2016).
[2] SCAQMD, Presentation to the 2016 AQMP STMPR, Socioeconomic Session, 28 July 2016.
[3] See SCAQMD Rule 2002. Also Governing Board package for 4 December 2015 meeting, Agenda item #30.

(BARCT) for various equipment by establishing RECLAIM Trading Credit (RTC) reduction targets and RTC adjustment factors for year 2016 and beyond. That rulemaking also took "credit" for the fact that certain companies have left Southern California, and made some adjustments for anticipated future growth of industrial sectors covered by the RECLAIM program. The 2015 rulemaking also included an "off-ramp" for electricity generating facilities (EGF) at BACT or BARCT. That last provision, if optioned by qualifying EGFs, would result in additional RTCs being removed from the RECLAIM program above and beyond the 12 tpd market adjustment approved by the Governing Board. And in 2016, AQMD Staff are also developing additional amendments to Rule 2002 which would, if adopted by the Governing Board, remove even more RTCs from the NOx RECLAIM Program in the event of future RECLAIM facility shutdowns.

26-4 Con't

As presented in the Draft AQMP, the proposed control measure purports to address several issues that arose during recent NOx RECLAIM amendments. "These measures listed below would be designed to achieve additional actual and/or SIP creditable emission reductions from the RECLAIM Program and ensure future equivalency with command-and-control regulations.[4] But as detailed below, all of these "issues" were already addressed in the December 2015 rulemaking or have now been made moot such that there is no factual rationale for the proposed target of 5 tpd of additional creditable emission reductions from the NOx RECLAIM program by 2031.

Specifically, the Draft AQMP suggests the following reasons for this measure:[5]

Issue as Presented: *"Assess the need for and the size of the differential between RTC holdings and actual emissions. The size of this unused RTC margin is affected by the possible need for a compliance margin, uncertainties in the growth projections for existing and new businesses, facility and equipment shutdowns, and holdings by investors. A full assessment may allow for an optimization of the size of the margin that could allow for further RTC reductions."*

26-5

During the last Regulation XX rulemaking, it was noted that overall NOx RECLAIM market had, in recent years (i.e., 2011-2013), exhibited an unused RTC margin of 4-6 tpd depending on the year and prevailing economic conditions. In the context that period's market cap of 26.5 tpd represented 15-25% of the overall NOx RTC market. By its very design, the 2015 rulemaking will have eliminated nearly all of those previously unused RTCs once fully implemented by 2023. As such, we do not believe this represents a valid basis for a future market adjustment.

Issue as Presented: *"Consider options for facilities at BACT or BARCT and/or facilities with no allocations (structural buyers) to exit the program and be subject to command and control regulations. The most recent NOx amendment allowed EGFs to voluntarily opt-out of RECLAIM. Such an option could be extended to other facilities, and potentially lead to more AQMP creditable emission reductions given that future non-RECLAIM facilities emissions are projected at actual levels with growth rather than total allocations."*

26-6

[4] SCAQMD Draft AQMP, Appendix IV, page IV-A-77.
[5] SCAQMD Draft AQMP, Appendix IV, page IV-A-75 et seq.

The 2015 rulemaking already featured an "off-ramp" for EGFs at BACT or BARCT, and the rulemaking by design would force the remaining RECLAIM facilities to meet the Staff's BARCT levels (found in Rule 2002) on a programmatic basis. Simply put, the "issue" identified is no longer valid after the 2015 amendments to RECLAIM. 26-6 Con't

Issue as Presented: *"Consider command-and-control regulation overlays to certain RECLAIM facilities. For some RECLAIM facilities a command-and-control overlay may be the best way to reduce NOx emissions while maintaining the required equivalency with command and control."* 26-7

The 2015 rulemaking by design would force RECLAIM facilities to meet the Staff's BARCT levels (found in Rule 2002) on a programmatic basis. Those BARCT levels are in many cases equal to or more stringent than current BACT.[6] The suggested "command-and-control overlays" would fundamentally conflict with Regulation XX program design. And given the 2015 amendments, they would be unlikely to yield material additional, creditable emission reductions.

Issue as Presented: "*Assess facility and equipment shutdowns and the removal of associated RTCs from the market. Under command-and-control rules, shutdown emission credits are heavily discounted to BACT, based on the last 2 years of operation. While there is no discount of credits for a RECLAIM facility or equipment shutdown, the overall RTCs available to RECLAIM facilities have been reduced over time to reflect the advancement of BARCT (i.e., command-and-control equivalency). In some cases, these BARCT levels are equal to, or more stringent than, BACT determinations. However, these credits, if not removed from the program, could reduce the incentive to implement cost-effective controls that would otherwise be required under command-and-control.*" 26-8

As noted above, AQMD Staff are already developing a Proposed Amended Rule 2002 which would, if adopted by the Governing Board, remove additional RTCs from the NOx RECLAIM program in the event of future RECLAIM facility shutdowns. It is impossible to know how many, if any, facilities might shutdown in the future and whether such shutdowns would trigger the removal of additional credits from the RECLAIM market.

Issue as Presented: *"Assessment of whether the cost-effectiveness benefits that the RECLAIM market was intended to provide still exist given the need for all feasible NOx reductions and the potential lack of lower-cost control options."* 26-9

While such an assessment could be informative, this is not a rationale for further reductions in the NOx RECLAIM market.

Issue as Presented: *"Perform additional or more frequent BARCT assessments and adjust allocations as control technologies improve and are implemented in practice."* 26-10

[6] SCAQMD 2016 AQMP, Appendix IV, page IV-A-77. "In some cases, these BARCT levels are equal to, or more stringent than, BACT determinations."

AQMD is already obligated to perform such assessments under the California Health & Safety Code.[7] Such assessments would trigger future rulemaking if it was concluded that BARCT was more stringent that the levels presented in Rule 2002. Given the severity of BARCT determinations in the 2015 rulemaking, some of which are already more stringent than BACT, there is no technical basis at this time to suggest that BARCT advancement will be able to yield an additional 35% of NOx emissions from RECLAIM facilities by 2031 (i.e., 5 tpd / 14.5 tpd). 26-10 Con't

Issue as Presented: *"Assess whether more SIP creditable and/or actual emission reductions could be achieved without the RECLAIM program, and if so, explore how the program could be sunset in an orderly and equitable fashion."* 26-11

This is a policy matter which would need to be considered by the Governing Board. It is not a rationale that supports further proposed reductions in the NOx RECLAIM market.

Issue as Presented: *"Re-examination of the RECLAIM program if RTC prices hit the upper or lower threshold amounts. The current NOx RECLAIM regulation has a lower price threshold of $200,000 per ton (infinite year block) and upper price thresholds of $22,500 and $35,000 per ton (discrete year; annual and 3-month average, respectively). The levels of these thresholds or additional thresholds could be modified commensurate with future BARCT assessments and attainment needs."*

California's Health and Safety Code requires an air district to make certain findings when adopting rules and regulations to implement a market-based incentive program, including a determination that: 26-12

- The program will result in an equivalent or greater reduction in emissions at equivalent or less cost compared with current command and control regulations and future air quality measures that would otherwise have been adopted as part of the district's plan for attainment.
- The program will provide a level of enforcement and monitoring, to ensure compliance with emission reduction requirements, comparable with command and control air quality measures that would otherwise have been adopted by the district for inclusion in the district's plan for attainment.
- The program will not result in a greater loss of jobs or more significant shifts from higher to lower skilled jobs, on an overall districtwide basis, than that which would exist under command and control air quality measures that would otherwise have been adopted as part of the district's plan for attainment.
- The program will not result in disproportionate impacts, measured on an aggregate basis, on those stationary sources included in the program compared to other permitted stationary sources in the district's plan for attainment.[8]

Any reconsideration of price triggers or cost effectiveness thresholds would need to be supported by findings that the program will not result in disproportionate impacts, measured on an

[7] CH&SC §39616(c).
[8] CH&SC §39616(c).

aggregate basis, on those facilities included in the RECLAIM program as compared to other permitted stationary sources in the District. We are skeptical that such a finding could be made at this time; the issue does not support further reductions in the NOx RECLAIM market. 26-12 Con't

Issue as Presented: *"Assess the impacts of investors holding RTCs. Investors have historically played an important role in the RECLAIM program. However, their holding of RTCs have posed problems with the trading and identification of reductions because they are not RECLAIM facilities that have an initial allocation or a potential to reduce NOx emissions."*

California Health & Safety Code specifically provides that RECLAIM "shall achieve emission reductions across a spectrum of sources by allowing for trading of emissions trading units for quantifiable reductions in emissions from a significant number of different sources."[9] So this topic would appear to be a policy matter which would need to be considered by the Governing Board and/or State Legislature. Regardless, it is not a rationale which supports further proposed reductions in the NOx RECLAIM market. 26-13

Given the already adopted and proposed changes to the RECLAIM program, the basis presented for proposed Control Measure CMB-05 is fundamentally flawed. It lacks any factual rationale to support the notion that 5 tpd of additional creditable emission reductions could be achieved by 2031. For these reasons, this proposed control measure should be removed from the AQMP. If the district insists on including a RECLAIM control measure in this AQMP, it should be a range since what is included in the AQMP is the minimum commitment to USEPA that must be met. We recommend a range of 0-3 tpd. And further, WSPA believes that any additional adjustment to RECLAIM Trading Credits (RTCs) under the NOx RECLAIM program should be applied equally to all NOx RECLAIM market participants as a proportion of their present RTC holdings consistent with the founding principles of the RECLAIM program.

Lastly, staff estimates that the cost to implement this measure to be 50% higher than the projection for the December 2015 amendments, but there is no basis for that estimate. This figure should be supported with an actual technical basis or completely removed from the document.

4. **As a co-benefits measure, proposed Control Measure ECC-01 (Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives) should not involve any AQMD "enhancements."**

The Draft AQMP presents proposed Control Measure ECC-01 as potentially involving AQMD authority to regulate emissions from stationary sources and that "AQMD will work with other regulatory agencies for program enhancements."[10] Yet, the Draft AQMP also suggests "Because this control measure relies on other programs, no additional costs other than relatively minor administrative costs are anticipated as a direct result of this control measure."[11] [emphasis added] These positions are contradictory. Since the measure is intended to rely on the 26-14

[9] California Health & Safety Code §40440.1(a).
[10] SCAQMD Draft AQMP, Appendix IV, page IV-A-25, Implementing Agencies.
[11] SCAQMD Draft AQMP, Appendix IV, page IV-A-25, Cost-Effectiveness.

accounting of co-benefits from GHG programs, policies, and incentives, it is not appropriate to consider other "enhancements" or AQMD authority under this measure. The Draft AQMP discussion of ECC-01 must be revised to exclude references to program enhancements or the exercise of AQMD authority. 26-14 Con't

5. **Proposed Control Measure FUG-01 (Improved Leak Detection and Repair) should be revised to consider the use of optical gas imaging (OGI) technology as a suitable substitute for, not an addition to, conventional LDAR component inspections. This was the intended purpose of "Smart-LDAR" and would help to resolve the inefficient and labor-intensive effort associated with conventional LDAR programs. References to unspecified "new technologies" should be removed from the measure.**

As with prior AQMPs, this Draft AQMP includes a proposed control measure which describes a wide-ranging approach to potentially further reducing VOC emissions from fugitive emission components at petroleum industry facilities and chemical plants. The control measure again focuses on the potential use of optical gas imaging technology (as it did the 2012 and 2007 AQMPs).[12] Optical gas imaging (OGI) technology was borne out of a desire to conduct fugitive emission LDAR programs in a more efficient manner (thus, the term "Smart-LDAR"). Prior AQMPs have specifically recognized the inefficient and labor-intensive effort associated with conventional LDAR programs; however, this concept is not addressed in FUG-01. The control measure should recognize the problem and do something about the inefficiency of existing LDAR programs.

26-15

The control measure lists seven existing AQMD rules for which it is suggested that the requirements could be enhanced, but the nature of the potential enhancements to the individual rules is not explained. So the overall proposed approach remains vague. Mention is made of an OGI pilot program. The control measure needs to provide more information and greater clarity, or, in the alternative, there should be a description of a potential stakeholder process through which a pilot program might be developed.

FUG-01 suggests that OGI might be used to supplement existing LDAR programs. However, clearly the highest and best potential use of the OGI is as a substitute for conventional inspections of components with an organic vapor analyzer. WSPA's overriding concern is that adding OGI to existing requirements is not cost-effective. Replacing LDAR with OGI is more attractive, and there are various possibilities that could be explored (e.g., using OGI for difficult-to-monitor components).

The control measure summary table[13] identifies potential VOC reductions of 2 tpd by 2023 from an inventory of 7.1 tpd. WSPA believes that the emissions reduction estimate (i.e., >25%) is overly optimistic. We also note that the baseline emissions inventory is considerably different than the figures which were presented in the 2012 AQMP for Control Measure FUG-03. WSPA would like to understand the source of the 7.1 tons/day emissions inventory as well as the basis

[12] SCAQMD 2012 AQMP Control Measure FUG-03 and 2007 AQMP Control Measure FUG-01.
[13] SCAQMD 2016 AQMP, Appendix IV, page IV-A-80.

for the estimated reductions. We note that the discussion of "Emissions Reduction" provides no basis for the estimated emission reductions.

The cost effectiveness for this measure is presented as $11,000 per ton of emissions reduced, but there is no basis for that estimate. This figure should be supported with an actual technical basis or completely removed from the document.

Lastly, the proposed measure also suggests exploring the use of "new technologies to detect VOC fugitive emissions in order to supplement existing programs and achieve additional emission reductions." But the Draft AQMP does not explain what those technologies might be, how they would be effective, or how much they might cost and to whom. The measure goes on to discuss two phase implementation without these technologies (or so we inferred). Given the lack of an actual proposal for these new technologies, all references to unspecified "new technologies" should be removed from proposed Control Measure FUG-01. 26-15 Con't

WSPA appreciates the opportunity to submit these comments. We may submit additional comments during this process as the District releases additional 2016 AQMP documents including, but not limited to the second Draft AQMP. We understand all submissions will be given due consideration by the District staff and the Governing Board.

Please contact me with any questions at (310) 808-2146 or sgornick@wspa.org.

Sincerely,

Suzanne C. Gornick

cc: Michael Krause, SCAQMD

Attachment to Comment Letter #26:

Western States Petroleum Association
Credible Solutions • Responsive Service • Since 1907

Thomas A. Umenhofer, CCM, REPA
Vice President

July 18, 2016

Carol Sutkus
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Re: WSPA Comments on ARB Proposed 2016 State Strategy for the State Implementation Plan

Dear Ms. Sutkus and Ms. Cayabyab:

The Western States Petroleum Association (WSPA) is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states. WSPA appreciates the opportunity to provide comments on the Air Resources Board (ARB) proposed 2016 State Strategy for the State Implementation Plan (SIP Strategy) which describes proposed measures to achieve the reductions from the mobile sector and consumer products.

Specifically, WSPA would like to provide feedback to ARB regarding the updated ARB Mobile Source Strategy (MSS), dated May 16, 2016. This document is considered by ARB as a key part ARB's integrated planning effort in the development of the SIP Strategy. Section 10 (Fuels) of the MSS is of particular significance as it applies to diesel and renewable diesel fuels. In Section 10 (pages 153-154) of the MSS, ARB proposes the following:

> "ARB would bring to the Board a proposed measure that would require Low-Emission Diesel to comprise a steadily increasing percent of the ARB diesel pool. Due to the magnitude of needed NOx reductions in the South Coast and the large volumes of Low-Emission Diesel needed for full statewide implementation, the proposed measure would be phased-in with a gradual implementation strategy that starts in the South Coast, and subsequently expands statewide.
>
> This standard is flexible and enables multiple fuel types to meet this standard. The specifications of Low-Emission Diesel would require less than one percent aromatics, virtually no sulfur, and a blendstock carbon intensity maximum of 30-60 gCO2e/MJ. This standard is anticipated to increase consumption of Low-Emission Diesel fuels, including: renewable diesel from biomass, NOx-mitigated biodiesel, renewable natural gas from biomethane, gas to liquid diesel from biomethane, renewable hydrocarbon diesel, and/or co-processed renewable hydrocarbon diesel. This proposed measure would provide NOx benefits predominately from legacy (pre-2010) on-road heavy-duty vehicles, off-road engines, stationary engines, portable engines, marine vessels and locomotives, as well as NOx and Diesel PM benefits in potentially all model year off-road engines, stationary engines, portable engines, marine vessels and locomotives. Interstate vehicles, even those registered out-of-state but operating on ARB diesel blended with Low-Emission Diesel, are also anticipated to provide emission reduction benefits.

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> This standard would complement existing ARB programs that incentivize increased use of renewable fuels as substitutes for conventional gasoline and diesel fuels, and will focus on more completely transitioning the fuel mix away from petroleum based diesel to a cleaner, renewable mix of diesel substitute fuels. Potential diesel substitutes that may be considered include renewable diesel from biomass, NOx mitigated biodiesel, renewable natural gas from biomethane, gas to liquid diesel from biomethane, renewable hydrocarbon diesel, and/or co-processed renewable hydrocarbon diesel. The proposed measure is anticipated to diversify the fuel pool, as it will incentivize increased production of Low-Emission Diesel fuels. This proposed measure would require incremental progress toward a goal of Low-Emission Diesel comprising 50 percent of the on and off-road diesel sold in State by 2031."

Specifically, WSPA has several concerns regarding the above proposal that we believe need to be addressed before moving forward with the proposed Low-Emission Diesel program:

Concern 1 - Lack of Clarity in Defining Low-Emissions Diesel

WSPA has several key questions regarding Low-Emissions Diesel (LED). What is the disposition of conventional gas to liquids (GTL) fuels and other like fuels in this strategy? Why add the carbon intensity component to the LED when the LCFS standard and Cap and Trade program already does this? This fuel could provide significant NO_x and PM reductions similar to renewable diesel. This measure should focus on emissions and allow the market to determine how to get there within the confines of the regulations currently in place.

Concern 2 - Questionable Projection Methodology

Unlike the "top-down" approach used in estimating Renewable Diesel (RD) volumes through 2020 in the Low Carbon Fuel Standard (LCFS) and for Advanced Diesel Fuels (ADF), this analysis is based on "bottom-up projections." Top-down in this context means looking at what RD plants are in operation (or may be in operation in the subject time frame) to arrive at a total renewable diesel available figure to which a "how-much-of-that-is-coming-to-CA" factor is applied. The MSS estimates appear to go all the way to starting with available feedstock that could be converted to RD globally. If this is a correct interpretation of how estimates are calculated, then the estimate could potentially yield an increase in RD into California that is 3 times (or more) higher than the 2020 estimates in ARB's illustrative scenario case (which may be an overestimate to begin with). WSPA requests that ARB explain the assumptions used to determine the available feedstock.

Concern 3 - Lack of Demonstration of Measurable Benefit

By ARB's own figures, later model year trucks equipped with NO_x traps and PM filters will constitute more than 90% of the fleet by 2023. In addition, there is another measure in the MSS that drives the engine manufacturers to ever lower exhaust emission targets. With those two key elements in mind, it is not clear what the benefits of the resultant potentially highly-expensive fuel would be. WSPA would like ARB provide a forecast of market share for legacy on-road diesel vehicles in 2025 as well as the projected off-road fleet. How did ARB separate the impact of vehicle technology from the impact of the LED fuel? What is the incremental benefit of the LED fuel over the new technology vehicles?

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Concern 4 - Uncertainly in Demand for Diesel

The ARB proposal suggests that for LED which would create a set of circumstances that do not exist today. To fully analyze this issue, WSPA believes that ARB would need to answer several sets of critical questions:

a. For example, what are the incremental criteria and GHG emissions resulting from the potentially displaced volume of diesel being exported from California? Does ARB assume that the displace diesel will be exported or that refinery capacity will be reduced proportionally?
b. Where does ARB anticipate the additional renewable diesel will come from? Is it produced in-state? What are emissions from this production?
c. If it is imported into California, where does it come from and how does it get here? What are the emissions from the transportation of the renewable diesel?
d. What would be the AB 32 Cap & Trade Program implications of the increase in renewable diesel imports? Would this cause emissions leakage and/or require border carbon adjustments?

These are important questions that must be addressed before proceeding with the MSS as it is currently written.

WSPA requests that ARB take an additional look at each of these concerns and provide a response that not only addresses the concerns but provides viable options to eliminate or minimize these concerns. Further, WSPA believes that a better approach needs provided (through consultation with the industry sector) than the broad state-wide measure currently put forward. Obviously, the need for emission reductions is regional (i.e., not state-wide) while the availability of LED will be extremely limited and the costs prohibitively high. The logic of not directing that limited volume only to the areas where the needs are greatest should be examined closely by ARB. This effort could include analysis of the implication of "leakage" into the area of non-LED fuel and out of the area of LED fuel, of potentially bifurcating on-road and off-road diesel supply, and other potential distribution optimization opportunities.

WSPA appreciates ARB's consideration of our comments, and we look forward to your responses. If you have any questions, please contact me at (805) 701-9142 or email tom@wspa.org.

Sincerely,



cc: Richard Corey - ARB
Edie Chang - ARB
Cathy Reheis-Boyd - WSPA

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Responses to Comment Letter from Western States Petroleum Association (WSPA)
(Comment Letter #26)

Response to Comment 26-1:

Staff appreciates your comments and continuing support for the regional air quality planning process and successes.

Response to Comment 26-2:

See Response to Comment 7-5 regarding unquantified measures.

Response to Comment 26-3:

Staff appreciates the support for the incentive programs and understands the concern with the amount of needed funding. A Financial Incentive Funding Action Plan has been prepared as a companion document to the 2016 AQMP. The plan will provide an analysis of potential funding opportunities and proposed actions to be taken to secure the funding identified in the AQMP. The Financial Incentive Funding Action Plan will also include activities to pursue funding, the schedule, and reporting commitments. Pursuing the funding will require an analysis of authority, formation of a stakeholder working group, and in the case of federal funds, creation of a national collaborative comprised of National Association of Clean Air Agencies (NACAA) for state/local air agencies, private sector members (engine manufacturers, Manufacturers of Emission Controls Association (MECA), trade associations, labor unions, etc.) and non-government organizations (local, state, national). Collaboration within the state will include California Air Pollution Control Officers Association (CAPCOA), CARB, NGOs, private sector supporters, and state/local partnerships.

Response to Comment 26-4:

The RECLAIM control measure ensures compliance with state law that mandates that periodic BARCT assessments be performed for the program. This re-assessment would occur out into the future and well beyond the December 2015 amendments to the program. Potential technologies that were identified in the December 2015 amendments would have further matured and newer technologies can be identified that can result in additional reductions for RECLAIM sources. The AQMP proposes additional serious consideration for an orderly sunsetting of the RECLAIM program in order to create more regulatory certainty, reduce compliance burdens for facilities, and achieve SIP-creditable emission reductions. Approximately every 10 years, NOx RECLAIM has reduced RTCs by 8 to 12 tons per day. Given the historical evidence of past NOx emission reductions coinciding with control technology maturation, it is quite reasonable to assume that an additional 5 ton per day reduction is achievable in the eight years between 2023 and 2031.

Response to Comment 26-5:

The December 2015 amendments to the NOx RECLAIM program did not eliminate the margin between NOx emissions and RTC holdings. That is, if BARCT equivalency is implemented as adopted, there would still be a margin. As BARCT advances in the future, there is a need to address the size of the margin again. The size of the margin is not the sole driver for the creation of this control measure. The purpose of the control measure is to seek further reductions from the NOx RECLAIM program based on a future BARCT

assessments, as required by the California Health and Safety Code, or through an orderly sunset of the program.

Response to Comment 26-6:

The December 2015 amendments allowed EGFs to voluntarily opt out of the RECLAIM program because virtually all of these facilities are already at BARCT or BACT. The same opportunity for other NOx RECLAIM facilities that are also at BARCT or that are structural buyers will be considered. Facilities that are not at BARCT and rely on the market to purchase RTCs would still be able to function in this type of structure until an orderly transition into command and control regulations can be accomplished, if this avenue is pursued.

Response to Comment 26-7:

NOx RECLAIM facilities have the option of installing BARCT on all pieces of equipment and/or purchasing RTCs in the open market to offset NOx emissions. A command and control overlay, could achieve emission reductions for all pieces of equipment that are not at BARCT, which is the case for many facilities in RECLAIM, and could provide additional, creditable emission reductions. Staff agrees that this would modify the current RECLAIM program, but believes it may provide greater certainty to the needed reductions, and would achieve additional reductions beyond the 2015 amendments as BARCT advances in the future.

Response to Comment 26-8:

Amendments to Rule 2002 were adopted in October 2016, which would prevent large sell-offs of RTCs from shutdowns that other facilities could use to prevent the installation of BARCT. This would apply only to complete facility shutdowns for the largest NOx RTC holders in the RECLAIM program that were issued an initial allocation. Facilities that are subject to the shutdown requirements would be required to surrender only those credits that were issued to them at the beginning of the program. Any credits held above that level would be able to be sold into the market. Staff will continue to consider any appropriate amendments to RECLAIM shutdown provision.

Response to Comment 26-9:

The assessment of the benefits that the RECLAIM program provides given the need for all feasible NOx reductions and the potential lack of lower-cost control options is necessary because many of these lower-cost control options have been either already implemented or are in the process of being implemented. Further programmatic reductions may result in the convergence of the two approaches (market-based versus command and control) to achieve the same emission reduction goals. This assessment is complementary to the assessment of potential future reductions if RECLAIM remains otherwise unchanged.

Response to Comment 26-10:

The SCAQMD is required by the California Health and Safety Code to perform periodic BARCT assessments. As technologies progress and mature, further reductions may be technically feasible and cost effective for not only already-affected source categories, but for other source categories that were not previously analyzed in the 2015 RECLAIM amendments. Please also see the response to comment 26-4 for the basis for proposing additional BARCT reductions.

Response to Comment 26-11:

The 2015 amendments to the NOx RECLAIM program that were adopted by the Governing Board already provide the opportunity for EGFs to opt-out of the program. Further rulemaking would be required to provide the same opportunity for other RECLAIM facilities that are already at BARCT. Through this control measure, further emission reductions would either be achieved by another programmatic allocation shave, or by a transition into a command and control regulatory structure that can achieve SIP-creditable emission reductions. Either approach would require both a public process and Governing Board approval.

Response to Comment 26-12:

The purpose of the RTC cost thresholds is to alert the Governing Board when the credit price is too low, which signifies an excess of RTCs in the market, or when it is too high, which can signify when there are insufficient RTCs in the market. These market condition thresholds are safeguards that would assure that the market is functioning properly. If any adjustments to these cost thresholds are required, the findings that are referenced in the comment could be made at the time of the rulemaking, if required.

Response to Comment 26-13:

As described in the control measure, quantifiable SIP-creditable emission reductions may be achieved from sources in a command and control regulatory structure, whereas in RECLAIM some of these potential reductions exist in the form of RTCs that are held by investors. SIP-creditable emission reductions are quantifiable with the installation of BARCT on categories of source-specific equipment. The basis for the control measure is in meeting the requirements of state law. Please see the response to comment 26-4. The method and application of the emission reductions (across the board or sector-specific) would be determined at the time of rulemaking. As described in the response to comment 26-4, a transition of the program into a command and control regulatory structure would also effect the SIP-creditable emission reductions. The basis for the cost estimate of this control measure is the costs that were determined for the December 2015 amendments to the NOx RECLAIM program. For the purposes of this control measure, it is assumed that further reductions would be achieved from already controlled equipment and it is reasonable to expect that the cost effectiveness would be higher for a smaller amount of emission reductions. Based on past rulemaking experience, a 50 percent higher cost is reasonable. Despite this, further refinement (increase or decrease of costs) would occur at the time of rulemaking. The technical basis for a final cost effectiveness determination would occur as a result of a subsequent BARCT assessment. Additionally, based on previous BARCT assessments, a 5 ton per day NOx reduction of the current market-based program is a reasonable target.

Response to Comment 26-14:

The word “enhancements” has been removed from ECC-01 (appears once in “Implementing Agency" section) in the Revised Draft Plan.

Response to Comment 26-15:

Optical Gas Imaging tools such as the FLIR Camera have proven to be useful instruments in screening component leaks but still lack the ability to determine mass emission rates from component leaks. The current control measure (FUG-01), looks to utilize remote sensing and other instrumentation to detect and quantify fugitive emission leaks both at the source and at the fence-line. Similar to U.S. EPA's Alternative Work Practice To Detect Leaks From Equipment , staff may consider alternative protocols that

outline equipment specifications, calibration techniques, required performance criteria, procedures for conducting surveys and training requirements for optical gas imaging instrument operators without an accompanying requirement to conduct annual monitoring using EPA Method 21 provided that it can be demonstrated to identify and quantify leaks at an equivalent or better level. The emission reduction estimates are based on early results from a comprehensive measurement campaign aimed to fully characterize technologies that quantify fugitive and stack emissions from large refineries and other important VOC sources in the Basin such as oil and gas production sites.

Cost-effectiveness calculations are based on the use of solar occultation flux technology at a unit capital cost of approximately $300,000 at 33 sites. The cost estimates include full-time operator, maintenance and electrical costs which have been included in the revised measure.

Comment Letter from U.S. EPA (Comment Letter #27)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

AUG 19 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Dear Dr. Fine:

We appreciate the opportunity to comment on your draft 2016 Air Quality Management Plan (Draft AQMP), released June 30, 2016. This letter provides general comments on the descriptions of incentive measures in the Draft AQMP. We may provide additional comments on other elements of the Draft AQMP at a later date.

We have preliminarily reviewed the descriptions of 19 voluntary incentive measures in Appendix IV-A of the Draft AQMP (FLX-02, MOB-01 to MOB-14, ECC-02, ECC-03, CMB-01, CMB-02), several on which the Draft AQMP appears to rely for emission reductions. These generalized descriptions do not provide sufficient information for EPA to evaluate the potential for these measures to qualify for state implementation plan (SIP) emission reduction credit. For example, the Draft AQMP does not identify relevant portions of the program guidelines that the District will use to ensure that emission reductions achieved through implementation of the identified programs are quantifiable, surplus, enforceable, and permanent. Additionally, the Draft AQMP does not contain any draft commitments that the State/District will adopt and submit to satisfy Clean Air Act enforceability requirements. 27-1

Under longstanding EPA policy, SIP credit may be allowed for a voluntary incentive program only where a state submits enforceable commitments to ensure that the emission reductions necessary to meet Clean Air Act requirements are achieved. Such commitments must be specific enough to be legally and practically enforceable – *e.g.*, by specifying the applicable program implementation criteria (by title, date, chapter and section number), how the state will monitor and report on emission reductions achieved, and how the state will remedy emission reduction shortfalls in a timely manner. Alternatively, states may under certain circumstances submit enforceable commitments to achieve specified amounts of emission reductions from unidentified control measures, as limited components of a comprehensive SIP control strategy.[1] 27-2

[1] The EPA has historically accepted enforceable tonnage commitments addressing up to approximately 10 percent of the emission reductions needed for attainment of the national ambient air quality standards. *See, e.g.*, 76 FR 69896 (November 9, 2011).

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We look forward to working with you as you further develop the Draft AQMP. If you have questions about these matters, please contact me (415-947-4146) or Idalia Perez (415-972-3248)

Sincerely,

Amy K. Zimpfer, P.E.
Associate Director, Air Division

cc: Sylvia Vanderspek, California Air Resources Board

Responses to Comment Letter from U.S. EPA
(Comment Letter #27)

Response to Comment 27-1:

SCAQMD staff plans to organize working groups to assist in the development of guidelines and ensure the integrity elements of quantifiable, surplus, enforceable and permanent are satisfied. Appendix IV-A provides information regarding the intent for staff to seek approval of a Board Resolution that will demonstrate a federally enforceable commitment being requested by the U.S. EPA. In addition, staff plans to provide technical analysis, funding, resources, outreach, and legal authority to establish the incentive-based measures for SIP approvability.

Response to Comment 27-2:

Staff appreciates the guidance provide by U.S. EPA in the comment including the details necessary to make the incentive measures creditable such as how the program will monitored, how reductions achieved are reported, and how emission reduction shortfalls will be remedied in a timely manner.

Comment Letter from County of Los Angeles Board of Supervisors (Comment Letter #28)

LORI GLASGOW
EXECUTIVE OFFICER

**COUNTY OF LOS ANGELES
BOARD OF SUPERVISORS**

KENNETH HAHN HALL OF ADMINISTRATION
500 WEST TEMPLE STREET, ROOM 383
LOS ANGELES, CALIFORNIA 90012
(213) 974-1411 • FAX (213) 620-0636

MEMBERS OF THE BOARD
HILDA L. SOLIS
MARK RIDLEY-THOMAS
SHEILA KUEHL
DON KNABE
MICHAEL D. ANTONOVICH

August 19, 2016

Mr. Wayne Nastri, Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Dear Mr. Nastri:

The Los Angeles County Board of Supervisors, in collaboration with the Department of Public Health, strongly urges you to work with the necessary State and Federal agencies to adopt an Air Quality Management Plan (AQMP) that will improve air quality and public health using regulatory control measures based on available resources instead of adopting the current proposal for clean vehicle incentives that predominantly relies on securing billions of dollars in funding that currently does not exist. 28-1

In order to pay for these incentives, the AQMP predicts that the South Coast Air Quality Management District (SCAQMD) will need to secure approximately $11,000,000,000 to $14,000,000,000 in funding over a seven to fifteen year period. None of this funding has yet been secured, and securing the approximately $1,000,000,000 a year needed from the Federal and State governments to provide these financial incentives is by no means a sure bet. The AQMP proposes developing an action plan "as part of the AQMP public adoption process to identify the necessary actions by the District, the region, the State, the Federal government, and other partnerships to ensure the requisite levels of funding are secured as early as possible and sustained through 2031" (AQMP, ES-8). 28-2

In short, the AQMP proposes providing significant financial incentives to polluters to clean up their fleets, from funding that does not yet exist. Should the funding fail to materialize, the AQMP offers no meaningful back up plan, instead focusing on provisions in the Federal Clean Air Act that would allow for falling short of air pollution reduction goals (see AQMP, 4-44 to 4-45). In the meantime, the Basin's residents would remain captive to the region's poor air quality, and the associated negative health impacts. Taking this gamble poses an unacceptable level of risk to Los Angeles County residents, particularly those who are in our most vulnerable communities. 28-3

The implementation of this plan to improve air quality is critical to improving public health in the County. In principle, the Department of Public Health agrees with the overall goals. One aspect that is lacking is adequate attention to abatement of stationary source odorous emissions that impact health of nearby residents but often do not exceed applicable standards. Such emissions have become a critical issue with regard to recent significant community public health interventions, such as the Allenco Oil field site, the Sunshine Canyon Landfill community, and the Aliso Canyon gas leak disaster. The Health Effects section of the AQMP does not address or acknowledge odor issues, and related health effects from odors or other low-level exposures that emanate from facilities that are closely situated to communities. This is a significant gap in the AQMP. Given the County's recent responses to air emissions causing odor-related health effects, the AQMP should delineate improvements in the way that local, state, and federal agencies can prevent, survey, mitigate, and respond to odors. This issue should also be discussed in Chapter 8, "Beyond Requirements." 28-4

We strongly urge the SCAQMD to work with the necessary State and Federal agencies to adopt an AQMP that will meaningfully improve air quality and public health.

Sincerely,

HILDA L. SOLIS
Chair of the Board
Supervisor, First District

MARK RIDLEY-THOMAS
Supervisor, Second District

SHEILA KUEHL
Supervisor, Third District

Responses to Comment Letter from Los Angeles County Board of Supervisors
(Comment Letter #28)

Response to Comment 28-1:

The 2016 AQMP does propose a number of stringent regulatory measures aimed at reducing NOx and VOC emissions from a variety of stationary and mobile sources. These regulatory measures were established after a thorough analysis of all ozone-emitting sources and available methods and technologies to further reduce emissions. SCAQMD staff is not aware of any additional feasible regulatory measures. Incentive-based approaches are focused on accelerating high-emitting sources to transition to cleaner technologies sooner than would take place under regulations which generally focus on new mobile sources. Also, some sources are beyond the authority of the SCAQMD, thus the incentives are a way to gain emission reductions sooner than natural turnover of vehicles and equipment. Accelerating the deployment of cleaner technologies before future rulemaking is established allows the new technology to be commercially available, achieved in practice, feasible in more applications, cost effective, as well as a publicly acceptable. It should be noted that the Revised Draft 2016 AQMP has modified two incentive-only measures to include a future rulemaking commitments.

The specific sources of funding have yet to be finalized but staff is developing the Financial Incentive Funding Action Plan that maps out the potential opportunities to secure funding. Such funding would be sought on a federal, state and local level.

Response to Comment 28-2:

As noted in Response to Comment 26-3, the Financial Incentive Funding Action Plan will identify proposed actions to secure additional funding.

Response to Comment 28-3:

As part of the revised draft, staff is proposing that a one year period be given to identify actions to achieve additional emission reductions and initiate actions proposed in the Financial Incentive Funding Action Plan to secure funding. Staff will be reporting to the Governing Board on the progress on these activities. If steps are not taken to implement the identified actions or funding incentives are not secured in a timely manner, staff will recommend to the Governing Board to consider rule development within its legal authority or develop other enforceable mechanisms to achieve additional emission reductions.

Response to Comment 28-4:

While odor reduction is not the purpose of the AQMP that demonstrates attainment of the federal air quality standards for criteria pollutants, the SCAQMD takes nuisance concerns seriously. The SCAQMD has a nuisance rule, Rule 402 that *"a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property*." SCAQMD vigorously enforce this rule through Hearing Board actions, and if necessary, in court. In recent years, staff worked to alleviate odor issues from waste treatment facilities, trash and recycling facilities, and rendering plants through both enforcement actions and rulemaking. Further, Appendix I (*Health Effects*) of the AQMP has been updated to include a discussion of odors.

Comment Letter from Air-Conditioning, Heating, and Refrigeration Institute (Comment Letter #29)

AHRI
AIR-CONDITIONING, HEATING, & REFRIGERATION INSTITUTE
we make life better™

2111 Wilson Boulevard Suite 500 Arlington VA 22201-3001 USA
Phone 703 524 8800 | Fax 703 562 1942
www.ahrinet.org

August 19, 2016

Michael Krause
Planning and Rules Manager
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765-4178

Re: Draft 2016 Air Quality Management Plan

Dear Mr. Krause:

These comments are submitted by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) in response to the South Coast Air Quality Management District's (AQMD) issuance of the draft 2016 Air Quality Management Plan (AQMP). AHRI is the trade association representing manufacturers of heating, cooling, water heating, and commercial refrigeration equipment. More than 315 members strong, AHRI is an internationally recognized advocate for the industry, and develops standards for and certifies the performance of many of the products manufactured by our members. In North America, the annual output of the HVACR industry is worth more than $20 billion. In the United States alone, our members employ approximately 130,000 people, and support some 800,000 dealers, contractors and technicians.

We ask that staff consider the following comments regarding CMB-02, Emission Reductions From Commercial And Multiunit Residential Space And Water Heating, as proposed in the draft 2016 AQMP. This control measure mentions several components for achieving additional NOx emission reductions.

29-1

The proposal to specify the NOx emission limit for residential water heaters only in terms of ppm appears reasonable, in theory. However, as noted, all manufacturers currently comply with Rule 1121 based on the ng/J of output requirement. Contrary to the explanation in the description of this measure, this was not so much by choice, but rather because in the development of the rule this was presented as the requirement. The equivalent ppm NOx emission limit was provided in the rule only for relative comparison purposes. The premise that higher efficiency models of residential gas water heaters are emitting NOx at higher ppm rate than less efficient models complying with Rule 1121 needs to be evaluated with actual test data to establish whether it is sufficiently valid. A change to a ppm NOx limit may require manufacturers to retest their products. Such a testing burden should not be imposed on manufacturers without a clear determination that NOx emission reductions actually will be achieved. Also, there is an inherent benefit associated with higher efficiency water heaters; they use less energy. This proposal could have an unintended consequence of disincentivizing consumers to purchase higher efficiency water heaters. The statement that "replacement of standards efficiency water heaters with higher efficiency units does not currently result in lower NOx emission" is not substantiated by an actual field data. As much as it is a theoretical supposition, not a statement of fact.

The proposal to establish a NOx emission rule for commercial space heating equipment has been under discussion for some time. We are involved with the SCAQMD staff in the development of Rule 1111.1. However, the suggestion that the technology to reduce emissions in residential gas furnaces is transferable to commercial space heating equipment is an oversimplification that no longer should be included in this description. Recent correspondence from AHRI has alerted the SCAQMD to the problems in trying to develop models complying with Rule 1111. As we have noted, notwithstanding significant efforts on all involved parties, there are no residential gas furnaces complying with Rule 1111 available in the district today. There is no reason to believe that whatever solution is developed to resolve the current Rule 1111 situation will be transferable to commercial space heating equipment. The experience of both Rule 1111 and Rule 1121 is that implementing technology-forcing reductions in NOx emissions of gas-fired equipment is a difficult and complex undertaking. Rule 1111.1 should be developed solely on the consideration of the design and operating characteristics of the products covered by the rule. The rule development should not automatically assume that technologies used on products outside the scope of the rule can be applied to commercial space heating equipment. 29-2

The measure also proposes to develop a program to incentivize the replacement of older boilers, water heaters and space heaters with new, more efficient, low NOx boilers, water heaters and space heaters or zero-emitting alternative technology. We support the general concept of this incentive program. However, it is critically important that such programs provide the widest range of options to residential and commercial consumers so that they can chose the new, more efficient, lower NOx emitting equipment that best fits their needs. Those needs will be defined by various aspects such as first cost, installation costs, operating costs, the load of the particular installation, equivalency of function (e.g. the recovery rate of gas water heaters is faster than that of electric water heaters), and limitations of any particular option. An incentive program to meet the need of the SCAQMD to reduce NOx emissions will only be successful it provides options that meet the consumers' needs. Additionally, the actual benefit of NOx emission reductions must be assessed within the context of other SCAQMD and California Energy Commission activities to promote less energy use in residences and commercial buildings. This may be particularly significant when considering the cost/benefit of future NOx emission reduction measures. 29-3

AHRI appreciates the opportunity to provide these comments. If you have any questions regarding these comments, please do not hesitate to contact me.

Respectfully submitted,

Frank A. Stanonik

Frank A. Stanonik
Chief Technical Advisor

Responses to Comment Letter from Air-Conditioning, Heating, & Refrigeration Institute (AHRI) (Comment Letter #29)

Response to Comment 29-1:

The emission limits for water heaters and forced air furnaces are in the form of mass emissions per unit of heat provided to heat water or a building (useful heat). It is not in the form of mass per unit of heat produced from the fuel or per unit of heat available in the fuel. This heat output based emission limit allows higher efficiency units to emit NOx at a higher concentration (ppm) in the exhaust while emitting the same mass (gram or pound) of NOx per unit of heat absorbed by the water or provided to building space. An earlier examination of test results for units meeting the 40 ng/J limit did not indicate a pattern of high efficiency units emitting less NOx. Most unit's test results indicate they have emissions close to the rule limit. If the commenter can provide data on products from multiple manufacturers and multiple product lines indicating that NOx emissions from standard and high efficiency units of the same product line are significantly different, SCAQMD will revise this statement.

Response to Comment 29-2:

Some commercial furnaces use the same technology as residential units. They have a row of tubes or clamshell heat exchangers with individual burners. The commercial units simply have more rows of tubes or clamshells. Other types of commercial units use other types of burners and heat exchangers. Some manufacturers of these other types of units currently advertise NOx emissions less than 30 ppm. Based on these facts, staff believes reductions are possible from commercial furnaces, but these issues will be thoroughly addressed during the rulemaking process.

Response to Comment 29-3:

Staff appreciates support for incentive programs and does recognize that customer needs and public acceptance play a role in transitioning to new cleaner technologies, and thus in developing incentive program.

Comment Letter from Airlines for America (Comment Letter #30)

Airlines for America®

August 19, 2016

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765-4182
submitted electronically at: https://onbase-pub.aqmd.gov/sAppNet/UnityForm.aspx?key=UFSessionIDKey
and emailed to: aqmp@aqmd.gov

Re: Comments on Draft 2016 Air Quality Management Plan

To Whom It May Concern:

On behalf of our members, Airlines for America® ("A4A")[1] thanks the South Coast Air Quality Management District ("SCAQMD" or "District") for providing this opportunity to comment on its Draft 2016 Air Quality Management Plan ("Draft 2016 AQMP"). We note from the outset that the Draft 2016 AQMP shares many elements and overlaps considerably with the State's Draft Sustainable Freight Action Plan ("Draft Action Plan") and – in particular – Proposed 2016 State Strategy for the State Implementation Plan ("State SIP Strategy"). As such we incorporate our comments on those documents by reference.[2]

As noted in both of those sets of comments, A4A and its member airlines have a very strong record of continually improving environmental performance while increasing our considerable contributions to the national and California economies. This record includes a long history of working with regulatory authorities at the international, national, state and local level to pursue policies and actions that protect public health and the environment while maintaining economic vitality and growth. We welcomed the approach adopted in both the Draft Action Plan and the State SIP Strategy, which envisioned improving and protecting public health and preserving and enhancing the California and local economies as co-equal imperatives. Similarly, we fully support the District's effort to develop its 2016 AQMP to attain compliance with National Ambient Air Quality Standards ("NAAQS") and its overall objective "[t]o ensure air quality goals will be met while maximizing benefits and minimizing adverse impacts to the regional economy."[3] However, just as we identified a number of significant concerns with the Draft Action Plan and State SIP Strategy, we have a number of concerns about the Draft 2016 AQMP. 30-1

[1] A4A is the principal trade and service organization of the U.S. airline industry. A4A's members are: Alaska Airlines, Inc.; American Airlines Group; Atlas Air, Inc.; Federal Express Corporation; Hawaiian Airlines; JetBlue Airways Corp.; Southwest Airlines Co.; United Continental Holdings, Inc.; and United Parcel Service Co.; Air Canada, Inc. is an associate member.
[2] Comments of Airlines for America on the Draft Action Plan, submitted July 6, 2016, electronically at www.casustainablefreight.org; Comments of Airlines for America on the Proposed SIP Strategy submitted July 18, 2016, electronically at www.arb.ca.gov/lispub/comm/bclist.php.
[3] Draft 2016 AQMP at ES-4.

Airlines for America Comments
Draft 2016 AQMP
August 19, 2016 - 2

Introduction

We are proud of our industry's exemplary record of simultaneous environmental and economic achievement, which is perhaps best reflected in U.S. Bureau of Transportation Statistics data confirming that system-wide (including domestic and international operations) U.S. airlines burned 6 percent less jet fuel in 2015 than in 2000, even though they carried 24 percent more passengers and cargo on a revenue-ton-mile basis. The most recent data available from the U.S. Environmental Protection Agency shows that less than two percent of domestic greenhouse gas ("GHG") emissions is attributable to commercial aviation and the sector exhibits much lower growth from 1990 levels (5%) – and from a much smaller base – compared to the transportation sector (17%) and on-road sources in particular (24%).[4] At the same time, aviation drives about 5% of gross domestic product both nationally and in California, with commercial aviation accounting for the vast majority of this activity in the State, providing 856,000 jobs and over $112 billion in economic activity.[5]

U.S. airlines have achieved this level of simultaneous economic and environmental performance because we have relentlessly pursued and implemented technology, operational and infrastructure measures to minimize our environmental impacts. For example, A4A and our members have committed the time and resources needed to support the development of economically reasonable, technologically feasible international standards for aircraft engines and aircraft governing noise, NOx, PM, and CO2, through the International Civil Aviation Organization / Committee on Aviation Environmental Protection ("ICAO/CAEP"). The District has recognized that, as a result of the successive, increasingly stringent NOx standards developed by ICAO/CAEP, aircraft engines produced today must be about 50% cleaner than under the initial standard adopted in 1997.[6] A4A also has been instrumental in a global aviation coalition that has established specific, ambitious goals for reducing CO2 emissions from international aviation, including achieving carbon-neutral growth from 2020 onward. As a founding member of the Commercial Aviation Alternative Fuels Initiative® ("CAAFI"), we have provided key support for the development of low-carbon, low-PM[7] sustainable alternative jet fuel, which already is being produced in California and fueling flights from Los Angeles International Airport ("LAX").[8] With respect to airport ground support equipment ("GSE"), even despite our view that the State lacks the authority to regulate in this area we nonetheless cooperated with the State as it developed a suite of emissions regulations applicable to GSE (as well as other engine types), including its In-Use Off-Road Diesel ("ORD") regulation, the Airborne Toxic Control Measure for Diesel Particulate Matter from Portable Engines ("PE-ATCM") and related Statewide Portable Equipment Registration Program ("PERP") rule, and Off-Road Large-Spark Ignition ("LSI") regulation.

30-2

[4] See Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014 (April 2016), Table A-115.
[5] *The Economic Impact of Civil Aviation on the U.S. Economy – Economic Impact of Civil Aviation by State* (January 2015) at 23.
[6] *Preliminary Draft of the 2016 AQMP SCAQMD Mobile Source Measures* (April 14, 1016).
[7] Alternative jet fuel has a greater than 50% reduction in PM emissions compared to conventional jet fuel. See http://www.virent.com/news/virent-bio-jet-provides-more-than-50-reduction-in-particulate-matter-emissions/
[8] United Airlines has begun using renewable jet fuel at LAX and has an agreement with AltAir Fuels for the purchase of up to 15 million gallons over a three-year period. In addition, FedEx and Southwest Airlines have also each signed agreements with Red Rock Biofuels to purchase 3 million gallons per year of renewable jet fuel for use in California beginning in 2017.

More details about our economic and environmental record and various efforts and activities that have enabled our achievements are presented in our Draft Action Plan and State SIP Strategy comments. Here we reemphasize that we are committed to building on our strong environmental record and recognize that continued progress from all sectors is needed to meet the concurrent imperatives to reduce emissions while preserving economic growth and vitality. It is in this spirit that we present these comments and respectfully request the District to consider them as it refines the Draft 2016 AQMP. 30-2 Con't

Prefatory Note on Scope and Purpose of These Comments

Before presenting our comments, we note that they do not (and are not intended to) address each and every proposed action or program identified in the Draft 2016 AQMP that may affect aircraft, GSE or other sources of interest to airlines. While these comments may repeat or emphasize points already made in our Draft Action Plan and State SIP Strategy, we intend to direct comments here to issues raised for the first time and/or brought into further focus by the Draft 2016 AQMP. Accordingly, we underscore that we have incorporated our Draft Action Plan and State SIP Strategy comments by reference and ask the District to consider the information and suggestions presented there as they relate to the Draft 2106 AQMP.

In addition, we also emphasize that these comments (inclusive of those incorporated by reference) are intended to assist the District as it works to refine the document and are not intended to constitute a comprehensive or final response to any specific policy, project, action or measure identified in the Draft 2016 AQMP. In particular, any actions that will need to be adopted and implemented by State or Federal agencies will be subject to full notice and comment requirements under applicable law. Similarly, measures to be defined, proposed or adopted in the future by the District also will be subject to such requirements. Under proposed measure "MOB-04: Emissions Reductions at Commercial Airports," for example, the District would "convene a working group" of stakeholders to assist the District in developing as yet undefined "mechanisms to implement this measure," which could include as yet undefined "regulation." Clearly, before any such "mechanism" could be approved or implemented the District would need to formally propose the mechanism and provide full opportunity for stakeholders to comment. Accordingly, A4A and our members expressly reserve any and all rights to comment on any regulatory measure, policy or other "mechanism" identified in the document. 30-3

Comments

Emissions Inventories

An accurate and transparent emissions inventory is perhaps most fundamental to deriving a viable strategy for reducing emissions. In our State SIP Strategy comments we expressed concern regarding the lack of clarity on the basis for the estimates (both historical and future) in the inventory of emissions that may be attributed to the aviation sector. Part of our concern was that the emissions reductions the State expected to be derived from "further deployment of cleaner technologies" with respect to "aircraft" were "based on current growth forecasts, which are undergoing review"[9] to which we do not yet have access. More detail, including underlying growth factors used to project future expected emissions is provided in the Draft 2016 AQMP 30-4

[9] State SIP Strategy at 25, note to Table 4.

and we appreciate the efforts of SCAQMD to informally discuss the methodology and data used to derive the Draft 2016 AQMP inventories.

Still, we do not have clarity regarding the data and methodologies used to develop future inventories (e.g., the assumptions used regarding fleet turnover and penetration of cleaner technologies into the fleet) and how they relate to those used to estimate possible future emissions reductions. Most glaringly, while the State SIP Strategy indicates that measures implemented by the California Air Resources Board ("CARB") could reduce NOx emissions from aircraft in the District by 17 tons-per-day ("tpd") in 2023,[10] this value is more than the total of 15.52 tpd NOx emissions the District projects will be emitted by aircraft in 2023.[11] It is obviously impossible to reduce emissions from any source by more than 100%. This underscores the need for both the State and the District to provide more robust information regarding the derivation of the emission inventories and expected results from various potential actions identified in both the State SIP Strategy and the Draft 2016 AQMP. Without this information it is very difficult, if not impossible, to understand the viability of the inventories and comment meaningfully on the control strategy outlined in the Draft 2016. Certainly, before any action or initiative targeting sources of interest to our industry goes forward, the District will need to provide a more transparent, detailed explanation of its conclusions regarding existing and projected emissions levels and the emissions reductions any particular action or initiative is expected to achieve.

30-4 Con't

"Fair-Share" Approach

The District has identified a "fair-share" strategy as one of the primary objectives of the Draft 2016 AQMP. As we understand this strategy, it effectively assigns a proportional amount of emissions reductions to particular sources equivalent to that needed Districtwide to achieve the NAAQS. In short, the District projects that NOx emissions must be reduced 43% below the projected 265 tpd (to 150 tpd) in 2023 and 55% below the projected 224 tpd (to 100 tpd) in 2031 – as result, the "fair-share" reductions targeted under the Draft 2016 AQMP for particular sources are 43% and 55% below the projected level of emissions in 2023 and 2031 respectively.

30-5

While we understand the appeal of this approach as a kind of targeting or benchmarking exercise, it is in our view an inappropriate means of formulating specific policies, actions or other measures that should be pursued to achieve emissions reductions needed to achieve the NAAQS. Most importantly, the approach arbitrarily assigns emissions reductions to be expected from a particular source or class of sources without regard to the state of technology development and deployment or cost-effectiveness of measures relative to other sources. Such considerations are critical to development of any credible set of emission reduction policies and/or measures.[12] Again, before any action or initiative targeting sources of interest to our industry goes forward, the District will need to provide a more transparent, detailed explanation of the basis for concluding that technologically feasible, cost-effective measures exist.

[10] State SIP Strategy, Table 4.
[11] Draft 2016 AQMP, Appendix III, 2023 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day).
[12] There also is some concern that there is some incentive to conclude emissions from sources that are not subject to District jurisdiction are large and thereby unjustifiably reduce the burden for reducing emissions borne by such sources.

Need to Recognize Limits on State and Local Authority to Regulate in the Aviation Sector

In our comments on the Draft Action Plan and the State SIP Strategy, we emphasized that it is absolutely essential that the State and its political subdivisions respect under that federal law they lack authority to regulate aircraft, aircraft engines and aviation fuels and face strict limitations on their authority to regulate the aviation sector generally. We will not repeat the more extensive legal discussion presented in our Draft Action Plan and State SIP Strategy comments here. It is important to understand, however, that the U.S. Congress has enacted federal aviation laws establishing these limits in recognition that commercial aviation safety and the efficiency of the National Airspace System depends on the application of a consistent set of regulatory requirements by a primary federal agency – the Federal Aviation Administration – with the necessary expertise and capability to develop and administer those requirements. This has made the development of an extremely safe aviation system that contributes enormously to local, regional and national economic prosperity possible. As such, providing "authority to the state or SCAQMD" to supplant the "jurisdiction of the federal government" over aircraft is a counterproductive idea that we oppose.[13] We also note that in previous comments we have questioned in the strongest possible terms the viability of "[p]artnering with airports to incentivize cleaner aircraft to come to California airports," a proposal that also is referenced in the Draft 2016 AQMP.[14] While phrased in terms of "incentives," the proposal actually appears to contemplate disincentives. In this context, we highlight the reference to "mitigation fees" that appears in the description of Control Measure MOB-04 in District's *Initial Study for the Draft Program Environmental Impact Report for: 2016 [AQMP]* ("Initial Study").[15] This is the type of "incentive" that EPA itself has determined is "not reasonably available" to States[16] and airports have no authority to impose. Similarly, while it is true that "[a]irlines are constantly evaluating ways to improve passenger transportation and overall system efficiencies" and that "[s]uch strategies have the potential to further reduce criteria pollutants,"[17] we are very concerned by the implication that such strategies could be transformed into regulatory mandates or otherwise implemented by the State, District or other political subdivision of the State, including airport authorities. As we indicated to the State, we would oppose these types of initiatives and we also urge the District to focus instead on affirmative partnerships and positive incentives that would support the development of cleaner, more efficient aircraft and aircraft engines and their deployment into the fleet. 30-6

We do understand that the Control Measure MOB-04 is intentionally amorphous and the District will depend on input from a "working group" comprised of stakeholders to develop viable "mechanisms to implement this measure." We will gladly devote the resources necessary to participate in that working group.

Positive Incentives

We applaud the District for recognizing that significant funding will be needed to achieve a level of penetration of new, cleaner technologies into mobile sources if it is to achieve the level of emissions reductions it anticipates will be necessary to meet the NAAQS. We support positive "incentive programs" as a tool to achieve needed reductions as long as they are structured to ensure that they do not circumvent the strict limits on the authority of the State and its political 30-7

[13] Draft 2016 AQMP at ES-5.
[14] Draft 2016 AQMP at 4-33.
[15] Initial Study at A-7.
[16] *See*, 66 Fed. Reg. 57160, 57189 (Nov. 11, 2001).
[17] Draft 2016 AQMP at UV-A-128.

subdivisions. We will look forward to working with the District to identify viable funding mechanisms that could have a positive impact on emissions from sources of interest to our industry.

30-7
Con't

CONCLUSION

We appreciate the opportunity to comment on this Draft 2016 AQMP. We continue to strive to improve our environmental performance and contribute to the prosperity of California and its residents and, in that spirit, look forward to conferring with the District as it refines and finalizes the Draft 2016 AQMP.

Sincerely yours,



Timothy A. Pohle
Senior Managing Director, Environmental Affairs

Responses to Comment Letter from Airlines for America
(Comment Letter #30)

Response to Comment 30-1:

Staff appreciates the support for the development of the Plan and participating in the public process.

Response to Comment 30-2:

Information regarding the U.S. airline industry is duly noted.

Response to Comment 30-3:

The measures and strategy provided in the Plan are broad in nature and some of them warrant further work to determine technical feasibility or achievable emission reductions. Staff recognizes that future decisions would be vetted through working groups and workshops providing the stakeholders and interested parties with opportunities to participate, review and comment. Staff would not limit comments on these concepts in the Plan to just this period of time.

Response to Comment 30-4:

The emissions inventory is updated as the AQMP is developed and new information is provided. For example, after the release of the Draft 2016 AQMP in June, we revised aircraft emissions, as we received newer data reflecting SCAG's newest growth forecast. Staff is open to work to improve the emissions inventory so the most accurate data is included in the Final AQMP and submitted to U.S. EPA as part of the Plan in compliance with the Clean Air Act requirements.

There was a typo on the CARB 2016 SIP strategy document. The 2023 emission reductions associated with aircraft category is 11 TPD, not 17 TPD. This is reflected in the draft final version of the AQMP.

Response to Comment 30-5:

The SCAQMD, CARB and U.S. EPA recognize the need for emission reductions from local, state and federal sources. As such, a “fair share” of reductions needs to take place. The percent NOx emission reductions needed to meet the 8-hour ozone standards by 2023 and 2031 at 45 and 55 percent, respectively, would be a guide although not a definitive endpoint. As rightfully noted by the commenter, other factors such as technology development or cost-effectiveness, needs to be considered. Staff did take the effort to study the proposals in the control strategy to be sure the measures could be feasibly implemented and within an acceptable cost effectiveness range. As a result, it is not expected that each and every source category can reduce emission by the exact same percentage. In some cases, more technical evaluation will need to take place, and thus reductions are deemed “to be determined” and are not committed to in the SIP. Incentives could assist those measures whereby it is not yet cost effective to transition to cleaner technologies, but financial support will help ensure it is cost-effective for the user to operate cleaner equipment.

Response to Comment 30-6:

Staff appreciates the comments regarding authority. Staff believes that working with A4A and airport authorities, we can identify and quantify additional emission reductions from existing actions and future

actions that are being implemented to improve operational efficiencies in aircraft operations (being taken by individual airlines) and by airport authorities. Staff does not have any preconceived concepts for incentives and such concepts will be identified and developed through a public process. We welcome A4A's participation in the process.

Response to Comment 30-7:

Staff appreciates support for incentive programs and is developing the Financial Incentive Funding Action Plan that maps out the potential opportunities to ensure the proposals secure funding. Such funding will be sought on a federal, state and local level.

Comment Letter from Association of American Railroads (Comment Letter #31)

ASSOCIATION OF AMERICAN RAILROADS
425 Third St., SW, Suite 1000
Washington, D.C. 20024

Evelyn R. Nackman
Associate General Counsel

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August 19, 2016

Michael Krause
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765

SUBMITTED VIA EMAIL

RE: Railroad Comments on SCAQMD Draft AQMP – Measure MOB-02 [Emission Reductions at Rail Yards and Intermodal Facilities]

The Association of American Railroads ("AAR") and its members appreciate the opportunity to provide initial comments on draft Measure MOB-02 [Emission Reductions at Rail Yards and Intermodal Facilities] of the South Coast Air Quality Management District's ("District") Draft Air Quality Management Plan ("Draft AQMP"). AAR has several members that operate in California; however, all AAR members have an interest in discussions that involve locomotive idling measures.[1]

AAR and its members have worked with state and federal regulators to reach meaningful and carefully considered resolutions to environmental concerns in California and the nation. Over the last two decades, AAR and its members made significant equipment investments in California and voluntarily agreed to enforceable measures that were effective in significantly reducing diesel particulate matter and NOx emissions from locomotives and other rail operations in the state and particularly in the District. With that context in mind, AAR provides the input below on draft Measure MOB-02. 31-1

[1] The Association of American Railroads ("AAR") is a national, non-profit trade association that represents the Nation's major freight railroads. AAR's membership includes freight railroads that operate 83 percent of the line-haul mileage, employ 95 percent of the workers, and account for 97 percent of the freight revenues of all railroads in the United States. AAR's membership also includes passenger railroads that operate intercity passenger trains and provide commuter rail service. AAR is the Nation's leading railroad policy, research, standard setting, and technology organization. AAR and its members are committed to operating the safest, most efficient, cost-effective, and environmentally sound rail transportation system in the world.

At its core, draft Measure MOB-02 impermissibly seeks to implement the District's 2006 anti-idling rules encompassed in Rules 3501 and 3502 (collectively, "3500 Rules"). Yet, on April 30, 2007, the United States District Court for the Central District of California ruled that the 3500 Rules were preempted by the Interstate Commerce Commission Termination Act ("ICCTA") and that the District even lacked authority under state law to promulgate the 3500 Rules.[2] As a result, on May 17, 2007, the U.S. District Court permanently enjoined the District from implementing or enforcing the 3500 Rules:

> [T]he District, its Governing Board, and their board members, officers, agents, employees, attorneys and all others acting in concert or participation with them, are hereby *permanently enjoined from implementing or enforcing* any provision of Rules 3501, 3502 or 3503.[3]

31-2

A true and correct copy of the permanent injunction is attached hereto as Exhibit A for your record.

On September 15, 2010, the Ninth Circuit Court of Appeals upheld the permanent injunction, affirming the District Court's ruling on the basis of ICCTA preemption.[4] Presently, the permanent injunction remains in effect. The Draft AQMP acknowledges this fact, noting that a "federal District Court decision prevents these rules from being implemented." The District should therefore remove Measure MOB-02 from the Draft AQMP.

Furthermore, the 3500 Rules remain preempted by ICCTA even though the District submitted Rules 3501 and 3502 (but not 3503) to the California Air Resources Board ("ARB") for approval and forwarding to EPA as a potential State Implementation Plan ("SIP") revision. On December 29, 2014, the United States Surface Transportation Board ("STB") opined that even if incorporated into the SIP, the 3500 Rules would be preempted by ICCTA. STB explained that:

31-3

> "[A]ctions taken and regulations enacted under federal environmental statutes or other federal statutes may directly conflict with the purposes and regulatory scheme under the Interstate Commerce Act. When such a conflict occurs, the [STB] or a court must determine whether the two federal statutes and their applicable regulatory regimes can be harmonized. [Citations omitted.] ... [I]f EPA were to approve the Rules as part of California's SIP, it appears, based on the current record, that the Rules *likely would be preempted* by [ICCTA] § 10501(B) *even under the harmonization standard* (emphasis added)."[5]

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[2] *Ass'n of Am. R.R. v. S. Coast Air Quality Mgmt. Dist.*, 2007 U.S. Dist. LEXIS 65685 at *26 (C.D. Cal. 2007).
[3] *Ass'n of Am. R.R. v. S. Coast Air Quality Mgmt. Dist.*, No. CV06-1416, Document 193 (C.D. Cal. May 17, 2007) (judgment granting permanent injunction).
[4] *Ass'n of Am. R.R. v. S. Coast Air Quality Mgmt. Dist.*, 622 F.3d 1094, 1098 (9th Cir. 2010).
[5] *Id.* At p. 8 (emphasis added)

A true and correct copy of STB's 2014 Decision is attached hereto as Exhibit B. Thus, even if EPA approves the SIP revision at some point in the future, the approval will not automatically eliminate ICCTA preemption. Of course, the possible inclusion of the 3500 Rules in an approved SIP would not affect the status of the permanent injunction, which will remain in effect unless and until it is lifted by the U.S. District Court.

31-3 Con't

For the foregoing reasons, Measure MOB-02 has no legal basis and should not be included in the Draft AQMP. AAR therefore requests that the District remove Measure MOB-02 from the Draft AQMP. AAR and its members reserve the right to provide further legal, technical, and policy comments on the next draft of the AQMP and CEQA documents.

Sincerely,



Evelyn R. Nackman

Attachments:
1) Exhibit A - Permanent Injunction
2) Exhibit B - 2014 STB Decision

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August 19, 2016

Michael Krause
SCAQMD Headquarters
21865 Copley Drive
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SUBMITTED VIA EMAIL

RE: AAR Comments on Facility Targets in MOB-02

The Association of American Railroads (AAR) and its member companies appreciate the opportunity to comment on the South Coast Air Quality Management District's ("District") Draft 2016 Air Quality Management Plan ("Draft AQMP").

Measure MOB-02 in the Draft AQMP calls for the District to establish "emission reduction targets" for rail yards. The District lacks authority to establish emission reduction targets for rail yards. Moreover, the Draft AQMP has failed to demonstrate that facility caps will not have a chilling effect on job growth and lead to increased vehicle miles traveled (VMT) and emissions, as well as increase the cost of rail transportation. Consequently, all references to facility targets should be removed from the next draft of the AQMP. The AAR also endorses the comments submitted by BizFed and CCEEB. 31-4

We appreciated the opportunity to engage with District staff through the AQMP Advisory Group and we look forward to our continued partnership.

Sincerely,

Evelyn R. Nackman

Responses to Comment Letter from Association of America Railroads
(Comment Letter #31)

Response to Comment 31-1:

Staff appreciates the support for the development of the Plan and participating in the public process.

Response to Comment 31-2:

Staff is revising the write-up on MOB-02 to limit the discussion of Rules 3501 and 3502 to the background and regulatory history sections. Please see Draft Final 2016 AQMP Appendix IV-A at pages IV-A-133–IV-A-137. The proposed implementation approach for MOB-02 is a collaborative approach to identify actions, which may be voluntary or regulatory in nature that could potentially result in additional emission reductions. The actions can be at the local, state, or federal level.

MOB-02 does not seek to impermissibly implement the District's 2006 anti-idling rules encompassed in Rules 3501 and 3502, as the commenter suggests. Rather, MOB-02 seeks to assess and identify potential actions to further reduce emissions associated with mobile sources operating in and out of rail and intermodal facilities. The identified actions can be voluntary or regulatory or other enforceable mechanisms adopted by local, state, or federal governmental agencies. The description of the draft measure notes that "[i]f emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms." AQMP 4-28. The District acknowledges that a federal District Court decision prevents Rules 3501, 3502, and 3503 from being implemented until they become federally enforceable through inclusion in the SIP and the district court lifts the injunction. However, the District disagrees that the injunction prevents the District from including MOB-02 – which seeks to assist in implementing the State SIP Strategy "Further Deployment of Clean Technologies" measures related to on-road heavy-duty vehicles, off-road equipment, and federal sources that operate in and out of railyards and intermodal yards – in the AQMP.

Response to Comment 31-3:

As the commenter notes, the District has submitted Rule 3501 and 3502 to CARB for approval and forwarding to EPA as a potential SIP revision. Shortly after the rules were adopted, the railroads challenged the District's adoption of the rules and on appeal, the Ninth Circuit upheld the lower court's injunction and declined to harmonize ICCTA and the CAA. However, the court reasoned that because the 3500 rules had not yet been approved by EPA for inclusion into the SIP and did not have the force and effect of federal law that would require harmonization, "to the extent that state and local agencies promulgate EPA-approved statewide plans under federal environmental laws (such as statewide implementation plans under the Clean Air Act), ICCTA generally does not preempt those regulations because it is possible to harmonize ICCTA with those federally recognized regulations…" *Ass'n of American Railroads v. SCAQMD*, 622 F.3d 1094, 1098 (9th Cir. 2010). Heading the court's advice, the District submitted the rules to CARB. The railroads sought an order holding the District in contempt for allegedly violating the injunction but the court rejected the motion, citing the railroads' own arguments before the Ninth Circuit that the proper course of action was for the District to submit the rules for inclusion in the SIP, where they and the Clean Air Act could be harmonized with ICCTA.

While the Surface Transportation Board later denied EPA's request to issue a declaratory order regarding whether the 3500 Rules, if included in the SIP, would be preempted by ICCTA, it provided an opinion, as

"guidance", for further proceedings. As the commenter noted, the guidance concluded that it was "likely" that the rules would be considered preempted once included in the SIP. Unfortunately, STB issued this "non-decision" in a manner which prevented the District from challenging it in court, because STB took no judicially-reviewable final action. Yet at the same time, its words are being used against the District as though an actual decision had been reached. The District believes the STB's "guidance" is legally erroneous and has continued to request that EPA approve Rules 3501 and 3502 into the SIP. The District does not dispute the commenter's statement that even if EPA approves the 3500 rules into the SIP in the future, it will not "automatically eliminate ICCTA preemption", as ICCTA and the Clean Air Act will have to be harmonized and upheld to the extent possible. The District also does not dispute that the permanent injunction will remain in effect until it is lifted by the U.S. District Court.

However, for the reasons noted in the response above, the District does not believe that MOB-02 has no legal basis. For that reason, the District is not excluding it from the AQMP.

Response to Comment 31-4:

Staff is revising the write-up on MOB-02 to clarify its intent to help implement the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures. Staff will consider the economic impacts of any proposed regulations through the working group process and the socioeconomic impact assessment. Staff will also consider other enforceable mechanisms such as agreements with affected stakeholders.

Comment Letter from Building Industry of Southern California, Inc. (Comment Letter #32)

Building Industry Association of Southern California, Inc.

August 19, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 92765

RE: Draft 2016 Air Quality Management Plan Comments

Dear Dr. Fine:

The Building Industry of Southern California, Inc. (BIASC) is pleased to provide the following comments to the Draft 2016 AQMP in continuing collaboration with the SCAQMD to produce a final plan which will both serve the goals of the District in a productive and cost effective approach, and serve the constituency and stakeholders of the SCAQMD region, through improved air quality, health benefits and economic opportunity.

The Building Industry Association of Southern California, Inc. (BIASC) is a regional trade association that represents more than 1,100 member companies within a six county region and is comprised of Chapters in Orange, Los Angeles/Ventura, Riverside/Imperial and San Bernardino counties. Together, BIASC's members build most of the new home communities throughout the same six-county region. 32-1

This AQMP will certainly be pivotal in reaching the federal attainment goals for both PM 2.5 and moving the ball forward towards ultimate Attainment status for the south coast basin. The current Draft AQMP has a number of measures which have been included into the District's attainment strategy and calculations and as such, are intended to be accountable in the State Implementation Plan (SIP). Additionally, the Draft AQMP contains a number of measures not yet determined to be viable and potential emission reductions from the measures have not be quantified and are not included in the attainment strategy. These "To Be Determined" (TBD) measures are numerous and represent a significant unknown element to the 2016 Draft AQMP. It is our hope that these TBD measures will be treated as items for further study rather than "placeholders" for intended future rulemakings. 32-2

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An Affiliate of the National Association of Home Builders and the California Building Industry Association

Baldy View
LA/Ventura
Orange County
Riverside

EGM-01: Emission Reduction from New Development and Redevelopment Projects:

BIASC along with several coalition partners provided earlier comments to the EGM-1 control measure description which AQMD staff largely incorporated into this current Draft, for which we are appreciative. We look forward to continuing collaboration on the final Plan as well as in the implementation of the AQMP beginning in 2017.

While this measure is currently not included in the attainment strategy and emission reduction calculations, we remain aware of the intention to continue to explore potential application of an indirect source rule (ISR), with the SJVAPCD rule 9510 as a primary comparative value.

Affordability is a major contributor to the increasing critical housing shortage in southern California. Regulatory efforts ranging from the Federal, State and Regional levels are often disjointed, redundant and counter-productive, leading to inordinate cost impacts to new home construction. BIASC notes that several layers of regulatory structures exists that addresses AQ concerns including the recently adopted Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) which provides a primary template for integrating land use and transportation planning region wide, while reducing Green-House-Gas (GHG) emissions though intended reduction in vehicle trips. The California Environmental Quality Act (CEQA) also provides a comprehensive environmental analysis for AQ, including GHG analysis. BIASC opposes redundant and overlapping regulatory efforts as major contributors to increasing the cost of housing.

32-3

BIASC opposed the earlier AQMD measure PR-2301 on both jurisdictional grounds as well as infringement to local land use control authority. While we remain opposed to similar rule development on the same grounds, we are committed to close collaboration with SCAQMD to explore all options including technologies, BMP's and other innovations to move the ball forward towards eventual attainment status for the SCAQMD region.

Additionally, we strongly oppose the implementation of fee based mitigation as an ineffective approach to meeting air quality improvement goals, and encourage incentive based approaches targeted at reducing both construction costs and encouraging environmentally friendly consumer behavior.

BIASC plans to be an active participant in the EGM-1 Working Group and encourages the District to reform that group early in the process following adoption of the 2016 AQMP by the Governing Board.

BCM-03: Further Emission Reduction from Paved Road Dust Sources:

BIASC suggests removal of language in this measure that references a review of National Pollution Discharge Elimination System (NPDES) measures in what we see as an infringement of the Regional Water Quality Control Board jurisdictional authority, or at a minimum a needless complication of intensions. 32-4

BIASC looks forward to continuing to work with the SCAQMD to finalize the 2016 AQMP and offers these comments in the spirit of cooperation and good public policy outcomes.

Respectfully,

Steven S. Schuyler
Executive Vice-President, Government Affairs
Building Industry Association of Southern California

Responses to Comment Letter from Building Industry Association of Southern California, Inc. (BIA) (Comment Letter #32)

Response to Comment 32-1:

Staff appreciates the collaboration during the development of the Plan and participating in the public process.

Response to Comment 32-2:

The intent of the measure is to help implement the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measure. Emission reductions are not identified at this time in part because they may overlap with reductions from the State strategy. Additional emission reductions identified through a public process will be credited in the SIP as part of future Rate-of-Progress reporting and future AQMP revisions. Please see Response to Comment 7-5 for discussion on the TBD measures.

Response to Comment 32-3:

As the commenter is aware, there is a requirement to implement “All Feasible Measures,” particularly in areas of extreme nonattainment such as the South Coast Air Basin. Staff wants to re-convene the working group to consider the concerns raised in the comments including the imposition of a fee in lieu of taking physical action during the development process. Staff also recognizes the comments regarding redundancy in regulatory efforts and will take all issues under consideration as part of the public process. Any mitigation fee would be proposed as an optional alternative to direct emission reduction. Staff looks forward in working with the industry on this measure.

Response to Comment 32-4:

Please see Response to Comment 6-2 with regard to the National Pollution Discharge Elimination System (NPDES) permit review in BCM-03. In short, the measure does not seek to “review” NPDES permit requirements or any attempt to change such requirements but rather to consider them in developing the control measure.

Comment Letter from BYD Heavy Industries (Comment Letter #33)

BYD Heavy Industries
1800 S Figueroa St.
Los Angeles, CA 90015

August 19, 2016

South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765

Re: Comments on Draft 2016 South Coast Air Quality Management Plan

Dear South Coast Air Quality Management District:

BYD Heavy Industries ("BYD") appreciates the opportunity to comment on the draft Air Quality Management Plan ("AQMP").

I. Introduction

BYD is a global manufacturer of zero-emission light-duty and heavy-duty battery electric vehicles. With its North American offices headquartered in Los Angeles, CA and multiple manufacturing facilities in Lancaster, CA, BYD seeks to support policy agendas that squarely address climate change and its associated dangers.

BYD applauds the ambitious goals set out in the AQMP and, as a member of the Los Angeles community, stands ready to do its part in making those goals a reality. Given the reality of finite resources available to address the region's air quality challenges, *it is critical that funding decisions be made with the mindset of achieving maximum emissions reductions per dollar spent.* With that in mind, BYD offers the following comments on the draft 2016 AQMP. 33-1

II. Mobile Source Control Strategies

Prioritize Commercially Available Zero-Emission Options

Incentive-based programs form an important component of the AQMP's control strategies, especially for NOx control. These urgent mitigation needs are compounded by the realities of limited funding resources, highlighting the importance of directing what funding is available toward the most effective solutions. *Therefore, in cases where a zero emission solution is available, no funding should be directed toward any technology type that results in emissions.* 33-2

Battery electric drayage trucks, transit buses, forklifts, and medium freight and delivery trucks are already commercially available and ready to meet the needs of their respective industries. Providing funding for diesel, near zero, hybrid and alternative-fuel solutions

that will continue to emit more greenhouse gases and criteria air pollutants makes no sense when completely zero-emission solutions are commercially available. The opportunity to deploy as many of these completely zero-emission heavy-duty vehicles as possible should be aggressively seized.

33-2 Con't

Positive Feedback Loops

Indeed, front-loaded investments directed toward funding the price difference between zero-emission heavy-duty vehicles and their conventional counterparts will cause that gap to narrow quickly. BYD estimates that once a program like this funds 1,000 vehicles, per vehicle pricing will drop by 30% due to efficiencies achieved by economies of scale. This price drop could be achieved in one year if the AQMP directed $200,000,000 toward a specific vehicle type, such as drayage trucks. This type of early investment strategy will allow advanced technologies to scale quickly, thereby reducing, or even eliminating, the need for incentive funding in the mid- to long-term.

33-3

Additionally, year over year decreases in battery pricing due to improved density will make these vehicles even more affordable. It should also be noted that the reduced number of mechanical parts found in electric vehicles allows for significant operational and maintenance savings. As a result of these factors, battery electric heavy-duty vehicles will become cheaper to own and operate than internal combustion alternatives.

Getting Money Out the Door

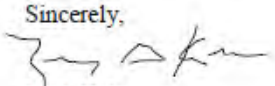
Time is of the essence with respect to mitigating the emissions currently choking the region. As such, BYD recommends that funding be disbursed utilizing voucher systems, akin to the California Air Resources Board's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP).

33-4

III. Conclusion

The goals outlined in the AQMP are thoughtful and ambitious. They will be all the more effective by directing funds toward technologies that achieve the greatest emission reductions, rather than intermediary technologies. BYD thanks the South Coast Air Quality Management District for the opportunity to provide comments.

Sincerely,



Zach Kahn
Director of Government Relations
BYD Heavy Industries
zach.kahn@byd.com

Responses to Comment Letter from BYD Heavy Industries
(Comment Letter #33)

Response to Comment 33-1:

Staff appreciates your participation in the AQMP development process and comments on the Draft Plan. Staff agrees that the most cost effective approaches are preferred in achieving maximum emission reductions for less money spent.

Response to Comment 33-2:

The Revised Draft Plan highlights the priority to maximize emission reductions utilizing zero-emitting technologies when cost-effective and feasible, and near-zero emission technologies in all other applications. Staff supports multiple pathways to reduce emissions but recognizes the more stringent ozone standards will be very challenging to meet without zero-emitting technologies, where feasible. In some applications, near-zero technologies may be needed to "bridge the gap" to zero emission technologies and to attain the needed reductions by the attainment deadlines for the 1-hr and 80 ppb 8-hr ozone standards.

Response to Comment 33-3:

Staff agrees that over time, zero-emitting technologies will become more commercially available, feasible in more applications, and cost-effective.

Response to Comment 33-4:

Staff agrees that prompt funding is important, and will consider all options in the dispensing of incentive funding and will consider the voucher program option as noted in the comment. These ideas will be discussed and considered during the working group meetings when the structure of the program is developed. Staff encourages all interested parties to participate at that time.

Comment Letter from California Construction & Industrial Materials Association (Comment Letter #34)

CALCIMA
California Construction and Industrial Materials Association

August 19, 2016

Michael Krause
Program Supervisor
South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, CA 91765

Re: Comments on DRAFT 2016 Air Quality Management Plan

Dear Mr. Krause,

California Construction & Industrial Materials Association (CalCIMA) appreciates the opportunity to comment on the South Coast Air Quality Management District's (District) draft 2016 Air Quality Management Plan (AQMP). Moving the District's air basin into attainment is a step toward improved air quality and improved economic growth by increasing the ability of businesses to operate in this region.

CalCIMA is a statewide trade association representing construction and industrial material producers in California. Our members supply the materials that build our state's infrastructure, including public roads, rail, and water projects; help build our homes, schools and hospitals; assist in growing crops and feeding livestock; and play a key role in manufacturing wallboard, roofing shingles, paint, low-energy light bulbs, and battery technology for electric cars and windmills.

CalCIMA is in support of an AQMP that provides an outline of methods to clean our air that still facilitates a reasonable business environment through regulations, workforce quality, and living environment. Accordingly, CalCIMA is highly encouraged that the District is proposing implementation of incentive programs to assist with funding the accelerated deployment of cleaner equipment that improve our basin's air quality. As an industry that has invested hundreds of millions of dollars to comply with the federal Clean Air, we find it commendable that the District recognizes the value of this past investment by committing to the development and administration of future incentive funding. Over the years, the districts' industries and agencies have been targeted to replace an extensive amount of existing equipment in order for our region to attempt to attain federal Clean Air Act objectives. It should be noted that our industry understands it is very likely that we will be targeted again to replace this equipment if incentive funding does not encourage voluntary actions to comply with the federal Clean Air Act caps on emissions that are realized through the adoption of District control measures. 34-1

Additionally, we commend the District for addressing federal sources of emissions whereas the California business owners of trucks and operations are not the only entities principally required to make emissions reductions to comply with the federal Clean Air Act. Federal government should do its' fair share to reduce emissions which can be achieved by incentivizing and regulating sources they 34-2

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are accountable for under federal law. The robust and vibrant economy of California and the District endure unique impacts due to the requirements of the Clean Air Act's continually decreasing emissions targets. Accordingly, CalCIMA appreciates the District requesting that the federal government do its' fair share in this AQMP.

CalCIMA also recognizes the partnership between the District, the region, the state, the federal government, and other stakeholders to ensure that requisite levels of funding are appropriately secured. In respect to this partnership, CalCIMA supports the District's proposal of the following actions:

- At the National Level:
  - Creation of a National Clean Air Investment and Cleanup Fund; and
  - Development of new partnerships with states and regions currently in nonattainment of existing federal air quality standards or may be in nonattainment of future air quality standards.
- At the State Level:
  - Prioritize existing funding programs to maximize the co-benefits of criteria pollutant and greenhouse gas emission reductions; and
  - Initiating new funding programs.
- At the Regional / Local Level:
  - Local ballot measures;
  - Identification of potential new sources of funding opportunities at all levels of government; and
  - Reinvigorating the District's Strategic Alliance Initiative.

34-2 Con't

Pursuant to Appendix IV-A – SCAQMD's Stationary and Mobile Sources Control Measures, posted below are CalCIMA's comments for the District's review and consideration.

CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources

Description: This proposed control measure would seek emissions reductions of NOx and VOCs from traditional combustion sources by replacement of existing equipment with zero and near-zero emission technologies via facility modernization efforts inclusive of increasing renewable fuels for power and transportation sources. Modernization can include lower emission, less toxic alternative technologies, processes, and materials along with increasing energy efficiency. Equipment that would be addressed includes non-power plant combustion sources such as engines, turbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production, and other sources that include industrial and commercial facilities operating natural gas, diesel and liquid petroleum gas (LPG) stationary and emergency engines, as well as NOx point sources from the service/commercial and manufacturing/industrial sectors.

34-3

Comment: As the District notes, cleaner emissions technology options may not have affordable upfront costs. Whereas, the installation and use of these cleaner and more efficient choices may need

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to be incentivized, and when possible, combined with existing credit based programs to provide additional sources of revenue. CalCIMA is in accordance with the District's proposal to incentivize the impacted industry with the methods outlined below:

- Loans and grants;
- Permitting and fee incentives pursuant to expansion of the existing equipment certification program and pre-approved permit program to include additional equipment categories;
- Reduced permitting fee programs for other advanced technologies;
- The mechanism of credit offsets and New Source Review incentives including expansion of the number of exemptions under Rule 1304 – Exemptions and expanding the use of the priority reserve under Rule 1309.1 – Priority Reserve, in addition this mechanism includes the adoption of a Clean Air Investment Fund and potential short-term leasing of offset credits;
- CEQA incentives such as expedited District review;
- Branding incentives that recognize businesses or equipment that reach a superior level of air quality excellence; and
- Recordkeeping and reporting incentives can reduce the recordkeeping and reporting requirements for specific zero and near-zero emission technologies.

34-3 Con't

MCS-01	Improved Breakdown Procedures and Process Re-Design

Description: This proposed control measure relates to District Rule 430 'Breakdown Provisions' and applies to breakdowns that result in a violation of any rule or permit conditions, and encompasses reporting requirements pursuant to malfunctions of continuous emissions monitoring systems (CEMS), continuous fuel gas monitoring system (CFGMS), or other equivalent monitoring systems. The rule provides relief from violations from breakdowns that are not caused by operator error, neglect, improper operation, or maintenance procedures. The period covered under this relief is limited to a maximum of 24 hours from the time the owner or operator knew or reasonably should have known of the breakdown, or to the end of the operating cycle. The operator is required to submit a written follow-up report, and District staff promptly investigates the site to determine whether the occurrence meets all District criteria to qualify as a breakdown.

34-4

Currently, Rule 430 is not approved for inclusion in the State Implementation Plan (SIP) because it does not meet U.S. EPA's policy for startups, shutdowns, and malfunctions (SSM). U.S. EPA's May 2015 final action on SSM stipulates that exemptions from excess emissions during periods of breakdown are not allowed. A piece of equipment may experience a breakdown repeatedly and still comply under Rule 430, but each breakdown event may have associated excess emissions, which have no cap or incidence limit under the current rule. U.S. EPA is currently addressing rule-specific breakdown provisions on a rule-by-rule basis when they are considered for SIP approval. The District states this control measure would introduce improved breakdown procedures and/or process re-designs that would apply to breakdowns from all emission sources, providing pollutant concentration and/or incidence limits to comply with U.S. EPA's SSM policy.

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Comment: U.S. EPA standards already address excess emissions outside of normal operation which may be the determining reason there are no SIP-creditable reductions from this control measure. Accordingly, CalCIMA is recommending the District retain Rule 430 in its' current design to reflect U.S. EPA standards. Breakdowns do not occur intentionally, and equipment is already required to be maintained in accordance with manufacturer guidelines as detailed in correlating District permits. Additional rulemaking related to Rule 430 may only result in the additional cost of resources in lieu of emissions reductions. However, if the District still plans to modify Rule 430 to further develop breakdown procedures and/or process re-designs within the AQMP, CalCIMA would like to receive a better understanding of specifically what the language would state in relation to pollutant concentration limits that will be introduced that signify when a breakdown condition occurs. And, the combustion equipment this will apply to that may be required to be readily tested with a portable analyzer that may apply to combustion equipment such as boilers, engines, and some ovens and furnaces, along with associated control equipment such as Selective Catalytic Reduction (SCR). Additionally, if Rule 430 language is further developed by the District, it is suggested that sources / facilities that have maintained compliance for a specified amount of months be exempt from breakdown emission limits in order to encourage compliance by eliminating penalties for truly accidental upset conditions.

34-4 Con't

FLX-02	Stationary Source VOC Incentives

Description: This control measure is designed to incentivize lower polluting and less toxic alternative processes and materials for existing residential, commercial, and industrial modernization.

Comment: CalCIMA is in accordance with the District that using an incentives-based approach will encourage businesses to make choices that will reduce emissions while minimizing cost impacts. An incentive-based approach is also consistent with business retention efforts, particularly in regards to replacing older higher-emitting equipment or material with new lower-emitting equipment or material.

34-5

EGM-01	Emission Reductions from New Development and Redevelopment Projects

Description: This control measure aims to mitigate and, where appropriate, reduce emissions from new development and redevelopment projects and is designed to reduce emissions related to new residential, commercial, industrial and institutional development, including redevelopment. These types of projects are considered indirect sources. An indirect source is defined as any facility, building, structure, or installation, or combination thereof, which generates or attracts mobile source activity that results in emissions of any pollutant (or precursor) for which there is a State Ambient Air Quality Standard.

34-6

California Health and Safety Code (H&SC) Section 40716 states that "a District may adopt and implement regulations to reduce or mitigate emissions from indirect and areawide sources of air pollution." As an example, a 1993 California Attorney General opinion states that "a District's regulations may require the developer of an indirect source to submit the plans to the District for

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review and comment prior to the issuance of a permit for construction by a city or county. A District may also require the owner of an indirect source to adopt reasonable post-construction measures to mitigate particular indirect effects of the facility's operation [as a stationary source]. Such regulations could be enforced through and action for civil penalties…" (Cal. Attorney General Opinion 92-519.) While other types of indirect source measures could be developed, the same attorney general's opinion concluded that the District may not impose a permitting system upon indirect sources per se, given the primacy of local land use control. H&SC Section 40716 also states that "nothing in the section constitutes an infringement on the existing authority of counties and cities to plan or control land use, and nothing in the section provides or transfers new authority over such land use to a district" when an air district adopts and implements regulations to reduce or mitigate emissions from indirect and areawide sources of air pollution or encourage or require the use of measures that reduce the number or length of vehicle trips.The District will consider whether a rule similar to SJVAPCD Rule 9510 or other mechanisms that will result in mitigating or help to mitigate and potentially further reduce emissions associated with new development or redevelopment projects should be implemented.

34-6 Con't

Comment: CalCIMA would like to be included in the work group that was established as part of the 2007 AQMP that will reconvene pursuant to this control measure to explore potential actions and innovative approaches to mitigate and potentially reduce emissions from new or redevelopment projects.

MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy and Medium-Heavy-Duty Vehicles

Description: This proposed control measure intends to seek greater emission reduction benefits through the early deployment of near-zero, partial zero-emission, and zero-emission light-heavy- and medium-heavy-duty vehicles with gross vehicle weight ratings (GVWR) from 8,501 lbs to 33,000 lbs through implementation of electric hybrid vehicles via the continuation of the State hybrid truck and bus voucher incentive project (HVIP).

34-7 Con't

Comment: CalCIMA is encouraged to support the District's proposal to continue implementation of this incentive programs to assist with funding the accelerated deployment of cleaner equipment that improve our basin's air quality.

MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles

Description: This proposed control measure seeks additional emission reductions from existing heavy heavy-duty vehicles with gross vehicle weight ratings (GVWR) greater than 33,000 lbs. Specifically while the California Air Resources Board's Truck and Bus regulation will ultimately require a majority of the heavy-duty trucks to meet 2010 heavy-duty exhaust emission standards by 2023, there is a need to deploy on-road heavy-duty trucks that have engines that are considered "near-zero" or have "zero-emission mile" capability. For the purposes of this control measure, "near-zero" is defined

34-8

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as 0.02 g/bhp-hr NOx emissions. Both voluntary incentive funding and non-monetary incentive programs would be implemented.

Comment: CalCIMA is encouraged to support the District's proposal to continue implementation of this incentive programs to assist with funding the accelerated deployment of cleaner equipment that improve our basin's air quality.

34-8 Con't

MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program

Description: This control measure would develop a mechanism to incentivize the early deployment of zero and near-zero emission trucks through the generation of mobile source emission reduction credits that can be used by other entities for compliance with other District rules. The mobile source emission reduction credits will be discounted to provide additional emission reductions to help meet air quality standards.

34-9

Comment: CalCIMA supports this program to create an on-road, mobile source emission reduction credit generation program that would encourage early deployment of zero and near-zero emission trucks.

MOB-10	Extension of the SOON Provision for Construction / Industrial Equipment

Description: This control measure aims to promote faster turnover of older in-use construction and industrial diesel engines by extending the current Surplus Off-Road Opt-In for NOx (SOON) Program beyond 2023 to 2031 with a minimum allocation of $10 million.

34-10

Comment: CalCIMA is encouraged to support the District's proposal to continue implementation of this incentive programs to assist with funding the accelerated deployment of cleaner equipment that improve our basin's air quality.

MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program

Description: This control measure aims to develop mechanisms to incentivize the early deployment of zero- and near-zero emission off-road mobile equipment where applicable or the early deployment of Tier 4 or cleaner combustion equipment where applicable through the generation of mobile source emission reduction credits that can be used by other entities for compliance with District rules where such crediting is allowed. The mobile source emission reduction credits will be discounted to provide additional emission reductions to help meet air quality standards. This measure would amend Rule 1620 to provide greater flexibility for entities to initiate projects to accelerate the deployment of zero- and near-zero emission off-road mobile equipment. For the purposes of this measure, a near-zero emission engine is one that is certified to be at least 90 percent cleaner than the current Tier 4 off-road emission standard for the horsepower specification of the off-road engine or meets the lowest optional NOx emission standard for on-road heavy-duty engines if the on-road engine is used in an off-road application.

34-11

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Comment: CalCIMA is encouraged to support the District's proposal to continue implementation of this incentive programs to assist with funding the accelerated deployment of cleaner equipment that improve our basin's air quality. However, to better understand the emissions standards pursuant to near zero engines, we are requesting clarification of the precise standards that would result from engines being certified to be 90 percent cleaner than current Tier 4 off-road emission standards. We would also recommend an incentive program be designed to support manufacturers with the research, development, and certification of zero and near-zero emission equipment. 34-11 Con't

MOB-14	Emission Reductions from Incentive Programs

Description: This control measure aims to implement a rule similar to SJVAPCD's Rule 9610 'State Implementation Plan Credit for Emission Reductions Generated through Incentive Programs' in order to have emissions reductions generated through incentive programs credited in State Implementation Plan (SIP) emission inventories. 34-12

Comment: CalCIMA is encouraged to support the District's proposal to continue implementation of this incentive programs to assist with funding the accelerated deployment of cleaner equipment that improve our basin's air quality.

BCM-03	Further Emissions Reductions from Paved Road Dust Sources

Description: The District states that particulate emissions occur whenever vehicles travel over a paved surface such as a road or parking lot through the re-suspension of loose material. Paved road dust emissions have been found to vary with what is termed the "silt loading" present on the road surface. Silt loading is more specifically defined as the mass of silt-sized material (> 75 micrometers in diameter) per unit area of the travel surface. Sources affecting silt loading generally include: 1) pavement wear and decomposition; 2) vehicle-related deposition; 3) dust fall; 4) litter; 5) mud and soil carryout from unpaved areas; 6) erosion from adjacent areas; 7) spills; 8) biological debris; 9) ice control compounds; 10) recent precipitation history; and 11) recent road sweeping/cleaning history. Because of the importance of silt loadings to emissions, paved road dust control techniques attempt to either prevent material from being deposited on the surface (preventative controls) or remove material deposited on travel lanes (mitigative controls). Examples of preventative control include covering of haul trucks or paving of access areas to construction sites. Street sweeping is an example of a mitigative control. In general, preventative controls are usually more cost-effective than mitigative controls to reduce paved road dust PM emissions. 34-13

The District's existing Rule 1157 'PM10 Emission Reductions from Aggregate and Related Operations' requires access improvements which are intended to reduce the amount of material tracked out from a facility onto surrounding paved public roads. The District's existing Rule 403 'Fugitive Dust' requires access improvements for sites greater than five acres and all material tracked out from applicable sources must be removed at the conclusion of the work day or at any time it extends more than 25 feet out from a site.

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This proposed control method would impact Rules 1157 and 403 requirements to reduce track out from stationary sources (e.g. aggregate facilities, construction sites, etc.) by specifying the most effective track out prevention measures, such as use of a wheel washing system, for sites with high vehicular activity exiting the site, or those with repeated track-out violations. The District states that the design of a wheel washing system will vary greatly depending on site-specific characteristics and anticipated traffic levels. Basic wheel washer system costs for a site with 100 trucks exiting a day have been estimated to range from $55,000 to $63,000 (approximately $12,500 for installation) and operational costs will vary with local utility rates. Wheel washing systems can also be leased for approximately $3,000 per month with one time installation/removal, including transportation, costs estimated at approximately $14,000. Operational and maintenance costs will depend on site-specific conditions. Street sweeping costs vary greatly based on number of miles and frequencies and whether the work is conducted with in-house or contracted resources. One local jurisdiction estimated twice monthly contract sweeping costs at $25 per curb mile.

34-13 Con't

Comment: CalCIMA will postpone providing expansive comments on this proposed control measure until the District releases the associated cost-effectiveness numbers pursuant to compliance. In relation to cost-effectiveness, we suggest that treatment of the water implemented in equipment be included in related calculations. Additionally, it should be noted that if the quantity of wheel washing facilities significantly increases in the District it may have an impact of water usage in correlation with the drought which does not have a foreseeable end at this point in time. This is to say that conservation of water should be at the forefront of any policy constructed in order to achieve a balanced environmental approach.

BCM-06	Emissions Reductions from Abrasive Blasting Operations

Description: This control measure addresses abrasive blasting as it relates to cleaning, preparing, or texturizing of the surface of a material such as metal or masonry by forcibly propelling a stream of abrasive material against the surface. The District states that sand is the most widely used blasting abrasive material and other abrasive materials can include slag, steel or iron shot/grit, garnet or walnut shells, and that abrasive blasting operations are done in both confined and unconfined conditions. The District's current permit conditions for abrasive blasting in confined (cabinet/machine/room) conditions require venting to a PM air pollution control (APC) equipment when in full use. Baghouses or dry filters are the most frequently used APC equipment. For open and portable blasting operations, venting to APC equipment is not required unless abrasives contain a carcinogenic toxic material. This control measure proposes voluntary applications of the following methods of control by providing incentives, primarily focusing on dry abrasive blasting operations conducted in open areas using portable blasting equipment with or without a permit. Blasting enclosures and dust collection methods include:

34-14

- A portable blasting enclosure/booth can be installed at the outdoor job site with a dust collection system. The portable enclosure for outdoor blasting can be used to further reduce emissions even when abrasives used do not contain any known carcinogenic toxic material.

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The blasting emissions can then be vented to PM APC equipment with a combination of filters installed. If abrasives contain a known carcinogenic material, a manufacturer-certified HEPA filter can be used in the APC equipment for additional control;
- The outdoor workspace may be walled off with permanent or temporary construction barriers while maintaining a negative pressure environment; and
- Pressure conditions can be monitored to ensure proper pressure is maintained so that blasting dust would not escape out of the enclosed workspace. Portable or fixed differential pressure monitors may be considered to continuously monitor and assist in the maintenance of pressure condition.

34-14 Con't

Comment: CalCIMA is encouraged to support the District's proposal to continue implementation of this incentive programs to assist with funding the accelerated deployment of cleaner equipment that improve our basin's air quality.

BCM-07	Emissions from Stone Grinding, Cutting, and Polishing Operations

Description: This control measure addresses PM emissions from stone fabrication such as grinding, cutting, drilling, scarifying, polishing, carving, and etching generates significant amounts of dust emissions containing PM10, some PM2.5, and silica particles which are known to cause lung diseases or silicosis. The control method proposes financial incentives be made available to exchange existing dry/wet equipment with new equipment that includes integrated add-on controls.

34-15

Comment: CalCIMA is encouraged to support the District's proposal to continue implementation of this incentive programs to assist with funding the accelerated deployment of cleaner equipment that improve our basin's air quality.

CalCIMA respectfully asks the District to consider our comments. Please contact me with any questions or concerns at (951) 941-7981 or at sseivright@calcima.org.

Sincerely,

Suzanne Seivright
Director of Local Governmental Affairs

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Responses to Comment Letter from California Construction and Industrial Materials Association (CalCIMA) (Comment Letter #34)

Response to Comment 34-1:

Staff appreciates your participation in the AQMP development process and support for the incentive programs.

Response to Comment 34-2:

Staff appreciates the support for the partnership for emission reductions from the federal, state and local level. In addition, staff agrees that funding would also need to be provided from a federal, state and local level.

Response to Comment 34-3:

The incentive methods provided by the commenter are supported by staff which agrees that value could be gleaned from non-financial incentives such as expedited permit review or flexibility in recordkeeping requirements.

Response to Comment 34-4:

The commenter recognizes the current challenges with the U.S. EPA policy compared to the existing Rule 430, but if and when amendments are considered for SCAQMD Rule 430, a full public process will take place. The stakeholders and interested parties can participate in the rule amendment process, including discussions of possible exemptions.

Response to Comment 34-5:

Staff appreciates the commenter's support for stationary source VOC incentives.

Response to Comment 34-6:

Staff encourages stakeholders and interested parties, including the commenter, to participate in the working group meetings during the development of the facility-based measures that affect indirect sources of emissions.

Response to Comment 34-7:

Incentive measures can be very effective in accelerating the deployment of cleaner vehicles and equipment and staff appreciates the commenter's support for the incentive programs.

Response to Comment 34-8:

Please see Response to Comment 34-7 regarding the continued implementation of incentive programs for MOB-08.

Response to Comment 34-9:

Credit generation programs can also be very effective in incentivizing the transition to cleaner technologies and staff appreciates the commenter's support for the credit generation programs.

Response to Comment 34-10:

Please see Response to Comment 34-7 regarding the continued implementation of incentive programs for MOB-10.

Response to Comment 34-11:

Staff appreciates the commenter's support for the incentive and credit generation programs, and the clarification regarding affected equipment will be further vetted as these programs are developed. Staff encourages participation from the commenter during the development of these programs.

Response to Comment 34-12:

Staff appreciates the support for incentive programs to implement MOB-14.

Response to Comment 34-13:

Cost-effectiveness estimates and water demand impacts will be provided if rule development is proposed for this source category. SCAQMD staff agrees on the importance of water conservation in all potential control programs.

Response to Comment 34-14:

Staff appreciates the support for incentive programs for BCM-06.

Response to Comment 34-15:

Staff appreciates the support for incentive programs for BCM-07.

Comment Letter from California Council for Environmental and Economic Balance (Comment Letter #35)

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August 19, 2016

Michael Krause
Planning and Rules Manager
SCAQMD Headquarters
21865 Copley Drive
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RE: Draft 2016 Air Quality Management Plan

Dear Mr. Krause:

We are pleased to submit the following comments on behalf of the California Council for Environmental and Economic Balance ("CCEEB"). CCEEB is a non-profit, non-partisan association of business, labor, and public leaders, which advances balanced policies for a strong economy and a healthy environment. CCEEB represents major mobile and stationary sources across California and is an active stakeholder at the South Coast Air Quality Management District ("SCAQMD").

CCEEB supports the general approach to the Draft Air Quality Management Plan ("AQMP"), which relies on a comprehensive mix of regulations and incentives to achieve numerous federal ozone and PM2.5 standard beginning as early as 2019 and up to 2031. The preponderance of these reductions will be achieved through direct regulations of sources, totaling 68 percent of NOx reductions by 2023, and 80 percent of NOx reductions by 2031 (from 2012 base year). However, because mobile sources account for 88 percent of all NOx emissions in the South Coast—and given the stringency of existing on-road and off-road tailpipe and engine standards, as well as stationary source regulations—aggressive incentive programs are needed to accelerate fleet and equipment turnover. To fully achieve the needed deployment of clean technologies for mobile sources in the South Coast, the SCAQMD and ARB staffs estimate that it will require about $1 billion per year of incentive funding for the next 14 years. The total cost to deploy these clean technologies is almost $40 billion through 2031. 35-1

As a general principle, CCEEB believes that staff should only submit to ARB those measures for which there are quantifiable emission reductions. This would not preclude the District from pursuing other measures within its authority; however, such measures should not become federally enforceable under the SIP. 35-2

Need Strong Partnerships to Develop Funding Plan and SIP-creditable Incentives

CCEEB places the highest priority on incentive programs that satisfy federal Clean Air Act ("CAA") emission reduction requirements and, as such, are SIP creditable. We appreciate discussion of CAA requirements in the proposed AQMP, as well as the agency's commitment to developing a viable and comprehensive funding plan. CCEEB believes that the SCAQMD should build strong partnerships with public stakeholders, the California Air Resources Board ("ARB") and U.S. EPA in this endeavor, both as a means to solicit creative and effective ideas, as well as a way to build broad-based political support and consensus. For example, CCEEB recommends that the District work with ARB to secure a portion of the money from the VW settlement to help fund the incentive measures proposed in the AQMP. It's important to consider, too, that not all incentives involve direct funding; and public partners may be best in tune with what will drive effective and innovative penetration of clean technologies.

35-3

California and the SCAQMD Must Maximize Emission Reductions Across All Incentive Programs

CCEEB acknowledges that the AQMP is ambitious. Achieving the aggressive technological transformation outlined in the plan, and in the short timeframe needed to meet federal air quality standards, will take a tremendous amount of political will, capital investment, and cross-sector support. To be credible, the District, along with ARB, must demonstrate its commitment to maximizing funding support for emission reductions across all investment programs, including the Greenhouse Gas Reduction Fund. This could involve sustained advocacy at the Legislature and the Governor's Office to ensure that spending priorities are aligned with NOx and PM2.5 control measures contained in the AQMP. While public investments can and should provide multiple benefits, the health benefits stemming from attainment of air quality standards must take priority. Public funds and the private capital they are meant to leverage are inherently limited; the District must show that it can prudently administer its fiscal resources and prioritize scarce public funds in order to demonstrate that the incentive-based regulatory strategy laid out in the proposed AQMP is both feasible and worthy of support. The District must work with the State that must be willing to lead with its own dollars to act as a catalyst for private investment.

35-4

Below, please find our comments to specific control measures.

CMB-01 Transition to Zero and Near-Zero Emission Technologies for Stationary Sources

This proposed control measure would seek emission reductions of NOx and VOCs from traditional combustion sources by replacement with zero and near-zero emission technologies.

While CCEEB understands the overall intent of this measure, we have numerous questions about many of the details it contains. For example, we believe clarity is needed to distinguish between the Zero and Near-Zero Technologies Implementation Schedule and the Facility Modernization methods of control.

We also have questions about some of the inventories used in the measure. For example, we note that Table 1 on page IV-A-50 shows NOx emissions for stationary ICEs at 22.5 tpd, yet the total fuel combustion in the 2012 Summer Planning Emissions inventory listed in Appendix 3 is 29.18 tons per day of NOx, and this includes emissions from RECLAIM sources. Clearly, there is a need to work through these numbers and ensure inventory accuracy.

35-5

Page IV-A-51 states, "Based on this analysis, staff assumes that approximately 6,300 diesel ICEs can be replaces with Tier IV engines and 110 non-diesel ICEs can be replaced by powering with electrical energy, fuel cells, or backup battery storage units. The diesel replacements are considered a short term reduction (2023) while the majority of the non-diesel ICEs are considered a long term reduction target (2031) as it is anticipated the cost will decrease and market acceptance will increase for fuel cells and/or backup battery storage units."

CCEEB is currently working with the ARB on this issue. While great progress is being made, we do not believe that there will be a sufficient supply of Tier IV engines to meet the 2023 demand. Further, we have significant concerns that non-diesel ICEs will be available in sufficient quantities to meet the 2031 demand. We believe that any target dates/years identified in the AQMP for ICEs should be aligned with the phase-out dates that CARB is identifying in the proposed rulemaking revisions to the PERP and ATCM regulations, slated to be finalized and adopted in 2017.

CMB-02 Emission Reductions from Commercial and Residential Space and Water Heating
CMB-04 Emission Reductions from Restaurant Burners and Residential Cooking
ECC-03 Additional Enhancements in Reducing Existing Residential Building Energy Use

These three measures will regulate many sources that have not previously been subject to District rules or part of an emissions reduction strategy. Moreover, these businesses, many of them small and medium-sized enterprises, will account for 75 percent of estimated compliance costs for all Stationary Source Measures, with each of the three measures costing approximately $100 million per year.

35-6

CCEEB supports staff's efforts to look at these source categories. In doing so, we ask that the District work closely with affected businesses and their representatives. For example, under CMB-04 that targets restaurant equipment, the District should work closely with the North American Association of Food Equipment Manufacturers (NAFEM) and the commercial food service industry.

CMB-03 Emission Reductions from Non-Refinery Flares

The purpose of this control measure would be to seek reductions of NOx and VOC from gas handling at non-refinery sources. CCEEB supports encouraging facilities to look for ways to reduce flaring, but due to the nature of flares and operational constraints, particularly from wastewater treatment plants and landfills, it is essential that this measure remain as an incentive. Furthermore, CCEEB encourages the District to find and encourage beneficial uses of waste gas, including pipeline injection.

35-7

CMB-05 Further NOx Reductions from RECLAIM Assessment

In this control measure, staff identifies a series of approaches that can be explored to make the program more effective in ensuring equivalency with command and control regulations implementing BARCT, and to potentially generate further NOx emission reductions at RECLAIM facilities.

CCEEB has significant concerns with inclusion of a control strategy with an assigned reduction for the RECLAIM program. We believe that there are too many unknowns at this time to assign a reduction. The program went through a significant shave just last December. That action is now under review by the Air Resources Board. We do not know the outcome of that review, but it could change the dynamics for any future reductions from the program. The December amendments also provided an opt-out for power generators. While CCEEB supported this part of the proposal, we do not know

35-8

how many facilities will chose to use it and we do not know what effect that will have on the market or the universe of RECLAIM credits. There are other provisions that also add uncertainty to the program. Staff is currently developing a provision to address credits from facilities that have shut down. Again, we do not know the impact that this will have on the market. Finally, the December amendments included a floor price for credits. This too brings with it some level of market uncertainty. Given these uncertainties, we do not believe it is appropriate for this control measure to have an assigned reduction to the plan. Rather, the AQMP should list the emission reductions from this measure as "TBD".

35-8 Con't

CTS-01 Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants

This proposed control measure seeks VOC emission reductions by focusing on select coating, adhesive, solvent, and sealant categories by further limiting the allowable VOC content in formulations or incentivizing the use of super-compliant technologies.

A portion of the proposed method of control is stated to be an additional tightening of regulatory exemptions that may be used as "loopholes" to avoid the required use of compliant products. CCEEB agrees that "loopholes" are not appropriate and should be addressed. However, we are also aware of situations that require a regulatory exemption. Many of the rules in Regulation 11 contain exemptions for valid reasons. Prior to proposing the elimination of an exemption, CCEEB strongly encourages staff to work with all stakeholders to ensure that an appropriate substitute product is readily available.

35-9

MCS–01 Improved Breakdown Procedures and Process Re-Design

The purpose of this control measure is to revise the current breakdown procedures in Rule 430 resulting in a process re-design that would apply to breakdowns from all emission sources. In that there are no SIP-creditable emission reductions associated with this control measure, CCEEB does not believe it is appropriate to include MCS-01 in the AQMP. As CCEEB has previously stated in testimony to the Board, we would support an amendment to Rule 430 outside the AQMP process that adds language to say, "Nothing in this action precludes citizen suits or EPA enforcement." CCEEB also believes that there are other alternatives that could also address EPA's policy for Shutdown, Start-Up and Malfunctions (SSM). As MCS-01 proposes only one option, the inclusion of breakdown associated emission limits into existing source specific rules for resolution of the SSM issue, CCEEB is further concerned that inclusion of MCS-01 in the AQMP would limit consideration of these other possible strategies.

35-10

MOB-01 Emission Reductions at Commercial Marine Ports;
MOB-02 Emission Reductions at Rail Yards and Intermodal Facilities;
MOB-03 Emission Reductions at Warehouse Distribution Centers; and
MOB-04 Emission Reductions at Commercial Airports

The AQMP proposes four "Facility-Based" Mobile Source Measures that reference facility based targets. CCEEB requests that all references to facility-based targets be removed. Both the District and CARB have acknowledged that the growth management and indirect source control measures are not necessary to meet the requirements of the Clean Air Act. There is no emission reduction target for these control measures in the draft AQMP. These control measures seek to reduce emissions from on- and off-road sources. These emission sources are within the exclusive purview of CARB and EPA, which already have rules and regulations to significantly reduce NOx emissions. According to the draft 2016 AQMP, the effect of the rules and regulations are significant, showing reductions of over 67 percent in NOx emissions and close to 60 percent in VOC emissions between 2012 and 2023, even with increases in fleet population. Additional mobile source emission reductions will come from new measures that achieve turnover of older vehicles with replacement by the cleanest vehicles and equipment currently available and increased penetration of commercially available near-zero and zero-emission technologies through incentives programs. 35-11

Additionally, such rules would likely have a chilling effect on business development as they could lead to increased VMT, costs, and emissions should facilities choose to site outside of the area because of these measures.

MOB-07 Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Duty Vehicles and
MOB-08 Accelerated Retirement of Older On-Road Heavy-Duty Vehicles

MOB-07 seeks additional emissions reductions through the continuation of the State Hybrid Truck and Bus Voucher Incentive Program (HVIP).

MOB-08 seeks additional emission reductions from on-road heavy-duty vehicles beyond the emissions reductions targeted in ARB's Truck and Bus Regulation. 35-12

CCEEB recognizes that these sources are a very significant component necessary to achieve the needed emission reductions to meet the basin's clean air requirements. We generally support the approach used in these measures, as both cost effective and able to show early benefits. However, we would like to see language added to ensure that these measures take a fuel neutral approach to transportation pathways. MOB-07

places priority on the early introduction of electric hybrid vehicles and zero-emission medium-heavy duty vehicles. CCEEB urges consideration of near-zero vehicle options.

35-12 Con't

We would be pleased to meet with you and your colleagues to discuss our comments in more detail.

Thank you.

Sincerely,

William J. Quinn
Chief Operating Officer

cc: Mr. Wayne Nastri, SCAQMD Acting Executive Officer
Dr. Philip Fine, SCAQMD Deputy Executive Officer
Mr. Gerald Secundy, CCEEB President
Ms. Janet Whittick, CCEEB Policy and Communications Director
Mr. Jackson Gualco, CCEEB Consultant
Ms. Kendra Daijogo, CCEEB Consultant
Members, CCEEB's South Coast Air Project

Responses to Comment Letter from California Council for Environmental and Economic Balance (CCEEB) (Comment Letter #35)

Response to Comment 35-1:

Staff appreciates your participation in the AQMP development process and support for the general approach outlined in the Draft Plan.

Response to Comment 35-2:

Please see Response to Comment 7-5 regarding TBD measures that do not have quantifiable emission reductions yet.

Response to Comment 35-3:

Staff appreciates the comment. The VW settlement is identified as one of the potential funding opportunities in the proposed Financial Incentive Funding Action Plan. A draft Financial Incentive Funding Action Plan will be released for public comments and will serve as a companion document to the AQMP.

Response to Comment 35-4:

This will be included in the development of the Financial Incentive Funding Action Plan. Also, please see Response to Comment 35-3 regarding maximizing funding support. Staff agrees on the need to support measures to reduce NOx and PM2.5.

Response to Comment 35-5:

Staff has determined potential source categories for emission reduction for the incentive programs. Upon implementation and formation of a working group, new zero and near-zero emitting technologies could be identified as well as other sources for potential NOx reductions. Staff anticipates many facilities and stakeholders will come forth and participate in the incentive program development. Once a working group is established, staff will determine the most effective means for distribution of funds to achieve emission reductions. The priority will be towards zero emitting technologies wherever possible and near-zero emitting technologies, if there are no other alternatives. The timeline for reductions will largely depend on an analysis of where the most effective reductions can be achieved. Incentives are expected to help facilities and equipment owners change out equipment earlier towards zero and near-zero technology.

Using the total fuel combustion from the 2012 Summer Planning emissions inventory, staff feels that 6 tons per day (tpd) NOx emission reductions can be achieved through regulation and if facilities are incentivized towards zero and near-zero technologies.

Many options, other than Tier 4 ICEs, are available for diesel ICE replacements such as fuel cells, battery storage, or diesel ICE bi-fuel modifications. Diesel ICEs will have to at least meet Tier 4 standards to qualify as a replacement option; however, staff will prioritize ICEs that strive for zero and near-zero emissions. Staff will also consider regulatory requirements for facilities applying for new permits for backup diesel generators such that the facility will have to demonstrate why zero or near-zero emitting alternatives are not feasible prior to approving a new permit. Incentives can be applied to encourage the replacement of existing diesel backup generators to battery storage, in applications where longer-term back-up power is

not required, or may be used for new equipment at facilities that go above and beyond regulatory requirements to use zero and near-zero technologies that may not be cost-effective.

In regards to aligning the targeted reductions with the phase-out dates for CARB's Portable Equipment Registration Program (PERP) and Airborne Toxic Control Measure (ATCM) regulations, CMB-01 includes incentive measures designed to encourage early adoption of zero and near-zero technologies, before regulatory requirements are enforced. If staff waits to implement the measure until regulatory requirements are in place, emission reductions would not be additional and therefore do not qualify for an incentive. Engine operators will be encouraged to participate in incentive programs for zero and near-zero technology and become early adopters of these technologies before regulatory compliance deadlines.

Response to Comment 35-6:

SCAQMD does plan to work with affected businesses. Please note ECC-03 is for existing residential buildings and incentives based on the equipment purchase decision.

Response to Comment 35-7:

The District agrees with the commenter with regards to encouraging the beneficial use of waste gas from landfills and wastewater treatment plants, including pipeline injection. For these types of projects that employ zero or near-zero technology, including pipeline injection, incentive opportunities can be made available under CMB-01. Incentives for infrastructure and biogas cleanup would help these sources find beneficial uses with co-benefits for these waste streams. CMB-03, however, is a regulatory measure and would require emission reductions from non-refinery flares.

Response to Comment 35-8:

Reductions in the RECLAIM program are a result of periodic BARCT assessments that evaluate any new technology that can be applied cost effectively to existing sources. Potential technologies that were identified in the December 2015 amendments would have further matured and based on past amendments, the control measure's emission reduction target is not unreasonable. One approach under serious consideration is an orderly sunsetting of the RECLAIM program which would involve a long-term transition to a command-and-control regulatory structure. The basis for staff's estimate of a potential NOx reduction of 5 tons per day is previous rulemakings, the long time period proposed to implement the reductions, and the margin between RTC's in the market and BARCT level emissions.

Response to Comment 35-9:

Staff acknowledges that there were valid reasons for the inclusion of exemptions in Regulation XI at the time of adoption. With changes and improvements in technologies, staff must re-evaluate the existing exemptions, especially when those exemptions are used as loopholes to circumvent rule requirements. Staff will work closely with stakeholders to determine if rule exemptions can be limited or removed.

Response to Comment 35-10:

Staff appreciates the commenter's concern with the inclusion of MCS-01 in the Plan, however, as the commenter is aware, U.S. EPA has expressed concerns with Rule 430, has not provided much guidance explaining a possible new policy, and there is litigation challenging the current policy. Thus, it is critical

that staff discloses the need to potentially amend existing Rule 430 pursuant to future direction from U.S. EPA. If and when amendments are considered for SCAQMD, Rule 430 a full public process will take place at which time the stakeholders and interested parties can participate in the rule amendment process, including other possible strategies or options to comply.

Response to Comment 35-11:

Please see Response to Comment 23-4 with regard to the facility-based measures to be implemented by the SCAQMD.

Response to Comment 35-12:

Additional language has been added to encourage the deployment of zero-emission technologies wherever feasible and near-zero emission technologies everywhere else.

Comment Letter from California Hydrogen Business Council (Comment Letter #36)

CALIFORNIA HYDROGEN BUSINESS COUNCIL

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August 19, 2016

Comments by California Hydrogen Business Council on SCAQMD's draft 2016 Air Quality Management Plan

Executive Director Jeff Serfass appreciated the opportunity to provide in-person comments on SCAQMD's Air Quality Management Plan (AQMP) at its Diamond Bar workshop on July 14th. The comments below expand on his verbal comments.

In the Plan's attention to distributed generation resources, it should be recognized that hydrogen and fuel cells used for stationary power and in microgrids can eliminate the need for some combustion energy facilities. Generation of fuel cell electric energy close to commercial and industrial loads, and even residential facilities, can provide the advantages of distributed resources without production of NO_xs and other products of combustion turbines and engines. 36-1

The Plan places appropriate emphasis on the role of solar and wind resources. Hydrogen produced from intermittent, sometimes excess renewable energy can be a management tool that enhances a solar and wind strategy. Hydrogen produced from solar and wind, that is then used in power to gas strategies and directly as a transportation fuel, will help match the combination of loads and the renewable resources. We ask that SCAQMD work with the California ISO and others to plan to maximize the use of solar and wind resources with hydrogen as a keystone to the strategy. 36-2

Mobile source control strategies promoted by the California Air Resources Board don't explicitly mention hydrogen and fuel cell technologies which are well suited for now and in the future. For example, hydrogen can be employed in ports to create a full hydrogen economy there, serving the entire goods movement chain with an integrated systems approach.[1] Very importantly, this allows for the synergism of co-benefits that can also be applied to light duty vehicles throughout the basin with fuel infrastructure benefits. 36-3

The Plan states that renewable energy technologies must still be supplemented by fossil fuel generation due to the intermittency of renewable energy. This is simply not true. Energy storage, and in particular, bulk energy storage supplied by hydrogen strategies, can make a 100% renewable energy electric system possible. 36-4

In the Plan, energy storage is considered as an electron to electron system and fails to understand the role of power to gas and the opportunities for larger scale energy storage systems that can't easily be met by battery or other limited storage options. It is easy to conclude that hydrogen energy storage in an "electrons 36-5

[1] See "The Port of the Future: The Potential of Fuel Cells to Green Our Nation's Ports" at http://hfcarchive.org/wp-content/uploads/2012/02/Port-of-the-Future.pdf

to storage to electrons" strategy does not meet efficiency or cost objectives, but hydrogen energy storage strategies through power to gas and supply of hydrogen as a vehicle fuel can meet efficiency and cost goals, offering larger-scale, longer duration storage systems. At the Workshop, interest in power to gas information and data was expressed so attached to these comments is the CHBC White Paper on Hydrogen and Energy Storage and Power to Gas.

36-5 Con't

The Plan could benefit from asserting what the end game is, to provide certainty about where we really need to get to.

The AQMP should assert its role in ensuring that the hydrogen infrastructure is built faster, for support of a faster turnover from combustion engines to non-combustion fuel cell electric vehicles. The AQMP needs to work with industry to accelerate fleet turnover. The current regional and state plans do not necessarily reduce emissions as "expeditiously as practical" and needs to recognize the urgency for quicker action.

36-6

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About the California Hydrogen Business Council

The California Hydrogen Business Council is comprised of organizations and individuals involved in the business of hydrogen. Its mission is to advance the commercialization of hydrogen in transportation and stationary sources to reduce emissions and dependence on foreign oil. More information at www.californiahydrogen.org

CALIFORNIA HYDROGEN BUSINESS COUNCIL

Power-to-Gas: The Case for Hydrogen White Paper

INTRODUCTION

California is faced with an increasingly urgent need to deploy utility-scale energy storage solutions to support the integration of a rapidly expanding supply of intermittent renewable power generation resources. One promising approach to address this need is the use of hydrogen as an energy storage medium in an approach referred to as Power-to-Gas (or P2G). In this approach, hydrogen produced from electrical energy via electrolysis is used as an energy storage medium either directly or after further conversion to methane as the carrier. Electrolysis is a mature technology which converts electricity into hydrogen (and oxygen) by splitting water. Beyond the storage function of converting electricity to gaseous fuel for later use, these systems can cycle up and down rapidly providing additional grid support functions including voltage and frequency regulation and rapid ramping up or down as needed. This technology is currently being deployed in Europe and Canada but is only at the early demonstration phase in California and is not as widely known as other energy storage approaches such as batteries, pumped hydro and compressed air. This White Paper is intended to provide policy makers and other interested parties with an overview of the concept and its potential a cost-effective resource for fuel production and grid services.

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CALIFORNIA HYDROGEN BUSINESS COUNCIL

Power-to-Gas: The Case for Hydrogen
White Paper

BACKGROUND

Countries around the world are investing heavily in renewable generation with wind and solar as the dominant technologies. Without large-scale storage of electrical energy, power grids cannot accommodate high levels of intermittent renewable resources because of mismatches in supply and demand which can result in periods of significant excess generation creating the need for bulk storage. Short-term, rapid fluctuation in power production from wind and solar also challenge the ability of the grid to respond creating the need for rapidly responding grid resources. This situation is predicted to become acute in California over the coming five years as solar production peaks near mid-day and declines rapidly just as demand peaks in the late afternoon and early evening creating a the need for rapid ramp up of replacement power. This need will become even more dramatic as California progresses toward its goal of 50% renewable power by 2030. A similar situation can exist with wind resources which can show high production in pre-dawn hours when demand is low. In periods when supply exceeds demand, excess wind power must be curtailed, which wastes a renewable resource. In such periods of excess, which can span minutes, hours or even days, large amounts of renewable electricity can be lost simply because the grid cannot accept the power.

Power-to-Gas (P2G) represents one potential tool for managing renewable power intermittency and over-generation. Simply described, P2G is the process of using electrolysis to split water into hydrogen and oxygen. Through this process, electrical energy is converted to chemical energy in the form of hydrogen. The hydrogen can then be transported through the natural gas grid via blending or further conversion to methane, transported by other means such as trucks, or used directly at the point of production. The stored chemical energy can be used to generate electricity via a fuel cell or other generation device, as a transportation fuel, or for any other purpose for which hydrogen or methane is used. The water consumption of the P2G process is small, with about 50 gallons of water required to convert 1 MWh of power into 20 kg of hydrogen. Put another way, all of the energy required to run a household could be stored by converting less than 1% of the indoor water it consumes.

The Power-to-Gas concept is illustrated in Figure 1 and Figure 2 shows the potential for rapid-response capability of P2G systems. An important distinction between P2G and other forms of energy storage is that P2G allows conversion of energy amongst a variety of sectors and end-uses (e.g., electric grid, gas grid, transportation fuel) and takes advantage of the natural gas grid as an existing and inexpensive storage resource to augment, and in some instances replace, dedicated hydrogen storage infrastructure. Defining grid electricity storage to include conversion and later use in non-electrical forms of energy is critical to achieving emissions and climate goals in a least-cost, best-fit manner. Constraining storage solutions to "electricity-in, electricity-out" only will increase the cost of intermittency.

CALIFORNIA HYDROGEN BUSINESS COUNCIL

Power-to-Gas: The Case for Hydrogen White Paper

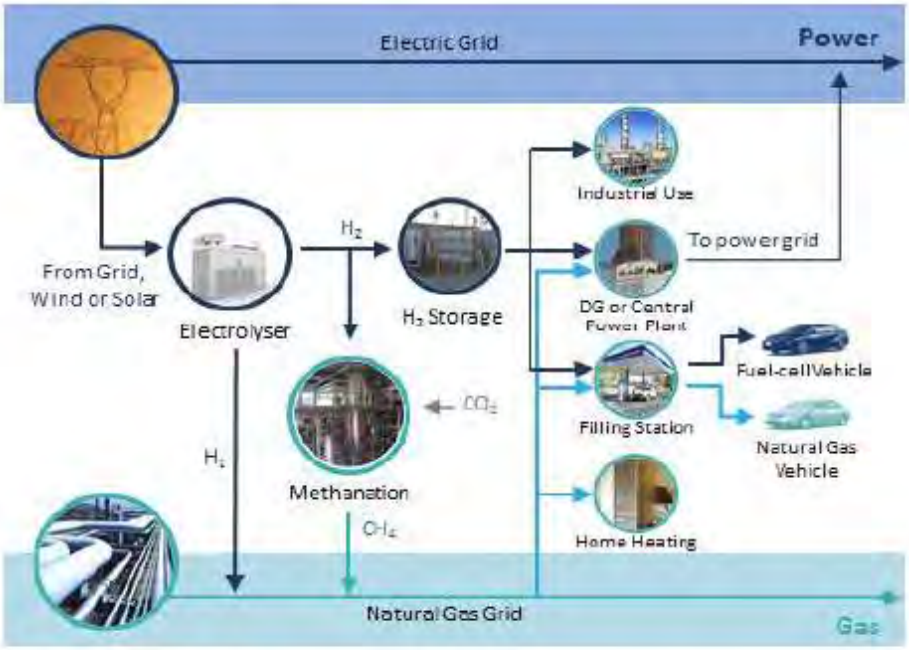

Figure 1 – Power-to-Gas Concept

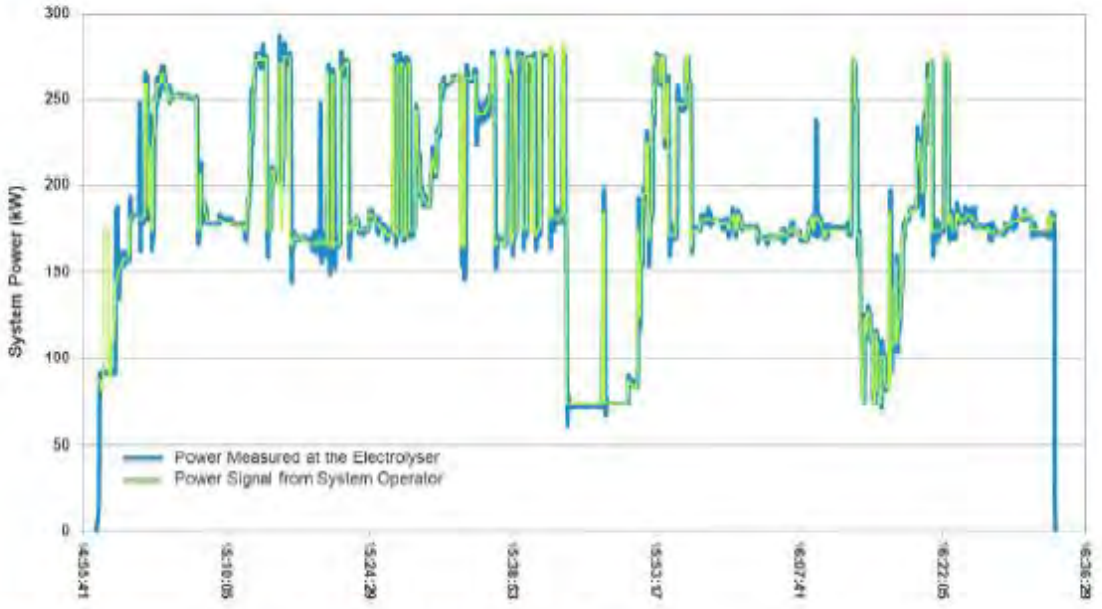

Figure 2 – Electrolyzer Sub-second Load Following Capability

THE NEED FOR GRID-SCALE ENERGY STORAGE

The need for grid-scale energy storage to manage renewable energy intermittency and over-generation is evident in Europe, where large deployments of renewable power resources often produce excess power that out-strips demand. For example, between 2011 and 2012, 'constraint payments' to wind farms by National Grid were over ten percent of the total amount paid to all generators, which totalled around $55 million.[1] The value of the balancing services market in the UK for 2014/15 rose to more than $1.7billion. In some areas of Germany, 30% of the wind production is curtailed.[2]

Closer to home, Texas and Washington have faced their own renewable energy challenges. In Texas, renewable power over-generation and transmission capacity constraints resulted in negative energy prices in 2011–2013.[3] In Washington, Bonneville Power Administration paid wind farmers nearly $3 million over several months in 2012 to curtail their power deliveries.[4]

The California Independent System Operator (CAISO) forecasts similar challenges for the California grid. Shown in Figure 3, the now famous "Duck Curve[5]" (this refers to the shape of the CAISO net load (grid supplied power) plotted against time of day)

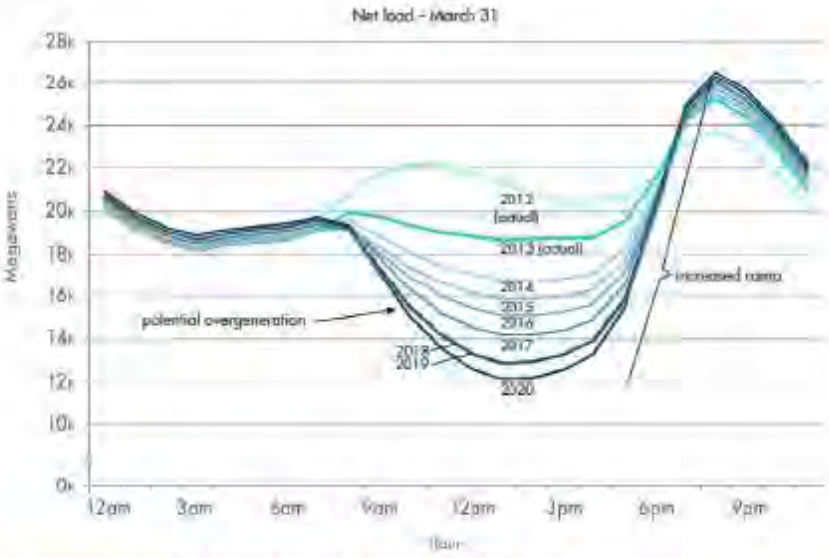

Figure 3 – "The Duck Curve" – Net Load Curve
Source: DEMAND RESPONSE AND ENERGY EFFICIENCY ROADMAP, CAISO, 2013

[1] http://instituteforenergyresearch.org/analysis/uk-pays-millions-to-wind-farms-not-to-generate-electricity-while-scotland-fells-trees-to-build-more-wind-farms/#_edn3
[2] Presentation by Dr. Alexander Vogel, Gas to Power Conference, Cologne, Germany, November 2012
[3] http://www.eia.gov/todayinenergy/detail.cfm?id=16831
[4] http://washingtonstatewire.com/blog/too-much-windpower-rivers-surged-this-summer-and-oversupply-cost-2-7-million/
[5] This curve is the net load served by the California Independent System Operator and it reflects the reduced load in the middle part of the day created by increasing amounts of self-generated solar energy. Surplus results when the system supply exceeds demand, at which point "must run" resource must be curtailed to protect the system.

could lead to annual surplus renewable energy of up to 12,000 GWh (nearly 10% of renewable production) under a 50% renewables scenario.[6] In addition, the rapid decline of solar production in the later afternoon and evening will also lead to the need for rapid ramping of replacement resources, which will add cost to the grid and also pose technical challenges for both the electric and natural gas grids. Storage will be a technical necessity if California is to reach its goals for renewable electricity.

The Duck Curve clearly shows the need for load shifting over periods of four to twelve hours. In addition, at high penetration levels of solar and wind resources, not only daily, but also seasonal variations in resource level will require storage resources over longer time periods. Power-to-Gas is uniquely suited to these long-duration storage needs.

While battery costs go up in proportion to the quantity of energy stored (duration), P2G cost is nearly independent of the quantity of energy stored when the existing gas grid is used as the storage medium as illustrated in Figure 4. Although future costs are subject to uncertainty, the cases assessed here reflect a cross-over in efficiency-adjusted capital cost with lithium-ion battery costs at a storage duration of between 12 hours and 35 hours of storage capacity. The case labelled "Dedicated Fuel Cell" assumes that a fuel cell is part of the system cost to reconvert storage energy to electricity. The "Existing Generation" case assumes that the gaseous fuel produced by the P2G system is transported over the natural gas system and used in an existing generation resource.

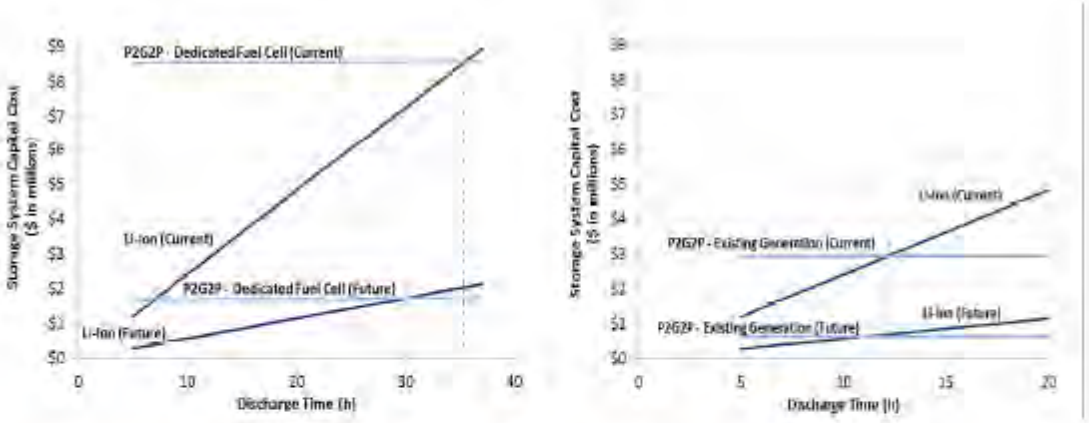

Figure 4 – Capital Cost versus Storage Duration for 1 MW (output) Battery and P2G2P Systems

[6] https://www.ethree.com/documents/California_Utility_Brief_E3_Study_Final.pdf

THE POWER-TO-GAS GRID-SCALE ENERGY STORAGE SOLUTION

Power-to-Gas represents a viable and potentially low-cost approach to large-scale energy storage, and electrolyzers can also serve other grid functions such as rapid demand or supply response, spinning reserve, and frequency and voltage regulation. As shown in Figure 5 below, P2G is a technology that can be similar in scale to pumped hydro and compressed air but is much more modular and flexible in siting and can utilize the vast storage capacity of the existing natural gas grid. As an example, over 130 billion cubic feet of natural gas storage capacity exists in Southern California. To put this in perspective, this is enough to supply all of the gas-fired generation in the region for more than two months.

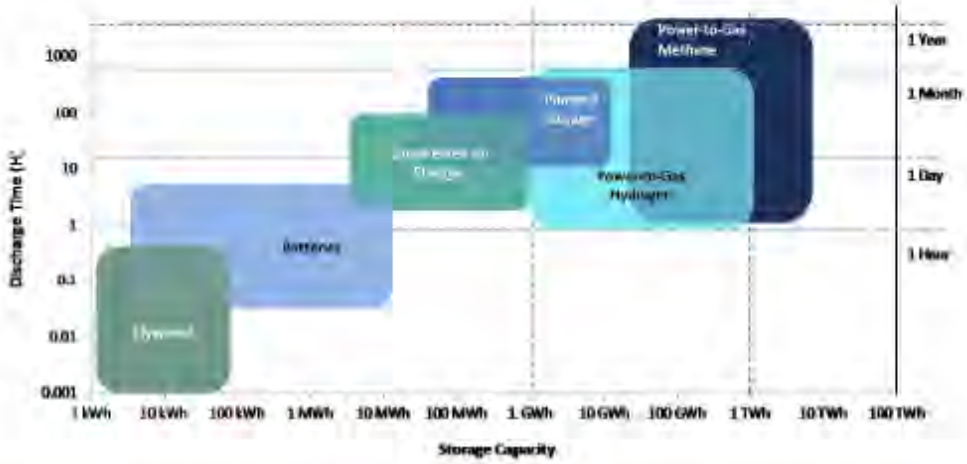

Figure 5 – Storage Technologies and Power / Energy Characteristics (After Fraunhofer ISE, 2015)

As discussed, P2G has the unique feature of converting electrical energy into chemical energy in the form of hydrogen or methane. This expands the range of storage use cases to include use as a vehicle fuel for fuel cell or natural gas vehicles. Today, vehicle fuel carries a substantially higher value than electricity on an energy-equivalent basis. Like other energy storage technologies that are especially amenable to bulk energy storage (e.g., pumped hydro, compressed air), the incremental cost of increasing storage capacity is low. This feature enables lower cost bulk energy storage of the type and duration (e.g., daily, seasonal) that will be required for mitigating renewable power curtailment.[7]

Other key attributes of P2G energy storage include its modularity to support sub-megawatt to multi-megawatt deployment, siting flexibility (due to footprint, zero or near-zero emissions and

[7] Maton, Zhao and Brouwer, International Journal of Hydrogen Energy, Volume 38, pp. 7867-7880, 2013

low noise), sub-second response times, minimal adverse environmental impacts, the use of the existing massive gas pipeline infrastructure and technical maturity. Because of these features, P2G is being actively pursued as a storage solution around the globe. This includes megawatt-scale installations in Europe[8] and Canada[9].

Various government agencies have also begun to recognize the merits of P2G:

- An industry panel advising the European Union's hydrogen research program said in 2011, "hydrogen has the potential of storing virtually unlimited amounts of renewable energy to be converted back into the grid by stationary fuel cells with high efficiency and quick response times, enabling incorporation of large amounts of intermittent solar and wind power into the grid as base load."[10]
- The UK's Department of Energy and Climate Change (DECC) "2050 Pathways Analysis" indicates that energy storage using hydrogen is a critical area.[11] Sandia National Laboratories concluded in 2011 that "Hydrogen energy storage is an ideal match for renewables of all scales, especially large-scale wind."[12]
- The National Renewable Energy Laboratory has examined the potential of storing large amounts of hydrogen in the natural gas pipeline system, and developed a lifecycle cost analysis of hydrogen versus other technologies for electrical energy storage demonstrating positive benefit to cost ratios under a variety of scenarios.[13]
- A recent report on energy storage funded by the European Commission Fuel Cell and Hydrogen Joint Undertaking identifies a major role for hydrogen energy storage if Europe is to meet its 2050 carbon goals. The report identifies the potential need in Europe for several hundred GW of electrolyzer capacity to serve energy storage needs, with up to 170 GW in Germany alone. It states that the use of electrolytic hydrogen in the gas grid, transportation or industrial sectors can productively utilize nearly all excess renewable energy.[14]

[8] http://www.iea.org/media/workshops/2014/hydrogenroadmap/13hydrogenicsrobertharvey.pdf
[9] http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/ontario-picks-contenders-for-wind-solar-energy-storage/article19901932/
[10] https://www.sintef.no/upload/Materialer_kjemi/kurs_konferanser/symposium-Water-electrolysis-and-hydrogen-as-a-part-of-the-future-renewable-energy-system.pdf
[11] https://www.gov.uk/2050-pathways-analysis
[12] http:// prod.sandia.gov/techlib/access-control.cgi/2011/114845.pdf
[13] http://www.nrel.gov/hydrogen/pdfs/48360.pdf
[14] http://www.fch-ju.eu/sites/default/files/4-FCH%20JU%20-%20NL%20Panel%205%20%20Energy%20Storage%20study%20%28ID%201356957%29%20%28ID%201375431%29%20%28ID%201375739%29.pdf

UTILIZING NATURAL GAS PIPELINE SYSTEMS

HYDROGEN INJECTION AND BLENDING

The existing natural gas pipeline system provides an existing and ubiquitous network that could potentially be used for delivering hydrogen in the form of a hydrogen-natural-gas blend. The hydrogen/natural gas mixture can then be delivered to end use systems for use with or without separation. Natural gas pipelines are widespread and highly interconnected throughout North America, while being well monitored, maintained, and regulated.

Because the physical and chemical properties of hydrogen are different from natural gas, the permissible hydrogen fraction is limited. Research studies have suggested that volume fractions of up to 20% could be tolerated, although the highest current limit in Europe is 12% (Holland) with most standards below 5%.[15] The gas grid in Hawaii currently delivers gas containing 10% hydrogen.[16] Research and analysis is in progress by various entities in the U.S. to determine appropriate blending limits. A test and evaluation project on this topic is currently in progress at the University of California, Irvine.

METHANATION

Another method of utilizing the natural gas pipeline system is to methanize the hydrogen prior to injecting it by combining the hydrogen with carbon dioxide, from waste sources for example, to create methane. The resultant renewable methane (assuming 100% renewable electricity as the energy source) is interchangeable with conventional natural gas and can be stored and transported over the natural gas system and used without restriction. Very large amounts of over-generation from renewables could be accommodated via methanation, which opens the possibility of synergistically de-carbonizing both the electricity and natural gas grids.

POWER-TO-GAS ECONOMIC ANALYSIS

The economics of Power-to-Gas depend upon the ultimate use of the hydrogen and the type and amount of grid services provided and, like other technologies in early deployment, upon further reduction in system costs as designs evolve, performance improves and manufacturing volumes increase. A variety of storage and related functions can be performed by electrolyzers depending upon the system configuration and the value of the various functions performed.

[15] http://www.nrel.gov/docs/fy13osti/51995.pdf
[16] Hydrogen Delivery Technical Team Roadmap, U.S. DRIVE Partnership, 2013.

Relative to storage functionality, there are two broad categories of systems: those that return power to the grid (Power-to-Gas-to-Power) and those that store and use electrical energy in the form of gaseous fuel (Power-to-Gas). Several grid services can be provided by electrolyzer systems. These include:

- Energy time shifting (arbitrage)
- Voltage and frequency regulation
- Ramping
- System Capacity
- Rapid Demand and Supply Response
- T&D investment deferral

Analysis of system cost effectiveness requires assessment of the value of various functions that can be performed by various system configurations and then optimization of the system dispatch over the time period being analyzed to achieve optimal economic dispatch. Such analyses are dependent upon the local power system and regional economics, so that these analyses must be done on a localized basis. Full-up modeling of the western U.S electricity grid under alternative deployment scenarios utilizing differing mixes for battery and P2G resources is being conducted by the National Renewable Energy Laboratory and the University of California, Irvine and initial results will be published later this year. Initial results from these analyses of energy conversion using electrolysis illustrate the potentially compelling business case for Power-to-Gas.

Figure 6 shows the cost of producing hydrogen and methane respectively under various prices for input electrical energy. Currently applicable time-of-use rates in Southern California are in the $0.07/kWh to $0.09/kWh range. However, new rate and market structures being developed by the California Independent System Operator (CAISO) and the electric utilities will make the effective cost of electricity significantly lower by providing rate offsets or revenue streams for a variety of grid functions. Depending upon location, additional revenue (or rate discounts) could be available for voltage and frequency support, as well as various types of investment deferral that will likely include alternative forms of energy storage. For the current discussion, these effects are captured though the range of input electricity prices of zero (free curtailed electricity) to $0.06/kWh (potential future off-peak rate).

The results of this analysis show that, based upon expected progress on technology cost, hydrogen and methane can be can be produced at costs comparable to conventional vehicle fuel. This is without consideration of any renewable fuel premium, which could be in the range of $2 per gasoline gallon equivalent in the 2030 time frame.[17] Alternatively, intermittent

[17] ICF International. http://www.caletc.com/wp-content/uploads/2014/04/ICF-Report-Final-2.pdf

renewable electricity could be converted to fuel, transported on the gas grid, and redelivered as fully dispatchable renewable electricity (via existing combined cycle or natural-gas-capable fuel cell generators) at less than $0.07/kWh. This is net of conversion losses (55% fuel-to-electricity efficiency and no charge for surplus electricity).

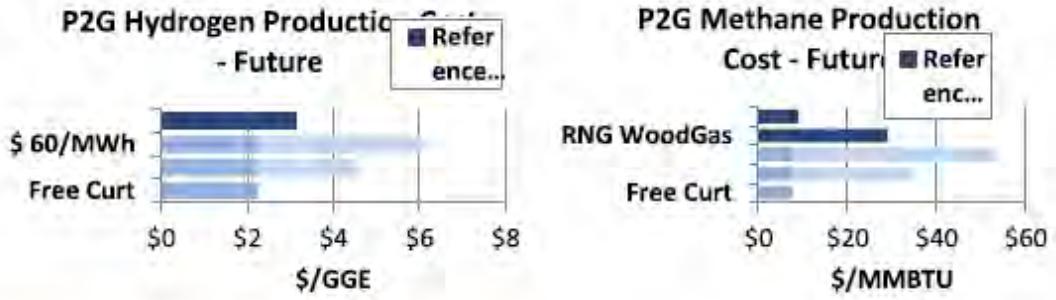

Figure 6 – Production Cost of Fuel via Power-to-Gas

As noted below, grid services provide potential additional revenue streams that can further enhance the value proposition for Power-to-Gas systems. Figure 7 illustrates the value of shifting electricity consumption to the least expensive time (arbitrage) and also from providing ancillary services to the grid operator. The analysis employs the assumptions used in the current DOE H2A model ("Future Central Hydrogen Production from PEM electrolysis v3.0" which features a base feedstock cost of $0.066/kWh).[18] The potential ancillary services provided include regulation, spinning reserve and non-spinning reserve. Electrolyzer behavior was calculated using an operations optimization model that maximizes revenues and minimizes operating expenses. The value of grid services can generally be expected to

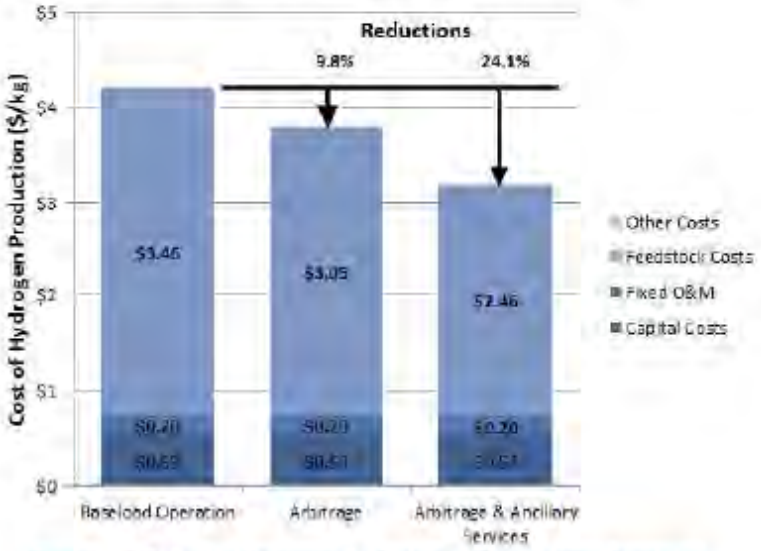

Figure 7 – Potential Incremental Value of Electrolyzer Providing Grid Services

[18] http://www.hydrogen.energy.gov/h2a_production.html

increase at higher levels of renewables penetration.

POLICY AND REGULATORY ISSUES

There are a number of features of Power-to-Gas that differ from other storage technologies such as batteries, compressed air and pumped hydro. Most notably, the value of P2G is maximized when the use of stored energy can be either in the form of electricity or fuel. It will be important for market structures and tariffs to recognize this attribute. Although not the dominant scenario, there are other examples of mixed pathways that have been accepted by the California Public Utilities Commission (CPUC), such as use of electricity to make ice used for space cooling without reconversion. Compressed air could also be used for direct mechanical drive for example. Because innovation can be expected to produce more mixed-energy-mode storage scenarios, it is important to anticipate them in development of policy and regulation. Other rules and standards may need to be adapted as well, for example, modifying spinning reserve standards to accommodate rapid-response systems that do no employ rotating equipment.

In addition, like other developmental technologies, Power-to-Gas will require research, development and demonstration. Support from state and federal agencies will be critical to reducing cost and ensuring that the potential of P2G is reached. Currently, RD&D funding for battery technology is orders of magnitude greater than that for P2G. A robust P2G RD&D program should be a priority for the state of California.

SUMMARY

The case for using hydrogen and/or methane to store renewable energy is compelling for a number of important use cases. Power-to-Gas energy storage leverages an already existing storage infrastructure that has a vast amount of capacity, the natural gas grid, making P2G an excellent candidate for long-duration storage applications. It is unique because it is a multi-functional technology that serves use cases that support the electricity, transportation and heating sectors.

- Electrolysis is the only viable and commercially proven method of producing hydrogen from highly variable renewable electricity generation. Electrolyzers can provide a dynamic response to supply and load fluctuations – a critical factor in grid stabilization.
- Once produced, hydrogen can be used for high-value applications such as for clean transport fuel therefore turning electricity into a high value road fuel capable of extended range and rapid fueling characteristics.

- Hydrogen, or methane generated from hydrogen, can also be injected into the natural gas pipeline system providing a flexible method of storing renewable energy for all the traditional uses of natural gas.
- The use of widespread electrolysis in California will not adversely affect the drought situation as the water converted by the electrolyzers is modest in amount, can be reclaimed water, and can be recovered in some cycles such as when used in a fuel cell.
- The need (and opportunity) for bulk energy storage in California is potentially in the TWh range, given the developing "duck curve", the mandate for energy storage procurement and the state's goals to transition to non-petroleum vehicle fuels.
- The cost of fuel produced via Power-to-Gas is competitive with other pathways to produce renewable fuel and the cost competitiveness will increase as the need for (and value of) grid services increases.
- P2G can be cost effective for electricity storage if the cost of input electricity is low such as at times of surplus supply.
- The value proposition for P2G as grid storage is being developed along with other forms of energy storage, but important market-structure, regulatory and policy issues must be addressed in the near term to capture this value starting with increased awareness of the multiple facets and successful international deployment of P2G.

APPENDIX

SUMMARY OF ANALYSIS ASSUMPTIONS

Primary Assumptions – P2G		
Electrolyzer Cost - Future	314.15 $/kW	DOE H2A Future Central Electrolysis Model v3.0 - Escalated to Year 2015 Dollars
Electrolyzer Cost - Current	478.3 $/kW	DOE H2A Current Central Electrolysis Model v3.0 - Escalated to Year 2015 Dollars
Fixed O&M Cost	25 $/kW-yr	Average of Source A from Alex - "A: Behnam Zakerin, Sanna Syri "Electrical energy storage systems: A comparative life cycle cost analysis", Renewable and Sustainable Energy Reviews, 2014/15.
Cost of Money	10%	
Regulation Service	38.5 $/MWh	"Ancillary Services: Technical and Commercial Insights" by Brendan Kirby, July 2007
Regulation Fraction	2% of Capacity	"Ancillary Services: Technical and Commercial Insights" by Brendan Kirby, July 2007
Spinning Reserve Service	8.4 $/MWh	"Ancillary Services: Technical and Commercial Insights" by Brendan Kirby, July 2007
Spinning Reserve Fraction	100% of Capacity	
Economic Life	15 years	
Dispensing and Delivery Capital Cost	1.4744 $/kg H2	DOE HDSAM for LA Area
Electrolyzer Efficiency	44.7 kWh/kg H2	DOE 2015 target

REPRESENTATIVE HYDROGEN ENERGY STORAGE USE CASES

Case	Description	Hours of storage	Power to electrolyzer	Power out	Benefits
1	Addressing the duck curve	8	0.5 to 1 MW	1 MW	Renewable firming, ramping, capacity, regulation, energy, reserves
2	Utilizing surplus renewables for fuel	(8)	1 MW	0	Regulation-up, curtailment charges, FCEV fuel sales
3	Integrated power and fueling	TBD	TBD	TBD	DG benefits, deferral, plus EV power and FCEV fuel
4	Investment deferral / peak shaving (substation)	4	1 MW	1 MW	T&D upgrade deferral, energy time shift, regulation, reserves
5	DG and Voltage / VAR support	8	1 MW	1 MVAR	VAR support, voltage support, peak shaving, reserves

POWER-TO-GAS PROJECTS IN EUROPE



Further information can be found at: http://www.europeanpowertogas.com/demonstrations

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White Paper published on October 8, 2015

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Responses to Comment Letter from California Hydrogen Business Council (Comment Letter #36)

Response to Comment 36-1:

Staff recognizes the value of fuel cells as a possible option to reduce emissions in a variety of applications. The Draft Plan discusses fuel cell technology in a number of control measures found in Appendix IV-A of the Plan.

Response to Comment 36-2:

Chapter 10 has been updated to expand on both power to gas strategies and hydrogen as a transportation fuel.

Response to Comment 36-3:

For the revised draft, fuel cell technologies will be explicitly mentioned as a potential zero-emission technology.

Response to Comment 36-4:

Chapter 10 has been updated to expand the discussion on the need to supplement renewable energy. Please refer to the "Challenges and Opportunities in Moving Towards 100 Percent Renewable Power" section.

Response to Comment 36-5:

Chapter 10 has been updated to expand on both power to gas strategies and hydrogen as a transportation fuel.

Response to Comment 36-6:

Chapter 10 has been updated to expand on hydrogen infrastructure discussion. Staff acknowledges the receipt of the "Power-to-Gas: The Case for Hydrogen White Paper" document.

Comment Letter from California Trucking Association (Comment Letter #37)

August 19, 2016

South Coast Air Quality Management District
21865 Copley Dr
Diamond Bar, CA 91765

Submitted Electronically

Thank you for the opportunity to comment on the Initial Draft of the 2016 Air Quality Management Plan (AQMP). The California Trucking Association (CTA) is the nation's largest statewide trade association representing the trucking industry.

Trucking Will Meet and Exceed "Fair Share" Emission Reductions without "Further Deployment"

California's trucking industry is already subject to the most stringent emission regulations in the nation. In the past ten years, the California Air Resources Board (CARB) adopted a comprehensive suite of air quality rules which regulate nearly every facet of the in-use emissions from heavy-duty trucks. The industry spends approximately $1 billion annually in compliance costs for these rules, which include: 37-1

- Statewide Truck and Bus Rule
- Statewide Drayage Truck Regulation
- Transport Refrigeration Unit Air Toxic Control Measure
- Heavy Duty Tractor-Trailer Greenhouse Gas Reduction Measure
- Commercial Vehicle Idle Reduction Program
- Heavy Duty Vehicle Inspection Program
- Periodic Smoke Inspection Program

Increased California-only costs from State strategies to reduce the carbon intensity and price the carbon content of fuel such as the Low Carbon Fuel Standard (LCFS) and Cap and Trade will also cost the trucking industry somewhere between $500 million and $1 billion annually through 2020[1].

These existing regulations are estimated to by the Air Resources Board (ARB) achieve a 71% reduction in NOx from current levels.

[1] Assumes 3 billion gallons of diesel consumed annually 2016-2020. Conservatively estimate CO2 allowance price to remain at auction floor. Low costs in 2016 of $0.13/gallon increased cost from Cap and Trade and a $100/MTCO2 LCFS credit price. High Costs in 2020 of a $0.17/gallon increased cost from Cap and Trade and a $200/MTCO2 LCFS credit price.

Estimated Emissions from Medium/Heavy-Duty Trucks		
	Remaining NOx (tpd)	Reduction from Current Levels
Current Regulations	43	71%
Current and Proposed CARB Mobile Source Stategy	28	81%
Current, Proposed and CARB Further Deployment On-Road Heavy Duty	17	89%
Current, Proposed, and AQMP Incentives (Table 4-15)	8	95%

*Based on 2012 - 2031 Summer Planning Inventory for Class 2B - 8 Diesel Trucks

Proposed, quantified measures in CARB's Mobile Source Strategy increase the reductions to **81%** without the anticipation of further deployment or development of cleaner technologies. As discussed throughout the AQMP Advisory Group process, each sector was anticipated to help achieve a "fair share" reduction goal of 80% from current levels. Trucking is forecasted to exceed this goal without further action beyond current regulations and proposed, quantified measures in the CARB Mobile Source Strategy.

Current and proposed on-road heavy duty measures account for the lion's share of reductions under CARB's Mobile Source Strategy.

37-1 Con't

South Coast NOx Reductions in CARB Mobile Source Draft Strategy (tpd)				
Measure Concepts by Source Category	70% Reduction 80ppb Standard (2023)	Percent of Total	80% Reduction 75ppb Standard (2031)	Percent of Total
On Road Light Duty				
Current Programs	47	87%	59	91%
Proposed Programs	0	0%	1	2%
Further Deployment	7	13%	5	8%
Total Category Reductions	**54**	**100%**	**65**	**100%**
Trucks and Buses (ORHD)				
Current Programs	97	72%	115	77%
Proposed Programs	3	2%	23	15%
Further Deployment	34	25%	11	7%
Total Category Reductions	**134**	**100%**	**149**	**100%**
Off-Road Federal and Int'l				
Current Programs	9	16%	15	23%
Proposed Programs	1	2%	12	18%
Further Deployment	48	83%	38	58%
Total Category Reductions	**58**	**100%**	**65**	**100%**
Other Off-Road				
Current Programs	23	61%	32	68%
Proposed Programs	1	3%	5	11%
Further Deployment	14	37%	10	21%
Total Category Reductions	**38**	**100%**	**47**	**100%**
Total Expected NOx Reductions	**284**		**326**	

CARB's Mobile Source Strategy also incorporated several measures for which they have not yet quantified (NYQ) emission reductions or cost, but plan to in the coming years. These NYQ measures include programs to lower in-use emissions and incorporating criteria pollutant benefits from the recently released Final Rule for the Second Phase of the Environmental Protection Agency (EPA) and National Highway Transportation Safety Administration's (NHTSA) Heavy-Duty Vehicles and Engines Greenhouse Gas and Fuel Efficiency Standards (Phase 2).

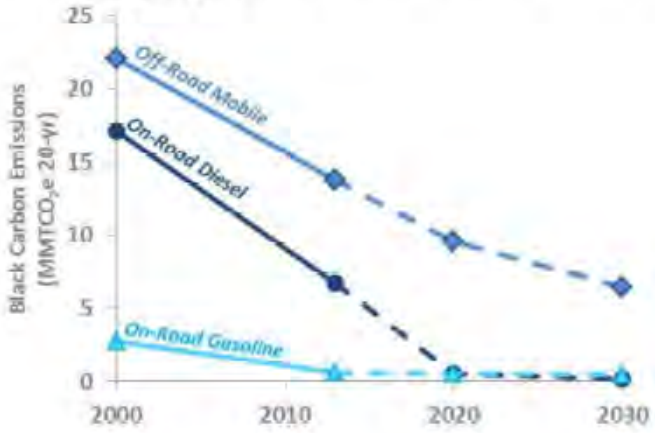
37-2

EPA/NHTSA anticipates that their Phase 2 rules will result in as much as a 10.2% reduction in downstream NOx by 2040[2]. Cost-effective programs to lower in-use emissions also hold great promise as emission control deterioration accounts for a large part of the total T6-T7 EMFAC vehicle category emissions.

In addition to progress on regional air quality, localized health risk from diesel PM has also been drastically cut. As of 2023, with very few exceptions, all heavy-duty trucks in the South Coast Air Basin will be equipped with particulate matter (PM) filters. CARB's own May 2015 evaluation of PM filters[3] found that "PM filters virtually eliminate PM from truck exhaust".

This is reflected in CARB's recent emissions inventory for black carbon[4], for which diesel PM is a close surrogate.

Figure 2. Black Carbon Emissions from On-Road and Off-Road Mobile Sources with Existing Measures.



37-3

[2] Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2 Regulatory Impact Analysis, Table 5-42

[3] http://www.arb.ca.gov/msprog/onrdiesel/documents/DPFEval.pdf

[4] http://www.arb.ca.gov/cc/shortlived/meetings/04112016/appendixa.pdf

This is further reflected in a comparison between today's assumed PM emissions and those used to characterize health risk from diesel PM just 16 years ago[56].

	PM2.5 Emission Factor (g/mile)	% Reduction
Diesel Risk Reduction Plan (Appendix VII)	0.670	
EMFAC2011 (2010+ zero-mile)	0.035	-94.8%
EMFAC2014 (2010+ zero-mile)	0.004	-99.4%

37-3 Con't

Serious Concerns with MOB 01-04 and MOB-08

We have serious concerns about the proposed control measures MOB-01 through 04 ("Facility Measures") and portions of MOB-8 ("Fleet Rules").

CTA is strongly opposed to the regulation of mobile sources such as trucks and transport refrigeration units via freight facility emission caps and performance targets. The proposed Facility Measures may leave the door open for the adoption of such regulations. These concepts would represent an unprecedented, and legally questionable, expansion of the SCAQMD's regulatory authority of the freight industry. Given the remarkable progress demonstrated to date, we do not believe such a draconian regulatory expansion is either appropriate or warranted at this time.

37-4

We are also concerned about any expansion of the AQMD's Fleet Rules to private trucking fleets. The extensive legal history on the Fleet Rules should make it clear that any such expansion would be a pointless and wasteful exercise which would tie up valuable resources that could otherwise go towards achieving real air quality progress.

Because of the limited authority the district has to regulate mobile sources, we would urge the AQMD to continue to work collaboratively with CARB, the EPA and the industry to further the progress towards zero and near-zero emission technologies.

There is ample history and evidence to show that this collaborative approach has and will continue to achieve significant air quality progress while continuing to balance economic concerns.

[5] http://www.arb.ca.gov/diesel/documents/rrpapp7.PDF
[6] http://www.arb.ca.gov/msei/msab_oct_workshop_10_07_2013_final.pdf

CTA Supports Targeted, Cost-Effective Incentives

The CTA will continue its work with State, Federal and Local stakeholders to bring about additional incentives to the South Coast Air Basin to further air quality progress. The CTA has strongly supported recent, successful bipartisan legislative efforts at the State level to reauthorize the Carl Moyer Program and set aside a portion of the Greenhouse Gas Reduction Fund for deployment of near-zero emission technologies.

The Initial Draft AQMP anticipates the potential of a $5.1 billion incentive program for Medium and Heavy Duty Trucks which would achieve another 20 tons per day by 2031 by replacing nearly 130,000 trucks to help implement the State's "Further Deployment" commitment. Because of the assumed grant amount of $35,000 - $50,000 per unit, the likely private sector investment necessary to realize such a program would likely increase the overall costs to somewhere closer to $10-15 billion. It is of note that such a program would actually far exceed CARB's committed tons under "Further Deployment" for the entire On-Road Heavy-Duty Sector. 37-5

A basic flaw in the way the analysis is framed in the Draft AQMP is using an assumption that 130,000 truck projects will in fact meet cost-effectiveness guidelines as set in the Carl Moyer Program. Because of the low NOx and PM emissions from 2010 and newer diesel engines, even assuming a replacement project vehicle achieves a 90% reduction at a new 0.02g/bhp-hr low NOx standard would make it difficult to reach traditional cost-effectiveness thresholds with a typical 3-5 year project life.

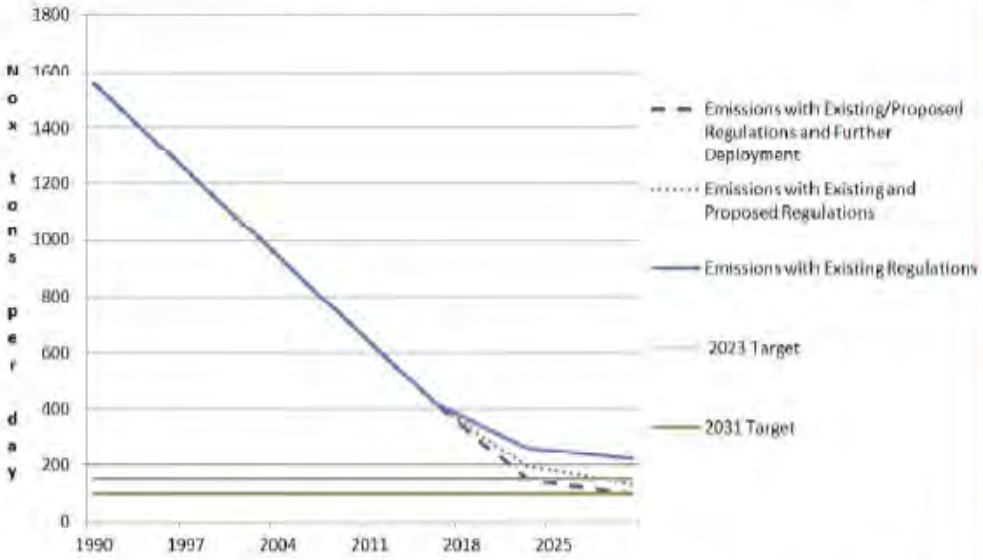
Future stakeholder discussions will need to explore issues of continued cost-effectiveness in a world of diminishing returns as emissions levels get further towards zero. SB513 (Beall-2015) allows adjustments to, specifically, Moyer cost-effectiveness thresholds through a public process. Such a discussion may be productive to further the case for additional public dollars to assure the public and policymakers that our emission control programs continue to be targeted at achieving the most cost-effective use of public and private investment.

AQMP Should Provide Additional Historical Context

While the current draft AQMP does provide useful historical context for policymakers regarding our remarkable air quality progress, it could better highlight certain historical data on NOx reductions to more simply frame the choices which are outlined in the draft plan. 37-6

For instance, while pages 1-6 through 1-10 of the draft plan demonstrate the progress made on ozone since 1990, because this is primarily a NOx focused plan we believe

reductions in NOx achieved by existing and proposed regulations and incentives since that same timeframe should be highlighted.[7]



37-6 Con't

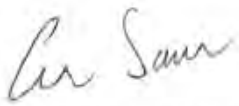
For instance, implementing the estimated 33 ton per day improvement from the "further deployment" of technologies in 2031 would reduce an additional **2.1%** of NOx beyond what will be achieved by regulations and incentives already adopted and quantified using the same 1990 baseline as Figure 1-4. This is roughly equivalent to the average annual emission reduction achieved in a single year between 1990 and 2031.

[7] Historical NOx (1990 levels) from California Almanac of Emissions and Air Quality – 2009 Edition
http://www.arb.ca.gov/aqd/almanac/almanac09/textfiles/table4_12.txt

Conclusion

Thank you for the opportunity to comment on the draft plan. If you have any questions, please feel free to contact Chris Shimoda at cshimoda@caltrux.org

Thank You,



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(916)373-3562

Responses to Comment Letter from California Trucking Association (CTA)
(Comment Letter #37)

Response to Comment 37-1:

The State Mobile Source Strategy includes a measure titled "Further Deployment of Cleaner Technologies" for on-road heavy-duty vehicles. The SCAQMD along with U.S. EPA are identified as implementing agencies under this measure. As such, the draft 2016 AQMP includes two measures MOB-07 and MOB-08 to seek additional emission reductions to help implement the "Further Deployment" measure. Staff recognizes that heavy-duty trucks have already achieved significant NOx reductions but believes additional reductions are needed wherever feasible, especially since some sectors, e.g. aircraft, may not be able to achieve as great a percent reduction.

Response to Comment 37-2:

Staff appreciates the comments regarding U.S. EPA's final Phase 2 rulemaking. The NOx emission reductions associated with the final rule are modest compared to the needed NOx reductions for the region to attain federal air quality standards. U.S. EPA notes this in the final rule. As such, U.S. EPA plans to initiate the development of more stringent engine emission standards for NOx, and has recently stated its intent to do so in response to SCAQMD's petition for rulemaking for a national ultra-low-NOx truck standard.

Response to Comment 37-3:

Compared to those from old diesel engines, today's diesel PM emissions are much lower and the associated health risk has been drastically cut. Nevertheless, the current health risk still dominates cancer risk in the Basin and thus, needs to be lowered to protect public health.

Response to Comment 37-4:

See Response to Comment 23-5 regarding facility emissions cap and performance targets.

While the SCAQMD staff prefers to work with industry stakeholders to identify actions that result in additional emission reductions, there may be a need to develop fleet rules within the SCAQMD's legal authority if such actions do not lead to additional emission reduction to help meet the State Mobile Source Strategy "Further Deployment" measures. Staff recognizes that fleet rules would need to receive a waiver from EPA if they were extended to private fleets.

Staff appreciates the comment and plans to work closely with CARB and U.S. EPA.

Response to Comment 37-5:

Staff appreciates the comment supporting incentives funding.

There are several scenarios analyzed to determine the incentive funding needed. Carl Moyer cost-effectiveness is one approach. The other is a per vehicle incentive, which could be much higher than the Moyer cost-effectiveness criteria. Staff believes that such funding levels are appropriate based on CARB's Technology Assessment for Low NOx Heavy-Duty Diesel Engines.

Response to Comment 37-6:

SCAQMD staff appreciates the comments regarding NOx emission reductions since the 1990's. However, as shown in the attachment demonstration, additional NOx emission reductions from on-road heavy-duty trucks along with NOx emission reductions from other stationary and mobile sources will be needed. Historically, significant NOx emission reductions have occurred from a smaller number of trucks and other equipment since their emissions on a per unit basis, were significantly higher than the emissions from current trucks. As such, a greater number of trucks will need to be turned over to achieve the 33 tons/day called for in the State SIP Strategy.

Comment Letter from the City of Irvine (Comment Letter #38)

Community Development Department
One Civic Center Plaza, P.O. Box 19575, Irvine, CA 92623-9575

August 18, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 92765

Subject: **City of Irvine Comments: June 2016 Draft of the 2016 Air Quality Management Plan**

Dear Dr. Fine:

The City of Irvine appreciates the opportunity to provide comments on the June 2016 Draft of the 2016 Air Quality Management Plan (AQMP). The Draft 2016 AQMP is a monumental effort and the City of Irvine recognizes that the AQMP is critical to the region's ability to achieve federal air quality standards and healthful air.

The following general comments and recommendations are offered by the City of Irvine on the initial June 2016 Draft 2016 AQMP. The City of Irvine reserves the right to make further comments at a future date when the full impact of the proposed 2016 AQMP can be assessed:

38-1

1. Fragmented and Incomplete Document Release: The City of Irvine's review of this initial draft was conducted in the absence of critical, related documents which have yet to be released by the South Coast Air Quality Management District (SCAQMD). Documents not yet released include the Draft 2016 AQMP Program Environmental Impact Report (EIR) and the AQMP's Socioeconomic Analysis. The City of Irvine finds it extremely difficult to grasp and conduct a comprehensive review and comment of the Plan, when only certain elements of the Plan have been released.

   Due to the lack of a complete document, the City of Irvine respectfully submits at this time, preliminary higher-order comments that will hopefully assist in AQMD's preparation of a revised September 2016 Draft AQMP for review and comment. Please note that the City of Irvine reserves the right to make further refinements or revisions to these comments, in

addition to submitting additional and final comments, when all 2016 Draft AQMP documents are released in a coordinated and integrated review process.

The City of Irvine also reserves the right to make further comments at a future date when the full impact of the document can be analyzed, and further recommends that the SCAQMD consider releasing all elements of the Plan simultaneously along with the Draft Program EIR. 38-1 Con't

2. Action Plan for Incentive Strategies: The Draft 2016 AQMP contains a number of measures that are designed to be implemented through incentives to accelerate the penetration of zero- and near-zero emission technologies, and to further reduce emissions from other mobile and stationary control measures. The Draft 2016 AQMP also notes that as much as $14 billion in funding needs to be identified in order to implement "incentive strategies."

   It is the City of Irvine's understanding that the $14 billion in funding need represents the total funding need of all the agencies responsible for implementing the proposed measures. The City of Irvine recommends that the incentive funding need for each proposed measure be detailed in the 2016 AQMP Plan and Appendices, particularly Table IV-A-1 and Table IV-A-2 in Appendix IV-A, and that funding need by agency also be summarized and presented. 38-2

   The Draft 2016 AQMP should include an action plan that identifies the funding source for all incentive strategies. It should also include a discussion on the impact to local jurisdictions. For example, in regards to measures EEC-02 (Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures (NOx and VOC) and EEC-03 (Additional Enhancements in Reducing Existing Residential Building Energy Use (NOx and VOC), there needs to be more details as to the recipient of the incentive and who will be required to complete the bookkeeping and monitoring.

3. EGM-01: Emission Reduction from New Development and Redevelopment Projects: The purpose of this measure is to mitigate and reduce emissions from new development and redevelopment projects. The description of EGM-01 is very broad and could be interpreted to add a new fee to new development or redevelopment in the SCAQMD service area, similar to Rule 9510 adopted by the San Joaquin Valley Air Pollution Control District. 38-3

As a local government, we have concerns about this prospective measure absent more information on how a development fee might impact local land use under our authority. To the extent that such a control measure would redistribute or constrain growth in the region, it could undermine the greenhouse gas (GHG) and pollutant emission reductions that are imbedded in the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) that the City of Irvine worked diligently to complete with the Southern California Association of Governments. A fee might not be the best way to ensure that new structures accommodate clean technologies, and the AQMD should also explore other cost effective methods.

38-3 Con't

Because of its ambiguity and potential overlap with the RTP/SCS, this proposed measure should not be included among the AQMP's enforceable, committed measures. The City of Irvine recommends that the Orange County Council of Governments, the subregional agency for Orange County, be included in any South Coast AQMD Working Group that is established or reconvened on this measure, to allow for meaningful dialogue on this proposed measure. Further, if this measure proceeds to rule development in the future, the SCAQMD needs to assure that any proposed rule will integrate with, and enhance the California Environmental Quality Act (CEQA) process and not impede the project approval process in light of CEQA timelines.

4. Duplicative Measure: BCM-03: Further Emission Reduction from Paved Road Dust Sources: The AQMP proposes that measures BCM-03 would include a review of existing National Pollutant Discharge Elimination System (NPDES) mandates and that this is conducted in conjunction with any potential rulemaking efforts. NPDES permits are administered by the local regional water quality control boards. The SCAQMD does not have jurisdiction over the issuance and maintenance of mandates required of NPDES permits. The City of Irvine requests that the SCAQMD remove reference to NPDES mandate review as to not confuse jurisdictional and implementation issues related to these permits.

38-4

5. Unquantified Measures: There are a number of measures that have not been quantified in the Draft 2016 AQMP. These are often referred to as "to-be-determined" or "TBD" measures. Based upon the review of the initial Draft 2016 AQMP, it is the City of Irvine's understanding that the Plan is capable of achieving federal air quality standards in absence of any of the TBD measures. The City of Irvine raises a concern regarding whether it is appropriate to include these types of measures in the 2016 AQMP, since they do not advance attainment. Inclusion of TBD measures implies some level of commitment toward delivering those measures even

38-5

though it has not been determined how many emission reductions they can provide, or at what cost. An economic analysis cannot be performed without the quantified benefits. The City of Irvine is concerned that the inclusion of TBD measures in the AQMP could allow the District staff to substitute a TBD measure in place of other quantified and committed measures after the 2016 AQMP is approved. The City of Irvine understands that in the future, the TBD measures may prove to be more cost effective than other committed measures. This kind of transfer should not be implemented as an administrative change, and should only be pursued through an appropriate public process. Until the time that either a backstop measure is needed or a TBD measure is identified to be more cost effective than one of the currently qualified measures, the City of Irvine requests that the TBD measures either be removed from the plan, or clearly separated from the quantified measures, and called out as uncommitted measures that require further development and evaluation.

38-5
Con't

Furthermore, should the TBD measures remain in the AQMP, the City of Irvine requests that the 2016 AQMP include a discussion that clearly states the purpose for including these strategies and the process required to incorporate them. Preferably, this process would include action by the SCAQMD Governing Board and opportunities for public review and comment.

Thank you again for the opportunity to provide input on this initial Draft 2016 AQMP. We appreciate your consideration of the comments provided in this letter and we look forward to your responses. We hope that future releases of the Draft 2016 AQMP will be coordinated to include all appendices and supporting documents to ensure we all are afforded a comprehensive review. Please do not hesitate to contact me if you have any questions.

Sincerely,

Susan Emery
Director of Community Development

Responses to Comment Letter from the City of Irvine
(Comment Letter #38)

Response to Comment 38-1:

The release of the Draft AQMP in June 2016 was designed to allow the public to become familiar with the proposed strategy and provide comments to be included in a Revised Draft Plan. Release dates have been staggered for the Draft Program Environmental Impact Report (PEIR) and Socioeconomic Assessment in order for the supporting documents to analyze the latest version of the Plan. As such, the costs and benefits analysis was released August 31, 2016 and the PEIR was released mid-September in time for review of the Revised Draft Plan that was released early October. Similarly, Appendix V and VI did lag behind the release of the Draft Plan but were available by September and provided over 30 days to review and comment. All those comment periods overlapped to allow for a comprehensive, concurrent review by the public.

In addition, staff is providing a 60-day public review and comment period for the PEIR and while each of the draft Socioeconomic chapters have been given a 30-day public review and comment period, a complete updated Socioeconomic Assessment with appendices was released in November for another 30-day public review and comment period. Comments on the Revised Draft Plan were encouraged to be provided 30-days after its release so staff could incorporate changes into the Draft Final Plan scheduled to be released in early December.

Response to Comment 38-2:

The funding needs identified in the AQMP is based on meeting the emission reductions associated with the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures for light-duty vehicles, on-road heavy-duty vehicles, federal and international sources, and off-road equipment. Tables 4-17 to 4-21 show a breakdown of potential funding by these sectors.

The deployment of cleaner technologies will be implemented by CARB, U.S. EPA, and the SCAQMD to incentivize cleaner vehicle and equipment. However, the specific implemented agency may depend on the source of funds or other factors.

For ECC-02, no additional costs are anticipated beyond those that would otherwise be allocated to reduce GHG emissions through State programs. This measure seeks merely to quantify criteria pollutant reductions from these GHG programs. ECC-03 is for existing residential buildings in the Basin and incentives are based on equipment, not the agency.

A Financial Incentive Funding Action Plan is being prepared to identify potential sources of funding. The Financial Incentive Funding Action Plan will be a companion document to the AQMP.

Response to Comment 38-3:

Under state law, the SCAQMD is required to assess rules and regulations adopted by other air agencies to ensure that all feasible measures are provided in the AQMP. As such, staff will be taking comments on whether adoption of a rule similar to San Joaquin Rule 9510 is appropriate for the South Coast Air Basin or whether there are other actions/mechanisms to address potential emissions associated with new or redevelopment projects. In addition, the facility-based measures will be developed in a public process and will initially seek enforceable actions to achieve emissions reductions. Please see Response to

Comment 23-4 for details of the revised version of the facility-based measures in the Revised Draft Plan. Finally, staff encourages the Orange County Council of Governments to participate in the working group during the development of this measure.

Response to Comment 38-4:

Please see Response to Comment 6-2 with regard to NPDES requirements and clarification that staff did not intend the language to mean that SCAQMD would week to change NPDES permit requirements.

Response to Comment 38-5:

As mentioned in the Draft AQMP, the SCAQMD mobile source measures are proposed to help implement the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures. The SCAQMD is identified as an implementing agency along with CARB and U.S. EPA. As such, many of the SCAQMD mobile source measure do not have associated emission reductions since the reductions are provided in the State Strategy (see Appendix IV-B). Please see Response to Comment 7-5 for further discussion of TBD measures.

Comment Letter from the City of Mission Viejo (Comment Letter #39)

TRANSMITTED VIA EMAIL

August 19, 2016

Dr. Philip Fine
Deputy Executive Director
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 92765

SUBJECT: City of Mission Viejo Preliminary Comments:
South Coast Air Quality Management District
June 2016 Draft of the 2016 Air Quality Management Plan

Dear Dr. Fine:

The City of Mission Viejo appreciates the opportunity to review and comment on the June 2016 draft of the 2016 Air Quality Management Plan (AQMP). It is the City's understanding that comments received on the June 2016 AQMP (hereafter referred to as the Plan) will assist the South Coast Air Quality Management District (AQMD) in the development of a Revised Plan that will be released in September 2016. Accordingly, the comments presented below are higher-order comments and recommendations that the City of Mission Viejo respectfully submits for your consideration. The City of Mission Viejo further notes that an additional policy-level and a technical review and comment of the Plan will be conducted upon AQMD release of a September 2016 Revised Plan, when all related Plan documents are released and made available for a concurrent review, particularly the Draft Program Environmental Impact Report.

The City of Mission Viejo comments are as follows:

1. Fragmented Release of 2016 AQMP Documents for Public Review:
The June 2016 Draft Plan was released for review and comment in absence of critical appendices and related documents, including the Draft Program Environmental Impact Report and the draft Socioeconomic Assessment. This staggered release of Plan documents prevents reviewing agencies from conducting a comprehensive and concurrent review and comment of the Draft Plan across all related documents and appendices. 39-1

   Recommendation: The City of Mission Viejo respectfully recommends that when all Revised Plan documents are released, that a review period be established that allows for a minimum, 60-day concurrent review of all released documents, due to the complexity and technical nature of the Plan documents and to accommodate recognized holidays that may occur within the review period timeframe (Labor Day, Thanksgiving Holiday).

   Further, to allow for a streamlined review of the revised Plan documents, the City of Mission Viejo would welcome a red-line version of the Revised Plan, to enable the reader to easily grasp revisions that have been made to the Plan documents since the June 2016 draft.

2. Incentive-Based Measures to Reduce Emissions:
The June 2016 Draft Plan includes several, voluntary Incentive-Based measures in the Plan's portfolio of proposed strategies to reduce emissions to satisfy Clean Air Act standards. These voluntary, incentive-based measures include ECC-03: existing residential building energy usage; CMB-01: transition to zero and near-zero emission technologies for stationary sources; and, CMB-02: commercial and residential space and water-heating).

The City of Mission Viejo supports AQMD's consideration of an elective strategy approach to reduce emissions, and AQMD's recognition that incentive-based strategies can co-exist and supplement traditional command-and-control, rule adoption measures. The City of Mission Viejo further observes that the Plan quantifies the anticipated emissions reductions that could be achieved from each of the above-referenced measures, and the Plan identifies that the emissions reductions from voluntary, incentive-based measures "must be real, quantifiable, surplus, enforceable and permanent." [2016 Draft AQMP: Technical Appendix IV-A; page IV-A-12].

Recommendation: The Draft AQMP outlines a series of key elements that must be applied to the implementation of Voluntary Incentive Measures, in order for the emissions reductions to count towards the Clean Air Act emissions reductions. Such actions include AQMD's future development of guidelines for each of the voluntary measure that addresses the federal test for each measure to be real, quantifiable, surplus, enforceable and permanent, which the AQMP refers to as the Integrity Elements.

39-2

The City of Mission Viejo urges the South Coast AQMD to include and consult with local government representatives on Voluntary Incentive Measure implementation. This would include any Ad Hoc Working Groups, public outreach, and introductory briefing workshops tailored specifically to Voluntary Incentive Measure implementation. In particular, the City of Mission Viejo would welcome the opportunity for AQMD to overview and explain how current local government processes and permitting requirements may be impacted by implementation of any of the Voluntary Incentive Measures.

As example, some questions that warrant further explanation and clarification include the following:

a) If incentives are awarded for residential weatherization, appliance efficiency, and renewable energy sources (solar photovoltaic roofs) by retrofitting existing residential buildings, as proposed under Measure ECC-03, what is the process and impact to local jurisdiction building and permitting procedures? Also, would the proposed retrofit improvements also require a separate application or approval process through the South Coast AQMD?
b) How are the incentive monies for the improvements allocated? Is there a fair-share allocation by county and by city? Is there an application process that must be pursued? Further, does the application process prioritize applications from disadvantaged communities? The City of Mission Viejo is concerned that such an emphasis or priority for disadvantaged communities would result in many jurisdictions and applicants being ineligible for funding opportunities to conduct

energy-related retrofits, if there are no disadvantaged communities in the jurisdiction, such as in South Orange County.

c) Is a contract agreement necessary or required as part of the program requirements, as referenced in the Plan, and if so, who are the parties to the contract agreement?

d) Who is responsible for the requirements of record-keeping, tracking, reporting and monitoring of the retrofitted improvements? Would this be a new reporting process that would be established between the South Coast AQMD and local governments, perhaps similar to the annual AB2766 reporting requirements of local subvention funds?

e) Is there a prototype of the Voluntary Incentive Program implementation that can be made available, either as an Appendix or separate report to the 2016 Plan?

39-2 Con't

3. Proposed Measure EGM-01: Emission Reduction from New Development and Redevelopment Projects

The 2016 draft AQMP includes a proposed "Emission Growth Management Measure," referred to as EGM-01: Emissions Reduction from New Development and Redevelopment Projects. This measure is proposed for adoption in 2017, with an implementation period of 2018 – 2031, with South Coast AQMD as the Implementing Agency, and with anticipated Plan emissions reductions to be determined.

The prototype for this measure is a Rule 9510 that was adopted in December 2005 by the San Joaquin Valley Air Pollution Control District (SJVAPCD). Rule 9510 requires both development projects of a certain scale, and transportation projects emitting a certain level of construction exhaust emissions, to be subject to the Rule. The Rule requires the project applicant to perform an emission generation analysis, from which the SJVAPCD calculates how much emissions must be reduced, and the project applicant must then achieve the required emissions reductions on-site (voluntarily) and/or through payment of an off-site mitigation fee. The City of Mission Viejo also understands that the 2016 Plan is required to include a consideration of this proposed measure, as State law requires AQMD to consider all feasible measures, including measures adopted by other air districts.

39-3

Recommendation:

a) Re-assess adoption and implementation dates for EGM-01 and reconvene an AQMD Working Group for EGM-01: The draft 2016 Plan identifies a 2017 adoption period for the proposed measures, with implementation beginning in 2018. There are many and significant questions on this proposed measure that warrants consultation and recommendations from affected stakeholders, including local government, the business community, and the development community. While the Plan recognizes that an AQMD Working Group was established to discuss a similar proposed measure in conjunction with the 2007 AQMP, this group has not met for several years.

The City of Mission Viejo recommends that an AQMD EGM-01 Working Group be immediately convened to initiate discussion on the proposed measure, and that at minimum, representatives from the Orange County Council of Governments and the Orange County Transportation Authority be included in the Working Group. All local jurisdictions in the South Coast Air Basin should also be

informed on all outreach and meeting materials, and webcasting opportunities provided for all Working Group meetings.

The City of Mission Viejo also recommends that AQMD consider more realistic adoption and implementation dates for EGM-01, and delay the adoption and implementation dates currently identified in the draft Plan, to accommodate a robust discussion of EGM-01 with stakeholders.

b) Address how the rule would interact, conflict, or supplement existing development approval and environmental requirements: The City of Mission Viejo is concerned how the implementation of the proposed measure would interact with existing and proposed regulations and requirements. As example:

(1) Would an EGM-01 emissions generation analysis be separate or coordinated with local jurisdiction environmental analysis (i.e., CEQA) requirements for a project? What happens if AQMD's threshold for an emissions generation analysis is imposed upon a project that requires no discretionary action by the local jurisdiction?
(2) Would EGM-01 impose an additional fee on development projects? If such a fee were imposed, how would AQMD use the fee, and would the benefits of the fee-capture return back to the city and county from where the fee was collected?
(3) How does the potential requirement of an emissions generation analysis complement or conflict with the State's proposal to require a Vehicle-Miles Traveled analysis for development projects, or with the Governor's "by-right" housing proposal?

39-3 Con't

4. Funding for Incentive-Based Measures

At a July 19, 2016 public workshop on the draft 2016 Plan, South Coast AQMD staff identified that significant funding – approximately $11 to $15 billion over 15 years – is needed to attain the emissions reduction standards called forth in the Plan. The City of Mission Viejo inquired, and AQMD staff confirmed, that such funding must be reasonably expected to be available, and AQMD staff noted that an action plan to secure the incentive funding would be developed.

Recommendation: While an overall estimate of funding need has been identified for the incentive-based measures over the 15-year planning period of the 2016 AQMP, there is no identification of:

39-4

a) how much of the incentive funding is needed for each proposed measure;
b) how much of the funding would be allocated to the different agencies involved in measure implementation (i.e., the California Air Resources Board versus the South Coast AQMD);
c) what are the funding sources that would be secured to fund the incentive-based measures; and,
d) what is the cost-effectiveness of the incentive funding for each proposed measure.

The City of Mission Viejo would recommend that AQMD's proposed Incentive-Based Measures Funding Action Plan be developed and released concurrently with

the Revised Plan documents, and that said Action Plan include a discussion of the questions noted above.

Thank you for the opportunity to provide input on the June 2016 draft of the 2016 AQMP, and for consideration of the larger-order comments and questions noted above, in AQMD's preparation of a September 2016 Revised Draft of the 2016 AQMP. The City of Mission Viejo looks forward to conducting a comprehensive policy and technical level review of the September 2016 Revised Draft Plan, in coordination with the to-be-released Socioeconomic Assessment and the Draft Program EIR. 39-4 Con't

Additionally, the City of Mission Viejo concurs with the Orange County Council of Governments (OCCOG) comments dated August 16, 2016 on the June 2016 draft of the 2016 AQMP.

Should you have any questions or seek clarification on our submitted comments, please do not hesitate to contact Ms. Elaine Lister, Director of Community Development, at 949/470-3069, or via email at elister@cityofmissionviejo.org.

With appreciation,

Dennis R. Wilberg,
City Manager
City of Mission Viejo

cc: Keith Rattay, Assistant City Manager
Elaine Lister, Director of Community Development
Larry Longenecker, Planning Manager
Marnie O'Brien Primmer, OCCOG Executive Director
Marika Poynter, OCCOG TAC Chair (City of Irvine)
Greg Nord, Orange County Transportation Authority
Gail Shiomoto-Lohr, GSL Associates

Responses to Comment Letter from the City of Mission Viejo
(Comment Letter #39)

Response to Comment 39-1:

Please see Response to Comment 38-1 regarding the staggered release of the Plan and related documents such as the Socioeconomic Assessment and Draft PEIR. Per your suggestion, the Revised Plan was released with track changes to assist the reader with the changes made since the Draft Plan.

Response to Comment 39-2:

Staff encourages the commenter to participate in the working groups that will be established to develop the guidelines necessary for each of the incentive programs. Staff agrees that clarification will need to be made during this process including impact to existing local planning procedures, how the incentive money will be allocated, contract agreements, as well as recordkeeping and reporting responsibility. These issues will be clarified as part of the working group process with full public input.

Response to Comment 39-3:

Staff will include local governments and sub-regional organizations as part of the working group.

Staff appreciates the comment to set later timelines for the adoption/implementation of the measure and will consider revising the dates.

Response to Comment 39-4:

Staff is preparing a draft Financial Incentive Funding Action Plan as a companion document to the AQMP. The draft Financial Incentive Funding Action Plan will be released for public comments prior to the adoption of the AQMP with ample time for public review.

Please see Response to Comment 38-2 with regard to funding for each measure, agency responsibility, funding sources, and cost-effectiveness. Staff will take into consideration the Commenter's recommended actions.

Comment Letter from Climate Resolve (Comment Letter #40)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Form Informtion

Date Created	Time Created	AQMP Year
08/19/2016	12:27 PM	2016

Commentor Contact Information

Commentor's Name *	Organization *	City	State	Zip Code
DAVID FINK	CLIMATE RESOLVE If not representing a specific organization, please enter "No Affiliation".	LOS ANGELES	CA	90013

Comments (Unlimted Size)

Thank you for the opportunity to comment on the 2016 AQMP. The document is robust on comprehensive with a few notable areas we would like to see included and/ or expanded. The first is in regards to cool roof technology. In Chapter 4 you reference cool roofs the associated benefits including: energy efficiency gains, reduced ozone formation and emission reduction. It should be noted that in 2015 the city of Los Angeles began requiring cool roofs on all new residential construction as well as re-roofs when over half the roof is being replaced and that the Los Angeles Department of Water & Power (LADWP) offers a two tiered cool roof rebate. To expand the benefits beyond LA City an LA county (and surrounding counties) residential cool roof mandate or a statewide mandate could be implemented. Also to expedite deployment SoCal Edison and other utilities could offer a similar rebate to the one offered by LADWP. The next item which we would like to see language on is the benefits and opportunities for cool pavement technology. Similar to cool roofs, cool pavements can dramatically lower ambient temperatures on very hot days and provide cooler temperatures in the evenings as well. Wide-spread deployment of cool paving materials could significantly reduce the urban heat island effect. There likely needs to be some technological development before the materials are cost effective but with demand an economy of scale can be quickly built leading to more affordable materials. Much like cool pavements cool coatings have the same benefits but unlike cool pavements they are ready to be deployed and have been on a small scale. The main difference is that they are not made to withstand high traffic roads but are applied on parking lots, service roads etc. mandates could be in place that require cool coatings on new parking lots and service roads etc. The third area that should be included is urban forestry or more specifically an expanded urban tree canopy. The Los Angeles Sustainable City pLAn calls to "Initiate tree and tree-canopy registry to document LA's urban forest to guide tree planting investments". This is a good start with tree canopy expansion targets as a potential longer term goal. Trees provide much needed urban cooling through shading and evapo-transpiration. All this leads to lower ground level air temperatures cooling buildings, streets, cars and other forms of transportation. Lastly, active transportation is referred to in Chapter 4 (page 4-35) under "SCAG's Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures". Another document that could be included to promote biking, walking and taking public transit is the Mobility Plan 2035, the City of Los Angeles' transportation policy which was updated in 2015. The Mobility Plan calls for among other things: a variety of new mobility options, such as frequent reliable transit, mobility hubs, a safe bicycle network, more walkable neighborhoods, ride-sharing and car sharing. Thank you again for the opportunity to comment on the 2016 AQMP. Please let us know if you have any questions or if we can provide any further details based on the above comments.

40-1

40-2

40-3

40-4

40-5

Upload Additional Comment and Supporting Files (30 Mb Maximum per file)

AQMP Comments Files

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature *



For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from Climate Resolve
(Comment Letter #40)

Response to Comment 40-1:

Ongoing meteorological and chemical transport modeling will help determine whether and to what extent cool roofs lead to improvements in air quality. Control measure ECC-04 addresses cool roofs.

Response to Comment 40-2:

SCAQMD staff is aware of the potential impacts of cool pavements and cool coatings on local air quality. Staff is in the early stages of quantifying these effects with meteorological and chemical transport modeling. For more discussion, the Plan includes a possible control measure (ECC-04) that addresses cool roofs that is achieved with cool coatings. Cool roofs can be achieved by various methods such as applying special coating material to existing roofs or adding cooling material into roofing material during manufacturing. The control measure addresses the coating method only. The details can be found in Appendix IV-A.

Response to Comment 40-3:

Cool pavements can have significant effect as well. However, the data to investigate the cool pavement impact is not readily available yet, therefore the control measure addresses cool roofs only at this time. Staff will continue to evaluate the cool roof and pavement impacts on air quality.

Response to Comment 40-4:

Staff is aware of the potential for increases in urban forestry to reduce building cooling emissions and increase walkability of urban areas. However, more urban vegetation can also increase biogenic emissions. A modeling analysis would be required to quantify the net effect of urban forestry on air quality.

Response to Comment 40-5:

Staff supports efforts by SCAG to promote biking, walking and taking public transit. As the commenter is aware, the emission reductions achieved by SCAG's 2016–2040 RTP/SCS are included in the baseline emissions inventory in the 2016 AQMP so it is critical these programs are successful for the 2016 AQMP to achieve its goals in a timely manner.

Comment Letter from Del Amo Action Committee (Comment Letter #41)

Florence Gharibian (Florence Gharibian@yahoo.com)
Chair, Del Amo Action Committee
Los Angeles Environmental Justice Network Member
21715 Lasso Lane
Walnut, California 91789
(818) 303 5914

Subject: ID No. EPA-HQ-OAR-2010-0682 Proposed Refinery Rule Comments

Dear Interested Party:

I began my environmental work at the USEPA National Field Investigations Center at the Denver Federal Center in November 1972. I worked in the library and assisted the research scientists at the Center in their valuable work. Much of that work focused on determining pollution of major water bodies through remote sensing. The only computer in the office was a monster machine located in the Director, James Gallagher's office. After graduating from the University of Colorado in 1974 I transferred to the San Francisco Region 9 Office where I continued my career in the Library. In 1981 I accepted an assignment with the State of California working as the Director of the Office of Public Information and Participation during a tumultuous time when the Stringfellow site in Riverside County, CA was notorious and controversial. Ultimately I accepted a position as a Waste Management Specialist with the State of California. When I retired in May 2011 I was a Branch Chief in the Enforcement Program supervising staff in Los Angeles County. I am honored now to serve as the Chair of the Del Amo Action Committee and as a member of the Los Angeles Environmental Justice Network. The comments submitted today are based on my own review of the Draft Refinery Rule. 41-1

I thank God for the work I do in protecting the environment. When I began my employment at the USEPA passion ran high. The path taken was new ground. So many educated people worked so hard to find the right way to clean up our environment. I traveled to Riverside County to work on the Stringfellow site in the early 80's when the air there was acid, air pollution an ever present reality. So many, working hard and applying the best science have accomplished much since that time. It is time now to take the next steps. Continuing to clean up our air is an urgent priority. I know the petroleum industry influences environmental rule making. I'm sure you have received many comments from representatives of this industry. They have the ability and money to hire lawyers and write comments arguing they've done enough, are doing enough, will have to spend money needlessly etc. Please consider the comments of the environmental groups who were forced to sue the USEPA to get something

done just as seriously as you consider the comments from the petroleum industry and their representatives.

41-1 Con't

I have the following comments:

Comment One

The regulations refer to the Maximum Available Control Technology. Utilizing the Maximum Available Control Technology must include using the best science available to determine real time emissions from the refineries. This data must be available to the public.

The USEPA fact sheet on the proposed rule includes this quote:

"The Clean Air Act requires the EPA to review and revise the national emission standards for air toxics, as necessary, taking into account developments in practices, processes and control technologies since the issuance of the original standards."

The California South Coast Air Quality Management District Board participated in a meeting in May 2014. A presentation was given at this meeting on Optical Sensor equipment. The South Coast web site includes several references to this equipment.

41-2

This technology is used to quantify emissions from refineries. The South Coast Air Quality Management District is currently considering purchasing this equipment for use in monitoring air emissions at refineries in the District. **When this equipment was used to quantify emissions from refineries the emissions were much higher than those reported by the refineries.**

I know that the term Maximum Available Control Technology is not a term applied to monitoring equipment traditionally. I am asking the USEPA to demand that the refineries use equipment to monitor their emissions that utilizes the best science available to measure as accurately as possible the emissions from the refinery. I am also asking the USEPA to evaluate the monitoring equipment described in the information found on the South Coast web site and to consider employing this equipment to do air emissions monitoring.

Comment Two:

Please provide information on how the USEPA will insure that the refineries are complying with the new rule when it is finalized. Will the USEPA conduct inspections; do air monitoring to insure that the refinery emissions data is accurate? Will the USEPA conduct enforcement and impose meaningful penalties on violators when violations are cited as a result of inspections?

41-3

It is my experience that without effective inspections and enforcement, rules and regulations are not effective. This component must be indentified and defined in the regulations.

In preparing the comments I'm submitting today I reviewed a document completed by the California Environmental Protection Agency in February 2014; *Improving Public and Worker Health and Safety at Petroleum Refineries, Report of the Interagency Work Group on Refinery Safety (February 2014 Report).* The work group was convened in the aftermath of a serious chemical release and fire at the Chevron Richmond oil refinery in August 2012. Governor Brown formed an Interagency Working Group to examine ways to improve public and worker safety through enhanced oversight of refineries and to strengthen emergency preparedness in anticipation of any future incident. The Working Group consists of participants from 13 agencies and departments, as well as the Governor's Office. The report is available at the California Environmental Protection Agency site on the Interagency Refinery Task Force.

41-3 Con't

Many of my comments are based on and are reinforced by the Task Force findings.

At one point in my career I served as an inspector for the CA Department of Toxic Substances Control in Los Angeles. In doing this work I went to industries located in Los Angeles Environmental Justice communities. I also went to some of the Los Angeles oil refineries. My observations when doing this work prompted me to research the age of the refineries in Los Angeles. The Chevron El Segundo Refinery was built in 1912, Conoco Phillips Wilmington, 1917, Exxon/Mobile Torrance, 1907. The process of refining oil is not new. Having seen some of these refineries myself, the refineries are not new. It is logical to assume that fugitive emissions and accidents at these refineries are more likely to occur at equipment and piping that is, in some cases, over 100 years old.

Comment 3:

The refineries should be required to conduct inventories and provide information on equipment that will be replaced because it is old and might cause "unintended" releases. (I use the word unintended because that is the word used by the USEPA in the introduction to the regulations. I think this word is entirely too polite.) To support this comment I offer a quote from the February 2014 Governor's report referenced above: The USEPA should consider implementing a process similar to the Near Miss Incident Report used in the airline industry. This process enables workers to submit information on equipment requiring repair or other problems they see when they are doing their work. This program prohibits retaliation against employees identifying problems.

41-4

Following is a quote from the CalEPA February 2014 report:

"Workers involved in facility operations, represented by the United Steelworkers, reported that refinery structures are old and outdated, corrosion is pervasive, process safety management staffing has been reduced, and preventive maintenance is often not conducted before failure occurs. Workers also expressed concern that those who exercise their authority to shut down unsafe operations may experience retaliation by management, that relying on shut-down actions by workers shifts responsibility away from management's obligation to ensure mechanical

integrity through preventive maintenance, and that maintenance and safety problems identified by refinery workers are not always corrected in a timely fashion. Several workers additionally reported that, in their view, management does not take seriously the monitoring of employee exposures to hydrogen sulfide, which can be immediately fatal."

41-4 Con't

The workers at a refinery are at greatest risk of the health impacts from the hazardous chemicals. They have the highest rate of exposure to the chemicals. They are at greatest risk from an accident resulting in an explosion or fire.

Comment 4

I hold in my hand a notice routinely published in the Los Angeles Times. The headline in the notice is WARNING. The notice states *"Chemicals known to the State of California to cause cancer, birth defects and other reproductive harm are in and around oil fields,"* The notice is published by eleven refineries in Los Angeles. The health risks of the hazardous chemicals used or created at refineries are based the health evaluations on individual chemicals. The understanding of the cumulative health risks of the multiple chemicals found on refineries and at industries on or near refineries is non-existent or limited at best. This inadequate understanding argues for conservative regulatory limits and the use of the most comprehensive and accurate testing possible.

On August 13, 2014 the California Environmental Protection Agency announced the availability of Cal EnviroScreen 2.0. The Office of Environmental Health Hazard Assessment created this screening methodology that is used to help identify California communities that are disproportionately burdened by disproportionately burdened by multiple sources of pollution.

41-5

The development of the screening tool was identified as a first step in assuring that all Californians have access to environmental justice, the California Environmental Protection Agency determined that it was necessary to identify the areas of the state that face multiple pollution burdens so programs and funding can be targeted appropriately toward improving the environmental health and economic vitality of the most impacted communities. Many Californians live in the midst of multiple sources of pollution and some people and communities are more vulnerable to the effects of pollution than others. For this reason, the Agency and the Office of Environmental Health Hazard Assessment (OEHHA) developed a science-based tool for evaluating multiple pollutants and stressors in communities, called the California Communities Environmental Health Screening Tool.

A cursory review of the data provided in this screening tool demonstrates that many of the communities identified as communities threatened by the burden of serious pollution are located in the same locations as the majority of California's refineries. This truth strengthens the argument for the most accurate air emissions data for the refineries. It argues for conservative emission standards, it argues for making the refineries as safe and healthy as possible for the people who work at the refineries and the communities surrounding them.

Closing Comments

I offer in my comments several reliable sources of information. The information is up to date, all published in 2014. The reports and other information I've cited are developed by organizations with integrity and knowledge. Please review this information and my comments in your work to finalize these important regulations. It matters.

Sincerely Yours,

Florence Gharibian

Florence Gharibian
Chair, Del Amo Action Committee

Responses to Comment Letter from Del Amo Action Committee
(Comment Letter #41)

Response to Comment 41-1:

Staff appreciates your interest in the environmental issues of our region, years of dedicated work for the health of others, and participation in the development of the 2016 AQMP.

Response to Comment 41-2:

While this comment appears to be directed toward a proposed EPA refinery rule, it was submitted as a comment on the AQMP. Staff will respond to individual points as they may relate to the AQMP. The AQMP includes control measure FUG-01 which proposes to study and implement a Smart-LDAR program to monitor fugitive emissions from refineries and oil and gas production facilities. Optical Gas Imaging is included as one of the potential technologies to be utilized for fugitive emission monitoring.

Response to Comment 41-3:

The U.S. EPA has the ability to conduct inspections, do air monitoring and conduct enforcement at refineries located in SCAQMD. In most instances however, SCAQMD staff performs those tasks. Several SCAQMD teams are dedicated to ensuring compliance at refineries on a regular basis. As part of their routine compliance duties, SCAQMD inspectors verify compliance with leak detection and repair regulations at refineries to limit fugitive emissions from pipelines, storage tanks and processing equipment.

Response to Comment 41-4:

The SCAQMD heavily regulates and enforces refineries under the RECLAIM program, however, the Plan is proposing further assessment of the RECLAIM program to continue to improve or even possibly sunset the program and transition to a command-and-control approach. Retaliation at regulated facilities is already prohibited by the Clean Air Act, 42 U.S.C. § 7622. Staff appreciates the real concern this could pose for an employee who is ever in that position.

Response to Comment 41-5:

The SCAQMD has a comprehensive toxic control program, oversees compliance with AB 2588, and requires cumulative health risk analyses in CEQA documents. The Draft Plan does include an education and outreach measure (FLX-01) that is intended to increase awareness of existing regulations and how to further educate the public regarding air pollution and encourage local involvement to assure local neighborhoods are not being polluted unchecked. The Draft Plan also addresses oil fields in such measures as CMB-04 seeking to replace traditional non-refinery flares with gas handling equipment or procedures that are much cleaner and useful such as use as a transportation fuel. Please see Response to Comment 41-4 regarding refineries.

Comment Letter from Gateway Cities Council of Governments (Comment Letter #42)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Form Informtion

Date Created	Time Created	AQMP Year
08/19/2016	12:20 PM	2016

Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
NANCY PFEFFER	GATEWAY CITIES COUNCIL OF GOVERNMENTS	PARAM OUNT	CA	90723

If not representing a specific organization, please enter "No Affiliation".

Comments (Unlimted Size)

1) The draft AQMP proposes to reduce emissions in part by adopting a suite of incentives that would provide public funding to supplement private investment in cleaner, lower-emitting technologies. This is a constructive approach, provided that the District comes up with a clear plan for obtaining incentive funding and that this funding plan does not place undue burdens on either local governments or on employers in our region. 42-1

2) The plan includes a proposed measure denoted "EGM-01" which would consider controls on emissions from new development and redevelopment projects. The draft AQMP does not call for any emission reductions from this measure; instead, we understand that the District plans to convene a working group of affected parties to discuss and further develop this measure following adoption of the AQMP. We would like to be included in this working group. 42-2

3) The plan includes four measures focused on mobile sources associated with goods movement, denoted "MOB-01" through "MOB-04." The draft AQMP does not call for any emission reductions from these measures; instead,we understand that the District plans to convene a working group of affected parties to discuss and further develop these measures following adoption of the AQMP. We would like to be included in this working group. 42-3

Upload Additional Comment and Supporting Files (30 Mb Maximum per file)

AQMP Comments Files

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature *



For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from Gateway Cities Council of Governments (Comment Letter #42)

Response to Comment 42-1:

Staff appreciates the comments regarding the incentive funding approach. Relative to the preparation of the Draft Funding Action Plan, staff has developed a set of guiding principles to secure and disburse incentive funds. One of the proposed principles addresses your concern regarding the need to minimize the economic impact from the funding source. The Funding Action plan will be proposed for consideration by the Board at the same time as the AQMP.

Response to Comment 42-2:

Proposed measure EGM-01 does not have any associated emission reductions at this time since the measure calls for formation of a working group to identify actions that could be taken to mitigate emissions from new and redevelopment projects. Staff welcomes Gateway Cities Council of Governments participation on the working group.

Response to Comment 42-3:

As noted in the Revised Draft 2016 AQMP, MOB-01 through MOB-04 are proposed to help meet the State SIP Strategy "Further Deployment of Cleaner Technologies" measures emission reductions. The measures seek to work collaboratively with affected stakeholders and the public to identify actions that could help achieve the State SIP Strategy emission reductions. A working group will be created to help implement the measures. Staff welcomes Gateway Cities Council of Governments participation on the working group.

Comment Letter from Gatzke Dillon & Ballance LLP (Comment Letter #43)

G | D | B Gatzke Dillon & Ballance LLP
LAWYERS

August 19, 2016 *By Electronic Mail*

Michael Krause
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765-4182
mkrause@aqmd.gov

Re: *Comments on Draft 2016 Air Quality Management Plan*

Dear Mr. Krause:

This letter is submitted on behalf of John Wayne Airport, Orange County (Airport or JWA) and contains the Airport's written comments on the Draft 2016 Air Quality Management Plan (Draft 2016 AQMP) issued by the South Coast Air Quality Management District (SCAQMD or District) on June 30, 2016. We appreciate the opportunity to provide comments and to continue to work constructively and cooperatively with the SCAQMD in evaluating and developing realistic airport emission reduction strategies for the Draft 2016 AQMP.

We hope that our past comments, our comments in this letter, and our continued cooperation in this process will allow us to make meaningful contributions toward resolving and addressing the complex airport regulatory issues associated with air quality in the Basin.

43-1

GENERAL COMMENTS

The Airport has the following general comments on the Draft 2016 AQMP:

1. First, it is important for us to emphasize the serious concerns the Airport has about SCAQMD's proposal to control indirect sources through "facility-based" mobile source measures, including MOB-04 (Emission Reductions at Commercial Airports). These types of control measures seek to reduce emissions from on- and off-road sources, which are within the exclusive purview of the California Air Resources Board (ARB) and the U.S. Environmental Protection Agency (EPA), both of which already have rules and regulations in place for these sources to significantly reduce criteria pollutant emissions. In addition, the Airport is concerned about the SCAQMD making commitments to the state and federal governments that it will control emissions through indirect source rules because SCAQMD lacks legal authority to adopt indirect source rules at airports.

2. Second, both the District and ARB have acknowledged that the proposed indirect source control measures, including MOB-04, are not necessary to meet the requirements of the federal Clean Air Act. Further, there is no emission reduction target for MOB-04, or any of the other indirect control measures, in the Draft 2016 AQMP, and there appears to be

43-2

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little or no emission reduction benefits from the indirect source control measures proposed. Instead, it is clear that additional mobile source emission reductions will come from new measures that call for greater emission reductions through accelerated turnover of older vehicles to the cleanest vehicles and equipment currently available, and increased penetration of commercially-available near-zero and zero-emission technologies through existing incentives programs. 43-2 Con't

3. Third, the proposed facility based mobile control measures, including MOB-04, appear to leave the door open for the adoption of facility emission caps and performance targets; concepts which the Airport has repeatedly opposed. These concepts would represent a legally questionable expansion of the SCAQMD's regulatory authority over airports in the South Coast Air Basin. 43-3

4. Fourth, to the extent the SCAQMD attempts to impose airport emission caps and/or performance targets, a key concern will be the use of a baseline to measure emissions reductions and the apparent failure of this method to provide some type of "credit" to the Airport for the significant emission reduction measures that have already been implemented and are currently being implemented to reduce air quality impacts associated with Airport operations. These measures already provide: (i) more efficient fuel operations and consumption; (ii) the ability to manage aircraft operations in a more efficient manner; (iii) a reduction in the fugitive dust generated by aircraft activity at JWA; (iv) improvement in traffic circulation within the vicinity of JWA; and (v) the possibility for use of alternative fuels. In order to maintain equity and to avoid inadvertently "penalizing" those who voluntarily implement significant air quality reduction measures, the Draft 2016 AQMP should provide some type of "credit" to "sources" for these efforts rather than reflect these emission reductions into future emissions inventories and/or in baseline emissions inventories. 43-4

5. Finally, in addition to the general comments provided above, we also have a number of specific comments relating to the Draft 2016 AQMP discussion and analysis, which are provided below. 43-5

SPECIFIC COMMENTS

The District includes discussion of two categories of potential control measures included in the Draft 2016 AQMP; control measures to be implemented by SCAQMD and control measures to be implemented for sources under State and federal jurisdiction. The specific comments of the Airport address both of these categories of control measures.

A. MOBILE SOURCE CONTROL MEASURE – MOB-04 – EMISSION REDUCTIONS AT COMMERCIAL AIRPORTS

The District is proposing a number of new mobile source control measures. One of these proposed measures, MOB-04, Emission Reductions at Commercial Airports, focuses on imposing possible regulations on airports in the Basin. The Draft 2016 AQMP does not provide the specific program for this control measure, but, instead, describes the measure in broad, non-specific terms.

Although the Airport understands why this control measure has been provided in concept only at this point, the Airport is concerned with a number of potential issues regarding any type of indirect source control measure, including the District's authority to regulate airports, direct accountability, and the possible imposition of a mitigation fee program or other clean fleet incentive program. The Airport would like to provide comments on each of these topics as follows:

1. District's Authority to Regulate Airports

43-6

According to the Draft 2016 AQMP, it appears that the District is considering the use of an indirect source control measure, including a mitigation fee program, for proposed commercial aviation measures. We have discussed at length with the District, ARB, and the U.S. EPA our concern regarding the role of the airport proprietor with respect to the administration of air quality emission strategies at airports in the Basin. And, as you know, we have expressed strong opposition to the measures previously proposed by the District. The airports are not in favor of becoming the air quality "enforcers" for all airport users. In addition to our concern regarding the airport proprietor's exact role and obligations under any "indirect source rule" that may be considered, we are concerned as to what, if any, penalties airport proprietors might be subjected to if one of their airport users fails to provide the required emission reductions in connection with their operation(s).

We also have serious doubt, particularly in the context of the Airport Noise and Capacity Act of 1990 (49 USCA §2151, *et seq.*) (ANCA), as to whether airport proprietors generally have sufficient residual regulatory authority to act effectively as the agencies implementing and enforcing any indirect source regulation imposed by the District. At a minimum, the District should receive adequate assurances from the Federal Aviation Administration (FAA), the Department of Transportation (DOT), and any other relevant federal authorities that airport proprietors do, in fact, have sufficient regulatory authority to allow them to make meaningful implementation choices, and which would allow them to enforce local regulations to achieve whatever mandates are imposed on them by the District.

We also continue to have a fundamental disagreement with the District regarding the extent of the District's authority to regulate airports. Specifically, we continue to believe that, to the extent the District attempts to regulate aircraft related emissions, directly or indirectly (as is the case with an indirect source control measure), any such regulation would constitute a constitutionally impermissible local intrusion into a federally preempted field of regulation. (*People of State of Cal. v. Dept. of Navy* (1977) 431 F.Supp. 1271, 1281; *Washington v. General Motors Corp.* (1972) 405 U.S. 109, 92 S.Ct. 1396, 31 L.Ed.2d 727.) The District's attempted indirect regulation of airport related emissions would be an impermissible and unconstitutional intrusion into an area which is pervasively and exclusively controlled by federal law and federal authority. (*City of Burbank v. Lockheed Air Terminal, Inc.* (1973) 411 U.S. 624, 633.)

43-6 Con't

2. Direct Accountability

Another primary concern we have with any measure to reduce emissions from airports in the Basin is that it require direct accountability. We therefore want to reemphasize the position which has been consistently conveyed to the District regarding the role of the air carrier airports in the Basin in addressing the air quality challenges which face our region. Specifically, we continue to believe that any air quality regulations should ensure direct accountability for emissions. JWA strongly supports direct accountability for emissions related to aircraft operations and related emission sources, and is concerned that any indirect source control measure would inappropriately and unnecessarily blur the lines for direct accountability from these emissions sources.

43-7

3. Implementation of a Mitigation Fee or Clean Fleet Incentive Program

The Draft 2016 AQMP references a possible mitigation fee and/or clean fleet incentive program in the context of MOB-04. Specifically, in the proposed action section, the Draft 2016 AQMP indicates that these types of measures would require the District to partner with airports to incentivize cleaner aircraft to come to California airports and require the imposition of mitigation fees.

43-8

The Airport has a number of concerns with respect to the implementation of any type of mitigation fee program or program which requires airports to provide incentives for airlines to fly only their cleanest fleets in the Basin. First, it is unclear, among other issues, how such a mitigation fee program or clean fleet incentive program would be monitored and administered; how such a mitigation fee program/clean fleet program would be enforced; how the District would determine aircraft activity at individual airports in the Basin; what would be used as a baseline for monitoring purposes; and what type of emission sources would be regulated under the mitigation fee and/or clean fleet program.

Second, for many of the reasons discussed above, airport-enforced mitigation fee programs or clean fleet programs have continually been opposed by the FAA.

Third, mitigation fee programs imposed on airlines, in theory, may result in activity reductions or the use of the "cleanest fleet" where mitigation fees are imposed. Under a program of this type, presumably commercial aircraft and general aviation aircraft owners or operators pay a "mitigation fee" based upon some type of emission measurements or aircraft activity or both. It is unclear to what extent these types of measures impact the natural evolution of the commercial and general aviation community, and, in particular the new entrant aviation community, and to what extent they may effect competition in the Basin.

43-8 Con't

Fourth, and finally, any regulatory program that results in imposing mitigation fees or clean fleet incentive programs could potentially result in an enormous administrative burden to airports throughout the Basin.

B. EMISSIONS INVENTORY

Over the past several years, JWA has provided information to SCAQMD staff relating to its baseline emissions inventory as well as its projections for future aircraft activity (both general aviation and commercial aircraft) at the Airport. As this information indicates, and as the District knows, the Airport is under certain legal and operational constraints with respect to existing and future operations. We appreciate SCAQMD's recognition of the uniqueness of the legal and regulatory constraints as well as the available infrastructure (existing and planned) at each of the airports in the Basin and the necessity of taking into account both the unique characteristics and available infrastructure at each of the airports in the context of the continued development and approval of any regulatory strategies, including proposed measure MOB-04.

One concern we have, however, is that it appears that none of the initially published data from SCAQMD provides JWA specific emissions inventories. Rather, it appears that all of the emissions inventory data for airport forecasts is based upon categories of sources with a reference to the 2016-2040 RTP/SCS data from SCAG. (*See, e.g.*, Draft 2016 AQMP, Chapter 3). Unfortunately, SCAG did not use the data provided by JWA to forecast fleet mix and Landings and Take-offs (LTO) for 2040. JWA has provided the SCAQMD (via correspondence with Zorik Pirveysian of Intergra Environmental Consulting, Inc.) with JWA specific data. We therefore request that the Draft 2016 AQMP be revised to use the specific data provided by JWA to the District to forecast fleet mix and LTO's at the Airport rather the data from SCAG which is not airport specific.

43-9

As indicated above, another key and continuing concern relating to the use of a baseline to measure emissions reductions is the current failure of this method to provide some type of "credit" to the Airport for the significant emission reduction measures that have already been

implemented and are currently being implemented to reduce air quality impacts associated with airport operations. As indicated above, in order to maintain equity and to avoid inadvertently "penalizing" those who voluntarily implement significant air quality reduction measures, the Draft 2016 AQMP should provide some type of "credit" to "sources" for these efforts and not simply "bake" into the baseline these significant emission reduction measures.

According to the Draft 2016 AQMP, quantified emission reductions that are real, surplus, permanent, and enforceable will be reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or *in the baseline emissions inventories* as part of future AQMP/SIP development. It is unclear from this statement what data SCAQMD will rely upon for the baseline emissions inventories and what data it will use for the estimated projected reductions in airport generated trips that could occur through implementation of the proposed control measures. In addition, if the baseline emissions inventories in the Draft 2016 AQMP will not be used by the District as the performance standards for proposed measures, the Draft 2016 AQMP must be revised to accurately indicate what performance standards or objectives the District will adopt for the air transportation industry. The Draft 2016 AQMP should also be revised to include a discussion of some type of "credit system" that will be provided for airports that have already implemented significant emission reduction measures.

43-9 Con't

C. POTENTIAL INCONSISTENCIES BETWEEN EXISTING AND PROPOSED NEW CONTROL MEASURES

The long term control measures identified by the Draft 2016 AQMP to be considered by ARB for implementation continue to: (1) pursue approaches to reduce emissions from ground support equipment (GSE) (OFFS-04); (2) require zero emission airport shuttle-buses (ORHD-07); and (3) require fleet and facility modernization. We continue to be concerned about these long term control measures because, as you know, the SCAQMD already has a number of regulatory rules governing vehicle fleets. Any future regulatory measures should be consistent with these existing regulations. In addition, airports should not be required to regulate or administer emission reduction programs for vehicle fleets or GSE that they do not own or operate. As indicated above, this type of indirect source rule would not be within SCAQMD's legal authority.

43-10

D. COST EFFECTIVENESS

Although the Draft 2016 AQMP includes a preliminary assessment of the cost effectiveness of available and proposed measures, this preliminary analysis does not adequately address the public policy concerns which the District must consider. In addition, the cost effectiveness of other proposed regulatory measures, including any possible mitigation fee program or clean aircraft incentive program, are not discussed. It is imperative that before any further analysis is conducted regarding any of the measures provided in the Draft 2016 AQMP directed toward

43-11

airports and airlines, that the District prepare appropriate and complete analyses of the cost effectiveness of all of the proposed measures as mandated by California law in order to provide the airports in the Basin with information which measures the full costs of any and all possible regulatory programs in terms of the increase in emission reduction costs versus program and improvement costs. (*See, e.g.,* Cal. Health & Safety Code 40440(e), 40703, and 40913(b)). The CALIFORNIA CLEAN AIR ACT also requires the District Governing Board to determine that the Draft 2016 AQMP is a cost-effective strategy that will achieve attainment of the state standards by the earliest practicable date. (CAL. HEALTH & SAFETY CODE §§40440(e), 40703, and 40913(b).)

Certainly, it is imperative that before any further analysis is conducted regarding any of the possible regulatory measures mentioned in the Draft 2016 AQMP directed toward airports and airlines, the District prepare appropriate and complete analyses of the cost-effectiveness of all of the proposed measures as mandated by California law. Particularly, before the District provides further information regarding possible regulatory approaches, it is important for the District to take a "hard look" at this issue and to provide the airports in the Basin with information which measures the full costs of *any* and *all* possible regulatory programs in terms of the increase in emission reduction costs versus program and improvement costs. 43-11 Con't

In addition to the program and improvement costs, we continue to be concerned about the effect any emission reduction strategies will have on new entrant air carriers, especially relatively small air carriers with a limited fleet mix, and the importance of maintaining a competitive airline environment in the Basin. A regulatory scheme which would inhibit competition would probably result in significantly higher air fares to and from the Basin than in other parts of the country, which could in turn have a seriously negative effect on the local economy. This issue must also be taken into account when addressing the cost effectiveness of the proposed measures.

E. EMISSION REDUCTIONS AND PERFORMANCE STANDARDS

Although the Draft 2016 AQMP has identified a number of control measures for the airport and airline industry, including MOB-04, as indicated above, the Draft 2016 AQMP fails to discuss any performance standards and objectives for these measures despite ongoing discussion that indicates that the District could quickly pivot to regulation, if necessary, and that such regulations are within the District's legal authority. Have internal performance targets been established for these control measures? The Draft 2016 AQMP must provide any performance targets that have been established so that there is an opportunity to comment on the targets prior to developing specific control measures for the airport and airline industry. 43-12

In addition, although we understand that the rule development process will provide additional opportunity for public and stakeholder input as well as ongoing technical review, assessment of costs and environmental impacts, it is difficult to assess measure MOB-04 or the proposed State

Implementation Plan (SIP) strategy measures, including ORHD-07 (zero emission airport shuttle buses) and OFFS-04 (zero emission GSE), without further information on their proposed parameters; we look forward to better understanding the District's proposals. That being said, and as the District has recognized, in many instances, controlling emissions at airports in the Basin is constrained by legal, operational, technological, and economic limitations. Therefore, we encourage the District to continue to be sensitive to and informed of such constraints when designing or implementing any regulations developed by SCAQMD and predicting associated emission reductions.

43-12 Con't

CONCLUSION

In closing, thank you again for this opportunity to comment on the Draft 2016 AQMP. We look forward to continuing to engage in an open, thorough and responsive public process and assisting the District with its efforts to improve air quality in the South Coast Air Basin. If you have any questions regarding the comments set forth in this letter, please do not hesitate to contact us at your convenience.

Very truly yours,

Lori D. Ballance
of
Gatzke Dillon & Ballance LLP

LDB/rlf

cc: Mark Denny, COO, County of Orange
David Salardino, California Air Resources Board
Rhonda Runyon, California Air Resources Board
Barry Rondinella, Airport Director
Melinda McCoy, Airport Environmental Engineer

Responses to Comment Letter from Gatzke Dillon & Balance LLP
(Comment Letter #43)

Response to Comment 43-1:

Proposed measure MOB-04 is seeking to identify actions to help achieve the emission reductions associated with the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures for light-duty vehicles, off-road equipment, and federal and international sources. Staff will be taking comments and input to identify actions that may be voluntary or regulatory in nature. Any proposed regulatory action by the SCAQMD will be within its legal authority.

Response to Comment 43-2:

See Response to Comment 43-1. Staff does not agree that these measures are not necessary. While they do not have separate emission reduction targets, this is because staff is seeking to identify additional actions through a public process (as discussed in MOB-04), to help meet the State Strategy emission reduction commitment.

Response to Comment 43-3:

MOB-04 is proposing that the overall AQMP emission reductions to attain federal air quality standard be used as an initial goal to help identify additional emission reductions. Staff will consider comments and input through the public process on identifying actions that result in additional emission reductions. The actions may be voluntary or regulatory in nature. Based on comments received, staff will work with affected parties to develop enforceable mechanisms to ensure that the resulting emission reductions remain permanent if the reductions are proposed to be included in the SIP.

Response to Comment 43-4:

Staff will work with affected stakeholders to evaluate what baseline emissions will be appropriate to identify actions that result in additional emission reductions.

Staff will take into consideration what actions have already resulted in additional emission reductions. If the actions are not recognized in the baseline and the actions are quantifiable and permanent, the resulting emission reductions may be taken as part of future Rate-of-Progress reporting and future AQMP revisions.

Response to Comment 43-5:

Staff appreciates your comments and participation in the development of the Draft Plan.

Response to Comment 43-6:

Staff believes that SCAQMD has the legal authority to regulate indirect sources as recognized by *National Ass'n. of Home Builders v. San Joaquin Valley Unified APCD*, 627 F. 3d 730 (9th Cir. 2009). Moreover, EPA's former indirect source regulation specifically identified airports as a type of indirect source .See "Indirect Source Controls: An Intersection of Air Quality Management and Land Use Regulation", Loyola of Los Angeles Law Review, 6-1-91, p. 1133. The 9th Circuit Court of Appeals rejected the contention that indirect source controls were preempted by the Clean Air Act's provisions regarding mobile sources. With regard

to any other potentially preemptive federal statute, we note that once the measure is approved into the SIP, it would be entitled to be harmonized with the provisions of that federal statute and upheld wherever possible. *Association of American Railroads v. South Coast AQMD*, 622 F. 3d 1094 (9th Cir. 2010). With regard to the airport's authority as a proprietor, this issue will be discussed further during the working group process to the extent there is a desire to rely on such authority.

Response to Comment 43-7:

Staff understands this comment to be suggesting that any indirect source measure be directed at airlines rather than at the airport as a whole. Staff will consider the feasibility of this option during development of the measure. Any such measure would need to include an enforceable mechanism to be included in the SIP.

Response to Comment 43-8:

SCAQMD staff recognizes your concern with a possible mitigation fee to comply with a facility-based measure regulating airports. The concept of a fee program is discussed as an example that will be further vetted during the working group meetings regarding this measure. In addition, any proposed fee program will go through analysis on the cost-effectiveness of such a program and if such a program is within the authority of the airports. Staff encourages stakeholders and interested parties to participate in these working group meetings to ensure the program and/or rule is developed in a feasible and effective manner.

Response to Comment 43-9:

The airport emissions are now replaced with the data provided by Mr. Zorik Pirveysian on Aug 10, 2016. According to the report by Mr. Pirveysian, emissions from John Wayne Airport (JWA) were estimated with EDMS model for the years of 2016, 2021, and 2026. This estimation was conducted based on JWA's detailed operations forecast for these years which covered air carrier, air taxi, and GA operations.

Response to Comment 43-10:

The SCAQMD is working closely with CARB to ensure that any proposed rules from CARB will be consistent with local rules. Please see Response to Comment 43-6 regarding legal authority.

Response to Comment 43-11:

Staff appreciates the comment and will consider the comments during the public process to identify additional actions. Although AQMP control measures are accompanied by cost-effectiveness data where feasible, in some cases this information can only be ascertained as the precise form of the measure is developed during subsequent rulemaking or development of other enforceable mechanisms.

Response to Comment 43-12:

In response to the concerns raised by the commenter, the Revised Draft Plan has been modified to include details regarding the trigger to pivot to regulation. If steps are not taken to implement the voluntary actions, SCAQMD staff will recommend to the Board whether to consider development of rules within legal authority no later than one year after the adoption of the Final 2016 AQMP.

Comment Letter from Lennox International Inc. (Comment Letter #44)

LENNOX INTERNATIONAL

Lennox International Inc.
2140 Lake Park Boulevard
Richardson, Texas 75080-2254

Mailing Address:
P.O. Box 799900
Dallas, Texas 75379-9900

Telephone: 972.497.5000
Facsimile: 972.497.6568
Lennoxinternational.com

Dave Winningham
Sr. Engineering Manager,
Regulatory Affairs
Telephone: 903-736-4085

August 19, 2016

Michael Krause
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Submitted via: www.aqmd.gov

Re: Lennox Comments on SCAQMD Draft 2016 Air Quality Management Plan

Lennox International Inc. (Lennox) hereby submits comments on the, *Draft 2016 Air Quality Management Plan*, that was published by the South Coast Air Quality Management District in June 2016 (hereafter referred to as the "AQMP").

Lennox is a leading provider of climate control solutions for the heating, air-conditioning, and refrigeration equipment markets. Lennox is a publicly-traded company and has thousands of employees. Lennox manufactures HVAC and Refrigeration (HVACR) products that will be affected by the 2016 AQMP. Lennox appreciates the opportunity to work with SCAQMD to develop reasonable, practical regulations that help to further its goals. However, Lennox has concerns regarding the Draft AQMP and current SCAQMD regulations as outlined in the comments below.

Comments on the Draft 2016 AQMP. 44-1

Lennox recognizes that the federal Clean Air Act (CAA) requires areas not attaining the national ambient air quality standards (NAAQS) to develop and implement an emission reduction strategy that will bring the area into attainment in a timely manner and the role SCAQMD plays in this effort.

Lennox applauds the SCAQMD direction as stated in the draft plan; "The 2016 AQMP represents a new approach, focusing on available, proven, and cost-effective alternatives to traditional strategies, while seeking to achieve multiple goals in partnership with other entities promoting reductions in greenhouse gases and toxic risk, as well as efficiencies in energy use, transportation and goods movement. The Plan recognizes the critical importance of incentives that encourage the accelerated transition of vehicles, buildings, and industrial facilities to cleaner technologies in a manner that benefits not only air quality, but also the local businesses and the regional economy. These "win-win" scenarios are key to implementation of this Plan with broad support from a wide range of stakeholders."

Lennox key concern regarding the draft 2016 AQMP is that the current SCAQMD regulations under Rule 1111 Low NOx requirement for Residential Furnaces products does not 44-2

seem well aligned with the strategy stated in the draft plan. Lennox is also concerned that as part of the Draft AQMP, CMB-02 – EMISSION REDUCTIONS FROM COMMERCIAL AND RESIDENTIAL SPACE AND WATER HEATING (i.e. rule 1111.1) will result in a similar situation to that current found for the Residential Furnaces under Rule 1111.

44-2 Con't

To summarize, the current situation regarding Rule 1111 is that we are 18 months into the implementation of the rule and there are no products available on the market that meet the 14ng/joule NOx requirement. While Lennox and other Furnace manufacturers participated in the technology assessment conducted by SCAQMD leading up to the promulgation of Rule 1111, it appears that the task of deployment of the technology and the burden associated with the rule has been significantly underestimated.

Rule 1111 as enacted employs a 3 year mitigation period and associated fees to allow manufacturers time to come into compliance. This mitigation period started in April 2015. Since the completion of the technology assessment Lennox has and continues to significantly invest toward development of low NOx products that meet the standard criteria. As we are now approaching the end of 2016, Lennox has concerns that the mitigation period for high efficiency gas furnaces may end without product being available to the market. Lennox is also concerned that the structure and timing of the mitigation period and fees first are not aligned with the 2016 AQMP and in fact could be a disincentive toward SCAQMD objectives and a significant burden to the HVAC industry.

The following summarizes Lennox's evaluation of current rule 1111.

44-3

- Mitigation Fee structure is a disincentive for higher efficiency products.
- Multiple burdens.
  - Burden of Mitigation fees.
  - Burden of development of a product specifically for the CA market that has limited if any association with the core US products.
- Timing disincentive for higher efficiency products (mitigation fee ends 1st), could result in no products being available.
- Fuel Switching – Potentially to less efficient alternatives due to mitigation fee cost.
- Incenting repair versus replace due to higher cost – Loss of emission reduction and efficiency improvements.

Lennox expressed these concerns and other key issues related to the development of low NOx furnace products during our recent meeting with SCAQMD staff and were encouraged by the discussion surrounding these issues. This encouragement extends further to Lennox's perspective of the draft 2016 AQMP where SCAQMD acknowledges:

- The critical importance of incentives that encourage the accelerated transition to cleaner technologies in a manner that benefits not only air quality, but also the local businesses and the regional economy.
- Mobile sources currently contribute about 88 percent of the region's total NOx emissions.
- Without an adequate and fair-share level of reductions from all sources, the emission reduction burden would unfairly be shifted to stationary sources.

Further, Lennox understands that SCAQMD is considering amending Rule 1111 to put in place a heat input based emission limit which will result in lower NOx emissions for high efficiency units compared with standard efficiency units. As part of this consideration a conversion to a PPM metric which is a fundamental input into the current NOx calculation is under consideration. While Lennox can support this direction, careful consideration must be given to the process and the levels taking into account the impacts of product efficiency and reliability as it relates to the combustion process. 44-3 Con't

Lennox strongly recommends that current Rule 1111 be reviewed for alignment with the Draft 2016 AQMP and its stated methods towards achievement of the required air quality standards. Further, Lennox recommends that SCAQMD give full consideration to the recommendations outlined in our recent meeting and encourages further direct dialogue with Lennox on the specific issues regarding Rule 1111, potential rulemaking for Commercial Furnaces and amendments thereof.

In summary, Lennox greatly appreciates the opportunity to engage with SCAQMD both directly and thru these comments. Please contact me directly for any further information needed regarding these issues.

Sincerely,

David Winningham

Dave Winningham,
Sr. Engineering Manager, Regulatory Affairs

Responses to Comment Letter from Lennox International Inc. (Lennox)
(Comment Letter #44)

Response to Comment 44-1:

Staff appreciates the commenter's interest in the development of the 2016 AQMP and recognizing the importance of co-benefits from reductions in GHGs and toxics to assist in reducing criteria pollutants necessary for meeting the federal air quality standards.

Response to Comment 44-2:

The incentive based programs for water heating are based on existing technologies. The technologies for commercial heating furnaces was identified in the previous and the current AQMP. The proposed limits for commercial heating furnaces are consistent with manufacturer's recommendations in workshops and advertised emissions that were provided by manufacturer. The data available at this time suggests that incentivizing residential heating furnaces with emissions less than the rule limit will not result in significant emission reductions over the timeframe analyzed in the control measure. However, an analysis of life cycle emissions under future energy supply scenarios may result in emission reduction opportunities.

Response to Comment 44-3:

CMB-02 does not impact Rule 1111 in the short-term. It proposes incentive programs for water heaters, boilers and potentially commercial space heating furnaces and residential heating furnaces. Lower emitting heating furnaces may be included in incentive programs if there is a potential for significant NOx reductions. Water heaters and boilers provide a much greater opportunity to incentivize NOx reductions. Because an incentive program for residential furnaces cannot be put in place until units meeting the new emission limit are produced, Rule 1111 requirements and mitigation programs do not conflict with the proposed incentive programs. Any proposal to delay compliance dates for Rule 1111 would be addressed independently during a rule amendment. At this time there is no specific proposal by SCAQMD staff to amend Rule 1111. A rule may be developed in the future to regulate NOx emissions from commercial heating furnaces as technology advances.

Comment Letter from Los Angeles Area Chamber of Commerce (Comment Letter #45)

LOS ANGELES AREA
CHAMBER OF COMMERCE

August 19, 2016

Wayne Nastri
Acting Executive Officer
21865 Copley Dr.
Diamond Bar, CA 91765

RE: SCAQMD 2016 DRRAFT AIR QUALITY MANAGEMENT PLAN

Dear Mr. Nastri,

On behalf of the Los Angeles Area Chamber of Commerce, our more than 1,650 members and the more than 650,000 people they employ throughout the region, we are submitting comments in response to the 2016 Air Quality Management Plan (AQMP). The document represents comprehensive air quality goals, policies and programs impacting the South Coast Basin, in addition to environmental needs while promoting economic growth and well-being for all Californians.

The following comments are a collection of the Chamber's stakeholders, which aided in developing what we refer to as "guiding principles", we hope the final AQMP will reflect:
(1) Incentive-based policy framework; We support the District's efforts to work with industry and stakeholders to attain emissions and clean air goals. (2) Incentive based programs; we believe positive outcomes are best achieved through incentives, rather than punitive regulatory actions. The overall policy framework should refrain from being penal in nature, and rather prioritize non-regulatory, incentive based programs. (3) Innovative methodology to reduce emissions should be deployed while acknowledging that the region has made visible strides in lowering emissions from stationary sources. (4) Cost effectiveness and technology neutral equipment and retrofits should also be significantly reflected in the AQMP; in offering cost effective alternatives, stakeholders are not adversely operationally or financially burdened. (5) The plan acknowledges that many of the emission control technologies that are needed are not currently cost effective, but to attain the health standards by the deadline (2023) these control technologies need to be deployed. (6) The plan should be fuel neutral and impartial, offering an array of alternatives to consumers. (7) The AQMP should provide sufficient incentives to offset the capital and operational costs of low emissions technologies to both, mobile and stationary. (8) Facility based measures including potential facility emission caps can cause severe potential implications on the national supply chain. This regulatory action can create an unprecedented expansion to regulate goods movement facilities and shippers and is contrary to efficiency. (9) The plan identifies the need for approximately $2 billion in incentives for stationary sources to assure that the needed control technologies are deployed by the deadline (2023). More specific information of how this plan will be funded is essential to moving forward with implementation. The AQMP should consider partnering with various stakeholders to effectively finance incentive programs.

45-1
45-2
45-3
45-4
45-5

Thank you for your efforts. We look forward to continue working with you.

Sincerely,

Gary Toebben

Gary Toebben
President & CEO

RECEIVED | 8-19-16 | SCAQMD | Diamond Bar | 213.580.7511 | F 213.580.7511 | 1660 W. 3rd St. | Los Angeles, CA 90017

Responses to Comment Letter from Los Angeles Area Chamber of Commerce (Comment Letter #45)

Response to Comment 45-1:

Staff appreciates the support for the incentive programs in the Draft Plan.

Response to Comment 45-2:

The policy in the Plan is to prioritize what is cost-effective and feasible whether through a regulatory approach or an incentive based approach. There is strong support for regulations that are permanent, effective, and enforceable. However, incentives can assist in advanced deployment of cleaner technologies and allow for public acceptability, as well as, provide time for the new technology to be more commercially available, and feasible in more applications.

Response to Comment 45-3:

Please see Response to comment 45-2 regarding cost-effectiveness and the value of incentives to deploy advanced technologies, particularly with fast approaching deadlines for the ozone standards. The plan is fuel neutral in that any power source meeting required emission standards may be used.

Response to Comment 45-4:

During the public process, staff will be taking comments and input on identifying actions that result in additional emission reductions. As part of this effort, staff will examine impacts on the supply chain. In a separate activity, the Ports are evaluating ways to optimize the supply chain. To the extent that emission reductions are realized from the Ports' efforts, staff will work with the Ports and interested stakeholders to quantify the reductions for consideration in recognizing the reductions in the SIP. In implementing the facility-based measures, staff will need to identify enforceable mechanisms, but there is no preconceived conclusion that this would necessarily involve emission caps.

Response to Comment 45-5:

Staff is developing a draft Financial Incentive Funding Action Plan to provide more specific information on potential funding sources and a set of proposed actions to secure funding.

Partnerships are a critical element in developing a successful incentive program and will be emphasized in the draft Financial Incentive Funding Action Plan.

Comment Letter from Los Angeles Department of Water & Power (Comment Letter #46)

Los Angeles Department of Water & Power

ERIC GARCETTI
Mayor

Commission
MEL LEVINE, *President*
WILLIAM W. FUNDERBURK JR., *Vice President*
JILL BANKS BARAD
MICHAEL F. FLEMING
CHRISTINA E. NOONAN
BARBARA E. MOSCHOS, *Secretary*

MARCIE L. EDWARDS
General Manager

August 19, 2016

Mr. Michael Krause
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Dear Mr. Krause:

Subject: Los Angeles Department of Water & Power's Comments on Draft 2016 Air Quality Management Plan

The Los Angeles Department of Water & Power (LADWP) appreciates the opportunity to provide comments on the Draft 2016 Air Quality Management Plan (AQMP). LADWP supports South Coast Air Quality Management District's (SCAQMD) efforts to further develop efficient and effective policies to reduce emissions in order to meet the federal standards in the South Coast Air Basin (SCAB).

Serving approximately 1.4 million customers in Los Angeles with a generating capacity of over 7,300 megawatts, LADWP is the largest municipal electric utility in the nation, and the third largest electric utility in California. LADWP is a vertically integrated utility, owning and operating a diverse portfolio of generation, transmission, and distribution assets spanning several states.

All of LADWP's generating units are equipped with Best Available Retrofit Control Technology (BARCT) or Best Available Control Technology (BACT) and have reduced NOx emissions by 90 percent. As part of its modernization efforts, since the 1990's, LADWP has been replacing its existing, less efficient utility boilers in the South Coast Air Basin with new, state-of-the-art combined-cycle and simple cycle turbine systems equipped with selective catalytic reduction technology to minimize NOx emissions. During this modernization process, LADWP's generating facilities have been subject to New Source Review and are equipped with BACT. 46-1

LADWP also continues to make unprecedented investments in renewable energy resources, energy efficiency and transportation electrification to improve the environment. LADWP is on track to meet 33 percent of its energy sales from renewable energy resources by 2020, has a goal to achieve 15 percent energy savings by 2020, and is continuing to implement programs to support the electrification of the transportation sector to reduce greenhouse gases and criteria pollutants, including NOx, and as a potential solution to absorb over-generation from solar renewable sources.

Los Angeles Aqueduct Centennial Celebrating 100 Years of Water 1913-2013
111 N. Hope Street, Los Angeles, California 90012-2607 *Mailing address:* Box 51111, Los Angeles, CA 90051-5700
Telephone: (213) 367-4211 www.LADWP.com

LADWP's provides comments on SCAQMD's proposed regulatory language and draft preliminary draft staff report below. 46-1 Con't

CTS—01 Further Reductions from Coatings, Solvents, Adhesives, and Sealants

As the draft AQMP states, this control measure "seeks limited VOC emission reductions by focusing on select coating, adhesive, solvent and sealant categories by further limiting the allowable VOC content in formulations or incentivizing the use of super-compliant technologies." The AQMP states that VOC reductions could be achieved by lowering the VOC content of source categories within SCAQMD source-specific rules such as Rule 1171. LADWP has concerns with respect to amendments to these rules as it operates and maintains a number of equipment to maintain grid reliability.

LADWP, as well as owners/operators of electric generating facilities in the SCAB, operate and maintain electric system components, circuit breakers and continuous emissions monitoring system (CEMS) analyzers. LADWP uses denatured alcohol, which is subject to rule 1171, to clean the optical sensing elements in the CEMS. With respect to the cleaning of circuit breakers, the manufacturers specify the use of denatured alcohol. The potential consequences of not using denatured alcohol is that the warranty would be voided and/or the circuit breaker would not function properly (leading to possible power outage, fire or explosion, release of SF6 insulating gas into the atmosphere, violation of the SF6 emission limit). Any alternative to denatured alcohol cannot leave a residue as it could provide a path to ground to electricity and the contaminants in the residue could cause flash over and/or prevent SF6 from reforming properly after extinguishing an arc. 46-2
To date, LADWP has not found a safe and effective alternative to denatured alcohol.

LADWP and Southern California Edison have had several discussions with the California Air Resources Board (CARB) with respect to the above described concerns and its Consumer Products Regulation requirements. CARB is working with the utilities to determine how to address the issue. If SCAQMD amends Rule 1171 with respect to use of denatured alcohol, LADWP recommends that SCAQMD work closely with the electric utilities to ensure that alternative solvents are safe and effective.

Electricity Sources

Figure 10-10 shows the percentage breakdown of the generation mix for electricity supplied to the Los Angeles (LA) Basin from LADWP which would not only include electricity supplied from its LA Basin generating facilities, but also electricity from its generating facilities within California but outside the LA Basin and generating facilities outside California. However, since the 2016 AQMP does not address the emissions associated with electricity imports *into* the Basin, the information in Figure 10-10 could cause confusion. If SCAQMD intends to show this information, it should clarify that the 46-3

emissions associated with electricity generated outside the LA Basin would not be subject to SCAQMD jurisdiction.

The discussion in this section states that LADWP's energy supply from coal has remained constant at 40 percent based on the CEC Utility Annual Power Content Labels for 2014. To provide an update for inclusion into the 2016 AQMP, on July 1, 2016, LADWP completed its divestiture from its 21.2 percent ownership of Navajo Generating Station, a coal-fired facility located in Arizona, three-and-a-half years ahead of schedule. LADWP's energy supply from coal is projected to be between 28 and 30 percent without Navajo Generating Station.

46-3 Con't

ECC-01 – Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives
ECC-02 – Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures

LADWP supports the above stated control measures that recognize criteria pollutant emission reductions from energy and climate change related programs that also significantly reduce greenhouse gas (GHG) emissions. LADWP supports SCAQMD's efforts to take advantage of the co-benefit emission reductions from implementation of State regulations such as the AB 32 cap-and-trade, renewable portfolio standard, California's Title 24 program and SB 350's energy efficiency goal and energy targets.

46-4

State Implementation Plan Crediting to Accommodate Electrification

As the AQMP states, an essential part of the strategy to reduce NO_x levels in the SCAB region will be to electrify sources and thereby eliminate the NO_x emissions that currently result from their burning of fossil fuels. Specifically, the increased electricity generation will result in small increases in NO_x emissions by affected electric generating facilities, but those emissions will be more than offset by substantial NO_x emission reductions achieved by the newly electrified sources. Electrification of even portion of these sources will result in substantial overall NO_x reductions.

An important element of this strategy is for SCAQMD to work with the U.S. Environmental Protection Agency (EPA) to develop a mechanism for accounting for and providing emission reduction credit to the owners and operators of affected electric generating facilities for the net NO_x emission reductions achieved in the SCAB through the electrification of other source categories within the basin. This emission reduction crediting mechanism would demonstrate how the SCAQMD will meet its obligations to attain and maintain the air quality goals under the Clean Air Act. At present, there is not any EPA-recognized state implementation plan (SIP) mechanism that accounts for and provides the appropriate credit to electric utilities for emissions reductions achieved by the electrification of other source categories. LADWP urges SCAQMD to work with key

46-5

EPA staff (both at headquarters and Region 9) to develop a SIP crediting mechanism modeled after approaches that EPA has developed for promoting energy efficiency and renewable energy measures as an acceptable approach for the SCAQMD and other state authorities to meet their ozone reasonable further progress goals for reducing NO_x emissions under the Clean Air Act. 46-6

Development of an EPA-recognized SIP crediting mechanism will address the regulatory uncertainty that would otherwise result from this paradigm shift and thereby encourage the implementation of policies to reduce emissions from the transportation and major source categories of emissions through electrification in the South Coast Air Basin and other urban ozone nonattainment areas.

Conclusion

Again, LADWP appreciates the opportunity to provide comments on the 2016 Draft AQMP. If you have any questions or would like additional information, please contact Ms. Jodean Giese of my staff at (213) 367-0409.

Sincerely,

Mark J. Sedlacek

Mark J. Sedlacek
Director of Environmental Affairs

JG:dms
Enclosures
c: Ms. Jodean Giese

Responses to Comment Letter from Los Angeles Department of Water & Power (LADWP)
(Comment Letter #46)

Response to Comment 46-1:

Staff appreciates the interest and participation in the development of the 2016 AQMP as well as investments in renewable energy resources, energy efficiency, and transportation electrification.

Response to Comment 46-2:

Staff will work closely with stakeholders when considering VOC reductions to ensure safe and effective alternatives exist.

Response to Comment 46-3:

Figure 10-10 footnote has been updated to state "and generation outside the Basin is not subject to SCAQMD regulatory authority". However, this table shows electricity usage and associated CO2 emissions, not generation.

Response to Comment 46-4:

Staff agrees that co-benefits can assist in generating criteria pollutant reductions while existing programs reduce GHGs and toxics. The Draft Plan includes measures such as ECC-01 and ECC-02 that take advantage of the co-benefits from other programs.

Response to Comment 46-5:

Staff is willing to discuss a possible SIP crediting mechanism for electric utilities with EPA if it can be shown how such as mechanism would incentivize reducing emissions, especially from the transportation sector.

Comment Letter from Los Angeles World Airports (Comment Letter #47)

Los Angeles World Airports

August 19, 2016

Michael Krause
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765

Re: **Draft 2016 Air Quality Management Plan**

Dear Mr. Krause:

LAX
LA/Ontario
Van Nuys
City of Los Angeles
Board of Airport Commissioners

As you know, Los Angeles World Airports (LAWA) is the proprietary department of the City of Los Angeles that owns and operates Los Angeles International Airport (LAX), LA/Ontario International Airport (ONT), and Van Nuys general aviation airport (VNY). LAX is the seventh busiest airport in the world and third busiest in the United States. This letter identifies a number of issues that LAWA sees with the 2016 Draft AQMP, including:

- Current and forecast airport-related emissions in the 2016 Draft AQMP are not accurate and substantially understate the annual emissions that LAWA and other airports anticipate occurring through the horizon of this AQMP (2032).
- Aircraft emissions reductions predicted by the control scenarios due to the introduction of more aircraft meeting the International Civil Aviation Organization's (ICAO) latest aircraft engine emission standards will not materialize as expected. The large majority of aircraft that currently operate at LAX meet these standards, and thus, the expected reductions from the U.S. Environmental Protection Agency's (USEPA) adoption of ICAO's latest aircraft emission standards have already been achieved and are reflected in the emissions inventories that LAWA prepared and shared with the SCAQMD.

47-1

We appreciate the work of SCAQMD staff to address these discrepancies and other issues.

I. LAX Is an Important Regional Transportation Source and LAWA Has Taken Meaningful Steps to Reduce Emissions.

47-2

LAWA has long been a leader in airport sustainability and is committed to improving air quality at our facilities and across the region. Energy efficiency and air quality improvement programs are chief components of LAWA's sustainability policy, which was first adopted in 2008. Since then, LAWA has implemented a wide variety of programs designed to achieve reductions in energy consumption and improve air quality, including:

- Energy efficiency projects, including LAX's new Central Utility Plant, which is a modern, energy efficient facility and is estimated to reduce operational GHG emissions by 6%;
- Voluntary purchase of green power from LADWP, which accounted for more than 10% of LAX's total power purchase in 2015;
- The LAX Solar Feasibility Study, which will identify sites on the LAX campus for the installation of solar photovoltaic power systems;
- LAWA's Clean Fleet Program, which is the nation's largest alternative-fuel airport fleet;
- LAX's Ground Support Equipment Emissions Reduction Policy, which requires airlines and other GSE operators to meet emissions targets through conversion or retirement of conventionally fueled equipment used to service aircraft;
- LAWA's Gate Electrification program, which provides electrical power and pre-conditioned air for parked aircraft to use instead of burning jet fuel – currently 100% of LAX's passenger gates are electrified and LAWA is working to expand electrification to aircraft parking spaces, maintenance hangars and cargo areas;
- LAWA's Clean Construction program, which is designed to reduce emissions from construction including mandating use of Tier IV diesel equipment, Model Year 2010+ haul trucks and other control measures;
- LAX FlyAway Bus Program, which provides ground transportation between LAX and multiple locations in the Los Angeles area;
- LAWA's award-winning Employee Rideshare program, which had a 23% participation rate in 2015 and saved more than 300,000 gallons of fuel; and
- LAX's Alternative Fuel Vehicle program, which requires shuttles, trucks, and other large commercial vehicles operating at the airport to be powered by alternative fuel.

47-3

LAWA is proud of the strong partnership forged with the SCAQMD, and appreciates the opportunity to actively participate in the process of developing the 2016 AQMP through the white paper working groups, the Control Strategy Forum, and the AQMP Advisory Group. In the spirit of mutual collaboration, LAWA offers the following comments on the 2016 Draft AQMP proposed programs and control measures:

II. Aircraft Emissions in the Draft 2016 AQMP Should Be Updated To Reflect Aircraft Inventories Provided by LAWA.

Although the text of the 2016 Draft AQMP indicates that aircraft inventories have been updated since the 2012 AQMP (page 3-6 last bullet), a comparison of the numbers shows that they are almost identical. In April 2015, LAWA provided SCAQMD staff as well as the Southern California Association of Governments (SCAG) more accurate 2012 aircraft inventories for the draft 2016 AQMP based on recorded flight landing and takeoff data at LAX, ONT, and VNY. The 2012 aircraft inventories in the 2016 Draft AQMP under-represent aircraft emissions in the basin and consequently may distort the impact of future control efforts. In addition, LAWA

47-4

provided airport, including aircraft, emission inventory forecasts for LAX (report dated September 2015), and for ONT and VNY (reports dated October 2015). The LAX and ONT forecasts were based on the 2016 RTP approved by SCAG. The 2016 AQMP should be updated to include the aircraft inventories provided by LAWA. 47-4 Con't

III. Estimated Emissions Reductions From Aircraft Should Be Clarified.

Throughout the 2016 Draft AQMP, SCAQMD calls for emission reductions from State and Federally controlled sources, generally referring to "Further Deployment of Cleaner Technologies." In Table 4-4 (page 4-29) reductions of aircraft NOx emissions are listed as 17 tons-per-day (tpd) in 2023 and 13 tpd in 2031. Yet, baseline inventories only have 15.6 tpd in 2023 and 17.09 tpd in 2031. While a footnote to Table 4-4 implies that emission reductions are undergoing review, it appears that the estimated NOx reductions from aircraft are inconsistent. Furthermore, it is unclear why there is a difference between Tables 4-4, 4-17, and 4-18. Table 4-17 (pages 4-61 and -62) identifies incentive funding needed to achieve emission reductions from aircraft, ocean-going vessels, and freight locomotives: $2.94 billion to achieve a 40 tpd reduction from these sources in 2023, and $1.47 billion to achieve another 20 tpd reduction by 2031. Another set of funding scenarios is provided in table 4-18. LAWA requests that SCAQMD clarify the targeted emission reductions from aircraft, understanding that LAWA does not have regulatory control over aircraft given federal preemption limitations. 47-5

IV. The 2016 Draft AQMP Overestimates NOx Emission Reductions from Aircraft.

The 2016 Draft AQMP appears to assume that emission controls for aircraft will reduce aircraft emissions by 76% to over 100% of Basin-wide aircraft emissions without providing any detail on how those reductions are being estimated. The reductions assumed are shown in Table 4-4 of the main document and Table 3 of Appendix IV-B (page IV-B-9). The assumed reductions actually exceed Basin-wide aircraft emissions in 2023. The proposed control measure: "Further Deployment of Cleaner Technologies: Off-Road Federal and International Sources" (page IV-B-57) implies that only ICAO's CAEP/8 compliant aircraft engines would be allowed in the South Coast. However, the large majority of engines assumed to operate on aircraft already comply with CAEP/8 NOx standards. Thus, the assumed emissions reductions, ranging from 76% to 100% of total Basin-wide aircraft emissions, appear to be greatly overestimated. 47-6

V. LAWA Supports the Creation of an Airport Working Group To Assess and Develop Control Measures for Other Airport Sources.

Control Measure MOB-04, as discussed in Appendix IV-A, pages IV-A-125 – 129, seeks to create a working group of airports, airlines, and other interested stakeholders to assess and develop mechanisms to reduce emissions from other airport sources. LAWA is proud of its many programs designed to reduce emissions from other airport sources as noted above. LAWA is eager to work with airlines, other airports, and interested stakeholders to find ways to 47-7

expand these programs to other airports and is interested in successful emission reduction programs in operation at other airports. While the 2016 Draft AQMP does not estimate emission reductions from this control measure, LAWA desires to work with the SCAQMD to develop ways to quantify the emissions benefits from existing and future emission control programs.

The 2016 Draft AQMP refers to emissions reductions from airport regulation of Taxis and Transportation Network Companies (TNCs) in Appendix IV-C and p. 133. Each municipality regulates Taxis differently. LAWA is not able to regulate Taxis at LAX and VNY as the City's Board of Taxicab Commissioners has exclusive jurisdiction over Taxis in the City of Los Angeles. Similarly, LAWA is not able to directly regulate TNCs as the California Public Utilities Commission has exclusive jurisdiction to regulate TNCs. Nevertheless, through the working group, LAWA is eager to explore voluntary and/or incentive based programs to encourage Taxis and TNCs to use clean vehicles at its airports. 47-7 Con't

LAWA looks forward to working with the SCAQMD and other stakeholders to explore opportunities for further emissions reductions at airports in the region and thanks the SCAQMD for the opportunity to comment on the 2016 Draft AQMP. We look forward to continued engagement in the public process and applaud the SCAQMD for its commitment to air quality improvement in the Basin.

Sincerely,

Lisa Trifiletti/TM

Lisa Trifiletti
Deputy Executive Director
Environmental Programs Group

LT:TM:eb

Responses to Comment Letter from Los Angeles World Airports (LAWA)
(Comment Letter #47)

Response to Comment 47-1:

Staff appreciates the commenter's participation in the development of the 2016 AQMP.

Response to Comment 47-2:

SCAQMD staff recognizes the energy efficiency and air quality improvement programs that have benefited and will continue to benefit the region.

Response to Comment 47-3:

Please see Response to Comment 47-2 regarding the implementation of energy efficiency programs.

Response to Comment 47-4:

The aircraft emissions inventory was updated using activity data provided by airport, FAA data and growth projection from SCAG in August 2016 and have been included in the Revised Draft 2016 AQMP.

Response to Comment 47-5:

There were errors in the reported emission reductions associated with aircraft for 2023. The projected emission reductions for 2023 has been updated for the Draft Final 2016 AQMP.

Relation to the difference in funding levels shown in Tables 4-17 and 4-18 (June 2016 release version), the Table 4-18 scenario called for greater emission reductions from locomotives and marine vessels. The targeted emission reductions from aircraft will be clarified in the State SIP Strategy portion of the 2016 AQMP.

Response to Comment 47-6:

Please see Response to Comment 47-5 with regard to NOx emission reductions from aircraft.

Response to Comment 47-7:

Staff appreciates the comments regarding LAWA's environmental programs and looks forward to working with LAWA and the other airport authorities, the airline industry, environmental and community organizations, and other interested stakeholders to identify actions that potentially result in additional emission reductions through the working group process.

The SCAQMD staff is aware that the City of Los Angeles Taxicab Commission has authority over taxicab service at LAX and would extend an invitation to the City's Department of Transportation staff to participate in the working group.

Comment Letter from Orange County Council of Governments (Comment Letter #48)

August 19, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 92765

RE: Orange County Council of Governments (OCCOG) Comments: June 2016 Draft of the 2016 Air Quality Management Plan

Dear Dr. Fine:

The Orange County Council of Governments (OCCOG) appreciates the opportunity to provide comments on an initial, June 2016 Draft of the 2016 Air Quality Management Plan (AQMP). The Draft 2016 AQMP is a monumental effort and OCCOG recognizes that this Plan is critical to the region's ability to achieve federal air quality standards and healthful air. OCCOG has established an Ad Hoc Working Group comprised of member agencies representing local government, transportation agencies and the business community to collaboratively review and comment on the draft Plan.

The following general comments and recommendations are offered by OCCOG on the initial June 2016 Draft 2016 AQMP. OCCOG reserves the right to make further comments at a future date when the full impact of the proposed control strategy can be assessed:

1. Fragmented and Incomplete Document Release: OCCOG's review of this initial draft was conducted in the absence of critical, related documents which have yet to be released by the South Coast AQMD. Documents not yet released include the draft 2016 AQMP Program Environmental Impact Report and the AQMP's Socioeconomic Analysis. 48-1

   OCCOG finds it extremely difficult to grasp and conduct a comprehensive review and comment of the Plan, when only certain elements of the Plan have been released. At this time, the main part of the Draft 2016 AQMP, Appendices I, II, III, and IV A-C have been released, while the Modeling and Attainment Demonstrations Appendix, Compliance with Other Clean Air Act Requirements Appendix, the Socioeconomic Analysis, and the Program Environmental Impact Report have not yet been released for public review.

   Due to the lack of a complete document, OCCOG respectfully submits at this time, preliminary higher-order comments that will hopefully assist in AQMD's preparation of a revised September 2016 Draft Plan for review and comment. Please note that OCCOG reserves the right to make further refinements or revisions to these comments, in addition to submitting additional and final comments, when all 2016 Draft AQMP documents are released in a coordinated and integrated review process.

   OCCOG thus reserves the right to make further comments at a future date when the full impact of the document can be analyzed, and further recommends that the South Coast AQMD please consider releasing all elements of the Plan simultaneously.

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2. Action Plan for Incentive Strategies: The Draft 2016 AQMP contains a number of measures that are designed to be implemented through incentives to accelerate the penetration of zero- and near-zero emission technologies, and to further reduce emissions from other mobile and stationary control measures. The Draft 2016 AQMP also notes that as much as $14 billion in funding needs to be identified in order to implement "incentive strategies".

   It is OCCOG's understanding that the $14 billion in funding need represents the total funding need of all the agencies responsible for implementing the proposed measures. OCCOG recommends that the incentive funding need for each proposed measure be detailed in the 2016 AQMP Plan and Appendices, particularly Table IV-A-1 and Table IV-A-2 in Appendix IV-A, and that funding need by agency also be summarized and presented. 48-2

   The Draft 2016 AQMP should include an action plan that identifies the funding source for all proposed incentive strategies. It should also include a discussion on the impact to local jurisdictions. For example, in regards to measures EEC-02 and EEC-03, there needs to be more details on who the recipient of the incentive is and who will be required to complete the bookkeeping and monitoring.

3. EGM-01: Emission Reduction from New Development and Redevelopment Projects: The purpose of this measure is to mitigate and reduce emissions from new development and redevelopment projects. The description of EGM-01 is very broad and could be interpreted to add a new fee to new development or redevelopment in the SCAQMD service area, similar to Rule 9510 adopted by the San Joaquin Valley Air Pollution Control District.

   As a coalition of local governments, this prospect concerns us absent more information on how a development fee might impact local land use under our authority. To the extent that such a control measure would redistribute or constrain growth in the region, it could undermine the GHG and pollutant emission reductions that are imbedded in the Regional Transportation Plan/Sustainable Communities Strategy that OCCOG worked diligently to complete with SCAG. A fee might not be the best way to insure that new structures accommodate clean technologies, and the District should also explore other cost/effective methods. 48-3

   Because of its ambiguity and potential overlap with the RTP/SCS, the OCCOG suggests that this proposed measure not be included among the AQMP's enforceable, committed measures. OCCOG further recommends that OCCOG be included in any South Coast AQMD Working Group that is established or re-convened on this measure, to allow for meaningful dialogue on this proposed measure. Further, if this measure proceeds to rule development in the future, the SCAQMD needs to assure that any proposed rule will integrate with, and enhance the California Environmental Quality Act (CEQA) process and not impede the project approval process in light of CEQA timelines.

4. Duplicative Measure: BCM-03: Further Emission Reduction from Paved Road Dust Sources: AQMD proposes that measure BCM-03 would include a review of existing NPDES mandates and that this be conducted in conjunction with any potential future rulemaking efforts. NPDES permits are administered by the local regional water quality control boards. AQMD does not have jurisdiction over the issuance and maintenance of mandates required of NPDES permits. OCCOG requests that AQMD staff remove reference to NPDES mandate review as to not confuse jurisdictional and implementation issues related to these permits. 48-4

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5. Unquantified Measures: There are a number of measures that have not been quantified in the Draft 2016 AQMP. These are often referred to as "to-be-determined" or "TBD" measures. Based upon the review of the initial draft 2016 AQMP, it is OCCOG's understanding that the Plan is capable of achieving federal air quality standards in absence of any of the TBD measures. OCCOG raises a concern on whether it is appropriate to include these types of measures in the 2016 AQMP, since they do not advance attainment. Inclusion of TBD measures implies some level of commitment toward delivering those measures even though it has not been determined how many emission reductions they can provide, or at what cost. An economic analysis cannot be performed without the quantified benefits. OCCOG is concerned that inclusion of TBD measures in the AQMP could allow the District to substitute a TBD measure in place of other quantified and committed measures by the SCAQMD staff after the 2016 AQMP is approved. The OCCOG understands that in the future the TBD measures may prove to be more cost effective than other committed measures. This kind of transfer should not be implemented as an administrative change, and should only be pursued through an appropriate public process Until the time that either a backstop measure is needed or a TBD measure is identified to be more cost effective than one of the currently quantified measures, the OCCOG requests that the TBD measures either be removed from the plan, or clearly separated from the quantified measures, and called out as uncommitted measures that require further development and evaluation. 48-5

   Furthermore, should the TBD measures remain in the AQMP, the OCCOG requests that the 2016 AQMP include a discussion that clearly states the purpose for including these strategies and the process required to incorporate these strategies. This process would preferably include action by the SCAQMD Governing Board and opportunities for public review and comment.

Thank you again for the opportunity to provide input on this initial Draft 2016 AQMP. We appreciate your consideration of all the comments provided in this letter and we look forward to your responses. We hope that future releases of the Draft 2016 AQMP will be coordinated to include all appendices and supporting documents to ensure we all are afforded a comprehensive review. Please do not hesitate to contact me if you have any questions.

Sincerely,

Marnie O'Brien Primmer
Executive Director
Orange County Council of Governments

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Responses to Comment Letter from Orange County Council of Governments (OCCOG)
(Comment Letter #48)

Response to Comment 48-1:

Staff appreciates the interest and participation in the development of the 2016 AQMP. With regards to the timeline of the release of the Plan and related documents, please see Response to Comment 38-1.

Response to Comment 48-2:

The funding needs identified in the AQMP is based on meeting the emission reductions associated with the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures for light-duty vehicles, on-road heavy-duty vehicles, federal and international sources, and off-road equipment. Tables 4-17 to 4-21 show a breakdown of potential funding by these sectors.

The deployment of cleaner technologies will be implemented by CARB, U.S. EPA, and the SCAQMD to incentivize cleaner vehicle and equipment. However, the specific implemented agency may depend on the source of funds or other factors.

For ECC-02, no additional costs are anticipated beyond those that would otherwise be allocated to reduce GHG emissions through State programs. This measure seeks merely to quantify criteria pollutant reductions from these GHG programs. ECC-03 is for existing residential buildings in the Basin and incentives are based on equipment, not the agency.

A Financial Incentive Funding Action Plan is being prepared to identify potential sources of funding. The Financial Incentive Funding Action Plan will be a companion document to the AQMP.

Response to Comment 48-3:

Under state law, the SCAQMD is required to assess rules and regulations adopted by other air agencies to ensure that all feasible measures are provided in the AQMP. As such, staff will be taking comments on whether adoption of a rule similar to San Joaquin Rule 9510 is appropriate for the South Coast Air Basin or whether there are other actions/mechanisms to address potential emissions associated with new or redevelopment projects. In addition, the facility-based measures will be developed in a public process and will initially seek enforceable actions to achieve emissions reductions. Please see Response to Comment 23-4 for details of the revised version of the facility-based measures in the Revised Draft Plan. Finally, staff encourages the Orange County Council of Governments to participate in the working group during the development of this measure.

Response to Comment 48-4:

Please see Response to Comment 6-2 with regard to NPDES requirements and clarification that staff did not intend the language to mean that SCAQMD would week to change NPDES permit requirements.

Response to Comment 48-5:

As mentioned in the Draft AQMP, the SCAQMD mobile source measures are proposed to help implement the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures. The SCAQMD is identified as an implementing agency along with CARB and U.S. EPA. As such, many of the SCAQMD

mobile source measure do not have associated emission reductions since the reductions are provided in the State Strategy (see Appendix IV-B). Please see Response to Comment 7-5 for further discussion of TBD measures.

Comment Letter from Pacific Merchant Shipping Association (Comment Letter #49)



August 19, 2016

Wayne Nastri
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Submitted Electronically at:
http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/Draft2016AQMP

Comments on the Draft 2016 Air Quality Management Plan

Dear Mr. Nastri:

The Pacific Merchant Shipping Association (PMSA), on behalf of its member ocean carriers and marine terminals operating in the South Coast Air Basin and throughout California, submits the following comments regarding the South Coast Air Quality Management District's (SCAQMD) Draft 2016 Air Quality Management Plan (AQMP).

Over the past decade, the members of PMSA have significantly reduced emissions from cargo operations at the San Pedro Bay ports. In a cooperative approach with the ports of Long Beach and Los Angeles, PMSA members have invested billions of dollars in technology and infrastructure that has made the Clean Air Action Plan both a success and a model throughout the world. Since 2005, diesel particulate matter emissions have been cut over 80%, sulfur oxides by 97%, and nitrogen oxides by 50%. This achievement could have only been achieved through the cooperation fostered by the ports with ocean carriers and terminal operators. 49-1

Moreover, the cooperative approach established through the Clean Air Action Plan allows for significant emission reductions, even with the economic shock of the Great Recession, without harming the flow of cargo through the two ports that is the lifeblood of Southern California's economy. While our members have proved resilient that does not mean that poorly considered planning will not seriously harm the ports and the businesses and communities that rely on them. With that in mind, PMSA has two areas upon which it will focus its comments: incentive-based strategies and facility-based mobile source measures.

Pacific Merchant Shipping Association
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Incentive Funding Must Be Prioritized

Emission reduction strategies at the ports rely on expensive infrastructure improvements and significant levels of capital investment by the private sector. Over the past decade, PMSA members have spent billions modernizing terminals, installing infrastructure and upgrading vessels for shorepower, replacing cargo handling and terminal equipment, demonstrating new low-emission and zero-emission technologies, and improving efficiency. All of this has occurred despite significant losses of market share and lack of growth in container volumes.

While our members will continue investing in Southern California, the rate of improvement that the AQMP seeks is not sustainable without higher levels of container throughput long-term, and in the short-term cannot be achieved without incentive funding to accelerate turnover and invest in new technologies. Moreover, it is increasingly more difficult to reach the new goals when compared to the reductions that have already been achieved at great cost. A recent study conducted by Moffat & Nichol for PMSA estimates that terminal operators will invest roughly $7 billion in California-based marine terminal equipment, but would incur an additional $16-$28 billion in order to replace the current cleaner equipment with even cleaner zero and near-zero equipment. 49-2

That investment would be a challenge based on normal fleet turnover time frames. It is near impossible on the timeframe envisioned in the AQMP without significant incentive funding. And, a further challenge, it is estimated that ocean carriers will lose $5 billion this year due to historically low freight rates that are ravaging the industry. As a result, we urge SCAQMD to strengthen the use of incentive funding in the AQMP and identify specific funding needs, consistent with the Moffat & Nichol study, for maritime sources.

Given the importance of incentive funding to meeting the goals of the AQMP, the inclusion of any growth controls on the ports is exceptionally problematic. The inclusion of such measures puts in jeopardy the very ability for terminals and carriers to access the incentive funding necessary to achieve the AQMP's goals. While the ports have used programs like the Technology Advancement Program to spur new technologies for the maritime sector, those funds have been supplemented with other local, state, and federal funding. That funding is nearly always dependent on emission reductions being surplus over and above regulatory baselines. The inclusion in the AQMP of measures such as MOB-01 (discussed further below) will necessarily put that funding into jeopardy by calling into question whether future emission reductions are surplus.

If the goals of the AQMP cannot be achieved by 2024 and 2031 without significant incentive funding, but the very structure of the AQMP risks that incentive funding by being overly proscriptive, then the AQMP must be revised to ensure incentive funding will not be at risk in order to meet the region's goals.

Facility-based Mobile Source Measures Must Be Removed

The draft AQMP includes several facility-based mobile source strategies that go well beyond SCAQMD's authority. The inclusion of MOB-01, Emission Reductions at Commercial Marine Ports, in particular, attempts to establish SCAQMD control over mobile sources that are outside its jurisdiction. SCAQMD has no authority over mobile sources, particularly port-related sources. Port-related mobile sources are under the authority of the California Air Resources Board (CARB) and U.S. Environmental Protection Agency (US EPA). Further, SCAQMD does not have the authority to limit land use or growth as contemplated in MOB-01. In California, land-use decisions are the domain of local cities and counties. Local air districts do not, and should not, dictate to local governments how they may or may not choose to organize and plan their communities.

Over the course of the public process, SCAQMD staff has described the facility-based mobile source measures, including MOB-01, in varying, contradictory ways. During one AQMP Advisory meeting, staff described the collection of facility-based mobile source measures as not necessary to demonstrate attainment with the National Ambient Air Quality Standards (NAAQS), as evidenced by the lack of an emission reduction commitment. Later, during another AQMP Advisory meeting, SCAQMD staff described the facility-based mobile source measures as the local implementation of CARB's Mobile Source Strategy, specifically the "Further Deployment of Technology" measures. But, while CARB's Mobile Source Strategy does include a reference to SCAQMD's mobile source strategies, CARB's document states that the "further deployment measures will rely on expanded incentive funding programs to accelerate deployment, as well as advocacy for additional actions at the federal and international level, along with efforts to increase system efficiencies," and, significantly, it does not describe facility-based mobile source measures. As the recently-released California Sustainable Freight Action Plan specifically reiterates, "[t]here is no direction to implement a freight facility performance targets measure in either ARB's *Mobile Source Strategy* or *Proposed 2016 State Strategy for the State Implementation Plan*."[1] In any case, staff has not adequately described these measures and, given SCAQMD's clear lack of authority, staff must remove these measures from the final AQMP. 49-3

SCAQMD's inclusion of the facility-based mobile source measures in the AQMP threatens the vary basis of the success of the CAAP: voluntary cooperation among port stakeholders. The inclusion of these measures will cast a pall over the upcoming efforts at the ports. Both ports have recently announced an update to the CAAP in order to continue their successful efforts to improve air quality. In addition, the Port of Los Angeles recently announced a new effort, establishing the Sustainable Freight Advisory Committee, that seeks the support of port

[1] Sustainable Freight Action Plan, Appendix C, p. C-41, http://www.casustainablefreight.org/files/managed/Document/282/CSFAP_AppendixC_FINAL_07272016.pdf

stakeholders to accelerate the introduction of electric vehicles and equipment. Both the CAAP and Sustainable Freight efforts are founded on the principle that only through voluntary cooperation can the highest levels of investment and emissions reductions be reached. This essential cooperation will be jeopardized by the vague, unenforceable threat posed by the facility-based mobile source measures.

Despite the fact that there are no emission reductions are associated with the facility-based mobile source measures, SCAQMD chose to include these contentious measures in the AQMP. It makes no sense to include strategies that, based on SCAQMD staff statements, are not needed to demonstrate attainment with the NAAQS. The facility-based mobile source strategies do not further goals of the AQMP or State Implementation Plan. 49-3 Con't

For all of these reasons, SCAQMD must remove the facility-based mobile source measures from the AQMP. The inclusion of the facility-based mobile source measures will only serve to hamper the cooperation necessary to develop and deploy new technologies at our local ports. It will stifle the cooperation of port-related businesses, who will be rightfully concerned that their voluntary efforts would be transformed into command-and-control strictures that will limit their opportunity to grow and thrive. These measures will only ensure conflict among stakeholders which will ultimately prevent and impede progress.

Support National and International Standards

Finally, PMSA asks SCAQMD to continue its support for national and international standards for federal sources. Improving standards at these jurisdictional levels are necessary to achieve emission reductions at the ports and for allowing the long-term growth that will support our local communities and higher levels of investment in emissions reduction technologies. PMSA supports SCAQMD in efforts that seek to control emissions from the appropriate regulatory body, including the International Maritime Organization, US EPA, or CARB. 49-4

PMSA looks forward to working with South Coast Air Quality Management District on the next draft of the 2016 Air Quality Management Plan and its eventual finalization.

Sincerely,

Thomas Jelenić
Vice President

Responses to Comment Letter from Pacific Merchants Shipping Association (PMSA)
(Comment Letter #49)

Response to Comment 49-1:

Staff appreciates the comments submitted and applauds the commenter on the efforts to assist in successful air quality improvement programs at the Ports.

Response to Comment 49-2:

Staff appreciates the support of the incentive program and agrees that it is necessary for some sources to transition to cleaner technologies due to the high cost of new equipment. With respect to future funding mechanisms, staff intends to seek funds to implement the AQMP, so that such funds would not require reduction to be surplus to the 2016 AQMP.

Response to Comment 49-3:

The proposed measure MOB-01 is not intended to limit land use or growth. The primary objective of MOB-01 is to help achieve the emission reductions associated with the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures for on-road heavy-duty vehicles, off-road equipment, and federal and international sources. The SCAQMD is listed as an implementing agency along with CARB and U.S. EPA. While the State has not been given direction to implement a freight facility performance targets measure at the State level, the SCAQMD is proposing facility-based measures that are within the SCAQMD authority to develop and implement. As noted earlier, these measures do not have associated emission reduction targets and seeks a collaborative approach to identifying actions that potentially result in emission reductions to help implement the State SIP Strategy “Further Deployment” measures. Such actions may be a combination of voluntary and regulatory actions. Regulatory actions may be adopted by local, state, or federal governments. This may include local ordinances that have quantifiable emission reductions.

Staff believes that the public process proposed in MOB-01 provides an opportunity for the SCAQMD staff to receive comments and input from all affected stakeholders including the Ports, goods movement industry, environmental and community organizations, and interested parties. The comments and input received will be used to develop mechanisms ensure the associated emission reductions will be maintained.

Response to Comment 49-4:

Staff appreciates the comment supporting national and international standards where appropriate. SCAQMD will continue to strongly support such standards.

Comment Letter from the Ports of Long Beach and Los Angeles (Comment Letter #50)

SAN PEDRO BAY PORTS

CLEAN AIR ACTION PLAN

August 19, 2016

Mr. Wayne Nastri
Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765
Electronic Submittal Via:
https://onbase-pub.aqmd.gov/sAppNet/UnityForm.aspx?key=UFSessionIDKey

Dear Mr. Nastri:

SUBJECT: COMMENTS ON THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT'S *DRAFT 2016 AIR QUALITY MANAGEMENT PLAN* (JUNE 2016)

The Ports of Long Beach and Los Angeles (Ports) appreciate the opportunity to participate in the South Coast Air Quality Management District's (District or SCAQMD) 2016 Air Quality Management Plan Advisory Committee and to comment on the *Draft 2016 Air Quality Management Plan* released on June 30, 2016 (AQMP). The Ports recognize the amount of effort that has gone into the development of the 2016 AQMP and acknowledge the efforts of the District to release a plan that seeks to balance "traditional" regulatory measures with innovative incentive-based measures.

The Ports support the development and implementation of programs to achieve the applicable and current national ambient air quality standards (NAAQS). Consistent with that effort, the Ports voluntarily developed the highly successful San Pedro Bay Ports Clean Air Action Plan (CAAP) and continue to be successful in implementing those programs. As a result of the CAAP, between 2005 and 2015, emissions from maritime goods movement sources were reduced at an accelerated rate over command and control rules; accounting for overall reductions of 84% for diesel particulate matter (DPM), 50% for nitrogen oxides, and 97% for sulfur oxides. The Ports' emissions inventories in 2015 show reductions that are in excess of the 2014 emission

50-1

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The San Pedro Bay Ports Clean Air Action Plan was developed with the participation and cooperation of the staff of the US Environmental Protection Agency, California Air Resources Board and the South Coast Air Quality Management District.

reduction goals in the CAAP. Thus, the Ports have a proven track record of developing and implementing appropriate and effective emission reduction strategies based on cooperative and voluntary measures, independent of or in advance of regulatory requirements. 50-1 Con't

The CAAP relies upon cooperative efforts with the maritime goods movement industry to achieve healthful air for the surrounding communities. The voluntary and cooperative aspects of the CAAP are critical because the Ports set stretch goals under incentive-based programs that rely in part upon federal, state and District monetary grants. Many of these grants are only available for programs that achieve "surplus" emissions reductions (i.e., those emissions reductions that are not required by regulation) by either accelerating the air quality regulatory agency requirements, or implementing non-regulatory programs. A significant concern of the Ports is the potential loss of this grant money, which is essential to continuing the successful implementation of the CAAP, if CAAP measures are included in the 2016 AQMP, directly or indirectly. 50-2

In order to meet the NAAQS, a collaborative and concerted effort with our agency partners is also essential, with the understanding that while the Ports can voluntarily achieve significant emission reductions, the CAAP is not a suitable control measure for the 2016 AQMP. United States Environmental Protection Agency (EPA), California Air Resources Board (CARB), and the District are the air quality regulatory agencies, and as such have authority as granted by statute to regulate the emissions directly from maritime goods movement sources. The Ports do not operate, own or control the maritime goods movement emission sources, and do not have the same authority as the air quality regulatory agencies. As such, the Ports should not be the agencies designated as responsible for achieving emission reductions from the maritime goods movement industry. 50-3

Additionally, the Ports are currently in the process of developing the next update of the CAAP. Many of the existing CAAP control strategies have been adopted or superseded by state or international requirements, such as the rules for replacing drayage trucks, switching to cleaner marine fuels, and using shore power while at berth. In collaboration with the maritime goods movement industry and our regulatory partners, the Ports seek to identify additional strategies to voluntarily achieve emissions reductions from ships, trucks, locomotives, cargo-handling equipment, and harbor craft to support the state's and region's air quality attainment needs. The CAAP Update will also incorporate strategies to address near-zero and zero emission technologies, greenhouse gas emissions, energy, and operational efficiencies. 50-4

In response to the District's request, the Ports respectfully submit the following comments regarding the Draft 2016 AQMP at this time, as well as questions and concerns that must be addressed *prior to* finalization and adoption of the 2016 AQMP by the District. We note, however, that it is difficult for the Ports to specify all comments at this time as the critical Appendices V and VI, Incentive Funding Action Plan, and 50-5

socioeconomic analysis have not yet been released to the public. We urge the District to consider extending the comment date on the 2016 AQMP until all Appendices and other critical components of the AQMP (e.g., the socioeconomic analysis, Incentive Funding Action Plan, etc.) have been released to the public so that a more comprehensive analysis can be conducted and comments provided to the District prior to Board consideration. Based on the information currently available, the Ports request that the Draft 2016 AQMP be revised as follows:

- Remove Mobile Source Control Measure MOB-01, as it does not provide emission reductions for the attainment demonstration, exceeds the District's authority, and is duplicative of other proposed control measures and state, federal and international laws. 50-6
- Exclude the Ports from the growth management control measure, EGM-01.
- Revise MOB-14 so that it does not preclude the maritime goods movement industry's ability to obtain grant funding.
- Focus on attaining the applicable NAAQS and not the revoked NAAQS.
- Specifically identify which measures are contingency measures as required by the Clean Air Act.
- Include in the socioeconomic analysis prepared for the 2016 AQMP a thorough cost-benefit evaluation of all control measures, including MOB-01 if it remains in the Plan as currently proposed, and all contingency measures.
- Complete and circulate the Incentive Funding Action plan for public review and comment *before* inclusion in the Socioeconomic analysis.
- Respond with changes in the 2016 AQMP to address the Ports' concerns and questions associated with the technical analysis, including the baseline and future year emissions inventory.

Detailed comments on each of the Ports' requested bullet items above are provided in the following Attachment.

The Ports strongly encourage the District to make the above-requested changes to the Draft 2016 AQMP, and in particular, eliminate control measure MOB-01 as it is unnecessary and exceeds the District's authority. The Ports also urge the District to complete the appropriate Incentive Funding Action Plan, as well as the appropriate socioeconomic impact analysis, and to provide the Ports and other members of the public with an adequate opportunity for comprehensive review and comment on those documents along with the (revised) Draft 2016 AQMP *prior to* submitting the Plan to the Board for consideration. 50-7

The Ports remain committed to achieving our clean air goals identified in the CAAP to help improve regional air quality. We strongly believe that the voluntary and cooperative CAAP process established by the Ports remains the most appropriate forum for the Ports and the air regulatory agencies to discuss technical and policy issues related to reducing emissions from port-related sources.

The Ports appreciate this opportunity to provide comments on the Draft 2016 AQMD. We look forward to continuing to work with the District on advancing our shared goals for clean air in the South Coast region.

Sincerely,

HEATHER A. TOMLEY
Director of Environmental Planning
Port of Long Beach

CHRISTOPHER CANNON
Director of Environmental Management
Port of Los Angeles

CC:LW:TD:mrx
APP No.: 160818-518

cc: Jon Slangerup, Port of Long Beach, Chief Executive Officer
Gene Seroka, City of Los Angeles Harbor Department, Executive Director
Richard Corey, California Air Resources Board, Executive Officer
Alexis Strauss, Region 9, Acting Regional Administrator

Attachment: Detailed Comments on the Ports' Requested DRAFT 2016 AQMP Revisions

Attachment to Comment Letter #50:

SAN PEDRO BAY PORTS

CLEAN AIR ACTION PLAN

ATTACHMENT

Detailed Comments on the Ports' Requested DRAFT 2016 AQMP Revisions

1. SCAQMD Mobile Source Control Measure: MOB-01 Emission Reductions at Commercial Marine Ports.

The Ports appreciate the discussion in this control measure that recognizes our successful efforts in implementing the CAAP since 2006 and exceeding our emission reduction goals in 2014. Yet, it appears that the District remains concerned over its ability to claim and quantify credit in the state implementation plan SIP for the emission reductions achieved by the Ports through the CAAP in the absence of District-imposed "enforceable" rules or control measures. The District continues to attempt to hold the Ports responsible for achieving their voluntary stretch goals, and for backstopping requirements that are currently being enforced by state and international regulations. Further, MOB-01 suggests that if the emission reductions occurring at the Ports are not maintained after they are reported into the SIP that this measure may be implemented in the form of a backstop regulation by the SCAQMD or by the State or federal government, or other enforceable mechanisms, notwithstanding the limitations of the federal Clean Air Act. 50-8

The District has previously proposed to address its need for enforceable measures by various other approaches, e.g., control measure MOB-03 in the 2007 AQMP and control measure IND-01 in the 2012 AQMP,which characterized the Ports as "indirect sources" of emissions.. The 2007 MOB-03 was described as "a backstop measure for indirect sources of emissions from ports and port-related facilities" and in the ensuing years, District staff proposed and sought public review of a 'backstop" rule that would be enforceable and applicable to the Ports, "Proposed Rule 4001." The Ports raised many questions and objections to control measure IND-01 and Proposed Rule 4001 in numerous comment letters[1] sent to the District and EPA. EPA, in its April 2016 action

[1] Comment Letters to U.S. Environmental Protection Agency dated November 19, 2015; California Air Resources Board dated March 25, 2014; South Coast Air Quality Management

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The San Pedro Bay Ports Clean Air Action Plan was developed with the participation and cooperation of the staff of the US Environmental Protection Agency, California Air Resources Board and the South Coast Air Quality Management District.

partially approving the 2012 SIP, excluded the commitments proposed by IND-01 from its action and stated that it would respond to that in a separate rulemaking. (See 81 FR 22025 (April 14, 2016) US EPA Partial Approval and Partial Disapproval of California Air Quality SIP.) The District has reported that Proposed Rule 4001 has been placed on hold, in light of work to develop supposedly different approaches for the pending 2016 AQMP.[2]

The Draft 2016 AQMP indicates, however, that the District has not abandoned those efforts to establish policies and control measures that may provide a framework or justification for the District to adopt rules or regulatory measures that may be applied to the Ports, either directly or as a backstop or contingency measures. The Draft AQMP introduces a new proposed control measure "MOB-01" which states: "The proposed measures will replace control measures MOB-03 in the 2007 AQMP and IND-01 in the 2012 AQMP." (Draft 2016 AQMP, p. 4-24.) MOB-01 is described as a control measure to achieve emission reductions at commercial marine ports and is characterized in the Draft AQMP as a "facility-based mobile source control measure." Although the nomenclature may have changed, the Ports believe that proposed new MOB-01 is no different from the District's previous Ports-related control measures, where the District invoked its purported authority to regulate the Ports as "indirect sources" of emissions. The Ports point to the Draft AQMP, which states that "mobile sources" currently contribute about 88% of the region's total NOx emissions. It then acknowledges that "[s]ince the SCAQMD has limited authority to regulate mobile sources, staff worked closely with the CARB and EPA, which have primary authority over mobile sources, to ensure mobile sources perform their fair share of pollution reduction responsibilities" (p. ES-7).

50-8 Con't

The Ports also note that in describing the MOB-01 control measure, the Draft 2016 Plan characterizes the Ports as a "facility-based mobile source." In addition to the troublesome wording of that characterization, the description of this proposed control

50-9

District dated January 15, 2014, January 31, 2014, October 2, 203, August 21, 2013, October 31, 2012, and August 30, 2012

[2] According to the minutes of the District's "Mobile Source Committee" meeting of April 15, 2016, included in the District's Board Meeting minutes from May 6, 2016 (agenda item #21), the U.S. EPA "in its recent decision on the approval of the 2012 AQMP did not evaluate IND-01 and will evaluate the control measure at some future date. Staff has been working on Proposed Rule 4001 to implement Control Measure IND-01 and has placed the rule development on hold with the development of the 2016 AQMP."

measure strongly indicates that the District intends to use MOB-01 as an indirect source control measure in order to quantify and lock in the emissions reductions achieved by the Ports under the CAAP. These "facility-based mobile source measure" approaches would have serious negative effects on maritime commerce and impede the State of California's freight competitiveness. Those burdensome and counter-productive approaches would be directly in conflict with the goals of Governor Brown's Executive Order to improve freight transportation efficiency and increase competitiveness of California's freight system, as well as the recently-released California Sustainable Freight Action Plan. The Ports continue to oppose any form of a "rule" that would impose SCAQMD oversight on the Ports and are strongly opposed to the District creating or relying on any concept of a "facility-based mobile source measure," whether described as an "Indirect Source Rule," "Backstop Rule" or the "freight hub," "facility cap," and/or "freight facility performance targets" approach. Neither EPA nor CARB can require the District to adopt a control measure for MOB-01 because indirect source control measures cannot be required as a condition of SIP approval. (42 U.S.C. § 7410(a)(5)(A)(ii); Health & Safety Code, § 40468.) Therefore, the Ports have serious concerns about the District making enforceable commitments to the state and federal governments that the Ports will control "indirect sources."

50-9 Con't

The District has not identified any legislation purporting to confer authority on the SCAQMD to regulate public marine facilities as "mobile sources."[3] The District itself acknowledges that it does not have "primary regulatory authority" over the Port (or other large facilities identified as major sources of emissions, e.g., rail yards, airports, and distribution centers). Nevertheless, the Draft AQMP further states: "This measure [MOB-01] may be implemented in the form of a regulation by the SCAQMD within its existing legal authority, or by the State or federal government, or other enforceable mechanisms." (p. 4-24.) This statement raises legal issues regarding the extent of the District's limited "existing legal authority;" the Ports have previously raised these issues in opposition to PR 4001. The Draft Plan is vague and ambiguous as to the source and extent of any specific "existing legal authority" that may be contemplated by the District or by MOB-01. The District has not previously cited any specific authority under the California Clean Air Act for this type of regulation (Cf., Health & Safety Code §§ 39000 et seq., and more specifically Chapter 5.5 (§§ 40400-40536) dealing with the SCAQMD).

50-10

[3] The EPA itself treats "facilities based" emission sources as distinct from "mobile sources". See, e.g., 66 FR 65208 "Database of sources of environmental releases of dioxin-like compounds in the U.S., ref year 1987-1995. December 18, 2001.

In fact, the District has no authority to regulate mobile sources or to draw any geographic boundary or to arbitrarily characterize source categories and declare those areas or groups of sources to be an "indirect source." "Mobile sources" of emissions are beyond the limited regulatory authority conferred by the Legislature on local or regional districts (e.g., Health & Safety Code § 40001(a); *also see*, 76 Ops. Cal. Atty. Gen. 11 (1993); 75 Ops. Cal. Atty. Gen. 256 (1992); 74 Ops. Cal. Atty. Gen. 196 (1991); 73 Ops. Cal. Atty. Gen. 229, 234-35 (1990)). Congress vested the federal government with the authority to set nationwide emissions standards for mobile sources, including non-road mobile engines and vehicles. (42 U.S.C. §§ 7521, 7547.) Congress expressly and impliedly preempted states from setting standards or other requirements relating to the control of emissions for mobile sources. (42 U.S.C. § 7543, (a) & (e).) The maritime goods movement emission sources are within the express and implied preemption. The Clean Air Act allows California to seek authorization from EPA to adopt "standards and other requirements related to the control of emissions" for some, but not all, mobile sources covered by MOB-01. (42 U.S.C. §§ 7543 (b) & (e)(2)(A).) Thus, District does not have mobile source regulatory authority.

50-10
Con't

The Clean Air Act defines an indirect source as "a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution." (42 U.S.C. § 7410(a)(5)(C).) An "indirect source review program" is "the facility-by-facility review of indirect sources of air pollution, including such measures as are necessary to assure, or assist in assuring, that a new or modified indirect source will not attract mobile sources of air pollution" that would contribute to the exceedance of the NAAQS. (42 U.S.C. § 7410(a)(5)(D)(i).) "Direct emissions sources or facilities at, within, or associated with, any indirect source shall not be deemed indirect sources for the purpose" of an indirect source review program. (42 U.S.C. § 7410(a)(5)(C).) Air pollution control districts are not statutorily authorized to impose a permit system on indirect sources. (*Friends of Oceano Dunes, Inc. v. San Luis Obispo County Air Pollution Control District* (2015) 235 Cal.App.4th 957, 964, as modified on denial of reh'g (Apr. 23, 2015).)

The control measures also fail as an indirect source review program because the businesses within the geographic and source designated areas are not a "new or modified indirect emissions source." (42 U.S.C. § 7410(A)(5).) A source is new if it adds to the air basin's existing emissions baseline. (*National Ass'n of Home Builders v. San Joaquin Valley Unified Air Pollution Control Dist.* (9th Cir. 2010) 627 F.3d 730, 731-32.) The Clean Air Act defines modification as "any physical change in, or change in the method of operation, of a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of an air pollutant not previously emitted." (42 U.S.C. § 7411(a)(4).)

Only those provisions necessary to meet the requirements of the Clean Air Act are included in the SIP. (Health & Safety Code, § 39602.) The purpose of an indirect source program is to ensure that mobile source emissions do not "cause or contribute to air pollution concentrations exceeding any national primary ambient air quality standard for a mobile-source related air pollutant." (42 U.S.C. § 7410(a)(5)(D)(i).) MOB-01 is not necessary to meet the NAAQS requirements of Clean Air Act. The emissions reductions listed in the Draft AQMP for MOB-1 for the years 2023 and 2031 are listed as "To Be Determined" -- which indicates that the reductions will be determined once the inventory and control approach are identified, and are not relied upon for attainment demonstration purposes. In reality, there would be little to no emission reduction benefit from indirect source measures because state, federal and international authorities have adopted rules and regulations to significantly reduce NOx emissions from these on- and off-road mobile sources. According to the 2016 AQMP, "[t]he effect of the rules and regulations are significant, showing reductions of over 67 percent in NOx emissions and close to 60 percent in VOC emissions between 2012 and 2023, even with increases in fleet population" (p.3-4).

50-10 Con't

MOB-01 further violates the dormant Commerce Clause by impeding the free and efficient flow of commerce by imposing a heavy burden on ports, the shipping industry, navigation and commerce without any local environmental benefit, or an insubstantial local benefit at best.

The Draft 2016 AQMP also inappropriately refers to the Ports as an "Implementing Agency," which the AQMP defines as "the agency(ies) responsible for implementing the control measure" (p. IV-A-20MOB-01 statesthat "[t]he Ports through its CAAP update can decide the most effective approaches to achieve the overall emission reductions targets" (p. IV-113). However,to the extent the AQMP singles out and mischaracterizes the Ports as "Implementing Agencies," without including all of the other public and private partners working to achieve emission reductions, it erroneously implies that the Ports would have an assigned enforcement obligation, and improperly shifts an unwarranted burden of regulatory implementation to the Ports. While the Ports have successfully adopted voluntary efforts to reduce emissions from maritime goods movement sources, the Ports are not air agency regulators. The Ports do not have the regulatory responsibility or authority to achieve emission reductions from sources over which they do not have jurisdiction, ownership or operational control. Further, the District is well aware from the Ports' previous comment letters on these issues, that generally the Ports lack authority to enforce as mandates the programs on all mobile sources operating in the Ports as they are preempted by state, federal and international law. This portion of the AQMP, requiring the Ports to select and implement the control measures, does not address or overcome these legal impediments.

50-11

The Ports respectfully remind the District that the CAAP is a planning document that provides guidance on strategies and targets that are ultimately implemented through individual actions adopted by each Port's respective Board of Harbor Commissioners (Boards). The State granted to the Cities of Long Beach and Los Angeles exclusive authority to implement the Tidelands Trust under the oversight of the State Lands Commission. Each city has been appointed as a trustee and has established their respective Board of Harbor Commissions with exclusive control and management of the Tidelands and revenues and expenditures from the Tidelands. However, such discretion must be exercised in accordance with their obligations to prudently manage Tidelands assets and revenues within a nexus and proportionality to the Tidelands Trust interest, as well as in accordance with applicable laws such as the California Environmental Quality Act (CEQA) and principles of federal preemption. The District cannot mandate action by each Port's Board of Harbor Commissioners, nor can the District direct how the Ports may be obligated to spend state Tidelands money; only the appointed trustee can make discretionary actions to obligate state Tidelands funds. Specifically, any measures listed in the AQMP or the CAAP must each require the Boards to authorize the expenditure of monies and program costs, or to approve conditions of infrastructure project development in their discretion as a CEQA lead agency and as Tidelands trustees.

50-11 Con't

Further, the District has not complied with the procedural requirements to adopt indirect source control rules that are contemplated in MOB-01. The requirements are: (1) ensure, to the extent feasible, and based upon the best available information, assumptions, and methodologies that are reviewed and adopted at a public hearing, that the proposed rule or regulation would require an indirect source to reduce vehicular emissions only to the extent that the district determines that the source contributes to air pollution by generating vehicle trips that would not otherwise occur; (2) ensure that, to the extent feasible, the proposed rule or regulation does not require an indirect source to reduce vehicular trips that are required to be reduced by other rules or regulations adopted for the same purpose; (3) take into account the feasibility of implementing the proposed rule or regulation; (4) consider the cost effectiveness of the proposed rule or regulation; (5) determine that the proposed rule or regulation would not place any requirement on public agencies or on indirect sources that would duplicate any requirement placed upon those public agencies or indirect sources as a result of another rule or regulation adopted pursuant to Health and Safety Code sections 40716 or 40717. (Health & Saf. Code, § 40717.5.)

50-12

Instead of MOB-01, the Ports suggest that a collaborative, voluntary approach, consistent with the cooperative partnership that has been proven to be successful over the past decade, will continue to be the most effective means for controlling emissions from maritime goods movement activities within the jurisdiction of Ports. This approach,

50-13

which could be memorialized under a cooperative agreement between the Ports and SCAQMD, CARB, and EPA, would benefit all parties because it continues the collaborative effort that has resulted in unprecedented emission reductions at the Ports, shares responsibility between Parties, provides more certainty for the local economy, avoids litigation, insures incentive funding that is tied to excess emissions will continue to be available, and will result in better air quality.

50-13 Con't

2. SCAQMD Growth Management Control Measure: EGM-01

The Draft 2016 AQMP states: "[f]or the purposes of this measure [EGM-01], indirect sources include all facilities not covered by another 2016 AQMP Control Measure. In addition, during the rule development process, additional indirect sources may be included or excluded" (p. IV-A-169).

The Ports should not be included within this control measure in the event MOB-01 is removed from the 2016 AQMP or during the rule development process. In addition to the reasons stated above in section 1, the Ports have serious concerns about the District making a commitment to the state and federal governments that the SCAQMD will control growth or dictate land use decisions. SCAQMD has no authority to control growth or overrule local land use decisions. (Health & Saf. Code, § 40716 [air districts cannot infringe on the existing authority of counties and cities to plan or control land use]; see also Health & Saf. Code, §§ 40000, 40414, 40440.1, 40717.5(c)(1).) Land use is within the exclusive preview of local cities and counties.

50-14

3. SCAQMD Mobile Source Control Measure: MOB-14 Emission Reductions from Incentive Programs

The Draft 2016 AQMP mobile source control measures include development of incentive funding programs and supporting infrastructure for early deployment of advanced control technologies. MOB-14 states that it seeks to develop a rule similar to the San Joaquin Valley Air Pollution Control District Rule 9610 – "State Implementation Plan Credit for Emission Reductions Generated through Incentive Programs" -- such that emissions reductions generated through incentive programs can be credited in the SIP emission inventories.

50-15

It will be critical to prioritize and secure the necessary funding needed to implement the proposed incentive-based measures in the Draft AQMP and achieve the aggressive emission reduction targets in the South Coast Air Basin. The Ports know first-hand that the move toward zero emissions is a costly endeavor and have placed significant emphasis on efforts to advance the development of near-zero and zero emissions equipment for on-terminal and on-road applications. Through the Ports' Technology

Advancement Program (TAP), we have been involved with funding the demonstration of clean technologies used in port operations for nearly a decade. Significant progress has been made and we expect that zero emissions operations will be feasible in the future. The scale of this effort will be significant, with cost for the equipment and fueling infrastructure in the *Billions* of dollars.

The Ports and the maritime goods movement industry will require a substantial amount of funding assistance from the local, state and federal agencies. As such, the Ports are supportive of incentive funding to accelerate advancement of technologies. The Ports continue to strongly support the implementation of funding programs such as the Proposition 1B Goods Movement Emission Reduction Program and the Carl Moyer Memorial Air Quality Attainment Program, both of which have provided funding for much needed assistance with upgrading wharves for shore power, the replacement of drayage trucks, and the replacement and repower of engines in cargo-handling equipment, harbor craft, and locomotives.

50-15 Con't

While the Ports support funding programs and the need to credit emissions reductions generated from through incentive funding programs, the Ports strongly recommend that MOB-14, or any resulting regulatory strategy be structured in such a way that does not preclude the maritime goods movement industry's ability to secure grant funding for early actions. For example, it is not clear from the description of MOB-14 whether facility emission caps or port backstop rules could effectively disqualify companies and agencies from received grants, because typically grants funds cannot be used for regulatory compliance. The Ports believe that this unintended consequence of a control measure like MOB-14 could significantly impede early equipment replacement and transition to zero emission technologies, and also severely affect the economic competitiveness of the maritime goods movement industry. In addition, if the required emission levels for attainment are not be met in the region, the Ports must not be held accountable for attaining emission reductions that are predicated on incentive funding if the funding does not come through at the necessary and appropriate levels.

4. Inclusion of Revoked NAAQS in the 2016 AQMP

The Draft 2016 AQMP includes updates to previous plans for the revoked 1-hour (120 ppb) and 1997 8-hour (80 ppb) ozone NAAQS (p. 4-1), rather than addressing the current and controlling ozone NAAQS. For example,, the Draft 2016 AQMP attainment strategy seeks to reduce NOx emissions sufficiently to meet the revoked 1-hour ozone NAAQS of 120 ppb by 2023 and the revoked 8-hour ozone NAAQS of 80 ppb by 2024, instead of focusing on achieving the applicable ozone NAAQS of 75 ppb by 2032. This approach is inappropriate and unnecessary.

50-16

While the SCAQMD is required to comply with the anti-backsliding provisions of the Clean Air Act [CAA sec 172(e)], which preclude the adoption of controls that are less stringent than existing controls applicable in the District, the 2012 AQMP does not contain any mandates akin to MOB-01 that are applicable to the Ports. Therefore, the removal of MOB-01 from the 2016 AQMP by the District would not be "backsliding" from any existing standards relied upon for attainment under the existing 2012 AQMP.

50-16 Con't

Furthermore, the proposed approach of targeting the revoked standards and their associated deadlines of 2023 and 2024, which are significantly earlier than the controlling deadline of 2032 in the current regulations, puts the region at unnecessary risk that contingency measures for ozone will be required in the three years leading up to the attainment date for the revoked NAAQS.

5. Contingency Measures

> The Draft 2016 AQMP states the following regarding contingency measures: "Some measures in the summary table are listed as "TBD" (to be determined) for emission inventory, emission reductions and/or cost control. The "TBD" measures are not relied upon to demonstrate attainment of the standards but have been included if potentially feasible for the integrated, comprehensive plan. "TBD" measures require future technical and/or cost assessments in order to better understand and quantify emissions from and cost impact to the anticipated affected sources for the measures. It may be determined at that time that the "TBD" measure is not feasible or cost-effective to adopt and implement, or if reductions can be achieved, those reductions would be submitted into the SIP. Thus, "TBD" measures are included in the Plan as needed for contingency or if there are any shortfalls in committed emission reductions" (p. IV-A-18).

50-17

The District needs to identify specifically which measures in the AQMP it intends to be "contingency measures." Referring to "TBD" measures does not provide sufficient identification because the measure language is not consistent with the measure being a contingency measure. The contingency measures should only be for the *applicable* NAAQS, and not for the revoked NAAQS attainment timeframes.

Further, EPA's March 6, 2015, rulemaking allows extreme nonattainment areas for ozone to develop and adopt contingency measures meeting the requirements of 182(e)(5) (black box) to satisfy the requirements for both attainment contingency measures in CAA sections 172(c)(9) and 182(c)(9). These enforceable commitments must obligate the state to submit the required contingency measures to the EPA no later

than three years before any applicable implementation date, in accordance with CAA section 182(e)(5). (See Federal Register, Vol. 80, No. 44, 12264 Friday, March 6, 2015.) Therefore, it is premature to submit contingency measures for 2032. As for reasonable further progress (RFP) contingency measures, these are only needed to provide the incremental shortage in emission reductions and last one year.

50-17 Con't

EPA is also continuing its long term policy that allows promulgated federal measures to be used as contingency measures as long as they provide emission reductions in the relevant years in excess of those needed for attainment or RFP. The 2016 AQMP needs to be revised to reflect these allowances that EPA has made for extreme nonattainment areas.

6. State and Federal Control Measures and Incentive Funding Strategy

The Draft AQMP includes additional control measures to reduce emissions from sources that are primarily under State and Federal jurisdiction, including on-road and off-road mobile sources. As stated, these reductions are needed to achieve the remaining emission reductions necessary for the Basin's attainment. The Draft AQMP identifies 107 tons of NOx reductions in 2023 and 97 tons of NOx reductions in 2031 to help the District meet attainment. Almost all of these reductions, however, are associated with the measures calling for "further deployment of cleaner technologies," which involve accelerating the development, demonstration, and deployment of cleaner engine technologies, in whole or in part through the use of incentive programs. Achieving these substantial emission reductions "is predicated on securing the amount of funding needed" to further deploy these cleaner technologies, according to the Draft AQMP.

50-18

The AQMP estimates an approximate range of $4 to $11 billion in funding over a 7 to 15 year period to achieve the projected NOx emissions reductions from mobile sources (p. 4-59). "The total funding needed ranges from $13 to $16 billion to achieve the NOx emission reductions associated with the State Mobile Source Strategy" (p. 4-62). "A total of $1.1 to $1.6 billion of stationary source incentive funding programs are proposed with projected cost-effectiveness levels in the same range as the mobile source incentives" (p. 4-66). The AQMP further states:

> "The amount of incentive funding needed is estimated to be approximately $11 – 14 billion in total funding over a seven to fifteen year period. Currently, the SCAQMD receives around $56 million per year in incentives funding to accelerate turnover of on- and off-road vehicles and equipment under SB1107, a portion of the state's Tire Fee, and AB923. AB 923 will sunset in 2024. In addition, the District has received close to $550 million in Proposition 1B funding. The last round of Proposition 1B will be ending in

> the next couple of years. The District has also received funding under the DERA program on a competitive basis. However, the amount of funding needed to achieve the NOx emission reductions associated with the "Further Deployment" measures proposed in the State Mobile Source Strategy and the 2016 AQMP will require on the order of $1 billion per year if funding is available beginning in 2017" (pp. ES-8 to 9).
> As such, the short-fall is significant.

50-18 Con't

Assuming $16 billion is a reasonable estimate – and the accuracy of that estimate is open to question – should the District fail to secure this funding, it may be forced to adopt the "contingency" measures specified in the Draft AQMP, of which MOB-01 may be is one. The Ports are concerned the District may not secure the necessary funding, which would likely necessitate the hasty adoption of such contingency measures without a comprehensive analysis of the impacts, or possible alternatives, and without robust public input.

In addition, the Draft AQMP acknowledges that achieving the emissions reductions from the 2016 AQMP incentive-based control measures for both mobile and stationary sources will require approximately $11 – $14 Billion in total funding. Given this significant funding level needed to attain the ozone NAAQS over the next seven to fifteen years, the Draft AQMP refers to "an action plan [that] will be developed as part of the AQMP public adoption process" to identify the necessary actions to secure new sources of funding to implement the AQMP (p. 4-66). However, the Draft AQMP provided insufficient details on what would be contained in such an Incentive Funding Action Plan.

50-19

Furthermore, at the District's Mobile Source Committee meeting of July 22, 2016, the AQMD staff presentation indicated that a draft of the Incentive Funding Action Plan is expected as part of 2016 AQMP adoption. However, District staff has informed the Ports that an Incentive Funding Plan will not be available until *after* the AQMP has been adopted. This is not acceptable. Without a review of the Incentive Funding Action Plan concurrent with the Draft AQMP, it is not known whether the Plan is viable (i.e., activities to secure additional funding or actions are not realized), and the risk of contingency measures being triggered cannot be evaluated.
For this reason, the Ports urge the District to fully analyze the Incentive Funding Action Plan, and all contingency measures now, and to release that analysis *prior to* the close of public comment so that the public can evaluate the adequacy of the District's strategy and comment on that strategy.

7. Socioeconomic Impact Analysis

The Draft 2016 AQMP indicates that there will be no analysis of contingency measures in the socioeconomic study. Also, it appears that several measures that do not have emissions reduction targets or other information will not be included in the socioeconomic analysis. This means there will be no comprehensive review of the impacts associated with implementation of all measures or the repercussions of the potential adoption of the "facility-based mobile source measures" discussed in the MOB-01 section above. 50-20

The Ports request a full socioeconomic analysis of all control measures, and that the socioeconomic analysis be completed and an adequate opportunity for public comment be provided *prior to* action on the Draft 2016 AQMP. 50-21

Furthermore, it appears that the socioeconomic study will only analyze the impacts associated with approximately $16 billion in government subsidies, not including the match funding that will be required from private operators. The Ports are concerned that this amount is substantially underestimated and ignores the private capital that will be necessary to purchase thousands of pieces of costly near-zero and zero emission equipment to be deployed at the ports and throughout the region. 50-22

Finally, the description of the anticipated socioeconomic study assumes that there will be no tax increases to fund these incentives; however, the Draft AQMP contradicts this assumption as it clearly states AQMD's intent to seek local and state ballot measures, which would include taxpayer funding (p. 4-68). 50-23

The socioeconomic analysis must include an analysis of the impacts on the private sector from having to invest in significant new capital costs associated with cleaner equipment, and it must include an analysis of the impact on taxpayers as a result of higher taxes. 50-24

8. Specific Technical Comments on the 2016 Draft AQMP

a. Appendix IV-A, Table IV-A-2 SCAQMD Proposed Mobile Source 8-Hour Ozone Measures, p. IV-A-4

The title of MOB-01 is inconsistent with the description of the control measure provided starting on page IV-A-109, which lists "CO" as a target pollutant. The control measure summary for MOB-01 (pp. IV-A-109-115) indicates that the goal of the measure is to seek emission reductions of NOx, SOx, and PM2.5. Please 50-25

Mr. Wayne Nastri
South Coast Air Quality Management District

clarify if the measure is also intended to address emissions of CO, otherwise CO should be removed from Table IV-A-2 and updated accordingly. 50-25 Con't

In addition, for MOB-01, the emission reductions in tons per day (tpd) for 2023/2031 are identified as "TBD" with a corresponding footnote "b", which states "Submitted into the SIP as part of reporting or in baseline inventories for future AQMP/SIP Revisions." We request that the District provide further clarification on how the "Rate of Progress" will be calculated and compared to ensure that the emissions reductions achieved by the proposed control measure are surplus emissions. 50-26

b. Appendix IV-A, Emission Reductions at Commercial Marine Ports [All Pollutants], p. IV-A-109

The Ports each prepare annual air emissions inventories of port-related sources, and in July 2015, transmitted the San Pedro Bay Ports 2012 air emissions inventory, as well as forecasted port-related emissions for each year through 2031 for inclusion on the 2016 AQMP based on discussions with District and CARB staff.[4,5] It is not clear whether the emissions of NOx, SOx, and PM2.5 listed in the Control Measure Summary Table (p. IV-A-109) reflect the Port's actual emissions, as they do not correspond with those transmitted to the District and CARB. 50-27

It is the Ports' understanding that the emissions from port-related sources in the 2016 AQMP would reflect the actual emissions reported by the Ports. These discrepancies should be addressed.

To provide for a meaningful and comprehensive review, the Ports request that the District identify the port-related sources (i.e., ocean-going vessels, harbor craft, locomotives, cargo-handling equipment, and heavy-duty trucks) of emissions that make up the total emissions in the Control Measure Summary (p. IV-A-109). It is

[4] Email Communication, Subject: San Pedro Bay Ports 2012 Emissions Inventory. July 21, 2015. Allyson Teramoto (Port of Long Beach) to Henry Hogo, Joe Casmassi, Randall Pasek (AQMD); Nicole Dolney, Sylvia Vanderspek, Gabe Ruiz (CARB).

[5] Email Communication, Subject: 2016 AQMP Emissions Forecasting Dial +1 (312) 757-3121 Access Code: 299-388-957. August 9, 2016. Archana Agrawal (Starcrest Consulting Group, LLC) to Henry Hogo, Randall Pasek (AQMD); Nicole Dolney, Sylvia Vanderspek, Russel Furey, Vernon Hughes, Gabe Ruiz (CARB).

also important to identify the assumptions used to estimate future emissions in 2022, 2023, and 2031. For instance, it is important to understand the assumed International Maritime Organization (IMO) tier level of engines installed on ocean-going vessels calling at the Ports, as well as the fleet makeup of all other port-related source categories, including heavy-duty trucks, cargo-handling equipment, locomotives, and harbor craft. It is also important to identify the source-specific "growth" factors that were used to estimate future year emissions.

50-27 Con't

The **table** on the next page shows a comparison of the emissions provided in the Draft 2016 AQMP and the Ports' actual 2012 emissions and forecasted emissions for 2023 and 2031. As shown, there are several inconsistencies in the emissions inventories prepared by the Ports and the inventory used for the AQMP.

Annual Average	2012	2022	2023	2031
NOx (MOB-01 Draft 2016 AQMP)	39.37	TBD	42.39	35
NOx (2012 San Pedro Bay Ports Actual Emissions)	41.95	47.80	46.35	42.03
PM2.5 (MOB-01 Draft 2016 AQMP)	1.06	TBD	0.81	0.93
PM2.5 (2012 San Pedro Bay Ports Actual Emissions)	1.03	0.83	0.84	0.93
SOx (MOB-01 Draft 2016 AQMP)	4.04	TBD	1.23	1.47
SOx (2012 San Pedro Bay Ports Actual Emissions)	3.90	0.81	0.82	0.91

50-28

As previously mentioned, we request that the control costs associated with MOB-01 (and all other control measures) be quantified and included in the 2016 AQMP.

c. Appendix IV-A, Emission Reductions at Commercial Marine Ports [All Pollutants], CARB In-Use Fleet Rules. p. IV-A-112

It is stated in this paragraph that "The majority of marine vessel emissions are created by main propulsion engines, but auxiliary engines emissions are important, in part because they occur at dock in closer proximity to persons in and around the port" (p. IV-A-112). This statement is misleading in that the contribution of auxiliary engine emissions (excluding boiler emissions) to overall ocean-going vessel emissions (including transit, maneuvering, and hoteling at-berth) is often times nearly equivalent to or higher than main propulsion engines, which are only operational during transit and maneuvering.

50-29

Mr. Wayne Nastri
South Coast Air Quality Management District

d. Appendix IV-A, Format of Control Measures, Emission Reductions. p. IV-A-19

This section states that: "During the rule development, the most current inventory will be used. However, for tracking rate-of-progress for the SIP emission reduction commitment, the approved AQMP inventory will be used. More specifically, emission reductions due to mandatory or voluntary, but enforceable actions shall be credited toward SIP obligations" (p. IV-A-19).
We request that any differences between the "most current inventory" used for rule development and the "approved AQMP inventory" be clearly described and addressed prior to any mandatory or voluntary emissions being credited toward SIP obligations.

50-30

e. Appendix IV-B, Tier 4 Vessel Standards. p. IV-B-50

Under this proposed action, CARB intends to work with the EPA, U.S. Coast Guard, and international partners to urge the International Maritime Organization (IMO) to adopt a Tier 4 NOx standard for new ocean-going vessels and efficiency requirements for existing vessels (p. IV-B-50).

The Ports support the advocacy for more stringent IMO standards and efficiency targets for ships. Currently, newly built ships are required to meet IMO Tier 3 standards for NOx. The Ports have developed an IMO Tier distribution forecast based on the existing world fleet, estimated future vessel calls at the Ports, and Tier 3 order information provided by the engine manufactures. The Ports' Tier distribution forecast indicates strongly that there will be no significant (less than 5%, best case scenario) Tier 3 penetration of the ship calls by 2023. Further, the forecast indicates that the existing world fleet (Tier 0-2) could service the Ports through the mid to late 2030s to 2040s.

50-31

Recognizing that Tier 3 fleet penetration will be significantly slower than CARB is estimating and coupled with the fact that there have been no discussions at IMO Marine Environmental Protection Committee related to a Tier 4 NOx engine standard, the Ports believe that it is highly inappropriate to assume aspirational reductions related to Tier 4 fleet penetration until the standard is at least drafted if not promulgated. Taking reductions for standards that are neither in discussion nor in development is not appropriate for SIP planning purposes. Therefore, the Ports request that the estimated emissions reductions associated with Tier 3 fleet penetration this measure be reconsidered for the proposed SIP commitment and that all reductions associated with Tier 4 be removed.

Furthermore, it is stated that: "The new standards would be allowed to enter the fleet using natural turnover and would not be accelerated by additional rules or incentives" (p. IV-B-51). While the Ports are in favor of CARB advocating for IMO Tier 4 NOx standards and efficiency targets for ships, we believe that effort should be placed on encouraging the cleanest ships to deploy to our ports now. There are currently fewer than 50 ships worldwide on order that will have IMO Tier 3 capabilities and it is unknown where they will be they deployed. We do not foresee a sizeable number of Tier 3 ships servicing our ports in the near term. As more of these ships become available for deployment, the Ports recommend the development of statewide strategies, such as incentive funding programs to attract these clean new ships to our Ports.

50-31 Con't

f. Appendix II, Chapter 2, PM10 Temporal Variation. p. II-2-57

The Ports are concerned that the narrative in this section misrepresents what is actually occurring at the Ports. In particular, we feel the following statement is misleading:

Moreover, higher port activity due to peak cargo traffic which typically occurs in the fall of each year coupled with the lower mixing height in the fall may also contribute to the higher PM10 concentrations during this time of year.

50-32

Actually, higher port activity generally occurs in the middle to late summer, however the shape of the peak has become less pronounced. And furthermore, historical data received at the Ports' Air Monitoring Stations indicates that PM10 concentrations near the Ports are no higher in the fall than any other time of the year. Since these findings do not support the assumption in the statement above, the Ports request that the statement above be removed from the document.

Responses to Comment Letter from Ports of Long Beach & Los Angeles (San Pedro Bay Ports) (Comment Letter #50)

Response to Comment 50-1:

Staff appreciates the support for the development and implementation of the 2016 AQMP. Staff also recognizes the hard work and commitment it was taken to successfully fulfill the voluntary Clean Air Action Plan (CAAP) that has benefited the region.

Response to Comment 50-2:

The intent of the proposed facility-based measures is not to interfere with critical funding and grant monies. Staff is proposing to work to ensure that opportunities for emission reductions are realized and accomplished.

Response to Comment 50-3:

Staff agrees that a collaborative effort is the best approach in establishing a successful program, particularly in light of various regulatory authorities and interests. In addition, staff recognizes some of the limitations faced by the Ports and their terminal operators. The SCAQMD does have authority to regulate indirect sources such as the ports. Staff encourages stakeholders and interested parties to participate in the development of the facility-based programs so all interests and needs are considered. With regard to SCAQMD's regulatory authority, see Response to Comment 96-4.

Response to Comment 50-4:

SCAQMD staff will need to review the updated CAAP to understand the goals set forth and to ensure that all available emission reduction opportunities are included. As such, the voluntary program under MOB-01 could be established based on the updated CAAP.

Response to Comment 50-5:

Please see Response to Comment 38-1 regarding the timing of the release of the Plan and related documents, as well as review periods for those documents. The draft Financial Incentive Funding Action Plan was released in December and the public is provided time for review and comment before Board consideration in February 2017.

Response to Comment 50-6:

Staff continues to see value in the facility-based measures, which has garnered support from other commenters, so they will remain in the proposed 2016 AQMP. However, staff does acknowledge concerns and seeks to resolve those concerns during the working group meetings. Please see Response to Comment 49-3 for further discussion of MOB-01.

Given the comments received on the various perspectives of the SCAQMD's legal authority during the public process in implementing the 2007 AQMP MOB-3 and the 2012 AQMP IND-01 measures, staff believes that a more constructive approach to achieving additional emission reductions in the near-term is through the actions the Ports are taking in the development of the Clean Air Action Plan (CAAP) update. If such actions are voluntary in nature and the associated emission reductions are proposed to be included

in the SIP, enforceable commitments must be made to ensure the reductions are surplus and permanent. The enforceable commitment may be in the form of a rule or other enforceable mechanisms. For responses relative to the need for and authority for measure MOB-01, see Responses to Comments 96-3, 96-4, 96-11, 96-13, 96-23, and 96-29.

To the extent that MOB-01 is developed to seek additional emission reductions on a separate track from EGM-01, the Ports will not be included under EGM-01. Please also see Response to Comment 96-32.

MOB-14 recognizes emission reductions associated with funding programs and does not preclude any entities from obtaining grant funding since the funding programs are voluntary. For more details on discussion of MOB-14, see Responses to Comments 96-39 and 96-40.

The 2016 AQMP does focus on attaining the NAAQS but as described in Chapter 6, there are anti-backsliding requirements associated with revoked standards, including emission reduction commitments. Also see Response to Comment 96-7.

For a discussion of Clean Air Act contingency measures, see Chapter 4 of the AQMP and Response to Comment 96-42.

The Socioeconomic Assessment evaluates the cost impacts from both the stationary and mobile source strategies. Since MOB-01 is seeking additional emission reductions to help meet the State Strategy "Further Deployment of Cleaner Technologies" measures, the assumptions for the "Further Deployment" measures have been included. For the issue of socioeconomic analysis of MOB-01 and other facility-based measures, see Responses to Comments 50-20 through 50-24.

For a discussion of the incentive funding plan, see Responses to Comments 50-18 and 50-19.

The emission inventories will be updated to reflect the Ports emissions inventory with concurrence from CARB. More details regarding the emissions inventory can be found in Responses to Comments 50-27 through 50-30.

Response to Comment 50-7:

Please see Response to Comment 50-6 relative to the commenter's requested changes.

Control measure MOB-01 does not exceed the District's authority. See responses to Comments 96-3 and 96-4 for a more detailed discussion.

Please see Responses to Comments 50-5 and 50-19 regarding the Financial Incentive Funding Action Plan. Staff again appreciates the Ports past efforts in cleaning the air and looks forward to collaborating on future emission reduction efforts.

Please see Response to Comment 38-1 regarding the timing of the release of the Plan and related documents, as well as review periods for those documents. The draft Financial Incentive Funding Action Plan was released in December and the public is provided time for review and comment before Board consideration in February 2017.

Response to Comment 50-8:

Staff is proposing that the 2007 AQMP Measure MOB-03 and 2012 AQMP Measure IND-01 be replaced since the emission reductions associated with the two measures have already been achieved or are projected to be achieved. As such, the 2016 AQMP Measure MOB-01's intent is to help achieve a portion of the emission reductions associated with the State SIP Strategy "Further Deployment" measures. Please see Responses to Comments 96-2 and 96-3 for more details. Also, see Response to Comment 96-4 regarding the SCAQMD's regulatory authority.

Response to Comment 50-9:

With regard to the issue that neither CARB nor EPA may require the SCAQMD to adopt an indirect source rule, see Response to Comment 96-36. With regard to the assertion that measure MOB-01 would conflict with state goals to improve transportation efficiency and sustainable freight, staff disagrees. Both these goals are complementary to achieving clean air goals since they seek to reduce fuel consumption and reduce the amount of work required to move freight. Measure MOB-01 will seek to take advantage of improvements such as these that improve air quality.

Response to Comment 50-10:

With regard to SCAQMD's authority, see Responses to Comments 96-4 and 96-33. With regard to the claim that SCAQMD is attempting to regulate mobile sources in a manner prohibited by the Clean Air Act, See Response to Comment 96-11. The SCAQMD is not proposing any permit system for indirect sources. With regard to the argument that indirect source measures may only apply to new or modified sources, see Response to Comment 96-12. With regard to the argument that the facility-based measures are not necessary, see Responses to Comments 96-11 and 96-29.

Response to Comment 50-11:

With regard to identifying the Ports as "implementing agencies," see Response 96-20. With regard to the Ports' claim that they lack any authority to impose requirements on their tenants, see Response 96-16. With regard to the argument that reducing air pollution will violate the Tidelands Trust, see Responses to Comments 96-27 and 96-28.

Response to Comment 50-12:

SCAQMD will comply with Health and Safety Code §40717.5 when and if it adopts an indirect source rule. The statute applies when the agency adopts or amends a rule, not when it adopts an AQMP. See Response to Comment 96-10.

Response to Comment 50-13:

Proposed Measure MOB-01 is proposing a collaborative approach to identify actions that potentially result in emission reductions and may result in the development of enforceable mechanisms such as a cooperative agreement that the commenter is suggesting. Also, see Responses to Comments 96-2 and 96-3 regarding MOB-01.

Response to Comment 50-14:

With regard to the Ports' request to be excluded from measure EGM-01, see Response to Comment 96-32. It should be noted that measure EGM-01 does not seek to plan or control land use, establish zoning

requirements, or specify what land uses a city may allow in a given area. It would only seek to reduce emissions from indirect sources, which is clearly within SCAQMD's authority. See Response to Comment 96-4.

Response to Comment 50-15:

Please see Responses to Comments 96-38 and 96-39.

Response to Comment 50-16:

See Response to Comment 96-7.

Response to Comment 50-17:

With regard to contingency measures, see Chapter 4 of the AQMP and Response to Comment 96-42.

Response to Comment 50-18:

The emission reductions associated with the State SIP Strategy mobile source measures are commitments that CARB has made to achieve in order for the region to attain federal air quality standards by their applicable dates. CARB has indicated that they plan to provide additional discussion on actions to be taken to make up for any emissions reduction shortfall (this includes having sufficient incentives funding) in meeting the state's emission reduction commitments. Any actions that CARB proposes will be vetted through a public process. See also Response to Comment 50-17.

Response to Comment 50-19:

A Draft Financial Incentives Funding Action Plan was released on December 16, 2016 for a 30-day written comment period. In addition, the funding levels that are being sought have been analyzed as part of the socioeconomic analysis released in December 2016 for public comments.

Response to Comment 50-20:

The Draft Socioeconomic Report quantifies costs for control measures with quantified emission reductions only. The costs and emission reductions were analyzed for contingency measures BCM-01 (Further Emission Reductions from commercial cooking) and BCM-04 (Manure Management strategies). As stated in Chapter 4 of the Draft Final 2016 AQMP and reiterated in Appendix 2-A of the Draft Socioeconomic Report, the "facility-based" SCAQMD mobile source measures—MOB-01, MOB-02, and MOB-03—are being proposed to facilitate local implementation of the state's State Implementation Plan (SIP) Strategy "Further Deployment of Cleaner Technologies" measures. The SCAQMD measures propose a process to also identify voluntary actions that could potentially result in additional NOx emission reductions beyond the state's emission reduction commitments. Since these actions are not specifically identified at this time and may be voluntary in nature, staff does not presume that the affected industries and businesses would voluntarily incur any costs in addition to what has been quantified for CARB's "Further Deployment" measures.

Response to Comment 50-21:

The Draft Socioeconomic Report was released on November 19, 2016, with an additional public review and comment period of 30 days that ended on December 19, 2016. The Preliminary Draft Socioeconomic Report was released on August 31, 2016 with a comment period of 60 days. The preliminary draft covered the estimates of costs and benefits of the plan and were released earlier to maximize the review time for public and stakeholders. See Response to Comment 50-20 regarding the request to include all control measures in the socio-economic analysis.

Response to Comment 50-22:

The Draft Socioeconomic Report analyzes macroeconomic impacts associated with the total incremental cost of implementing the Draft 2016 AQMP. The total incremental cost includes matching funds required from affected businesses and consumers to purchase and maintain near-zero and zero emission equipment as well as different levels of government incentive funding. Please see Chapter 2 of the Draft Socioeconomic Report for more details on incremental costs.

Response to Comment 50-23:

The Draft Financial Incentives Action Plan for the 2016 AQMP, released in December 2016, provides a set of proposed actions that will be taken by the SCAQMD along with public and private sector stakeholders and the public at large to secure additional financial incentive funding. This includes estimates of potential revenues from each source. Taxpayer funding from local and state ballot measures represents a potential funding source outlined in the Plan. To be conservative about the prospect of securing additional public revenue from new sources, the Draft Socioeconomic Report has analyzed a worst-case scenario under which all incentive funding is assumed to be financed from existing state revenues with no health benefits included. This worst-case scenario is expected to have minimal impact on projected job growth in the region.

Response to Comment 50-24:

Please see Responses to Comments 50-22 and 50-23.

Response to Comment 50-25:

The reference to “CO” has been corrected in the Draft Final 2016 AQMP released in December 2016.

Response to Comment 50-26:

Please see Response to Comment 96-54.

Response to Comment 50-27:

Please see Response to Comment 96-56.

Response to Comment 50-28:

Please see Response to Comment 96-56.

Response to Comment 50-29:

The comment has been noted and discussion on auxiliary engine emissions has been revised (see Draft Final 2016 AQMP Appendix IV-A, page IV-A-129).

Response to Comment 50-30:

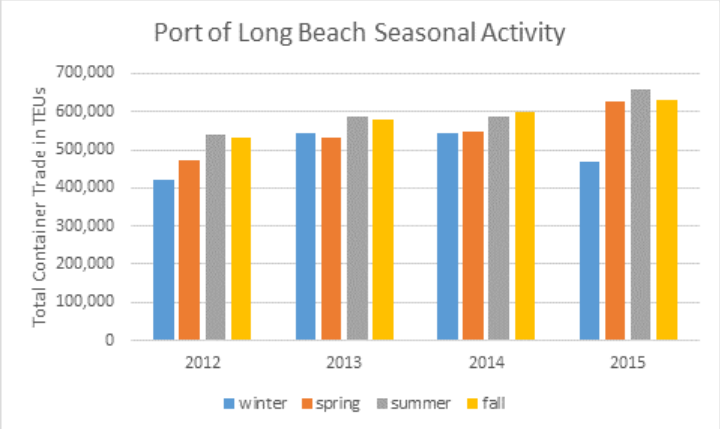
As implementation of MOB-01 moves forward, the most current emissions inventories will be used in developing potential emission reductions from the identified actions. For SIP accounting and reporting purposes, the percent change in emissions will be based on actual emissions reported by the ports and the historic base year (2012) will be used to calculate rate-of-progress.

Response to Comment 50-31:

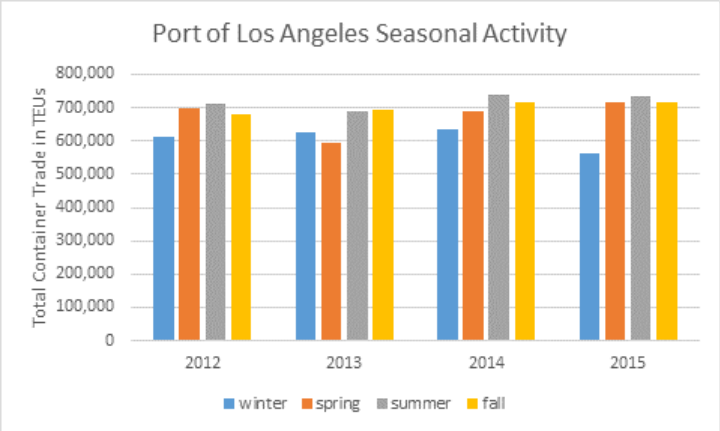
Staff appreciates the efforts the ports are making to incentivize deployment of the cleanest ocean-going vessels entering the ports. The future year estimates of the number of Tier 3 vessels provided by the ports are being considered by CARB in its update to the ocean-going vessel emissions inventory. While it is important to reflect the most accurate emissions inventory, it is also important to propose the development of cleaner emission standards and reflect the potential emission reductions associated with implementation of such standards. Any emission reductions associated with such standards are commitments that CARB has made. If no Tier 4 standards are established by IMO, CARB has committed to achieving the associated emission reductions nevertheless.

Response to Comment 50-32:

As noted in the comment, the monthly PM10 near the coast has relatively low variability throughout the year, with less than 8 µg/m^3 between the lowest and highest monthly averages as shown in Figure 2-39. The inland stations are relatively higher from June through October. Also, as noted in the comment, it does appear likely that monthly cargo traffic counts have become more consistent in recent years. The seasonal activity at the Ports of Long Beach and Los Angeles, as illustrated in the plots below using data from the POLB/LA website, generally peaked in the summer season between 2012 and 2015, with the fall months typically second. Each of the ports did have activity peaks in the fall for one of the years shown. Nonetheless, it is likely that lower mixing heights associated with cooling fall temperatures and the increase in offshore Santa Ana wind events in the fall months are likely more significant to the PM10 monthly variability that the differences and activities associated.



(Data Source: Port of Long Beach: http://www.polb.com/economics/stats/teus_archive.asp)



(Data Source: Port of Los Angeles: https://www.portoflosangeles.org/maritime/stats.asp)

Comment Letter from RadTech (Comment Letter #51)



August 19, 2016

Mr. Philip Fine
Deputy Executive Officer, SCAQMD
21865 Copley Drive
Diamond Bar, CA 91765

Re: Public Comments on the Draft 2016 Air Quality Management Plan

Dear Mr. Fine:

RadTech is pleased to submit public comments on behalf of our over 800 members, regarding the Draft 2016 Air Quality Management Plan. RadTech is honored to have been selected to serve on the Air Quality Management Plan (AQMP) advisory committee and in that capacity have commented on many of the proposals brought forth by staff. The plan's focus on incentives based approaches fits well with UV/EB/LED technology and can help the district achieve its air quality goals without sacrificing the economy. In addition to reductions in Volatile Organic Compounds (VOCs) that go above and beyond current limits specified in the District's source specific rules, UV/EB/LED technology can produce co-benefits such as reduction in combustion contaminants (PM 2.5, NOx, Greenhouse Gases) that would normally be generated by add-on control devices. Some additional thoughts follow:

Control Strategy and Implementation (Page 4-4)

We request that an analysis of UV/EB/LED technology be included in the plan, similar to that included for Solar Energy Technology. This would go a long way to inform businesses of their compliance options and fit well with the district's goal of increasing public outreach. The District's 2003 plan (Chapter 4, page 4-55) included a detailed discussion of energy curable technology which is missing from the current draft. The specific language follows for quick reference: 51-1

"Radiation-Curing Technologies Radiation-curing products are liquids with low viscosity that are 100 percent solids. The main difference between traditional solvent-based products and radiation-curing products is the curing mechanism. Radiation-curing products do not dry in the sense of losing solvents to the atmosphere as is the case with solvent-based products. Instead, when radiation-curing products are exposed to radiation, a polymerization reaction starts which converts the liquid to a hard, tough, cured solid film in a fraction of a second. This process typically results in significantly lower VOC emissions compared to solvent-based products. The most common radiations used to cure the products are ultraviolet light (UV) and electron beam (EB). The UV-curing products need a chemical called photoinitiator, which initiates the polymerization (curing) process when exposed to UV light.

The EB-cured products do not contain photoinitiators and are cured when the electrons generated with the EB equipment react directly with monomers and polymers in the liquid product. Due to almost instant curing of these products, the concept of drying time is eliminated which allows any post-application operation to commence immediately or in-line. Other advantages include the attainment of very high gloss levels, reduction of VOC emissions and solvent odors, and reduced energy consumption. UV and EB-curing products can be used on virtually all substrates, from metal and wood to glass and plastic. Applications of UV and EB-curing products are numerous and proliferating rapidly. Examples include: paper, furniture, automotive components, no-wax flooring, credit cards, packaging, lottery tickets, golf balls, eye glass lenses, CDs, baseball bats, beer cans and hundred of other items. However, these technologies have registered significant progress toward alleviating previous limitations in technology for field applications. UV applications are also making headway in automotive field repair, and efforts are underway for applying this technology for aerospace and military field uses."

51-1 Con't

We strongly urge the district to include the above analysis it in the 2016 plan. Additionally, since the 2003 document was authored, LED technology has become more prevalent in our industry. We request that the language be modified to UV/EB/LED.

ECC-01 - Co-Benefit Emission Reductions from GHG Programs, Policies and Incentives [All Pollutants] (Page 4-12)

51-2

Add-on controls which are combustion sources that emit Green House Gases (GHGS) and are typically sources of criteria pollutants, UV/EB/LED technology does not generate GHGs. We support the concept of "promoting implementation and development of new technologies" and evaluating them for "reduction of emissions of both GHGs and criteria pollutants."

ECC-03 - Additional Enhancements in Building Energy Efficiency and Smart Grid Technology [NOx, VOC] (Page 4-14)

51-3

This control measure appears to be limited to incentive programs for existing residences that includes weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. UV/EB/LED technology works at ambient temperature and is good for temperature sensitive substrates like paper, wood, and some plastics. The "low bake" concept is aimed to reduce the cure temperatures and yields energy savings. There are now other 100% solids ambient curable technologies but UV/EB/visible cure remains to be the only viable single component, ambient, on demand cure technology today. We urge the district to extend the incentives to commercial buildings where stationary sources may be operating.

FLX-01 Improved Education and Public Outreach (Page 4-16)

51-4

We appreciate the inclusion of "super-compliant" coatings, which would include UV/EB/LED products, in this section.

FLX-02 Stationary Source VOC Incentives (Page 4-19)

51-5

We are supportive of the incentives concept for facilities who utilize equipment which result in cost effective emission reductions that are beyond existing requirements. However, instead of imposing permit conditions, relaxing permitting requirements, in the form of 219 exemptions, would be a better r incentive for facilities to voluntarily convert to lower emitting processes.

Clean Air Investment and Cleanup Fund (Page 4-66)

51-6

RadTech commends the district for considering the creation of a national clean air investment fund for contaminated air. Stationary sources who reduce their emissions above and beyond existing district rule requirements, should be eligible to access funds in order to invest in technologies such as UV/EB/LED.

Appendix IV-A-29

51-7

The district has identified various negative impacts associated with the use of control equipment such as: "the potential to create secondary adverse air quality impacts"……increased ammonia emissions" and, since ammonia is a precursor to particulate formation, increased particulate emissions. The district has further found that "in the event of an accidental release of ammonia, sensitive receptors in the vicinity of the release may be exposed to harmful concentrations of ammonia vapor." These statements further validate the environmental viability of reformulation to UV/EB/LED technology and make a case for the district to encourage the use of said technology. We urge recognition of the technology for the category of "Commercial Natural Gas External Combustion-Other" as conversion to UV/EB processes can eliminate the need for add-on control devices that use natural gas and generate combustion contaminants.

Appendix IV-A-43

51-8

We urge inclusion of UV/EB/LED technology as a strategy that reduces emissions, improves energy efficiency, reduces fuel and creates new job opportunity. It is not clear whether or not emissions from afterburners and similar combustion control devices have been included in the analysis.

Appendix IV-A-46

51-9

RadTech concurs with the district's statement that "…incentivizing the use of much cleaner, less polluting, products and equipment will require additional efforts to broaden the scope of stationary source incentives." We urge the district to consider Board Member Judy Mitchell's comment to staff to provide an exemption for UV/EB processes from permitting requirements under Rule 219.

Appendix IV-A-47

We commend the district for including the provision of incentives for existing businesses to implement zero and near-zero emission technologies and encouraging new businesses that use and/or manufacture near-zero and zero emission technologies to site in the Basin. Users of UV/EB/LED technology should have access to the incentives. 51-10

Appendix IV-A-48

We urge the inclusion of permitting exemptions in the "Permitting and Fee Incentives and Enhancements" section. As it currently stands, this section only mentions the expansion of the certification program but does not mention permit exemptions for equipment that goes above and beyond rule requirements such as UV/EB. We support the "Branding Incentives" and the "Recordkeeping and Reporting Incentives". 51-11

Appendix IV-A-50

It is unclear whether or not the "Incinerators" category in Table 1, includes emissions from add-on control devices. 51-12

Appendix IV-A-85

UV/EB/LED technology can play a role in the market sectors (Rule 1106, Rule 1124, Rule 1128, Rule 1107) mentioned on this page. The technology can create the "win-win business case" the section contemplates. 51-13

Appendix IV-A-86

Please refer to comment on Control Strategy and Implementation (Page 4-4), above.

Appendix IV-A-99

We support the district's efforts to improve education and public outreach. To this end, including industry resources on the district's website (such as a link to the RadTech webpage) would be beneficial to business owners who seek near-zero or zero technologies. 51-14

Appendix IV-A-100

We support outreach programs for consumers to increase awareness of the benefits of purchasing low emitting products and encourage the district to extend the sane outreach to business owners who may be looking for compliance options.

Appendix IV-A-103

We agree with incentivizing lower polluting and less toxic alternative processes and materials for industrial modernization. UV/EB/LED processes can help the district achieve this goal. 51-15

Appendix IV-A-104

UV/EB/LED processes should be eligible for any funding provided through the mechanisms outlined in this section.

Appendix IV-A-105

We urge the inclusion of permitting exemptions in the "Permitting and Fee Incentives and Enhancements" section. As it currently stands, this section only mentions the expansion of the certification program but does not mention permit exemptions for equipment that goes above and beyond rule requirements such as UV/EB. 51-16

Appendix IV-A-106

Please refer to comment on Control Strategy and Implementation (Page 4-4), above.

We appreciate the opportunity to work with you and your staff. Please do not hesitate to contact me at 909-240-0866 or via email: rita@radtech.org.

Regards,

Rita M. Loof
Director Regional Environmental Affairs

Responses to Comment Letter from RadTech
(Comment Letter #51)

Response to Comment 51-1:

A description of energy curable technology is now included in Appendix IV A to inform businesses of a compliance option.

Response to Comment 51-2:

Control measure ECC-01 includes the concept of promoting implementation of new technologies that reduce both GHG and criteria pollutant emissions. Incentives, programs, and partnerships will be evaluated for reduction of emissions of both GHGs and criteria pollutants. As facilities seek to reduce GHG emissions by adopting lower-GHG technologies such as UV/EB/LED, the criteria pollutant benefits will be analyzed.

Response to Comment 51-3:

ECC-03 is aimed at implementing efficiency improvements at residential buildings. Combustion sources at residential buildings, including stoves, heaters, fireplaces, etc., would be targeted to reduce NOx emissions. As UV/EB/LED technology is designed for manufacturing applications, it is not appropriate to include these technologies when seeking emission reductions at residential buildings. Process efficiencies for commercial buildings are covered within other control measures.

Response to Comment 51-4:

Your support is acknowledged.

Response to Comment 51-5:

Rule 219 is currently under review to consider further exemptions for low emission UV/EB/LED technologies. However, in some cases, it is necessary to have a permit with associated conditions in order to verify that the operations have low overall emissions. For example, high production UV/EB/LED printing equipment may utilize low-VOC inks but may use such large quantities that overall emissions exceed offset, BACT, BARCT or emission reporting thresholds.

Response to Comment 51-6:

Your support is acknowledged.

Response to Comment 51-7:

Control measure ECC-02 proposes improvements to commercial building efficiency measures to reduce energy use for heating, cooling, lighting, cooking, and other needs. The control measure does not address the use of control equipment used during manufacturing operations. UV/EB/LED technologies are designed for manufacturing applications and are not appropriate to include in this measure. However, if UV/EB/LED technologies are developed that address heating, cooling, lighting, cooking and other building energy needs, they would be available for inclusion as alternatives.

Afterburners and similar combustion related control equipment are included in the emission inventory of the control measure. The measure does not directly quantify a process change, such as replacing a VOC emission source requiring combustion control equipment with a low emission technology like UV/EB/LED that does not require control equipment, as it is difficult to predict where pollution prevention opportunities might occur. Where possible however, the control measure should incentivize process changes that eliminate the need for combustion equipment.

Response to Comment 51-8:

Please see Response to Comment 51-7 with regard to the inclusion of UV/EB/LED technology.

Response to Comment 51-9:

Staff encourages the commenter to participate in the development of the incentive programs to ensure all options are considered particularly with regards to possible future rulemaking and potential exemptions. Please also see Response to Comment 51-5 regarding Rule 219.

Response to Comment 51-10:

Your support is acknowledged.

Response to Comment 51-11:

Your support for incentives is acknowledged but as noted in Response to Comment 51-9, any proposed action regarding access to incentives would take place during program and/or rule development.

Response to Comment 51-12:

The "Incinerators" category in CMB-01, Table 1 – "NOx Combustion Sources" does not include add-on control devices.

Response to Comment 51-13:

Comment noted.

Response to Comment 51-14:

Your support is acknowledged. Control measure FLX-01 (Appendix IV-A-99 in Draft 2016 AQMP) contains a component to conduct outreach to business owners to help implement projects that have emission benefits and short payback periods. Including industry resources, such as links to super-compliant technology providers, will be part of the outreach efforts.

Response to Comment 51-15:

Super-compliant technologies such as UV/EB/LED may be eligible for incentive funding.

Response to Comment 51-16:

Please see Response to Comment 51-5 and 51-9 regarding exemption for UV/EB processes from permitting requirements.

Comment Letter from Ramboll Environ (Comment Letter #52)

COMMENTS ON THE DRAFT 2016 AQMP ATTAINMENT DEMONSTRATION MODELING FOR THE SOUTH COAST AIR BASIN

August 19, 2016

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INTRODUCTION

This document represents comments from an initial review of the attainment demonstration modeling component of the draft 2016 Air Quality Management Plan (AQMP) for the South Coast Air Basin (SoCAB) released by the South Coast Air Quality Management District (SCAQMD) on June 30, 2016. The draft 2016 AQMP did not include the critical Appendix V that documents the air quality modeling, which severely limited my ability to review the draft AQMP attainment demonstration modeling. The draft 2016 AQMP on the website[1] originally stated that Appendix V would be released by the end of July 2016 with comments due by August 19, 2016. Since then, the website has been updated to state that Appendix V would be released in early August but comments are still due August 19. As of the August 19, 2016 comment deadline, Appendix V has still not been released. After the release of Appendix V, a review period of at least 30 days is needed to allow the scientific community to review and comment on the modeling that is the key technical component of the draft 2016 AQMP.

52-1

Qualifications

I, Ralph E. Morris, am a Managing Principal at the Novato, California office of Ramboll Environ US Corporation (Ramboll Environ). Ramboll Environ is a > 1,000 person environment and health consulting firm that was formed in 1982. I have over 36 years of experience in air quality modeling and in particular with the development and application of advanced photochemical grid models (PGMs) as used in the draft 2016 AQMP ozone and $PM_{2.5}$ attainment demonstration modeling. I have served on, and been an active member of, the SCAQMD's Scientific Technical Modeling Peer Review Modeling Advisory Group (STMPRAG) for over a decade. The last meeting of the STMPRAG was held on March 16, 2016[2] before the final draft AQMP attainment demonstration modeling was performed. I have performed PGM attainment demonstration modeling for numerous State Implementation Plans (SIPs), such as the current

[1] http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/Draft2016AQMP
[2] http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPRMod_031616

Denver 2017 ozone SIP and past Denver 2008 ozone SIP[3], so I am very familiar with the procedures, guidance and tools needed to conduct a SIP attainment demonstration modeling. I was a member of EPA's first ozone SIP modeling guidance workgroup in 1990 that led to the initial EPA ozone SIP guidance document (EPA, 1991[4]). Although I have been employed by Ramboll Environ for over 20 years, the views expressed in this document are my own and may not represent those of Ramboll Environ or other staff of Ramboll Environ.

Documents Considered

The main documents considered were those in the draft 2016 AQMP released on June 30, 2016 and the Appendix III released at a later date. As noted above, the Appendix V modeling component of the draft 2016 AQMP was not released before the August 19 comment deadline, so I reserve the right to submit additional comments after its release.

On July 8, 2016, I requested the draft 2016 AQMP CMAQ[5] air quality modeling files that were used in the attainment demonstration modeling. The SCAQMD responded promptly to this request with the transfer of all of the ozone attainment demonstration modeling files by July 29, 2016. However, I am still waiting for the $PM_{2.5}$ attainment demonstration modeling files and have not had sufficient time to analyze the files prior to the August 19, 2016 comment review deadline.

52-1
Con't

My comments are also relying on information presented by SCAQMD during the development of the draft 2016 AQMP at the STMPRAG and AQMP Advisory Group meetings and my involvement in previous AQMPs, including the 2012 and 2007 AQMPs and dating back to the 1989 AQMP. I am also relying on my over 30 years of experience in air quality modeling within the U.S. and throughout the world and experience in conducting attainment demonstration SIP modeling.

More recently, I have been involved in a study for the Truck and Engine Manufacturers Association (EMA) that, among other things, assessed the ability of the 2012 AQMP 2008 CMAQ modeling database to reproduce the observed ozone trends over time in the SoCAB. This on-going work will also perform a similar analysis using the draft 2016 AQMP 2012 CMAQ modeling database. However, since that database was only received approximately two weeks before the August 19, 2016 comment period end date, those results are not included in my comments. Although I am relying on work we performed for EMA for some of my comments, my comments do not necessarily represent the opinions of EMA.

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[3] http://www.colorado.gov/airquality/documents/deno308/
[4] https://www3.epa.gov/ttn/scram/guidance/guide/uamreg.pdf
[5] CMAQ stands for Community Multiscale Air Quality (CMAQ) modeling system that is a Photochemical Grid Model (PGM) developed by U.S. EPA and distributed through the CMAS Center (https://www.cmascenter.org/).

COMMENTS ON THE DRAFT 2016 AQMP ATTAINMENT DEMONSTRATION MODELING

The SCAQMD should be commended on their draft 2016 AQMP modeling efforts. This is a large body of work applying complex and complicated models to arguably the most difficult air quality problem in the U.S. As with any air quality modeling effort, there are uncertainties and areas for improvements. Hopefully my comments will help improve the modeling results. 52-2

Below I present two over-arching comments on the draft AQMP attainment demonstration modeling followed by specific comments on Chapter 5 "Future Air Quality" of the draft 2016 AQMP.

Over-Arching Comments

Draft 2016 AQMP Documentation is Insufficient to Provide Informed Review and Comments on the Attainment Demonstration Modeling: As noted above, the draft 2016 AQMP documentation failed to include Appendix V "Modeling and Attainment Demonstrations" that was still not available by the August 19, 2016 comment deadline. At the end of July, the SCAQMD also provided the ozone modeling attainment demonstration database. But there is insufficient documentation and time to provide informed comments on the modeling by the August 19, 2016 comment due date. I am requesting an extension of the comment period until after the release of the modeling documentation and receipt of data files and request that the SCAQMD hold a meeting of the STMPRAG where the details of the modeling can be discussed and a more thorough peer-review conducted. 52-3

AQMP Modeling Databases Fail to Reproduce Observed Ozone Trends Resulting in Incorrect Future Year Ozone Projections and Assessment of the SoCAB's Emissions Carrying Capacity for Ozone Attainment: The CMAQ modeling in the 2012 AQMP failed to accurately reproduce the observed ozone reductions in the SoCAB resulting in higher future year ozone levels than observed and therefore a higher amount of NOx emission reduction needed to attain the ozone NAAQS. This issue became very obvious in 2015 due to the following facts: 52-4

- The 2012 AQMP modeling using a 2008 CMAQ modeling database projected that the 5-year (5Y) ozone Design Value (5Y-DV[6]) at Crestline would be reduced from 116 ppb in 2008 to 107 ppb in 2023 without any additional controls for an ozone reduction rate of 0.60 ppb/year.

[6] An Ozone Design Value (DV) is defined as the three-year average of the fourth highest Maximum Daily Average 8-hour (MDA8) ozone concentration and is compared to the ozone NAAQS to determine attainment/nonattainment. We also refer to the ozone DV as a 3-year DV (3Y-DV). To make future year ozone projections a 5-year DV (5Y-DV) is used that is an average of three years of ozone DVs centered on the year in question (e.g., for the 2012 year, $DV_{2010-2012}$, $DV_{2011-2013}$ and $DV_{2012-2014}$).

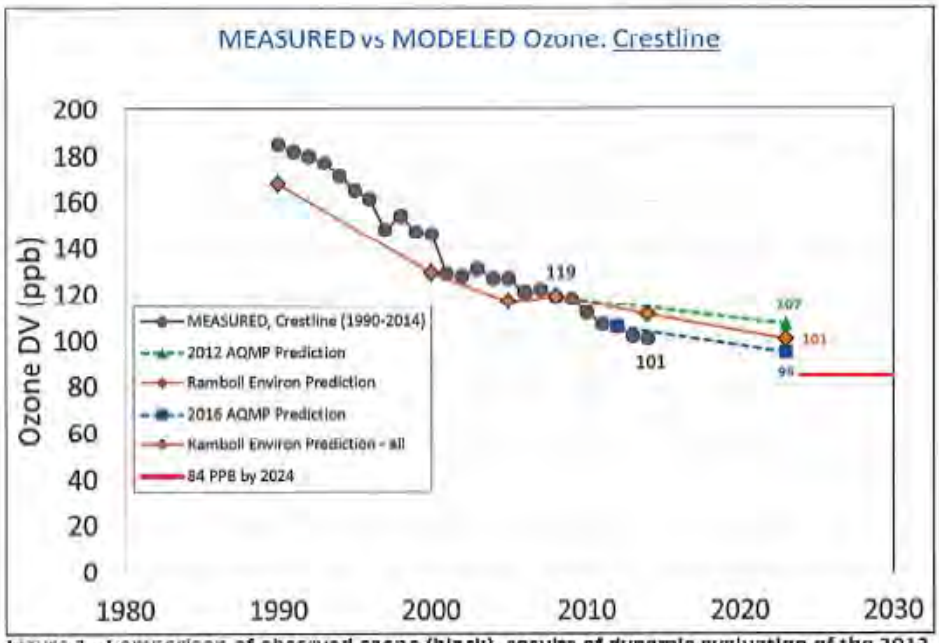

Figure 1. Comparison of observed ozone (black), results of dynamic evaluation of the 2012 AQMP 2008 CMAQ database (orange), 2012 AQMP projected ozone (green) and draft 2016 AQMP projected ozone (blue) rate of change (ppb/year).

52-4 Con't

Tables 1 and 2 compare the observed and CMAQ predicted ozone DV concentrations and rate of ozone reduction at the Crestline, Redlands and Fontana monitoring sites for the 2012 AQMP and draft 2016 AQMP, respectively. These comparisons use a simple arithmetic trend approach using the differences in ozone between the first and last year of a period to clearly and simply illustrate the differences in the observed and AQMP modeled ozone trends. A better approach would be to use regression equations, as used in the draft 2016 AQMP to derive their observed 2.3 ppb/year reduction (pages 5-4) that compare well with the simple arithmetic observed ozone trends in Table 1 below (2.14-2.43 ppb/year). Comments on the draft 2016 AQMP submitted by EMA use the regression trend approach and come to the same conclusions as shown in Tables 1 and 2 that the trend in AQMP modeled ozone reductions is much slower than observed.

The three monitoring sites in Tables 1 and 2 were selected because they have the highest current year (2012) and projected 2023 future year ozone DVs in the SoCAB. For the 2012

AQMP, the observed rate of ozone reduction (2.14 to 2.43 ppb/year) is 4 to 10 times greater than the modeled rate (0.20 to 0.60 ppb/year, Table 1). The observed rate of ozone reduction is also greater than the modeled rate from the draft 2016 AQMP. However, for the draft 2016 AQMP comparisons, there is only a three year overlap between the observed (2012-2015) and modeled (2012-2023) ozone trend period so the observed trend is more uncertain than in the 2012 AQMP comparison. We will have longer-term comparisons of the observed and modeled 2016 AQMP ozone trend comparisons when the dynamic evaluation of the draft 2016 AQMP 2012 CMAQ database is completed.

52-4 Con't

Table 1. Comparison of observed and predicted rate of ozone reductions for the 2012 AQMP 2008 CMAQ modeling database.

Monitoring Site	Observed Ozone			2012 AQMP 2008 CMAQ Ozone		
	2008 3Y-DV (ppb)	2015 3Y-DV (ppb)	Reduction Rate (ppb/yr)	Reduction Rate (ppb/yr)	2008 5Y-DV (ppb)	2023 5Y-DV (ppb)
Crestline	119.0	102.0	2.43	0.60	116.0	107.0
Redlands	116.0	101.0	2.14	0.40	109.0	103.0
Fontana	112.0	97.0	2.14	0.20	107.0	104.0

Table 2. Comparison of observed and predicted rate of ozone reductions for the draft 2016 AQMP 2012 CMAQ modeling database.

Monitoring Site	Observed Ozone			Draft 2016 AQMP 2012 CMAQ Ozone		
	2012 3Y-DV (ppb)	2015 3Y-DV (ppb)	Reduction Rate (ppb/yr)	Reduction Rate (ppb/yr)	2012 5Y-DV (ppb)	2023 5Y-DV (ppb)
Crestline	106.0	102.0	1.33	0.73	103.0	95.0
Redlands	105.0	101.0	1.33	0.79	104.7	96.0
Fontana	101.0	97.0	1.33	0.45	101.0	96.0

Specific Comments

The following are specific comments on Chapter 5 of the draft 2016 AQMP (note that other portions of the draft AQMP also use the same information as in Chapter 5).

Page 5-2: Both WRF v3.6 and WRF v3.6.1 are stated as having been used, which can't both be correct. The WRF model performance evaluation should also be included as part of the draft AQMP. Limited results have been presented at the STMPRAG meetings, but given the importance of the meteorological inputs, the full evaluation of WRF meteorological model should be made available. 52-5

Page 5-2: The document states that CMAQ v5.0.2 was used in the draft 2016 AQMP. However, we tried to run EPA's CMAQ v5.0.2[9] using the draft 2016 AQMP 2012 CMAQ database and it could not run. It appears the SCAQMD has modified the CMAQ v5.0.2 so that it is no longer the EPA version. The draft 2016 AQMP should state that a modified version of CMAQ v5.0.2 was used, what the modifications were, and how those modifications affect the modeling results. 52-6

Page 5-3: Draft AQMP states that *"Gridded daily biogenic VOC emissions were provided by CARB using the MEGAN biogenic emissions model."* However, MEGAN also produces biogenic NOx emissions. We confirmed that there are NOx emissions in the biogenic emissions input file so assume that those are from MEGAN. This is an issue because some of the past AQMPs have neglected biogenic NOx emissions. 52-7

Page 5-3: Draft AQMP states that *"Detailed information on the modeling approach, data retrieval, model development and interpretation of results is presented in Appendix V."* No Appendix V was included with the draft 2016 AQMP. 52-8

Page 5-3: Draft AQMP states that *"U.S. EPA guidance has recommended the use of relative reduction factors (RRFs)"* for projecting future year ozone Design Values implying that EPA's guidance was followed. However, this statement is ambiguous as EPA released guidance in 2007 (EPA, 2007) and draft guidance in December 2014 (EPA, 2014), which has not been finalized. Technically the 2007 guidance is the current guidance, although most groups are using the draft 2014 guidance. This brings up several questions/comments: 52-9

1. Which EPA guidance is the SCAQMD following in their draft 2016 AQMP (2007 or 2014)?
2. As it is, the SCAQMD has added an extra criterion in their future year ozone projection procedures that is not included in either of the EPA guidance documents so they are not exactly following EPA guidance. This extra requirement is that days used in calculating the model-derived RRFs must satisfy a model performance evaluation (MPE) criteria

[9] EPA's official version of CMAQ v5.0.2 as downloaded from the CMAS Center was used (https://www.cmascenter.org/).

that the modeled and observed MDA8 ozone on the day is within 20% of each other. Although I don't object to this MPE requirement, the draft AQMP should discuss the implications of adding this extra MPE requirement beyond EPA guidance. In general, the CMAQ model tends to be more responsive (i.e., higher ozone reductions) under higher modeled ozone concentrations and by adding this extra MPE requirement the RRFs will be based on lower modeled ozone days, which could make the modeled ozone concentration reductions less responsive and predict higher future year ozone DVs than if EPA guidance was followed exactly.

52-9 Con't

Pages 5-3 to 5-4: The draft AQMP notes that the observed maximum ozone DV in the SoCAB has been reduced at a rate of 2.3 ppb/year over the last 14-year period (2001-2014), with the current maximum 2014 ozone DV of 102 ppb being 28% above the 1997 8-hour ozone NAAQS (0.08 ppm) and 36% above the 2008 8-hour ozone NAAQS (0.075 ppm). Two comments on these statements are as follows:

1. Attainment of the 1997 8-hour ozone NAAQS occurs when the maximum ozone DV is below 85 ppb, so 84.9 ppb would attain the NAAQS. Thus, 102 ppb is 20% not 28% above the 1997 NAAQS. Similarly, attainment of the 2008 ozone NAAQS occurs when the maximum ozone DV is below 76 ppb, so 75.9 ppb is attainment, and 102 ppb is 34% not 36% above the 2008 NAAQS.
2. More importantly, the draft 2016 AQMP makes no comparisons between the 2.3 ppb/year rate of reduction of the observed ozone DV and the AQMP's CMAQ estimated 0.79 ppb/year rate of reduction out to 2023 and 0.62 ppb/year rate of reduction out to 2031. The fact that the draft 2016 AQMP understates the observed rate of ozone reduction by approximately a factor of 3 raises serious questions about the accuracy and reliability of the draft 2016 AQMP CMAQ-derived future year ozone projections and NOx carrying capacity. Those questions need to be studied and explained.

52-10

Pages 5-6 and 5-7: In Table 5-1 the number of days that the 75 ppb is exceeded on weekend versus weekdays is presented and explained as *"A strong 'weekend effect', typically experienced in urban areas, results from reduced NOx emissions on weekends leading to higher ozone and consequently more weekend days exceeding the standard."* However, no explanation is provided for what this means and why this is important to the AQMP. The observed "weekend effect" is a clear indication that the SoCAB is still currently on the VOC-limited side of the ridgeline where NOx reductions will increase ozone concentrations. As the draft 2016 AQMP is following a NOx emissions control strategy, this raises several questions:

52-11

1. What are the consequences of the NOx control in the near-term and on the path toward attainment? What if the control plan falls short of its goal (as they have in the past, for

example the 2010 1-hour ozone NAAQS attainment date); will ozone levels end up being worse than they are? More explanation on what these results mean is warranted.

2. Is the model able to reproduce the observed "weekend effect" in the CMAQ 2012 base case simulation? This is an important diagnostic evaluation component and gives an indication of whether the CMAQ 2012 modeling database is capturing some of the atmospheric chemistry features in the SoCAB.

52-11 Con't

Page 5-9: Table 5-2 in the draft 2016 AQMP presents the projected 2023 and 2031 ozone DVFs for the base and control scenario (i.e., the attainment demonstration modeling). The 2023 ozone DV results under the 2023 base and control case for the three highest ozone monitors in the SoCAB are reproduced in Table 3, along with the efficiency of ozone DV reductions in 2023 for the base and control scenario in tons per day NOx emissions reduced over ppb ozone reduced (TPD/ppb). The 2023 ozone DVs for the control scenario at these three sites are 79, 82 and 80 ppb. However, attainment of the 1997 0.08 ppm ozone NAAQS just requires that all ozone DVs be below 85 ppb, so the 2023 control plan is over-controlling NOx emissions to achieve a 2023 ozone DV level (82 ppb) that is lower than it needs to be (84.9 ppb). The last column in Table 1 shows what the ozone attainment NOx carrying capacity would be without this over-control, which increases the 2023 NOx carrying capacity from 150 TPD to 174 TPD. That is, the draft 2016 AQMP estimates that in 2023 115 TPD of NOx emissions are needed to attain the 1997 ozone NAAQS at all monitors. This calculation suggests that the necessary NOx controls for attainment can be reduced by ~20% (91 TPD reductions) and still demonstrate ozone attainment. The costs of the NOx controls are quite high, so the SCAQMD should pursue the scenario of reducing NOx emissions to the level needed to demonstrate ozone attainment without over-controlling.

52-12

In addition, we ran EPA's latest Modeled Attainment Test Software (MATS[10]) projection tool on the draft AQMP 2012 base case and the 2023 control case CMAQ output files provided by the SCAQMD and obtained projected future year 2023 DVs at all monitoring sites. We used the 7x7[11] approach as recommended in EPA's current modeling guidance (EPA, 2007. The projected 2023 ozone DV at Crestline, Fontana and Redlands (the three highest ozone sites) using the MATS 7x7 approach are in the 76-77 ppb range, which is 5 ppb lower than the maximum 82 ppb 2023 DV from the draft 2016 AQMP. This suggests that the 2023 ozone attainment could be demonstrated using an even higher 2023 NOx carrying capacity than the ~174 TPD discussed above and in Table 3 if the ozone projection approach in EPA's current modeling guidance is used.

[10] https://www3.epa.gov/ttn/scram/modelingapps_mats.htm

[11] MATS uses the maximum modeled MDA8 ozone concentrations in an array of grid cells centered on the ozone monitoring site. EPA's current guidance (EPA, 2007) recommends using a 7x7 array of 4 km grid cells, while EPA's draft guidance (EPA, 2014) recommends using a 3x3 array of grid cells.

Table 3. Observed current year (DVC) and 2023 projected future year (DVF) ozone DVs from the draft 2016 AQMP at three sites for the 2023 base (264.84 TPD NOx emissions) and 2023 control (150 TPD NOx emissions) scenarios with ozone reduction efficiency (TPD/ppb) and the revised ozone attainment carry capacity to demonstrate attainment of the 0.08 ppm 1997 ozone NAAQS.

Site Name	Site ID	Observed 2012 Ozone DVC (ppb)	2016 AQMP 2023 Base DVF (ppb)	2016 AQMP 2023 Control DVF (ppb)	Ozone Reduction Efficiency (TPD per ppb)	Revised 2023 NOx Carrying Capacity (TPD)
Crestline	60710005	103.0	95.0	79.0	7.178	192.3
Fontana	60712002	101.0	96.0	82.0	8.203	173.8
Redlands	60714003	104.7	96.0	80.0	7.178	185.2

52-12 Con't

Page 5-10: The draft 2016 AQMP states *"Appendix V also provides base year model performance statistics and grid-level CMAQ predictions for the base and future milestone years as well as weight of evidence discussion to support the modeling attainment demonstration."* Although some interim model performance evaluation (MPE) results have been presented at STMPRAG meetings, they were not final and incomplete. The draft 2016 AQMP was released without Appendix V so we have very little to no information on how well the CMAQ 2012 base case reproduced the observed ozone in 2012, which is the first step in the MPE process (i.e., the operational evaluation).

52-13

Page 5-19: The $PM_{2.5}$ attainment demonstration modeling discussion starts on page 5-19 of Chapter 5 of the draft 2016 AQMP. Again, details on the $PM_{2.5}$ attainment demonstration modeling are left to Appendix V, which is not yet available. Furthermore, when we requested the draft 2016 AQMP CMAQ modeling databases, complete inputs and outputs were only provided for the May-Sep ozone season so we cannot even try to analyze the $PM_{2.5}$ attainment demonstration modeling. Additional time should be provided to comment on the modeled attainment demonstration after the release of Appendix V and transfer of the $PM_{2.5}$ modeling database.

52-14

Page 5-28: This section discusses the potential ramifications of attaining the Oct 2015 0.070 ppm ozone NAAQS with an anticipated 2037 attainment date, 21 years from now. Over the last three AQMPS (2007, 2012 and 2023), the 2023 baseline NOx emissions have changed by almost a factor of two: 506, 319 and 263 TPD NOx, respectively. Given these uncertainties from past AQMPs in making NOx emissions projections 7-16 years in the future, making them 21 years in

52-15

the future is even more uncertain and such uncertainties and caveats need to be discussed in this section.

52-15 Con't

RECOMMENDED NEXT STEPS

The dynamic model performance evaluation of the draft 2016 AQMP 2012 CMAQ modeling database and modeled/measured ambient concentration and ratio analysis with comparison with emissions funded by the EMA is currently underway. The intent is to collaborate and share the results with the SCAQMD and others when they are available. When Appendix V of the draft 2016 AMQP is released, the scientific community should be allowed to review it and provide comments on the draft 2016 AQMP attainment demonstration modeling.

After the release of Appendix V and after the receipt of comments on the draft 2016 AQMP attainment demonstration modeling, we recommend that the SCAQMD should hold a STMPRAG meeting where the draft 2016 AQMP modeling, dynamic evaluation results, and comments can be discussed by the peer-review group in an open forum.

52-16

CLOSING

Thank you for the opportunity to provide comments on the draft 2016 AQMP modeling. The amount of work and effort put into the draft 2016 AQMP attainment demonstration modeling is quite impressive. Please feel free to contact me if you have any questions.



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Responses to Comment Letter from Ramboll Environ
(Comment Letter #52)

Response to Comment 52-1:

Please see Response to Comments 38-1 with regard to the timing of the release of the Plan, appendices, and various related documents, and the ability to review and comment on those documents with appropriate time. Specifically, Appendix V and associated modeling database were released to public in September 2016 and comments were due in November, providing more than 45 days for public review.

Response to Comment 52-2:

Comment noted.

Response to Comment 52-3:

SCAQMD hosted a Science Technology Modeling Peer Review committee (STMPR) meeting on Oct 26, 2016 to discuss the revised attainment scenarios and the approaches that Ramball-Environ/EMA suggest. The presentations and minutes describing the discussions among the committee members and public are available at
http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPR(Mod)_102616.

Response to Comment 52-4:

Photochemical reactions involved in ozone formation are complex and ozone levels exhibit a non-linear response to ozone precursor emissions. Ozone isopleths presented in the AQMP and VOC white paper present the complexity and non-linear nature clearly. Therefore, the improvement of ambient ozone concentration is not expected to follow a linear trend with time, as presented in the comment letter. For example, if the high ozone concentrations measured in 2016 are included in the graph presented in the comment letter, the rate of ozone improvement over time agrees reasonably well with the model prediction. More importantly, staff were unable to reproduce the measurement data presented in Figure 1. The design values in the figure did not match with EPA Air Quality System (AQS) data.

Secondly, the modeling attainment demonstration was conducted based on state-of-the art numerical models and U.S. EPA's newest guidance. The new RRF approach is more responsive to emission reductions than the methodology used in the 2012 AQMP. Namely, the 2016 AQMP is able to demonstrate attainment with less NOx emission reduction compared to the reductions assumed in the 2012 AQMP.

Thirdly, the dynamic evaluation needs to be performed cautiously since spatial and temporal allocations as well as speciation and reactivity change over time. The dynamic evaluation conducted by Ramboll-Environ did not include changes in spatial and temporal distribution of emissions that occurred over the years, therefore cannot be used to draw definitive conclusion on model performance.

In all, linear regression cannot be used to evaluate ozone trend or ozone prediction performance, given the non-linearity and complexity of ozone chemistry, therefore a comprehensive numerical modeling approach is used in the AQMP and the state-of-art modeling technique and EPA recommendation are employed in the AQMP analysis.

Response to Comment 52-5:

It is WRF v3.6.1. The full WRF performance evaluation is provided in Appendix V.

Response to Comment 52-6:

The CMAQ version used for 2016 AQMP included a modification in the subroutine "rdbcon.F", which reads lateral boundary values from the boundary conditions file. The original "rdbcon.F" repeatedly accesses boundary files at every chemical sync step, even though the boundary values stay constant during an hour window. The updated version reads the boundary values only once in every hour, which is the frequency interval of both the MCIP meteorological input file and the boundary conditions file. This modification reduces CPU time substantially by decreasing the input read time, while results do not change because the boundary values read by CMAQ are the same. The update was reported to Community Modeling and Analysis System (CMAS) center who is in charge of CMAQ update and maintenance.

An additional modification was included in the AERO_DATA.F subroutine to by-pass the reading of PH2O emissions. Emissions of PH2O is not included in the AQMP inventory. The default AERO6 subroutine in CMAQ requires PH2O emission, and if these species are not present in the emission files, CMAQ does not run. This subroutine was modified so that these species are no longer required to continue with the simulation.

Response to Comment 52-7:

The biogenic emissions used for 2016 AQMP contains biogenic NOx emissions.

Response to Comment 52-8:

Please see Response to Comment 52-1 regarding Appendix V.

Response to Comment 52-9:

The 2014 guidance, which the 2016 AQMP was based on, recommends use of the 20 percent performance criteria (U.S. EPA 2014, p.102). In addition, most of high ozone days are included in the top 10 RRF calculation days, therefore no significant bias is expected even with the MPE condition.

Response to Comment 52-10-1:

Comment noted and reflected in the draft final.

Response to Comment 52-10-2:

Ozone trend cannot be fit into a linear line due to its complexity and non-linear nature of photochemistry.

One should use great caution in drawing a straight line to project ozone trends, since the ozone progress slope will vary depending on the length and the timing of the period that the trend is retrieved from. For example, if ozone ambient data measured in 2016 is included in the trend analysis, the AQMP projected ozone progress agrees well with the measured progress. The linear regression is an overly simplified approach that is not recommended by EPA or science community.

In addition, staff were unable to reproduce the numbers provided in the table. EPA recommends to use 5-year weighted average design values, but the ozone concentrations in the table do not agree with EPA recommended 5-year design value.

Response to Comment 52-11:

CMAQ shows slightly better performance for weekends, while the model has reasonably good performance for both weekdays and weekends.

Ozone concentration goes up with reduced NOx emission under the presence of excessive NOx. The weekend effect – higher ozone during weekends when NOx emissions are lower than in weekdays – is still obvious in the Basin. This indicates a NOx reduction disbenefit, a condition that ozone concentrations increase as a result of reductions of NOx emissions. The progress in reducing ambient ozone concentrations may be slow until NOx levels become sufficiently low to overcome the NOx disbenefit. During the course to attainment, VOC reductions resulted from concurrent reduction from NOx strategy and limited strategic VOC strategies FUG-01 and CTS-01 are expected to minimize the inadvertent temporary ozone increase.

Response to Comment 52-12:

The attainment scenarios and NOx reductions required to meet the standards have been revised.

The District followed the 2014 U.S. EPA guidance to show attainment. The methodology in the 2014 guidance allows up to ~20 TPD more remaining NOx, depending on station, than the 1997 guidance.

Response to Comments 52-13:

Please see Response to Comment 52-8 regarding Appendix V of the 2016 AQMP.

Response to Comment 52-14:

Appendix V was released in September 2016 and its associate modeling input and output for the entire 2012 modeling year including PM2.5 were made available in August 2016.

Response to Comment 52-15:

The baseline emissions inventory changes over time. This reflects updated databases, improved methodology as well as regulations implemented after the release of prior AQMPs (in this case 2012 AQMP). The STMPR meeting was held on October 26th, per the request from Ramboll-Environ. Details of the modeling approaches and performance evaluation were discussed in the meeting (http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPR%28Mod%29_102616) and described in Appendix V.

Response to Comment 52-16:

Please see Response to Comment 52-1. Per the request, a STMPR was held on October 26, 2016.

Comment Letter from Riverside County Transportation Commission (Comment Letter #53)

RCTC
Riverside County Transportation Commission

4080 Lemon Street, 3rd Floor • Riverside, CA
Mailing Address: P. O. Box 12008 • Riverside, CA 92502-2208
(951) 787-7141 • Fax (951) 787-7920 • www.rctc.org

August 19, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: Riverside County Transportation Commission Comments on Draft 2016 AQMP

Dear Dr. Fine:

The Riverside County Transportation Commission (Commission) appreciates the opportunity to comment on the Draft 2016 Air Quality Management Plan (AQMP). The Commission is one of six county transportation commissions in the Southern California Association of Governments (SCAG) region, and administers a half-cent sales tax for transportation improvements and programs in addition to allocating federal and state transportation funds. Our program of projects consists of improvements on the multimodal system, which are consistent with the SCAG Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). Riverside County is one of the fastest growing counties in the country and improvements needed to support an integrated transportation system that can accommodate a large population and employment growth are critical to the health and well-being of Riverside County residents. Therefore, the 2016 AQMP should reflect the various needs of this diverse region in relation to jobs/housing balance and disadvantaged communities. The 2016 AQMP should also avoid a one-size fits all approach and provide as much flexibility in meeting air quality goals that are fair and equitable to all sectors. 53-1

The California Air Resources Board established the Advanced Clean Transit Regulation requiring heavy-duty vehicles to meet the 2010 heavy-duty engine emission standard. Given the high costs of electric and hydrogen fuel-cell buses this requirement will put a heavy burden on transit operators that have fully converted its fleets to Compressed Natural Gas (CNG). Efforts are underway to move towards hydrogen fuel-cell fleet conversion, but the high costs will prevent a full fleet conversion by 2023. We hope funding and/or incentives are made available to convert fleets; however, given the present limitation of funding, fleet turnover will be extremely difficult to achieve by 2023. Therefore, we suggest the Advanced Clean Transit regulation can be performance based and technology neutral. 53-2

In regards to EGM-01 – Emissions Reductions from New Development and Redevelopment, it is unclear how this measure will be implemented. There seems to be some overlap and conflict with local land use authority. Local agencies in the SCAG region implement, and are consistent with, land use strategies included in the 2016 RTP/SCS. In addition, CEQA guidelines are currently being updated to reflect SB 743 requirements, which may deem this measure duplicative or unnecessary. We recommend removal of this measure or referencing the upcoming CEQA guidance on implementing SB 743. 53-3

Incentive strategies are necessary to achieve air quality goals and objectives. However, these incentives are not well defined and the funding needed to implement the incentive strategies should be clarified as "new" funding. Current funding is scarce and at its limits, therefore, new funding must be identified to reach the $14 billion identified for implementing the incentive strategies. New funding should be sought from the federal government, or current programs that the SCAQMD administers could also be reviewed for efficiencies and possible redirection towards incentive strategies. 53-4

Any new fees or increases to fees should be fully vetted by the public before adopting and enacting such increases to ensure public/private agencies and the general public are not economically burdened or disadvantaged. 53-5

We agree with the objective to develop a strategy with fair-share emission reductions at the federal, state, and local levels. Participation at the federal level in terms of reducing emissions from federal sources has not been exercised leaving the entire region disadvantaged with the difficult task of reducing emissions from sources it has no control over. Participation and support at the federal level is critical in helping the region attain its air quality goals especially with Southern California being the major gateway for commerce and logistics warehousing for the entire country. 53-6

There are many TBD measures identified, which is confusing. We recommend clarifying the inclusion of TBD measures, explaining purpose, and separating them from the rest of the measures. 53-7

Thank you for allowing us the opportunity to comment. Please contact me at (951) 787-7141 if you have any questions.

Sincerely,

Shirley Medina
Planning and Programming Director

Responses to Comment Letter from Riverside County Transportation Commission (Comment Letter #53)

Response to Comment 53-1:

Staff appreciates the support for flexibility and recognizes that the job/housing needs vary from region to region. Much of the underlying demographic assumptions are provided by SCAG as reflected in the 2016 RTP/SCS.

Response to Comment 53-2:

Your comments will be forward to CARB. SCAQMD staff believes that funding incentives will be needed to assist transit fleets to convert over to near-zero and zero-emission bus technologies. Funding is already available to transit agencies to help fund natural gas engine repowers to ultra-low NOx engines.

Response to Comment 53-3:

Under state law, the SCAQMD is required to assess rules and regulations adopted by other air agencies to ensure that all feasible measures are provided in the AQMP. As such, staff will be taking comments on whether adoption of a rule similar to San Joaquin Rule 9510, indirect source review, which seeks to achieve emissions reductions from the construction of and use of development projects through design features and on-site measures, is appropriate for the South Coast Air Basin or whether there are other actions/mechanisms to address potential emissions associated with new or redevelopment projects. The District may not dictate what land use can occur in what area but it may impose additional requirements on a source to ensure attainment to air quality standards.

During the public rulemaking process, SCAQMD staff will evaluate whether the measure is a duplicative of the SB 743 requirements.

Response to Comment 53-4:

A draft Financial Incentive Funding Action Plan is being prepared as a companion document to the 2016 AQMP. The plan will provide an analysis of potential funding opportunities and proposed actions to be taken to secure the funding identified in the AQMP. The Financial Incentive Funding Action Plan will also provide funding levels from existing programs.

Given the significant amount of funding identified, there is a need to not only seek funding from the federal government, but also at the state and local levels.

Response to Comment 53-5:

Staff agrees that any new potential funding opportunities should be discussed in a public process.

Response to Comment 53-6:

Staff agrees that participation and support at the federal level is critical in attaining the standards. CARB's SIP Strategy includes NOx and VOC reductions from federal sources that were included in the modeling and are assisting in meeting the federal air quality standards.

Response to Comment 53-7:

Please see Response to Comment 38-5 regarding the proposed SCAQMD mobile source measures. Please see Response to Comment 7-5 regarding TBD measures.

Comment Letter from Southern California Alliance of Publicly Owned Treatment Works (Comment Letter #54)

SCAP
SOUTHERN CALIFORNIA ALLIANCE OF PUBLICLY OWNED TREATMENT WORKS

August 18, 2016

Mr. Wayne Nastri, Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Dear Mr. Nastri:

Re: Comments on the Draft 2016 Air Quality Management Plan

The Southern California Alliance of Publicly Owned Treatment Works (SCAP) appreciates this opportunity to provide comments on the Draft 2016 Air Quality Management Plan (Draft AQMP). SCAP represents 83 public agencies that provide essential water supply and wastewater treatment to nearly 19 million people in Los Angeles, Orange, San Diego, Santa Barbara, Riverside, San Bernardino and Ventura counties. SCAP's wastewater members provide environmentally sound, cost-effective management of more than two billion gallons of wastewater each day and, in the process, convert wastes into resources such as recycled water and biogas. 54-1

This transmittal is a follow-up to SCAP's June 2, 2016 letter regarding the Preliminary Draft of SCAQMD 2016 AQMP Stationary Source Measures. Our members remain concerned that some of the proposed control measures could negatively impact the beneficial use of biogas produced from municipal wastewater treatment plants and landfills. We would greatly appreciate modifications to the Draft AQMP to address our concerns pertaining to biogas as discussed below.

As stationary sources in the South Coast Air Basin, our members appreciate the challenge posed by this AQMP. SCAQMD is required to determine how to achieve clean air without the ability to control mobile or federal sources, which constitute the vast majority of the emissions to be controlled. SCAP objects to the proposed "fair share" concept where SCAQMD, CARB and EPA would each reduce emission sources under their control by 50 percent. We believe that stationary sources are already well-controlled and achieving our "fair share" is not feasible without a significant infusion of incentive funding. In the event that funding cannot be guaranteed, SCAP requests that CARB and EPA be assigned a greater share of the reductions required to achieve attainment. 54-2

The following outlines our specific comments on the draft stationary source control measures contained in Appendix IV-A:

SCAP
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CMB-01 Transition to Zero and Near-Zero Emission Technologies for Stationary Sources:
This draft control measure seeks to replace traditional combustion sources with zero and near-zero emission technologies including electrification or fuel cells. The background section for this control measure continues to emphasize that biogas from wastewater treatment plants and landfills can be processed and cleaned for the use in fuel cells or transportation fuels. While our SCAP membership embraces these goals, we would again like to respectfully remind staff that biogas cleanup is not usually cost-effective and fuel cells have consistently failed prematurely due to stack failures, which then requires flaring in order to continue providing necessary management of the biogas. At minimum, to provide a realistic characterization, these challenges should be discussed in the AQMP. Clearly, without substantial funding incentives and performance guarantees, our members will be unable to justify biogas fuel cell or transportation fuel projects. 54-3

Table 4 provides a listing of incentive effectiveness by category, where wastewater treatment plants and landfills are identified. While this table was developed to provide "*…an estimate based on the specific equipment and facilities identified*", no supporting calculations or assumptions are included. We request that the methodology used to identify these units and quantify the required monetary incentive be provided for review and comment.

While we seek SCAQMD's support in incentivizing zero and near-zero biogas technologies, we do not believe these biogas technologies are truly commercially available, reliable or cost-effective yet. Due to these inherent challenges, we again request that biogas not be specifically included in this control measure.

CMB-03 Emission Reductions from Non-Refinery Flares:
While we appreciate the acknowledgement that flares are needed for emergency or backup capacity, we are concerned that our previous comments regarding the wastewater sector inventory were not addressed. Our comments outlined that SCAQMD staff provided a detailed summer planning inventory that clarified that the wastewater sector contributes only 0.01 tons per day of NOx. Considering wastewater flares are an insignificant source of NOx and they are normally used for emergency or backup purposes, SCAP requested that the wastewater sector be excluded from this control measure. Moreover, we are troubled by the inclusion of the proposed World Bank Zero Routine Flaring initiative, which is applicable to the oil and gas industry. Such a reference should be either removed or qualified as only pertaining to the oil and gas industry. We again respectfully request that such an insignificant source, composed entirely of essential public services, be excluded from this control measure. 54-4

We are also concerned that the draft control measure discussion omits a discussion of technological and financial challenges associated with biogas pipeline injection or vehicle fuel projects. The following briefly outlines some of our concerns regarding the language contained in this draft control measure: (1) wastewater treatment plants and landfills do not extract biogas



from the ground, so reinjection is not applicable, (2) our members strive to utilize biogas as a renewable resource. Nevertheless, flaring capacity at wastewater treatment plants is needed for emergency and backup purposes. Unlike wastewater treatment plants, landfill biogas continually declines in flow and methane concentration after landfill closure. The heating value of such dilute biogas cannot support most energy production applications, so facilities will need to maintain the ability to flare. Consequently, this control measure should not suggest that flared biogas can easily be used as a renewable fuel, (3) our members have installed fuel cells with advanced biogas gas cleanup systems, but premature breakthrough has significantly impacted the viability of this technology. The discussion excludes any mention of these actual operational limitations, so we request that such limitations be included and assessed by SCAQMD staff, (4) the discussion suggests that flared biogas can be used cost-effectively as transportation fuel, but in reality such projects are not financially viable, and (5) considering most biogas flares are used for emergency and backup purposes, we have difficulty understanding SCAQMD's estimated cost-effectiveness assumptions. We would like to review and comment on SCAQMD's cost-effectiveness calculations. 54-4 Con't

We respectfully request that this control measure exclude the wastewater sector, include an updated emissions inventory for landfills and wastewater treatment plants, SCAP be provided an opportunity to review and comment on SCAQMD's cost-effectiveness calculations and include a meaningful discussion regarding the technological and financial barriers limiting our ability to pursue pipeline injection and vehicle fuel projects.

MCS-01 Improved Breakdown Procedures and Process Re-Design:

Considering no SIP-creditable reductions would be obtained, SCAP does not understand the value of this proposed control measure. We acknowledge that EPA has expressed concerns regarding Rule 430 due to Startup Shutdown Malfunction (SSM) litigation and the resulting SIP Call [Federal Register / Vol. 80, No. 113 / June 12, 2015]. However, Rule 430 has yet to be disapproved by EPA and litigation challenging the SIP Call is ongoing.

Based upon our conversations with EPA, we believe that there are various approaches to address EPA's new SSM policy. In fact, EPA's SIP Call indicates that states and local agencies are allowed to issue their own enforcement discretion criteria, but such criteria cannot be binding on the United States or any citizens group. We respectfully request that SCAQMD staff review responses from individual states, which illustrates the nebulous nature of EPA's SIP Call (see http://www.arnoldporter.com/en/perspectives/publications/2016/07/how-states-are-reacting-to-epas-caa-mandate). These responses clearly justify a need for public vetting of any change to SCAQMD's SSM policy. We again recommend that this proposed control measure be excluded from the AQMP and allow legal proceedings to conclude prior to any SCAQMD rulemaking. 54-5

BCM-10 Emission Reductions from Greenwaste Composting:

While we understand that this proposed control measure is intended to reduce VOC and NH_3 54-6

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emissions from chipping and grinding, we are concerned about specifically identifying vendors with non-commercial technology. In the past, our members have retained vendors with this type of technology, which were unable to achieve claimed emission levels in real-world practice. SCAP again requests that developing technology not be specifically discussed in the AQMP unless the actual performance can be demonstrated and validated in commercial and sector specific applications.

As described in our previous comment letter, we remain confused by the focus on food waste digestion in association with a greenwaste composting control measure. This draft control measure indicates that increased anaerobic digestion capacity *"...at Sanitation Districts could lower emissions of NH3 and VOC for certain waste streams..."* We agree that wastewater treatment plants can reduce emissions associated with food waste, but we are unaware of any technology that would allow wastewater treatment plant digesters to process greenwaste. Please revise this control measure to exclude the discussion of greenwaste digestion at wastewater treatment plants.

54-6 Con't

BCM-05 Ammonia Emission Reductions from NOx Controls:

While we appreciate staff's verbal clarification that this proposed control measure is only intended for large-scale projects, we respectfully request that this clarification be memorialized in the control measure. Moreover, to avoid potential confusion, SCAP recommended that this control measure be revised to indicate biogas and other small-scale projects would not be subject to ammonia emission reductions.

54-7

We would like to take this opportunity to thank you for meeting with our biogas coalition on August 9th. We look forward to working with you supporting for legislation and policies that provide financial incentives encouraging the use of biogas as a resource. Please do not hesitate to contact Mr. David Rothbart of the Los Angeles County Sanitation Districts, SCAP Air Quality Committee Chair, should you have any questions regarding our comments on the draft AQMP at (562) 908-4288, extension 2412.

Sincerely,

John Pastore

John Pastore, Executive Director

cc:
Dr. Philip Fine, SCAQM

Responses to Comment Letter from Southern California Alliance of Publicly Owned Treatment Works (SCAP) (Comment Letter #54)

Response to Comment 54-1:

The control measures CMB-01 and CMB-03 do not negatively impact the beneficial use of biogas, they encourage it. Under CMB-01, incentives for infrastructure and biogas cleanup would help biogas sources find beneficial uses with co-benefits for these waste streams. CMB-03 is a regulatory measure and would require emission reductions from non-refinery flares if flaring is used, but biogas operators would still be encouraged to explore beneficial uses of biogas first.

Response to Comment 54-2:

Staff appreciates the support for the incentive programs. The SCAQMD, CARB and U.S. EPA recognize the need for emission reductions from local, state and federal sources. As such, a "fair share" of reductions needs to take place. The percent emission reductions needed to meet the 8-hour ozone standards by 2023 and 2031 at 45 and 55 percent, respectively, from NOx emissions would be a guide although not a definitive endpoint. Stationary sources are already "well controlled." However, staff recognizes opportunities to transition to cleaner technologies with commercially available, cost-effective equipment. In addition, incentives could assist in accelerating deployment of advanced technologies in some cases faster than a regulatory approach. It is important to recognize the responsibility of the SCAQMD to ensure attainment of the standards in a timely manner and the District's authority over the stationary sources that could assist in meeting those required deadlines. As noted numerous times during the development of the Plan, eliminating all stationary source emissions would still not result in the standards being met, but that does not remove the responsibility of those sources, when cost-effective and feasible, to contribute to reductions.

Response to Comment 54-3:

Staff notes the challenges of transitioning to zero and near-zero technologies. The incentive measure strives to help facilities transition to zero and near-zero technologies that may not currently be the cost-effective. Incentives for infrastructure and biogas cleanup would help these sources find beneficial uses with co-benefits for these waste streams. Facilities are targeted for the long-term reduction target (2031). It is expected advancements in technology will continue and become more cost-effective once it is established. Staff also anticipates technology will evolve to address waste streams for facilities that produce low levels of biogas and market based programs like the low carbon fuel standard and renewable portfolio standard can help encourage biogas utilization. Staff has noted some of the challenges in CMB-01 such as costs for pipeline infrastructure and biogas cleanup. A working group will be formed to further discuss the challenges, including reliability, availability, and cost-effectiveness, for specific sectors on biogas. This may include a technology assessment. Biogas operators are encouraged to explore beneficial use of biogas whenever and wherever technologically feasible and cost-effective. Table 4 (formerly), currently in the Draft Final in CMB-01 as Table 5 – "Incentive Effectiveness by Category," is only a demonstration of source categories staff identified for potential emission reductions through incentive funding and costs for replacement or control equipment currently available. Upon implementation and formation of a working group, new zero and near-zero emitting technologies could be identified as well as other sources for potential NOx reductions. Staff used the permitting database and Annual Emissions Reporting (AER) database to determine specific equipment and facilities that may provide a pathway for the emission reductions using incentive funding. Staff identified all combustion source categories and the

respective emissions from the permitting and AER database to determine where emission reductions can be achieved. Staff anticipates many facilities and stakeholders will come forth and participate in the incentive program and once a working group is established it will determine the most cost-effective means for distribution of funds to achieve emission reductions.

Response to Comment 54-4:

Staff will include wastewater treatment facilities in the control measure as a possible source of emission reductions from non-refinery flares. Using the permitting and Annual Emissions Reporting (AER) system, it was determined non-refinery flares at wastewater treatment systems have low overall emissions. Once the rulemaking process begins, working group meetings will be formed to discuss the wastewater treatment facilities in detail and determine whether they should be considered an insignificant source. Staff notes the World Bank Zero Routing Flaring initiative applies to oil and gas facilities; however, it will be taken into consideration during rule development. Consideration may be made for circumstances where there is a need for an emergency or backup handling of the gas. A technology assessment may be conducted to validate the feasibility of the technology for different source categories and exemptions may be considered during the rulemaking process. Staff has included language acknowledging wastewater treatment plants may have lower waste gas streams and the options for pipeline injection may be limited. Staff has also included the emission inventory for sewage treatment, which is 0.01 tpd of NOx and is expected to remain so for 2023 and 2031. The emissions inventory will be further refined during the rulemaking process as will the cost effectiveness and technical feasibility of emission reductions from wastewater treatment facilities.

Also, please see Response to Comment 54-3 regarding challenges with biogas pipeline, reinjection, and vehicle fuels (CMB-03).

Staff acknowledges the need for emergency flaring and is not proposing a ban on flaring. Emission limits will be set on flaring. Beneficial use of biogas will be incentivized over routine flaring.

Response to Comment 54-5:

Please see Response to Comment 35-10 regarding the control measure MCS-01.

Response to Comment 54-6:

The 2016 AQMP control measure BCM-10 explores emerging technologies as a potential control method, which would be considered during the rulemaking process following a demonstration of the commercial viability and performance of this technology, as with any other emerging technology. BCM-10 proposes emission reductions from processing organic waste including foodwaste and greenwaste. While anaerobic digesters focus on foodwaste, BMP composting focuses on greenwaste.

Response to Comment 54-7:

The applicability of this control measure cannot exclude small scale projects at this point in time. Until such time where a rulemaking is conducted, a proper analysis of all sources will be able to signify which types of sources will be directly affected along with the associated emission reductions.

Comment Letter from Southern California Edison (Comment Letter #55)

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

August 19, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

RE: 2016 Air Quality Management Plan

Dear Dr. Fine:

Southern California Edison (SCE) appreciates the opportunity to comment on the South Coast Air Quality Management District's (District) proposed 2016 Air Quality Management Plan. Moving the District's air basins into attainment is a step toward improved air quality and improved economic growth by increasing the ability of businesses to operate in this region. The District's proposed Plan is an effective set of control measures that, if adopted into rules by the District and other agencies, will lead the region toward attainment with the National Ambient Air Quality Standards (NAAQS) through cleaner transportation and stationary source technologies. SCE recognizes that adopting the control measures in the AQMP is the first step in the process where the District, CARB, and other agencies will develop the control measures into proposed rules, and that the rulemaking process is where the detailed examination of issues such as cost-effectiveness, feasibility, total cost, environmental impacts and "upstream" energy sectors impacts will occur. SCE also recognizes that many control measures will not become rules but instead require the District and the stakeholder community to secure additional funding sources to enable research, development and demonstrations, as well as education programs and incentive based commercialization programs. SCE supports this overall direction and effort to bring the region into attainment with the NAAQS. 55-1

SCE recommends that the Plan specifically include a long-term, large-scale, and comprehensive role for utilities to implement the transportation-electrification provisions of Senate Bill 350 (2015). Both investor-owned utilities and publicly-owned utilities have a role in increasing transportation electrification within California. Publicly-owned utilities are currently investing in transportation electrification, and seeking new ways to be involved across all transportation segments. SB 350 directs investor-owned utilities to propose and implement programs and investments to accelerate widespread transportation electrification in order to help meet several long-term state goals and federal air-quality standards. Further, SB 350 defines transportation electrification in a very broad manner. Many of the interagency partners are and should continue to work with the Public Utilities Commission to implement SB 350 in the most effective fashion, and to extend limited state funds.

P.O. Box 800
2244 Walnut Grove Ave
Rosemead, CA 91770

To the extent utilities are providing and will provide transportation-electrification infrastructure and investments, state agencies should seek to avoid duplicating or boxing-out utility investment. The Plan should specifically call for a utility public-private partnership regarding, for example: investments in charging and propulsion infrastructure, market-education and outreach programs, incentive programs, pilot projects, and electric rates designed with transportation electrification in mind. Also, the District should work with the CPUC and the Utilities as utility applications for infrastructure projects are developed and licensed. Achieving the infrastructure needed to deploy zero-emission technologies is a significant challenge; utility participation is needed to aid both the private and public sector in deploying these technologies. 55-1 Con't

SCE also recognizes that, occasionally, past control measures have not been successfully developed into rules because of issues discovered in the rulemaking process, and that the result was other rules on different source categories or new incentive programs were developed to replace the missing reductions in air pollution. Given this challenging situation, it is in all our interests to work with the District and other agencies to determine the most cost-effective, least impact rules resulting from the control measures in this AQMP and to secure funding for cost-effective pollution reductions from incentive programs.

Comments on Specific Stationary Source Control Measures

ECC-01 Co-Benefit Emission Reductions From GHG Programs, Polices, And Incentives

The concept of taking advantage of existing efforts to reduce GHG emissions through reduced reliance on combustion technologies certainly can be used to reduce criteria pollutant emissions. But there are situations where sources with low criteria pollutant emissions can have higher GHG emissions. An example is the Mountain View Generating Station which SCE operates. Mountain View GS is one of the lowest emitting generating stations in the United States. It achieves the low emissions because of the extremely high efficiency of the combined cycle technology. But this high efficiency also results in frequent dispatch by the California Independent System Operator. So while the generating station has low emissions of criteria pollutants, it does have relatively higher GHG emissions. As the District looks to realize and document the reductions of criteria pollutants from the GHG programs, there must be the recognition of what might appear to be conflicting outcomes in some situations. 55-2

When looking across the entire electric generation sector, there has been seen a continued reduction in GHG emissions and criteria pollutants as a result of the state mandated Renewable Portfolio Standard, and the SCE Preferred Resources Pilot. Both programs look to achieve cleaner energy generation through the adoption and procurement of renewable energy. As is pointed out in your discussion of Proposed Method of Control, there will be continued expansion of regulations which will increase zero emission renewable resources.

ECC-2 Co-Benefits From Existing Residential And Commercial Building Energy Efficiency Measures 55-3

Southern California Edison, as authorized by the Public Utilities Commission, has an exsiting energy efficiency program. As noted in your description of this control measure, SB 350 require the CPUC to establish efficiency targets for the utilities. This will require regulatory action at the Commission which will allow the District the opportunity for input into that process and to work jointly with SCE and other stakeholders as the regulations are developed at the PUC. 55-3 Con't

The focus on energy efficiency measures should also be a coordinated effort where existing utility sponsored programs are jointly offered to disadvantaged communities along with any programs the District may develop. This will allow for greater outreach and for the opportunity to have community members pick a program that best suits their needs and for which they are qualified.

ECC-03 Additional Enhancements in Reducing Existing Residential Building Energy Use

Southern California Edison has experience in smart grid technology and, through our energy education programs, we have assisted customers in the selection of appropriate smart technology to reduce energy use. While costs for conversion of household energy usage through solar and storage are still expensive, use of electric water heaters as an energy storage device that can be cycled to use non-peak energy can be a very efficient first step for consumers. The major concern with this control measure is the funding for the incentives. Without the incentives, much of this proposal will be unachievable. The District will need to partner with all stakeholders to develop the strategy to obtain the needed funds. 55-4

CMB-01 Transistion To Zero And Near-Zero Technologies For Stationary Sources

This is one of the more complex and aggressive control measures with many different facets. To incorporate combined heat and power, changes in flaring technologies, process heating and steam production, along with smart grid and new storage technologies is a major undertaking. Developing rules that will satisfy the Clean Air Act Requirements just adds to the complexity. The implementation of the smart grid and storage technologies will require very close coordination with Southern California Edison at the front end of any projects associated with this control measure. 55-5

When an entity contemplates the use of additional electric generation through CHP which could feed back into the grid or the addition of possible storage technologies, there first must be an engineering analysis regarding the local electric circuits. The assertion that grid based energy storage systems can reduce the need for additional peaker generation is correct for short term energy needs. But the local circuits must be capable of handling the two way power flows for charging the battery and feeding power back into the grid. The determination of these capabilities requires complex and time consuming analysis as required by CPUC regulations. SCE can support the concepts articulated in this proposal, but we need to highlight the technical realities associated with implementation.

3

SB 350 mandates the CPUC to have regulated energy companies develop plans for increased use of renewable resources. This requirement, along with Edison's existing energy storage development programs, should provide useful information that will assist in the implementation of these concepts. But there are still regulatory actions related to SB 350 at the CPUC. The District should work closely with Edison to inform that regulatory process and ensure the final result is achievable and compliments the goals of this control measure. 55-5 Con't

CTS-01 Further Reductions From Coatings, Solvents, Adhesives, and Sealants

In the electric utility industry, there are many pieces of equipment that must be maintained on a regular basis to ensure grid reliability. This includes switching equipment, and generation equipment. In many cases the manufacturers of this equipment specify the use of denatured alcohol as the only approved cleaning solvent; the use of an unapproved solvent will void the warranty of the equipment and will possibly result in an unsafe condition if any residue remains on the equipment following cleaning or maintenance. Southern California Edison, Los Angeles Department of Water and Power and San Diego Gas and Electric have had several conversations with the Air Resources Board to raise some concerns with their Consumer Products Regulations. The ARB is working with the utilities to determine how to address the issue. 55-6

This raises concerns with any proposed changes to SCAQMD Rule 1171. SCE performs maintenance activities under the provisions of Rule 1171 (g) (4). While we do not use a large amount of the solvent, it is a necessary product for appropriate maintenance of critical electrical equipment. The District will need to work closely with the utilities and ensure that, while we focus on a shift to zero emission technology, we do not have unintended results that will affect the fuel source for that technology.

Comments on Specific Mobile Source Control Measures

MOB-05 Accelerated Penetration Of Partial Zero-Emission And Zero Emission Vehicles

Southern California Edison supports the proposals in MOB-05. Making incentives available for the purchase of zero emission electric vehicles is a timely move that will mesh nicely with the SCE Charge Ready Pilot. This pilot program is moving forward with the goal of putting in infrastructure and helping with the costs for the installation of 1500 charging stations, many in disadvantaged communities. The program can greatly increase the number of workplace charging stations that can add additional incentives for the use of electric vehicles. The development of a funding mechanism which will make the purchase of these zero emission vehicles more economical, with additional incentives for low income purchasers, compliments the Edison Charge Ready pilot. 55-7

MOB-07 Accelerated Penetration Of Partial Zero-Emission And Zero-Emission Light-Heavy Duty And Medium-Heavy Duty Vehicles

Southern California Edison supports control measure MOB 07. The emphasis on zero emission technology holds the most potential for reducing NOx emissions in the basin and it also has the advantage of proving the technology to other fleet operators. The analysis which will determine what types of trucks and engines can be used for this control measure must be a high priority. But this measure will help to move towards cleaner fleets. 55-8

MOB-09 On-Road-Mobile Source Emission Reduction Credit Generation

Southern California Edison supports control measure MOB-09. While this will have some limitations as a result of the necessary quantification protocol in Rule 1612, it still adds to the improved deployment of zero emission technology. It is one more option that either a project proponent in need of credits, or someone wishing to sell the credits might use. 55-9

MOB-11 Extended Exchange Program

Southern California Supports AQMP Control Measure MOB-011 Extended Exchange Program. The ubiquitous use of gasoline powered lawn equipment makes this control measure one that can realize efficient emission reductions particularly in areas, such as parks and recreation areas, where they are in close proximity to human activity. This control measure may offer an area for collaboration with SCE in assisting with the logistics and program publicity. 55-10

Southern California Edison appreciates the work that has been put into the AQMP and we look forward to working closely with the District during the rulemaking process.

Sincerely,

Thomas Gross

Thomas Gross

5

Responses to Comment Letter from Southern California Edison
(Comment Letter #55)

Response to Comment 55-1:

Staff appreciates the participation in the development of the 2016 AQMP and support for the overall direction of the Plan. Transportation electrification will play an important role in the future for our region and SCAQMD will certainly be interested in the impacts from the implementation of SB 350.

The commenter recommends that the 2016 AQMP "include a long-term, large-scale, and comprehensive role for utilities to implement the transportation-electrification provisions of Senate Bill 350". To develop a large-scale and comprehensive role as part of the 2016 AQMP is beyond the scope of the AQMP. However, Chapter 10 of the Draft Final 2016 AQMP includes an overall discussion of the role utilities will play in helping the region meet federal air quality standards. Several activities are proposed for the SCAQMD to engage in, including "coordinating planning, technology demonstration, and incentive program efforts"; "schedule for infrastructure and technology needs"; and "provide technical and project assistance", which staff believes will address the long-term role of the utilities will have. As part of this activity, the role utilities will have can be further defined.

Response to Comment 55-2:

Staff will be cognizant of any potential conflicting outcomes when tracking co-benefits from ECC-01 and appreciates the comment.

Response to Comment 55-3:

As the SCAQMD has done in the past, staff will work collaboratively with Southern California Edison and all stakeholders to address implementation of the incentive and co-benefit measures.

Response to Comment 55-4:

Please see Response to Comment 55-3 with regard to partnering with stakeholders. Please see Response to Comment 26-3 regarding the Financial Incentive Funding Action Plan.

Response to Comment 55-5:

Staff agrees that implementation of control measure CMB-01 will not be an easy task and there will be technical hurdles to overcome to be successful. Chapter 10 in the Revised Draft Plan now includes a statement on using electric water heaters as a form of energy storage during excess renewable generation and a grid resource when load reductions are needed. Staff appreciates the need for engineering analysis to ensure compatibility with the grid.

Response to Comment 55-6:

SCAQMD staff will work closely with stakeholders when considering VOC reductions to ensure safe and effective alternatives exist.

Response to Comment 55-7:

SCAQMD staff appreciates the comments and support for District Measure MOB-05 and looks forward to working with the commenter on expanding the infrastructure in support of the greater number of zero-emission vehicles.

Response to Comment 55-8:

SCAQMD staff appreciates the comments and support for District Measure MOB-07 and looks forward to working with the commenter on expanding the infrastructure in support of the greater number of zero-emission vehicles.

Response to Comment 55-9:

SCAQMD staff appreciates the comments and support for District Measure MOB-09 and looks forward to working with the commenter on expanding the infrastructure in support of the greater number of zero-emission vehicles.

Response to Comment 55-10:

SCAQMD staff appreciates the comments and support for District Measure MOB-11 and looks forward to working with the commenter on expanding the infrastructure in support of the greater number of zero-emission equipment.

Comment Letter from Southern California Gas Company (Comment Letter #56)

SoCalGas
A Sempra Energy utility

George L. Minter
Regional Vice President
External Affairs & Environmental Strategy
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August 19, 2016

Philip Fine, Ph.D.
Deputy Executive Officer
Planning, Rule Development & Area Sources
21865 Copley Drive
Diamond Bar, CA 91765

Submitted via OnBase Comment Form

RE: Comments on the Draft 2016 Air Quality Management Plan

Dear Dr. Fine:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide comments on the South Coast Air Quality Management District's (SCAQMD) Draft 2016 Air Quality Management Plan (AQMP). SoCalGas strongly supports SCAQMD's efforts to develop an integrated AQMP to demonstrate attainment of the ozone and fine particulate matter (PM2.5) National Ambient Air Quality Standards (NAAQS). The attainment of the Clean Air Act standards is vitally important to those communities in which SoCalGas operates and provides natural gas service.

Throughout the AQMP process we have offered our support, technical expertise, and partnership to SCAQMD on the development of control measures and inventories. Going forward, we welcome continued collaboration through participation in working groups, efforts to co-fund research and development for advanced technology solutions, and partnership on incentives programs. SoCalGas respectfully submits the following comments on the Draft 2016 AQMP. 56-1

I. A Robust Mobile Source Strategy is Key to Demonstrating Attainment

This AQMP poses unique and daunting challenges as attainment of the 1997 and 2008 8-hour ozone standards (80 parts per billion and 75 parts per billion, respectively) require a 43 percent reduction in nitrous oxides (NOx) by 2023 and a 55 percent reduction in NOx by 2031. The challenge in achieving emissions reductions on this scale in the next seven to fifteen years is compounded by the fact that SCAQMD has limited authority, if any, to control the majority of 56-2

the emission sources in the South Coast Air Basin (Basin). Mobile sources emit over 80 percent of regional NOx emissions, with heavy-duty trucks as the single largest contributor.[1]

Accordingly, SCAQMD's fair-share approach properly assigns responsibility to those sources that are the most significant contributors to NOx emissions in the Basin, and provides a clear path to attainment. SoCalGas strongly supports this approach that allocates mobile source emission reduction commitments to the California Air Resources Board (ARB) and to the U.S. Environmental Protection Agency (EPA), while still committing to a partnership with ARB and EPA to seek emissions reductions from these mobile sources locally. However, all emission reduction commitments in the AQMP (from SCAQMD, ARB, and EPA) must be supported by adequate inventory data, as well as cost-effectiveness and feasibility analyses. Anything less could result in an over-commitment by SCAQMD, ARB, and/or EPA to emissions reductions, which will then have to be reconciled from the already heavily regulated stationary source sector. 56-2 Con't

Near-Zero Emission Trucks Are Necessary to Reach Air Quality Goals. SCAQMD and ARB are aligned in their recognition that dramatic reductions in NOx emissions from heavy-duty trucks must be achieved by 2023. To do so, California needs an accelerated transition to near-zero heavy-duty trucks for those trucks based in California, and a complimentary new federal heavy-duty truck emission standard to address trucks that operate in the state but are not registered here. As ARB's Mobile Source Strategy notes, "[a]bout 60 percent of total heavy-duty truck [vehicle miles traveled] in the South Coast on any given day is accrued by trucks purchased outside of California, and are exempt from California standards."[2] SoCalGas is supportive of ARB's proposed federal low NOx standard and submitted letters supporting both SCAQMD's and San Joaquin Valley Air Pollution Control District's (SJVAPCD) Petitions to EPA requesting such a standard.[3] 56-3

As SCAQMD well knows, in 2015, Cummins Westport Inc. certified the world's first heavy-duty engine at near-zero emission levels – 90 percent below the existing federal NOx standard, and certified to meet ARB's lowest-tier optional near-zero emission standard (0.02 g/bhp-hr NOx), while also reducing greenhouse gases (GHGs) by 15 percent. This "next generation" heavy-duty natural gas engine is now commercially available for transit bus, refuse, school bus, and medium-duty truck applications. And, the commercialization of additional near-

[1] The top six NOx emissions source categories are: heavy-duty trucks (45 tons per day NOx), off-road mobile equipment (43 tons per day NOx), ships and commercial boats (34 tons per day NOx), locomotives (23 tons per day NOx), cars and light duty vehicles (22 tons per day NOx), and aircraft (16 tons per day NOx). Draft 2016 AQMP, Chapter 4, p. 4-7.

[2] ARB, "Mobile Source Strategy," p. 46 (May 2016), *available at*: http://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf.

[3] South Coast Air Quality Management District, "Petition to EPA for Rulemaking to Adopt Ultra-Low NOx Exhaust Emission Standards for On-Road Heavy-Duty Trucks and Engines," (June 3, 2016), *available at*: http://www.aqmd.gov/docs/default-source/default-document-library/news-docs/nox-petition-to-epa-june-2016.pdf?Status=Temp&sfvrsn=2; San Joaquin Valley Air Pollution Control District, "Petition Requesting that EPA Adopt New National Standards for On-Road Heavy-Duty Trucks and Locomotives Under Federal Jurisdiction" (June 22, 2016), *available at*: http://www.valleyair.org/recent_news/Media_releases/2016/PR-District-Petitions-Federal-Government-06-22-16.pdf. SoCalGas' Letters of Support are included as Attachments A and B.

zero emission heavy-duty natural gas engines are expected to follow by 2018, addressing a wider array of medium- and heavy-duty on-road applications.

56-3 Con't

The technology to achieve the massive and necessary NOx emissions reductions is at our fingertips. This is truly the case in the heavy-duty trucking sector. SoCalGas strongly supports SCAQMD's efforts to accelerate the deployment and market penetration of these vehicles through incentive programs.

II. Stationary Sources Have Substantially Reduced Their Emissions, But Require Incentives to Spur Advanced Technology Solutions

While the vast majority of the emissions reductions needed for attainment must come from mobile sources, reductions from stationary point and area sources within the Basin are a necessary corollary. SoCalGas is committed to help facilitate the development, commercialization, and deployment of near-zero emission equipment that is cost-effective and technologically feasible.

Industrial Modernization Requires Accurate Inventories and Facility-Specific Solutions. After decades of regulation and ratcheting down emissions limits, the major stationary sources simply cannot achieve the scale of emissions reductions needed for attainment with currently available cost-effective technologies. The industrial modernization measure (CMB-01) proposes incentive programs to spur the replacement of combustion equipment (e.g. boilers, turbines, and engines) at facilities as well as identifying the 66 largest, non-RECLAIM NOx emitting facilities as candidates for incentives and modernization protocols.[4] The breadth of this control measure is quite large, and an accurate emissions inventory is a critical first step to ensure the success of programs derived from the measure (see Attachment I for more detailed comments). However, with work on inventories and refinement of strategy, SoCalGas believes that the incentives contemplated in this measure could successfully encourage more rapid turnover of antiquated equipment, and the use of advanced, near-zero emission control technology that is not yet cost-effective.

56-4

Controlling Small, Area Sources Can Be Costly and Difficult to Implement. The majority of the other stationary source control measures focus on smaller emissions sources scattered throughout the Basin. For example, the measures addressing emissions from space and water heating equipment (CMB-02) as well as cooking equipment (CMB-04) reach beyond commercial facilities and into the home. These measures deserve special scrutiny if for no other reason than the fact that CMB-04 has the highest Amortized Annual Average cost, and CMB-02 has the third highest Amortized Annual Average cost.[5] The measures propose a mix of incentives-based and traditional command and control approaches and seek a combined three tons per day of NOx reductions from thousands of area sources by 2023. The emission limits and technological advancements contemplated by these measures may not be market ready for

56-5

[4] Appendix IV-A, p. IV-A-51.

[5] Preliminary Cost Summary Handout, Agenda Item 2, SCAQMD Scientific, Technical & Modeling Peer Review Advisory Group (July 28, 2016), *available at*: http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPRSocio_072816.

several years. SoCalGas has been actively engaged with SCAQMD on these measures and while we reiterate our support for near-zero, cost-effective and feasible technological solutions, we also emphasize the importance of pursuing the deployment of high efficiency equipment and energy conservation initiatives, particularly in the residential sector. 56-5 Con't

Energy Efficiency Should Build on Past Successes. With regard to the AQMP measures specifically addressing energy efficiency, SoCalGas encourages the use of incentives for equipment upgrades, comprehensive conservation and performance assessments, and weatherization services. The proposed control measure addressing residential building energy use (EUC-03) has the second highest Amortized Annual Average cost.[6] We offer our support to SCAQMD so as to maximize and leverage existing energy efficiency programs. And, when developing energy efficiency initiatives, we emphasize the importance of flexible strategies, not singularly focused approaches (e.g. merely weatherization), and offering a range of fuel neutral solutions to optimize savings. 56-6

Renewable Natural Gas Use Can Reduce NOx, As Well As GHG Emissions. Additionally, SoCalGas has been enthusiastically engaged in conversations with SCAQMD staff about the further development of control measures that focus on the beneficial use of biogas to achieve NOx reductions from flares and other combustion sources. We offer our strong support for a control measure that delineates a pathway for conditioning and utilizing waste gas as a transportation fuel or for pipeline injection. By developing such a measure, SCAQMD has a unique opportunity to promote emissions reductions from both stationary and mobile sources. Pipeline injection is a win-win scenario as it not only diverts gas from being combusted in a flare, but also decarbonizes the natural gas supply. Then, when the biogas is utilized as renewable natural gas (RNG), the lowest carbon intensity transportation fuel, in an ultra-low NOx engine, we can achieve significant criteria pollutant as well as GHG reductions. 56-7

The Renewable Transportation Fuel Industry Must Grow Quickly, Aided By Fuel Neutral Policies. SoCalGas also notes that ARB has a proposed "Low-Emission Diesel Requirement" in the Mobile Source Strategy that intersects with SCAQMD's proposed biogas control measure and incentive programs for near-zero heavy-duty trucks. The objective of ARB's measure is to replace 50 percent of diesel demand with low emission diesel by 2031, thereby establishing a state policy that could significantly bias the growth of the biofuels industry and limit innovation in the alternative fuels markets.[7] As we all know, this industry needs support to grow, especially to reach production levels anticipated in these plans for both renewable diesel and RNG. Because there is a finite amount of investment funding available, it is critical to consider the implications of these policies on the growth and innovation of the nascent biofuels industry. We seek clarification on the role of biogas and renewable diesel within the appropriate transportation markets. To inform a policy assessment on the growth of the renewable fuels industry, we urge SCAQMD and policymakers to examine the respective 56-8

[6] *Id.*

[7] "Mobile Source Strategy," California Air Resources Board (May 2016), p. 153, *available at*: http://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf.

renewable biofuels technologies, costs, energy consumption, feedstock impacts, and near- and long-term environmental benefits. 56-8 Con't

III. Identifying Revenue Sources for Incentive Funding is Critical to the Success of the Attainment Strategy

SCAQMD has made it clear that traditional command and control regulations simply cannot achieve the emissions reductions necessary to attain the federal ozone and particulate matter standards by the legally mandated attainment dates. Historical heavy-duty vehicle turnover rates must be accelerated, and advanced emission control equipment, which is not yet cost-effective, must be deployed to achieve the scale of emissions reductions required by 2023. SoCalGas agrees that an incentive-based approach is the only way to obtain the necessary emissions reductions in the timeframe required without putting a significant and disproportionate economic burden on residential, commercial, and industrial sources in the Basin. Without incentives to defer the costs of advanced technology when equipment is replaced, the cost-effective control technology options available to replace older equipment will likely not result in sufficient emissions reductions by 2023. Thus, SCAQMD is appropriately looking beyond traditional regulatory approaches to demonstrate attainment. 56-9

The incentives plan delineated in this AQMP comes with a price-tag of one billion dollars per year for 15 years. SoCalGas acknowledges that securing funding at that level will be no small feat. And, incentives that benefit all residents of the Basin should be funded by all citizens. To that end, we offer our support for SCAQMD's efforts to identify incentive dollars at the federal, state, and local levels to address the Basin's unique air quality challenge and look forward to Staff's development of a more specific funding framework. SoCalGas recognizes that it is incumbent upon industry to step up to help identify revenue sources, facilitate equipment turnover, maximize efficiencies, and support the development of the next generation of advanced technology solutions.

The AQMP Incentive Program Should Encourage Local Manufacture of Low Emission Equipment. SCAQMD and the State of California are national and global leaders in trying to develop an economy that will continue to provide an attractive standard of living, while reducing the pollution and associated health impacts upon our residents. Incentives are needed to do this. And, these incentive programs can be structured to attract new, clean manufacturing and new jobs to our area. We encourage SCAQMD, ARB, and EPA to broaden their efforts to seek new funding and leverage these financial incentives to develop clean industries for our region. 56-10

IV. Comments on Individual Control Measures

Our comments, presented in the following attachments, are organized by control measure and AQMP chapter. To facilitate further discussion and mutually beneficial coordination, we have included a SoCalGas subject matter expert's name and email address for each of the individual comments. Please do not hesitate to also reach out to Noel Muyco, Environmental Affairs Program Manager, at (213) 215-3397 or NMuyco@semprautilities.com, with any questions.

Comments are provided on the following control measures and AQMP chapters:

Appendix	Control Measure / Chapter	SoCalGas Contact
1	CMB-01: Transition to Zero & Near-Zero Emission Technologies for Stationary Sources	Daniel McGivney DMcGivney@semprautilities.com
2	CMB-02: Emission Reductions From Commercial And Residential Space And Water Heating	Steve Simons SSimons@semprautilities.com
3	CMB-03: Emission Reductions From Non-Refinery Flares	Daniel McGivney DMcGivney@semprautilities.com
4	CMB-04: Emission Reductions From Restaurant Burners and Residential Cooking	Steve Simons SSimons@semprautilities.com
5	FUG-01: Improved Leak Detection and Repair	Charles Humphrey CHumphrey@semprautilities.com
6	BCM-01: Further Emission Reductions from Commercial Cooking	Steve Simons SSimons@semprautilities.com
7	MOD-7: Accelerated Penetration of Partial Zero-Emission and Zero-Emission of Light-Heavy and Medium-Heavy-Duty Vehicles MOB-8: Accelerated Retirement of Older On-Road Heavy-Duty Vehicles	Jerilyn Mendoza JMendoza5@semprautilities.com
8	Chapter 10: Climate and Energy	Geoff Danker GDanker@semprautilities.com

Respectfully submitted,

George I. Minter
Regional Vice President, External Affairs & Environmental Strategy

SoCalGas Comments on the Draft 2016 AQMP

Appendix 1

CMB-01: Transition to Zero & Near-Zero Emission Technologies for Stationary Sources

I. Summary of the Control Measure

This measure seeks NOx and VOC emissions reductions from replacement of traditional combustion sources, including internal combustion engines (stationary and emergency), turbines, boilers, furnaces, ovens, and flares with zero and near-zero emission technologies. Replacement technologies are identified as including fuel cells, electrification, beneficial use of waste gas, energy storage, as well as maximizing existing energy efficiency measures.

II. Proposed Method of Control

Two pathways for emission reductions are contemplated:

(1) Implementation Schedule for Zero and Near-Zero Emission Technologies.

SCAQMD will develop and adopt an implementation schedule for non-power plant combustion sources that generate power for electricity either through distributed generation, facility power, process heating, and/or steam generation. Equipment such as engines, turbines, and boilers will be identified based on age in an "implementation schedule." Incentives will be provided to allow early retirement and advanced replacement with zero and near-zero emission technologies.

(2) Incentivizing Facility Modernization.

SCAQMD will incentivize emission reductions from various stationary and area sources through Voluntary Incentive Programs (VIPs). Facilities would qualify for incentive funding if they install zero or near-zero equipment or accept permit conditions resulting in cost-effective emissions reductions that are beyond existing requirements. Landfills and municipal solid waste facilities are examples of facilities where such modernization could occur.

56-11

III. Comments

A. Distinguishing Between the Methods of Control

SoCalGas supports the incentives-based approach as the most efficient, cost-effective method to spur equipment turnover and facility modernization. However, we are not clear on the distinction between the Zero and Near-Zero Technologies Implementation Schedule and the Facility Modernization methods of control.

Is it SCAQMD's intent that an Implementation Schedule be developed as a first step towards incentivizing early retirement and advanced replacement of equipment? Would the equipment identified in the Implementation Schedule be eligible for incentives by equipment type? Or would incentives be limited to the VIPs identified for facilities subject to the Facility Modernization pathway? Both pathways appear to use equipment age as a trigger for targeting equipment and sources for replacement or modification, and both discuss the use of incentives. We would appreciate clarity on how SCAQMD intends to prioritize categories of equipment and facilities targeted by this control measure.

As noted in our earlier comment letter (May 20, 2016), SoCalGas recommends that the development of any Implementation Schedule or VIP should consider "an additional filtering analysis that considers feasibility and cost-effectiveness before committing to an across-the-board percentage reduction." These are important criteria needed for development and implementation of any SIP-creditable mechanism.

B. Emissions Inventories

We commend SCAQMD for revising the top-down approach initially included in this draft control measure and constructing a bottom-up emissions inventory of non-RECLAIM, combustion sources in the Annual Emission Reporting (AER) program. Working from actual inventory profiles provides an important starting point for identifying feasible, cost-effective emissions reductions.

However, SoCalGas is troubled by the large inventory numbers included in this measure. Based on information provided in Table 1, there are 12,928 Stationary Internal Combustion Engines (ICEs) emitting 22.5 tons per day of NOx in the South Coast Air Basin.[1] Over 9,000 of those ICEs were permitted on or before 2010, emit 11 tons per day of NOx, and are identified as eligible for VIPs.[2] Additionally, Table 1 identifies boilers as an equipment category that emits 8.3 tons per day of NOx. And, all of the equipment categories in Table 1 total out to 38 tons per day of NOx. But, the CMB-01 Control Measure Summary states that the entire Summer Planning NOx Inventory in 2012 for all non-RECLAIM combustion sources included in this measure is 22.3 tons per day of NOx.[3] This is far less than the tonnage included in Table 1. Moreover, the total fuel combustion in the 2012 Summer Planning Emissions inventory listed in Appendix 3 is 29.18 tons per day of NOx.[4] These inventory numbers are inconsistent and point to the fact that the AER-derived data appears to overstate emissions.

56-11 Con't

C. Emission Reductions Solutions Should Be Technology Neutral

Opportunities to reduce emissions should be analyzed on a technology neutral basis. For example, advancements in engine control technology could reduce emissions well below current standards. While combined heat and power (CHP) applications were mentioned in previous drafts of this measure, the current draft appears to choose fuel cells and battery storage as winning technologies.

SoCalGas strongly recommends that energy efficiency improvements and increased deployment of CHP and micro-CHP be considered as part of the suite of technology solutions. Conventional generation technologies (e.g. engines, turbines, micro-turbines) that are configured for CHP feature the exact same benefits being attributed to fuel cells. Additionally, CHP offers numerous other advantages including higher overall energy efficiency metrics due to increased waste heat utilization from higher quality waste heat, higher reliability and durability, and vastly lower fixed and variable costs. The U.S. Environmental Protection Agency (EPA) recognizes that CHP systems generally have a system efficiency greater than 60 percent, and can be as high

[1] Table 1 - NOx Combustion Sources, Draft 2016 AQMP Appendix IV-A, p. IV-A-50.
[2] Table 2 – Breakdown of ICEs, Draft 2016 AQMP Appendix IV-A, p. IV-A-50.
[3] Control Measure Summary, Draft 2016 AQMP Appendix IV-A, p. IV-A-42.
[4] Attachment B – 2012 Summer Planning Emissions by Source Category in South Coast Air Basin (Tons/Day), Draft 2016 AQMP Appendix 3.

as 90 percent.[5] Further, CHP systems provide a unique capability to produce high pressure steam (in excess of 320 degrees Fahrenheit) that is necessary for many industrial applications (whereas the current fuel cell technologies have waste streams achieving a maximum of 250 degrees Fahrenheit). Thus, the environmental, economic, and operational benefits of current CHP technology should be considered.

Although we continue to discourage mandating a specific technological pathway, as discussed in our prior comment letter (May 20, 2016), SoCalGas supports incentivizing fuel cells as advanced technology solutions. Fuel cells may emit less on a megawatt-hour basis than a CHP system and, at first glance, may appear to be less costly to operate. But, when boiler fuel costs are taken into account, they are actually more expensive. While natural gas prices fluctuate, at a fully bundled price of $0.50/therm (commodity plus transportation), fuel cells can cost an additional $1.50/hr to $7.50/hr to operate compared to a natural gas engine. This would be in addition to the $7,000/kW price a customer would have to pay for a new system. Incentives could help overcome these cost barriers.

Additionally, while replacing CHP with fuel cells may cost a customer additional money, new fuel cells and CHP projects will provide a customer savings on their utility bills all while emitting no more than 0.07lbs NOx/MWh. This would provide a cost-effective solution, while lowering NOx emissions from the grid.[6]

Further, providing incentives for fuel cells and new CHP systems will create a more robust marketplace. Currently, there are several examples of ultra-clean CHP and fuel cells ready for commercial application. SCAQMD has permitted ICEs that meet the rigorous Rule 1110.2 electric generation emissions standard, and there are at least two ultra-clean, commercially available ICE systems for CHP applications (e.g. Tecogen and Jenbacher). There are also three fuel cell manufacturers that have several installations in Southern California: Bloom, Fuel Cell Energy, and Doosan (previously United Technology).

56-11 Con't

With regard to the discussion about energy storage, SCAQMD seems to assume that energy storage systems will be charged by renewable energy generation when available. However, there is currently no requirement that energy storage be used in this manner and we caution against making that emissions assumption. In actual practice, energy storage systems are frequently charged at a time when renewable generators are not producing power, which means that the storage system is charging from the grid and NOx emissions are simply being shifted to electric generating units. California's Self Generation Incentive Program (SGIP) data shows that in Southern California Edison and SoCalGas territory, out of 98 non-residential, Advanced Energy Storage systems installed, only three have been paired with a renewable resource. In addition, less than 25 percent of over 500 pending projects are projected to be attached to a renewable resource.[7]

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[5] "CHP Benefits," U.S. Environmental Protection Agency, *available at*: https://www.epa.gov/chp/chp-benefits.
[6] Southern California Edison's utility owned generation had a NOx emission factor of 0.1 lbs/MWh in 2014. *See* "Corporate Responsibility Report," Southern California Edison (2014), p. 52. *available at:* https://www.sce.com/wps/wcm/connect/c0fceef5-e04a-4287-8301-8e66e3e5fbac/2014_Corporate+Responsibility+Report_FINAL+single-page.pdf?MOD=AJPERES&ContentCache=NONE.
[7] "SGIP Weekly Projects & Budget Reports," Self-Generation Incentive Program, California Public Utilities Commission, *available at*: http://www.cpuc.ca.gov/sgip/.

D. Incentive Programs

In order to bring fuel cells and other emerging technology to market, incentives that provide actual dollars towards capital costs would be most beneficial. Additionally, we encourage SCAQMD to consider including equipment retrofits as part of its incentives program. Retrofits of existing equipment could avoid stranded investment and provide cost-effective, feasible, emission reduction solutions. This measure carries an incentives price tag of $450 million, and SoCalGas supports the development of VIPs that are SIP-creditable and meet the quantifiable, surplus, enforceable, and permanent criteria.[8] We also support SCAQMD's efforts to explore additional solutions for incentives, including reduced permitting fees, New Source Review and Emission Reduction Credit Incentives, as well as expedited California Environmental Quality Act review and other concepts.

56-11 Con't

[8] However, we note here that based on the "Preliminary Cost Summary of Draft 1016 AQMP Control Measures" provided at the Scientific, Technical and Modeling Peer Review Advisory Group Meeting on July 28, 2016, the VIP cost of CMB-01 is listed at $337.3 million. Has SCAQMD reconsidered the level of incentive funding available for this measure? What accounts for the more than $100 million fluctuation? *See* "Preliminary Cost Summary of Draft 1016 AQMP Control Measures," Agenda Item 2, SCAQMD Scientific, Technical & Modeling Peer Review Advisory Group (July 28, 2016), *available at*: http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPRSocio_072816.

SoCalGas Comments on the Draft 2016 AQMP

Appendix 2

CMB-02: Emission Reductions from Commercial and Residential Space and Water Heating

I. Summary of the Control Measure

This measure seeks NOx emissions reductions from unregulated commercial space heating furnaces and reductions from incentive programs to replace older boilers, water heaters, space heating furnaces, and pool heaters with new low emission and more efficient units.

II. Proposed Method of Control

This measure includes a mix of regulatory and incentive-based methods of control. SCAQMD is proposing to continue to implement the existing Rule 1111 emission limit of NOx for residential space-heaters and to consider adopting a similar rule to regulate commercial heating units. Another component of this measure may be to require residential water heaters to meet the heat input based emission limits in Rules 1121 and 1146.2 to ensure that energy efficiency incentive programs for these residential appliances achieve NOx emission reductions. Additionally, this measure proposes to incentivize the voluntary replacement of older boilers, water heaters, space heaters, and pool heaters with currently available low NOx technologies.

III. Comments

A. Proposed Regulatory Measures

SoCalGas supports the development and deployment of low NOx residential and commercial space heaters, and residential water heaters. However, we urge caution when pursuing new commercial space heating emissions limits based on the existing Rule 1111 NOx emissions limits. Though the Rule 1111 NOx emissions limit (14 ng/J (20ppm)) for residential space heaters went into effect in 2015, manufacturers have yet to bring a product to market. Citing reliability, durability, and serious safety concerns, the Air-Conditioning, Heating, and Refrigeration Institute and furnace manufacturers have asked for reconsideration and leniency from the Rule 1111 limits and mitigation fee program. SoCalGas strongly recommends that SCAQMD work closely with industry to resolve these design and safety issues before proposing similar mandatory emission limits on commercial-size space heating equipment. To that end, we would welcome the opportunity to partner with SCAQMD to provide funding support for the research, development, and longer-term field demonstration of viable, low NOx space heating products. 56-12

Further, SoCalGas cautions that, before eliminating the heat output based emission limits for water and space heating equipment, SCAQMD should consult with manufacturers to gain a better understanding of the costs for equipment redesign and safety recertification. Such a change in regulatory direction could impose a significant burden on manufacturers who have been subject to constantly changing emissions limits.

B. Incentives Programs

SoCalGas supports the development of an incentive program that is designed to take advantage of existing energy efficiency programs targeting higher efficiency water and condensing gas space-heating products. Any incentive program developed by SCAQMD should

provide funding for both high efficiency, low emission gas and solar technologies and should be fuel neutral without emphasizing electric alternatives over gas options. We are committed to introducing new, low NOx water and space heaters into the marketplace and would offer our assistance to SCAQMD on how to best use incentive funding to augment existing energy efficiency programs. We also would welcome partnerships to create new programs to incentivize the replacement of older, higher-emitting units.

56-12 Con't

SoCalGas Comments on the Draft 2016 AQMP

Appendix 3

CMB-03: Emission Reductions from Non-Refinery Flares

I. Summary of the Control Measure

This proposed control measure seeks reductions of NOx and VOC from gas handling at non-refinery sources including organic liquid loading stations, tank farms, oil and gas production facilities, landfills, and wastewater treatment facilities.

II. Proposed Method of Control

CMB-03 consists of two levels of control: 1) beneficial use of waste gas that would typically be flared by directing it to equipment that can convert or clean the gas into an acceptable renewable energy source; 2) the installation of new low NOx flares implementing Best Available Control Technology (BACT).

III. Comments

A. Beneficial Use of Waste Gas Provides a Pathway to Reduce Both Stationary and Mobile Source Emissions

SoCalGas strongly supports SCAQMD's proposal to develop a pathway for the beneficial use of waste gas. By diverting biogas from flares, and then conditioning and utilizing the waste gas as a transportation fuel or injecting into a natural gas pipeline, SCAQMD has a unique opportunity to reduce emissions from both stationary and mobile sources. Pipeline injection is a win-win scenario as it both minimizes combustion emissions and decarbonizes the natural gas supply, thereby realizing greenhouse gas (GHG) reduction co-benefits and contributing to the Low Carbon Fuel Standard (LCFS) and Renewable Fuel Standard (RFS) goals. 56-13

Currently, the allowable emission rate from biogas engine-driven electrical generation is much higher than the allowable rate from power plants and other engines, especially new engine-driven electric generation.[1] Rather than being disposed via combustion, this waste gas would be much better utilized in the transportation sector as a source of Renewable Natural Gas (RNG). As SCAQMD is well-aware, in 2015, Cummins Westport Inc. certified the world's first heavy-duty engine at near-zero emission levels – 90 percent below the existing federal standard, and certified to meet ARB's lowest-tier optional low-NOx emission standard at 0.02 g/bhp-hr NOx. The tailpipe emissions of heavy-duty vehicles running on these engines are as low as emissions associated with generating the electricity used to charge heavy-duty battery-electric vehicles (BEVs) with a state of the art generation plant. And, when fueled with RNG, the lowest carbon

[1] Current (and future) allowable emission rates for biogas fueled engine-driven electrical generation in the South Coast Air Basin can be found in SCAQMD Rule 1110.2(d)(1)(C). Currently, most biogas engines must meet 36 ppmvd NOx and 40 (landfill gas) or 250 (digester gas) ppmvd VOCs. On January 1, 2017, the emission limits for all biogas engines become 11 ppmvd NOx and 30 ppmvd VOC. Existing engine systems already must meet the 2017 biogas emission standards and new engine-driven electric generation must meet much more stringent emission limits. *See* SCAQMD Rule 1110.2(d)(1)(L).

intensity transportation fuel, near-zero emission natural gas trucks can provide a pathway to meet both the federal ozone standard and the State's climate change goals.[2]

ARB is currently requiring RNG use for all near-zero emission natural gas trucks under the incentive programs being proposed, a commendable and attainable goal under today's market conditions, and consistent with the integrated planning approach for GHG and criteria pollutant reductions. Because of the linkage created by these interconnected State and local incentive programs (i.e. near-zero emission natural gas trucks receiving incentives must use RNG), there will be significantly more demand for RNG production. The approach proposed in this control measure will directly support the State's other objectives, while identifying another NOx reduction benefit associated with the use of biogas or RNG. Further, this control measure has the potential to complement SCAQMD's "Petition to EPA for Rulemaking to Adopt Ultra-Low NOx Exhaust Emission Standards for On-Road Heavy-Duty Trucks and Engines" and would provide a clear pathway to support the development of the RNG market for use in low NOx heavy-duty trucks throughout the South Coast Air Basin.

56-13 Con't

B. Further Information is Needed to Accurately Represent Control Costs

The draft proposed control measure currently approximates a control cost of $20,000 per ton of NOx reduced. SoCalGas is concerned that this does not adequately account for the costs of pipeline interconnects. In order for this technology to be successfully demonstrated and deployed, we encourage SCAQMD to consider incentivizing facility upgrades to allow the waste water treatment and landfill industries to overcome cost barriers currently inhibiting pipeline interconnects. To that end, SoCalGas looks forward to continued discussions and participation in a working group to further explore biogas opportunities.

[2] RNG-fueled near-zero emissions heavy-duty engines provide 80 percent or greater significant GHG emissions reductions. "Game Changer Technical White Paper: Next Generation Heavy-Duty Natural Gas Engines Fueled by Renewable Natural Gas" (May 3, 2016), Figure 4, *available at:* http://ngvgamechanger.com/pdfs/GameChanger_FullReport.pdf.

SoCalGas Comments on the Draft 2016 AQMP

Appendix 4

CMB-04: Emission Reductions from Restaurant Burners and Residential Cooking

I. Summary of the Control Measure

This measure seeks NOx emissions reductions from residences, retail restaurants, and quick service restaurants utilizing commercial cooking ovens, ranges, fryers, and charbroilers through the development, installation, and use of low NOx burner technologies.

II. Proposed Method of Control

SCAQMD proposes to achieve a 50 percent reduction in NOx emissions by 2031 from residential and commercial cooking operations through existing energy efficiency programs, new incentives programs, and potential regulatory approaches.

III. Comments

SoCalGas appreciates the opportunity to partner with the SCAQMD to promote the development, commercialization, and installation of high-efficiency, low-emissions gas-fired cooking equipment. We have committed to co-fund a study profiling the NOx emissions of various types of cooking equipment so as to provide an informed pathway for identifying and targeting the highest-emitting equipment that will be the most cost-effective and feasible to replace. An accurate equipment emissions inventory is a critical first step for this control measure.

56-14

While we are supportive of a pragmatic, incentives-based approach to achieve emissions reductions in the cooking sector, we caution that there will be significant hurdles to overcome. Residential and commercial cooking equipment (other than certain types of charbroilers) have never been regulated – neither in the South Coast Air Basin, nor in any other jurisdiction. There are numerous challenges to reducing NOx emissions from cooking equipment and we encourage the SCAQMD to work closely with the North American Association of Food Equipment Manufacturers, equipment manufacturers, and the commercial food service industry.

Redesigning cooking equipment will be a significant undertaking for manufacturers as this control measure could potentially impact many models and types of highly specialized cooking equipment with unique applications, processes, and product requirements. Manufacturers have limited resources to redesign different types of equipment for a myriad of uses. And, there is currently no known technical burner solution to reduce NOx from residential or commercial ranges. Developing more efficient burners that combust less fuel, with correspondingly lower NOx emissions should be also considered. SoCalGas recommends that incentive programs and potential future regulations should focus on equipment with the highest NOx reduction potential from point of sale to provide business certainty and direction so that manufacturers can invest their limited resources effectively.

Moreover, targeting residential cooking equipment is likely not cost-effective. This equipment is very low-use, with an hour or less of active burner use per day.[1] Further, many of

[1] Only seven percent of residential fuel use is for cooking (about 31 therms per year or about 0.086 therms per day – 8,630 Btu per day). Range tops commonly have multiple burners with varying inputs. Small burners for simmer-type cooking are rated at around 5,000 Btu per hr, standard burners are rated at about 9,000 to 12,000 Btu per hr, and

SoCalGas' residential customers are economically challenged and would likely not be able to afford increased equipment costs without significant financial assistance. Alternatively, initiatives to encourage home energy conservation could effectively reduce residential cooking emissions.

We are also concerned that, per SCAQMD's "Preliminary Cost Summary of Draft 2016 Control Measures," this measure has the highest Annual Amortized Average cost ($118.9 milion) of all of the stationary source measures. Based on the table provided at the Scientific, Technical and Modeling Peer Review Advisory Group Meeting on July 28, 2016, nearly 80 percent of the costs associated with CMB-04 are attributed to compliance costs, not incentive costs.[2] This directly conflicts with Staff's statements that the control strategy will focus on incentive programs, not command and control regulations. SoCalGas strongly encourages SCAQMD to reconsider shifting the allocation of costs towards incentives for this measure.

Prelimnary Cost Summary of Draft 2016 AQMP Control Measures

	Present Value of Compliance Cost (2017) $MM		Present Value of Incentives (2017) $MM		Present Worth Value (2017) $MM	Amortized Annual Average (2017-2031) $MM
SCAQMD Stationary Source Measures						
BCM-01 (Commercial Cooking)	$163.0	+	$0.0	=	$163.0	$17.0
BCM-10 (Greenwaste Composting)	$18.4	+	$0.0	=	$18.4	$1.7
CMB-03 (Non-Refinery Flares)	$36.3	+	$0.0	=	$36.2	$2.2
CMB-02 (Space and Water Heating)	$1,891.4	+	$327.7	=	$2,219.1	$99.0
CMB-04 (Restaurant Burners and Residential Cooking)	$1,552.7	+	$388.2	=	$1,940.9	$118.9
CTS-01 (Coatings, Solvents, Adhesives, and Lubricants)	$59.0	+	$0.0	=	$59.0	$5.4
ECC-03 (Building Energy Efficiency)	$1,553.4	+	$313.5	=	$1,866.9	$103.4
CMB-01 (Transition to Zero & Near-Zero Emission Technologies)	$515.8	+	$337.3	=	$853.1	$34.8
CMB-05 (RECLAIM)	$837.8	+	$0.0	=	$837.8	$19.3
FUG-01 (Leak Detection and Repair)	$11.5	+	$0.0	=	$11.5	$1.0
Total for SCAQMD Stationary Source Measures	**$6,639.3**	+	**$1,366.6**	=	**$8,005.9**	**$402.6**

56-14 Con't

SoCalGas remains hopeful that with further study, inventory refinement, and funding initiatives, the South Coast Air Basin will benefit from emissions reductions from the cooking sector. SoCalGas welcomes the opportunity to continue to participate in a cooking industry working group, to co-fund an emissions inventory study, to co-fund an equipment research and development program, and to maximize funding for existing energy efficiency programs. We also recommend that this group be expanded to include cooking operators that are non-profits, or run by local governments, such as cafeterias at hospitals, schools, and universities. We look forward to continued collaboration with SCAQMD on this measure and to study, develop, and demonstrate new, low NOx burner technologies for commercial applications in restaurant operations.

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large high input burners are rated at about 15,000 to 20,000 Btu per hr. *See* "California Statewide Residential Appliance Saturation Study," California Energy Commission, Energy Commission Publication No. CEC-400-04-009 (June 2004), *available at:* http://www.energy.ca.gov/HERS/rulemaking/documents/docs_relied_upon.html.

[2] "Preliminary Cost Summary of Draft 1016 AQMP Control Measures," Agenda Item 2, SCAQMD Scientific, Technical & Modeling Peer Review Advisory Group (July 28, 2016), *available at*: http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPRSocio_072816.

SoCalGas Comments on the Draft 2016 AQMP

Appendix 5

FUG-01: Improved Leak Detection and Repair

I. Summary of the Control Measure

This proposed control measure would reduce VOC emissions from a variety of emission sources, including but not limited to, oil and gas production facilities, storage and transfer facilities, and other sources where fugitive emissions occur from piping components, wastewater system components, and process and storage equipment.

II. Proposed Method of Control

Phase 1: Pilot Smart LDAR Program

The Pilot Program will demonstrate feasibility of new Smart leak detection and repair (LDAR) technology and establish implementation protocols. The goal of the Pilot Program will be to identify facilities and industries already subject to LDAR programs and to assess whether Smart LDAR could be utilized.

Phase II: Amend Fugitive VOC Rules

Based on the results of Phase I, SCAQMD fugitive VOC rules including Rules 462, 463, 1142, 1148.1, 1173, 1176, and 1178 may be amended to include the use of new detection technology.

III. Comments

A. Cost-Effectiveness

56-15

SoCalGas supports the use of optical gas imaging technology where cost-effective and feasible. For example, using Smart LDAR during Rule 463 inspections on tanks could be an effective use of the technology. During the Phase I Pilot Program, SoCalGas could share information regarding our on-the-ground experience with Smart LDAR, including certain limitations of the gas-imaging technology, and difficulties implementing in the field.

This control strategy relies upon adding new Smart LDAR requirements, as well as self-inspection programs, additional work practices, and record-keeping and reporting requirements. All of these new mandates will require new capital investments, maintenance costs, and increased labor costs. The proposed measure approximates a cost-effectiveness figure of $11,000 per ton of VOC reduced, but provides no detail as to how this figure was derived, and what data was used to support the cost analysis. SoCalGas requests an explanation for the current cost analysis and that a more robust analysis including labor and ancillary costs be conducted.

SoCalGas estimates that the LDAR provisions in the California Air Resources Board's (ARB's) Proposed Regulation on Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities (Proposed Regulation) will cost upwards of $36 million annually statewide (using a global warming potential (GWP) 72 for methane). During our review of the Proposed Regulation, SoCalGas found that ARB appeared to under-estimate the costs of the LDAR provisions by a factor of three or more due to omitted costs such as labor and ancillary

equipment.[1] A summary comparing the ARB and SoCalGas economic analysis of LDAR is provided below, and a detailed description of the calculations are provided in Attachment 5A.[2]

Table 1. Summary of ARB Economic Analysis (EA) and SoCalGas EA Cost-Effectiveness Calculations for the Proposed Rule LDAR Provisions.

Parameter	ARB EA (Quarterly, GWP = 72)	ARB EA (Quarterly, GWP = 72) Corrected	SCGas EA (Quarterly, GWP = 72)	SCGas EA (Quarterly, GWP = 21)	SCGas EA (Annual, GWP = 72)	SCGas EA (Annual, GWP = 21)
Cost of LDAR Program [$ / yr]	$10,182,299	$9,646,628	$36,870,175	$36,870,175	$9,485,109	$9,485,109
Baseline (Uncontrolled) Methane Emissions [mt CH4 / yr]	13,650	13,805	11,351	11,351	11,351	11,351
Global Warming Potential [mt CO2e / mt CH4]	72	72	72	21	72	21
Annual Emissions Reductions from LDAR	60%	60%	90%	90%	80%	80%
Estimated Emission Reductions (mt CO2e / yr)	589,680	596,376	735,545	214,534	653,818	190,697
Annual Value of Gas Saved [$ / yr]	$1,547,683	$1,565,257	$889,045	$889,045	$790,262	$790,262
Cost per Metric Ton [$/mt CO2e]	**$17.27**	**$16.18**	**$50.13**	**$171.86**	**$14.51**	**$49.74**
Cost per Metric Ton with Gas Savings [$ /mt CO2e]	**$14.64**	**$13.55**	**$48.92**	**$167.72**	**$13.30**	**$45.60**

56-15 Con't

While SoCalGas welcomes the use of advanced technology, especially when it is more efficient than Method 21, SCAQMD must carefully consider the entire range of costs – capital investment, labor, and maintenance – before promulgating regulatory mandates.

[1] "SoCalGas and SDG&E Comments on Proposed Regulation for Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities," (July 18, 2016), p.3, *available at*: http://www.arb.ca.gov/lists/com-attach/20-oilandgas2016-B3RUMVOyBQIRJFUx.pdf.

[2] While comparing the cost-effectiveness of ARB's Proposed Regulation seeking methane emission reductions to SCAQMD's control measure focused on VOC reductions is not an apples-to-apples comparison, we provide our economic analysis of the Proposed Regulation as included in our July 18, 2016 comment letter to ARB to illustrate the need to comprehensively evaluate cost-effectiveness with consideration of labor and ancillary equipment costs. *See* Attachment 5A.

B. Avoiding Regulatory Duplication

ARB's Proposed Regulation is focused on reducing methane emissions; however, it also has VOC reduction co-benefits. ARB estimates a reduction of 1,152,000 metric tons of carbon dioxide equivalent (using GWP 72 for methane), which equates to about 320 metric tons of VOC per year. ARB also estimates a fugitive emission savings of about 220,000 metric tons of carbon dioxide equivalent, or 44 metric tons of VOC per year (0.12 tons per day). These fugitive emissions reductions estimated by ARB are very minimal. In contrast, this proposed control measure estimates a savings of 2 tons per day of VOC through Smart LDAR and other regulatory requirements. SoCalGas seeks clarification as to how SCAQMD plans to achieve these emissions reductions. Also, are these reductions mainly attributed to the petroleum industry? 56-15 Con't

Additionally, SoCalGas respectfully requests that as the SCAQMD seeks to amend its Rules to require Smart LDAR and associated maintenance and recordkeeping requirements, it also carefully balances the need for additional, duplicative regulation. ARB's Oil & Gas Rule will likely be adopted in February 2017, with implementation beginning in 2018. SCAQMD should work to minimize regulatory duplication and align any future rule amendments with existing state and federal requirements.

ATTACHMENT 5A
Excerpt from July 18, 2016 SoCalGas and SDG&E Comment Letter to CARB

Attachment B: Review of Appendix B "Economic Analysis" to the CARB Staff Report

Overview

Appendix B of the Economic Analysis of the Proposed Regulation significantly underestimates the costs of implementing the Proposed Rule storage facility monitoring provisions. This appears to be the result of flaws in some of the data and assumptions that form the basis of the Economic Analysis. As set forth in the attached cover letter, SoCalGas and SDG&E recommend that ARB delay the adoption of these rules to give stakeholders and experts more time to provide necessary input—particularly with respect to costs and technical feasibility.

SoCalGas offers our assistance in providing information to improve the basic understanding of the affected emission sources. As an introduction, a brief review of the CARB EA of the proposed rule Well Stimulation provision is illustrative

Well Stimulation Provision

The Economic Analysis estimates that six separator/incinerator control systems will be sufficient to control emissions from 1,200 well stimulation activities per year. This equates to 200 well stimulations per year (or about four per week) for each control system. The Economic Analysis does not cite a specific source for the underlying data or assumptions to support this estimation. SoCalGas encourages ARB to consider adjusting the Economic Analysis to take into account the following:

56-16

First, discussion with production personnel estimates full compliance with this rule provision would likely require at least twelve full-time control systems. Well stimulation treatments typically require one to three days to complete. Assuming an average of two days per well stimulation treatment, and considering real-world scheduling delays (*e.g.*, schedule changes due to mechanical and other problems, unexpected well issues, inclement weather, control equipment downtime for maintenance, etc.), a minimum of twelve, as opposed to six, full-time control systems would be required.

Second, the Economic Analysis should be revised to take into account the following anticipated costs, which currently are missing from the estimate:

- transporting the separator/incinerator control systems from site to site. At a minimum, a heavy duty trailer and large towing (*e.g.*, tractor-trailer) truck would need to be purchased and dedicated to each control system;
- ancillary equipment including pipes, hoses, connectors, tools, etc.;
- operating labor. At least one full time person would be required to drive each truck and operate each control system. Additional personnel would be required to set up and break-down the equipment at each site (e.g., connect pipes and hoses);
- travel costs including per diem for the operator and truck fuel;
- disruption / delay of well stimulation activities due to implementation of the control requirements;
- control system maintenance labor and spare parts; and
- management and scheduling.

Moreover, the cost estimate assumes the control systems will have ten-year lifetimes, but do not cite the basis for the underlying assumption that equipment that is in continuous use and transported on a trailer over oil-field roads for ten years will remain functional for at least ten years. SoCalGas does not believe this is a realistic assumption.

In addition, the cost estimate does not consider the GHG and other pollutant emissions from operating the control equipment (*e.g.*, combustion emissions from the incinerator and separator heater, gas leaks from separator components) and driving the tractor-trailer truck.

In sum, the ARB analysis assumed that the control equipment is purchased and that this transaction is all that is required. There were no costs for any labor or transportation or ancillary equipment, and a lack of accounting for the facility labor and ancillary equipment required to implement the proposed rule control practices and technologies is a consistent trend throughout the ARB economic analyses.

Additional assistance and feedback can be provided, but the comment schedule does not allow the ability to develop detailed comments and alternatives for all affected sources. Similar examples of erroneous or questionable assumptions and analysis are available for other sources affected by the proposed rule. For these reasons, SoCalGas urges ARB to delay implementation in order to obtain additional input from stakeholders and experts.

The following review of the ARB proposed rule LDAR provisions demonstrates that ARB has overestimated the cost-effectiveness of the LDAR provisions by a factor of three or more.

Leak Detection and Repair Estimates

56-16 Con't

The Economic Analysis for the proposed rule LDAR provisions appears to under-estimate the cost-per-metric-ton of CO_2e emissions controlled by a factor of about three, as summarized in Table 1. In addition to a direct comparison with the CARB LDAR costs, Table 1 presents SoCalGas LDAR cost-effectiveness estimates based on several assumptions, as discussed below.

- The second column lists the CARB Economic Analysis cost and emissions data for quarterly LDAR as presented in Appendix B "Economic Analysis" to the CARB Staff Report: Initial Statement of Reasons (ISOR).
- The third column lists the CARB Economic Analysis cost and emissions data for quarterly LDAR with identified corrections to the CARB calculations (identified in Attachment A and Attachment B)
- The fourth column lists the SoCalGas Economic Analysis cost and emissions data for quarterly LDAR, and the SoCalGas cost per metric ton reduction estimates are about three times greater than the CARB cost per metric ton reduction estimates. Note that SoCalGas estimates higher annual emissions reductions from LDAR than CARB (90% vs. 60%). This reduction estimate is based on measured leak reduction data and is discussed in Comment 10 of Attachment A.
  - For comparison, the fifth column lists the SoCalGas Economic Analysis cost and emissions data for quarterly LDAR using the 100-year Global Warming Potential (GWP) for methane of 21, and these SoCalGas cost per metric ton reduction estimates are about an order of magnitude greater than the CARB cost per metric ton reduction estimates. The CARB EA used a 20-year GWP for methane of 72 whereas SoCalGas believes the standard 100-year GWP for methane of 21 is more appropriate. The many reasons that the 100-year GWP is more appropriate for this analysis are presented in SoCalGas and SDG&E Comments on Revised Draft Regulation for Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities.[1]

[1] SoCalGas and SDG&E Comments on Revised Draft Regulation for Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities, February 18, 2016.

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- The sixth column lists the SoCalGas Economic Analysis cost and emissions data for annual LDAR, and these are about the same magnitude as the CARB cost per metric ton reduction estimates. Note that SoCalGas estimates higher annual emissions reductions from annual LDAR than CARB estimates from quarterly LDAR (80% vs. 60%). This reduction estimate is based on measured leak reduction data and is discussed in Comment 10 of Attachment A.
  - For comparison, the seventh column lists the SoCalGas Economic Analysis cost and emissions data for annual LDAR using the more appropriate 100-year GWP for methane of 21 as discussed above, and the SoCalGas cost per metric ton estimates are about 3 times greater than the CARB cost per metric ton reduction estimates.

The data in Table 1 demonstrate that annual, rather than quarterly, LDAR is expected to exceed the target Estimated Emission Reductions at a cost-effectiveness level deemed acceptable by the CARB Economic Analysis.

Table 1. Summary of CARB EA and SoCalGas EA Cost-Effectiveness Calculations for the Proposed Rule LDAR Provisions.*

Parameter	CARB EA (Quarterly, GWP = 72)	CARB EA (Quarterly, GWP = 72) Corrected	SCGas EA (Quarterly, GWP = 72)	SCGas EA (Quarterly, GWP = 21)	SCGas EA (Annual, GWP = 72)	SCGas EA (Annual, GWP = 21)
Cost of LDAR Program [$ / yr]	$10,182,299	$9,646,628	$36,870,175	$36,870,175	$9,485,109	$9,485,109
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Global Warming Potential [mt CO2e / mt CH4]	72	72	72	21	72	21
Annual Emissions Reductions from LDAR	60%	60%	90%	90%	80%	80%
Estimated Emission Reductions (mt CO2e / yr)	589,680	596,376	735,545	214,534	653,818	190,697
Annual Value of Gas Saved [$ / yr]	$1,547,683	$1,565,257	$889,045	$889,045	$790,262	$790,262
Cost per Metric Ton [$ / mt CO2e]	$17.27	$16.18	$50.13	$171.86	$14.51	$49.74
Cost per Metric Ton with Gas Savings [$ / mt CO2e]	$14.64	$13.55	$48.92	$167.72	$13.30	$45.60

* Attachment A and Attachment B detail the calculations and data used to develop Table 1.

As summarized in Table 1, the CARB EA severely under-estimates the cost per metric ton of CO2e emission reductions. The primary reasons for the under-estimation include:

- CARB over-estimated the baseline/uncontrolled methane leak emissions. The uncontrolled methane leak emissions listed in Table B-9 of the CARB EA are based on total hydrocarbon (THC) emission

56-16 Con't

factors from a CAPCOA document[2], and CARB assumed that 100% of the THC was methane rather than considering that transmission and storage natural gas contains about 95% methane by volume (about 93% methane by weight) and production and processing natural gas contains about 78.8% methane by volume (about 60% methane by weight). In addition, several of the emission factors in Table B-9 were incorrectly copied from the CAPCOA document. These errors combined to over-estimate methane emissions by about 20%.

- CARB relied upon discussions with LDAR contractors for LDAR surveys cost information, and these contractors have a very strong incentive to provide lowest possible implementation costs because promulgation of quarterly LDAR requirements would be very beneficial to their business. LDAR implementation costs provided in the most recent economic analysis published by ICF International (ICF 2016)[3] are more than twice the average rate provided by the LDAR contractors, and these were used for the SoCalGas EA. Based on the text on page B-36 of the CARB EA and discussion of "person year", it is not clear that CARB staff understand that the industry standard practice is two person survey teams, both for safety reasons and to record data including number of components inspected as required by the proposed rule.
- The CARB EA did not include any costs for facility personnel to support the LDAR surveys including training, scheduling, safety orientation, survey team escort and support, leak repair, etc. SoCalGas experience is that that one FTE will be required to support the LDAR project per year.
- SoCalGas experience is that the CARB EA recordkeeping and reporting estimates are about an order of magnitude too low. These tasks include collecting and tracking daily LDAR data (including leaks found and follow-up repair and verification measurements), audio-visual inspection requirements at unmanned sites, data QA checks (e.g., compare daily LDAR data to final reports), and report assembly and review.
- The CARB EA assumed that the facilities financially benefit from the gas savings; however, transmission and storage facilities do not own the gas they transport and storage and do not benefit economically from LDAR gas savings. This is commonly acknowledged in literature on methane reduction programs from EPA and others.
- The CARB EA valued gas savings at $3.44 per Mcf which is considerably higher than current spot prices for natural gas.
- The CARB EA used a 5% discount rate based on Cal/EPA guidelines and the rationale that "five percent is the average of what the US Office of Management and Budget recommends (7 percent) and what US Environmental Protection Agency has used historically for regulatory analysis." However, EPA used a 7% discount rate for the technical support document for the recently promulgated New Source Performance Standards for the oil and gas industry (40 CFR 60, subpart OOOOa)[4] and the CARB EA-cited ICF document (ICF 2014) employs a 10% discount rate. Thus, the CARB EA 5 percent discount rate is not supported by pertinent documents and the SoCalGas EA used a conservative discount rate of 7%.

56-16 Con't

Other deficiencies and flaws noted in the CARB EA include:

[2] CAPCOA, ARB. 1999. The California Air Resources Board Staff California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities.

[3] ICF 2016. "Economic Analysis of Methane Reduction Potential from Natural Gas Systems," ICF International, May 2016

[4] EPA-HQ-OAR-2010-0505-5120. Background Technical Support Document for the Proposed New Source Performance Standards 40 CFR 60, subpart OOOOa, August 2015.

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- The calculation of "Cost per Ton with Savings" on page B-41 is incorrect.
- Engineering units are frequently incorrect (e.g., the units for the Conversion Factor of 836.2 should be scf/kg-mole rather than kg/kg-mole as listed on page B-40).
- Table B-9 of the CARB EA lists 1,318,700 components to survey, but page B-35 calculates a total of 1,339,185 that includes 20,485 well casings at heavy oil facilities and 939 compressors * 11 components per compressor, and this total is used to calculate the survey team years. Thus, the CARB EA total component basis for compliance costs (1,339,185) differs from the CARB EA total component basis for emission estimates (1,318,700) and is a flaw in the analysis. Further, the 1,339,185 component total is flawed because:
  - The 20,485 well casings at heavy oil facilities do not require quarterly LDAR, they require measurement of "the natural gas flow rate from the well casing vent annually by direct measurement" [§95668(h)(1)]; thus, the well casings should not be included in the LDAR components total.
    - An additional deficiency in the CARB EA is that an economic analysis for the proposed rule well casings provision is not provided.
  - Compressors (and the associated drivers) typically have many more than 11 components. Table W-1B to Subpart W of Part 98 lists a total of 259 components per compressor in the production segment to be used for GHG emissions reporting. Larger compressors employed in transmission and storage would be expected to have a higher total component count.

56-16 Con't

Finally, it is notable that the CARB EA states,

> "the capital cost of larger repairs is not included based upon the assumption that these repairs would need to be made regardless of an LDAR program; because ***the operator would repair these parts regardless of the LDAR program [emphasis added]***"

And

> "Emissions were estimated using emission factors from CAPCOA guidelines (CAPCOA, 1999), which also accounted for 'super leaker' components. These are components that leak at a rate several times the rate of what is expected from a typical component, and make up the majority of emissions. Several studies that have reported measurements of CH_4 emissions from natural gas production sites share a common observation-the existence of skewed emissions distributions, where a small number of sites or facilities account for a large proportion of emissions."

These two statements suggest that the majority of gas leak emissions would be controlled regardless of the implementation of an LDAR program. This simple assumption is very compelling and casts doubt on the need for and viability of the proposed rule LDAR provision.

SoCalGas Comments on the Draft 2016 AQMP

Appendix 6

BCM-01: Further Emission Reductions From Commercial Cooking

I. Summary of the Control Measure and Proposed Method of Control

BCM-01 seeks particulate matter (PM) reductions from commercial under-fired charbroilers. The intent of the measure is to establish a tiered program targeting higher efficiency controls for under-fired charbroilers at large volume restaurants and more affordable, lower efficiency controls at smaller restaurants.

II. Comments

SCAQMD has proposed charbroiler control measures in the past and concluded that such measures would be infeasible due to an inability to identify cost-effective controls. Accordingly, SoCalGas supports SCAQMD's efforts to conduct the requisite testing and studies before promulgating requirements to address under-fired charbroiler emissions. We encourage SCAQMD to identify the total costs for control systems by not only taking into account the cost of control devices, but also by considering the costs of installation, operation, maintenance, and labor. The Center for Environmental Research and Technology (CE-CERT) at the University of California, Riverside is currently compiling a technical and cost feasibility analysis to guide future regulation of PM emissions from under-fired charbroilers. SoCalGas urges SCAQMD to narrowly tailor any future proposed regulations using such cost and feasibility analyses. 56-17

SoCalGas also notes that the Draft AQMP states that "the NOx strategy to meet ozone standards will still ensure achieving the annual [PM2.5] standard by 2025."[1] Therefore, this measure may not even be necessary to attain the 2012 annual PM2.5 standard. And even if SCAQMD must pursue regulatory action to reduce direct PM emissions, the control of PM2.5 from wood-burning fireplaces has been demonstrated to be much more effective in the PM2.5 plan. SoCalGas' natural gas log replacement program has been very effective in reducing PM from fireplaces, and we offer our support to SCAQMD to continue our partnership on the firewood exchange program.

[1] Draft 2016 AQMP, Chapter 4, p. 4-38.

SoCalGas Comments on the Draft 2016 AQMP

Appendix 7

Mobile Source Measures

MOB-7: Accelerated Penetration of Partial Zero-Emission and Zero-Emission of Light-Heavy and Medium-Heavy-Duty Vehicles

MOB-8: Accelerated Retirement of Older On-Road Heavy-Duty Vehicles

I. Summary of the Control Measures and Methods of Control

MOB-07 seeks additional emissions reductions through the continuation of the State Hybrid Truck and Bus Voucher Incentive Program (HVIP).

MOB-08 seeks additional emission reductions from on-road heavy-duty vehicles beyond the emissions reductions targeted in California Air Resources Board's (ARB) Truck and Bus Regulation.

II. Comments

SoCalGas enthusiastically endorses these Mobile Source Measures, as we believe they provide the fastest and most effective ways to improve air quality in our region. As stated in the Draft 2016 AQMP Appendix IV-A, "[e]missions from heavy-duty diesel mobile sources continue to represent a significant and increasing portion of the emissions inventory in the Basin, adversely affecting regional air quality."[1] Reducing emissions from heavy-duty diesel mobile sources is an urgent air quality and public health priority for the entire region. And, by focusing on upgrading the existing population of heavy-duty trucks operating in the South Coast Air Basin (Basin), critical mobile source emissions reductions can be achieved in the near-term in a cost-effective manner. 56-18

A. Incentive Funding for Low NOx Heavy-Duty Trucks Can Provide Immediate Air Quality Impacts

The Draft AQMP notes that a near-zero, 8.9 liter low-NOx engine already exists for the light-heavy sector. "[T]here is currently one natural gas engine certified to the 0.02 g/bhp-hr optional NOx exhaust emissions standard. (For purposes of this measure, the term "near-zero" is used for engines meeting the 0.02 g/bhp-hr level.)"[2] MOB-07 specifically recommends HVIP funding of $15,000 per vehicle for near-zero vehicles.[3] SoCalGas understands that this incentive could be raised by ARB in the next few months to $18,000, and possibly to as much as $25,000 per vehicle. We strongly support SCAQMD's collaboration with ARB on these efforts. The inclusion of the highest incentive funding level possible is critical to offset the cost of purchasing a new near-zero natural gas heavy-duty vehicle. SoCalGas believes such incentives will have direct and immediate impacts to improve air quality in the Basin.

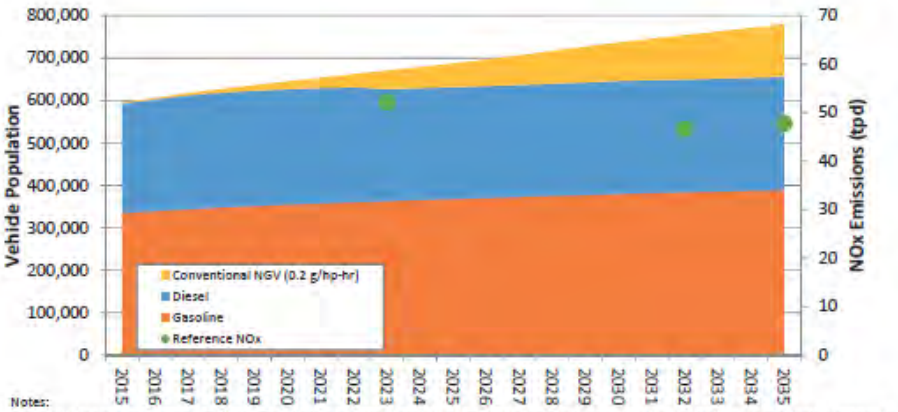
Further, while MOB-07 seems to place priority on the early introduction of electric hybrid vehicles and zero-emission medium-heavy-duty vehicles in the Basin, SoCalGas reminds SCAQMD that a federal revised low NOx standard of 0.02g/bhp-hr for heavy-duty vehicles is

[1] Draft 2016 AQMP, Appendix IV-A, p. IV-A-137.
[2] *Id.*
[3] *Id.* at p. IV-A-138.

technologically and commercially feasible because the "next generation" heavy-duty natural gas engine is now available for transit bus, refuse, school bus, and medium-duty truck applications. Additional near-zero emission heavy-duty natural gas engines are expected to follow by 2018, addressing a wider array of medium- and heavy-duty on-road applications.[4] While we support a robust marketplace of vehicle options, we also remind SCAQMD that near-zero emission vehicles provide an economically viable and commercially feasible long-term emissions reduction solution.

SoCalGas has conducted significant research into the efficacy of investing in near-zero natural gas heavy-duty trucks to help local air districts meet air quality and other goals.[5] Below shows the penetration of natural gas trucks into the Basin based upon market forces at the current NOx emission rate of 0.2 grams of NOx per brake horsepower hour.

Figure 1.



Notes:
1. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Constructio T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
2. Vehicle population is based on the EMFAC2011 data for the South Coast Air Basin.

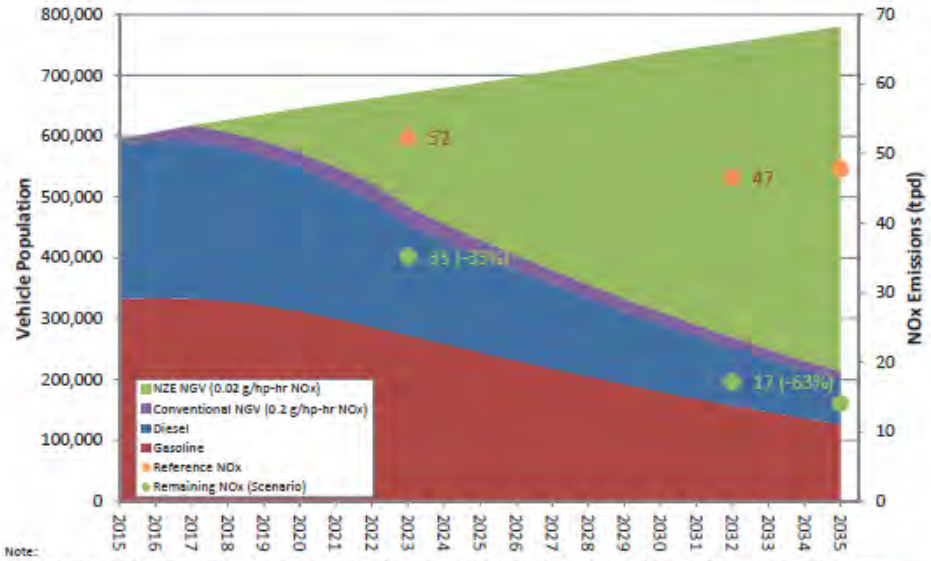
56-18 Con't

If we look a little further into the future – two years at most – we believe a 12 liter heavy-duty natural gas engine that would produce 90 percent less NOx per brake power hour, at 0.02 grams, will be commercially available. Engines that size could support near-zero NOx heavy-duty trucks used for drayage and long hauls common in the freight sector. If purchases of such near-zero NOx natural gas trucks were supported by incentive funds, market penetration of the trucks would be expedited, leading to a 33 percent NOx emission reduction by 2023 and 63 percent NOx emission reductions by 2031 in the Basin alone.

[4] "Petition to EPA for Rulemaking to Adopt Ultra-Low NOx Exhaust Emission Standards for On-Road Heavy-Duty Trucks and Engines," (SCAQMD) pp. 24-26 (June 2016), *available at*: http://www.aqmd.gov/docs/default-source/default-document-library/news-docs/nox-petition-to-epa-june-2016.pdf?Status=Temp&sfvrsn=2.
[5] For further discussion and full explanation of assumptions for these Figures, please see "Near-Zero Emission (NOx) Natural Gas Truck Opportunities in the South Coast Air Basin," Environ International Corporation (December 2014), included as Attachment 7A to these comments.

SoCalGas Comments on the Draft 2016 AQMP

Figure 2.



Note:
1. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Construction, T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
2. Maximum incentives range from $15,300 - $35,000/Truck depending on the vehicle type and engine size.
3. Assumed penetration rates after the incentive period ends remain at the 2023 level due to some mechanism.

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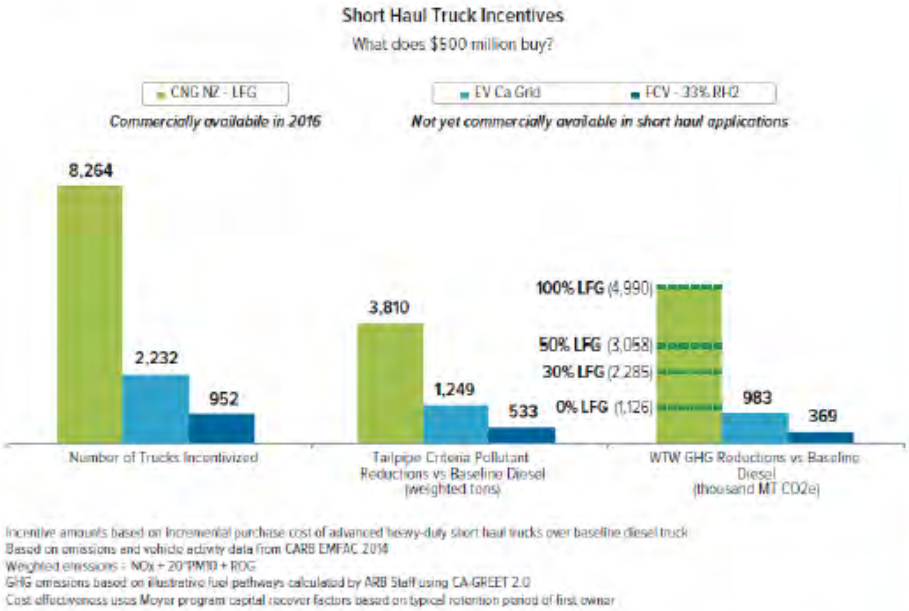
As discussed at length in the *Game Changer Technical Whitepaper* by Gladstein, Neandross and Associates, upgrading these traditional heavy-duty trucks with advanced near-zero emission natural gas vehicles can provide a cost-effective solution to help meet our air quality goals in the near term.

Figure 3 below demonstrates the relative impact that incentives supporting heavy-duty natural gas vehicles can have compared to alternative choices (which may not be available for several decades).[6] For example, providing incentives for near-zero emission heavy-duty natural gas vehicles fueled with renewable natural gas (RNG) can have three times the NOx emissions reduction and five times the "well-to-wheels" GHG reduction benefits as the next best alternative. Additionally, growing the demand for RNG as a vehicle fuel for Southern California's goods movement sector will promote the development of RNG production facilities, which often present an opportunity to maximize co-benefits by mitigating biogas combustion and reducing atmospheric emissions of methane. Coupled with the near-term availability of this technology, these leveraged impacts make supporting the adoption of heavy-duty natural gas vehicles through the AQMP a clear choice.

[6] "Game Changer Technical White Paper: Next Generation Heavy-Duty Natural Gas Engines Fueled by Renewable Natural Gas" (May 3, 2016), Figure 4, *available at:* http://ngvgamechanger.com/pdfs/GameChanger_FullReport.pdf.

Figure 3.



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B. SoCalGas Supports Other Actions to Facilitate the Transition to Near-Zero Heavy-Duty Trucks

In addition to incentive funding, the AQMP contemplates a suite of other strategies to spur modernization of the fleet of heavy-duty on-road vehicles serving the South Coast Air Basin. In its discussion of MOB-08, SCAQMD suggests a variety of measures, ranging from preferential access to marine ports and warehouses for near-zero trucks to a provision similar to the Surplus Off-Road Option for NOx (SOON) program for the largest on-road truck fleets in the region.[7] SCAQMD states that its "staff will convene a stakeholders working group" to evaluate the efficacy of such options that could be implemented to reduce emissions from on-road heavy-duty trucks.[8] SoCalGas respectfully and formally requests to be included in the stakeholders working group to offer its expertise and insight on the near-zero natural gas heavy-duty vehicle market and how robust market development is critical for the future of clean air in the Basin.

[7] Draft 2016 AQMP, Appendix IV-A, p. IV-A-143.
[8] *Id.*

DRAFT

ATTACHMENT 7A



Near-Zero Emission (NOx) Natural Gas Truck Opportunities in the South Coast Air Basin

56-19

Prepared for:
Southern California Gas Company
Los Angeles, California

Prepared by:
ENVIRON International Corporation
Los Angeles, California

Date:
December 2014

Project Number:
048505K Phase K06

Southern California Gas Company
A Sempra Energy utility

gna GLADSTEIN, NEANDROSS & ASSOCIATES

ENVIRON

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1 Introduction, Background, Purpose

This is a companion to the evaluation of near-zero nitrogen oxide (NOx) emission ("NZE") natural gas ("NG") trucks, also referred to as advanced NG trucks. ENVIRON has been evaluating the effectiveness of trucking sector financial incentives on the adoption rate of advanced natural gas engine technologies that can achieve a NOx emission rate of 0.02 g/bhphr, which is 90% lower than the current, most stringent on-road truck emission standards. The geographic boundary of this analysis is the South Coast Air Basin("Basin"). These results are a part of a larger effort to examine near-zero NOx natural gas opportunities in the entire mobile source inventory.

The US Environmental Protection Agency ("USEPA") requires the Basin to meet the 80 ppb ozone National Ambient Air Quality Standard (NAAQS) by 2023, which requires NOx emissions to be reduced below 115 tons/day. Current air quality regulations are predicted to bring NOx emissions down to just under 330 tons/day in that timeframe; thus, NOx emissions must be reduced approximately 65% beyond current regulations. Furthermore, EPA adoption of the more stringent 75 ppb ozone NAAQS requires that the Basin bring NOx emissions below 80 tons/day by 2032, or 75% beyond 2023 levels given current regulations. Seventy-eight percent of NOx emissions in the Basin are mobile sources of which 21% are heavy-duty trucks.

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This analysis is based upon a pure economic justification for the adoption of natural gas technologies in the heavy-duty trucking sector through the use of the Future of Transportation Fuels economic decision model published by the National Petroleum Council in 2012 ("FTF Model"). The analysis segments heavy-duty (HD) trucks by gross vehicle weight rating categories (Light HD (14,000 – 26,000lbs), Medium HD (26,000lbs – 33,000 lbs) and Heavy HD (>33,000 lbs)). Two scenarios were modeled, "SoCalGasRef," a reference case that predicts the likely, natural, adoption of natural gas as a fuel in this sector, and "SoCalGasHigh," a maximum case which predicts the most aggressive adoption rate of natural gas technologies. Differences between these scenarios are described in the next section.

Finally, financial incentives are applied to each of the modeling cases. Incentives are applied in two tiers. The first tier incentives are designed to boost the adoption rate of conventional natural gas technologies, which from a regulatory perspective, have the same emissions as conventional diesel technologies. Second-tier financial incentives are designed to change the purchase of a conventional natural gas technology truck to an advanced, NZE natural gas truck. The first tier incentives and second-tier incentives were applied together in both the SoCalGasRef and the SoCalGasHigh incentive cases.

The analysis results presented include the truck fleet population impacts, NOx emission benefits, total financial incentive program cost and programmatic cost-effectiveness.

2 Economic Modeling

The Heavy-Duty Truck component of the FTF Model predicts the rate at which various fuel technologies will be adopted by the trucking industry between now and 2050. The model predicts the percentage of conventional truck sales (diesel/gasoline) vs. the alternative fuel (natural gas in this case) on an annual basis. These percentage sales values are then applied to vehicle populations predicted by the California Air Resources Board's (CARB) motor vehicle emission model, EMFAC 2011. Basic assumptions of the modeling runs include the following:

- The model assumes NG truck sales begin in 2007 and run through 2050;
- The approximate incremental cost of an NG truck over diesel starts at $65k in 2015 and drops to $47k in 2023;
- Three market adoption curves choices are, "conservative," "moderate" and "aggressive," which are based on an American Trucking Association (ATA) owner survey regarding tolerance to payback for investment. The aggressive curve is closely aligned with the actual ATA survey respondent preferences on payback;
- The consumer begins with a preference towards diesel, but by 2050 is indifferent between diesel and natural gas (preference factor); and
- Fuel prices are based on EIA Annual Energy Outlook 2010 Reference case x 150%; the FTF Model relies on the EIA Annual Energy Outlook, without adjustment.

The incremental cost of alternative fuel technologies is one of the most influential factors on the model results. The vehicle price assumptions used in this analysis are presented in Table 1.

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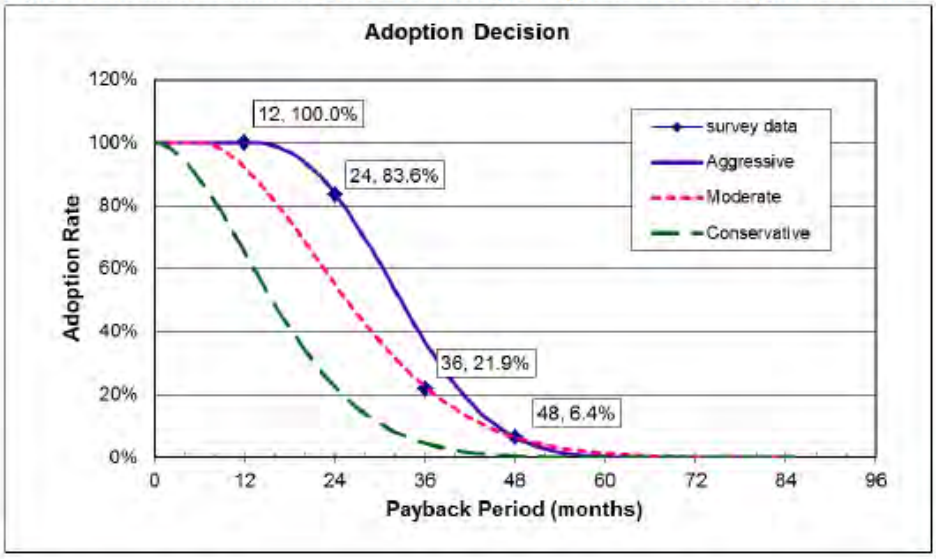
Table 1. SoCalGas FTF Model runs technology pricing assumptions, diesel base cost & incremental natural gas truck incremental price above diesel.

Truck Group	2023 Base Diesel Vehicle Cost	NG Incremental Price in 2023	
		SoCalGas Reference	SoCalGas High
Heavy HD Combination	$144,953	$47,355	$30,028
Heavy HD Single	$ 190,399	$18,906	$7,463
Drayage	$144,953	$34,604	$18,399
Refuse	$190,399	$18,906	$7,463
Light & Medium HD	$61,529	$21,165	$15,682

Another variable that was adjusted to develop the SoCalGasRef and SoCalGasHigh penetration curves is the NGV Adoption Curve. The technology adoption curves make up the core of the FTF Model and are based on surveys of American Trucking Association (ATA) members regarding their purchasing behaviors and various economic scenarios including fuel pricing and

expected return on investment in these alternative fuel technologies. The survey results were then compiled into adoption curves that indicate the rate at which alternative fuel technologies compete with diesel and gasoline. The FTF Model has three settings for these, "aggressive," "moderate" and "conservative."[1] Note that the aggressive curve is based on the actual ATA survey results, therefore the Moderate and Conservative curves are somewhat more conservative than the actual ATA survey responses. The SoCalGasHigh case is based on the Aggressive NGV adoption curve (the real world survey results of the trucking industry), therefore the SoCalGasRef case, based on the Moderate Adoption Curve, is more conservative than the real world survey results of the trucking industry.

Figure 1: Incentives Modeling NGV Technology Adoption Curves– Payback Period.



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The model also has a "Preference Factor" variable that is indicative of the market's preference for conventional fuels (diesel/gasoline) against the alternative fuel, in this case, natural gas. The scenarios modeled in this exercise assume that truck purchasers are initially wholly biased towards conventional fuels (i.e., 100% bias to conventional, 0% bias to natural gas), but by the end year of the scenario (2050), are indifferent to conventional fuels over natural gas (i.e., 50% bias to conventional fuel, 50% bias to natural gas). These settings allow 100% penetration of natural gas truck sales into the market under the proper conditions. This differs from the FTF Model default settings, which artificially limit the maximum market penetration of natural gas to

[1] The "aggressive" setting is indicative of a fleet consumer that has a higher tolerance to longer payback (50% of respondents indicated that they would accept a 33 month payback of the additional cost of the Natural Gas fueled truck due to fuel cost savings). The "moderate" setting consumer would accept a shorter payback period than the aggressive setting (28 months) and the "conservative" setting consumer would expect a still shorter payback period (16 months).-

50% of new sales by setting the "preference factor" such that there is always a bias against NG Trucks.

Specific to fuel pricing, both the SoCalGasRef and SoCalGasHigh modeling scenarios assume that natural gas fuel pricing is 1.5x the Energy Information Administration's (EIA) Annual Energy Outlook (AEO) 2010 natural gas pricing. Natural gas fuel price forecasts are scaled due to the relatively low NG pump price assumed in AEO2010 and are an effort to provide pump prices that are more representative of current (2013) average pricing. The FTF Model default fuel price projection is based directly on AEO2010 data, which are likely based on fueling information for a fleet that involved a greater percentage of transit bus, refuse, and other large, time-fill station applications. As more fleets adopt natural gas, it is predicted that more fuel will be dispensed through smaller stations, fast-fill stations, and/or in a retail setting, contributing to a higher dispensed price than the AEO2010 projections.

2.1 NOx NZE Natural Gas Engine Technologies

This analysis is predicated on the assumption that natural gas engine technologies capable of achieving NOx emission rates at a 0.02 g NOx/bhphr certification level in the 8.9L and 15L sizes are commercially available in 2018. This is based on feedback from the natural gas engine manufacturer, Cummins Westport.

2.2 NOx & Greenhouse Gas (GHG) Emission Modeling

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The FTF model output of percent new vehicle sales based on model year and fuel type are apportioned to the CARB EMFAC 2011 emission model fleet population. Information on vehicles miles travelled (VMT) by truck type (e.g., light-, medium-, and heavy-heavy duty truck) and truck usage (e.g., drayage, construction, refuse collection, utility service, etc.) is included in EMFAC 2011. Those sectors/truck types with the highest VMT per truck would maximize potential NOx emission reductions per truck using advanced technology NZE engines, increasing the effectiveness of financial incentives for such trucks/trucking sectors.

This analysis makes a blanket assumption that conventional natural gas engines certified to a 0.2 g/bhphr NOx standard will be commercially available in 2015, and starting in 2018, NZE natural gas engines certified to a 0.02 g/bhphr NOx emission standard are made commercially available. Emissions are quantified by vehicle size and type and then summed to provide a total Basin NOx impact. The difference between the default EMFAC emission prediction and SoCalGasRef and SoCalGasHigh NZE natural gas scenarios represent the modeled NOx reductions.

GHG emissions are modeled by application of CARB's GHG natural gas potency factor to the predicted volume of natural gas consumed. Natural gas fuel consumption is calculated from the volume of gasoline and diesel fuel displaced and application of an efficiency loss factor.

3 Financial Incentives Scenarios

The two scenarios modeled are SoCalGas Reference and SoCalGas High.

- SoCalGas Reference assumes: (1) a high price differential between NGV and Diesel Trucks; and (2) uses the conservative NGV adoption curve;
- SoCalGas High assumes: (1) a low price differential between NGV and Diesel Trucks; and (2) uses the aggressive NGV adoption curve

Each of these two scenarios are presented as a base case ("Base Case"), representing the modeled, natural adoption rate of NG technologies given the economic market conditions assumed, and a financial incentive scenario case ("Incentive Case") where incentive funding is offered to encourage the adoption of NZE natural gas technologies. For the Incentive Case runs, financial incentives are applied in two levels; Incentive 1 encourages additional natural gas technology adoption by depressing the cost of natural gas technology engine and Incentive 2 is applied to convert all conventional natural gas truck sales to near zero natural gas technology, which is defined as 0.02 g NOx/bhp-hr.

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- Financial Incentive 1 to accelerate conventional NG truck adoption[2]
  - $25,000 for Class 8 Truck Tractors and Class 8 Drayage Trucks
  - $15,000 for Class 4 through 8 Straight and Solid Waste Collection Trucks ($7,500 in the high penetration rate case)
- Financial Incentives 2 to influence NZE natural gas technology adoption (0.02 g/bhp-hr NZE NG truck technology vs. 0.2 g/bhp-hr conventional NG truck technology)[3]
  - $10,000 for Class 8 Tractors
  - $8,000 for Class 4 – 8 Straight Trucks

The financial incentives are assumed to be direct grants to qualifying vehicle purchasers. More sophisticated forms of incentives that have been used in the past were not investigated. It is likely that other incentive programs can be used which will result in equal or greater penetration, at lower total costs. A partnership among appropriate government agencies and others with more experience in these types of programs is recommended for vetting these issues.

3.1 SoCalGas Reference Scenario Results

The results of the SoCalGas Reference scenario runs are presented in Figures 2, 3, and 4. Figure 2 is the SoCalGas Reference Base Case. The area chart is a representation of the total

[2] The $25,000 and $15,000 incentives were based on estimated 2015 price differentials discussed in Section 2. For example, the larger trucks have a $65k price differential in 2015. Program incentives can be refined based on updated price information for vehicles and the incentive program objectives.
[3] The $8,000 - $10,000 price estimates for "financial incentive 2" were based on the original cost indicated by a natural gas engine manufacturer however the same manufacturer revised this cost estimate to $4,000 - $5,000 in more recent, subsequent discussions. These more recent updated values for financial incentive 2 were not modeled.

population of heavy-duty trucks registered in the South Coast Air Basin, predicted in the years 2015 – 2035, stratified by fuel type (gasoline-red, diesel-blue and natural gas-purple) and is

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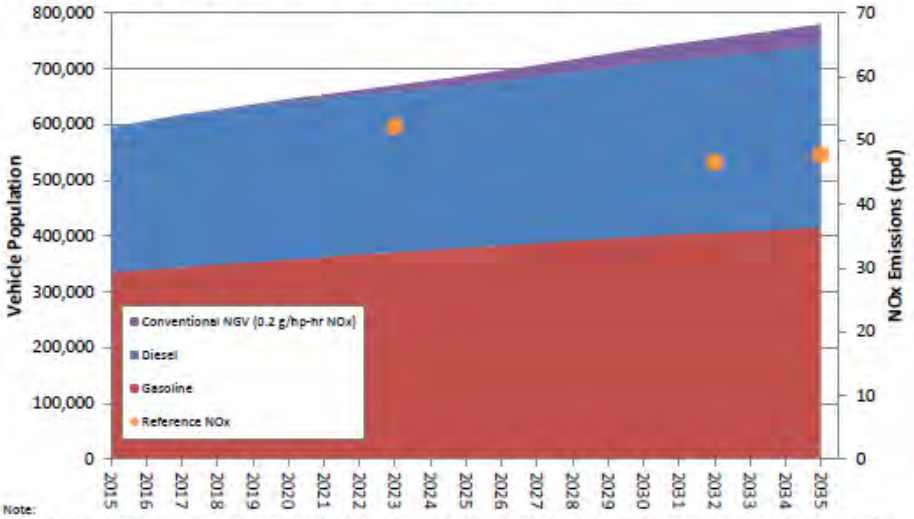
Figure 2: SoCalGas Reference- Base Case Scenario.



Note:
1. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Construction, T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
2. Vehicle population is based on the EMFAC2011 data for the South Coast Air Basin.
3. Reference NOx emissions were obtained from the 2012 Air Quality Management Plan (AQMP) from the SCAQMD.

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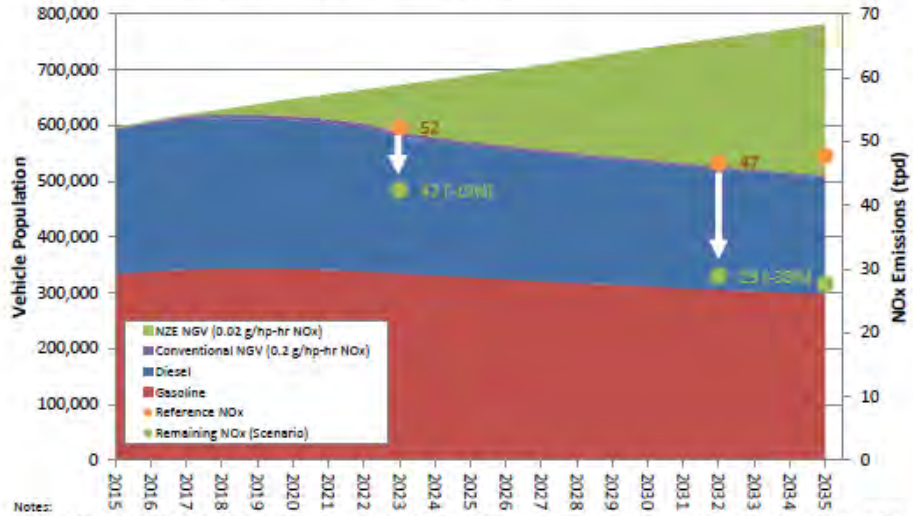
Figure 3: SoCalGas Reference Incentive Case.



Notes:
1. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Construction, T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
2. Maximum incentives range from $23,000 - $35,000/Truck depending on the vehicle type and engine size.
3. Assumed penetration rates after the incentive period ends remain at the 2023 level due to some mechanism.

associated with the primary y-axis (to the left). No incentive is applied in Figure 2. The three orange dots represent daily NOx emissions associated with the fleet population in the year indicated (2023, 2032 and 2035) and are associated with the second y-axis (to the right). These NOx emission values are the reference against which all scenarios are compared.

This case assumes three differences from the Reference Base Case:

1. A financial incentive for conventional (0.20 g NOx/bhp-hr) natural gas trucks is introduced in 2015 through 2023;
2. A financial incentive for the adoption of NZE NOx technology (0.02 g NOx/bhp-hr) is introduced starting in 2018 through 2023; and
3. A mechanism, yet to be defined, is introduced starting in 2023 to maintain the adoption rate of NZE NOx technology at 2023 levels.

The purple portion of the area chart represent the population of conventional natural gas vehicles introduced in period from 2015 – 2018. The green portion represents NZE natural gas vehicles introduced in the period from 2018 – 2035. The green dots represent the NOx emissions of the total fleet in the years indicated, and the orange dots represent the reference NOx emissions of the SoCalGas Reference Base Case (transcribed from Figure 2).

The incentive program yields daily NOx reductions of 19% and 38% in 2023 and 2032, respectively, at an incentive program cost of $2.05 billion. It is noted that a majority of these NOx reductions come from the heavy heavy-duty truck segment of the market at a cost of $660 million (Figure 4).

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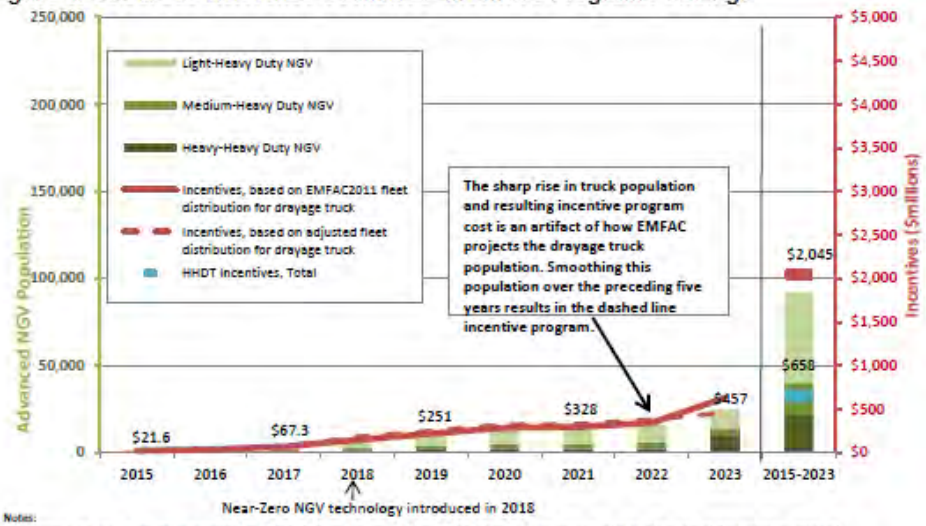
Figure 4: SoCalGas Reference Scenarios- Incentive Program Funding.



Notes:
1. Represents the funding needed to incentivize purchase of the new near-zero NG vehicle each year that would otherwise have been diesel if no incentives provided.
2. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Construction, T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
3. The last bars show the cumulative advanced NGV population and the total incentive dollars required during 2015 - 2023 under NPC high penetration scenario
4. The NGV new sales projection was derived from the NPC model based on the high adoption assumptions and the natural gas price at 1.5 times EIA 2010 forecast.

3.2 SoCalGas High Scenario Results

The results of the SoCalGas High scenario runs are presented in Figures 5, 6 and 7. The High Base Case scenario, Figure 5, shows significantly higher adoption rates of natural gas truck technologies (purple) than the Reference Base Case (Figure 2). However predicted NOx emissions are identical to those of the Reference Base Case as conventional natural gas engines are certified to the same emission rate as a comparable diesel or gasoline engine.

Figure 6 is the SoCalGas High Incentive Case. This case makes very similar financial incentive assumptions as the Reference Incentive Case, although the actual truck incentive funding amounts have been adjusted based on the higher underlying adoption rate of natural gas trucks. The purple portions of the area chart represent the population of conventional natural gas vehicles introduced in period from 2015 – 2018. The green portion represents NZE natural gas vehicles introduced in the period from 2018– 2035. The green dots represent the NOx emissions of the total fleet in the years indicated, and the orange dots represent the reference NOx emissions of the SoCalGas Reference Base Case (transcribed from Figure 5). The incentive program yields daily NOx reductions of 33% and 63% in 2023 and 2032, respectively, at an incentive program cost of $4.3 billion. It is noted that a majority of these NOx reductions (9.6 tpd out of 17 tpd) come from the heavy heavy-duty truck segment of the market at a cost of $885 million (Figure 7).

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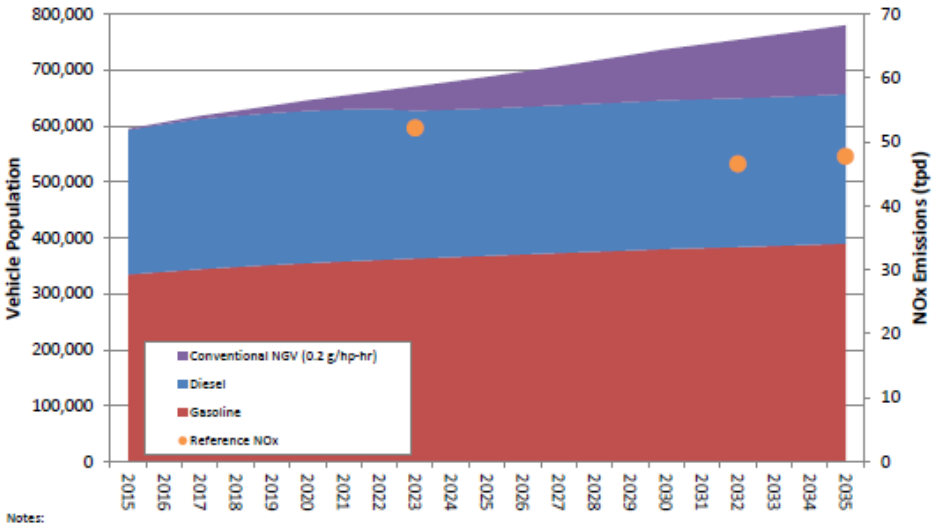
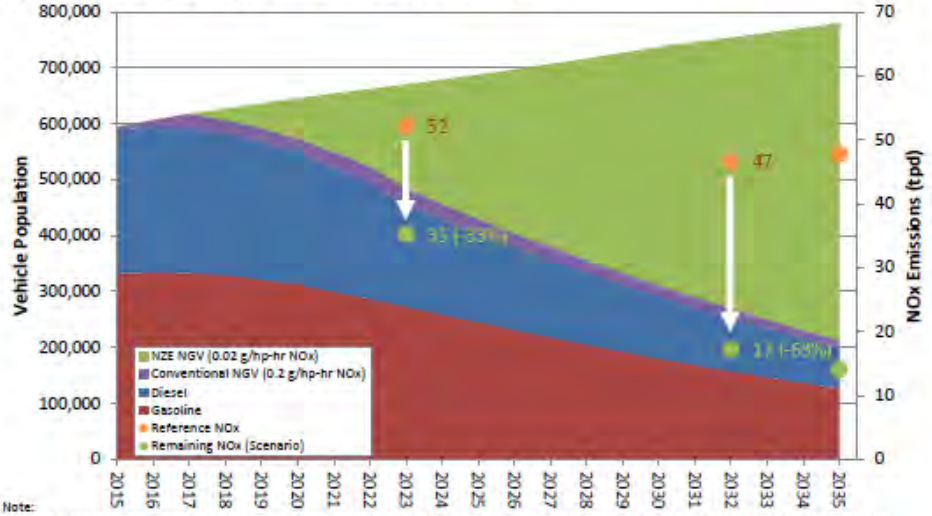
Figure 5: SoCalGas High- Base Case Scenario.



Notes:
1. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Construction, T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
2. Vehicle population is based on the EMFAC2011 data for the South Coast Air Basin.
3. Reference NOx emissions were obtained from the 2012 Air Quality Management Plan (AQMP) from the SCAQMD.

Figure 6: SoCalGas High- Incentive Case Scenario.



Note:
1. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Construction, T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
2. Maximum incentives range from $15,500 - $35,000/Truck depending on the vehicle type and engine size.
3. Assumed penetration rates after the incentive period ends remain at the 2023 level due to some mechanism.

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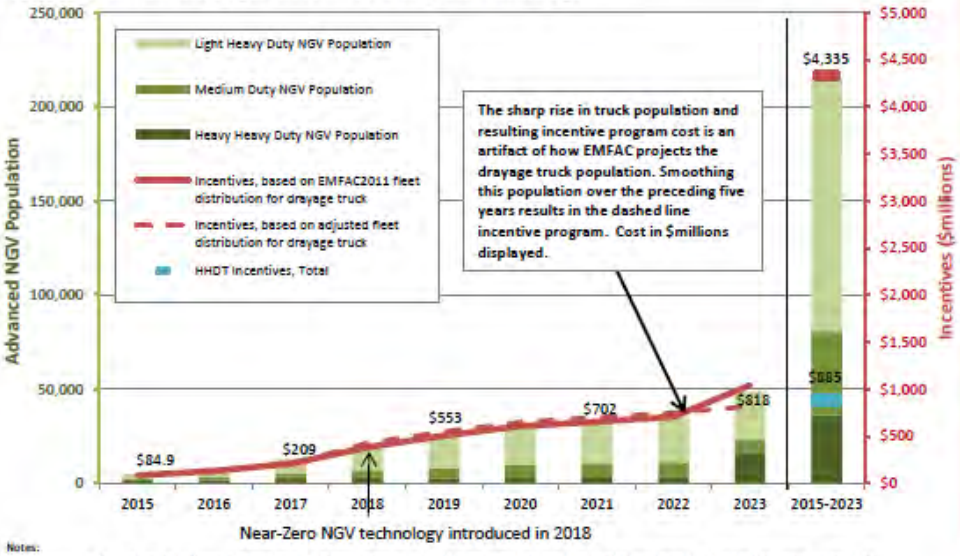
Figure 7: SoCalGas High- Incentive Program Funding.



Notes:
1. Represents the funding needed to incentivize purchase of the new near-zero NG vehicle each year that would otherwise have been diesel or gas if no incentives provided.
2. Analysis includes T7 Drayage, T7 Single, T7 Solid Waste Collection Vehicle, T7 Tractor, T7 Tractor Construction, T7 Agriculture, T7 Single Construction, T7 Public, T7 Utility, T7 IS, T6 Instate Heavy, T6 Instate Small, T6 Utility, T6 Public, T6 TS, T6 Agriculture, T6 Instate Construction Heavy, T6 Instate Construction Small, LHDDT, and LHDGT.
3. The last bars show the cumulative advanced NGV population and the total incentive dollars required during 2015 - 2023 under NPC high penetration scenario
4. The NGV new sales projection was derived from the NPC model based on the high adoption assumptions and the natural gas price at 1.5 times EIA 2010 forecast.

3.3 Cumulative Incentive Costs Compared to 2023 Emission Reductions

The cumulative cost of the incentives can be compared to the reductions that result from the incentives. The 2023 NOx reductions are compared to the cumulative cost of the incentives for each type of heavy-duty truck (light, medium, and heavy) for the SoCalGas High, maximum incentives scenario. The cumulative cost of the incentives for all heavy-duty trucks is $4,335M, resulting in a NOx reduction in 2023 of 17 tons/day. Over half of the 2023 NOx reductions (9.6 tons/day) result from only $885M (or 20%) of the cumulative cost of the incentives, for incentives given to heavy-heavy duty trucks only. Additional reductions can only be achieved at a much higher cumulative cost for incentives given to light- and medium-duty trucks per ton /day of NOx reduced (7.3 tons/day of NOx reductions in 2023 for a cumulative cost of $3,450M).

3.4 Greenhouse Gas Emissions Analysis

Lastly, the greenhouse gas (GHG) reductions for the maximum incentives scenario were analyzed. In Figure 9, the 2023 and 2035 GHG emission reductions are compared to the baseline emissions for each year. All SoCalGas maximum incentives scenarios show a decrease in GHG emissions compared to the current baseline of conventional diesel and gasoline in-state trucks. The results for each SoCalGas scenario include a range of GHG reductions that could further occur if natural gas from renewable sources (such as renewable natural gas from biomass or RNG) displaced fossil-fuel NG.

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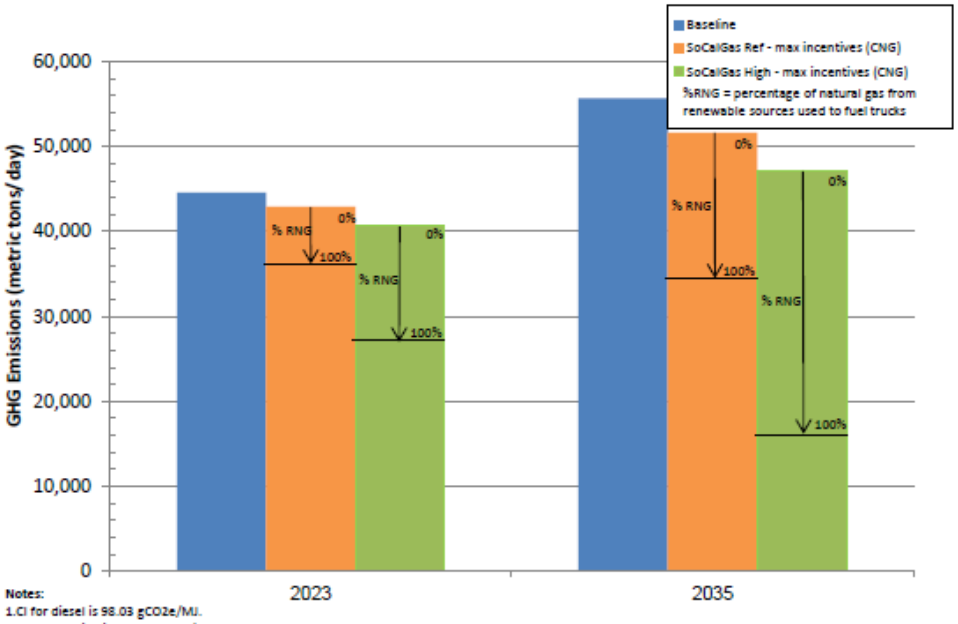
Figure 8: Greenhouse Gas Emission Reduction Analysis for In-State Trucks in the South Coast Air Basin (uses currently adopted climate intensity).



Notes:
1.CI for diesel is 98.03 gCO2e/MJ.
2.CI for gasoline is 98.83 gCO2e/MJ.
3.CI for renewable NG is 11.26 gCO2e/MJ based on landfill gas.
4.CI for CA pipeline CNG is 67.7 gCO2e/MJ.
5.Conventional natural gas assumes a fuel efficiency decrease of 10% when compared to diesel and equivalent fuel efficiency to gasoline.
6.Near zero natural gas assumes a fuel efficiency decrease of 15% when compared to diesel and a fuel efficiency decrease of 5% when compared to gasoline.

SoCalGas Comments on the Draft 2016 AQMP

Appendix 8

Chapter 10: Climate and Energy

I. Summary

In September 2011, the SCAQMD Governing Board adopted the "Air Quality-Related Energy Policy." The policy promoted zero and near-zero emission technologies through ultra clean energy strategies to meet air quality, energy security, and climate change objectives. Pursuant to the Policy, SCAQMD staff is required to prepare an update of energy usage within the District in each AQMP. Chapter 10 of the Draft 2016 AQMP addresses this obligation and focuses on:

- Climate change and the relationship to the AQMP;
- Regional energy and fuel information;
- Grid collaboration, renewable generation, demand response, energy efficiency and energy storage issues related to "Moving Towards 100 Percent Renewable Power;" and
- Transformation of the energy sector in the future in Southern California.

II. Comments

SoCalGas supports SCAQMD's efforts to address climate change co-benefits and proactively plan for a sustainable energy future. We offer the following comments to clarify and supplement the discussion in Chapter 10.

A. Methane's Role as a Precursor to Ozone

56-20

Chapter 10 discusses methane's contributions to tropospheric ozone and the interactions between climate and criteria pollutants in the atmosphere:

> These interactions often worsen the impacts from greenhouse gases and increase background levels of criteria pollutants. While methane persists in the atmosphere for 10 to 14 years, its atmospheric lifetime is impacted by criteria pollutants (Prather, 2007). As methane reacts within the atmosphere, it acts like a VOC and increases background tropospheric ozone levels. Over the past 12 years, global methane emissions have increased over 30 percent, which also increased background levels of tropospheric ozone (Turner, 2016). Increasing background tropospheric ozone makes achieving air quality standards more difficult. Lastly, tropospheric ozone is also one of the strongest and significant short lived climate pollutants (Intergovernmental Panel on Climate Change [IPCC] AR5, 2013).[1]

It has been known since the 1970s that methane is an ozone precursor. However, its conversion to ozone formation at the scale of an area like the South Coast Basin is limited by methane's low reactivity. California State Implementation Plans (SIPs) have emphasized control of NOx and VOCs to address ozone. The definition of VOC has always excluded methane, because of its extremely low reactivity. Accordingly, throughout the history of California SIPs and AQMPs, we have known that local control of methane emissions will not contribute to attainment of ozone national ambient air quality standards (NAAQS) in the non-attainment area of origin.

[1] Draft 2016 AQMP, Chapter 10, p. 10-2.

For methane to form ozone it must first react in the atmosphere, but methane reacts extremely slowly. For illustration, methane that is emitted in Los Angeles, travelling across the U.S. under prevailing 15 mile per hour winds, would reach the Atlantic Ocean after 10 days, during which time less than one percent could react in the atmosphere. The significance is that there is virtually no ozone formation in the originating air basin, and less than one percent of the ozone forming potential of the emitted methane could even be realized before the emissions leave the U.S. to become part of the global background inventory.[2] It has been calculated that even if California eliminated its methane emissions, the greatest potential benefit would be less than 0.02 ppb, and that change would be across the globe and negligible in any U.S. nonattainment area.[3]

Because of the low reactivity of methane in the atmosphere, the traditional way of attaining ozone standards (i.e. controlling sources of emissions in the air basin) is not applicable to methane emissions. EPA has begun a serious investigation of the role of methane in global background ozone formation. But, we do not have to wait on EPA. Programs such as EPA's Natural Gas Star, of which SoCalGas was a founding participant, have already been very successful in reducing methane from the natural gas sector. And, ARB's Short Lived Climate Pollutant Plan, which SoCalGas also supports, lays out how to proceed to control methane from a climate change perspective.

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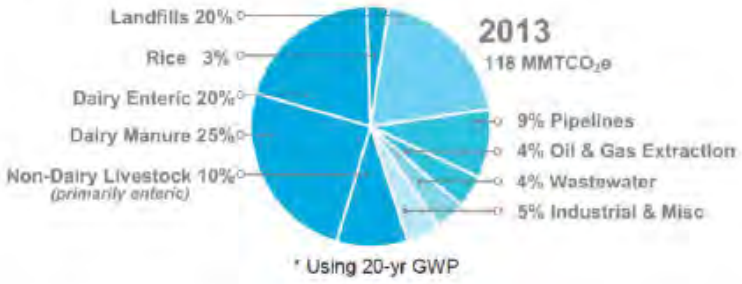
Further, it is important to note that approximately 80 percent of California methane emissions are from forestry, agriculture, livestock, and waste, and that total California methane emissions are a small fraction (<0.5%) of global methane emissions (over 20,000 $MMTCO_2e$ in 2010 (and growing), using the same 20-year global warming potential of 72).[4]

Figure 1. California 2013 Methane Emission Sources[5]



[2] Crutzen, Paul J. "Photochemical reactions initiated by and influencing ozone in unpolluted tropospheric air." Tellus 26, no. 1-2 (1974), pp. 47-57;
Crutzen, Paul J. "My life with O3, NOx, and other YZOx compounds (Nobel lecture)." Angewandte Chemie International Edition in English 35, no. 16 (1996), pp. 1758-1777.
[3] West, J. J. and Fiore, A. M., "Management of Tropospheric Ozone by Reducing Methane Emissions," Environ. Sci. Technol. (2005), pp. 4685–4691, DOI: 10.1021/es048629f
[4] "Global Anthropogenic Emissions of Non-CO2 Greenhouse Gases: 1990–2020," U.S. EPA, EPA Report 430-R-06-003 (June 2006), *available at:* https://www.epa.gov/global-mitigation-non-co2-ghg-report/global-anthropogenic-emissions-non-co2-greenhouse-gases-1990.
[5] "Proposed Short-Lived Climate Pollutant Reduction Strategy," ARB (April 11, 2016), p. 58, *available at*: http://www.arb.ca.gov/cc/shortlived/meetings/04112016/proposedstrategy.pdf.

B. Discussion About Advanced Energy Storage Technologies Should Consider the Role of Power-to-Gas

SoCalGas is actively pursuing research and development on the cost and readiness of Power-to-Gas in the South Coast Air Basin. Through a partnership with the National Fuel Cell Research Center at the University of California, Irvine, SoCalGas is investigating and testing the hydrogen blending necessary for commercial Power-to-Gas storage of excess wind and solar energy. Power-to-Gas has the potential to compliment the State's aggressive Renewable Portfolio Standard goals by:

- Making solar more affordable and reliable,
- Accelerating the development of more renewables projects in the state,
- Reducing congestion (and the associated service disruptions) on our electric grid,
- Generating clean hydrogen for fuel cells and alternative fuels, and
- Producing renewable biogas for use for heating homes, cooking and transportation.

Moreover, Power-to-Gas has been successfully developed and commercialized in Europe, with over 30 projects launched to date. For example, the first Power-to-Gas plant was installed in Falkenhagen, Germany in 2013 and successfully injects hydrogen into the natural gas grid. Another plant in Stuttgart, Germany utilizes waste carbon dioxide from a biogas plant, produces hydrogen from water with a PEM electrolyzer, and injects methane into the pipeline system. This technology is a reality and holds tremendous potential for California.

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Power-to-Gas also has benefits in addition to being an "alternative to curtailing excess renewable power," that are not mentioned in Chapter 10.[6] Power-to-Gas technologies allow for longer charge and discharge capacities compared to batteries. Conceptually, producing synthetic natural gas from electricity and then storing it on the pipeline or underground could allow for much larger amounts of energy storage than any battery system. In addition, using the natural gas pipeline system, stored energy can be moved more easily to where it is needed (vs. electricity which would be trapped in stationary batteries). Finally, Power-to-Gas also offers ancillary services. Electrolyzers and fuels cells have excellent response to electrical load changes and can provide support to the electrical grid.

C. Growing the Renewable Natural Gas Industry

i. Additional Sources of Renewable Natural Gas Feedstock

SoCalGas appreciates the discussion of biogas in Chapter 10. We would like to note that there are some additional sources of biogas worth adding to the AQMP, particularly in light of the California mandates to divert organics from landfills:

- Source Separated Organics (SSO) – These can include residential food waste and yard waste (e.g. grass clippings) that can be converted to biogas in a digester or through gasification.
- Municipal Solid Waste (MSW) – There are project developers working to separate the organic fraction from MSW and converting that fraction to gas.

[6]Draft 2016 AQMP, Chapter 10, p. 10-24.

- Food producers/distributors/retailers – The entire food supply chain is looking for ways to divert their organic wastes (fruit peels, unsold product, bruised tomatoes, etc.) from landfills.

Los Angeles County alone produced 21 million tons of solids waste in 2012, of which 32 percent was organic. So, the potential for biogas production is quite large. SCAQMD is exploring opportunities to promote the injection of biogas into the pipeline, and we support these efforts as they will provide pathways for the most efficient, beneficial use of the waste gas.

ii. Helping Grow the Renewable Fuels Industry

The policies being pursued in this AQMP as well as in ARB's Mobile Source Strategy can result in significant growth in both the renewable natural gas (RNG) industry and in the renewable diesel industry. Both fuel types offer GHG and NOx emissions reductions, and we urge policymakers to enact programs which will promote multiple choices for operators, with incentives appropriately aligned with performance in meeting emissions reduction goals. We recommend that the following points be considered when implementing renewable fuel policies:

- Renewable diesel has an important role in reducing GHG emissions and has also shown in testing that NOx emissions may be reduced when used as a replacement fuel in existing trucks, allowing the use of renewable diesel to be directly attributable to meeting the federal Clean Air Act criteria pollutant goals, as well as the State's climate change goals. (Note that ARB has committed to a reexamination of the earlier studies.)
- Near-zero emission natural gas trucks, when fueled with RNG, can also meet both the federal Clean Air Act attainment mandates, and help meet the State's climate change goals. For near-zero emission natural gas trucks, the dramatic 90 percent reduction in NOx emissions is the result of an advanced engine technology – which will deliver this emission reduction regardless of whether it is fueled with traditional natural gas, upgraded biogas, or RNG.
- ARB is currently requiring RNG use for all near-zero emission natural gas trucks under the incentive programs being proposed, a commendable and attainable goal under today's market conditions, which is consistent with the integrated planning approach for GHG and criteria pollutant reductions. Because of this linkage created by these incentive programs (i.e., near-zero emission natural gas trucks receiving incentives must use RNG) there will be significantly more demand for RNG production. As a result of these multiple requirements for near-zero emission trucks, more drastic air quality and environmental benefits will be achieved with this approach.
- ARB has also proposed a measure, "Low-Emission Diesel Requirement," to "require that diesel fuel providers sell steadily increasing volumes of low-emission diesel until it comprises 50 percent of total diesel sales by 2031."[7] We seek parity in the renewable fuels thresholds and note the disconnect between requiring 100 percent RNG for near-zero emission natural gas trucks, but only 50 percent renewable diesel. Further, the ARB measure would intersect with the existing proposed ARB measures for NOx emission reductions from near-zero emission natural gas trucks using RNG by establishing a state

56-20 Con't

[7] "Mobile Source Strategy," California Air Resources Board (May 2016), p. 153, *available at*: http://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf.

policy that could significantly bias the growth of the biofuels industry, essentially limiting innovation in the alternative fuels markets. As we all know, this industry needs support to grow, especially to reach production levels anticipated in these plans for both renewable diesel and RNG.

Because of this double emission reduction benefit (NOx and GHG) from both renewable diesel and RNG, policymakers should compare the varying outcomes of these policies and consider adopting incentives commensurate with the benefits achieved. There is a finite amount of investment funding available; therefore, it is critical to consider the implications of these policies on the growth and innovation of the nascent biofuels industry. SoCalGas urges SCAQMD and other policymakers to examine the respective renewable biofuels technology, costs, energy consumption, feedstock impacts, near and long term environmental benefits, and the impact on the direction of growth of the renewable fuels industry generally.

56-20 Con't

The Energy+Environmental Economics (E3) consulting firm has performed studies that evaluate some potential pathways to achieving the State's 2030 and 2050 environmental goals which can serve as a starting point for this examination. Last year E3 examined the impact of supplementing an "Electrification" scenario, with a "Low Carbon Gas" option, in order to improve the State's ability to reach its 2030 GHG goals.[8] We urge further consideration of the benefits of the low carbon gas scenario. E3 concluded that one of the critical differences between a 100 percent electrification compliance scenario and a scenario that includes a Low Carbon Gas option would be the choice of allocating biomass feedstock to the production of alternative fuels – namely bio and renewable diesel, and RNG. Fortunately, E3 also studied feedstock availability and found that less than 10 percent of the potential feedstock available nationally was necessary to produce the amount of RNG needed for their Low Carbon Gas option. However, due to the shared feedstock for the development of many biofuels, it is clear that it will be critically important to establish policies that do not unilaterally support the development of single biofuels in order to maintain cost-effective energy diversity and achieve our statewide environmental goals. Below is a table summarizing some of the results of the E3 study:

[8] "Decarbonizing Pipeline Gas to Help Meet California's Greenhouse Gas Reduction Goal," Energy+Environmental Economics (E3) (November 2014, released January 27, 2015) (available upon request).

SoCalGas Comments on the Draft 2016 AQMP

Table 1.

	2015	2030 CARB Mobile Source Strategy	2030 E3 Electrification	2030 E3 Low Carbon Gas
ZEVs[1/] (millions of vehicles)	0.1	5 - 7.3	9.3	9.3
CNG and LNG trucks and buses (millions of vehicles)	0.00003	0.400	0.037[4/]	0.359
Biogas (% of total gas system demand)	0%	3/	2%	30%[5/]
Renewable Diesel (% of total diesel demand)	2%[2/]	55%	67% - 85%	3%
Statewide GHG Reduction (% Reduction from 1990 Levels)	2%	**40%**	**40%**	**40%**

1/ Includes BEVs, PHEVs, and FCVs
2/ Estimated renewable diesel share in 2013, based on reported LCFS compliance
3/ Almost all renewable fuels are liquids. Some renewable gaseous fuel, tied to incentive requirements
4/ E3 Electrification Scenario includes approximately 320,000 hybrid diesel trucks in the Alternative Fuel HD Sector
5/ RNG transportation demand as a percent of total system demand is approximately 17% in 2030, and is approximately 30% in 2050.

56-20 Con't

In addition, SoCalGas has also been examining the comparison in cost and energy use for producing various biofuels from this common feedstock, and should have additional data to inform this discussion shortly. We encourage SCAQMD as well as ARB, California Energy Commission, San Joaquin Valley Air Pollution Control District, and other stakeholders to consider potential outcomes of policies proposed in these plans on the growth and direction of the biofuels industry and the impacts on achieving our near- and long-term environmental goals.

As noted at the conclusion in Chapter 10, SCAQMD is looking to engage in conversations about the "schedule for infrastructure and technology needs."[9] SoCalGas looks forward to participating further in a biogas working group and partnering with the agency on future study and implementation of energy and transportation infrastructure initiatives.

[9] Draft 2016 AQMP, Chapter 10, p. 10-29.

SoCalGas
a Sempra Energy utility

ATTACHMENT A

George L. Minter
Regional Vice President
External Affairs & Environmental Strategy
Southern California Gas Company
555 W. 5th Street
Los Angeles, CA 90013

June 14, 2016

The Honorable Gina McCarthy, Administrator
United States Environmental Protection Agency
William Jefferson Clinton Federal Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460
McCarthy.Gina@epa.gov

RE: Support of Petition to EPA for Rulemaking to Adopt Ultra-Low NOx Exhaust Emission Standards for On-Road Heavy-Duty Trucks and Engines (dated June 3, 2016)

Dear Administrator McCarthy:

Southern California Gas Company (SoCalGas) submits this letter in support of the above-referenced Petition filed with EPA on June 3, 2016 by the South Coast Air Quality Management District (SCAQMD), *et al*. The attainment of the federal ozone standards is vitally important to those communities in which SoCalGas operates and provides natural gas service.

SCAQMD and the California Air Resources Board (CARB) have demonstrated that attainment of the 1997 and the 2008 8-hour ozone standards in the South Coast Air Basin will be unachievable without emissions reductions from a new, ultra-low heavy-duty engine exhaust emission standard for NOx. In the South Coast Air Basin, 88 percent of regional NOx emissions come from mobile sources within the basin, and on road heavy duty diesel trucks are the largest categorical contributor.[1] CARB's Mobile Source Strategy demonstrates that implementation of all current rules will reduce NOx in the South Coast Air Basin by over 50 percent between 2015 and 2031, but that these reductions will not be sufficient to attain the ozone standards without a new federal, heavy-duty truck engine emission standard.[2]

As detailed in the Petition, a revised low NOx standard of 0.02g/bhp-hr is technologically and commercially feasible. In 2015, Cummins Westport Inc. certified the world's first heavy-duty engine at near-zero emission levels—90 percent below the existing federal standard, and certified to meet ARB's lowest-tier optional low-NOx emission standard. This "next generation" heavy-duty natural gas engine is now commercially available for transit bus, refuse, school bus, and medium-duty truck applications. Additional near-zero-emission heavy-duty natural gas engines are expected to follow by 2018, addressing a wider array of medium- and heavy-duty on-road applications.

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[1] SCAQMD, "Petition to EPA for Rulemaking to Adopt Ultra-Low NOx Exhaust Emission Standards for On-Road Heavy-Duty Trucks and Engines," (hereafter "Petition") p.12 (June 2016).
[2] CARB, "Mobile Source Strategy," p.22, 83 (May 2016).

The tailpipe emissions of heavy-duty vehicles running on these engines are as low as emissions associated with generating the electricity used to charge heavy-duty battery-electric vehicles with a state of the art generation plant. When paired with renewable natural gas, which provides the lowest carbon intensity of any transportation fuel available today, this technology has the added benefit of providing significant greenhouse gas emissions reductions (80 percent or greater).

SoCalGas supports federal leadership to implement an ultra-low heavy-duty engine emission standard for NOx in order to achieve the necessary emission reductions for the South Coast Air Basin to attain federal ozone standards.

Respectfully submitted,

George Minter
Regional Vice President, External Affairs and Environmental Strategy

cc: Christopher Grundler, Director, Office of Transportation and Air Quality, EPA
Grundler.christopher@epa.gov

Wayne Nastri, Acting Executive Officer, SCAQMD
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Lisha Smith, Deputy Executive Officer, Legislative & Public Affairs, SCAQMD
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ATTACHMENT B

SoCalGas
A Sempra Energy utility

George I. Minter
Regional Vice President
External Affairs & Environmental Strategy
Southern California Gas Company
555 W. 5th Street
Los Angeles, CA 90013

August 5, 2016

The Honorable Gina McCarthy, Administrator
United States Environmental Protection Agency
William Jefferson Clinton Federal Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460
McCarthy.Gina@epa.gov

RE: Support of San Joaquin Valley Air Pollution Control District Petition to EPA for Rulemaking to Adopt Ultra-Low NOx Exhaust Emission Standards for On-Road Heavy-Duty Trucks and Engines (dated June 22, 2016)

Dear Administrator McCarthy:

Southern California Gas Company (SoCalGas) is one of Sempra Energy's California utilities regulated by the California Public Utilities Commission. Sempra Energy, based in San Diego, California is a Fortune 500 energy services holding company.

SoCalGas is the nation's largest natural gas distribution utility, delivering clean, safe and reliable energy to 21.6 million consumers in more than 500 communities across 20,000 square miles throughout central and southern California, from Visalia to the Mexican border.

SoCalGas' service territory is located in nine of California's air districts, including South Coast Air Quality Management District (SCAQMD) and San Joaquin Valley Air Pollution Control District (SJVAPCD), which are the only extreme ozone nonattainment areas in the United States. Both the SCAQMD and SJVAPCD air districts must reduce nitrous oxide (NOx) by more than 50% in order to attain ozone and particulate matter (PM2.5) National Ambient Air Quality Standards promulgated by your agency.

SoCalGas submits this letter in support of the above-referenced SJVAPCD Petition filed with EPA on June 22, 2016. Attainment of the federal ozone and PM2.5 standards is vitally important to those communities in which SoCalGas operates and provides natural gas service.

The SJVAPCD and the California Air Resources Board (CARB) have demonstrated that attainment of the 2008 8-hour ozone standards will be unachievable without emissions reductions from a new, ultra-low heavy-duty engine exhaust emission standard for NOx. Over eighty five percent of regional NOx emissions in the SJVAPCD come from mobile sources within their air basin, and on-road heavy-heavy duty diesel trucks (HHDV) are the largest categorical contributor.[1]

[1] SJVAPCD 2016 Ozone Plan for the 2008 8-Hour Ozone Standard, Appendix B – Emissions Inventory (June 2016), http://www.valleyair.org/Air_Quality_Plans/Ozone-Plan-2016/b.pdf

As detailed in the Petition, a revised low NOx standard of 0.02 g/bhp-hr is technologically and commercially feasible. In 2015, Cummins Westport Inc. certified the world's first heavy-duty engine at near-zero emission levels—90 percent below the existing federal standard, and certified to meet ARB's lowest-tier optional low-NOx emission standard. This "next generation" heavy-duty natural gas engine is now commercially available for transit bus, refuse, school bus, and medium-duty truck applications. Additional near-zero-emission heavy-duty natural gas engines are expected to follow by 2018, addressing a wider array of medium- and heavy-duty on-road applications.

The tailpipe emissions of heavy-duty vehicles running on these engines are as low as emissions associated with generating the electricity used to charge heavy-duty battery-electric vehicles with a state of the art generation plant. When paired with renewable natural gas, which provides the lowest carbon intensity of any transportation fuel available today, this technology has the added benefit of providing significant greenhouse gas emissions reductions (80 percent or greater).

SoCalGas supports federal leadership to implement an ultra-low heavy-duty engine emission standard for NOx in order to achieve the necessary emission reductions for both the South Coast Air Basin and the SJVAPCD to attain federal ozone standards.

Respectfully submitted,

George Minter
Regional Vice President, External Affairs and Environmental Strategy

cc: Christopher Grundler, Director, Office of Transportation and Air Quality, EPA
Grundler.christopher@epa.gov

Seyed Sadredin, Air Pollution Control Officer, SJVAPCD,
Seyed.Sadredin@valleyair.org

Responses to Comment Letter from Southern California Gas Company (SoCalGas)
(Comment Letter #56)

Response to Comment 56-1:

SCAQMD staff appreciates the participation in the development of the 2016 AQMP and future participation in the implementation of the Plan strategies.

Response to Comment 56-2:

SCAQMD staff agrees that a robust mobile source strategy is critical as it has already been determined that the standards would still not be met if all stationary sources under the authority of the SCAQMD were reduced to zero. Please see Responses to Comments 30-5 and 54-2 regarding "fair share" reductions.

Response to Comment 56-3:

SCAQMD staff agrees that the fast approaching deadlines for the ozone standards will require cleaner technology that is available now so there are opportunities for near-zero technology to fulfill that need. In addition, incentives could help advance deployment of cleaner technology and assist in public acceptability. Staff modified the Plan objective to prioritize maximizing emission reductions utilizing zero-emission technologies when cost-effective and feasible and near-zero emission technologies in all other applications. Further, staff appreciates support for the incentive measures.

Response to Comment 56-4:

Staff appreciates the support for the incentive programs. Please see Response to Comment B-2 regarding the emissions inventory. Older, higher-emitting NOx equipment will be targeted by this control measure. The purpose of the incentive program is to create opportunities and make it more cost-effective to replace equipment, transition to zero or near-zero technologies, encourage earlier change-out of higher-emitting equipment, and drive technology development and cost reduction. Projects that are more cost-effective may be given priority compared to other projects with less NOx reductions and higher costs (larger incentives needed).

Response to Comment 56-5:

Staff agrees that along with the updated Plan objective discussed in Response to Comment 56-3, the incentives can assist in early deployment of advanced cleaner technologies particularly if the emission sources are smaller in size but cumulatively have an impact. The control measures referenced propose to incentivize currently available technology in the near-term and zero and near-zero cost-effective technologies in the future.

Response to Comment 56-6:

Existing programs are built into the future emission baseline projections. As SCAQMD develops and implements new incentive programs staff will work with the existing rebate program administrators to help end users leverage multiple programs. Please see Response to Comment 17-3 regarding fuel neutrality.

Response to Comment 56-7:

Chapter 10 has been updated in the Revised Draft Plan to expand the discussion on biogas and renewable natural gas. The 2016 AQMP also includes control measures CMB-03, which focuses on emissions reductions from non-refinery flares and CMB-01, which includes technologies for stationary sources, including possible incentives for biogas utilization as a transportation fuel or pipeline injection, if cost effective.

Response to Comment 56-8:

The SCAQMD staff believes that all fuels should be based on renewable fuel stocks to the greatest extent possible. As such, staff sees a need for renewable natural gas and renewable diesel. As pointed out in the State SIP Strategy and the 2012 Vision for Clean Air document, while a greater penetration of alternative fuels is envisioned out to 2050, diesel fuel trucks will remain a large contribution to the region's air quality problems due to the fact that many of these trucks are from out-of-state. SCAQMD staff will continue to work with CARB, CEC, U.S. EPA, and U.S. Department of Energy and the Commenter in evaluating the cost and benefits of all biofuels.

Response to Comment 56-9:

Staff agrees that identifying revenue sources for incentive funding is critical. The draft Financial Incentive Funding Action Plan is being developed to identify existing funding sources and potential new sources of funding.

Response to Comment 56-10:

Staff shares the interest in local manufacturers developing low-emission equipment. SCAQMD cannot dictate such an action, but could consider this during the design of incentive programs. Staff encourages participation during the incentive program development to provide suggestions and support. Staff appreciates the support in Attachments A and B to this specific comment.

Response to Comment 56-11:

56-11A: Staff appreciates the support. Staff's intent is to incentivize the replacement of older and higher emitting equipment. Please see Response to Comment 71-1 regarding CMB-01 and the incentive criteria. Staff anticipates many facilities and stakeholders will come forth and participate in the incentive programs. Once a working group is established, it will help to determine the most cost-effective means for distribution of funds to achieve emission reductions.

56-11B: Staff has revised Table 1 in the emissions inventory for stationary internal combustion engines (ICEs). Please see Response to Comment 73-2 regarding the stationary ICEs inventory.

56-11C: Please see Responses to Comments 17-3 and 83-2 regarding fuel and technology neutrality. Please see Response to Comment 83-14G regarding combined heat and power (CHP).

56-11D: Staff appreciates the support. Once a working group is formed, retrofits that are cost effective and technologically feasible may be considered for incentives.

Response to Comment 56-12:

56-12A: Please see Response to Comment 83-15C, regarding Rule 1111 and commercial space heating equipment.

56-12B: Please see Response to Comment 17-3, regarding fuel neutrality. Staff appreciates the support.

Response to Comment 56-13:

56-13A: Staff appreciates the support and notes the information provided by the commenter.

56-13B: CMB-03 is a regulatory measure for non-refinery flares. The control measure will consist of cleaning the gas that would be typically flared and using it for transportation fuel or pipeline injection or directing it to equipment that can be converted to power and/or heat, if technologically feasible and cost-effective. If all other options are infeasible, the installation of newer flares implementing the best available control technology will be required. Incentive opportunities can be made available under CMB-01. A working group will be formed during rulemaking and the SCAQMD welcomes the commenter to participate.

Response to Comment 56-14:

Staff appreciates the support and will continue to work with the commenter on high-efficiency and low emission technologies. During rulemaking, a working group will be formed to discuss the technology in detail and staff welcomes all stakeholders to participate. Please see Response to Comment 83-17A regarding residential cooking units. Please see Responses to Comments 83-6 and 83-17B regarding the cost of the incentive programs.

Response to Comment 56-15:

56-15A: Please see Responses to Comments 83-6 and 83-18 regarding cost effectiveness. The initial cost assumption was based on similar assumptions as the CARB cost effectiveness estimate mentioned in the comment. However, the revised estimate is based on Optical Gas Imaging technology supplementing conventional LDAR and does not include the cost of implementing LDAR.

56-15B: Please see Response to Comment 83-18 regarding rule development and aligning requirements.

Response to Comment 56-16:

Staff notes the information provided by the commenter.

Response to Comment 56-17:

Staff appreciates the support. During rulemaking a working group will be formed and cost effectiveness will be considered.

Response to Comment 56-18:

SCAQMD staff appreciates the comments relative to proposed measures MOB-07 and MOB-08 and incentivizing near-zero emission technologies. As the Commenter noted, there is currently an 8.9 liter natural gas engine that is 90 percent cleaner than the 2010 on-road heavy-duty engine emissions standard. The 11.9 liter natural gas engine that is 90 percent cleaner than the 2010 emissions standard is currently being prototyped with anticipated field demonstration in mid-2017.

The SCAQMD staff is currently engaged with CARB staff on funding programs for the near-zero emissions vehicles. As the Commenter is aware, the state legislature appropriated $23 million in Low Carbon Transportation Funds for low-NOx near-zero engines. In addition, the MSRC has been funding transit bus repowers with the near-zero 8.9 liter engine. Staff looks forward with working with the Commenter and affected stakeholders to further incentivize near-zero emission technologies and to the extent that commercially available zero-emission technologies are available. Zero-emission technologies may include some form of hybridization, which would include the use of near-zero emission combustion engines with zero-emission technologies.

Lastly, staff welcomes the Gas Company's participation on the various working groups that will be formed to implement the SCAQMD proposed mobile source measures including MOB-08.

Response to Comment 56-19:

SCAQMD staff thanks the Commenter for submitting the "Near-Zero Emission (NOx) Natural Gas Truck Opportunities in the South Coast Air Basin" report. The report will help inform the public on the benefits of near-zero natural gas engine technologies. SCAQMD staff will continue to work with the Commenter in the deployment of near-zero natural gas technologies and the use of renewable natural gas to help the region meet federal air quality standards.

Response to Comment 56-20:

56-20A: The portion of the chapter referenced relates to the increase in methane emissions globally. We agree that methane reacts slowly in the atmosphere, and therefore, it is not considered an important ozone precursor within an urban scale. Methane's atmospheric lifetime is over a decade. This long atmospheric lifetime and strong absorption bands within the IR regions make it a potent greenhouse gas. However, methane does eventually react like a VOC in the atmosphere and results in the formation of ozone on a more global scale. With increasing global background concentrations of methane, the background levels of ozone also increase. If global emissions of methane continue to increase corresponding to higher global background levels, the ozone levels coming into the Basin will be higher. The SCAQMD along with other agencies will continue to monitor and further study how much increasing background ozone is expected to affect the Basin's ozone levels.

56-20B: Staff agrees that power to gas is an important technology that helps incorporate higher levels of renewable resources. Chapter 10 of the AQMP discusses the important need for storage technologies to help incorporate higher percentages of renewable energy. Part of this discussion includes the importance of further developing power to gas technologies. The chapter shows the importance of power to gas technologies to help with large utility scale storage along with long term energy storage needs.

56-20C: The 2016 AQMP includes many areas focused on the further development of biogas and renewable fuels. Within the Basin, there are opportunities to further develop waste streams to produce biogas along with the better utilization of existing waste streams to not only recover biogas but also reduce emissions at these sources. There are many different types of biogas sources and technologies that can be developed along with those listed. The SCAQMD has also been working to help bring new biogas facilities online in the Basin by helping fund the development of new facilities that utilize municipal waste and food waste streams. Within the AQMP, several stationary and mobile source control measures pursue and utilize the development of biogas waste streams. The SCAQMD has been in discussions with SoCal Gas, wastewater treatment facilities, landfill operators, and others in working on better

understanding the issues surrounding the economics and need for regulatory certainty to further develop biogas sources within the Basin and in California.

Utilizing biogas for transportation sources can create a win-win for both emissions and the local economy. However, as noted, not all biofuels reduce criteria or GHG pollutant emissions. We recognize certain biofuels can potentially reduce NOx and have negative carbon pathways. We agree that it is important to study the lifecycle emissions of these fuels for not only GHGs, but also for criteria pollutants.

Comment Letter from Southern California Leadership Council (Comment Letter #57)

SOUTHERN CALIFORNIA LEADERSHIP COUNCIL

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Managing Director

August 19, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 92765

Re: Comments Concerning the South Coast Air Quality Management District's June 2016 Draft Air Quality Management Plan.

Dear Dr. Fine,

On behalf of the Southern California Leadership Council and the undersigned group of partner organizations, we thank you for the opportunity to review and comment on the June 2016 draft of the 2016 Air Quality Management Plan (the "Draft AQMP"). Our group is comprised of leading Southern California business and industry organizations.

Each of our organizations appreciates the assistance provided by, and the hard work of the able staff of the South Coast Air Quality Management District (the "District") in the many months leading up to the Draft AQMP. As we bring the issues set forth below to your attention for consideration as part of your work to finalize the AQMP, we look forward to additional helpful discussions. In particular, we applaud the District's staff for its willingness to champion incentive-based approaches to address the region's air quality challenges, and its recognition of the fact that economic considerations call for flexibility and adaptability in such far-reaching regulatory processes. 57-1

Our organizations are particularly focused on assuring that the District will continue the historically stellar progress toward safer air quality throughout the District's jurisdiction, while avoiding any and all unnecessary negative economic and societal impacts. In particular, we share the District's aim for air quality that is cleaner still; but we do so in light of the ongoing need to more fully and successfully provide employment and housing for the District's growing population. With that in mind, we applaud the District's promise to provide thorough economic analyses, including an evaluation of the AQMP's impact on jobs and job creation. Our groups will continue to work with the District and other stakeholders to assure that sound science and economic analyses are met with equally sound regulatory policies as we pursue our shared aims.

Given this backdrop, we respectfully submit the following comments at this time:

I. The District needs to provide additional information before we can fully and fairly assess, comment upon, and help the District to promulgate the AQMP.

Although the District's staff has made impressive efforts to produce and present the Draft AQMP, the presentation for public comment still excludes numerous elements that must be received by the interested public and taken into consideration. These thus-far omitted elements include the Modeling and Attainment Demonstrations Appendix, Compliance with Other Clean Air Act Requirements Appendix, the Socioeconomic Analysis, and the Program Environmental Impact Report, none of which have yet been released in draft form for public review. 57-2

Consequently, our organizations provide in this letter only the most general and basic comments, while reserving our right to provide more comprehensive, detailed and connective comments at any appropriate time when those additional elements come into view.

II. The Draft AQMP relies heavily on large amounts of funding for incentive-based emissions reduction programs without identifying and analyzing sources of needed funding.

The Draft AQMP discusses measures that are expected to be implemented through the provision of financial incentives to accelerate the penetration of, for example, zero-emission and near-zero emission technologies, and to further reduce emissions from other mobile and stationary control measures. Specifically, the Draft AQMP identifies the need for $14 billion in new funding to advance various suggested "incentive strategies." 57-3

While our organizations greatly appreciate this approach because, once again, we generally favor incentive based programs over less flexible command and control regulations, we are keenly interested in understanding and commenting upon the means by which the District might secure all such funding. Our concern is underpinned by the fact that many constituencies in the District are already hard-pressed by regulatory impositions that cumulatively harm the region's economy and add to the persistent shortage of jobs and housing.

Our organizations are also extremely concerned about the additional relative burdens that may be imposed upon various constituencies if and when tax or fee regimes might be fashioned to amass such financing. Many constituencies – particularly new and relocating industries, new development and homebuilding, and redevelopment – are already over-burdened, even without new and additional impositions. Therefore, our organizations look forward to more information and discussion about financial solutions that will square with the very broad-based societal benefits of the District's efforts to further improve air quality.

III. EMG-01, in particular, has the potential to unfold in ways that will seriously stultify development and redevelopment and harm the region's economy.

The Draft AQMP contains a vague and ambiguous discussion of a promised measure labeled as EGM-01, which puts forth the prospect of a so-called indirect source regulation. The stated purpose of this measure is to mitigate and reduce emissions from new development and redevelopment projects. The description of EGM-01 is unclear; but it implies the potential for the imposition of new fees on development and redevelopment throughout the District or, selectively and arbitrarily, perhaps in ways similar to Rule 9510 adopted by the San Joaquin Valley Air Pollution Control District.

Our organizations are generally opposed to new development and redevelopment fees that may be imposed on top of the already highly excessive costs and burdens imposed by the California Environmental Quality Act. Moreover, our organizations have long appreciated and championed the primacy of local governments' decision-making powers concerning questions of land use and development – consistent with our democratic principles, and the fact that development invariably unfolds in response to organic demand from countless quarters. 57-4

Because EMG-01 is ambiguous as set forth in the Draft AQMP, and because it hints at the prospect of an unduly heavy-handed new land use regime, our organizations urge the District to exclude this measure from the District's enforceable, federalized measures. We look forward to participating in further discussions with the District to make sure that the District's clean air goals are not seen as having such overwhelming importance as to warrant the sacrifice of venerable and sensible land use prerogatives. In addition, the District will need to be mindful of the limitations of its enabling statutes if and when it brings forward any proposal under this measure.

IV. The proposed measures denominated MOB-1 through MOB-4 and MOB-8 would harm goods movement and the industries related thereto, and should be entirely reconsidered.

Our organizations respectfully oppose the proposed control measures denominated MOB-1 through 4 and MOB-8. Efficient and economical goods movement is essential to the region's overall economy, especially given that our region is home to the busiest and most important ports in the nation. Emissions related to goods movement should be addressed gradually and nationally through fleet change incentives and reasonably paced technological change, such as the affordable, appropriately gradual adoption of fuel and engine-type changes, which can most sensibly be achieved through standards for new vehicles. To the extent that the above-referenced MOB measures might be read to invite arbitrary caps on goods movement facilities and limitations on what are truly diffuse and dynamic goods movement activities, they should be discarded. 57-5

V. The District should reconsider and recast all measures that are proposed without quantified air quality benefits. 57-6

The Draft AQMP discusses various measures for which no air quality benefits are quantified, referred to as "to-be-determined" or "TBD" measures. A broad reading of the Draft

AQMP suggests that the AQMD's implementation should be able to meet the federally imposed air quality standards even if all such TBD measures were to be forgone. Accordingly, our organizations urge the District to either forgo all such TBD measures in the AQMP, or incorporate only those for which both the costs and benefits of the measures can be identified and vetted publicly before they are included. Importantly, no socio-economic analyses can possibly be performed if there are no quantified air quality benefits from the measures at issue. Therefore, to the extent that the merits of such measures cannot be reasonably proven in the current AQMP process, such measures should be identified only as possible areas of future study and consideration. 57-6 Con't

VI. Our organizations urge the District to forgo CMB-05, which as proposed, would make adjustments to the RECLAIM program outside of the recent and very successful process for RECLAIM program amendments.

We note that the Draft AQMP includes a measure (CMB-05) that proposes to make a downward adjustment in permissible NOx emissions under the RECLAIM program applicable to stationary sources. The RECLAIM program was recently amended through a process that was, as is typical, robustly attended by all constituencies, and at which large volumes of detailed evidence was provided. More importantly, the recent amendments are the result of remarkable voluntary concessions, stakeholder engagement and broad-based agreement. In light of this, we believe that the AQMP process is not the proper vehicle through which to reconsider RECLAIM, given that the District's, its committees and Board, and all constituents' attention are spread over a much broader range of issues. Accordingly, we urge the District to remove CMB-05 as a measure, and rely instead on the existing process for future amendments to the RECLAIM program. 57-7

VII. The District needs to undertake a critical re-assessment of the burdensome federal and state air quality mandates with a view to advancing either (i) the most desirable and economical ways to comply, or (ii) the most persuasive and successful ways to challenge and correct them.

Our organizations recognize that the District is legally responsible for taking action to meet goals and stay within parameters mandated by state and federal law, particularly by the U.S. Environmental Protection Agency and the California Air Resources Board. Indeed, the District has long been tasked with trying to achieve increasingly stringent federal standards that are imposed disparately on our highly populous and economically important South Coast region. 57-8

Our organizations urge the District to take a more clear-headed and circumspect stance regarding the increasingly difficult state and federal targets and mandates that the District is being asked to meet. Many of the most recent federally imposed criteria air pollution standards have merely arguable scientific (health) justification. Respectfully, the District should be identifying these issues and effectively challenging the promulgating agencies to which it must regularly submit plans and measures.

Our South Coast region has already seen tremendous improvements in air quality in recent decades, but not without serious and unsustainable economic costs. Achieving still cleaner air

quality is reasonably possible only through careful, measured, sensible steps and with great care concerning the economic consequences. Our region's economy will be crippled if the District simply attempts to implement aggressive state and federal mandates, knowing that they will force rapid and extensive transformation on industries that are unable to accommodate such change. When warranted, the District must be willing to push back on unrealistic mandates and/or work for more reasonable and achievable pathways and timelines for reaching these aggressive targets.

57-8 Con't

VIII. Conclusion

Once again, we wish to applaud the District and its staff for the efforts concerning both the Draft and the AQMP. We look forward to your responses. We hope that future releases of the Draft 2016 AQMP will be coordinated to include all appendices and supporting documents to ensure we all are afforded a comprehensive review. We thank you for your consideration of these comments, and for your ongoing work with us and all stakeholders.

Respectfully submitted,

Richard Lambros
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SCLC SOUTHERN CALIFORNIA LEADERSHIP COUNCIL

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Bryan Starr
Sr. Vice President, Government Affairs
ORANGE COUNTY BUSINESS COUNCIL

Responses to Comment Letter from Southern California Leadership Council (SCLC)
(Comment Letter #57)

Response to Comment 57-1:

Staff appreciates the participation in the development of the 2016 AQMP and support for the incentive measures. Further, staff echoes the commenter's interest in ensuring the economic impacts, such as job loss and job creation are fully analyzed and considered.

Response to Comment 57-2:

Please see Responses to Comments 38-1 and 52-1 with regard to the timing of the release of the Plan, appendices, and various related documents, and the ability to review and comment on those documents with appropriate time.

Response to Comment 57-3:

Please see Response to Comment 26-3 with regard to the Financial Incentive Funding Action Plan. Staff appreciates the support for the incentives but also recognizes the value of a regulatory approach that establishes permanent and enforceable reductions. Staff believes there can be a balance to achieve the aims of clean air while not imposing undue burden on industry, housing and re-development.

Response to Comment 57-4:

A comment is made that proposed measure EGM-01 is vague and ambiguous. The measure is broadly drafted to provide for discussion with affected stakeholders and the public on identifying actions that can potentially result in the mitigation of emissions and potentially additional emission reductions from new and redevelopment projects. Such actions can be regulatory or voluntary in nature. As such, the measure does not propose a specific control method.

Please see Response to Comment 38-3 regarding the proposed facility-based control measure EGM-01. While the District may not dictate what land use can occur in what area, it may impose additional requirements on a source to ensure attainment of air quality standards.

Response to Comment 57-5:

Staff believes that the approach proposed to identify actions that the goods movement industry are implementing for cost savings reasons is an approach that will not harm the goods movement industry. This is one area of opportunity that will be further discussed as part of the public process.

A comment was made that "Emissions related to goods movement should be addressed gradually and nationally through fleet change incentives and reasonably paced technological change, such as the affordable, appropriately gradual adoption of fuel and engine-type changes, which can most sensibly be achieved through standards for new vehicles." Given the amount of emission reductions needed to attain federal air quality standards and the short deadlines to meet the first ozone air quality standard by 2023, there is a need to accelerate turnover of older vehicles and equipment as soon as possible. This acceleration will be much faster than typical "business-as-usual" rate of adoption of new fuels and acquisition of new cleaner vehicles. The SCAQMD staff and CARB are proposing that additional incentives funding be identified to help with this effort. In addition, actions being taken in the goods movement

industry may have emission reduction co-benefits that could be recognized in the SIP. Some of these actions may be the result of other (non-SCAQMD) regulatory requirements or to improve operational efficiency.

Response to Comment 57-6:

Please see Response to Comment 7-5 regarding the proposed SCAQMD TBD measures and Response to Comment 38-5 regarding mobile source measures.

As noted in the Socioeconomic Impact Report, several of the SCAQMD mobile measures are proposed to help meet the emission reductions associated with the State SIP Strategy "Further Deployment" measures. As such, no additional emission reductions are specifically provided for the SCAQMD mobile source measures. However, the estimated cost to achieve the emission reductions associated with the State SIP Strategy measures have been analyzed in the Socioeconomic Impact Report.

Response to Comment 57-7:

The December 2015 amendments to the RECLAIM program came as a result of a BARCT assessment. State law mandates that these BARCT assessments occur periodically in order to identify feasible and cost effective technology that can be applied to existing RECLAIM sources to achieve program equivalency. RECLAIM amendments in the past have resulted from control measures of previous AQMPs. The RECLAIM rulemaking will go through a public process.

Response to Comment 57-8:

Staff acknowledges the commenter's opinion of challenging agencies promulgation of new air pollution standards, but that action would not preclude the need to comply with existing requirements to meet the current ozone and PM2.5 standards. Further, the approval of the federal standards is a long public process. The Clean Air Act requires the periodic review of the standard such that all of public health studies are conducted and reviewed in the public domain. This review is also conducted by an independent panel of Clean Air Scientific Advisory Committee (CASAC) who makes recommendations to U.S. EPA before U.S. EPA decides how to proceed. Staff would encourage those interested in the development of the standards and those concerned regarding the stringency of the standards to participate in this process. Currently, there is a review of the PM air quality criteria and standards. An Integrated Review Plan (IRP) was released this year for public review and comment. Please access the following link to download the IRP: https://yosemite.epa.gov/sab/sabproduct.nsf//LookupWebProjectsCurrentCASAC/EB862B233FBD0CDE85257DDA004FCB8C?OpenDocument. There will be three more accompanying documents to be released over the next three years for public input before any potential rulemaking would take place.

Comment Letter from the Truck and Engine Manufactures Association (Comment Letter #58)

STATE OF CALIFORNIA
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

SCAQMD's Draft 2016 Air Quality Management Plan	))	**Comment Deadline: August 19, 2016**

COMMENTS OF
THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

August 19, 2016

Jed R. Mandel
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STATE OF CALIFORNIA
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

SCAQMD's Draft 2016 Air Quality Management Plan	))	**Comment Deadline: August 19, 2016**

COMMENTS OF THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

Introduction

The Truck and Engine Manufacturers Association ("EMA") hereby submits its comments on the Draft 2016 Air Quality Management Plan (the "Draft AQMP") that the South Coast Air Quality Management District ("SCAQMD" or the "District") released for public review on June 30, 2016.

EMA is the not-for-profit trade association that represents the world's leading manufacturers of internal combustion engines, and the vehicles and equipment that those engines power, other than passenger cars. Heavy-duty on-highway ("HDOH") engines and vehicles are included among the broad array of products that EMA's members design and manufacture. Inasmuch as one of the core regulatory strategies at the heart of the Draft AQMP is the adoption of new low-NO_x emission standards for HDOH engines – indeed, the SCAQMD has petitioned the U.S. EPA to initiate a rulemaking to adopt such standards – EMA's members have a direct and very significant interest in ensuring that the Draft AQMP is based on accurate, well-reasoned and validated emissions inventory assumptions and modeling. As discussed in detail below, that is not the case.

The Draft AQMP, as it relates to HDOH engines and vehicles, is premised on significant over-estimations of future ozone levels in the South Coast Air Basin ("SCAB"). The SCAQMD and the California Air Resources Board ("CARB") have derived those over-estimations from their use and application of the Community Multi-Scale Air Quality ("CMAQ") model, which, as applied in this context, consistently has over-predicted future ozone levels in the SCAB for many years, including as recently as 2012 when CARB and the SCAQMD developed their last SIP submissions. In light of those consistent over-predictions of ozone, the SCAQMD's assertion (including in its rulemaking petition to EPA) that ozone attainment requires an additional 90% reduction in NO_x emissions from HDOH engines and vehicles – over and above the rigorous NO_x-control regulations that are already in place – is not supported by the facts. While some future HDOH emission requirements may prove to be warranted and reasonable, the assumed premise for adopting a 90% lower NO_x standard in 2019 is incorrect. 58-1

CARB's EMFAC model – the tool for estimating future levels of individual precursor emissions, and in particular NO_x – also is over-estimating the magnitude of future-year emission inventories, and is utilizing emission inputs and related data that are significantly out-of-date. This, too, is a fundamental problem that needs to be remedied before the District proceeds to adopt any specific menu of SIP strategies, especially strategies that it estimates will cost well in excess of $38 billion, including almost $14 billion in incentive funding.

The following detailed comments on the Draft AQMP focus on eight main points. Certain of those points overlap with the comments that EMA previously submitted regarding CARB's 2016 SIP Strategy. A copy of EMA's earlier comments on the CARB SIP Strategy is attached as Exhibit "A," and is incorporated by reference into these comments.

1. The SCAQMD Needs To Extend The Current Deadline For Comments

The August 19th deadline that the SCAQMD has established for comments on the Draft AQMP is not reasonable. In particular, the District has not yet made available the critically important "Appendix V" materials (referred to as the District's "Modeling and Attainment Demonstrations"), which contain the "detailed information on the modeling approach, data retrieval, model development and enhancement, model application, emissions inventory development, and interpretation of results." (Draft AQMP, p.5-3.) In essence, Appendix V contains virtually all of the relevant detailed information relating to the accuracy and validity of the Draft AQMP. Yet it is not available for review in advance of the comment deadline. Indeed, it appears that the Appendix V materials will not be available until weeks after the comment deadline. 58-1 Con't

That is not consistent with the requirements of administrative due process. The District should extend the comment deadline on the Draft AQMP to a date that is at least 30 days after the public release of all of the Appendix V materials, and the District's draft response to comments should be discussed within the Scientific Technical Modeling Peer Review (STMPR) Advisory Group before the District's responses are included in any draft final 2016 AQMP.

2. The AQMP Should Include Scientific Validation Of The Approach Used To Estimate Future Ozone Design Values (DVs), And Should Correct For Any Identified Discrepancies

Review of the District's current and past AQMP attainment modeling efforts indicates that the model-derived results consistently under-estimate projected ozone reductions and over-estimate needed emission reductions. (See Exhibit A.) In particular, analysis of the current Draft AQMP indicates that it continues the trend of under-estimating future ozone reductions and, thus, over-estimating absolute ground ozone levels in the applicable attainment years (2023 and 2031). This necessarily yields incorrect conclusions regarding the extent to which multi-billion dollar controls and incentives are required to reach attainment in the SCAB. 58-2

The SCAQMD should undertake the necessary efforts to validate the operative predicted ozone reduction rates by comparing modeled backcasts against measured historic ozone design values ("DVs"), and should caveat the District's model-based attainment projections accordingly. Simply stated, and as detailed below, the discrepancies between modeled and measured levels of ozone and NO_x in the SCAB are too significant at this juncture to allow for the adoption or implementation of multi-billion dollar public policy choices based on that modeling.

Accordingly, the SCAQMD should not finalize the Draft AQMP until such time as the latest modeled projections can be fully assessed and validated. To that end, and before seeking Board approval of the Draft AQMP, the SCAQMD should utilize the validation methods and analyses that U.S. EPA recommends, including "dynamic evaluations" that assess and take into

account the past performance of air quality modeling efforts. If such validation shows that the 2016 AQMP models under-predict ozone trends going back in time 10 to 15 years (backcasts), we recommend that the forecasts be adjusted accordingly.

The potential under-estimates in ozone reduction rates (which appear to be on the order of 2 times or more) could result in billions of dollars being spent unnecessarily. Thus, we also recommend that prioritized modeling and technical research studies be initiated as soon as possible, and that the appropriate qualifiers be included in the Draft AQMP stating that any enforceable emission reduction commitments will be subject to revised and improved attainment demonstrations. In that regard, EMA appreciates the meeting that was held on May 26, 2016, with experts from Ramboll-Environ and Sonoma Technologies Inc. ("STI"), and with the SCAQMD modeling team, during which we discussed the need to assess and validate the relevant CMAQ-based results, and agreed in principle to collaborate on the recommended type of modeling validation efforts. The statement of work that Ramboll/STI have prepared to undertake the validation work at issue is attached as Exhibit "C." EMA looks forward to iterating with the District staff as this important work proceeds. 58-2

The recommended validation work is not simply an academic exercise. The costs of erroneous projections are extremely high. In fact, the SCAQMD is anticipating that its Draft AQMP will have an implementation price tag exceeding $38 billion. Those enormous costs raise very serious questions about the unintended adverse consequences of inaccurate air quality modeling and emission inventory estimates. Those questions become even more pointed when the actual current rate of progress in reducing ozone levels is considered.

3. The Current And Recent AQMPs Significantly Underestimate Ozone DV Rates of Reduction When Compared Against Measured SoCAB Ozone DVs

As noted above and as detailed in Exhibit A, the CMAQ modeling tool, as applied in this context, is yielding significantly different results compared to the trends in actual observed and measured ozone concentrations. Unless the SCAQMD can point to new validation efforts demonstrating that the "updated modeling platform" is significantly better at predicting future trends or rates of ozone reductions/increases over time, there is no basis for assuming that the past over-estimates of future ozone levels will not continue. In the past (i.e., the 2012 AQMP), Appendix V was used to show the accuracy (uncertainty) of models as assessed against the "base year" (2008 in that case). However, that type of "base year" validation—which really only amounts to a re-anchoring of the model to updated inventory numbers – does not assess the accuracy of the model with respect to actual forecasts or backcasts. It is that type of "dynamic" validation work that is required. Of course, in this instance, as already noted, the relevant Appendix V materials are not even available. 58-3

At page 5-3 of the AQMP, the District states: *"The trend of Basin ozone design values is presented in Fig 5-1. The 8-hour design values have averaged a reduction of approximately 2.3 ppb per year over the 14-year period..."*

The referenced "14 year period" covers the years from 2001 through 2014. While the District highlights the average rate of ozone DV reductions over that time period, the District fails to acknowledge that the previous 2007 and 2012 AQMPs, as well as the current Draft AQMP, continue to predict rates of ozone design value ("DV") reductions that are much lower than those actually measured (see chart below). A review of the three most recent AQMPs shows that the model-predicted ozone DV reduction rates have been as follows:

2007 AQMP: 1.38 ppb per year (years 2002 to 2023)
2012 AQMP: 0.60 ppb per year (years 2008 to 2023)
2016 AQMP: 0.73 ppb per year (years 2012 to 2023)

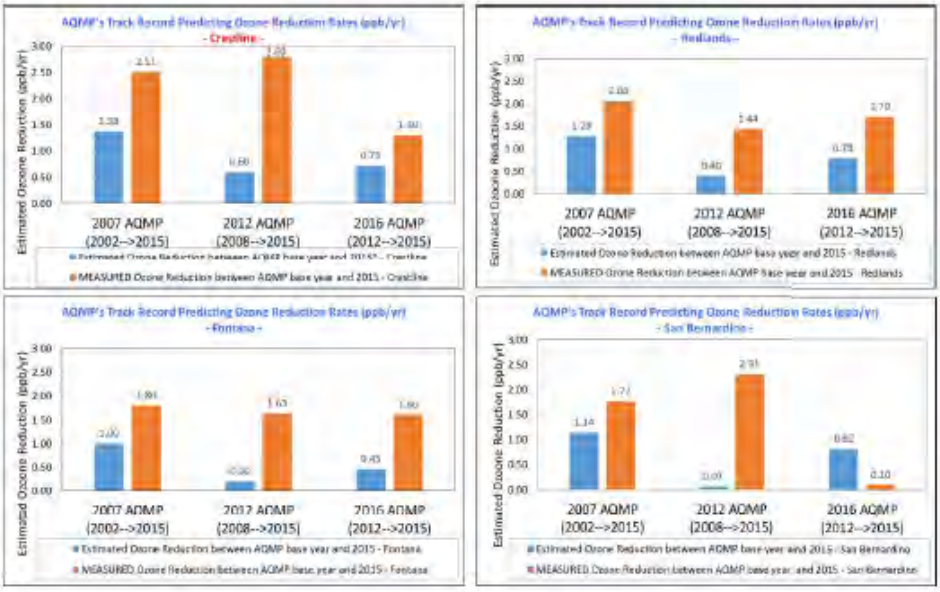
To evaluate the accuracy of the above CMAQ-derived ozone DV trend predictions, we have used the following data, assumptions and analytical methods:

- The 2007 AQMP contains predicted ozone DV changes from 2002 to 2023
- The 2012 AQMP contains predicted ozone DV changes from 2008 to 2023
- The 2016 Draft AQMP contains predicted ozone DV changes from 2012 to 2023
- Actual measurements of ozone changes (reductions) between 2002 and 2015 are readily available from CARB and District databases
- Prior analysis by Ramboll-Environ (see Exhibit A, p.5, and Exhibit "B," which is an enhanced excerpt from Exhibit A), using 2012 AQMP CMAQ-ready files, has shown that ozone predictions between 2001 and 2023 are fairly linear (i.e., the slope of reductions between 2001-2014 is almost the same as the slope between 2014 and 2023 for all the SCAB monitoring sites). It is thus likely that the AQMPs' predictions of ozone changes between 2002, 2008, or 2012 to 2023 also are fairly linear
- AQMP ozone reductions can be calculated between the base year and 2023, and, for this analysis, the reduction rate is assumed to be the same between the base year and 2015 (linearity)
- Using this approach, we can compare ozone DV reduction rates (ppb/year) between the various AQMP's predictions and those actually measured at the critical monitoring sites in the SCAB for the relevant years used in each AQMP
    - For example, the blue bar depicting the 2016 Draft AQMP's estimated ozone reductions for Crestline (0.60 ppb/yr) (see chart below) is calculated as follows: subtracting the 2023 Baseline DV (Table 5-2) from the 2012 5-yr (baseline) Weighted DV (Table 5-1), and then dividing by 11 years (2023-2012). This resulting 0.60 ppb/yr reduction rate is assumed to be the same between 2012-2015 and 2015-2023. Ongoing work by Ramboll Environ will look to confirm that this linearity assumption remains valid (similar to the linearity demonstrated between 2008 and 2023 using the 2012 AQMP CMAQ database, as depicted in Exhibit B)
- The actual measured DVs between either 2002, 2008, or 2012 and 2015 are estimated using the slope of a linear regression calculation applied to each ozone data set

58-3 Con't

- It is recognized that the 2012-2015 period does not offer enough years to obtain a very robust estimate of ozone DV reductions (ppb/yr). Nevertheless, the comparisons can be made, keeping this caveat in mind

Using the approach described above, the following charts compare ozone DV reductions (ppb/year) between the various AQMP predictions and the actual corollary measurements obtained at the key air quality monitoring sites in the SCAB:



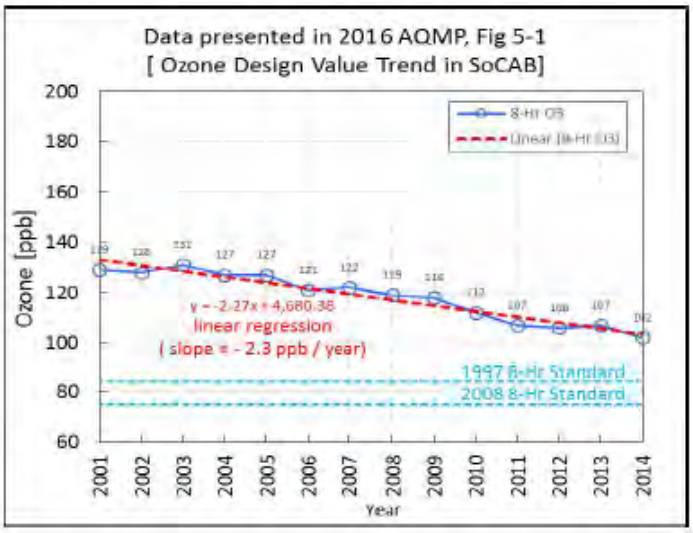
58-3 Con't

The foregoing clearly indicates that the Draft AQMP is predicting very slow reduction rates in ozone DVs similar to the previous AQMPs. In the case of Crestline, for example, the current modeling predicts a reduction rate of just 0.73 ppb/year. However, a review of CMAQ-predictions versus measured ozone DVs over the last decade, as depicted above, does not support the model predictions. The measured reductions are nearly 2 times greater. Moreover, there is no evidence presented in the Draft AQMP to increase the level of confidence in the more recent predictions. To the contrary, it remains likely that the reduction rates predicted for the various monitoring sites in the SCAB are still under-predicting reality to a significant extent.

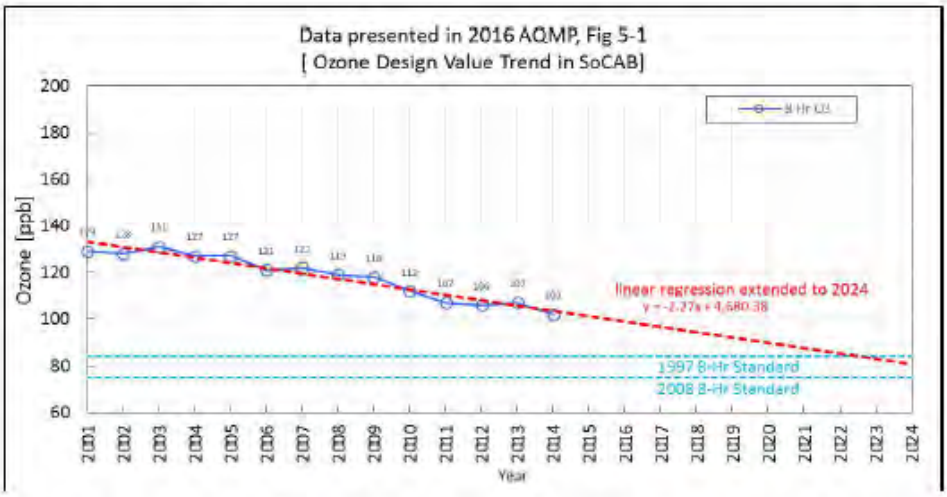
4. If The AQMP Under-Estimates Future Ozone DV Reduction Rates, The SCAB Is Closer To Ozone Attainment In 2023 And 2031

The Draft AQMP states (at p.5-4) that the measured 8-hour ozone design value in the SCAB has been declining at a rate of 2.3 ppb per year over the 14-year period from 2001 to 2014. At that same rate, the ozone level at Crestline (which was 101 ppb in 2014) would be 80 ppb in 2023 and 62 ppb in 2031. That rate of decline would result in an ozone level that would be well below the targeted attainment level in 2031 (of 75 ppb) and in attainment with the applicable NAAQS in 2023 (i.e., a DV less than 85 ppb), without any additional control measures. While expecting a constant 2.3 ppb/year reduction between 2012 and 2023 may not be reasonable, a rate of 0.73 is more unlikely based on the analyzed data to date.

Figure 5-1 from the Draft AQMP shows the ozone DV trend, and compares it against the 1997 8-hr standard (84 ppb when accounting for allowable rounding). Figure 5-1 is reproduced below. For clarity, we have added labels to each data point. We have also included a linear regression through the data (which yields the estimated 14-year ozone-reduction slope of -2.3 ppb/year). It is interesting to note that the DV during those 14 years was set by Crestline each year, except in 2013. In that year, Crestline's DV was 102 ppb while Redlands' DV was 107 ppb. The ozone DV rate of reduction for Crestline during that time period was -2.42 ppb/year. 58-4



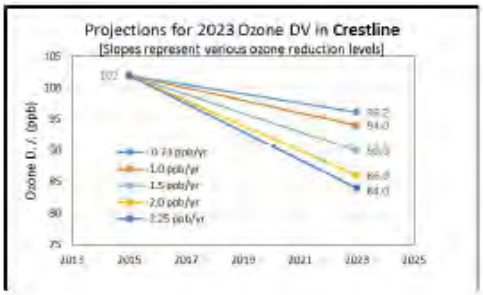
For additional insight, the same data shown are below, extended to 2024, the year when attainment with the 1997 8-hr ozone standard of 84 ppb must be demonstrated. When the established trend is extended to 2024, the DV appears to meet the 1997 8-Hr standard on time.

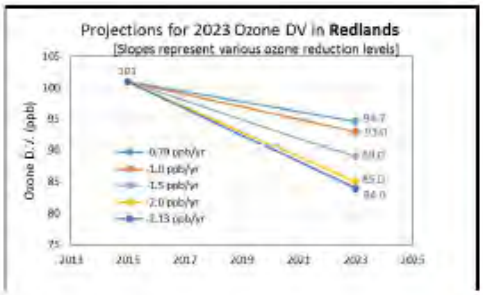


While we have heard from CARB and SCAQMD staff that the measured ozone DV trends are expected to change (slow down) in the future, and already are changing in some monitoring stations, the fact remains that CMAQ-modeled results, as derived for prior AQMPs, have significantly under-predicted the pace of ozone DV reductions. The 2012 AQMP discussed an expected slowing of the ozone DV reduction rates beyond 2008. However, those slower-paced reductions were not confirmed by the subsequently measured data. Significantly, the 2012 AQMP did include emissions inventory updates to account for the 2008-2010 recession, so the recession cannot serve as a potential rationale for the significant discrepancies between AQMP-estimated and actual (measured) ozone DV reductions.

58-4 Con't

There are other ways to explore this same fundamental concern. For example, the chart below illustrates the estimated ozone DV levels for Crestline and Redlands in 2023. Since the actual ozone DVs for 2015 are already known (102 and 101 ppb, respectively, pursuant to CARB's published records), one can predict the 2023 ozone DVs assuming various reduction rates. The Crestline chart shows that the Draft AQMP-predicted rate of 0.73 ppb/yr results in a 2023 ozone DV of 96.2 ppb (12 ppb above attainment). However, if the 0.73 ppb/yr is under-estimated, and, if for instance, the real reduction rates between 2015 and 2023 are more on the order of 1.5 ppb/yr, the 2023 ozone DV would be 90 ppb (just roughly 6 ppb out of attainment). Furthermore, if the actual reduction rate between 2015 and 2023 ends up being closer to 2.25 ppb/yr, Crestline would be in full attainment with the 84 ppb standard. Similar conclusions can be drawn for Redlands or any other monitoring station in the SCAB. These seemingly small differences in 2023 ozone levels can have a profound effect on the necessary extent and cost of attainment-strategy emission reductions. All of this cautions against finalizing a $38 billion AQMP (including $14 billion in incentive funding) before all of the significant modeling uncertainties at issue are resolved.





58-4 Con't

5. The Current AQMP Is Targeting A NO_x Carrying Capacity Based On A 82.0 ppb Ozone Level Instead Of A 84.9 ppb Ozone Level

Other salient facts underscore that the District is over-stating the need for future ozone reductions. For example, in Table 5-2 of the Draft AQMP, the CMAQ modeling that the District is relying on to frame the Draft AQMP has yielded ozone DVs that are below the required regulatory target in 2023, which is 84.9 ppb. Under the District's modeling, the maximum DV (in Table 5-2, Fontana) is reduced to 82 ppb. While that might not appear to be significant on its face, a 2.9 ppb ozone differential corresponds roughly to 20 tons per day ("tpd") of NO_x, which means that the 2023 NO_x carrying capacity should actually be 170 tpd, not 150 tpd as the District claims in the Draft AQMP. That 20 tpd difference amounts to a 13% increase in the SCAB's actual NO_x carrying capacity. Viewed another way, if the District properly calibrated its modeling to match up with the actual point of ozone attainment in 2023 (84.9 ppb), the necessary reductions in NO_x from the baseline would be 32%, not 43% as stated in the Draft AQMP (at page 5-9).

58-5

When coupled with the District's significant over-predictions of future ozone levels, the over-statement of potentially necessary NO_x reductions makes it all the more evident that the Draft AQMP is not sufficiently sound or accurate enough to stand as the basis for public policy choices that the District estimates will cost approximately $38 billion.

6. The AQMP Needs To Include A Quantitative Uncertainty Analysis Of Baseline And Future-Year Emission Estimates

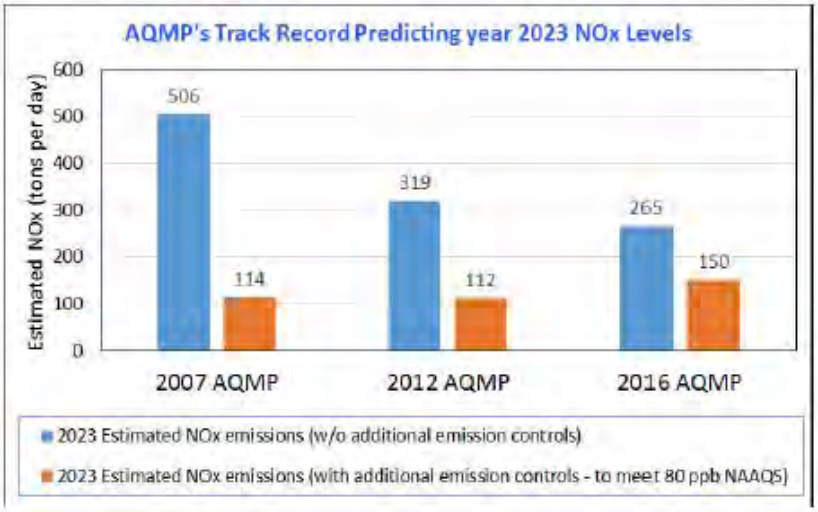
While a section of Chapter 3 of the Draft AQMP entitled "Uncertainties in the Emissions Inventory" stresses the importance of an accurate inventory and describes general improvements to emissions models, the District fails to include any quantitative uncertainty estimates for the baseline or future-year emissions estimates. Similarly, the District does not discuss or attempt to quantify the uncertainties associated with the methods and datasets used to prepare the emissions estimates for air quality modeling (e.g., spatial and temporal allocation, and chemical speciation).

58-6

Of particular interest are the uncertainties associated with the on-road mobile source emissions estimates that are generated from EMFAC2014. Mobile source NO_x emissions estimates are an area of active research, and several recent studies have found that photochemical grid modeling results show better agreement with ambient monitoring data when NO_x emissions are decreased by 50% or more (See Anderson et al., 2014; Kota et al., 2014; Canty et al., 2015; Jacob

et al., 2015)[1]. Generally, those studies attribute the NO_x overestimates to the mobile source sector. For example, Anderson et al. (2014) suggest that emission control systems deteriorate more slowly than is assumed in EPA's MOVES. In Exhibit A, EMA has highlighted similar concerns relating to the over-stated zero-mile emission rate, and the over-estimated tampering, malfunction and malmaintenance ("TM&M") rates incorporated into EMFAC2014.

While page 3-9 of the Draft AQMP states: *"forecasts are made with the best information available; nevertheless, there is uncertainty in emissions projections,"* this section on uncertainties does not describe or quantify the specific uncertainties related to the District's emissions forecasts. That omission is especially concerning given the dramatic differences in future-year emission projections among the various versions of the AQMP. For example, as shown on the chart below, for the same future-year of 2023, the 2007, 2012, and 2016 AQMPs project baseline NO_x emissions of 506 tpd (2007), 319 tpd (2012), and 265 tpd (2016) – results that vary by nearly 50%.[2] Because those NO_x emissions projections play a critical role in the accuracy of modeled future-year ozone projections, additional understanding of the significant differences in forecasted NO_x emissions is required before finalizing the Draft AQMP.



58-6 Con't

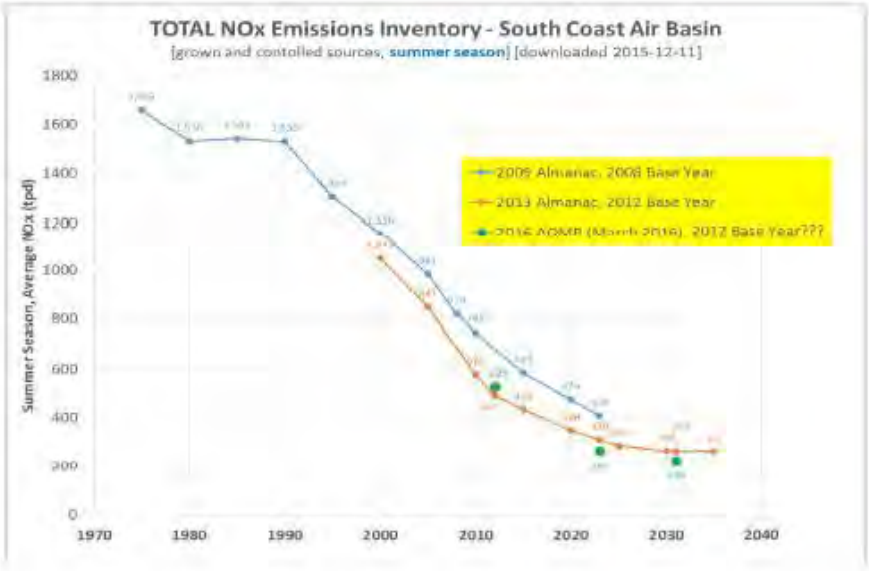
[1] Canty, et al., "Ozone and NO_x Chemistry in Eastern US: Evaluation of CMAQ/CB05 with Satellite (OMI) Data," Atmos. Chem. Phys., 15: 10965-10982 (2015); Anderson, et al., "Measured and Modeled CO and NO_y in DISCOVER-AQ: Evaluation of Emissions and Chemistry Over the Eastern U.S.," Atmos. Environ., 96:78-87 (2014); Kota, et al., "Evaluation of On-Road Vehicle CO and NO_x National Emission Inventories Using and Urban-Scale Source-Oriented Air Quality Model," Atmos. Environ., 85:99-108; Zhou, et al., "Reconciling NO_x Emissions Reductions and Ozone Trends in the U.S., 2002-2006," Atmos. Environ., 70:236-244 (2013); and Jacob, et al., "Factors Controlling PM and Ozone Over the Southeast US as Emissions Decrease: Insights From the NASA SEAC^{4}RS Campaign," EPRI Envision Conference (2015).

[2] Even accounting for the various emission control regulations adopted between the 2007 AQMP and the 2016 Draft AQMP, the baseline NO_x emission projections would still vary by more than 100 tpd (more than 35%).

7. The Impact Of The 2008-10 Recession Was Already Accounted For In The 2012 AQMP, And Should Not Be Considered An Improvement To The 2016 AQMP Modeling

At page 5-8 of the AQMP, the District states: *"... Lower 2023 baseline VOC and NOx emissions in the 2016 AQMP relative to the 2012 AQMP reflect the impact of the recession occurring between 2008 and 2010."* That is not accurate.

Review of the 2012 AQMP reveals that the emissions inventory used for that analysis was based on the 2013 CARB Almanac. Significantly, that set of inventory numbers already appears to have accounted for the 2008-2010 recession. The figure below shows a comparison of NO_x inventory values from the 2009 and 2013 Almanacs, along with the most recent NO_x values used in the Draft AQMP. It is clear that the 2013 Almanac NO_x emissions (which were used for the 2012 AQMP) show an "additional reduction" of NO_x between the 2008 and 2010 time frame. The NO_x slopes of the 2009 and 2013 Almanac values are clearly different during the recession period. Additionally, the NO_x values used in the Draft AQMP (shown in green) seem to line up quite closely to those of the previous inventory. From this, it seems unjustified to attribute the NO_x inventory changes in the 2016 AQMP model to the 2008-2010 recession. 58-7



8. The Targeted 43% Reduction in NO_x Levels Could Not Start Prior To 2017

The red line in Figure 5-24 of the AQMP (reproduced below) shows the necessary "glide path" to achieve an additional 43% reduction in NO_x levels by 2023, and indicates a baseline NO_x level on the order of 390 tpd in 2015. However, that baseline number has not been achieved based on current inventories. Similarly, the expectation of a gradual decrease in NO_x (red line) between 2012 and 2023 is not realistic. Accordingly, if the targeted 43% reduction in NO_x (already overstated, as noted above) is to be achieved, it will have to take place at the tail end of the 2012-2023 time period, which would more accurately describe the emission reduction challenge suggested by the current Draft AQMP's attainment modeling. Figure 5-24 should be revised so that the red dashed line begins in 2017 and is consistent with the emission reduction timing described in the Draft AQMP's descriptions of the proposed control measures.

58-8



FIGURE 5-24

SUMMER PLANNING BASELINE EMISSIONS AND OZONE CARRYING CAPACITY

Conclusion

EMA appreciates the opportunity to submit comments on the Draft AQMP, but requests that the comment deadline be extended to allow for a full and fair review of the vitally important Appendix V materials. In addition, EMA urges the District not to finalize the Draft AQMP until such times as the very significant ozone modeling issues can be more fully assessed and resolved. In that regard, EMA is committing significant resources to fund additional research (to be performed by Ramboll Environ and Sonoma Technology, Inc.) into the magnitude and potential causes of the discrepancies between modeled and measured ozone values in the SCAB. An outline of the Ramboll/STI research plan is attached as Exhibit "C." As discussed at the meeting held on May 26, 2016, EMA would welcome the opportunity to collaborate and iterate on this important research initiative with the District staff, and we would welcome any feedback on the scope of work at issue.

In sum, it is clear that CMAQ, as applied by CARB and the SCAQMD, does (and will) over-predict future ozone levels in the SCAB. Consequently, the District's CMAQ-based assertions (and petition) that an 80% reduction in NO_x emissions is required to reach NAAQS attainment, and that the NO_x standard for HDOH engines must be reduced by 90% to hit that 80% reduction target, are both derived from significant over-predictions of what ozone (and NO_x) levels will be in 2031. From that, it also follows that the SCAQMD's (and CARB's) intent to enter into binding SIP commitments to adopt a new low-NO_x standard for HDOH engines (at a 0.02 g/bph-hr level) is based on an incorrect premise.

The Draft AQMP, therefore, should not be approved in its current form. In fact, and as noted above, given the consistent history of deriving over-stated results from the application of CMAQ, the Draft AQMP should not be finalized or approved until such time as CARB and the SCAQMD can complete and publish a thorough validation and dynamic evaluation of its 2016 ozone modeling efforts, as recommended by EPA, and until the results of the research proposed by Ramboll/STI can be fully considered.

Respectfully submitted,

TRUCK AND ENGINE
MANUFACTURERS ASSOCIATION

EXHIBIT A

STATE OF CALIFORNIA
AIR RESOURCE BOARD

Proposed 2016 State Strategy	)	**Board Hearing Date:**
for the State Implementation	)	**September 22, 2016**
Plan, and Draft Environmental	)	
Analysis (Appendix B)	)	

COMMENTS OF
THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

July 18, 2016

Jed R. Mandel
Timothy A. French
Truck and Engine Manufacturers Association
333 West Wacker Drive, Suite 810
Chicago, Illinois 60606

STATE OF CALIFORNIA
AIR RESOURCE BOARD

Proposed 2016 State Strategy for the State Implementation Plan, and Draft Environmental Analysis (Appendix B)	))))	**Board Hearing Date: September 22, 2016**

COMMENTS OF THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

Introduction

The Truck and Engine Manufacturers Association ("EMA") hereby submits its comments on the Proposed 2016 State Strategy for the State Implementation Plan, and the accompanying Draft Environmental Analysis (hereinafter, the "2016 SIP Strategy") that the California Air Resources Board ("CARB") made available for public comment on May 17, 2016. EMA appreciates the opportunity to submit these comments on the 2016 SIP Strategy, and is doing so to help improve the accuracy and reasonableness of CARB's strategic plan to continue to improve air quality throughout California. EMA looks forward to following up with CARB staff on the important issues identified in these comments.

EMA is the not-for-profit trade association that represents the world's leading manufacturers of internal combustion engines, and the vehicles and equipment that those engines power, other than passenger cars. Heavy-duty on-highway ("HDOH") engines and vehicles are included among the array of products that EMA's members manufacture. Since a linch-pin of the 2016 SIP Strategy is the proposed adoption of new low-NO_x emission standards for HDOH engines, EMA's members have a direct and substantial interest in ensuring that the 2016 SIP Strategy is based on well-reasoned and validated emissions inventory assumptions and modeling. As explained below, that is not the case.

The 2016 SIP Strategy, as it relates to HDOH engines and vehicles, is premised on significant over-estimations of future ozone levels in the South Coast Air Basin ("SCAB"). CARB has derived those over-estimations from its use and application of the Community Multi-Scale Air Quality ("CMAQ") model, which, as applied by CARB, consistently has over-predicted future ozone levels in the SCAB for the past 25 years, including as recently as 2012 when CARB developed its last SIP submissions. In light of those consistent over-predictions of ozone, CARB's assertion that ozone attainment requires an additional 90% reduction in NO_x emissions from HDOH engines and vehicles – over and above the rigorous NO_x-control regulations that are already in place – is simply not supported by the actual facts. While some future HDOH emission requirements may prove to be warranted and reasonable, the assumed premise for adopting a 90% lower NO_x standard in 2019 is flawed and incorrect.

CARB's EMFAC model – the tool for estimating future levels of individual precursor emission, and in particular NO_x – also is over-estimating the magnitude of future-year emission inventories, and is utilizing emission inputs and related data that are significantly out-of-date. This, too, is a fundamental problem that CARB should remedy before adopting any specific menu of SIP strategies, especially strategies that are estimated to cost in excess of $10 billion.

CARB's assertion that it is justified in proposing to adopt non-aligned "Phase 2" greenhouse gas ("GHG") emission standards for HDOH vocational vehicles is similarly flawed. Specifically, CARB asserts that it intends to "layer additional requirements for vocational vehicle aerodynamics onto the federal Phase 2 program." (2016 SIP Strategy, p. 52.) That proposal is unreasonable.

The feasibility and cost-effectiveness of the Phase 2 GHG program (which will be finalized near the end of July) is premised upon complete alignment and harmonization between U.S. EPA and CARB. HDOH vehicle manufacturers cannot afford to build separate vehicles to meet California's purported need for unique incremental GHG requirements. Moreover, the notion that enhanced aerodynamics features are suitable for vocational vehicle applications is wrong. The very broad array of vocational vehicle applications, from dump trucks and garbage trucks to transit buses and school buses, and the urban and multi-purpose drive cycles over which they operate, are fundamentally ill-suited to enhanced aerodynamics. That is the reason why U.S. EPA -- which in this instance has the exact same regulatory interest as CARB -- eschewed requiring enhanced aerodynamic performance for vocational vehicles. Putting a vocational vehicle on California roads or placing that vehicle under CARB's jurisdiction does not change the fundamental aerodynamic limitations under which vocational vehicles operate.

CARB Has Failed To Provide
For A Fair Notice And Comment Process

As an initial matter, CARB has failed to provide for a fair and reasonable notice and comment process relating to the 2016 SIP Strategy. Specifically, CARB has based its 2016 SIP Strategy, and each of the proposed control measures, on the numerous modeling files and results that CARB and the SCAQMD have developed for the SCAQMD's 2016 Air Quality Management Plan ("AQMP"). While the text of the AQMP was just released on June 30, 2016, the underlying modeling files and results have not been made available for public review and comment. That is a clear abrogation of administrative due process, and should require a new notice and comment process when the data and methods underlying the 2016 AQMP become publicly available. In that regard, all of the modeling methods, data and results that CARB and the SCAQMD are relying on their preparation of the 2016 AQMP and SIP Strategy (including all "Appendix III" and "Appendix V" materials) should be released for public scrutiny as soon as possible.

CMAQ Over-Predicts
SCAB Ozone Levels

CMAQ modeling is the cornerstone of the 2016 SIP Strategy. In that regard, "ARB and the South Coast have been collaborating on air quality modeling to provide estimates of the reductions needed to attain the ozone and $PM_{2.5}$ standards." (2016 SIP Strategy, p.12.) The resultant estimates from those collaboratory modeling runs of the necessary emission reductions are very large. As CARB explains:

> Current modeling indicates that NO_x emissions will need to decline to approximately 130 tons per day (tpd) [in the SCAB] in 2023, and 90 tpd in 2031 to provide for attainment in the remaining portions of the region that do not yet meet the standards. Reaching these levels will require an approximate 70 percent reduction from today's levels by 2023, and an overall 80 percent reduction by 2031. (Id.)[1]

Based on those same modeling efforts, CARB is proposing to adopt in 2019 low-NO_x standards that will "provide 90 percent overall NO_x emission reductions from the current engine and emission control technologies." (2016 SIP Strategy, p.49.) "For heavy-duty vehicles, the State SIP Strategy calls for combustion engine technology that is effectively 90 percent cleaner than today's standards." (2016 SIP Strategy, p. 4.)

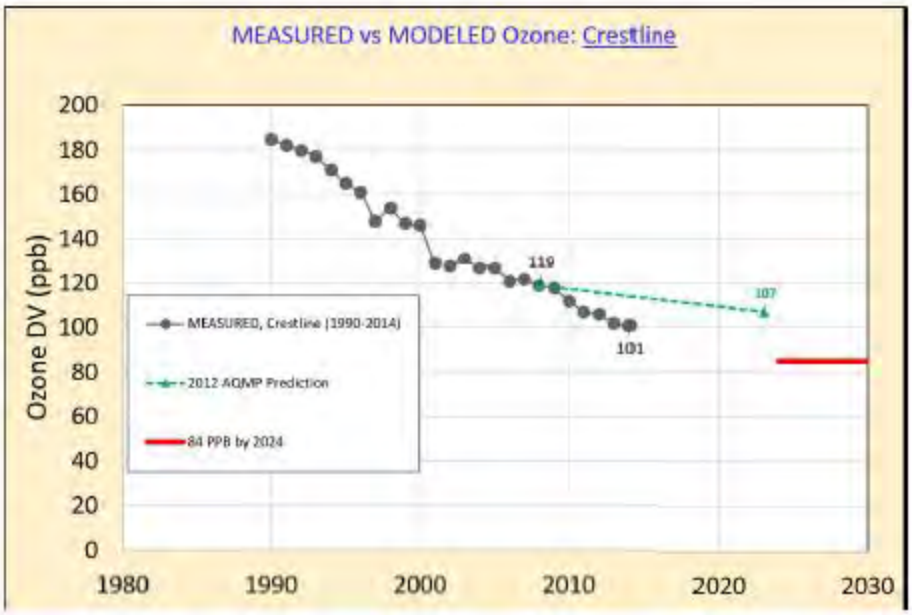
As noted above, CARB's call for an additional 90% reduction of the NO_x standard applicable to HDOH engines is premised on its utilization and application of CMAQ in a manner that consistently has over-predicted future ozone levels in the SCAB. EMA has worked with leading experts from Ramboll Environ to develop comprehensive analyses comparing CMAQ-modeled levels of ozone in the SCAB against actual monitored levels of ozone in the SCAB (hereinafter, the "Ramboll Analysis"). In addition, EMA is working with Sonoma Technology, Inc. ("STI") to perform additional analyses of NO_x and VOC trends, and to develop detailed comparisons between the available ambient data and the modeled emissions inventories for the SCAB. The Ramboll Analysis shows that, dating back to 1990, monitored levels of ozone have declined at a rate (ppb/year) that is 2 times faster than the CMAQ-modeled levels. The performance of CMAQ has been even worse over the more recent time period (2008-2014), during which time the observed and monitored trend in the reduction of ozone (on a ppb/year basis) has been 2 to 8 times faster than the CMAQ-predicted trend.

The specifics of the Ramboll Analysis bear this out. It is undisputed that at 14 out of 16 air quality monitoring stations in the SCAB, actual measured levels of ozone already were significantly lower in 2014 than the ozone levels that CMAQ predicted (for purposes of the 2012 SIP) would be achieved in 2023. Stated differently, actual ozone results already were significantly better in 2014 than the results CMAQ predicted for 2023, a full nine years later. The following chart depicts this significant disparity (all units are in ppb):

[1]It is very interesting to note that the 2016 AQMP asserts a different conclusion in this regard. The AQMP claims that "[t]he carrying capacities, the maximum allowable NO_x emissions to meet the ozone standards, are estimated to be 150 TPD NO_x in 2023 [not 130 tpd], and 100 TPD NO_x in 2031 [not 90 tpd]. (See AQMP, p.5-9.) Consequently, it is clear that, at best, one of those sets of estimates, either CARB's or the SCAQMD's, is wrong.

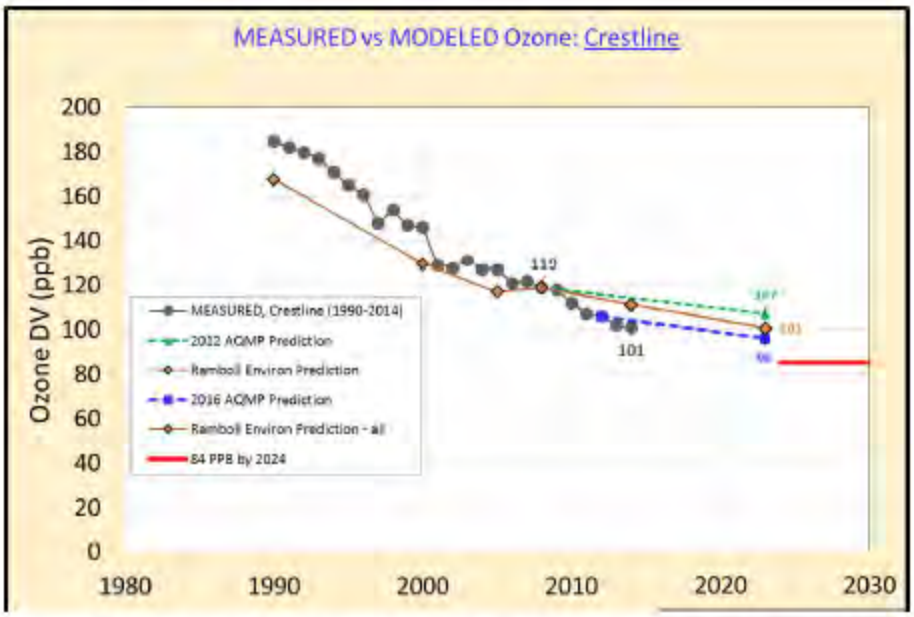
Location	2014 measured O_3 DV	2023 projections (Table 5-5, 2012 AQMP)
San Bernardino	97	108
Crestline	101	107
Glendora	93	107
Upland	96	106
Fontana	99	104
Redlands	102	103
Riverside	93	100
Pomona	86	100
Azusa	80	95
Santa Clarita	97	94
Banning	93	94
Pasadena	78	92
Reseda	87	90
Perris	89	88
Lake Elsinore	82	85
Burbank	00	76
Basin-Wide Max	102	108

The Ramboll Analysis explored this disparity in greater depth. Specifically, that analysis assessed, on a year-by-year basis, how CMAQ-modeled ozone levels and trends compare against actual monitored ozone levels and trends. Set forth below is an example of such a detailed comparison, focusing on the Crestline monitoring site, which historically has been the highest "design value" for the SCAB.

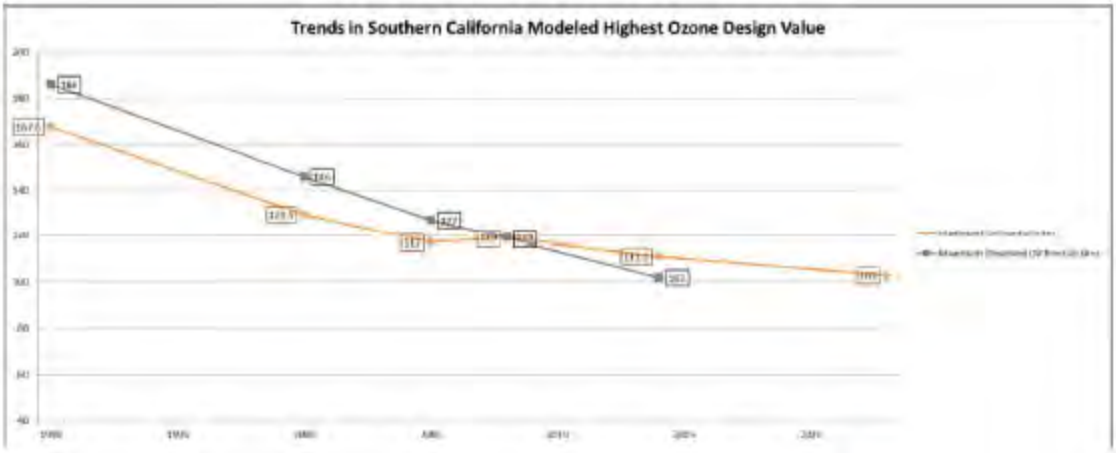


The foregoing chart compares the trend line for actual ozone reductions against the trend line that CARB derived in 2012 using CMAQ (and utilizing a 2008 base year). As is evident from the chart, the actual monitored ozone value at Crestline in 2014 (101 ppb) was significantly better than the CMAQ-predicted value for Crestline in 2023 (107 ppb). Moreover, the trend line that CMAQ predicted (just four years ago as a component of the 2012 SIP submissions) was much flatter, and much less responsive, than the trend line for the actual ozone reductions observed at Crestline. Significantly, the same holds true at almost every other monitoring site in the SCAB as well.

To check on the responsiveness of the CMAQ model, the Ramboll Analysis performed a "dynamic evaluation," including "backcasts" using CMAQ, and modeled past ozone levels that could be directly compared on a year-to-year basis against actual monitored ozone levels. Once again, those backcasts confirmed that the CMAQ-derived trend lines were flatter and less responsive than the actual trend lines, not just with respect to forecasted ozone levels, but against past ozone levels as well. CMAQ's lack of responsiveness is depicted in the following chart (see the orange line) for the Crestline monitoring site.



The phenomenon observed at Crestline – that both forecasted and backcasted ozone trends derived from CMAQ are flatter and less responsive than actual monitored trends—also holds at almost every other monitoring site in the SCAB. The net result is that CMAQ-modeled ozone forecasts, as developed by CARB, have been and are over-predicting future ozone levels in the SCAB. In addition, it also is clear that actual ozone levels in 2014 already were significantly lower than the ozone levels that CARB forecasted for 2023, and that the actual rates of decline in ozone levels in the SCAB (on a ppb/year basis) are greater than the CMAQ-modeled rates by a factor ranging from 2 to 8, as depicted in the following charts:



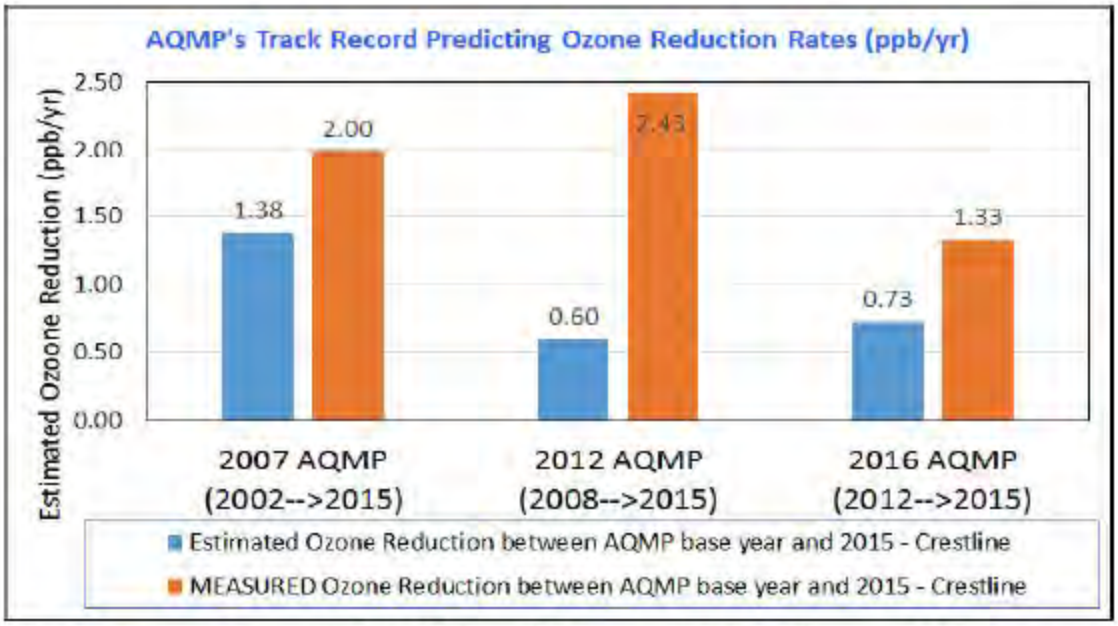
Location	Measured ΔO_3 (ppb)	Modeled ΔO_3 (ppb) [2012 AQMP]	Measured/Modeled ΔO_3
Azusa	-16	-2	8
Crestline	-18	-9	2
Fontana	-13	-2	7
Glendora	-14	-2	7
Pomona	-17	-4	4
Redlands	-14	-7	2
Riverside	-14	-6	2
San Bernardino	-19	-5	4
Santa Clarita	-8	-5	2
Upland	-14	-2	7
Basin-Wide Max	-17	-8	2

Rebutting the clear facts that the Ramboll Analysis has brought to light requires more than just a claim that CARB's 2016 runs of CMAQ (utilizing a 2012 base year instead of a 2008 base year) will be better. Simply anchoring CMAQ in more contemporary emissions inventory data does nothing to answer the question of why CMAQ, as applied by CARB, has been consistently biased for more than 20 years in a manner that is less responsive than the actual response of ozone formation in the actual environment. Moreover, there is no evidence that CARB's "do-overs" of its NO_x and VOC inventory estimates, and its corollary CMAQ modeling runs, yield any better forecasted results. In fact, the relevant evidence clearly suggests the contrary.

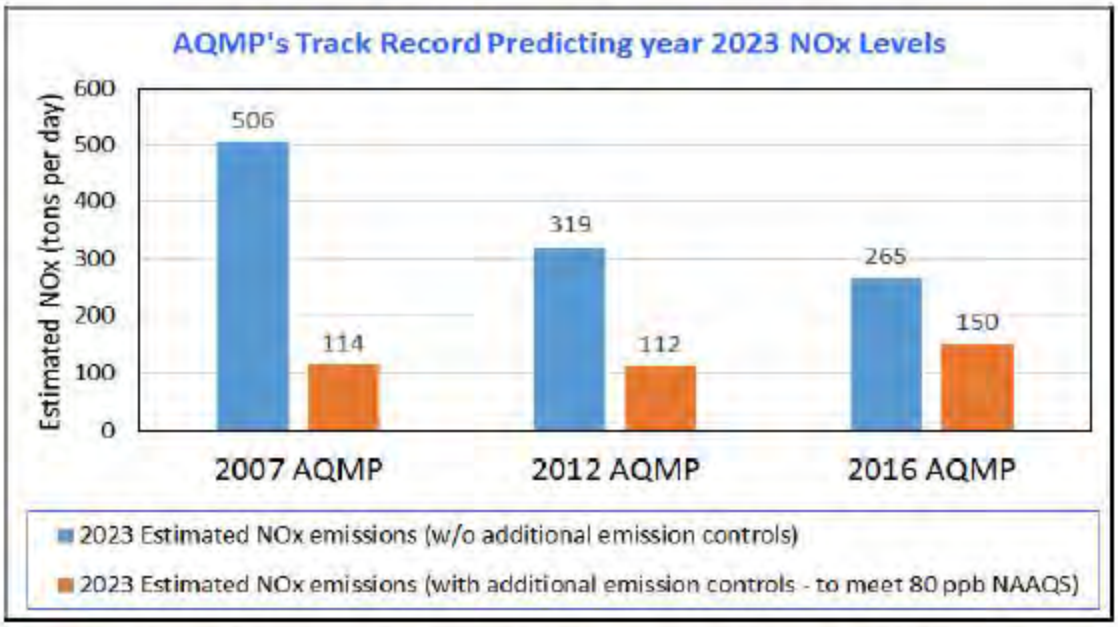
For example, just four years ago, in 2012, CARB re-ran CMAQ (utilizing a 2008 base year) to prepare its 2012 SIP submissions. By 2014 – in a span of just 2 years – the CMAQ modeled results were already off by nearly 15% at the SCAB design value site (Crestline), projecting an ozone level in 2014 of approximately 115 ppb, when the actual measured ozone level was 101 ppb in 2014. (See chart, supra.) Similarly, as confirmed by the just-released draft 2016 AQMP (albeit released without the necessary Appendix materials), between the time of the 2012 SIP submittals and the 2016 updates – just a 4-year time period – the estimate of the baseline NO_x inventory for 2023 dropped from 319 tpd to 265 tpd. That amounts to a 17% difference between the two modeling efforts over just a 4-year interval.

In addition, the projections of the SCAB's NO_x carrying capacity in 2023 have increased from an estimate of 112 tpd in the 2012 SIP to an estimate of 150 tpd in the 2016 SIP – a 34% increase in the SCAB's estimated NO_x carrying capacity in just 4 years. The estimates of the additional NO_x reductions purportedly required to demonstrate attainment are equally varied and imprecise. Specifically, the draft SIP submissions now assert than an additional 43% reduction in NO_x emissions is required by 2023. Just four years ago, however, the 2012 SIP asserted that an additional 65% reduction was necessary. That again amounts to a 34% difference or error between the estimates relating to the nearer-term ozone NAAQS attainment date. The estimates pertaining to the longer-term attainment date in 2031 are certainly even more error-prone and imprecise. Thus, based on past performance, there is no indication that the current round of CMAQ-derived predictions will prove to be more reliable than the last.

The following charts depict the manner in which CARB has been under-predicting ozone reduction rates and over-predicting NO_x levels in the SCAB since 2007, a period encompassing the preparation of three SIP submissions (and AQMPs) utilizing CMAQ.



(The AQMP ozone reductions are calculated between the base year and 2023. For the purpose of this chart, the rate of those reductions is assumed to be the same (linear) between the base year and 2015.)



In light of the consistent and significant discrepancies between modeled and measured levels of ozone and NO_x in the SCAB, CARB should not finalize or approve the 2016 SIP Strategy until such time as CARB's latest projections can be fully assessed and validated. To that end, and before seeking approval of the 2016 SIP Strategy, CARB should utilize the validation methods and analyses that U.S. EPA recommends, including "dynamic evaluations" that assess and take into account the past performance of air quality modeling efforts.

This is not simply an academic concern. The costs of erroneous projections are extremely high. In fact, the SCAQMD is anticipating that its draft AQMP will have an implementation price tag ranging from $10-$12 billion. Those enormous costs raise very serious questions about the unintended adverse consequences of flawed air quality modeling and emission inventory estimates. Those questions became even more pointed when the actual current rate of progress in reducing ozone levels is considered.

The draft AQMP states (at p.5-4) that the measured 8-hour ozone design value in the SCAB has been declining at a rate of 2.3 ppb per year over the 14-year period from 2001 to 2014. At that same rate, the ozone level at Crestline (which was 101 ppb in 2014) would be 80 ppb in 2023 and 62 ppb in 2031. That rate of decline would result in an ozone level that would be well below the targeted attainment level in 2031 and very near attainment in 2023, without any additional control measures whatsoever. All of this cautions against finalizing a $12 billion SIP Strategy before each of the very significant modeling uncertainties at issue is resolved.

It is clear that CMAQ, as applied by CARB and the SCAQMD, does (and will) over-predict future ozone levels in the SCAB. Consequently, CARB's CMAQ-based assertions that an 80% reduction in NO_x emissions is required to reach NAAQS attainment, and that the NO_x standard for HDOH engines must be reduced by 90% to hit that 80% reduction target, are both derived from a significant over-prediction of what ozone (and NO_x) levels will be in 2031. From that, it also follows that CARB's intent to enter into a binding SIP commitment to adopt a new low-NO_x

standard for HDOH engines (at a 0.02 g/bph-hr level) is based on a significantly flawed premise. The 2016 SIP Strategy should not be approved in its current form. In fact, and as noted above, given CARB's consistent history of generating over-stated results through its application of CMAQ, the 2016 SIP Strategy should not be finalized or approved until such time as CARB can complete and publish a thorough validation and dynamic evaluation of its 2016 ozone modeling efforts, as recommended by EPA.

Underlying NO_x Inventories
Are Substantially Overstated

CARB's estimates of future reductions in ambient levels of NO_x and total NO_x emissions, both with and without additional NO_x-control measures, are only as reliable as CARB's emission inventory assessments and models. If past is prologue, the reliability of CARB's estimates of future NO_x levels in the SCAB is highly questionable and uncertain. That uncertainty is compounded by the fact that the 2016 AQMP NO_x inventory estimates have not been available for review and public comment (specifically, Appendix III and Appendix V). Nonetheless, even without knowing what the updated and detailed 2016 numbers might be, there are a number of well-known problems with CARB's NO_x inventory estimates that need to be addressed and corrected before CARB finalizes the 2016 SIP Strategy.

Zero-Mile Emission Rates

CARB uses EMFAC to estimate real-world in-use emissions from various sources, including HDOH vehicles. CARB has utilized EMFAC to develop state-wide and district- specific NO_x inventories for several decades, and EMFAC is updated at regular intervals to make changes in modeling methods, and to incorporate the impact of new emission standards and other emission reduction programs.

The current version of EMFAC is referred to as "EMFAC2014" and was released in December of 2015. Counter-intuitively, EMFAC2014 significantly *increased* the estimate of NO_x emissions from HDOH vehicles equipped with 2010 and later model year heavy-duty engines, as compared with the previous version of EMFAC – which was referred to as EMFAC2011.

EMFAC's estimate of the in-use emissions from HDOH vehicles takes several factors into consideration, including vehicle type, mileage, speed, load and deterioration. The fundamental underlying emission rate, however, is referred to as the "zero-mile rate" or "ZMR." The ZMR is meant to represent the emission rate for new (and relatively new), well-maintained HDOH vehicles operating on California roads, and is subject to various adjustment factors, including speed correction factors. The ZMR is expressed in units of grams/mile ("g/mi") and varies with vehicle size, tare (unloaded) weight, and load factor. All else being equal, the ZMR increases with vehicle size, tare weight and load factor.

The certified emission rates for HDOH vehicles and engines are different and utilize a different metric. HDOH engines are certified separately on an engine dynamometer to standards expressed in units of grams/brake horsepower–hour ("g/bhp-hr"). Since the denominator for this standard is, in essence, work performed, the standard can be a constant, and does not vary with engine size or power rating.

The historical "rule of thumb" is that the in-use NO_x emissions from a Class 8 line-haul truck (which are in units of g/mi) operating on California roads over a duty cycle similar to the certification test procedure (i.e., the "UDDS transient cycle") are generally assumed to be 3.5 times the engine dynamometer-based certification emission standard (which is in units of g/bhp-hr). This "rule of thumb" ratio, or conversion factor, is a function of calculating (g/mi)/ (g/bhp-hr) or bhp-hr/mi, and, generally, represents the work needed to move a Class 8 line-haul truck one mile.

The NO_x emission standard for 2010 and later model year heavy-duty engines is 0.20 g/bhp-hr. Therefore, the general "rule of thumb" estimate of the in-use ZMR NO_x emission rate for a Class 8 line-haul truck over the representative UDDS duty cycle is 0.70 g/mi (0.20 x 3.5 = 0.70).

Significantly, the ZMR for 2010 model year and later Class 8 line-haul trucks that is used in EMFAC2014 is 1.89 g/mi. Obviously, this is much higher – nearly three (3) times higher – than the "rule of thumb" estimate (which, as noted, would be 0.70g/mi). By contrast, the analogous ZMR in the prior version of EMFAC (EMFAC2011) was 1.14 – markedly lower than the EMFAC2014 value. This calls into question whether the ZMR for HDOH vehicles in EMFAC2014 is materially over-estimating the actual emissions from 2010 and later model year HDOH vehicles.

The EMFAC2014 ZMR for HDOH vehicles was based on very limited testing that CARB and the SCAQMD conducted at CARB's chassis-dynamometer test facilities in Los Angeles. Specifically, eight HDOH vehicles were tested, three powered by engines certified to the 2007 through 2009 model year requirements, and just five certified to the 2010 and later standards. Of those five engines, however, only two (2) were actually certified to the 0.20 g/bhp-hr NO_x standard; the other three used emissions credits and were certified to a level above the 0.20g/bhp-hr NO_x standard. Further, the two engines certified to the 0.20 NO_x standard – already an unreasonably small sample size – were both produced by the same engine manufacturer.

The first of those two 0.20g vehicles was powered by a 2010 model year engine, and recorded a 1.95 g/mi NO_x level when tested over the UDDS test cycle. The second vehicle was powered by a 2011 model year engine, and yielded a 1.98 g/mi NO_x level when operated over the UDDS cycle. As noted, the UDDS cycle is a chassis-dynamometer-based test cycle that, when the proper loading is applied to the vehicle being tested, is reasonably similar to the engine-dynamometer transient certification test.

Due to the important policy and regulatory impacts of EMFAC modeling, as well as in light of the very small number of vehicles – just two – on which CARB's ZMR result is based, EMA arranged for a follow-up ZMR study. EMA contracted with CE-CERT to perform the ZMR study, and coordinated with CARB in setting up the test plan to ensure that the results could be directly compared against the results of the original CARB/SCAQMD ZMR study.

Based on the joint input from EMA and CARB, the CE-CERT study involved testing five late-model year, low-mileage heavy-duty line-haul vehicles produced by a variety of manufacturers that participate in the HDOH market. The same battery of tests as run in the original ZMR study were performed at CE-CERT with the vehicles loaded to the same level and otherwise tested under the same circumstances. CARB requested and arranged to have three of the five vehicles tested at its Los Angeles facility.

The average validated results for the vehicles tested at CE-CERT yield a significantly different result than what is assumed in EMFAC2014. Specifically, the average "rule of thumb" or conversion ratio – that ratio being the UDDS value divided by certification NO_x standard of 0.20 -- of the HDOH vehicles tested and validated at CE-CERT is 4.04, reasonably close to the expected "rule of thumb" scaling factor of 3.5. That corresponds to an average UDDS level of 0.81 g/mi. Since the tested vehicles all had low accumulated mileage, the 0.81 g/mi value would be a good approximation for the ZMR. That value is well below – more than two times below -- the EMFAC2014 ZMR value of 1.89 g/mi, and provides clear evidence that the current version of EMFAC is programmed in a manner to yield materially over-stated estimates of future-year NO_x emissions. EMFAC clearly needs to be revised.

Unreasonable TM&M Rates and Impacts

EMFAC2014's incorporation of unreasonably over-estimated tampering, malfunction and malmaintenance ("TM&M") rates, and its inclusion of unreasonably over-estimated emission increases ascribed to those incidences of TM&M, also raise significant concerns regarding the model's accuracy. In that regard, CARB did not update the TM&M assumptions that were used in the earlier versions of EMFAC. Those assumptions, however, are based principally on surveys of trucking fleets and repair facilities conducted in 1988 (a study conducted for CARB by Radian Corporation) and in 1998 (a study for EPA conducted by Engine, Fuel and Emissions Engineering, Inc.) – surveys prepared some 28 and 18 years ago. Quite obviously, those earlier surveys are long out-of-date, and include many assumptions that no longer pertain to recent and current model year HDOH vehicles that operate with advanced electronically-controlled after-treatment systems, fully integrated and comprehensive OBD systems, and multiple "inducements" to ensure emissions compliance.

An example of the out-of-date TM&M assumptions that CARB continues to rely on in the current version of EMFAC is set forth in the attached "Appendix C" from CARB's earlier technical support document for EMFAC. That Appendix lists the assumed lifetime TM&M rates and NOx emissions impacts for 2010 and later model year HDOH engines. Even with OBD requirements factored in, CARB assumes that over the assumed 1,000,000-mile life of a HDOH vehicle, more than 40% of those miles will be driven by vehicles having a failed NOx sensor, and that more than 12% of all miles will be driven by HDOH vehicles with a continuously malfunctioning NOx aftertreatment system, yielding a 200% to 300% increase in NOx emissions over all of those miles. Those types of over-stated and outdated assumptions have a very material impact on the modeled level of future NO_x emission inventories. In fact, the net effect of those TM&M assumptions is that the modeled NO_x level for each and every 2010 and later model year vehicle increases by .07 g/mi every 10,000 miles, starting off at near 2 g/mi and ending up (at the 1,000,000 mile mark) at 9 g/mi. That is more than 11 times higher than the reasonable ZMR of 0.81 g/mi for the relevant HDOH vehicles.

In an effort to improve EMFAC (and thereby avoid the unreasonable consequences of inaccurate and overstated emission inventories), EMA is working to develop better and more accurate information relating to actual TM&M rates for recent and current model year HDOH engines, and the likely resultant impacts on emissions from potential incidences of TM&M. Such an updated database would enable EMFAC to incorporate actual rates (and declining trends) of malfunctions for current HDOH vehicles, coupled with current assessments of emissions impacts, as opposed to CARB's assumed rates based principally on surveys conducted in 1988 and 1998.

CARB's assumptions, and the current EMFAC model, also fail to account for the mitigating effects of comprehensive OBD systems as well as the advanced "inducement" systems that de-power or disable the re-start function of HDOH vehicles that are experiencing potential emission-related problems, specifically those that could increase NO_x emissions. The inducements that EPA and CARB require as a condition for the certification of current model HDOH vehicles preclude any significant amount of miles of operation of any HDOH vehicle that has any malfunctioning SCR-related components. Those inducements, and the related OBD requirements, do not expire or shut-off at 500,000 miles (as implicitly assumed in EMFAC), and quite simply eliminate many if not all of the most significant NO_x increases from TM&M that CARB is still including in EMFAC – again, based on studies dating back to 1988. Indeed, as CARB itself noted in its January 2013 Field Evaluation Report:

> CARB staff believes that companies and truck operators will simply not tamper with the HDD vehicles and risk costly repairs and/or possible fines, especially when those vehicles will cause the engine's power to degrade causing delivery delay and general inconvenience.

EMFAC's increase in NO_x emissions for 2010 and later HDOH vehicles by multiples of the underlying emission standard after 500,000 miles is significantly over-stated and will drive unreasonable and significantly over-stated estimates of future NO_x inventories. EMFAC must be revised to account for the mitigating impacts of comprehensive OBD systems and inducements. Otherwise, CARB's SIP Strategy will be premised on unreasonable emissions data, in addition to flawed modeling.

CARB's Intent to Pursue
Separate GHG Standards For
Vocational Vehicles Is Misguided

The 2016 SIP Strategy also includes CARB's proposed commitment to adopt medium and heavy-duty GHG "Phase 2" standards to harmonize with the GHG "Phase 2" standards that U.S. EPA will finalize near the end of July. However, CARB's proposed SIP commitment goes well beyond harmonization. Specifically, CARB's proposal "may include some more stringent, California-only provisions that are necessary to meet California's unique air quality challenges. For example, the California Phase 2 proposal may layer additional requirements for vocational vehicle aerodynamics onto the federal Phase 2 program." (2016 SIP Strategy, p.52.)

CARB should not include a California Phase 2 proposal in the 2016 SIP Strategy, which is focused on ozone attainment in the SCAB. Such a proposal is not germane to the SIP process, is not necessary, and is not reasonable. Full harmonization between U.S. EPA and CARB on the anticipated Phase 2 GHG standards is a basic prerequisite to their feasibility and cost-effectiveness. Separate CARB standards therefore are directly at odds with the core Phase 2 rulemaking premise that there will be one nationwide set of next-phase GHG standards. Further, the notion that there are additional enhanced requirements for "vocational vehicle aerodynamics" that CARB can devise and implement in a feasible and cost-effective manner is unfounded. Vocational vehicles are not suited to an enhanced "layer" of aerodynamic demands. Those vehicles spend a significant percentage of time in parked-idle or drive-idle modes; they routinely engage in stop-and-go operations; they typically operate at non-highway speeds and in non-cruise driving modes; and they otherwise operate on (and are certified on) urban and multi-purpose drive cycles that do not

lend themselves to enhanced aerodynamics. Indeed, less than 5% of vocational vehicles operate on the regional duty cycle that theoretically might accommodate increased aerodynamic performance.

Further, as expressly conceded in the 2016 SIP Strategy (see id. at p.52), CARB has not attempted to quantify the "criteria emission reductions" that might result from California-only Phase 2 requirements. Thus, in addition to being entirely out of context in an ozone SIP Strategy, CARB's envisioned Phase 2 GHG add-ons are not calculated to yield any benefits for the attainment demonstrations at issue.

More fundamentally, U.S. EPA – which has the same regulatory objective as CARB – has carefully examined the appropriate Phase 2 GHG standards for vocational vehicles. EPA has determined properly that, for all the reasons noted above (and more), enhanced aerodynamic requirements are not appropriate for vocational vehicles. CARB should not assume in its SIP Strategy that a different conclusion is warranted.

Conclusion

The 2016 SIP Strategy, as it relates to HDOH engines and vehicles, is premised on significant over-estimations of future NO_x and ozone levels in the South Coast Air Basin ("SCAB"). CARB has derived those over-estimations from an outdated version of EMFAC and from its application of the Community Multi-Scale Air Quality ("CMAQ") model, which consistently has over-predicted future ozone levels in the SCAB over the past 25 years, including as recently as 2012 when CARB developed its last SIP submissions. In light of those consistent over-predictions of NO_x and ozone, CARB's assertion that ozone attainment in 2031 requires an additional 90% reduction in NO_x emissions from HDOH engines and vehicles – over and above the rigorous NO_x-control regulations that are already in place – is simply incorrect. While some future HDOH emission requirements may prove to be warranted and reasonable, the assumed premise for adopting a 90% lower NO_x standard in 2019 is fundamentally flawed. As a result, the 2016 SIP Strategy needs substantial revision, and should not be approved or adopted in its current form.

Similarly flawed is CARB's intended adoption of unique California-only Phase 2 GHG requirements for vocational vehicles. Separate California GHG requirements are directly at odds with the core premise of the pending U.S. EPA rulemaking for a nationwide Phase 2 GHG program, and are inherently unreasonable given the aerodynamic constraints under which vocational vehicles operate.

EMA appreciates the opportunity to submit these comments on the 2016 SIP Strategy, and we look forward to working with CARB staff to improve the accuracy of the underlying CMAQ and EMFAC models.

Respectfully submitted,

TRUCK AND ENGINE
MANUFACTURERS ASSOCIATION

Appendix C. Frequency of Occurrence of T&M and Malfunction and Resulting Emission Impact for 2010+ Model Year HHDD Trucks

Tampering and malmaintenance (T&M) and malfunction rates were developed for the model year group of 2010 and subsequent model year heavy-duty vehicles. This appendix provides a description of the frequency of occurrence of T&M and malfunction categories and the resulting emission impact for 2010+ model year HHDD trucks (further detail can be found in the staff report for the HDV OBD regulation; see Footnote 4 of this memo).

Frequency of Occurrence Rates

The table below shows the revisions to the frequency of occurrence of T&M and malfunction categories for 2010+ model year group.

Table C1. Frequency of Occurrence of T&M and Malfunction Acts for 2010+ HHDDTs[a]

EMFAC2002		Revised		
T&M Act	2003+	T&M and Malfunction Act	2010+	
			No OBD	w/ OBD
Timing Advanced	2%	Timing Advanced	2%	**1.33%**
Timing Retarded	2%	Timing Retarded	2%	**1.33%**
Minor Injector Problem	8%	**Injector Problem (Minor/Moderate/Severe)**	13%	**8.67%**
Moderate Injector Problem	5%	**NOx Aftertreatment Sensor**	**52.7%**	**40.1%**
Severe Injector Problem	0%	**Replacement NOx Aftertreatment Sensor**	**1.8%**	**10.8%**
Puff Limiter Misset	0%	**PM Filter Leak**	**13.9%**	**9.75%**
Puff Limiter Disabled	0%	**PM Filter Disabled**	**2%**	**1.33%**
Max Fuel High	0%	**Fuel Pressure High**	0%	0%
Clogged Air Filter	15%	Clogged Air Filter	15%	**10%**
Wrong/Worn Turbo	5%	Wrong/Worn Turbo	5%	**3.33%**
Intercooler Clogged	5%	Intercooler Clogged	5%	**3.33%**
Other Air Problem	8%	Other Air Problem	8%	**5.33%**
Engine Mechanical Failure	2%	Engine Mechanical Failure	2%	**1.33%**
Excessive Oil Consumption	3%	Excessive Oil Consumption	3%	**2%**
Electronics Failed	3%	Electronics Failed	**30%**	**20%**
Electronics Tampered	5%	Electronics Tampered	5%	**3.33%**
Catalyst Removed	0%	**Oxidation Catalyst Malfunction/Removed**	5%	**3.33%**
EGR Stuck Open	0%	**NOx Aftertreatment Malfunction**	**17.1%**	**12%**
EGR Disabled	10%	EGR Disabled/**Low Flow**	**20%**	**13.3%**

a. Revised values shown in boldface (see text for discussions).

For the frequency of occurrence rates in Table C1, staff modified several of the existing components to better reflect the technology that is expected to be used on 2010 and subsequent engines as well as to account for malfunction of components in addition to tampering or malmaintenance. Specifically, staff added categories for PM filter leaks, missing/tampered PM filters, NOx aftertreatment system malfunctions, and NOx aftertreatment control sensor malfunctions. Staff eliminated the categories deemed to be not applicable to 2010+ model years, such as puff limiter misset, puff limiter disabled, and EGR stuck open. Staff also merged minor, moderate, and severe injector problems into a single injector problem category, expanded EGR disabled to include EGR low flow/performance malfunctions, and modified the category for catalyst removed to oxidation catalyst malfunction/removed. The frequency of occurrence in Table C1 represents an average failure rate over the life of the 2010+ model year vehicles.

For the baseline "without OBD" values, staff estimated various failure rates for the categories. For the existing categories in the table (except for the electronics failed category), staff did not modify the estimated failure rates. However, for the added and modified categories staff estimated failure rates based on information from manufacturers, suppliers, and, where appropriate, experience with similar components in light-duty. In all cases, staff assumed any failures occurring during the warranty period would be fixed immediately, and thus a failure rate of 0% was assumed during the warranty period.

For EGR, staff increased the failure rate from 10% to 20% to account for nearly every engine using EGR in the 2010 timeframe and for the increased sensitivity and reliance to proper EGR performance on those engines. For the oxidation catalysts, staff increased the failure rate from 0% to 5% to account for nearly every engine being equipped with a catalyst, for combining oxidation catalyst performance malfunctions with oxidation catalyst tampered/removed into a single category, and for the increased sensitivity and reliance on proper oxidation catalyst performance to achieve PM filter regeneration.

For the electronics failed category, staff increased the frequency of occurrence from 3% to 30% to account for the significant increase in complexity of the 2010+ emission control systems. For these engines, a substantial number of sensors (e.g., temperature, mass air flow, pressure) and actuators (e.g., intake or exhaust throttles) are being added and other components have become more complex (e.g., high pressure common rail fuel injection system components, variable geometry turbos). In addition to actual sensor or actuator failures, each sensor and actuator has additional circuits and wiring that increase the chance for a failure in-use.

For the added category of PM filter leak, staff estimated a failure rate that increased over time starting with an approximately 6% failure rate at the end of useful life (~450,000 miles) and ramping up to a failure rate of 37% at 1,000,000 miles. In setting this failure rate, staff largely discounted the high failure rates currently being observed in the heavy-duty fleet (both OEM-equipped and retrofit) and estimated much more conservative failure rates. For the category of PM filter disabled (largely due to tampering), staff assumed a rate of only 2%.

At present, two competing NOx aftertreatment technologies are being considered for 2010 model year applications. Accordingly, staff analyzed both systems and their associated components. It was assumed that a blend of the two would exist in the fleet, with some using a selective catalytic reduction (SCR) system with a single NOx control sensor and reductant delivery (e.g., urea) and some using a NOx adsorber system with upstream and downstream air-fuel (A/F) control sensors. For the category of NOx aftertreatment in Table C1, staff grouped together the SCR catalyst and the components associated with reductant storage and delivery or, in the case of an adsorber system, included failures of the adsorber itself. For these failures, staff again estimated a failure rate that increased over time. The failure rate for this category was ramped in starting with a 10% failure rate at 500,000 miles (50,000 miles beyond useful life) to a 50% failure rate by 1,000,000 miles. While failures of an SCR catalyst itself may be fairly limited, the associated hardware includes urea tank, tank heaters, in-exhaust injector, compressed air delivery to the injector, and urea supply pump and control system are all components subject to malfunction and can have the same emission impact as an SCR catalyst failure. In assuming that only half of the trucks left on the road at 1,000,000 miles will have experienced a failure of any one of these components at some point in its 1,000,000-mile life, staff believes the estimate is fairly conservative. For an adsorber system, the adsorber itself will likely have a significant failure rate in a 1,000,000-mile timeframe given the sensitivity to thermal damage and the need for periodic desulfation that must be conducted at temperatures extremely close to the thermal damage point. Further, each desulfation event will likely slightly deteriorate the performance of the adsorber leading to an eventual fail on some share of the engines. In some cases, adsorber systems may also rely on in-exhaust injectors, fuel supply lines, control, and metering systems that are subject to malfunction and can have a similar emission impact.

For the two NOx aftertreatment control sensor categories, a two-part failure rate was estimated and modeled as two separate categories. For SCR systems using a single NOx control sensor, the model assumes the sensor has an initial fail, some portion of those sensors are replaced, and a second fail occurs later in the life of the new sensor. For NOx adsorber systems with two A/F sensors, the model assumes one of the two sensors has an initial fail, some portion of those sensors are replaced, and a second fail occurs later in the life of the engine which could be either a failure of the replaced sensor or a an initial failure of the other A/F sensor on the vehicle.

For the initial failure in both systems, a single failure of a control sensor was estimated to ramp in starting with a 35% failure by 250,000 miles and peaking at a 90% failure rate after a subsequent 200,000 miles (i.e., by 450,000 miles). Staff based these failure rates on discussions with engine manufacturers expressing concern that they had not been convinced that NOx sensor durability was sufficient to last 100,000 miles, much less the useful life period of 450,000 miles. Discussions with sensor suppliers suggest significant potential for further improvement in durability over the next few years. Accordingly staff assumed essentially a 0% failure rate for twice the current expected life of the sensor before ramping the failure up to near complete failure at 4.5 times the current expected sensor life. Further, A/F sensors are commonplace in light- and medium-duty vehicles and Inspection and Maintenance (I/M) program data indicates these sensors are failing in I/M on approximately 2.5% of the fleet at 100,000 miles. Assuming this failure rate were to grow linearly at a failure

rate of 2.5% per 100,000 miles, that would represent a cumulative failure rate of 7.5% at 250,000 miles. Additionally, this 2.5% failure rate only includes the subset of vehicles with a malfunctioning A/F sensor vehicles that ignore an illuminated warning light and actually fail the I/M test. Data from non-I/M areas would support that the actual in-use failure rate is higher than that and is a result of a portion of the people fixing the vehicle prior to the I/M test. When adjusting that number to reflect the more realistic situation that the failure rate increases non-linearly over time, that the actual in-use failure rate in light-duty is actually higher than the 2.5% that show up in I/M, and that each engine with a NOx adsorber system is projected to use two A/F sensors, a 35% failure rate at 250,000 miles is reasonable. To further assume that 90% of the sensors will have failed once by 450,000 miles is consistent with a continued increase of the failure rate and engine manufacturers' expressed opinions that the sensors will not last through the useful life. This initial failure of the control sensor is represented in the category for NOx Aftertreatment Sensor.

The second part of the failure rate for the NOx aftertreatment control sensor categories estimates the percentage of the fleet that will repair/replace the first failed sensor and then experience a subsequent failure of the repair/replaced sensor while still within the first 1,000,000 miles of the engine life. For this failure rate, staff assumed the same sensor durability and failure rate (i.e., failure rate ramps in at 35% beginning 250,0000 miles after the previous sensor repair/replacement and peaks at 90% after an additional 200,000 miles) but only applied it to the fraction of vehicles which were estimated to already have a failed sensor and a subsequent repair. This second part of the failure rate of the control sensor is represented in the category for Replacement NOx Aftertreatment Sensor.

OBD Repair Rate

While the frequency of occurrence rates shown in Table C1 are a single number that represents the average failure rate, or probability of occurrence, the model actually assumes that there are constantly some additional failures and repairs that are occurring in the fleet. For the baseline (without OBD) scenario described above, these numbers represent the failures that are above and beyond what is being routinely repaired in the field.

To account for the adopted HD OBD program, staff estimated a repair rate for all the categories in Table C1. A 33% reduction in the frequency of occurrence across all categories was estimated to simulate the malfunctions that are repaired due to the presence of the OBD system. The rationale for the 33% repair rate was that all the malfunctions estimated in the categories would likely result in MIL illumination. It is expected that some fraction of vehicle owners or operators would take repair action simply because they were alerted to the presence of a malfunction by the MIL. Additionally, California has two inspection programs that are applicable to heavy-duty vehicles. First, the heavy-duty vehicle inspection program (HDVIP) conducts roadside testing and issues citations or notice-of-violations for trucks that fail either a snap-idle opacity test or a visual inspection. This inspection program currently tests about 6% of the heavy-duty fleet in California. Secondly, California has a fleet annual self-inspection program whereby all fleets (defined as anybody with two or more trucks) are required to perform self-inspections for snap-idle opacity on an annual basis, repair any vehicles that fail the inspection, and retain records of the inspection for review by ARB inspectors. Currently, about 75% of the California fleet is subject to this fleet self-inspection.

While both programs are currently focused on smoke emissions and visual tamper inspections, it is expected that they will both be updated to include an inspection of the OBD system and to fail vehicles that have an illuminated MIL. When combining these three factors together (voluntary response to an illuminated MIL, HDVIP inspections, and fleet self-inspections), staff believes it is fairly conservative to expect that one third of the illuminated MILs will be repaired.

Staff also considered that some malfunctions could also cause degraded drivability, performance, or fuel economy, and those impacts would also influence the repair rate. However, as stated above, these failure rates already assume that additional failures and repairs are currently occurring in the fleet and will continue to. Furthermore, in analyzing the categories created by staff, the failures with the largest emission impacts (e.g., PM filter malfunctions and NOx aftertreatment related categories) are not expected to have an adverse impact on drivability or performance and may actually result in an improvement to fuel economy, thus negating any additional incentive to repair the detected malfunction.

Malfunction Emission Rates

Staff also modified the associated emission rates for each of the categories of Table C1 to better reflect the best estimates available at this time based on the expected 2010 and subsequent emission control systems. For the existing categories that result in an increase in PM emissions, staff reduced the estimates for the PM emission increases by a factor of 0.95 based on the expectation that all 2010 engines will be equipped with a PM filter which will trap 95% of any engine-out increases in PM. For the added categories of PM filter leaks and PM filter missing/tampered, staff estimated PM increases of 600% and 1,000%, respectively. For the PM filter leaks, this represents an emission level of 0.07 g/bhp-hr, which is above the adopted OBD threshold of 0.05 g/bhp-hr but reflects industry's contention that most PM filter leaks will rapidly grow beyond a small leak. For the category of PM filter missing/tampered, staff estimated the emissions would approach that of an engine without a PM filter for an increase of 1000% (to 0.10 g/bhp-hr).

For HC emission rates for the existing categories, staff estimated the presence of larger oxidation catalysts to achieve sufficient exotherms for PM filter regeneration would convert 50% of any increases in engine-out HC rates and thus reduced the HC emission increases by a factor of 0.5. For the added categories related to PM filters and malfunctions associated with NOx aftertreatment or the aftertreatment control sensors, staff assumed a small HC increase due to reduced conversion of HCs within the PM trap itself or improper reductant malfunctions (e.g., overdosing fuel in a NOx adsorber system). For a malfunction of the oxidation catalyst itself, staff assumed a 50% increase in HC emissions.

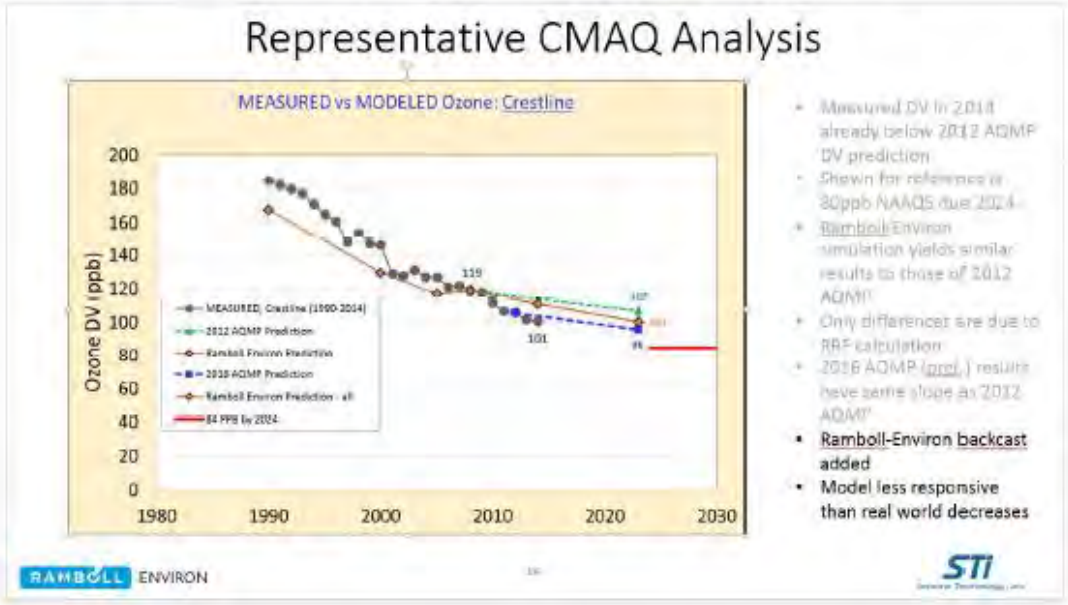
For NOx emission rates for those existing categories, staff estimated that engine-out NOx increases would be reduced by the presence of NOx aftertreatment to varying degrees. For smaller engine-out NOx increases, the aftertreatment was estimated to convert 75% of the excess NOx (thus reducing the emission rate by multiplying by a factor of 0.25). For larger engine-out NOx increases, a lower aftertreatment conversion efficiency (65%) was used to reflect the reduced ability of the system to handle large feed gas concentration increases. For the added categories of NOx aftertreatment control sensors, an emission increase of

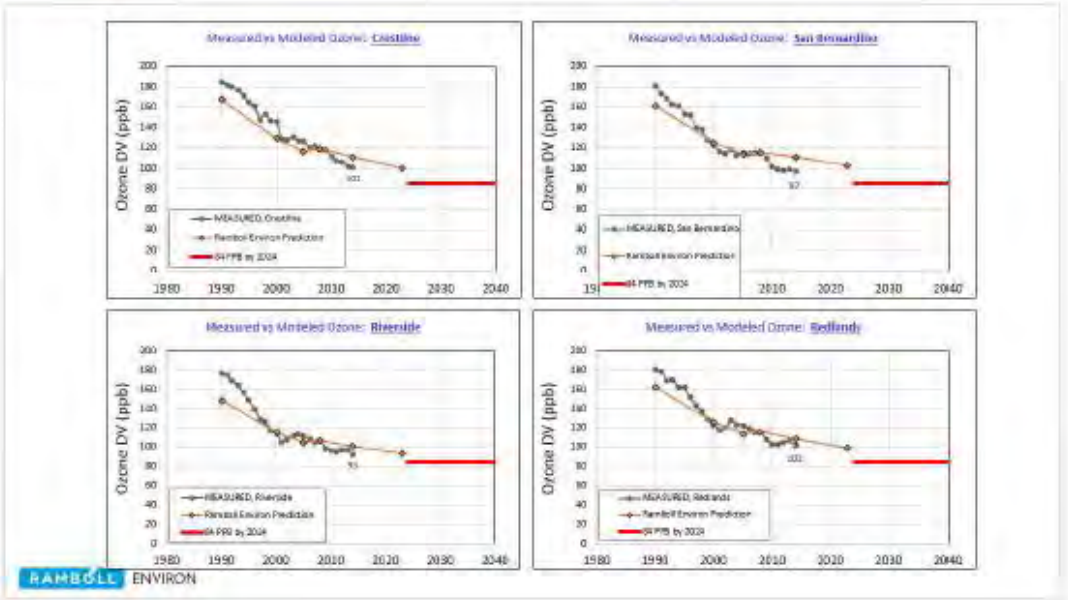
200% (to a tailpipe emission level of 0.6 g/bhp-hr NOx) was assigned based on the assumption that a loss of feedback control (either a NOx sensor for SCR or an A/F sensor for an adsorber) would result in significantly lower NOx conversion rates because the system would likely shut off reductant delivery or go into a conservative open loop operation that injects minimal reductant to minimize the risk of overdosing or inefficient use of reductant. For the added category of NOx aftertreatment, a failure was calculated to have a 300% increase (to reflect a tailpipe emission level of 0.8 g/bhp-hr NOx). This represents an intermediate level between an MIL failure (at 0.5 g/bhp-hr) and a complete loss of NOx aftertreatment (at 1.2 g/bhp-hr). Considering that this category includes failures of the SCR catalyst or adsorber itself as well as failures of the reductant delivery system (exhaust injectors, reductant tank, reductant delivery lines, reductant metering, reductant heaters, and compressed air delivery system), many of which would likely result in shutting off reductant delivery or defaulting to open loop operation, a 300% emission increase seems to be appropriate. Staff also adjusted the emission rates and frequency of occurrence rates for both the NOx aftertreatment system category and the NOx aftertreatment sensor categories to properly account for the combined emission impact (e.g., an engine with a failure in both categories will get a 300% NOx increase, not a combined 200% NOx increase from the aftertreament control sensor failure and an additional 300% NOx increase from the aftertreatment failure). Lastly, while there is a category for EGR malfunctions in EMFAC, the NOx emission increase associated with an EGR failure was previous set to a 0.0% increase. This was modified to a NOx emission increase of 150% (to a tailpipe level of 0.5 g/bhp-hr NOx). This emission rate was calculated by assuming a complete loss of EGR would cause engine-out NOx to go from 1.2 to 2.4 g/bhp-hr for an increase of 1.2 g/bhp-hr and then assuming that the NOx aftertreatment would convert 60% of that increase leaving a tailpipe increase of 0.48 g/bhp-hr. Thus, EGR failures were estimated to range from the OBD MIL on point of 0.3 g/bhp-hr to a complete loss of EGR at 0.68 g/bhp-hr with a nominal middle failure point of 0.5 g/bhp-hr.

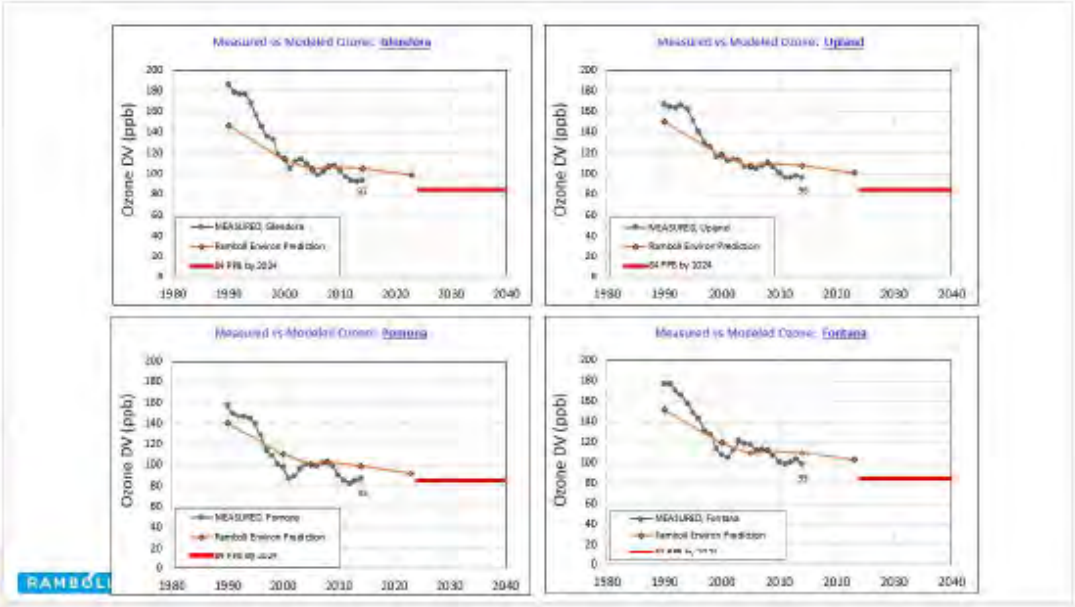
EXHIBIT B

Excerpt from Presentation given by Ramboll-Environ to ARB and SCAQMD

- See linearity of CMAQ ozone predictions between 2008 and 2023, demonstrated by equal slopes between 2008-2014 and 2014-2023, for all monitoring sites analyzed.






Measured vs Modeled Ozone: Glendora
Measured vs Modeled Ozone: Upland
Measured vs Modeled Ozone: Pomona
Measured vs Modeled Ozone: Fontana
Ozone DV (ppb)
1980
1990
2000
2010
2020
2030
2040

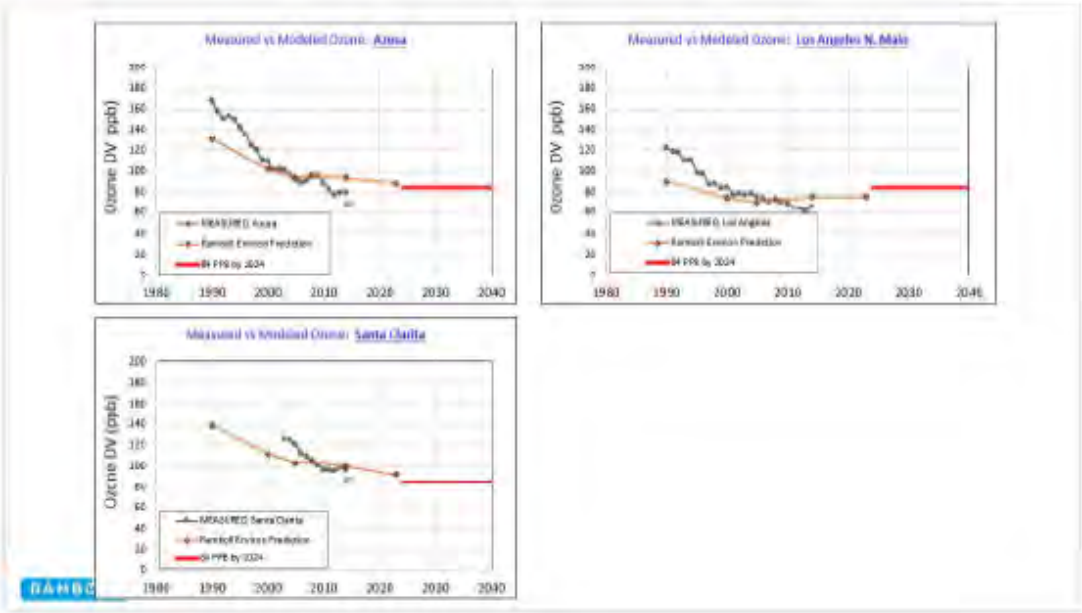

Measured vs Modeled Ozone: Azusa
Measured vs Modeled Ozone: Los Angeles N. Main
Measured vs Modeled Ozone: Santa Clarita
Ozone DV (ppb)
1980
1990
2000
2010
2020
2030
2040

EXHIBIT C

STATEMENT OF WORK

As requested by EMA, Ramboll Environ (RE) is pleased to provide a scope of work for additional modeling and analyses to determine how well the South Coast Air Basin (SoCAB) AQMP modeling tracks observed historic ozone trends as well as to determine ozone trends in recent and future years. The objectives of the new work are to:

- Extend the preliminary EMA dynamic evaluation study that was previously conducted using the 2012 AQMP modeling database with dynamic evaluation using the latest 2016 AQMP modeling database (expected to be available in June 2016)
- Conduct emissions reconciliation analysis of the South Coast emissions inventories
- Investigate weaknesses in EMFAC emission predictions
- Conduct uncertainty analysis on emissions and boundary conditions
- Apply EPA techniques to reduce forecasting errors
- Prepare presentation and conference paper and present the results at the 15th annual Community Modeling Analysis System (CMAS) conference in October 2016
- Publish the results of the study in a peer-reviewed journal.

The tasks that will be performed to accomplish these objectives are described below.

Task 1: Dynamic Evaluation

In the preliminary EMA study with the 2012 AQMP modeling database (2008 base year), RE conducted dynamic evaluation of the modeling system by calculating design values for historical years (1990, 2000, 2005) and a current year (2014), using 2008 as the base year. The trends in modeled and observed ozone design values were compared and the comparison showed that the modeled ozone concentrations were generally significantly less responsive (i.e., stiffer) to emissions changes over the years than observed in the measurements. However, the 2012 AQMP database is now dated and SCAQMD is expected to release the modeling database for the 2016 AQMP (2012 base year) in June 2016. The objective of this task is to determine if the "stiffness" noted previously with the 2012 AQMP has been corrected in the latest AQMP or if modeled ozone reductions still tend to be smaller than the measured reductions.

The following activities will be conducted in this task:

- Develop gridded model-ready emissions for the summer ozone season (June through August) and historical years 1995, 2000, 2005, and 2008 and a recent year (2014 or 2015). As in the preliminary EMA study, RE will use the model-ready emissions for base year 2012 from the 2016 AQMP and the most current estimates of total basin-wide emissions for the historical and recent years to develop the model-ready emissions for these years
- Conduct CMAQ simulations for the summer season of 1995, 2000, 2005, 2008, 2012 (base year), and 2014/2015 using the exact same version of CMAQ used in the 2016 AQMP. The meteorology for all years will be for the base year (2012) following the same approach that is used in projecting future year design values.

- Compare modeled changes in summer season ozone design values from 1995 to 2014/2015 with observed changes for key monitoring locations:
  - Trends in ozone design values
  - Bar graphs and tables showing ppb/decade reductions

Task 2: Emissions Reconciliation Analysis and Review of Satellite Measurements

This task will primarily be performed by STI under subcontract to Ramboll Environ. STI's scope of work for their activities under this task (including a presentation at the 2016 CMAS conference and a peer-reviewed journal article) is provided as an attachment to this SOW. RE will provide the necessary modeling data (CMAQ predictions, gridded emissions) to STI for their analysis. In addition, RE will conduct a detailed literature review of recent studies using satellite measurements to infer NOx emission trends in the South Coast and compare the trends from these studies with those from the South Coast emission inventories. A quick review of some satellite measurement papers indicates that the inventories may be underestimating the reductions in SoCAB NOx emissions over time.

Task 3: Investigate EMFAC limitations

On May 15, 2015, the California Air Resources Board (CARB) released an updated version (v1.0.7) of the EMFAC2014 model to the public. Subsequently, on December 14, 2015, EPA approved the use of EMFAC2014 for State Implementation Plan (SIP) and conformity purposes. The EMFAC model estimates emissions from all types of light- and heavy-duty on-road vehicles in California based on emission rates by vehicle technology and assumptions about vehicle population and vehicle activity (e.g. vehicle miles travelled or VMT, number of starts, idle hours).

According to the EMFAC2014 web database, heavy-heavy duty diesel trucks (HHDT; 33001 to 60,000 pounds gross vehicle weight rating; hereafter referred to as HD diesel vehicles) comprise 32% of NOx emissions from on-road vehicles in the SoCAB. In EMFAC2014, emission rates and speed correction factors for heavy duty diesel trucks meeting 2007 and 2010 emission standards are based on emission testing conducted by CARB and SCAQMD of only six 2010 and later HD diesel vehicles (EMA Memorandum from Tim French, 2014). These data are only partially representative of the technology or typical suite of HD diesel vehicles in-use. Furthermore, the EMFAC estimates of HD diesel vehicle tampering, malfunction and malmaintenance (TM&M) rates, which increase emissions from HD diesel vehicles over the life of the vehicle, are based on dated (1988 and 1998) data (EMA, 2014). These estimates do not reflect the advances in technology (after-treatment systems, fully integrated OBD systems) and other measures (multiple "inducements" to ensure emission compliance) that have been implemented in recent model year HD diesel vehicles (EMA, 2014).

In this task, Ramboll Environ will conduct a detailed review of the basis of Model Year (MY) 2007+ HD diesel vehicle emission rates, speed correction factors and TM&M rates included in EMFAC2014. We will compare EMFAC2014 assumptions for each of these parameters with EPA MOVES model assumptions for MY 2007+ HD diesel vehicles. We will also conduct a literature search to identify any new studies or data sets available and provide a general assessment on whether any new data could be used to estimate MY 2007+ HD diesel vehicle emission rates. The results of the above analysis would be documented in a technical memorandum which would discuss uncertainty in EMFAC2014 MY 2007+ HD diesel vehicle emission rates along with alternative emission rates available in the MOVES model and list

other identified data sources. If data sets are found during the literature review that could improve EMFAC2014 estimates of HD diesel vehicle emission rates, Ramboll Environ could make detailed evaluations of these data under an additional task.

Task 4: Quantify uncertainties in model projections

The objective of this task is to help identify the factors contributing to the lower response of the model to emission changes over the years than observed at many SoCAB monitoring locations. Errors in modeled future year projections can be attributed to uncertainties in a number of factors including emissions, meteorological inputs, boundary conditions, and uncertainties in model formulation, including chemistry mechanisms. In this task, RE will investigate the role of three of these uncertainties in the CMAQ simulations: meteorology, emissions and boundary conditions.

For understanding the extent to which year-to-year meteorological differences influence modeled future year design values, RE will conduct CMAQ sensitivity studies for the 2012 base year and 2023 future year using 2008 meteorology. This approach leverages the model-ready meteorological files for 2008 that are already available from the 2012 AQMP and that were used in the preliminary CMAQ modeling for EMA. The future year design values calculated using 2008 meteorology will be compared with those using 2012 meteorology.

For quantifying the emissions uncertainty, RE will conduct CMAQ sensitivity studies for the summer seasons of the 2016 AQMP base year (2012) and a historical year, to be determined in consultation with EMA, by separately reducing VOC and NOx emissions from on-road mobile sources by a factor of two. Since the modeling inputs do not include pre-merged emissions (i.e., separate emissions for each source category), the fraction of emissions from on-road mobile sources in the SoCAB will be used to determine the amount of reductions in the modeling inputs.

For quantifying the boundary conditions uncertainty, RE will reduce ozone boundary conditions by 10 ppb in CMAQ sensitivity studies for the summer seasons of 2012 and a historical year. These changes to the boundary conditions will enhance the responsiveness of the model to emission changes between the historical year and 2012 within the modeling domain and will likely bring the predicted ozone reductions in closer agreement with measured reductions.

The results of the sensitivity study design value projections for the historical year using the emissions and BC sensitivity tests will be compared with those using the base 2016 AQMP modeling database from Task 1 and with the observed ozone trends to see which changes results in a better match of modeled and actual observed ozone trends between 2008 and the selected historical year.

Task 5: Apply EPA methods to reduce ozone forecast errors

Scientists at EPA's National Exposure Research Laboratory (NERL) have investigated methods to correct biases and errors in ozone projections from photochemical grid models, such as CMAQ (Hogrefe et al., 2014; Porter et al., 2015). In this task, RE will use the methods described in Porter et al. (2015) to reduce the ozone forecast errors from the CMAQ modeling conducted for EMA, We will apply the methods ("Mean and Variance with Temporal Matching" and "Cumulative Distribution Function Matching") that were identified by Porter et al. (2015) as being the most promising of the various methods that were used in their analysis. The validity of these techniques will be tested by applying the techniques to the summer season of one historical year. We will then conduct a summer season simulation for 2023 using the 2016 AQMP database, and apply the technique to adjust 2023 projections.

Task 6: Conference presentation

In this task, RE will present the results of the study at the 15th Annual Community Modeling Analysis System (CMAS) conference in October 2016. CMAS was established under funding from the U.S. EPA to support community-based air quality modeling. The CMAS Center (located at the University of North Carolina, Chapel Hill) is responsible for releasing CMAQ and other models and providing training and support to model users. The CMAS conference is held annually in Chapel Hill, and is well-attended by the photochemical modeling community.

RE will prepare a draft abstract for review by EMA and submit the final abstract to CMAS by the due date (June 29, 2016). We will request an oral presentation for the "Regulatory Modeling and SIP Applications" session of the conference. Prior to the conference in October, RE will prepare a draft presentation and extended abstract for review by EMA and for discussion during a conference call between RE staff and EMA. RE will revise these documents based on the review and discussion and submit the materials to CMAS for the conference presentation and proceedings.

Task 7: Conduct literature review and prepare manuscript for peer-reviewed publication

In this task, RE will conduct a detailed literature review and analysis of previous dynamic evaluations conducted with CMAQ and other models to put the results of the EMA study in context with previous studies. RE will prepare a manuscript, suitable for publication in a peer-reviewed journal, which will summarize the salient features of the literature review and present the EMA study results.

Task 8: Project management, reporting and coordination with stakeholders

In this task, RE will coordinate project activities with project sponsors, agencies, and subcontractors (currently Sonoma Technology, Inc.). RE will attend meetings and interact and collaborate with scientists at SCAQMD, ARB, and EPA. RE staff will attend conference calls, prepare project reports and presentations for these activities. RE staff will assist EMA in the preparation of comments to the draft 2016 AQMP.

Sonoma Technology, Inc.
Environmental Science and Innovative Solutions

June 3, 2016 STI-916025

Prakash Karamchandani
Ramboll Environ
773 San Marin Drive, Suite 2115
Novato, CA 94998

Re: Statement of work and budget for South Coast emissions reconciliation analyses

Dear Prakash,

STI is pleased to submit the attached statement of work (SOW) and budget estimate for performing emissions reconciliation analyses for the South Coast Air Basin (SoCAB). Our SOW describes the following activities:

- Acquiring and processing available ambient monitoring data for 1991-2015 from Photochemical Assessment Monitoring Stations (PAMS) and other sites in the SoCAB
- Working with Ramboll Environ to acquire emissions inventory data used in retrospective and future year photochemical modeling simulations for the SoCAB and processing these data to support emissions reconciliation analyses
- Compare ambient- and emissions-derived trends in VOC and NO_x levels and VOC/NO_x ratios
- Use PAMS data to evaluate trends in MIR-weighted reactivity at various sites

We look forward to working with you on this project, and please contact me with questions at 707.665.9900 or sreid@sonomatech.com.

Sincerely,

Stephen Reid
Environmental Modeling Division Manager

Approved:

Hilary Hafner
Senior Vice President

Attachments

Statement of Work

Emissions inventories are an important component of air quality planning and a key input to photochemical grid models that support air quality assessments. Several methods are available to evaluate and improve emissions estimates, including comparisons between emissions inventories and ambient monitoring data. These comparisons, which are often called "emissions reconciliation," are used to identify omissions or inaccuracies in an emissions inventory, leading to further investigation and inventory improvement. The basic approaches used to perform emissions reconciliation analyses include selective, quantitative comparisons of emissions inventory- and ambient-derived molar pollutant ratios (e.g., VOC/NO_x or CO/NO_x), as well as comparisons of emissions inventory- and ambient-derived hydrocarbon compositions. Typically, these comparisons are made for morning commute periods when emission rates are high and mixing depths are low, minimizing the impact of confounding factors such as transported and chemically changed pollutants (Chinkin et al., 2005).

In addition, the sensitivity of ozone formation to changes in VOC or NO_x concentrations has been linked to several indicator species, including total reactive nitrogen (NO_y) and formaldehyde (HCHO). For example, VOC-sensitive conditions may exist when afternoon NO_y concentrations exceed 20 parts per billion (ppb) and HCHO/NO_y ratios are less than 0.28 (Sillman, 1995).

To support assessments of trends in ozone and ozone precursor concentrations in the South Coast Air Basin (SoCAB), STI will evaluate trends in ambient VOC and NO_x concentrations and VOC/NO_x ratios for selected monitoring sites and perform reconciliation analyses with air quality model-ready emissions data. STI will also analyze trends in VOC reactivity by applying Maximum Incremental Reactivity (MIR) values to individual hydrocarbons species measured at SOCAB monitoring sites. In addition, STI will review available data for key indicator species.

Gridded, hourly emissions data will be acquired from Ramboll Environ for the years 2000, 2005, 2008, 2012, and a current year (2014 or 2015). We understand that the 2012 data will be obtained from the South Coast Air Quality Management District's (SCAQMD) CMAQ database developed for the 2016 Air Quality Management Plan (AQMP). Emissions data for 2000, 2005, 2008, and 2014/2015 will be generated by Ramboll Environ by applying scaling factors to the 2012 CMAQ-ready emissions data. These scaling factors will be developed from historical SoCAB emission summaries from the California Air Resources Board (ARB).

Task 1: Ambient Data Analyses

For the time period of interest (1991-2015), STI has reviewed available ambient monitoring data for the SoCAB from EPA's Air Quality System (AQS), including data from Photochemical Assessment Monitoring Stations (PAMS), State and Local Air Monitoring Stations (SLAMS), and other special purpose monitoring sites. A summary of available total nonmethane organic compounds (TNMOC), NO_x, and indicator species data is show in Table 1.

This summary of available data indicates that the Asuza, Burbank, Pico Rivera, and Upland sites are likely to have sufficient data to support trend analyses for VOC, NO_x and VOC/NO_x ratios. Limited

analyses can also be performed at additional sites (e.g., VOC/NO_x ratios can be calculated for 2005 and 2008 at the LAX-Hastings site). The availability of indicator species data is extremely limited.

Table 1. Summary of data availability by monitoring site.

Site Name	Site Type	TNMOC Availability*	NOx Availability	Indicator Species Availability
Azusa	PAMS	1995 - 2014 (missing data after 2011)	1991 - 2015	
Burbank	Other	1998 - 2012 (missing data in 1997 and 2012)	1991 – 2014	Formaldehyde (HCHO): 1997-2012
Los Angeles North	Unofficial PAMS	1995 - 2001 (only sample at 5 PST and 12 PST); 2009 - 2014	1991 – 2015	NO_y: 2011 – 2015 HCHO: 2009 – 2012
Pico Rivera	PAMS	1997 - 2004	1991 – 2005	HCHO: 1997-2001
Pico Rivera New	SLAMS	2006 - 2014	2006 - 2015 (missing data in 2006 and 2012)	HCHO: 2006-2012
Hawthorne	Other	1997 - 2003	1991 - 2004	
LAX – Hastings	SLAMS	2004 - 2013	2004 - 2015	
Newhall	Other	1999 & 2000	1994 - 1995; 1999 - 2001 (missing July in 1999)	HCHO: 1999-2000
Santa Clarita	Other	2001 - 2014 (missing July data in 2014)	2001 - 2015	HCHO: 2001-2012
Banning-South Hathaway	PAMS	1997 - 2008	1997 - 2015	HCHO: 1996-2008
Rubidoux	Unofficial PAMS	2009 - 2013	1994 - 2015	NO_y: 2011 – 2015
Upland	PAMS	1994 - 2008 (missing 1996)	1994 - 2015	

*Data monitored for summer only (typically beginning in June or July and continuing through September.

For the monitoring sites and time period (1991-2015) of interest, we will acquire available data from AQS for speciated hydrocarbons, total nonmethane organic compounds (TNMOC), NO_x, and indicator species, as well as wind speed and wind direction. To ensure quality data for analysis, Level 1 validation of the VOC data will be performed, as outlined in Brown and Hafner (2006). The goal of data validation is to identify a representative data set for each site. Therefore, outliers, unrealistically low concentration values, and shifts in species patterns will be flagged as suspect and may not be included in the analysis. In addition, for PAMS sites, the sum of PAMS target compounds

(PAMSHC) will be compared to corresponding TNMOC values, and TNMOC data will be excluded where PAMSHC is greater than TNMOC or less than 70% of TNMOC.

Our analyses will focus on ozone season data (May-October) collected during early morning hours (e.g., 0600-0900) to minimize the influence of transported pollutants and chemical reactions on ambient measurements. After the appropriate ambient data have been selected and prepared, trends in hourly TNMOC and NO_x concentrations at each site will be evaluated by calculating the mean ozone season value for each year. In addition, TNMOC/NO_x ratios will be calculated based on molar ratios with TNMOC in units of ppbC, and NO_x in units of ppb. TNMOC/NO_x ratios will be calculated by day of week (weekdays vs. weekend days) and wind quadrant, as the sources impacting a given monitoring site vary by wind direction. In addition, we will evaluate trends in VOC reactivity by applying Maximum Incremental Reactivity (MIR) values to individual hydrocarbons species measured at PAMS sites.

Task 2: Emissions Inventory Analyses

For each monitoring site, STI will define grid analysis zones based on predominant wind speeds during early morning hours (e.g., 0600–0900), using average wind speeds to identify which grid cells to include in the ratio analyses based on approximate air parcel travel distance during the time period selected of interest. These grid analysis zones will then be used to identify grid cells in the CMAQ modeling domain for which emissions data will be analyzed.

STI will work with Ramboll Environ to acquire gridded, speciated, hourly emissions data for all grid cells of interest. These data will include all years for which CMAQ modeling was performed so that trends in total VOC and NO_x emissions and emissions-derived VOC/NO_x ratios can be assessed. VOC emissions will be provided by the lumped and explicit chemical species associated with the SAPRC-07 chemical mechanism that was used for CMAQ simulations. For ratio calculations, VOC emissions data will be converted to moles carbon to facilitate comparisons with ambient data, which is reported in units of parts per billion carbon (ppbC).[1] In addition, VOC/NO_x ratios will be calculated by wind quadrant and day of week to support comparisons with ambient-derived ratios.

As described above, emissions inventory work will focus on the 2000, 2005, 2008, 2012 and 2014/2015 emissions data derived from the 2016 AQMP modeling.

Synthesis of Findings

STI will prepare tabular and graphical summaries of our comparisons of trends in ambient- and emissions-derived VOC and NO_x concentrations and VOC/NO_x ratios. These data will be discussed in a brief technical memorandum and summarized in PowerPoint slides. STI will also assist in presenting results to SCAQMD and ARB, as needed.

[1] Note that we will be unable to match individual hydrocarbon species in the emissions inventory with individual PAM species, which limits the comparability of these data sets (e.g., we cannot compare the MIR-weighted reactivity of the ambient data and the emissions data).

Responses to Comment Letter from Truck and Engine Manufacturers Association (EMA)
(Comment Letter #58)

Response to Comment 58-1:

Staff appreciates the participation in the AQMP public process and your comments. The 2016 AQMP employed a state-of-the-science numerical modeling system, WRF-CMAQ, and followed U.S. EPA guidance to demonstrate attainment and estimate emission reductions needed to meet the standards. The comment letter states that AQMP's over-predicts ozone and over-estimates the NOx emission reductions required to meet the standard. However, that statement is based on non-standard methodologies, such as a simplified extrapolation, which have not been approved by U.S. EPA or used by the scientific community for predicting air quality. SCAQMD hosted a Science Technology Modeling Peer Review committee (STMPR) meeting on October 26, 2016 to discuss the revised attainment scenarios and the approaches that Ramboll-Environ/EMA suggest. The presentations and minutes describing the discussions among the committee members and public are available at http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPR(Mod)_102616.

Appendix V was released in September 2016 and available for public review for more than 45 days.

Comments on CARB's SIP strategy and EMFAC were forwarded CARB who will be holding its public hearing on the SIP strategy and/or EMFAC.

Response to Comment 58-2:

U.S. EPA lists different types of model performance evaluations to ensure the accuracy of model prediction. The AQMP attainment demonstration includes various types of evaluations including operational evaluation, diagnostic and a form of dynamic evaluation using sensitivity tests. Another dynamic evaluation approach, also recognized by U.S EPA, is using various conditions, e.g., by day of the week, by season, and regionally. The AQMP modeling includes a five-month period starting from May to September, which includes various meteorological conditions, emission variability, and seasonal changes. The modeling results exhibit a robust model performance across these different chemical environments, thus supporting the assertion that the modeling results respond appropriately to changes in emissions. Therefore the AQMP approach satisfies an alternative form of dynamic evaluation that EPA recommends.

The comments on the under-estimation of future design values are not valid since the linear interpolation method referred in the commenter's analysis is overly simplified approach that overlooks the complexity of ozone chemistry, therefore is not supported by U.S. EPA nor scientific community. One should use great caution in drawing a straight line to project ozone trends, since the ozone progress slope will vary depending on the length and the timing of the period that the trend is retrieved from. For example, if ozone ambient data measured in 2016 is included in the trend analysis, the 2012 AQMP projected ozone progress agrees well with the measured progress. In addition, staff were unable to reproduce the numbers provided in the comment letter. EPA recommends to use 5-year weighted average design values, but the ozone concentrations in the table do not agree with EPA recommended 5-year design value.

Response to Comment 58-3:

The attainment demonstrations in the 2016 AQMP as well as in the 2012 AQMP were conducted using the most recent U.S. EPA guidance released at the time. The attainment demonstration in the 2016 AQMP was based on the U.S. EPA guidance released in 2014, whereas the demonstration in the 2012 AQMP was based the guidance released in 2007. The new RRF methodology delineated in the 2014 guidance leads to future design values that are more responsive to emission reductions, compared to the previous RRF approach from the 2007 guidance. This is why the ozone carrying capacity estimated in the 2016 AQMP is higher than the one estimated in the 2012 AQMP.

As responded above, ozone trend cannot be interpolated linearly and model performance cannot be evaluated based on such linear interpolated value. One should use great caution in drawing a straight line to project ozone trends, since the ozone progress slope will vary depending on the length and the timing of the period that the trend is retrieved from. For example, if ozone ambient data measured in 2016 is included in the trend analysis, the AQMP projected ozone progress agrees well with the measured progress.

The measurements data used in the bar graphs on p.5 need validation. The U.S. EPA guidance recommends using a 5-year weighted design value to demonstrate attainment. The measured data given in the bar graphs do not match with the 4th highest of a given year, 3-year design value nor 5-year weighted design value.

Response to Comment 58-4:

Ozone chemistry is complex and the response of ozone to changes in precursor emissions is not linear. This is particularly evident in the case of the NOx reduction disbenefit, which is the increase in ozone concentration despite the reduction in NOx emissions. High levels of NOx in metropolitan urban areas, such as Los Angeles, provide atmospheric conditions under which an initial reduction in NOX emissions increases ozone concentrations. Under these conditions, NOx emissions need to reach a substantially lower level to result in a net ozone reduction, and hence, overcome the NOx disbenefit. Therefore, a simple extrapolation using a straight line would not provide an accurate estimation of future ozone concentration. This type of simple linear extrapolation has not been approved by U.S. EPA or used by the research community.

The 2012 AQMP relied on the 2012 Regional Transportation Plan (RTP) to forecast future growth. The 2012 RTP incorporated the impact of the economic recession that occurred during the 2008-2010 period to a certain degree. It is not expected that the growth forecast reflected the full intensity of the recession. For example, the consumption of taxable gasoline consumption reached its minimum level in 2012, which is after the RTP was finalized in April 2012. Therefore, some discrepancy is expected in the projected emissions inventory and actual data.

Neither SCAQMD nor US EPA support the linear extrapolation of ozone to future years. The rates of ozone progress in the figure in page 8 are mere speculations with no supporting analysis.

Response to Comment 58-5:

The carrying capacity for 2023 to attain the 80 ppb ozone standard is approximately 150 tons per day (TPD) of NOx. The attainment scenario that incorporates proposed control measures is revised. The total NOx emissions remaining in the attainment scenario is 141 TPD. This yields the Basin maximum concentration to 84.5 ppb, which due to EPA rounding conventions is in attainment of the standard.

170 TPD of NOx will lead to approximately 87 ppb, which is above the standard.

Response to Comment 58-6:

There are uncertainties in both baseline and future-year emission inventories. The attainment demonstration using RRF and periodic updates of AQMPs are explicit acknowledgement of that fact. However, qualification of the uncertainties is difficult, if not impossible, simply because the amount of information that goes into preparation of an emissions inventory. As described in Chapter 3 and Appendix V, we strive to use the most up to date information in our emission inventories.

As shown in Appendix V, the modeling performance in characterizing primary and secondary pollutant concentrations in the basin is satisfactory. In our past work, such as MATES studies, emissions trend and concentration modeling are consistent with ambient concentrations. Therefore, we have reasonable confidence in our baseline inventories in representing basic air pollution characteristics in the area.

It's true that there are additional uncertainties in projecting future-year emissions, primarily from difficulties in forecasting future economic conditions and the pace of technology development. The future-year growth forecast is from SCAG. SCAG provided a retrospective analysis of its performance in socioeconomic forecast over the past 30 years at the May STMPR meeting. While there are uncertainties, the long-term trend of SCAG's forecast is deemed to be robust.

When comparing the projected 2023 baseline NOx emissions from 2007, 2012 and 2016 AQMPs, it's true they changed significantly and they became progressively smaller. These changes are not a reflection in uncertainties in the emissions inventories, as implied by the commenter. The smaller 2023 baseline emissions is primarily due to the adoption of proposed measures including CAA 182(e)(5) measures in the past AQMPs.

Spatial and temporal distributions and speciation of emissions are important parts of modeling emission inventories. The District corroborated extensively with CARB on the distributions of emissions. Distribution profiles and gridding surrogates are updated periodically. There are some discussions of the distributions of emissions in Appendix V. If the commenter is interested in more detail or how a specific emission source is distributed, the staff will make the specific information available.

CARB has a continuous program in maintaining and updating emission speciation profiles. Detailed information can be found in https://www.arb.ca.gov/ei/speciate/speciate.htm. This comments were forwarded to CARB who will be holding its public hearing on EMFAC and state SIP strategy.

Response to Comment 58-7:

The 2012 RTP finalized in April 2012 did not capture the full impact of the recent economic recession, as evident from the data showing that the consumption of taxable gasoline reached its minimum level in 2012. Taxable diesel consumption shows a similar trend as well. Such discrepancies in the emissions inventory contributed to the uncertainties in the 2012 AQMP prediction.

Response to Comment 58-8:

The graph was revised accordingly.

The 2016 AQMP modeling approach satisfies the requirements and recommendations given in the 2014 U.S. EPA guidance, including an alternative form of dynamic evaluation.

Comment Letter from the Valley Industry and Commerce Association (Comment Letter #59)

August 19, 2016

Michael Krause, Planning & Rules Manager, AQMP
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: 2016 Draft Air Quality Management Plan – Comments

Dear Mr. Krause,

The Valley Industry and Commerce Association (VICA) represents over 400 businesses and non-profits across California. We welcome the opportunity to comment on the draft 2016 Air Quality Management Plan (AQMP). VICA supports the AQMP's focus on incentive-based models and the emphasis on working with business and affected industries.

Overly prescriptive regulatory mandates have a negative eff ect on our local region, by undermining the economy. We have made great progress reducing emissions from stationary sources in the South Coast Basin over the last few years. However, there have been high costs to manufacturers and other industrial businesses. These costs have contributed to some businesses leaving the area or reducing operations. This means fewer jobs, slower economic growth and the loss of real opportunities for Los Angeles residents. 59-1

We support continuing the emissions reductions progress through incentive-based frameworks, cost effectiveness and options for businesses. Some of the new emission control technologies are not currently cost-effective, but may be necessary to achieve standards by 2023. We support appropriate incentives to offset the capital and operational costs of implementing these technologies. The mobile source plan should be fuel-neutral and allow consumer choice. 59-2 59-3

VICA urges further detail on the funding of the $2 billion incentives outlined in the AQMP. This funding is critical to the AQMP achieving its targets and we urge the South Coast Air Quality Management District to partner with stakeholders to finance this incentive program. 59-4

VICA looks forward to continuing its work with the AQMP Advisory Group, and appreciates the thoughtful effort put into developing this plan.

Sincerely,

Kevin Tamaki
Chair

Stuart Waldman
President

Valley Industry & Commerce Association • 16600 Sherman Way, Suite 170 Van Nuys, CA 91406 • phone: 818.817.0545 • fax: 818.907.7934 • www.vica.com

Responses to Comment Letter from Valley Industry and Commerce Association (VICA) (Comment Letter #59)

Response to Comment 59-1:

Staff appreciates the support for incentives and acknowledges the concerns with regulations that burden businesses impacting jobs and economic growth.

Response to Comment 59-2:

Staff recognizes that some new emission control technologies are not currently cost effective so incentives can assist in advancing deployment of the cleaner technologies needed to meet the fast approaching deadline of 2023 for the 1997 ozone standard. The Plan has been updated to prioritize maximizing emission reductions utilizing zero-emission technologies, when cost-effective and feasible, and near-zero emission technologies in all other applications.

Response to Comment 59-3:

Staff appreciates the comment regarding the long-standing policy of fuel neutrality and supports such a balance where possible. However, staff believes that appropriate funding should be commensurate with the levels of emission reductions needed. As such, the SCAQMD has petitioned U.S. EPA to adopt ultra-low NOx engine emissions standards so that all fuel types have the opportunity to meet one performance standard.

Response to Comment 59-4:

Please see Response to Comment 26-3 regarding the Financial Incentive Funding Action Plan.

Comment Letter from PTS Staffing (Comment Letter #60)

From: Ronald Stein [mailto:rstein@PTSstaffing.com]
Sent: Sunday, August 21, 2016 6:41 AM
To: Angela Kim <akim@aqmd.gov>
Subject: 2016 AQMP Comment Form

Angela Kim, not sure if my comments were submitted via the online form 2016 AQMP Comment Form https://onbase-pub.aqmd.gov/sAppNet/UnityForm.aspx?key=UFSessionIDKey

If my comments did not come through, here are my comments to the AQMD:

California is in a precarious position. While the East coast experiences abnormally wet conditions, the stagnant weather conditions in California are causing more smog days. The emissions crusade that began in 2006 has failed to reduce California's 1 per cent contribution to the world's greenhouse gases, all while cap-and-trade has raised $7 billion in fees for the government's pet projects.

AB32 was signed into law in 2006 at a time when CA was contributing 1% to the world's greenhouse gases, now, a decade later, according to the California Energy Commission California still contributes a miniscule 1 per cent. The cap & trade program that has hit the citizens' pocketbooks for more than $7 Billion dollars to fund a multitude of governmental pet projects, has had little to no impact on the reduction of California's contributions to global greenhouse gas emissions.

The environmental crusaders are also unaware that wind and solar are only able to provide intermittent electricity to the grid, but cannot accomplish the work now performed by oil, natural gas, and coal that are the basis of every component of modern civilizations' industries and infrastructures. 60-1

Maybe it's karma that the cash cow of the cap & trade "fees" may be dying, as CARB avoids the transparency that the program has done little in 10 years to reduce California's 1% contribution to the World's Green House gases.

Yet, the state, by avoiding transparency of the results of the California emissions crusade remains on ago-it-alone crusade to micro manage the California emissions that generates billions of dollars for the government at the expense of businesses and the financially challenged. With numerous state government agencies there is a feeding frenzy on getting a piece of the lucrative cap and trade "fee" revenue.

In 2015, Britain's energy and climate change secretary Amber Rudd set priority to ensure energy bills for hard working families and businesses to be kept as low as possible, announced sweeping CUTS to renewable energy subsidies.

In Australia, after almost a decade of heated political debate, became the world's first developed nation to repeal carbon laws that put a price on greenhouse-gas emissions. In 2015, Australian voters turned against

1

climate laws, blaming them for lost jobs, rising energy bills, higher production costs, and living costs. J.P. Morgan, estimated the removal of the carbon tax would boost its valuation on several companies as much as 6%.

60-1 Con't

The public, especially the homeless and poor that are disproportionally bearing the cost burden for the emissions crusade efforts of the AQMD deserves to know if there is any progress over the last decade in reducing California's 1% contribution to the world's greenhouse gases.

Ronald Stein, P.E.
rstein@PTSstaffing.com

949-268-4023
Irvine, CA

Responses to Comment Letter from PTS Staffing (Ronald Stein)
(Comment Letter #60)

Response to Comment 60-1:

In 2013, the California cap was set to reduce emission levels by 2 percent below 2012, then decline 2 percent in 2014 and 3 percent annually from 2015 to 2020 (https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm).

The AB 32 goal to reduce greenhouse gas emission to 1990 levels by 2020 requires a portfolio of activities such as the current cap and trade program and the mandatory reporting regulation, to name a few. Progress has been demonstrated in both of these programs. Since the implementation of the Mandatory Reporting Regulation beginning in 2009 and the Cap-and-Trade program in 2012, emissions have dropped from 481.4 million metric tons of carbon dioxide equivalent (MMT CO2e) in 2008 to 441.5 MMT CO2e in 2014.

As stated in Chapter 10, the renewable generation technologies currently must still be supplemented by fossil fuel generation due to intermittency and periods of over-generation, along with lack of manageable loads and energy storage (MacDonald, 2016) (Trancik, 2015). The reliance on fossil generation to support renewables is expected to decline as more grid resources such as storage and demand response are more fully integrated onto the grid.

Comment Letter from National Fuel Cell Research Center (Comment Letter #61)

2016 Air Quality Management Plan
Comments of the National Fuel Cell Research Center
August 19, 2016

Submitted by:
Dr. Scott Samuelsen
Director, National Fuel Cell Research Center
Co-Chair, California Stationary Fuel Cell Collaborative
Professor of Mechanical, Aerospace, and Environmental Engineering
University of California Irvine
Irvine, California 92697-3550
gss@nfcrc.uci.edu
949-824-5468

I. Introduction

The National Fuel Cell Research Center (NFCRC) at the University of California, Irvine (UCI) facilitates and accelerates the development and deployment of fuel cell systems, promotes strategic alliances to address the market challenges associated with the installation and integration of fuel cell systems and renewable energy systems, and educates and develops resources for fuel cell and self-generation stakeholders around the world. The NFCRC is working with GE-Fuel Cells, LLC; LG Fuel Cell Systems Inc.; Bloom Energy; Doosan Fuel Cell America; and FuelCell Energy. All commend the excellent Air Quality Management Plan (AQMP) that the South Coast Air Quality Management District (SCAQMD) has drafted.

II. Comments on Draft AQMP

A. Fuel Cell as a Replacement for Stationary Combustion Sources

61-1

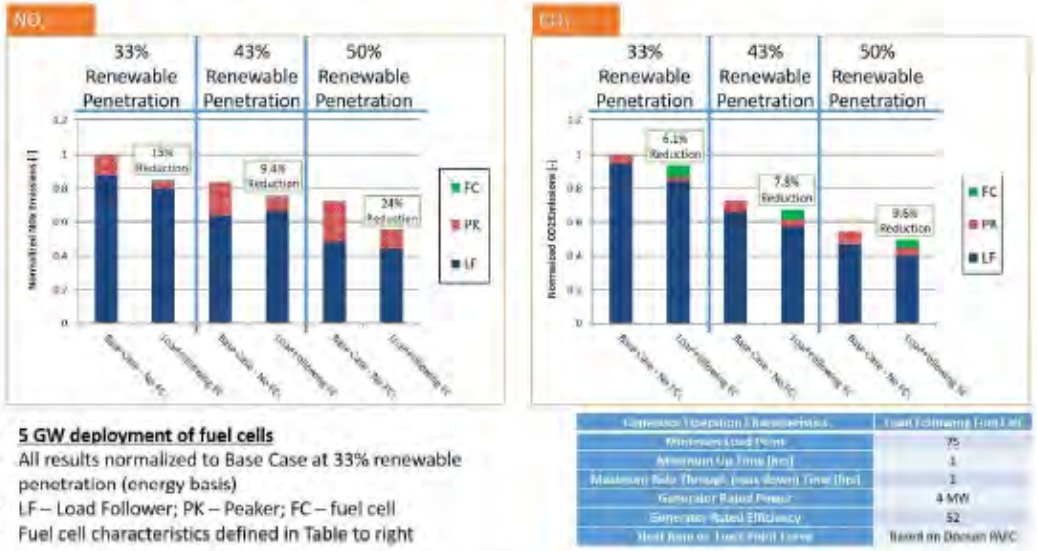
The NFCRC strongly supports the inclusion of fuel cells as Stationary Source Control Measures (CM) CMB-01, CMB-02 and CMB-03 for NOx emission reduction from traditional stationary combustion sources, from commercial and residential space and water heating, and from non-refinery flares, respectively.

In Appendix IV-A, SCAQMD's Stationary and Transportation Source Control Measures, the Background on Zero and Near-Zero Emission Technologies includes information on the success to date of fuel cells in California as a fuel flexible (biogas, hydrogen, natural gas) replacement for combustion technology, as well as providing backup power and hydrogen generation. Stationary fuel cells are installed as primary power generation in California at hospitals, critical telecommunication hubs, grocery stores, hotels, prisons, water resource

recovery facilities, food processing plants, universities, office buildings, and server farms. Some applications are all-electric, whereas other applications recover the heat for space heating, cooling, or steam. The use of heat for the production of chilled water is increasing in popularity as an alternative to electric driven vapor compression refrigeration. An example is the generation of 200 tons of chilling at the UCI Medical Center from a 1.4 MW stationary fuel cell that is mentioned in the draft AQMP. In addition to virtually zero emission of criteria pollutants, fuel cell systems consume net-zero water in the production of energy.

Grid simulations, conducted by the UCI Advanced Power and Energy Program (APEP), demonstrate the significant reduction in NO_x that both biogas and natural gas fuel cells would achieve in a low carbon grid with the co-benefit of reducing greenhouse gases (GHG) and other criteria air pollutants.[1] In Figure 1, for example, the substantial emissions reductions for both NO_x and CO_2 are demonstrated when load management from natural gas combined cycle plants is replaced with fuel cells.

61-1 Con't



- **5 GW deployment of fuel cells**
- All results normalized to Base Case at 33% renewable penetration (energy basis)
- LF – Load Follower; PK – Peaker; FC – fuel cell
- Fuel cell characteristics defined in Table to right

Figure 1: Grid Simulation Modeling of 5 GW Fuel Cell Deployment in California with Different Renewable Penetrations[2]

[1] *"Stationary Fuel Cell Benefits in a Low-Carbon California Grid,"* Advanced Power and Energy Program, University of California, Irvine. April 30, 2013.

[2] Shaffer, B., Tarroja, B., & Samuelsen, S. (2015). Dispatch of fuel cells as Transmission Integrated Grid Energy Resources to support renewables and reduce emissions. *Applied Energy, 148*, 178–186.

As acknowledged in the AQMP, experiential data support these projections, namely that stationary fuel cells reduce GHG emissions in addition to NO_x emissions. As an example, a 2013 California Public Utilities Commission (CPUC) report delineates this attribute (Figure 2) based on data from fuel cell and other systems installed through the Self Generation Incentive Program (SGIP).



* FC – CHP = CHP Fuel Cell, FC – Elec = Electric-Only Fuel Cell, GT = Gas Turbine, ICE = Internal Combustion Engine, MT = Microturbine, PRT = Pressure Reduction Turbine, WD = Wind Turbine

Figure 2. GHG Reductions of Fuel Cell Systems by Technology Type[3]

61-1 Con't

B. Fuel Cells and Energy Storage are Complementary Technologies in a Future Grid

Chapter 10 of the AQMP, "Climate and Energy," details how California is establishing a renewable grid, while relying heavily on firm clean power generation to meet GHG and criteria air pollutant emissions targets. Energy storage is also recognized in CM #CMB-01 as a provider of grid ancillary services. Although intermittent wind and solar renewables and energy storage provide many benefits, because they are not firm capacity, they are not a firm clean power generation solution to replace central station power plants. Therefore, supporting high efficiency, low GHG, and virtually zero criteria pollutant emission options such as fuel cells remains critical. In addition to the multiple applications of fuel cells listed as onsite generation for industrial, commercial and residential buildings in the AQMP, fuel cells also function as utility scale generation. On the utility side of the meter, large-scale fuel cell systems ("TIGER

61-2

[3] *2013 SGIP Impact Evaluation*, prepared by Itron. April 2015, page 7-2.

Stations")[4] are being deployed to create grid support solutions where transmission is constrained or increased reliability is sought. Examples range from a 15MW system in Connecticut, to a 30MW system in Delaware, to a 59MW system in Seoul, Korea. These resources are providing firm, clean load-following power generation to complement the increasing deployment of intermittent solar and wind renewable resources and support grid reliability in locations where it is most needed.

61-2 Con't

In research on smart grids, microgrids, and advanced energy communities, APEP analyses have consistently shown the significant requirement of both battery electric storage (BES) and dispatchable firm clean power generation, such as fuel cell systems, to support and enable increased solar and wind generation.

B.1. Utility Grid Network Modeling

A detailed consideration of utility grid network dynamics, and their evolution over time, is required to understand the power generation and energy storage needs of a grid as it evolves toward 100% renewable operation. The California electricity system dispatch tool (HiGRID)[5] was utilized over a portfolio of scenarios to evaluate various forms of storage (e.g., batteries, pumped hydro, compressed air, and flow batteries) and power generation (e.g., gas turbines, fuel cells) to manage a high-penetration of renewable solar and wind resources and achieve, overall, a stable and resilient 100% renewable grid. Results include the following:

61-3

- The fundamental characteristics of hydrogen energy storage and fuel cells, which allow independent sizing of power (MW) and energy (MWh) capacities, make both essential grid support technologies for a 100% renewable grid,
- The use of natural gas fuel cells (with current performance) can today reduce greenhouse gas emissions more than energy storage for cases of 33% and 50% renewable energy (see Figure 3),
- The ratepayer costs for use of natural gas fuel cells to achieve these higher GHG reductions are lower than the costs of corresponding energy storage technologies to achieve lesser GHG reductions (see Figure 4),

[4] TIGER: Transmission Integrated Grid Energy Resource.
[5] J. D. Eichman, F. Mueller, B. Tarroja, L. S. Schell, and S. Samuelsen, "Exploration of the integration of renewable resources into California's electric system using the Holistic Grid Resource Integration and Deployment (HiGRID) tool," Energy, vol. 50, pp. 353–363, 2013.

- If biogas resources can be sufficiently increased, they can best be used in fuel cells to produce additional GHG reductions with ultra-low criteria pollutant emissions,
- Fuel cells today can operate with dynamic load-following characteristics and are evolving to have very significant ramping capabilities which will enable even higher renewable solar and wind deployment,
- The natural gas system can evolve to store massive amounts of renewable fuel, preferably hydrogen made from otherwise curtailed renewable power, which future fuel cell systems can use to produce zero GHG and zero criteria pollutant emission power,
- In addition to fuel cells, battery technologies are also essential to grid support in the 100% renewable case with their characteristics of relatively fixed power and energy capacities (for shorter term and smaller sized energy storage), and
- Inverters used by both battery and fuel cell systems can be used to enhance grid reliability and other attributes by providing ancillary services in the future.

61-3 Con't

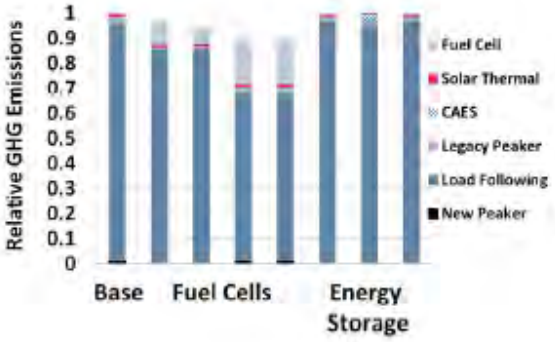


Figure 3. 33% Renewables: CO_2eq Emissions[6]

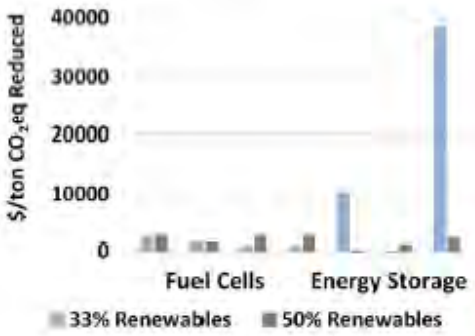


Figure 4. CO_2 Reduction Cost per Ton Reduced[6]

B.2. Distinguishing Characteristics

There is an important need to distinguish the technical capabilities and features that are offered by BES from those that are offered by firm (e.g., 24/7) clean power generation. A brief summary of these grid support characteristics is provided in Table 1. Note that firm clean power generation produced by fuel cell systems has the advantages of providing firm capacity additions

61-4

[6] Forrest, K., Shaffer, B., Tarroja, B., Samuelsen, S., "A Comparison of Fuel Cell and Energy Storage Technologies' Potential to Reduce CO_2 Emissions and Meet Renewable Generation Goals", *ECS Transactions*, 2016. 71(1), 193-203

to the grid, generating power at efficiencies between 43% - 65%, providing spatially separate charging and discharging, and separate power and energy capacity sizing. BES systems have the advantages of faster dynamic ramp rate, 100% of capacity dynamic ramping range, and higher round-trip efficiency. These distinguishing characteristics make BES preferred in some grid support applications and firm clean power generators preferred in others. For example, both BES and clean power generators can operate dynamically. Applications that require very fast ramp rates (e.g., frequency control) will prefer BES, whereas grid locations that need capacity additions will prefer firm, clean power generators. BES systems are not generators, so they must be installed in tandem with power generators and understood to consume some of the power generated whenever they are used. If round-trip efficiency is the most important characteristic desired in a grid support application, then BES systems are preferred. However, if it is desired to store a massive amount of energy, then the separate power and energy sizing characteristic of firm, clean power generators - coupled with electrolyzers and hydrogen storage - are preferred and are more cost effective. Finally, by using the existing natural gas pipeline infrastructure, which has no requirement for infrastructure investment (e.g., new transmission wires) to move the energy throughout the region, firm clean power generators are preferred, especially if the location of charging (e.g., desert solar farm) is separated from the desired location of discharging (e.g., major coastal city).

61-4 Con't

Because of these distinguishing characteristics and the preferred applications that result, it is critical to realize that both BES and firm clean power generators are important technologies for a sustainable and reliable utility grid network. Both of these emerging technologies require and deserve policy support for meeting California climate and air quality goals.

Table 1. Some Distinguishing Technical Characteristics of BES and Clean Power Generation for Grid support

Characteristic	*Clean Power Generation*	*Battery Energy Storage**
Firm Capacity	Yes	No (SOC+ dependent)
Dynamic Ramp Rate	Fast (type dependent)	Faster
Range of Dynamic Operation	20% - 100% of capacity (type dependent)	100% of capacity
Power Generation Efficiency	43% - 65%	NA
Round-trip Storage Efficiency	40% - 60%	70% - 85%
Spatially Separate Charging/Dis-charging	Yes	No
Separate Power & Energy Capacity Sizing	Yes	No

* BES here refers to the most common type of rechargeable battery systems deployed in the SGIP program (i.e., lithium ion) and does not include flow batteries

+ SOC: State of Charge

61-4 Con't

B.3. Importance of Rate Structures

There is also an important need to identify the manner in which firm clean power generation and BES are being dispatched on the utility grid network. For the most part, firm, clean power generation is today dispatched as a base-load resource due to the financial incentives that promote the 24 hours a day, 7 days a week (24/7) continuous operation of the equipment to garner the best rate of return on investment. However, if rate structures were developed to provide a financial incentive for firm, clean power generators to operate dynamically, producing more power during some times of the day and less during others, then the inherent capabilities of firm clean power generators to operate dynamically would be exercised by those participating in the SGIP program.

61-5

Similarly, BES systems are currently dispatched by participants in the SGIP program in a manner to garner the best rate of return on investment. In the case of BES, since these systems store energy rather than produce power, there are certain times of the day in which they consume

electric power and other times of the day in which they discharge electric power. Currently, this means that BES systems are typically charged at night when time-of-use (TOU) electric rates are low and discharged during the day when TOU rates are high.

Figure 5 presents a typical TOU daily rate structure for both the summer period (typically the months of June, July, August, and September) and winter period (typically October – May). Note that typically the differences between on-peak and off-peak prices in the winter are less than those in the summer, which may lead to circumstances under which energy arbitrage (i.e., charging BES systems when prices are low and discharging them when prices are high) may not be financially viable at all. That is, operations, maintenance, and degradation may cost more than the value of the energy price difference times the round-trip energy efficiency. Typically summer TOU prices have 3 levels: off-peak, mid-peak, and on-peak as shown in Figure 5. Also typical is the larger difference in price between off-peak and mid-peak and on-peak prices that make BES use for energy arbitrage more financially attractive. Note, that in all cases whenever a BES system is dispatched, it would be charging between the hours of 11:00pm and 8:00am and discharging between 8:00am and 11:00pm.

61-5 Con't

Figure 6 presents the hourly average breakdown of renewable power generation for a winter day (December 1, 2015) in California. Note that renewable power generation ranges from 1,600 MW to about 2,500 MW (averaging about 1,700 MW) between the hours of 11:00 pm and 8:00 am when BES systems are most likely to charge. Conversely, between the hours of 8:00 am and 5:00 pm the renewable power ranges from 2,500 MW to a peak of 7,100 MW with an average of approximately 6,100 MW. This is a period in which BES systems are likely to discharge and as a result tend to shift less renewable power from night to day and also exacerbate the potential for renewable power over-generation and curtailment.

Figure 7 presents the hourly average breakdown of renewable power generation for a summer day (June 3, 2016) in California. Note that renewable power generation ranges from 3,000 MW to about 4,100 MW (averaging about 3,600 MW) between the hours of 11:00 pm and 8:00 am when BES systems are most likely to charge. On the other hand, between the hours of 8:00 am and 7:00 pm the renewable power ranges from 4,000 MW to a peak of 9,200 MW with an average of approximately 8,300 MW. This period of high renewable power generation is the same period in which BES systems are likely to discharge. As a result, the typical dispatch of

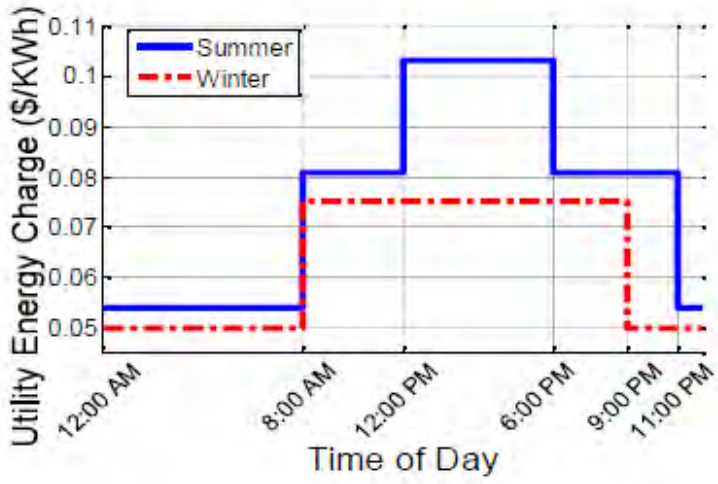


Figure 5. Typical time-of-use (TOU) rate structures for California IOU service territory.

61-5
Con't

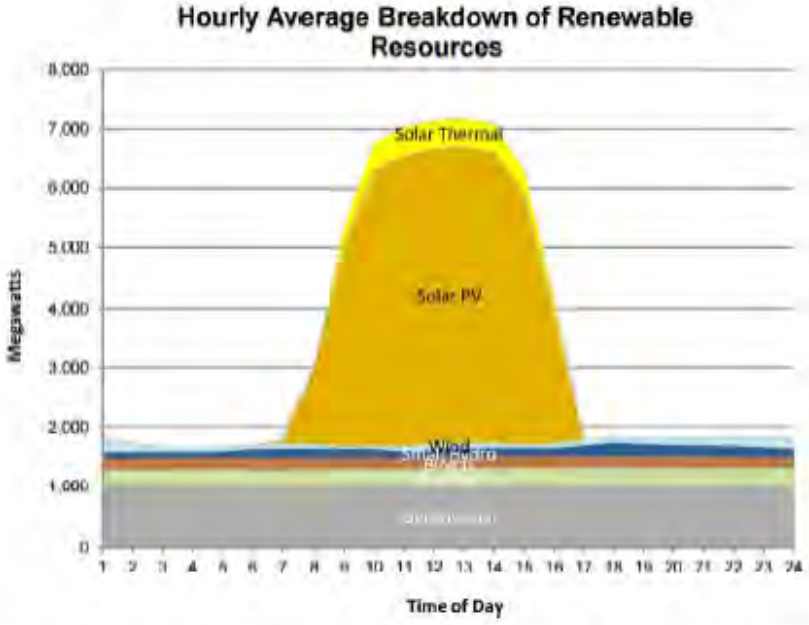


Figure 6. Average renewable power production in California on December 1, 2015.[7]

[7] CAISO, available on-line at: http://content.caiso.com/green/renewrpt/20151201_DailyRenewablesWatch.pdf

BES systems under current rate structures tends to shift less renewable power from the night to compete with more renewable power during the day and also tends to exacerbate the potential for renewable power over-generation and curtailment.

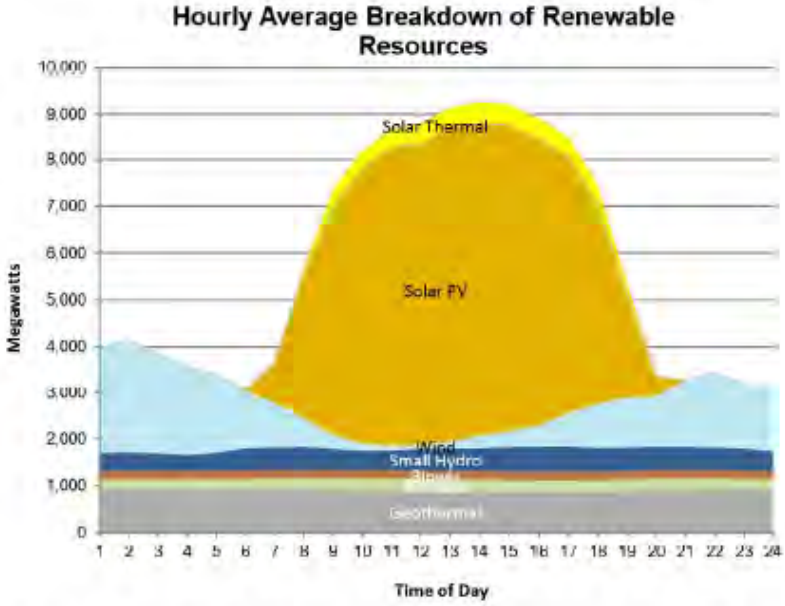


Figure 7. Average renewable power production in California on June 3, 2016.[8]

61-5 Con't

This unfortunate set of current conditions has led to the situation that BES systems are today performing a negative function on the grid, leading to increased grid dynamics and actually increasing the GHG emissions of the grid. The fact that BES systems produced a net increase of GHG emissions is confirmed by the latest information available from analysis of BES performance in the SGIP program.[9] Even though a very limited number of BES systems were evaluated in this study, TOU rate structures have not changed and, as a result, one should expect that BES systems in the SGIP program will continue to be dispatched in ways that are economically attractive while increasing GHG emissions.

Finally, an important need for work on rate structures is in order to (1) enable economic

[8] CAISO, available on-line at: http://content.caiso.com/green/renewrpt/20160603_DailyRenewablesWatch.pdf
[9] Itron, 2013 SGIP Impact Evaluation, April, 2015.

operation of both BES and firm clean power generators in a manner that best supports the introduction of more intermittent renewables, and (2) support grid reliability and sustainability. BES rate structures are required to incentivize charging during periods of high (excess) renewable power generation and discharging during periods of low renewable power generation and high demand (e.g., winter evening peak demand period). Firm, clean power generation rate structures are required to incentivize turn-down of power generation when renewable power generation is high (excess) and ramp-up of power generation when renewable power is low and demand is high. In addition, for both BES and firm, clean power generation, rate structures must be developed and implemented that value the ramping capabilities of both technologies and provide utilities with the tools to pay SGIP technologies for providing valuable ancillary services (e.g., Volt-VAR support, frequency regulation).

61-5 Con't

III. Conclusion

The AQMP appropriately proposes the inclusion of fuel cell systems that are available today to replace combustion generation. The ability of fuel cell systems to produce electricity, heating, cooling and generate hydrogen is unique. In addition to the direct replacement of traditional combustion sources in CM CMB-01 and CMB-02, CMB-03, fuel cell systems are also well-suited as a part of a renewable grid that can exclusively manage the dynamics of an intermittent renewable grid through attributes such as load-following and ramping ability (from 0-100%) in combination with firm, local capacity.

Responses to Comment Letter from National Fuel Cell Research Center (NFCRC)
(Comment Letter #61)

Response to Comment 61-1:

Staff appreciates the support and notes the information provided.

Chapter 10 in the Revised Draft Plan has been updated to expand the discussion on fuel cells and power-to-gas activity.

Response to Comment 61-2:

Staff notes the information provided. Chapter 10 in the Revised Draft Plan has been updated to expand the discussion on fuel cells and power-to-gas activity.

Response to Comment 61-3:

Staff notes the information provided. Chapter 10 in the Revised Draft Plan has been updated to expand the discussion on fuel cells and power-to-gas activity.

Response to Comment 61-4:

Staff notes the information provided. Please see Response to Comment 61-3 regarding fuel cells and power-to-gas activity.

Response to Comment 61-5:

Staff notes the information provided. Please see Response to Comment 61-3 regarding fuel cells and power-to-gas activity.

Comment Letter from the REALTORS Committee on Air Quality (Comment Letter #62)

REALTORS® *Committee on Air Quality*

Carol Banner, Chairman

106 South Grand Avenue
Pasadena, CA 91105
323/342-9373

August 19, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, CA

SUBJECT: Comments on the Draft 2016 Air Quality Management Plan

Dear Dr. Fine:

The REALTORS Committee on Air Quality (RCAQ) is a voluntary coalition of 35 Associations of REALTORS that serve the South Coast Air Basin. We strongly support clean air in concert with housing affordability and availability, a competitive economy, and overall quality of life.

The Draft 2016 AQMP is a bold move beyond previous AQMPs that relied on undefined "black box" measures to meet federal standards. The following comments identify our support for realistic and effective features of the Draft AQMP, along with several caveats about the Plan's impact on housing: 62-1

- **Take Full Advantage of Co-Benefits.** The AQMP should take credit for existing and future energy efficiency and conservation programs, greenhouse gas reductions and other existing programs by state, regional and local agencies that provide emission reduction co-benefits, without duplicating efforts. This integrated approach will save money in the long-run.

- **Employ Incentives.** RCAQ supports the proposed use of incentives, rather than sole reliance on command and control regulations, to accelerate penetration of clean technologies in residential properties. The AQMP estimates that $1 billion is needed for the next fifteen years to fund a wide range of incentives for all sectors of the economy. RCAQ urges the District to supplement the AQMP with a detailed action plan to establish the reasonable availability of needed incentive funds. 62-2

- **Avoid Negative Impacts on Housing Affordability, Availability.** A group of proposed control measures would impact new and existing housing in the air basin. This 62-3

includes measures aimed at energy conservation beyond SB 350 requirements, cleaner space and water heating, and more stringent wood-burning fireplace controls, and additional requirements for new development and redevelopment above and beyond Title 24, among others.

We want to focus the District's attention to the current and projected critical housing deficit within the basin. The unmet demand for workforce housing is particularly acute. Mandated retrofits or new features imposed when a property is transferred will push housing costs up and erode affordability; the increased cost typically gets mortgaged for 20 to 30 years, compounding the impact on affordable housing. Cost increases to for-sale housing will also cause a ripple effect on the cost of the rest of the housing stock, including rentals. In order to better understand this dynamic, we request that the District provide information on the cumulative socio-economic impacts of the suite of proposed measures that impact the housing sector as part of the forthcoming Socio-Economic Analysis. 62-3 Con't

We urge the District to insure that the AQMP does not exacerbate the region's shortage of shelter – especially affordable shelter. Control measures that impact housing must be conceived of as "win-win" measures that benefit housing and air quality concurrently. For this reason, we support the proposed incentive-based approach for ECC-03 as the most powerful way to motivate property owners and residents to incorporate cleaner, more energy efficient features and technologies in existing homes, without triggering unintended economic and health impacts associated with increasing housing costs at point of sale. Incentive programs will provide an efficient way to track and monitor the penetration of new technologies in housing.

- **Provide Ample Review Time for Draft AQMP, PEIR, and Socio-Economic Analysis.** As of this date, neither the Program EIR nor the Socio-Economic Analysis are available to review in concert with the Draft AQMP. We urge the District to insure the opportunity for a comprehensive review of all parts of the AQMP, supported by a series of public workshops in September and October. The comments conveyed in this letter are based only on the Draft Plan and appendices available as of August 19th. 62-4

- **Push for Federal Support and Cooperation.** No matter how ambitious the District is in regulating pollutants under its authority, our air basin will not meet federal clean air standards without full federal cooperation to reduce emissions under its control. One area where this is especially apparent is the need to clean the heavy-duty truck fleet serving the South Coast basin, a significant portion of which originates outside California. RCAQ supports District efforts to secure a national clean-truck regulation that will not only clean the South Coast Basin's fleet, but reduce pollution and diesel particulates in communities all across the nation. A nationwide standard would level the playing field, allowing the South Coast Air Basin to remain competitive in the goods movement arena, which encompasses a third of California's economy. 62-5

We look forward to discussing these comments with District staff so that they can be addressed in the Final Draft 2016 AQMP to be released in September. In addition to our overarching messages, **Attachment A** presents detailed recommendations on seven proposed control

measures that would affect housing affordability and availability. Please contact Carla Walecka, RCAQ representative on the AQMP Advisory Group, at 323-342-9373 or cwalecka@earthlink.net with any questions you may have about these comments.

Sincerely,

Carol Banner

Carol Banner, Chair
REALTORS Committee on Air Quality

3

Attachment A

REALTORS Committee on Air Quality (RCAQ)
Comments On Proposed AQMP Control Measures

ECC-02, Weatherization above and beyond SB 350 requirements

RCAQ supports the integration of clean new technologies into homes, We agree that the District should harness the emission reduction benefits of existing and planned state, federal and local energy efficiency programs and incentives.

ECC-03, Enhancement in Building Energy Efficiency and Smart Grid Technology Beyond SB 350

As noted in our cover letter, the air basin has a critical housing shortage and soaring housing costs. The District should proceed beyond the statewide level playing field set by SB 350 only if it can insure cost-effective results that do not harm housing affordability and availability, or discourage needed expansion and replacement of our housing stock. Therefore, we support the District's proposed incentives to encourage homeowners to upgrade their homes with cost/effective weatherization and energy efficiency features. This measure should allow home owners and residents to install the most cost-effective and appropriate technologies and appliances for their specific conditions and uses; one-size-fits all approaches must be avoided.

Further, the proposed control measure description should consider a variety of different types of incentives aimed at homeowners, utilities, and vendors for maximum cost/effectiveness. RCAQ looks forward to working with the District and other stakeholders to help identify the kinds of incentives and outreach necessary to motivate property owners to install the latest energy efficiency features in their homes, in a manner that does not place undue pressure on housing affordability and availability.

This measure needs to be linked with proposed FLX- 01, Education and Public Outreach, to inform property owners, residents and local jurisdictions of the availability of new technologies and models for space and water heating, low emission appliances, and energy cost savings and air quality benefits of retrofits and replacements.

As this measure is refined, we urge the District to more precisely describe the scope of surplus savings anticipated, as well as the amount of incentive funding required to achieve those surplus emissions savings. We are not able to comment specifically on the reasonableness of these two aspects at this time.

ECC-04, Cool Roof Technology and Emission Reductions

RCAQ supports District efforts to refine cool roof requirements to insure no adverse emission impact. In the event that retrofits are needed for any existing residential reflective roofs installed under the current requirements, we urge the District to provide financial incentives to those property owners.

4

CMB-02, Commercial and Multi-Family Residential Space and Water Heating
This measure would tighten the District's current boiler regulation, but a sense of scale is lacking in the control measure description: how many multi-family retrofits are assumed to yield a 30% NOx emission reduction by 2023, and 60% by 2031? How much acceleration of normal change-out patterns is needed? What is the expected average cost per multi-family unit? We also recommend that the timetable for implementation be tied to the commercial availability of new, cost-effective compliant boiler models. We strongly support implementing multi-family boiler change-outs through incentive programs aimed at cost/effective retrofits in order to avoid harming rental housing affordability.

CMB-04, Restaurant and Residential Cooking
This proposed measure includes residential cooking in addition to restaurant appliances. However, the control measure description does not discuss what the goal is for the residential sector. Until this is more fully developed through discussions with stakeholders, we recommend that the AQMP measure focus only on commercial applications. We recommend that any future efforts to change residential cooking appliances focus on incentives and education to motivate residents to change-out their old appliances for cleaner burning ones.

BCM-09, Tighter Wood Burning Fireplace Restrictions
This measure should be implemented only as a back-up measure if needed to attain the federal PM 2.5 standard. In the control measure description, we urge the District to maintain the ability for residents to use grandfathered wood fireplaces on as many days as possible during the winter season while not hindering attainment. We further urge the District to continue its effective incentive program for voluntary gas-log fireplace change-outs. RCAQ has supported this approach since wood burning restrictions were first added to the AQMP. Cost/effective incentives should be tailored to benefit those portions of the basin that exceed the federal PM 2.5 standard.

EGM-01, Emission Reductions from New Construction and Redevelopment
While we understand that state regulations require SCAQMD to consider a rule similar to the San Joaquin Valley's Rule 9510 development fee because it is "reasonably feasible", we do not support applying the same approach for the South Coast Air Basin. By adding costs to new construction, this rule would not only impact the cost of new homes but would have a ripple effect on the affordability of all housing in the basin. We note that new housing contributes to emission reductions by meeting current codes regarding Green materials, energy use, congestion mitigation, trip reduction ordinances, CEQA air quality mitigations, etc.

As drafted, this measure does not include emission reduction estimates or cost estimates due to uncertainty about how the measure would be structured, and does not specify the degree to which it overlaps with existing RTP/SCS strategies, Title 24, and other existing requirements that reduce emissions. For example, new construction consistent with SCAG's RTP/SCS contributes to mobile source emission reductions at the regional level that are already captured in the AQMP baseline. It is important not to double-count or duplicate emission reductions already being implemented. Until such time as this measure can be described and quantified, with a sound legal basis, it should remain in the portion of the AQMP that is not part of the enforceable commitment.

5

Conducting a thorough investigation through a multidisciplinary advisory group must be a prerequisite to moving forward on any kind of EGM-01 rule impacting housing. We note that the previous Proposed Rule 2301 Working Group has not met for years and would need to be reconstituted. The Realtor community would like to be involved in any EGM-01 advisory group.

Inconsistent Cost/Effectiveness Rankings

Tables 6-4 through 6-7 contain cost/effectiveness rankings for measures in Appendix IV-A. The tables assign cost effectiveness rankings even to measures that are not quantified. For example, EGM-01 is assigned a cost effectiveness ranking of 5 in the absence of either cost or emission reduction estimates. Is the "5" ranking for EGM-01 equivalent to the "5" ranking for other partially quantified and unquantified measures in this chart? A footnote acknowledges that emission reductions and costs will be determined after projects are implemented, which appears to contradict the "5" ranking.

Further, the least cost effective measures in Table 6-6 are assigned a value of "5," while the least cost effective measures in companion Table 6-5 are assigned values of 12, 13 and 14. Is a "5" for EGM-01 equivalent to a "14" for Improved Breakdown Procedures?

We recommend that all cost-effectiveness rankings be revisited after the Socio-Economic Analysis is complete. The ranking system needs to be clearer, and the ranking values need to be comparable across mobile and stationary sources measures.

Responses to Comment Letter from REALTORS Committee on Air Quality (RCAQ)
(Comment Letter #62)

Response to Comment 62-1:

Staff appreciates the participation in the development of the 2016 AQMP and agrees with taking advantage of the co-benefits achieved with the implementation of existing programs regulating GHGs or improving energy efficiency. As such, the Plan includes measures such as ECC-01 and ECC-02 that seek criteria pollutant reduction credit from such programs.

Response to Comment 62-2:

Staff appreciates the support for incentives and refers the commenter to Response to Comment 26-3 regarding the development of the Financial Incentive Funding Action Plan.

Response to Comment 62-3:

Staff understands the concern with housing and refers the commenter to Response to Comment 38-3 regarding the measure focused on new development and re-development projects. Support for control measure ECC-03 is appreciated. It should be noted that ECC-03 would provide voluntary incentives to encourage energy efficiency. For more information on socio-economic impacts please refer to the 2016 AQMP Socioeconomic Analysis (http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/socioeconomic-analysis).

Response to Comment 62-4:

The release of the Draft AQMP in June 2016 was designed to allow the public to become familiar with the proposed strategy and provide comments to be included in a Revised Draft Plan. Release dates have been staggered for the Draft Program Environmental Impact Report (PEIR) and Socioeconomic Assessment in order for the supporting documents to analyze the latest version of the Plan. As such, the costs and benefits analysis was released August 31, 2016 and the PEIR was released mid-September in time for review of the Revised Draft Plan that was released early October. Similarly, Appendix V and VI did lag behind the release of the Draft Plan but were available by September and provided over 30 days to review and comment. All those comment periods overlapped to allow for a comprehensive, concurrent review by the public.

In addition, staff is providing a 60-day public review and comment period for the PEIR and while each of the draft Socioeconomic chapters have been given a 30-day public review and comment period, a complete updated Socioeconomic Assessment with appendices was released in November for another 30-day public review and comment period. Comments on the Revised Draft Plan were encouraged to be provided 30-days after its release so staff could incorporate changes into the Draft Final Plan released in December.

Response to Comment 62-5:

Staff agrees that the Plan requires support on the federal level to provide a level playing field across the nation with a national clean truck regulation. Please see Responses to Comments 30-5 and 54-2 regarding "fair share" reductions from the federal, state and local levels.

Response to Comment 62-6:

Staff appreciates the support from the commenter.

Response to Comment 62-7:

Staff appreciates the participation in the development of ECC-03 and looks forward to future participation in the upcoming workgroup. Energy usage within the residential sector shows a correlation with household income. ECC-03 will assist removing some of the financial barriers by provided incentive funds to help lower the upfront capital equipment cost and also lower operation and maintenance costs as compared to an older existing appliance or application. The incentives proposed in ECC-03 would be used to improve housing and make it more affordable to incorporate energy efficiency. The availability of homes would not be affected.

Staff agrees that public outreach and education are essential to making the incentive program successful and fully intend to incorporate this into the program. Along with the upcoming working group with stakeholders staff intends to seek a collaboration with solar contractors, who review residences for solar panel additions, to promote program and encourage solar panel purchasers to incorporate additional zero and near-zero appliances (as mentioned in ECC-03) to into the home which would be coupled with the solar energy being generated.

Response to Comment 62-8:

Staff appreciates the support from the commenter. Staff will determine whether or not it is cost effective to install retrofits before proceeding to change requirements. A public working group will be formed if incentives are considered.

Response to Comment 62-9:

The control measure does not propose to amend existing boiler requirements to make them more stringent. The technology proposed in the AQMP is available now. The proposed programs provide incentives for commercial and multifamily property owners to convert to currently available ultra-low NOx units with emissions significantly lower than rule requirements in the short term and cost effective zero and near zero emission alternatives for the long term. Incentives would help property owners purchase new more efficient and lower NOx units near the end of the useful life of their existing units. An estimate of the incremental cost of purchasing lower emission units and the incentive per unit are identified in the AQMP and the socioeconomic assessment for the AQMP. Many businesses or buildings would have one unit. However, for businesses and buildings with multiple units, the cost can be estimated based on the number of units the owner chooses to replace. Staff's estimates of emission reductions, cost per unit, and the population of units is provided in the AQMP and the socioeconomic assessment for the AQMP.

Response to Comment 62-10:

The control measure does focus on commercial cooking appliances. All the proposed reductions are from incentives for commercial cooking appliances. However, in the long term, cost effective energy efficient or low NOx residential appliances could also be incentivized or included in a manufacturer based regulation.

Response to Comment 62-11:

Rule 445 is currently structured to curtail use of wood-burning devices through forecasting so called "no-burn" days, which otherwise allows for the use of grandfathered wood fireplaces on as many days as possible during the winter season. In addition, control measure BCM-09 seeks to expand the use of incentives associated with voluntary gas-log fireplace change-outs through the use of higher incentives or expansion of the eligible geographic area, focusing on expanding the effectiveness of the program. Additional analysis called for by this control measure will determine whether additional curtailment for 24-hour PM2.5 concentration reduction purposes are appropriate and necessary to assist in attainment of the annual average federal PM2.5 NAAQS.

Response to Comment 62-12:

Please see Response to Comment 64-12 regarding San Joaquin Valley's Rule 9510 and Response to Comment 57-4 regarding emission reduction estimates.

Response to Comment 62-13:

The cost-effectiveness ranking is determined based on the best available information at the time of SIP submission. In Table 6-4, although cost effectiveness has not been quantified for BCM-08 and BCM-09, they are assigned a ranking of "4" relative to other TBD measures that are ranked at "5", based on the estimated minimal cost of implementation.

The ranking in each table is relative to other measures in the same table. For example, the cost-effectiveness of the measure that is assigned a ranking of "4" in Table 6-4 is not equivalent to the 4th most cost-effective measure in Table 6-5. Inter-comparison across mobile and stationary measures could be done by relating the cost effectiveness in dollars/ton.

The Preliminary Draft Socioeconomic Report was released on August 31, 2016 with a comment period of 60 days. The Draft Socioeconomic Report was released on November 19, 2016, with an additional public review and comment period of 30 days that ended on December 19, 2016. Both released versions covered the estimates of costs, cost-effectiveness, and benefits of the plan and were released earlier to maximize the review time for the public and stakeholders.

Comment Letter from Richard Luczyski (Comment Letter #63)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Commentor Contact Information

Commentor's Name* Richard Luczyski

Organization* No Affiliation

If not representing a specific organization, please enter "No Affiliation".

Address 942 N. Chester Ave

Email Address* rluczyski@gmail.com

Phone Nbr (626)798-2030

City Pasadena

State CA

Zip Code 91104

Comments (Unlimted Size)

AQMP, You can have all the measurements of Air Quality posted in some web site, but until people can see those numbers each day, with the health risks they are subjecting themselves too each day, they will never make the connection of the accumulation effects they are doing to their health. You need to do a much better job with educating the public through as many venues as possible. Even though each of the pollutants found in the Air Quality information is given a value there is still some harm to the health of everyone who breathes the air where they live, work and play.I suggest you install more real time Air Monitors along all Freeways because the air will have different values in each location. So let people see and hear from whatever sources that will explain the harm that is caused each day just breathing the air in their communities. Maybe when people understand the harm caused they will move faster to solve those problems. At present we are just taken out of the decision process and letting Business and Government continue to kick the problem down the road, thinking in another ten or 15 years it will disappear. Let's move faster by showing the people the harm that is being caused by bad air today. In my community of Pasadena,CA.. I don't see any helpful Air monitoring equipment used to inform people of a potential health risk, but I do see signs about traffic problems,Alerts and Sporting and Concert events. So a sign certainly can be used for Health Alerts from Air Quality. Good or Bad. 63-1

Upload Additional Comment and Supporting Files (30 Mb Maximum per file)

AQMP Comments Files

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature*

For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from Richard Luczyski
(Comment Letter #63)

Response to Comment 63-1:

Staff agrees the public outreach and education is critical in establishing an informed public. As such, the 2016 AQMP includes a measure, FLX-01, that is designed to provide education, outreach and incentives for consumers to contribute to clean air efforts. Examples include consumer choices such as the use of energy efficient products, new lighting technology, "super-compliant" coatings, tree planting, transportation choices, and use of lighter colored roofing and paving materials which reduce energy usage by lowering the ambient temperature. With regard to the air quality data, staff does provide current air quality data online of all locations in our jurisdiction (http://www.aqmd.gov/home/library/air-quality-data-studies) in both the form of a map as well as written data. In addition, the forecasted air quality data and the historical air quality data from the past is provided from the same webpage.

With regards to air monitoring, since 1977 the SCAQMD has monitored air quality in the region and currently operates 38 stations (http://www.aqmd.gov/docs/default-source/default-document-library/map-of-monitoring-areas.pdf) to assist in understanding the air quality for various locations. Separately, we do have monitors along the freeways but the location decisions are made in collaboration with U.S. EPA. Near-roadway studies have been conducted (http://www.aqmd.gov/docs/default-source/air-quality/air-quality-monitoring-studies/Near-Road-Monitoring/special-monitoring-studies.pdf?sfvrsn=2) and staff encourages the public to read the published results also available online at http://www.aqmd.gov/docs/default-source/air-quality/air-quality-monitoring-studies/near-roadway-study.pdf?sfvrsn=2.

Comment Letter from Construction Industry Air Quality Coalition (Comment Letter #64)

CIAQC
CONSTRUCTION INDUSTRY AIR QUALITY COALITION

Coalition Members

AGC CALIFORNIA

Associated General Contractors America-San Diego Chapter, Inc.

Building Industry Association of Southern California

California Construction Trucking Association

Engineering Contractors Association

United Contractors

SCCA
Southern California Contractors Association

August 18, 2016

Michael Krause
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765

RE: DRAFT 2016 AIR QUALITY MANAGEMENT PLAN

Dear Mr. Krause:

The Construction Industry Air Quality Coalition (CIAQC) is pleased to submit the following comments on the portions of the AQMP that have been completed and released for public review. CIAQC participated in the development of both the **BizFed** and **Southern California Leadership Council** comment letters as well. While we concur with all the comments in those letter, we want to give added emphasis to those comments and add a few that are specific to our industry.

We are generally pleased with the overall direction of the proposed plan and its emphasis on incentives to achieve the proposed emission reductions. Incentives have been used effectively in other air quality programs to achieve extra emission reductions. In particular in the Carl Moyer program and the SOON program to achieve early emission reductions from off-road construction equipment.

1. **SCAQMD needs to make it a top priority to improve the accuracy of Photochemical Modeling Ozone Emission Reduction Predictions.** It is becoming more and more difficult and expensive to reduce emissions as we approach the level of zero in our quest for clean air. Since modeling is used extensively to predict the "emission" reductions needed it is important to get the numbers right. We are aware of independent analysis which indicate that the two previous plans developed by AQMD under predicted the emission reductions. This was based on real-time monitoring data in which actual readings indicate faster reduction that the model predicted. Achieving the emission reductions is extremely costly and it is important that employers not be required to reduce "phantom emissions" that never really existed in the first place. 64-1
2. **We are concerned about the effort to control growth and the use of indirect source controls.**
It is extremely difficult to construct new development in the South Coast Air Quality Management District. The California Environmental Quality Act (CEQA) and the myriad of agency rules and regulations have generated a housing and employment crises in Southern California. CARB has already adopted the most stringent rules in the nation for on and off-road sources. These measures will achieve significant reduction and have come at great cost to the construction industry in both dollars and jobs. Having SCAQMD add an additional layer of regulation will only punish an industry that is still struggling to recover from the recession of 2007. 64-2

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CIAQC

CONSTRUCTION INDUSTRY AIR QUALITY COALITION

Coalition Members

AGC CALIFORNIA

Associated General Contractors America-San Diego Chapter, Inc.

Building Industry Association of Southern California

California Construction Trucking Association

Engineering Contractors Association

United Contractors

SCCA

Southern California Contractors Association

3. **The Plan appears to rely heavily on premature death and mortality to justify the extraordinary cost of the proposed emission reductions**. It appears increasingly that the science identifying premature death from PM 2.5 is uncertain at best. Despite the air quality challenges in Southern California, California residents have the lowest mortality rate of all 50 states but Hawaii. Further Southern California has a lower mortality rate than the state as a whole. Even the authors of the studies cited by SCAQMD in their health effects chapter admitted that several years ago that their data did not support a finding of premature death from PM2.5 in California, or the western states for that matter. Regardless of the Federal standards and the resources used by the Federal regulators to set those standards, if the California evidence challenges those decisions, you owe it to our community to report those inconsistencies. 64-3

4. **We are concerned about the vagueness of the Off-Road emission targets and timing in the Draft Plan.** The Zero Emission Off-Road Emission Reduction Assessment; Zero Emission Off-Road Work-site Emission Reduction Assessment and the Zero Emission Diesel Requirement would all seem to directly impact the construction industry. However, these are all designated and "Not Yet Quantified", in both the 2023 and 2031 time-frame. Most of this equipment is very expensive to both acquire and operate. Business plans for equipment replacement are made many years in advance. The industry is already under heavy regulatory pressure to replace virtually all of its on-road, off-road and portable equipment in the time frames considered by the plan. This added uncertainty could have the unintended effect of slowing the turnover of diesel equipment while the long range plans are developed. 64-4

CIAQC appreciates the openness and willingness of the SCAQMD staff to engage our industry in the development of this AQMP. We want to continue to work closely with your staff as the specifics for the plan are developed. Our industry has many knowledgeable and technically skilled individuals. We are willing to share our expertise with your staff to write an Air Quality Management Plan of which we can all be proud.

Thank you.

Sincerely,

Michael Lewis, Senior Vice President
Construction Industry Air Quality Coalition

2449 East Garvey Ave. North, Suite A-11, West Covina, CA 91791
[illegible]

Responses to Comment Letter from Construction Industry Air Quality Coalition (CIAQC) (Comment Letter #64)

Response to Comment 64-1:

Numerical models have a certain level of uncertainty and limitations, but SCAQMD uses U.S. EPA guidance, a state-of-the science modeling platform and the most updated emissions inventory. Also, SCAQMD is willing to collaborate with stakeholders to improve modeling performance and emission estimation. For more specific responses, please see Responses to Comment Letters 52 and 58.

Response to Comment 64-2:

The SCAQMD staff has not concluded that a future regulation similar to San Joaquin Valley APCD Rule 9510 is the appropriate control method for the South Coast Air Basin. However, as stated in EGM-01, the SCAQMD must evaluate San Joaquin's rule as feasible measure to implement in the South Coast Air Basin. In addition, proposed measure EGM-01 is not intended to control growth, but rather identify actions that can mitigate emissions and potentially result in additional emission reductions. These actions can be regulatory or voluntary in nature and will be identified through a public process. SCAQMD staff believes that through the public process, actions can be identified that may either not place undue economic burden to the industry or minimize the economic impact to the industry.

The SCAQMD mobile source measures are proposed to help implement the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures. The SCAQMD is identified as an implementing agency along with CARB and U.S. EPA. As such, many of the SCAQMD mobile source measure are seeking to identify actions that potentially result in additional emission reductions that can go towards meeting the "Further Deployment" measures emission reductions.

Response to Comment 64-3:

In the latest Integrated Science Assessment of Particulate Matter (2009), the U.S. EPA determined that the scientific evidence is sufficient to conclude that PM2.5 causes premature mortality. Specifically, given multiple lines of scientific evidence from a broad range of studies, the overwhelming scientific consensus is that PM2.5 does, in fact, cause premature death. The fact that California has a low age-adjusted mortality rate does not preclude the population from experiencing the negative health effects of poor air quality. In fact, the Draft AQMP Appendix I (Health Effects) already discusses several epidemiological studies conducted in California and Southern California that link PM2.5 exposures with increased mortality, especially mortality from cardiovascular causes. The epidemiological studies summarized in the Draft Appendix I include studies that show strong associations between PM2.5 and premature deaths, as well as studies showing weaker or less certain associations, and those that show no effect, such that the readers can be informed of these studies, and can refer to the U.S. EPA Integrated Science Assessments or to the individual research publications for additional detail. While there are a small handful of studies that show no effect, the vast majority of the studies (including several conducted in California) show that PM2.5 is linked to increased mortality risk.

Beyond public health benefits, another justification of the Plan is simply that we legally need to meet the state and federal standards within the specified time frames. The socioeconomic analysis provides information about the potential incremental costs, benefits, and macroeconomic impacts associated with the Plan, and it quantifies these effects where data and methodologies are available. The purpose of the

socioeconomic analysis is therefore to further inform public discussions and the decision-making process associated with the adoption of the Plan, but it is not part of the "justification" of the Plan.

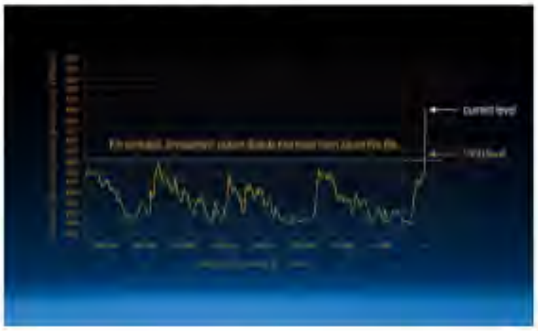
Response to Comment 64-4:

The comments are related to the measures included in the State Mobile Source Strategy. Your comment will be forward to CARB.

Comment Letter from Del Amo Action Committee (Comment Letter #65)

August 19, 2016

Climate change: How do we know?



For if people do these things when the tree is green, what will happen when it is dry?" Luke 23:31

Climate Change Chart from NASA

From Florence Gharibian: Florencegharibian@yahoo.com

Chair of the Del Amo Action Committee, participant in the Los Angeles Environmental Justice Network, Department of Toxic Substances Control (DTSC), Branch Chief, LA Enforcement Program (Retired).

The comments on the AQMP in this correspondence address:

- Placing a priority on facilities that pose an eminent and substantial danger to public health.
- SCAQMD as the primary regulatory agency enforcing air regulations at Stationary Sources.
- The importance of an effective enforcement program in ensuring regulatory compliance.
- Proposal for a program to encourage new clean air technologies.
- The importance of accurate petroleum refinery air monitoring.
- SCAQMD role in achieving more sustainable management of solid waste.

As I write these comments a fire storm burns out of control in San Bernardino County. The severity of the fires is a result of the California drought and unusually hot weather. 2016 is the hottest year on record across the globe. It is my firm belief that Climate Change is the result of the pollution of the earth. The existence of mankind hangs in the balance. 65-1

I submit these comments today because I believe that nothing is more important that protecting our environment, stopping pollution and cleaning up the damage already done.

Please let me tell you about the people in my life whose health was damaged by air pollution.

I met a dear friend in 1985 when I transferred from the USEPA to the State of California, moved to Los Angeles and became an inspector in training. She was one of the most diligent inspectors at the DTSC. Several years later she was working in the gulf on the 2010 BP Deep Water Horizon spill. While she was there a US refrigerated logistics provider had a major release of ammonia. She was one of over 150 people exposed to the ammonia during the release. Her lungs were seriously damaged. Her health permanently impaired.

On June 1, 2012, I lost my husband Joseph Gharibian. This handsome and wonderfully unique man died at age 65 of pulmonary fibrosis. He spent much of his career working as a pipe line draftsman in a refinery in Abadan, Iran. Almost one year later on May 31, 2013, I lost a dear friend to lung cancer. She never smoked.

I know mothers who take their children to the hospital emergency room frequently due to asthma. I know how difficult it is to spend the night in the emergency room with a loved one and then attempt to resume your normal life the next day.

I know many people have this sadness in their lives.

On August 19, 2016, the Los Angeles Times had two environmental articles. The articles were together on the same page. The first article is about lead findings at three elementary schools located near Exide. I am ashamed when I read articles about Exide. We should all be ashamed.

The headline for the second article is "Clean Tech Backs Emission Bill." Mark Bauhaus is quoted in the article, "Business must stand up and say this is important." Catherine Reheis-Boyd, president of the Western States Petroleum Association is quoted to say she supports addressing climate change but fears the State's policies are "putting it at a competitive disadvantage." Does her comment mean the refineries might leave Los Angeles?

65-1
Con't

I attended and spoke at the March 4, 2016, SCAQMD Board meeting when Barry Wallenstein was dismissed. An earlier agenda item on a SCAQMD rule offered the opportunity for a number of people to speak out regarding a new rule. Apparently the final rule as adopted by the Board was an industry modified version. Senator Kevin de Leon sent correspondence to the Board requesting reconsideration of the rule. A large number of people spoke in support of the rule. An impression was created when one of the speakers asked that everyone supporting the rule stand up. Of course most of the people who stood up and supported the rule are professionals working for the petroleum industry. The people representing Environmental Justice/injustice communities are often outnumbered. I saw this again on August 16, 2016, at the SCAQMD Advisory Committee meeting. The network of professionals ready to support industry appears to be the majority on the Committee.

The new acting SCAQMD Executive Officer, Wayne Nastri offered his proposed Mission Statement and draft Goals and Objectives at a recent Board meeting:

Mission Statement

"All residents have a right to live and work in an environment of clean air and we are committed to undertaking all necessary steps to protect public health from air pollution with sensitivity to the impacts of our actions on the community, public agencies and businesses."

I found Wayne Nastri's statement of goals and objectives in the accompanying document far more persuasive than statements in the draft AQMP. I suggest that his document be incorporated in the AQMP. The 15th goal in the document calls for work with residents and community leaders in disproportionately impact communities to remedy their air quality concerns. The 16th goal discusses an assessment of the SCAQMD community response program and suggests community education on how to file a citizen complaint. My comments also discuss citizen complaints but suggest a more responsive SCAQMD.

The Del Amo Action Committee

The Del Amo Action Committee works with the community neighboring the Del Amo/Montrose Superfund sites. It is correct and appropriate for the people living and working this community to be concerned about;

- Health and Safety threats from a company repackaging large volumes of Chlorine from railroad tank cars in a plant in close proximity to where they live.
- Vapor intrusion in their homes coming from pollutants in the soil and groundwater from Montrose Chemical, the Del Amo waste pits and other major industrial facilities currently operating or closed.
- Major safety threats due to hydrofluoric tanks at the Exxon/Mobile Refinery less than three miles from their community.

It is correct and appropriate for all LA's citizens to be concerned about clean air in the Los Angeles Basin. It is correct and appropriate for all of us to be concerned about Climate Change because we are all living on a small planet where climate change has the potential to create deserts and floods and de-population of large areas of this planet. Recently NASA released a report reflecting the shrinking groundwater resources across our planet. Groundwater in the Los Angeles area is precious and must be protected. The world's largest underground aquifers – a source of fresh water for hundreds of millions of people — are being depleted at alarming rates, according to new NASA satellite data that provides the most detailed picture yet of vital water reserves hidden under the Earth's surface;

65-1
Con't

The June 11, 2016 New York Times include an editorial written by Richard Conniff. The editorial is entitled, Dear Conservatives You Can Go Green Again. With recent polls suggesting that climate change has begun to loom ominously for many Republicans as it does for the majority of Democrats, it may be time for big, bold, even alarmingly bipartisan thoughts. In the end, our need for clean air to breathe, safe water to drink, a climate that does not change too drastically and forests, oceans and wildlife that remain healthy and resilient has almost nothing to do with whether we are Republicans or Democrats, conservatives or liberals, and everything to do with being fellow residents of Planet Earth, with no place else to call home. So here's the idea: Why don't we all just take a walk and have a long conversation about how we can fix up the old neighborhood together?

The South Coast Air Quality Management District Board is empowered to improve air quality and is responsible for taking the right steps to make that happen.

The South Coast Air Quality Management District has always and will continue to have a pivotal role in improving air quality in Los Angeles and surrounding areas. An Air Quality Plan should be a foundational document for the continuing and future work of the South Coast Air Quality Management District. This document must not reflect unacceptable compromise with industries that do not want to do enough to end the pollution they create.

The comments in this correspondence are based on the following foundational principals:

Three Foundational Principals for Governing Effective Environmental Regulatory Organizations

1. **The cultural and effectiveness of any organization begins with leadership at the top.**
2. **New Technologies have driven clean air, clean water and solid waste management. New Emerging Technologies provide the key to further sustainability progress.**
3. **Laws, rules and regulations are not effective without oversight and enforcement.**

1. <u>The SCAQMD needs to fine tune the ability to recognize and respond to situations and facilities that pose an Imminent and Substantial endangerment.</u>

   The draft Plan includes a commitment to prioritize existing conditions that *"represent an imminent and substantial endangerment to public health or environment." 110(a)(2)(G)].* The SCAQMD has knowledge of existing conditions at businesses in the basin that represent an imminent and substantial endangerment to public health and the environment. Those conditions must be prioritized and the risks eliminated.

   Citizen complaints can be a source of information regarding imminent and substantial endangerment. Often those complaints come from employees of a company doing unsafe and dangerous things. The ability to respond to high priority citizen complaints is critical. This involves having the right people take the complaints. Those people must have an ability to recognize a high priority complaint and contact the right AQMD inspectors to respond to the complaint. Latter in this document I will discuss two situations involving potential substantial endangerment to public health.

65-2

2. <u>New Technologies pave a path to the future.</u> The SCAQMD must invite and encourage the development of New Technologies. These new technologies will provide effective steps in achieving clean air. The use of new technologies is apparently defined by some as the "Black Box". Open the box, open the door and welcome the future.

   The draft Air Quality Plan discusses incentives funding. A small amount of that funding could go to the creation of a New Environmental Technologies Office perhaps in conjunction with Cal/EPA. The office would have an advisory committee with members from the academic community and industrial community. Proposals for new technologies would be encouraged. The proposals would then be evaluated by technical experts in the appropriate field.

   The New Technologies Group could have an advisory committee with the knowledge and ability to bring new technologies forward. This committee could be made up of members of the academic and research communities. Please seriously consider my proposal.

65-3

3. <u>The SCAQMD is responsible for enforcing laws and regulations.</u>

   The SCAQMD must have an enforcement program capable of monitoring compliance and taking enforcement at all stationary sources in the District. Stationary source compliance with permits, laws and regulations is essential to meeting Air Quality Objectives. A strong enforcement program is critical in assuring stationary source compliance is achieved. Estimates of air quality improvement are based on permitted stationary sources in compliance with their permits, laws

65-4

and regulations. Companies operating in serious non-compliance pollute the environment and hinder progress toward cleaner air. All of Cal/EPA's Boards and Departments are developing Supplemental Environmental Project (SEP) guidelines to be used in penalty determinations. The SCAQMD should develop SEP guidelines.

Wayne Nastri's goals document calls for the inspection of all Major or RECLAIM sources at least annually and inspections of chrome plating facilities quarterly. 20,000 site visits for compliance evaluations and inspections of 3,300 portable equipment units. In addition 1,800 asbestos demolition or renovation activities. He suggests the continuation of an evaluation program for select industries.

65-4 Con't

I suggest another inspection priority; the 9 petroleum refineries posting a WARNING notice in the Los Angeles Times this week. The notice warns the public that the companies have Chemicals known to the State of California to cause, cancer, birth defects and other reproductive harm. The notice was published by BP America, Exxon Mobil Corporation, Chevron, Shell Oil, Tesoro, Phillips 66, AERA Energy, VENOCO, LLC and Valero. The inspections should be done even if it does place these companies at a competitive disadvantage.

I pray the SCAQMD has the enforcement personnel and resources to complete this critical work. Strong enforcement requires management support, trained and capable inspectors and strong legal support.

4. <u>The Petroleum Industry must maximize air pollution reduction.</u>

A fire at the Chevron refinery in Richmond in August 2012 raised public questions and concerns about refinery safety and emergency response in California. Following a directive from the Governor Cal/EPA formed an Interagency Task Force on Refinery Safety. The Task Force membership includes ten state agencies, U.S. EPA, and local agencies from areas of the state that contain refineries. On July 2013 a report on "Improving Public and Worker Safety at Oil Refineries" was completed. Can I assume the SCAQMD participated in this work? On July 16, 2016, California announced regulatory proposals to improve safety at the refineries. The regulatory proposals are intended to make California refineries safer both for workers and surrounding communities.

65-5

Recently the California Department of Industrial Relations and the California Office of Emergency Services published draft regulations to improve worker safety at refineries and adequate emergency response to a fire or release. The new regulatory programs should support the work the SCAQMD does with the refineries in our area.

The petroleum industry infrastructure in Los Angeles is antiquated (most of the refineries began operating in the 1910-1920 time period). The petroleum refineries have high risks for accidents and pose continuing health threats to the people living near and working in the refineries.

Wayne Nastri's 5th goal statement calls for the further development of enhanced emissions/ambient monitoring capabilities. Under this goal the SCAQMD would conduct comprehensive research by evaluating a variety of advanced optical remote sensing technologies for the purpose of providing SCAQMD and the public with enhanced real and near real time monitoring capabilities that will ultimately result in improved control efficiencies and compliance. Four advanced optical technologies will be initiated and demonstrated in the field to characterize fugitive VOC emissions

from refineries, gas stations, oil wells and other point sources. This work will be additive to in stack and ambient real time demonstrations. The use of these air testing technologies will advance the SCAQMD's ability to better monitor fence line air emissions from refineries.

Last summer I testified at a USEPA hearing in Wilmington regarding refinery safety. I also prepared correspondence on the subject for submittal as a public comment. I've included that correspondence with these comments.

65-5 Con't

5. Sustainable Solid Waste Management Programs. Recently I attended a work shop sponsored by the Los Angeles Department of Public Works. The workshop showcased programs underway to maximize sustainability in solid waste management. The Los Angeles Environmental Justice network is very concerned about potential dangerous air emissions from trash to energy processes. The South Coast Air Quality Management District can provide support in the effort to modernize solid waste management by doing air quality monitoring to ensure the new trash to energy processes do not pollute the air and pose a danger to communities near the facilities.

65-6

During the Wilson Administration I was the Director of the Inland Empire Permit Assistance Center. One of Governor Pete Wilson's top priorities was to improve California's Economy. His administration convened public meetings in Los Angeles with major industry sectors. The sectors in Los Angeles included the entertainment industry, the media industry, the electronics industry and the garment industry. The Wilson Administration may have anticipated input regarding burdensome regulations stifling growth. The comments from representatives from the four sectors were surprising. When moderators sought information regarding impediments to further expansion and growth in the industries, when participants answered questions regarding why their employees don't want to move to the Los Angeles basin, all the representatives gave similar responses. They were and likely remain:

- Environmental Pollution
- Constantly congested and dangerous freeways
- Inadequacies in K-12 education

It was also interesting to learn the difficulties the sectors experienced when finding qualified employees. Participants identified two attributes their employees needed, the inability to get along with others and work in a team and the ability to find new alternatives and creative problem solving skills.

65-7

Comments on policy statements in the draft SCAQMD plan

Eliminate reliance on future technologies (CAA 182 (e)(5)) measures to the maximum extent possible by providing specific control measures which have quantifiable emission reductions and associated costs.

65-8

I don't understand the need for a goal that states that the AQMD will deny the possibilities of emerging or future technologies to the **maximum extent possible.** This statement implies that ranking high with the AQMD are existing control measures with quantifiable emission

reductions and associated costs. The cynical might suggest this means doing it all the same old way.

Why? Why is the first plan objective eliminating reliance on future technologies to the maximum extent possible? What could possibly be forward thinking in regard to this objective? What will be achieved by solely relying on current, specific control measures which may not be progressive? Why adamantly reject new technologies as the first step out of the gate? 65-8 Con't

Calculate and take credit for other planning efforts (e.g., GHG reduction targets, energy efficiency and transportation).

First, what does this mean? Second, why are the only words abbreviated in this statement GHG (I presume the abbreviation is for Green House Gas)? Third, what does this objective hope to accomplish? Does it mean that if the District plans something or if the regional planning agency plans something emission reduction credit will be given to the SCAQMD for this? 65-9

Develop a strategy with fair-share emission reductions at the federal, state and local levels.

This is an unclear statement also. Does it mean that if the basin doesn't meet air quality standards the AQMD can put the responsibility for failure on the CA Air Board or the USEPA? I'm not familiar with a fair-share emission reduction.

The plan goes on the say that the District will prioritize non-regulatory, win-win approaches. Does non-regulatory mean no rules, no enforcement? In addition special consideration and prioritization of non-regulatory strategies that contribute to the economy of the area will be utilized to reduce Ozone and PM.2.5 emissions? 65-10

It seems safe to say that the AQMD Plan objectives are not inspiring or possibly even understandable. I recommend the inclusion of Wayne Nastri's recent draft Mission Statement and Goals in the AQMP.

The plan does call for the Prioritize existing conditions that *represent an imminent and substantial endangerment to public health or environment. 110(a)(2)(G)].*

The SCAQMD has knowledge of existing conditions at businesses in the basin that represent an imminent and substantial endangerment to public health and the environment.

<u>April 7, 1990 Los Angeles Times.</u>

> *Declaring that the risks of hydrofluoric acid are unacceptable in urban Los Angeles County, the South Coast Air Quality Management District on Friday became the first government agency in the country to move toward phasing out the hazardous chemical at four oil refineries and a major i Despite objections from industry, the air quality agency set a tentative deadline of Dec. 31, 1994, for eliminating the acid at the five largest users in Los Angeles County--four oil refineries and a refrigerant manufacturing plant. The 11-1 vote came after a two-year study triggered by major oil refinery accidents involving the acid in Torrance and Texas. Only Los*

Angeles County Supervisor Mike Antonovich, an AQMD board member who argued that the move would eliminate jobs, voted against the proposal.

May 9, 2016 Daily Breeze

The Daily Breeze reported on the near miss when the Exxon Mobile air pollution equipment exploded. Equipment falling to the ground during the explosion narrowly missed the hydrofluoric acid tanks nearby. As a Representatives Ted Lieu and Maxine Waters wrote a letter to the South Coast Air Quality Management District, which is studying safer alternatives to the use of the acid. When exposed to air in high enough quantities, the acid can form a toxic, ground-hugging cloud that could kill or injure thousands. In 2016 The Daily Breeze also reported:

65-10
Con't

The region's air pollution watchdog has committed to studying a viable alternative to a potentially lethal chemical that puts thousands at risk of death or injury who live near the ExxonMobil refinery in Torrance and the Valero refinery in Wilmington.

From April 1990 to May 2016 is a long time for the SCAQMD to study an issue that could injure or kill thousands. Please think about what would happen if an accident did occur and thousands were injured and take the necessary action to eliminate the use of hydrofluoric acid at refineries.

In March 2016, the SQAMD made a decision to fire Barry Wallenstein, a man with extensive knowledge and experience. Numerous environmental organizations spoke out in opposition to this action. We all got one minute to express our concern. As mentioned earlier in this correspondence, the earlier agenda item was the dominant topic in the meeting. I now wish I would have taken the opportunity to speak under that agenda item. The people who spoke under that agenda item got three minutes. The majority of those speakers represented the petroleum industry.

I returned to the podium and asked for one more minute. I think everybody wondered what I was doing, I even did. In my effort to condense what I planned to say from about two minutes to one I failed to speak God's words.

In Isaiah chapter 24 the 8th Century BC prophet, poet and politician predicted that the earth would be devastated. All will be the same, the priest and the people, the master and the servant, for mistress and maid, the seller and buyer, the borrower and lender. The earth will be completely laid to waste. It will dry up and wither. Experts on Climate Change also warn us all of this devastation. They warn that the time when Climate Change will cause this wide spread devastation is uncertain. Thank you for considering my comments and the tremendous work underway at the SCAQMD.

Sincerely,

Florence Gharibian

Responses to Comment Letter from Del Amo Action Committee (Florence Gharibian)
(Comment Letter #65)

Response to Comment 65-1:

Staff appreciates the work done by the Del Amo Committee and shares the air pollution concerns in the region that affects the environment and public health of the population. The Draft Plan has been revised to highlight the proposed regulatory action and reiterate the importance on focusing on Environmental Justice areas.

In regard to the AQMP advisory group, it is comprised of approximately forty individuals drawn from a cross-section of the community representing major businesses, small businesses, environmental groups, government agencies and academic researchers. The membership was originally approved by the SCAQMD Governing Board at its February 7, 2014 meeting.

Response to Comment 65-2:

Staff agrees that response time is critical in determining the potential problem and source of the problem. The SCAQMD has a well-established complaint line, effective permitting program, educated and available enforcement team, an extensive monitoring system, on-going source testing practices, as well as experienced public outreach division. The SCAQMD is also a CEQA lead agency that evaluates the impacts of large air polluting projects and oversees implementation of measures to mitigate significant adverse impacts. Staff intends to continue to prioritize complaints of dangerous situations and work to remedy the situation to the best of our ability.

Response to Comment 65-3:

Staff agrees with the need to deploy new cleaner technologies in all appropriate areas. The Revised Draft Plan includes new language to prioritize maximizing emission reductions utilizing zero-emission technologies when cost-effective and feasible and near-zero emission technologies in all other applications.

Staff appreciates the suggestion for creating a New Environmental Technologies Office. The SCAQMD currently has a Technology Advancement Office that cosponsors low- and zero-emission and clean fuel technology development and demonstration projects in a cooperation with private industry, technology developers, and local, state, and federal agencies.

Response to Comment 65-4:

Please see Response to Comment 65-2 regarding the established permit program and other effective tools implemented by the SCAQMD. The SCAQMD has a strong enforcement program that has a mandate under both state and federal law to enforce health standards. Staff appreciates your comment on inspection priorities. The suggestion regarding the development of SEP guidelines is not part of the AQMP, but will be directed to the General Counsel's office.

Response to Comment 65-5:

The 2016 AQMP is comprised of a series of regulatory control measures including one that would assess the RECLAIM program (CMB-05) and another focused on gas handling from non-refinery flares (CMB-03)

which primarily can be found at oil and gas production sites. In addition, there is a proposed control measure (FUG-01) to improve detection of leaks with some of the new technologies mentioned by the commenter.

Response to Comment 65-6:

Staff shares the concern regarding new processes that could generate unwanted secondary impacts and in particular how it would affect air quality.

Response to Comment 65-7:

Air pollution is not only a deterrent for new businesses and employees, it also affects the health and work productivity of the existing workforce, and thus potentially impacting the success of businesses. These concerns are more reasons to continue to work towards reducing air pollution in our region.

Response to Comment 65-8:

The concern raised by the commenter requires clarification. The Clean Air Act (CAA) allows for areas of extreme non-attainment to rely on future technologies that have yet to be developed as part of the emission reduction package that is used in the modeling to demonstrate future attainment of the federal air quality standards. It is commonly referred to as a long-term measure or "black box" because the specific action to achieve those reductions in undefined. Again, this is allowable under the CAA but the Plan objective quoted by the commenter is a goal to eliminate reliance on a "black box" and actually define a pathway to achieve all of the future emission reductions. New technology is not being rejected but rather defined and promoted. Staff knows that zero and near-zero emission technology will be key to meeting the standards. The Plan defines the targeted sources such as on-road vehicles, off-road equipment, aircraft, ships and locomotives, and promotes the deployment of zero emission technologies, when cost effective and feasible, and near-zero emission technologies in all other applications.

Response to Comment 65-9:

Some measures will achieve emission reductions of criteria pollutants by determining the co-benefits from the implementation of existing regulations, such as greenhouse gas (GHG) requirements and energy efficiency programs. The SCAQMD will be responsible for tracking the emission reductions and justifying why those reductions will be permanent, enforceable, surplus and quantifiable before earning credit for those reductions in the State Implementation Plan (SIP).

Response to Comment 65-10:

Please see Responses to Comments 30-5 and 54-2 regarding the meaning of "fair share" reductions and Chapter 10 of the Plan for more information regarding climate change concerns.

Regarding safety concerns of hydrofluoric acid, since it is not a criteria pollutant it is not included in the AQMP. However, Proposed Rule 1410 - Hydrogen Fluoride Use at Refineries is currently scheduled for consideration in 2017.

Comment Letter from Clean Energy (Comment Letter #66)

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Clean Energy®

Dr. William A. Burke
Chairman, South Coast Air Quality Management District
21865 Copley Drive
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September 9, 2016

Re: Comments on the Draft *Air Quality Management Plan*

Dear Chairman Burke:

On behalf of Clean Energy, please accept the following comments concerning the proposed *Air Quality Management Plan (AQMP)*.

Clean Energy has been a highly active stakeholder in exploring and recommending public policies for how the South Coast Air Quality Management District (AQMD) can meet its federally mandated clean air goals. Failure to remedy the transportation sector will result in AQMD's inability to meet the reductions of nitrogen oxide (NOx) required by the 2023 and 2031 federal deadlines, respectively. It is vitally important that such remedies promote both public health and a strong economy to achieve critical air quality, energy, and social justice goals. We hope that our comments will help to further improve upon the final document.

The draft *AQMP* proposes to implement several air quality measures with an emphasis on mobile sources, "the principal contributor to our air quality challenges." We are pleased the *AQMP* in part integrates ARB's *State Implementation Plan*, which relies upon the findings by ARB in the *Mobile Source Strategy* discussion draft that calls for the statewide deployment of 900,000 low NOx trucks powered by 50% renewable fuel blends by 2031. Specifically, this document calls for low NOx trucks that can reduce NOx emissions by at least 90% over current medium- and heavy-duty truck emission standards or 0.02 grams. Renewable fuel blends could include but are not limited to biodiesel, renewable diesel and renewable natural gas. Clean Energy and the Natural Gas Vehicle industry stand ready, willing and able to help AQMD meet its attainment goals.

66-1

WHO ARE WE?

As North America's largest provider of natural gas transportation fuel with over nineteen years of leading industry experience, Clean Energy provides construction, operation and maintenance services for refueling stations nationwide. We have a deep understanding of the growing marketplace, and our portfolio includes over 589 stations in 43 states, including a significant presence of 165 stations in California.

Already used as a clean, low carbon source of energy around the world, natural gas is abundant and proven to be a cost-saving alternative fuel to diesel and gasoline. Natural gas for transportation fuel strengthens our economy with lower fuel costs, increases our energy security, and significantly benefits our environment by reducing carbon emissions and smog-forming NOx emissions by up to 23% and 90%, respectively, relative to diesel fuel. Carbon emissions are reduced even further – approximately 80% to 90% - when renewable natural gas (RNG) is used to power our engines compared to diesel.

We believe it is imperative that the final draft of the *AQMP* focus on the most cost-effective measures to reduce NOx, including in-state RNG production and near zero emission vehicles that can partially or

completely run on RNG, which can provide the most significant reductions in NOx and provide the most immediate benefits for disadvantaged communities.

Next Generation Heavy-Duty Engines Powered by RNG is a Game Changer for State and Non-Attainment Regions

In May 2016 a groundbreaking report was released entitled ***Game Changer***[1] – sponsored by several stakeholders including the South Coast AQMD – which concluded there should be an immediate start to deploying zero-emission and near-zero-emission heavy-duty vehicle (HDV) technologies on a wide-scale basis in the United States. In sync with many recent documents being produced by the Air Resources Board, the report states that, "(e)xpeditious action is needed to reduce smog-forming emissions from HDVs to restore healthful air quality—as is legally required under the federal Clean Air Act—for approximately 166 million Americans who reside in areas with exceedingly poor air quality. At the same time, to combat global climate change, the United States must aggressively reduce greenhouse gas (GHG) emissions from HDVs, which are the fastest growing segment of U.S. transportation for energy use and emissions."

The report further identified that near-zero engine strategies result in 3 to 8 times more NOx reductions and have 5 to 14 times more greenhouse gas emission reductions simply because near-zero trucks are four times more cost-effective compared to fuel cell or electric vehicle options at this time. In addition, these engines help meet Short-lived Climate Pollutant reduction goals by reducing black carbon and methane, especially if renewable natural gas fuel blends are used to power the engine.

Summary

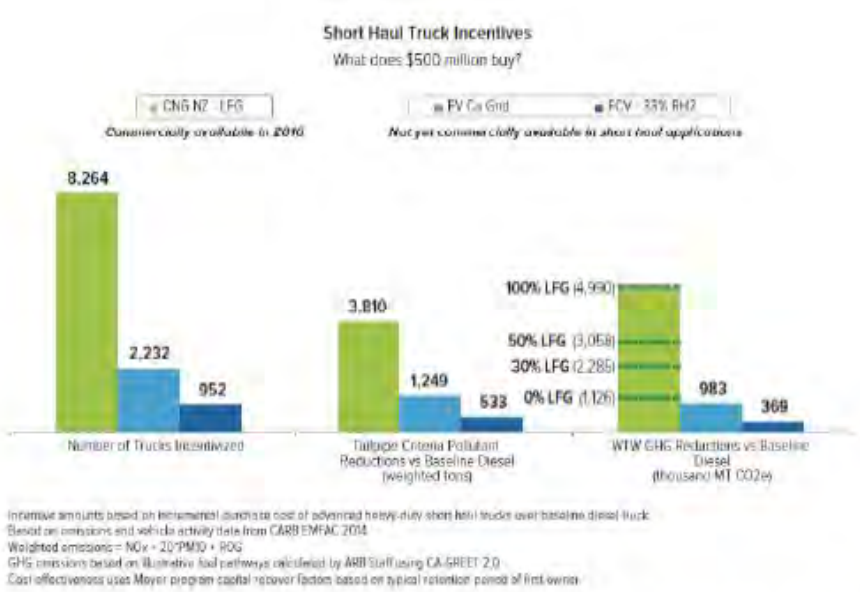


66-1 Con't

For example on cost-effectiveness, on the *APTA Clean Propulsion Committee Webinar* held on Thursday, June 30, LA Metro provided an assessment that they can get more cumulative greenhouse gas emission reductions over the next 40 years with low NOX engines using RNG at a cost that is $3-5 billion lower than zero-emission based alternatives. This is a major declarative finding for the RNG pathway with empirical data from the second largest transit fleet in the country.

And please consider this analysis by GNA considering short haul truck incentives:

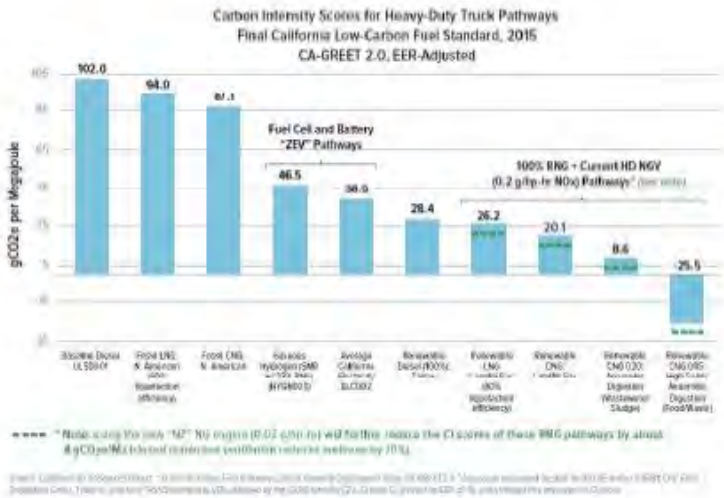
[1] http://ngvgamechanger.com/



66-1
Con't

The *AQMD* will **NOT** reach NOx and other goals without dedicating significant resources to the heavy-duty class 7 and 8 transportation sector to decrease its dependence upon diesel fuel use and increase the use of much cleaner low carbon fuels. To this end, the recent ARB-certified Cummins Westport's 0.01 g/bhp-hr NOx heavy-duty engine will play a significant role as it is a **game changer** for the transportation sector and public health. The 9L engine is now available for deployment and the 12L is expected to be certified by late 2017.

These engines will provide immediate environmental and health benefits, especially to disadvantaged communities. Returning to the ARB *Mobile Source Strategies Discussion Draft,* it specifically states on page 59, "Based on ARB staff's technology assessment, **the most viable approach to meeting the 2031 and 2030 goals is low-NOx trucks.**" In other words, **the only technically feasible way to meet the 2031 federal 8-hour ozone standards and the state's low carbon fuel and petroleum reduction goals is to deploy 900,000 low NOx trucks powered by 50% renewable fuel blends by 2031.**



These low-NOx engines set at the 0.02 g/bhp-hr standard, powered by conventional or renewable natural gas, or a blend of the two, will achieve greater environmental benefits than any electrified system for 1/5th to 1/10th the cost and far fewer operational and logistical challenges, as natural gas technology can be seamlessly integrated into large natural gas fleet operations such as drayage, goods movement, refuse, transit, and airport operations. 66-1 Con't

Game Changer supports the argument why AQMD must pursue **all** advanced technology choices, not just a focus on zero emission vehicle tailpipe strategies that have yet to be fully commercialized and are only forecasted to replace 23,000 "last mile" delivery trucks over the next 15 years.The *AQMP* should take a close look at the success stories that were enjoyed by the San Pedro Bay ports through their implementation of a joint *Clean Air Action Plan* and *Clean Truck Plan*. If we are ever to move away from polluting trucks and toward near-zero and zero emission strategies, we need to be able to have the mechanisms in place that can cull out aging trucks and replace those trucks with cleaner options.

It is unclear if the great state of California has any plans to require near-zero emission or better levels for trucks until 2023. Thus, it is clear the only way to deploy the sheer volume of near-zero trucks required to meet federal clean air standards is to develop a number of strategies at the local and state levels that include meaningful truck incentives, the phase out of older model year trucks throughout the freight system, the acceleration of RNG production statewide, and other innovative strategies.

Specific Recommendations to Meet AQMP's NOx Targets

- **The AQMP Must Include Specific Fleet Rules for Low NOx Adoption**

The challenges to reduce NOx emissions in a very brief amount of time from the mobile source sector is daunting. Specifically, the South Coast Air Basin for example must reduce its NOx emissions from mobile sources by 70% by 2023 and 80% by 2031 to reach federal ozone attainment. Such a goal would require approximately 272,000 low-NOx trucks meeting a 0.02 gram optional low-NOx value or better to be deployed in 6.5 years. One challenge for the AQMD is that the *State Implementation Plan* does not even establish a California engine standard for medium- and heavy-duty trucks at a 0.02 gram NOx value until the very year 66-2

that both the South Coast and the San Joaquin Valley are expected to reduce mobile source emission by roughly 70%. We suggest AQMD work to remedy this.

Much like the Air Resources Board's desire to accelerate zero emission-based strategies in both transit, last mile delivery, and airport shuttle fleets as outlined in the proposed document, AQMD also needs to consider creative and innovative ways to promote near zero emission trucks and buses. Specifically, AQMD should consider additional measures that touch upon fleet operations that could deploy optional low-NOx trucks and buses well before 2023. Namely, the goods movement sector would be a prime candidate for such a measure as our state's sea and inland ports, airports, railyards, and warehouses could dramatically improve regional and state air quality with the adoption of commercially available low-NOx strategies.

66-2 Con't

Further, unlike current commercial ZEV technology that is mired by cost, limited range, weight, durability, and infrastructure issues, low-NOx technologies powered by natural gas in the 6.7L and 8.9L are certified today, proven in the field, supported by existing infrastructure, and are far more cost-effective in price and operation. Additionally, an 11.9L low-NOx natural gas engine is expected to be certified as early as Q4 2017 making it possible for AQMD to consider a measure covering the goods movement sector as early as 2018-19 for implementation purposes. Providing this immediate relief to communities that are already heavily burdened by ozone, particulate, air toxics, and carbon pollution should be embraced as such measures would immediately help address air toxics goals and petroleum reduction targets while improving the opportunity to attain healthier federal ozone levels by 2023 and 2031. Consequently, such an inclusion of goods movement measures capable of deploying early low-NOx engine trucks will help make the case that both a state and federal low-NOx rulemaking is technically feasible by 2023 and 2024, respectively.

Concluding Remarks

California has aggressive emissions goals that CANNOT be realistically met without accelerating the adoption of near-zero strategies like natural gas fuel in the heavy duty vehicle sector. Most importantly, this technology is both proven and available today. Failure to provide AQMP measures that are more inclusive of near-zero emission strategies will almost certainly compromise the successful implementation of the following state goals:

- Mandated federal 8-hour ozone attainment goals for NOx reduction in 2023 and 2031;
- Improved conditions for disadvantaged communities;
- Meet the LCFS goal of 10% greenhouse gas emissions (GHG) by 2020 and 30% by 2030;
- 40% GHG reduction by 2030;
- 50% petroleum reduction by 2030;
- 80% GHG reduction by 2050;
- Significant reductions in short-lived climate pollutants.

66-3

We would like to thank AQMD staff for providing the opportunity to share our views and for considering our comments. We look forward to continuing our participation and partnership with you in this healthy discussion and process.

Sincerely,



Todd R. Campbell
Vice President, Public Policy & Regulatory Affairs
Clean Energy

Responses to Comment Letter from Clean Energy
(Comment Letter #66)

Response to Comment 66-1:

Staff appreciates the support in implementing the 2016 AQMP, in particular the mobile source strategy. Staff echoes the importance of promoting both public health and a strong economy to achieve air quality, energy and social justice goals. In response the commenter's interest in cost-effective paths to achieve the standards, the Revised Draft Plan has been modified to prioritize maximizing emission reductions utilizing zero-emission technologies when cost-effective and feasible and near-zero emission technologies in all other applications.

Response to Comment 66-2:

Staff shares the concern regarding the timing of implementation of a low-NOx standard in the state of California but also recognizes the effort that will need to take place before adoption and implementation of such a new standard. However, the modeling does not include reductions from those standards in 2023 and still demonstrates attainment as a result of other actions proposed to be fully implemented by 2023.

Response to Comment 66-3:

As discussed in Response to Comment 66-1, the Plan is seeking to achieve reductions in the near-term with the cleanest, most cost-effective technologies, as well as promoting incentives to advance deployment of cleaner technologies.

Comment Letter from Earthjustice (Comment Letter #67)



September 9, 2016

Wayne Nastri
Executive Officer
South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765
wnastri@aqmd.gov

Re: Comments on Draft 2016 Air Quality Management Plan ("AQMP")

Dear Mr. Nastri:

On behalf of the undersigned organizations, we submit this comment letter on the Draft 2016 Air Quality Management Plan ("AQMP" or "plan"). Overall, the plan has several systemic problems that must be fixed. First, there is an over-reliance on incentives and a lack of regulatory measures. Second, the South Coast Air Quality Management District ("South Coast AQMD" or "air district") does not commit to use all of its authority to reduce all reasonably achievable emissions and advance clean energy and clean transportation. Finally, the South Coast AQMD has failed to include viable and legally required contingency measures. These three issues must be addressed in the revised draft AQMP. 67-1

Before moving to the substance of our letter, we must address process issues. Initially, we respectfully request that the South Coast AQMD provide ample time for stakeholders to review and comment on the revised draft AQMP. Because this is the most important air plan in the last two decades, we need to make sure the plan is done correctly. That cannot happen in a rushed manner to meet arbitrary deadlines when we have already missed the initial deadline. As of today, one critically important document still has not been released – the Attainment Demonstration. In addition, the district has not released its macroeconomic impact analysis,

environmental justice analysis, or California Environmental Quality Act ("CEQA") alternatives analysis. Accordingly, we request at least 60 days to comment on the revised draft with these documents included. In addition, we request that the staff provide ample time to incorporate comments and responses to comments into the plan and the accompanying documents prepared in response to CEQA requirements. 67-1 Con't

I. The Air Quality Public Health Crisis Demands Action.

Our organizations have come together under a simple premise: South Coast air basin ("South Coast") residents should not get sick, have existing respiratory illnesses worsened, or die prematurely as a result of breathing. They have a fundamental human right to breathe clean air. Despite statements in the AQMP that pollution levels are getting better, recent monitoring results have shown that pollution reductions, particularly for ozone, are leveling off. In fact, the region continues to receive an "F" from the American Lung Association for ozone and fine particulate matter.[1] The public health imperatives that result from this failing grade are not abstract; our members and allies are suffering myriad harms from the high levels of pollution. To remedy these harms, we need a strong plan that sets us on an enforceable and mandatory path to clean air. The law requires this, and this is what the lungs of everybody in the region deserve, especially those of our children and grandchildren. 67-2

II. Incentive Programs Cannot Form the Primary Basis of the Entire Plan.

The AQMP relies too heavily on incentive programs. While our organizations are not opposed to incentive programs per se, the unprecedented level of voluntary incentive programs in this plan should create pause for everybody. The U.S. Environmental Protection Agency ("EPA") has made clear that voluntary incentive-based programs are only allowed to cover a relatively small subset of emissions reductions necessary to achieve the National Ambient Air Quality Standards ("NAAQS"). In elaborating on this position, EPA has stated: 67-3

> The limit is set at three percent (3%) of the total projected future year emissions reductions required to attain the appropriate NAAQS. However, the total amount of emissions reductions from voluntary measures shall also not exceed 3% of the statutory requirements of the CAA with respect to any SIP submittal to demonstrate progress toward, attainment of, or, maintenance of the NAAQS.[2]

Recent presentations from your agency and the California Air Resources Board ("CARB") have sought to focus on what percentage voluntary incentive programs make up –

[1] American Lung Association, 2016 State of the Air Report, 59-60, *available at* http://www.lung.org/local-content/california/documents/state-of-the-air/2016/sota-2016-full-report.pdf (The only exception is Orange County, which received a "pass" for annual P.M 2.5; Orange County received an "F" for ozone and 24 hour PM2.5).

[2] Memorandum from Richard D. Wilson, Acting Assistant Administrator for Air and Radiation, to EPA Regional Administrators, re "Guidance on Incorporating Voluntary Mobile Source Emission Reduction Programs in State Implementation Plans (SIPs)," October 24, 1997.

with barely any mention of regulations – in terms of planned emission reductions. In the presentation at the AQMP Advisory Group meeting held on August 16, 2016, South Coast AQMD staff noted that "[f]rom base year (2012), adopted regulations contribute to 68% NOx reductions by 2023 and 80% NOx reductions by 2031." This misses the point. We need large amounts of reductions moving forward – even beyond the regulations on the books now. We should be discussing what percentage of the future reductions needed come from voluntary incentive programs as opposed to mandatory and enforceable regulations. Besides, even in this scenario, the percentage reliant upon incentives amounts to unprecedented levels that EPA has never approved.

Even if the South Coast AQMD decides to move forward with this incentive laden approach, the preface concedes "[s]ecuring the necessary funding will not be easy, but through coordinated advocacy and outreach, integrated planning, coalition building, key partnerships, and political will, it is within reach."[3] These "buzz words" mean nothing when it comes to creating an enforceable plan. Political will or coalition work does not convert a voluntary and unfunded program into a legally compliant enforceable plan. The plan does not include assurances that adequate funds are available to carry out the plan as required by Section 110(a)(2)(E) of the Clean Air Act.[4] 67-3 Con't

Finally, while we are very happy that the AQMP has committed to move beyond the often abused "black box," which has prevented clean air progress in the region, we are concerned that the current approach creates a whole new set of problems. This stems from the fact that the South Coast AQMD acknowledges that "specific technologies needed to achieve the ozone standards are well-defined."[5] But, instead of requiring these technologies or asking CARB to require these technologies, the plan proposes an unfunded voluntary incentive-based approach to incorporate these technologies into the region. The District has exchanged a "black box" for an "empty cash box," which will not work and does not meet the mandates of the federal Clean Air Act and California's Health and Safety Code. Securing sufficient funding to achieve attainment under the proposed scenario would take a miracle. State and federal law do not allow the South Coast AQMD to rely upon miracles to demonstrate future compliance in its clean air plans. Attainment demonstrations must be based on legally enforceable, quantifiable, verifiable, and reasonably achievable emission reductions, not wishful thinking and unrealistically optimistic theoretical projections about securing funds from unwilling sources. Flying pigs and $14 billion for clean air investments exist only in fantasy. The AQMP must be based in reality.

III. The AQMP Must Include Additional Commitments to Regulations.

At the August 16, 2016 AQMP Advisory Group meeting, the South Coast AQMD staff mentioned that they had previously looked under every stone for control measures. We are 67-4

[3] Memorandum from Richard D. Wilson, Acting Assistant Administrator for Air and Radiation, to EPA Regional Administrators, re "Guidance on Incorporating Voluntary Mobile Source Emission Reduction Programs in State Implementation Plans (SIPs)," October 24, 1997.
[4] Draft AQMP, Table 1-3.
[5] Draft AQMP, Preface and ES-4.

pleased that they noted they would look again to see if there are control measures that could aid in achieving the NAAQS and the California Ambient Air Quality standards ("CAAQS"). However, also during that discussion, we became concerned that there was an improper lens in which staff will be reviewing control measures. We are fearful that in evaluating proposed control measures, South Coast AQMD staff will summarily dismiss proposed control measures out right claiming the pollution reductions are too few given the work to adopt a regulation.

First, we must express extreme frustration with the pattern of inaction in prior State Implementation Plans ("SIPs") to advance strategies to close the "black box". For decades, many of our groups have been pushing the South Coast AQMD to identify what it will take for the region to meet ozone NAAQS. Despite these consistent pleadings, this has never happened. Now, staff appears to claim that the lack of time before 2023 means regulatory control strategies are precluded because of timing related to passing regulations and providing sufficient time for the clean technology to be implemented. 67-5

Second, when looking at regulatory options, the staff seems hyper-focused solely on the 2023 attainment deadline. While we acknowledge the importance of this deadline, we must be mindful that we cannot make the same mistakes we have made for decades in planning – i.e. not adopting regulations soon enough to tackle the "black box". Thus, we need to think about what actions need to be put in place now for the 2031 deadline given we have 15 years.

Finally, we suggest that the South Coast AQMD view potential regulatory strategies under the notion of not allowing new development and replacement of equipment to make matters worse. Clean energy and clean transportation options exists now, and there is no reason we should be allowing continued use of polluting equipment moving forward, when the current plan's strategy is just to raise taxpayer dollars and fees to pay to replace that equipment down the road.

IV. The District's Control Strategy Must be Enhanced.

While there are many regulations that should be adopted, we suggest enhancements to the following regulations now.

A. CMB-02 – Emission Reductions from Commercial and Residential Space and Water Heating (NOx).

67-6

CMB-02 is a very important commitment for the air district. However, the current measure as drafted makes little to no sense. Importantly, the South Coast AQMD should at a minimum make sure that future development does not incorporate technologies that will need to be replaced in five or ten years, and will require raising taxpayer dollars and fees to pay for these replacements.

Importantly, the AQMP concedes: "One readily available option is to use electric water and space heaters."[6] The Draft AQMP further concedes: "[t]he initial purchase price of these

[6] Draft AQMP, at IV-A-61.

units is often less than gas water heaters and furnaces."[7] Even if electric heaters are not desirable for consumers, the Draft AQMP discusses "air to air heat pump water heaters," which are "reasonably priced" and are a cost-effective option for reducing NOx and heating water for residences and small commercial properties." The South Coast AQMD should adopt regulations requiring cost effective equipment in the AQMP given that the cost-savings exist now.

Second, we are concerned about raising $50,000,000 to pay to replace 50,000 swimming pool heaters in the South Coast air basin. Even though we vehemently disagree with using taxpayer dollars to replace pool heaters in single family homes, even if the District pursues this approach, the cost is very high – i.e. $50,000 per ton of NOx reduced. And like water heaters, there is no reason we should be allowing new pools to be built without requiring available zero emission technologies.

Third, the measure should include requirements on space heating. Space heating represents 37% of residential gas use and 36% of commercial gas use in California, totaling approximately 2.79 billion therms of natural gas consumption per year.[8] Most space heating is powered by direct combustion of natural gas, contributing to significant NOx emissions. There are several options for zero emissions (or low emissions) space heating technologies that do not rely on direct combustion of natural gas or propane. One of the best options is a ductless mini-split system heat pump space heater. 67-6 Con't

Ductless mini-split-system heat pumps are an excellent option for heating and cooling in new construction, home additions, multi-family (condo or apartment) housing, and to improve comfort in poorly heated or cooled rooms. Mini splits have no ducts, so they avoid the energy losses associated with the ductwork of central forced air systems. Duct losses can account for more than 30% of energy consumption for space conditioning, especially if the ducts are in an unconditioned space such as an attic.

B. MOB-01 – Emission Reductions at Commercial Marine Ports (NOx, SOx, CO).

We are outraged that the South Coast AQMD in the fine print on page 109 of Appendix IV-A is proposing to abandon the important Port Backstop Rule – IND-01. Abandoning this rule has taken place with no public process. Instead, the public has been forced to find out about this change by small font buried in an Appendix of the Draft AQMP. The egregious nature of this change is compounded by the concession that the ports "collectively are the single largest fixed source of air pollution in Southern California."[9] If the South Coast AQMD dares to abandon its prior commitment to make sure the ports live up to their voluntary promises, the approach outlined in MOB-01 will not protect our air.

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[7] *Id.*

[8] California Residential Appliance Saturation Survey (2009). Commercial End Use Survey (2006)

[9] Draft AQMP, at IV-A-110.

We are aware of few other industries that are allowed to write the rules of how they will achieve emissions reductions. The South Coast AQMD needs to provide more details on how much pollution reductions the Ports of Los Angeles and Long Beach need to achieve. It is not appropriate to kick the can down the road in identifying how many reductions in precursor emissions must occur to facilitate meeting deadlines in 2019, 2022, 2023 and 2031.

It is important to be clear about the need for a port backstop rule and why the South Coast AQMD adopted IND-01 in the first place. After enormous pressure from community groups, environmental organizations, and air quality regulators, the Ports adopted a Clean Air Action Plan in 2006. In that plan, the Ports made commitments to meet certain air pollution reduction milestones. South Coast AQMD incorporated those commitments into the baseline emissions inventory in the last AQMP. Failure to deliver those emission reductions would make the emissions inventory inaccurate and bring the attainment demonstration into question. In response, the Ports argued vehemently against the inclusion of a backstop rule commitment in the last AQMP. Their objections brought into question the honesty and sincerity of their Clean Air Action Plan commitments. Port air pollution must be controlled and reduced in order to attain state and federal air quality standards. Caving into the Ports and abandoning IND-01 makes the achievement of those emission reductions uncertain, and brings into question the accuracy and thoroughness of the new baseline emissions inventory.

67-6
Con't

Finally, ambiguities in the draft plan make it impossible for commenters to provide competent input on the strategy. Importantly, the measure states the following –

> This AQMP measure is designed to provide an ability for the Ports' actions to be credited in the State Implementation Plan after the emission reductions have occurred. If the actions are to be credited in the SIP, assurance must be provided that, if emissions do not continue to meet projections, the Ports working with affected stakeholders will develop and implement actions to get back on track, to the extent that cost-effective and feasible strategies are available. A demonstration to U.S. EPA will need to be made that the actions meet U.S. EPA's guidance in order to be credited into the SIP.[10]

Commenters must see the actual commitments and the demonstration that will be made to U.S. EPA. Given this, we require that this information from the Ports be provided in the revised draft AQMP to provide commenters the ability to provide input. This could be done at an upcoming AQMP Advisory Group meeting because both ports have representation on the group. The need to really push the ports to clean up their pollution is exemplified by the August 19th letter they submitted on the AQMP. These port authorities clearly do not see the urgency in meeting clean air standards because they argue that the AQMP can ignore deadlines before 2031. Moreover, they do not want to be held accountable for reducing emissions. These port authorities need to understand that the Clean Air Act creates mandatory duties to bring clean air to the South Coast; we have long since past the time when we can allow the ports to solely rely on voluntary programs to clean up their highly polluting operations.

[10] Draft AQMP, at IV-A-111.

C. Fleet Rules

Ample legal authority exists to push forward clean vehicles ranging from light duty equipment to heavy duty equipment. Even though local jurisdictions like the South Coast AQMD are preempted by federal law from adopting emissions standards and limitations, they have authority to adopt fleet rules and indirect source regulations.

The District may "direct[] state and local governmental entities to purchase, procure, lease, or contract for use of vehicles meeting specified air pollution criteria." *See Engine Mfrs. Ass'n v. South Coast Air Qual. Mgmt. Dist.,* 498 F.3d 1031, 1045-46 (9th Cir. 2007). However, this authority is not boundless because rules governing purchases of new vehicles by private actors (at least, beyond those under contract with a government entity) are likely pre-empted by the Clean Air Act. *See Engine Mfrs. Ass'n v. South Coast Air Qual. Mgmt. Dist.,* 541 U.S. 246, 258-9 (2004) (citation omitted)).[11] But the authority exists, and the District should use it.

The District has, in the past, applied its fleet rules to state and local public entities, including the State of California, counties, cities, public districts, and private entities under contract to such entities *(*Advisory Notice to Fleets Subject to SCAQMD Fleet Vehicle Rules 1186.1, 1191, 1192, 1193, 1194, 1195 and 1196 (July 20, 2005- noting that rules will not be applied to private entities, or the federal government).

67-7

The government fleets in question are substantial; in 2000, the District estimated that fleets governed by the light- and medium-duty rule (Rule 1191) had a population of roughly 44,000 vehicles (Staff Report, Proposed Rule 1191, Att. 2). The Heavy Duty rule covers fleets that comprised nearly 7,000 vehicles in 2000 (Staff Report, Proposed Rule 1196, App. B).

One study found that government automobiles tend to travel an average of 12,000 miles per year, with heavier-duty trucks travelling only slightly less (11,000 miles per year).[12] These are smaller figures than within the private sector. The same study found the replacement cycle for government automobiles to range from 5 to 7 years.[13] One would expect, therefore, the fleet rule to have relatively rapid effects.

These effects would also include support for the creation of a viable clean vehicle market and economic incentives for vehicle manufacturers to develop and sell more clean vehicles to a wider range of customers. The impact of a regional commitment to clean government fleets should not be underestimated. If the South Coast AQMD is to achieve clean air, it will have to have clean vehicles. The momentum to get the prerequisite clean vehicle development commitment from manufacturers could start with the adoption of aggressive fleet rules.

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[11] Note, however, that EPA could authorize the District to regulate private fleets, by waiving the Act's pre-emption provisions pursuant to 42 U.S.C. 7543(b). We recommend that the District petition EPA to do so.
[12] P.S. Hu and M.Q. Wang, State Vehicle Fleets and Their Potential Acquisition of Alternative Fueled Vehicles under EPACT 507 (1996). http://ntl.bts.gov/lib/000/700/722/507.pdf.
[13] *Ibid.*

The Plan should commit to adopt new and update the existing fleet rules. These changes should be done to require zero emissions vehicles in fleets throughout the basin, particularly those well suited for zero emission technologies. 67-7 Con't

D. Small Off-Road Engines (SORE).

While we understand that CARB has the general legal authority over SOREs, the District could make sure that new developments are conditioned on using zero emission models in their landscaping and lawn care. This type of use of indirect source authority will help reduce the need for incentives to reduce pollution from this large source of the emissions inventory. 67-8

E. Warehouses and Distribution Centers.

The AQMP must include a commitment to develop an indirect source rule for warehouses. The Inland Empire has seen a proliferation of these facilities in the last decade. In addition, the Southern California Association of Governments projects even more warehouse space will be built or retrofitted in the coming years. These facilities contribute to major impacts and are sited in places that routinely show high levels of ozone and fine particulate matter. Thus, it is imperative that there finally be a commitment to adopt an indirect source rule to control pollution from these facilities. 67-9

F. The NOx Regional Clean Air Incentives Market ("RECLAIM") Commitment Does Not Resolve Fundamental Flaws with the Program.

The RECLAIM program is broken. The AQMP should commit to shifting to a command and control system that will make sure large emitters like refineries actually install pollution controls, rather than just buying credits. This is especially important since most of the refineries are in the Ports area which has the highest air toxics risk in the basin (over 1200 per million).[14] 67-10

V. The District Must Make Good On its Promise to Achieve Early NOx Reductions.

In February of 2015, several members of the public raised concerns about the deeply faulty particulate matter plan that was passed by the Governing Board. The South Coast AQMD promised early NOx reductions, and this has not happened. Instead, we continue to hear that the RECLAIM program fulfilled that promise, but it most certainly did not. By adopting the Western States Petroleum Association's delayed shave proposal, any RECLAIM Trading Credits in the years between now and 2019 are simply paper reductions and will not improve air quality. 67-11

VI. The Plan Must Create an Appendix that Includes the District's Responses to Public Comments.

South Coast AQMP staff should create an Appendix in the forthcoming Revised Draft AQMP that will include thorough responses to all the public comments submitted to the Draft Plan released on June 30, 2016. This will help ensure transparency and accountability in the 67-12

[14] South Coast AQMD, Multiple Air Toxics Exposure Study IV Report (2014).

public process. During the AQMP Advisory Group Meeting on August 16, 2016, staff presented their responses to public comments submitted to date in their PowerPoint presentation. This is not sufficient. Their responses were not detailed enough, and often misinterpreted the public comments that were submitted. 67-12 Con't

VII. The Plan Must Include Greater Commitment to Solar Technologies.

The California Health and Safety Code contains a clear mandate that air quality plans "incorporate solar energy technology into its air quality management plan in applications where it can be shown to be cost-effective.[15] It is not enough to passively take credit for other programs that the State administers. The South Coast AQMD must do more. We request the South Coast AQMD lay out plans to require solar energy technology in new construction and major remodels, and to see these incorporated into the forthcoming revised AQMP draft. 67-13

VIII. Compliance with state level CAAQS Requirements.

We are disappointed that Chapter 8 of the Draft AQMP discusses the new federal 8-hour ozone standard set at 70 parts per billion ("ppb"), but does not develop a strategy to achieve the additional 25 tons per day ("tpd") reductions needed to meet that standard. We remind the South Coast AQMD that the current CAAQS for the 8-hour ozone standard is set at 70 ppb. The Lewis Presley Air Quality Management Act is abundantly clear that "a comprehensive basinwide air quality management plan must be developed and implemented to provide for the rapid abatement of existing emission levels to levels which will result in achievement and maintenance of **state** and federal ambient air quality standards and to ensure that new sources of emissions are planned and operated so as to be consistent with the basin's air quality goals."[16] There is no basis for the conclusion that this plan can ignore the current state ambient air quality standard for the 8-hour ozone standard, which was established in 2008. Importantly, we reserve the right to provide additional comments on this issue at the moment because Chapter 6 of the Draft AQMP cross references more details being provided in "Appendix VI: Compliance with Other Clean Air Act Requirements," which has yet to be released. The South Coast AQMD website states that this appendix was expected to be released in early August. It's already the beginning of September, and the public has not seen anything yet. Due to this delay, we request that the South Coast AQMD provide the public with a 30-day comment period after the release of this appendix in order to provide comments based on specific information, and not just a placeholder on the website. 67-14

IX. Conclusion

We appreciate your consideration of these comments. We request that our comments and the staff response to our comments be included in the administrative record for any decision being made by the South Coast AQMD Governing Board about the AQMP and for any

[15] Cal. Health & Safety Code, § 40404.5.
[16] Cal. Health & Safety Code, § 40402(e).

environmental impact review under CEQA. We hope that the agency will actually listen to our input as opposed to many decades of instances when our comments have been ignored. The health of ourselves and our children and grandchildren is at stake. 67-14 Con't

Sincerely,

Adriano Martinez
Angela Johnson Meszaros
Earthjustice

Evan Gillespie
Sierra Club

Michele Hasson
Center for Community Action & Environmental Justice

Martha Dina Argüello
Physicians for Social Responsibility-Los Angeles

Fabiola Lao
Coalition for Clean Air

Bahram Fazeli
Communities for a Better Environment

David Pettit
Natural Resources Defense Council

Taylor Thomas
East Yard Communities for Environmental Justice

Responses to Comment Letter from Earthjustice
(Comment Letter #67)

Response to Comment 67-1:

The 2016 AQMP does propose a number of regulatory measures aimed at reducing NOx and VOC emissions from a variety of stationary and mobile sources. These regulatory measures were established after a thorough analysis of all ozone-emitting sources and available methods and technologies to further reduce emissions. Incentive-based approaches are focused on accelerating high-emitting sources to transition to cleaner technologies sooner than would take place under regulations. Some sources are beyond the authority of the SCAQMD. Incentives are one way to gain emission reductions sooner than natural turnover of vehicles and equipment. Accelerating the deployment of cleaner technologies before future rulemaking is established allows the new technology to be commercially available, achieved in practice, feasible in more applications, cost effective, as well as publicly acceptable. The specific sources of funding have yet to be finalized, but staff is working on developing the Financial Incentive Funding Action Plan that maps out the possible opportunities to ensure the proposals have secured funding. Such funding is being sought on a federal, state and local level. To ensure the reductions are creditable in the SIP, the U.S. EPA does require these reductions to be quantifiable, surplus (beyond regulations), permanent and enforceable. With such integrity elements in place, the incentive actions can be effective and provide lasting improvements.

The release of the Draft AQMP in June 2016 was designed to allow the public to become familiar with the proposed strategy and provide comments to be included in a Revised Draft Plan. Release dates have been staggered for the Draft Program Environmental Impact Report (PEIR) and Socioeconomic Assessment in order for the supporting documents to analyze the latest version of the Plan. As such, the costs and benefits analysis was released August 31, 2016 and the PEIR was released mid-September in time for review of the Revised Draft Plan that was released early October. Similarly, Appendix V and VI did lag behind the release of the Draft Plan but were available by September and provided over 30 days to review and comment. All those comment periods overlapped to allow for a comprehensive, concurrent review by the public.

In addition, staff is providing a 60-day public review and comment period for the PEIR and while each of the draft Socioeconomic chapters have been given a 30-day public review and comment period, a complete updated Socioeconomic Assessment with appendices was released in November for another 30-day public review and comment period. Comments on the Revised Draft Plan we were encouraged to be provided 30-days after its release so staff could incorporate changes into the Draft Final Plan scheduled to be released in early December. Finally, at their October meeting, the SCAQMD Governing Board accepted delaying consideration of the 2016 AQMP until February 2017.

Response to Comment 67-2:

Staff understands and shares the same concerns regarding public health due to poor air quality in our region.

Response to Comment 67-3:

Please see Response to Comment 67-1 regarding the regulatory efforts put forth in the Revised Draft Plan.

Staff appreciates the support for the incentive programs and understands the concern with the amount of needed funding. A Financial Incentive Funding Action Plan was prepared as a companion document to the 2016 AQMP (http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draftfinancialincentivefunddec2016.pdf?sfvrsn=6). The plan will provide an analysis of potential funding opportunities and proposed actions to be taken to secure the funding identified in the AQMP. The Financial Incentive Funding Action Plan will also include activities to pursue funding, the schedule, and reporting commitments. As shown in that Plan, even a very small VMT fee could generate $1 billion annually. Staff does not intend to rely on a single funding source. Pursuing the funding will require an analysis of authority, formation of a stakeholder working group, creation of a national collaborative comprised of National Association of Clean Air Agencies (NACAA) for state/local air agencies, private sector members (engine manufacturers, Manufacturers of Emission Controls Association (MECA), trade associations, labor unions, etc.) and non-government organizations (local, state, national). Collaboration with the state will include California Air Pollution Control Officers Association (CAPCOA) and state/local partnerships, and other stakeholders. EPA has indicated that incentive measures may be approvable under the "enforceable commitments" mechanisms which would allow a greater percent of reductions than the 3% referred to in the comments.

Response to Comment 67-4:

The Revised Draft Plan includes the addition of future rulemaking for two of the previously incentive-only measures (CMB-01 and CMB-02). Please see Response to Comment 67-1 regarding the role incentive measures can play in achieving fast approaching deadlines by 2022 and 2023 for the 1-hour and 1997 8-hour ozone standards, respectively. Achieving these standards solely through regulation would not be realistic.

Response to Comment 67-5:

CMB-02 includes future rulemaking and will impose feasible requirements for space heating and water heaters. Staff will consider the technologies mentioned and encourages manufacturers to submit additional information supporting the feasibility and cost effectiveness of proposed technologies.

Response to Comment 67-6:

With regard to the facility-based measures including MOB-01, during the public process, SCAQMD staff will seek input and comments on identifying actions that could be voluntary or regulatory nature. The SCAQMD staff will report to the SCAQMD Governing Board on progress in identifying actions. However, if actions are not identified or incentive funding is not sufficient to achieve additional emission reductions, the SCAQMD staff will recommend to the SCAQMD Governing Board the development of rules within the SCAQMD authority or other enforceable mechanisms. Staff is proposing that a recommendation be made within one year from the adoption of the Final 2016 AQMP. The new language can be found in the updated MOB-01 write-up located in Appendix IV-A of the Revised Draft Plan.

Response to Comment 67-7:

MOB-08 has been modified to reflect enhancing the existing fleet rules and the updated MOB-08 description can be found in Appendix IV-A of the Revised Draft Plan. Requiring zero-emission public fleets may require additional authority from the state legislature since current law sets a benchmark of "methanol or other equivalently clean burning alternative fuels." H&S §40447-5

Response to Comment 67-8:

Staff appreciates the comment and is aware of the emission reduction opportunities in the small off-road engines (SORE) category. In order to increase the penetration of new low emission and zero-emission equipment in SORE category, MOB-11 is proposing to expand the District's existing lawn mower and leaf blower exchange program to cover larger commercial lawn and garden equipment that are subject to federal preemption or may not be required to turnover to newer equipment. This expansion will be accomplished by increasing the number of exchange events and available funding for these programs. In addition, other SORE equipment may also be considered for exchange programs for accelerating the turnover of existing engines. Finally, such cleaner SORE equipment could be a mechanism for complying with EGM-01 regarding new development.

Response to Comment 67-9:

Please see Response to Comment 67-6 regarding the facility-based measures, including warehouses.

Response to Comment 67-10:

CMB-05 proposes a re-assessment of the RECLAIM program, which has been modified to reflect a serious consideration of phasing out the program and shifting to a command and control system. The updated CMB-05 description can be found in Appendix IV-A of the Revised Draft Plan.

Response to Comment 67-11:

The 2016 AQMP is a comprehensive Plan with committed reductions to be achieved in both 2023 and 2031, thus attaining the ozone standards by the required deadlines. Staff continues to work on regulation and other program implementation to reduce NOx emissions both in the short-term and the long-term.

Response to Comment 67-12:

A separate document will be provided with all the comment letters received that will also include specific responses to each of the comments. The release of this document is expected to be in December after the release of the Draft Final Plan.

Response to Comment 67-13:

Solar technologies are discussed throughout the 2016 AQMP and are considered as an option in a number of proposed control measures including the energy climate change (ECC) measures. Solar technologies can be cost-effective for NOx reductions when combined with other technologies and will also be considered for other measures such as CMB-01 and CMB-02.

Response to Comment 67-14:

Staff is aware of the need to work toward achieving the state standards that are in some cases more stringent than the current federal standards, although the strengthening of the federal standards are beginning to align with the state standards. The challenge of meeting the federal standards has been an on-going struggle for this region for a variety of reasons such as technological feasibility and wide-range public acceptance of new technologies and products. The 2016 AQMP represents an "all of the above"

approach, and thus the maximum feasible continued progress towards meeting State standards is assured.

Please see Response to Comment 67-1 with regard to the timing of the release of supporting appendices and the ample time provided for public review and comment.

Comment Letter from Altergy Systems (Comment Letter #68)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Form Information

Date Created	Time Created	AQMP Year
09/27/2016	9:26 AM	2016

Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
CORINNE VITA	ALTERGY SYSTEMS If not representing a specific organization, please enter "No Affiliation".			

Comments (Unlimted Size)

Can you include language in the control measure for customers who put in fuel cells instead of generators at NEW SITES – not removal of existing generators but using the control measure incentive to prevent them from putting in generators at new sites?

I spoke with a few customers, they may not take their generators out but they would use the incentive program to put fuel cells in at new sites where they would of put in generators

The best control measure would include incentives for customers to take out generators and replace with fuel cells and for customers who choose to put in fuel cells at new sites instead of generators

68-1

Upload Additional Comment and Supporting Files (30 Mb Maximum per file)

AQMP Comments Files

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature*

Corinne Vita

For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from Altergy Systems
(Comment Letter #68)

Response to Comment 68-1:

The 2016 AQMP control measure CMB-01 has already included language on development of fuel cells at new sites, as well as replacing the existing generators with fuel cells or other technologies where feasible.

Comment Letter from David W. Brown (Comment Letter #69)



Preliminary Draft
Socioeconomic Report for 2016 AQMP

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the Socioeconomic Report for 2016 AQMP. Responses to comment will be compiled and included in the final Report package.
*Fields Required to Submit a Comment

Form Information

Date Created	Time Created	AQMP Year
08/31/2016	12:16 PM	2016

Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
DAVID W. BROWN	NO AFFILIATION	COOS BAY	OR	97420

If not representing a specific organization, please enter "No Affiliation".

Comments (Unlimited Size)

As someone who considers himself an environmentalist, I believe that the most exciting affordable technology to implement to drastically reduce NOx in numerous industrial applications is the Duplex Technology developed by ClearSign Combustion. These working for SCAQMD would do well to further investigate this technology (that is currently working at an Aera Energy Once Through Steam Generator in California and at Kern Energy in Bakersfield in a refinery heater. It is also installed in at least several well-head flares in California (undisclosed company and location at this point but in CA per the company). Duplex can work in any flame based technology. Industrial boilers are the next frontier for the company along with industrial applications in industries like paper, chemical, cement and steel plants. Full disclosure: I am a shareholder in the company, but have no affiliation with CLIR regarding my employment.

69-1

Upload Additional Comment and Supporting Files (30 Mb Maximum per file)

Socioeconomic Report Comments Files

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature*

For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from David W. Brown
(Comment Letter #69)

Response to Comment 69-1:

Thank you for providing the Duplex Technology information to reduce NOx emissions in industrial applications. Staff will review this technology in detail during the rulemaking process.

SECTION 3

COMMENTS AND RESPONSES TO COMMENTS

ON THE REVISED DRAFT 2016 AQMP

COMMENT LETTER NUMBER

AGENCY/ COMPANY	DATE	Comment Letter Number
Automobile Club of Southern California (AAA)	11/29/2016	100
American Trucking Associations (ATA)	11/7/2016	91
Building Industry Association of Southern California, Inc. (BIASC)	11/7/2016	86
California Construction and Industrial Materials Association (CalCIMA)	11/7/2016	75
California Council for Environmental and Economic Balance (CCEEB)	11/7/2016	85
California Small Business Alliance	11/7/2016	81
City of Irvine	11/7/2016	79
Construction Industry Air Quality Coalition (CIAQC)	11/2/2016	99
Del Amo Action Committee (Florence Gharibian)	11/7/2016	97
Diesel 2 Gas Solutions (Jim Villa)	10/21/2016	71
Earthjustice	11/7/2016	84
Eastern Municipal Water District	11/7/2016	80
ES Engineering	11/4/2016	73
Gatzke Dillon & Ballance LLP (GDB) on behalf of John Wayne Airport	11/7/2016	76
Individual Trucking Companies	10/13/2016	70
Latham & Watkins LLP on behalf of Regulatory Flexibility Group (RFG)	11/7/2016	87
Los Angeles County Business Federation (BizFed)	11/7/2016	95
Minuteman Transport Inc. (Peter Amundson)	11/7/2016	82
Orange County Sanitation District (OCSD)	12/6/2016	101

COMMENT LETTER NUMBER (CONCLUDED)

AGENCY/ COMPANY	DATE	Comment Letter Number
Orange County Transportation Authority (OCTA)	11/2/2016	88
Pacific Merchant Shipping Association (PMSA)	11/7/2016	94
Ports of Long Beach and Los Angeles (San Pedro Bay Ports)	11/7/2016	96
Public Solar Power Coalition (Harvey Eder)	11/7/2016	98
Realtors Committee on Air Quality (RCAQ)	11/7/2016	92
Rhetta Alexander	11/5/2016	74
Southern California Air Quality Alliance	11/7/2016	77
Southern California Alliance of Publicly Owned Treatment Works (SCAP)	11/7/2016	78
Southern California Gas Company (SoCalGas)	11/7/2016	83
Southern California Leadership Council (SCLC)	11/7/2016	93
Truck and Engine Manufacturers Association (EMA)	11/7/2016	90
Valley Industry and Commerce Association (VICA)	11/7/2016	89
Western States Petroleum Association (WSPA)	11/4/2016	72

Comment Letter from Individual Trucking Companies (Comment Letter #70)

-----Original Message-----
From: Peter Amundson [mailto:Peter@minutemantransport.com]
Sent: Wednesday, October 12, 2016 12:44 PM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Yes to Incentives! No to AQMD Dracionian Rules!

Peter Amundson
14840 E Proctor Ave
City of Industry, CA 91746

October 12, 2016

Dear Wayne Nastri,

My company has spent hundreds of thousands of dollars to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules.

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

70-1

Sincerely,
Peter Amundson

1

-----Original Message-----
From: Edward Boe [mailto:edward.boe@xpo.com]
Sent: Wednesday, October 12, 2016 9:29 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: The South Coast AQMD

Edward Boe
2200 Claremont Ct.
Hayward, CA 94545

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules.

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Ed Boe

70-2

1

-----Original Message-----
From: Mike Burkett [mailto:mburkett@biagibros.com]
Sent: Wednesday, October 12, 2016 9:09 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Incentives Can Help My Business

Mike Burkett
500 Tower Rd
Napa, CA 94559

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-3

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Mike Burkett

1

-----Original Message-----
From: Tony Corriea [mailto:tonyc@weststar.us]
Sent: Wednesday, October 12, 2016 11:44 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Yes to Incentives! No to AQMD Dracionian Rules!

Tony Corriea
5760 E. Lerdo Hwy
Shafter, CA 93263

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-4

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Tony Corriea

1

-----Original Message-----
From: Scott Cramer [mailto:Scramer@cfl-usa.com]
Sent: Wednesday, October 12, 2016 10:40 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Incentives Can Help My Business

Scott Cramer
1344 White Ct
Santa Maria, CA 93458

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-5

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Scott Cramer

1

-----Original Message-----
From: Greg Dubuque [mailto:greg@libertylinehaulwest.com]
Sent: Wednesday, October 12, 2016 9:49 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: AQMD VS. ME....AND I WANT TO BE ON YOUR TEAM!!!

Greg Dubuque
1501 Chapin Road
Montebello, CA 90640

October 12, 2016

Dear Wayne Nastri,

My small trucking company has spent close the $3,000,000 to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5. However, because I compete at national level, I enter "the game" with a competitive disadvantage.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime as well as shorten the life cycle of the engine.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules.

70-6

How can you improve air quality immediately? ENFORCE THE RULES WE ALREADY HAVE. Everyday CARB allows non compliant out-of-state trucks to come in to my state and haul the freight I bid on. They win it because they have a cheaper cost of operation. Enough with the excuses of "we don't have enough funds" to enforce. CARB targets fleets within the state as :low hanging fruit" and does nothing to enforce out of state carriers. I am on the roads everyday and see this. If these trucks were off the road, and replaced with today's technology, you would see that 2% improvement you are looking for without any new rules enacted.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Greg Dubuque

1

-----Original Message-----
From: Steve Hansen [mailto:steve@hansenadkins.com]
Sent: Wednesday, October 12, 2016 11:24 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: AQMD Take a Break on Trucking!

Steve Hansen
3552 Green Ave
Los Alamitos, CA 90720

October 12, 2016

Dear Wayne Nastri,

I have spent my 52 years in the Los Angeles area, my professional life in trucking, and do recognize and appreciate the improvement in air quality over the years.

As a trucking company we do more than our fair share to do our best. Give trucking time to absorb the important and effective changes that are now taking effect before attacking our industry once again with additional regulation and cost.

My company has spent over $12 Million to upgrade to newer, clean emissions trucks to comply with existing CARB regulations. These investments have resulted in tremendous reductions in truck emissions.

Our Company is still absorbing the cost of purchasing 80 new CARB compliant trucks. Our customers have still not recognized the full increase in cost burden nor brought rates in line with expenses associated with changes we have made due to new CALIFORNIA regulations.

70-7

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State.

Now is absolutely not the time to adopt new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable, dangerous, patchwork of rules.

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

70-7
Con't

Sincerely,
Steve Hansen

-----Original Message-----
From: William Jarvis [mailto:william.jarvis@mclanefs.com]
Sent: Wednesday, October 12, 2016 10:29 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: AQMD Rules Will Be Bad For My Business and Our Teammates(Voters)

William Jarvis
14813 Meridian Parkway
Riverside, CA 92562

October 12, 2016

Dear Wayne Nastri,

I urge you to think for yourself and not be influenced by your peers. My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules.

70-8

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
William Jarvis - General Manager

1

-----Original Message-----
From: Fredrick Johring [mailto:fred@gsltrans.com]
Sent: Wednesday, October 12, 2016 11:24 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: AQMD Rules Will Be Bad For My Business

Fredrick Johring
2999 Pacific Commerce Dr.
East Rancho Dominguez, CA 90221

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-9

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Fred Johring

-----Original Message-----
From: Michael Kelso [mailto:mikek@trimodal.com]
Sent: Wednesday, October 12, 2016 5:55 PM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: SCAQMD Proposed Measures

Michael Kelso
6962 Cerritos Ave.
Cypress, CA 90630

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules.

70-10

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Michael Kelso

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-----Original Message-----
From: Tiffany Leal [mailto:tiffanyleal@inland-group.com]
Sent: Wednesday, October 12, 2016 9:49 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: AQMD Rules Will Be Bad For My Business

Tiffany Leal
9730 Cherry Ave
Fontana, CA 92335

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules.

70-11

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Tiffany Leal

-----Original Message-----
From: Valerie Liese [mailto:vliese@jjtinc.com]
Sent: Wednesday, October 12, 2016 4:15 PM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Proposed regulations for S. California

Valerie Liese
1090 E. Belmont St.
Ontario, CA 91761

October 12, 2016

Dear Wayne Nastri,

My company has spent hundreds of thousands of dollars to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. And yet, you say that's not enough.
Unfortunately, manufacturers were not given enough time to develop engines and retrofit equipment, resulting in mechanical failures, thus leaving the trucking industry with trucks in our shops most of time, rather than on the roads being productive.

Because of these rules, just coming out of a recession, and equipment that continuously failed or burnt to the ground,I had to close my doors after 45 years in a family-owned business in California because of your mandates. With your new proposed regulations, you will guarantee even more businesses closing their doors, more unemployment and prices raising dramatically.

Comprehensive rules must be made not only statewide, but nationwide. To make rulings for our area alone, will ensure all industries and businesses suffer.

70-12

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules.

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

70-12
Con't

Sincerely,
Valerie Liese

-----Original Message-----
From: Chris McNatt [mailto:cmcnatt@gmail.com]
Sent: Wednesday, October 12, 2016 10:19 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: AQMD Overreach

Chris McNatt
1175 Kipling Avenue
Los Angeles, CA 90041

October 12, 2016

Dear Wayne Nastri,

My clients' companies have spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-13

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Chris McNatt

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-----Original Message-----
From: Robert Nearing [mailto:robert.nearing@mclanefs.com]
Sent: Wednesday, October 12, 2016 10:39 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: AQMD Rules Will Be Bad For My Business

Robert Nearing
14813
Riverside, CA 92518

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-14

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Robert Nearing

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-----Original Message-----
From: Ron Overacker [mailto:roveracker@socogroup.com]
Sent: Wednesday, October 12, 2016 9:29 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Incentives Can Help My Business

Ron Overacker
145 Vernon Way
El Cajon, CA 92020

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-15

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Ron Overacker

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-----Original Message-----
From: anthony peters [mailto:peterstrucking@yaqhoo.com]
Sent: Wednesday, October 12, 2016 5:05 PM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: AQMD Rules Will Be Bad For My Business

anthony peters
po box 397
gustine, CA 95322

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules.

70-16

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
ANTHONY PETERS

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-----Original Message-----
From: Peter Schneider [mailto:pschneider@tgstrans.com]
Sent: Wednesday, October 12, 2016 1:14 PM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Incentives Can Help My Business

Peter Schneider
PO Box 2668
Fresno, CA 93745

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-17

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Peter Schneider

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-----Original Message-----
From: Tobin Shirk [mailto:tobin@mammettrucking.com]
Sent: Thursday, October 13, 2016 7:56 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Yes to Incentives! No to AQMD Dracionian Rules!

Tobin Shirk
126 N.Heliotrope Ave.
Monrovia, CA 91016

October 13, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-18

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Tobin Shirk

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-----Original Message-----
From: Kenneth Shuemake [mailto:Pshuemake@sbcglobal.net]
Sent: Wednesday, October 12, 2016 9:19 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Incentives Can Help My Business

Kenneth Shuemake
744 Q Street
Firebaugh, CA 93622

October 12, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-19

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Kenneth Shuemake

1

-----Original Message-----
From: Greg Stefflre [mailto:gregstefflre@gmail.com]
Sent: Thursday, October 13, 2016 7:26 AM
To: Wayne Nastri <wnastri@aqmd.gov>
Subject: Incentives Can Help My Business

Greg Stefflre
675 Green View Rd.
La Habra Heights, CA 90631

October 13, 2016

Dear Wayne Nastri,

My company has spent millions to upgrade to newer, cleaner trucks and equipment to comply with existing CARB regulations. These investments have resulted in over 80% reductions in NOx and 99% reductions in PM2.5.

CARB and EPA have signaled that they will adopt lower NOx standards for engines that will result in up to a 98% reduction in NOx. These new emission standards will increase the cost of trucks and will likely result in higher maintenance cost and downtime.

Trucking has done more than its fair share to clean the air in the South Coast and is already one of the most highly regulated industries in the State. Now is absolutely not the time to adopt draconian new regulations such as attempting to expand the district's fleet rule authority to private truck fleets and imposing facility emission caps on thousands of freight facilities, creating an unworkable patchwork of rules. 70-20

We urge you to continue to work with truckers on incentive based approaches, fairly enforcing existing rules to provide a level playing field to compliant fleets and to allow CARB and EPA to work with engine manufacturers on the adoption of national emission standards.

Harmful rules are not the way to go. Work with the industry and not against it!

Sincerely,
Greg Stefflre

1

Responses to Comment Letter from Individual Trucking Companies
(Comment Letter #70)

Response to Comments 70-1 to 70-20:

Thank you for your comments. The SCAQMD staff is working with CARB to identify additional funding in the near-term that will help turnover older trucks to trucks which meet and exceed the latest emission standards. Regardless, according to the 2016 AQMP emissions inventory, heavy-duty diesel trucks were still the highest source for NOx emissions in 2012. Although emissions in future years are expected to be lowered, NOx emissions from heavy-duty diesel trucks in the South Coast are still significant and should be reduced to protect public health.

While the acquisition of a truck that meets the current 2010 emission standard is important, the region must go beyond current standards in order to attain federal air quality standards by their applicable deadlines. As such, CARB will be developing new engine standards. Meanwhile, the SCAQMD has petitioned U.S. EPA to establish new national engine emission standards. As incentives funding opportunities are identified, we would encourage the acquisition of trucks with the cleanest available engines.

Comment Letter from Diesel 2 Gas Solutions (Comment Letter #71)

From: Jim Villa [mailto:jim@diesel2gas.com]
Sent: Friday, October 21, 2016 2:30 PM
To: Diana Thai <dthai@aqmd.gov>
Cc: Bob Butler <bob@generator-services.com>; Drew Butler <drew@diesel2gas.com>
Subject: RE: Request for Additional Information - Diesel2Gas and CNG Direct

Hi Diana,

Here are some questions/comments we have regarding the AQMP in regards to Bi-Fuel and Flare Gas Recovery in CMB-01 and CMB-03 respectively:

For Bi-Fuel

- What other incentive does the end user have by converting to Bi-Fuel? Does it simply help their facility reduce NOx output, or are there benefits for the equipment?
- What does the client have to do to qualify for the funds? Do the funds come after the job is complete? How long will it take to get the funds?
- Since our system is CARB certified, will it still require a source test?
- In Table 4, are the funds available per unit or per facility?
- Will lower Tier levels (T-1 & T-2) be targeted first since the % of NOx levels reduced is greater with a Bi-Fuel system?
- The AQMP lists 60 retrofit opportunities. How are these units or facilities identified? If there are additional units/facilities identified, will they qualify for the funds as well? When do the funds run out?

71-1

For CNG transportation/Flare Gas Recovery

In regards to flare gas recovery, can the option of utilizing CNG trailers be considered? In CMB-03, one of the options that is not discussed is transporting stranded gas (IV-A-80) through CNG trailers to the pipeline or to a site that is able to utilize the gas. This is an option that avoids the need for flares.

We are currently completing construction on a project where we will be doing this is Bakersfield. It will be up and running within the next couple months. The client pays us to transport the fuel to the pipeline, or we have the option to purchase the fuel and sell it to our clients. The gas needs to be cleaned up to pipeline quality. We are currently working with SJVAPCD on flare gas capture incentives and/or grants that would help eliminate all types of flaring occurring in their air districts. Currently this is the only option that eliminates all flaring either emergency, intermittent or constant and uses. If you would like us to share the information we have been working with on SJVAPCD or would like to work with them we would be happy to help in any way.

71-2

Best regards,

Jim

Jim Villa
Regional Sales Manager
Diesel 2 Gas Solutions
909-917-3501 Cell

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Responses to Comment Letter from Diesel 2 Gas Solutions
(Comment Letter #71)

Response to Comment 71-1:

CMB-01 is designed to transition to zero NOx emission technologies where and when technology is feasible and cost-effective and near-zero NOx technologies in all other applications. Along with NOx reductions, equipment owners and operators may experience other co-benefits such as increased energy efficiency, reduced maintenance, greenhouse gas (GHG) reductions, and/or a reduction in criteria pollutants. A facility converting a diesel internal combustion engine (ICE) to a bi-fuel system, in addition to reducing NOx emissions, may also reduce operating costs, reduce maintenance, create fuel savings, and extend run times.

The incentive program will be developed in detail with comprehensive guidelines that are approved by the SCAQMD Governing Board. Public working groups or workshops will take place to discuss the guidelines and incentives, including fund distribution. Facilities that qualify for incentives shall submit applications during an open enrollment period. Projects will be evaluated based on criteria, including, but not limited to, emission reductions, cost-effectiveness, age of equipment, remaining useful life of existing equipment, Environmental Justice (EJ) considerations, and small business status.

The working group will discuss whether zero and/or near-zero emission technologies will require source testing. Source testing may be required to verify proper equipment operation or that equipment meets emission limits.

Older higher emitting NOx equipment will be targeted by this control measure. The purpose of the incentive program is to create opportunities and make it more cost-effective to replace equipment, transition to zero or near-zero technologies, encourage earlier change-out of higher-emitting equipment, and drive technology development and cost reduction. Projects that are more cost-effective may be given priority compared to other projects with less NOx reductions and higher costs (larger incentives needed).

The retrofit opportunities identified in CMB-01, Table 5 - "Incentive Effectiveness by Category" (formerly Table 4) are a demonstration of source categories staff identified for potential emission reductions through incentive funding and costs for replacement or control equipment currently available. Upon implementation and formation of a working group, new zero or near-zero emitting technologies can be identified as well as other sources for potential NOx reductions. If more cost-effective NOx reductions are achieved through one source category, it may lessen the need from another NOx source category. Once a facility applies for an incentive program, the facility will need to identify the zero or near-zero technology with they wish to replace or retrofit their older higher emitting equipment. The number of units/facilities identified for retrofits were based on staffs' estimate of cost-effective emission reduction opportunities. If additional units/facilities are identified, they may qualify for funding if funds are available.

Response to Comment 71-2:

The option of utilizing CNG trailers may be considered to transport stranded gas. Staff may need to take into consideration increased vehicle emissions from bringing a sufficient number of CNG trailers to transport stranded gas from a site. Staff is open to methods of control that would eliminate flaring and provide beneficial use of gas from non-refinery sources. A working group will be formed during rulemaking to discuss further options and details of the rule.

Comment Letter from Western States Petroleum Association (Comment Letter #72)

Western States Petroleum Association
Credible Solutions • Responsive Service • Since 1907

Patty Senecal
Director, Southern California Region

4 November 2016 Via Email: PFine@aqmd.gov

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: WSPA Comments on the Revised Draft 2016 Air Quality Management Plan (AQMP)

Dear Dr. Fine:

Western States Petroleum Association (WSPA) is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California, Arizona, Nevada, Oregon, and Washington. WSPA member companies operate petroleum refineries and other facilities in the South Coast Air Basin that will potentially be affected by the information presented in the Revised Draft 2016 Air Quality Management Plan.

72-1

WSPA appreciates the opportunity to submit these comments and continues to support the regional air quality planning process. Over the last two decades, Southern California's industrial facilities (i.e., stationary sources including the region's petroleum refineries) have reduced their emissions by over 70 percent for most criteria pollutants including nitrogen oxides (NO_X) and sulfur oxides (SO_X). And by 2023, these industries will have further reduced their NO_X emission by another 45 percent.

Our general comments in the Revised Draft AQMP are as follows:

1. **The AQMP control strategy should exclude all measures not needed to minimally achieve the region's carrying capacity targets for attainment of the National Ambient Air Quality Standards (NAAQS).**

72-2

As presented in the Revised Draft AQMP,[1] the proposed control strategy continues to include a number of measures which are not necessary for meeting the AQMP objectives. These additional measures are not shown as necessary for reaching the region's "carrying capacity." In fact, most of these extra measures have no quantified emission benefits yet would impose considerable costs on the Southern California economy. They should be removed from the AQMP.

[1] SCAQMD, Revised Draft 2016 AQMP, Table ES-2 (October 2016).

2. **The AQMP control strategy should prioritize non-regulatory, incentive based approaches to reducing emissions outside the State Strategy. The AQMP should consider the potential benefits of extending incentives to reduce costs to industrial stationary sources.**

To the extent they are needed to demonstrate attainment, WSPA is supportive of the AQMP's inclusion of control measures based on incentives and other non-regulatory approaches intended to accelerate the transition of vehicles, buildings, and industrial facilities to cleaner technologies. Southern California's industrial facilities (i.e., stationary sources including the region's petroleum refineries) have dramatically reduced their emissions by over 70 percent for most criteria pollutants over the last two decades, and by 2023 these same industries will have further reduced their NO_X emission by another 45 percent[2]. With these additional reductions, industrial facilities may not be able to further reduce emissions in a cost effective manner absent financial incentives.

72-3

Industrial sector employment is a vital part of the regional economy. The AQMP should extend the use of incentives to include large stationary sources, including major sources presently subject to the RECLAIM program. This could serve to accelerate the deployment of lower emission technologies and would be consistent with recent discussions at the Ad Hoc Committee on Large Compliance Investments and Future Regulatory Certainty to consider targeted incentives, financing, and funding programs as means for promoting emission reductions and helping businesses remain economically viable, especially in environmental justice areas.[3]

3. **Given the December 2015 and October 2016 amendments to the RECLAIM program, Proposed CMB-05 (Further NOx Reductions from RECLAIM Assessment [NOx]) is unreasonable and lacks any technical foundation. Proposed measure CMB-05 should be completely removed from the AQMP.**

In December 2015, the AQMD Governing Board approved the single largest adjustment to the NOx RECLAIM program since it began in 1994. When fully implemented, those amendments will have removed at least 12 tons per day (tpd) from the NOx RECLAIM market; a 45% reduction. This is on top of the nearly 70% reduction in NOx emissions achieved under RECLAIM since 1994.

The December 2015 rulemaking made RECLAIM adjustments to reflect the (perceived) advancement of NOx Best Available Retrofit Control Technology (BARCT) for various equipment by establishing new RECLAIM Trading Credit (RTC) adjustment factors for year 2016 and beyond. That rulemaking also took "credit" for the fact that certain companies had left Southern California, and made adjustments for anticipated future growth of industrial sectors covered by the RECLAIM program. The December 2015 rulemaking also included an "off-ramp" for electricity generating facilities (EGF) at BACT or BARCT. That last provision, if optioned by qualifying EGFs, could result in additional RTCs being removed from the RECLAIM program above and beyond the 12 tpd market adjustment approved by the Governing Board. And in October 2016, the Governing Board adopted further amendments that will remove even more RTCs from the NOx RECLAIM Program in the event of future RECLAIM facility shutdowns.

72-4

As presented in the Revised Draft AQMP, the proposed measure purports to address "*...issues that arose during recent NOx RECLAIM amendments. These measures listed below would be designed to achieve*

[2] SCAQMD December 2015 amendments to the NOx RECLAIM program, Rule 2002, adopted 12/4/15.
[3] SCAQMD Ad Hoc Committee on Large Compliance Investments and Future Regulatory Certainty, September 2, 2016.

additional actual and/or SIP creditable emission reductions from the RECLAIM Program and ensure future equivalency with command-and-control regulations." As detailed below, each of these "issues" has already been addressed in the December 2015 or October 2016 rulemakings or are otherwise moot. 72-4 Con't

Specifically, the Revised Draft AQMP suggests the following reasons:[4]
Note: Changes from the first draft AQMP are represented as follows: removed words are crossed out and added words are underlined.

Issue as Presented: *"Assess whether more SIP creditable and/or actual emission reductions could be achieved without the RECLAIM program, and if so, explore how the program could be sunset in an orderly and equitable fashion. ~~Assessment of whether t~~The cost-effectiveness benefits that the RECLAIM market was intended to provide may ~~still exist~~ cease to exist given the need for all feasible NOx reductions and the potential lack of lower-cost control options. As many of the program's original advantages appear to be diminishing and generating increased scrutiny, an orderly sunset of the RECLAIM program may be the best way to create more regulatory certainty and reduce compliance burdens for RECLAIM facilities. Many of the approaches listed below may serve as interim steps in a long-term elimination of the program."* 72-5

As stated earlier in this letter, the RECLAIM program has been very successful over the past 20 years, and with the recent amendments in December 2015, significant emission reductions will continue to be realized over the next 6 years. A sunset of the program would be a policy matter to be debated by the Governing Board and should not only include a detailed socioeconomic assessment to consider the potential impacts to the regional economy but also a thorough review of the District's legal obligations under the California Health & Safety Code. Additionally, Staff has not offered any information to suggest such a policy change could even yield creditable reductions. For these reasons, a sunset of the RECLAIM program is, at best, premature, and should not be included as an alternative in the AQMP.

Issue as Presented: *"Consider options for facilities at BACT or BARCT and/or facilities with no allocations (structural buyers) to exit the program and be subject to command and control regulations. The most recent NOx amendment allowed EGFs to voluntarily opt-out of RECLAIM. Such an option could be extended to other facilities, and potentially lead to more AQMP creditable emission reductions ~~given that future non-RECLAIM facilities emissions are projected at actual levels with growth rather than total allocations~~."* 72-6

The December 2015 rulemaking already featured an "off-ramp" for EGFs at BACT or BARCT, and that rulemaking (by design) would force the remaining RECLAIM facilities to meet the Staff's BARCT levels (found in Rule 2002) on a programmatic basis. As stated previously, if optioned by qualifying EGFs, the provision could result in additional RTCs being removed from the RECLAIM program above and beyond the 12 tpd market adjustment approved by the Governing Board. Therefore, WSPA cautions staff from including additional "off-ramp" provisions in the AQMP until the impact of its implementation is clearly understood on the RECLAIM program.

Issue as Presented: *"Consider command-and-control regulation overlays to certain RECLAIM facilities. For some RECLAIM facilities a command-and-control overlay may be the best way to reduce NOx emissions while maintaining the required equivalency with command and control."* 72-7

[4] SCAQMD Draft AQMP, Appendix IV, page IV-A-88 et seq.

The December 2015 rulemaking by design forces RECLAIM facilities to meet the Staff's BARCT levels (found in Rule 2002) on a programmatic basis. Those BARCT levels in most cases are equal to or more stringent than current BACT.[5] The suggested "command-and-control overlays" would fundamentally conflict with Regulation XX program design. And given the December 2015 amendments, there is no evidence to suggest they would yield additional creditable emission reductions. 72-7 Con't

Issue as Presented: "*Assess the need for and the size of the differential between RTC holdings and actual emissions. The size of this unused RTC margin is affected by the possible need for a compliance margin, uncertainties in the growth projections for existing and new businesses, facility and equipment shutdowns, and holdings by investors. A full assessment may allow for an optimization of the size of the margin that could allow for further RTC reductions.*" 72-8

During the December 2015 rulemaking, it was noted that overall, the NOx RECLAIM market had, in recent years (i.e., 2011-2013), exhibited an unused RTC margin of 4-6 tpd depending on the year and prevailing economic conditions. In the context of that period's market cap of 26.5 tpd, the 4-6 tpd represented 15-25% of the overall NOx RTC market. By its very design, the December 2015 rulemaking will have eliminated nearly all of those previously unused RTC's once fully implemented by 2023. This historical observation does not represent a valid basis for further market adjustment.

Issue as Presented: *"Assess facility and equipment shutdowns and the removal of associated RTCs from the market. Under command-and-control rules, shutdown emission credits are heavily discounted to BACT, based on the last 2 years of operation. While there is no discount of credits for a RECLAIM facility or equipment shutdown, the overall RTCs available to RECLAIM facilities have been reduced over time to reflect the advancement of BARCT (i.e., command-and-control equivalency). In some cases, these BARCT levels are equal to, or more stringent than, BACT determinations. However, these credits, if not removed from the program, could reduce the incentive to implement cost-effective controls that would otherwise be required under command-and-control. California Health & Safety Code Section 39616(c)(1) requires that RECLAIM, a market-based program, will result in equivalent or greater reduction in emissions at equivalent or less cost compared with current command and control regulations and future air quality measures that would otherwise have been adopted as part of the SCAQMD's plan for attainment. Amendments are currently being considered to address RTCs upon facility shutdowns."* 72-9

On 7 October 2016, the Governing Board adopted additional amendments to RECLAIM which comprehensively addressed the facility shutdown issue. This "issue" is now resolved and should be removed from the AQMP.

Issue as Presented: *"Perform additional or more frequent BARCT assessments and adjust allocations as control technologies improve and are implemented in practice."* 72-10

AQMD is already obligated to perform such assessments under the California Health & Safety Code.[6] Such assessments would trigger future rulemaking if it was concluded that BARCT was more stringent than the levels stated in Rule 2002. Given the severity of the BARCT determinations in the December

[5] SCAQMD 2016 AQMP, Appendix IV, page IV-A-89. "In some cases, these BARCT levels are equal to, or more stringent than, BACT determinations."
[6] H&SC §39616(c).

2015 rulemaking, some of which are more stringent than accepted BACT, there is no technical basis at this time to suggest that BARCT advancement will be able to yield an additional 5 tpd of NOx emissions from RECLAIM facilities by 2031. 72-10 Con't

Issue as Presented: *"Re-examination of the RECLAIM program if RTC prices hit the upper or lower threshold amounts. The current NOx RECLAIM regulation has a lower price threshold of $200,000 per ton (infinite year block) and upper price thresholds of $22,500 and $35,000 per ton (discrete year; annual and 3-month average, respectively). The levels of these thresholds or additional thresholds could be modified commensurate with future BARCT assessments and attainment needs."*

California Health and Safety Code requires the District to make certain findings when adopting rules and regulations to implement a market-based incentive program, including a determination that:

- The program will result in an equivalent or greater reduction in emissions at equivalent or less cost compared with current command and control regulations and future air quality measures that would otherwise have been adopted as part of the district's plan for attainment.
- The program will provide a level of enforcement and monitoring, to ensure compliance with emission reduction requirements, comparable with command and control air quality measures that would otherwise have been adopted by the district for inclusion in the district's plan for attainment. 72-11
- The program will not result in a greater loss of jobs or more significant shifts from higher to lower skilled jobs, on an overall districtwide basis, than that which would exist under command and control air quality measures that would otherwise have been adopted as part of the district's plan for attainment.
- The program will not result in disproportionate impacts, measured on an aggregate basis, on those stationary sources included in the program compared to other permitted stationary sources in the district's plan for attainment.[7]

Any reconsideration of price triggers or cost effectiveness thresholds would need to be supported by findings that the program will not result in disproportionate impacts, measured on an aggregate basis, on those facilities included in the RECLAIM program as compared to other permitted stationary sources in the District. Given the severity of the December 2015 and October 2016 amendments, we are skeptical that such a finding could be made at this time. We do not believe this issue supports further reductions in the NO_X RECLAIM market.

Issue as Presented: *"Assess the impacts of investors holding RTCs. Investors have historically played an important role in the RECLAIM program. However, their holding of RTCs has posed problems with the trading and identification of reductions because they are not RECLAIM facilities that have an initial allocation or a potential to reduce NOx emissions."* 72-12

This topic appears to be a policy matter which would need to be considered by the Governing Board and possibly state legislation. California Health & Safety Code specifically provides that RECLAIM "shall achieve emission reductions across a spectrum of sources by allowing for trading of emissions trading

[7] H&SC §39616(c).

units for quantifiable reductions in emissions from a significant number of different sources."[8] Absent a change in policy directive, this does not support further reductions in the NOx RECLAIM market.

To summarize, the basis presented in the Revised Draft AQMP for proposed Control Measure CMB-05 do not support this control measure given the RECLAIM program changes already adopted under the December 2015 and October 2016 rulemakings. Furthermore, the proposed measure lacks any rationale to support the notion that 5 tpd of additional creditable emission reductions could be achieved by 2031. For these reasons, proposed measure CMB-05 should be completely removed from the AQMP. If the District insists on including a RECLAIM control measure in this AQMP, the emission reduction should be represented as a range since what is included in the AQMP is the minimum commitment to USEPA that must be met. We recommend a range of 0-3 tpd. WSPA believes this range adequately encompasses the uncertainty on all the components listed above, some already adopted (i.e. facility shutdown credits) and some to be considered (i.e. command-and-control overlays), but none of them have specific reductions that have been analyzed and justified. And further, WSPA believes that any additional adjustment to RECLAIM Trading Credits (RTCs) under the NOx RECLAIM program should be applied equally to all NOx RECLAIM market participants as a proportion of their present RTC holdings consistent with the founding principles of the RECLAIM program. 72-12 Con't

4. **The costs presented for proposed control measure CMB-05 (RECLAIM) in Table 6-5 are significantly understated. This understatement compromises the Governing Board's ability to make in informed policy decision.**

Revised Draft AQMP Table 6-5 presents the cost for proposed measure CMB-05 at $13,500 - $21,000 per ton of NO_X reduced. This is supposedly based on information in the Staff Report for the December 2015 amendments to Regulation XX. However, WSPA previously provided information to the District which clearly demonstrated that the cost for refinery sector emission reductions beyond those required in the December 2015 amendments would be significantly higher.

WSPA, through a third party contractor, conducted a confidential cost survey of the Southern California refineries related to total capital and operating costs for compliance with the District's proposed NO_X RECLAIM shaves. This proprietary information was submitted by refiners on a confidential basis to the third-party contractor who de-identified and aggregated the compliance costs for the overall industry. That forecast suggested the refinery sector compliance costs for the December 2015 shave would be nearly twice the estimate presented by AQMD staff. 72-13

Furthermore, WSPA's contractor also projected that additional NO_X reductions could cost the refining industry as much as $120,000 per ton, using a 10-year equipment life. Even using Staff's liberal 25-yr equipment life assumption, the estimated costs for additional reductions came to over $55,000 per ton of NOx. While proposed measure CMB-05 fails to explain how any additional reductions from RECLAIM might actually be achieved (see above), it does openly contemplate the imposition of command-and-control overlays that might further increase compliance costs for RECLAIM sources beyond previous projections.

[8] California Health & Safety Code §40440.1(a).

5. **Proposed measured CMB-01 should be expanded to include facilities in the RECLAIM program.**

Proposed measure CMB-01, Transition to Zero and Near-Zero Emission Technologies for Stationary Sources, would seek emissions reductions of NO_X and VOCs from traditional combustion sources by replacement with zero and near-zero emission technologies. This incentive measure would help fund qualifying technology changes by deploying funding or grants to encourage the immediate use of clean, low emission technologies. Such facility modernization concepts have been extensively discussed with stakeholders and were summarized in the Business Case for Clean Air Strategies White Paper. But for some reason, the current CMB-01 proposal would exclude RECLAIM facilities without exception. Given the interest in promoting feasible emission reductions from combustion sources, we see no reason for such a broad exclusion. 72-14

Proposed measure CMB-01 should be revised to allow RECLAIM facilities with qualifying projects to participate in the incentive funding program.

6. **Under proposed Measure FUG-01 (Improved Leak Detection and Repair), WSPA supports the use of Smart-LDAR as a substitute for conventional LDAR programs. This would be the intended purpose of "Smart-LDAR" and could help to resolve the inefficient and labor intensive effort associated with conventional LDAR programs.**

The Revised Draft AQMP includes a proposed control measure which describes a wide-ranging approach to potentially further reducing VOC emissions from fugitive emission components at petroleum industry facilities and chemical plants. The control measure again focuses on the potential use of optical gas imaging technology (as it did the 2012 and 2007 AQMPs).[9] Optical gas imaging (OGI) technology was borne out of a desire to conduct fugitive emission LDAR programs in a more efficient manner (thus, the term "Smart-LDAR"). Prior AQMPs have specifically recognized the inefficient and labor intensive effort associated with conventional LDAR programs; however, this concept is not addressed in FUG-01. 72-15

WSPA appreciates that the Revised Draft AQMP's language for this control measure has been revised to (potentially) allow the use of Smart-LDAR technologies as an alternative to inefficient conventional LDAR programs. This would be the intended purpose of "Smart-LDAR" and could help to resolve the inefficient and labor intensive effort associated with conventional LDAR programs.

7. **Proposed Measure FUG-01 (Improved Leak Detection and Repair) should be revised to clarify that Smart-LDAR would not be required as a supplement to conventional LDAR inspections.**

The Revised Draft AQMP states that: "*Consideration will be made, where appropriate, for the use of Smart LDAR as a substitute for existing LDAR programs. Some smart LDAR technologies are qualitative only and the lack of quantitative information would require the continued use of existing LDAR programs in those situations.*" [10] 72-16

As noted above, we support the concept of potentially replacing traditional LDAR programs with Smart-LDAR technologies. Industry would be strongly opposed to requirements for using Smart-LDAR

[9] SCAQMD 2012 AQMP Control Measure FUG-03 and 2007 AQMP Control Measure FUG-01.
[10] SCAQMD, Revised Draft 2016 AQMP, Appendix IV, page IV-A-93.

technologies as a supplement to existing LDAR programs. The highest and best potential use of Optical Gas Imaging (OGI) is as a substitute for conventional inspections of components with an organic vapor analyzer. Adding OGI (or other technologies) to existing requirements is not cost-effective and may not provide environmental benefit. 72-16 Con't

8. The emission reductions cited for Proposed Measure FUG-01 are not supported.

The control measure summary table identifies potential VOC reductions of 2 tpd by 2023 from an inventory of 7.1 tpd.[11] WSPA believes that the emissions reduction estimate (i.e., >25%) is overly optimistic. We also note that the baseline emissions inventory is considerably different than the figures which were presented in the 2012 AQMP for Control Measure FUG-03. WSPA still wants to understand the source of the 7.1 tons/day emissions inventory as well as the basis for the estimated reductions. 72-17

9. For Proposed Measure FUG-01, all references to new technologies or optical remote sensing technologies are out of place and should be removed.

The proposed measure also suggests exploring the use of "new technologies to detect VOC fugitive emissions in order to supplement existing programs and achieve additional emission reductions."[12] But the Draft AQMP does not explain what those technologies might be, how they would be effective, or how much they might cost and to whom. The measure goes on to discuss two phase implementation without these technologies (or so we inferred). Given the lack of an actual proposal for these new technologies, all references to unspecified "new technologies" should be removed from proposed Control Measure FUG-01. 72-18

Furthermore, the Cost Effectiveness section for proposed measure FUG-01 contains a random reference to "SOF" (Solar Occultation Flux).[13] WSPA understands that pilot studies are currently being conducted to develop a variety of ORI technologies that could be used to detect fugitive emission leaks; however, we are concerned that a specific technology would be named in a general document such as the AQMP. Therefore, any references to SOF should be removed from the AQMP.

10. Proposed measure BCM-02 (Emission Reductions from Cooling Towers) is not needed for the attainment demonstration; it should be removed from the AQMP.

As presented in the Revised Draft AQMP, this control measure would seek to phase-in the use of drift eliminators with 0.001% efficiency for existing cooling towers. This would be achieved by requiring retrofit of older cooling towers with modification to the cooling fans to accompany the drift eliminators. Newly constructed cooling towers have demonstrated ultra-low drift rate of 0.0005%. 72-19

The Revised Draft AQMP does not present an emission reduction number for this proposed measure, and it is clearly unnecessary for the $PM_{2.5}$ attainment demonstration. In fact, the Revised Draft AQMP modeling assessment shows that the region will satisfy the $PM_{2.5}$ NAAQS based solely on the ozone

[11] SCAQMD, Revised Draft AQMP, Appendix IV, page IV-A-91.
[12] SCAQMD 2016 Revised Draft AQMP, Appendix IV, page IV-A-93.
[13] SCAQMD 2016 Revised Draft AQMP, Appendix IV, page IV-A-94.

strategy control measures and that no additional measures are needed.[14] As such, this measure should be removed from the AQMP. 72-19 Con't

11. Proposed measure BCM-05 is not needed to support the attainment demonstration; it should be removed from the AQMP.

As presented in the Revised Draft AQMP, this control measure would require ammonia slip catalysts be installed in combustion sources with Selective Catalytic Reduction (SCR) systems for the control of NO_X. These would be installed post-SCR and could result in less ammonia slip from these sources. 72-20

The Revised Draft AQMP does not present an emission reduction number for this measure, and the measure is clearly not needed for the $PM_{2.5}$ attainment demonstration. In fact, the Revised Draft AQMP modeling assessment shows that the region will satisfy the $PM_{2.5}$ NAAQS based solely on the ozone strategy control measures and that no additional measures are needed.[15] Since this measure is unnecessary for regional attainment, it should be removed from the AQMP.

12. General Comments Regarding CARB's Mobile Source Strategy.

WSPA is deeply concerned about the costs and impacts presented in CARB's Mobile Source Strategy for South Coast (Appendix IV-B of the draft 2016 AQMP), including the low-emission diesel standard. The total estimated cost for CARB control measures affecting South Coast is $28.7 billion; $834 million is attributed to the low-emission standard alone[16]. WSPA has submitted initial comments to CARB on the low-emission diesel standard in June 2016 and will provide additional comments to SCAQMD on the mobile source strategy once the remaining sections of the AQMP Socioeconomic Report are released in the coming weeks. 72-21

WSPA appreciates the opportunity to submit these comments. We may submit additional comments during this process as the District releases additional 2016 AQMP documents including, but not limited to the Final Draft AQMP. We understand all submissions will be given due consideration by the District staff and the Governing Board.

If you have any questions, please contact me at (310) 808-2144 or by email at patty@wspa.org.

Sincerely,

Patty Senecal

[14] SCAQMD, Presentation to the AQMP Working Group, Meeting #14, Agenda Item 2 (27 October 2016).
[15] Ibid.
[16] AQMD, Preliminary Draft Socioeconomic Report for the 2016 AQMP, August 2016. Page 23.

Responses to Comment Letter from Western States Petroleum Association (WSPA)
(Comment Letter #72)

Response to Comment 72-1:

Staff appreciates comments and continued support for the regional air quality planning processes.

Response to Comment 72-2:

Please see Response to Comment 7-5 regarding TBD measures.

Response to Comment 72-3:

Staff appreciates support for the incentive programs. Industrial stationary sources, such as those described in CMB-01, can use incentives for transitioning some of these equipment to near-zero or zero technology. However, the sources located at large RECLAIM facilities are not intended to be included among those eligible to receive incentives under the control measure because these sources currently operate under a cap and trade market structure and the respective RECLAIM facilities have the option of installing emission controls or purchasing emission credits in the open market.

Response to Comment 72-4:

Please see Response to Comment 26-4 regarding the RECLAIM program.

Response to Comment 72-5:

As stated in the Draft Final control measure, a NOx RECLAIM working group will be convened and will result in a detailed analysis regarding technology and economic impacts. All of this will be subject to a public process and will be subsequently reported to the Governing Board with findings and recommendations.

There is no legal requirement for a socioeconomic analysis of AQMP and the proposed control measures included therein. Staff will prepare the potential economic impacts to the regional economy during the rule making process as legally applicable.

Response to Comment 72-6:

Please see Response to Comment 26-6 regarding RECLAIM facilities at BACT or BARCT and structural buyers. In addition, the impacts of allowing an opt-out for these types of facilities will be analyzed as part of the RECLAIM working group analysis beginning in 2017.

Response to Comment 72-7:

Please see Response to Comment 72-5 regarding the RECLAIM working group analysis of impacts. In addition, creditable reductions may become available from other sources not analyzed as part of the December 2015 amendments and also from facilities that are not subject to the shave.

Response to Comment 72-8:

Please see Response to Comment 26-5 regarding the unused RTC margin and Comment 72-5 regarding the RECLAIM working group analysis of impacts.

Response to Comment 72-9:

Please see Response to Comment 26-8 regarding facility and equipment shutdowns. In addition, as part of the RECLAIM assessment, the effect of the recently adopted shutdown provisions will also be evaluated.

Response to Comment 72-10:

Please see Response to Comment 26-10 regarding additional BARCT assessments.

Response to Comment 72-11:

Please see Response to Comment 26-12 regarding the NOx RTC price thresholds. Also, the District Board will make the necessary findings required by the Health and Safety Code when making any changes to the RECLAIM program.

Response to Comment 72-12:

Please see Response to Comment 26-13 regarding RTCs held by investors and the basis for control measure CMB-05. The Health and Safety Code provision cited by the commenter concerns trading from a significant number of different sources, not investors. The method and application of the emission reductions (across the board or sector-specific, including investors) would be determined at the time of rulemaking. The Health and Safety Code provision cited by the commenter concerns trading from a significant number of different sources, not investors.

Response to Comment 72-13:

The costs presented for control measure CMB-05 are based on costs that resulted from an expansive BARCT assessment by District staff that was verified by a third party consultant. While the details of a subsequent BARCT assessment would be determined as part of future rulemaking, it is reasonable that the cost effectiveness would increase for these same sources for a lesser amount of emission reductions than in the previous BARCT assessment. Concerning the commenter's claim that additional NOx reductions would cost the refining industry as much as $120,000 per ton, staff would need to see further details of these costs to fully address and verify them. In the past, such outside analyses have included other ancillary costs for upgrades that are not fully attributable to RECLAIM. The cost effectiveness values assume a 25-year equipment life, consistent with previous rulemakings that have been approved by the Governing Board. If a transition to command and control does occur, subsequent rulemakings would address the various source categories and each would have its own cost effectiveness analysis.

Response to Comment 72-14:

Please see Response to Comment 72-3 regarding RECLAIM facilities and CMB-01.

Response to Comment 72-15:

As noted in the revised control measure, the use of Smart-LDAR technologies as an alternative to conventional LDAR programs is under consideration where appropriate.

Response to Comment 72-16:

Where applicable, Smart-LDAR could replace conventional LDAR programs. However, there may be situations where the application of Smart-LDAR in combination with conventional LDAR programs may bring additional VOC reductions. It is premature to exclude Smart-LDAR as a supplement to conventional LDAR, particularly in cases where the Smart-LDAR does not quantify emissions.

Response to Comment 72-17:

The 2012 AQMP Measure FUG-03 emission inventory of 3.8 tons per day only included emissions from petroleum refineries. The 2016 AQMP Measure FUG-01 includes fugitive VOC emissions from oil and gas production sites as well. With improvements to the emission inventory determination, growth assumptions and the inclusion of oil and gas production, the 2016 AQMP inventory for applicable sites is 7.1 tons per day by 2031 (4.5 tons per day at petroleum refineries and 2.6 tons per day at oil and gas production sites). Emission reductions are estimated at approximately 1 ton per day being reduced at petroleum refineries (22 percent reduction) and the remainder from oil and gas production sites. The emission reduction estimates are preliminary as the rapid development of Smart-LDAR technology will likely result in improved fugitive emission control.

Response to Comment 72-18:

Further studies of Smart-LDAR technologies are on-going and advances in technology will be considered during rule development. The cost-effectiveness section includes examples and costs of some of the emerging technologies. The cost-effectiveness estimate is based on the Optical Gas Imaging technology as a supplement to conventional LDAR as a worst-case scenario. Potential cost savings from alternative technologies or labor reductions if Smart-LDAR can act as a substitute are not included. Solar Occultation Flux (SOF) is a remote sensing methodology that can be applied to locate and quantify fugitive hydrocarbon emissions. It is included, along with other remote sensing methods, as a technology that SCAQMD is evaluating that can identify, quantify, and locate VOC leaks in real time. While it is a more specific methodology than the others, removing it from the AQMP would omit that SCAQMD is studying its applicability for the control measure.

Response to Comment 72-19:

Please see Response to Comment 7-5 with regard to TBD measures.

Response to Comment 72-20:

The emission reductions under control measure BCM-05 are listed as “to be determined” (TBD) because further technical and feasibility evaluations are warranted and the attainment demonstration is not dependent on these measures. However, they are included in the AQMP as part of a comprehensive plan with all feasible measures in case there is a possible need for contingency measures and a shortfall in reductions.

Clarification of the TBD measures has been added in Chapter 4 of the Revised Draft Plan.

The impacts and reduction potential of ammonia emissions from combustion sources with SCR may be evaluated at a future time since ammonia is a precursor compound to PM2.5 whose 24-hour and annual standards have yet been met in the region. Moreover, although modeling demonstrates timely attainment of PM2.5 standards with ozone measures, the PM2.5 plan cannot take advantage of §182(e)(5) ozone measures, so additional PM2.5 measures are needed.

Response to Comment 72-21:

Staff appreciates the comments regarding CARB's Mobile Source Strategy and will forward the comments to CARB. Staff looks forward to future comments regarding CARB's measures.

Staff is currently preparing a response to a similar comment (Comment 72-21) submitted to the Draft Socioeconomic Report. The response will be provided in the Final Socioeconomic Report, in consultation with CARB's economist staff.

Comment Letter from ES Engineering Services (Comment Letter #73)

ES ENGINEERING SERVICES

1036 W. Taft Avenue

Orange, California 92865

714.919.6547

November 4, 2016

Dr. Philip Fine, Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Subject: **Draft Air Quality Management Plan – CMB01**

Dear Dr. Fine:

Thank you for the opportunity to submit comments regarding the recently issued Draft Air Quality Management Plan (AQMP). ES Engineering Services (ES) offers these comments based upon our experience with the engine dealer community and various operators of emergency engines in the South Coast region.

Control Measure CMB-01 – Transition to Zero and Near-Zero Emission Technologies for Stationary Sources includes SCAQMD's strategy for achieving additional emission reductions through the removal or replacement of existing emergency engines with low emission technologies. ES has several concerns about the control measure reflected in the draft plan. Our concerns are related to the estimated emissions inventory for emergency engines and perceived benefits that can be achieved, as well as the functional requirements for emergency engines that may be foregone by implementing the measure. 73-1

Inventory

SCAQMD estimates that the baseline inventory for internal combustion engines is 22.5 tons per day (TPD), with 11.5 TPD attributed to 3,860 engines believed to have been installed the year 2010. We understand that the inventory reflects reported emissions for a subset of the population in SCAQMD's annual emission report (AER) program. The reported emission profile was then applied to the estimated engine population, based upon the number of permit applications submitted to SCAQMD since the year 2010. 73-2

We believe that several aspects of SCAQMD's inventory methodology may result in a significantly inflated emissions inventory and also overstate the benefit of implementing control measures affecting emergency engines. Although it is quite likely that 3,860 applications for internal combustion engines were submitted since the year 2010, it is also likely that a significant number of those applications are to modify existing permits or record changes of operators. Based upon information previously provided by SCAQMD, it is likely that the actual number of engine installations is less than 2,000 units and over 99% of those engines are dedicated to low-use emergency operations. Additionally, reliance on AER data for emergency engines may overstate fuel consumption and emission rates that SCAQMD would apply to the whole inventory. SCAQMD's default AER emission factors do not reflect technology that has been sold during the past 20 years. Additionally, the operating characteristics of many engines the AER program (hospitals, Title V facilities, etc.) may more intensive than the operation of typical emergency engine operations in the basin. 73-2 Con't

We believe that a methodology that considers typical operating patterns, permitted emission levels, and engine characteristics will provide a more accurate emissions inventory that is considerably lower than the inventory reflected in the Draft AQMP. This is true not only for engines installed after 2010, but also for the population of remaining engines that were installed during the preceding years. ES encourages SCAQMD to reconsider its method of estimating emergency engine emissions. We have shared our own engine inventory data with SCAQMD staff and hope to discuss our assumptions and concerns during the next week.

Emergency Engine Management Strategy

Several statements that are included on pages IV-A-51 and IV-A-52 of the Draft AQMP warrant discussion and additional clarification.

"Old" Versus "New Engines"

SCAQMD distinguishes between old and new emergency engines in an effort to suggest that compliance management strategies for older engines may be more severe than strategies for new engines. While this distinction is likely valid, the evolution of technology since the mid-1990s does not align with the year 2010 threshold. BACT standards in place today for emergency engines generally date back to 2006, and BACT standards as far back as 1998 were only marginally less stringent than current standards. Furthermore, many engines installed in the early to mid-1990s meet the Tier 1 emission standards that were implemented in 1998. As such, any discussion regarding the need for engine replacements should be focused on engines that were installed prior to the mid-1990s. Even for those engines, however, a replacement strategy may not be effective they are already restricted to fewer than 20 hours per year for testing and maintenance activities. 73-3

Replacement Technologies 73-4

SCAQMD suggests that several technologies are viable options for existing older engines as well as new installations. These technologies include batteries with solar recharge capabilities, fuel cells and Tier 4 diesel engines designed to meet prime power emission standards. SCAQMD also specifically mentions the application of two of these technologies (battery and fuel cell) at cell tower sites. SCAQMD is correct that telecommunications companies have incorporated both of these technologies in practice or in demonstration mode, but sole reliance on either of these technologies in critical installations may not be achieved. 73-4 Con't

Batteries

Batteries are used as a primary backup source at cell towers, but they cannot provide the 24 – 72 hours of backup that is mandated by the Federal Communications Commission for many telecommunications sites. As such the batteries must themselves be supported by redundant reliable backup power. That redundancy is currently available only through the installation of a secondary stationary emergency engine to either charge or replace the depleted battery. This secondary stationary engine requires the same testing and maintenance operations as required for a primary stationary emergency. Alternatively, operators can dispatch a portable engine in any situation where an outage is likely to exceed the battery charge life. These engines tend to have lower testing and maintenance operations, but result in mobile source emissions due to their transport to the site. While solar recharge capabilities may be appropriate in some commercial operations, their function is limited in many telecommunications sites due to the risk of outages occurring when panels are not capable of recharging and the limited space for panel installation at many telecommunications sites. 73-5

Fuel Cells

SCAQMD also indicates that telecommunications companies have been testing and even relying on fuel cells for power. It is true that many such installations exist, and many have been completed by our client. However, the installations are typically limited to sites with loads below 6 kW and 30% - 50% of the cost of these systems have been offset through government programs. Our client has yet to conclude that the technology is feasible from either a functionality or economic perspective for sites with larger load demands. Additionally, as a prime power source in many telecommunications sites with larger load demands located in an urban area, a fuel cell would likely necessitate the continued reliance upon a backup emergency generator in the same way that grid power must be supported. 73-6

Tier 4 Engines

SCAQMD suggests that Tier 4 engine technology may be suitable for emergency engine operations. ES cautions that the reliance of selective catalytic reduction (SCR) in many Tier 4 applications may not 73-7

be compatible with the way in which emergency engines are operated. As such, the emission reductions that SCAQMD envisions may simply not be achieved. Most operations of emergency engines are related to testing and maintenance activities that occur intermittently for very short periods (15 – 30 minutes) and at low operating loads that result in low exhaust temperatures. During these operations, the SCR system would not be activated. 73-7 Con't

General Emergency Engine Operations

As SCAQMD suggests, various industries have different needs for emergency engine operations. They may also have vastly different testing and maintenance requirements that affect the feasibility and environmental benefit of any of the strategies suggested by SCAQMD. ES strongly encourages SCAQMD to more thoroughly examine the operating practices of all industries that rely upon emergency generators. Because testing and maintenance activities account for the bulk of emergency engine operations, a strong understanding of actual testing and maintenance practices throughout the basin is needed if SCAQMD is to objectively assess the functional viability, cost effectiveness and environmental impact of potential control strategies 73-8

Incentives

SCAQMD suggests that policy and economic incentives can be used to offset the cost of its control strategy for emergency engines. ES is concerned about the practicality of relying upon those incentives. Reduced permitting and compliance management costs cannot effectively offset the significant cost of many of the strategies that are suggested for emergency engines. Furthermore, it is hard to envision that funding for economic incentives will be so abundant that one can forgo a cost effectiveness demonstration to qualify for funding, nor would it be appropriate to do so regardless of the level of funding. Due to the restricted operations and limited emissions from emergency engines, and their insignificant contribution to the daily NOx inventory, it is unimaginable that operators of emergency engines will be able to effectively compete against large emitters for incentive funds. 73-9

Again, I appreciate the opportunity to submit these comments. I am also happy to discuss my concerns at your convenience, especially as you continue to evaluate how internal combustion engines are operated in the District and formulate the final control measure for stationary internal combustion sources.

Sincerely,
ES Engineering Services



November 4, 2016 5
Dr. Philip Fine
South Coast AQMD

Karl A. Lany
Vice President
Air Quality Regulatory Compliance Services

SCAQMD BACT Comments November 2016

Responses to Comment Letter from ES Engineering Services
(Comment Letter #73)

Response to Comment 73-1:

Staff appreciates the commenter's concerns which are addressed below.

Response to Comment 73-2:

Based on the feedback and further discussions with the commenter, staff reevaluated the inventory of ICEs (number of pieces of equipment and baseline emissions). Staff determined that 60 percent of the new (>2010) permits represented new pieces of equipment, with the other 40 percent representing old ICEs with administrative changes to the permit, that change is reflected in the Draft Final. In addition, staff re-assessed the emission factors used to estimate the baseline emissions and further refined the calculation based on a weighted average of emergency versus non-emergency ICEs. The Draft Final reflects the updated calculation and estimates the overall permitted ICEs to be 5.5 tpd.

Response to Comment 73-3:

The proposed incentive program plans to target older higher emitting equipment. Staff strives to target larger sources of NOx emissions that are more cost-effective to replace. In addition, the replacement strategy developed in CMB-01 is an example of possible NOx source categories and the respective zero or near-zero technologies that are currently available and may be applicable to reduce emissions. Please see Response to Comment 71-1 regarding CMB-01, Table 5 – "Incentive Effectiveness by Category" (formerly Table 4). Older higher emitting equipment is targeted for replacement through the incentive program, including engines before the mid-1990s. The incentive program will allow early retirement and advanced replacement or retrofits with zero or near-zero emission technologies that go beyond current emission standards. Regarding future regulations, the specific requirements will be developed with the assistance of the appropriate stakeholders during working group meetings. An implementation schedule based on equipment age can be considered to ensure that the existing units serve their useful equipment life.

Response to Comment 73-4:

Staff acknowledges that battery storage and fuel cells may not be feasible replacements for ICEs in all applications and will further refine the details of any regulatory requirements during the rulemaking process. Battery storage and fuel cells are examples of zero and near-zero technology available that may be viable solutions for NOx reductions. In certain applications, technology assessments may need to be completed to ensure a viable solution for replacements or retrofits of older existing ICEs. Given the complexity of each facility and its ICE usage, different technologies are available to be implemented and not one solution is appropriate for all ICE replacements or retrofits.

Response to Comment 73-5:

Please see Response to Comment 73-4 regarding battery storage.

Response to Comment 73-6:

Please see Response to Comment 73-4 regarding the use of fuel cells.

Response to Comment 73-7:

Please see Response to Comment 73-4 regarding Tier 4 engines and technology assessments. The operation of the ICEs for testing and maintenance may not activate the SCR system, however; during the operation for longer emergency operations, the SCR system will be activated which will reduce emissions in the Basin. Furthermore, CMB-01 refers to replacement with "zero or near-zero technology, **but at a minimum Tier 4 standards**". Staff mentions several technologies as possible replacements for diesel ICE and the need to form working groups as well as possibly conducting a technology assessment.

Response to Comment 73-8:

Please see Response to Comment 73-4 regarding emergency engine operations and technology assessments. During rulemaking, a working group will be formed to allow industry stakeholders to participate in discussions regarding specific operating practices and needs.

Response to Comment 73-9:

Please see Response to Comment 71-1 about higher NOx source categories. The intention of the control measure is to find the most incentive-effective means to reduce NOx emissions or to help technology overcome the initial cost hurdle. Some of the facilities affected may see a more long-term benefit than necessarily an initial cost reduction, including, but not limited to, permitting or maintenance costs.

Staff acknowledges that the individual emissions from an emergency ICE is relatively low as a result of the limited operating hours. However, because of the large number of ICEs in the Basin, those emissions add up to represent a large source of NOx emissions. CMB-01 is looking for ways to reduce those emissions, through either incentives or regulations, and looks forward to working with stakeholders to seek opportunities for emission reductions.

Comment Letter from Rhetta Alexander (Comment Letter #74)

November 5, 2016

Michael Krause
Planning & Rules Manager
South Coast AQMD
mkrause@aqmd.gov

Subject: Comment on the Draft 2016 AQMP

Dear Mr. Krause:

First of all I want to thank you and all the AQMD staff and advisory committee participants for all their hard work in putting together the Draft 2016 AQMP. It is hard to think of a more important document that will have more impact on the health and quality of life for the millions of people who live and work within the South Coast AQMD.

I have attached a copy of the letter dated July 27, 2016 which was addressed to Governing Board Chair Burke and Governing Board Members from ten individuals from environmental and health organizations concerning the Draft 2016 AQMP. The letter outlines seven principles that should frame revisions to the final plan that will help make the plan just and equitable and help bring clean air back to the South Coast region. I concur fully with each of these seven principles and am adding/highlighting a few additional comments about the plan below. Some of these thoughts and observations have been shared with staff at our Environmental Justice Advisory Group meetings.

- Since SCAQMD is currently out of compliance in the 'extreme', voluntary and/or collaborate efforts too-date have not been successful. Among other regulatory requirements, the plan should require companies to include the cost of cleaner technology and equipment in the cost of doing business, as opposed to obtaining public/government money.
- The plan should include a requirement for the use of solar water heaters, solar panels, as well as dual pain windows and insulation in all new commercial and residential developments.
- If not already included, the plan should specifically include annual standards for compliance from all stakeholders as well as consequences for non compliance to ensure that no less than the 43% and 55% emissions reductions are met in 2023 and 2031 respectively.
- The plan should clearly articulate a pathway for third party and/or public enforcement so that when standards are not met people have recourse for engagement and accountability.
- The plan must clearly include in the economic analysis not only the adverse impacts to the environments and public health caused by fossil fuels but the economic and health benefits of renewable energy sources specifically wind, solar, hydrogen and hydro.
- The list of the sources of potential funding opportunities should be realistic and include all stakeholders (corporate, industrial and commercial as well as consumers and taxpayers).

74-1

It is quite clear to most scientists that we really don't have the luxury of these 7 to 15 years to meet these standards. Rather than permitting the expansion of fossil fuel plants, I believe that it is imperative that all stakeholders move beyond our addiction to fossil fuels and, with all due haste, towards clean, renewable and sustainable sources of energy including wind, solar, hydrogen and hydro.

Thank you for this opportunity to share my concerns.

Rhetta Alexander
Member, SCAQMD Environmental Justice Advisory Group
Resident: 6903 Burnet Avenue, Van Nuys, CA 91405

Attachment





















July 27, 2016
South Coast Air Quality Management Governing Board
Attn: Board Chair William Burke
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Dear Governing Board Chair Burke and Governing Board Members,

The 2016 South Coast Air Quality Management District's (South Coast AQMD) Air Quality Management Plan (AQMP) provides an integral opportunity for the South Coast AQMD to bring clean air to a region plagued with dirty air for decades. While air quality has improved in the region, more than 5,000 people die prematurely each year due to unsafe air. In fact, progress in reducing ozone pollution has leveled off in recent years. To make matters worse, the communities bearing the heaviest burden of the region's air quality crisis are disproportionately low-income people of color.

While the organizations represented in this letter are reviewing the draft AQMP and preparing more detailed comments, we write now to provide some immediate feedback on the draft, stipulating seven principles that should frame revisions to the final plan. In sum, these principles reflect a range of policy considerations which will help make the final plan just and equitable and help bring clean air back to the South Coast region and its more than 17 million residents, particularly the region's most vulnerable communities. The seven principles are:

1) The 2016 plan must demonstrate a measurable, enforceable pathway into compliance with the Clean Air Act and eliminate the "black box," which just defers tough decisions.

Southern California constantly receives an "F" for air quality and, despite progress, air quality continues to plague communities, particularly communities of color. This is unacceptable. The 2016

Air Quality Management Plan must provide a detailed set of enforceable measures that achieve the 2022, 2023 and 2032 deadlines for attainment. Reliance on black box measures presents an unfavorable trade-off for those who breathe in the South Coast Air Basin, While it may provide additional time to identify the strategies to attain an ozone standard, the track record of failing to actually identify these measures has resulted in decades of South Coast residents breathing smog-polluted air. We need a plan that reflects the urgency on the health impacts felt by Southern Californians, which means actually articulating the measures to meet clean air standards,

2) The 2016 plan should have early nitrogen oxide ("NOx") reductions, as the South Coast AQMD promised the public at the February 2015 Governing Board meeting.

During the long deliberation over the prior PM2.5 plan for the South Coast and the monitors in the Inland Empire still showing violations, the Governing Board promised it would explore bringing back measures with early NOx reductions. To date, this has not happened, and residents, particularly those residing in close proximity to polluters, need relief from the heavily polluted air, In fact, the Governing Board wasted an opportunity to fix the NOx RECLAIM program, which could have provided an opportunity for early NOx reductions, Instead, the Governing Board opted to approve a Western States Petroleum proposal that cut fewer credits out of the system on a more prolonged timeline, As people continue to suffer and die from air pollution, we call on the South Coast AQMD not to waste any more time or opportunities. Thus, the plan should include enforceable regulatory measures that reduce NOx in the near term to meet the 2023 deadline.

3) The 2016 plan must be just and address long standing inequities in air quality that disproportionately harms low income communities of color.

Recognizing the inequality in air quality that falls along demographic lines of race, ethnicity, and class in Southern California, the AQMP's measures must prioritize regulations, strategies, and investments that frontload reductions in communities ranked in the top 25% most over-burdened communities as designated by CalEPA's CalEnviroScreen tool, There is immense urgency to bring clean air to the communities most harmed by polluting fossil fuels, and the AQMP should demonstrate how it will address this inequity,

4) We need an enforceable clean air plan, not an incentive dollar wish list.

The draft AQMP recently released by the South Coast AQMD staff relies too heavily on unsecured incentive funding, More than 90% of proposed future reductions are dependent on incentive-based programs – many funded with unidentified dollars. While incentives can be helpful in pushing clean air gains, it is important that the financial responsibility of paying for clean air not be borne by those who can least afford it, Taxpayers should not be required to subsidize large polluting industries. Furthermore, the strategy to raise much of the money relies on actions well beyond the control of the South Coast AQMD and will not withstand scrutiny by the California Air Resources Board or the Environmental Protection Agency. It is a not a viable strategy to assume this money will be made available by Congress, for example. Such unfunded "incentives" are, similar to the

"black box," an ill-conceived way to avoid legal mandates to impose enforceable control measures. Rather, we need strict regulatory programs to help spur innovation and drive pollution reductions, clean vehicles and clean energy.

5) The AQMP should prioritize zero-emission technologies that maximize co-pollutant and greenhouse gas reduction benefits.

Through legislative, administrative, and local actions, California is pursuing strategies to solve the serious problems created by burning fossil fuels, from climate change to unhealthy air and more. Wherever feasible, AQMP measures must require and/or spur zero-emission technologies powered by clean energy.

6) The AQMP needs to commit to adopting clean energy measures for stationary and area sources.

There are a panoply of regulations that are excluded from the draft list of measures produced by South Coast AQMD staff. For example, the plan should include a requirement for solar or electric water heaters in all new development. It should require point of sale transition to electric hot water heaters. In addition, there should be a requirement that diesel backup generators are no longer permitted. The advent of clean energy like solar and storage provides important opportunities that do not appear in the current list of measures. The plan should also make sure it is not permitting the construction of new fossil fuel power plants. In particular, the draft measures seek to take credit for many programs designed to reduce energy demand. It is antithetical to take credit for these programs while simultaneously allowing the construction of new power plants.

7) While the authority over mobile sources of pollution is generally with the California Air Resources Board and the Environmental Protection Agency, the South Coast AQMD does have authority to clean up dirty vehicles. It must use this authority in this Plan.

The plan should commit to an overhaul of the Fleet Rules, which are purchasing requirements for fleets of vehicles. The plan should also commit to expanding the fleet rules to a broader set of fleets. In addition to fleet rules, the plan should also make use of its indirect source authority. The federal Clean Air Act and California's Health & Safety Code provide authority for local entities like the South Coast AQMD to advance clean vehicles through indirect source authority and transportation control measures. Under the Clean Air Act, the term "indirect source" means "a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution." 42 U.S.C. § 7410(a)(5)(C).

Particular focus should be placed on indirect sources in the Inland Empire, such as warehouses, where the majority of those displaced and burdened by under regulated logistics sprawl are low-income communities of color. We need this type of regulation to ensure that the massive tidal wave of new warehouses does not worsen air quality in what is already the most polluted area of the South Coast. Incidentally, this type of regulation could also be used to require clean energy at these facilities, including solar panels, microgrids, and other clean technologies.

In sum, these principles provide the framework for an equitable clean air plan that reflects the urgency so many Southern Californians feel when confronted daily with the air pollution killing so many and impairing the quality of life of so many more. We look forward to discussing this with you further in the coming weeks and months.

Sincerely,

Martha Arguello
Physicians for Social Responsibility – Los Angeles

Tom Dolan
Inland Congregations United for Change

Bahram Fazeli
Communities for a Better Environment

Evan Gillespie
Sierra Club

Michele Hassan
Center for Community Action and Environmental Justice

Maya Golden Krasner
Center for Biological Diversity

Fabi Lao
Coalition for Clean Air

Adrian Martinez
Earthjustice

David Pettit
Natural Resources Defense Council

John Yi
American Lung Association

CC:
Wayne Nastri, Acting Executive Officer
Jill Whynot, Chief Operating Officer
Philip Fine, Deputy Executive Officer

Responses to Comment Letter from Rhetta Alexander
(Comment Letter #74)

Response to Comment 74-1:

The 2016 AQMP does propose a number of stringent regulatory measures aimed at reducing NOx and VOC emissions from a variety of stationary and mobile sources. These regulatory measures were established after a thorough analysis of all ozone-emitting sources and available methods and technologies to further reduce emissions. Incentive-based approaches are focused on accelerating high-emitting sources to transition to cleaner technologies sooner than would take place under regulations. Some sources are beyond the authority of the SCAQMD so the incentives are a way to gain emission reductions sooner than natural turnover of vehicles and equipment. Accelerating the deployment of cleaner technologies before future rulemaking is established allows the new technology to be commercially available, feasible in more applications, cost-effective, as well as a publicly acceptable. The specific sources of funding have yet to be finalized but staff is working on developing the Financial Incentive Funding Action Plan that maps out the potential opportunities to ensure the proposals secure funding. Such funding is being sought on a federal, state and local level. To ensure the reductions are creditable in the SIP, the U.S. EPA does require these reductions to be quantifiable, surplus (beyond regulations), permanent and enforceable. With such integrity elements in place, the incentive actions can be effective and provide lasting improvements.

SCAQMD can incentivize the use of cleaner technologies, such as solar powered equipment or energy efficiency actions. The 2016 AQMP includes such measures under ECC-03 and CMB-02. The current draft AQMP includes ECC-03 and CMB-02, which outline incentive programs along with future rulemaking for existing residential and commercial buildings to transition to zero and near-zero technologies that include solar electric water heaters, heat pumps, solar thermal pool heaters, electric clothes washers and home weatherization which includes dual pane windows. The proposed ECC-03 and CMB-02 control measures are additional and surplus to Rule 1121 and would maximize emissions benefits by incentivizing renewable heat and power along with increased efficiency. Additionally, the SCAQMD will be working with other agencies and stakeholders to monitor the development of the new Title 24 California new building energy standards. The new upcoming Title 24 standards will be requiring new residential and commercial development to have net zero energy construction.

Pursuant to the Clean Air Act (CAA), emission milestones reductions are required to be quantified and achieved. These milestones can be accomplished with both existing regulations and proposed emission reduction measures. If not met, contingency measures would need to be implemented to make up the shortfall. These quantitative milestones are provided in Appendix VI-C under the discussion of Reasonable Further Progress.

The CAA allows for “citizen suit” challenges to the Plan including compliance with the emission reduction commitments and timely attainment of the standards. The Clean Air Act contains two sections that authorize citizen participation in CAA enforcement and implementation – sections 304 and 307. Section 307 allows a citizen to bring an action in the courts of appeal for review final actions that EPA has taken under the Act, including the EPA Administrator’s act in approving or promulgating any implementation plan. Section 304 allows a citizen to bring an action in district court again any person who has violated an emission standard or limitation or an order issued by the Administrator or a State with respect to such a standard or limitation, or against the Administrator if she has failed to perform a nondiscretionary

act. Section 304 has been interpreted to include suing a state or local agency that has made an enforceable commitment to obtain specific emission reductions. CBE v Deukmejian, 731 F. Supp. 1448 (N.D. Ca. 1990). All elements of the Plan, future rulemaking and emission reduction tracking are conducted in a transparent manner through a public process.

The Socioeconomic Assessment for the 2016 AQMP has been conducted evaluating costs and public health benefits from the implementation of the control measure strategy. This document is available online (http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/socioeconomic-analysis) and the public was provided multiple review and comment periods. With regard to impacts to the environment, a CEQA analysis was also conducted and a Program Environmental Impact Report was prepared (http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2016/2016-aqmp-draft-program-eir-combined.pdf?sfvrsn=2). The public received a 60-day review and comment period.

Potential funding opportunities are included in the Financial Incentive Funding Action Plan that provides an overview of the funding needed, the sources of funding, and action needed to be taken to secure such funding.

Comment Letter from California Construction & Industrial Materials Association (Comment Letter #75)

CALCIMA
California Construction and Industrial Materials Association

November 7, 2016

Michael Krause
Program Supervisor
South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, CA 91765

Re: Second Set of Comments on DRAFT 2016 Air Quality Management Plan

Dear Mr. Krause,

California Construction & Industrial Materials Association (CalCIMA) appreciates the opportunity to comment on the South Coast Air Quality Management District's (District) draft 2016 Air Quality Management Plan (AQMP). Moving the District's air basin into attainment is a step toward improved air quality and improved economic growth by increasing the ability of businesses to operate in this region.

75-1

CalCIMA is a statewide trade association representing construction and industrial material producers in California. Our members supply the materials that build our state's infrastructure, including public roads, rail, and water projects; help build our homes, schools and hospitals; assist in growing crops and feeding livestock; and play a key role in manufacturing wallboard, roofing shingles, paint, low-energy light bulbs, and battery technology for electric cars and windmills.

Pursuant to Appendix IV-A – SCAQMD's Stationary and Mobile Sources Control Measures, posted below are CalCIMA's comments for the District's review and consideration.

CMB-05	Further NOx Reductions from RECLAIM Assessment

Description: There are approximately 275 facilities in the Regional Clean Air Incentives Market (RECLAIM) program which includes facilities with NOx or SOx emissions greater than or equal to 4 tons per year in 1990 or any subsequent year. This control measure identifies approaches that can be explored to make the program comparably equivalent to command and control regulations. RECLAIM allocates NOx and SOx facility emissions allocations known as RECLAIM Trading Credits (RTCs) or facility emission caps which decline over time, as well as monitoring, reporting, and recordkeeping requirements for sources located at RECLAIM facilities. RECLAIM was designed

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CALCIMA
California Construction and Industrial Materials Association

to provide BARCT equivalent emission reductions in the aggregate for the facilities in the program. To meet the declining annual facility caps, RECLAIM facilities have the option of installing pollution control equipment, changing operations, or purchasing RTCs from other facilities in the RECLAIM market.

75-1 Con't

New AQMP directive:
The District is seriously considering a long-term transition to a traditional command-and-control regulatory structure since the District is determining that the program's original advantages appear to be diminishing and generating increased scrutiny. The District has developed a list of suggested approaches that may serve as interim steps in a long-term elimination of the program.

Comment: Until additional information is received from the District pursuant to the more specific dynamics of what the transition to a command and control environment would be, CalCIMA cannot support the sunset of the RECLAIM program.

It should be noted that intermittent changes in regulation significantly increases avoidable material financial costs that may not result in any additional emissions reduction in the air basin when an opportunity for operators to strategically plan compliance is not provided. Coping with regulatory uncertainty challenges the financial viability of our operations, and when regulatory changes are made swiftly it creates potentially futile internal obstacles that curtail our ability to respond effectively to the new regulatory agenda. It is a struggle to take a more planned approach to regulatory implementation in the face of this regulatory uncertainty. In many cases we feel we must adopt a 'wait and see' stance on key issues – which can result in a form of strategic paralysis that may inhibit the aptitude to pursue any emission reductions methods that are above and beyond requirements that improve the air in the District.

CalCIMA respectfully asks the District to consider our comments. Please contact me with any questions or concerns at (951) 941-7981 or at sseivright@calcima.org.

Sincerely,

Suzanne Seivright
Director of Local Governmental Affairs

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Responses to Comment Letter from California Construction & Industrial Materials Association (Comment Letter #75)

Response to Comment 75-1:

As stated in the draft final control measure CMB-05, a NOx RECLAIM re-assessment working group will be convened in the spring of 2017 to examine various aspects of the RECLAIM program and consider options for an orderly transition into command and control. Participants of the working group will include RECLAIM facilities and the timing of a transition to command and control will be a key focus of the assessment.

Comment Letter from Gatzke Dillon & Ballance LLP (Comment Letter#76)

G | D | B Gatzke Dillon & Ballance LLP
LAWYERS

November 7, 2016 *By Electronic Mail*

Michael Krause
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765-4182
mkrause@aqmd.gov

Re: *Comments on Revised Draft 2016 Air Quality Management Plan*

Dear Mr. Krause:

This letter is submitted on behalf of John Wayne Airport, Orange County (Airport or JWA) and contains the Airport's written comments on the Revised Draft 2016 Air Quality Management Plan (Revised Draft AQMP) issued by the South Coast Air Quality Management District (SCAQMD or District) in October 2016. These comments are in addition to, and do not replace, the comments the Airport submitted on the Draft 2016 AQMP on August 19, 2016. We appreciate the opportunity to provide additional comments on the Revised Draft AQMP and to continue to work constructively and cooperatively with the SCAQMD in evaluating and developing realistic airport emission reduction strategies for the 2016 AQMP. 76-1

We hope that our past comments, our comments in this letter, and our continued cooperation in the process will allow us to make meaningful contributions toward resolving and addressing the complex airport regulatory issues associated with air quality in the Basin.

COMMENTS

A. INDIRECT SOURCE RULES

First, although we appreciate the clarity that has been added to the "facility-based" mobile source measures in terms of process, schedule, and the possible formal rule development or alternative implementation processes, we continue to have serious concerns about SCAQMD's proposal to control mobile sources through "facility-based" indirect source rules, including MOB-04 (Emission Reductions at Commercial Airports). Although the Revised Draft AQMP indicates that any development of rules will be "within its existing legal authority," the Airport also remains concerned about the SCAQMD continuing to make commitments to the state and federal governments that it will control emissions through indirect source rules because SCAQMD currently lacks legal authority to adopt indirect source rules at airports. To the extent SCAQMD seeks "additional authority" to implement indirect source regulations we continue to believe that these types of indirect source rules are preempted by state and federal law and regulation. 76-2

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B. EMISSIONS INVENTORY

As indicated in our previous comment letter, JWA has provided information to SCAQMD staff relating to its baseline emissions inventory as well as its projections for future aircraft activity (both general aviation and commercial aircraft) at the Airport. It continues to be unclear as to whether the data provided in the Revised Draft AQMP and in Appendix III (Emission Inventory) includes JWA specific emissions inventories. Rather, it continues to appear that all of the emissions inventory data for airport forecasts continues is based upon categories of sources with a reference to the 2016-2040 RTP/SCS data from SCAG. (*See, e.g.*, Revised Draft 2016 AQMP, Chapter 3). As we have indicated to SCAQMD staff in the past, SCAG did not use the data provided by JWA to forecast fleet mix and Landings and Take-offs (LTO) for 2040. JWA has provided the SCAQMD (via correspondence with Zorik Pirveysian of Intergra Environmental Consulting, Inc.) with JWA specific data. We therefore continue to request that the Final Draft 2016 AQMP use the specific data provided by JWA to forecast fleet mix and LTO's at the Airport rather the data from SCAG which is not airport specific and that the Final Draft Plan provide sufficient information so that the reader can adequately determine whether airport specific data has been relied upon for the base year and future baseline years. 76-3

C. POTENTIAL INCONSISTENCIES BETWEEN EXPECTED EMISSION REDUCTIONS FROM SIP STRATEGY AND PROJECTED ANNUAL AVERAGE EMISSIONS

One of the State SIP strategy measures identified in the Revised Draft AQMP continues to be the further deployment of cleaner technologies for aircraft. The expected emission reduction (tpd) for this measure is provided on page 4-35 in Table 4-5. According to this Table, the expected emission reductions for this measure are 17 tpd of NOx in 2023. However, in Appendix III, Attachment A, the 2023 annual average emissions for aircraft is 17.31 tpd of NOx. Although we understand that the District is focusing on emission reduction strategies that result in no additional emissions, it is neither reasonable nor technologically feasible to expect a reduction of future NOx emissions from aircraft to zero by 2023. Revisions should be made to these expectations to set realistic emission reduction goals for aircraft. 76-4

We are particularly concerned about this issue because, to the extent that the District attempts to impose some type of indirect source rule and/or facility cap on airports in the future which take into account aircraft emission reductions, these unrealistic goals for aircraft emission reductions may result in unreasonable baseline and future emission reduction requirements for airports. Please see our previous comment letter relating to the legality of such measures.

D. NAIC EMISSION GROWTH FACTOR BY COUNTY IN THE SCAB

Table III-2-8 in Appendix III of the Revised Draft 2016 AQMP provides information regarding the NAIC emission growth factors by County in the South Coast Air Basin (SCAB). This Table indicates that the air transportation growth factor for Riverside County is the highest in the SCAB, followed by San Bernardino and Orange County. The Table provides the lowest air transportation growth factor for Los Angeles County. Please explain the reason why the growth factor numbers are higher for Riverside, San Bernardino and Orange County than for Los Angeles County and the basis for these growth factor numbers. 76-5

CONCLUSION

In closing, thank you again for this opportunity to comment on the Revised Draft 2016 AQMP. We look forward to continuing to engage in an open, thorough and responsive public process and assisting the District with its efforts to improve air quality in the South Coast Air Basin. If you have any questions regarding the comments set forth in this letter, please do not hesitate to contact us at your convenience.

Very truly yours,

Lori D. Ballance
of
Gatzke Dillon & Ballance LLP

LDB/rlf

cc: David Salardino, California Air Resources Board
Rhonda Runyon, California Air Resources Board
Jessica Witt, Deputy Chief Operating Officer
Barry Rondinella, Airport Director
Melinda McCoy, Airport Environmental Engineer

Responses to Comment Letter from Gatzke Dillon & Balance LLP
(Comment Letter #76)

Response to Comment 76-1:

Staff appreciates the additional comments on the Revised Draft Plan and continued cooperation with the SCAQMD in evaluating and developing realistic airport emission reduction strategies for the 2016 AQMP.

Response to Comment 76-2:

Staff appreciates the additional comments regarding the process in implementing the proposed District Measure MOB-04. The primary intent of the proposed measure is to explore opportunities for emission reductions to help meet the emission reductions associated with CARB's proposed "Further Deployment of Cleaner Technologies" for federal and international sources. As proposed in the Revised Draft AQMP, staff desires to work collaboratively with the region's commercial airport authorities to identify actions that are occurring at the various airports. In addition, through the public process, staff will explore if there are other approaches such as regulatory actions that could potentially result in additional emission reductions at airports. Such actions could occur at the local, state, or federal level. Please see responses to comment letter 43 for the District's position on the legal issues raised.

Response to Comment 76-3:

The airport emissions for future years are now replaced with the data provided by Mr. Zorik Pirveysian on Aug 10, 2016. According to the report by Mr. Pirveysian, emissions from John Wayne Airport (JWA) were estimated with EDMS model for the years of 2016, 2021, and 2026. This estimation was conducted based on JWA's detailed operations forecast for these years which covered air carrier, air taxi, and GA operations. The military aircraft emissions for JWA were quantified based on the operations data obtained from FAA's TAF database using U.S. EPA's emission factors. Since 2026 represents the year in which JWA reaches its constrained levels, JWA's 2026 emissions were also used through 2040.

Response to Comment 76-4:

It was a typographical error which was corrected in the revision. The reduction that the State SIP strategy has assigned to the aircraft category is 11 TPD in 2023.

Response to Comment 76-5:

The growth factors in the table were provided by SCAG. The specific category in question was driven by air transportation employment projections from the 2016 RTP/SCS. The growth in Los Angeles County is projected to be slower than the other three counties due to the fact that LA County is close to, if not already at, its full capacity.

Comment Letter from Southern California Air Quality Alliance (Comment Letter #77)



November 7, 2016

VIA E-MAIL

Philip Fine, Ph.D.
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comments on the Revised Draft 2016 Air Quality Management Plan

Dear Dr. Fine:

On behalf of the Southern California Air Quality Alliance ("Alliance") I am submitting these comments on the Revised Draft 2016 Air Quality Management Plan ("RDAQMP").

The Alliance supports the approach being taken in the RDAQMP of combining ambitious encouragement of the development of zero and near-zero emission technologies along with the incentives required to assure timely implementation of those technologies. We look forward to working with SCAQMD in finalizing and implementing the 2016 Air Quality Management Plan. 77-1

We believe that the SCAQMD has made tremendous progress in cleaning the air in the Southern California region by implementing programs that reflect fuel-neutral, feasible, and cost-effective technologies. These features should continue to guide the development and implementation of the 2016 Air Quality Management Plan. We have been given some degree of reassurance regarding the SCAQMD's intention to continue fuel-neutral, feasible and cost-effective air pollution control measures by statements at AQMP Advisory Group meetings and some supporting references in the RDAQMP. However, we believe that these policies need to be clearly stated and reinforced in the 2016 Air Quality Management Plan so that there can be no misunderstanding or blurring of the policies underlying the air pollution reduction program. 77-2

The Alliance also agrees that incentive programs will be essential to the success of the 2016 Air Quality Management Plan given the constraints inherent in requiring broad scale adoption of new, cleaner technologies by end users not directly regulated by SCAQMD. The implementation of zero and near zero emission technologies in the transportation sector cannot be accomplished by command-and-control alone, as it would be impossible to mandate that millions of individual actors replace their current transportation methods with zero or near-zero emission vehicles within the time frames called for in the RDAQMP. Only by incentivizing the implementation of this technology can the development AND adoption of these technologies be spurred to meet the necessary implementation schedules. We look forward to working with SCAQMD in developing an appropriate approach to getting the funding needed for the proposed incentive programs. 77-3

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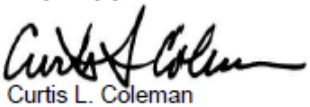
Finally, with regard to specific control measures, we expect to work with SCAQMD staff in the development of **CMB-05 Further NOx Reductions from RECLAIM Assessment**. SCAQMD staff has given indications that RECLAIM may have outlived its usefulness. We believe that RECLAIM provides significant benefits to RECLAIM facility operators and SCAQMD and would like to see those benefits retained. We are committed to work with SCAQMD staff on issues related to RECLAIM, as we did during the recent RECLAIM amendments dealing with shutdowns. We listened to your recent statements at the AQMP Advisory Group meeting regarding some problems that the RECLAIM program creates in terms of claiming emission reductions under federal law. We believe that there could be ways to address those problems while still maintaining significant benefits of the RECLAIM program and we look forward to further discussions as the 2016 Air Quality Management Plan begins implementation. 77-4

We look forward to reviewing the Draft Final AQMP when it is released in December.

Very truly yours



Curtis L. Coleman

Executive Director
Southern California Air Quality Alliance

Responses to Comment Letter from Southern California Air Quality Alliance (Comment Letter #77)

Response to Comment 77-1:

Staff appreciates the support for the development of zero and near-zero emission technologies along with incentives.

Response to Comment 77-2:

See Response to Comment 17-3 regarding fuel-neutral technology. With regard to clearly stating and reinforcing such a policy, the commenter is directed to Page 4-9 in Chapter 4 of the 2016 AQMP that discusses the performance-based policy that includes technology and fuel neutrality.

Response to Comment 77-3:

Staff appreciates the comments regarding the need for incentivizing early emission reductions and the need to identify additional funding. Staff looks forward to working with SCAQA on developing approaches for securing additional incentives funds.

Response to Comment 77-4:

The RECLAIM re-assessment working group will look at various options for the future of RECLAIM, including those provided by the commenter and command and control overlays with an orderly transition into a command and control regulatory structure. Staff looks forward to working with the stakeholders regarding the RECLAIM program.

Comment Letter from Southern California Alliance of Publicly Owned Treatment Works (Comment Letter #78)

SCAP
SOUTHERN CALIFORNIA ALLIANCE OF PUBLICLY OWNED TREATMENT WORKS

November 7, 2016

Mr. Wayne Nastri, Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Dear Mr. Nastri:

Re: Comments on the Draft 2016 Air Quality Management Plan

The Southern California Alliance of Publicly Owned Treatment Works (SCAP) appreciates this opportunity to provide comments on the Draft 2016 Air Quality Management Plan (Draft AQMP). SCAP represents 83 public agencies that provide essential water supply and wastewater treatment to nearly 19 million people in Los Angeles, Orange, San Diego, Santa Barbara, Riverside, San Bernardino and Ventura counties. SCAP's wastewater members provide environmentally sound, cost-effective management of more than two billion gallons of wastewater each day and, in the process, convert wastes into resources such as recycled water and biogas. 78-1

This transmittal is our third comment letter regarding the Draft AQMP, but our comments have yet to be addressed. Our members are troubled that some of the proposed control measures appear to negatively impact the beneficial use of biogas produced from municipal wastewater treatment plants and landfills. We would greatly appreciate modifications to the Draft AQMP to address our comments. 78-2

Overall, SCAP is concerned that SCAQMD has not been provided the regulatory authority to control ozone forming emissions in the South Coast Air Basin from mobile and federal sources, which constitute 88 percent of the emissions inventory. Accordingly, we object to the proposed "fair share" concept where SCAQMD, CARB and EPA would each reduce emission sources under their control by 50 percent. We believe that stationary sources are already well-controlled and achieving our "fair share" is not feasible without a significant infusion of incentive funding. The Draft AQMP fails to provide an adequate or reliable incentive funding mechanism for mobile and federal sources, which will likely be funded prior to stationary source control projects. Considering this reality, SCAP believes that CARB and EPA should be solely responsible for securing incentive funding for mobile and federal sources. The Clean Air Act was not crafted to penalize the South Coast Air Basin for CARB and EPA's failure to adequately control mobile and federal sources. We respectfully request that the AQMP be revised to ensure that stationary sources are not penalized in the event that CARB and EPA are unable to adequately control mobile and federal sources. 78-3

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The following outlines our specific comments on the draft stationary source control measures contained in Appendix IV-A:

Cost effectiveness and feasibility:
SCAP applauds SCAQMD for placing a priority on feasible and cost-effective control measures. However, in order to ensure that control measures remain feasible and cost-effective, SCAQMD should perform an assessment of actual costs and the technological feasibility of certain rules. Rather than only estimating costs looking forward, we respectfully request that a third party consultant be retained to perform such an assessment looking backward. Specifically, the recent biogas limits contained in Rule 1110.2 should be assessed to validate staff's cost-effectiveness and technology feasibility assumptions. We believe that such an analysis would help refine cost-effectiveness assumptions and shed light on the reliability and cost-effectiveness of applicable biogas projects moving forward. Other recent rules, such as 1147, should also be assessed to help refine cost-effectiveness assumptions to be used during future rulemaking. We believe that such a third party assessment would provide greater transparency and validate whether emission reductions are truly cost-effective and feasible moving forward. 78-4

CMB-01 Transition to Zero and Near-Zero Emission Technologies for Stationary Sources:
Incentives:
Our members are increasingly concerned that incentive funding will not be available, while new requirements are imposed with little regard for cost-effectiveness or reliability. CMB-01 explains that *"Staff anticipates many facilities and stakeholders will come forth and participate once a working group is established and it will be determined the most cost effective means for distribution of funds to achieve emission reductions."* Although we appreciate a working group will be established, the Draft AQMP lacks specificity regarding how funds will be distributed and whether cost-effective projects will be required to reduce emissions without incentive funding. We respectfully request that these details be outlined and vetted prior to the adoption of the AQMP. 78-5

Biogas:
This draft control measure seeks to replace traditional combustion sources with zero and near-zero emission technologies including electrification or fuel cells. This control measure continues to emphasize that biogas from wastewater treatment plants and landfills can be processed and cleaned for the use in fuel cells or transportation fuels. While our SCAP membership embraces these goals, we would again like to respectfully remind staff that biogas cleanup is not usually cost-effective and fuel cells have consistently failed prematurely due to stack failures, which then requires flaring in order to continue providing necessary management of the biogas. At minimum, to provide a realistic characterization, we again request that these challenges be discussed in the Draft AQMP.

As we have indicated in the past, we appreciate SCAQMD's support in incentivizing zero and near-zero biogas technologies. However, SCAQMD should clarify that biogas technologies are not truly commercially available, reliable or cost-effective yet. We are troubled that performance claims provided by vendors are not fully validated by SCAQMD prior to rule development and as a result our industry has been negatively impacted. Due to these inherent challenges, we request that a third party consultant be retained to perform such a validation prior to the adoption of future biogas rules and the emission reductions associated with such projects not be included in this AQMP.

Emergency Diesel Engines:

Considering our members provide an essential public service by treating wastewater and conveying drinking water, we are very concerned about the proposed emergency diesel engine requirements. In the event of a major earthquake event or other significant emergency, sanitation and drinking water infrastructure must have a source of uninterrupted reliable power. Fuel cells, battery storage and alternative fuels are not currently able to provide such a reliable source of backup emergency power. As acknowledged by the Draft AQMP, "*.. some essential back-up power applications (hospitals, communications, transportation, etc.) require capabilities for long-term power and fuel storage or delivery under extreme emergency conditions*" The Draft AQMD should be revised to clarify that essential public services must maintain the ability to respond to a long-term power disruption using a reliable and available fuel. 78-6

Similarly, our members have concerns regarding requiring the ability for Tier 4 engines to operate during an extended emergency. SCR systems associated with Tier 4 diesel engines rely upon urea, which can be depleted in an emergency. The Draft AQMP should also establish the regulatory framework needed to ensure that Tier 4 engines can be used reliably in the event of a significant emergency.

CMB-03 Emission Reductions from Non-Refinery Flares:

SCAP is extremely concerned that the Draft AQMP now indicates that our sector will need to clean biogas for vehicle fuel/pipeline injection project or, if not feasible, utilize equipment to produce power and/or heat. This measure continues to indicate that if all other options are infeasible, the installation of newer flares at BACT will be required. Based upon our experience with Rule 1110.2, we believe that SCAQMD staff already deems alternatives to flaring to be feasible and cost-effective. As outlined above, we respectfully request that a third party consultant be retained to validate the cost-effectiveness and feasibility of the technology needed to comply with biogas control measures. 78-7

While we appreciate the acknowledgement that flares are needed for emergency or backup capacity, we are concerned that our previous comments regarding the wastewater sector inventory were not addressed. For example, our previous comments requested that the inventory be amended to reflect that we only contribute 0.01 tons per day of NOx. Considering wastewater flares are an insignificant source of NOx and they are normally used for emergency or backup purposes, SCAP requests that the inventory be revised and the AQMP include an acknowledgment that wastewater flares are an insignificant source of NOx emissions.

MCS-01 Improved Breakdown Procedures and Process Re-Design:

As we have previously commented, SCAP requests that this measure be excluded from the AQMP. This measure will not achieve any emission reductions and EPA's Startup Shutdown Malfunction (SSM) policy is currently being challenged by 36 states. In the event this control measure cannot be removed from the AQMP, we request that a description of the ongoing litigation and potential flexibility afforded by EPA should be included in MCS-01. States subject to EPA's SIP-Call have proposed alternative compliance approaches that should be considered by SCAQMD prior to any amendment or repeal of Rule 430, if the SSM policy is upheld by the D.C. Circuit. 78-8

Mr. Wayne Nastri November 7, 2016

BCM-10 Emission Reductions from Greenwaste Composting:
SCAP again requests that developing technology not be specifically discussed in the AQMP unless the actual performance can be demonstrated and validated in commercial and sector specific applications.

As described in our previous comment letters, we remain confused by the focus on food waste digestion in association with a greenwaste composting control measure. This draft control measure indicates that increased anaerobic digestion capacity *"...at Sanitation Districts could lower emissions of NH3 and VOC for certain waste streams..."* We agree that wastewater treatment plants can reduce emissions associated with food waste, but we are unaware of any technology that would allow wastewater treatment plant digesters to process greenwaste. Please revise this control measure to exclude the discussion of greenwaste digestion at wastewater treatment plants. 78-9

BCM-05 Ammonia Emission Reductions from NOx Controls:
While we appreciate staff's verbal clarification that this proposed control measure is only intended for large-scale projects and will not impact the NOx control systems associated with Rule 1110.2, we again respectfully request that this clarification be memorialized in the AQMP.

Last, but not least, we would like to remind staff that Clean Air Act Section 185 penalties will be triggered by either the depletion of non-SIP approved funding mechanisms outlined in Rule 317 or by non-attainment of the 8-hour ozone standard. As outlined above, our members believe that stationary sources will bear the brunt of this AQMP because CARB and EPA appear to be unwilling or unable to significantly control mobile and federal source emissions. Because Section 185 would penalize major stationary sources due to lack of control over mobile and federal sources, we respectfully request SCAQMD's commitment to lobby for the revision of this provision of the Clean Air Act, if triggered. 78-10

We would like to take this opportunity to thank you again for supporting legislation and policies that will provide financial incentives for the productive use of biogas. Please do not hesitate to contact Mr. David Rothbart of the Los Angeles County Sanitation Districts, SCAP Air Quality Committee Chair, should you have any questions regarding our comments on the Draft AQMP at (562) 908-4288, extension 2412.

Sincerely,

John Pastore, Executive Director

cc: Dr. Philip Fine, SCAQMD

Responses to Comment Letter from South California Alliance of Publicly Owned Treatment Works (SCAP) (Comment Letter #78)

Response to Comment 78-1:

Staff appreciates the comments on the Revised Draft 2016 AQMP.

Response to Comment 78-2:

Staff appreciates continued participation in the AQMP development and will respond to individual comments in addition to revising the Plan, as appropriate in response to some comments.

Response to Comment 78-3:

Please see Responses to Comments 30-5 and 54-2 regarding "fair share" reductions and the SCAQMD responsibility in regulating stationary sources, ensuring attainment of the standards, and fulfilling shortfall of the reductions to obtain those standards.

Response to Comment 78-4:

SCAQMD appreciates the support for placing a priority on feasible and cost-effective control measures. As part of the rulemaking process, a socioeconomic analysis is conducted on those rules that may have an economic impact. A cost-effectiveness analysis was conducted for Rules 1110.2 and 1147. Third party consultants along with the public are welcome to comment during the rulemaking process. In 2015, a preliminary retrospective socioeconomic analysis was conducted at the request of stakeholders and was presented at the June 3, 2015 Scientific, Technical & Modeling Peer Review (STMPR) meeting. SCAQMD Rule 1105.1, the SOx RECLAIM program, and Rule 1110.2 were selected as examples for this analysis. An initial review showed that costs determined by SCAQMD, as well as other agencies, are typically overestimated. There are also uncertainties that may be affecting retrospective costs supplied by stakeholders. Examples of these layered costs are rule compliance costs versus costs for other concurrent facility upgrades or corporate decisions resulting in more expensive controls, as compared to other commercially available and less expensive controls.

Response to Comment 78-5:

Please see Response to Comment 78-4 about cost-effectiveness. In addition, technology assessments may be conducted to ensure technologies will provide sufficient reliability for specific applications. A Financial Incentive Funding Action Plan is currently under development that will provide more detail as to the possible sources of funding available. The plan will provide an analysis of potential funding opportunities and proposed actions to be taken to secure the funding identified in the AQMP. Staff will lobby for incentive funding to ensure the success of incentive measures. The Financial Incentive Funding Action Plan will also include activities to pursue funding, the schedule, and reporting.

Regulatory measures may be implemented in the future after the implementation of the incentive programs and the cost of technologies decline. If staff identifies sources of NOx reductions that are currently cost-effective, regulatory measures will be pursued without incentives.

Please see Response to Comment 54-3 and 54-4 regarding biogas. Staff has noted some of the challenges in CMB-01 such as costs for pipeline infrastructure and biogas cleanup. A working group will be formed to further discuss the challenges for specific sectors on biogas. Biogas operators are encouraged to explore beneficial use of biogas whenever and wherever technologically feasible and cost-effective.

Response to Comment 78-6:

Please see Response to Comment 73-4 and 73-7 regarding technology assessments. Staff included language in CMB-01 to acknowledge some essential back-up power applications may require capabilities for long-term power and fuel storage under extreme emergency conditions. However, new technologies may prove to be as reliable if not more reliable than conventional technology. As reported by the U.S. Department of Energy, fuel cells were instrumental in providing backup power during Hurricane Sandy in 2012. While many of the diesel, propane, and battery cell phone tower backup generators were affected by the storm, the fuel cells performed without issues (http://energy.gov/articles/calling-all-fuel-cells). As zero and near-zero technologies evolve, improve, and become more cost effective, they may become the preferred source of reliable backup power for critical applications.

Response to Comment 78-7:

Please see Response to Comment 54-4. Staff included language acknowledging wastewater treatment plants may have lower waste gas streams and the options for pipeline injection may be limited. Staff has also included the emission inventory for sewage treatment, which is 0.01 tpd of NOx and is expected to remain so for 2023 and 2031. The emissions inventory will be further refined during the rulemaking process as will the cost effectiveness and technical feasibility of emission reductions from wastewater treatment facilities.

Response to Comment 78-8:

Please see Response to Comment 35-10 regarding the inclusion of control measure MCS-01 in the Plan. Staff acknowledges the ongoing national litigation on this matter, and alternative compliance approaches that may be developed elsewhere in the nation will be considered prior to any amendment of Rule 430.

Response to Comment 78-9:

Emerging technologies have been discussed in the 2016 AQMP as a potential method to control and/or reduce emissions from stationary sources. Actual performance of a technology and commercial and sector-specific applications will be demonstrated and validated during the rule development process. Please also see Response to Comment 4-1.

As the commenter stated in the comment letter, anaerobic digesters can reduce emissions associated with foodwaste, but cannot currently practically process greenwaste. Staff is well aware of the impracticability of digester for processing greenwaste. This is already stated in BCM-10 as "Capacity at existing digestion facilities at Sanitation Districts could lower emissions of NH3 and VOC for *certain waste streams*." It is also indicated clearly in the Emission Reductions section of the measure, stating "Increased use of anaerobic digestion could help lower VOC and ammonia emissions from treatment of organic waste, such as foodwaste, biosolids, or manure *where feasible*."

Response to Comment 78-10:

Large scale projects typically have more emissions that can make improvements or add-on controls more cost-effectively. However, small scale projects do not always lead to small emissions and there may be opportunities whereby small scale projects can cost effectively apply controls to further reduce emissions. Thus, the applicability of this control measure cannot exclude specific facilities or small scale projects at this point in time. Until such time where a rulemaking is conducted, a more extensive analysis of potential applicable sources will be identified and analyzed as to which types of sources could feasibly and cost effectively reduce emissions associated with a particular facility or size of project.

Please see Response to Comments 30-5 and 54-2 regarding "fair share" control of mobile and federal source emissions. Staff is aware of the equivalency exercise under Rule 317 and continues to work with CARB and U.S. EPA to ensure reductions from sources not within our authority.

Comment Letter from the City of Irvine (Comment Letter #79)



Community Development

November 7, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 92765

Subject: City of Irvine Comments: Draft 2016 Air Quality Management Plan

Dear Dr. Fine:

The City of Irvine appreciates the opportunity to provide comments on the revised Draft 2016 Air Quality Management Plan (AQMP) and the associated Socio Economic Analysis. The Draft 2016 AQMP is a monumental effort and the City of Irvine recognizes that the AQMP is critical to the region's ability to achieve federal air quality standards and healthful air. 79-1

The following general comments and recommendations are offered by the City of Irvine on the revised Draft 2016 AQMP released in October. The City of Irvine reserves the right to make further comments at a future date when the full impact of the Draft 2016 AQMP can be assessed.

1 Action Plan for Incentive Strategies: The Draft 2016 AQMP contains a number of measures that are designed to be implemented through incentives to accelerate the penetration of zero- and near-zero emission technologies, and to further reduce emissions from other mobile and stationary control measures. The Draft 2016 AQMP also notes that as much as $14 billion in funding needs to be identified in order to implement "incentive strategies." 79-2

It is the City of Irvine's understanding that the $14 billion in funding need represents the total funding need of all the agencies responsible for implementing the proposed measures. The City of Irvine recommends that the incentive funding need for each proposed measure be detailed in the 2016 AQMP Plan and Appendices, particularly Table IV-A-1 and Table IV-A-2 in Appendix IV-A, and that funding need by agency also be summarized and presented. If a funding action plan is not provided, we are unable to verify the financial assumptions made in the Draft 2016 AQMP.

The Draft 2016 AQMP should include an action plan that identifies the funding source for all incentive strategies. It should also include a discussion on the impact to local jurisdictions. For example, in regards to measures EEC-02 (Co Benefits from Existing Residential and Commercial Building Energy Efficiency Measures (NOx and VOC) and EEC-03 (Additional Enhancements in Reducing Existing Residential Building Energy Use (NOx and VOC), additional details are needed as to the recipient of the incentive and who will be required to complete the bookkeeping and monitoring. 79-2 Con't

2. Preservation of Local Funding: As noted in the previous comment, the South Coast Air Quality Management District (SCAQMD) has not identified funding sources for the incentive strategies. The City of Irvine is opposed to the redirection of any funds currently allocated to County Transportation Commissions and/or local jurisdictions in order to fund the incentive strategies, as this could result in an inability for the region to deliver the projects and programs used to demonstrate air quality conformity in the Regional Transportation Plan. 79-3

3. EGM-01: Emission Reduction from New Development and Redevelopment Projects: The purpose of this measure is to mitigate and reduce emissions from new development and redevelopment projects. The description of EGM-01 is very broad and could be interpreted to add a new fee to new development or redevelopment in the SCAQMD service area, similar to Rule 9510 adopted by the San Joaquin Valley Air Pollution Control District. While implementation of this measure has been delayed until 2019-2031, the City of Irvine continues to have concern with EGM-01. 79-4

   As a local government, Irvine is concerned with this prospective measure absent more information on how a development fee might impact local land use under its authority. To the extent that such a control measure would redistribute or constrain growth in the region, it could undermine the greenhouse gas (GHG) and pollutant emission reductions that are imbedded in the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) that the City of Irvine worked diligently to complete with the Southern California Association of Governments (SCAG). A fee might not be the best way to ensure that new structures accommodate clean technologies, and the SCAQMD should also explore other cost effective methods.

   Because of its ambiguity and potential overlap with the RTP/SCS, this proposed measure should not be included among the AQMP's enforceable, committed measures. The City of Irvine recommends that the Orange County Council of Governments, the subregional agency for Orange County, be included in any SC AQMD Working Group that is established or reconvened on this measure, to allow for meaningful dialogue on this proposed measure. Further, if this measure

proceeds to rule development in the future, the SCAQMD needs to assure that any proposed rule will integrate with, and enhance the California Environmental Quality Act (CEQA) process and not impede the project approval process in light of CEQA timelines. 79-4 Con't

4. CMB-02: Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications: The purpose of this control measure is to seek annual average NOx appliances such as boilers, water heaters, and space heating furnaces, and other natural gas or LPG equipment with zero emitting or lower NOx technologies. There is concern that this measure will further impact the affordability of housing by placing a burden on existing homeowners. 79-5

5. Duplicative Measure, BCM-03, Further Emission Reduction from Paved Road Dust Sources: The AQMP proposes that measures BCM-03 would include a review of existing National Pollutant Discharge Elimination System (NPDES) mandates and that this is conducted in conjunction with any potential rulemaking efforts. NPDES permits are administered by the local regional water quality control boards. The SCAQMD does not have jurisdiction over the issuance and maintenance of mandates required of NPDES permits. The City of Irvine requests that the SCAQMD remove reference to NPDES mandate review as to not confuse jurisdictional and implementation issues related to these permits. 79-6

6. Technology Neutrality: The City of Irvine recommends that the AQMP remain technology neutral. With evolving new technologies, the plan should not single out any particular technology or group of technologies. Remaining technology neutral will allow the plan to be more flexible and will provide property owners with a wide variety of options that are cost effective. 79-7

7. Unquantified Measures: There are a number of measures that have not been quantified in the Draft 2016 AQMP. These are often referred to as "to-be-determined" or "TBD" measures. Based upon the review of the initial Draft 2016 AQMP, it is the City of Irvine's understanding that the Plan is capable of achieving federal air quality standards in absence of any of the TBD measures. The City of Irvine raises a concern regarding whether it is appropriate to include these types of measures in the 2016 AQMP, since they do not advance attainment. Inclusion of TBD measures implies some level of commitment toward delivering those measures even though it has not been determined the amount, if any, emission reductions they can provide, or at what cost. An economic analysis cannot be performed without the quantified benefits. The City of Irvine is concerned that the inclusion of TBD measures in the 2016 AQMP could allow the District staff to substitute a TBD measure in place of other quantified and committed measures after the 2016 AQMP is approved. The City of Irvine understands that in the future, the TBD measures may prove to be more cost 79-8

effective than other committed measures. This kind of transfer should not be implemented as an administrative change, and should only be pursued through an appropriate public process. Until the time that either a backstop measure is needed or a TBD measure is identified to be more cost effective than one of the currently qualified measures, the City of Irvine requests that the TBD measures either be removed from the plan, or clearly separated from the quantified measures, and called out as uncommitted measures that require further development and evaluation. 79-8 Con't

Furthermore, should the TBD measures remain in the 2016 AQMP, the City of Irvine requests that the 2016 AQMP include a discussion that clearly states the purpose for including these strategies and the process required to incorporate them. Preferably, this process would include action by the SCAQMD Governing Board and opportunities for public review and comment.

Thank you again for the opportunity to provide input on the revised Draft 2016 AQMP. We appreciate your consideration of the comments provided in this letter and we look forward to your responses. We look forward to the release of the final draft of the 2016 AQMP tentatively scheduled for December 2016, with a scheduled review and adoption in February 2017. The City of Irvine continues to reserve the right to make further comments at the time of the release of the final draft documents.

If you have any questions, please contact Marikia Poynter, Senior Planner, at 949 724 6456 or mpoynter@cityofirvine.org.

Sincerely,

Susan Emery
Director of Community Development

cc: Tim Gehrich, Deputy Director of Community Development
Barry Curtis, Manager of Planning Services
Bill Jacobs, Principal Planner
Marika Poynter, Senior Planner

Responses to Comment Letter from City of Irvine
(Comment Letter #79)

Response to Comment 79-1:

Staff appreciates the comments on the 2016 Revised Draft AQMP and recognition of the critical role of the AQMP to achieve federal air quality standards and healthful air.

Response to Comment 79-2:

Please see Responses to Comments 7-4 and 11-1 regarding the Financial Incentive Funding Action Plan. A draft Financial Incentive Funding Action Plan was released in December 2016 for public comment. The draft Action Plan focuses on mobile sources and identified potential funding needed to implement the State SIP Strategy "Further Deployment of Cleaner Technologies" measures. The draft Plan provides an evaluation of the funding needed for each of the measures. Since the SCAQMD staff believes that new funding will need to come a variety of sources, SCAQMD staff has not identified any specific funding sources by agency. The draft Action Plan discusses a large of potential opportunities that will be further discussed through a public process. In addition, a rest of guiding principles is proposed as the SCAQMD moves forward in securing new funding. One of the proposed principle is the recognition that any new funding not be through diversion of existing funds from programs not related to air quality.

Response to Comment 79-3:

It is not the intent to redirect existing funding from other programs to help incentivize the turnover of older vehicles and equipment, but rather, to seek new sources of revenues. This will be clearly stated in the funding action plan.

Response to Comment 79-4:

See Responses to Comments 38-3 and 86-2 regarding a development fee in EGM-01. SCAQMD staff will solicit comments on the feasibility of implementing an approach similar to Sn Joaquin's rule and whether other approaches will be more appropriate in lieu of a mitigation fee. Staff will ensure that any approach proposed will complement SCAG's RTP/SCS and not impede with the CEQA process. Lastly, staff welcomes the participation of the City and the Orange County Council of Governments on the working group.

Response to Comment 79-5:

Staff believes there can be a balance in achieving the aims of clean air while not imposing an undue cost burden on existing homeowners. Staff's goal, in collaboration with interested stakeholders, is to identify the most cost-effective approaches that are best in achieving maximum emission reductions for less money spent.

Response to Comment 79-6:

Please see Response to Comment 6-2 regarding the NPDES mandate review.

Response to Comment 79-7:

Please see Responses to Comments 17-3 and 77-2 regarding technology neutrality.

Response to Comment 79-8:

Please see Response to Comment 7-5 regarding TBD measures.

Comment Letter from Eastern Municipal Water District (Comment Letter #80)

November 7, 2016

Mr. Wayne Nastri, Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Subject: Comments on the 2016 Revised Draft Air Quality Management Plan dated October 2016

Dear Mr. Nastri:

The Eastern Municipal Water District (EMWD) appreciates this opportunity to provide comments on the 2016 Revised Draft Air Quality Management Plan (2016 AQMP). EMWD operates many stationary sources to provide potable water, water reclamation and recycled water services to over 700,000 people in a service area of 555 square miles. As the provider of both water and wastewater reclamation services, EMWD is responsible for effectively managing its resources economically while being a good neighbor to the community. 80-1

As a stationary source in the South Coast Air Basin, EMWD recognizes the challenges faced by the South Coast Air Quality Management District (AQMD) and would like to thank the AQMD staff for their efforts and consideration of stakeholder comments and feedback during the development of the current 2016 AQMP. We respectfully request that the AQMD consider the following comments: 80-2

In CMB-01, *Zero and Near Zero Emission Technologies (IV-A-46)*, the measure discusses the use of fuel cells to replace emergency diesel engines. This section acknowledges that some essential backup power applications require capabilities for long-term power under extreme emergency conditions; however providers of essential public services such as water and wastewater services are not specifically mentioned.

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Essential public services should be included in this exemption consideration for existing and future installations. EMWD requests the following language change to *Appendix A, CMB-01, IV-A-46,* "Some essential back-up power applications (hospitals, communications, transportation, *essential public services* etc. require capabilities for long-term power and fuel storage or delivery under extreme emergency conditions (earthquakes, long term power outages, natural gas pipeline disruption, etc.)" 80-2 Con't

The reason that essential public services, such as EMWD, should be exempt is because the recommendations for replacement of diesel emergency generators with fuel cells or other alternatives will not work for our facilities. EMWD must be able to provide water and wastewater services during an extreme emergency to protect and sustain public health. Specifically, fuel cells have the following limitations: 80-3

- Fuel cells in this application are new and unproven technology in that the reliability in an emergency application has not been evaluated.
- Importantly, the proposed replacement technology relies on natural gas supply which will probably be compromised in an extreme emergency and not be readily available at remote facilities. This will greatly jeopardize the ability to provide essential public services during emergencies, especially under extreme conditions. Emergency generators are self-contained and work effectively under these conditions.
- Financially, fuel cells are expensive in comparison to diesel emergency generators which to EMWD customers does not economically justify the cost effectiveness of fuel cells.

In CMB-01, *Equipment Replacement (IV-A-51),* a discussion related to engine replacement including different types of Internal Combustion Engines (ICEs) is provided. The discussion in the measure related to the replacement of diesel emergency engines and the potential limit changes for prime engines is concerning to EMWD. In addition to the concerns expressed previously related to replacement of diesel ICEs with fuel cells, EMWD has the following comments regarding the engine replacement of existing diesel emergency generators at our facilities: 80-4

- The availability and reliability of Tier 4 diesel backup generator engines, especially for higher horsepower ranges, is a concern. Certified Tier 4 engines greater than 750 horsepower are limited.
- Tier 4 engines have various after-treatment controls required to attain those standards. Consequently the reliability of these engines to operate in an actual emergency is questionable and has not been demonstrated. This is a concern for essential public services during an emergency.

The estimated Total NOx Emissions of 1.5 tons per day (tpd) for Tier I and Tier II diesel engines specified in *CMB-01 Table 2 (IV-A-51)* appears high assuming these estimates are based on actual operation, which is low since they are installed for emergency back-up use.

Overall, EMWD is concerned with mandated replacements of emergency diesel generators which are rarely operated and in-place for the purpose of emergency back-up. This will not result in 80-5

substantial emission reductions; therefore it is difficult to justify these actions as cost effective or economically responsible to our customers.

CMB-01 also discusses amending existing regulations to reduce the emission limits for prime natural gas engine installations by employing new catalyst technology with a multi-step approach. The discussion in *CMB-01 (IV-A-52)* implies that this technology can achieve less than 2 ppm NOx in a retrofit non-CHP installation. EMWD is concerned with the statement that this multi stage catalyst technology supports a new emission limit of 2 ppm equivalent to the CARB Distributed Generation (DG) standards, and recommends that prior to drafting the rule that the technology be proven to meet the new emission limit. EMWD would like to stress the importance of recognizing the difference between package systems and retrofit installations for new technologies. This distinction should be recognized in the measure. In addition, typically new low emission control systems add a level of complexity that are often problematic and impact the operational reliability of our facilities. Operational reliability of essential public services is critical and should not be dismissed. 80-5 Con't

In CMB-01, *Facility Modernization by Sector (IV-A-53)*, the measure emphasizes the use of biogas from wastewater treatment plants and landfills in fuel cells or transportation fuels. While EMWD embraces these goals, we would like to respectfully remind staff that biogas cleanup is not usually cost-effective. We appreciate AQMDs optimism that technology will evolve to provide solutions for low levels of biogas however this has not occurred yet. The volume of biogas production is a limiting factor related to the feasibility of pipeline injection and is an issue for EMWD operated regional wastewater facilities. Our wastewater facilities are somewhat unique in that that are geographically spread out and their individual biogas production volume is lower than typically required for pipeline injection and transportation fuel projects. EMWD appreciates the added discussion in the draft AQMP related to funding incentives and supports incentive funding for these project types. In addition, EMWD will actively participate in working groups formed for these efforts. 80-6

While we appreciate AQMD's support in incentivizing zero and near-zero biogas technologies, we do not believe these biogas technologies are truly commercially available, reliable or cost-effective yet. Due to these inherent challenges, we request that biogas not be specifically included in this control measure.

With regard to CMB-03, *Emission Reductions from Non-Refinery Flares*, we are concerned with the implications of this measure due to the fact that flares in the wastewater sector are needed for emergency and backup use. Wastewater facilities attempt to use all of this renewable fuel for energy rather than just flaring. We are concerned that the wastewater sector inventory is not accurately portrayed in the AQMP since it is lumped together with the oil and gas facility categories. Based on detailed summer planning inventory from AQMD staff, the wastewater sector contributes only *0.01 tons per day (tpd)* of NOx. Based on the 2.4 tpd inventory in CMB-03, the contribution by the wastewater sector is less than 0.5% of the total NOx emissions from non-refinery flares. Considering wastewater flares are an insignificant source of NOx, they are 80-7

typically used for emergency or backup purposes, and the cost of replacement, EMWD requests that the wastewater sector be excluded from this control measure and the inventory be revised to reflect the insignificance of the wastewater sector.

The *Background (IV-A-78)* discussion in CMB-03, references the Rule 1110.2 amendments relative to the implementation of biogas emission limits. EMWD would like to reiterate that biogas is viewed by our industry as a valuable "renewable" resource, not a waste product. EMWD has made numerous efforts to research effective biogas technologies to preserve beneficial use of biogas. EMWD continues to pursue this goal as we continue our biogas research efforts and expand our focus to Combined Heat and Power (CHP) studies and projects. It is critical that AQMD understand that the beneficial use of this renewable resource is highly important to EMWD as an agency and as commitment to our customers. The *Background (IV-A-78)* should acknowledge understanding of this shared goal and EMWD's support for collaborative efforts. 80-7 Con't

In addition, CMB-03 does not acknowledge that despite beneficial use of biogas, wastewater treatment facilities will still require a reliable emergency/back-up option which means our flares are essential. Consequently, based on the *Proposed Method Control Item 2*, future AQMD rules would drive mandated replacements with newer flares. Based on this path, EMWD would be required to replace our emergency back-up flares that meet the current BACT standard of 0.06 lb per MMBtu. EMWD has difficulty understanding the justification to expend millions of dollars to replace reliable backup flare installation(s) at our wastewater treatment plants when this replacement will not result in meaningful emission reductions. 80-8

CMB-03 (IV-A-80) also discusses changes in flare technology and the utilization of clean enclosed burner (CEB) technologies. EMWD would like to highlight reliability concerns with utilizing more complex emission control system that are often more problematic and consequently affect the operational reliability of essential public services. 80-9

In CMB-03, *Regulatory* History (IV-A-78), the measure highlights that no source specific rules for NOx emissions from non-refinery flares are currently in place. This statement dismisses the fact that although there is not a source specific rule for the wastewater sector, operators have still been subject to new source review for installations which requires BACT. As noted in the *Proposed Method of Control* section, these 2006 BACT requirements are more stringent than the flare rule implemented in the San Joaquin Valley Air Pollution Control District. 80-10

Thank you in advance for considering our comments above and for the opportunity to comment. If you have any questions, please feel free to contact Al Javier at (951) 928-3777 extension 6327 or at javiera@emwd.org

Sincerely,

Jayne E. Joy, P.E
Director of Environmental and Regulatory Compliance

JJ/ARJ/AT:tlg

c: Dr. Philip Fine, SCAQMD
Michael Krause, SCAQMD
Records Management, EMWD

Responses to Comment Letter from Eastern Municipal Water District (EMWD)
(Comment Letter #80)

Response to Comment 80-1:

Staff appreciates comments on the 2016 Revised Draft AQMP.

Response to Comment 80-2:

Please see Response to Comment 78-6 regarding the use of fuel cells.

Response to Comment 80-3:

Please see Response to Comment 78-6. Natural gas supplies may be provided with natural gas trailers. These trailers may be linked to provide more fuel supply. Incentives will encourage and/or play a significant role in making it cost-effective for facilities or equipment owners to transition to zero or near-zero technologies or replace equipment earlier. In the future, regulatory measures may be considered after the implementation of the incentive programs when the cost of technologies decline and reliability has been demonstrated.

Response to Comment 80-4:

Please see Responses to Comments 71-1 regarding CMB-01, Table 5 - "Incentive Effectiveness by Category" (formerly Table 4), 73-2, 73-3, 73-4, and 73-7.

Response to Comment 80-5:

Please see Response to Comment 73-9 and 78-6. Regulatory measures may be considered in the future after the implementation of the incentive program programs when the cost of technologies decline and reliability has been demonstrated. If specific regulatory measures are developed in the future, staff will address differences in technologies (package systems and retrofit installations) and the needs of different industries by forming working groups and conducting technology assessments as necessary.

Response to Comment 80-6:

Please see Response to Comment 54-4. Options such as those mentioned in Response to Comment 71-2 to transport the fuel using CNG trailers could be an option for the geographically spread out facilities that do not produce a large volume of biogas. Staff encourages EMWD's participation in future working groups. Due to the Basin's extreme non-attainment all sources must be considered during the development of the AQMP.

Response to Comment 80-7:

Please see Response to Comment 78-7. Staff appreciates EMWD's efforts to research effective biogas technologies to promote beneficial use of biogas and its expanded focus on combined heat and power (CHP) studies and projects.

Response to Comment 80-8:

Please see Response to Comment 54-4. During the rule making process, staff will evaluate the individual facilities and sectors when evaluating the technical feasibility and cost effectiveness of the emission reductions.

Response to Comment 80-9:

Please see Response to Comment 54-4. Staff will conduct a comprehensive technical review of the available flares and control technologies during the rule making process.

Response to Comment 80-10:

San Joaquin Valley Air Pollution Control District (SJVAPCD) has a source specific rule for flares that includes wastewater treatment plants, oil and gas production, combustion, incinerators, petroleum refining, and VOC control. Although the SJVAPCD flare rule emission limit requirements for NOx are less stringent than SCAQMD's 2006 BACT requirements, their rule primarily targets VOC emission reductions. Thus, a regulatory measure is necessary to address existing flares at non-refinery sources and meet limits at least as stringent as other air Districts.

Comment Letter from California Small Business Alliance (Comment Letter #81)

CALIFORNIA Small Business Alliance
Dedicated to Environmental Progress and Economic Growth

November 7 ,2016

Mr. Wayne Nastri, Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 917 65

COMMENTS ON THE DRAFT 2016 AIR QUALITY MANAGEMENT PLAN

Dear Mr. Nastri:

The California Small Business Alliance (Alliance) is a non-partisan coalition of California trade associations committed to providing small businesses with a single constructive voice before air quality management districts and other environmental regulatory agencies. As active participants in the South Coast Air Quality Management District's (SCAQMD) 2016 Air Quality Management Plan (AQMP) Advisory Group, the 2016 AQMP Advisory Council, and on many AQMP White Paper Working Groups, Alliance members have been consistent contributors in the development of the plan. An Alliance representative has also been designated by the Home Rule Advisory Group to participate in the review of the health impacts of particulate matter air pollution in the South Coast Air Basin (SCAB) during the development of the AQMP. Finally, Alliance members have been actively engaged in the ongoing dialog with other stakeholders representing a broad cross section of business interests, neighborhood community organizations, and local, state and federal agencies. Now, with the October 7, 2016 Draft AQMP out for review and comment by the public, we want to take this opportunity to offer our comments as part of the process. 81-1

Our comments are concentrated in five (5) major areas, as follows:

SCAQMD Proposed 8-Hour Ozone Strategy

Our reading of this section of the October 2016 Revised DRAFT 2016 AQMP revealed that the SCAQMD has finally come to realize that to ultimately achieve the ozone ambient air quality standards, significant additional emission reductions will be necessary from sources under the primary jurisdiction of the California Air Resources Board (CARB) and U. S. Environmental Protection Agency (EPA). Alliance members have come to the same realization; that without an ample fair share commitment of emission reductions from CARB and EPA, the emission reduction burden would unfairly be shifted, once again, to stationary sources which are already struggling under the most stringent controls in the nation. 81-2

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A further reading of this section appears to confirm the SCAQMD's commitment to continue the policy of technology-and fuel-neutrality (i.e. "*All technologies and fuels should be able to compete on an equal footing to meet environmental needs*"). Alliance members support the SCAQMD's long-standing practice of setting performance standards that allow all fuels and technologies to compete. However, a further reading of the Revised Plan seems to suggest that SCAQMD proposes to put a priority on maximizing emission reductions utilizing zero emission technologies wherever cost effective and feasible, and near-zero emission technologies in all other applications. It is not clear to us what those "other applications" would include. While the Alliance applauds the SCAQMD for placing a priority on feasible and cost-effective control measures, we caution you to avoid policies that would effectively pick "winners and losers" in the selection of technologies that are mandated for use by small businesses. Accordingly, Alliance members hasten to remind the SCAQMD that the owners and operators of these businesses are the most knowledgeable as to which technologies are best suited for their operations. Over time, they have built successful businesses, provided thousands of good paying jobs for people in California, and proven that they can compete in the global market. 81-3

Finally, while the Alliance whole heartedly endorses SCAQMD's commitment to establish a working group that will discuss, evaluate and compare the cost effectiveness and feasibility of various technologies including those that have zero and near zero emissions, we believe that this working group must include these very knowledgeable small business owners and operators.

Control Measures

As mentioned earlier in this comment letter, Alliance members are encouraged that, today, the SCAQMD, CARB, and EPA openly acknowledge that the rules, regulations and programs for stationary sources are not sufficient to achieve the NOx emissions reductions necessary to attain the ozone standards by the approaching deadlines. On balance, we would be remiss if we did not mention that because of the decades where businesses have had to choose to operate under the most onerous command and control regulations in the nation, relocate elsewhere or cease operations, that they are largely responsible for the limited options that are left available to these agencies. 81-4

For the reasons stated, Alliance members object to the proposed "fair share" concept where SCAQMD, CARB and EPA would each reduce emission sources under their control by 50 percent. Stationary sources – particularly small businesses – have borne more than their "fair share" of the emission reduction obligation in the SCAB, and are well-controlled. Any more meaningful reductions from these smaller sources would not be practicable or cost-effective without an adequate or reliable source of incentive funding.

Alliance members believe that CARB and EPA should be solely responsible for incentive funding and emission controls needed for mobile and federal sources. The Clean Air Act was not crafted to penalize the SCAB for CARB and EPA's failure to adequately control mobile and federal sources. We urge the SCAQMD to revise the 2016 AQMP to ensure that stationary sources are not penalized if CARB and EPA are unable to adequately control the sources under their respective direct jurisdiction.

CTS-01 Further Emission Reductions from Coatings, Solvents, Adhesives, and Lubricants (VOC)

Alliance members are general supportive of SCAQMD's proposal pursue a strategic VOC control program; one that will promote strategies and technologies for NOX reductions that also lead to reductions in VOCs, GHGs, and air toxics. However, our support comes with some reservations in that it seeks VOC emission reductions from certain coatings, adhesives, solvent and sealant categories by further limiting the allowable VOC content in formulations or by incentivizing the use of super-compliant technologies. The proposed control measure states that it is intended as an additional tightening of regulatory exemptions that may be used as "loopholes" to avoid the required use of compliant products. The broad diversity of small business industries in the Alliance, and our intense involvement in decades of rulemaking activities has made us aware of many situations that required certain regulatory exemptions. Many of the Regulation 11 series rules contain exemptions for valid reasons. For those reasons, Alliance members strongly urge SCAQMD to work with us and other stakeholders to ensure that appropriate substitute products are not only available, but reliable and acceptable to our local industries. 81-5

FLX-02 Stationary Source VOC Incentives

Alliance members are acutely aware of the challenges posed by the 2016 AQMP, and we applaud SCAQMD for considering using "carrots" rather than "sticks" to encourage businesses to make choices that will reduce emissions, while minimizing cost impacts. Using an incentives-based approach may encourage businesses, particularly small businesses, to opt for cleaner technologies at an accelerated rate. 81-6

Our reading of Control Measure FLX-02 revealed that SCAQMD plans to explore mechanisms that would enable facilities to qualify for incentive funding if they utilize equipment or material, or accept permit conditions which result in cost-effective emission reductions that are beyond existing requirements. Industries represented by Alliance, as well as other industry organizations have long disputed the District's procedures and objectivity for conducting cost-effectiveness analyses. To that end, we urge SCAQMD to work closely with work closely with us as they set about the task of exploring and developing mechanisms that would enable facilities to qualify for incentive funding.

Incentive Funding

Alliance members generally support the concept by the District, CARB and EPA, to achieve the NOx emission reductions needed to attain the federal ozone air quality standards by 2023 and 2031, using an incentive-based approach. We believe positive outcomes are best achieved through incentives rather than punitive regulatory actions. Yet, given the fact that air quality has unarguably improved over the years, and that the reductions in harmful emissions have come almost entirely from stationary sources (businesses), the question of how these three (3) regulatory agencies will decide on a "fair share" approach to achieve the emission reductions required by the 2016 AQMP and related State Implementation Plan (SIP), is a matter of some concern to us. 81-7

Considering that stationary sources under the jurisdiction of the District constitute approximately 12 percent of the NOx emissions in the region, and considering that mobile sources under the jurisdiction of other regulatory agencies (CARB and EPA) account for 88 percent of the region's total NOx emissions, it seems only "fair" that they should willingly accept sole responsibility for reducing the greater share of the emissions required by the AQMP. Our use of the term "responsibility" is meant to mean financial responsibility as well as jurisdictional responsibility.

Our reading of the AQMP suggests that the SCAQMD has yet to identify and secure adequate or reliable sources of incentive funding for mobile, federal and stationary sources. Moreover, the proposed strategy appears to put a priority on funding state and federal sources before stationary source control projects. At the time of our reading, SCAQMD estimated that $1 - $2 billion dollars is needed for incentive programs for stationary sources, and that $11 - $14 billion dollars is needed for incentive programs for mobile sources. 81-7 Con't

Considering the uncertainty of the political climate, both now and after the upcoming election, Alliance members are justifiably skeptical about SCAQMD's ability to secure reliable sources of funding in the amount required to guarantee CARB and EPA that the AQMP will achieve the emission reductions promised. As such, we urge SCAQMD to revise the AQMP to ensure that stationary sources are not penalized if CARB and EPA decline or are unable to fund incentive programs to adequately control the sources under their respective direct jurisdiction.

Air Quality and Health Effects

In our letter of August 26, 2016, wherein we submitted comments on Appendix 1 - Health Effects, we attempted to point out many inconsistencies in the assignment of causality of certain air pollutants to cancer incidents involving both mortality and morbidity, particularly in the SCAB. In reviewing the October revision of the 2016 AQMP, we were unable to notice any editorial changes in Appendix 1, in response to our letter.

Our letter expressed our deep and continuing concern that SCAQMD is basing the entire AQMP on: 1) achieving "Attainment" in accordance with ambient air quality standards as set forth by both the federal government and the State of California, and 2) improving the health effects of the population in the SCAB due to exposure to criteria air pollutants, as described in Chapter 2 and Appendix 1. 81-8

In the above referenced letter, we highlighted many instances where the weight of evidence descriptors for causal determination of adverse health effects seems to call in to question the reliability of the findings and conclusions reported in the research papers cited therein. For example, most of the determinations made by EPA regarding the causality of air pollution health effects, is that there is "likely to be a causal relationship," "suggestive of a causal relationship," "not likely to be a causal relationship" or "inadequate to infer a causal relationship." On its face, the degree to which important uncertainties seem to permeate the research cited in Appendix I, strongly suggests that more definitive research is urgently needed, especially in an AQMP that is

projected to cost regulated sources $38.2 billion dollars, reduce health impacts, and improve air quality.

Alliance members were equally disappointed upon reading the Literature Review of Air Pollution-Related Health Endpoints and Concentration-Response Functions for Particulate Matter, prepared by IEc, dated September 29, 2016. Our impression of the report was that the contractor "cherry picked" the scientific studies that supported the theories advanced in Appendix 1. Noticeably absent were references to studies by credible and respected scientists with different conclusions, particularly when discussing the adverse health effects of exposure to PM2.5.

In the same report IEc expresses their reliance on "weight of evidence" to justify their recommendations. This is arguably the criterion which is most debated, since it has subsequently been demonstrated that many chronic diseases can have multiple causes and some substances can cause multiple health effects, but not necessarily death. To reinforce our point, we have attached a chart entitled" "Estimated Percentage of Cancer Cases Caused by Identifiable and/or Potentially Preventable Factors." The chart is an excerpt from a report by the American Association for Cancer Research. The chart shows that of the many known causes of the majority of cancers diagnosed today, 33 percent are attributable to Tobacco (smoking), and only 2 percent is attributable to Pollution. 81-8 Con't.

Our comment letter of August 26th urged SCAQMD to cast a wider net and invite credible and respected scientists with differing perspectives to present their work to stakeholders, and even the Governing Board before the AQMP is finalized.

We appreciate SCAQMD allowing us to participate in the development of the 2016 AQMP, as well as the opportunity to comment on this latest revision.

Sincerely,

Bill La Marr
Executive Director

Attachment (1) – As Indicated

Estimated Percentage of Cancer Cases Caused by Identifiable and/or Potentially Preventable Factors

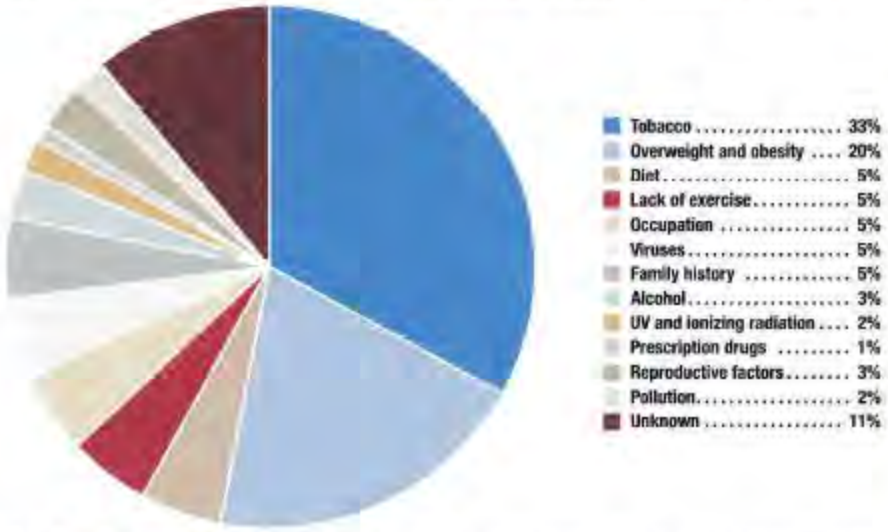

Figure 9: An Ounce of Prevention is Worth a Pound of Cure. The majority of cancers diagnosed today are a result of preventable causes, including smoking, obesity, poor dietary habits and physical inactivity. Many of these cancers could be prevented by modifying personal behaviors, although continued research is necessary to identify better ways to help address these behaviors. Data obtained from (147).

DID YOU KNOW?

that **17** cancers in addition to lung cancer are caused by smoking?

2010, concludes that there is no safe level of exposure to tobacco smoke. Yet, 70 million Americans regularly use tobacco products, and every day in 2010, 8,500 Americans aged 12 years and older smoked their first cigarette (15). It is not only the lives of those who use tobacco products that are at risk; scientific evidence has shown that exposure to secondhand tobacco smoke also causes cancer. Although this has led to some important public health policies restricting smoking in public places, countless lives could be saved in the future through continued research to develop and implement effective tobacco prevention, cessation and control strategies such as those described in "Tobacco and Cancer: An AACR Policy Statement" [(16); see **Fig. 11**, pg. 30 and **Sidebar on Tobacco Tax**, pg. 31].

Obesity and Physical Inactivity Weigh in on Cancer

Data from numerous epidemiological studies have revealed that obesity is clearly linked to an increased risk for the adenocarcinoma subtype of esophageal cancer and to pancreatic, colorectal, kidney, endometrial and postmenopausal breast cancers (8). Mounting evidence indicates that obesity is also associated with an increased risk for other cancers, including gallbladder and liver cancers (8). In line with the dramatic increase in incidence of obesity, incidence of several of these cancers, including pancreatic, kidney and liver cancers, have increased during the past 10 years (17). Independent of weight, a lack of regular physical activity is associated with an increased risk for colon, endometrial and postmenopausal breast cancers and also may be associated with lung, pancreatic and premenopausal breast cancers (8).

Obesity and physical inactivity are not just associated with increased cancer risk. They also negatively impact tumor recurrence, metastasis and patient survival for several types of cancers (17). Among patients with breast cancer (18), colorectal



Responses to Comment Letter from California Small Business Association (CSBA)
(Comment Letter #81)

Response to Comment 81-1:

Staff appreciates active participation and contribution in the development of the 2016 AQMP and comments on the 2016 Revised Draft AQMP.

Response to Comment 81-2:

Please see Responses to Comments 30-5 and 54-2 regarding "fair share" reductions and the SCAQMD responsibility in regulating stationary sources, ensuring attainment of the standards, and fulfilling shortfall of the reductions to obtain those standards.

Response to Comment 81-3:

Please see Response to Comment 17-7 regarding zero and near-zero technology. CMB-01 proposes to incentivize the replacement of equipment with the largest NOx emission reduction potential and the lowest costs. Where technologically feasible and cost effective, priority will be given to zero emission technologies. "Other applications" includes technology that is near-zero or lower-emitting NOx replacement equipment or retrofits. References to specific lower-emitting technologies is not to favor one technology over another as the SCAQMD strives to maintain a fuel neutral policy. In CMB-01, staff references lower-emitting technology only to demonstrate the type of technology currently available for reducing NOx emissions in identified source categories, along with a possible pathway to achieve the NOx emission reductions.

Staff appreciates the endorsement. A working group will include all interested stakeholders including, but not limited to, the public, business owners and operators, equipment manufacturers, and environmental groups.

Response to Comment 81-4:

Staff appreciates the comments regarding small businesses. Please see Responses to Comments 30-5 and 54-2 regarding "fair share" reductions and Response to Comment 26-3 regarding the Financial Incentive Funding Action Plan that outlines the existing funding sources as well as the potential funding opportunities. Staff has been in discussions with CARB staff on incentives funding for mobile sources and the need for additional reductions from mobile sources in the longer-term. CARB has committed to meeting the emission reductions associated with the State SIP Strategy. The SCAQMD has also petitioned U.S. EPA to establish new national engine emission standards to help the region meet federal air quality standards. While SCAQMD staff appreciates the comment regarding the state and federal responsibilities to incentive funding, local leadership in securing new funding (whether at the state or federal level) will be needed. As such, the SCAQMD is planning to build a coalition to work together on securing new funding.

Response to Comment 81-5:

Staff appreciates support for the strategic VOC control program. SCAQMD plans to take advantage of advances in technology to reduce VOC limits in categories where there are cost-effective alternatives and

will work with interested stakeholder through the rule amendment process to ensure necessary and valid exemptions remain in SCAQMD rules.

Response to Comment 81-6:

Staff appreciates the endorsement of the approach in FLX-02. A working group will be formed to explore lower polluting and less toxic alternative processes and materials for existing residential, commercial, industrial, and transportation sources. Staff looks forward to input from all interested stakeholders including, but not limited to, the public, business owners and operators, equipment manufacturers, and environmental groups.

Response to Comment 81-7:

Please see Response to Comment 81-4 regarding "fair share" reductions and incentive funding.

SCAQMD staff understands the concerns regarding mobile sources verses stationary sources. As discussed in Response to Comment 81-4, the State is committed to meeting the emission reductions associated with the State SIP Strategy measures. CARB staff indicated that they plan to discuss in greater detail proposed actions should there be a shortfall in incentive funding. These actions will impact primarily mobile sources that are under their authority and would not impact stationary sources. As implementation of the 2016 AQMP moves forward, SCAQMD staff will be seeking additional incentives for both stationary and mobile sources.

Response to Comment 81-8:

The comments from Mr. La Marr's letter from August 26, 2016 are addressed in the Response to Comments for the Appendix I document, Response to Comment Letter 20. Changes were made to the draft Appendix I in response the Comment Letter 20 for Appendix I.

To clarify, the purpose of the AQMP Appendix I is to summarize the state of the health effects and causal determinations as assessed by U.S. EPA and other scientific agencies, to discuss some recent studies published since the latest U.S. EPA reviews, to give some quantitative estimates of the health impacts of particulate matter air pollution in the South Coast Air Basin, and to present a "local perspective" by highlighting studies conducted in the South Coast Air Basin, Southern California, or California. These causal determinations are presented at face value in the Appendix I document. While some pollutants and health endpoints have only limited data to support a causal determination, others, such as PM2.5 and mortality, have a large amount of evidence that led U.S. EPA to conclude a causal relationship. Text was added to the AQMP Appendix I to clarify these points.

While Chapter 2, Appendix I, and the Socioeconomic Report describe the health effects associated with air pollution, these components of the AQMP are meant to provide the reader additional information regarding the state of the science and the projected economic impacts and benefits of the Plan. However, a justification of the Plan is simply the legal requirement to achieve attainment by the specified timelines.

Regarding the IEc report referenced in this letter, the report defined in detail the methodology used to conduct the literature search and to review the studies for relevance and quality. Additionally, the report describes IEc's review results, and the basis for their recommendations. The weight of evidence definitions presented in the report are defined by U.S. EPA, and are the same criteria used in the U.S. EPA scientific reviews of the health, ecological and welfare effects of the criteria pollutants. It is certainly

recognized that many chronic diseases can have multiple causes, and these weight of evidence criteria account for such nuances. For example, for a Causal Relationship for Health Effects, the definition states that "chance, bias, and confounding could be ruled out with reasonable confidence," meaning that other potential causes of that disease would be accounted for when evaluating the relationship between the pollutant and the health endpoint. Additionally, it is recognized that a substance can cause multiple health effects, as evidenced by the extensive range of health effects included in the U.S. EPA Integrated Science Assessments.

Tobacco smoking and second-hand smoke are certainly important risk factors for cancers and several other health outcomes. However, the importance and potential impact of addressing air pollution cancer risk (and other health risks) cannot be understated. Air pollution is one of only a few known modifiable risk factors for cancer that is an involuntary exposure. In other words, people generally cannot choose not to breathe the air in the communities where they live, work, or play. The SCAQMD staff recognize that there are many risk factors that are important to address in the realm of public health, but the scope of the SCAQMD's AQMP, upon which Appendix I is developed, is to address the regional ambient air quality standards for ozone and PM2.5 and propose actions to reduce emissions from those source categories contributing to the regional pollution problem.

Comment Letter from Minuteman Transport, Inc. (Comment Letter #82)

From: Peter Amundson <Peter@minutemantransport.com>
Sent: Monday, November 7, 2016 5:35 PM
To: AQMP Inquiries
Subject: South Coast Air Quality Management District Public Hearing

AQMD
Everyone appreciates clearer air and the combined efforts of the public and industry has paid off resulting with the Southland environment being the best in my lifetime. As a middle aged native of Los Angeles County that is saying allot. The trucking industry has spent nearly a billion dollars a year to reduce emissions by over 80% in the South Coast Basin. The 2010 engine exhaust is cleaner than some of the air it operates in.
I ask for reason as we move forward as transportation in the region is already very heavily regulated and I oppose further expansion of regulation by the South Coast. To reduce the few remaining emissions, I support a collaborative incentive based approach as a win-win for the environment and business. 82-1
With a little patience we can reach the clear air goals without costing much needed California jobs and hurting our economy. Incentives are not the answer as businesses typically spend 2-3x the amount of a public incentive to purchase equipment and there is never enough funding to go around. Truckers spent at least $9 for every $1 of public incentives to comply with the current rules.
The draft 2016 AQMP seems unnecessarily aggressive and with reason and patience we can get there without horrific impacts on the Southland economy and the families that depend upon it.
Sincerely
Peter Amundson
President
Minuteman Transport, Inc

Responses to Comment Letter from Minutemen Transport Inc.
(Comment Letter #82)

Response to Comment 82-1:

Thank you for your comments. The SCAQMD staff is working with CARB to identify additional funding in the near-term that will help turnover older trucks to trucks which meet and exceed the latest emission standards. Regardless, according to the 2016 AQMP emissions inventory, heavy-duty diesel trucks were still the highest source for NOx emissions in 2012. Although emissions in future years are expected to be lowered, NOx emissions from heavy-duty diesel trucks in the South Coast are still significant and should be reduced to protect public health.

While the acquisition of a truck that meets the current 2010 emission standard is important, the region must go beyond current standards in order to attain federal air quality standards by their applicable deadlines. As such, CARB will be developing new engine standards. Meanwhile, the SCAQMD has petitioned U.S. EPA to establish new national engine emission standards. As incentives funding opportunities are identified, we would encourage the acquisition of trucks with the cleanest available engines.

Comment Letter from Southern California Gas Company (Comment Letter #83)

SoCalGas
A Sempra Energy utility

George Minter
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November 7, 2016

Philip Fine, Ph.D.
Deputy Executive Officer
Planning, Rule Development & Area Sources
21865 Copley Drive
Diamond Bar, CA 91765

Submitted via OnBase Comment Form

RE: Comments on the Revised Draft 2016 Air Quality Management Plan

Dear Dr. Fine:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide comments on the South Coast Air Quality Management District's (SCAQMD) Revised Draft 2016 Air Quality Management Plan (AQMP or Plan). SoCalGas strongly supports SCAQMD's efforts to attain the federal Clean Air Act standards. The attainment of the ozone and fine particulate matter (PM2.5) standards are vitally important to our company and those communities where SoCalGas operates and provides services. 83-1

We continue to offer our support, expertise, and partnership to SCAQMD to create a technically sound, fuel and technology neutral AQMP that will protect public health by demonstrating timely attainment of the federal Clean Air Act standards, while also sustaining the vitality of Southern California's economy. Following the adoption of the Plan, we look forward to continuing to collaborate with SCAQMD on the implementation of the control measures, efforts to secure incentive funding, and the development of incentive programs. To that end, SoCalGas respectfully submits the following comments on the Revised Draft 2016 AQMP.

I. Continued Application of SCAQMD's Long-Standing Fuel and Technology Neutral Practice is Critical to Maximizing Emission Reductions Needed for Ozone Attainment 83-2

Fuel and Technology Neutrality is an Essential Component of SCAQMD's Mission and Energy Policy. SCAQMD has historically adhered to a fuel and technology neutral policy in order to carry out its mission to undertake "all necessary steps to protect public health from air

pollution, with sensitivity to the impacts of its actions on the community and businesses."[1] In 2011, the Governing Board approved the "AQMD Air Quality-Related Energy Policy," (Energy Policy) directing SCAQMD staff to proceed with future clean air program development in a fuel neutral manner by "promot[ing] zero and near-zero emission technologies in both stationary and mobile applications to the extent feasible."[2] The Energy Policy also recognized that the promotion of "zero and near-zero emission technologies through ultra clean energy strategies" was vital "to meet air quality, energy security, and climate change objectives."[3] As SCAQMD tackles the monumental challenge of attaining the 1997 and 2008 8-hour ozone standards through a 43 percent reduction in nitrous oxides (NOx) by 2023 and a 55 percent reduction by 2031, a continued fuel neutral approach is key to ensuring that every technological solution will remain available to maximize emission reductions.

83-2 Con't

When Assessing How to Maximize Emission Reductions, Cost-Effectiveness and Feasibility Must Be Assessed Based on Life-Cycle Emissions. SoCalGas strongly supports SCAQMD's long-standing practice of setting performance-based standards that allow all fuels and technologies to compete. An equal playing field encourages innovation and competition, thereby reducing the costs of attaining Clean Air Act standards. The Revised Draft AQMP acknowledges SCAQMD's long-standing policy of fuel and technology neutrality and states a commitment to continuing the policy.

> "Air quality regulatory agencies have traditionally set policies and requirements that are performance-based, and thus technology- and fuel-neutral. This is a policy that the SCAQMD intends to continue. All technologies and fuels should be able to compete on an equal footing to meet environmental needs."[4]

83-3

The Revised Draft AQMP also includes a new policy statement: "Overall, the Revised Plan now puts a priority on maximizing emission reductions utilizing zero emission technologies wherever cost effective and feasible, and near-zero emission technologies in all other applications."[5] SoCalGas supports prioritizing maximum emission reductions by allowing technologies to compete head-to-head. However, this policy statement should not be read to result in a *de facto* prioritization of zero emission technologies, which would be inconsistent with SCAQMD's long-standing technology and fuel neutral policy.

When assessing zero and near-zero emission technologies, SoCalGas agrees that "full life-cycle in-basin emissions related to energy and fuel production and transmission pathways must be considered, along with GHG emissions, toxic impacts, and anticipated future changes to

[1] SCAQMD mission statement, *available at*: http://www.aqmd.gov/home/about#mission.
[2] "AQMD Air Quality-Related Energy Policy," SCAQMD, July 11, 2011, *available at*: http://www.aqmd.gov/docs/default-source/planning/Greenhouse-Gases/board-approved-energy-policy-090911.pdf?sfvrsn=6.
[3] *Id.*
[4] Revised Draft AQMP, Chapter 4, p. 4-9.
[5] Revised Draft AQMP, "Key Changes in This Revised Draft," p. v.

the energy portfolio in the Basin."[6] Central to this is a recognition that "zero emission" commonly refers only to emissions from the tailpipe or stack. Yet, impacts from electrification happen offsite, away from the source, and still result in local and regional emission increases. The AQMP should specify that all control measures seek to maximize emission reductions, and that subsequent rulemaking will evaluate both zero emission and near-zero emission technologies using full life-cycle analysis.

83-3 Con't

The Revised Plan Is Inconsistent in How It Proposes to Prioritize Maximizing Emission Reductions. While SCAQMD staff have conveyed their intent to continue to implement the agency's fuel neutral policy and many statements in the Revised Draft AQMP appear to be consistent with that intent, the wording of the "prioritization" language varies from page to page, and control measure to control measure. For example, CMB-01 includes the statement that, "[z]ero emission technology will be *required* whenever and wherever feasible and cost effective, otherwise near-zero technology will be required"; CMB-02 states that, "SCAQMD will propose regulatory requirements *based on* zero emission technologies where feasible and cost effective, and near-zero emission technologies in other applications where *feasible*"; and MOB-08 states that, "District staff will explore the potential to increase the deployment of zero-emission vehicles *wherever feasible* and near-zero emission vehicles everywhere else" (emphases added).[7]

83-4

In each of these statements, and many others scattered throughout the Revised Draft AQMP, the concept of maximizing emission reductions is absent, and key words are altered– i.e., "required" is substituted for "priority," cost-effectiveness is missing, and there is no mention of life-cycle emissions. SoCalGas urges SCAQMD to carefully examine the Revised Draft AQMP to ensure that the fuel and technology neutral policy is articulated consistently with consideration of cost-effectiveness, feasibility, and the full life-cycle of emission impacts.

A Public Process is Necessary to Oversee Cost-Effectiveness and Feasibility Assessments to Maximize Emission Reductions. Although it is incredibly important that the wording in the AQMP is consistent and accurate, ultimately, the continued implementation of SCAQMD's fuel and technology neutral policy will hinge upon the execution of cost-effectiveness and feasibility assessments for the stationary and mobile sources targeted for emission reductions. We strongly urge SCAQMD to undertake a transparent, public process for determining cost-effectiveness and feasibility thresholds that will inform the development of future rulemakings and incentive programs. Furthermore, SoCalGas agrees that life-cycle emissions are a critical component of any cost-effectiveness and feasibility assessment as assumptions about electrification and grid emissions are often oversimplified. SoCalGas looks forward to participating in a Working Group that will discuss, evaluate, and compare the cost-effectiveness and feasibility of competing technologies applicable to uses such as space and water heating, trucking, and backup generation.

83-5

[6] Revised Draft AQMP, Chapter 4, p. 4-9.
[7] Revised Draft AQMP, Appendix IV-A, pp. IV-A-46, 71,159.

II. An Incentive-Based Approach is the Only Viable Path, and the Most Cost-Effective Path to Near Term Emission Reductions in the Stationary Source Sector

Incentivizing Equipment Turnover Results in Accelerated Emission Reductions. SoCalGas understands that for SCAQMD to reduce NOx emissions by the order of magnitude mandated by the federal 8-hour ozone standards, all sources of combustion emissions must be examined and assessed. Small area sources such as pool heaters, water heaters, and stoves contribute to the emissions inventory as do larger point sources such as turbines, flares, and engines. SCAQMD should continue to rely upon incentive-based programs to reduce emissions, particularly from residential appliances. These pieces of equipment typically have long life spans, and using incentives to increase turnover rates can lead to significant, near term emission reductions. Alternatively, if the same equipment was instead subject to a regulatory approach, it would carry out the rest of its useful life of a decade or more before emission reductions were realized. Simply put, traditional regulations will not result in the installation of lower emission equipment at the pace needed to achieve the necessary reductions by 2023. 83-6

Nevertheless, the Revised Draft AQMP now places an increased emphasis on the promulgation of stationary source regulations as compared to the prior Draft's emphasis on the development of incentive programs. Incentive programs can be designed to leverage other programs, and help to hold down the cost of the AQMP. Regulatory mandates offer no such flexibility, and emphasizing a regulatory approach significantly drives up the cost of achieving emission reductions.

The cost of this AQMP is already high as compared to the 2012 AQMP, which carried a price tag of $36.6 million (2005$) for stationary source measures.[8] The 2016 Draft Plan has an Annual Average Cost of $402.6 million (2015$) for the stationary source sector.[9] The primary drivers for this enormous price tag are three stationary source control measures that seek to regulate small, area sources of emissions in residences and in commercial applications. According to the Preliminary Draft Socioeconomic Report, CMB-02, Space and Water Heating, has an amortized annual average of *$99.0 million*, CMB-04, Emission Reductions from Restaurant Burners and Residential Cooking, has an amortized annual average of *$118.9 million*, and ECC-03, Additional Enhancement in Building Energy Efficiency and Smart Grid Technology, has an amortized annual average of *$103.4 million*.[10] These three control measures account for *80 percent* of the total amortized annual average costs of all stationary source control measures in the Revised Draft 2016 AQMP, while only reducing emissions by an estimated 6.54

[8] "Draft Cost by Measure," Agenda Item #5 – Socioeconomic Analysis, AQMP Advisory Group Meeting, July 26, 2012.

[9] Preliminary Draft Socioeconomic Report, August 2016, Table 2-1, p. 21.

[10] *Id.* SoCalGas also notes that the dollar figures in the Preliminary Draft Socioeconomic Report do not translate to the incentive and regulatory costs cited in the Revised Draft AQMP. It is nearly impossible to cross-reference these two documents and we strongly urge SCAQMD to ensure that the cost-effectiveness numbers contained in both documents are consistent, comprehensible, and accessible to the public.

tons per day of NOx by 2031 – a small fraction of the emission reductions necessary for attainment. And these three control measures fall primarily on residential consumers and small businesses, with the least financial ability to absorb these costs. 83-6 Con't

Incentives for Energy Efficiency Measures Will Be Most Effective When Layered on Existing Platforms. SoCalGas encourages the use of incentive dollars to maximize and leverage existing energy efficiency programs. Given SoCalGas' extensive experience implementing energy efficiency programs and low-income energy efficiency and weatherization programs for our customers, we seek to collaborate with SCAQMD on future energy efficiency efforts. These existing programs help customers upgrade the efficiency of their homes, reduce their monthly energy costs, and improve the quality of their living environment. However, approximately 40 percent of existing energy efficiency projects are blocked by a variety of physical and logistical barriers. Collaboration between SoCalGas and SCAQMD to incentivize barrier removal may provide a significant opportunity to reduce emissions through expanded implementation of efficiency measures such as weatherization, equipment replacements, and upgrades. 83-7

When developing energy efficiency initiatives, SoCalGas emphasizes the importance of flexible strategies, offering a range of fuel and technology neutral solutions to optimize savings. We strongly urge SCAQMD not to abandon its long-standing fuel and technology neutral policy by selecting technologies as "winners" in the energy efficiency realm. SoCalGas also offers its technical expertise and support to SCAQMD as the agency seeks to participate in Title 20 and 24 proceedings at the California Energy Commission.

Incentivizing the Beneficial Use of Biogas Provides a Pathway for Both Stationary and Mobile Source Emission Reductions. SoCalGas also enthusiastically supports the use of incentives to develop a pathway for the beneficial use of biogas. By diverting biogas from flares at landfills, wastewater treatment facilities, and municipal solid waste facilities, and then conditioning and utilizing the waste gas as a transportation fuel or injecting into a natural gas pipeline, SCAQMD has a unique opportunity to reduce emissions from both stationary and mobile sources. Pipeline injection is a win-win scenario as it both minimizes combustion emissions by utilizing gas that would otherwise be flared and decarbonizes the natural gas supply. Accordingly, greenhouse gas (GHG) reduction co-benefits are realized while contributing to Low Carbon Fuel Standard and Renewable Fuel Standard goals. Further, SoCalGas agrees with SCAQMD that using biogas for transportation fuel is optimal. When biogas is used for transportation purposes it provides a source of renewable fuel, avoiding NOx from combustion, reducing GHG emissions, and facilitating ultra-low-NOx natural gas vehicle deployment. 83-8

III. Mobile Sources Are the Most Significant Emitters, and Most Cost-Effective to Control

Large-Scale, Cost-Effective Emission Reductions Can Be Achieved by Incentivizing the Deployment of Low NOx Heavy-Duty Trucks. Mobile sources are responsible for the large majority of in-Basin NOx emissions. More than 80 percent of the region's NOx emissions come from mobile sources, with heavy-duty trucks as the single largest contributor. Because SCAQMD has limited authority to regulate mobile source emissions, a fair-share, incentives-based approach properly assigns responsibility to the California Air Resources Board (ARB) and to the United States Environmental Protection Agency to control mobile sources under state and federal jurisdiction. 83-9

Both SCAQMD and ARB recognize that dramatic reductions in NOx emissions from heavy-duty trucks must be achieved by 2023. To do so, California needs an accelerated transition to near-zero heavy-duty trucks for those trucks based in California, and a complimentary new federal heavy-duty truck emission standard to address trucks that operate in the state but are not based here. As SCAQMD is well aware, in 2015, Cummins Westport Inc. (CWI) certified the world's first 8.9-liter heavy-duty engine at near-zero emission levels – 90 percent below the existing federal NOx standard, and certified to meet ARB's lowest-tier optional near-zero emission standard (0.02 g/bhp-hr NOx), while also reducing GHGs by 15 percent. CWI has begun production of this "next generation" heavy-duty natural gas engine for transit bus, school bus, refuse, and medium-duty truck applications. And, CWI is now working on the development of a 12-liter, heavy duty engine that is expected to be demonstrated next year with full-scale commercialization by the beginning of 2018.

Incentivizing widespread deployment of these near-zero heavy-duty trucks and buses, as contemplated in MOB-07 and MOB-08, is the single most impactful emission reduction strategy. SoCalGas strongly supports the appropriation and designation of incentive dollars for near-zero heavy-duty trucks.

IV. The Development and Execution of an Incentive Funding Plan is Key to the Successful Implementation of the AQMP

Collaboration Amongst Stakeholders is Critical. All stakeholders recognize that the success of this AQMP is contingent upon the development and execution of a realistic, comprehensive Incentive Funding Plan. Identifying and securing funding on the scale of one billion dollars per year is a monumental task. SoCalGas supports a collaborative effort drawing upon the resources of political leaders, industry, interest groups, nongovernmental organizations, and the public to work at the local, state, and federal levels to leverage existing funding and develop new funding programs. We offer our resources and expertise towards this endeavor, and look forward to participating in an Incentive Funding Plan Working Group. 83-10

The Funding Plan Must Include Realistic Timelines, Which Are Consistent with Control Measure Commitments. As the Incentive Funding Plan is developed, it is important to make sure that the incentive funding timelines are consistent with the assumptions in the AQMP. For example, to the extent that the funding plan seeks to leverage monies appropriated by ARB, the control measures must take into account the annual budgetary process. Specifically, the facility based measures (MOB-01 to 04), and the heavy-duty truck measure (MOB-08) now include a timeline stating that if funding is not realized one year after the adoption of the Final 2016 AQMP, SCAQMD staff will return to the Governing Board with recommendations contemplating rulemakings.[11] SoCalGas would like to point out that the one-year funding window may be unrealistic as ARB budgets are approved in June, which only provides SCAQMD with four months to secure funding from the state for this series of control measures. We raise this as an example of the type of coordination that must occur when developing the Incentive Funding Plan alongside the AQMP. 83-11

Funding Dollars Should Be Leveraged to Maximize Near Term Emission Reductions. SoCalGas also urges SCAQMD to leverage existing and upcoming funding programs for investment where it is most needed – in the heavy-duty trucking sector. One-time funding sources like the Volkswagen settlement funds ($381 million for California) provide an opportunity to facilitate market penetration of near-zero, low NOx trucks, achieving significant emission reductions by 2023. The use of the funding from the Volkswagen settlement funds will directly achieve the settlement objective – to immediately address diesel emissions. Unlike electric alternatives, these low NOx trucks are less expensive, available to drive today, and can service a wide variety of trucking applications. SoCalGas recommends that other funding programs including Low Carbon Transportation Funding, Carl Moyer, and potential new funding sources be utilized to incent near-zero heavy-duty trucks. 83-12

V. Comments on Individual Control Measures

In addition to the comments provided in this letter, SoCalGas has also drafted more detailed comments on several control measures, which are provided in the enclosed attachments. To facilitate further discussion and mutually beneficial coordination, we have included a SoCalGas subject matter expert's name and email address for each of the individual comments. Please do not hesitate to also reach out to Noel Muyco, Environmental Affairs Program Manager, at (213) 215-3397 or NMuyco@semprautilities.com, with any questions. 83-13

Comments are provided on the following control measures:

[11] Revised Draft AQMP, Appendix IV-A, pp. IV-A-8, 159.

Appendix	Control Measure / Chapter	SoCalGas Contact
1	CMB-01: Transition to Zero & Near-Zero Emission Technologies for Stationary Sources	Daniel McGivney DMcGivney@semprautilities.com
2	CMB-02: Emission Reductions From Commercial And Residential Space And Water Heating	Steve Simons SSimons@semprautilities.com
3	ECC-03: Additional Enhancements in Reducing Existing Residential Energy Use	Noel Muyco NMuyco@semprautilities.com
4	CMB-04: Emission Reductions From Restaurant Burners and Residential Cooking	Steve Simons SSimons@semprautilities.com
5	FUG-01: Improved Leak Detection and Repair	Charles Humphrey CHumphrey@semprautilities.com
6	BCM-05: Ammonia Emission Reductions from NOx Controls	Gregg Arney GArney@semprautilities.com

83-13 Con't

Respectfully submitted,

George I. Minter
Regional Vice President, External Affairs & Environmental Strategy

SoCalGas Comments on the Revised Draft 2016 AQMP

APPENDIX 1

CMB-01: Transition to Zero & Near-Zero Emission Technologies for Stationary Sources

I. Summary of the Control Measure

This measure seeks NOx and VOC emission reductions from replacement of traditional combustion sources, including internal combustion engines (stationary and emergency), turbines, boilers, furnaces, ovens, and flares with zero and near-zero emission technologies. Replacement technologies are identified as including fuel cells, electrification, beneficial uses of waste gas, energy storage, as well as maximizing existing energy efficiency measures.

II. Proposed Method of Control

Two pathways for emission reductions are contemplated:

(1) Zero and Near-zero Emission Technologies

83-14

In the October 7 Revised Draft AQMP, SCAQMD proposes to rely upon a combination of regulatory and incentive-based strategies in order to transition non-power plant combustion sources to zero or near-zero emission technologies as those technologies become technologically feasible and cost-effective. Incentive measures could be implemented to allow early retirement and advanced replacement of equipment with zero and near-zero emission technologies.

(2) Facility Modernization

SCAQMD proposes to use regulatory and incentive measures to obtain reductions from various stationary sources including landfills, wastewater treatment, and municipal solid waste facilities. Incentive funding could be used to accelerate replacement of older equipment with zero or near-zero technology or to encourage facilities to accept permit conditions resulting in cost-effective emissions reductions that go beyond existing requirements.

III. Comments

A. SCAQMD's Commitment to Continue Its Long-Standing Technology and Fuel Neutral Policy Should Be Supported Through Consistent Statements in the AQMP

SoCalGas appreciates that SCAQMD has committed to continue its long-standing policy to establish performance-based rules and incentive programs that are correspondingly technology and fuel neutral. SoCalGas agrees with and fully supports the statement in the Revised Draft AQMP emphasizing that "all technologies and fuels should be able to compete on an equal footing to meet environmental needs."[1]

However, if SCAQMD truly intends to continue to implement the fuel and technology neutral policy, then the Revised Draft AQMP must use consistent language to explain staff's intent. For example, despite a number of statements explaining that maximizing emission reductions will be "prioritized," the Proposed Method of Control in CMB-01 states that:

[1] Revised Draft AQMP, Chapter 4, p. 4-9.

> "CMB-01 is *designed* to transition to zero emission technologies where and when feasible and cost-effective, and near-zero in all other applications. In assessing the cost-effectiveness of these technologies, the life-cycle in-basin emissions under current and future energy productions and transmission portfolios must be considered" (emphasis added).[2]

SoCalGas is very concerned that "designing" a control measure to transition to zero emission equipment is a slippery slope towards choosing technological winners, and could provide justification for future regulatory mandates and incentive programs that stray from SCAQMD's long-standing, neutral policy. Throughout this control measure and the entire AQMP, there are many variations of this language and the lack of a consistent message regarding the use of terms "maximizing emission reductions," "cost effectiveness," and "feasible" is problematic. For example, CMB-01 includes statements describing the prioritization of zero emissions technologies at least nine times where the language is inconsistently applied (e.g., sometimes the terms "technically feasible" and "cost-effective" are not included; another includes the term "economically feasible," but no reference to "technologically feasible"; another states the use of zero and near-zero technology be used to "go beyond current emission standards").[3] 83-14 Con't

SoCalGas appreciates SCAQMD staff's transparency and communication on this measure, and the AQMP as a whole. We urge SCAQMD staff to continue to effectuate their intent of implementing a fuel and technology neutral approach when promulgating future regulations and developing incentive programs. The AQMP is the blueprint for those future actions and, accordingly, the language must be internally consistent and clearly stated. SoCalGas requests that language discrepancies in CMB-01 (as well as CMB-02, ECC-03, and the mobile source measures) be reconciled.

B. SCAQMD Should Clarify the Definitions of Terms Describing Equipment Emissions

In this control measure and throughout the Revised Draft, SCAQMD has used various terms to describe new technologies and products including "zero emission," "near-zero emission," and "lower-emission." SoCalGas finds the use of these terms to be confusing and requests that the terms be defined and used consistently. Further, when defining "zero emission" equipment, SCAQMD must be careful to consistently apply life-cycle, in-basin emission analysis.[4] Zero emission technologies are likely electric, and should reflect electric grid

[2] Revised Draft AQMP, Appendix IV-A, p. IV-A-49.
[3] *Id.* at pp. IV-A-44, 45, 46, 49, 52, 53.

[4] We note that Southern California Edison's Utility Owned Generation had a NOx emission factor of 0.1 lbs/MWh, as described in their 2014 Corporate Responsibility Report, which includes a significant proportion of renewable generation. *See* "2014 Corporate Responsibility Report," Southern California Edison, p. 52, *available at*: http://viewer.epageview.com/Viewer.aspx?docid=63f974d3-069f-46db-beb1-a53200e1b3c5#?page=52.

emissions and the low grid system efficiency (typically around 35 percent).[5] We seek clarification as to what emissions factor SCAQMD is using for grid emissions, and we ask that assumptions and methodologies for calculating grid emissions be shared with the public.

The CMB-01 narrative also frequently uses other terms that may or may not be interchangeable with the terms zero and near-zero, such as "low emissions technology," "much cleaner, less polluting, products and equipment," "lower-emitting technology or equipment," "cost-effective emission reductions that are beyond existing requirements," "cleanest technologies," "ultra-clean technologies," and "newer more efficient and lower polluting equipment."[6] The use of these descriptions for equipment replacements or to obtain emission reductions beyond existing limits only create confusion and difficulty in distinguishing between what is and what is not considered to be "zero- or near-zero" emission technologies, and how these technologies will be assessed for use in future regulatory strategies and incentive programs. 83-14 Con't

SoCalGas strongly urges SCAQMD to review and revise control measure CMB-01 to utilize consistent language describing the use of technologically feasible and cost-effective zero and near-zero technologies to maximize achievable emission reductions.

C. Cost-Effectiveness Calculations Should Be Transparent in Both the Draft AQMP and the Preliminary Draft Socioeconomic Report

The use of incentives in the stationary source sector is the most efficient and effective manner to obtain the emission reductions necessary to reach attainment. Incentives lead to the replacement of equipment that otherwise would live out the rest of its useful life of a decade or more if subject to regulation. Additionally, it is much costlier to obtain emission reductions within the stationary source sector as compared to a similar amount of emission reductions within the mobile source sector. However, SoCalGas also recognizes the need to complement incentive programs with regulatory strategies where technologically feasible and cost-effective solutions are available to maximize achievable emission reductions within the stationary source sector.

SoCalGas is concerned about the contradiction between the cost-effectiveness and incentive cost data cited in the draft Control Measure Summary table for CMB-01 (e.g., a Total Incentive of $450 million and revised per ton incentive of $53,000)[7] and what is cited in the Preliminary Draft Socioeconomic Report (e.g., CMB-01 Total Incremental cost of $853 million with the present value of incentives totaling $337.5 million, and Amortized Annual Average cost of approximately $35 million).[8] There is a significant gap (over $100 million) between the incentives with no explanation, and it is nearly impossible to attempt to crosswalk between the two documents. It is extremely difficult for industry to determine the worthiness or viability of

[5] *See e.g.* "Accounting Methodology for Source Energy of Non-Combustible Renewable Electricity Generation," Department of Energy, October 2016, p. 2; ASHRAE Standard 105-2014 Informative Appendix J; EPA Combined Heat and Power (CHP) Partnership, *available at:* https://www.epa.gov/chp/chp-benefits.

[6] Revised Draft AQMP, Appendix IV-A, pp. 45, 48, 49, 53, 54, 58.

[7] *Id.* at p. IV-A-44.

[8] Preliminary Draft Socioeconomic Report, August 2016, p. 21, Table 2-1.

the proposed strategies within CMB-01, regulatory and incentive, without having a solid estimate of the cost or incentive dollars necessary to fully implement the measure.

SoCalGas requests that SCAQMD review the cost estimates and data used in both CMB-01 and the Preliminary Draft Socioeconomic Report and provide a more robust and transparent analysis that better aligns these regulatory costs and incentives, the source data, and the cost estimation methodologies. In the end, one should be able to understand how these numbers were derived and determine that the result is a reasonable cost estimate based upon the data available and used in the analysis. Additionally, the results analyzed in the Socioeconomic Report should be easily understood and linked to the cost data in CMB-01.

83-14 Con't

D. Emission Inventories Should Be Refined

In the Control Measure Summary table for CMB-01, the total Summer Planning inventory for 2012 is identified as 22.3 tons per day of NOx and the NOx reductions in 2021 and 2031 are 2.5 and 6.0 tons per day, respectively.[9] However, Table 2 provides data on internal combustion engines and references an emission inventory of 22.5 tons per day NOx solely from engines, with approximately 11 tons per day from older diesel and non-diesel fueled engines.[10] Though engines are one of the key equipment categories affected by this control measure and contribute the most significant share of the emission reductions, there are several other equipment categories (e.g., afterburners, boilers, dryers, flares, furnaces, heaters, incinerators, ovens, and turbines).[11] It is troubling that the internal combustion engine inventory is equal to the entire baseline emissions for this control measure. We raised this issue in our August 19 letter, and continue to be concerned about these inventory figures. SoCalGas requests that SCAQMD add supporting analysis and discussion to explain these discrepancies and, where appropriate, revise the data accordingly.

Further complicating this issue is data provided in Table 3, which identifies the various equipment categories (including internal combustion engines) affected by this control measure along with each category's annual emissions and the resultant emission reductions obtained through implementation of CMB-01 (based upon Annual Emission Report (AER) data).[12] SCAQMD goes on to note that the emission reduction data identified in Table 3 are different than those identified in the CMB-01 Control Measure Summary table because the numbers are derived from AER data, as opposed to being Summer Planning inventory data, but does not provide any insight as to why they are different or how they can be reconciled with each other. The use of differing data to support CMB-01 strategies should be clear and easily understandable to the public and all interested parties, and the methodologies used to generate the data should be identified. SoCalGas requests that SCAQMD harmonize the emissions data used in this measure so that the inventory and the estimated emission reductions are easily recognized and understood.

[9] Revised Draft AQMP, Appendix IV-A, p. IV-A-44.
[10] *Id.* at p. IV-A-51, Table 2.
[11] *Id.* at p. IV-A-50, Table 1.
[12] *Id.* at p. IV-A-61, Table 3.

E. SoCalGas Supports the Use of Incentives for the Beneficial Use of Renewable Gas for Transportation and Pipeline Injection

SoCalGas has been engaged in many conversations with SCAQMD staff about the further development of control measures, especially in regard to Facility Modernization, that focus on the beneficial use of biogas to achieve NOx reductions from existing flaring and other on-site uses. We offer our strong support for a strategy that provides a pathway for gas conditioning and utilizing waste gas as a transportation fuel or for pipeline injection. By developing viable alternatives to flaring, SCAQMD has a unique opportunity to promote emission reductions from both stationary and mobile sources. Pipeline injection is a win-win scenario as it not only diverts gas from being combusted in a flare, but also decarbonizes the natural gas supply. Then, when utilizing renewable gas, the lowest carbon intensity transportation fuel, in an ultra-low NOx engine, SCAQMD can achieve significant criteria pollutant as well as GHG reductions.

83-14 Con't

F. Incentives Are Most Effective to Transition Older, Higher Emitting Equipment to Zero and Near-Zero Emission Technology

SCAQMD has discussed that while regulated sources already meet existing emission standards, there are inventories of older, less energy efficient equipment that meet applicable concentration based emission limits but have higher mass emissions than more modern equipment. CMB-01 also considers the replacement of 1,000 pieces of permit exempt equipment currently located at permitted facilities. One of the core strategies of CMB-01 is to transition these older, higher emitting equipment to zero and near-zero emission technologies. SoCalGas, once again, strongly encourages and supports the use of incentives to achieve this goal, especially towards capital costs, which are frequently the largest barrier to new investment.

The use of incentives for equipment retrofits would also be a benefit, allowing business to avoid stranded investments while achieving cost-effective emission reductions. Incentives should be used in SCAQMD's effort to replace older, higher emitting permit exempt equipment. SoCalGas also supports SCAQMD's efforts to explore additional solutions for incentives, including reduced permitting fees, New Source Review and Emission Reduction Credit Incentives, as well as expedited California Environmental Quality Act review and other concepts for expediting retrofits.

G. Additional, Specific Comments on this Control Measure

- *"Beyond BACT"*: CMB-01 states that "[n]ew businesses can be required to install and operate zero-emission equipment, technology and processes beyond the current Best Available Control Technology (BACT) requirements."[13] SoCalGas requests that

[13] Revised Draft AQMP, Appendix IV, p. IV-A-46 (first paragraph, second sentence under "Zero and Near-Zero Technologies").

SCAQMD provide more discussion explaining this concept. Pursuant to New Source Review, only BACT can be required of a new source when seeking a permit. Thus, such a "beyond-BACT" policy appears to stray from both the federal Clean Air Act and SCAQMD's long-standing fuel neutral policy.

- ***Combined Heat and Power:*** Under the discussion of zero and near-zero Emission Technologies, SCAQMD states that fuel cells are more energy efficient (between 45 and 50 percent more efficient) than single cycle combustion-based engines, citing an energy efficiency range of 25 to 35 percent.[14] The United States Environmental Protection Agency notes that Combined Heat and Power (CHP) can be anywhere from 60 to 90 percent efficient.[15] SoCalGas requests that SCAQMD include CHP along with fuel cell applications as a possible near-zero technology to replace older, higher emitting equipment.

83-14 Con't

- ***Battery Storage:*** In SCAQMD's discussion of possible control strategies regarding internal combustion engines, SCAQMD profiles the use of battery storage as a zero or near-zero emission technology for replacing both diesel-fueled, engine-driven emergency electrical generators and prime natural gas fueled engine-driven equipment.[16] According to the released "2013 SGIP Impact Report" released in April 2015, however:

  > "Batteries inherently consume more electricity than they discharge due to electrochemical losses; therefore, to provide GHG reductions, batteries must charge from the grid during relatively "clean" hours of grid generation and discharge during "dirty" hours of grid generation to overcome their net increase in energy consumption."[17]

  Because batteries use more electricity than they discharge, it is imperative that time of use be considered when batteries are connected to the grid– i.e., they should be required to charge during periods when emissions on the grid are low and only discharged when emissions from the grid are high. Roundtrip efficiencies should also be considered when evaluating the technical feasibility and cost-effectiveness of battery systems for the purpose of obtaining NOx emission reductions.

  In addition, stationary backup generators are only permitted for 200 hours of use per year and are routinely tested only a few hours per year for reliability and maintenance testing (typically once per week or month for approximately one hour). If a battery is used in place of a backup emergency generator, the battery will constantly be drawing electricity from the grid to maintain a charge due to the electrochemical losses in order to be available for the rare emergency event. As part of the analysis regarding the efficacy of

[14] *Id.* at p. IV-A-46 (second paragraph, first sentence).
[15] "CHP Benefits," U.S. Environmental Protection Agency, *available at* https://www.epa.gov/chp/chp-benefits.
[16] Revised Draft AQMP, Appendix IV-A, p. IV-A-51 (first paragraph under category "Equipment Replacement, Engines").
[17] "2013 SGIP Impact Evaluation," Self-Generation Incentive Program, California Public Utilities Commission, section 8.3, page 8-5, *available at*. http://www.cpuc.ca.gov/sgip/.

this equipment replacement strategy, SCAQMD should investigate whether the electrical draw from the grid is a net reduction compared to the small usage of a backup generator.

- ***Non-Catalytic After-Treatment Emerging Technologies:*** SCAQMD states that there are non-catalytic after-treatment "emerging technologies" that can achieve the same 2 ppm NOx emissions level as selective catalytic reduction (SCR) on a refinery boiler.[18] SoCalGas is not aware of these emerging technologies and requests that SCAQMD either delete this discussion or identify these emerging technologies.
- ***"Unpermitted" Equipment:*** In this measure, SCAQMD identifies 1,000 "unpermitted" ovens, furnaces, and kilns that exist at "permitted facilities" throughout the Basin.[19] Use of the term "unpermitted" is not an accurate description of this equipment and implies that this equipment is being operated out of compliance. The more appropriate term is "permit exempt." SoCalGas recommends that the word "unpermitted" be replaced with "permit exempt" or another more accurate description. For this permit exempt equipment category, SoCalGas supports the use of incentives to obtain the noted emission reductions.

83-14 Con't

[18] Revised Draft AQMP, Appendix IV-A, p. V-A-53 (first paragraph, second to last sentence).
[19] *Id.* at IV-A-53 (in the paragraph under the heading "Ovens/Furnaces/Kilns").

SoCalGas Comments on the Revised Draft 2016 AQMP

APPENDIX 2

CMB-02: Emission Reductions from Replacement with Zero and Near-Zero NOx Appliances in Commercial and Residential Applications

I. Summary of the Control Measure

This measure seeks NOx emission reductions from unregulated commercial space heating furnaces and reductions from incentive programs to replace older boilers, water heaters, space heating furnaces, and pool heaters with new low emission and more efficient units. In this Revised Draft, the control measure has been expanded to include all residential water and space heating appliances, with consideration being given to incentives and regulations for other appliances such as clothes dryers, pool heaters, etc.

II. Proposed Method of Control

This measure includes a mix of regulatory and incentive-based methods of control. SCAQMD is proposing to continue to implement the existing Rule 1111 (Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces) emission limit of NOx for residential space-heaters and to consider adopting a similar rule to regulate commercial heating units. Another component of this measure may be to require that residential water heaters meet the heat input based emission limits in Rules 1121 (Control of Nitrogen Oxides from Residential - Type, Natural-Gas-Fired Water Heaters) and 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters) to ensure that energy efficiency incentive programs for these residential appliances achieve NOx emission reductions. Additionally, this measure proposes to incentivize the voluntary replacement of older boilers, water heaters, space heaters, and pool heaters with currently available low NOx technologies. This version places more emphasis on a traditional regulatory approach than the previous one.

83-15

III. Comments

A. Cost-Effective and Technologically Feasible Pathways to Maximize Emission Reductions Should Be Prioritized, Not Any One Particular Technology

The new draft of this measure states that it "will focus on cost effective zero emission technologies wherever and whenever feasible and near-zero technologies in other applications."[20] SoCalGas is deeply concerned that such an approach could result in a change in SCAQMD's long-standing policy of fuel and technology neutrality. SCAQMD must be careful to avoid policies and statements that will *de facto* result in mandating the selection of certain technologies. SoCalGas supports SCAQMD's long-standing practice of setting performance standards that allow all fuels and technologies to compete. This encourages innovation and competition, which will reduce the costs of attaining air quality goals.

SoCalGas appreciates SCAQMD staff's transparency and communication on this measure, and the AQMP as a whole. We urge SCAQMD staff to continue to effectuate their

[20] Revised Draft AQMP, Appendix IV-A, p. IV-A-67.

intent to implement a fuel and technology neutral approach when promulgating future regulations and developing incentive programs. However, the AQMP is the blueprint for those future actions and, accordingly, the language must be internally consistent and clearly stated. SoCalGas requests that language discrepancies in CMB-02 (as well as CMB-01, ECC-03, and the mobile source measures) be reconciled.

The most effective way to ensure that SCAQMD continues to follow its long-standing policy of fuel and technology neutrality is to establish a working group that will discuss, evaluate, and compare the cost-effectiveness and feasibility of the various technologies (zero emission, near-zero emission, and lower-emission) applicable to a particular use like residential space and water heating. SoCalGas looks forward to participating in and contributing to future cost-effectiveness analyses and technology feasibility assessments.

B. Clarity is Needed on the Definition of Terms Describing Appliance Emissions

83-15 Con't

In this control measure and throughout the Revised Draft, SCAQMD has used various terms to describe new technologies and products including "zero emission," "near-zero emission" and "lower-emission." SoCalGas finds the use of these terms to be confusing and ill-defined. Zero emission technologies (likely electric) are not actually zero emission, but rather should reflect electric grid emissions and the low system grid efficiency (typically around 35 percent).[21] In fact, CMB-02 recognizes that life-cycle in-basin generation emissions are not zero:

> "In assessing the cost-effectiveness of these technologies, the life-cycle in-basin emissions under current and future energy productions and transmission portfolios will be considered. As the energy supply and distribution system change over time, certain technologies may become more or less effective at reducing emissions. GHG emissions and toxic impacts must also be considered."[22]

SCAQMD must be careful when using the term "zero emission." Life-cycle in-basin emissions analysis should be consistently applied during the implementation of this control measure, and everywhere "zero emission" technologies are being compared for use in the AQMP. We note that Southern California Edison's Utility Owned Generation had a NOx emission factor of 0.1 lbs/MWh, as described in their 2014 Corporate Responsibility Report, which includes a significant proportion of renewable generation.[23] However, it is unclear what emission factor SCAQMD is using for grid emissions. We seek clarification on SCAQMD's assumptions and methodology.

From a natural gas equipment perspective, in the long-term, "near-zero emission" technologies (approaching grid emissions) are technologically feasible. However, their

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[21] *See e.g.* "Accounting Methodology for Source Energy of Non-Combustible Renewable Electricity Generation," Department of Energy, October 2016, p. 2; ASHRAE Standard 105-2014 Informative Appendix J; EPA Combined Heat and Power (CHP) Partnership, *available at:* https://www.epa.gov/chp/chp-benefits.

[22] Revised Draft AQMP, Appendix IV-A, p. IV-A-67.

[23] "2014 Corporate Responsibility Report," Southern California Edison, p. 52, *available at*: http://viewer.epageview.com/Viewer.aspx?docid=63f974d3-069f-46db-beb1-a53200e1b3c5#?page=52.

commercial acceptance will depend upon the application, price sensitivity of markets, equipment and installation constraints, product system safety, product durability, and reliability. Essentially all point and area sources (with a few exceptions such as cooking equipment) in SCAQMD are currently regulated under New Source Review (new or modified permitted sources) or Regulation 11 (existing permitted and unpermitted sources). However, there are timing issues associated with replacement of existing permitted and unpermitted older equipment with newer "lower-emission equipment" that meet the existing regulations. In the case of permitted and unpermitted equipment, the amount of remaining useful life will be a critical factor in determining the cost-effectiveness of a replacement strategy.

SoCalGas recommends a public process with operator and manufacturer involvement to make sure that pursuing replacements is truly a cost-effective strategy. SoCalGas strongly supports the AQMP proposals to use voluntary incentives to accelerate the replacement of older equipment with these newer lower polluting and higher efficiency products and technologies.

C. Further Research and Development is Needed to Bring Ultra-Low Emission Burners to Market

In this Revised Draft, SCAQMD states, "[t]here are also burner technologies available in the near future that can achieve NOx emissions of 5 to 10 ppm."[24] While there are burners that can achieve lower emissions than the current regulations, they have not been successfully adopted into actual products. The existing Rule 1111 NOx emission limits are a cautionary tale. Though the Rule 1111 NOx emission limit (14 ng/J (20ppm)) for residential space heaters went into effect in 2015, manufacturers have yet to bring a product to market. In coordination with the development of the Rule, SCAQMD and SoCalGas cosponsored research work to develop 14 ng/joule NOx central furnaces. Four separate proposals from manufacturers were funded with all four projects showing initial success in building prototype furnaces that could meet the NOx emission target. 83-15 Con't

However, none of these burner technologies and furnace designs have gone forward to commercialization due to concerns regarding product reliability, durability, and safety. In fact, the Air-Conditioning, Heating, and Refrigeration Institute and furnace manufacturers have asked for reconsideration and leniency from the Rule 1111 limits and mitigation fee program. SoCalGas strongly recommends that SCAQMD work closely with industry to resolve these design and safety issues before proposing similar mandatory emission limits on commercial-size space heating equipment.

Further, SoCalGas cautions that, before eliminating the heat output based emission limits for water and space heating equipment, SCAQMD should consult with manufacturers to gain a better understanding of the costs for equipment redesign and safety recertification. Such a change in regulatory direction could impose a significant burden on manufacturers who have been subject to constantly changing emission limits. Over the long term, SoCalGas would like to work

[24] Revised Draft AQMP, Appendix IV-A, p. IV-A-68.

with the manufacturing community and with SCAQMD to develop improved lower-emission products that are also safe and meet consumer needs.

D. SoCalGas is Actively Pursuing the Development and Demonstration of Residential Advanced Technologies

As discussed in our comments on ECC-03, SoCalGas welcomes the opportunity to collaborate with SCAQMD on research, development, and deployment of advanced technologies in the residential sector. To that end, we are currently working to identify market demonstration opportunities for residential and community scale fuel cell technologies. The California Energy Commission (CEC) had a recent solicitation to fund research, development, and demonstration projects that advance the state of technology of small and micro-scale combined heat and power (mCHP) systems and complementary enabling technologies. CEC has not yet announced the awards for their mCHP solicitation, but the targeted use for these mCHP systems (20-30 kW) are multifamily and small commercial buildings.

SoCalGas has partnered with mCHP developers to demonstrate their products in Southern California. We have tested a mCHP EC power (25 kW) at the Gas Technology Institute (GTI), and we are planning to conduct a field demonstration at SoCalGas' Energy Resource Center. We are also evaluating other, similar mCHP systems such as the 1.5 kW SolidPower fuel cell at University of California, Irvine for ZNE single family residential application, and the AO Smith system (21 kW). 83-15 Con't

Additionally, SoCalGas is actively engaged in several other field demonstrations that have also received CEC grants. We are engaged in a demonstration targeted for 2017-18 to test Stone Mountain's residential and commercial heat pumps in Southern California, a field demonstration project for a new residential space heater by Canadian-based Dettson, and we are evaluating the potential of conducting a field demo of MTrigen (4 kW electric plus a 5 ton cooling) heat pump. As additional funding opportunities arise, SoCalGas looks forward to partnering with SCAQMD, and continuing to work with both established and upcoming technology manufacturers, as well as home builders, to develop and demonstrate residential advanced technologies.

E. Incentivizing Equipment Replacement is the Most Cost-Effective Path to Achieving Near-Term Emission Reductions

In this Revised Draft, SCAQMD has put an increased emphasis on regulations compared to the emphasis on incentives in the prior Draft AQMP. SCAQMD should continue to rely upon incentive-based programs, particularly in this control measure, and especially in the near-term (pre-2023). This equipment is typically long-lived and increasing turnover is a more cost-effective NOx emission reduction strategy than regulations that have to rely upon normal equipment replacement rates (15 to 25 years for various categories of boilers/water heaters).[25]

[25] Preliminary Draft Socioeconomic Report, p. 57.

Traditional regulations will not result in the turnover of equipment to lower-emission equipment needed to attain the 2023 ozone standard.

SoCalGas continues to support the development of an incentive program designed to take advantage of existing energy efficiency programs targeting higher efficiency water and condensing gas space-heating products. Any incentive program developed by SCAQMD should provide funding for both high efficiency, low emission gas and electric technologies and should be fuel neutral without emphasizing electric alternatives over gas options. We are committed to introducing new, low NOx water and space heaters into the marketplace and would offer our assistance to SCAQMD on how to best use incentive funding to augment existing energy efficiency programs. We also would welcome partnerships to create new programs to incentivize the replacement of older, higher-emitting units. 83-15 Con't

We are also concerned about the significant increase in total cost of all stationary source control measures in this plan, as compared to the 2012 AQMP. The 2012 Annual Average Costs for all stationary source measures was $36.6 million (2005 $), compared to the 2016 Annual Average Costs for all stationary source measures of $402.6 million (2015 $). This control measure stands out as one of three that are the primary contributors to this increase. The three control measures are CMB-02 ($99.0 million), CMB-04, Emission Reductions from Restaurant Burners and Residential Cooking NOx ($118.9 million), and ECC-03, Additional Enhancement in Building Energy Efficiency and Smart Grid Technology ($103.4 million). With the exception of CMB-01, no other proposed control measure even comes close to these three, as can be seen in this table from the Preliminary Draft Socioeconomic Report:[26]

[26] *Id.* at p. 21.

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Table 2-1: Preliminary Cost Summary of Draft 2016 AQMP Measures

	Implementation Period for Cost Analysis	Present Value of Remaining Incremental Cost (Millions, 2015$)		Present Value of Incentives (Millions, 2015$)		PWV of Total Incremental Cost (Millions, 2015$)	Amortized Annual Average (2017-2031, Millions, 2015$)
SCAQMD Stationary Source Measures							
BCM-01: Commercial Cooking	2021	$163.0	+	$0.0	=	$163.0	$17.0
BCM-10: Greenwaste Composting	2017-2031	$18.4	+	$0.0	=	$18.4	$1.7
CMB-03: Non-Refinery Flares	2017	$36.3	+	$0.0	=	$36.3	$2.2
CMB-02: Space & Water Heating	2018-2031	$1,891.4	+	$327.7	=	$2,219.1	$99.0
CMB-04: Restaurant Burners and Residential Cooking	2018-2031	$1,552.7	+	$388.2	=	$1,940.9	$118.9
CTS-01: Coatings, Solvents, Adhesives, and Lubricants	2020 and beyond	$59.0	+	$0.0	=	$59.0	$5.4
ECC-03: Building Energy Efficiency	2018-2031	$1,553.4	+	$313.5	=	$1,866.9	$103.4
CMB-01: Transition to Zero & Near-Zero Emission Technologies	2018-2031	$515.8	+	$337.3	=	$853.1	$34.8
CMB-05: (RECLAIM)	2026-2031	$837.8	+	$0.0	=	$837.8	$19.3
FUG-01: Leak Detection and Repair	2017-2031	$11.5	+	$0.0	=	$11.5	$1.0
Total for SCAQMD Stationary Source Measures		$6,639.3	+	$1,366.6	=	$8,005.9	$402.6

While cost-effectiveness is a primary concern of SoCalGas, the relative cost of these three measures demands additional scrutiny and serious efforts to significantly reduce the costs of the stationary source control strategy. We also note that these control measures will fall mostly on small businesses and individual residents within the South Coast Air Basin.

83-15 Con't

SoCalGas Comments on the Revised Draft 2016 AQMP

APPENDIX 3

ECC-03: Additional Enhancements in Reducing Existing Residential Energy Use

I. Summary of the Control Measure

Energy consumption in existing residential and commercial buildings results in direct and indirect criteria, toxic, and greenhouse emissions. Co-benefit reductions from current building codes and SB350 (Clean Energy Pollution Reduction Act of 2015) are accounted for in control measure ECC-02 (Co-benefits from Existing Residential and Commercial Building Energy Efficiency Measures). ECC-03 sets targets to achieve increases in efficiency, along with increased renewable energy sources within the residential sectors, to achieve category emission reductions of 15 percent by 2023 and 30 percent by 2031.

II. Proposed Method of Control

Achieving reductions beyond SB350 and Title 24 is expected to be administered through state agencies and implemented, in part, through electrical and natural gas utilities. SCAQMD staff will work with agencies, utilities, and other stakeholders to further implement weatherization and other measures that provide energy savings along with emission reductions within the Basin. SCAQMD staff will also assist in developing new tools that help effectively implement efficiency measures along with quantifying energy savings and emission reduction benefits.

83-16

III. Comments

A. SCAQMD's Long-Standing Technology and Fuel Neutral Policy Should Apply to the Energy and Climate Control Measures

SoCalGas has significant concerns with the stated objective of this control measure to set, "a path to implement advanced highly efficient *zero-emission* appliance technologies" (emphasis added).[27] As discussed extensively in our other control measure comments, we urge SCAQMD not to change its long-standing policy of fuel and technology neutrality. If interpreted verbatim, this statement will lead to the selection of "winning" technologies instead of continuing the long-standing practice of setting performance standards that allow all fuels and technologies to compete. It contradicts many other statements in the AQMP explaining that, "all technologies and fuels should be able to compete on an equal footing to meet environmental needs."[28] Fuel neutrality encourages innovation and competition, which will reduce the costs of attaining air quality goals. Therefore, we request that SCAQMD affirm the continuation of the fuel and technology neutral policy here, and throughout the AQMP.

[27] Revised Draft AQMP, Appendix IV, p. IV-A-34.
[28] Revised Draft AQMP, Chapter 4, p. 4-9.

We also note that another objective of this control measure is to incorporate "efficiency measures, including weatherization along with renewable energy sources."[29] SoCalGas encourages SCAQMD to clarify that the use of renewable gas is an eligible strategy in this control measure as a renewable energy source. Utilization of renewable gas furthers other goals in the AQMP, and would maintain consistency with a fuel and technology neutral policy.

B. SoCalGas is Actively Pursuing the Development and Demonstration of Residential Advanced Technologies

When fuels and technologies compete, new, cost-effective technologies are developed. SoCalGas welcomes the opportunity to collaborate with SCAQMD on research, development, and deployment of advanced technologies in the residential sector. SoCalGas is currently working to identify market demonstration opportunities for residential and community scale fuel cell technologies. The California Energy Commission (CEC) had a recent solicitation to fund research, development, and demonstration projects that advance the state of technology of small and micro-scale combined heat and power (mCHP) systems and complementary enabling technologies. CEC has not yet announced the awards for their mCHP solicitation, but the targeted use for these mCHP systems (20-30 kW) are multifamily and small commercial buildings.

83-16 Con't

SoCalGas has partnered with a couple of mCHP developers to demonstrate their products in Southern California. We have tested a mCHP EC power (25 kW) at the Gas Technology Institute (GTI), and are planning to conduct a field demonstration at SoCalGas' Energy Resource Center. We are also evaluating other, similar mCHP systems such as the 1.5 kW SolidPower fuel cell at University of California, Irvine for ZNE single family residential application, and the AO Smith system (21 kW).

Additionally, we are in the early stages of developing a demonstration project that would address cost parameters, technical feasibility, home design and appliance integration, operation and maintenance, and builder education and public awareness. SoCalGas is collaborating with several different national and regional builders that are focused on constructing high quality, energy efficient homes that achieve ZNE (Zero Net Energy) performance criteria for both single and multi-family projects. While no firm contracts or development agreements have been established to date, SoCalGas intends to identify and initiate a demonstration project in 2017-18, likely within a single new housing community encompassing at least 20 to 40 homes depending on funding availability. Wide-scale adoption of residential fuel cell technologies would be based upon successful demonstration of the technology's market viability.

SoCalGas is also actively engaged in several other field demonstrations that have also received CEC grants. We are engaged in a demonstration targeted for 2017-18 to test Stone Mountain's residential and commercial heat pumps in Southern California, a field demonstration project for a new residential space heater by Canada-based Dettson, and we are evaluating the potential of conducting a field demo of MTrigen (4 kW electric plus a 5 ton cooling) heat pump. As additional funding opportunities arise, SoCalGas looks forward to partnering with SCAQMD,

[29] *Id.*

and continuing to work with both established and upcoming technology manufacturers, as well as home builders, to develop and demonstrate residential advanced technologies.

C. *Partnering to Implement Energy Efficiency Programs Will Maximize Emission Reductions*

SoCalGas looks forward to partnering with SCAQMD and other stakeholders to effectively implement efficiency measures to satisfy the goals of ECC-03, as well as ECC-02. We have extensive experience implementing energy efficiency and low income and weatherization programs for our customers, and we seek to collaborate with SCAQMD on future energy efficiency efforts. Moreover, we have successfully partnered with SCAQMD in the past and look forward to continuing our collaborative relationship.

For example, we recently partnered on the Weatherization Program for Homes Near Freeways and Intermodal Facilities. In June 2015, SCAQMD Board approved $500,000 of its Targeted Airshed Fund to collaborate with SoCalGas to layer their fund with SoCalGas' Energy Savings Assistance Program to weatherize homes and reduce residential exposure to criteria pollutants and diesel particulate matter in areas adjacent to freeways and heavily used intermodal facilities with trucks and locomotives. Weatherization of homes along freeways and intermodal facilities is critical to improve indoor air quality, minimize exposure to criteria pollutants such as NOx, CO and PM, and reduce energy usage. These measures also include attic insulation, door weather stripping and caulking, and minor repairs to doors and windows. In Boyle Heights and the City of San Bernardino, 1,076 total homes were weatherized under this partnership, which concluded in January 2016.

83-16 Con't

In 2013, SoCalGas also successfully partnered with SCAQMD to pursue a year-long emissions reduction project using a combination of SoCalGas' Energy Efficiency Program funding and the AB 1318 Mitigation Fees funding. The emission reduction project was pursued to offset emissions from the construction and operation of the CPV Sentinel Energy Project power plant located in Desert Hot Springs. This project successfully installed high efficiency filtration and weatherized many homes in the Desert Hot Springs area.

In addition, SoCalGas was pleased to work with SCAQMD to develop a proposed "Small Boiler Replacement Program (SBRP)" and a "Residential Gas Water Heater Early Retirement Program" in San Bernardino and Riverside counties in 2006. Though this project was not launched at that time, we may be able to use this prior work to develop similar programs in the future. Controlling boiler emissions is a priority of this AQMP – in this control measure, as well as in CMB-01. SoCalGas would be pleased to share the historical program descriptions as the framework for a renewed effort.

D. *Implementing Energy Efficiency Programs Effectively Requires Overcoming Barriers*

Given SoCalGas' extensive experience implementing energy efficiency programs for our customers, we seek to collaborate with SCAQMD on the development of new incentive

programs. Continuing in our utility tradition, SoCalGas administers energy efficiency programs and low-income energy efficiency and weatherization programs, helping customers to improve the efficiency of their homes, reduce their monthly energy costs, and better the quality of their living environment.

However, a variety of physical and logistical barriers prevent energy efficient equipment upgrades in many projects. Older buildings, for example, are more likely to have structural or design issues that make energy efficient retrofits or installation of renewable technology cost-prohibitive. This is particularly problematic for people in disadvantaged communities who are more likely to live in homes that have asbestos (on old furnaces, water heaters, ducting), aged electrical infrastructure (old unsafe knob and tube wiring, or lack of electrical outlets), aged plumbing configurations (drainage problems for condensate drains for high efficiency equipment), and/or faulty water pressure regulators (preventing installation of other equipment).

Further, financial barriers limit low-income customers' access and means to energy upgrades. Low-income Californians are disproportionately renters; 64 percent of low-income Californians rent their homes. Because large up-front expenditures for energy retrofits are exacerbated by long payback time frames, property owners hesitate to invest in energy efficient upgrades and renewable technology installation if they cannot realize the full savings of such an investment.[30] Moreover, 43 percent of all low-income renters live in multifamily housing, which are frequently "master-metered." For building units that are master-metered (generally older buildings), utilities are either included in the rent or billed flatly by the property owner. In these cases, it is difficult to ensure that the energy savings realized by the property owner are conveyed to the low-income tenant through lower rents or utilities charges.[31]

83-16 Con't

California Public Utilities Commission-approved energy efficiency programs preclude assistance or funding for the removal of barriers that prevent implementation, since the primary intent of most programs is to prioritize the lowest cost, lowest barrier "low hanging fruit" opportunities. Accordingly, SoCalGas is concerned that exclusion of funding for removal of these barriers prevents the implementation of a significant number of projects. These barriers include issues such as asbestos, electrical, and water pressure regulation issues. SoCalGas recommends consideration of future, proposed opportunities to utilize funding from local, regional, state and federal sources to address and remediate these barriers. This would enable an increase in overall energy savings, by improving the program cost-effectiveness, and also increase the number of homes retrofitted. Such a program would directly contribute to measurable reductions in natural gas combustion emissions due to expanded installation of newer high-efficient gas heating equipment.

Collaboration between SoCalGas and SCAQMD to identify available funding for barrier removal opportunities may provide significant opportunities in the South Coast Air Basin to

[30] "A Study of Barriers and Solutions to Energy Efficiency, Renewables and Contracting Opportunities Among Low-Income Customer and Disadvantaged Communities," California Energy Commission, *available at:* http://www.energy.ca.gov/sb350/barriers_report/.
[31] *Id.*

reduce emissions through expanded implementation of efficiency measures such as weatherization, equipment replacement, and upgrades.

E. SoCalGas Offers Expertise to Navigate Title 20 and 24 Proceedings

SoCalGas welcomes the opportunity to continue our discussions with SCAQMD staff on codes and standards. The collective statewide investor-owned utilities make up the body of the codes and standards team focusing on Title 24, Part 6 (Title 24) and Title 20, Sections 1601-1608 (Title 20), where Title 24 speaks to building components and design and Title 20 focuses on appliance standards. This control measure discusses both residential building components and appliances and is focused on achieving large emission reductions as a result of anticipated energy reductions from *existing* building retrofits, while the state focuses on near-to and mid-term ZNE goals. We look forward to more in depth discussion on both Title 24 and 20 and how they may be able to contribute towards SCAQMD's goals.

SoCalGas seeks clarification on the following issues:

83-16 Con't

- Under Title 24 requirements, new buildings can achieve ZNE through both prescriptive and performance methods. How will SCAQMD align the objectives of the control measure(s) with the methodology and protocols developed pursuant to Title 24 prescriptive and performance methods?
- More specifically, under Title 24, builders may choose from different options to achieve the goals. Yet this control measure is seeking actual emission reductions from specific equipment. Will implementation of this control measure in the context of Title 24 requirements limit the choices that builders currently have? And what type of an effect will this have in the T24 calculation path?
- Will this control measure be implemented in a way so as to limit builders' existing flexibility? If not, then how will such flexibility be handled under the AQMP? Will such flexibility of choices be able to satisfy the EPA Integrity Elements, or allow builders to select the performance method versus the prescriptive?

SoCalGas looks forward to discussion on these threshold issues. If unresolved, implementation of this measure may pose a near-term roadblock for builders, and inhibit their choices in their planning and design phases.

SoCalGas Comments on the Revised Draft 2016 AQMP

APPENDIX 4

CMB-04: Emission Reductions from Restaurant Burners and Residential Cooking NOx

I. Summary of the Control Measure

This measure seeks NOx emission reductions from residences, retail restaurants, and quick service restaurants utilizing commercial cooking ovens, ranges, fryers, and charbroilers through the development, installation, and use of low-NOx burner technologies.

II. Proposed Method of Control

While the initial focus of this control measure is on commercial cooking equipment, SCAQMD will also consider a program to incentivize higher efficiency or lower emission residential appliances and will evaluate options for rules regulating NOx emissions from new commercial and residential cooking units, including requirements for new construction of commercial and residential buildings.

III. Comments

A. The Completion of a Study Profiling the Emissions of Various Categories of Cooking Equipment is an Important First Step

83-17

Residential and commercial cooking equipment (other than certain types of charbroilers regulated for particulate matter) have never before been subject to NOx regulations. As discussed in our August 19 comment letter, there are numerous barriers to reducing NOx emissions from cooking equipment. However, we are encouraged that SCAQMD has responded proactively to concerns raised from the affected industries, and is working collaboratively with the North American Association of Food Equipment Manufacturers (NAFEM), equipment manufacturers, and the commercial food service industry in pursuing this control measure.

Further, in an effort to better understand the baseline NOx emissions from this equipment category, SoCalGas and SCAQMD have partnered to fund a study to characterize the NOx emissions from commercial cooking equipment. This study will be performed by SoCalGas at the Engineering Analysis Center and Energy Resource Center, and by Fisher-Nickel at the Food Service Technology Center. The study will assess NOx emissions from several common types of cooking equipment, including under fired charbroilers, standard and high efficiency open vat fryers, standard and high efficiency griddles, and various oven types including convection, range, deck, conveyor, and rack.

Additionally, the study will develop and validate test methods for measuring emissions of several types of natural gas fired commercial cooking equipment. All test methods and results will be reviewed by a newly formed Technical Committee comprised of representatives from SCAQMD, Fisher-Nickel, GTI, SoCalGas, and foodservice industry trade associations. SoCalGas appreciates the opportunity to partner with SCAQMD to promote the development, commercialization, and installation of high efficiency, low-emission gas-fired cooking equipment.

B. Cost-Effectiveness Remains a Significant Concern

Any SCAQMD regulation addressing NOx emissions from residential and commercial cooking equipment will be the first of its kind, and carry a heavy cost burden. This control measure could potentially impact many models and types of highly specialized cooking equipment with unique applications, process, and product requirements, such that redesigning cooking equipment will be a significant undertaking for food equipment manufacturers. SoCalGas encourages SCAQMD to consider incentivizing the development of more efficient burners that combust less fuel, with correspondingly lower NOx emissions. Overwhelmingly, commercial food service providers prefer to use natural gas cooking equipment for reasons including taste, cooking method, and operating cost advantages. Such a strong customer preference should be taken into account.

83-17 Con't

Further, we continue to caution that for many of SoCalGas' residential customers who are economically challenged, it is nearly impossible to replace older, inefficient equipment without significant financial assistance. SoCalGas strongly encourages the use of incentives for equipment replacement or energy efficiency initiatives to address residential sector cooking emissions. Any regulatory endeavor would be incredibly costly per ton of NOx reduced, as residential cooking equipment is very low-use, with an hour or less of active burner use per day.[32]

Lastly, SoCalGas remains concerned that, according to the Draft Socioeconomic Analysis, this control measure carries a price tag of $118.9 million dollars per year.[33] This constitutes the highest annual amortized cost of all of the control measures included in the Analysis. Given the challenges associated with mandating behavior change, and the incredibly high cost of regulation, SoCalGas strongly urges SCAQMD to reallocate a much larger portion of control costs to incentives.

[32] Only seven percent of residential fuel use is for cooking (about 31 therms per year or about 0.086 therms per day – 8,630 Btu per day). Range tops commonly have multiple burners with varying input. Small burners for simmer type cooking are rated at around 5,000 Btu per hr, standard burners are rated at about 9,000 to 12,000 Btu per hr, and large high input burners are rated at about 15,000 to 20,000 Btu per hr. *See* California Statewide Residential Appliance Saturation Study, Energy Commission Publication No. CEC-400-04-009, June 2004, *available at:* http://www.energy.ca.gov/HERS/rulemaking/documents/docs_relied_upon.html.

[33] Preliminary Draft Socioeconomic Report, August 2016, Table 2-1, "Preliminary Cost Summary of Draft 2016 AQMP Measures," p. 21.

APPENDIX 5

FUG-01: Improved Leak Detection and Repair

I. Summary of the Control Measure

This proposed control measure would reduce VOC emissions from a variety of emission sources, including but not limited to, oil and gas production facilities and other sources where fugitive emissions occur from piping components, wastewater system components, and process and storage equipment.

II. Proposed Method of Control

This control measure proposes to upgrade existing inspection and maintenance rules to require, at a minimum, a self-inspection program or, where feasible, utilization of optical gas imaging-assisted leak detection and repair (LDAR). In addition, the use of new technologies (Smart LDAR) to detect fugitive VOC emissions as a supplement to existing LDAR programs would be investigated.

III. Comments

83-18

A. How Was the Revised Cost-Effectiveness Calculated?

As noted in our August 19 comment letter, SoCalGas supports the use of optical gas imaging technology where cost-effective and feasible and we are committed to working with SCAQMD in its investigation of the use of Smart LDAR technologies.

However, SoCalGas would also like to emphasize our previous comments regarding cost-effectiveness. In the June 30 draft of FUG-01, SCAQMD noted an $11,000 per ton VOC controlled cost estimate. In this October 7 version, the control cost has been reduced to $4,000 to $5,000 per ton VOC reduced. SoCalGas is aware of the added language included in FUG-01's "Cost Effectiveness" in Appendix IV.[34] However, there is no discussion regarding why the original cost estimate changed, what data was utilized, and no supporting calculations demonstrating how these cost estimates were derived. Additionally, it is unclear how or why SCAQMD chose the Solar Occultation Flux (SOF) technology for use in its cost-effectiveness discussion and in the estimate of the capital, annual labor, maintenance and electrical costs cited. And, there is no explanation regarding how the estimated emission reductions of 2 tons per day were used to calculate the new cost-effectiveness range of $4,000 to $5,000 per ton VOC.

In SoCalGas' August 19 comment letter, we requested that SCAQMD provide the data and calculations that were used to derive the $11,000 per ton VOC reduced control cost estimate. With the new (and lower) control cost estimates contained in the October 7 draft FUG-01, SoCalGas once again requests that the data and methodology used to calculate the control cost be provided to facilitate public understanding of how SCAQMD arrived at its cost-effectiveness determination.

[34] Revised Draft AQMP, Appendix IV, p. IV-A-94.

B. The Technical Feasibility of LDAR Technology Should Be Assessed

While SoCalGas welcomes the use of advanced technology, especially when it is more efficient than Method 21, SCAQMD must carefully consider the technological feasibility and the entire range of costs—e.g., capital investment, construction, labor, and maintenance—before promulgating regulatory mandates. Additionally, SoCalGas supports SCAQMD's proposal to demonstrate feasibility of new Smart LDAR technologies through pilot studies and offer our assistance with these pilot projects and the development of Smart LDAR implementation protocols as noted in FUG-01's Smart LDAR phased-in approach.

Further, SoCalGas recommends that SCAQMD convene a Working Group to evaluate both the technical feasibility of Smart LDAR at stationary sources and the cost-effectiveness of mandating the technology. Requiring Smart LDAR will require significant investments that should be evaluated in more detail—facilities may have to install multiple units thereby substantially raising the capital and O&M costs. SoCalGas also requests that SCAQMD expeditiously release its analysis and findings of the 2015 study done to characterize technologies that quantify fugitive and stack emissions cited in Appendix IV.[35]

83-18 Con't

C. Regulatory Duplication Should Be Avoided

SoCalGas respectfully requests that as SCAQMD seeks to amend its Rules to require Smart LDAR and associated maintenance and recordkeeping requirements, it also carefully balances the need to avoid additional, duplicative regulation. The California Air Resources Board's Oil & Gas Rule is currently scheduled for adoption in February 2017, with implementation beginning in 2018. Other agencies such as California's Department of Conservation's Division of Oil, Gas and Geothermal Resources and the United States Environmental Protection Agency are also developing regulations that will include similar requirements. SCAQMD should work to minimize regulatory duplication and align any future rule amendments with state and federal regulatory requirements as they become available.

[35] Revised Draft AQMP, Appendix IV, p. IV-A-92 (fourth paragraph).

APPENDIX 6

BCM-05: Ammonia Emission Reductions from NOx Controls

I. Summary of the Control Measure

This proposed control measure seeks reductions of ammonia from NOx controls such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR).

II. Proposed Method of Control

Recent advances in catalyst technology have resulted in the development of ammonia slip catalysts that selectively convert ammonia into nitrogen (N2). These catalysts could be installed on boilers, engines, furnaces, and turbines that utilize either selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) resulting in less ammonia slip.

III. Comments

83-19

A. Applicability of BCM-05 Should More Specifically Describe the Basic Equipment Targeted by this Control Measure

Currently, BCM-05 states under the "Description of Source Category" section that this measure would target or be applicable to NOx Controls such as Selective Catalytic and Selective Non-Catalytic Reduction.[36] However, the basic equipment that would be affected by this control measure is not noted in the source category description, nor are any applicable ranges in equipment size or fuel throughput discussed. SoCalGas requests that SCAQMD more specifically identify the base equipment categories and size ranges affected by this measure in the source category description to ensure that affected regulated entities can better understand the applicability of BCM-05 to their operations.

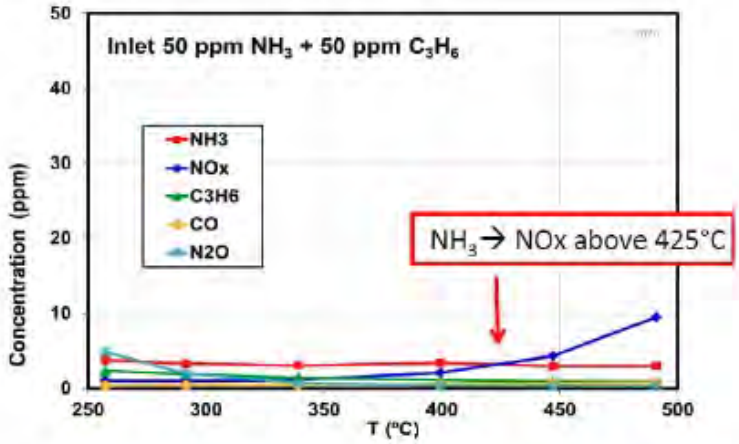
B. Conditions for Effective Application of an Ammonia Slip Catalyst Should Be More Comprehensively Evaluated

BCM-01 correctly states that the Johnson Matthey Advanced Ammonia Slip Catalyst can reduce ammonia slip with SCR equipped sources. However, the catalyst is not as effective in applications without waste heat recovery. Slide 5 of Johnson Matthey's presentation given at SCAQMD 2016 AQMP Control Strategy Symposium in June 2015, states that at above 425 degrees Celsius (797 degrees Fahrenheit), ammonia starts converting to NOx. [37]

[36] Revised Draft AQMP, Appendix IV-A, p. IV-A-214.

[37] Johnson Matthey Presentation, SCAQMD 2016 AQMP Control Strategy Symposium, June 2015, *available at*: http://www.aqmd.gov/docs/default-source/Agendas/aqmp/control-strategy-symposium/pm2-5-miller.pdf?sfvrsn=2

SoCalGas Comments on the Revised Draft 2016 AQMP



83-19 Con't

A closer look at the graph shows that the conversion curve actually starts increasing around 400 degrees Celsius (752 degrees Fahrenheit). Exhaust temperature in simple cycle turbines, 4-stroke lean burn engines, and in a few 2-stroke lean burn engines exceed these temperatures. If there is no use for waste heat recovery at a site to reduce the exhaust temperature, the Ammonia Slip Catalyst will cause an increase in NOx. This would conflict with the major emphasis of this ozone attainment plan which is to achieve NOx reductions and, in addition, could negatively impact a source's ability to achieve current or future applicable emission limits. SoCalGas requests that SCAQMD add clarifying language better describing the limitations in the applicability of ammonia slip catalysts.

Responses to Comment Letter from Southern California Gas Company (SoCalGas)
(Comment Letter #83)

Response to Comment 83-1:

Staff appreciates the continued collaboration and close partnership with SoCalGas in developing the 2016 AQMP for the attainment of the federal ozone and particulate matter standards in the Basin.

Response to Comment 83-2:

Please see Response to Comment 17-3 regarding fuel and technology neutrality.

SCAQMD strives to remain fuel neutral and CMB-01 is not intended to incentivize one technology over another. Language has been included in CMB-01 to emphasize SCAQMD's fuel and technology neutral stance. In CMB-01, staff references lower-emitting technology only to demonstrate the type of technology currently available for reducing NOx emissions in identified source categories, along with a possible pathway to achieve the NOx emission reductions. The emphasis on zero emission technologies, wherever and whenever technically feasible and cost effective, is not to favor a specific technology but to maximize the potential NOx reductions.

Response to Comment 83-3:

Please see Responses to Comments 17-3 and 83-2 regarding fuel and technology neutrality.

A working group will be formed to finalize detailed criteria and guidelines for the incentive program, which will need to be approved by the SCAQMD Governing Board. These guidelines will give additional consideration for a life-cycle analyses and co-benefits to fully assess the comprehensive emission reduction potential. CMB-01 seeks to find the most incentive-effective means to achieve NOx reductions.

Response to Comment 83-4:

Staff was provided the specific areas of concern raised by the commenter and many of the suggested clarifications have been made in the Draft Final Plan.

Response to Comment 83-5:

See Responses to Comments 17-3, 83-2, and 83-3 regarding fuel and technology neutrality and a working group.

Staff agrees with the commenter on the importance of a transparent public process and looks forward to stakeholder's participation in the working group

Response to Comment 83-6:

The SCAQMD is proposing to use incentives to help meet clean air goals for 2022 and 2023. Regulatory programs are also being developed especially for the longer term, and would be more cost-effective after incentive programs lead to development of lower cost, low emission and near zero emission equipment.

The commenter has incorrectly added the cost of the incentive program to the estimated incremental cost to represent the cost to business and property owners of commercial and multifamily properties. The cost impact to property or business owners is the incremental cost minus the incentives. In previous AQMPs, the majority of the cost of a rule-based control measure occurs over only a few years during rule implementation. The cost of the proposed measures in this AQMP are spread over 15 years, as indicated by the commenter, because the control measure has both short and long term goals.

The cost of the 2016 AQMP is higher than the 2012 AQMP mainly because the 2012 plan was not an ozone plan and while a few early ozone control measures were included in the 2012 AQMP, it was not a specific ozone reduction strategy demonstrating attainment. In addition, the costs of CMB-02, CMB-04, and ECC-03 have been revised, mainly to reflect incremental cost instead of total equipment cost. The combined cost net of incentives for CMB-02, CMB-04, and ECC-03 would now amount to about 29 percent of the overall net costs among all proposed stationary source control measures. Please refer to the Draft Socioeconomic Report for the updated cost estimates.

Response to Comment 83-7:

Staff appreciates comments and offers to further collaborate with utilities on implementing efficiency incentive programs. In past SCAQMD efficiency incentive efforts, we worked closely with utilities to leverage incentive funds. This collaboration helped achieve greater results for the efficiency program and we fully intend on these collaborative efforts in the future. This intent was further stated within ECC-03. When developing the energy efficiency strategies, the SCAQMD will convene a workgroup and collaborate with utilities, agencies, and other organizations to help leverage funding, coordinate incentives with similar existing programs, and to better understand technologies is current and future years. Please also refer to response to comment 56-3.

Response to Comment 83-8:

Staff appreciates the support.

Response to Comment 83-9:

Staff appreciates the comments regarding the mobile source contributions to the ozone air pollution problems in the South Coast Air Basin and the need to reduce mobile source emissions as quickly as possible. Staff will continue to work with CARB and U.S. EPA to ensure that emission reductions from mobile sources occur as early as possible. Staff appreciates the support for the AQMP Measures MOB-07 and MOB-08.

Response to Comment 83-10:

Staff concurs with the commenter regarding collaborative efforts and looks forward to your participation on the Working Group. Staff will endeavor to work with all stakeholders to pursue new funding.

Response to Comment 83-11:

Staff appreciates the comments regarding realistic timelines. Relative to realizing additional funding, staff anticipates that the mechanisms for new funding be identified in the one year period after adoption of the 2016 AQMP. It is important to show progress during this one period to identify new sources of

funding. Actions to implement identified mechanisms may occur within the one year period or may begin after the one year period.

Response to Comment 83-12:

Staff appreciates the comments regarding leveraging funding for near-zero emission technologies. Near-zero emission technologies have an important role in the near-term to achieve a significant amount of NOx emission reductions for many vocations where current zero emission technologies may not be feasible or not commercially available. Staff will continue to encourage fleets as they turnover their older vehicles to acquire near-zero and zero emission vehicles.

Response to Comment 83-13:

Comment noted. Detailed responses to the individual control measures attached in Appendices 1 to 6 are provided in the following sections.

Response to Comment 83-14:

83-14A: Please see Responses to Comments 17-3 and 83-2 regarding fuel and technology neutrality. Staff has included language in CMB-01 to further emphasize SCAQMD is fuel and technology neutral.

83-14B: Please see Response to Comment 17-7 regarding zero and near-zero emissions. Staff revised the language in CMB-01 to improve consistency. Staff will look at life-cycle emissions as part of subsequent analysis for the prioritizing and disbursement of incentives. Various scenarios will be analyzed for life-cycle emissions, such as those from natural gas power generation and renewables. Grid emissions can be assumed to meet the CARB Distributed Generation standards of 0.07 lb/MW-hr for NOx, which is the emission level for controlled power plants. However, there may be some variability depending on the type of generating equipment (combined cycle gas turbine, boiler, simple cycle turbine, wind, solar, etc.) and whether the power is generated inside or outside the Basin.

83-14C: The commenter noted $450 million of incentives estimated for CMB-01 in the Draft 2016 AQMP Appendix IV-A and was concerned about the lower amount of incentives subsequently reported in the Preliminary Draft Socioeconomic Report. The difference was due to whether the time value of money was taken into account. The Preliminary Draft Socioeconomic Report based the cost analysis using the same $450 million of incentive funding expected to be needed to implement CMB-01; however, it was reported as the *present worth value* of the stream of incentives anticipated to be allocated between 2018 and 2031. More precisely, the incentives expected to be allocated each year was discounted by a rate of four percent to year 2017 because, generally speaking, one dollar tomorrow is considered to be less valuable than one dollar today.

83-14D: Please see Response to Comment 73-2. Staff revised the inventory for ICEs.

83-14E & 83-14F: Staff appreciates the support for beneficial use of renewable gas for transportation and pipeline injection and for the use of incentives to transition older, higher-emitting equipment to zero and near-zero emission technologies.

83-14G:

"Beyond BACT": Staff agrees with the comment and revised the CMB-01 accordingly.

Combined Heat and Power (CHP): Staff included a discussion on CHP in CMB-01. Please see Response to Comment 73-4 about technology assessments.

Battery Storage: Staff appreciates the feedback on battery technologies and areas to consider when assessing the potential emission reductions. Staff will further evaluate this and all potential technologies during the development of the incentive programs.

Non-Catalytic After-Treatment Emerging Technologies: Staff included more detail on the non-catalytic after-treatment technology. More detail can be found in the RECLAIM staff report from December 2015.

"Unpermitted Equipment": Staff agrees with the comment and changed the reference from "unpermitted" to "permit exempt".

Response to Comment 83-15:

83-15A: Please refer to the response for comment 83-14 regarding fuel and technology neutrality.

83-15B: Please also refer to the response for comment 83-14 regarding the definition of near-zero and zero emission technologies. The SCAQMD will take into account equipment life in the analysis for the AQMP and proposes to include equipment life in establishing effective programs that can be approved by CARB and meet U.S. EPA requirements as discussed in the control measures. The SCAQMD always develops its program through a public process and will continue to do so during the development of the proposed incentive programs.

83-15C: Low NOx space heaters are currently available for residential and commercial applications. Nortek demonstrated a Rule 1111 ultra-low NOx compliant residential space heater at the 2015 AHRI annual meeting. In addition, Nortek currently sells small commercial space heaters in Europe and Australia with NOx emissions significantly lower than 30 ppm. A number of companies advertise large commercial space and air heating units with emissions less than 30 ppm. MultiCalor sells a line of Rule 1111 compliant residential space heaters in Europe and other companies' compliant products will be available next year. One U.S. manufacturer has started certifying a line of Rule 1111 low NOx furnaces under the SCAQMD certification program. The SCAQMD has been meeting with Rule 1111 furnace manufacturers individually to discuss their concerns and will continue to meet with affected companies during the next year. With regard to large commercial space heating furnaces, the SCAQMD is proposing to incentivize development of lower emission units and rule development will be considered at a later date. With respect to changing the form of emission limits in SCAQMD rules, any proposed change that would be considered would be addressed through the public process the SCAQMD uses for all of its programs.

83-15D: The SCAQMD will continue to work with the Gas Company on high efficiency and low emission advanced technologies.

83-15E: Incentives are critical in meeting clean air goals for 2022 and 2023. Regulatory programs would be developed for the longer term and would be more cost-effective after incentive programs lead to development of lower cost low emission and near zero emission equipment.

Please see Response to Comment 83-6 regarding the cost of the incentive program.

Response to Comment 83-16:

83-16A: Please see response to comment 83-7 regarding energy efficiency strategies. It should be noted that ECC-03 states "Zero emission and high efficiency applications will be prioritized to the extent they are feasible and cost-effective at the time of implementation."

83-16B: Staff appreciates the participation in the development of ECC-03 and look forward to future participation in the upcoming workgroup.

83-16C: Staff appreciates the participation in the development of ECC-03 and look forward to future participation in the upcoming workgroup.

83-16D: Staff appreciates the participation in the development of ECC-03 and look forward to future participation in the upcoming workgroup. Energy usage within the residential sector shows a correlation with household income. ECC-03 will assist to remove some of the financial barriers by providing incentive funds to help lower the upfront capital equipment cost and will also lower operation and maintenance costs as compared to an older existing appliance. The funds saved could then be used to offset potential physical or logistical barriers in a residence. It should be noted that each residence may have varying barriers depending on age of home, existing infrastructure, and other factors.

As mentioned in the SCAQMD Residential and Commercial White Paper, incorporating non-energy benefits into energy savings programs may provide more of a motivating factor to utilize existing programs. A recent UCLA study showed a study group of Los Angeles residents were least motivated to undertake energy saving measures when they were linked to reduced energy costs; a more significant motivator was to link energy saving efforts with reduced emissions. Therefore coupling energy savings with the amounts of emissions reduced may provide additional motivation to implement energy savings measures.

83-16E: ECC-03 is a voluntary incentive program available to increase turnover to more energy efficient appliances or other applications and is designed to reduce end use energy consumption and provide emission reductions within existing residences. It will not affect Title 24 Zero Net Energy methods, calculation path, or other aspect. Incentive funds from ECC-03 would be available to an eligible purchaser of the designated energy efficient applications to assist in meeting the Title 24 requirements. SCAQMD will participate in the Title 24 2020 Zero Net Energy (ZNE) efficiency development process to advocate for criteria pollutant and GHG emissions consideration.

Response to Comment 83-17:

83-17A: This control measure does not propose to incentivize replacement of residential cooking units. The focus of the proposed incentive program is on commercial cooking appliances, incentivizing purchase of more efficient and lower emission units and incentivizing development of lower emission burners for commercial cooking equipment.

83-17B: Please see Response to Comment 83-6 regarding cost-effectiveness of the incentive program.

In addition, the cost estimates for CMB-02, CMB-04, and ECC-03 include substantial amounts of incentives that are proposed to significantly lower the costs incurred by private businesses and consumers. Moreover, the cost estimates of these three proposed control measures have been revised since the August release of the Preliminary Draft Socioeconomic Reports. Please refer to the November 19, 2016 Draft Socioeconomic Report for the updated cost estimates.

Response to Comment 83-18:

The original cost-effectiveness estimate was based on the 2012 AQMP control measure. The $11,000 per ton cost-effectiveness was based on the cost of implementing traditional LDAR programs. Basically, it assumed that the cost to implement Smart-LDAR would be at worst the same as a traditional LDAR program. The previous cost-effectiveness estimate reflected an upper bound considering the lower expected cost of OGI techniques. The revised cost-effectiveness figure is based on the Optical Gas Imaging technology as a supplement to conventional LDAR. Potential cost savings from alternative technologies or labor reductions if Smart-LDAR can act as a substitute are not included. SCAQMD plans to implement the control measure through a public process. Both the pilot program to demonstrate feasibility of Smart-LDAR and any rule development to control fugitive emissions will be pursued in a public process allowing interested stakeholders to participate. Any rule development process that occurs will consider aligning requirements with similar efforts from other regulatory agencies.

Response to Comment 83-19:

BCM-05 lists the potential source categories such as boilers, engines, furnaces, and turbines that operate with either NSCR or SCR control equipment. Staff acknowledges that there may be limitations for certain specific high temperature flue gas installations and a future assessment of these categories and potential emission reduction opportunities would narrow down the applicability of specific source categories of equipment and size ranges.

Comment Letter from Earthjustice (Comment Letter #84)

November 7, 2016

Wayne Nastri
Executive Officer
South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765
wnastri@aqmd.gov

Re: Comments on Revised Draft 2016 Air Quality Management Plan ("AQMP")

Dear Mr. Nastri:

On behalf of the undersigned organizations, we submit this comment letter on the Revised Draft 2016 Air Quality Management Plan ("Revised AQMP" or "Revised Plan"). Overall, we are pleased that the Revised AQMP incorporated some of the suggestions we have provided on how to improve this vital plan. But, we continue to be concerned that the plan will not succeed in its ultimate goal of bringing clean healthy air to the millions of residents in the South Coast air basin. We need a plan that focuses on regulatory measures first. To the extent the Air District pursues voluntary programs, there needs to be a clear evaluation and timetable to pivot to regulations when these programs do not succeed. And the backup rule-makings need to start immediately. 84-1

I. Our Coalition Appreciates the Added Regulations.

We are pleased the Revised AQMP includes a commitment to two additional regulatory actions – achieving additional Nitrogen Oxide ("NOx") emission reductions from diesel back-up generators (CMB-01) and home appliances (CMB-02). These are important rulemakings to push truly clean technologies in the region, in addition to reducing our reliance on dangerous fossil fuels. These regulations should be started immediately to make sure the benefits accrue to the full extent prior to the 2022, 2023 and 2031 attainment dates for ozone. 84-2

II. Incentives Still Dominate the Plan, which is Risky.

We continue to be concerned about the massive reliance on huge unfunded incentives as the foundation of this plan. We have not seen the full funding plan, but the concepts floated to date are more like aspirational wishes than a real plan to clean the air. As such, we reiterate that certainty in pollution reductions comes from regulations as opposed to vague and uncertain fundraising programs for voluntary incentives. 84-3

III. The NOx REgional CLean Air Incentive Market ("RECLAIM") Commitment Should Be Strengthened.

The Revised Plan alters the NOx RECLAIM commitment (CMB-05) by noting one option is a "long-term transition to a traditional command-and-control regulatory structure." We appreciate the acknowledgment that some industries have used the NOx RECLAIM program as a shield from installing life-saving, readily-available pollution controls. The best example is the failure of oil refineries to install Selective Catalytic Reduction (SCR) units on many pieces of equipment at their facilities. This has created huge ongoing environmental injustice, especially in the areas around the refineries. Breathers in the region cannot wait for a "long-term" change to this broken system. There is no reason it should take another 15 years for the refineries to install equipment that can be installed in the next two to three years. Accordingly, we request a commitment to shift to command and control on a shorter timeframe. 84-4

IV. The Plan Needs to Commit to More Regulations to Curb Mobile Source Emissions within the Air District's Authority.

We continue to be disappointed that the Revised Plan does not propose robust regulations to address the significant health threat from large diesel truck magnets in the region. Sources like warehouses and ports impose immense pollution burdens on communities. We need regulatory programs to address these large sources. The Revised Plan suggests a voluntary program with vague notions of pivoting to regulations down the road. While we understand the Air District's authority is not boundless, it does have authority for indirect sources, which should be immediately implemented to the maximum extent. Accordingly, we ask that the Air District be a leader in making sure these diesel magnet sources do their part to stop polluting the region's air and communities. 84-5

V. The Air District Should Target Incentives to Disproportionately Impacted Communities for True Zero Tailpipe Emission Technologies and Associated Charging Infrastructure.

The Air District currently administers more than $100 million dollars in incentive dollars each year. The Revised Plan proposes to dramatically increase the annual contribution to polluting industries to clean up. Whether some or all that money is raised, the District should focus on providing truly zero emission technologies in disadvantaged communities. As we shift away from dangerous natural gas and diesel fuels, we need the Air District to focus first on providing truly transformational technologies to the disadvantaged communities because they need it first. This could come in the form of funding to develop charging infrastructure for bus depots serving these communities or funds to promote zero emission equipment projects at freight facilities. This type of targeted investment should be a cornerstone of the Air District's programs moving forward. We request the final Plan explicitly present a detailed analysis showing how much of the incentive funds will be going directly to disadvantaged communities. This is necessary for environmental justice. 84-6

VII. Conclusion

We appreciate your consideration of these comments. We expect the plan to be improved in the coming months to make sure the promise Congress made to all Americans of breathing clean air will be achieved. We will provide additional written comments and testimony as this process further unfolds. Please do not hesitate to contact us if you have questions.

Sincerely,

Adriano L. Martinez
Earthjustice

Taylor Thomas
East Yard Communities for Environmental Justice

Evan Gillespie
Sierra Club

Responses to Comment Letter from Earthjustice
(Comment Letter #84)

Response to Comment 84-1:

Staff appreciates the participation of the environmental coalition groups and support for the changes in the Revised Draft Plan. Staff acknowledges the concerns raised regarding the success of the Plan with a comprehensive control strategy of regulatory measures, incentives and co-benefits. As discussed in Response to Comment 11-1, regulatory measures are the first approach taken to achieve emission reductions, however, incentives are critically needed to achieve reductions for fast-approaching deadlines to meet ozone standards by 2022 and 2023, and can help advance deployment of cleaner technologies that traditionally would need more time for deployment.

Response to Comment 84-2:

CMB-01 and CMB-02 are designed to first target emission reduction opportunities through an incentive program. The purpose of the incentive program is to create opportunities and make it more cost-effective to replace equipment, transition to zero or near-zero technologies, encourage earlier change-out of higher-emitting equipment, and drive technology development and cost reductions. The incentive program will be followed by a regulatory program to ensure future emission reductions continue permanently.

Response to Comment 84-3:

Staff is working to secure funding for the incentive programs and recently released the Financial Incentives Funding Action Plan (http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draftfinancialincentivefunddec2016.pdf?sfvrsn=6). SCAQMD is committed to meeting the emission reduction in the Plan including incentives and regulations and provide for any shortfalls in commitments that may occur in the future.

Response to Comment 84-4:

The timing of an orderly transition into a command and control regulatory structure for RECLAIM facilities will be assessed as part of the RECLAIM working group that will convene in the spring of 2017 and will include stakeholders from the regulated community as well as environmental organizations.

Response to Comment 84-5:

Staff appreciates the comments regarding developing new rules and regulations for mobile sources. Staff believes that the one year period provides sufficient time for staff to work with affected parties and the public to identify actions that could be voluntary or regulatory. Voluntary actions will need to be "backstopped" if these actions are to be credited in the SIP. The commenter is referred to Chapter 4 of the 2016 AQMP regarding the actions to be taken for voluntary measures. If a direct regulatory process was followed, staff may need at least one to two years to develop any new rule proposal. Staff does not believe that any time will be lost with the approach proposed in the 2016 AQMP and will use this one year period to assess whether formal rulemaking will be taken. If so, staff will be able to build upon the input provided during the one-year period, which may have occurred if the SCAQMD proceeded with direct rulemaking.

Response to Comment 84-6:

Staff appreciates the concerns raised on ensuring incentive funding for both mobile and stationary sources is prioritized for reducing emissions in disadvantage communities and staff agrees that disadvantaged communities should be a priority. The incentive programs will contain a reporting element so the reductions achieved in Environmental Justice areas can be highlighted. The process and procedure in funding distribution will be discussed and determined during the working group meetings that will be established when developing the incentive program guidelines. The distribution will also examine the cost-effectiveness of projects so more emission reductions can be achieve with the same amount of incentive funding.

The SCAQMD will continue to encourage the deployment of zero and near-zero emission technologies where feasible. Historically, much of the incentive funding have occurred in environmental justice communities per provisions in the Health and Safety Code. The SCAQMD will continue to prioritize funding to environmental justice and disadvantaged communities. The priority on incentive spending in disadvantaged communities was emphasized in the Draft Final AQMP.

Comment Letter from California Council for Environmental and Economic Balance (Comment Letter #85)

California Council for Environmental and Economic Balance
101 Mission Street, Suite 1440, San Francisco, California 94105
415-512-7890 phone, 415-512-7897 fax, www.cceeb.org

November 7, 2016

Dr. Phillip Fine
Deputy Executive Officer, Planning and Rules
South Coast Air Quality Management District
Submitted electronically to pfine@aqmd.gov

Re: October 2016 Revised Draft Air Quality Management Plan

Dear Dr. Fine,

We are pleased to submit the following comments on behalf of the California Council for Environmental and Economic Balance (CCEEB). CCEEB is a non-profit, non-partisan association of business, labor, and public leaders, which advances balanced policies for a strong economy and a healthy environment. CCEEB represents major mobile and stationary sources across California and is an active stakeholder at the South Coast Air Quality Management District (SCAQMD).

CCEEB shares in the commitment of the SCAQMD to clean air and the protection of public health. For more than two decades, CCEEB and its members have been proud to work in close partnership with the District, its Governing Board, and its highly regarded professional staff on planning, development and implementation of the nation's strongest and most effective air pollution control regulations for stationary sources. The 2016 Air Quality Management Plan (AQMP) will be the most ambitious effort undertaken by the District in its history, and its success will rely on broad-based support from the Air Resources Board ARB), the federal Environmental Protection Agency, and state Legislature and Administration, and the many public stakeholders in the South Coast Air Basin. CCEEB is pleased to provide these comments in furtherance of the AQMP goals, and looks forward to continuing our successful work with the District and its partners in achieving attainment of state and federal ambient air quality standards. 85-1

What follows are comments on a few areas of the AQMP related to the recent October revisions.

Incentive Funding

At the October 27 meeting of the AQMP Advisory Group, staff presented a list of potential funding opportunities in support of the draft AQMP. While some of the 85-2

proposals could be politically challenging to implement, CCEEB believes that all options should be under consideration at this time, and we appreciate staff's efforts to identify viable funding opportunities. CCEEB is pleased to support District efforts in this area, and volunteers to participate in any stakeholder working group to further explore and secure funding opportunities. A good model for collaboration is the broad-based coalition formed in support of AB 8 (Perea, 2013), a bill which extended funding for the AB 118, Carl Moyer, and AB 923 mobile source programs. Given the short timeframe to achieve needed AQMP and State Implementation Plan (SIP) incentive-based emissions reductions, we urge all haste in pursuing this line of work.

85-2 Con't

For existing state programs, including ARB administered penalty monies and climate change investments, funding should be designed to *maximize* emission reductions, particularly NOx and PM2.5 emissions. Where ARB does not have discretionary authority, or where ARB faces competing priorities in funding goals, the District and its partners must emphasize health benefits of achieving air quality standards in South Coast as well as the San Joaquin Valley to administrative and legislative decision makers the public. Importantly, and as shown in the District's environmental justice (EJ) analysis, the AQMP will deliver significantly larger per capita health benefits to EJ communities and, "the most vulnerable and susceptible communities will experience proportionally more of the projected health benefits of cleaner air."[1] The added annual monetized public health benefit to EJ communities ranges from 23 percent to 31 percent higher than for non-EJ communities, depending on how EJ communities are designated. This added benefit holds true for both avoided premature deaths among adults as well as avoided asthma-related emergency department visits among children. Aligning existing programs with this goal in mind provides near immediate funding towards AQMP and SIP targets, and allows more time to implement additional funding opportunities. It is also consistent with the "fair share" doctrine since these incentives would be directed to mobile sources under state and federal control.

Although mobile sources will receive the preponderance of incentive funding (as appropriate, given that this source category accounts for 88 percent of NOx emissions), identifying incentives for stationary sources remains important. We discuss the benefits of stationary sources incentives further in our comments on CMB-01 and CMB-02 below.

CMB-05: NOx RECLAIM

CCEEB members are concerned over revised language in CMB-05, which states that a sunset of the RECLAIM program is now under "serious consideration." The measure fails to describe when or how this could happen, and is vague about whether or not there

85-3

[1] SCAQMD Preliminary Draft Socioeconomic Report (September 23, 2016), Chapter Six: Environmental Justice. Page 10.

would be interim program adjustments before a full sunset of RECLAIM. These are all important considerations. Our chief concern here is that CMB-05 could inadvertently and negatively affect market behavior due to program uncertainty.

CCEEB, along with a broad coalition of RECLAIM participants, worked extensively with the District on the recent NOx "shave," which will adjust the supply of RECLAIM trading credits to reflect equivalency with an updated assessment of Best Available Retrofit Control Technology (BARCT). Additionally, the District has made other program enhancements, such as new provisions regarding facility shutdowns. Throughout those rulemakings, it has been shown that RECLAIM consistently outperforms command-and-control in terms of emissions reductions, and in doing so, with lower (but still significant) compliance costs. Given this background, it is not clear in CMB-05 what is needed to, "make the program more effective in ensuring equivalency…with BARCT," or how a sunset of RECLAIM could achieve further NOx reductions.

85-3 Con't

In terms of the five tons per day of NOx reductions assigned to this measure, CCEEB reiterates our concern from our August 19 comments that there are too many unknowns at this time. This concern is now compounded by uncertainty over whether reductions would be achieved through further program reductions, sunset of RECLAIM, or a combination of both. For these reasons, at this time, we ask that "TBD" be used in the AQMP for CMB-05 instead of the assigned five tpd.

Finally, CCEEB asks staff to provide more information in the AQMP about how such a transition to command-and-control could occur, which entities would be affected, including those currently not in the RECLAIM program, what would be the potential timing, and what process the Board will use to make a decision. Any discussion of CMB-05 should take adequate precautions to minimize potential market distortions. We support the continuance of the RECLAIM advisory group to help work with staff on refining and implementing this measure.

CMB-01: NOx Stationary Sources --and--
CMB-02: Commercial and Residential Appliances

The October revision made significant changes to CMB-01 and CMB-02, measures that previously had focused on incentives intended to accelerate technology deployment. The revised AQMP adds a regulatory overlay to these measures, but does not clarify how new rules would work in conjunction with incentives.

85-4

The choice between using either a regulatory approach or an incentive-based approach depends on many factors. Regulations should be technologically feasible, cost effective, based on commercially available control technology, and practical for the application. Determining Best Available Control Technology (BACT) for a piece of equipment or

process is a prime example of this. Incentives, on the other hand, help advance new, emerging commercial technologies; overcome market failures to prompt behavior change and accelerate fleet and equipment turnover; achieve reductions from ubiquitous small, area sources that would be administratively burdensome to directly regulate; and assist small businesses and individual households with regressive compliance costs. Incentivizing equipment turnover also results in near-term emission reductions, as incentives increase turnover rates in equipment with long lifespans.

Regulatory approaches intended to force changes in the *types* of equipment or processes being used are more problematic. For example, District rules can require Tier 4 engines for new or modified backup generation, but incentives should be used to encourage switching to alternate technologies like fuel cells, microturbines, and battery storage. CCEEB recommends that the AQMP be explicit in terms of what criteria or principles would guide the District in choosing between regulatory and incentive-based approaches (or a mix of the two), and that consistent language be used throughout the AQMP. For example, an incentive program would assist early adopters of near zero emission technologies, prior to the implementation date of a standard requiring near zero emission technologies.

Another concern with the October revision is that the regulatory push for zero emission engines and equipment seems misaligned with the District's longstanding commitment to the principle of fuel and technology neutrality ("fuel neutrality"). Performance-based, fuel-neutral policies allow different technologies to compete openly and with a level playing field, thereby speeding innovation and market penetration of cleaner products and advanced controls. Similarly, fuel neutrality helps avoid mistakes in predicting unknown technological futures, that is, picking winners. For end users, fuel neutrality provides flexibility for people and businesses to choose the tools and processes they need or want to enjoy economic prosperity, mobility, and high-quality lifestyles, while guaranteeing progress towards environmental and public health goals. Fuel neutrality also allows service providers, such as water and waste water, to determine the most appropriate available technology that enables them to provide uninterrupted, reliable services to the public.

85-4
Con't

Fuel neutrality does not preclude encouraging the development and utilization of zero or near zero emission technologies, but it should guide how such policies are developed. The AQMP should specify that all control measures seek to maximize emission reductions, and that subsequent rulemaking will evaluate both zero emission and near zero emission technologies using full lifecycle analysis. Lifecycle analysis should consider both direct and indirect emissions, timing—that is, when emissions can be achieved—and cost effectiveness. If a near-zero technology can be deployed faster, with greater market penetration, and at a lower cost, it should be considered, as it may ultimately achieve better environmental outcomes. Conversely, it should not be assumed that zero

emission by way of electrification automatically results in the maximum reduction of emissions; this must be evaluated in lifecycle analysis.

Lifecycle analysis must also consider operational performance for intended equipment and engine applications, and any indirect costs or constraints stemming from needed structural or process changes. For example, in CMB-02, switching from a space heater to a heat pump could require onsite excavation, changes to the physical structure of buildings and HVAC systems, and diminished performance in certain applications. These issues would need to be factored into any rulemaking. As another example, in CMB-01, switching from a backup generator to battery storage could limit operating time during electrical outages, which could be impractical or unsafe in certain circumstances. 85-4 Con't

We are interested to understand how the new regulatory overlay will affect the socioeconomic analysis for these measures. In the June draft AQMP, which reflected an incentive-only approach, these two measures alone were one-third (33.24%) of total stationary source costs. The cost impact of the new regulatory overlay needs to be evaluated, along with analysis of the incremental cost of achieving the estimated 2.3 additional tons per day by 2031. It is worth noting that the cost of these two measures will primarily fall upon small- and medium-sized businesses and residential households.

MCS-01: Improved Breakdown Procedures and Process Re-Design

CCEEB requests that this measure be excluded from the AQMP. This measure will not achieve any emission reductions and EPA's Startup Shutdown Malfunction (SSM) policy is currently being challenged by 36 states. In the event this control measure cannot be removed from the AQMP, we request that a description of the ongoing litigation and potential flexibility afforded by EPA should be included in MCS-01. States subject to EPA's SIP-Call have proposed alternative compliance approaches that should be considered by SCAQMD prior to any amendment or repeal of Rule 430, if the D.C. Circuit upholds the SSM policy. 85-5

MOB-01 Emission Reductions at Commercial Marine Ports;
MOB-02 Emission Reductions at Rail Yards and Intermodal Facilities;
MOB-03 Emission Reductions at Warehouse Distribution Centers; and
MOB-04 Emission Reductions at Commercial Airports 85-6

The revised AQMP continues to propose four "Facility-Based" Mobile Source Measures that reference facility based targets. CCEEB again requests that all references to facility-based targets be removed. Emissions from the goods movement sector are projected to fall significantly from current levels due to regulations already in place and new State and Federal measures identified in CARB's Mobile Source Strategy. To achieve further emission reductions in the South Coast, we continue to support voluntary, incentive-

based approaches that do not put our Region at a competitive disadvantage. For these reasons, we strongly oppose Facility Measures. 85-6 Con't

We would be pleased to meet with you and your colleagues to discuss our comments in more detail.

Thank you.

Sincerely,

William J. Quinn
Chief Operating Officer

cc: Ms. Karen Magliano, Air Resources Board
Mr. Wayne Nastri, SCAQMD Acting Executive Officer
Mr. Michael Krause, SCAQMD Planning and Rules Manager
Mr. Gerald Secundy, CCEEB President
Ms. Janet Whittick, CCEEB Policy and Communications Director
Mr. Jackson Gualco, CCEEB Consultant
Ms. Kendra Daijogo, CCEEB Consultant
Members, CCEEB's South Coast Air Project

Responses to Comment Letter from California Council for Environmental and Economic Balance (CCEEB) (Comment Letter #85)

Response to Comment 85-1:

Staff appreciates the close, long-standing partnership with the SCAQMD on planning, development, and implementation of effective air pollution control regulations for stationary sources. Staff also appreciates comments on the 2016 Revised Draft AQMP to achieve attainment of the federal and State ambient air quality standards.

Response to Comment 85-2:

Please see Response to Comment 84-6 regarding incentive funding, environmental justice communities, and designing distribution based on maximizing emission reductions.

Response to Comment 85-3:

As stated in the draft final control measure CMB-05, a NOx RECLAIM working group will be convened in the spring of 2017 to assess various aspects of the program and also to develop options for the future of the program, including an orderly transition into a command and control regulatory structure and the timing of such a transition to achieve more SIP-creditable NOx reductions. Absent an orderly transition into a command and control regulatory structure, a five ton per day NOx reduction of the current market-based program is a reasonable target based on previous BARCT assessments.

Response to Comment 85-4:

Please see Responses to Comments 11-1, 28-1, 35-5, 45-2 regarding regulations and incentives.

Please see Responses to Comments 17-3 and 83-2 regarding fuel and technology neutrality. The push for zero or near-zero technologies is consistent with the District's goal to achieve the maximum NOx reductions that are technically and economically feasible; it is not a departure from fuel and technology neutrality. The technology replacements will be based on facilities or equipment owners indicating the type of technology they are requesting to replace or retrofit.

Please see Response to Comment 83-3 for life-cycle analysis.

During rulemaking process, a socioeconomic analysis will be conducted. Incentive-effectiveness will also be considered when awarding incentive funds.

Response to Comment 85-5:

Please see Response to Comment 35-10 regarding the inclusion of control measure MCS-01 in the Plan. Staff acknowledges the ongoing national litigation on this matter, and alternative compliance approaches that may be developed elsewhere in the nation will be considered prior to any amendment of Rule 430.

Response to Comment 85-6:

Staff believes that there is only one reference to specific "facility-based targets" in the four referenced measures as proposed in the "Control Measure Summary" section of MOB-01, which will be revised prior

to the Board's adoption of the AQMP. There are references to the State SIP Strategy emission reductions associated with the "Further Deployment of Cleaner Technologies" measures that the SCAQMD will strive to help implement through the four facility-based measures. The emission reductions associated with the "Further Deployment" measures serve as a starting point for discussions in identifying actions that may be voluntary or regulatory in nature. It is not expected that the identified actions will achieve the full emission reduction committed by the State, but will provide some certainty that emission reductions will be realized. As such, the emission reductions are proposed to be credited as part of future Rate-of-Progress reporting and recognized in future AQMP revisions.

Comment Letter from Building Industry Association of Southern California, Inc. (Comment Letter #86)

Building Industry Association of Southern California, Inc.

Southern California

November 7, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 92765

RE: Revised Draft 2016 Air Quality Management Plan

Dear Dr. Fine,

The Building Industry of Southern California, Inc. (BIASC) is pleased to provide the following comments to the Revised Draft 2016 AQMP in continuing collaboration with the SCAQMD to produce a final plan which will both serve the goals of the District in a productive and cost effective approach, and serve the constituency and stakeholders of the SCAQMD region, through improved air quality, health benefits and economic opportunity. 86-1

BIASC is a regional trade association that represents more than 1,100 member companies within a six county region and is comprised of Chapters in Orange, Los Angeles/Ventura, Riverside/Imperial and San Bernardino counties. Together, BIASC's members build most of the new home communities throughout the same six-county region.

EGM-01: Emission Reduction from New Development and Redevelopment Projects

The Revised Draft AQMP continues to have several measures which have not been included into the District's attainment strategy and as such, will appropriately not be accountable in the State Implementation Plan (SIP). One such proposed measure, EGM-1 (Emission Reductions from New Development and Redevelopment, all pollutants) is included as one of these TBD measures and is not even emission specific. 86-2

BIASC contends that under the Health & Safety Code (Cal. Health & Safety Code, § 39602.), only provisions required to meet Clean Air Act requirements should be included in the State implementation Plan (SIP). Since the TBD emission reductions listed in the current Revised AQMP Draft are not required to meet current attainment targets, they should not be included in the 2016 AQMP at all.

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949.553.9500 | biasc.org

Baldy View
LA/Ventura
Orange County
Riverside County

Revised Draft 2016 Air Quality Management Plan
November 7, 2016

Measures being included under the Health & Safety Code "consideration of all feasible measures" provision should be considered outside of the 2016 AQMP process, such as through the ISR working group soon to be reconvened.

All feasible measures need only be considered expeditiously as possible (Health & Safety Code § 40914(b)), and as such, not required to be included prematurely in the 2016 AQMP.

BIASC remains aware of the intention to continue to explore potential application of an indirect source rule (ISR), with the SJVAPCD rule 9510 as a primary comparative value. While we acknowledge that this evaluation is appropriate, we believe it again falls into the on-going consideration of feasible measures, outside of the current 2016 AQMP.

86-2 Con't

Additionally, we strongly oppose the implementation of fee based mitigation as an ineffective approach to meeting air quality improvement goals, alternatively AQMD should encourage incentive based approaches targeted at reducing both construction costs and encouraging environmentally friendly consumer behavior.

Commitment to Participate in the Title 24 Net Zero Efficiency Development Process

BIASC is committed to working with the SCAQMD and others to help quantify reasonable design and construction standards to apply to GHG emissions measurements. We routinely do this now to help inform mitigation practices and design options in meeting compliance for local Climate Action Plans.

With regard to criteria pollutants, the application to all six NAAQS is less clear with regards to energy efficiencies as applicable to new development. BIASC will be available to discuss in more detail how we can be a collaborative partner in this endeavor.

86-3

The housing affordability crisis is a major contributor to the increasing critical housing shortage in southern California. Regulatory efforts ranging from the Federal, State and Regional levels are often disjointed, redundant and counter-productive, leading to inordinate cost impacts to new home construction.

BIASC notes that several layers of regulatory structures exists that addresses Air Quality concerns including the recently adopted 2016 Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) which provides a primary template for integrating land use and transportation planning region wide, while reducing Green-House-Gas (GHG) emissions though intended reduction in vehicle trips.

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The California Environmental Quality Act (CEQA) also provides a comprehensive environmental analysis for AQ, including GHG analysis. BIASC opposes redundant and overlapping regulatory efforts as major contributors to increasing the cost of housing. 86-4

BIASC provides these comments as ongoing partners with SCAQMD in advancing the goal of clean air and eventual "Attainment" status for the South Coast Air Basin.

Respectfully,
BUILDING INDUSTRY ASSOCIATION OF SOUTHERN CALIFORNIA, INC.



Steven S. Schuyler
Executive Vice President, Government Affairs

Responses to Comment Letter from Building Industry Association of Southern California (Comment Letter #86)

Response to Comment 86-1:

Staff appreciates participation in the 2016 AQMP development process.

Response to Comment 86-2:

Proposed Control Measure EGM-01 is included in the Draft 2016 AQMP based on the provisions of the California Clean Air Act, which requires the plan to include "every feasible measure" and an "expeditious adoption schedule" (Health and Safety Code § 40914). On its website, CARB provided the following interpretation of "All Feasible Measures" (https://www.arb.ca.gov/ssps/ssps.htm#N_1_):

> "The CCAA requires districts that are unable to achieve five percent annual emission reductions to demonstrate to the ARB's satisfaction that it has included every feasible measure in its plan and an expeditious adoption schedule. However, the CCAA did not define the term every feasible measure. When the initial CCAA plans were being prepared, we [CARB] looked to related environmental statutes that offered useful definitions and precedent for defining this term. The most relevant definition found, and the one used, was in the guidelines issued to implement the California Environmental Quality Act (CEQA). In these guidelines, "feasible" is defined as:
>
> > Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." (14 California Code of Regulations, Section 15364)
>
> Thus, we [CARB] interpret the adoption of every feasible measure to mean that, at a minimum, a district consider regulations that have been successfully implemented elsewhere. They should also consider going beyond what has already been accomplished by evaluating new technologies and innovative approaches that may offer potential emission reductions. Further, districts should consider not only technological factors, but also social, environmental, economic (e.g., cost-effectiveness), and energy factors which prevail in the district, along with the resources realistically available to the district to adopt, implement, and enforce the measures."

The 2016 AQMP serves as a blueprint for the SCAQMD to implement measures to meet air quality standards including proposed measure EGM-01, which provides a mechanism for the SCAQMD to consider San Joaquin's Rule 9510 as discussed above. The proposed measure envisions initiating a public process to determine whether development of a rule similar to San Joaquin's Rule 9510 will be appropriate for the South Coast Air Basin and Coachella Valley or if there are other approaches that potentially result in additional emission reductions. If other approaches are identified and if the approaches are voluntary in nature and proposed to be credited in the SIP, there will be a public process to ensure that the reductions meet U.S. EPA integrity elements discussed in Chapter 4 of the 2016 AQMP. Given that specific implementation actions are not identified at this time, the emission reductions associated with EGM-01 are shown as "TBD." As specific actions are identified and the associated emission reductions are

proposed to be credited in the SIP, the emission reductions will be credited as part of the Rate-of-Progress reporting and credited in future AQMP revisions. As such, inclusion of EGM-01 and other TBD measures should not be considered outside the 2016 AQMP process and are not being prematurely considered.

Staff appreciates the comment regarding incentives funding and looks forward to working with the commenter and other stakeholders to identify incentives funding.

While we understand the concerns relative to fee-based approaches, the SCAQMD staff will be soliciting comments and input on such an approach and the feasibility of implementing such an approach in the South Coast Air Basin.

Response to Comment 86-3:

Staff appreciates participation in the 2016 AQMP development process. Control measure ECC-03, a voluntary inventive measure for residential energy efficiency to reduce NOx and VOCs, will closely follow the Title 24 Zero Net Energy developments and advocate for Title 24 to include criteria pollutant reductions. The SCAQMD will convene a workgroup and collaborate with utilities, agencies, and other organizations such as the Building Industry Association of Southern California.

Response to Comment 86-4:

It is not the intent of control measure EGM-01 to conflict with other regulatory efforts such as the responsibilities of evaluating and disclosing the potential adverse impacts from a project, including new development or redevelopment projects, under CEQA. On the contrary, if developed properly, successful implementation of EGM-01 could be relied upon by CEQA practitioners in their air quality and GHG analysis, and maybe more importantly, demonstrates a reduction of the potential adverse impacts from mobile sources.

Comment Letter from Latham & Watkins (Comment Letter #87)

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November 7, 2016

Via Electronic Upload

Dr. Phillip Fine
Deputy Executive Officer
Planning, Rule Development, and Area Sources
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Regulatory Flexibility Group Comments on the South Coast Air Quality Management District ("SCAQMD") 2016 Air Quality Management Plan

Dear Dr. Fine:

Thank you for the opportunity to provide comments regarding the October 2016 draft of the SCAQMD 2016 Air Quality Management Plan (the "AQMP" or "Plan"). We submit these comments on behalf of the Regulatory Flexibility Group ("RFG"), a coalition of California entities whose operations are subject to regulation under the Clean Air Act and corresponding state and regional air quality programs. RFG members include manufacturers, electric utilities and electric generating facilities, natural gas utilities, oil and chemical companies and other regulated entities. RFG members have participated in the review of and comment on SCAQMD regulations since its formation in the fall of 1990. We applaud District Staff for its extensive effort with respect to this iteration of the AQMP, and we look forward to continuing to work with Staff in advance of the Governing's Board's consideration of the Plan. Our general comments follow. 87-1

RFG Supports a Technology- and Fuel-Neutral AQMP

We appreciate that Staff has affirmatively stated in the draft AQMP that it intends to apply the long-standing approach of air quality regulatory agencies to set policies and requirements that are fuel and technology neutral. As we have previously advocated, the AQMP should not pick winners and losers, but instead should force technologies to compete against one another to maximize air quality benefits and provide products that meet residential, commercial, and industrial needs at reasonable cost. 87-2

Technology and fuel neutrality promotes competition, which forces technologies to become cleaner and drives down prices. In regulatory regimes around the Country, and in this District, technology and fuel neutral policies have succeeded in encouraging a clean air competition, which has resulted in the development and improvement of cleaner technologies powered by a number of energy sources. Importantly, technology and fuel neutrality also protects against price spikes and shortages, which can have devastating impacts on the economy. For all of these reasons, RFG fully supports the affirmative statement that the AQMP is intended to be fuel and technology neutral; we do, however, request that the District include additional affirmative statements throughout the AQMP (and, in particular, in CMB-01 and CMB-02) so that there is no ambiguity as to the District's intent in this regard. 87-2 Con't

RFG Supports an Incentive-Based AQMP

We appreciate the District's ongoing sensitivity to the delicate balance between the region's economic health and continued air quality progress. We believe that the next 15 years will pose unique and unprecedented challenges in crafting an air quality strategy that can meet the region's dual economic and environmental goals. In light of these interrelated goals, we were particularly encouraged by the draft AQMP's focus on aggressive, incentive-based programs targeting opportunities across industries and sectors for additional cost-effective emission reductions. As RFG has consistently advocated for the last decade, an incentive-based approach protects against the significant risk that mandating further reductions will result in Southern California businesses (which generally have already implemented Best Available Control Technology ("BACT")) incurring costs that are well beyond those that would be considered reasonable relative to the corresponding environmental benefit. 87-3

Nevertheless, we have some concerns that the textual revisions (*e.g.* the addition of the phrase "aggressive new regulations" to the overall strategy discussion on page 4-3 and the significant revisions to CMB-01 and CMB-02) made in the October 2016 draft of the AQMP preview an intent by the District to pull back from the incentive approach in favor of a traditional regulatory regime. While RFG recognizes that in order to achieve the Clean Air Act requirements, a combination of incentives and regulation will be necessary, we also feel strongly that an aggressive, multi-stakeholder effort to obtain the incentive funding necessary to derive air quality benefits in advance of implementing any regulations provides the best opportunity to meet air quality goals without risking the overall economic vitality of our region. RFG stands ready to work with the District to pursue the federal, state, and local funding opportunities in support of the incentive approach.

Regulatory Measures and Cost-Effectiveness

To the extent incentives alone are not sufficient to capture additional emission reduction opportunities from stationary sources, the District should only proceed with future regulatory measures after very careful technical evaluation of the feasibility of achieving further reductions at a reasonable cost. We are concerned with the District's increasing acceptance of higher values for cost effectiveness, particularly for those stationary sources that have already invested significantly in the control measures and from which there are limited further emission reduction opportunities available when compared to mobile sources. 87-4

Given the economic and employment risk of further burdening stationary sources, we strongly believe that any future regulation should include very clear incremental cost-effectiveness benchmarks to ensure that control measures, as implemented, remain within reasonable economic boundaries. Furthermore, any future stationary source measures should contain appropriate alternative compliance mechanisms (*e.g.*, an alternative compliance fee set at the relevant incremental cost benchmark level and used to fund clean technologies) to ensure that sources have a ready compliance alternative when costs near the benchmark level. 87-4 Con't

RFG Advocates for the Immediate Implementation of Certain AQMP-Identified "Incentives" for Stationary Sources

Currently, there is a material risk in Southern California that the traditional permitting process, offset scarcity and continued imposition of technology-forcing regulations will result in environmental regulations thwarting economic health. This can happen whenever stationary sources choose not to site their operations, and their jobs, in our region due to the length, uncertainty and relatively high cost of seeking a permit here rather than in more hospitable regions. We are also concerned that we may lose many of the businesses currently operating in the District if they believe they will be unable to achieve or afford emerging regulations. These unfavorable conditions can be avoided, or at least substantially reduced, by reforming the current regulatory program. This AQMP offers the opportunity to establish the framework to facilitate this needed reform.

We were particularly appreciative of the opportunity to share our concerns in this regard during the development of the Industrial Facility Modernization White Paper. In our comments on that document, we advocated for, among other things, the reform of the New Source Review ("NSR") program and the development of a presumptive BACT approach to expedite permitting. While AQMP CMB-01 lists permitting and NSR enhancements (along with a number of worthwhile proposals) as "potential" incentive measures for stationary sources, RFG feels strongly that the AQMP needs to go further in this regard. ***Without near term, meaningful NSR and permitting reform, we risk losing job creating opportunities because our region cannot permit new facilities fast enough or cheaply enough to compete with alternative destinations.*** 87-5

RFG, therefore, recommends that the AQMP commit the District to moving forward with the rapid deployment of the following two critical "incentives" to preserve existing manufacturing in the South Coast Basin and to capture new opportunities:

- *Expedited Permit Processing*: The District now has over 40 years of experience in evaluating control options (*e.g.*, BACT for the permitting of new and modified stationary sources). Certainly, the time has come when the District can identify, in advance, for the vast majority of the stationary sources it permits in the region, precisely what the control technologies will be for sources permitted here. We urge the District, in addition to expansion of the existing equipment certification program and pre-approved permit program, to develop a presumptive BACT approach by which sources can immediately receive a permit for most equipment types without the traditional extensive review period. Provided that the District develops a process for distinguishing between permit

applications that reasonably require further evaluation and those that do not, we believe that such an approach can be approved under existing law. 87-5 Cont

- *NSR Reform*: For well over a decade, we have urged the District, the California Air Resources Board and the EPA to pursue major offset reform. The current system is broken and the result is that it is nearly impossible for a manufacturing or energy project to be sited in the South Coast Basin even though any such facility would necessarily install BACT. Given this reality, we support the CMB-01-listed approaches of expanding the number of exemptions under Rule 1304, expanding the use of the priority reserve under Rule 1309.1, and providing short-term leasing options. We also see the contemplated clean air investment fund ("CAIF") as fitting into a three-tier approach for the comprehensive reform of the current system that RFG has been advocating for the last several years. Under the RFG-proposed approach: (1) a facility would seek to obtain any available offsets at or below a predetermined offset price (*e.g.*, similar to the AQMP cost-effectiveness benchmarks); (2) if a sufficient supply is not available on the market, then the facility would purchase offsets from a pre-funded CAIF administered by the District or by other appropriate publicly-accountable entities; and (3) to the extent a sufficient offset supply is still not available, then the facility would pay the benchmark fee to the CAIF. The CAIF would invest in appropriate emerging low-emissions technologies that the Board determines will be necessary for attainment and to meet the region's public health objectives. 87-6

While RFG also supports and deems critical a number of the other CMB-01-listed potential incentive opportunities for stationary sources (including incentive funding, CEQA initiatives, and recordkeeping reform), we feel strongly that expedited permitting and offset reform have the best opportunity to balance air quality improvement with the facilitation of needed opportunities for economic growth in our region and, therefore, request that the District make an affirmative commitment to immediately move forward with the implementation of these reforms in the AQMP.

The Future of RECLAIM Requires Careful Consideration

The RECLAIM program has been highly successful. As the District is well aware, regulated facilities under the RECLAIM program have dramatically reduced NOx emissions since the program's inception in the mid-1990s. In fact, the RECLAIM program has achieved an approximately 70% reduction in emissions from covered sources over the last two decades, which significantly exceeds the reductions from non-RECLAIM stationary sources over the same period. Critics of RECLAIM tend to evaluate the program against a "technology benchmark," and point to the absence of specific control technologies at certain facilities as "evidence" of the program's shortcomings. The problem with this approach is that it applies a completely inappropriate benchmark for evaluating the effectiveness of a market-based cap and trade program, which, by design, does not mandate any specific control technologies. The appropriate measure of success for a program such as RECLAIM is an "emissions benchmark," which evaluates whether or not the program has achieved the intended emission reductions. As indicated above, when evaluated against the appropriate benchmark, RECLAIM has exceeded both requirements and expectations. 87-7

The past success of the RECLAIM program does not mean that it should not be reevaluated from time to time, or that there are not ways to further improve upon the program. RFG supports continued evaluation of the program, as has been done since its inception, to determine whether or not there are ways to improve upon its past success. While additional analysis would be required before any informed decisions could be made, it may be appropriate to transition certain sources or categories of sources, particularly those that currently operate at BACT or BARCT levels, to a more traditional command and control regulatory regime. However, any transition of even a portion of the RECLAIM program to a command and control model will require extremely careful planning and consideration that takes into account the substantial investments that facilities have made over the past two decades consistent with the RECLAIM market-based model. In evaluating any proposed changes to the RECLAIM program, care should be taken to preserve those elements of the program that have worked effectively to achieve substantial emission reductions.

87-7
Con't

Finally, given the clear indication that the District intends to reevaluate at least certain aspects of the RECLAIM program, we do not believe it is appropriate at this time for the District to project a five ton emission reduction by 2031. Instead, we recommend assigning a "TBD" in the AQMP.

Thank you for the opportunity to submit these comments. We look forward to further discussions with the SCAQMD staff and with other stakeholders.

Sincerely,



Michael J. Carroll
of LATHAM & WATKINS LLP

Responses to Comment Letter from Latham & Watkins (Comment Letter #87)

Response to Comment 87-1:

Staff appreciates the support of SCAQMD's extensive effort to develop the AQMP. Staff also appreciates comments on the 2016 Revised Draft AQMP and looks forward to continuing to work with regulated entities under the federal Clean Air Act and other state and regional air quality programs.

Response to Comment 87-2:

Please see Responses to Comments 17-3 and 83-2 regarding fuel and technology neutrality. Clarifying statements regarding fuel neutrality were also added to the control measures.

Response to Comment 87-3:

Staff appreciates the support. Please see Responses to Comments 11-1, 28-1, 35-5, 45-2 regarding regulations and incentives.

Response to Comment 87-4:

Please see Response to Comment 85-4 regarding socioeconomic analysis.

Response to Comment 87-5:

Staff notes the commenter's remarks and appreciates the support for potential incentive opportunities. All possible incentive concepts will be investigated during the implementation of incentive programs, including facilitated permit processing and NSR Reform.

Response to Comment 87-6:

Please see Response to Comment 87-5 regarding NSR Reform.

Response to Comment 87-7:

Staff acknowledges that the RECLAIM program has resulted in significant emission reductions since its inception and that its market-based cap and trade approach does not require emission controls on every piece of equipment. A thorough evaluation will be conducted as part of the RECLAIM working group, which will be convened in the spring of 2017, to assess various aspects of the program, including an orderly transition to a command and control regulatory structure. Staff also acknowledges that certain facilities such as those that are already at BACT or BARCT may be more easily transitioned into command and control. The timing of a programmatic transition of all RECLAIM facilities to command and control will be a focus of the assessment. Absent an orderly transition into a command and control regulatory structure, a five ton per day NOx reduction of the current market-based program is a reasonable target based on previous BARCT assessments.

Comment Letter from Orange County Transportation Authority (Comment Letter #88)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

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Form Information

Date Created	Time Created	AQMP Year
11/02/2016	4:02 PM	2016

Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
GREG NORD	OCTA	ORANGE	CA	92868

If not representing a specific organization, please enter "No Affiliation".

Comments (Unlimited Size)

The Orange County Transportation Authority (OCTA) appreciates the AQMD addressed our initial comments, but we would like to reiterate some of the comments originally submitted by OCTA on August 9, 2016 (attached). OCTA continues to have concerns regarding the Advanced Clean Transit measure, which is still being discussed and refined through the California Air Resources Board. At this time, it is difficult to analyze costs or benefits associated with this measure, since it is yet to be defined. Additionally, OCTA remains particularly concerned with the costs of implementing this measure, and the potential impacts those costs could have on service and our transit dependent communities.

88-1

Related to the Advanced Clean Transit measure are the bus fleet assumptions identified in Appendix III, Attachment D. The numbers of diesel buses assumed to be in operation seem very high for all the years, including the 2012 base year. OCTA has the second largest bus fleet in the region at about 550 buses, which are almost entirely CNG. Metro has the largest fleet with about 2500 buses that are also almost entirely CNG. Therefore, it is difficult to understand how the assumption that solely 7000 diesel "urban buses" is justified for the base year. This may be impacting the model results as well as the socioeconomic analysis for the measures, especially the Advanced Clean Transit measure.

88-2

OCTA also remains concerned with the broad assumptions used for MOM-01, and we request to be included on the working group noted in Table 4-3.

While the AQMP now includes a year-by-year analysis of funding needs, the current scenarios do not seem to present a reasonable strategy for achieving the 2023 standards. Therefore, additional discussion and outreach on this issue should be sought through the development of the action plan that is intended to identify the necessary steps for securing the required funding. OCTA would appreciate the opportunity to participate in this process.

88-3

Finally, OCTA would like to emphasize that we are concerned about any strategies that may impact funding, or any other aspect of delivering projects in the Regional Transportation Plan. Such strategies would be counterproductive, as they could impact the ability for the region to implement the projects and programs used to demonstrate air quality conformity through the Regional Transportation Plan.

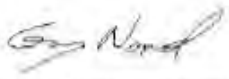
Upload Additional Comment and Supporting Files (30 Mb Maximum per file) (1)

AQMP Comments Files

PLN - AQMP Comments - 11/2/2016 - Comment Type: REVISED DRAFT 2016 AQMP - Author: GREG NORD - Agency: OCTA - N

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature*



For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

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August 9, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: **Draft 2016 Air Quality Management Plan**

Dear Dr. Fine:

The Orange County Transportation Authority (OCTA) appreciates the opportunity to provide comments on the Draft 2016 Air Quality Management Plan (AQMP). In addition, OCTA appreciates your diligent efforts to include a wide variety of stakeholders in your process as the final 2016 AQMP is developed.

Consistent with many of the strategies proposed in the AQMP, OCTA is currently taking actions that benefit air quality. These include upgrades to our bus fleet, such as: utilizing renewable natural gas, repowering 199 buses with 0.2 grams per brake horse-power engines (down from 2.0 grams per brake horse-power), ordering 0.02 gram per brake horse-power engines for 98 buses in our fleet, and acquiring a hydrogen fuel-cell bus, with another ten hydrogen fuel-cell buses and five electric buses pending a grant award. Other actions by OCTA that benefit sustainability include implementation of a regional network of bikeways, reallocation of transit resources to more efficiently serve high-demand areas, studying opportunities for transit-oriented development, and improving active transportation connectivity to transit services. 88-4

Furthermore, OCTA has a voter-approved sales tax measure to fund a multi-modal set of programs and projects that improve mobility in the region, reduce emissions, and preserve and enhance the environment. These include signal synchronization, system preservation, a new streetcar line, enhanced commuter rail services, freeway congestion management, an advanced-mitigation program that has set aside over 1,300 acres as permanent open space in Orange County, and a competitive funding program to mitigate water runoff beyond required standards. 88-5

OCTA does, however, have several concerns that we believe deserve further consideration prior to finalizing the AQMP. These concerns are outlined in the discussion below. 88-6

Orange County Transportation Authority
550 South Main Street / P.O. Box 14184 / Orange / California 92863-1584 / (714) 560-OCTA (6282)

Advanced Clean Transit

The California Air Resources Board's (CARB's) Advanced Clean Transit Regulation is included in the AQMP. This is intended to ensure that nearly every heavy-duty vehicle operated in California in 2023 will meet the 2010 heavy-duty engine emission standard. However, even a highly aggressive full-fleet penetration of 2010-compliant engines would not provide sufficient nitrous oxide (NOx) reductions to attain the federal ozone standard in the timeframe required. This proposed rulemaking also requires transit operators to replace their entire bus fleets with zero-emission technologies between 2018 and 2040.

88-6 Con't

The basic requirement to update bus fleets does not appear to be cost-effective, considering a battery electric or hydrogen fuel-cell bus costs between $900,000 and $1.5 million, plus the cost of fueling/charging infrastructure. A conventional compressed natural gas bus costs about $600,000. As such, implementation of the CARB regulation for buses could potentially lead to less funding for bus operations, which would likely result in reduced service levels and discretionary transit uses, which would disproportionately affect transit dependent populations in Orange County and the South Coast Air Quality Management District (SCAQMD) region. Given this, OCTA proposes that the Advanced Clean Transit regulation be performance based and technology neutral. This would help to reduce potential service impacts, and account for emission reduction efforts already underway, such as the current OCTA initiatives noted earlier.

Further, this level of investment by all of the transit operators throughout the region is only estimated to reduce NOx emissions by less than 200 pounds per day by 2023, and about 200 pound per day by 2031. This contributes extremely little to the 115 tons per day (tpd) reduction that is targeted for 2023, or the 124 tpd reduction targeted for 2031.

EGM-01 – Emission Reductions from New Development and Redevelopment Projects

88-7

The purpose of this measure is to mitigate and reduce emissions from new development and redevelopment projects. However, the description of EGM-01 is overly broad, and OCTA suggests that SCAQMD work with stakeholders to narrow this description or eliminate the strategy prior to finalizing the 2016 AQMP. Further, there are no quantifiable emission reductions associated with this measure, nor is there a cost-effectiveness analysis.

An EGM-01 working group consisting of affected stakeholders from local governments, the building industry, developers, realtors, other business representatives, environmental/community organizations, and other stakeholders, was established as part of the 2007 AQMP. OCTA respectfully requests inclusion in the working group when, and if, it is reconstituted.

In addressing indirect sources, the SCAQMD should develop implementation and compliance methods that will not unduly restrict local or regional jurisdictions' prerogatives with respect to land use approvals. During rule development, special consideration should be given to assure that any rule adopted will integrate with, and enhance, the California Environmental Quality Act (CEQA) process, and not impede the project approval process in light of CEQA timelines.

88-7 Con't

Incentive Strategies

The 2016 AQMP contains a number of measures that are designed to provide incentives to accelerate the penetration of zero- and near-zero emission technologies. Many of the measures target mobile sources that are regulated by the CARB and the United States Environmental Protection Agency (U.S. EPA).

It is therefore important to demonstrate within the 2016 AQMP that CARB and U.S. EPA are committed to these strategies, since they will likely be the implementing agencies. If they are not committed, these strategies should not be included in the 2016 AQMP, due to SCAQMD's inability to delegate to these agencies.

88-8

The Draft 2016 AQMP also notes that as much as $14 billion in funding must be identified in order to implement the "incentive strategies." Without identification of funding sources, these measures do not seem to be any more useful than the "black box" strategies that were included in previous AQMPs. OCTA is also concerned about the types of funding sources that could be considered and would appreciate involvement in making these determinations. OCTA's primary concern is related to potential increases in regulatory fees, or potential diversion of funds that OCTA depends on to deliver transit service, and the other programs mentioned earlier that contribute toward sustainability and quality of life.

Unquantified Measures

There are a number of measures that have not been quantified in the Draft 2016 AQMP. These are often referred to as "to-be-determined" or "TBD" measures. It may not be appropriate to include these types of measures in the 2016 AQMP, since the inclusion of measures implies some level of commitment toward delivering those measures. This could become problematic, considering an economic analysis cannot be performed without the quantified benefits.

Currently, it appears as though these measures could easily be put in place of the other quantified and committed measures by SCAQMD staff after the 2016 AQMP is approved. This kind of transfer of commitment should not be an action that can be implemented as an administrative change. OCTA also understands that the TBD measures may prove to be more cost effective than some of the other measures, and so it would make sense to pursue them. However, until the time that either a backstop measure is needed or a TBD measure is identified to be more cost effective than one of the currently quantified measures, OCTA requests that the TBD measures either be removed from the plan, or clearly separated from the quantified measures, and called out as uncommitted measures that require further development and evaluation. 88-9

Furthermore, should the TBD measures remain in the AQMP, OCTA requests that the 2016 AQMP include a discussion that clearly states the purpose for including these strategies and the process required to incorporate these strategies. This process would preferably include action by the SCAQMD Governing Board and opportunities for public review and comment.

Thank you once again for the opportunity to provide input on the Draft 2016 AQMP. Should you have any questions regarding the comments above, please contact Greg Nord, Principal Transportation Analyst, at 714-569-5885, or gnord@octa.net.

Sincerely,

Kia Mortazavi
Executive Director, Planning

KM:gn

c: Board of Directors
Executive Staff

Responses to Comment Letter from Orange County Transportation Authority (OCTA)
(Comment Letter #88)

Response to Comment 88-1:

Staff appreciates your comment regarding CARB's Advanced Clean Transit measure rule development. Your comment will be forward to CARB for their consideration. The SCAQMD staff will be following CARB's rule development and will consider your comments as we evaluate the merits and benefits of CARB's proposed regulation.

Relative to the Urban Bus emissions inventory, it is SCAQMD staff's understanding that the category titled "Diesel Urban Buses" actually includes natural gas buses operated by OCTA and the other transit agencies in the region. The emissions inventory appropriately reflects the natural gas buses despite the title for this category.

Response to Comment 88-2:

Staff welcomes OCTA's participation on the EGM-01 Working Group.

Response to Comment 88-3:

As mentioned in the funding analysis provided in Chapter 4 of the Draft 2016 AQMP, the funding analyses are meant to provide an overall understanding of the levels of funding that would be needed to help meet the emission reductions associated with the State SIP Strategy "Further Deployment" measures. Specific actions to pursue funding will be proposed as part of the Incentives Funding Action Plan. Staff welcomes OCTA's participation on the Working Group.

In developing the Funding Action Plan, staff will clarify its intent to seek new funding and not divert funding from existing transportation related projects or other existing or future programs that do not have air quality benefits as their primary objective (e.g., education funding and revenues to local governments).

Response to Comment 88-4:

SCAQMD appreciates the participation in the development of the 2016 AQMP and the efforts taken by OCTA to benefit air quality including upgrades to the bus fleet.

Response to Comment 88-5:

SCAQMD appreciates the participation in the development of the 2016 AQMP and the efforts taken by OCTA to benefit air quality including upgrades to the bus fleet.

Response to Comment 88-6:

Comments regarding the Advanced Clean Transit regulation have been provided to CARB since the measure is part of the State Mobile Source Strategy. It is not the intent of the control measure to result in reduced service levels but CARB has not released specific proposals for the rule amendment at this time. However, CARB has discussed concepts for a proposed regulation, which includes consideration of near-zero emission buses as a transition to zero-emission buses.

Response to Comment 88-7:

San Joaquin Valley Air Pollution Control District has an adopted rule, Rule 9510, that is approved by U.S. EPA. Rule 9510 achieves emission reductions from development and re-development projects (e.g., residential, commercial, industrial). Under State law, as a nonattainment area, the SCAQMD must evaluate all feasible measures to determine if other areas have passed rules more stringent than our own to be adopted and implemented in the South Coast Air Basin and Coachella Valley. San Joaquin's Rule 9510 covers a broad sector of development projects and these project types will be evaluated through a public process.

As noted, a working group will be established to develop EGM-01 and we encourage participation. The intent of EGM-01 is to seek emission reductions through greater deployment of cleaner technologies and not restrict local government prerogatives with land use approvals.

Response to Comment 88-8:

The SCAQMD has been in discussions with CARB regarding implementation of the State Mobile Source Strategy. The emission reductions associated with the State Mobile Source Strategy are primarily the responsibility of CARB and U.S. EPA. For the "Further Deployment" measures, the SCAQMD has a shared responsibility to help implement the measures and incentive funding is one of the implementation components.

Staff has developed a Financial Incentive Funding Action Plan as a companion document to the 2016 AQMP. Staff will explore potential funding opportunities and will seek input from stakeholders and the public. Opportunities may include new sources of funding on the federal, state and local level. Staff does not intend for these measures to divert existing funds.

Response to Comment 88-9:

The "TBD" (to be determined) measures require further technical and feasibility evaluations and the attainment demonstration is not dependent on these measures. However, they are included in the AQMP as part of a comprehensive plan with all feasible measures in case there is a possible need for additional measures and a shortfall in reductions. As emission reductions are realized and to the extent that the reductions can be SIP creditable, the reductions will be taken as part of future rate-of-progress reporting or as part of future AQMP revisions. For the SCAQMD TBD mobile source measures, emission reductions are accounted for under the CARB SIP Strategy so emission reductions are not listed to avoid overlap. These emission reductions will take place locally and will be determined when the programs, such as facility-based measures, are implemented.

Clarification of the TBD measures has been added in Chapter 4 of the Revised Draft Plan.

Comment Letter from Valley Industry Commerce Association (Comment Letter #89)

November 7, 2016

Michael Krause, Planning & Rules Manager, AQMP
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: 2016 Revised Draft Air Quality Management Plan – Comments

Dear Mr. Krause,

The Valley Industry and Commerce Association (VICA) represents over 400 businesses and non-profits across California. We welcome the opportunity to comment on the revised draft 2016 Air Quality Management Plan (AQMP). VICA supported the original draft AQMP's focus on incentive-based models and the emphasis on working with business and affected industries.

We are concerned that the revised draft focuses more on regulations than the original draft. VICA would urge the AQMD to continue maintaining the RECLAIM Program, which has successfully resulted in significant air quality improvements. Finally, VICA supports a fuel-neutral mobile source plan which allows consumer choice. 89-1

Besides the significantly increased costs, it is not clear that increased regulation is feasible to support attainment. We are concerned that increased regulation and a prescriptive approach will harm our small businesses and local residents. We support continuing the emissions reductions progress through incentive-based frameworks, cost effectiveness and options for businesses. Some of the new emission control technologies are not currently cost-effective, but may be necessary to achieve standards by 2023. We support appropriate incentives to offset the capital and operational costs of implementing these technologies. In contrast, a prescriptive or regulatory approach will drive up costs for everyone.

We look forward to continuing our work with the AQMP Advisory Group, developing a plan which will help grow our economy and protect our jobs.

Sincerely,

Kevin Tamaki
Chair

Stuart Waldman
President

Valley Industry & Commerce Association • 16600 Sherman Way, Suite 170 Van Nuys, CA 91406 • phone: 818.817.0545 • fax: 818.907.7934 • www.vica.com

Responses to Comment Letter from Valley Industry and Commerce Association (VICA)
(Comment Letter #89)

Response to Comment 89-1:

The draft final AQMP focuses on both incentive-based and regulatory measures in order to achieve the attainment targets. Although the RECLAIM program has resulted in emission reductions since its inception, a re-assessment is necessary in order to achieve further SIP-creditable emission reductions, including a possible transition into a command and control regulatory structure.

Regulations are necessary to achieve emission reductions and to further the development of control technologies. Incentives offer additional technological momentum. Although some emission technologies may not be fully implemented or cost effective today, they may be feasible in the future and will aid to achieving air quality standards by 2031. The total cost of control technology are the same whether funded entirely by incentives or required by regulations. The AQMP is designed to offer incentives to offset some of these costs when needed to accelerate deployment of cleaner technologies.

Concerning the comment on fuel neutrality, staff added language conveying the SCAQMD's continued support for fuel neutrality.

Staff appreciates the comments provided and looks forward to VICA's participation in and comments on implementing CMB-05. Staff looks forward to VICA's participation in identifying new incentive funding to help offset the additional costs associated with advanced deployment of zero and near-zero emission technologies.

Comment Letter from Truck and Engine Manufactures Association (Comment Letter #90)

Truck & Engine Manufacturers Association™
Bringing Cleaner Power to the World Since 1988 ®

333 West Wacker Drive, Suite 810
Chicago, Illinois 60606
Tel: (312) 929-1970 | Fax: (312) 929-1975
www.truckandenginemanufacturers.org

November 7, 2016

Mr. Wayne Nastri
Acting Executive Director
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Re: Proposed Revisions to the 2016 Air Quality Management Plan – CMB-01

Dear Mr. Nastri:

The Truck and Engine Manufacturers Association (EMA) is the trade association representing the primary manufacturers of engines used in a wide variety of applications, as well as the manufacturers of heavy-duty trucks. EMA members include the leading manufacturers of compression-ignition, diesel-fueled engines used to power stationary prime and emergency generators and pumps, including those stationary engines that are subject to regulation under AQMD Rule 1470 and AQMD Rule 1110.2. EMA represents engine manufacturers on issues relating to emissions, and has worked closely with both the United States Environmental Protection Agency (EPA) and the California Air Resources Board (ARB) to develop the national and California-wide emission standards governing stationary engines. 90-1

EMA has participated in various AQMD rule development efforts, including the most recent efforts to revise Rules 1110.2 and 1470. The AQMD is proposing to adopt new language and requirements regarding stationary engines in the draft 2016 Air Quality Management Plan that is currently under review. Specifically, AQMD is proposing to adopt requirements for zero and near-zero emissions equipment in control measure "CMB-01" of the Plan. EMA has a number of concerns and comments regarding those proposed requirements as they apply to stationary internal combustion engines, and more specifically, emergency engines.

First, EMA questions the inventory and air quality emissions assumptions used to justify any new control measures for emergency engines in the District. By regulation and permit conditions, emergency engines in the District are limited to 20 hours of testing and maintenance and 200 hours of emergency operation annually, and actually operate on average less than 30 hours per year for maintenance, testing, and operation during an emergency. The very small number of operating hours makes emergency engines an extremely small source of all emissions, especially if the emergency engine is relatively new. The inventory used to justify further regulatory actions appears disproportionately large when compared to the very low number of operating hours that emergency engines run. Moreover, because of the very small amount of annual emissions from emergency engines, there will be no measurable or significant benefit of the rule on air quality or human health. There is no good evidence that the requirements proposed in CMB-01 will meet any public health goal or are necessary to meet air quality goals in the District. 90-2

Second, emergency engines are designed to meet very strict and demanding performance requirements since their function is to protect human life, keep essential services functioning, and preserve both physical assets and services during times of emergency. The AQMP proposes to replace emergency engines with other technologies such as fuel cells or battery storage facilities. However, those alternative technologies have not been proven to be capable of providing the level of protection and reliability of emergency engines. Requiring the use of such unproven technology threatens to jeopardize the safety of citizens throughout the District. 90-3

Third, the AQMD is designating a specific technology solution rather than setting an achievable and cost-effective technology-neutral standard. Regulatory agencies should not, as a normal practice, dictate specific and unique technologies since doing so distorts markets and limits technological solution and advancements. Designating specific technologies, especially unproven ones, in the AQMP is an unsound policy. 90-4

Fourth, the AQMD also seeks to set a minimum emission standard in cases where zero emissions technology is not feasible and indicates that standard for emergency engines should be final Tier IV nonroad emissions standards. The U.S. EPA, CARB, and even AQMD when developing Rule 1470, have already looked at those aftertreatment forcing standards for emergency engines and have determined that the use of the emissions control equipment necessary to meet those standards – generally diesel particular filters (DPF) and selective catalytic reduction (SCR) – is not technically or economically feasible. Nothing has changed to alter that view or conclusion, and the AQMD should not seek to require a standard that cannot be effectively or economically applied to emergency engines. 90-5

Finally, replacing all emergency engines with zero-emissions technology or requiring Tier 4 level emission standards will not be cost-effective. As mentioned above, both the US EPA and ARB have determined that the use of aftertreatment technology cannot be considered cost-effective since the addition of the technology as well as the need for increased maintenance costs greatly increases the capital and operating costs of the emergency engine system, but results in only minimal emissions reductions. Cost-effectiveness calculations by the US EPA and ARB related to using DPF's to reduce PM emissions from emergency diesel engines resulted in values well in excess of $1 million/ton of PM reduced, far higher than almost all other actions to reduce ambient PM levels. In addition, fuel cell costs are considerably higher than costs for reciprocating engines, and it is not clear what type of cost comparison could be made to replace engines with batteries sufficient to meet the performance and duty-cycle specifications for emergency engines. 90-6

Based on the above, EMA believes that there are valid technical and economic reasons that the AQMP should not include a requirement to replace stationary emergency engines with unproven and very expensive zero, near zero, or Tier IV Final emissions technology. The primary reason for not approving such a mandate is related to safety – emergency engines need to operate properly in order to protect human life and property. The potential direct impacts to human life and health from the proposed AQMP requirements far outweigh the negligible benefits from minimal emissions reductions from emergency standby generators. In addition, the costs of implementing the revisions to CMB-01 would be extremely high. Consequently, EMA strongly recommends that the provisions related to stationary emergency engines should be removed from the final AQMP, since they 90-7

are infeasible, produce no substantial emissions or health benefits, and will only add unnecessary costs to businesses and citizen within the District.

EMA appreciates the opportunity to submit these comments, and trust that AQMD staff will give careful consideration to the issues we have identified. To that end, please feel free to contact me if you have any questions regarding these comments.

90-7 Con't

Sincerely,

Joseph L. Suchecki

Joseph L. Suchecki
Vice-President, Public Affairs

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.
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Date Created	Time Created	AQMP Year
11/07/2016	12:19 PM	2016

Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
JOSEPH L. SUCHECKI	TRUCK AND ENGINE MANUFACTURERS ASSOCIATION	CHICAGO	IL	60606

If not representing a specific organization, please enter "No Affiliation".

Comments (Unlimited Size)
The Truck and Engine Manufacturers Association (EMA) provides the attached comments on the 2016 AQMP relative to CMB-01 regarding emergency engines. Emergency engines provide essential services to protect life and property and contribute minimally to air emissions due to their very limited use. The measures proposed in CMB-01 are not feasible and certainly are not cost-effective and should not be adopted. EMA looks forward to working with the District on the proposed measures.

90-8

Upload Additional Comment and Supporting Files (30 Mb Maximum per file) (1)

AQMP Comments Files
PLN - AQMP Comments - 11/7/2016 - Comment Type: REVISED DRAFT 2016 AQMP - Author: JOSEPH L. SUCHECKI - Agency: TRUCK AND ENGINE MANUFACTURERS ASSOCIATION - N

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature*

For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from Truck and Engine Manufacturers Association (EMA)
(Comment Letter #90)

Response to Comment 90-1:

Staff appreciates the commenter's experience in the trucking industry and providing your insight.

Response to Comment 90-2:

Please see Response to Comment 73-2 regarding the emissions inventory and the Draft Final Appendix IV A for the revised inventory calculations. Also see 73-9 regarding the emissions for emergency ICE**.**

Response to Comment 90-3:

Please see Response to Comment 73-4 about technology assessments and 78-6 about fuel cell reliability.

Response to Comment 90-4:

Please see Responses to Comments 17-3 and 83-2 regarding fuel and technology neutrality. CMB-01 mentions many technologies and lays out a path for achieving 3.9 tpd NOx reductions. Staff is not mandating the technologies mentioned, just demonstrating that the projected emissions reductions are feasible. Once the incentive program is initiated, the facilities will seek incentives for replacement technologies or control equipment that serves their individual needs. Alternatively, any regulatory requirements will look at setting emissions standards to achieve NOx reductions.

Response to Comment 90-5:

Please see Response to Comment 73-4 regarding technology assessments. Please see Response to Comment 35-5 regarding Tier 4 engines. If regulatory measures are implemented, staff will only propose technology that is feasible or cost-effective. The incentive option was put in place to assist and accelerate a transition to zero and near-zero technologies that are not currently cost-effective.

Response to Comment 90-6:

The incentive measure strives to help facilities transition to zero and near-zero technologies that are not currently the most cost-effective option. The purpose of the incentive program is to create opportunities or make it more cost-effective to replace equipment, transition to zero or near-zero technology, encourage earlier change-out of higher-emitting equipment, and drive technology development and cost reductions.

Response to Comment 90-7:

Please see Response to Comment 73-4 about technology assessments.

Comment Letter from American Trucking Associations (Comment Letter #91)

American Trucking Associations
950 North Glebe Road, Suite 210 * Arlington, VA * 22203
www.truckline.com

November 7, 2016

South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar CA 91765

Submitted Electronically

RE: ***Revised Draft 2016 Air Quality Management Plan***

The American Trucking Associations, Inc. (ATA) submits these comments in response to the South Coast Air Quality Management District's (District) "*Revised Draft 2016 Air Quality Management Plan (AQMP).*"[1] ATA is the national trade association representing the American trucking industry. As such, ATA is vitally interested in environmental initiatives that impact the nation's trucking companies and the flow of commerce.

The trucking industry has made significant progress reducing emissions. As a result of more stringent federal engine emissions standards, a new truck today generates one-tenth the level of particulate matter (PM) and the ozone precursor, nitrogen oxides (NOx), than a similar truck manufactured in 2006. In addition, the fuel economy of these new trucks is improved by at least 20 percent, which directly correlates to greenhouse gas emissions (GHG) emission reductions. An additional 25 percent improvement in fuel economy, and GHG reductions, is being phased-in through 2027. These GHG reductions also reduce NOx and PM emissions. 91-1

Despite these significant emission reductions, the draft AQMP proposes to grant new regulatory authority over trucks to the District. ATA is extremely concerned about this unprecedented approach which could result in different operational requirements at the regional or facility level. The following comments discuss these concerns in more detail.

1) A Regulatory Framework is Already in Place to Achieve Significant Reductions

In addition to the emission reductions being achieved through federal engine emission standards, the State of California has implemented an aggressive regulatory program that targets further reductions. This program establishes emission standards for new engines and 91-2

[1] ATA is a united federation of motor carriers, state trucking associations, and national trucking conferences created to promote and protect the interests of the trucking industry. Directly and through its affiliated organizations, ATA encompasses over 34,000 motor carriers and suppliers of every type and class of operation in the United States, Canada, and Mexico.

vehicles and for the in-use trucks, trailers and transport refrigeration units that operate throughout the state. The estimated compliance cost of the in-use portion of this regulatory program is approximately $1 billion annually with additional regulations affecting the fuel sold in the state adding an additional $1 billion annually.[2] 91-2

The air quality benefits of the existing federal and state regulatory programs, which impact nearly every aspect of truck operations, will reduce current truck-related NOx emissions in the District by 70 percent by 2031.[3] When the additional statewide truck-related measures identified in the California Air Resources Board's (CARB) Mobile Source Strategy are included, truck-related NOx reductions are projected to surpass 80 percent by 2031.

These reductions are consistent with the "fair share" reduction goal of 80 percent which was discussed throughout the AQMP Advisory Group process. In other words, trucking's fair share goal can be achieved through the existing federal and state regulatory framework.

2) Proposed Measures MOB-01 through 04 ("Facility Measures") and MOB-08 ("Fleet Rules") will Adversely Impact Interstate Commerce

ATA is extremely concerned about the District's proposed control measures which could lead to a patchwork of emissions regulations affecting truck operations, specifically the facility measures and fleet rules. As proposed, these measures could establish access restrictions at various freight facilities located in the District as well as unique equipment purchasing requirements on the trucking companies located in the District. These measures represent an unprecedented, and legally questionable, expansion of the District's authority to regulate mobile sources and the flow of commerce. 91-3

While certain aspects of these rules have been found by the U.S. Supreme Court to be preempted, the Clean Air Act further prohibits the state (or subdivision thereof) from creating a "third vehicle" standard.[4,5] Given the legal constraints associated with the District's authority to regulate mobile sources, a more constructive path to achieving further emission reductions will be to continue to work collaboratively with CARB and the freight industry to incentivize and voluntarily accelerate the deployment of lower-emitting, advanced technology vehicles.

3) Emissions Reductions from All Existing Programs have not been Included

CARB has indicated that NOx reductions from a number of existing regulatory programs have not been accounted for in the attainment demonstration modeling. Specifically, the modeling does not account for NOx reductions associated with both the Phase 1 and Phase 2 federal GHG 91-4

[2] Estimates provided by the California Trucking Association.
[3] California Air Resources Board, *Mobile Source Strategy*, (May 2016).
[4] Engine Manufacturers Association v. South Coast Air Quality Management District, U.S. Supreme Court, No. 02-1343 (April 28, 2004).
[5] 42 USC §7504.

emissions standards for medium and heavy-duty trucks. According to the U.S. EPA, the Phase 2 rule alone is projected to reduce downstream (i.e., tailpipe) NOx emissions by 10.2 percent by 2040.[6] NOx reductions associated with the state's existing Periodic Inspection Program, which requires annual tailpipe emissions testing of in-use heavy-duty diesel vehicles, have not been accounted for either. In addition, it is unclear if NOx reductions from the state's Tractor-Trailer GHG Regulation have been included in the demonstration modeling.

91-4 Con't

It is imperative that all existing emission reductions be accounted for as part of the District's attainment demonstration. To address these deficiencies, the District should work with CARB and other stakeholders to further evaluate the modeling assumptions and create a more transparent process to identify what actions are or are not being accounted for.

ATA remains committed to improving air quality throughout the nation in a practical and efficient manner. We request your careful consideration of these comments.

Respectfully,



Michael Tunnell
Director, Energy and Environmental Affairs
American Trucking Associations

[6] U.S. Environmental Protection Agency, *Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles – Phase 2, Regulatory Impact Analysis, p. 5-43 (August 2016).*

Responses to Comment Letter from American Trucking Associations (ATA)
(Comment Letter #91)

Response to Comment 91-1:

Staff appreciates the efforts made by the trucking industry to reduce emissions from heavy-duty vehicles. Regarding the comment "that the draft AQMP proposes to grant new regulatory authority over trucks to the District", it is the primary intent of AQMP Measure MOB-08 to seek incentives funding in the near-term and identify voluntary actions that the trucking industry is implementing that could potentially result in additional NOx emission reductions. The latest draft 2016 AQMP proposes a one-year period for the SCAQMD staff to work with all stakeholders to identify actions and seek additional incentives funding. Identified actions may be voluntary or regulatory in nature. As noted in Response to Comment 91-4 below, if emission reductions associated with several of the State SIP Strategy measures are quantified and if reductions are obtained through incentive measures, those reductions will help reduce the emission reduction commitment for the "Further Deployment of Cleaner Technologies" heavy-duty measure. However, if sufficient progress is not made in this effort, the SCAQMD staff will report to its Governing Board whether formal rulemaking should proceed or other enforceable mechanisms be developed.

Response to Comment 91-2:

As noted in the State SIP Strategy, heavy-duty truck emissions have been significantly reduced. However, as stated in the State SIP Strategy further emission reductions from this category will still be needed for the South Coast Air Basin to attain federal air quality standards. AQMP Measure MOB-08 does not have emission reductions associated with implementation of the measure since this measure is proposed to assist in achieving the emission reductions associated with the State SIP Strategy "Further Deployment" measure.

Response to Comment 91-3:

As stated in response to Comment 91-1, the primary intent of MOB-08 is to work collaboratively with the industry and other stakeholders to identify voluntary actions through a public process, which may alleviate some of the Commenter's concerns. The voluntary actions would include incentives funding and voluntary turnover of older trucks. In addition, the trucking industry continues to look at operational efficiencies to save on fuel costs. Such actions may have potential criteria pollutant emission reduction benefits, which could be credited in the SIP.

Response to Comment 91-4:

As CARB quantifies the emission reduction associated with the on-road heavy-duty vehicle measures in the State SIP Strategy, it is the SCAQMD staff understanding that this will help reduce the emission reduction associated with the "Further Deployment" measures. Staff intends to work closely with CARB on this effort.

Comment Letter from REALTORS Committee on Air Quality (Comment Letter #92)

REALTORS® *Committee on Air Quality*

Carol Banner, Chairman

106 South Grand Avenue
Pasadena, CA 91105
323/342-9373

November 7, 2016

Michael Krause
South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, CA

SUBJECT: Comments on the Revised Draft 2016 Air Quality Management Plan

Dear Mr. Krause:

The REALTORS Committee on Air Quality (RCAQ), a voluntary coalition of 35 Associations of REALTORS that serve the South Coast Air Basin, strongly supports clean air in concert with housing affordability and availability. We have reviewed the October 7th Revised Draft 2016 AQMP and offer the following additional comments to insure that the proposed control strategies do not exacerbate the region's housing shortage and affordability crisis.

92-1

1. Strong Support for Incentives to Accelerate Implementation of the AQMP

SCAQMD has added more regulatory elements to the current Revised Draft AQMP. We believe that measures related to housing and residential uses must continue to be implemented through incentives to avoid damaging impacts to the cost and availability of housing for families of all income levels. To that end, we support the District's ongoing efforts to prepare an incentives action plan that identifies realistic sources for the needed incentive funds. The AQMP must establish that the amount of incentives are commensurate with the amount of emission reductions committed.

92-2

2. Measure CMB-02, Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications

This measure has been significantly changed to urge consideration of solar and Zero Emission technology for space and water heating, whenever cost-effective. The previous focus on multifamily residential has been broadened to all residential buildings. This measure also seeks to accelerate the pace of space and water heating change-outs. We also

note the 90% increase in the amount of emission reductions committed from this measure in 2031 as a result of the new scope.

We urge that this measure impact residential households only through incentives, to insure a win-win outcome for air quality and affordable housing.

We support continued fuel neutrality in this measure. We believe emphasis should be placed on clean technologies and appliances that are most cost/effective and commercially available. We also support a range of compliance options for residents, as one-size-fits all solutions don't address the needs of diverse households, housing stock and geographic locations within the Basin. 92-2 Con't

Because this measure is proposed to be part of the enforceable commitment to be submitted to USEPA, it is important that the emission reductions be appropriately scaled to the amount of incentive funds that can reasonably be expected to help residents comply. The AQMP estimates that $520 million in incentives will be needed to implement this measure, and we look forward to details in the Final AQMP that identify likely resources.

We recommend that the District convene a stakeholder working group to advise on CMB-02 rulemaking. RCAQ asks to be included in this effort.

3. **Indirect Source Measure EGM-01, Emission Reductions from New Construction and Redevelopment**

As we explained in our August 2016 comment letter, an increase in new housing costs will ripple through the entire housing stock, so EGM-01 should be pursued cautiously. We do not support a San Joaquin Valley APCD-type rule: the requirements are arbitrary and not based on the specific characteristics of the South Coast Air Basin. We continue to urge that the EGM-01 development process examine the full range of implementation options appropriate for the South Coast Air Basin, especially in light of already stringent Title 24 requirements. 92-3

EGM-01 is not quantified: the draft AQMP includes no cost or emission reduction estimates. As a result, the socio-economic impacts of this measure are not evaluated in the Socioeconomic Analysis. SCAQMD has designated this measure as "To Be Determined" and not part of the enforceable commitment to be submitted to USEPA for approval. We request that SCAQMD insure that this TBD control measure will not generate a federally enforceable rule adoption requirement or emission reduction commitment before the need for, and content of, a rule is fully evaluated by the EGM-01 working group.

4. Economic Impact of Proposed AQMP Control Measures

RCAQ has long asked for a tally of the cumulative costs and impacts of the AQMP on the region and the housing sector – not just the incremental cost of the current proposal. Missing chapters of the Socioeconomic Impact Analysis have just been released three working days before the District has called for comments on the Revised Draft AQMP. We are therefore not able to comment on the newly released information and will submit further comments on those documents during November. 92-4

Thank you for your consideration of these comments. We are available to discuss them with you at your earliest convenience. Please contact RCAQ consultant Carla Walecka at cwalecka@earthlink.net or 323=342-9373.

Sincerely,

Carol Banner

Carol Banner
RCAQ Chairman
carolabanner@gmail.com

Responses to Comment Letter from Realtors Committee on Air Quality (RCAQ)
(Comment Letter #92)

Response to Comment 92-1:

Staff appreciates the support for the incentives and encourages the commenter to participate in the further development of the Financial Incentive Funding Action Plan that will help define the ways to obtain funding needed to achieve the corresponding committed emission reductions.

Response to Comment 92-2:

The commenter advocates the exclusive use of incentives to reduce emissions and thus eliminate the financial impact on residential households. The application of incentive funds will be considered when the individual incentive program and guidelines are developed. The guidelines are expected to address the detailed implementation specific to the different incentive programs. A Financial Incentive Funding Action Plan is currently under development that will provide more detail as to the possible source of funding available.

The SCAQMD has a long-standing policy of technology and fuel neutrality; however, staff also recognizes the benefits of cleaner technologies and appliances that are most cost-effective and commercially available. Staff, in collaboration with interested stakeholders, will also seek a range of compliance options for residents.

Staff will form working groups to facilitate a dialogue between agencies, utilities, businesses, and other stakeholders to accomplish the proposed controls. Working group meetings could help affected or interested stakeholders, such as the Realtors Committee on Air Quality, address potential concerns that may arise from new technology and equipment replacement.

Response to Comment 92-3:

As indicated in EGM-01, staff will consider the appropriateness of implementing an approach similar to San Joaquin Rule 9510 for the South Coast Air Basin. Since the measure does not have any associated emission reductions at this time, there is no enforceable commitment to emission reductions for this measure. As approaches are identified through the public process, more specific emission reductions will be credited in the SIP if the emission reductions meet U.S. EPA's integrity elements for surplus emissions and whether the emissions are permanent and enforceable. At that time, if the emission reductions are generated through voluntary actions, there will be a need to develop an enforceable commitment that the reductions will be maintained.

Response to Comment 92-4:

Because control measures that could potentially affect the housing sector such as control measure EGM-01 require more technical analysis, the emission reductions are yet to be determined (TBD). However, as discussed in detail for the control measure in Appendix IV-A, a working group will be established to discuss the development of EGM-01 after the adoption of the AQMP. The outcome will result in a rule or program that will be evaluated for potential environmental impacts under CEQA requirements and potential socioeconomic impacts as requested by the commenter. Because the control measure EGM-01 is a TBD measure and the specific approach to implementing is not yet determined, the Socioeconomic Assessment at this time is limited in its analysis of EGM-01.

Comment Letter from Southern California Leadership Council (Comment Letter #93)

SOUTHERN CALIFORNIA LEADERSHIP COUNCIL

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Executive Staff:
Kish Rajan
President

Richard Lambros
Managing Director

November 7, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 92765

Re: Comments Concerning the South Coast Air Quality Management District's Final 2016 Draft Air Quality Management Plan.

Dear Dr. Fine,

On behalf of the Southern California Leadership Council ("SCLC") and the undersigned group of partner organizations, we thank you for the opportunity to review and comment on the final draft of the 2016 Air Quality Management Plan (the "Draft AQMP"). Our group is comprised of leading Southern California business and industry organizations.

Each of our organizations appreciates the assistance provided by, and the hard work of, the able staff of the South Coast Air Quality Management District (the "District") in the many months leading up to the final Draft AQMP. As we bring the issues set forth below to your attention for consideration as part of your work to finalize the AQMP, we look forward to additional helpful discussions. In particular, we wish to encourage the District's staff to adhere to incentive-based approaches to address the region's air quality challenges, and to recognize that economic considerations call for flexibility and adaptability in such far-reaching regulatory processes. 93-1

Our organizations are particularly focused on assuring that the District will continue the region's historically huge progress toward safer air quality, while avoiding any and all unnecessary negative economic and societal impacts. In particular, we share the District's aim for air quality that is cleaner still; but we do so in light of the ongoing need to provide employment and housing for the District's growing population. With that in mind, we applaud the District's attempt to provide economic analyses, including an evaluation of the AQMP's impact on jobs and job creation. Our groups will continue to work with the District and other stakeholders to assure that sound science and strong economic analyses are met with equally sound regulatory policies as we pursue our shared aims.

Given this backdrop, we respectfully submit the following comments for your consideration:

I. The final Draft AQMP reflects an unwise drift away from incentive-based emissions reduction programs.

In our comments lodged in August, SCLC and a similar group of partner organizations applauded the District staff's then-proposed reliance on the use of financial incentives to accelerate the penetration of, for example, zero-emission and near-zero emission technologies, and to further reduce emissions from other mobile and stationary control measures. Indeed, our organizations generally favor incentive based programs over the far less flexible and more imposing command and control regulations.

With this in mind, our August comments on the earlier draft AQMD focused on the means by which the District may secure such funding for incentive-based programs. Specifically, we emphasized that the chosen means of generating revenue to support incentive programs should be fairly imposed and broad-based, consistent with the broadly-shared societal benefits of the District's efforts to further improve air quality. 93-2

We are disappointed that the final version of the Draft AQMP reflects a relative retreat from the earlier projected reliance on incentive based programs. Accordingly, we respectfully ask the District's staff and Board to reconsider and reverse the present direction away from incentives.

Most especially, we oppose the newly stated suggestion that the District's successful RECLAIM program should be scrapped in favor of a return to command and control regulation. The District's RECLAIM program is nationally recognized as the paradigmatic incentive trading market for achieving reductions in emissions from stationary sources. Although the program's participants carry heavy burdens to comply with it, the program nonetheless affords relative predictability and some flexibility of types that are essential to retaining vitally important industries in the region and protecting our regional economy and jobs.

We also urge the District to recognize that incentive-based approaches show the greatest promise as the means to foster and accelerate the acceptance of beneficial fleet and fuel changes in the mobile source context. Our organizations believe that gradual changes in mobile sources, achieved over a length of time that avoids undue economic dislocation, is the best path by which to achieve further air quality improvements – and that such changes should accommodate a range of technologies and fuels so that market forces can adjust and cure over time. The District's use of incentive-based approaches in the mobile source context is wise and pivotal because the District enjoys only limited independent, command-and-control jurisdictional authority over mobile sources.

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II. The District must recognize the primacy of local governmental control over land use decisions, and must avoid imposing any indirect source controls that could stultify development and redevelopment and thus harm the region's economy.

The Draft AQMP contains a vague, "to be determined" measure labeled as EGM-01, which holds forth the prospect of an indirect source regulation affecting land use. The stated purpose of this measure is to mitigate and reduce emissions from new development and redevelopment projects. The eventual definition of EGM-01 remains uncertain; but the District's space-holder implies the potential for the imposition of new fees on development and redevelopment throughout the District or, selectively and arbitrarily, perhaps in ways similar to Rule 9510 adopted by the San Joaquin Valley Air Pollution Control District. 93-3

Our organizations remain generally opposed to new development and redevelopment fees that may conflict with or be imposed on top of the already highly excessive costs and burdens imposed by the California Environmental Quality Act. Moreover, our organizations have long appreciated and championed the primacy of local governments' decision-making powers concerning questions of land use and development – consistent with our democratic principles and the fact that development invariably unfolds in response to organic demand from countless quarters.

Because EMG-01 is undefined as set forth in the Draft AQMP, and because it hints at the prospect of an unduly heavy-handed new land use regime, our organizations urge the District to exclude this measure from the final AQMP. We look forward to participating in further discussions with the District to make sure that the District's clean air goals are not seen as having such overwhelming importance as to warrant the sacrifice of sensible, locally-based land use prerogatives. Especially, the District must avoid trampling on the prerogatives that local governments continue to enjoy under the SB 375 regime. In addition, the District will need to be strictly mindful of the limitations of its enabling statutes if and when it ever brings forward any proposal affecting land use.

III. The proposed measures denominated as MOB-1 through MOB-4 and MOB-8 would harm goods movement and the industries related thereto, and should be entirely reconsidered.

Our organizations continue to oppose the proposed control measures denominated as MOB-1 through 4 and MOB-8. Efficient and economical goods movement is essential to the region's overall economy, especially given that our region is home to the busiest and most important ports in the nation. Emissions related to goods movement should be addressed gradually and without undue local disruption through both fleet change incentives and reasonably paced technological changes, such as the affordable, appropriately gradual adoption of fuel and engine-type changes, which can most sensibly be achieved through standards for new vehicles. To the extent that the above-referenced MOB measures might be read to invite arbitrary caps on goods movement facilities and limitations on what are truly diffuse and dynamic goods movement activities, they should be rejected. 93-4

IV. The District should reconsider and recast all measures that are proposed without quantified air quality benefits.

The Draft AQMP discusses various measures for which no air quality benefits are quantified, referred to as "to-be-determined" or "TBD" measures. A broad reading of the Draft AQMP suggests that the AQMD's implementation should be able to meet the federally imposed air quality standards even if all such TBD measures were to be forgone. Accordingly, our organizations urge the District to either forgo all such TBD measures in the AQMP, or incorporate only those for which both the costs and benefits of the measures can be identified and vetted publicly before they are included. Importantly, no meaningful socio-economic analyses can possibly be performed if there are no quantified air quality benefits from the measures at issue. Therefore, to the extent that the merits of such measures cannot be reasonably proven in the current AQMP process, such measures should be identified only as possible areas of future study and consideration. 93-5

V. Our organizations urge the District to forgo CMB-05, which as proposed, would make further adjustments to the RECLAIM program outside of the recently-completed, arduous process for updating the program.

As noted above, the Draft AQMP suggests that the District may consider the eventual abandonment of the RECLAIM program. We oppose any such abandonment. We also note that the Draft AQMP includes a measure (CMB-05) that proposes to make a downward adjustment in permissible NOx emissions under the RECLAIM program applicable to stationary sources. 93-6

Less than a year ago, the RECLAIM program was updated through a process that was, as is typical, robustly attended by all constituencies, and at which large volumes of detailed evidence were provided. The recent program updates reflect a remarkable degree of voluntary concessions, stakeholder engagement and broad-based agreement. In light of this, we believe that the AQMP process is not the proper vehicle through which to make any lurching changes to the RECLAIM program, given that the District, its committees and Board, and all constituents are necessarily now focused on a much broader range of issues. Accordingly, we urge the District to remove CMB-05 as a measure, and rely instead on the discrete, robust process for future adjustments to the RECLAIM program.

VI. The District needs to take a more robust posture against overly-burdensome and unachievable federal and state air quality mandates.

Our organizations recognize that the District is legally responsible for taking action to meet goals and stay within parameters mandated by state and federal law, particularly by the U.S. Environmental Protection Agency and the California Air Resources Board. Indeed, the District has long been tasked with trying to achieve increasingly stringent federal standards that are imposed disparately on our highly populous and economically important South Coast region. 93-7

SCLC and its partner organizations continue to urge the District to take a more clear-headed and circumspect stance vis-à-vis the increasingly difficult state and federal targets and mandates that the District is being asked to meet. Many of the most recent federally imposed criteria air pollution standards are based on scientific (health) justifications that are arguable at best. Moreover, air quality standards and timelines are imposed and expected to be met without any regard for non-anthropogenic, natural background loads and the practical realities of our air basin's unique topography and vast economy. Respectfully, the District should be identifying and investigating such issues, and effectively challenging the promulgating agencies to which it must regularly submit its plans and measures.

Our South Coast region has already seen tremendous improvements in air quality in recent decades, but not without very serious economic costs. Achieving still cleaner air quality is reasonably possible only through careful, measured, sensible steps undertaken with great care concerning the economic consequences. Our region's economy will be crippled if the District simply attempts to implement aggressive state and federal mandates, knowing that they will force rapid and extensive transformation on industries that are unable to accommodate such change. When warranted, therefore, the District must be willing to push back against unrealistic mandates, and work to identify and secure more reasonable and achievable pathways and timelines for reaching the targets that are established.

93-7
Con't

VII. Conclusion

Once again, we wish to applaud the District and its staff for the efforts concerning the AQMP. We hope that the final AQMP will reflect the District's appreciation and embrace of our concerns. We thank you for your consideration of these comments, and for your ongoing work with us and all stakeholders.

Respectfully submitted,

Richard Lambros
Managing Director
SCLC SOUTHERN CALIFORNIA LEADERSHIP COUNCIL

Mike Lewis
Senior Vice-President
CIAQC

Wes May
Executive Director

Paul Granillo
President & CEO
ie INLAND EMPIRE ECONOMIC PARTNERSHIP

Peter Herzog
Assistant Director of Legislative Affairs
NAIOP COMMERCIAL REAL ESTATE DEVELOPMENT ASSOCIATION SoCAL CHAPTER

Rob Evans
Executive Director
NAIOP COMMERCIAL REAL ESTATE DEVELOPMENT ASSOCIATION INLAND EMPIRE CHAPTER

Dr. Philip Fine
November 7, 2016
Page 6 of 6

Bryan Starr
Sr. Vice President, Govt Affairs
ORANGE COUNTY BUSINESS COUNCIL

Clayton Miller
Executive Vice President
SCCA

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.
*Fields Required to Submit a Comment

Form Information

Date Created	Time Created	AQMP Year
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Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
RICHARD LAMBROS	SOUTHERN CALIFORNIA LEADERSHIP COUNCIL AND PARTNER ORGANIZATIONS			

If not representing a specific organization, please enter "No Affiliation".

Comments (Unlimited Size)
To whom it may concern,

On behalf of the Southern California Leadership Council and eight partner organizations, I've attached a group comment letter regarding the South Coast Air Quality Management District's Final Draft 2016 Air Quality Management Plan.

Best,

Richard Lambros
Managing Director
Southern California Leadership Council

Upload Additional Comment and Supporting Files (30 Mb Maximum per file) (1)

AQMP Comments Files
PLN - AQMP Comments - 11/7/2016 - Comment Type: REVISED DRAFT 2016 AQMP - Author: RICHARD LAMBROS - Agency: SOUTHERN CALIFORNIA LEADERSHIP COUNCIL AND PARTNER ORGANIZATIONS - N

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Commentor Signature*

For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

Responses to Comment Letter from Southern California Leadership Council (SCLC)
(Comment Letter #93)

Response to Comment 93-1:

Staff appreciates the participation in the development of the 2016 AQMP and support for incentive-based approaches, as well as an analysis of job impacts from the implementation of the Plan as part of the Socioeconomic Assessment.

Response to Comment 93-2:

The Revised Draft 2016 AQMP still maintains incentive-based approaches focused on accelerating high-emitting sources to transition to cleaner technologies sooner than would take place under regulations for both stationary and mobile sources. The only difference is the addition of future rulemaking that ensures emission reductions achieved will continue to be achieved when there is more public acceptance, more clean technology commercially available, and these technologies are more cost-effective. Future rulemaking will ensure emission reductions are permanent and enforceable, thus ensuring credit in the State Implementation Plan (SIP) as our region continues to grow.

The possibility of returning the RECLAIM facilities to a command and control approach was one of the re-assessment concepts considered in the Draft Plan as proposed in control measure CMB-05. The only difference in the Revised Draft Plan is the addition to seriously consider the sunset of the program. All the possible actions listed in the control measure write-up in Appendix VI-A will be assessed during the re-convening of the RECLAIM working group. At that time, program effectiveness can be discussed and recommendations can be formulated for the Governing Board. Staff encourages the commenter to participate in the public process and appreciates the concerns with such a proposal.

Response to Comment 93-3:

As noted in responses to Comment 86-2 and 92-3, a public process will be established to consider the appropriateness of implementing a rule similar to San Joaquin's Rule 9510. Staff believes that there are actions other than fees that will result in additional emission reductions, such as from implementing Title 24 and looks forward to working with SCLC on this effort.

Response to Comment 93-4:

Staff believes that the approach of working collaboratively with affected stakeholders and the public will lead to actions that will not be disruptive to the industry. There are no emission reductions associated with the measures since implementation of the measures will help meet the emission reductions in the State SIP Strategy.

Response to Comment 93-5:

Please see Response to Comment 7-5 regarding the purpose of the TBD measures and why they are proposed to remain in the 2016 AQMP. With regard to meaningful socioeconomic analysis, such an analysis will take place during any rule or program development of these TBD measures when a more in-depth technical evaluation has been performed and more detailed project description has been formulated.

The proposed 2016 AQMP contains control strategies with quantified emission reductions, as well as control measures with to-be-determined (TBD) emission reductions. It is important to note that NAAQS are expected to be attained with the quantified emission reductions alone. For the cost analysis, incremental costs are estimated for the control strategies with quantified emission reductions only. Some of the control strategies with TBD emission reductions may serve as contingency measures to make up for any unexpected emission reductions shortfall. However, many of these control strategies include emerging technologies. Therefore, their emission-reducing potential may still need to be evaluated and their cost-effectiveness, and in some cases their costs too, remain highly uncertain or unknown at this time.

Response to Comment 93-6:

The draft final control measure CMB-05 states that a RECLAIM working group will be convened in the spring of 2017 to assess various aspects of the program, including an orderly transition to a command and control regulatory structure. Absent such a transition, a downward adjustment of five tons per day is proposed. Past changes to the RECLAIM program that have resulted in SIP-creditable emission reductions have been the result of control measures that have been a part of previous AQMPs. Control measure CMB-05 proposes to achieve a NOx emission reduction of 5 tons per day from the RECLAIM program. This commitment will result in the emission reductions being submitted into the SIP.

Response to Comment 93-7:

Please see Response to Comment 57-8 regarding challenging the promulgating agencies as to the stringency of air quality standards and mandates.

Comment Letter from Pacific Merchant Shipping Association (Comment Letter #94)

November 7, 2016

Wayne Nastri
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Submitted Electronically at:
http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/reviseddraft2016AQMP

Comments on the Revised Draft 2016 Air Quality Management Plan

Dear Mr. Nastri:

The Pacific Merchant Shipping Association (PMSA), on behalf of its member ocean carriers and marine terminals operating in the South Coast Air Basin and throughout California, submits the following comments regarding the South Coast Air Quality Management District's (SCAQMD) Revised Draft 2016 Air Quality Management Plan (AQMP).

On August 19, 2016, PMSA submitted comments on the first draft the AQMP, which are attached and included as part of this comment letter. One of the key areas of focus of the previous comment letter was the facility-based control measures. This revised draft AQMP has done nothing to allay our concerns regarding SCAQMD's inclusion of facility-based control measures, particularly MOB-01. The facility-based measures are fundamentally flawed and should be removed from the AQMP. Among the numerous reasons that the measures should not be approved as part of the AQMP include the following: 94-1

- The facility-based measures are not needed to demonstrate attainment
- SCAQMD has no authority over mobile sources
- The measures attempt to implement the California Air Resources Board's (CARB) "Further Deployment of Technology" measure despite that measure being assigned to CARB for responsibility
- The measures do not meet the Clean Air Act's requirements for a State Implementation Plan submittal
- The measures interferes with local land-use decisions
- The measures threaten the future success of the San Pedro Bay Clean Air Action Plan by undermining the voluntary approach that proved so successful in an area of limited regulatory authority

Pacific Merchant Shipping Association
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- The measures risk the future economic growth in San Pedro Bay, which will be necessary to pay for the deployment of advanced technology that SCAQMD seeks

For all of these reasons, SCAQMD must remove the facility-based mobile source measures from the AQMP. The inclusion of the facility-based mobile source measures will only serve to hamper the cooperation necessary to develop and deploy new technologies at our local ports. It will stifle the cooperation of port-related businesses, who will be rightfully concerned that their voluntary efforts would be transformed into command-and-control strictures that will limit their opportunity to grow and thrive. These measures will only ensure conflict among stakeholders which will ultimately prevent and impede progress. 94-1 Con't

PMSA hopes that it can work with SCAQMD to develop alternatives, like the San Pedro Bay Clean Air Action Plan, to the flawed facility-based control measures as SCAQMD moves toward finalization of the 2016 Air Quality Management Plan.

Sincerely,

Thomas Jelenić
Vice President

Attachment: PMSA Comment Letter on Draft AQMP, dated August 19, 2016

August 19, 2016

Wayne Nastri
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Submitted Electronically at:
http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/Draft2016AQMP

Comments on the Draft 2016 Air Quality Management Plan

Dear Mr. Nastri:

The Pacific Merchant Shipping Association (PMSA), on behalf of its member ocean carriers and marine terminals operating in the South Coast Air Basin and throughout California, submits the following comments regarding the South Coast Air Quality Management District's (SCAQMD) Draft 2016 Air Quality Management Plan (AQMP).

Over the past decade, the members of PMSA have significantly reduced emissions from cargo operations at the San Pedro Bay ports. In a cooperative approach with the ports of Long Beach and Los Angeles, PMSA members have invested billions of dollars in technology and infrastructure that has made the Clean Air Action Plan both a success and a model throughout the world. Since 2005, diesel particulate matter emissions have been cut over 80%, sulfur oxides by 97%, and nitrogen oxides by 50%. This achievement could have only been achieved through the cooperation fostered by the ports with ocean carriers and terminal operators.

Moreover, the cooperative approach established through the Clean Air Action Plan allows for significant emission reductions, even with the economic shock of the Great Recession, without harming the flow of cargo through the two ports that is the lifeblood of Southern California's economy. While our members have proved resilient that does not mean that poorly considered planning will not seriously harm the ports and the businesses and communities that rely on them. With that in mind, PMSA has two areas upon which it will focus its comments: incentive-based strategies and facility-based mobile source measures.

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Incentive Funding Must Be Prioritized

Emission reduction strategies at the ports rely on expensive infrastructure improvements and significant levels of capital investment by the private sector. Over the past decade, PMSA members have spent billions modernizing terminals, installing infrastructure and upgrading vessels for shorepower, replacing cargo handling and terminal equipment, demonstrating new low-emission and zero-emission technologies, and improving efficiency. All of this has occurred despite significant losses of market share and lack of growth in container volumes.

While our members will continue investing in Southern California, the rate of improvement that the AQMP seeks is not sustainable without higher levels of container throughput long-term, and in the short-term cannot be achieved without incentive funding to accelerate turnover and invest in new technologies. Moreover, it is increasingly more difficult to reach the new goals when compared to the reductions that have already been achieved at great cost. A recent study conducted by Moffat & Nichol for PMSA estimates that terminal operators will invest roughly $7 billion in California-based marine terminal equipment, but would incur an additional $16-$28 billion in order to replace the current cleaner equipment with even cleaner zero and near-zero equipment.

That investment would be a challenge based on normal fleet turnover time frames. It is near impossible on the timeframe envisioned in the AQMP without significant incentive funding. And, a further challenge, it is estimated that ocean carriers will lose $5 billion this year due to historically low freight rates that are ravaging the industry. As a result, we urge SCAQMD to strengthen the use of incentive funding in the AQMP and identify specific funding needs, consistent with the Moffat & Nichol study, for maritime sources.

Given the importance of incentive funding to meeting the goals of the AQMP, the inclusion of any growth controls on the ports is exceptionally problematic. The inclusion of such measures puts in jeopardy the very ability for terminals and carriers to access the incentive funding necessary to achieve the AQMP's goals. While the ports have used programs like the Technology Advancement Program to spur new technologies for the maritime sector, those funds have been supplemented with other local, state, and federal funding. That funding is nearly always dependent on emission reductions being surplus over and above regulatory baselines. The inclusion in the AQMP of measures such as MOB-01 (discussed further below) will necessarily put that funding into jeopardy by calling into question whether future emission reductions are surplus.

If the goals of the AQMP cannot be achieved by 2024 and 2031 without significant incentive funding, but the very structure of the AQMP risks that incentive funding by being overly proscriptive, then the AQMP must be revised to ensure incentive funding will not be at risk in order to meet the region's goals.

Facility-based Mobile Source Measures Must Be Removed

The draft AQMP includes several facility-based mobile source strategies that go well beyond SCAQMD's authority. The inclusion of MOB-01, Emission Reductions at Commercial Marine Ports, in particular, attempts to establish SCAQMD control over mobile sources that are outside its jurisdiction. SCAQMD has no authority over mobile sources, particularly port-related sources. Port-related mobile sources are under the authority of the California Air Resources Board (CARB) and U.S. Environmental Protection Agency (US EPA). Further, SCAQMD does not have the authority to limit land use or growth as contemplated in MOB-01. In California, land-use decisions are the domain of local cities and counties. Local air districts do not, and should not, dictate to local governments how they may or may not choose to organize and plan their communities.

Over the course of the public process, SCAQMD staff has described the facility-based mobile source measures, including MOB-01, in varying, contradictory ways. During one AQMP Advisory meeting, staff described the collection of facility-based mobile source measures as not necessary to demonstrate attainment with the National Ambient Air Quality Standards (NAAQS), as evidenced by the lack of an emission reduction commitment. Later, during another AQMP Advisory meeting, SCAQMD staff described the facility-based mobile source measures as the local implementation of CARB's Mobile Source Strategy, specifically the "Further Deployment of Technology" measures. But, while CARB's Mobile Source Strategy does include a reference to SCAQMD's mobile source strategies, CARB's document states that the "further deployment measures will rely on expanded incentive funding programs to accelerate deployment, as well as advocacy for additional actions at the federal and international level, along with efforts to increase system efficiencies," and, significantly, it does not describe facility-based mobile source measures. As the recently-released California Sustainable Freight Action Plan specifically reiterates, "[t]here is no direction to implement a freight facility performance targets measure in either ARB's *Mobile Source Strategy* or *Proposed 2016 State Strategy for the State Implementation Plan*."[1] In any case, staff has not adequately described these measures and, given SCAQMD's clear lack of authority, staff must remove these measures from the final AQMP.

SCAQMD's inclusion of the facility-based mobile source measures in the AQMP threatens the vary basis of the success of the CAAP: voluntary cooperation among port stakeholders. The inclusion of these measures will cast a pall over the upcoming efforts at the ports. Both ports have recently announced an update to the CAAP in order to continue their successful efforts to improve air quality. In addition, the Port of Los Angeles recently announced a new effort, establishing the Sustainable Freight Advisory Committee, that seeks the support of port

[1] Sustainable Freight Action Plan, Appendix C, p. C-41, http://www.casustainablefreight.org/files/managed/Document/282/CSFAP_AppendixC_FINAL_07272016.pdf

stakeholders to accelerate the introduction of electric vehicles and equipment. Both the CAAP and Sustainable Freight efforts are founded on the principle that only through voluntary cooperation can the highest levels of investment and emissions reductions be reached. This essential cooperation will be jeopardized by the vague, unenforceable threat posed by the facility-based mobile source measures.

Despite the fact that there are no emission reductions are associated with the facility-based mobile source measures, SCAQMD chose to include these contentious measures in the AQMP. It makes no sense to include strategies that, based on SCAQMD staff statements, are not needed to demonstrate attainment with the NAAQS. The facility-based mobile source strategies do not further goals of the AQMP or State Implementation Plan.

For all of these reasons, SCAQMD must remove the facility-based mobile source measures from the AQMP. The inclusion of the facility-based mobile source measures will only serve to hamper the cooperation necessary to develop and deploy new technologies at our local ports. It will stifle the cooperation of port-related businesses, who will be rightfully concerned that their voluntary efforts would be transformed into command-and-control strictures that will limit their opportunity to grow and thrive. These measures will only ensure conflict among stakeholders which will ultimately prevent and impede progress.

Support National and International Standards

Finally, PMSA asks SCAQMD to continue its support for national and international standards for federal sources. Improving standards at these jurisdictional levels are necessary to achieve emission reductions at the ports and for allowing the long-term growth that will support our local communities and higher levels of investment in emissions reduction technologies. PMSA supports SCAQMD in efforts that seek to control emissions from the appropriate regulatory body, including the International Maritime Organization, US EPA, or CARB.

PMSA looks forward to working with South Coast Air Quality Management District on the next draft of the 2016 Air Quality Management Plan and its eventual finalization.

Sincerely,

Thomas Jelenić
Vice President

Responses to Comment Letter from Pacific Merchant Shipping Association (PMSA)
(Comment Letter #94)

Response to Comment 94-1:

The SCAQMD along with U.S. EPA are identified as co-implementing agencies for the State SIP Strategy "Further Deployment" measures. As such, the proposed facility-based measures are intended to facilitate discussion on collaborative efforts that potentially could provide emission reductions to assist in achieving the goals of the State SIP Strategy. As such, the SCAQMD staff intends to work with all affected parties including the public to identify actions that may be voluntary or regulatory in nature. Even though the facility-based measures do not specify specific emission reductions (since the emission reductions are associated with the "Further Deployment" measures), staff believes that the inclusion of the measures provides a forum for the one-year period discussion. Staff believes that the concerns raised by the Commenter will be alleviated to some extent given that the identified actions may be actions that the industry is currently taking to improve operational efficiency and reduce fuel costs.

Also, see response to Comment 49-3.

Responses to comments provided in the attachment to this letter are found in responses to Comment Letter 49.

Comment Letter from Los Angeles County Business Federation (Comment Letter #95)

Los Angeles County Business Federation

Strengthening the Voice of Business

November 7, 2016

Michael Krause
Planning and Rules Manager
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

RE: COMMENTS ON REVISED DRAFT 2016 AIR QUALITY MANAGEMENT PLAN

Dear Mr. Krause:

We are writing on behalf of the Los Angeles County Business Federation (BizFed) - a grassroots alliance of more than 160 top business groups representing 325,000 employers with 3 million employees throughout Los Angeles County. Our members include large and small employers, minority business owners, and job creators from a wide range of industries.

We appreciate the opportunity that the South Coast Air Quality Management District (SCAQMD or District) gave us to comment on the Draft 2016 Air Quality Management Plan (AQMP or Plan) earlier this year. Now that the District has released its Revised Draft AQMP, we take this additional opportunity to comment on the revisions that have been made. Please view these comments on the Revised Draft AQMP, which are outlined below, within the overall context of those comments made in our previous comment letter (submitted on August 18, 2016) as many of our prior comments still need to be addressed. A copy of our August 18 letter has been attached for your convenience. 95-1

SCAQMD's Commitment to Continue Its Long-Standing Technology and Fuel Neutral Policy Should Be Supported Through Consistent Statements in the AQMP

BizFed supports SCAQMD's long-standing practice of setting performance standards that allow all fuels and technologies to compete. This practice encourages innovation and competition, which serve to reduce the costs of attaining air quality goals.

However, the Revised Draft AQMP includes a new policy statement regarding the "prioritization" of maximum emission reductions: 95-2

> "Overall, the Revised Plan now puts a priority on maximizing emission reductions utilizing zero emission technologies wherever cost effective and feasible, and near-zero emission technologies in all other applications. The measures recognize the need for an analysis to consider life-cycle in-Basin emissions (including GHGs) related to energy/fuel production and transmission under future energy pricing and electricity generation scenarios." (Revised Draft AQMP, page V)

We are concerned that the excerpted statement could result in a change in SCAQMD's long standing policy of fuel and technology neutrality. We also point out that almost all so-called "zero emission technologies" are not zero emissions overall, rather they rely on electricity or hydrogen, and there are

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significant emissions with producing either of those forms of energy.

The Revised Draft AQMP acknowledges the relationship between this new policy statement and SCAQMD's long-standing neutrality policy, and states the District's intent to continue implementing its neutrality policy (see Revised Draft AQMP, page 4-9, paragraph one). Ultimately, however, the implementation parameters of the new "prioritization" policy will determine whether the new policy will serve to trump the SCAQMD's long-standing neutrality policy.

We request that SCAQMD affirm its neutrality policy wherever the new "prioritization" policy is explained, with a statement to read as follows: 95-2 Con't

"The SCAQMD will continue to follow its long-standing Fuel and Technology Neutral Policy as all technologies and fuels should be able to compete equally to meet environmental needs."

We also believe the best way to assure that SCAQMD continues to follow its long-standing neutrality policy is to establish a working group that will discuss, evaluate, and compare the cost effectiveness and feasibility of the various technologies (e.g., zero emission, near zero emission, and lower emission) applicable to a particular use (e.g., residential space and water heating).

A Regulatory Approach to Control Stationary Sources Drives Up the Cost of the AQMP

In the Revised Draft AQMP, SCAQMD has put an increased emphasis on regulations as compared to the prior Draft AQMP. However, the facts clearly prove that, even if all stationary sources are regulated to achieve a zero emissions level, the region will still not be in attainment. In other words, we cannot regulate our way to attainment. Thus, incentive-based programs, especially in the near term (pre-2023), are essential to advance the region's air quality goals.

By way of an example, residential appliances, as well as commercial and industrial equipment, typically have long useful lives, and increasing turnover is a more cost effective NOx emission reduction strategy than regulations that must rely upon normal equipment replacement rates (e.g., 15 to 25 years for various categories of boilers/water heaters per the Preliminary Draft Socioeconomic Report, page 57). In fact, traditional regulations will not result in the turnover of equipment to lower emission equipment needed to attain the 2023 ozone standard.

95-3

Nevertheless, the Revised Draft AQMP now places an increased emphasis on the promulgation of stationary source regulations as compared to the prior Draft AQMP's emphasis on the development of incentive programs. Such an approach significantly drives up the cost of achieving emission reductions. As compared to the 2012 AQMP, which carried a price tag of $36.6 million (as measured by 2015 dollars) for stationary source measures, the 2016 AQMP has an Annual Average Cost of $402.6 million (as measured by 2015 dollars) for the stationary source sector. The primary drivers for this enormous price tag are three stationary source control measures that seek to regulate small, area sources of emissions in residences and commercial applications. Per the Preliminary Draft Socioeconomic Report, CMB-02, Space and Water Heating, has an amortized annual average of *$99.0 million*; CMB-04, Emission Reductions from Restaurant Burners and Residential Cooking, has an amortized annual average of *$118.9 million*; and ECC-03, Additional Enhancement in Building Energy Efficiency and Smart Grid Technology, has an amortized annual average of *$103.4 million*.

While cost-effectiveness is a primary concern, the relative cost of these three measures demands additional scrutiny and serious efforts to significantly reduce the costs of the stationary source control program. We note that the burden of these control measures will fall mostly on small businesses and individual residents within the air basin. Except for CMB-01, no other proposed control measure even comes close to these three (see Table 2-1 on page 21 of the Preliminary Draft Socioeconomic Report). We also have concerns about the accuracy of the emission reductions proposed for emergency generators, which operate our region's communications systems, hospitals, schools and elevators in power emergencies.

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MOB-01 through -04, and -08 Will Negatively Impact Regional Goods Movement and Goods Movement-Dependent Industries

We continue to have serious concerns about the proposed control measures MOB-01 through -04 ("Facility Measures") and portions of MOB-08 ("Fleet Rules"). The Revised Draft AQMP does not reflect the serious concern expressed by the business community to these control measures.

Facility Measures and Fleet Rules put the region at a competitive disadvantage with the rest of the country for the following reasons:

- They push private investments in freight facilities and infrastructure outside of the region, thereby lengthening vehicles miles traveled to reach Southern California population centers and increasing emissions.
- They negatively impact wage growth and job creation in a sector which is one of the region's largest providers of working class jobs.
- They create an unnecessary patchwork of regulations as California has already adopted the strictest fleet regulations in the country to meet the basin's needs.

95-4

Emissions from the goods movement sector are projected to fall significantly from current levels due to regulations already in place and new State and Federal measures identified in CARB's Mobile Source Strategy. To achieve further emission reductions in the South Coast, we continue to support voluntary, incentive-based approaches that do not put our Region at a competitive disadvantage. For these reasons, we strongly oppose Facility Measures and expansion of Fleet Rules.

BizFed Has Serious Concerns About SCAQMD's Proposals to Control Growth and Indirect Sources

The proposed control measures that identify the emission reductions as "TBD" should be removed from the Revised Draft 2016 AQMP. Per the Revised Draft 2016 AQMP, "TBD" is for emission reductions to be determined once the measure is further evaluated, the technical assessment is complete, and the inventory and cost-effective control approaches are identified. Importantly, the "TBD" control measures are *not* relied upon for attainment demonstration purposes.

As these "TBD" control measures stand, they cannot meet the Clean Air Act requirements for a SIP submittal. Further, by including these control measures in the 2016 AQMP, the District is committing to develop rules regardless of the process outcome and putting the South Coast Air Basin at risk of sanctions if the process shows these measures should not be implemented.

95-5

Additionally, MOB-01 through MOB-05 and EGM-01 are indirect source control measures that cannot be required as a condition of SIP approval by EPA or CARB. (42 U.S.C. § 7410(a)(5)(A)(ii); Cal. Health & Safety Code, § 40468.) Only those provisions necessary to meet the requirements of the Clean Air Act can be included in the SIP. (Cal. Health & Safety Code, § 39602.) Therefore, the District is not required statutorily to adopt EGM-01 simply because another air district has adopted this measure.

Moreover, the District intends to utilize EGM-01 to promote a regionwide shift toward compact development and active transportation with implications for trip generation, as documented in SCAG's 2016 RTP/SCS pursuant to SB 375. This is a violation of the California Health and Safety Code that prohibits the District from assuming any land use control. This measure also overlaps with the CEQA process and will delay projects (including air quality beneficial projects) and unnecessarily increase development costs.

Via MOB-01 through MOB-05 and EGM-01, the District is also inappropriately attempting to enforce the unattainable modeling assumptions in the SCAG's SCS, and any modified assumptions the District utilized in the Draft 2016 AQMP. If EPA approves this novel and significant change in SIPs in its final

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rulemaking, it will be signaling to states and local agencies that they can enforce assumptions. This will undermine the SIP process and lead to serious disagreements and controversies over all assumptions states and local agencies include in their SIPs because the regulated community will be fearful that any technical assumptions included in the SIP will be enforced in the future. Technical assumptions estimated by scientists will become political decisions. Further, this approach has been disapproved by the Ninth Circuit Court of Appeals in *Bayview Hunters Point Community Advocates v. Metropolitan Transportation Commission*, 366 3d 692 (9th Cir. 2004). 95-5 Con't

We also note that the District is relying on securing significant funding for incentives to implement early deployment and commercialization of zero and near-zero technologies, and there are a number of funding sources available provided the emission reductions are not required by a plan or rule. Thus, by making voluntary actions, mandatory, the District will reduce the funding sources that would otherwise be available.

BizFed Supports Maintaining the RECLAIM Program

The District's RECLAIM (REgional CLean Air Incentives Market) Program is the world's first comprehensive market program for reducing air pollution. The success of the program is well documented: it has resulted in a 70% reduction of NOx & SOx emissions at RECLAIM facilities over the last 20 years, and currently requires NOx emissions to be reduced another 45% over the next 6 years. (This rate of pollution reduction is far greater than any other program in the region.) The facilities currently regulated by RECLAIM (power plants, refineries, breweries, amusement parks, etc.) produce only 5% of the NOx emissions in the air basin, while emissions from mobile sources such as cars & trucks make up 88% of the air basin's emissions.

BizFed supports maintaining the RECLAIM Program, which is viewed as an innovative, more economical approach to clean air when compared to traditional command-and-control regulations. The flexibility offered by RECLAIM allows facilities to recognize emissions below their cap as part of the "bottom line", which further incentivizes facilities to reduce their emissions. A traditional command-and control approach does not address growth rates and could potentially interfere with expected emissions reductions for the region. Without RECLAIM, Southern California companies and the regional economy would suffer unnecessary constraints on economic growth by making it even more difficult for the region to attract new businesses or to encourage upgrades of existing businesses. Until a suitable alternative is formulated that provides similar flexibility to facilities to achieve emission reductions that meet or exceed command and control regulations in the most cost-effective way, the Program should remain intact to give businesses the flexibility to comply with air regulations through the trading program. 95-6

We firmly believe RECLAIM will continue to be a successful program that merits recognition of past achievements and appreciation of what it can continue to accomplish in the future. Until a suitable incentive and/or market-based program is developed for businesses that allows the flexibility for emission reductions to be achieved in the most cost-effective manner, RECLAIM should continue to be supported by SCAQMD. Such an approach will help protect against endangerment of the regional economy now and in the future.

In addition, the basis presented for proposed Control Measure CMB-05 is fundamentally flawed and lacks any technical rationale to support the notion that 5 tons per day (tpd) of additional creditable emission reductions could be achieved by 2031 given the amendments to the RECLAIM Program adopted in December 2015 (see pages 3 and 4 of BizFed's comment letter dated August 18, 2016 on the Draft 2016 AQMP).

BizFed Continues to Have Concerns About Cost-Effectiveness

We are acutely aware of the considerable disagreement that exists between SCAQMD staff and many segments of the business community - large and small - over the ways in which cost-effectiveness 95-7

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values are calculated and used to justify certain regulatory actions. We wish to re-affirm our stance that, when the District calculates such values and offers cost-effective alternatives, stakeholders should not be adversely burdened either operationally or financially, as is too often the case.

In closing, BizFed continues to appreciate the District's engagement with the business community during the development of the 2016 AQMP, and we remain committed to working with SCAQMD to ensure the Plan fulfills its legal requirements while also protecting and promoting job creation and economic success for Southern California.

95-7 Con't

Thank you for considering our viewpoints on this important matter.

Sincerely,

Gilbert F. Ivey
BizFed Chair
Former CAO,
Metropolitan Water District

David Fleming
BizFed Founding Chair

Tracy Hernandez
BizFed Founding CEO
IMPOWER, Inc.

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Los Angeles County Business Federation

Strengthening the Voice of Business

August 18, 2016

Michael Krause
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765

Re: Draft 2016 Air Quality Management Plan

Dear Mr. Krause:

We are writing on behalf of the Los Angeles County Business Federation (BizFed) - a grassroots alliance of more than 155 top business groups representing 275,000 employers with 3 million employees throughout Los Angeles County. Our members include large and small employers, minority business owners, and job creators from a wide range of industries.

We appreciate the opportunity that the South Coast Air Quality Management District (SCAQMD or District) gave our members to participate in working groups that led to the development of White Papers for the 2016 Air Quality Management Plan (AQMP or Plan). Now that the District has released its Draft 2016 AQMP, we take this opportunity to comment formally on the Plan's proposed programs and control measures.

SCAQMD Should Prioritize Technical Improvements to Enhance the Accuracy of its Photochemical Modeling Ozone Reduction Predictions

Community Multi-scale Air Quality (CMAQ) photochemical modeling is the cornerstone of the 2016 State Implementation Plan (SIP) Strategy, and "ARB and the South Coast have been collaborating on air quality modeling to provide estimates of the reductions needed to attain the ozone and PM2.5 standards" (ARB 2016 SIP Strategy, p. 12). Recent studies by Ramboll Environ (26th CRC Real World Emissions Conference) comparing ozone model and monitoring results have shown that the current CMAQ modeling may appreciably underestimate past and future ozone reductions in the South Coast Air Basin. Therefore, we believe it is of critical importance to enhance the accuracy of the District's predictive modeling tools.

Specifically, the Ramboll Environ analysis that has been discussed with ARB and SCAQMD staff over the last few months shows that, dating back to 1990, monitored ozone levels have declined at a rate (ppb/year) that is 2 times faster than the CMAQ-modeled levels. Over a more recent time period (2008-2014), the observed and monitored trend in the reduction of ozone (again, on a ppb/year basis) has been 2 to 8 times faster than the CMAQ-predicted trend. As a result, the 2012 and 2007 AQMPs have under-predicted reductions in ozone between their respective baseline years and 2015 (i.e., they have over predicted absolute ozone levels when compared against measured 2015 levels). Based on the documented, historical inaccuracies of the CMAQ modeling, the ability of the 2016 AQMP to make accurate predictions of ozone reductions between 2012 and 2023 (or 2031) should be carefully considered; and, needed technical improvements should be identified and implemented as soon as possible. Validation of models against past measured ozone levels should be seriously considered.

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While likely evident, we must underscore that this is not simply an academic concern. The costs of further under-predicted reductions would be extremely high. SCAQMD's preliminary cost summary for the Draft 2016 AQMP's control measures is $38 billion (2017 present value), which includes almost $14 billion in incentives, between 2017 and 2031. If future ozone reductions are under-estimated (leading to an over-estimation in needed reductions), perhaps dramatically, then standards imposed on the regulated community and incentive funds may be unnecessarily large.

The District has a well-earned reputation of being on the forefront of regulatory emissions and photochemical modeling science. BizFed recommends that SCAQMD dedicate funding and staff resources to work with ARB and industry technical experts on an expedited basis, with resolution of these issues in 2017 being a priority. Ultimately, these issues may not be resolved in the timeframe of the 2016 AQMP development; at a minimum, however, they should be acknowledged in control strategy commitments to USEPA. In addition, the public should be allowed at least one-month (30 days) to review and comment on Appendix V, entitled "Modeling and Attainment Demonstrations," of the Draft AQMP upon its issuance.

The Overall Policy Framework Should Prioritize Cost-Effective, Non-Regulatory, and Innovative Approaches to Emission Reductions

BizFed is supportive of an AQMP establishing a policy framework that prioritizes non-regulatory, innovative approaches to emission reductions that are cost-effective and minimize operational disruptions. Programs or control measures must allow for and should incentivize voluntary and collaborative approaches to achieving air quality goals. Furthermore, we believe that an AQMP should not be punitive, especially as the region has made tremendous strides lowering emissions from stationary and mobile sources. To this end, the Draft 2016 AQMP includes incentives to encourage the accelerated transition of vehicles, buildings, and industrial facilities to cleaner technologies in a manner that benefits air quality and the local economy. We support this approach and appreciate the District's efforts to partner with industry.

Currently, the Plan estimates that the amount of incentive funding needed is approximately $11 – 14 billion over a seven to fifteen-year period. We urge the District to provide additional information as to how much funding has been secured, how much funding has yet to be obtained, and the timeline over which the balance of funds is expected to be received and become available for use. BizFed is committed to collaborating proactively with the District to help develop solutions for obtaining the needed funding. We understand that this will take a strong public-private effort, and we look forward to working with SCAQMD on this matter.

BizFed Has Serious Concerns About SCAQMD's Proposals to Control Growth and Indirect Sources

SCAQMD proposes one growth management measure, EGM-01 - Emission Reductions from New Development and Redevelopment Projects, and four "facility-based" mobile source measures: MOB-01 - Emission Reductions at Commercial Marine Ports, MOB-02 - Emission Reductions at Rail Yards and Intermodal Facilities, MOB-03 - Emission Reductions at Warehouse Distribution Centers, and MOB-04 - Emission Reductions at Commercial Airports. These control measures seek to reduce emissions from on- and off-road sources, which are within the exclusive purview of ARB and the U.S. EPA. Importantly, both ARB and the U.S. EPA already have rules and regulations in place for these sources to significantly reduce NOx emissions. According to the Draft 2016 AQMP, "[t]he effect of the rules and regulations are significant, showing reductions of over 67 percent in NOx emissions and close to 60 percent in VOC emissions between 2012 and 2023, even with increases in fleet population." (Draft 2016 AQMP, Chapter 3, p. 3-4.)

BizFed has serious concerns about the SCAQMD making commitments to the state and federal governments that it will control growth and indirect sources because SCAQMD lacks authority to control growth or overrule local land use decisions, and land use is within the exclusive purview of

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local cities and counties. Furthermore, not only does SCAQMD lack the authority to adopt indirect source rules, such rules would likely have a chilling effect on business development.

Critically, both the District and ARB have acknowledged that the growth management and indirect source control measures are not necessary to meet the requirements of the federal Clean Air Act. Further, there is no emission reduction target for these control measures in the Draft 2016 AQMP, and there is little to no emission reduction benefit from the indirect source control measures. Instead, additional mobile source emission reductions will come from new measures that call for greater emission reductions through accelerated turnover of older vehicles to the cleanest vehicles and equipment currently available and increased penetration of commercially-available near-zero and zero-emission technologies through existing incentives programs.

Measures MOB-1 through MOB-4, and MOB-8 Will Negatively Impact Regional Goods Movement and Goods Movement Dependent Industries

We have serious concerns about the effects that the proposed control measures MOB-1 through MOB-4 ("Facility Measures") and portions of MOB-8 ("Fleet Rules") will have on goods movement and goods movement-dependent industries.

BizFed has repeatedly opposed freight facility emission caps and performance targets. The proposed Facility Measures may leave the door open for the adoption of such regulations. These concepts would represent an unprecedented, and legally questionable, expansion of the SCAQMD's regulatory authority of the freight industry at a time when the industry is spending billions of dollars to reduce key pollutants by as much as 99 percent.

We are also concerned about any expansion of the District's Fleet Rules to private trucking fleets, which was already struck down by the United States Supreme Court.

Facility Measures and Fleet Rules put the region at a competitive disadvantage with the rest of the country because they:

- Push private investments in freight facilities and infrastructure outside of the region.
- Negatively impact wage growth and job creation in a sector that is one of the region's largest providers of working class jobs.
- Create inefficiencies by creating incentive to cite freight facilities outside the region, thereby lengthening vehicle miles traveled to reach Southern California population centers and increasing emissions.
- Create an unnecessary patchwork of regulations as California has already adopted the strictest fleet regulations in the country to meet the basin's needs.

Measure CMB-05 Is Not Needed Due to the December 2015 Amendments to the RECLAIM Program, and Its Reductions Are Unsubstantiated

The Draft AQMP, in control measure CMB-05, proposes a reduction target of 5 tpd from the NOx RECLAIM program by 2031. The presented basis for this measure is to address "issues that arose during recent NOx RECLAIM amendments." (Draft 2016 AQMP, Appendix IV, p. IV-A-77.)

However, all of the so-called "issues" were addressed by the December 2015 amendments to the RECLAIM program or about to be moot based on pending rulemaking. For example, by its very design, the December 2015 RECLAIM rulemaking will essentially eliminate all previously "unused" RTCs once fully implemented by 2023. The December 2015 rulemaking also features an "off-ramp" for Electrical Generating Facilities at BACT or BARCT, so that remaining RECLAIM facilities will have to meet the Staff's BARCT levels (found in Rule 2002) on a programmatic basis. Staff also is now proposing

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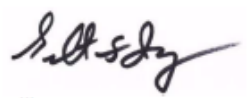
RECLAIM amendments for confiscation of RTCs from shutdown facilities. Further, several other "issues" are no longer valid concerns given the 2015 amendments to RECLAIM. And several of the other concepts (e.g., command-and-control overlays, the role of investors, etc.) are matters of District policy and/or State law, and should be considered beyond the scope of this AQMP.

Given the substantial emission reductions already achieved by the RECLAIM program, and the very large pending reductions being required under the December 2015 amendments, we are very concerned about proposed CMB-05 and the cost burden it would impose on the Southern California economy. Furthermore, Staff has provided no factual basis to support taking 5 tpd of additional reductions out of the NOx RECLAIM program. We strongly recommend this measure be removed from the AQMP. If the district insists on including a RECLAIM control measure in this AQMP, it should be a range since what is included in the AQMP is the minimum commitment to USEPA that must be met. We recommend a range of 0-3 tpd.

In closing, as the District moves forward to finalize the 2016 AQMP, the business community that we represent and, we believe, the business community at large remain committed to working with SCAQMD to ensure the Plan fulfills its legal requirements while also protecting and promoting job creation and economic success for Southern California. Thank you for allowing us the opportunity to provide our comments on this important matter.

Sincerely,



Gilbert F. Ivey
BizFed Chair
Former CAO,
Metropolitan Water District



David Fleming
BizFed Founding Chair



Tracy Hernandez
BizFed Founding CEO
IMPOWER, Inc.

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Responses to Comment Letter from Los Angeles County Business Federation (BizFed)
(Comment Letter #95)

Response to Comment 95-1:

Staff appreciates comments on the 2016 Revised Draft AQMP and continued participation in the AQMP development process.

Response to Comment 95-2:

Please see Response to Comment 17-3 regarding technology and fuel neutrality. Staff does not view prioritizing maximum emission reductions from the cleanest technology as favoring a particular technology. There a many paths to reduce emissions and we encourage businesses and consumers to make choices that will benefit air quality. With regard to clearly stating and reinforcing such a policy, the commenter is directed to Page 4-9 in Chapter 4 of the 2016 AQMP that discusses the performance-based policy that includes technology and fuel neutrality.

Response to Comment 95-3:

SCAQMD continues to recognize the short-term benefits from encouraging and supporting transitions to cleaner technologies outside the regulatory framework with the application of incentive opportunities. Staff believes there can be a balance in achieving the aims of clean air while not imposing an undue cost burden on the regulated community, including small businesses. Staff's goal, in collaboration with interested stakeholders, is to identify the most cost-effective approaches that are best in achieving maximum emission reductions for less money spent. This approach includes the application of incentivized opportunities.

Staff agrees that increasing turnover is a cost-effective approach to reduce emissions and therefore the 2016 AQMP has identified several incentive control measures to accelerate this turnover. The increased appliance efficiencies and emission reductions within measures ECC-03 and CMB-01, will incentivize equipment beyond current SCAQMD regulations and existing efficiency programs which will ease the burden of complying with possible upcoming control measures. For many of these control measures we anticipate the incentives will lead to further technology development along with declining costs for high efficiency and low emission technologies. While the upfront costs for many of these control measures appear high, the increases in efficiency with replaced equipment often has short payback periods.

The cost of the 2016 AQMP is higher than the 2012 AQMP mainly because the 2012 plan was not an ozone plan and while a few early ozone control measures were included in the 2012 AQMP, it was not a comprehensive ozone reduction strategy to demonstrate attainment included in the 2016 AQMP. In addition, the costs of CMB-02, CMB-04, and ECC-03 have been revised, mainly to reflect incremental cost instead of total equipment cost. The combined cost net of incentives for CMB-02, CMB-04, and ECC-03 would now amount to about 29 percent of the overall net-of-incentive costs among all proposed stationary source control measures. Please refer to the Draft Socioeconomic Report for the updated cost estimates.

Response to Comment 95-4:

The SCAQMD staff acknowledges the concerns raised that Measures MOB-01 through MOB-04 and MOB-08 will cause a competitive disadvantage to the industry. It is the primary intent of the measures to work

collaboratively with affected stakeholders and the public to identify actions that will not be disruptive to the industry.

Response to Comment 95-5:

See response to Comment 86-2.

The commenter stated that "the District intends to utilize EGM-01 to promote a region-wide shift toward compact development and active transportation with implications for trip generation, as documented in SCAG's 2016 RTP/SCS pursuant to SB 375." This is not the intention of the staff. Proposed Measure EGM-01 seeks to mitigate emission impacts from new and redevelopment projects. There is no specific control method proposed for EGM-01, but rather, through a public process, staff will work with affected parties to identify actions that potential result in emission reductions. These actions can be voluntary or regulatory in nature, but must be enforceable if they are to be credited to the SIP. The *Bayview Hunters Point* case cited held that an emission inventory by itself was not enforceable but did not preclude agencies from adopting enforceable measures to limit emissions from indirect sources. Moreover, the RTP/SCS incorporated into the AQMP pursuant to Health & Safety Code § 40460(6)

Response to Comment 95-6:

Staff acknowledges the success of the RECLAIM program and its resultant emission reductions since its inception. The draft final control measure CMB-05 states that a RECLAIM working group will be convened in the spring of 2017 to assess various aspects of the program, including potentially an orderly transition to a command and control regulatory structure and possible overlays of command and control with cap and trade for some facilities to provide flexibility. Please see Response to Comment 23-6 regarding the basis for the proposed control measure CMB-05.

Response to Comment 95-7:

The 2016 AQMP has updated cost-effectiveness thresholds provided in Chapter 4 of the 2016 AQMP that provides staff guidelines in developing the proposed control measures. If determined to exceed those recommended thresholds, staff revisits the proposal, the affected universe, the control and expected reductions to ensure the proposed measures are cost-effective. Further, during rule development, more information will be determined during the technical evaluation that could modify the cost-effectiveness of the proposed rule, but the thresholds to compare the cost-effective values do not change.

Responses to the Attachment to this letter are found in Reponses to Comment Letter 23.

Comment Letter from the Ports of Long Beach and Los Angeles (Comment Letter #96)

SAN PEDRO BAY PORTS
CLEAN AIR ACTION PLAN

November 7, 2016

Mr. Wayne Nastri
Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Electronic Submittal Via:
https://onbase-pub.agmd.gov/sAppNet/UnityForm.aspx?key=UFSessionIDKey

SUBJECT: COMMENTS BY PORTS OF LONG BEACH AND LOS ANGELES ON *REVISED DRAFT* OF SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT'S 2016 AIR QUALITY MANAGEMENT PLAN

Dear Mr. Nastri:

The Port of Long Beach and Port of Los Angeles (Ports) appreciate the opportunity to participate in the South Coast Air Quality Management District's (District or SCAQMD) 2016 Air Quality Management Plan Advisory Committee, and to comment on the *District's Revised Draft 2016 Air Quality Management Plan* (either "Revised Draft" or "AQMP") released to the public on October 7, 2016.

The Ports previously submitted comments on the June 2016 draft of the 2016 AQMP on August 19, 2016, which are attached hereto. The Revised Draft, however, does not acknowledge or respond to the Ports' previous comments and objections to the proposed AQMP (and in some cases appears to further aggravate issues to which objections have been raised). The Ports therefore respectfully request that their comments be deemed to be incorporated in the Ports' comments on the current Revised Draft. 96-1

The Ports also note that their ability to provide comments on all aspects of the proposed new 2016 AQMP is precluded by the lack of complete information in the Revised Draft AQMP;

Port of LONG BEACH

THE PORT OF LOS ANGELES

e.g., proposed control measure MOB-01 is incomplete and vague, the socio-economic analysis and incentive funding plans have not yet been completed and the critical Appendices V and VI have not yet been finalized or released to the public. Accordingly, the Ports request that the District extend the comment period on the 2016 AQMP to allow the public an adequate opportunity to review and further comment on all Appendices and other critical components of the AQMP (e.g., the socioeconomic analysis, Incentive Funding Action Plan, etc.) well before the AQMP is to submitted for consideration by the District Board. 96-1 Con't

OVERVIEW OF ISSUES

The cities and businesses that move goods in and out of the Ports are vital to the regional, state, and national economy. The international cargo handled by the Ports accounts for over 1.1 million jobs in California and 3.3 million jobs in the United States; however, competition for much of this cargo is intensifying particularly with other international ports (Panama Canal, Canada, Mexico). The Ports are global leaders in the highly successful Clean Air Action Plan (CAAP) and other environmental programs, working in partnership with the port-related industry to reduce emissions from goods movement sources (ships, trains, trucks, cargo handling equipment, harbor craft). The CAAP, however, is not a blue print for the AQMP. The control measures in the Revised AQMP holds the Ports and related facilities responsible for shortfalls in voluntary CAAP measures, and will deter other ports and industries from any type of voluntary action.

The Ports have been innovative and effective leaders in the efforts of public agencies to improve air quality despite the fact that the Ports do not have regulatory authority or control over the emissions sources. Working collaboratively and voluntarily with the EPA, CARB, and the District, the Ports' efforts have achieved unprecedented success in helping the maritime goods movement industry obtain substantial reductions in emissions. The Ports continue to remain firm in our position that the District's attempt to regulate the Ports as "indirect sources" is unnecessary and counterproductive to the successful collaborative approach, and should not be included in the SIP. The District is inappropriately proposing to impose enforcement actions on the Ports for emissions generated by emissions sources that the Ports do not own, operate, or control. The District should, respectfully, focus on funding efforts as opposed to regulation that would detour from the overall objective of improving air quality. 96-2

As the Ports have noted in these and prior comments, the District lacks authority to adopt any control measure or "backstop" rule that would go into effect if the emission targets for NOx, SOx, and $PM_{2.5}$ from port-related sources are not met. Nor are such measures necessary because the Ports' recent emissions inventories show that the ports have exceeded the projected emission reduction targets identified in the CAAP. For example, diesel particulate matter (DPM) emissions have been reduced by 85% over the 9 year period between 2005 and 2014. In addition, emissions of nitrogen oxides (NOx) are down by 51%, and sulfur oxides (SOx) emissions have been reduced by 97%.

The Ports continually develop and support emission reduction strategies and programs that will result in cleaner air for the local communities and the region. These efforts have been entered into voluntarily, working cooperatively with the operators in the port area and the air quality regulatory agencies working aggressively with the goods movement industry to reduce

air quality impacts from the equipment they operate. The potential for additional regulation by the District on the Ports brings significant uncertainty that will have broad negative effects on the goods movement industry and the economy as a whole, and will jeopardize the voluntary, collaborative partnership between the cities, the industry, and all of the air agencies that has led to the significant emissions reductions achieved to date. 96-2 Con't

The current Revised Draft 2016 AQMP raises many concerns, and grounds for objection, in addition to the numerous concerns with the 2016 AQMP previously raised by the Ports. Those comments and objections are detailed in the attachment(s) to this letter. However, we take this opportunity to briefly note, and highlight for the District's consideration and response, the following points raised by the Revised Draft AQMP:

1. **The District Lacks Jurisdiction To Adopt Or Implement Several Of The Control Measures Proposed By The 2016 AQMP.**

The Ports, and others, have repeatedly pointed out the limitations imposed by federal and state law on the District's authority to impose regulations on emission sources that are not within its jurisdiction. Air pollution control districts only have the authority "to adopt and enforce rules and regulations" as to "emission sources under their jurisdiction. (Health & Safety Code, § 40001, sub. (a).)" (*Friends of Oceano Dunes, Inc. v. San Luis Obispo County Air Pollution Control District* (2015) 235 Cal.App.4th 957, 963, as modified on denial of reh'g (Apr. 23, 2015).

The revisions to the current draft AQMP have not only ignored those objections, but have actually proposed to move the District into even more flagrant excesses of the District's limited regulatory jurisdiction by repeatedly calling not just for incentive-based "control measures" but threatening the creation of new rule-making and "regulations" that would be imposed on emission sources beyond the District's existing legal jurisdiction. (E.g., Revised Draft AQMP, p. 4-3: "These strategies include *aggressive new regulations and* development of incentive funding ... " [newly revised text in italics]; *id.* at p. 4-22 & 23, also, Appendix IV-A-6 through 9.) 96-3

The District's authority to regulate is limited to its jurisdictional boundaries. The District was created by the California Legislature "in those portions of the Counties of Los Angeles, Orange, Riverside, and San Bernardino included within the area of the South Coast Air Basin, as described in Section 60104 of Title 17 of the California Administrative Code, as now or hereafter amended." (Cal. Health & Safety Code, § 40410.) The District's boundaries do not include the ocean area adjacent to the South Coast Air Basin. Thus, the District lacks authority to adopt and enforce measures in the AQMP because it does not have jurisdiction to regulate emission sources outside of its geographical boundaries as would be required if the CAAP programs become involuntary and mandatory.

The Cities' management of the Ports is largely subject to their roles as trustees of tidelands under the legislative acts that granted tidelands to the Cities under a public trust. As tidelands trustees, the Cities have been granted the discretion over how to best fulfill the express trust purposes. The District cannot adopt policies, control measures, or regulations that might attempt to compel the Ports to violate these tidelands trust obligations.

2. **The 2016 AQMP Would Exacerbate The Legal Conflicts Resulting From The District's Attempts To Regulate Mobile Sources Disguised As "indirect source control measures and regulations."**

The District has no authority to regulate mobile sources, or to arbitrarily group source categories or invoke geographic boundaries (e.g., the Ports) and declare those areas or groups of sources, by mischaracterizing them as an "indirect source." The Ports and the activities conducted there are not "indirect sources" of emissions within the meaning of the federal Clean Air Act (42 U.S.C. § 7410(a)(5)(C).) An "indirect source review program" is "the facility-by-facility review of indirect sources of air pollution, including such measures as are necessary to assure, or assist in assuring, that a new or modified indirect source will not attract mobile sources of air pollution" that would contribute to the exceedance of the NAAQS. (42 U.S.C., § 741O(a)(5)(D)(i).) "Direct emissions sources or facilities at, within, or associated with, any indirect source shall not be deemed indirect sources for the purpose" of an indirect source review program. (42 U.S.C. § 7410(a)(5)(C).) Indirect source control measures cannot be required as a condition of SIP approval by EPA or CARB. (42 U.S.C., § 7410(a)(5)(A)(ii); Health & Safety Code, § 40468.) There are no provisions in the Clean Air Act for including "backstop" measures. Only those provisions necessary to meet the requirements of the Clean Air Act can be included in the SIP. (Health & Safety Code, § 39602.) Backstop measures are not necessary to meet the 24-hour PM2.5 NAAQS requirements of Clean Air Act, and there is no emission reduction target in the attainment strategy for AQMP which the proposed measures purport to implement. (See e.g., 40 C.F.R. §§ 51.112-51.114.) 96-4

Furthermore, air pollution control districts such as SCAQMD are not authorized to regulate or impose a permit system on "indirect sources" of emissions. (*Friends of Oceano Dunes, Inc. v. San Luis Obispo County Air Pollution Control District*, *supra,* 235 Cal.App.4th at 964.)

The AQMP control measures appear to be yet another misguided effort to use the Clean Air Act's indirect source provisions as a guise to impermissibly regulate mobile sources. The District cannot regulate emissions from on- and off-road mobile sources operating at, and to and from, the Ports, which includes ocean-going vessels and locomotives. The District cannot regulate emissions from the tailpipes of on-road and off-road mobile sources, or enact mobile source regulations. The District also cannot regulate off-site emissions (emissions occurring during transit "to and from" the purported "site"). Congress did not intend or authorize the use of the indirect source provisions of the Clean Air Act as a way to circumvent mobile source preemption.

3. **The 2016 AQMP Would Violate The Dormant Commerce Clause.**

The control measures proposed in the Revised Draft AQMP would have serious negative effects on international and interstate commerce, navigation, maritime as well as land-based commerce, are will add unique and 'discriminatory' burdens which will have the effect of impeding California's and the Ports' economic competitiveness. Accordingly, these measures will likely undergo close scrutiny under the federal constitution's "dormant commerce clause" and "rights and immunities" protections. 96-5

"The high court's dormant commerce clause jurisprudence "'significantly limits the ability of States and localities to regulate or otherwise burden the flow of interstate commerce.'" (*McBurney, supra*, 569 U.S. at p. ___ [133 S.Ct. at p. 1719] ....) Generally speaking, the Commerce Clause protects against inconsistent legislation arising from the projection of one state regulatory regime into the jurisdiction of another State. [Citation.]" (*Healy, supra*, at pp. 336-337.)" (*Alamo Recycling, LLC v. Anheuser Busch InBev Worldwide, Inc.* (2015) 239 Cal. App.4th 983, 996.)

96-5 Con't

4. The AQMP Would Unconstitutionally Impose Unfunded State Mandates.

The California Supreme Court recently ruled in *State Department of Finance v. Commission of State Mandates (County of Los Angeles)* (2016) 220 Cal.App.4th 740, that certain requirements of the 2001 Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit could be considered unfunded State mandates that would violate the constitutional prohibition against such unfunded mandates (Cal.Const. art. X III B, sec. 6(C), unless adequate state reimbursement was also provided. The same rationale would apply to any unfunded requirements that are imposed upon the Ports under the 2016 AQMP. As framed, the requirements being imposed on the Ports are the creation of the District. The requirements are not "federal mandates" that might be exempted from this constitutional mandate.

96-6

5. The 2016 AQMP Would Unnecessarily And Erroneously Include Measures Based On Inapplicable NAAQS.

The District asserts that it is required to have a new attainment demonstration for three NAAQS: (1) the 8-hour ozone NAAQS established in 2008, 75 ppb (2008 8-hour Ozone); (2) the annual PM2.5 NAAQS established in 2012, 12 µg/m3 (2012 annual PM2.5); and, (3) the 24-hour PM2.5 NAAQS established in 2006, 35 µg/m3 (2006 24-hour PM2.5). This is not entirely accurate. EPA has yet to decide whether to revoke the 2008 8-hour ozone NAAQS or to impose appropriate anti-backsliding requirements. EPA will provide guidance on these issues in a subsequent rulemaking. It is premature to address the 2008 8-hour Ozone in the 2016 AQMP until EPA finalizes its rule. The 2016 AQMP demonstrates that the 2006 24-hour PM2.5 standard will be met by the 2019 attainment year with no additional reductions needed beyond already adopted measures. Therefore, the 2016 AQMP does not need to include new control measures to meet this standard. The 2016 AQMP states that the 2012 annual PM2.5 standard cannot be met by 2021, which is the attainment year for the current "moderate" designation. Therefore, the District will be requesting EPA re-designate the Basin as a "serious" nonattainment area, which will provide four more years to attain the annual PM2.5 standard by 2025. The Ports agree this request should be included in the draft 2016 AQMP. The District also concedes it is voluntarily submitting attainment demonstrations for the following NAAQS: (1) 1997 8-hour Ozone NAAQS, 80 ppb and (2) the 1979 1-hour Ozone NAAQS, 120 ppb. The District has prematurely chosen to provide for the alternative NOx/VOC reductions instead of the reasonable further progress demonstration under 42 U.S.C., § 7511a(c)(2) without conducting an economic analysis of these options. (40 C.F.R., § 51.1100(o)(12).) This economic analysis should be conducted and public input sought on this issue before the draft 2016 AQMP addresses the 1997 8-hour Ozone NAAQS and 1979 1-hour Ozone NAAQS.

96-7

6. **The District should not conduct its CEQA review or require public comment on the AQMP before all aspects of the Plan have been completed**.

The Ports note the difficulty, if not the inefficiencies, posed by the District's continuing practice of releasing the proposed new 2016 AQMP in piecemeal and incomplete fashion. It appears that the current Revised Draft AQMP is itself not yet complete, and anticipates additional substantive content. The necessary socio-economic analysis is also not yet complete.

96-8

As noted in the Ports comments on the Draft EIR, it is procedurally and legally inappropriate for the District to be conducting its CEQA review before the details of the proposed AQMP have been completed. The Ports and the public should not be required to review and comment on important environmental documents before the full shape of the proposed project (2016 AQMP) is better known and disclosed. (See, e.g., *City of Santee v. County of San Diego* (1989) 214 Cal.App.3d 1438, 1450: "A complete project description is necessary [for CEQA] to assure that all of a project's environmental impacts are considered."].)

Additional comments and objections are further detailed in the attachment(s) to this letter.

CONCLUSION

The Ports strongly encourage the District to strongly consider the issues identified herein and in its prior comments on the Draft 2016 AQMP, and to make the above-requested changes to the Draft 2016 AQMP, including but not limited to the following:

- eliminate control measure MOB-01 as it is unnecessary and exceeds the District's authority;
- clarify that control measure EGM-01 and any subsequent rulemaking related to indirect source review does not apply to the Ports; and
- revise control measure MOB-14 to clarify that it does not preclude the maritime goods movement industry's ability to secure grant funding for early actions.

96-9

The Ports also urge the District to complete the appropriate Incentive Funding Action Plan, as well as the appropriate socioeconomic impact analysis, and to provide the Ports and other members of the public with an adequate opportunity for comprehensive review and comment on those documents along with the (revised) Draft 2016 AQMP *prior to* submitting the Plan to the Board for consideration.

The Ports remain committed to achieving our clean air goals identified in the CAAP to help improve regional air quality. We strongly believe that the voluntary and cooperative CAAP process established by the Ports remains the most appropriate forum for the Ports and the air regulatory agencies to discuss technical and policy issues related to reducing emissions from port-related sources.

The Ports appreciate this opportunity to provide comments on the proposed 2016 AQMP. We look forward to continuing to work with the District on advancing our shared goals for clean air in the South Coast region. 96-9 Con't

Sincerely,





RICHARD D. CAMERON
Managing Director,
Environmental Affairs and Planning
Port of Long Beach

CHRISTOPHER CANNON
Director
Environmental Management
Port of Los Angeles

SAN PEDRO BAY PORTS
CLEAN AIR ACTION PLAN

ATTACHMENT
DETAILED COMMENTS ON THE REVISED DRAFT 2016 AQMP

1. The District Lacks Jurisdiction Over Ocean-Going Vessels.

The District's authority to regulate is limited to its jurisdictional boundaries. The District was created by the California Legislature "in those portions of the Counties of Los Angeles, Orange, Riverside, and San Bernardino included within the area of the South Coast Air Basin, as described in Section 60104 of Title 17 of the California Administrative Code, as now or hereafter amended." (Cal. Health & Safety Code, § 40410.)

The South Coast Air Basin includes the portion of Los Angeles County "[b]eginning at the Los Angeles-San Bernardino County boundary and running west along the township line common to T.3 N and T.2 N, San Bernardino Base and Meridian; then north along the range line common to R.8 W and R.9 W; then west along the township line common to T.4 N and T.3 N; then north along the range line common to R.12 W and R.13 W to the southeast corner of Section 12, T.5 N, R.13 W; then west along the south boundaries of Sections 12, 11, 10, 9, 8, 7, T.5 N, R.13 W to the boundary of the Angeles National Forest which is collinear with the range line common to R.13 W and R.14 W; then north and west along the Angeles National Forest boundary to the point of intersection with the township line common to T.7 N and T.6 N (point is at the northwest corner of Section 4 in T.6 N, R.14 W); then west along the township line common to T.7 N and T.6 N; then north along the range line common to R.15 W and R.16 W to the southeast corner of Section 13, T.7 N, R.16 W; then along the south boundaries of Sections 13, 14, 15, 16, 17, 18, T.7 N, R.16 W; then north along the range line common to R.16 W and R.17 W to the north boundary of the Angeles National Forest (collinear with township line common to T.8 N and T.7 N); then west and north along the Angeles National Forest boundary to the point of intersection with the south boundary of the Rancho La Liebre Land Grant; then west and north along this land grant boundary to the Los Angeles-Kern County boundary. (17 Cal. Code Regs., § 60104(d).)

96-10

The District's boundaries do not include the ocean area adjacent to the South Coast Air Basin. Thus, the District lacks authority to adopt and enforce measures in the AQMP (e.g., MOB-01, MOB-02, MOB-03, and EGM-01) because it does not have jurisdiction to regulate emission sources outside of its geographical boundaries as would be required if the CAAP programs become involuntary and mandatory. The Ocean Going Vessel (OGV) Vessel Speed Reduction program would require OGVs to slow vessel speed to 12 knots during their approach and departure from the ports at a distance of either 20 nm or 40 nm from Point Fermin, which is outside the District's jurisdictional boundary. The OGV Low Sulfur Fuel for Auxiliary Engines

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and Auxiliary Boilers program would require OGVs to switch to low sulfur distillate fuel within 40 nm from Point Fermin, which is outside of the District's jurisdictional boundary. The OGV Low Sulfur Fuel for Main Engines program would require OGVs to switch to low sulfur distillate fuel within 40 nm from Point Fermin, which is outside of the District's jurisdictional boundary.

The OGV Vessel Speed Reduction program is the only CAAP measure that is not already part of regulations adopted by other agencies. Yet, the Ports also lack jurisdiction to mandate any OGV actions of the ship owners if CAAP voluntary incentive targets are not met. OGVs are regulated by the federal government implementing its treaty obligations under MARPOL, administered by the IMO, specifically MARPOL Annex VI Regulations for the Prevention of Air Pollution from Ships (Annex VI), which sets global limits for SOx, NOx, and PM emissions from OGVs. Congress vested MARPOL and Annex VI authority with the Secretary of the U.S. Coast Guard (Secretary) and the Administrator (Administrator) of the EPA. (33 U.S.C., § 1903.) The Secretary has exclusive MARPOL administrative and enforcement authority. (33 U.S.C., § 1903(a).) The Administrator has Annex VI administrative, regulatory, investigative, and enforcement authority. (33 U.S.C., §§ 1901 et seq.)

The District's ability to adopt, enforce, and require the Ports to comply with any measure mandating the Vessel Speed Reduction program is precluded and preempted by Annex VI and federal regulations. (40 CFR § 1043.10.) The federal government has historically been the principal regulator of emissions from U.S. and foreign-flagged ships (or OGVs) under Annex VI. (40 C.F.R., § 94; 40 C.F.R., § 1043, 33 C.F.R. § 151).

96-10
Con't

The Ports are located within the "North American Environmental Control Area" (ECA) established under Annex VI. The North American ECA's limits are much stricter than Annex VI's global requirements. It would be unlawful for the District to require the Ports to collect and report NOx, SOx, and PM emissions information from OGVs subject to Annex VI requirements in the North American ECA. To collect this information, the Ports must impose a reporting requirement for OGVs coming and going from the Ports– effectively regulating them under Annex VI. The Ports lack authority to regulate U.S. and foreign-flagged ships in this manner. (33 U.S.C., §§ 1903, 1907.) Federal recordkeeping and reporting requirements for fuel and marine engines are expressly allowed (40 C.F.R., § 1043.70(b)-(c)), but no other recordkeeping and reporting requirements are authorized by statute or regulation. Any reporting requirement by the District is thus preempted by both Annex VI's record-keeping requirements for NOx engine standards and sulfur content in fuel (Regulations 13 and 14, Annex VI; incorporated by reference at 40 C.F.R., § 1043.100) and federal regulatory record-keeping and reporting requirements (40 C.F.R., § 1043.70).

The District's attempt to mandate certain voluntary CAAP programs would also be preempted on enforcement grounds. Congress expressly reserved enforcement authority of Annex VI regulations to the U.S. Coast Guard and EPA. (33 U.S.C., §§ 1903, 1907.) Enforcement inspections will be conducted only by the U.S. Coast Guard and, when referred by the Secretary, investigated by the Administrator. (33 U.S.C., §§ 1907(f)(1)-(2).) The U.S. Coast Guard and EPA are authorized to impose civil penalties for violations of MARPOL (including Annex VI) and 33 U.S.C., §§ 1901 et seq., § 1908(b)(1). The Ports and the District are not so authorized and cannot inspect, penalize, or undertake enforcement actions against OGVs under Annex VI and 33 U.S.C., §§ 1901 et seq.

The District's Executive Officer also lacks authority to decide that any emission target is not met. To satisfy the Emission Reduction Plan requirement, the Ports may have to impose more stringent emissions requirements on U.S. and foreign-flagged vessels than required by Annex VI. The Ports and the District both lack this authority.

96-10 Con't

2. The District Lacks Authority To Regulate Port Activities As "Indirect Sources."

The District has no authority to regulate mobile sources, and may not do so by mischaracterizing them as "indirect sources." (*Friends of Oceano Dunes, Inc. v. San Luis Obispo County Air Pollution Control District*, *supra*, 235 Cal.App.4th at 964 [air pollution control districts are not authorized to regulate or impose a permit system on "indirect sources" of emissions].) The Clean Air Act defines an indirect source as "a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution." (42 U.S.C., § 7410(a)(5)(C).) The Ports are not within this definition. "Direct emissions sources or facilities at, within, or associated with, any indirect source shall not be deemed indirect sources for the purpose" of an indirect source review program. (42 U.S.C., § 7410(a)(5)(C).)

Indirect source control measures cannot be required as a condition of SIP approval by EPA or CARB. (42 U.S.C., § 7410(a)(5)(A)(ii); Health & Safety Code, § 40468.) There are no provisions in the Clean Air Act for including "backstop" measures. Only those provisions necessary to meet the requirements of the Clean Air Act can be included in the SIP. (Health & Safety Code, § 39602.) Backstop measures are not necessary to meet the 24-hour PM2.5 NAAQS requirements of Clean Air Act, and there is no emission reduction target in the attainment strategy for AQMP which the proposed measures purport to implement. (See e.g., 40 C.F.R., §§ 51.112-51.114.)

96-11

The District advances the novel theory that it can designate a geographic area, such as a city or a Port, to be an "indirect source." Further, the geographic line drawn by the District does not respect political boundaries and lumps portions of the cities together as a single indirect source. The District believes it can draw any geographic boundary it desires and declare that area to be an "indirect source" without regard for whether the landowner operates or controls mobile sources that pass through the area. Under the District's theory, a local air district could designate as a stationary source, and an indirect source, any city or county that has natural features that attract ships or cars or other mobile sources, even if the city or county does not own, operate or control those sources. Is a city with oil fields a stationary source and indirect source because it attracts refineries, trucks and trains to transport the petroleum products? If Riverside County has increased the numbers of warehouses and distribution centers within its borders, is the governmental agency or county geographical area now a stationary source and indirect source because such distribution centers within their borders attract trucks and trains?

The AQMP control measures would use the Clean Air Act's indirect source provisions as a guise to impermissibly regulate mobile sources. The District cannot regulate emissions from on- and off-road mobile sources operating at, and to and from, the Ports, which includes ocean-going vessels and locomotives. The District cannot regulate emissions from the tailpipes of on-road and off-road mobile sources, or enact mobile source regulations. The District also cannot regulate off-site emissions (emissions occurring during transit "to and from" the purported

"site"). Congress did not intend or authorize the use of the indirect source provisions of the Clean Air Act as a way to circumvent mobile source preemption. 96-11 Con't

The AQMP measures also fail as an indirect source review program because the Ports are not a "new or modified indirect emissions source." The Clean Air Act defines modification as "any physical change in, or change in the method of operation, of a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of an air pollutant not previously emitted." (42 U.S.C., § 7411(a)(4).) The criteria pollutants targeted are among those that have been identified and reduced for the duration of the CAAP. Because the Ports do not qualify as either a new or modified source, any attempt to regulate them as such exceeds the the District's authority. 96-12

The AQMP control measures also violate the nexus requirement for indirect source review programs. The purpose of an indirect source review program is to ensure that mobile source emissions do not "cause or contribute to air pollution concentrations exceeding any national primary ambient air quality standard for a mobile-source related air pollutant." (42 U.S.C., § 7410(a)(5)(D)(i).) The District's own PM2.5 monitors show that emissions from mobile sources operating in and around the Ports are not causing or contributing to the South Coast Air Basin's nonattainment of the PM2.5 NAAQS. The District has in the past attributed nonattainment to a single monitor – Mira Loma (Van Buren) – which is located in Riverside, approximately 60 miles northeast of the Ports. This monitor has purportedly failed to attain the PM2.5 NAAQS because of drought conditions in Southern California, even though all of the South Coast Air Basin has experienced the drought and none of SCAQMD's other monitors have failed to demonstrate attainment with the PM2.5 NAAQS, including the two State and Local Air Monitoring Stations nearest to the Ports – in North and South Long Beach. The Long Beach monitors have consistently demonstrated attainment for at least the last four years and are projected to continue attaining the standard through 2019. The data thus suggest a nexus between nonattainment and a source located near the Mira Loma (Van Buren) monitor – not the Ports. 96-13

MOB-01 also fails as an indirect source review program because the businesses within the geographic and source designated areas are not a "new or modified indirect emissions source." (42 U.S.C., § 7410(A)(5).) A source is new if it adds to the air basin's existing emissions baseline. (*National Ass'n of Home Builders v. San Joaquin Valley Unified Air Pollution Control Dist.* (9th Cir. 2010) 627 F.3d 730, 731-32.) The Clean Air Act defines modification as "any physical change in, or change in the method of operation, of a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of an air pollutant not previously emitted." (42 U.S.C., § 7411(a)(4).) 96-14

3. **"Mobile Sources" Are Beyond The Scope Of District Authority.**

The revised AQMP continues and aggravates previously-objected-to proposals seeking to create and assert novel District regulatory authority over emission sources attributed to the Ports, which are mischaracterized as "facility-based mobile sources" – without identifying any legal authority for those proposed actions. (Revised Draft, pp. 4-27 through 4-33.) While the District acknowledges that it only has "limited authority to regulate mobile sources" (Revised Draft, p. ES-7), the AQMP nonetheless persists in attempting to do just that in MOB-01. The current revisions make explicit the threat to take such unauthorized actions "in the form of a regulation 96-15

by the SCAQMD ... " in order to characterize the Ports' voluntary, but effective, CAAP measures as "*enforceable commitments*." (Revised Draft, p. 4.28.) The Revised Draft continues to describe MOB-01 as a control measure to achieve and enforce emission reductions at commercial marine ports and continues to erroneously characterize it as a "facility-based mobile source control measure." The proposed MOB-01 is yet another attempt by the District (like prior IND-01 and PR 4001) to justify the imposition of illusory regulatory authority over the Ports as "indirect sources" of emissions.

96-15 Con't

By characterizing the Ports as a "facility-based mobile source," it appears that the District intends to use MOB-01 as not just an "indirect source" control measure, but as a prelude to "immediate" rule-making and enactment of regulations that might be enforced against the independent Ports. The Ports continue to oppose any form of a "rule" that would shift the District's oversight obligations on the Ports. They strongly oppose the District creating or relying on any concept of a "facility-based mobile source measure," whether described as an "Indirect Source Rule," "Backstop Rule" or the "freight hub," "facility cap," and/or "freight facility performance targets" approach.

96-16

The Ports are not a "Facility" as required by the Clean Air Act's indirect source provisions. Together, the Port of Los Angeles and Port of Long Beach encompass 10,700 acres, miles of waterfront and features 50 passenger and cargo terminals, including dry and liquid bulk, container, breakbulk, automobile and warehouse facilities, and a cruise passenger complexes. While some U.S. ports are "operating ports" that own and operate their terminals and equipment and hire longshoremen to handle cargo, the Ports are "non-operating" or "landlord" ports that hold the tidelands property in trust for the State of California and lease it out to port tenants that operate the terminals. Each port tenant is treated as an individual stationary source facility by the District and their activities are separately regulated and permitted by the District.

"Mobile sources" of emissions are beyond the limited regulatory authority conferred by the Legislature on local or regional districts (e.g., Health & Safety Code § 40001(a); *also see*, 76 Ops. Cal. Atty. Gen. 11 (1993); 75 Ops. Cal. Atty. Gen. 256 (1992); 74 Ops. Cal. Atty. Gen. 196 (1991); 73 Ops. Cal. Atty. Gen. 229, 234-35 (1990)). Congress vested the federal government with the authority to set nationwide emissions standards for mobile sources, including non-road mobile engines and vehicles. (42 U.S.C. §§ 7521, 7547.) Congress expressly and impliedly preempted states from setting standards or other requirements relating to the control of emissions for mobile sources. (42 U.S.C., § 7543, (a) & (e).) The maritime goods movement emission sources are within the express and implied preemption. The Clean Air Act allows California to seek authorization from EPA to adopt "standards and other requirements related to the control of emissions" for some, but not all, mobile sources covered by MOB-01. (42 U.S.C., §§ 7543 (b) & (e)(2)(A).) Thus, the District simply does not have mobile source regulatory authority.

96-17

The mobile emission sources that utilize the Ports already exist and are part of the baseline. Moreover, only those provisions necessary to meet the requirements of the Clean Air Act are included in the SIP. (Health & Safety Code, § 39602.) The purpose of an indirect source program is to ensure that mobile source emissions do not "cause or contribute to air pollution concentrations exceeding any national primary ambient air quality standard for a mobile-source related air pollutant." (42 U.S.C., § 7410(a)(5)(D)(i).) MOB-01 is not necessary to meet the NAAQS requirements of Clean Air Act. The emissions reductions listed in the Revised Draft for MOB-1 for the years 2023 and 2031 are listed as '**To Be Determined**" -- which indicates that

the reductions will be determined once the inventory and control approach are identified, and are not relied upon for attainment demonstration purposes. In reality, there would be little to no emission reduction benefit from indirect source measures because state, federal and international authorities have adopted rules and regulations to significantly reduce NOx emissions from these on- and off-road mobile sources. According to the AQMP, "[t]he effect of the rules and regulations are significant, showing reductions of over 67 percent in NOx emissions and close to 60 percent in VOC emissions between 2012 and 2023, even with increases in fleet population" (p. 3-4).

96-17 Con't

Despite repeated requests, the District still has not identified any legislation purporting to confer authority on the District to regulate public marine facilities as "mobile sources."[1] The District itself acknowledges that it does not have "primary regulatory authority" over the Port (or other large facilities identified as major sources of emissions, e.g., rail yards, airports, and distribution centers). Nevertheless, the Revised Draft states: "[T]he enforceable commitment may be in the form of a regulation by the SCAQMD within its existing legal authority, or by the State or federal government, or other enforceable mechanisms." (p. 4-28.) This statement raises the very same legal issues regarding the extent of the District's limited "existing legal authority" that the Ports have previously raised in opposition to PR 4001, and in their August 19, 2016 comment letter. The Revised Draft continues to ignore these basic, jurisdictional, flaws in the approach proposed to be taken by the 2016 AQMP.

96-18

The Ports maintain their fundamental objections to the provisions of the new AQMP that would inject the Ports into a newly-contrived regulatory scheme in an attempt to extend de facto District jurisdiction over mobile emission sources where no such jurisdiction exists as a matter of law. We refer to and incorporate the objections to this approach previously detailed in comment letters submitted in response to proposed IND-01, and to Proposed Rule 4001, and the Ports' August 19, 2016 letter commenting on the June draft AQMP.

4. <u>The AQMP Includes Procedural Deficiencies.</u>

Even though the Revised Draft AQMP would impose a strict timeline on the District to undertake rulemaking to create enforceable regulations "immediately" after the adoption of the Final 2016 AQMP (Table 4-3), the District has not complied with the procedural requirements to adopt indirect source control rules that are contemplated in MOB-01. The requirements are: (1) ensure, to the extent feasible, and based upon the best available information, assumptions, and methodologies that are reviewed and adopted at a public hearing, that the proposed rule or regulation would require an indirect source to reduce vehicular emissions only to the extent that the district determines that the source contributes to air pollution by generating vehicle trips that would not otherwise occur; (2) ensure that, to the extent feasible, the proposed rule or regulation does not require an indirect source to reduce vehicular trips that are required to be reduced by other rules or regulations adopted for the same purpose; (3) take into account the feasibility of implementing the proposed rule or regulation; (4) consider the cost effectiveness of the proposed rule or regulation; (5) determine that the proposed rule or regulation would not place any requirement on public agencies or on indirect sources that would duplicate any requirement

96-19

[1] The EPA itself treats "facilities based" emission sources as distinct from "mobile sources". See, e.g., 66 FR 65208 "Database of sources of environmental releases of dioxin-like compounds in the U.S.", ref year 1987-1995. December 18, 2001.

placed upon those public agencies or indirect sources as a result of another rule or regulation adopted pursuant to Health and Safety Code sections 40716 or 40717. (Health & Saf. Code, § 40717.5.)

96-19 Con't

The Revised Draft also inappropriately refers to the Ports as an "Implementing Agency," (Appendix IV-A, p. 126), which the AQMP elsewhere defines as "the agency(ies) responsible for implementing the control measure." On pages IV-A-127, the Revised Draft AQMP now purports to commit the Ports and District staff "to develop an enforceable mechanism to recognize the voluntary actions ... that can be credited in the SIP in a timely manner." However, to the extent the AQMP would mischaracterize the Ports as "Implementing Agencies," without including all of the other public and private partners working to achieve emission reductions, it improperly shifts an unwarranted burden of regulatory implementation to the Ports and erroneously implies that the Ports would have an assigned enforcement obligation. While the Ports have successfully adopted voluntary efforts to reduce emissions from maritime goods movement sources, and continue to be devoted to reducing emissions by working with the District as well as their own initiatives, the Ports are not air agency regulators. The AQMP should not commit the Ports to regulatory responsibility for "development" of enforceable mechanisms or control measures as to sources over which they do not have jurisdiction, ownership or operational control.

96-20

Further, as the District is well aware from the Ports' previous comment letters on these issues, the Ports lack authority to enforce as mandates the programs on all mobile sources operating in the Ports as they are preempted by state, federal and international law. This portion of the AQMP, requiring the Ports to select and implement the control measures, does not address or overcome these legal impediments.

5. **Control Measures in the AQMP would violate the dormant Commerce Clause.**

The "facility-based mobile source measure" approaches proposed in the revised draft AQMP would have serious negative effects on international and interstate commerce, navigation, maritime as well as land-based commerce, are will add unique and 'discriminatory' burdens which will have the effect of impeding California's and the Ports' economic competitiveness. Accordingly, these measures will likely undergo close scrutiny under the federal constitution's "dormant commerce clause" and "rights and immunities" protections.

96-21

"[A]ny state statute or regulation that impacts domestic interstate or foreign commerce is subject to judicial scrutiny under the commerce clause unless the statute or regulation has been preempted, or expressly authorized, by an act of Congress. (See, e.g., *Atlantic Coast Demo. v. Bd. of Chosen Freeholders* (3d Cir. 1995) 48 F.3d 701, 710.) The commerce clause's implicit, self-executing restriction on the states' power to regulate domestic interstate and foreign commerce is commonly referred to as the "negative" or "dormant" commerce clause. (*Barclays Bank, supra*, 512 U.S. 298, fn. 9....)" (*Pacific Merchant Shipping Assn. v. Voss* (1995) 12 Cal.4th 503, 514-15.)

The California Court of Appeal recently explained the broad scope of these constitutional limitations on state or local "regulations" impacting commerce, in *Alamo Recycling, LLC v. Anheuser Busch InBev Worldwide, Inc.* (2015) 239 Cal.App.4th 983, 996:

> The high court's dormant commerce clause jurisprudence "'significantly limits the ability of States and localities to regulate or otherwise burden the flow of interstate commerce.'" (*McBurney, supra*, 569 U.S. at p. ___ [133 S.Ct. at p. 1719] ....) More broadly, the high court in *Healy* explained that, taken together, its dormant commerce clause cases "stand at a minimum" for the three propositions. (*Healy, supra*, 491 U.S. at p. 336.) First, a state law violates the commerce clause if it applies to commerce that takes place wholly outside of the state's borders, regardless of whether the commerce has effects within the state. (*Id.* at p. 336, ...) Second, a state law that "directly controls" commerce occurring wholly outside the state's borders is invalid regardless of whether the law's extraterritorial reach was intentional....*Brown-Forman Distillers v. N. Y. Liquor Auth.* (1986) 476 U.S. 573, 579 [A statute that "directly regulates or discriminates against interstate commerce … is virtually *per se* invalid under the Commerce Clause … ."].) Third, "the practical effect of the statute must be evaluated not only by considering the consequences of the statute itself, but also by considering how the challenged statute may interact with the legitimate regulatory regimes of other States and what effect would arise if not one, but many or every, State adopted similar legislation. Generally speaking, the Commerce Clause protects against inconsistent legislation arising from the projection of one state regulatory regime into the jurisdiction of another State. [Citation.]" (*Healy, supra*, at pp. 336-337.)

96-21 Con't

Those burdensome and counter-productive approaches would be directly in conflict with the goals of Governor Brown's Executive Order to improve freight transportation efficiency and increase competitiveness of California's freight system, as well as the recently-released California Sustainable Freight Action Plan.

6. <u>The AQMD'S Imposition Of Unfunded Obligations On The Ports Violates The California Constitution, Article XIII B, Section 6.</u>

Article XIII B, Section 6(a) of the California Constitution states in relevant part as follows: "Whenever the Legislature or any state agency mandates a new program or higher level of service on any local government, the State shall provide a subvention of funds to reimburse that local government for the costs of the program or increased level of service ...."

96-22

The California Supreme Court recently ruled in *State Department of Finance v. Commission of State Mandates (County of Los Angeles)* (2016) 220 Cal.App.4th 740, that certain requirements of the 2001 Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit could be considered unfunded State mandates that would violate the above quoted constitutional mandate unless state reimbursement was provided.

The same rationale would apply to any unfunded requirements that are imposed upon the Ports under the 2016 AQMP. As framed, the requirements being imposed on the Ports are the creation of the District. The requirements are not "federal mandates" that might be exempted from this constitutional mandate.

7. **The AQMP Is Duplicative Of CARB and EPA Actions**

Control Measure MOB-01 is duplicative of existing ARB, EPA and international rules. When the CAAP was first released in 2006, there were few if any rules regulating port-related sources. A decade later, many of the voluntary port-related control strategies implemented under the CAAP have been superseded by state or international regulation. Much of the unprecedented emissions reductions from port-related sources that have been achieved to date rely on, and are largely (over 90% of emission reductions), the result of regulations for port-related sources at the state and international levels, including:

- CARB Truck Bus Regulation
- CARB Ocean-going Vessel At-Berth Regulation
- CARB and International Ocean-going Vessels Low-Sulfur Fuel Regulations
- CARB Cargo-handling Equipment Regulation
- CARB Commercial Harbor Craft Regulation
- International Maritime Organization North American Emission Control Area

96-23

The draft 2016 AQMP acknowledges this regulatory history and that the CAAP has been superseded by existing regulations.

8. **The District Cannot Adopt Control Measures Based On Unattainable Modeling Assumptions.**

Through MOB-01 through MOB-05 and EGM-01, the District is also inappropriately attempting to enforce the unattainable modeling assumptions in the SCAG's SCS, and any modifications the District utilized in the draft 2016 AQMP. If EPA approves this novel and significant change in SIPs in its final rulemaking, it will be signaling to states and local agencies that they can enforce assumptions. This will undermine the SIP process and lead to serious disagreements and controversies over all assumptions states and local agencies include in their SIPs because the regulated community will be fearful that any technical assumptions included in the SIP will be enforced in the future. Technical assumptions estimated by scientists will become political decisions. Further, this approach has been disapproved by the Ninth Circuit Court of Appeal in *Bayview Hunters Point Community Advocates v. Metropolitan Transportation Commission*, 366 3d 692 (9th Cir. 2004).

96-24

9. **The Requirements For RACM/RACT (Technologically And Economically Feasible) Have Not Been Met.**

The requirements in subparts 1 and 4 relative to RACM/RACT have not been met. EPA states that RACM includes any potential control measure for non-road emission sources that is both technologically and economically feasible. (80 Fed. Reg. 63647.) There must be an evaluation of technical feasibility that includes operation conditions, and non-air quality impacts as well as an economic feasibility that includes consideration of cost per ton of pollutant reduced, capital costs and annualized costs. There is no such analysis in the AQMP. The District cannot evade these requirements by calling a control measures an indirect source measure or a measure to simply enforce an attainment demonstration assumption.

96-25

10. No Emission Reductions Are Attributed To The MOB-01 Measure.

EPA has never approved the 2012 Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities [PR4001] as part of the SIP. No emission reductions from this measure are included in the attainment demonstration for the 2012 AQMP. Yet, the draft 2016 AQMP states that rulemaking is underway for PR 4001. There is no requirement or legal basis for continuing to develop PR 4001. MOB-01 addresses the same emissions sources. The District is singling out the Ports for double regulation. The impacts of this double regulation have not been assessed in the socio-economic analysis. The Ports' will be at a competitive disadvantage compared to other west-coast Ports. This will negatively impact the regional economy.

The District Governing Board previously found that without Control Measure IND-01: (1) "the 2012 AQMP, in conjunction with earlier AQMPs contains every feasible control strategy and measure to ensure progress toward attainment...."; (2) "the AQMP satisfies all the attainment deadlines for federal ambient air quality standards for 24-hour PM2.5 and 1-hour ozone NAAQS"; (3) "the 2012 AQMP satisfies the planning requirements set forth in the federal and California Clean Air Acts"; and, (4) "the 2012 AQMP includes every feasible measure and an expeditious adoption schedule". (Attachment 21, Resolution, motions, deleted Control Measure IND-01.) 96-26

On January 25, 2013, the CARB Board adopted Resolution No. 13-3. (Attachment 22, Resolution.) The CARB Board found that without Control Measure IND-01: (1) "the attainment analysis in the 2012 AQMP demonstrates that the 24-hour PM2.5 standard will be met throughout the [South Coast Air] Basin by the proposed attainment date"; (2) the 2012 AQMP demonstrates the [South Coast Air] Basin will attain the 1-hour ozone standard by 2022"; (3) "[t]the 2012 AQMP meets the applicable planning requirements established by the [Clean Air] Act and the Rule for 24-hour PM2.5 SIPs, and includes the required air quality and emissions data, modeled attainment demonstrations, RACM/RACT demonstrations, new source review, transportation conformity emission budgets, and contingency measures"; (4) "[t]he 2012 AQMP identifies contingency measures that will achieve additional emission reductions, beyond those relied on in the attainment demonstration, in the event that the South Coast Air Basin does not attain the 24-hour PM2.5 standard by 2014"; and, (5) "[t]he 2012 AQMP meets applicable planning requirements established by the [Clean Air] Act for 1-hour ozone SIPs, and includes the required air quality and emissions data, modeled attainment demonstrations, new source review and RACM/RACT demonstrations".

EPA proposes to conclude that RACM/RACT have been met without Control Measure IND-01/Proposed Rule 4001. Because there is no need for Control Measure IND-01/Proposed Rule 4001, there is no basis for approving it as part of the SIP.

11. Provisions Of The Proposed AQMP Would Improperly Infringe Upon The Ports' Roles As Trustees Of California Tidelands.

The Cities' management of the Ports is largely subject to their roles as trustees of tidelands under the legislative acts that granted tidelands to the Cities under a public trust. (E.g., *State of California ex rel. California State Lands Com. v. City of Long Beach* (2005) 125 Cal.App.4th 767, 771: "In 1911, the State granted the City of Long Beach all of its right, title and 96-27

interest in the tidelands situated within the boundaries of the city, to be held in trust and used to establish a harbor and to construct anything necessary or convenient for the promotion of commerce and navigation.") As tidelands trustees, the Cities have been granted the discretion over how to best fulfill the express trust purposes. The District cannot adopt policies, control measures, or regulations that might attempt to compel the Ports to violate these tidelands trust obligations.

The Revised Draft AQMP would strip the Cities of their discretion in administering the tidelands for the benefit of the State of California and compels the Cities to utilize their revenues for air quality purposes ahead of the purposes expressly set forth in the enactments granting tidelands to the Cities. As a practical matter, compliance with the incentives, control measures, and regulations proposed by the AQMP would depend in part on the Cities providing financial incentives to the owners and operators of mobile sources to incentivize emission reductions. If the District's Executive Officer could effectively require the Ports to develop an Emission Reduction Plan that requires more generous financial incentives must be offered by the Ports to achieve the emission targets (which is contemplated by the Revised Draft AQMP), this would ultimately impair and diminish the Cities' ability to execute their tidelands trust obligations by depleting revenues reserved for express trust purposes.

96-27 Con't

In their discretion, the Ports consider environmental quality to fall within the implied scope of the tidelands trust and have in fact made substantial expenditures when their operating budgets allow. The Ports also fully comply with the California Environmental Quality Act when developing their properties for tenants' use, which may include providing mitigation such as air quality reduction measures to address any environmental impacts. However, the tidelands trust does not expressly require revenues be expended for "air quality improvement", and the financial incentive programs and control measures proposed in the Revised Draft appear to infringe on the Cities' jurisdiction over their own funds, if the only way to increase compliance with a CAAP incentive program, for example, would be to increase the amount of incentives.

The proposed AQMP also compels the Cities to violate their Tidelands Trust obligations by mandating requiring the Ports to utilize trust for an entirely local program to reduce PM 2.5, SOx, and NOx emissions. The funding to implement the AQMP would confer only an emission reduction benefit to the South Coast Air Basin rather than to the entire State of California. Thus, funding or financial incentives compelled by the AQMP would require the Ports to provide "mitigation" beyond their direct impacts, and in conflict with the tidelands trust.

Moreover, the proposed AQMP would place the Ports at a competitive disadvantage to other California or West Coast ports. If commercial maritime business meant for the Los Angeles or Long Beach ports is diverted elsewhere as a result of compliance with the novel regulations and economic burdens arising from the AQMP, the Cities will be deprived of revenues they need to fulfill their tidelands trust obligations.

96-28

The Ports respectfully remind the District that the CAAP is a planning document that provides guidance on strategies and targets that are ultimately implemented through individual actions adopted by each Port's respective Board of Harbor Commissioners (Boards). The State granted to the Cities of Long Beach and Los Angeles exclusive authority to implement the tidelands trust under the oversight of the State Lands Commission. Each City has been appointed as a trustee and has established their respective Board of Harbor Commissions with

exclusive control and management of the Tidelands and revenues and expenditures from the Tidelands. However, such discretion must be exercised in accordance with their obligations to prudently manage Tidelands assets and revenues within a nexus and proportionality to the Tidelands Trust interest, as well as in accordance with applicable laws such as the California Environmental Quality Act (CEQA) and principles of federal preemption. The District cannot mandate action by each Port's Board of Harbor Commissioners, nor can the District direct how the Ports may be obligated to spend state Tidelands money; only the appointed trustee can make discretionary actions to obligate state Tidelands funds. Specifically, any measures listed in the AQMP or the CAAP must each require the Boards to authorize the expenditure of monies and program costs, or to approve conditions of infrastructure project development in their discretion as a CEQA lead agency and as Tidelands trustees.

96-28 Con't

12. The AQMP Improperly Includes Control Measures That Identify Emissions Reductions as "TBD."

The proposed control measures that identify the emission reductions as "TBD" should be removed from the draft 2016 AQMP (i.e., EGM-01& MOB-01). According to the draft 2016 AQMP, "TBD" is for emission reductions to be determined once the measure is further evaluated, the technical assessment is complete, and the inventory and cost-effective control approaches are identified. The District also concedes that the "TBD" measures are not relied upon for attainment demonstration purposes. As these control measures stand, they cannot meet the CAA requirements for a SIP submittal. The District has not shown these measures are cost-effective or feasible. The District is also including activities in these measures that the District lacks jurisdiction to adopt (as discussed in the previous section of this letter). These two "TBD" measures have virtually no details explaining how these measures will be implemented. This makes it difficult for the Ports' to assess the impacts, which is contrary to a public review and comment process.

It is not until after adoption of the 2016 AQMP, that the District proposes to engage in a public process to develop rules to implement these AQMP control measures. All of this "process" was supposed to take place during the development of the 2016 AQMP. The post adoption process includes identifying actions (voluntary and regulatory) that will result in emission reductions. The District intends to convene working groups for EGM-01 and MOB-01 within one month after adopting the 2016 AQMP, and then define objectives; seek initial input on the types of actions with potential criteria pollutant reductions; identify existing actions with potential emission reductions; identify future actions with potential emission reductions; develop model quantification methodologies for emission reductions associated with identified actions; quantify potential emission reductions; and develop mechanisms to ensure reductions are real, surplus and enforceable on-going on a monthly basis. This process is supposed to be completed in the next six months. After this task is completed, District staff will report to the Mobile Source Committee and Governing Board as to whether the District should continue with the process or recommend formal rule development. There is no option for dropping the control measures if the process concludes these control measures should not be implemented. By including these control measures in the 2016 AQMP, the District is committing to develop these rules regardless of the process outcome, and will place the South Coast Air Basin at risk of sanctions if the process shows these measures should not be implemented. Because these measures are not sufficiently developed, the impacts of these measures on the economy are not

96-29

taken into consideration in the socio-economic analysis, which significantly underestimates the costs associated with the 2016 AQMP.

The District's approach is not consistent with the Clean Air Act. In *Sierra Club v. Environmental Protection Agency* (D.C. Cir. 2004) 356 F.3d 296, 301-304, the court struck down the EPA's approval of a SIP that contained similar deferral and ambiguous strategies. The court held that the EPA's interpretation of the Act "cannot be squared with the unambiguous statutory language. The statute requires that the States commit to adopt *specific* enforceable measures. Here, the agency has accepted as sufficient a commitment to adopt what it concedes are *unspecified* measures –with the specifics to be named later." (*Id.* at 302, emphasis in original). These "TBD" measures must be removed from the 2016 AQMP.

96-29
Con't

The "TBD" measures do not quality as feasible at this time, and as such are not required to be in the 2016 AQMP. The District asserts that the emission reductions achieved and quantified by these "TBD" measures can be applied toward contingency requirements, make up for any shortfalls in reductions from other quantified measures, be credited towards rate-of-progress reporting, and/or be incorporated into future Plan revisions. Accordingly, it is premature to include these "TBD" measures in the 2016 AQMP.

13. <u>The AQMP Over-Reaches On Toxics And Enforceable Commitments.</u>

The Revised Draft 2016 AQMP also "embraces strategies that reduce toxic risk impacting local neighborhoods and disadvantaged communities adjacent to goods movement and transportation corridors." The Ports concur that reducing toxic risk is important and that there should be a strategy. However, the CAA does not address toxics through the SIP process; it is through NESHAPs, MACTs, etc. The strategies that reduce toxic risk should not be submitted to CARB or EPA as a SIP submittal. There is no reason for the District to put the South Coast Air Basin at risk of SIP sanctions or FIPs by including control measures that are not required by the CAA.

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In the Revised Draft AQMP, the District implies it intends to only rely upon the EPA's economic incentive programs (EIP) to render the incentive measures enforceable. None of the incentive programs meet the requirements of the EIP. In addition, there are other more worthy options that the District excludes such as MOUs and EPA's Voluntary Mobile Source Emission Reduction Program (VMEP). EPA has issued guidance on incorporating VMEPs into SIPs pursuant to Section 110 of the federal Clean Air Act. EPA developed the VMEP as an innovative program to assist states and local air agencies in implementing incentive programs. The VMEPs accommodates the uncertainty associated with the incentive and voluntary measures in the 2016 AQMP. For example, the SIP submittal must include a "good faith estimate" of emission reductions, including assumptions, and addressing both compliance and programmatic uncertainty. EPA's Guidance suggests that states enter into a Memorandum of Understanding with VMEP sponsors.

14. Comments Specific To Individual Proposed Control Measures.

a. EGM-01: "Emission Reductions From New Development And Redevelopment Projects [All Pollutants]."

There is only proposed control measure in the category for "emission growth management measures" in the AQMP ... "EGM-01. The Revised Draft (p.IV-A-7) explains that this proposed measure is intended to "evaluate the applicability" of the "Indirect Source Review – Rule 9510" as adopted by the San Joaquin Valley Air Pollution Control District ("SJVAPCD"), apparently pursuant to the District's belief that such evaluation is required by "a provision under state law." The Ports recognize the District's interest in evaluating "all feasible measures" to reduce emissions, but respectfully urge that any such evaluation of a "Rule 9510-style" indirect source review be framed so as to exclude the Ports or activities at the Ports. 96-31

i. Ports Should Not Be Subject To EGM-01.

The SJVAPCD adopted its Rule 9510 back in December 2005, near the height of a land development and residential construction boom in the San Joaquin air basin. The SJVAPCD explained that its primary purpose for pursuing its novel "indirect source review" program under Rule 9510 was "to reduce the impacts of growth in emissions resulting from new land development in the San Joaquin Valley." Those types of concerns – emissions from new land development" and housing construction – are not applicable to the Ports or the types of activities typically conducted at the Ports.

The Revised Draft explains that the "purpose" of EGM-01 is to mitigate emissions from new development and redevelopment projects, which it characterizes as "indirect sources." (Appendix IV-A, p. 185.) The Ports have previously pointed out, however, that the AQMP misuses that term at least as it seeks to use the "indirect source" characterization as a justification for imposing measures on mobile sources (even "facility-based mobile sources") associated with the Ports. To the extent that this measure appears to be an attempt to assert "indirect source" regulatory authority over activities at the Ports, it would be in excess of the District's jurisdiction, as explained in the comments on "indirect sources" and MOB-01. 96-32

The Ports have further explained that even if authority to regulate "indirect source" emissions may be appropriate as to some types of stationary facilities, such authority applies only to "new" sources of air pollution. The Revised Draft appears to justify this measure based on its anticipation that unspecified "outlying areas continue to be developed" in parts of the District. (Cf. Appendix IV-A, p. 185.) However, the Ports do not fit that description either, and cannot be characterized as areas of significant "new land development" such as served as the justification for SJVAPCD's Rule 9510.

Accordingly, the AQMP should make clear that this measure and any rule-making that may emerge from the District's evaluation of an indirect source review program like Rule 9510 would not be intended to be applicable to the Ports.

ii. **Adoption Of An "indirect source rule" Like San Joaquin Valley APCD Rule 9510 Would NOT Be Appropriate Or Lawful.**

The Revised Draft AQMP further states: "[f]or the purposes of this measure [EGM-01], indirect sources include all facilities not covered by another 2016 AQMP Control Measure, *specifically, control measures MOB-01 through MOB-14 to the extent that these control measures are part of the adoption of the Final 2016 AQMP."* . In addition, during the rule development process, additional indirect sources may be included or excluded" (Appendix IV-A, p. 185).

The Ports should not be included within this control measure in the event MOB-01 is removed from the Final 2016 AQMP or during the rule development process. In addition to the reasons stated above, the Ports have serious concerns about the District making a commitment to the state and federal governments that the SCAQMD will control growth or dictate land use decisions in areas subject to the Cities' police power (and the Ports' tidelands trust roles). SCAQMD has no authority to control growth or overrule local land use decisions. (Health & Saf. Code, § 40716 [air districts cannot infringe on the existing authority of counties and cities to plan or control land use]; see also Health & Safety Code, §§ 40000, 40414, 40440.1, 40717.5(c)(1).) Land use is within the exclusive preview of local cities and counties. 96-33

In addition, the legal constraints on the establishment or imposition of fees and charges, may no longer allow the District to pursue an indirect source review program with fees like Rule 9510. That Rule was adopted in 2005, and was subjected to judicial review in 2008, prior to passage of Proposition 26.. Accordingly, the District's evaluation of a similar rule (to the extent that such an contemplated rule may include a component requiring the payment of ISR mitigation fees or regulatory fees) may need to be able to meet the requirements of these subsequent constitutional amendments, imposing more stringent burdens on state and local agencies when they seek to establish or impose fees or other charges. (Cal. Const. art. XIII A, § 3 subd. (d); art. XIII C, § 1, subd. (e); art. XIII D, § 6, subd. (b)(5); *Schmeer v. City of Los Angeles* (2014) 213 Cal.App.4th 1310, 1322.) Accordingly, provisions for voter approval may need to be considered.

Further, the District cannot justify the inclusion of EGM-01 in the 2016 AQMP based on the premise that the CAA requires that all measures adopted by other air district must be included in the 2016 AQMP. Because EGM-01 is an indirect source control measure, the measure cannot be required as a condition of SIP approval by EPA or CARB. (42 U.S.C., § 7410(a)(5)(A)(ii); Cal. Health & Safety Code, § 40468.) Only those provisions necessary to meet the requirements of the Clean Air Act can be included in the SIP. (Cal. Health & Safety Code, § 39602.) Therefore, the District is not required by the CAA to adopt EGM-01 simply because San Joaquin Valley APCD adopted this measure.

b. **MOB-01: "Emission Reductions At Commercial Marine Ports."**

The Revised Draft continues to recognize the Ports' successful efforts in implementing the CAAP since 2006, exceeding our emission reduction goals in 2014. The Revised Draft, however, now asserts that the goal of proposed control measure MOB-01 is related to sources, admittedly mobile sources that "operate in and out of" the Ports. (Appendix IV-A, p. 121, also, p. 124.) The Revised Draft AQMP continues to mischaracterize the Ports as a "facility-based 96-34

mobile source," and seeks to justify MOB-01 as an indirect source control measure in order to quantify and to further the "enforceability" of emissions reductions achieved by the Ports under the CAAP. MOB-01 is described as a control measure to achieve emission reductions at commercial marine ports and is characterized in the AQMP as a "facility-based mobile source control measure."

96-34 Con't

The Revised Draft continues to attempt to hold the Ports responsible for achieving the Port Standards, and the AQMP continues to propose MOB-01 in this attempt. Further, MOB-01 suggests that if the emission reductions occurring at the Ports are not maintained after they are reported into the SIP that this measure may be implemented in the form of new rule-making or other "regulatory" action by the SCAQMD, or other "enforceable mechanisms," notwithstanding the limitations of the federal Clean Air Act. The Ports have previously addressed those limitations on the District's authority, above as well as in prior communications on this topic.

The most recent revisions to the Draft AQMP appear to signal that the District is seeking to even more aggressively pursue this "regulatory" approach, despite the objections to such measures. (Appendix IV-A, pp. 125-126.) It proposes to go so far as to "provide a schedule" for implementation of rule-making leading to new regulations or "other enforceable mechanisms" "immediately after adoption of the Final 2016 AQMP." (*Ibid.*) The Revised Draft would even commit the District staff to report "within six months after adoption of the Final 2016 AQMP" as to whether the Board should consider adopting rules within its existing authority or seek additional authority to adopt and implement measures. (Revised draft AQMP p. 4.23.) It also would require the District to make a recommendation "whether to proceed with formal rulemaking" no later than one year after adoption of the Final 2016 AQMP. (Appendix IV-A, p. 125) and would include a "schedule" for such enforcement and rulemaking (Table 4-3.)

96-35

The Revised Draft reveals that the District still fails to identify any statutory authority for its continued pursuit of this measure, despite its recognition that its authority in this regard is "limited." The Ports raised many questions and objections when the District has previously considered various other approaches, e.g., control measure MOB-03 in the 2007 AQMP and control measure IND-01 in the 2012 AQMP, to pursue this approach. The District ultimately appeared to recognize their shortcomings. The 2007 MOB-03 was described as "a backstop measure for indirect sources of emissions from ports and port-related facilities" and in the ensuing years, District staff proposed and sought public review of a 'backstop" rule that would be enforceable and applicable to the Ports, "Proposed Rule 4001." EPA, in its April 2016 action partially approving the 2012 SIP, excluded the commitments proposed by IND-01 from its action and stated that would respond to that in a separate rulemaking. (See 81 FR 22025 (April 14, 2016) "US EPA Partial Approval and Partial Disapproval of California Air Quality SIP.") The District has reported that Proposed Rule 4001 has been placed on hold, in light of work to develop supposedly different approaches for the pending 2016 AQMP.[2]

i. **Exceeds District Authority.**

Neither EPA nor CARB can require the District to adopt a control measure such as MOB-01 because indirect source control measures cannot be required as a condition of SIP

96-36

[2] Minutes of the District's "Mobile Source Committee" meeting of April 15, 2016, included in the District's Board Meeting minutes from May 6, 2016 (agenda item #21).

approval. (42 U.S.C. § 7410(a)(5)(A)(ii); Health & Safety Code, § 40468.) Therefore, the Ports have serious concerns about, and continuing objections to, the proposals in the revised draft AQMP for the District making enforceable commitments to the state and federal governments that the Ports will control and regulate "indirect sources."

The District has not identified any legislation purporting to confer authority on the SCAQMD to regulate public marine facilities as "mobile sources."[3] The District itself acknowledges that it does not have "primary regulatory authority" over the Port (or other large facilities identified as major sources of emissions, e.g., rail yards, airports, and distribution centers), and acknowledges that "additional authority provided to the State or SCAQMD for sources traditionally under the jurisdiction of the federal government (e.g., locomotives, aircraft and ships.)" (Revised Draft AQMP at p. ES-5.)

96-36 Con't

The District has no authority to regulate mobile sources or to draw any geographic boundary or to arbitrarily characterize source categories and declare those areas or groups of sources to be an "indirect source." "Mobile sources" of emissions are beyond the limited regulatory authority conferred by the Legislature on local or regional districts (e.g., Health & Safety Code § 40001(a); also see, 76 Ops. Cal. Atty. Gen. 11 (1993); 75 Ops. Cal. Atty. Gen. 256 (1992); 74 Ops. Cal. Atty. Gen. 196 (1991); 73 Ops. Cal. Atty. Gen. 229, 234-35 (1990)).

The Ports respectfully suggest, as more feasible and lawful alternatives to MOB-01, that these portions of the AQMP should pursue the District's reasonable goals by a collaborative, voluntary approach that will continue to be the most effective means for controlling emissions from maritime goods movement activities within the jurisdiction of Ports. This approach, which could be memorialized under a cooperative agreement between the Ports and SCAQMD, CARB, and EPA, would benefit all parties because it continues the collaborative effort that has resulted in unprecedented emission reductions at the Ports, shares responsibility between Parties, provides more certainty for the local economy, avoids litigation, insures incentive funding that is tied to excess emissions will continue to be available, and will result in better air quality.

ii. Preemption By The Federal Clean Air Act.

Congress vested the federal government with the authority to set nationwide emissions standards for mobile sources, including nonroad mobile engines and vehicles. (42 U.S.C., §§ 7521, 7547.) Congress expressly and impliedly preempted states from setting standards or other requirements relating to the control of emissions for mobile sources. (42 U.S.C., § 7543, (a) & (e) The goods movement sources that would be regulated by Proposed Rule 4001 are within the express and implied preemption. The Clean Air Act allows California to seek authorization from the EPA to adopt "standards and other requirements relating to the control of emissions" for some but not all mobile sources that would be covered by Proposed Rule 4001. (42 U.S.C., §§ 7543, (b) & (e)(2)(A).) The Clean Air Act does not allow for California to seek an EPA waiver for every one of the goods movement emission sources, nor has CARB made such a request.

96-37

c. MOB-14: "Emission Reductions From Incentive Programs [NOx, PM]."

[3] The EPA itself treats "facilities based" emission sources as distinct from "mobile sources". See, e.g., 66 FR 65208 "Database of sources of environmental releases of dioxin-like compounds in the U.S., ref year 1987-1995. December 18, 2001.

i. **Impact On Existing Funding Programs.**

The District is relying on securing significant funding for incentives to implement early deployment and commercialization of zero and near-zero technologies." There are a number of funding sources available provided the emission reductions are not required by a plan or rule. By making voluntary actions, mandatory, the District will reduce the funding sources that would otherwise be available.

Specifically, the Revised Draft 2016 AQMP mobile source control measures include development of incentive funding programs and supporting infrastructure for early deployment of advanced control technologies. MOB-14 states that it seeks to develop a rule similar to the San Joaquin Valley Air Pollution Control District Rule 9610 – "State Implementation Plan Credit for Emission Reductions Generated through Incentive Programs" -- such that emissions reductions generated through incentive programs can be credited in the SIP emission inventories (p. 4-33.). MOB -14 would also create "a new administrative mechanism to credit toward SIP requirements for future emission reductions achieved... through incentive programs administered by the District, CARB or US EPA." (Appendix IV-A-178.) 96-38

It will be critical to prioritize and secure the necessary funding needed to implement the proposed incentive-based measures in the Draft AQMP and achieve the aggressive emission reduction targets in the South Coast Air Basin. The Ports know first-hand that the move toward zero emissions is a costly endeavor and have placed significant emphasis on efforts to advance the development of near-zero and zero emissions equipment for on-terminal and on-road applications. Through the Ports' Technology Advancement Program (TAP), we have been involved with funding the demonstration of clean technologies used in port operations for nearly a decade. Significant progress has been made and we expect that zero emissions operations will be feasible in the future. The scale of this effort will be significant, with cost for the equipment and fueling infrastructure in the *Billions* of dollars.

The Ports and the maritime goods movement industry will require a substantial amount of funding assistance from the local, state and federal agencies. As such, the Ports are supportive of incentive funding to accelerate advancement of technologies. The Ports continue to strongly support the implementation of funding programs such as the Proposition 1B Goods Movement Emission Reduction Program and the Carl Moyer Memorial Air Quality Attainment Program, both of which have provided funding for much needed assistance with upgrading wharves for shore power, the replacement of drayage trucks, and the replacement and repower of engines in cargo-handling equipment, harbor craft, and locomotives. 96-39

While the Ports support funding programs and the need to credit emissions reductions generated from through incentive funding programs, the Ports strongly recommend that MOB-14, or any resulting regulatory strategy be structured in such a way that does not preclude the maritime goods movement industry's ability to secure grant funding for early actions. For example, it is not clear from the description of MOB-14 whether facility emission caps or port backstop rules could effectively disqualify companies and agencies from received grants, because typically grants funds cannot be used for regulatory compliance. The Ports believe that this unintended consequence of a control measure like MOB-14 could significantly impede early equipment replacement and transition to zero emission technologies, and also severely affect the economic competitiveness of the maritime goods movement industry. In addition, if the required

emission levels for attainment are not be met in the region, the Ports must not be held accountable for attaining emission reductions that are predicated on incentive funding if the funding does not come through at the necessary and appropriate levels.

96-39 Con't

We also note that the AQMP is vague as to how this measure may be "implemented," and merely asserts that "the District has developed [unspecified] policies and procedures to ensure that this control measure is successfully implemented." (Appendix IV-A-182.) Concerns would be raised if the AQMP were to contemplate "implementation" by measures including the imposition of purported "regulatory fees" such as those in the San Joaquin Valley APCD Rule 9510 scheme, as discussed above.

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The District also proposes to revise Credit Rules 1612 and 1612.1 so that mobile source emission reduction credits generated under these rules would only be available to help facilities affected by the facility-based measures (MOB-01 through MOB-04 and EGM-01). The credits are proposed to not be eligible for offset stationary source emissions. This will unnecessarily constrain the market for mobile source emission reduction credits and reduce the incentives for the conversion of mobile sources to zero and near-zero technologies.

15. <u>The District Lacks Authority To Require The Ports To Enforce Or Implement The Control Measures</u>.

The AQMP unlawfully compels the Ports to regulate local air quality in violation of California Health and Safety Code sections 40414 and 40440. The District's authority is confined to air quality and cannot infringe on the land use authority of counties and cities. (42 U.S.C., § 7431; Cal. Health and Safety Code, § 40414.) The Ports, not the District, have the authority to determine their own land use needs to advance trade and commerce. The Ports play a critical role in facilitating domestic and international maritime commerce. The Los Angeles City Charter charges the Port of Los Angeles with possession, management, and control of all navigable waters, tidelands, submerged lands, and other lands as specified in the City Charter. (City Charter, Sections 602 and 651.) Similarly, the Long Beach City Charter vests in the Long Beach Harbor Department the authority to control and supervise the Harbor District to provide for the needs of commerce, navigation, recreation and fishery. (Long Beach charter Article X11.) As an exercise of this authority, the ports decided to develop an emission inventory and implement CAAP programs after having weighed the risks of losing business to other ports without a CAAP-equivalent program. These emissions are not caused by the ports' own equipment or operations – they are caused by tenants and other goods movement customers that operate in or near the ports.

96-41

The Ports are not authorized by state or federal law to carry out the air quality responsibilities of an air district or state. (40 C.F.R., § 51.232(a).) The delegation requirements are also not met. (40 C.F.R., § 51.232(b).) The AQMP nevertheless requires the Ports to conduct regulatory activities, such as developing and adopting emission reduction strategies for maritime goods movement emission sources, which may include retrofit, idling, or fuel requirements; seeking the District's approval to implement the ERP regulations; and establishing enforcement procedures to ensure that PM2.5 emission reductions from mobile sources operating in or near the ports meet the 2012 AQMP assumptions.

16. <u>The AQMP's Contingency Measures Are Inconsistent With The Control Measures</u>.

The District intends to utilize the "TBD" control measures as contingency measures, which is inconsistent with the proposed control description in the "TBD" control measures. The inclusion of contingency measures is for federally enforceable attainment demonstrations (i.e., those SIP submittals approved by EPA). The 2016 AQMP attainment demonstration has not been approved by EPA as a SIP submittal. Under the CAA contingency measures consists of other available control measures that are not included in the control strategy and become effective upon a determination by the EPA Administrator that the area has failed to make reasonable further progress or to attain the NAAQS by the applicable statutory deadline. Reasonable further progress is quantitative emissions reduction milestones which are to be achieved every 3 years until the area is redesignated attainment. The contingency measures are supposed to be interim measures that address only the shortfall of either the reasonable further progress target or specific attainment deficiency until a SIP revision is prepared. The MOB-01 control measure is not a suitable contingency measure. Such measures must be fully adopted rules that are ready for rapid implementation upon failure to achieve RFP or attainment. The issues that are listed in this letter prove MOB-01 cannot and will not meet the contingency measure requirements. 96-42

The District should instead explore using excess emission reductions from existing rules as contingency measures. The RFP contingency requirement may also be met by utilizing an RFP above the requirement amount. EPA also allows reductions achieved through early implementation of an emission reduction measure to be used towards the contingency requirement. According to the 2016 AQMP, U.S. EPA's March 2015 ozone implementation rule provides that "extreme" areas with approved Section 182(e)(5) commitments only had to submit contingency measures under three years before the attainment date, and not the general CAA contingency measures.

17. **The AQMP Prematurely Includes Attainment Demonstrations For Revised And Revoked NAAQS.**

The draft 2016 AQMP addresses five NAAQS. The District asserts that it is required to have a new attainment demonstration for three NAAQS: (1) the 8-hour ozone NAAQS established in 2008, 75 ppb (2008 8-hour Ozone); (2) the annual PM2.5 NAAQS established in 2012, 12 $\mu g/m^3$ (2012 annual PM2.5); and, (3) the 24-hour PM2.5 NAAQS established in 2006, 35 $\mu g/m^3$ (2006 24-hour PM2.5). The District concedes it is ***voluntarily*** submitting an attainment demonstration for the following NAAQS: (1) 1997 8-hour Ozone NAAQS, 80 ppb and the 1979 1-hour Ozone NAAQS, 120 ppb. 96-43

2008 8-hour Ozone: The 2016 AQMP includes control measures and an attainment strategy to reach attainment of this standard by 2032. As part of EPA's development of an ozone NAAQS Implementation Rule for the revised 2015 8-hour ozone standard, EPA intends to, among other things, decide whether to revoke the 2008 8-hour ozone NAAQS, and to impose appropriate anti-backsliding requirements to ensure that the protections afforded by that standard are preserved. It is premature to include a full-scale attainment demonstration when anti-backsliding controls would govern the strategies available for the applicable demonstrations if and when the 2008 standard is revoked. The draft 2016 AQMP currently shows a transportation conformity demonstration under 42 U.S.C. § 7506(c) is required for the 2008 standard. (Table 6-1, page 6-10.) However, this requirement became inapplicable after revocation of the 1997 standard and may also become inapplicable under the Implementation Rule for the 2015

standard. (See 80 FR 12264, 12284.) Further, the anti-backsliding requirements applicable to a revoked 2008 standard may include those currently set forth for the 1997 revoked standard. (40 C.F.R. §§ 51.1105(a)(1), 51.1100(o); 42 U.S.C. §§ 7502(c)(4), 7511a(b)(1) and (c)(2).) But they could also be amended, as they were in the Implementation Rule for the 2008 standard. (80 FR 12264, 12298.)

2012 annual PM2.5: The 2016 AQMP states that the 2012 annual PM2.5 standard cannot be met by 2021, which is the attainment year for the current "moderate" designation. Therefore, the District will be requesting EPA re-designate the Basin as a "serious" nonattainment area, which will provide four more years to attain the annual PM2.5 standard by 2025. The Ports believe this is a prudent approach. 96-43 Con't

2006 24-hour PM2.5: The 2016 AQMP demonstrates that the 2006 24-hour PM2.5 standard will be met by the 2019 attainment year with no additional reductions needed beyond already adopted measures. Therefore, no additional measures should be included in the 2016 AQMP to achieve this standard.

1997 8-hour Ozone: In 2008, the 1997 8-hour Ozone standard was lowered to 75 ppb (the 2008 8-hour Ozone standard). EPA revoked the 8-hour 1997 standard, effective in 2015. The District included new control measures and prepared an attainment demonstration of 2031 in the 2016 AQMP. The District has prematurely chosen to provide for the alternative NOx/VOC reductions instead of the reasonable further progress demonstration under 42 U.S.C. § 7511a(c)(2) without conducting an economic analysis of these options. (40 C.F.R. § 51.1100(o)(12).) The District should study the costs associated with each analysis to determine which results in lower costs to businesses and the Ports. Additionally, it is unclear whether the attainment demonstration incorporates transportation conformity thereby subjecting the District to possible sanctions. Transportation conformity should be excluded because it became inapplicable after revocation of the standard. (See 80 FR 12264, 12284.)

1979 1-hour Ozone: EPA revoked the 1-hour standard entirely, effective in 2005. As stated above, the District should conduct an economic analysis of the NOx/VOC reductions and the reasonable further progress demonstration before selecting one over the other. It is also necessary to know whether the attainment demonstration incorporates transportation conformity for the reasons set forth above.

18. The Socio-Economics Analysis Is Incomplete.

The Ports note the difficulty, if not the inefficiencies, posed by the District's continuing practice of releasing the proposed new 2016 AQMP in piecemeal and incomplete fashion. It appears that the current Revised Draft AQMP is itself not yet complete, and anticipates additional substantive content. The necessary socio-economic analysis is also not yet complete. 96-44

The Revised Draft 2016 AQMP also indicates that there will be no analysis of contingency measures in the Socioeconomic study. Also, it appears that several measures that do not have emissions reduction targets or other information will not be included in the Socioeconomic analysis. This means there will be no comprehensive review of the impact 96-45

associated with implementation of all measures or the repercussions of the potential adoption of the "facility-based mobile source measures" discussed in the MOB-1 section above. 96-45 Con't

The Revised Draft (p.9-7) states that it anticipates that "the 2016 AQMP Socioeconomic Report will contain enhanced impact analyses on Environmental Communities...." That information should be made available as part of a complete analysis. 96-46

Furthermore, it appears that the Socioeconomic study will only analyze the impacts associated with approximately $16 billion in government subsidies, not including the match funding that will be required from private operators. The Ports are concerned that this amount is substantially underestimated and ignores the necessary private capital that will be necessary to purchase thousands of pieces of costly near-zero and zero emission equipment to be deployed at the ports and throughout the region. 96-47

Finally, the description of the anticipated socioeconomic study assumes that there will be no tax increases to fund these incentives; however, the Revised Draft AQMP contradicts this assumption as it clearly states AQMD's intent to seek local and state ballot measures, which would include taxpayer funding (p. 4-68). 96-48

The Socioeconomic analysis must include an analysis of the impacts on the private sector from having to invest in significant new capital costs associated with cleaner equipment, and it must include an analysis of the impact on taxpayers as a result of higher taxes. 96-49

To the limited extent portions of the Socioeconomic Report have been released, it appears that it may: (a) Underestimate the costs of compliance with new measures contemplated by the 2016 AQMP; (b) Overestimate the extent and benefits of changes in health costs and risk reductions; and (c) Fail to accurately address or quantify the likely impacts on Port competiveness and other related impacts on the regional economy. 96-50

The Ports request a full socioeconomic analysis of all control measures, and that the socioeconomic analysis be completed and an adequate opportunity for public comment be provided *prior to* action on the Revised Draft 2016 AQMP. 96-51

19. <u>The District Is Improperly Conduction CEQA Review Before The AQMP Is Complete</u>.

The draft Environmental Impact Report for the proposed 2016 AQMP is now out for public review and comment. The Ports are submitting separate comments on that Draft EIR, and we refer to and incorporate those comments here as well.

As noted in the Ports comments on the Draft EIR, it seems to be procedurally and legally inappropriate for the District to be conducting its CEQA review before the details of the proposed AQMP have been completed. The Ports and the public should not be required to review and comment on important environmental documents before the full shape of the proposed project (2016 AQMP) is better known and disclosed. (See, e.g., *City of Santee v. County of San Diego* (1989) 214 Cal.App.3d 1438, 1450: "A <u>complete</u> project description is necessary [for CEQA] to assure that <u>all</u> of a project's environmental impacts are considered."].) 96-52

20. Specific Technical Comments On AQMP

The Ports previously submitted specific technical comments on the June 2016 draft AQMP, and we appreciate that some of these comments are reflected in the revised draft, particularly the revised emissions under MOB-01, which are more consistent with the Ports' emission inventories. Many of our comments, however, are not explicitly addressed in the revised draft, and it is not clear that the current revised draft AQMP has acknowledged or responded to those comments. 96-53

We therefore incorporate by reference the technical comments raised in our August 19, 2016 letter, which is attached, and additionally, highlight the following new and/or restated technical issues.

a. Appendix IV-A, Table IV-A-2 SCAQMD Proposed Mobile Source 8-Hour Ozone Measures, p. IV-A-4.

For MOB-01, the emission reductions in tons per day (tpd) for 2023/2031 is identified as "TBD" with a corresponding footnote "b", which states "Submitted into the SIP as part of reporting or in baseline inventories for future AQMP/SIP Revisions." We request that the District provide further clarification on how the "Rate of Progress" will be calculated and compared to ensure that the emissions reductions achieved by the proposed control measure are surplus emissions. 96-54

b. Appendix IV-A, Page 7, Emission Reduction Benefits Of Funding Programs.

The Ports each prepare annual air emissions inventories of port-related sources. These inventories are based on actual equipment and activity data, and as such, incorporate emission reductions due to funding incentive programs if they occurred in the current or previous years emission inventories. The Revised Draft AQMP contains this language: "In addition, the SCAQMD is implementing several incentives funding programs that have resulted in early emission reductions (e.g., the Carl Moyer Memorial Air Quality Standards Attainment Program, the Surplus Off-Road Opt-In for NOx (SOON) program, and Proposition 1B – Goods Movement Emissions Reduction Program). The emission reduction benefits of the funding programs are quantified and are proposed to be included as part of the overall emission reductions for attainment of the NAAQS." (IV-A, page 7). 96-55

It is important to identify those reductions for port sources to avoid double-counting in the baseline and future emissions reductions analysis. The Ports' emissions inventories include incentive programs in the baseline year but do not project additional benefits that may occur due to additional incentive funding from these programs.

c. **Appendix IV-A, Emission Reductions At Commercial Marine Ports [NOx, SOx, PM], p. IV-A-120.**

The Ports each prepare annual air emissions inventories of port-related sources, and in July 2015, transmitted the San Pedro Bay Ports 2012 air emissions inventory, as well as forecasted port-related emissions for each year through 2031 for inclusion on the 2016 AQMP based on discussions with District and ARB staff. The Ports appreciate that emissions under MOB_01 have been revised, and they are within 5% of the San Pedro Bay Ports emissions that we shared with SCAQMD and ARB.

It is the Ports' understanding that the emissions from port-related sources in the 2016 AQMP would reflect the actual emissions reported by the Ports. These discrepancies should be addressed.

To provide for a meaningful and comprehensive review, the Ports request that the District identify the port-related sources (i.e., ocean-going vessels, harbor craft, locomotives, cargo-handling equipment, and heavy-duty trucks) of emissions that make up the total emissions in the Control Measure Summary (p. IV-A-109). It is also important to identify the assumptions used to estimate future emissions in 2022, 2023, and 2031. For instance, it is important to understand the assumed International Maritime Organization (IMO) tier level of ocean-going vessels calling at the Ports, as well as the fleet makeup of all other port-related source categories, including heavy-duty trucks, cargo-handling equipment, locomotives, and harbor craft. It is also important to identify the source-specific "growth" factors that were used to estimate future year emissions. 96-56

The **table** below shows a comparison of the emissions provided in the Revised Draft 2016 AQMP and the Ports' actual 2012 emissions and forecasted emissions for 2023 and 2031.

ANNUAL AVERAGE	All Source Categories			
	2012	**2022**	**2023**	**2031**
MOB1 NOx (Draft 2016 AQMP as of October 2016)	43.61	46.57	45.27	41.37
SPBP EIs	41.95	47.80	46.35	42.03
MOB1 /Ratio from 2012	1.00	1.07	1.04	.95
SPBP EIs PM2.5 Ratio from 2012	1.00	1.14	1.10	1.00
MOB1 PM2.5 (Draft 2016 AQMP)	1.03	0.83	0.84	0.93
SPBP EIs	1.03	0.83	0.84	0.93
MOB1 Ratio from 2012	1.00	0.81	0.82	0.90
SPBP EIs Ratio from 2012	1	0.80	0.81	0.91
MOB1 SOx (Draft 2016 AQMP)	3.9	0.81	0.82	0.91
SPBP EIs	3.90	0.81	0.82	0.91
MOB1 Ratio from 2012	1.00	0.21	0.21	0.23
SPBP EIs Ratio from 2012	1.00	0.21	0.21	0.23

As stated in our previous comment letter, to provide for a meaningful and comprehensive review, the Ports' request that the District identify the port-related sources (i.e., ocean-going vessels, harbor craft, locomotives, cargo-handling equipment, and heavy-duty trucks) of emissions that make up the total emissions in the Control Measure Summary (p. IV-A-120). It is also important to identify the assumptions used to estimate future emissions in 2022, 2023, and 2031. For instance, it is important to understand the assumed International Maritime Organization (IMO) tier level of ocean-going vessels calling at the Ports, as well as the fleet makeup of all other port-related source categories, including heavy-duty trucks, cargo-handling equipment, locomotives, and harbor craft. It is also important to identify the source-specific "growth" factors that were used to estimate future year emissions. 96-56 Con't

d. **Appendix IV-A, Format Of Control Measures, Emission Reductions, p. IV-A-21.**

This section states that: "During the rule development, the most current inventory will be used. However, for tracking rate-of-progress for the SIP emission reduction commitment, the approved AQMP inventory will be used. More specifically, emission reductions due to mandatory or voluntary, but enforceable actions shall be credited toward SIP obligations" (p. IV-A-21). 96-57

We request that any differences between the "most current inventory" used for rule development and the "approved AQMP inventory" be clearly described and addressed prior to any mandatory or voluntary emissions being credited toward SIP obligations.

e. **Appendix IV-B, South Coast Mobile Source Emission Reductions, p. IV-B-5.**

In this table, NOx reductions for 2031 are shown from 2015 level whereas the AQMP reductions are from 2012 level. SCAQMD should clarify how it plans to reconcile the emission reductions as the discrepancy could cause confusion when setting up goals and emission reduction targets. 96-58

f. **Appendix IV-B, Tier 4 Vessel Standards, p. IV-B-50.**

Under this proposed action, the ARB intends to work with the EPA, U.S. Coast Guard, and international partners to urge the International Maritime Organization (IMO) to adopt a Tier 4 NOx standard for new ocean-going vessels and efficiency requirements for existing vessels (p. IV-B-50).

The Ports support the advocacy for more stringent IMO standards and efficiency targets for ships. Currently, newly built ships are required to meet IMO Tier 3 standards for NOx. The Ports have developed an IMO Tier distribution forecast based on the existing world fleet, estimated future vessel calls at the Ports, and Tier 3 order information provided by the engine manufactures. The Ports' Tier distribution forecast indicates strongly that there will be no significant (less than 5%, best case scenario) Tier 3 penetration of the ship calls by 2023. Further, the forecast indicates that the existing world fleet (Tier 0-2) could service the Ports through the mid to late 2030s to 2040s. 96-59

Recognizing that Tier 3 fleet penetration will be significantly slower than CARB is estimating and coupled with the fact that there have been NO discussions at IMO Marine Environmental Protection Committee related to a Tier 4 NOx engine standard, the Ports believe that it is highly inappropriate to assume aspirational reductions related to Tier 4 fleet penetration until the standard is at least drafted if not promulgated. Taking reductions for standards that are neither in discussion nor in development is not appropriate for SIP planning purposes. Therefore, the Ports request that the estimated emissions reductions associated with Tier 3 fleet penetration this measure be reconsidered for the proposed SIP commitment and that all reductions associated with Tier 4 be removed.

96-59
Con't

Furthermore, it is stated that: "The new standards would be allowed to enter the fleet using natural turnover and would not be accelerated by additional rules or incentives" (p. IV-B-51). While the Ports are in favor of the ARB advocating for IMO Tier 4 NOx standards and efficiency targets for ships, we believe that effort should be placed on encouraging the cleanest ships to deploy to our ports now. There are currently fewer than 50 ships worldwide on order that will have IMO Tier 3 capabilities and it is unknown where they will be they deployed. We do not foresee a sizeable number of Tier 3 ships servicing our ports in the near term. As more of these ships become available for deployment, the Ports recommend the development of statewide strategies, such as incentive funding programs to attract these clean new ships to our Ports.

SAN PEDRO BAY PORTS
CLEAN AIR ACTION PLAN

August 19, 2016

Mr. Wayne Nastri
Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765
Electronic Submittal Via:
https://onbase-pub.aqmd.gov/sAppNet/UnityForm.aspx?key=UFSessionIDKey

Dear Mr. Nastri:

SUBJECT: COMMENTS ON THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT'S *DRAFT 2016 AIR QUALITY MANAGEMENT PLAN* (JUNE 2016)

The Ports of Long Beach and Los Angeles (Ports) appreciate the opportunity to participate in the South Coast Air Quality Management District's (District or SCAQMD) 2016 Air Quality Management Plan Advisory Committee and to comment on the *Draft 2016 Air Quality Management Plan* released on June 30, 2016 (AQMP). The Ports recognize the amount of effort that has gone into the development of the 2016 AQMP and acknowledge the efforts of the District to release a plan that seeks to balance "traditional" regulatory measures with innovative incentive-based measures.

The Ports support the development and implementation of programs to achieve the applicable and current national ambient air quality standards (NAAQS). Consistent with that effort, the Ports voluntarily developed the highly successful San Pedro Bay Ports Clean Air Action Plan (CAAP) and continue to be successful in implementing those programs. As a result of the CAAP, between 2005 and 2015, emissions from maritime goods movement sources were reduced at an accelerated rate over command and control rules; accounting for overall reductions of 84% for diesel particulate matter (DPM), 50% for nitrogen oxides, and 97% for sulfur oxides. The Ports' emissions inventories in 2015 show reductions that are in excess of the 2014 emission

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THE PORT OF LOS ANGELES
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reduction goals in the CAAP. Thus, the Ports have a proven track record of developing and implementing appropriate and effective emission reduction strategies based on cooperative and voluntary measures, independent of or in advance of regulatory requirements.

The CAAP relies upon cooperative efforts with the maritime goods movement industry to achieve healthful air for the surrounding communities. The voluntary and cooperative aspects of the CAAP are critical because the Ports set stretch goals under incentive-based programs that rely in part upon federal, state and District monetary grants. Many of these grants are only available for programs that achieve "surplus" emissions reductions (i.e., those emissions reductions that are not required by regulation) by either accelerating the air quality regulatory agency requirements, or implementing non-regulatory programs. A significant concern of the Ports is the potential loss of this grant money, which is essential to continuing the successful implementation of the CAAP, if CAAP measures are included in the 2016 AQMP, directly or indirectly.

In order to meet the NAAQS, a collaborative and concerted effort with our agency partners is also essential, with the understanding that while the Ports can voluntarily achieve significant emission reductions, the CAAP is not a suitable control measure for the 2016 AQMP. United States Environmental Protection Agency (EPA), California Air Resources Board (CARB), and the District are the air quality regulatory agencies, and as such have authority as granted by statute to regulate the emissions directly from maritime goods movement sources. The Ports do not operate, own or control the maritime goods movement emission sources, and do not have the same authority as the air quality regulatory agencies. As such, the Ports should not be the agencies designated as responsible for achieving emission reductions from the maritime goods movement industry.

Additionally, the Ports are currently in the process of developing the next update of the CAAP. Many of the existing CAAP control strategies have been adopted or superseded by state or international requirements, such as the rules for replacing drayage trucks, switching to cleaner marine fuels, and using shore power while at berth. In collaboration with the maritime goods movement industry and our regulatory partners, the Ports seek to identify additional strategies to voluntarily achieve emissions reductions from ships, trucks, locomotives, cargo-handling equipment, and harbor craft to support the state's and region's air quality attainment needs. The CAAP Update will also incorporate strategies to address near-zero and zero emission technologies, greenhouse gas emissions, energy, and operational efficiencies.

In response to the District's request, the Ports respectfully submit the following comments regarding the Draft 2016 AQMP at this time, as well as questions and concerns that must be addressed *prior to* finalization and adoption of the 2016 AQMP by the District. We note, however, that it is difficult for the Ports to specify all comments at this time as the critical Appendices V and VI, Incentive Funding Action Plan, and

socioeconomic analysis have not yet been released to the public. We urge the District to consider extending the comment date on the 2016 AQMP until all Appendices and other critical components of the AQMP (e.g., the socioeconomic analysis, Incentive Funding Action Plan, etc.) have been released to the public so that a more comprehensive analysis can be conducted and comments provided to the District prior to Board consideration. Based on the information currently available, the Ports request that the Draft 2016 AQMP be revised as follows:

- Remove Mobile Source Control Measure MOB-01, as it does not provide emission reductions for the attainment demonstration, exceeds the District's authority, and is duplicative of other proposed control measures and state, federal and international laws.
- Exclude the Ports from the growth management control measure, EGM-01.
- Revise MOB-14 so that it does not preclude the maritime goods movement industry's ability to obtain grant funding.
- Focus on attaining the applicable NAAQS and not the revoked NAAQS.
- Specifically identify which measures are contingency measures as required by the Clean Air Act.
- Include in the socioeconomic analysis prepared for the 2016 AQMP a thorough cost-benefit evaluation of all control measures, including MOB-01 if it remains in the Plan as currently proposed, and all contingency measures.
- Complete and circulate the Incentive Funding Action plan for public review and comment *before* inclusion in the Socioeconomic analysis.
- Respond with changes in the 2016 AQMP to address the Ports' concerns and questions associated with the technical analysis, including the baseline and future year emissions inventory.

Detailed comments on each of the Ports' requested bullet items above are provided in the following Attachment.

The Ports strongly encourage the District to make the above-requested changes to the Draft 2016 AQMP, and in particular, eliminate control measure MOB-01 as it is unnecessary and exceeds the District's authority. The Ports also urge the District to complete the appropriate Incentive Funding Action Plan, as well as the appropriate socioeconomic impact analysis, and to provide the Ports and other members of the public with an adequate opportunity for comprehensive review and comment on those documents along with the (revised) Draft 2016 AQMP *prior to* submitting the Plan to the Board for consideration.

The Ports remain committed to achieving our clean air goals identified in the CAAP to help improve regional air quality. We strongly believe that the voluntary and cooperative CAAP process established by the Ports remains the most appropriate forum for the Ports and the air regulatory agencies to discuss technical and policy issues related to reducing emissions from port-related sources.

The Ports appreciate this opportunity to provide comments on the Draft 2016 AQMD. We look forward to continuing to work with the District on advancing our shared goals for clean air in the South Coast region.

Sincerely,

HEATHER A. TOMLEY
Director of Environmental Planning
Port of Long Beach

CHRISTOPHER CANNON
Director of Environmental Management
Port of Los Angeles

CC:LW:TD:mrx
APP No.: 160818-518

cc: Jon Slangerup, Port of Long Beach, Chief Executive Officer
Gene Seroka, City of Los Angeles Harbor Department, Executive Director
Richard Corey, California Air Resources Board, Executive Officer
Alexis Strauss, Region 9, Acting Regional Administrator

Attachment: Detailed Comments on the Ports' Requested DRAFT 2016 AQMP Revisions

SAN PEDRO BAY PORTS
CLEAN AIR ACTION PLAN

ATTACHMENT

Detailed Comments on the Ports' Requested DRAFT 2016 AQMP Revisions

1. SCAQMD Mobile Source Control Measure: MOB-01 Emission Reductions at Commercial Marine Ports.

The Ports appreciate the discussion in this control measure that recognizes our successful efforts in implementing the CAAP since 2006 and exceeding our emission reduction goals in 2014. Yet, it appears that the District remains concerned over its ability to claim and quantify credit in the state implementation plan SIP for the emission reductions achieved by the Ports through the CAAP in the absence of District-imposed "enforceable" rules or control measures. The District continues to attempt to hold the Ports responsible for achieving their voluntary stretch goals, and for backstopping requirements that are currently being enforced by state and international regulations. Further, MOB-01 suggests that if the emission reductions occurring at the Ports are not maintained after they are reported into the SIP that this measure may be implemented in the form of a backstop regulation by the SCAQMD or by the State or federal government, or other enforceable mechanisms, notwithstanding the limitations of the federal Clean Air Act.

The District has previously proposed to address its need for enforceable measures by various other approaches, e.g., control measure MOB-03 in the 2007 AQMP and control measure IND-01 in the 2012 AQMP,which characterized the Ports as "indirect sources" of emissions.. The 2007 MOB-03 was described as "a backstop measure for indirect sources of emissions from ports and port-related facilities" and in the ensuing years, District staff proposed and sought public review of a 'backstop" rule that would be enforceable and applicable to the Ports, "Proposed Rule 4001." The Ports raised many questions and objections to control measure IND-01 and Proposed Rule 4001 in numerous comment letters[1] sent to the District and EPA. EPA, in its April 2016 action

[1] Comment Letters to U.S. Environmental Protection Agency dated November 19, 2015; California Air Resources Board dated March 25, 2014; South Coast Air Quality Management

partially approving the 2012 SIP, excluded the commitments proposed by IND-01 from its action and stated that it would respond to that in a separate rulemaking. (See 81 FR 22025 (April 14, 2016) US EPA Partial Approval and Partial Disapproval of California Air Quality SIP.) The District has reported that Proposed Rule 4001 has been placed on hold, in light of work to develop supposedly different approaches for the pending 2016 AQMP.[2]

The Draft 2016 AQMP indicates, however, that the District has not abandoned those efforts to establish policies and control measures that may provide a framework or justification for the District to adopt rules or regulatory measures that may be applied to the Ports, either directly or as a backstop or contingency measures. The Draft AQMP introduces a new proposed control measure "MOB-01" which states: "The proposed measures will replace control measures MOB-03 in the 2007 AQMP and IND-01 in the 2012 AQMP." (Draft 2016 AQMP, p. 4-24.) MOB-01 is described as a control measure to achieve emission reductions at commercial marine ports and is characterized in the Draft AQMP as a "facility-based mobile source control measure." Although the nomenclature may have changed, the Ports believe that proposed new MOB-01 is no different from the District's previous Ports-related control measures, where the District invoked its purported authority to regulate the Ports as "indirect sources" of emissions. The Ports point to the Draft AQMP, which states that "mobile sources" currently contribute about 88% of the region's total NOx emissions. It then acknowledges that "[s]ince the SCAQMD has limited authority to regulate mobile sources, staff worked closely with the CARB and EPA, which have primary authority over mobile sources, to ensure mobile sources perform their fair share of pollution reduction responsibilities" (p. ES-7).

The Ports also note that in describing the MOB-01 control measure, the Draft 2016 Plan characterizes the Ports as a "facility-based mobile source." In addition to the troublesome wording of that characterization, the description of this proposed control

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District dated January 15, 2014, January 31, 2014, October 2, 203, August 21, 2013, October 31, 2012, and August 30, 2012

[2] According to the minutes of the District's "Mobile Source Committee" meeting of April 15, 2016, included in the District's Board Meeting minutes from May 6, 2016 (agenda item #21), the U.S. EPA "in its recent decision on the approval of the 2012 AQMP did not evaluate IND-01 and will evaluate the control measure at some future date. Staff has been working on Proposed Rule 4001 to implement Control Measure IND-01 and has placed the rule development on hold with the development of the 2016 AQMP."

measure strongly indicates that the District intends to use MOB-01 as an indirect source control measure in order to quantify and lock in the emissions reductions achieved by the Ports under the CAAP. These "facility-based mobile source measure" approaches would have serious negative effects on maritime commerce and impede the State of California's freight competitiveness. Those burdensome and counter-productive approaches would be directly in conflict with the goals of Governor Brown's Executive Order to improve freight transportation efficiency and increase competitiveness of California's freight system, as well as the recently-released California Sustainable Freight Action Plan. The Ports continue to oppose any form of a "rule" that would impose SCAQMD oversight on the Ports and are strongly opposed to the District creating or relying on any concept of a "facility-based mobile source measure," whether described as an "Indirect Source Rule," "Backstop Rule" or the "freight hub," "facility cap," and/or "freight facility performance targets" approach. Neither EPA nor CARB can require the District to adopt a control measure for MOB-01 because indirect source control measures cannot be required as a condition of SIP approval. (42 U.S.C. § 7410(a)(5)(A)(ii); Health & Safety Code, § 40468.) Therefore, the Ports have serious concerns about the District making enforceable commitments to the state and federal governments that the Ports will control "indirect sources."

The District has not identified any legislation purporting to confer authority on the SCAQMD to regulate public marine facilities as "mobile sources."[3] The District itself acknowledges that it does not have "primary regulatory authority" over the Port (or other large facilities identified as major sources of emissions, e.g., rail yards, airports, and distribution centers). Nevertheless, the Draft AQMP further states: "This measure [MOB-01] may be implemented in the form of a regulation by the SCAQMD within its existing legal authority, or by the State or federal government, or other enforceable mechanisms." (p. 4-24.) This statement raises legal issues regarding the extent of the District's limited "existing legal authority;" the Ports have previously raised these issues in opposition to PR 4001. The Draft Plan is vague and ambiguous as to the source and extent of any specific "existing legal authority" that may be contemplated by the District or by MOB-01. The District has not previously cited any specific authority under the California Clean Air Act for this type of regulation (Cf., Health & Safety Code §§ 39000 et seq., and more specifically Chapter 5.5 (§§ 40400-40536) dealing with the SCAQMD).

[3] The EPA itself treats "facilities based" emission sources as distinct from "mobile sources". See, e.g., 66 FR 65208 "Database of sources of environmental releases of dioxin-like compounds in the U.S., ref year 1987-1995. December 18, 2001.

In fact, the District has no authority to regulate mobile sources or to draw any geographic boundary or to arbitrarily characterize source categories and declare those areas or groups of sources to be an "indirect source." "Mobile sources" of emissions are beyond the limited regulatory authority conferred by the Legislature on local or regional districts (e.g., Health & Safety Code § 40001(a); *also see*, 76 Ops. Cal. Atty. Gen. 11 (1993); 75 Ops. Cal. Atty. Gen. 256 (1992); 74 Ops. Cal. Atty. Gen. 196 (1991); 73 Ops. Cal. Atty. Gen. 229, 234-35 (1990)). Congress vested the federal government with the authority to set nationwide emissions standards for mobile sources, including non-road mobile engines and vehicles. (42 U.S.C. §§ 7521, 7547.) Congress expressly and impliedly preempted states from setting standards or other requirements relating to the control of emissions for mobile sources. (42 U.S.C. § 7543, (a) & (e).) The maritime goods movement emission sources are within the express and implied preemption. The Clean Air Act allows California to seek authorization from EPA to adopt "standards and other requirements related to the control of emissions" for some, but not all, mobile sources covered by MOB-01. (42 U.S.C. §§ 7543 (b) & (e)(2)(A).) Thus, District does not have mobile source regulatory authority.

The Clean Air Act defines an indirect source as "a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of pollution." (42 U.S.C. § 7410(a)(5)(C).) An "indirect source review program" is "the facility-by-facility review of indirect sources of air pollution, including such measures as are necessary to assure, or assist in assuring, that a new or modified indirect source will not attract mobile sources of air pollution" that would contribute to the exceedance of the NAAQS. (42 U.S.C. § 7410(a)(5)(D)(i).) "Direct emissions sources or facilities at, within, or associated with, any indirect source shall not be deemed indirect sources for the purpose" of an indirect source review program. (42 U.S.C. § 7410(a)(5)(C).) Air pollution control districts are not statutorily authorized to impose a permit system on indirect sources. (*Friends of Oceano Dunes, Inc. v. San Luis Obispo County Air Pollution Control District* (2015) 235 Cal.App.4th 957, 964, as modified on denial of reh'g (Apr. 23, 2015).)

The control measures also fail as an indirect source review program because the businesses within the geographic and source designated areas are not a "new or modified indirect emissions source." (42 U.S.C. § 7410(A)(5).) A source is new if it adds to the air basin's existing emissions baseline. (*National Ass'n of Home Builders v. San Joaquin Valley Unified Air Pollution Control Dist.* (9th Cir. 2010) 627 F.3d 730, 731-32.) The Clean Air Act defines modification as "any physical change in, or change in the method of operation, of a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of an air pollutant not previously emitted." (42 U.S.C. § 7411(a)(4).)

Only those provisions necessary to meet the requirements of the Clean Air Act are included in the SIP. (Health & Safety Code, § 39602.) The purpose of an indirect source program is to ensure that mobile source emissions do not "cause or contribute to air pollution concentrations exceeding any national primary ambient air quality standard for a mobile-source related air pollutant." (42 U.S.C. § 7410(a)(5)(D)(i).) MOB-01 is not necessary to meet the NAAQS requirements of Clean Air Act. The emissions reductions listed in the Draft AQMP for MOB-1 for the years 2023 and 2031 are listed as "To Be Determined" -- which indicates that the reductions will be determined once the inventory and control approach are identified, and are not relied upon for attainment demonstration purposes. In reality, there would be little to no emission reduction benefit from indirect source measures because state, federal and international authorities have adopted rules and regulations to significantly reduce NOx emissions from these on- and off-road mobile sources. According to the 2016 AQMP, "[t]he effect of the rules and regulations are significant, showing reductions of over 67 percent in NOx emissions and close to 60 percent in VOC emissions between 2012 and 2023, even with increases in fleet population" (p.3-4).

MOB-01 further violates the dormant Commerce Clause by impeding the free and efficient flow of commerce by imposing a heavy burden on ports, the shipping industry, navigation and commerce without any local environmental benefit, or an insubstantial local benefit at best.

The Draft 2016 AQMP also inappropriately refers to the Ports as an "Implementing Agency," which the AQMP defines as "the agency(ies) responsible for implementing the control measure" (p. IV-A-20MOB-01 statesthat "[t]he Ports through its CAAP update can decide the most effective approaches to achieve the overall emission reductions targets" (p. IV-113). However,to the extent the AQMP singles out and mischaracterizes the Ports as "Implementing Agencies," without including all of the other public and private partners working to achieve emission reductions, it erroneously implies that the Ports would have an assigned enforcement obligation, and improperly shifts an unwarranted burden of regulatory implementation to the Ports. While the Ports have successfully adopted voluntary efforts to reduce emissions from maritime goods movement sources, the Ports are not air agency regulators. The Ports do not have the regulatory responsibility or authority to achieve emission reductions from sources over which they do not have jurisdiction, ownership or operational control. Further, the District is well aware from the Ports' previous comment letters on these issues, that generally the Ports lack authority to enforce as mandates the programs on all mobile sources operating in the Ports as they are preempted by state, federal and international law. This portion of the AQMP, requiring the Ports to select and implement the control measures, does not address or overcome these legal impediments.

The Ports respectfully remind the District that the CAAP is a planning document that provides guidance on strategies and targets that are ultimately implemented through individual actions adopted by each Port's respective Board of Harbor Commissioners (Boards). The State granted to the Cities of Long Beach and Los Angeles exclusive authority to implement the Tidelands Trust under the oversight of the State Lands Commission. Each city has been appointed as a trustee and has established their respective Board of Harbor Commissions with exclusive control and management of the Tidelands and revenues and expenditures from the Tidelands. However, such discretion must be exercised in accordance with their obligations to prudently manage Tidelands assets and revenues within a nexus and proportionality to the Tidelands Trust interest, as well as in accordance with applicable laws such as the California Environmental Quality Act (CEQA) and principles of federal preemption. The District cannot mandate action by each Port's Board of Harbor Commissioners, nor can the District direct how the Ports may be obligated to spend state Tidelands money; only the appointed trustee can make discretionary actions to obligate state Tidelands funds. Specifically, any measures listed in the AQMP or the CAAP must each require the Boards to authorize the expenditure of monies and program costs, or to approve conditions of infrastructure project development in their discretion as a CEQA lead agency and as Tidelands trustees.

Further, the District has not complied with the procedural requirements to adopt indirect source control rules that are contemplated in MOB-01. The requirements are: (1) ensure, to the extent feasible, and based upon the best available information, assumptions, and methodologies that are reviewed and adopted at a public hearing, that the proposed rule or regulation would require an indirect source to reduce vehicular emissions only to the extent that the district determines that the source contributes to air pollution by generating vehicle trips that would not otherwise occur; (2) ensure that, to the extent feasible, the proposed rule or regulation does not require an indirect source to reduce vehicular trips that are required to be reduced by other rules or regulations adopted for the same purpose; (3) take into account the feasibility of implementing the proposed rule or regulation; (4) consider the cost effectiveness of the proposed rule or regulation; (5) determine that the proposed rule or regulation would not place any requirement on public agencies or on indirect sources that would duplicate any requirement placed upon those public agencies or indirect sources as a result of another rule or regulation adopted pursuant to Health and Safety Code sections 40716 or 40717. (Health & Saf. Code, § 40717.5.)

Instead of MOB-01, the Ports suggest that a collaborative, voluntary approach, consistent with the cooperative partnership that has been proven to be successful over the past decade, will continue to be the most effective means for controlling emissions from maritime goods movement activities within the jurisdiction of Ports. This approach,

which could be memorialized under a cooperative agreement between the Ports and SCAQMD, CARB, and EPA, would benefit all parties because it continues the collaborative effort that has resulted in unprecedented emission reductions at the Ports, shares responsibility between Parties, provides more certainty for the local economy, avoids litigation, insures incentive funding that is tied to excess emissions will continue to be available, and will result in better air quality.

2. SCAQMD Growth Management Control Measure: EGM-01

The Draft 2016 AQMP states: "[f]or the purposes of this measure [EGM-01], indirect sources include all facilities not covered by another 2016 AQMP Control Measure. In addition, during the rule development process, additional indirect sources may be included or excluded" (p. IV-A-169).

The Ports should not be included within this control measure in the event MOB-01 is removed from the 2016 AQMP or during the rule development process. In addition to the reasons stated above in section 1, the Ports have serious concerns about the District making a commitment to the state and federal governments that the SCAQMD will control growth or dictate land use decisions. SCAQMD has no authority to control growth or overrule local land use decisions. (Health & Saf. Code, § 40716 [air districts cannot infringe on the existing authority of counties and cities to plan or control land use]; see also Health & Saf. Code, §§ 40000, 40414, 40440.1, 40717.5(c)(1).) Land use is within the exclusive preview of local cities and counties.

3. SCAQMD Mobile Source Control Measure: MOB-14 Emission Reductions from Incentive Programs

The Draft 2016 AQMP mobile source control measures include development of incentive funding programs and supporting infrastructure for early deployment of advanced control technologies. MOB-14 states that it seeks to develop a rule similar to the San Joaquin Valley Air Pollution Control District Rule 9610 – "State Implementation Plan Credit for Emission Reductions Generated through Incentive Programs" -- such that emissions reductions generated through incentive programs can be credited in the SIP emission inventories.

It will be critical to prioritize and secure the necessary funding needed to implement the proposed incentive-based measures in the Draft AQMP and achieve the aggressive emission reduction targets in the South Coast Air Basin. The Ports know first-hand that the move toward zero emissions is a costly endeavor and have placed significant emphasis on efforts to advance the development of near-zero and zero emissions equipment for on-terminal and on-road applications. Through the Ports' Technology

Advancement Program (TAP), we have been involved with funding the demonstration of clean technologies used in port operations for nearly a decade. Significant progress has been made and we expect that zero emissions operations will be feasible in the future. The scale of this effort will be significant, with cost for the equipment and fueling infrastructure in the *Billions* of dollars.

The Ports and the maritime goods movement industry will require a substantial amount of funding assistance from the local, state and federal agencies. As such, the Ports are supportive of incentive funding to accelerate advancement of technologies. The Ports continue to strongly support the implementation of funding programs such as the Proposition 1B Goods Movement Emission Reduction Program and the Carl Moyer Memorial Air Quality Attainment Program, both of which have provided funding for much needed assistance with upgrading wharves for shore power, the replacement of drayage trucks, and the replacement and repower of engines in cargo-handling equipment, harbor craft, and locomotives.

While the Ports support funding programs and the need to credit emissions reductions generated from through incentive funding programs, the Ports strongly recommend that MOB-14, or any resulting regulatory strategy be structured in such a way that does not preclude the maritime goods movement industry's ability to secure grant funding for early actions. For example, it is not clear from the description of MOB-14 whether facility emission caps or port backstop rules could effectively disqualify companies and agencies from received grants, because typically grants funds cannot be used for regulatory compliance. The Ports believe that this unintended consequence of a control measure like MOB-14 could significantly impede early equipment replacement and transition to zero emission technologies, and also severely affect the economic competitiveness of the maritime goods movement industry. In addition, if the required emission levels for attainment are not be met in the region, the Ports must not be held accountable for attaining emission reductions that are predicated on incentive funding if the funding does not come through at the necessary and appropriate levels.

4. Inclusion of Revoked NAAQS in the 2016 AQMP

The Draft 2016 AQMP includes updates to previous plans for the revoked 1-hour (120 ppb) and 1997 8-hour (80 ppb) ozone NAAQS (p. 4-1), rather than addressing the current and controlling ozone NAAQS. For example,, the Draft 2016 AQMP attainment strategy seeks to reduce NOx emissions sufficiently to meet the revoked 1-hour ozone NAAQS of 120 ppb by 2023 and the revoked 8-hour ozone NAAQS of 80 ppb by 2024, instead of focusing on achieving the applicable ozone NAAQS of 75 ppb by 2032. This approach is inappropriate and unnecessary.

While the SCAQMD is required to comply with the anti-backsliding provisions of the Clean Air Act [CAA sec 172(e)], which preclude the adoption of controls that are less stringent than existing controls applicable in the District, the 2012 AQMP does not contain any mandates akin to MOB-01 that are applicable to the Ports. Therefore, the removal of MOB-01 from the 2016 AQMP by the District would not be "backsliding" from any existing standards relied upon for attainment under the existing 2012 AQMP.

Furthermore, the proposed approach of targeting the revoked standards and their associated deadlines of 2023 and 2024, which are significantly earlier than the controlling deadline of 2032 in the current regulations, puts the region at unnecessary risk that contingency measures for ozone will be required in the three years leading up to the attainment date for the revoked NAAQS.

5. Contingency Measures

> The Draft 2016 AQMP states the following regarding contingency measures: "Some measures in the summary table are listed as "TBD" (to be determined) for emission inventory, emission reductions and/or cost control. The "TBD" measures are not relied upon to demonstrate attainment of the standards but have been included if potentially feasible for the integrated, comprehensive plan. "TBD" measures require future technical and/or cost assessments in order to better understand and quantify emissions from and cost impact to the anticipated affected sources for the measures. It may be determined at that time that the "TBD" measure is not feasible or cost-effective to adopt and implement, or if reductions can be achieved, those reductions would be submitted into the SIP. Thus, "TBD" measures are included in the Plan as needed for contingency or if there are any shortfalls in committed emission reductions" (p. IV-A-18).

The District needs to identify specifically which measures in the AQMP it intends to be "contingency measures." Referring to "TBD" measures does not provide sufficient identification because the measure language is not consistent with the measure being a contingency measure. The contingency measures should only be for the *applicable* NAAQS, and not for the revoked NAAQS attainment timeframes.

Further, EPA's March 6, 2015, rulemaking allows extreme nonattainment areas for ozone to develop and adopt contingency measures meeting the requirements of 182(e)(5) (black box) to satisfy the requirements for both attainment contingency measures in CAA sections 172(c)(9) and 182(c)(9). These enforceable commitments must obligate the state to submit the required contingency measures to the EPA no later

than three years before any applicable implementation date, in accordance with CAA section 182(e)(5). (See Federal Register, Vol. 80, No. 44, 12264 Friday, March 6, 2015.) Therefore, it is premature to submit contingency measures for 2032. As for reasonable further progress (RFP) contingency measures, these are only needed to provide the incremental shortage in emission reductions and last one year.

EPA is also continuing its long term policy that allows promulgated federal measures to be used as contingency measures as long as they provide emission reductions in the relevant years in excess of those needed for attainment or RFP. The 2016 AQMP needs to be revised to reflect these allowances that EPA has made for extreme nonattainment areas.

6. State and Federal Control Measures and Incentive Funding Strategy

The Draft AQMP includes additional control measures to reduce emissions from sources that are primarily under State and Federal jurisdiction, including on-road and off-road mobile sources. As stated, these reductions are needed to achieve the remaining emission reductions necessary for the Basin's attainment. The Draft AQMP identifies 107 tons of NOx reductions in 2023 and 97 tons of NOx reductions in 2031 to help the District meet attainment. Almost all of these reductions, however, are associated with the measures calling for "further deployment of cleaner technologies," which involve accelerating the development, demonstration, and deployment of cleaner engine technologies, in whole or in part through the use of incentive programs. Achieving these substantial emission reductions "is predicated on securing the amount of funding needed" to further deploy these cleaner technologies, according to the Draft AQMP.

The AQMP estimates an approximate range of $4 to $11 billion in funding over a 7 to 15 year period to achieve the projected NOx emissions reductions from mobile sources (p. 4-59). "The total funding needed ranges from $13 to $16 billion to achieve the NOx emission reductions associated with the State Mobile Source Strategy" (p. 4-62). "A total of $1.1 to $1.6 billion of stationary source incentive funding programs are proposed with projected cost-effectiveness levels in the same range as the mobile source incentives" (p. 4-66). The AQMP further states:

> "The amount of incentive funding needed is estimated to be approximately $11 – 14 billion in total funding over a seven to fifteen year period. Currently, the SCAQMD receives around $56 million per year in incentives funding to accelerate turnover of on- and off-road vehicles and equipment under SB1107, a portion of the state's Tire Fee, and AB923. AB 923 will sunset in 2024. In addition, the District has received close to $550 million in Proposition 1B funding. The last round of Proposition 1B will be ending in

> the next couple of years. The District has also received funding under the DERA program on a competitive basis. However, the amount of funding needed to achieve the NOx emission reductions associated with the "Further Deployment" measures proposed in the State Mobile Source Strategy and the 2016 AQMP will require on the order of $1 billion per year if funding is available beginning in 2017" (pp. ES-8 to 9).
> As such, the short-fall is significant.

Assuming $16 billion is a reasonable estimate – and the accuracy of that estimate is open to question – should the District fail to secure this funding, it may be forced to adopt the "contingency" measures specified in the Draft AQMP, of which MOB-01 may be is one. The Ports are concerned the District may not secure the necessary funding, which would likely necessitate the hasty adoption of such contingency measures without a comprehensive analysis of the impacts, or possible alternatives, and without robust public input.

In addition, the Draft AQMP acknowledges that achieving the emissions reductions from the 2016 AQMP incentive-based control measures for both mobile and stationary sources will require approximately $11 – $14 Billion in total funding. Given this significant funding level needed to attain the ozone NAAQS over the next seven to fifteen years, the Draft AQMP refers to "an action plan [that] will be developed as part of the AQMP public adoption process" to identify the necessary actions to secure new sources of funding to implement the AQMP (p. 4-66). However, the Draft AQMP provided insufficient details on what would be contained in such an Incentive Funding Action Plan.

Furthermore, at the District's Mobile Source Committee meeting of July 22, 2016, the AQMD staff presentation indicated that a draft of the Incentive Funding Action Plan is expected as part of 2016 AQMP adoption. However, District staff has informed the Ports that an Incentive Funding Plan will not be available until *after* the AQMP has been adopted. This is not acceptable. Without a review of the Incentive Funding Action Plan concurrent with the Draft AQMP, it is not known whether the Plan is viable (i.e., activities to secure additional funding or actions are not realized), and the risk of contingency measures being triggered cannot be evaluated.
For this reason, the Ports urge the District to fully analyze the Incentive Funding Action Plan, and all contingency measures now, and to release that analysis *prior to* the close of public comment so that the public can evaluate the adequacy of the District's strategy and comment on that strategy.

7. Socioeconomic Impact Analysis

The Draft 2016 AQMP indicates that there will be no analysis of contingency measures in the socioeconomic study. Also, it appears that several measures that do not have emissions reduction targets or other information will not be included in the socioeconomic analysis. This means there will be no comprehensive review of the impacts associated with implementation of all measures or the repercussions of the potential adoption of the "facility-based mobile source measures" discussed in the MOB-01 section above.

The Ports request a full socioeconomic analysis of all control measures, and that the socioeconomic analysis be completed and an adequate opportunity for public comment be provided *prior to* action on the Draft 2016 AQMP.

Furthermore, it appears that the socioeconomic study will only analyze the impacts associated with approximately $16 billion in government subsidies, not including the match funding that will be required from private operators. The Ports are concerned that this amount is substantially underestimated and ignores the private capital that will be necessary to purchase thousands of pieces of costly near-zero and zero emission equipment to be deployed at the ports and throughout the region.

Finally, the description of the anticipated socioeconomic study assumes that there will be no tax increases to fund these incentives; however, the Draft AQMP contradicts this assumption as it clearly states AQMD's intent to seek local and state ballot measures, which would include taxpayer funding (p. 4-68).

The socioeconomic analysis must include an analysis of the impacts on the private sector from having to invest in significant new capital costs associated with cleaner equipment, and it must include an analysis of the impact on taxpayers as a result of higher taxes.

8. Specific Technical Comments on the 2016 Draft AQMP

a. Appendix IV-A, Table IV-A-2 SCAQMD Proposed Mobile Source 8-Hour Ozone Measures, p. IV-A-4

The title of MOB-01 is inconsistent with the description of the control measure provided starting on page IV-A-109, which lists "CO" as a target pollutant. The control measure summary for MOB-01 (pp. IV-A-109-115) indicates that the goal of the measure is to seek emission reductions of NOx, SOx, and PM2.5. Please

clarify if the measure is also intended to address emissions of CO, otherwise CO should be removed from Table IV-A-2 and updated accordingly.

In addition, for MOB-01, the emission reductions in tons per day (tpd) for 2023/2031 are identified as "TBD" with a corresponding footnote "b", which states "Submitted into the SIP as part of reporting or in baseline inventories for future AQMP/SIP Revisions." We request that the District provide further clarification on how the "Rate of Progress" will be calculated and compared to ensure that the emissions reductions achieved by the proposed control measure are surplus emissions.

b. Appendix IV-A, Emission Reductions at Commercial Marine Ports [All Pollutants], p. IV-A-109

The Ports each prepare annual air emissions inventories of port-related sources, and in July 2015, transmitted the San Pedro Bay Ports 2012 air emissions inventory, as well as forecasted port-related emissions for each year through 2031 for inclusion on the 2016 AQMP based on discussions with District and CARB staff.[4,5] It is not clear whether the emissions of NOx, SOx, and PM2.5 listed in the Control Measure Summary Table (p. IV-A-109) reflect the Port's actual emissions, as they do not correspond with those transmitted to the District and CARB.

It is the Ports' understanding that the emissions from port-related sources in the 2016 AQMP would reflect the actual emissions reported by the Ports. These discrepancies should be addressed.

To provide for a meaningful and comprehensive review, the Ports request that the District identify the port-related sources (i.e., ocean-going vessels, harbor craft, locomotives, cargo-handling equipment, and heavy-duty trucks) of emissions that make up the total emissions in the Control Measure Summary (p. IV-A-109). It is

[4] Email Communication, Subject: San Pedro Bay Ports 2012 Emissions Inventory. July 21, 2015. Allyson Teramoto (Port of Long Beach) to Henry Hogo, Joe Casmassi, Randall Pasek (AQMD); Nicole Dolney, Sylvia Vanderspek, Gabe Ruiz (CARB).

[5] Email Communication, Subject: 2016 AQMP Emissions Forecasting Dial +1 (312) 757-3121 Access Code: 299-388-957. August 9, 2016. Archana Agrawal (Starcrest Consulting Group, LLC) to Henry Hogo, Randall Pasek (AQMD); Nicole Dolney, Sylvia Vanderspek, Russel Furey, Vernon Hughes, Gabe Ruiz (CARB).

also important to identify the assumptions used to estimate future emissions in 2022, 2023, and 2031. For instance, it is important to understand the assumed International Maritime Organization (IMO) tier level of engines installed on ocean-going vessels calling at the Ports, as well as the fleet makeup of all other port-related source categories, including heavy-duty trucks, cargo-handling equipment, locomotives, and harbor craft. It is also important to identify the source-specific "growth" factors that were used to estimate future year emissions.

The **table** on the next page shows a comparison of the emissions provided in the Draft 2016 AQMP and the Ports' actual 2012 emissions and forecasted emissions for 2023 and 2031. As shown, there are several inconsistencies in the emissions inventories prepared by the Ports and the inventory used for the AQMP.

Annual Average	2012	2022	2023	2031
NOx (MOB-01 Draft 2016 AQMP)	39.37	TBD	42.39	35
NOx (2012 San Pedro Bay Ports Actual Emissions)	41.95	47.80	46.35	42.03
PM2.5 (MOB-01 Draft 2016 AQMP)	1.06	TBD	0.81	0.93
PM2.5 (2012 San Pedro Bay Ports Actual Emissions)	1.03	0.83	0.84	0.93
SOx (MOB-01 Draft 2016 AQMP)	4.04	TBD	1.23	1.47
SOx (2012 San Pedro Bay Ports Actual Emissions)	3.90	0.81	0.82	0.91

As previously mentioned, we request that the control costs associated with MOB-01 (and all other control measures) be quantified and included in the 2016 AQMP.

c. Appendix IV-A, Emission Reductions at Commercial Marine Ports [All Pollutants], CARB In-Use Fleet Rules. p. IV-A-112

It is stated in this paragraph that "The majority of marine vessel emissions are created by main propulsion engines, but auxiliary engines emissions are important, in part because they occur at dock in closer proximity to persons in and around the port" (p. IV-A-112). This statement is misleading in that the contribution of auxiliary engine emissions (excluding boiler emissions) to overall ocean-going vessel emissions (including transit, maneuvering, and hoteling at-berth) is often times nearly equivalent to or higher than main propulsion engines, which are only operational during transit and maneuvering.

d. Appendix IV-A, Format of Control Measures, Emission Reductions. p. IV-A-19

This section states that: "During the rule development, the most current inventory will be used. However, for tracking rate-of-progress for the SIP emission reduction commitment, the approved AQMP inventory will be used. More specifically, emission reductions due to mandatory or voluntary, but enforceable actions shall be credited toward SIP obligations" (p. IV-A-19).
We request that any differences between the "most current inventory" used for rule development and the "approved AQMP inventory" be clearly described and addressed prior to any mandatory or voluntary emissions being credited toward SIP obligations.

e. Appendix IV-B, Tier 4 Vessel Standards. p. IV-B-50

Under this proposed action, CARB intends to work with the EPA, U.S. Coast Guard, and international partners to urge the International Maritime Organization (IMO) to adopt a Tier 4 NOx standard for new ocean-going vessels and efficiency requirements for existing vessels (p. IV-B-50).

The Ports support the advocacy for more stringent IMO standards and efficiency targets for ships. Currently, newly built ships are required to meet IMO Tier 3 standards for NOx. The Ports have developed an IMO Tier distribution forecast based on the existing world fleet, estimated future vessel calls at the Ports, and Tier 3 order information provided by the engine manufactures. The Ports' Tier distribution forecast indicates strongly that there will be no significant (less than 5%, best case scenario) Tier 3 penetration of the ship calls by 2023. Further, the forecast indicates that the existing world fleet (Tier 0-2) could service the Ports through the mid to late 2030s to 2040s.

Recognizing that Tier 3 fleet penetration will be significantly slower than CARB is estimating and coupled with the fact that there have been no discussions at IMO Marine Environmental Protection Committee related to a Tier 4 NOx engine standard, the Ports believe that it is highly inappropriate to assume aspirational reductions related to Tier 4 fleet penetration until the standard is at least drafted if not promulgated. Taking reductions for standards that are neither in discussion nor in development is not appropriate for SIP planning purposes. Therefore, the Ports request that the estimated emissions reductions associated with Tier 3 fleet penetration this measure be reconsidered for the proposed SIP commitment and that all reductions associated with Tier 4 be removed.

Furthermore, it is stated that: "The new standards would be allowed to enter the fleet using natural turnover and would not be accelerated by additional rules or incentives" (p. IV-B-51). While the Ports are in favor of CARB advocating for IMO Tier 4 NOx standards and efficiency targets for ships, we believe that effort should be placed on encouraging the cleanest ships to deploy to our ports now. There are currently fewer than 50 ships worldwide on order that will have IMO Tier 3 capabilities and it is unknown where they will be they deployed. We do not foresee a sizeable number of Tier 3 ships servicing our ports in the near term. As more of these ships become available for deployment, the Ports recommend the development of statewide strategies, such as incentive funding programs to attract these clean new ships to our Ports.

f. Appendix II, Chapter 2, PM10 Temporal Variation. p. II-2-57

The Ports are concerned that the narrative in this section misrepresents what is actually occurring at the Ports. In particular, we feel the following statement is misleading:

Moreover, higher port activity due to peak cargo traffic which typically occurs in the fall of each year coupled with the lower mixing height in the fall may also contribute to the higher PM10 concentrations during this time of year.

Actually, higher port activity generally occurs in the middle to late summer, however the shape of the peak has become less pronounced. And furthermore, historical data received at the Ports' Air Monitoring Stations indicates that PM10 concentrations near the Ports are no higher in the fall than any other time of the year. Since these findings do not support the assumption in the statement above, the Ports request that the statement above be removed from the document.

Responses to Comment Letter from Ports of Long Beach and Los Angeles (Comment Letter #96)

Response to Comment 96-1:

See responses to the August 19, 2016 comments under Responses to Comment #50. Comments may be made up to the date of SCAQMD Governing Board adoption consideration of the 2016 AQMP, which is currently scheduled for February 2017. Similarly, the SCAQMD has released the Socioeconomic Report and the Draft Financial Incentives Funding Action Plan in December 2016. The 2016 AQMP will be considered by the SCAQMD Governing Board in February 2017, which gives over 60 days for public review and comments.

Response to Comment 96-2:

The proposal in AQMP Measure MOB-01 is to identify actions that will help meet the emission reductions associated with the State SIP Strategy "Further Deployment of Cleaner Technologies" measures for on-road heavy-duty vehicles, off-road equipment, and federal/international sources. If voluntary actions are identified and the actions meet U.S. EPA's criteria for crediting into the SIP, then the reductions will be recognized as part of the future Rate-of-Progress reporting and future AQMP revisions. To the extent that these actions are proposed to be included in the SIP, then a commitment must be made that the reductions be realized. If there is a shortfall, the emission reductions must be made up. As such, there is no upfront requirement placed on the Ports to meet an emission reduction target. Staff is proposing that a working group be formed to vet the process and details of how such a process can be implemented.

Staff commends the Ports in their efforts to reduce criteria pollutant emissions and the success that has occurred through their collaborative approach. It is for this reason that the SCAQMD staff believes that a collaborative approach working with the Ports, industry, and the public can potentially result in additional emission reductions in the near-term.

Response to Comment 96-3:

As noted in Response to Comment 96-2, MOB-01 is proposing a collaborative approach which will be established through a public process and not a direct rulemaking effort. However, if this approach does not lead to progress in identifying actions, staff may consider other actions the SCAQMD along with CARB may need to take to achieve the emission reductions associated with the "Further Deployment" measures. Staff will continue to work with the Ports and the public to solicit input on potential actions should the collaborative process do not result in meaningful progress. The benchmark for progress will be developed as part of the public process.

This comment alleges that the revised draft AQMP proposes new rule-making beyond the District's existing jurisdiction. This is not correct. Although the revised draft AQMP calls for "aggressive new regulations," it does not propose exceeding the District's legal jurisdiction.

The comment also argues that the "District's boundaries do not include the ocean area adjacent to the South Coast Air Basin." SCAQMD's territorial boundaries include areas out to 3 nautical miles from the coast, pursuant to the Submerged Lands Act. 43 U.S.C. §1312. Moreover, in some circumstances, state regulation may extend beyond these territorial boundaries. *Pacific Merchant Shipping Association v. Goldstene*, 639 F. 3d 1154. These issues can be further addressed if necessary during development of the control measure.

Finally, the comment asserts SCAQMD may not require the Ports to violate their tidelands trust obligations but does not explain how reducing air pollution would violate tidelands trust obligations.

Response to Comment 96-4:

This comment raises several issues concerning the SCAQMD's indirect source authority. Although the SCAQMD agrees that it may not require permits for indirect sources, the 2016 AQMP does not propose any such permit system. SCAQMD does have authority to regulate indirect sources in ways other than requiring permits. Health & Saf. Code §§40440(a), 40716.

The comment alleges that "the Ports and the activities conducted there are not 'indirect sources' within the meaning of the Clean Air Act." SCAQMD respectfully disagrees. The Clean Air Act defines an "indirect source" as "a facility, building, structure, installation, real property, road, or highway which attracts, or may attract, mobile sources of air pollution." 42 U.S.C. §7410(a) (5)(C). The Ports fit within this definition. Moreover, the Ports are functionally similar to airports, which are indisputably indirect sources. Under EPA's former regulation, an indirect source was defined to include sources including, but not limited to, airports. "Indirect Source Controls: An Intersection of Air Quality Management and Land Use Regulation" Loyola of Los Angeles Law Review, 6-1-91, p. 1133.

The comment suggests that indirect source regulation is a circumvention of provisions in the Clean Air Act limiting state and local ability to regulate mobile sources. The federal Court of Appeals squarely rejected this argument. *National Ass'n. of Home Builders v. San Joaquin Valley Unified APCD*, 627 F. 3d 730 (9th Cir. 2009).

Response to Comment 96-5:

The comment claims that control measures in the revised draft AQMP would violate the dormant commerce clause. The analysis under the commerce clause would depend on the specific facts of the control measure as it is implemented. It should be noted, however, that the federal Court of Appeals rejected a claim that the State Air Resources Board rule requires oceangoing vessels to use lower sulfur fuel even though the rule was estimated to cost over $360 million annually. *Pacific Merchant Shipping Ass'n. v. Goldstene*, 639 F. 3d 1154 (9th Cir. 2011).

Response to Comment 96-6:

This comment asserts that requirements that may be imposed on the Ports under the AQMP could be "unfunded State mandates" under Cal. Const. Art. XIII B sed. 6 (c). This claim must be raised in a proceeding before the Commission on State Mandates. *Redevelopment Agency v. Commission on State Mandates* 45 Cal. App. 4th 1188 (1996). If successful, it would require that the State pay the costs of a local government in complying with any identified new state mandates. However, this provision does not apply to obligations that are not unique to local government, or are not a state mandate, or to obligations that are actually federal mandates, or to any program where the local government has the authority to levy fees, charges, or assessments sufficient to pay for the program. Cal. Gov't. Code §17556(d). SCAQMD believes it is unlikely that such a claim would succeed.

Response to Comment 96-7:

The Ports argue that it is premature to address the 2008 8-hour ozone standard in the 2016 AQMP because U.S. EPA has not yet decided if it will revoke the standard. U.S. EPA has proposed two alternative

approaches for revoking the 2008 ozone NAAQS. Under the first approach, the 2008 ozone NAAQS would be revoked at essentially the same time for all areas of the U.S. and a set of protective anti-backsliding requirements would be promulgated for nonattainment areas. 81 Fed. Reg. 81,276, 81,286. *see also* 42 U.S.C. § 7502(e); *South Coast Air Qual. Mgmt. Dist. v. EPA*, 472 F.3d 882, 889 (D.C. Cir. 2006). The potentially applicable anti-backsliding requirements the District would be identical to the anti-backsliding requirements that are applicable to the 1-hour NAAQS and the 1997 8-hour NAAQS: (1) Reasonably Available Control Technology; (2) Vehicle Inspection/Maintenance programs; (3) major source applicability cutoffs for purpose of RACT; (4) Reasonable Further Progress/Rate of Progress reductions; (5) Clean Fuels fleet program; (6) clean fuels for boilers; (7) transportation control measures during heavy traffic hours; (8) enhanced ambient monitoring; (9) transportation controls; (10) vehicle miles traveled provisions; (11) NOx requirements; (12) attainment demonstrations; (13) nonattainment contingency measures for failure to attain the NAAQS or make RFP towards attainment; (14) nonattainment new source review major source threshold and offset ratios; (15) penalty fee program requirements for "severe" and "extreme" areas; (16) Reasonably Available Control Measures (17); and contingency measures associated with areas utilizing CAA § 182(e)(5). 81 Fed. Reg. 81,276, 81,288; *see also* 40 C.F.R. § 51.1100. Given the requirements that would still apply even if EPA did revoke the 2008 8-hour ozone standard under the first proposed approach, it is not premature to address that standard in the 2016 AQMP.

Under U.S. EPA's second proposed approach, the 2008 ozone NAAQS would continue to apply in any area designated nonattainment for the 2008 ozone NAAQS until that area is redesignated to attainment. 81 Fed. Reg. 81,276, 81,286. Because the standard would continue to apply to the District and would not be revoked until the District is redesignated to attainment, it is likewise not premature under this second scenario to address the 2008 8-hour ozone standard in the 2016 AQMP.

The Ports also argue that the 2016 AQMP does not need to include new control measures to meet the 2006 24-hour PM2.5 standard because the Plan shows that it will be met by the 2019 attainment year without any additional measures. Contrary to the Ports' assertion, the Plan does not include any additional measures to meet the 2006 24-hour PM2.5 standard. Additional measures specifically addressing PM2.5 that are being proposed are included in the Plan to further ensure attainment of the *annual* PM2.5 standard.

Finally, the Ports argue that the District has prematurely chosen to provide for the "alternative" NOx/VOC reductions instead of the reasonable further progress demonstration under 42 U.S.C. § 7511a(c)(2) without conducting an economic analysis of these options. The Ports argue that this economic analysis should be conducted and public input sought before the draft 2016 AQMP addresses the 1997 8-hour Ozone NAAQS and 1979 1-hour Ozone NAAQS. The NOx and VOC reductions the District is seeking to achieve are not premature. In the previous 2007 SIP for the 8-hour ozone standard, a substantial portion of the NOx emissions reductions relied on this "black box." A primary goal of the 2016 AQMP is to eliminate reliance on the "black box" to the extent feasible. The NOx and VOC reductions needed to meet the 1997 8-hour ozone standard are defined in this Plan because the technologies needed for attainment are identifiable and the CAA deadlines are fast approaching. Moreover, the Clean Air Act requires attainment of primary standards to be achieved as "expeditiously as practicable." Clean Air Act § 172(a)(2)(A). In addition, the Ports' suggestion that the District has chosen not to comply with the reasonable further progress requirement is wrong. The reasonable further progress demonstration is included in Appendix VI-C. Finally, the District did conduct an economic analysis of the Plan's ozone strategy, which was included in the socioeconomic report for the AQMP. This analysis analyzed the cost effectiveness of the various measures, evaluated the funding element for applicable incentive measures,

and contained an overall socioeconomic analysis for the Plan. All of these were released to the public for comment, with the earliest socioeconomic analysis released in June 2016. This economic analysis was conducted in conjunction with the Plan; the District disagrees that this analysis should have been done before the Plan was drafted.

Response to Comment 96-8:

The Ports contend that the District has released the 2016 AQMP in a piecemeal and incomplete fashion. The Ports further contend that it is procedurally and legally inappropriate for the District to conduct CEQA review before the details of the AQMP have been completed. The CEQA process, if working properly, requires that a project is open for public discussion and allows for agency modification during the process. *Concerned Citizens of Costa Mesa, Inc. v. 32nd District Agricultural Association* (1986) 42 Cal. 3d 929, 936. The CEQA process "is not designed to freeze the ultimate proposal for a proposed project in the precise mold of the initial project[; indeed, n]ew and unforeseen insights may emerge during the investigation and evoke a revision of the original proposal." *Kings County Farm Bureau v. City of Hanford* (5th Dist. 1990) 221 Cal. App. 3d 692, 738.

Details of all of the proposed project's control measures (in Appendix IV-A, IV-B, and IV-C) were available online and in discussion at the AQMP Advisory Group meetings for a meaningful review starting in the Spring of 2016. Although the specifics of the implementation of each control measure were further defined throughout the process, the known information is used to form the basis of the analysis of environmental impacts. Potential associated impacts were analyzed based on known information or supported assumptions to determine foreseeable effects. Furthermore, it should be noted that the CEQA analysis for the 2016 AQMP is not project-level, but rather program level. Each of the projects, including rule development borne out of the control measures, will undergo project level CEQA analysis in the future. See *Town of Atherton v. California High Speed Rail Authority* (2014) (holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR).

In addition, the Draft 2016 AQMP was released to the public on June 30, 2016 and the on-going changes to the Draft Plan were incorporated in both the Draft Program EIR released for public review on September 16, 2016, and the Revised Draft AQMP released to the public on October 7, 2016. No major changes to the project description, including the suite of control measures evaluated in the Draft PEIR, were made to constitute the need to reevaluate and recirculate the PEIR. No modifications to the Plan changed the conclusions, created new impacts or made worse the impacts already evaluated in the Draft PEIR. In addition, modifications that have been made to 2016 AQMP, since the Draft PEIR on the 2016 AQMP was made available for public review would not constitute significant new information within the meaning of the CEQA Guidelines. All key comments on the Draft and Revised AQMP and modifications to the Plan were disclosed to the public during the comment period of the PEIR.

Response to Comment 96-9:

This comment summarizes requests made in the Ports' comment letters 50 and 96. For responses relative to the need for and authority for measure MOB-01, see Responses to Comments 96-4, 96-11, 96-13, 96-23, and 96-29. For the issue of exclusion from measure EGM-01, see Response to Comment 96-32. For discussion of MOB-14, see Responses to Comments 96-39 and 96-40. For the issue of socioeconomic analysis of MOB-01 and other facility-based measures, see Responses to Comments 50-20 through 50-24.

For a discussion of the incentive funding plan, see Responses to Comments 50-18 and 50-19. For responses regarding the emissions inventory, see Responses to Comments 50-27 through 50-30.

As noted in Response to Comment 96-2, the SCAQMD staff looks forward to working with the Ports, affected industry, and the public in implementing MOB-01 in a collaborative manner. Staff looks forward to the Ports participation on the working group.

Response to Comment 96-10:

With regard to the geographic boundaries of the SCAQMD, see Response 96-3. This comment further assumes that measures in the AQMP such as MOB-01 would seek to directly enforce CAAP programs such as the Vessel Speed Reduction Program. However, the scope and content of the measure will be determined during the working group process. Although EPA and the Coast Guard are to enforce MARPOL Annex VI, that treaty does not preclude additional measures which are lawful under international law. When the US ratified Annex VI, it did so on the understanding that it did not prevent nations from adopting more stringent emissions standards for fuel oil requirements as a condition of entry into ports, and the statute giving enforcement authority expressly provides that it does not affect any other existing authority. 33 U.S.C. §1911.

Response to Comment 96-11:

Regarding the SCAQMD's ability to regulate the Ports as indirect sources, see Response 96-4. The SCAQMD is not attempting to define a geographical area as an indirect source, but rather believes that each port is a public entity operating as an indirect source, exercising authority as a landlord over all port activities, and generating large profits for its operations. (E.g., POLA revenues over expense of $212 million in 2015). Staff disagrees that the measures are not necessary, since they will assist in meeting the goals of CARB's Further Deployment measures. The Ninth Circuit has rejected the argument that indirect source rules impermissibly attempt to regulate mobile sources. National Ass'n of Home Builders, 627 F. 3d 730 (9th Cir. 2009).

Response to Comment 96-12:

This comment argues that SCAQMD may not adopt an indirect source measure applicable to a port because such measures can only apply to new or modified sources. The Clean Air Act section cited describes what is precluded from being required in a SIP—ISR programs for new and modified sources. It does not purport to limit the scope of permissible indirect source rules. Health and Safety Code §40716 giving indirect source authority is not limited to new sources, and §40440(a) refers to both new sources and sources where there are high levels of localized concentrations of pollutants (which would presumably be existing sources). As the Ports letter cites, state law recognizes that indirect source rules may apply to existing sources. Health and Safety Code §40717.5(a)(1).

Response to Comment 96-13:

Although the SCAQMD monitors typically showing the highest PM2.5 level are located farther inland, emissions of NOx and SOx from the Port sources are precursors to PM2.5 (and ozone) formed in the atmosphere farther east, and must be controlled to ensure attainment of the NAAQS.

Response to Comment 96-14:

See Response 96-12.

Response to Comment 96-15:

See Responses 96-4 and 96-11.

Response to Comment 96-16:

See Responses 96-4 and 96-11. Staff disagrees that the Ports have no control over the operations of their tenants, as they have demonstrated through implementing programs such as the Clean Truck Program.

Response to Comment 96-17:

See Response 96-11 re regulation of indirect sources not being preempted mobile source regulation, and 96-11 re the need for the measure.

Response to Comment 96-18:

See Response 96-4 re indirect source authority.

Response to Comment 96-19:

SCAQMD will comply with Health and Safety Code §40717.5 when and if it adopts an indirect source rule. The statute applies when the agency adopts or amends a rule, not when it adopts an AQMP.

Response to Comment 96-20:

With respect to describing the Ports as Implementing Agencies, it was not intended to exclude the other entities whose efforts would be part of implementation.

Response to Comment 96-21:

See Response 96-5. It should be noted that nothing in the measure MOB-01 would regulate commerce in another state.

Response to Comment 96-22:

See Response 96-6.

Response to Comment 96-23:

MOB-01 is designed to help implement the State SIP Strategy "Further Deployment" measures, which seek emission reductions beyond the existing state, federal, and international regulations cited. Also, see Response to Comment 96-2.

Response to Comment 96-24:

The case cited, Bayview Hunters Point, 366 F 3d 692 (9th Cir. 2004), stated that the measures cited in that case did not actually commit to a specific ridership goal.. It did not preclude a state or local agency from adopting enforceable mechanisms to achieve specific emissions reductions, which would be the intent of

MOB-01. SCAG's RTP/SCS is already required to be part of the AQMP, as stated in Health and Safety Code §40460(b).

Response to Comment 96-25:

The SCAQMD has not identified the facility-based measures as part of its RACT/RACM demonstration. It should be noted that nothing in the requirements for RACT or RACM precludes a state or local agency from adopting measures that go beyond RACT or RACM—indeed in the case of the serious area plan for PM2.5, the SCAQMD must implement BACT/BACM. More importantly, the technological and economic feasibility of any provisions of the enforceable mechanism to implement MOB-01 will be part of the working group process.

Response to Comment 96-26:

The reference to PR4001 is in regards to implementation of the 2012 AQMP. PR4001 has been placed on hold pending the adoption of the 2016 AQMP. As noted in Proposed Measure MOB-01, SCAQMD staff is proposing that the 2007 AQMP Measure MOB-03 and 2012 AQMP Measure IND-01 be replaced with proposed measure MOB-01 upon adoption by the SCAQMD Governing Board and subsequent submittal to CARB and U.S. EPA for approval. If the approvals occur, PR 4001 as currently proposed will be taken off the rule forecast calendar. However, depending on the progress in identifying actions as part of the implementation of MOB-01, there may still be a need for a rule proposal as discussed in the proposed measure. Also, see Response to Comment 50-8.

Response to Comment 96-27:

As the Ports have demonstrated through their measures implementing the existing CAAP, including the Clean Trucks Program, measures to reduce the adverse health effects of Port related operations due to air pollution are completely consistent with the Ports obligations under the tidelands trust doctrine. Staff does not believe a court would hold that the trust doctrine requires the Ports to prefer the interests of polluting industry over the health of nearby and downwind residents.

Response to Comment 96-28:

This comment alleges that it would violate the Tidelands Trust for the ports to implement measures to implement an "entirely local program to reduce PM2.5, NOx and SOx emissions" since the trust is for the benefit of the entire State. First, the benefits are not "entirely local" since the whole South Coast Air Basin and downwind areas such as Coachella Valley and Ventura County will benefit from port-related emission reductions. Second, virtually all activities the Ports engage in by their nature benefit local interests more than the interests of persons in far-away parts of the state, such as improving the docks, leasing property to terminal operators, etc. Finally, if this theory were true then the entire CAAP and Clean Truck Program would have been illegal. This comment also says that only the City can decide how to "prudently manage trust assets and revenues with a nexus and proportionality to the Tidelands Trust interest." Again, this amounts to an assertion that the Tidelands Trust requires the City to prefer the interests of polluting industry at the expense of the health of residents of the entire air basin and beyond. No authority is cited for this proposition.

Response to Comment 96-29:

The SCAQMD does not agree that the facility-based measures are not necessary for attainment. They are not relied on for the attainment demonstration because they are intended to assist in implementing the CARB Further Deployment measures. All the emission reductions associated with the Further Deployment measures are assigned to those measures. But without the SCAQMD's proposed facility based measures, those reductions may not be realized. Thus the facility based measures are indeed necessary. This comment argues that the facility based measures cannot be approved by EPA because they are insufficiently specific and thus not enforceable. . However, courts have enforced measures to attain specific goals even though the mechanisms are "unspecified." CBE v. Deukmejian, 731 F. Supp. 1448 (N.D.Cal. 1990).

Response to Comment 96-30:

The strategies to reduce air toxics contained in the AQMP will not be submitted into the SIP if they do not reduce criteria pollutants. The toxics section of the AQMP was included to provide a more comprehensive picture of the agency's plans to improve public health and reduce the impacts of air pollution. With regard to incentive measures, staff will work with EPA to ensure that the measures are approvable under applicable EPA guidance, or to the extent not approvable for up-front SIP credit, staff will submit the emission reductions attained into the SIP after the measures are implemented.

Response to Comment 96-31:

Staff appreciates the recognition of the need to adopt all feasible measures, and please see Response to Comment 86-2 regarding more details on the evaluation of all feasible measures. It is noted in the Draft Final 2016 AQMP Appendix IV-A that to the extent that the ports may be affected by proposed measure MOB-01, EGM-01 would not apply to the ports (Page IV-A-121).

Response to Comment 96-32:

Please see Responses to Comments 96-4, 96-11, and 96-31.

Response to Comment 96-33:

Regarding indirect source regulation and its applicability to the ports, see Responses 96-4 and 96-11. The SCAQMD has specific authority to adopt indirect source control measures even though CARB and EPA may not require them. Health and Safety Code §§40716; 40440.

Response to Comment 96-34:

Regarding the fact that indirect source measures are not the same as preempted mobile source emission standards, see Response 96-11.

Response to Comment 96-35:

Regarding the SCAQMD's authority to implement indirect source rules, see Response 96-4.

Response to Comment 96-36:

Staff agrees that neither EPA nor CARB may require the SCAQMD to include indirect source measures in the SIP. However, that does not mean they are beyond the SCAQMD's authority. SCAQMD is specifically

granted indirect source authority by Health & Safety Code §§40716 and 40440. Staff does not propose a permit system for indirect sources. For applicability to the Ports, see Response 96-4.

Response to Comment 96-37:

Indirect source measures are not preempted emission standards for mobile sources. See Response to Comment 96-11.

Response to Comment 96-38:

Staff agrees that it is important to prioritize and secure the necessary incentive funding to implement the AQMP and hopes the Ports will be actively involved in these efforts.

Staff recognize the commenters' concern regarding the need to avoid disqualifying projects from certain existing incentive programs by making those projects mandatory. Staff will work closely with the agencies responsible for implementing such programs to make sure that does not occur. In the past, some incentive programs have allowed funding to be provided for early implementation of measures that would ultimately become required.

Response to Comment 96-39:

See Response 96-38. Staff does not anticipate holding the Ports responsible for attaining emission reductions from incentive measures where the incentive funding on which the measure is based is not secured.

The comment misunderstands measure MOB-14, which does not propose a facility cap, but rather a mechanism to obtain emission reductions from mobile sources that may be used to assist in meeting obligations under a facility-based measure.

Response to Comment 96-40:

The comment appears to be confusing San Joaquin Valley Rule 9610, which provides a mechanism for obtaining credit for emission reductions from incentive programs, with San Joaquin Valley Rule 9510, which requires emission reductions from new indirect sources, and allows the payment of a mitigation fee in lieu of obtaining the required emission reductions. Finally, although SCAQMD staff would like to support allowing emission reductions from mobile sources to offset emissions increases at stationary sources, based on over two decades of working with EPA on this issue staff believes this would be unrealistic at this time.

Response to Comment 96-41:

This comment repeats in summary form a number of arguments laid out in more detail in the earlier comments and responded to earlier in this letter. In addition, none of the proposed measures would dictate what land uses the port may allow or specify zoning requirements.

Response to Comment 96-42:

The reference to "contingency" in the description of the facility based measures was not intended to mean these measures serve as the specific "contingency measures" required by the Clean Air Act. As the

commenter suggests, the SCAQMD and CARB are relying on excess reductions from already-adopted measures to serve as RFP contingency measures for the ozone plan. The EPA's March 2015 ozone implementation rule cited by the commenters does say that the 182(e)(5) contingency measures, which are to be submitted three years before they are needed, are the only ozone contingency measures for attainment in extreme areas. However, it did not eliminate the need for ozone contingency measures for reasonable further progress.

Response to Comment 96-43:

Please see Response 96-7 and 80 Fed. Reg. 12,264 for a discussion of the applicability of transportation conformity to the 1997 NAAQS once that NAAQS is revoked.

Response to Comment 96-44:

The Draft Socioeconomic Report was released on November 19, 2016, with an additional public review and comment period of 30 days that ended on December 19, 2016. Preliminary Draft Socioeconomic Report was released on August 31, 2016 with a comment period of 60 days. The preliminary draft covered the estimates for costs and benefits of the plan and were released earlier to maximize the review time for public and stakeholders.

As for the claim that the Revised Draft AQMP and the Socioeconomic Report are not complete, the complete documents were released in December 2016 for public review. There were minor revisions to the October 2016 version. Staff believes that there is sufficient time to comment on the revisions prior to the SCAQMD Governing Board's consideration of the 2016 AQMP in February 2017.

Response to Comment 96-45:

The Draft Socioeconomic Report quantifies costs for control measures with quantified emission reductions. The costs and emission reductions were analyzed for contingency measures BCM-01 (Further Emission Reductions from commercial cooking and BCM-04 (Maura Management strategies). As stated in Chapter 4 of the Draft Final 2016 AQMP and reiterated in Appendix 2-A of the Draft Socioeconomic Report, the "facility-based" SCAQMD mobile source measures—MOB-01, MOB-02, and MOB-03—are being proposed to facilitate local implementation of the state's State Implementation Plan (SIP) Strategy "Further Deployment of Cleaner Technologies" measures. The SCAQMD measures propose a process to also identify voluntary actions that could potentially result in additional NOx emission reductions beyond the state's emission reduction commitments. Since these actions are not specifically identified at this time and will be voluntary in nature, staff does not presume that the affected industries and businesses would voluntarily incur any costs in addition to what has been quantified for CARB's "Further Deployment" measures.

Response to Comment 96-46:

Chapter 6 of the Draft Socioeconomic Report, which analyzes the Draft 2016 AQMP's impact on environmental justice communities, was released to the public on September 23, 2016. The chapter was re-released on November 19, 2016 as part of the complete Draft Socioeconomic Report and reflects stakeholder inputs.

Response to Comment 96-47:

The Draft Socioeconomic Report analyzes macroeconomic impacts associated with the total incremental cost of implementing the Draft 2016 AQMP. The total incremental cost includes matching funds required from affected businesses and consumers to purchase and maintain near-zero and zero emission equipment as well as different levels of government incentive funding. Please see Chapter 2 of the Draft Socioeconomic Report for more details on incremental costs.

Response to Comment 96-48:

The Draft Financial Incentives Action Plan for the 2016 AQMP, released in December 2016, provides a set of proposed actions that will be taken by the SCAQMD along with public and private sector stakeholders and the public at large to secure additional financial incentive funding. This includes estimates of potential revenues from each source. Taxpayer funding from local and state ballot measures represents a potential funding source outlined in the Plan. To be conservative about the prospect of securing additional public revenue from new sources, the Draft Socioeconomic Report has analyzed a worst-case scenario under which all incentive funding is assumed to be financed from existing state revenues with no health benefits included. This worst-case scenario is expected to have minimal impact on projected job growth in the region.

Response to Comment 96-49:

Please see Responses to Comments 96-47 and 96-48.

Response to Comment 96-50:

See Response to Comments 96-44 on the release date of the Draft Socioeconomic Report and corresponding appendices. Please see Response to Comments 96-45 and Chapter 2 of the Draft Socioeconomic Report for more information on the calculation of compliance costs. Please see Chapter 3 of the Draft Socioeconomic Report for more information on public health benefit estimation and Chapter 4 for how these benefits were used to measure job impacts. Please see Appendix 4-C for the regional competitiveness impacts of the 2016 AQMP. It should be noted that competitiveness of the Ports themselves has not been analyzed as the Remi model is not designed to predict potential impacts on individual businesses or facilities.

Response to Comment 96-51:

Please see Response to Comment 96-44 and 96-45.

Response to Comment 96-52:

Please see Response to Comment 96-8.

Response to Comment 96-54:

As noted in the Response to Comment 96-2, potential emissions reduction associated with specific actions identified through a public process would be recognized in future rate-of-progress reporting and emissions inventories developed for future AQMP/SIP revisions. The state is required under federal law to report “rate-of-progress” towards achieving air quality standards through a periodic demonstration

showing the actual emission reductions achieved. Typically, emission reductions as a result of implementation of adopted rules and incentives programs such as the Carl Moyer Program are accounted in the Rate-of-Progress report. Proposed Measure MOB-01 does not have any "upfront" emission reduction commitment since specific actions have not yet been identified and the proposed measure is intended to help with the State SIP Strategy "Further Deployment" measures. As actual emission reductions occur through the identified actions, the reductions will be accounted as part of the rate-of-progress reporting.

Response to Comment 96-55:

Staff appreciates the comment regarding double counting of emission reductions and will ensure that emission reductions from incentives programs are appropriately associated with their funding source. At this time, only emission reductions from incentives programs that the SCAQMD and CARB implement are explicitly recognized in the base year and future year baseline emission inventories through proposed measure MOB-14. Emission reductions due to actions that occurred at the ports through funding programs such as the EPA Diesel Emissions Reduction Act (DERA) or voluntary actions such as the vessel speed reductions are recognized in the AQMP base year and future year emission inventories through actual reported activities from the ports.

Response to Comment 96-56:

The emissions reported in the control measure summary have been revised to reflect the totals reported numbers provided in the Commenter's letter (page 31) for 2012, 2022, 2023, and 2031. The port-related source emissions are from the five emission source categories that the ports use to report their annual emissions. SCAQMD staff has been working with CARB staff to update the overall ocean-going vessel emissions to reflect the information reported by the ports. The revised emissions from CARB will be reflected in the Final AQMP.

Response to Comment 96-57:

As implementation of MOB-01 moves forward, the most current emissions inventories will be used in developing potential emission reductions from the identified actions. For SIP accounting and reporting purposes, the percent change in emissions will be based on actual emissions reported by the ports and the historic base year (2012) will be used to calculate rate-of-progress.

Response to Comment 96-58:

During the public process to identify specific actions to implement MOB-01, staff will clarify what the emission reduction goals will be based on the State SIP Strategy "Further Deployment" measures and propose a process for calculating emission reductions.

Response to Comment 96-59:

Staff appreciates the efforts the ports are making to incentivize deployment of the cleanest ocean-going vessels entering the ports. The future year estimates of the number of Tier 3 vessels provided by the ports are being considered by CARB in its update to the ocean-going vessel emissions inventory. While it is important to reflect the most accurate emissions inventory, it is also important to propose the development of cleaner emission standards and reflect the potential emission reductions associated with implementation of such standards. Any emission reductions associated with such standards are

commitments that CARB has made. If no Tier 4 standards are established by IMO, CARB has committed to achieving the associated emission reductions nevertheless.

Responses to the second attachment to this letter can be found in Responses to Comments 50-8 through 50-32.

Comment Letter from Del Amo Action Committee (Comment Letter #97)

Three Foundational Principals for Governing Effective Environmental Regulatory Organizations

1. The cultural and effectiveness of any organization begins with leadership at the top.
2. New Technologies have driven clean air, clean water and solid waste management. New Emerging Technologies provide the key to further sustainability progress.
3. Laws, rules and regulations are not effective without oversight and enforcement.

From Florence Gharibian: Florencegharibian@yahoo.com November 7, 2016

Chair of the Del Amo Action Committee, participant in the Los Angeles Environmental Justice Network, Department of Toxic Substances Control (DTSC), Branch Chief, LA Enforcement Program (Retired).

The new acting SCAQMD Executive Officer, Wayne Nastri offered his proposed Mission Statement and draft Goals and Objectives at a recent Board meeting:

Mission Statement

"All residents have a right to live and work in an environment of clean air and we are committed to undertaking all necessary steps to protect public health from air pollution with sensitivity to the impacts of our actions on the community, public agencies and businesses."

It is correct and appropriate for all LA's citizens to be concerned about clean air in the Los Angeles Basin. It is correct and appropriate for all of us to be concerned about Climate Change because we are all living on a small planet where climate change has the potential to create deserts and floods and de-population of large areas of this planet.

97-1

I submitted comments in August 2016. My comments addressed several topics. Please also consider the comments in this correspondence.

1. Placing a priority on facilities that pose an eminent and substantial danger to public health.
2. SCAQMD as the primary regulatory agency enforcing air regulations at Stationary Sources.
3. The importance of an effective enforcement program in ensuring regulatory compliance.
4. Proposal for a program to encourage new clean air technologies.
5. The importance of accurate petroleum refinery air monitoring.
6. SCAQMD role in achieving more sustainable management of solid waste.

My first priority in August 2016 remains my first priority, facilities conducting activities that pose an eminent and substantial danger to public health. I provided information on two facilities in the Harbor Gateway area, Exxon Mobil Torrance and Jones Chemical. In conducting the research for the comments I am submitting today I reviewed a report prepared on September 9, 2016. It was included in an announcement cancelling a December 2016 meeting

regarding the Exxon Mobil refinery. The report is entitled, Alkylation Technology Study. The purpose of the study was to review and evaluate commercially available options for replacing HF (presumably Hydrofluoric Acid) Alkylation at the Exxon Mobile Refinery and other refineries in the Los Angeles area. Alternatives and costs of modification were discussed in the report.

Please provide information on the decision the SCAQMD has made on the steps the District will take to eliminate the serious public health risks posed by the Hydrofluoric Acid tanks at the Exxon Mobile Refinery.

In conducting research on the Jones Chemical facility also in the Harbor Gateway I found notations of the submittal of a AQMD permit application for Jones Chemical apparently providing information prepared by Jones Chemical on totally enclosing their dangerous chlorine activities. What is the status of this permit? The company is located in a residential area, adjacent to a Boys and Girls club and neighboring a food processing and distribution facility. The property where Jones Chemical is located is seriously contaminated with numerous dangerous industrial chemicals.

It would be tremendously helpful to know that the AQMD is addressing these urgent and potentially life threatening situations.

97-1 Con't

<u>The SCAQMD needs to fine tune the ability to recognize and respond to situations and facilities that pose an Imminent and Substantial endangerment.</u>

The draft Plan includes a commitment to prioritize existing conditions that "*represent an imminent and substantial endangerment to public health or environment.*" *110(a)(2)(G)].* The SCAQMD has knowledge of existing conditions at businesses in the basin that represent an imminent and substantial endangerment to public health and the environment. Those conditions must be prioritized and the risks eliminated.

97-2

Citizen complaints can be a source of information regarding companies that are violating the law. Often those complaints come from employees of a company doing unsafe and dangerous things. The ability to respond to high priority citizen complaints is critical. This involves having the right people take the complaints. Those people must have an ability to recognize a high priority complaint and contact the right AQMD inspectors to respond to the complaint.

<u>Budgeting and Fundraising</u>

Over the past several months I have attended the AQMD Board meetings and Advisory Committee meetings. At the September and October 2016 SCAQMD Advisory Committee meetings staff presented information on possible funding sources for incentives described in the draft AQMP. Two charts were discussed. The first provided information on funding currently available. The second provided possible sources for additional funding. As

97-3

acknowledged by staff, there is a significant shortfall. The possible sources for additional funding are uncertain. Staff recommended the formation of a modified advisory committee bringing together individuals with fund raising experience. Several Advisory Committee members commented on the difficulty SCAQMD may have in obtaining the additional funding. Staff acknowledged that the expanded funding base would likely not be in place for about two years.

The acquisition and disbursement of large sums of incentives funding would require employing accountants and individuals with financial management and fund raising expertise. If hiring of additional employees with this experience and knowledge is not possible then redirection of current staff would be required. Building the incentives program could result in significantly diverting talented engineering and technical staff away from mainstream air quality work in order to procure, track and disburse funding. In addition, it is fair to assume that the skills associated with raising funds, bookkeeping and appropriate disbursement of the funds are not the talents and skills normally associated with environmental engineers and technicians. 97-3 Con't

Diverting employees from their normal responsibilities associated with the mainstream work of the Air District in order to having staffing to run an estimated one billion dollar incentives program is not acceptable.

In addition it is necessary to place a high priority on determining how current funding and staffing will be aligned with the goals and objectives of the AQMP. The proposed new funding would come from several funding sources. The acquisition of this funding will require setting clear priorities on the programs that are the highest priority. Will encouraging and developing solar projects be a high priority? Or will funding for upgrades to stationary sources be the priority? The prioritization of funding currently available and clear priorities for future funding is essential. What priorities for the funding will be determined and what will the process be for setting those priorities. Will this information be clearly available to the public?

<u>Priority for Communities with Unfair Environmental Pollution Burdens</u>

I participate in several forums where programs that might be planned to improve conditions in Environmental Justice communities. The LA County Supervisors placed a priority on improving conditions in EJ communities and asked the LA County Planning Department to play a leadership role in the new program. Several Cal/EPA agencies and departments are placing a priority on doing more in EJ communities. Frankly specific projects and work to be done in the communities is somewhat lacking. 97-4

Perhaps a land use program could be developed for envisioning new land uses in these communities. The Del Amo Action Committee is working with the LA County Planning Department. We have suggested the use of an interactive program that would enable people living in EJ communities to envision their communities the way they wish they were.

The module would include zoning information, permitting information on companies in the area location of schools and residential areas and busy roadways and freeways. It would include the ability to envision parks, roadway landscaping and noise barriers. It would include planting of trees to aid in air pollution reduction. It would include closing areas where shopping is located and creating pedestrian walkways and bike paths in those areas.

Another addition to these communities could be trees. The trees to be one method of reducing air pollution. I recommend a book, The Man who Planted Trees, A Story of Lost Groves, the Science of Trees and a Plan to Save the Planet. It would be terrific if the District had a consultant that understood the benefit of trees to our environment and could help the District to begin to improve EJ communities by encouraging the planting of the right trees in the right places.

97-4 Con't

Pollution of every precious resource we have on this small plant matters.

Recently NASA released a report reflecting the shrinking groundwater resources across our planet. Groundwater in the Los Angeles area is precious and must be protected. The world's largest underground aquifers – a source of fresh water for hundreds of millions of people — are being depleted at alarming rates, according to new NASA satellite data that provides the most detailed picture yet of vital water reserves hidden under the Earth's surface. Recently I watched a PBS Program, The Dust Bowl by Ken Burns. The conditions causing the Dust Bowl are described as the worst ecological disaster in US history. Soil scientists and experts on crop rotation, funding enabling farmers to keep going and development of new ways to irrigate crops brought an end to the Dust Bowl. The Ogallala Aquifer that provides the most significant source of irrigation in the middle third of the country is disappearing. The conflict, can more sustainable farming methods be developed that will enable saving the aquifer?

97-5

Will the time come when the dust returns? This is not difficult to imagine in a drought ridden Southern California. We've all seen news coverage of dust storms coming through Phoenix.

I offer a small and haunting clip from John Steinbeck's novel the Grapes of Wrath:

> *When the folks first left and the evening of the first day came, the hunting cats slouched in from the fields and mewed on the porch. And when no one came out, the cats crept through the open doors and walked mewing through the empty rooms. And then they went back to the fields and were wild cats from then on, hunting gophers and field mice and sleeping in ditches in the daytime. When the night came, the bats that had stopped at the doors for fear of light swooped into the houses and sailed about through the empty rooms and in a little while they stayed in the dark room corners during the day, folding their wings high and hung their head down among the rafters, and the smell of their droppings were in the empty houses. In the empty nights the doors banged and the ragged curtains fluttered in the broken windows.*

New consumer products, new cars, zero emission vehicles are all things we hope for as a component of saving our environment. It is important to consider the whole life cycle of consumer products. What energy is needed to produce a product, what pollution is created in producing the product? When the product is no longer useful how will it be disposed? Replacing old more polluting vehicles with new vehicles that do not pollute the air is valuable of course. But I would suggest consideration of where those old cars will go. I've been to auto shredding facilities. I've seen the pollution they create; both to the soil and the air. The consideration of how the older vehicles will be handled when they are no longer in use is an important element of the program. 97-5 Con't

New Technologies Pave a Path to the Future.

I took the following paragraph from the revised AQMP.

> Control measure ideas were developed from a number of sources, including the AQMP Advisory Group, AQMP Control Strategy Symposium, Reasonably Available Control Technology (RACT)/Reasonable Available Control Measures (RACM) Analysis, Best Available Control Technology (BACT)/Best Available Control Measures (BACM) analysis (see Appendix VI), SCAQMD staff and public input, and previous Plan proposals. As part of the 2016 AQMP control measure development, SCAQMD staff conducted an AQMP Control Strategy Symposium in June 2015 to solicit new control concepts and innovative ideas from industry experts, professional consultants, government specialists, environmental and community representatives, and other stakeholders. Suggestions from staff and stakeholder recommendations assisted in identifying additional potential control measures and assessing control measure feasibility. For each control measure, the amount of emission reductions and the cost-effectiveness is considered in the selection of the measures.

The Control Strategy Symposium held in June 2015 should be repeated an expanded. Perhaps through this process the AQMD can convene experts and encourage more work on new air pollution control technologies. Perhaps the Symposium could include information on new technologies being employed in other countries. Is it possible that ambient air filtering systems could be employed in near freeway communities? Could consumers utilize better, more effective air filtering in their homes? 97-6

In my August comments I mentioned opening the Black Box, conceivably not the right term to use to describe an environmental organization capable of considering new, future technologies as potentially useful in meeting air quality goals.

A small amount of the incentive funding could go to the creation of a New Environmental Technologies Office perhaps in conjunction with Cal/EPA. The office would have an advisory committee with members from the academic community and industrial community. Proposals for new technologies would be encouraged. The proposals would then be evaluated by technical experts in the appropriate field.

The New Technologies Group could have an advisory committee with the knowledge and ability to bring new technologies forward. This committee could be made up of members of the academic and research communities. Please seriously consider my proposal.

The SCAQMD is responsible for enforcing laws and regulations.

The SCAQMD must have an enforcement program capable of monitoring compliance and taking enforcement at all stationary sources in the District. Stationary source compliance with permits, laws and regulations is essential to meeting Air Quality Objectives. A strong enforcement program is critical in assuring stationary source compliance is achieved. Estimates of air quality improvement are based on permitted stationary sources in compliance with their permits, laws and regulations. Companies operating in serious non-compliance pollute the environment and hinder progress toward cleaner air. All of Cal/EPA's Boards and Departments are developing Supplemental Environmental Project (SEP) guidelines to be used in penalty determinations. The SCAQMD should develop SEP guidelines.

Wayne Nastri's goals document calls for the inspection of all Major or RECLAIM sources at least annually and inspections of chrome plating facilities quarterly. 20,000 site visits for compliance evaluations and inspections of 3,300 portable equipment units; In addition 1,800 asbestos demolition or renovation activities. He suggests the continuation of an evaluation program for select industries. 97-7

I suggest another inspection priority; the 9 petroleum refineries posting a WARNING notice in the Los Angeles Times this week. The notice warns the public that the companies have Chemicals known to the State of California to cause, cancer, birth defects and other reproductive harm. The notice was published by BP America, Exxon Mobil Corporation, Chevron, Shell Oil, Tesoro, Phillips 66, AERA Energy, VENOCO, LLC and Valero. The inspections should be done even if it does place these companies at a competitive disadvantage.

As a person supervising hazardous waste facility inspectors I find the numbers Wayne Nastri offered in his goals document potentially unrealistic. Are the numbers of inspections in line with the work the AQMD inspectors have completed annually? I noticed the word "strong" was added to the revised AQMP in the discussion of regulation of stationary sources. I like that word. Several other positive changes were outlined in the revised plan.

Changes in the Revised Plan

I support the following changes in the AQMP: I copied the relevant sections:

CMB-03 – EMISSION REDUCTIONS FROM NON-REFINERY FLARES: Flare NOx emissions are regulated through NSR and BACT, but there are currently no source-specific rules regulating NOx emissions from existing flares at non-refinery sources, such as organic liquid loading stations, tank farms, and oil and gas production, landfills and wastewater treatment facilities. This control measure proposes that, consistent with the all feasible control measures, all non-refinery flares meet current BACT for NOx emissions and thermal oxidation of VOCs. The preferred method of control would involve capturing the gas that would typically be flared and converting it into an energy source (e.g., transportation fuel, fuel cells, facility power generation). If gas recovery is not cost-effective or feasible, the installation of newer flares utilizing clean enclosed burner systems implementing BACT will be considered. 97-8

FUG-01 – IMPROVED LEAK DETECTION AND REPAIR: This control measure seeks to reduce emissions from a variety of VOC emission sources including, but not limited to, oil and gas production facilities, petroleum refining and chemical products processing, storage and transfer facilities, marine terminals, and other sources, where VOC emissions occur from fugitive leaks in piping components, wastewater system components, and process and storage equipment leaks. Most of these facilities are required under SCAQMD and federal rules to maintain a leak detection and repair (LDAR) program that involves individual screening of all of their piping components and periodic inspection programs of equipment to control and minimize VOC emissions. This measure would utilize advanced remote sensing techniques (Smart LDAR), such as Fourier transform infrared spectroscopy (FTIR), Ultraviolet Differential Optical Absorption Spectroscopy (UV-DOAS), Solar Occultation Flux (SOF), and infrared cameras, that can identify, quantify, and locate VOC leaks in real time allowing for faster repair in a manner that is less time consuming and labor intensive than traditional LDAR. 97-9

This control measure would pursue two goals. The first is to upgrade a series of SCAQMD's inspection/maintenance rules (Rules 462, 1142, 1148.1, 463, 1178, 1173, and 1176) to require, at a minimum, a self-inspection program, or utilization of an optical gas imaging-assisted LDAR program where feasible. The second is to explore the use of new technologies to detect and verify VOC fugitive emissions in order to supplement existing programs, explore opportunities where Smart LDAR might substitute for existing LDAR programs, and achieve additional emission reductions. Both goals will be pursued in a public process allowing interested stakeholders to participate in pilot projects and the rule development process.

FLX-01 – IMPROVED EDUCATION AND PUBLIC OUTREACH: This proposed control measure seeks to provide education, outreach, and incentives for consumers and businesses to contribute to clean air efforts. Examples include consumer choices such as the use of energy efficient products, new lighting technology, "super-compliant" coatings, tree planting, and the use of lighter colored roofing and paving materials, which reduce energy usage by lowering the ambient temperature. In addition, this proposed measure intends to increase the effectiveness of energy conservation programs through public education and awareness as to the environmental and economic benefits of conservation. Educational and incentive tools to be used include social comparison applications (comparing your personal environmental impacts with other individuals), social media, and public/private partnerships.

This control measure is a voluntary program that provides education and outreach to consumers, business owners, and residences regarding the benefits of making clean air choices in purchases, conducting efficiency upgrades, installing clean energy sources, and approaches to conservation. These efforts will be complemented with currently available incentive programs and developing additional incentive programs. Lastly, the SCAQMD staff may develop an EIP to offer technical and financial assistance to help implement efficiency measures and other low emission technologies. 97-10

I've had a lot of experience with public education and outreach. The most difficult goal to achieve is two way conversations between people who are willing to listen and share. Sometimes education is a form of one way communication. A government official who believes that a community member may have something to tell them they need to hear can be a unique government official. Education can be a two way street.

The South Coast Air Quality Management District is one of the first organizations created to respond to the need to reduce air pollution and take steps to healthy air to the citizens of the Los Angeles area. The District continues to make significant progress in cleaning up the air we all breathe. The task is not an easy one. One of the struggles the District faces is maintaining the balance between improving air quality through reduction of air pollutions from stationary sources and responding to the need to have a viable economy. I attended a Board meeting in early September where speaker after speaker shared their own experiences with illnesses associated with air pollution. Their testimony was heart breaking. I remember one young man who left his sick father and small child to travel across Los Angeles on mass transit to testify at the Board meeting. I also attended a meeting in March 2016 when the Board dismissed Barry Wallerstein. An earlier agenda item brought industry representatives out in force. It is imperative for the District to conduct their business with integrity and openness; to respond to all, always in a fair and unbiased way. 97-11

The South Coast Air Quality Management District has always and will continue to have a pivotal role in improving air quality in Los Angeles and surrounding areas. An Air Quality Plan should be a foundational document for the continuing and future work of the South Coast Air Quality Management District. This document must not reflect unacceptable compromise with industries that do not want to do enough to end the pollution they create.

Oh by the way – Cool roofs, cool man really groovy. (smile)

Thank you for considering my comments and the tremendous work underway at the SCAQMD.

Sincerely,

Florence Gharibian

Jeremiah 5 22

I placed the sand as the bound for the sea.
A perpetual barrier it cannot pass.
Though the waves toss they cannot prevail.
Though they roar they cannot pass over it.

Responses to Comment Letter from Del Amo Action Committee
(Comment Letter #97)

Response to Comment 97-1:

Staff appreciates the interest in the development of the 2016 AQMP and concern for clean air in our region. The 2016 AQMP is an integrated plan designed to demonstrate attainment of the federal ambient air quality standards for our region. While emissions from all mobile and stationary sources are evaluated in the overall emissions inventory, specific issues at two facilities highlighted in the comment letter would not be specifically addressed under this Plan. Air polluting facilities are issued permits and are required to comply with the conditions of the permits. If not, there is enforcement action to ensure compliance. The emission inventory in the Plan assumes facilities are in compliance and emitting at their permitted level. Enforcement on facilities, particularly ones posing imminent and substantial danger to public health is a high priority for the SCAQMD, but not an action addressed specifically in a Plan designed to meet regional air quality targets. However, increased excessive flaring at some facilities in recent years have spurred new technologies and processes as alternatives to traditional gas handling. Thus, the 2016 AQMP is proposing a control measure CMB-03 to address non-refinery flaring. In addition, nine new toxic risk rules are being proposed in the 2016 AQMP. The SCAQMD's December 2016 Rule Forecast Report (Board Agenda #19) includes measures for consideration during 2017 dealing with both flaring and hydrofluoric acid at refineries (June and December 2017, respectively).

Response to Comment 97-2:

Staff agrees that citizen complaints are key to a successful enforcement program. Please see Response to Comment 65-2 regarding the established complaint and enforcement process.

Response to Comment 97-3:

Please see Response to Comment 26-3 regarding the Financial Incentive Funding Action Plan. In addition, a collaborative working group will be established to discuss and decide how to secure the funding. The individual incentive programs will also formulate working group to decide distribution priorities, qualifications, enforcement, etc.

Response to Comment 97-4:

The SCAQMD does not have authority concerning zoning or land use, but the distribution of incentives in environmental justice communities areas could help improve those communities. Please see Response to Comment 84-6 regarding prioritizing incentives distribution in disadvantaged communities.

Staff does utilize trees as an avenue to reduce pollution but trees are also a source of biogenic VOC emissions. While they can reduce PM concentrations to a small extent and reduce temperatures in urban settings, they have to be chosen carefully in order to minimize contributions to VOC emissions

Response to Comment 97-5:

Staff is very aware of the effects of the drought on air quality which has hampered the region's ability to meet attainment of the 24-hour and annual PM2.5 standards. The Plan is proposing to include the consideration of life-cycle analysis when evaluating the cost-effectiveness and feasibility of new technology in various applications. Energy demand and waste disposal are evaluated as part the

environmental impact analysis both for the Plan and in the future when rules and programs are further developed and defined.

Response to Comment 97-6:

SCAQMD periodically conducts new technology forums as suggested by the commenter. In addition, SCAQMD operates a Technology Advancement Division that conducts studies on emerging technologies, implements contracts to evaluate the operation of new cleaner technologies in various applications, as well as travels globally to international conferences to learn about and spread new ideas and technologies for clean air. This Division has two advisory groups, the Clean Funds Advisory Group and the Technology Advancement Advisory Group. Meetings of these advisory groups are open to the public and public comment is taken.

Response to Comment 97-7:

As our permitting and compliance divisions continue to improve existing programs positive outcomes will result in air quality benefits. Staff appreciates the new ideas.

SEP guidelines are not part of the AQMP but these suggestions will be referred to the Legal Division.

Response to Comment 97-8:

Staff appreciates the support.

Response to Comment 97-9:

Staff appreciates your support of FUG-01.

Response to Comment 97-10:

Staff agrees and comment noted. The SCAQMD has a Public Affairs office that provides outreach and conducts periodic regional meetings to update and educate the public in a variety of air quality-related topics.

Response to Comment 97-11:

Staff appreciates the heartfelt comments and we encourage continued participation and involvement in the process.

Comment Letter from Public Solar Power Coalition (Comment Letter #98)

DRAFT 2016 AIR QUALITY MANAGEMENT PLAN



2016 AQMP Comment Form

Please enter your contact information, comments and/or upload comment files below. The information collected may be used to provide further information about public workshops and hearings, and other events related to the 2016 AQMP. Responses to comment will be compiled and included in the final Plan package.

*Fields Required to Submit a Comment

Form Information

Date Created	Time Created	AQMP Year
11/07/2016	9:35 PM	2016

Commentor Contact Information

Commentor's Name*	Organization *	City	State	Zip Code
HARVEY EDER	PUBLIC SOLAR POWER COALITION If not representing a specific organization, please enter "No Affiliation".	SANTA MONICA	CA	90403

Comments (Unlimited Size)

this system is not working on 11.7.16 I wrote signed and tried to send comments but was rejected it wouldn't send,_____

here's trying again, part 3 would have been 2 because of the last one lost etc, more to come on immediate total solar conversion now
Also incorporated by reference my our submittal to Carb Scoping Plan Sacramento CARBs scoping Plan for 2016 my our comments of today 11.7.16
Solarly, Harvey Eder PSPC

98-1

Upload Additional Comment and Supporting Files (30 Mb Maximum per file)

AQMP Comments Files

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature*

Harvey Eder

For More Information Contact: Angela Kim (akim@aqmd.gov) (909) 396-2590

From: Harvey Eder <harveyederpspc@yahoo.com>
Sent: Wednesday, November 16, 2016 12:00 AM
To: harveyederpspc@yahoo.com
Cc: harveyederpspc@yahoo.com
Subject: comments for all documents ref.ceqa ,aqmp 2016 and socio economics.Solar Now

lFrom Harvey Eder Ex. Dir. for self and PSPC Public Solar Power Coalition Nov. 15, 2016

More time is needed to work on commenting on the above

incorporated by reference is the entire record in 2013 SC116941 EDER et.a and the a[[eelate case as well and everything said on the record etc

solar includes wind and water, This pro[osal includes floating solar and wind since some of this is con

Combined solar power pv and thermal with large tamks heat engine w.o combustion water tanks can be used after a big earthquake with seasonal storage in the ground as well as stratas in aquifers and earth due to confidental business inffformation.
the hox emissions will come down by 43 and 55 per cent by 23 and 31 respectfully this includes district heating and cooling systems these can all be done the new infrastructure program trump has thaked about water and sewerz etc, solar thermal is 2 to 3 times more efficent, also this and all submittalsare in ther dealings with the comision and the Segs solar energy generation about 400mw capacity
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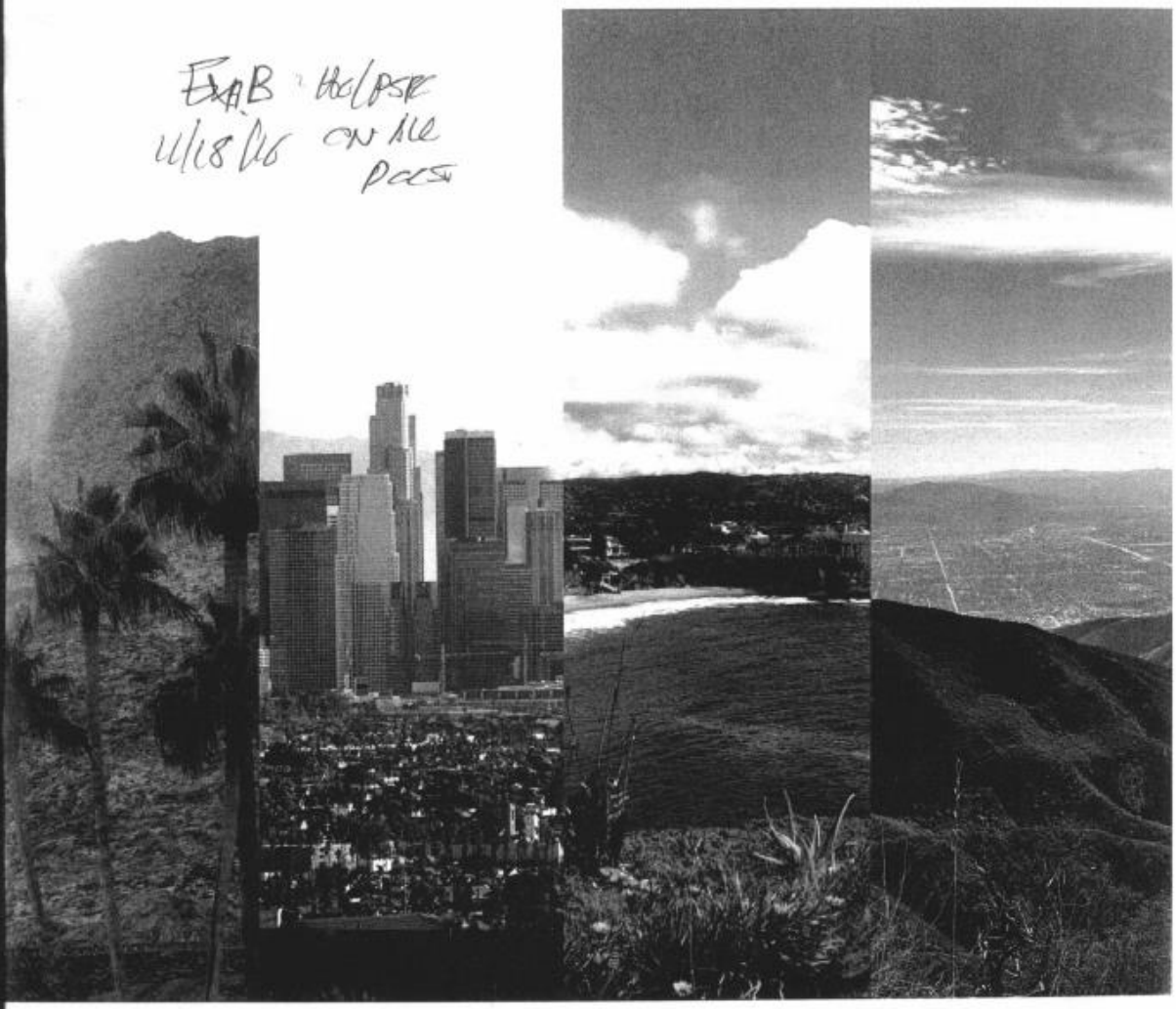
98-2

and IEA and IREn have info on solarrnargy and district solar heating and cooling sustems. so

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Program Environmental Impact Report

2016 AIR QUALITY MANAGEMENT PLAN



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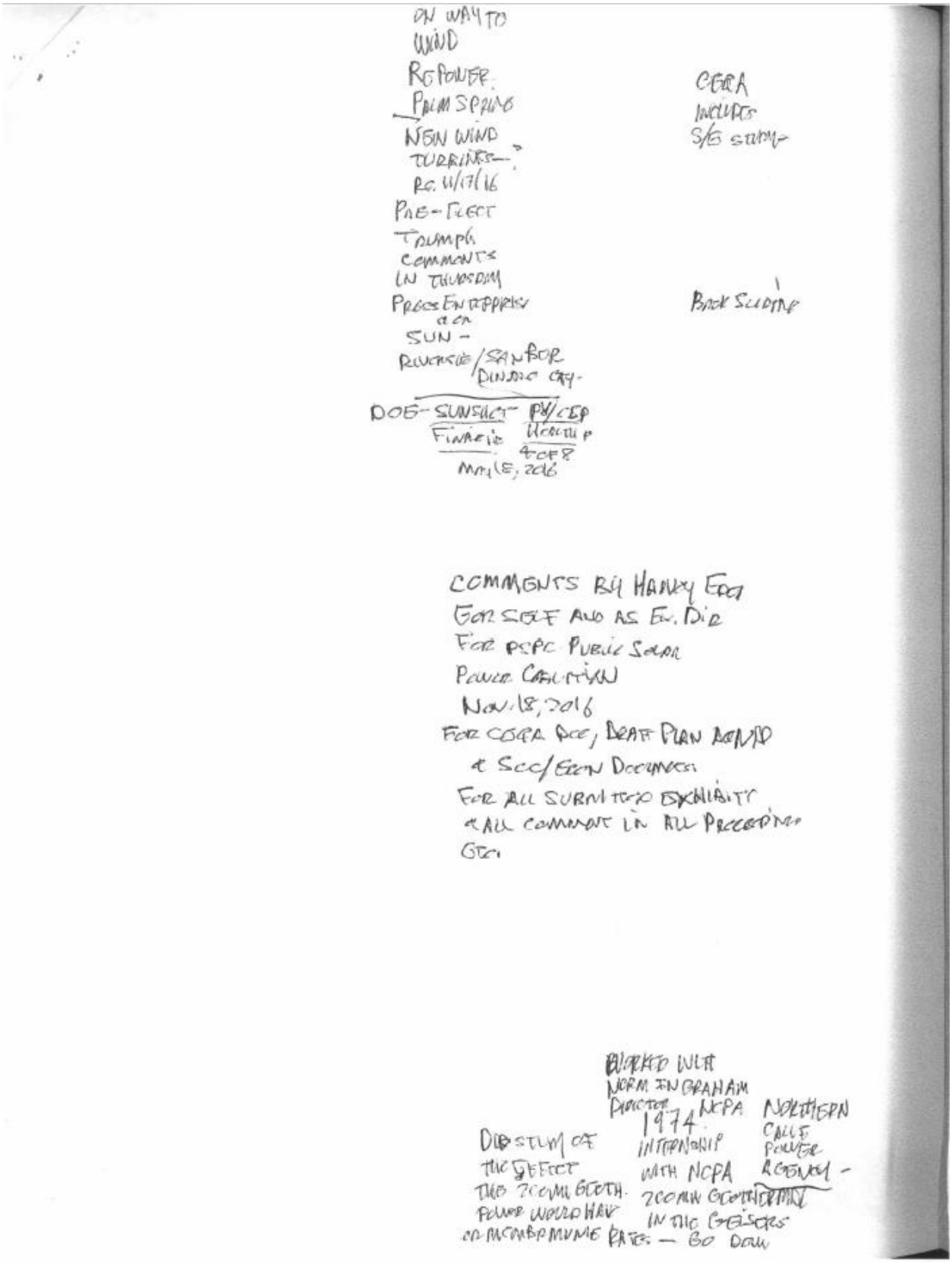

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4 OF 8
MAY 18, 2016

COMMENTS BY HANCY EDG
FOR SELF AND AS EX. DIR
FOR PSPC PUBLIC SOLAR
POWER COALITION
NOV. 18, 2016
FOR CEQA DOC, DRAFT PLAN AQMP
& SCC/ECON DOCUMENTS
FOR ALL SUBMITTED EXHIBITS
& ALL COMMENT IN ALL PROCEEDINGS
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6.0 INTRODUCTION

This Program EIR provides a discussion of alternatives to the proposed project as required by CEQA. Pursuant to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project but would avoid or substantially lessen any of the significant effects of the project, and provide means for evaluating the comparative merits of each alternative (CEQA, Guidelines, §15126.6(a)). In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines, §15126.6(f)(3).

6.1 METHODOLOGY FOR DEVELOPING PROJECT ALTERNATIVES

The alternatives typically included in CEQA documents for proposed SCAQMD rules, regulations, or plans are developed by breaking down the project into distinct components (e.g., emission limits, compliance dates, applicability, exemptions, pollutant control strategies, etc.) and varying the specifics of one or more of the components. Different compliance approaches that generally achieve the objectives of the project may also be considered as project alternatives.

The 2016 AQMP identifies control measures and strategies to demonstrate that the region will: (1) attain the revoked 1997 8-hour ozone standard (80 ppb) by 2023; (2) attain the 2008 8-hour ozone standard (75 ppb) by 2032; (3) attain the 2012 annual PM2.5 standard (12 ug/m3) by 2025; (4) attain the 2006 24-hour PM2.5 standard (35 ug/m3) by 2019; and (5) attain the revoked 1979 1-hour ozone standard (120 ppb) by 2022. The 2016 AQMP also discusses the recently adopted new federal 8-hour ozone standard (70 ppb), as well as incorporates toxics, climate change, energy, transportation, goods movement, infrastructure and other planning efforts that affect future air quality.

The proposed attainment strategy focuses on reduction of ozone precursors (NOx and VOC), direct PM2.5, and PM2.5 precursors (NOx). NOx emissions lead to the formation of both ozone and PM2.5. Therefore, the most significant air quality challenge faced by the SCAQMD is to reduce NOx emissions sufficiently to meet the upcoming ozone and PM2.5 federal standard deadlines. The 2016 AQMP analyses indicate that an additional 43 percent NOx emission reduction is needed by 2023 and 55 percent is needed by 2031 to attain the 8-hour ozone standard. The majority of NOx emission reductions are expected to come from mobile sources.

The possible alternatives to the proposed 2016 AQMP are limited by the nature of the project. For example, the SCAQMD is required to prepare a PM2.5 and ozone AQMP that demonstrates attainment of the federal ambient air quality standards by applicable dates. The magnitude of emission reductions needed for the attainment of these NAAQS requires an aggressive mobile source control strategy supplemented with focused, strategic stationary source control measures and close collaboration with federal, state, and regional governments, local agencies, businesses, and the public.

Further, 2016 AQMP control measures are developed to achieve the maximum emission reduction potential that is technically feasible and cost-effective. Because, the 2016 AQMP includes all feasible control measures identified as part of the AQMP development process and control measures reflect the maximum emission reduction potential, it is difficult to develop alternatives that would still achieve the project objectives, including attaining the federal ozone and PM2.5 standard, but are substantially different than the 2016 AQMP.

In spite of the limitations identified above with regard to developing project alternatives, similar to previous AQMP Program EIRs, alternatives to the 2016 AQMP focus on emphasizing different pollutant control strategies. For example, alternatives could rely more only on regulation only versus greater reliance on incentive funding and mobile source control measures. Ultimately, all project alternatives must demonstrate attainment of the federal ozone and PM2.5 standards.

Development of the ozone and PM2.5 attainment control strategy relies on baseline emissions specified by the emissions inventory of all emissions sources in the Basin. The federal CAA §172(c)(3) requires all plan [AQMP] submittals to include a comprehensive, accurate, and current inventory of actual emissions from all sources of the relevant pollutant(s). To fulfill the intent of this requirement, the year 2012 was selected as the baseline year for analyzing the effectiveness of 2016 AQMP control measures in attaining the ozone and PM2.5 standard. Typically, the existing setting is established at the time the NOP/IS is circulated for public review, which was July 2016. This baseline is used for all environmental topics analyzed in this Program EIR.

6.2 ALTERNATIVES REJECTED AS INFEASIBLE

In accordance with CEQA Guidelines §15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Section 15126.6(c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives; (2) infeasibility; or (3) inability to avoid significant environmental impacts.

As noted in Section 6.2, the range of feasible alternatives to the 2016 AQMP is limited by the nature of the proposed project and associated legal requirements. Similarly, the range of alternatives considered, but rejected as infeasible is also relatively limited. The following subchapters identify six potential alternatives to the 2016 AQMP that were rejected for the reasons explained in each subchapter.

6.2.1 NO PROJECT ALTERNATIVE – NO FURTHER ACTION

CEQA documents typically assume that the adoption of a no project alternative would result in no further action on the part of the project proponent or Lead Agency. For example, in the case of a proposed land use project such as a housing development, adopting the No Project Alternative terminates further consideration of that housing development or any housing development alternative identified in the associated CEQA document. In that case, the existing setting would typically remain unchanged.

The concept of taking no further action (and thereby leaving the existing setting intact) by adopting a No Project Alternative does not readily apply to an update of an already adopted and legally mandated plan such as the AQMP. Adopting a no project alternative for an update to the AQMP does not imply that no further action will be taken (i.e., halting implementation of the existing AQMP). The federal and state Clean Air Acts require the SCAQMD to revise and implement the AQMP in order to attain all applicable ozone and PM2.5 state and national ambient air quality standards. A no further action No Project Alternative in the case of the AQMP is not a legally viable alternative. Consequently, the No Project Alternative presented in this Program EIR is the continued implementation of the 2012 AQMP. Continued implementation of the 2012 AQMP without additional reduction measures would not be a feasible alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates, as explained above. However, continued implementation of the 2012 AQMP as the No Project Alternative (see Section 6.3.1 below) is consistent with CEQA guidelines §15126.6(e)(2) (italics added):

"The 'no project' analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, *as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services…*"

It should be noted that, except for air quality, there would be no further incremental impacts on the existing environment if no further action is taken. Although there are existing rules that may have future compliance dates, potential adverse impacts from these rules have already been evaluated in the Final Program EIR for the 2012 AQMP and subsequent rule-specific CEQA documents. Air quality would continue to improve to a certain extent, but it is unlikely that all state or federal ozone standards would be achieved as required by the federal and California CAAs.

6.2.2 FULL SOLAR CONVERSION ONLY

Under this alternative, all electricity would be generated by solar power. Public comments provided on the 2016 AQMP and NOP/IS (Appendix B) have requested that the alternative of complete solar power be evaluated.

Under this alternative, electricity would be generated by the construction and operation of additional solar generating systems. Some of these would be expected to be on existing housing, structures, and buildings. However, the amount of electricity that would need to be generated would require new large solar installations, which have generally been placed in the desert areas of California (CEC, 2016g), due to the large demand for land that is required. In 2015, solar thermal facilities generated a total of 14,953 gigawatt-hours or about 7.64 percent of the state's total electricity production (CEC, 2016g). Therefore, the state would need a significant increase in the construction and operation of additional solar generating systems.

While the solar technology has made great advances in recent years, there are still a number of existing concerns regarding the reliability and transmission of solar power. Large solar installations have been located in the desert portions of the state. As such, transmission lines that connect solar installations to the more populated portions of the state are not currently available.

Further, electricity would only be generated when the sun was out. While this is common in California, there are times when it is cloudy, rainy or night time when electricity would not be produced. So some type of electricity storage system may be required. The technology for large battery backup systems has not yet been developed which would mean that there would still be a requirement for natural gas-generated electricity. Therefore, full solar conversion is not feasible at this time.

A full solar alternative would result in a number of additional potentially significant environmental impacts than the current proposed AQMP strategy. This alternative would require the conversion of large portion of presumably desert habitat to industrial facilities, resulting in potentially significant impacts to aesthetics (impacts to visual character and glare), biological impacts (destruction of native habitats for rare and endangered species such as the desert tortoise), cultural impacts, land use impacts (conversion of native habitat to industrial land uses), additional air, noise, and traffic impacts associated with construction activities, and other similar impacts.

Finally, converting to full solar is an ambitious goal that has future possibilities. A full solar alternative to the 2016 AQMP would not result in sufficient emission reductions to assure attainment of the federal or state ozone standards. As discussed in Chapter 4.1.5, the carrying capacities (the maximum allowable NOx emissions to meet ozone standards) are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Elimination of natural gas-fired electricity power plants would not result in sufficient emission reductions to comply with ozone standards. Therefore, a full solar alternative would not achieve the primary objective of the proposed project to demonstrate attainment of the federal or state standards for ozone. For this reason, the alternative is considered to be infeasible at this time.

6.2.3 HEAVY VOC REDUCTION STRATEGY

The Heavy VOC Reductions Alternative scenario would aim to implement more VOC emission reductions to achieve ozone attainment, as opposed to the current 2016 AQMP strategy which focuses on NOx emission reductions. NOx levels would be held at or nearly constant and attainment would be dependent upon the reduction of VOC emissions, primarily in the areas of cleaner mobile sources, consumer products and lower VOC solvents. The VOC heavy approach is technically more uncertain, because it would require technology breakthrough in formulations of solvents or consumer products, which are not currently available. One result of the strategy may be the development of potentially new toxic formulations; however, replacement of solvents with low VOC formulations tends to be less toxic than conventional solvents.

Table 6.2-1 shows the limited feasible VOC control measures that have been identified as part of the 2016 AQMP. The VOC emission reductions currently total about 7-10 tons per day. Under this alternative, significant additional VOC emissions reductions would be required. Sufficient feasible VOC emission reductions are not available to demonstrate compliance with the ozone ambient air quality standards because there is a limited number of VOC sources and limited number of feasible VOC emission reductions. As a matter of fact, the ozone isopleths[1] for the two

[1] April 2016 AQMP Advisory Group Meeting #9 – http://www.aqmd.gov/docs/default-source/Agendas/aqmp/advisory9-item2.pdf (Slides 7-8)

Public Solar Power Coalition – Harvey Eder

The commentator provided printed copies of the following series of published papers. Since these papers are copyrighted materials (e.g. published papers or books), these copyrighted materials are not reprinted here, and instead, we are providing a list of the papers received, and links to websites where such materials may be available for viewing and download.

- Power to the People (William Bradley, December 2001)
- Home Investment Partnerships Program (U.S. Department of Urban Housing and Development, 2016)
- The California Energy Crisis, (Los Angeles Times, February 2001)
- Taken for a Ride (New Day Films, 1996)
- General Motors Streetcar Conspiracy (Wikipedia)
- Incorporating Emerging and Voluntary Measures in a State Implementation Plan (SIP) (U.S. Environmental Protection Agency, September 2004)
- Guidance on State Implementation Plan (SIP) Credits for Emissions Reductions from Electric-Sector Energy Efficiency and Renewable Energy Measures (U.S. EPA, August 2004)
- Control Techniques for Nitrogen Oxides Emissions from Stationary Sources – Second Edition (U.S. EPA, January 1978 - Cover to page 25 was provided)

Responses to Comment Letter from Public Solar Power Coalition
(Comment Letter #98)

Response to Comment 98-1:

Overall the 2016 AQMP is a blueprint for achieving the air quality standards in the Basin. The draft 2016 AQMP includes chapter 10 – Climate and Energy. This chapter includes a summary of the cause and effects of climate change, the changing energy sector, in-Basin emissions, and projections for the future. These topics directly affect the Basin's air quality and the 2016 AQMP control strategy. Ms. Klein's book describes drastic action must be taken to combat climate change with our social and economic systems. Chapter 10 does describe the cause of climate change with "the rapid expansion of fossil fuel-based energy, the emission of synthetic gases, and the depletion of our natural carbon sinks that have drastically increased the level of GHGs in the earth's atmosphere and depleted stratospheric ozone. This results in changing global weather patterns, such as more extreme storms, higher average temperatures, and more prolonged periods of drought."

Commenter provided: Klein, Naomi. This Changes Everything: Capitalism vs. The Climate (https://thischangeseverything.org/book).

Book summary: "Climate change, Klein argues, is a civilizational wake-up call, a powerful message delivered in the language of fires, floods, storms, and droughts. Confronting it is no longer about changing the light bulbs. It is about changing the world—before the world changes so drastically that no one is safe. Either we leap—or we sink."

Disclaimer: Since this book is copyrighted materials (e.g., published papers or books), these copyrighted materials are not reprinted here, and instead, we are providing the title of the book received, and link(s) to a website(s) where the book may be available for viewing and possible download. If anyone from the public would like to read the book provided, please contact the SCAQMD AQMP staff in the Planning Division at aqmp@aqmd.com, your local library or bookstore.

Response to Comment 98-2:

Staff appreciates the comments and involvement in the 2016 AQMP review process. In addition to the cause and effect of climate change, chapter 10 also includes a discussion on renewable generation technologies along with storage to address intermittency and periods of over-generation. Please refer to the chapter 10 section titled "Increased Grid Flexibility through Energy Storage Technologies" for additional information. In addition to the chapter 10 discussion, CMB-01 is a proposed incentive measure which includes battery storage and fuel cells are examples of zero and near-zero technology available that may be viable solutions for NOx reductions. In certain applications, technology assessments may need to be completed to ensure these technologies are a viable solution. Please also refer to response to comment 78-6 for batter storage in extreme emergency conditions.

Comment Letter from Construction Industry Air Quality Coalition (Comment Letter #99)

CIAQC

CONSTRUCTION INDUSTRY AIR QUALITY COALITION

Coalition Members

AGC CALIFORNIA

Associated General Contractors America-San Diego Chapter, Inc.

Building Industry Association of Southern California

California Construction Trucking Association

Engineering Contractors Association

United Contractors

SCCA

Southern California Contractors Association

November 2, 2016

Mr. Wayne Nastri
Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765

Dear Mr. Nastri:

In review of the Revised Draft 2016 AQMP, specifically item CMB-01, we have concerns as they relate to proposed additional emergency engine controls and mandates directed through this AQMP that could jeopardize the reliability of such emergency systems. Additionally we have concerns with the accuracy of data presented and the assumptions behind those numbers.

BACKGROUND 99-1

General uses of statements like "Zero emission technology *will be required*, whenever and wherever feasible and cost effective, otherwise near-zero technology *will be required*." (App. IV, top of page IV-A-45), or "Based on this analysis, staff expects a number of diesel ICEs can be replaced with zero or near-zero technology, *but at a minimum Tier 4 standards*." (App- IV, Page IV-A-51) cannot be introduced in the AQMP in reference to emergency engines. These statements imply broad-based mandates for these technologies without properly understanding the limitations of these technologies both in available power and reliability when used in emergency applications required to satisfy building codes for life safety and redundant back-up systems. Zero emission, near zero emission, and Tier 4 standards technologies are also more complicated, and are far more expensive to purchase, install, design into buildings, and maintain than the emergency diesel and gas engines allowed by both EPA and CARB in their NSPS and ATCM regulations respectively.

We also have significant concerns with the accuracy of data presented and the assumptions and extrapolations behind those numbers presented in Tables 1 and 2. We believe that the data is flawed, especially with any reference to emergency engines due to their restricted hours of operation. One only has to look at the 11.5 tons per day (TPD) identified in Table 2 for 3,860 engines permitted post-2010 and compare it to 9,068 older ICEs permitted 2010 and earlier with 11.0 TPD. How can the older engines contribute nearly 1/3 less per engine than the newer engines? This is even more perplexing when you consider the NOx controls on prime power and prime use engines are now controlled to extremely low NOx emissions levels by Rule 1110.2. Preliminary data from our independent sources indicates the contribution from *all* diesel emergency engines is less than 1.0 TPD. With the overall basin NOx baseline at 530 TPD stated in the Executive Summary, this makes the diesel emergency engines merely a fraction of a percent of the whole, and thus mandates of more expensive systems could not be justified. 99-2

2149 East Garvey Ave. North, Suite A-11, West Covina, CA 91791
Tel: 626 858 4611 Fax: 626 858 4610 e-mail: ciaqc@uia.net www.ciaqc.com

At the AQMP meeting on Thursday one of our CIAQC members and a consultant, who is well versed on emergency engine emissions, met with Aaron Katzenstein, who I understand is the lead/key staff person working on this measure. Feedback from that meeting supports our belief the data is overstated, and indicates staff requires a much better understanding of the limitations of these technologies, the yet-to-be-proven reliability of these systems, and the costs of such systems.

99-2 Con't

OUR ASK

In order for CIAQC to effectively evaluate the October draft AQMP concerns and **data we respectfully request that we be allowed to review your detailed calculations and assumptions behind the numbers in Table 1 and Table 2.** With your plan to finalize this document for a February 3 Governing Board hearing, **we ask for this information by November 4** to allow us enough time for our independent evaluation and subsequent discussions with staff. We also **ask that staff be directed to remove words that would indicate a mandate of these technologies, and replace such wording only with "incentives".** CIAQC is not opposed to companies wishing to experiment with new technologies under incentive programs, but we are not in favor of implied mandates within the AQMP that would improperly direct staff to conclude these technologies as BACT for emergency systems.

99-3

Thank you for your consideration of our concerns. We are available to meet with your staff to discuss these issues.

Sincerely,

Michael W Lewis

Michael Lewis
Executive Vice President
CIAQC

Cc: Bob Shepherd
Karl Lany
John Dunlap

Responses to Comment Letter from Construction Industry Air Quality Coalition (Comment Letter #99)

Response to Comment 99-1:

Please see Response to Comment 73-4 regarding technology assessments. Staff acknowledged in CMB-01 that there are applications that might not be suitable for zero and near-zero technology, these limitations will be further explored as regulatory and incentive measures are developed. At a minimum, consideration would be placed on replacement or repowering existing engines that meet Tier 4 standards if they are commercially available.

Response to Comment 99-2:

Please see Response to Comment 73-2 regarding emissions inventory.

Response to Comment 99-3:

Please see Response to Comment 73-2 regarding emissions inventory. Staff reassessed the emission factors used to estimate the baseline inventory and included changes in CMB-01, Table 1 – "Permitted NOx Combustion Sources" and Table 2 – "Breakdown of Permitted ICEs." The emissions for the identified NOx combustion source categories in Table 1 are based on emissions reported in the Annual Emissions Reporting (AER) database and the Permitting database. For each NOx combustion source category, staff summed the emissions reported from AER and divided the sum by the number of applications reported in AER to calculate the average tons per year (tpy) for each equipment. This average tpy for each equipment was then multiplied by the number of applications in the Permitting database. The number of units are derived from the Permitting database. The previous emissions for Stationary ICEs were reassessed by breaking up the source category for emergency and non-emergency engines. The Draft Final reflects the updated calculation and estimates the overall ICES to be 5.5 tons per day (tpd).

For Table 2, staff used the permitting database to determine the year of the equipment. The year the application was completed (including administrative changes) was assigned as the default for the equipment year. Previously categorized newer ICEs (in the October Revised Draft), revealed that 60 percent of the new (greater than 2010) permits represented new pieces of equipment and 40 percent primarily represented old ICEs with administrative changes to the permit. Therefore, the emissions inventory was reassessed to determine the number of pieces of equipment before 2010 and the respective emissions associated with them. The ICEs were then broken down into non-diesel versus diesel, and further with Tier I or II for diesel engines.

Comment Letter from Automobile Club of Southern California (Comment Letter #100)

Automobile Club of Southern California AAA.com

November 29, 2016

Mr. Wayne Nastri
Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765
wnastri@aqmd.gov

Re: Draft 2016 Air Quality Management Plan and Incentive Funding Action Plan

Dear Mr. Nastri:

The Automobile Club of Southern California is pleased to submit the following comments on the Draft 2016 Air Quality Management Plan (AQMP) and its accompanying Incentive Funding Action Plan. The Auto Club is submitting these comments because we are concerned that the South Coast Air Quality Management District (SCAQMD) is considering and may seek authority to increase light-duty vehicle registration fees in order to fund programs and subsidies designed to reduce emissions primarily from heavy-duty and off-road commercial vehicles and mobile off-road equipment. 100-1

Private passenger vehicles, including both light-duty automobiles and light-duty trucks, contributed about 17% of total nitrogen oxide (NOx) emissions from mobile sources in 2012, the baseline year for the AQMP. Reducing NOx emissions is a primary focus of the AQMP. Over the past few decades, there have been substantial reductions in light-duty vehicle emissions, including NOx. These reductions have been achieved because numerous vehicle and fuel requirements have been put in place over this time period, with costs borne by drivers when they purchase, fuel, and maintain their vehicles. And, the emissions reductions have been achieved despite a substantial increase in the total number of vehicles and total miles those vehicles are driven. This success has been one of the key ways air quality has been markedly improved in the South Coast Air Basin. 100-2

Heavy-duty and off-road commercial vehicles and mobile off-road equipment have yet to achieve similar emission reductions and now account for 83% of mobile source NOx emissions, even though there are far fewer of them than private passenger vehicles. Clearly, more needs to be done to reduce emissions from heavy-duty and off-road mobile sources. But it is inherently unfair and inappropriate to increase registration fees on the cleanest, light-duty vehicles, and the consumers who own and use them, to pay to clean-up the dirtiest mobile sources in the Basin. 100-3

The Auto Club, with 6.8 million members, has a long history of supporting and participating in fair and effective strategies to reduce motor vehicle emissions and improve air quality. Auto Club efforts over the years have included the following:

- Researching and providing consumer information about alternative-fuel and other green vehicles.
- Supporting fuel conservation and air quality programs, including carpooling and public transit.
- Supporting more ambitious fuel economy standards for auto manufacturers.
- Researching and providing information about proper vehicle maintenance.

100-4

The Auto Club also partners with state and regional organizations to provide, and better use, funding for transportation projects and programs to improve mobility, safety, and the environment. We are a founding member of Mobility 21, Southern California's transportation funding advocacy coalition. We helped develop and supported numerous county transportation sales tax measures and measures to protect transportation funds. And we currently serve on the state's Road Charge Committee, exploring practical pathways to implement mileage-based user fees to pay for transportation improvements. The mobility and emissions benefits of these efforts are important parts of achieving air quality goals in the Basin.

The share of NOx emissions from private passenger vehicles continues to decline. The AQMP's Appendix III "Summer Planning Emissions" detail tables indicate that the proportion of mobile source NOx emissions from light-duty vehicles is projected to decline from 17% to 7% over the next 15 years, even with expected increases in population, registered vehicles, and total miles travelled. Like in the past, these declines will come from continuing improvements in light-duty vehicle technology and efficiency. But, despite these relatively low and declining percentages, the SCAQMD is considering increasing light-duty vehicle registration fees by as much as $30 to pay to clean-up heavy-duty vehicles and off-road equipment.

100-5

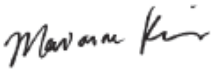
California motorists already pay to help clean-up heavy-duty vehicles and equipment. Most vehicle owners in the Basin currently pay as much as $30 in extra registration fees to the state for a variety of emissions-related programs, a portion of which goes to the SCAQMD. While some of this revenue is used for light-duty clean-vehicle rebates and early vehicle retirement programs, most is used to pay for incentive programs to subsidize on-road heavy-duty vehicles and off-road mobile equipment. The SCAQMD should not exacerbate this situation by imposing additional fees on light-duty vehicles to pay to clean-up heavy-duty vehicles and mobile equipment. The owners and operators of such vehicles and equipment should bear the burden of cleaning them up.

100-6

The Auto Club appreciates the difficult task the SCAQMD has in preparing an updated AQMP that meets federal and state air quality requirements. Moving forward, we hope to be a partner in advancing initiatives identified in the plan that will bring the Basin into conformity. Toward that end, we would like to offer our service and expertise on the Incentive-Based Funding Plan Stakeholder Group. We look forward to helping the SCAQMD develop and approve a plan that can achieve air quality goals in a fair and equitable manner.

Thank your for this opportunity to provide the Auto Club's comments on the 2016 AQMP. Please call me at (714) 885-2325 or email me kim.marianne@aaa-calif.com if you have any questions.

Respectfully,



Marianne Kim
Senior Public Policy Analyst

Responses to Comment Letter from Automobile Club of Southern California (AAA)
(Comment Letter #100)

Response to Comment 100-1:

Staff appreciates the concerns expressed regarding increased registration fees. The Draft 2016 AQMP provides an analysis of the level of incentive funding that may be needed to help accelerate the turnover of older vehicles and equipment to meet federal air quality standards by their applicable dates. The SCAQMD staff is preparing a draft Incentives Funding Action Plan to discuss potential funding opportunities that the region could consider to generate sufficient incentive funds. The purpose of the Action Plan is to generate discussion that affected stakeholders and the public can develop consensus to support. Potential increase in auto registration fees is one potential funding opportunity among several areas including cargo container fees. Staff understands the need to fully vet any proposed fee increase and develop such programs in a manner such that the economic impacts are minimized. As such, a working group is proposed to be created to discuss various potential opportunities to explore. Staff welcomes AASC participation on the working group.

Response to Comment 100-2:

Staff agrees that the NOx emissions from light-duty passenger cars and light-duty trucks have decreased over time and continues to decrease due to CARB Advanced Clean Car Regulation. However, additional NOx reductions will be needed from light-duty vehicles for the region to attain the ozone air quality standards by 2023 and 2031. The State SIP Strategy calls for additional NOx reductions from this sector with an estimated additional 7 tons/day of NOx reductions by 2023. The NOx reductions are beyond the requirements of the current regulations. Incentive programs to encourage the voluntary purchase of new advanced technology vehicles is an important element of the State SIP Strategy. However, the levels of incentive funding must be secured through new funding opportunities.

Response to Comment 100-3:

Staff agrees that on-road heavy-duty vehicles are larger contributors to the region's air quality problem. As provided in Response to Comment 100-1, the SCAQMD is looking at every potential opportunity for incentive funding. It is anticipated that sources of incentive funding will come from a variety of programs to be identified and pursued through a public process.

Response to Comment 100-4:

Staff appreciates the efforts that AAA have provided in helping the region meet air quality standards. Staff looks forward to working with AAA in these efforts.

Response to Comment 100-5:

For the purposes of engendering frank public discussion, staff conducted an analysis of the level of funding that will be needed to help meet the emission reductions needed for attainment. As such, the "$30" number was used for discussion purposes. Any level of potential must be fully vetted at all levels of government and the public.

Response to Comment 100-6:

As mentioned earlier, staff appreciates the concerns expressed and looks forward to AAA's participation on the working group.

Comment Letter from Orange County Sanitation District (Comment Letter #101)

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December 6, 2016

Mr. Wayne Nastri, Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Subject: Comments on the Draft 2016 Air Quality Management Plan

Dear Mr. Nastri,

The Orange County Sanitation District (OCSD) appreciates the opportunity to provide comments on the Draft 2016 Air Quality Management Plan specifically on the draft stationary source control measures contained in Appendix IV-A.

OCSD is the third largest wastewater treatment agency west of the Mississippi River and safely collects, treats and recycles the wastewater generated by 2.6 million people in central and northwest Orange County. We are especially proud of our partnership with the Orange County Water District to provide a high quality treated wastewater to the Groundwater Replenishment System which is the world's largest wastewater reclamation project, ultimately allowing OCSD to reclaim nearly 100% of its influent wastewater. 101-1

As we share the same mission of protecting public health and environment as the South Coast Air Quality Management District (SCAQMD), we are well aware of the challenges faced by SCAQMD in bringing the South Coast Air Basin into compliance with federal and state standards. Nonetheless, as a public agency we continually seek efficient ways to meet these challenges to ensure that the public's money is wisely spent.

OCSD is an active member of the Southern California Alliance of Publicly Owned Treatment Works (SCAP) and is a signatory to each of the three comment letters on the Draft AQMP submitted by SCAP to date. We support the comments that were presented in the SCAP letters and will not repeat the same comments in this letter other than

Our Mission: To protect public health and the environment by providing effective wastewater collection, treatment, and recycling.

to urge SCAQMD to work with CARB and EPA to do their "fair share" of reducing emission sources under their control by 50%. 101-1 Con't

While we plan on participating in the development of the rules based on the proposed control measures and submit more detailed comments during that time, we herein present our comments on the draft stationary source control measures contained in Appendix IV-A that are relevant to OCSD:

CMB-01 Transition to Zero and Near-Zero Emission Technologies for Stationary Sources:

This draft control measure seeks to reduce NOx and VOCs emissions from traditional combustion sources such as internal combustion engines by replacement with zero and near-zero emission technologies.

Although this control measure seems to target "higher-emitting" equipment, we are still concerned with the statement in the ***Regulations*** section (IV-A-48) that this control measure could create new regulations or change existing regulations, including Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines. 101-2

As SCAQMD may be aware, OCSD has recently completed a $30 million retrofit of eight digester gas fueled internal combustion engines by installing Selective Catalytic Reduction and Catalytic Oxidizers systems along with a digester gas cleaning system. The newly retrofitted engines have been in operation since August 2016 in full compliance with the Rule 1110.2. We were also the only wastewater treatment agency that conducted a timely and successful project to demonstrate that the new Rule 1110.2 limits are technologically achievable at the expense of over $3 million in 2010. In order to ensure an equitable return on these investments, we request that biogas engines, such as ours, not be included in this control measure.

The ***Zero and Near-Zero Emission Technologies*** section (IV-A-46) discusses the need to replace older higher-emitting equipment with newer zero and near-zero emitting equipment such as fuel cells. This section briefly mentions that "a tri-generation (heat, power, and hydrogen) [technology] is being demonstrated at Orange County Sanitation District showing that the gas cleanup system is capable of removing contaminants such as siloxanes, sulfur, and hydrocarbons while also providing transportation fuels."

We would like to clarify that this demonstration project, which was a collaborative effort with the National Fuel Cell Research Center at the University of California Irvine and other public and private entities, concluded in May 2014. It was the first tri-generation system in the world to use the digester gas in a fuel cell.

The demonstration tri-generation unit consisted of a 3-stage digester gas cleaning system in order to meet the stringent input fuel requirement and a 300 KW fuel cell unit and operated on digester gas with the natural gas as a backup. The power produced was exported to the plant power grid and the hydrogen supplied the on-site hydrogen vehicle fueling station. Please note that we did not capture and use the waste heat. Despite initial operational issues related to exporting the power to the existing plant power grid and other mechanical problems, the project met its overall energy efficiency target and also demonstrated improved treatment of digester gas for use in fuel cells.

101-2 Con't

It is important for SCAQMD staff to understand that our project, however, was not intended to assess the cost-effectiveness of the gas cleaning system, but only to determine whether the technology was effective. During the entire three-year project, only about 21 million standard cubic feet (MM scf) of digester gas was used, which is a tiny fraction compared to our daily average production of 4 MM scf of digester gas between the two treatment plants. Based upon our experience, we believe that there is insufficient data to determine whether this technology is cost-effective or reliable for biogas applications.

With regard to the discussions on emergency diesel engines and proposed replacement with low NOx emitting equipment such as fuel cells, we are concerned that essential public services such as wastewater treatment plants are not specifically mentioned as applications requiring "capabilities for long-term power and fuel storage or delivery under extreme emergency conditions." The emergency diesel engines at OCSD's two treatment plants and the remote pumping stations serve a critical role in maintaining operation of key wastewater treatment processes and preventing sewage spills during long-term power disruptions. In our 2015 Annual Emissions Report, the total NOx emissions from the engines located at the two treatment plants was less than 0.007 tons per day. Replacing these engines with new low NOx emitting equipment such as fuel cells, battery storage, and alternative fuels will result in a negligible reduction in emissions while jeopardizing the operational reliability of essential public service. We request that the

101-3

draft control measure be revised to exclude diesel emergency engines, such as those used by the wastewater sector. 101-3 Con't

CMB-03 Emission Reductions from Non-Refinery Flares:

This control measure would create a new, source specific rule for non-refinery flares such as those operating at wastewater treatment plants.

As mentioned above, we have invested over $30 million to retrofit our digester gas fueled engines to meet the Rule 1110.2 emission limits, so we are highly motivated to maximize the use of this renewable fuel in our engines rather than wasting this resource by flaring.

In our 2015 Annual Emissions Report, we reported that 1 MM scf of digester gas was flared which resulted in less than 0.001 ton/day of NOx emissions. In comparison, almost 1,300 MM scf of digester gas was used in our engines. As demonstrated by the usage data, our flares are only used to facilitate maintenance or manage biogas during breakdowns of our engines, which may become more frequent due to the complexity of the control systems needed to achieve the new Rule 1110.2 limits. 101-4

As a provider of an essential public service, we must be able to continually treat sewage and manage biogas and replacing flares, which are an insignificant source of NOx emissions, with low emitting equipment such as fuel cells would negatively impact the reliability of a critical emergency backup device. Therefore, we request that the wastewater sector be excluded from this control measure.

BCM-05 Ammonia Emission Reductions from NOx Controls:

This control measure seeks to reduce ammonia emissions from NOx control systems such as the Selective Catalytic Reduction systems that we recently installed on our digester gas engines.

While we appreciate staff's verbal clarification during April 26, 2016 SCAP/SCAQMD meeting that this proposed control measure is only intended for large-scale projects and will not impact the NOx control systems that SCAP member agencies have recently installed or are in the process of installing for compliance with Rule 1110.2 such as those at OCSD, we again respectfully request that this clarification be memorialized in the AQMP. 101-5

We appreciate the opportunity to comment on the proposed Draft AQMP. If you have any questions or require further information, please contact Terry Ahn of my staff at 714-593-7082.

Sincerely,

Ron Coss
Laboratory, Monitoring and Compliance Manager

TA:RC:bg

cc: Dr. Philip Fine, SCAQMD

Responses to Comment Letter from Orange County Sanitation District (OCSD)
(Comment Letter #101)

Response to Comment 101-1:

Staff appreciates the comments on the Draft and Revised Plan as submitted by SCAP as well as their active participation as a member of the 2016 AQMP Advisory Group. With regard to fair share, the SCAQMD, CARB and U.S. EPA recognize the need for emission reductions from local, state and federal sources. As such, a fair share of reductions needs to take place. As reiterated previously, the percent NOx emission reductions needed to meet the 8-hour ozone standards by 2023 and 2031 at 45 and 55 percent, respectively, would be a guide to fair share apportionment although not a definitive endpoint. Stationary sources are already "well controlled." However, staff recognizes opportunities to transition to feasible cleaner technologies with commercially available, cost-effective equipment. In addition, incentives could assist in accelerating deployment of advanced technologies in some cases faster than a regulatory approach. It is important to recognize the responsibility of the SCAQMD to ensure attainment of the standards in a timely manner and the District's authority over the stationary sources that could assist in meeting those required deadlines.

Response to Comment 101-2:

Staff notes the commenter's information on the recently completed project and the demonstration tri-generation unit. Staff included the tri-generation project in CMB-01, as an example of technology that exists, not as a demonstration of cost-effectiveness. The purpose of the incentive program is to create opportunities and make it more cost-effective to replace equipment, transition to zero or near-zero technologies, encourage earlier change-out of higher-emitting equipment, and drive technology development and cost reductions. A working group will be formed to further discuss the challenges for specific sectors regarding biogas.

Response to Comment 101-3:

Please see Responses to Comments 54-3, 54-4, and 78-7 regarding wastewater treatment and biogas usage and Response to Comment 73-4 regarding technology assessments and ICEs.

Response to Comment 101-4:

Please see Responses to Comments 54-3, 54-4, and 78-7 regarding wastewater treatment and biogas.

Response to Comment 101-5:

Large scale projects typically have more emissions that can make improvements or add-on controls more cost-effective. However, small scale projects do not always lead to small emissions and there may be opportunities whereby small scale projects can cost effectively apply controls to further reduce emissions. Thus, the applicability of this control measure cannot exclude specific facilities or small scale projects at this point in time. Until such time where a rulemaking is conducted, a more extensive analysis of potential applicable sources will be identified and analyzed as to which types of sources could feasibly and cost effectively reduce emissions associated with a particular facility or size of project.

DRAFT FINAL 2016 AQMP

ADDENDUM TO THE COMMENTS AND RESPONSES TO COMMENTS ON THE 2016 AQMP

JANUARY 2017

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

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County of San Bernardino

EXECUTIVE OFFICER:

WAYNE NASTRI

Preface

Nine (9) comment letters and a number of "exhibits" were received on the Draft Final 2016 AQMP after January 3, 2017 when responses to all other comment letters were released to the public. These comment letters and exhibits are added as an addendum to the January 3, 2017 Responses to Comments along with staff responses to specific comments.

For some comments similar remarks have been previously made in previous comment letters, thus the response may indicate where the reader can locate the appropriate previous response(s). Modifications to the Plan and/or Appendices have been made in response to many of the comments previously submitted.

Comment Letter Number

AGENCY/ COMPANY	DATE	Comment Letter Number
Los Angeles County Business Federation (BizFed)	1/4/2017	102
Southern California Leadership Council (SCLC)	1/4/2017	103
Automobile Club of Southern California (AAA)	1/9/2017	104
Western States Petroleum Association (WSPA)	1/4/2017	105
California Interfaith Power & Light	1/6/2017	106
Public Solar Power Coalition (Harvey Eder)	1/4/2017– 1/24/2017	107
Truck and Engine Manufacturers Association (EMA)	1/24/2017	108
The Undersigned Organizations, including: Alliance of Automobile Manufacturers, American Trucking Associations (ATA), California Business Properties Association, California Class I Railroads, California Small Business Alliance (CSBA), Construction Industry Air Quality Association (CIAQA), FuturePorts, International Warehouse Logistics Association (IWLA), Los Angeles Area Chamber Of Commerce, Los Angeles County Business Federation (BizFed), Maersk Line, NAIOP Inland Empire, NAIOP SoCal, Pacific Merchant Shipping Association (PMSA), San Gabriel Valley Economic Partnership, and Truck & Engine Manufacturers Association (EMA)	1/23/2017	109
National Fuel Cell Research Center (NFCRC)	1/18/2017	110
Santa Clarita Valley Economic Development Corporation (SCVEDC)	1/25/2017	111

Comment Letter from Los Angeles County Business Federation (BizFed)
(Comment Letter #102)

Los Angeles County Business Federation
Strengthening the Voice of Business

January 4, 2017

Mr. Wayne Nastri
Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: ***BizFed Comments on the Final Draft Air Quality Management Plan***

Dear Mr. Nastri:

We are writing on behalf of the Los Angeles County Business Federation (BizFed) - a grassroots alliance of more than 160 top business groups representing 325,000 employers with 3 million employees throughout Los Angeles County. Our members include large and small employers, minority business owners, and job creators from a wide range of industries.

We appreciate the opportunity that the South Coast Air Quality Management District ("AQMD" or "District") has given us to participate in the development of the Air Quality Management Plan ("AQMP"). BizFed members have engaged your staff on numerous technical issues through the AQMP Advisory Group and formally submitted comments. Now that the District has released its Final Draft AQMP, we take this opportunity to again comment on several of our major outstanding concerns.

1. The Draft Socioeconomic Report does not accurately depict how the AQMP costs would apply to the regional economy. 102-1

The Draft Socioeconomic Report suggests:

"Over 90 percent or $14.6 billion of the 2016 AQMP's total incremental cost is attributed to publicly funded incentive programs that eligible industries and consumers can use to offset the cost of purchasing cleaner technologies."

But as shown in the Draft Incentive Funding Plan, this funding would not come from existing public sources. Rather, the AQMD Staff are proposing to raise this $14.6 billion (which is not a complete figure, see below) from consumers and employers in the form of new property taxes, sales taxes, fuel taxes, vehicle registration fees, cargo container fees, and vehicle mileage fees. Such taxes and fees could have significant impacts to the regional economy and particularly on consumers and employers in key manufacturing sectors. The placement of these cost burdens has not been fully accounted in the Socioeconomic Report.

6055 E. Washington Blvd., #260 Commerce, California T: 323.889.4340 F: 213.652.1802 www.bizfed.org

2. The Draft Socioeconomic Report does not present a complete assessment of the AQMP's costs to the regional economy. The socioeconomic analysis and the incentive funding plan should be revised.

The Draft Socioeconomic Report states that implementation of the Revised Draft AQMP would result in nearly $16 billion of incremental costs.[ii] But that does not include costs for the proposed light-duty vehicle measures which are a key part of the strategy. The actual cost (using staff's figures) would appear to be closer to $40 billion.[iii]

The light-duty control measure ("Further Deployment for Cleaner Technologies, On-Road Light Duty") is proposed to reduce emissions through early penetration of the zero and near-zero vehicle technologies established under the ZEV regulation. CARB and AQMD Staff have estimated that approximately 500,000 to 600,000 of the oldest passenger cars and trucks would need to be turned over to model year vehicles meeting the currently applicable LEV III emission standard or advanced hybrid or zero-emission technology by 2023 (i.e., within 6 years).[iv]

The scale of this measure would completely alter the transportation sector, yet the Draft Socioeconomic Report has chosen to selectively exclude these costs. It also excludes any of the infrastructure costs (e.g., fuels supply chain costs, electricity infrastructure costs) that such a transformation would involve.

102-2

The Preliminary Draft version of the report presented a cost estimate for the measures that totaled $22 billion, of which $11.5 billion would require incentives.[v] Staff's has stated that these are co-benefits because they are CARB measures but according to CARB, these light-duty measures and associated costs are directly related to the AQMP:

> ***"This proposed measure is designed to achieve further emission reductions for South Coast attainment in 2023 and 2031 through a suite of additional actions****, including early penetration of zero and near-zero technologies, and emission benefits associated with increased transportation efficiencies, as well as the potential for autonomous vehicles and advanced transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both ARB and the South Coast. These actions reflect an initial assessment of a pathway, recognizing that as funding is allocated and advanced technologies further develop, the balance amongst approaches will necessarily adjust."* [vi]

The AQMD's socioeconomic analysis needs to be revised to include the full assessment of the AQMP's costs including the light-duty vehicle measures. And the Draft Incentive Funding Plan should address from where an additional $11.5 billion of incentives for light-duty would come.

3. We remain very concerned that proposed CMB-05 has been inadequately considered.

As noted by industry stakeholders representing most of the employers covered by the RECLAIM program, we are deeply concerned about CMB-05. In control measure CMB-05, staff has proposed a reduction target of 5 tpd from the NOx RECLAIM program by 2031. The presented reason for this measure is to address "issues that arose during recent NOx RECLAIM amendments."[vii] However, all of those presented issues were already addressed by the December 2015 and October 2016 amendments to the program. In the Final Draft AQMP, staff now suggests that the program could be sunset, but have provided no evidence that a program sunset could yield SIP-creditable reductions. The 275 facilities in the program have many thousands of permitted equipment, and a reversion to command-and-control regulation would not be without innumerable complications.

102-3

Given the substantial NO_x emission reductions already achieved by the RECLAIM program (i.e., over 70% since 1994), and the very large pending reductions (i.e., another 45%) demanded under the latest amendments (i.e., December 2015 and October 2016 amendments), we are very concerned that proposed CMB-05 cost burdens could damage the regional economy. We strongly recommend this measure be subjected to further Working Group analysis to address the complicated legal and economic issues of a proposed program sunset before making any such commitments. Given the speculation concerning what technology may be ten years from now, we again recommend any emission reduction target for CMB-05 should be presented as a range (e.g., 3-5 tpd).

102-3 Con't

4. The proposed measures denominated as MOB-1 through MOB-4 and MOB-8 would harm goods movement and the industries related thereto, and should be entirely reconsidered.

Our organizations continue to oppose the proposed control measures denominated as MOB-1 through 4 and MOB-8. Efficient and economical goods movement is essential to the region's overall economy, especially given that our region is home to the busiest and most important ports in the nation. Emissions related to goods movement should be addressed without undue local disruption through both fleet change incentives and reasonably paced technological changes, such as the affordable, appropriately progressive adoption of fuel and engine-type changes, which can most sensibly be achieved through standards for new vehicles. To the extent that the above-referenced MOB measures impose emissions caps on goods movement facilities and place economic limitations on the dynamic goods movement system, they should be rejected.

102-4

5. The District should reconsider and recast all measures that are proposed without quantified air quality benefits.

The Draft AQMP discusses various measures for which no air quality benefits are quantified, referred to as "to-be-determined" or "TBD" measures. A broad reading of the Draft AQMP suggests that the AQMD's implementation should be able to meet the federally imposed air quality standards even if all such TBD measures were to be forgone. Accordingly, our organizations urge the District to either forgo all such TBD measures in the AQMP, or incorporate only those for which both the costs and benefits of the measures can be identified and vetted publicly before they are included. Importantly, no meaningful socio-economic analyses can possibly be performed if there are no quantified air quality benefits from the measures at issue. Therefore, to the extent that the merits of such measures cannot be reasonably proven in the current AQMP process, such measures should be identified only as possible areas of future study and consideration.

102-5

6. The Draft Socioeconomic Report presents costs for the stationary source measures which are significantly lower than prior Staff analysis without adequate foundation.

The Amortized Annual Average costs (2017-2031) for all AQMD Stationary Source Measures has dropped significantly, from $402.6 million[1] to $254.6 million[2]. This is a reduction of $148 million per year (i.e., 37%). Although this would seem to be welcome news, there is inadequate explanation of the change. AQMD Staff provided the following explanation of this reduction for NOx reduction control measures at the AQMP Advisory Group meeting:[3]

102-6

- "More NOx emission reductions for CMB-01 & CMB-02 in 2031.

[1] AQMD, Draft Socioeconomic Report, Table 2-1, August 2016.
[2] AQMD, Draft Socioeconomic Report, Table 2-1, November 2016
[3] AQMP Advisory Group meeting, December 14, 2016.

- Different portfolios of technologies and equipment
- Incremental Cost in Lieu of Total Cost (CMB-02, CMB-04, ECC-03)"

However, the only added NOx emission reductions[4] were in CMB-01, and the Amortized Annual Average costs actually increased, from $34.8 million (August SE Report) to $89.8 million (November SE Report). This is an increase of $55 million per year.

CMB-02 NOx emission reductions did not change from the August Report to the November Report[5]. Yet the Amortized Annual Average costs decreased, from $99.0 million (August Socioeconomic Report) to $51.6 million (November Socioeconomic Report). This is a decrease of $47.4 million per year.

Likewise, for CMB-04[6] and ECC-03[7] there was no change in NOx emission reductions, and yet substantial reductions in Amortized Annual Average costs, of 74% and 63% respectively.

We are only left with the explanations of "Different portfolios of technologies and equipment," and "Incremental Cost in Lieu of Total Cost." However, without further details, the significant changes in control measure costs are concerning. Changes in the costs of Control Measures must be adequately explained as part of the public process.

102-6 Con't

7. The economic analysis for the Advanced Clean Cars 2 Measure is based on assumptions without precedent. The analysis should be revised to reflect a more supportable basis.

The AQMD's claim of negative costs (i.e. economic savings) for the Advanced Clean Cars 2 measure concept depends in large part upon an assumption that costs for ZEV or PHEV will rapidly decline. But there is no historical precedent for this critical assumption and, in fact, CARB's Mobile Source Strategy economic analysis says:[8]

> "During implementation of the Advanced Clean Cars 2 measure concept, the incremental price of a ZEV or PHEV is expected to rapidly decline, but may remain higher than a conventional vehicle for a few years after 2025. However, when considering the cost savings from the offset of gasoline consumption in a conventional vehicle, and the lower average operating cost of plug-in electric vehicles operating on electricity, the period when operating cost savings compensate for higher purchase costs may be short and may also be dependent on other factors. Although ARB is evaluating current advanced vehicle incremental costs as part of the Mid-term Review (MTR), previous cost estimates are used for this analysis until the MTR staff analysis is complete." (Page A-8)

102-7

If this assumption is not borne out, the costs of the state SIP and this AQMP would be significantly greater than have been presented. We recommend that until CARB's Mid-term Review is completed and there has been time for public analysis and comment, AQMD should not be relying upon such an unprecedented assumption.

8. As we look towards the Governing Board's February consideration of the AQMP, we await AQMD Staff's release of completed analyses for stakeholder review and comment.

102-8

As previously noted by members of the AQMP Advisory Group, the staff has released the AQMP products in a manner which has made stakeholder review and comment extremely challenging. As one example, the comment period on the Draft Socioeconomic Report just ended on 19 December, but that document was based on the Revised Draft version of the AQMP (released 7 October) which has since been superseded by the Final Draft AQMP (released 5 December). Thus, stakeholders have not even seen a socioeconomic

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[4] AQMD, See strike thru version of November Socioeconomic Report, page IV-A-23
[5] See strike thru version of November Socioeconomic Report, page IV-A-47
[6] See strike thru version of November Socioeconomic Report, page IV-A-64
[7] See strike thru version of November Socioeconomic Report, page IV-A-73
8 CARB, Mobile Source Strategy, Appendix A: Economic Analysis, May 17, 2016.

analysis of the latest AQMP control strategy, and the socioeconomic report does not reflect the Incentive Funding Plan (released 16 December) which proposes to impose billions of new taxes and fees onto the economy.

Another important example is the pending revisions to the proposed State SIP Strategy by the California Air Resources Board (CARB) staff. Most of this AQMP's emission reductions are associated with mobile sources covered by State SIP Strategy. CARB staff was expected to release that revision in late December, with public comments to be made in January. That CARB strategy isn't scheduled for Board consideration until March 2017.

102-8 Con't

Due to the non-sequential release of these analyses and the inconsistent technical bases, stakeholders have simply not had the opportunity to fully review this complex policy proposal. Thus, we reserve the right to continue providing additional comments and to work with Staff toward the completion of the AQMP analyses to support the Governing Board's consideration at the February Governing Board meeting.

In closing, the business community represented by BizFed believes these issues present significant risks and challenges which have not been fully addressed in the AQMP products. We remain committed to working with AQMD staff and Governing Board members to ensure the plan fulfills its legal requirements while also protecting and promoting job creation and economic success for Southern California.

Sincerely,



Mike Lewis
BizFed Chair
CIAQC



David Fleming
BizFed Founding Chair



Tracy Hernandez
BizFed Founding CEO
IMPOWER, Inc.

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[i] AQMD, Draft Socioeconomic Report, page ES-3.

[ii] AQMD, Draft Socioeconomic Report, page ES-6.

[iii] AQMD, Preliminary Draft Socioeconomic Report, page 23.

[iv] AQMD, Final Draft AQMP, Table 4-5 and Appendix IV-B, Table 3.

[v] AQMD Preliminary Draft Socioeconomic Report, Table 2-1, Present Worth Value of Total Incremented Cost.

[vi] CARB, Mobile Source Strategy, May 2016, See description of "Further Deployment of Cleaner Technologies: On-Road Light-Duty Vehicles" found on page 74.

[vii] AQMD, Final Draft 2016 AQMP, Appendix IV-A, p. IV-A-69.

Responses to Comment Letter from Los Angeles County Business Federation (Comment Letter #102)

Response to Comment 102-1:

Staff appreciates comments on the Revised Draft 2016 AQMP and continued participation in the AQMP development process.

In Chapter 4 of the Draft Final Socioeconomic Report, staff evaluated the job impacts of two alternative scenarios with respect to funding of the incentive programs proposed in the Draft Final 2016 AQMP. The scenarios were chosen for economic impact evaluation not because they would be the most likely, but because they would represent extreme cases which provide the upper and lower bounds of the analysis of projected job impacts.

On one end of the spectrum, staff considered the case where all incentives would be funded by directly reallocating funds from existing state programs within the four-county region to be used for the proposed incentive programs. This scenario is expected to have the largest negative job impact because state government functions and operations exhibit some of the largest employment multipliers according to the REMI model of the regional economy. The large employment multiplier results from the fact that the government sector itself and the sectors to which a large portion of government spending goes to (e.g., construction or healthcare and social assistance) are relatively labor intensive. Therefore, a budget reduction of the existing public programs and services tends to have a greater negative regional job impact than do other fiscal mechanisms, such as levying new taxes on regional residents or introducing new fees for business operations.

In a scenario where incentives are instead financed by new taxes, the resulting decrease in household spending would not be concentrated in labor intensive industries. In addition, a proportion of that spending decrease would impact not only businesses inside the four-county region but also businesses located outside the region (i.e., greater leakage), thereby causing some of the potential negative job impacts from spending decreases to occur outside of this region. Similarly, increases in business operation costs through the introduction of new operation-related fees would affect a variety of industry sectors, but they are less likely to be as labor-intensive as those affected by a state budget reallocation. Moreover, certain fee structures, such as cargo handling fees on containers, would largely affect businesses located outside the region and may or may not indirectly affect their upstream suppliers within the region.

On the other end of the spectrum, staff considered the case where all the incentive programs would be funded from sources outside the region and would therefore have a negligible impact on individuals and businesses within region. This case would then represent the lowest impact funding scenario, an example of which is the scenario where the proposed incentive programs would be fully funded by existing federal revenue sources.

The Draft Financial Incentives Funding Action Plan for the Draft Final 2016 AQMP provides information on all potential funding opportunities. However, a systematic assessment of these opportunities through the public process is necessary to determine the most likely scenarios. It is therefore premature to examine the socioeconomic impacts of the most likely scenarios. Staff will conduct economic impact evaluations as the most likely scenarios are identified through the public working group process.

Response to Comment 102-2:

As stated in the preface of Chapter 2 in the November 19, 2016 version of the Draft Socioeconomic Report, the proposed mobile source measure "Further Deployment for Cleaner Technologies: On-Road Light-Duty Vehicles" is primarily designed to reduce greenhouse gas emissions and therefore it is recognized as providing the co-benefit of NOx and VOC reductions that are expected to be implemented even if the Draft Final 2016 AQMP is not adopted. Their costs are therefore not a result of the Draft Final AQMP and are not included in the socioeconomic assessment of the Draft Final 2016 AQMP.

Moreover, according to CARB's economic impact analysis of the state's mobile source strategy, there would be minimal direct costs on program participants from 2017, and at minimum, to 2023. This is because a large portion of the capital costs related to purchasing cleaner vehicles were assumed to be financed by incentive programs during the same period. Incremental costs of capital spending are expected only from 2023 to 2031, when incentives were conservatively assumed to be unavailable in CARB's economic modeling (pages A-9 to A-10; the analysis is available at https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc_appA.pdf).

However, it should be noted that, first, the purchase of cleaner light-duty vehicles will be voluntary and program participants are not expected to make the purchase unless it is economically advantageous to do so. Second, the additional cost estimated by CARB and subsequently analyzed in the Preliminary Draft Socioeconomic Report did not take into account cost-savings, including fuel and operating and maintenance savings for the entire period of 2017 to 2031. As a result, even if the net incremental costs of this measure would have been included in the analysis, they are expected to be significantly lower than the preliminary cost estimate and may result in overall net cost-savings. Whether this "Further Deployment" measure for on-road light-duty vehicles would result in net costs or cost-savings, those cost impacts are expected to occur even if the Draft Final 2016 AQMP is not adopted and therefore they are not a result of implementing the Draft Final 2016 AQMP.

Response to Comment 102-3:

Staff acknowledges the success of the RECLAIM program and its resultant emission reductions since its inception. Under the State law, the SCAQMD is required to conduct periodic BARCT assessments as pollution control technologies advance over time. Under the proposed control measure, the BARCT re-assessment would occur for the future and beyond the recent 2015 amendments to the program. Potential technologies that were identified in the December 2015 amendments would have further matured and based on past amendments, the control measure's emission reduction target of 5 tpd from the NOx RECLAIM program by 2031 is reasonable. This control measure also proposes a serious consideration for an orderly sunsetting of the RECLAIM program in order to create more regulatory certainty, reduce compliance burdens for facilities, and achieve more SIP-creditable emission reductions.

The Draft Final control measure CMB-05 states that a RECLAIM working group will be convened in the spring of 2017 to assess various aspects of the program, including a potential orderly transition to a command and control regulatory structure and possible overlays of command and control with cap and trade for some facilities. Socioeconomic analysis will be performed at the time of rule development. Also, see Response to Comment 26-13 regarding a range of potential emission reductions.

Response to Comment 102-4:

The SCAQMD staff acknowledges the concerns that Measures MOB-01 through MOB-04 and MOB-08 may cause a competitive disadvantage to the industry. It is the primary intent of the measures to work

collaboratively with affected stakeholders and the public to identify actions that will not be disruptive to the industry. MOB-01 through MOB-04 are proposed to help meet the State SIP Strategy "Further Deployment of Cleaner Technologies" measures emission reductions. The measures seek to work collaboratively with affected stakeholders and the public to identify actions that could help achieve the State SIP Strategy emission reductions. A working group will be created to help implement the measures.

MOB-08 discusses an approach to identify actions that can be quantified and SIP creditable. The measures include language to develop enforceable mechanisms such as a Surplus Off-Road Opt-In for NOx (SOON)-like rule for on-road trucks or expansion of existing fleet rules to private fleets if voluntary actions are not sufficient. Expansion of the fleet rules to private fleets would require U.S. EPA to grant a waiver under the Clean Air Act.

While staff appreciates the comment regarding new fuel and engine emissions standards, new engine emissions standards apply to new purchases of vehicles, but does not in themselves accelerate the turnover of older vehicles. As such, there is a need to identify actions whether they be voluntary or regulatory in nature, to help accelerate this turnover.

Also, see Response to Comment 23-5.

Response to Comment 102-5:

As noted in the Revised Draft 2016 AQMP, the "TBD" (to be determined) measures require further technical and feasibility evaluations and the attainment demonstration is not dependent on these measures. However, they are included in the AQMP as part of a comprehensive plan with all feasible measures in case there is a possible need for additional measures due to a shortfall in reductions. As emission reductions are realized and to the extent that the reductions can be SIP creditable, the reductions will be taken as part of future rate-of-progress reporting or as part of future AQMP revisions. Socieoeconomic analyses will be performed when these measures can be further evaluated with technicality and feasibility assessments, along with quantified emission reductions.

For the SCAQMD TBD mobile source measures, emission reductions are accounted for under the CARB SIP Strategy so emission reductions are not listed to avoid overlap. These emission reductions will take place locally and will be determined when the programs, such as facility-based measures, are implemented.

Response to Comment 102-6:

Please refer to Appendix 2-A Pages A-7 to A-13 of the Draft Final Socioeconomic Report for the selection of different portfolios of technologies and equipment, and the assumptions used for those revisions. Previously, for ECC-03, CMB-02, and CMB-04, the cost estimates included the total cost of equipment and installation, whereas the revised cost estimates now reflect the incremental cost. Incremental cost was calculated as the difference between purchasing and operating a lower-emitting unit and a conventional unit and, when applicable, this difference was augmented by a factor to account for potentially accelerated equipment turnover.

Response to Comment 102-7:

Regarding the Advanced Clean Cars (ACC) mobile measure proposed by CARB, the economic analysis did not—as incorrectly claimed by the Commenter—assume that costs for ZEV or PHEV would rapidly decline over time; instead, fixed vehicle costs were conservatively assumed in the analysis. (For more cost

information and assumptions, please refer to page 2-A-34 of Appendix to the November 2016 version of the Draft Socioeconomic Report, available at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/draft/DraftSocioRpt_111816.pdf, and page A-44 of the May 2016 version of Appendix A (Economic Impact Analysis) of the Mobile Source Strategy, available at https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc_appA.pdf.)

As the proposed ACC measure is expected to begin implementation in 2026, the expected lifetime of the clean vehicles that would come online as a result of this measure would very likely extend well beyond the attainment year 2031. SCAQMD staff's analysis accounted for cost and cost-savings during the entire equipment life, even if the end of equipment life is beyond 2031. By doing so, the overall cost of the proposed ACC measure was estimated at an amortized average annual savings of $90.8 million. The estimated cost-savings is not a result of any assumption regarding projected vehicle costs, but rather as a result of reduced operation, maintenance and fuel costs (electricity and hydrogen versus gasoline).

The analysis was based on the best available data of the expected vehicle cost and costs of operation and maintenance including fuel cost at the time of cost development. The cost assumptions are the standard assumption used by ARB, and they have been used in the State Implementation Plan, Mobile Source Strategy, and the Scoping Plan. The Mid-term Review document referenced in the comment letter has not yet been released and CARB staff does not expect a major update on cost assumptions.

Response to Comment 102-8:

The Preliminary Draft Socioeconomic Report was released on August 31, 2016 with a comment period of 60 days. The preliminary draft covered the estimates for costs and benefits of the Draft AQMP and were released earlier to maximize the review time for the public and stakeholders. The Draft Socioeconomic Report was released on November 19, 2016, with an additional public review and comment period of 30 days that ended on December 19, 2016.

As for the claim that the Revised Draft AQMP and the Socioeconomic Report are not complete, the complete Draft Final AQMP documents were released in December 2016 for public review. There were minor revisions to the October 2016 version, for which socioeconomic analyses have been updated. The Draft Final Socioeconomic Report does reflect the Draft Final AQMP. Staff believes that there is sufficient time to comment on the revisions prior to the SCAQMD Governing Board's consideration of the 2016 AQMP in February 2017.

The Financial Incentive Funding Action Plan provides information on all potential funding opportunities. However, a systematic assessment of these opportunities through the public process is necessary to determine the most likely scenarios. It is therefore premature to examine the socioeconomic impacts of a specific scenario. Staff will conduct further economic impact evaluations as the most likely scenarios emerge through the public working group process.

While there were overlapping releases of the AQMP and supporting documents to maximize transparency and time for review, the draft final analyses are consistent.

Comment Letter from Southern California Leadership Council (SCLC)
(Comment Letter #103)

SOUTHERN CALIFORNIA LEADERSHIP COUNCIL

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Maureen Stapleton
Todd Stevens
Tim Ward
Steve Williams
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President

Richard Lambros
Managing Director

January 4, 2017

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 92765

Re: Comments Concerning the South Coast Air Quality Management District's Final 2016 Draft Air Quality Management Plan.

Dear Dr. Fine,

On behalf of the Southern California Leadership Council ("SCLC") and the undersigned group of partner organizations, we thank you for the opportunity to review and comment on the final draft of the 2016 Air Quality Management Plan (the "Draft AQMP"). Our group is comprised of leading Southern California business and industry organizations.

Each of our organizations appreciates the assistance provided by, and the hard work of, the staff of the South Coast Air Quality Management District (the "District") in the many months leading up to the final Draft AQMP. As we restate and amplify the issues set forth below, we look forward to additional helpful discussions with the District's staff. 103-1

Our organizations are particularly focused on assuring that the District will continue the region's historic progress toward safer air quality, while avoiding any and all unnecessary negative economic and societal impacts. In particular, we share the District's aim for air quality that is cleaner yet; but we do so in light of the ongoing need to assure that there will be full employment and sufficient housing for the District's growing population. With that in mind, we recognize the District's attempts to provide economic analyses, including an evaluation of the AQMP's impact on jobs and job creation. We regret the fact, however, that the District's analysis to date remains incomplete and is dismissive of many of the legitimate concerns that have been brought forward to date. Our groups will continue to work with the District and other stakeholders to assure that sound science and strong economic analyses are met with equally sound regulatory policies as we pursue our shared aims.

Given this backdrop, we respectfully submit the following comments for your consideration:

I. The final Draft AQMP includes incentive-based emissions reduction programs that are incomplete and without a clearly defined funding source. d.

In our comments that were lodged in response to previous drafts of the AQMP, SCLC and like-minded organizations applauded the District staff's then-proposed reliance on the use of financial incentives to accelerate the penetration of, for example, zero-emission and near-zero emission technologies, and to further reduce emissions from other mobile and stationary control measures. Indeed, our organizations generally favor incentive based programs over the far less flexible and more imposing command and control regulations.

Our earlier comments focused on the ongoing uncertainty about means by which the District may secure such funding for incentive-based programs. Specifically, we emphasized that the chosen means of generating revenue to support incentive programs should be fairly imposed on a broad base of the affected society, consistent with the broadly-shared societal benefits of the District's efforts to further improve air quality. For example, we have particularly emphasized that the new development and redevelopment that will take place within the District's jurisdiction should not be disproportionately targeted and burdened as sources of revenue for incentives programs.

103-1 Con't

We remain disappointed that (i) the final version of the Draft AQMP reflects a lack of information concerning the sources of funding for the promised incentive based programs, and (ii) the Draft AQMP still suggests that the District may impose unduly burdensome and excessive exactions on the activities that are most vital to our economy – vital industries and commerce, community development and redevelopment. We continue to urge the District to recognize that incentive-based approaches show the greatest promise as the means to foster and accelerate the acceptance of beneficial fleet and fuel changes in the mobile source context across the District and region.

Our organizations believe that steady changes in mobile sources, achieved over the lengths of time will avoid undue economic dislocation and the stranding of investments, constitute the best path by which to achieve further air quality improvements. Presently, it remains unclear whether the District intends to more radically accelerate fleet and fuel change by imposing crushing exactions on unduly narrow segments of the economy. To the extent that such a potential remains, we respectfully wish to see that potential negated. The District's use of incentive-based approaches in the mobile source context will be wise in the end only if it is tempered with both realistic timelines for change and evolving consumer acceptance, as well as fair, moderate and broad-based funding mechanisms for such programs.

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II. The District must recognize the primacy of local governmental control over land use decisions, and must avoid imposing any indirect source controls that could stultify development and redevelopment and thus harm the region's economy.

The Draft AQMP continues to reflect a vague, "to be determined" measure labeled as EGM-01, which holds forth the prospect of an indirect source regulation affecting land use. The stated purpose of this measure is to mitigate and reduce emissions from new development and redevelopment projects. Although the eventual definition of EGM-01 remains uncertain; the District's responses to earlier comments continue to imply the potential for the imposition of new fees on development and redevelopment throughout the District, perhaps in ways similar to Rule 9510 adopted by the San Joaquin Valley Air Pollution Control District.

Our organizations remain extremely concerned about any prospects of such new impositions on new development and redevelopment in the region. Our concerns fall within three categories. First, we are opposed to new fees impacting development and redevelopment which may conflict with or be imposed in addition to the already highly excessive costs and exactions imposed by the California Environmental Quality Act, or may add still more to the procedural burdens currently associated with land use approvals.

103-2

Second, as noted above, we oppose all proposed solutions that would impose disproportionate burdens on new development and redevelopment in comparison to the impositions on all citizens shared more broadly and concurrently with one another. We would view disproportionate burdens on new development and redevelopment as economically unreasonable, as well as potentially being unconstitutional (i.e., a so-called "regulatory taking").

Third, our organizations continue to champion the primacy of local governments' decision-making powers concerning questions of land use and development – consistent with democratic principles and the fact that development invariably unfolds in response to popular demand that arises organically and generally in reaction to countless influences and growing populations. We are increasingly concerned, therefore, that unduly constrictive projections about overall transportation demand and aggregate vehicle miles traveled will eventually collide with existing local governments' prerogatives concerning land use approvals. This potential collision of imperatives deserves much more public scrutiny, debate and enlightened understanding than the District and the various agencies with which it interacts (CARB, EPA and SCAG) have provided to date.

Because EMG-01 is undefined as set forth in the Draft AQMP, and because it hints at the prospect of a new land use approval regime, our organizations look forward to participating in further discussions with the District to make sure that the District's clean air goals do not unduly impeded sensible, locally-based land use prerogatives. Especially, the District must avoid both (i) undermining the prerogatives that local governments continue to enjoy under the SB 375 regime, and (ii) imposing heavy exactions that would have the same effect. In addition, the District will

need to be strictly mindful of the limitations of its enabling statutes if and whenever it were ever to bring forward any proposal affecting local land use prerogatives. 103-2 Con't

III. The proposed measures denominated as MOB-1 through MOB-4 and MOB-8 would harm goods movement and the industries related thereto, and should be entirely reconsidered.

Our organizations continue to oppose the proposed control measures denominated as MOB-1 through 4 and MOB-8. Efficient and economical goods movement is essential to the region's overall economy, especially given that our region is home to the busiest and most important ports in the nation. Emissions related to goods movement should be addressed gradually and without undue local disruption through both fleet change incentives and reasonably paced technological changes, such as the affordable, appropriately gradual adoption of fuel and engine-type changes, which can most sensibly be achieved through standards for new vehicles. To the extent that the above-referenced MOB measures might be read to invite arbitrary caps on goods movement facilities and limitations on diffuse and dynamic goods movement activities, we continue to urge their rejection. 103-3

IV. The District should reconsider and recast all measures that are proposed without quantified air quality benefits.

The final Draft AQMP continues to discuss various measures for which no air quality benefits are quantified, referred to as "to-be-determined" or "TBD" measures. A broad reading of the final Draft AQMP suggests that the AQMD's implementation should be able to meet the federally imposed air quality standards even if all such TBD measures were to be forgone. Accordingly, our organizations urge the District to either forgo all such TBD measures in the AQMP, or incorporate only those for which both the costs and benefits of the measures can be identified and vetted publicly before they are included. Importantly, meaningful socio-economic analyses becomes impossible if and to the extent that TBD measures infiltrate the AQMP. Therefore, to the extent that the merits of such measures cannot be reasonably defined, demonstrated and quantified in the current AQMP process, such measures should be identified only as possible areas of future study and consideration. 103-4

V. Our organizations urge the District to forgo CMB-05, which as proposed, would make further adjustments to the RECLAIM program outside of the recently completed, arduous process for updating the program.

The final Draft AQMP continues to suggest that the District may consider the eventual abandonment of the RECLAIM program. We oppose any such abandonment. We also note that the Draft AQMP includes a measure (CMB-05) that proposes to make a downward adjustment in permissible NOx emissions under the RECLAIM program applicable to stationary sources. 103-5

Less than a year ago, the RECLAIM program was updated through a process that was, as is typical, robustly attended by all constituencies, and at which large volumes of detailed evidence were provided. The recent program updates reflect a remarkable degree of voluntary concessions,

stakeholder engagement and broad-based agreement. In light of this, we believe that the AQMP process is not the proper vehicle through which to make any lurching changes or existential threats to the RECLAIM program, given that the District, its committees and Board, and all constituents are necessarily now focused on a much broader range of issues. Accordingly, we continue to urge the District to remove CMB-05 as a measure, and rely instead on the discrete, robust process for future adjustments to the RECLAIM program. 103-5 Con't

VI. The District needs to take a more robust posture against overly burdensome and unachievable federal and state air quality mandates.

Our organizations recognize that the District is legally responsible for taking action to meet goals and stay within parameters mandated by state and federal law, particularly by the U.S. Environmental Protection Agency and the California Air Resources Board. Indeed, the District has long been tasked with trying to achieve increasingly stringent federal standards that are imposed disparately on our highly populous and economically important South Coast region.

But the fact that the District is subject to paramount state and federal law does not relieve the District from its thus far unmet obligation to advocate firmly and successfully for reasonable moderation from these higher levels of government. The District must recognize and respond to the fact that the interests of the citizens who reside in the District are threatened by impossible-to-meet and crushing mandates from these state and federal regulatory institutions.

SCLC and its partner organizations continue to urge the District to take a more clear-headed and circumspect stance vis-à-vis the increasingly difficult state and federal targets and mandates that the District is being asked to meet. Many of the most recent federally imposed criteria air pollution standards are based on scientific (health) justifications that are arguable at best and do not take into account the tremendous strides in air quality that have already been achieved by the District. Moreover, air quality standards and timelines are imposed and expected to be met without any regard for non-anthropogenic, natural background loads and the practical realities of our air basin's unique topography and vast economy. Respectfully, the District should identify, investigate and tackle such issues with an eye toward the unique challenges that we face in the region as a growing population and vitally important economy, and effectively challenge the promulgating agencies. 103-6

Our South Coast region has already seen tremendous improvements in air quality in recent decades, but not without very serious economic costs. Achieving still cleaner air quality is reasonably possible only through careful, measured, sensible steps undertaken with great care concerning the economic consequences. Our region's economy will be crippled if the District dutifully implements aggressive and uncritical state and federal mandates, knowing that they will force rapid and extensive transformation on industries that are unable to accommodate such change. When warranted, the District must be willing to push back persuasively against unrealistic state and federal mandates, and work to identify and secure more reasonable and achievable pathways and timelines for reaching the targets that are established.

VII. Conclusion

Once again, we wish to applaud the District and its staff for their efforts concerning the AQMP. We hope that the final AQMP will reflect the District's respect for and appreciation of the concerns we have articulated in this letter. We thank you for your consideration of these comments, and for your ongoing work with us and all stakeholders.

Respectfully submitted,

Richard Lambros
Managing Director
SCLC SOUTHERN CALIFORNIA LEADERSHIP COUNCIL

Mike Lewis
Senior Vice-President
CIAQC

Wes May
Executive Director

Paul Granillo
President & CEO
IE INLAND EMPIRE ECONOMIC PARTNERSHIP

Peter Herzog
Assistant Director of Legislative Affairs
NAIOP COMMERCIAL REAL ESTATE DEVELOPMENT ASSOCIATION LOCAL CHAPTER

Rob Evans
Executive Director
NAIOP COMMERCIAL REAL ESTATE DEVELOPMENT ASSOCIATION INLAND EMPIRE CHAPTER

Bryan Starr
Sr. Vice President, Government Affairs
ORANGE COUNTY BUSINESS COUNCIL

Clayton Miller
Executive Vice President
SCCA

Responses to Comment Letter from Southern California Leadership Council (SCLC)
(Comment Letter #103)

Response to Comment 103-1:

The Draft Financial Incentives Funding Action plan was prepared as a companion document to the 2016 AQMP (http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draftfinancialincentivefunddec2016.pdf?sfvrsn=6), which maps out the possible opportunities to ensure the proposals will secure funding. Such funding is being sought at federal, state and local levels. The list of potential funding opportunities is listed in Table ES-1 of the Funding Action Plan. The list of opportunities is not meant to be exhaustive, but sufficiently extensive to provide discussion on potential next steps to realize such funding. Some of the potential funding opportunities are quantified based on actual data and an assumed monetary level to generate the revenues shown in the table. These assumptions do not presume that if such opportunities are pursued that the revenue levels will be achieved after vetting through a public process, but rather serve as examples of the revenue levels that could be realized with the assumed level of implementation.

There are seven guiding principles proposed in the Draft Funding Action Plan that address the concerns regarding economic impact on the funding source and the recognition that existing funding should not be diverted to help meet the emission reductions in the 2016 AQMP.

Also, see Response to Comment 57-3.

Response to Comment 103-2:

SCAQMD staff appreciates the concerns expressed regarding land use, CEQA, relationship with SB 375, and equity. Your concerns will be discussed as part of the public process in implementing EGM-01. Also, see Response to Comment 93-3.

Response to Comment 103-3:

See Response to Comment 93-4 with regards to the proposed facility-based and fleet rule measures.

Response to Comment 103-4:

See Response to Comment 93-5 with regards to "TBD" measures.

Response to Comment 103-5:

See Responses to Comments 75-1 and 93-6 with regards to the RECLAIM control measure.

Response to Comment 103-6:

See Response to Comment 57-8 regarding challenging the promulgating agency as to the stringency of air quality standards and mandates.

Comment Letter from Automobile Club of Southern California (AAA)
(Comment Letter #104)

Automobile Club of Southern California AAA.com

January 9, 2017

Mr. Wayne Nastri
Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765
wnastri@aqmd.gov

Re: Draft Financial Incentives Funding Action Plan

Dear Mr. Nastri:

The Automobile Club of Southern California respectfully submits the following comments on the Draft Incentive Funding Action Plan released December 16, 2016. These comments are a follow-up to our November 29, 2016 letter, attached, on the Air Quality Management Plan (AQMP). We are writing now with specific concerns about the Draft Action Plan's funding options, which include imposing new or increased taxes or fees on passenger vehicles to pay for emissions reduction programs primarily for heavy-duty and off-road commercial vehicles and equipment. 104-1

Private passenger vehicle owners and operators already pay a disproportionate share of revenues for air quality programs compared to their contribution of NOx. The proposed plan would exacerbate the situation. A significant portion of SCAQMD ongoing revenues currently come from taxes and fees on passenger vehicles paid at the time of vehicle purchase and annual registration (See Tables III-1). Despite this, up to six out of the 17 potential increased funding sources identified in the Draft Action Plan involve additional taxes or fees on passenger vehicle owners (Table IV-1). In fact, just one option, increasing light-duty motor vehicle registration fees, could generate up to 24 percent of the $1 billion annual new revenues proposed for AQMP programs.

The Draft Action Plan's proposal to use motor vehicle fuel tax revenues is unrealistic and likely unconstitutional. Despite relatively high motorist taxes, fees, and other charges, roads in California are in poor condition and in need of additional resources. The Governor and legislative leaders are poised to increase gas and other motorist taxes and fees to pay for road repairs and other transportation efforts. Increasing them still further to provide more money for the AQMD is a political non-starter. In addition, Article XIX of the State Constitution limits the uses of motorist taxes and fees, including the gas tax. Eligible uses include "research, planning, construction, improvement, maintenance, and operation of public streets and highways." Off-road equipment and vehicles (e.g., leaf blowers, back-up generators, off-road construction equipment, ATV motor 104-2

bikes, etc.) that do not operate on "public streets and highways" would be entirely prohibited from receiving gas taxes paid by motorists. 104-2 Con't

The Auto Club supports effective efforts to reduce both criteria pollutant and greenhouse gas emissions, but motorists, with the cleanest vehicles, should not be required to pay for emissions from heavy-duty on- and off-road vehicles and equipment, the dirtiest vehicles. Owners and operators of such equipment should pay to clean them up, just has private passenger vehicle owners and operators have paid, and continue to pay, to substantially reduce emissions from light-duty vehicles. The Draft Action Plan should accurately and completely inventory the numerous taxes, fees, costs, and other charges that motorist now pay to reduce both criteria pollutant and greenhouse gas emissions, relative to other mobile sources, including on- and off-road heavy-duty vehicles and equipment. 104-3

The technical merits, feasibility, and effectiveness of the Draft Action Plan have not been fully vetted and analyzed by subject experts. Therefore, it is premature to adopt the plan as a mechanism to implement the AQMP. Approving the Draft Action Plan, as presented, at the same time as the proposed AQMP is essentially "putting the cart before the horse." The Draft Action Plan needs more input from subject area experts regarding its economic, legal, and political viability before it moves forward. 104-4

The Auto Club has a long history of supporting and participating in fair and effective strategies, including appropriate taxes and fees, to reduce motor vehicle emissions and improve air quality. But there must be a clear nexus between the payer and the problem that is being addressed or the beneficiaries of the use of funds paid. We first endorsed a 2-cent per gallon gas measure in 1923 and numerous fair, effective, and appropriate motorist taxes and fees since. But we oppose increasing or adding new motorist fees or taxes to support emission reduction programs primarily for commercial vehicles and equipment, thereby "shifting the burden" away from the primary polluters. 104-5

Moving forward, we hope to be part of the public-private partnership in advancing initiatives identified in the plan that will bring the Basin into conformity (See Page V-6) using fair and equitable funding options. Toward that end, we would like to offer our service and expertise on the Financial Incentives Funding Working Group. We look forward to helping the SCAQMD develop and approve a plan that can achieve air quality goals in a fair and equitable manner.

Thank your for this opportunity to provide the Auto Club's comments on the 2016 AQMP. Please call me at (714) 885-2325 or email me kim.marianne@aaa-calif.com if you have any questions.

Respectfully,

Marianne Kim
Senior Public Policy Analyst



Automobile Club of Southern California AAA.com

November 29, 2016

Mr. Wayne Nastri
Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765
wnastri@aqmd.gov

Re: Draft 2016 Air Quality Management Plan and Incentive Funding Action Plan

Dear Mr. Nastri:

The Automobile Club of Southern California is pleased to submit the following comments on the Draft 2016 Air Quality Management Plan (AQMP) and its accompanying Incentive Funding Action Plan. The Auto Club is submitting these comments because we are concerned that the South Coast Air Quality Management District (SCAQMD) is considering and may seek authority to increase light-duty vehicle registration fees in order to fund programs and subsidies designed to reduce emissions primarily from heavy-duty and off-road commercial vehicles and mobile off-road equipment.

Private passenger vehicles, including both light-duty automobiles and light-duty trucks, contributed about 17% of total nitrogen oxide (NOx) emissions from mobile sources in 2012, the baseline year for the AQMP. Reducing NOx emissions is a primary focus of the AQMP. Over the past few decades, there have been substantial reductions in light-duty vehicle emissions, including NOx. These reductions have been achieved because numerous vehicle and fuel requirements have been put in place over this time period, with costs borne by drivers when they purchase, fuel, and maintain their vehicles. And, the emissions reductions have been achieved despite a substantial increase in the total number of vehicles and total miles those vehicles are driven. This success has been one of the key ways air quality has been markedly improved in the South Coast Air Basin.

Heavy-duty and off-road commercial vehicles and mobile off-road equipment have yet to achieve similar emission reductions and now account for 83% of mobile source NOx emissions, even though there are far fewer of them than private passenger vehicles. Clearly, more needs to be done to reduce emissions from heavy-duty and off-road mobile sources. But it is inherently unfair and inappropriate to increase registration fees on the cleanest, light-duty vehicles, and the consumers who own and use them, to pay to clean-up the dirtiest mobile sources in the Basin.

The Auto Club, with 6.8 million members, has a long history of supporting and participating in fair and effective strategies to reduce motor vehicle emissions and improve air quality. Auto Club efforts over the years have included the following:

- Researching and providing consumer information about alternative-fuel and other green vehicles.
- Supporting fuel conservation and air quality programs, including carpooling and public transit.
- Supporting more ambitious fuel economy standards for auto manufacturers.
- Researching and providing information about proper vehicle maintenance.

The Auto Club also partners with state and regional organizations to provide, and better use, funding for transportation projects and programs to improve mobility, safety, and the environment. We are a founding member of Mobility 21, Southern California's transportation funding advocacy coalition. We helped develop and supported numerous county transportation sales tax measures and measures to protect transportation funds. And we currently serve on the state's Road Charge Committee, exploring practical pathways to implement mileage-based user fees to pay for transportation improvements. The mobility and emissions benefits of these efforts are important parts of achieving air quality goals in the Basin.

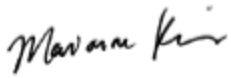
The share of NOx emissions from private passenger vehicles continues to decline. The AQMP's Appendix III "Summer Planning Emissions" detail tables indicate that the proportion of mobile source NOx emissions from light-duty vehicles is projected to decline from 17% to 7% over the next 15 years, even with expected increases in population, registered vehicles, and total miles travelled. Like in the past, these declines will come from continuing improvements in light-duty vehicle technology and efficiency. But, despite these relatively low and declining percentages, the SCAQMD is considering increasing light-duty vehicle registration fees by as much as $30 to pay to clean-up heavy-duty vehicles and off-road equipment.

California motorists already pay to help clean-up heavy-duty vehicles and equipment. Most vehicle owners in the Basin currently pay as much as $30 in extra registration fees to the state for a variety of emissions-related programs, a portion of which goes to the SCAQMD. While some of this revenue is used for light-duty clean-vehicle rebates and early vehicle retirement programs, most is used to pay for incentive programs to subsidize on-road heavy-duty vehicles and off-road mobile equipment. The SCAQMD should not exacerbate this situation by imposing additional fees on light-duty vehicles to pay to clean-up heavy-duty vehicles and mobile equipment. The owners and operators of such vehicles and equipment should bear the burden of cleaning them up.

The Auto Club appreciates the difficult task the SCAQMD has in preparing an updated AQMP that meets federal and state air quality requirements. Moving forward, we hope to be a partner in advancing initiatives identified in the plan that will bring the Basin into conformity. Toward that end, we would like to offer our service and expertise on the Incentive-Based Funding Plan Stakeholder Group. We look forward to helping the SCAQMD develop and approve a plan that can achieve air quality goals in a fair and equitable manner.

Thank your for this opportunity to provide the Auto Club's comments on the 2016 AQMP. Please call me at (714) 885-2325 or email me kim.marianne@aaa-calif.com if you have any questions.

Respectfully,



Marianne Kim
Senior Public Policy Analyst

Responses to Comment Letter from Automobile Club of Southern California (AAA)
(Comment Letter #104)

Response to Comment 104-1:

SCAQMD staff understands the concerns raised. The Draft Funding Action Plan was prepared with the understanding that any proposed funding opportunity that is pursued would go through a public process. The concerns raised will be part of the discussions as part of this process. Also, see Response to Comment 100-6.

Response to Comment 104-2:

SCAQMD staff appreciates the comments made regarding motor vehicle fuel tax. The potential sources of revenues to fund incentives programs discussed in the Draft Funding Action Plan were meant to engender discussion. As such, the Plan does not summarize issues related to the challenges and authority to creating new funding sources. Staff will be discussing the challenges, authority, and limitations including the concerns raised on each of the potential opportunities as part of the public process after the adoption of the 2016 AQMP. Staff can consider suggestions such as additional fees for heavy-duty vehicles.

Response to Comment 104-3:

As part of the public process, SCAQMD staff plans to discuss in further detail each of the potential opportunities including a discussion on the existing surcharges imposed for each sector.

Response to Comment 104-4:

As discussed above, the potential funding opportunities are presented for public discussion purposes. SCAQMD staff is not recommending moving forward with any specific proposal at this time. The Draft Funding Action Plan proposes a set of activities and a schedule for the activities. SCAQMD staff will be seeking the SCAQMD Governing Board's approval to proceed with the activities necessary to secure new funding, but will not be seeking direction to pursue specific potential opportunities prior to the stakeholder process.

Response to Comment 104-5:

SCAQMD staff believes that the potential opportunities discussed in the Draft Funding Action Plan cover the major mobile source categories. We look forward to the Automobile Club's participation on the Working Group. During the discussions on funding opportunities as part of the public process, there will be discussions on the nexus between the funding source and the beneficiaries of the funds.

Responses to the November 29, 2016 Attachment to this comment letter are found in Responses to Comment Letter 100.

Comment Letter from Western States Petroleum Association (WSPA)
(Comment Letter #105)

Western States Petroleum Association
Credible Solutions • Responsive Service • Since 1907

Patty Senecal
Director, Southern California Region

January 4, 2017

Via email: PFine@aqmd.gov

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comments on the Final Draft Air Quality Management Plan (AQMP)

Dear Dr. Fine:

Western States Petroleum Association (WSPA) is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California, Arizona, Nevada, Oregon and Washington. WSPA has been an active participant in air quality planning issues for over 30 years. WSPA member companies operate petroleum refineries and other facilities in the South Coast Air Basin and thus have a major stake in the Air Quality Management Plan (AQMP) being prepared by the South Coast Air Quality Management District (SCAQMD or District), and any rule developments that might stem from the final AQMP as adopted by the District's Governing Board. 105-1

WSPA submitted comments on the Revised Draft version of the AQMP on 4 November 2016 which comments are incorporated herein by reference (see attached copy). WSPA also supports the comments made by BizFed on January 4, 2017 concerning the Final Draft AQMP.

Additionally, WSPA has the following comments concerning the Final Draft AQMP.

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psenecal@wspa.org www.wspa.org

1. **The Final Draft AQMP continues to propose a number of control measures for which there are no quantified emissions benefits and no costs presented. Given the Final Draft AQMP's clear demonstration that these measures are not needed for either the ozone or $PM_{2.5}$ attainment demonstrations, they should be removed from the control strategy.**

The Final Draft AQMP continues to include a number of proposed control measures which are demonstrated in the plan as unnecessary for reaching the region's "carrying capacity."[1] These additional measures are presented with no quantified emissions benefits and are often vaguely described as to what the proposed measures would even require. Such extraneous measures include:

Number	Title	Emission Reductions (tpd) (2023/2031)
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	N/A
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD
FLX-02	Stationary Source VOC Incentives [VOC]	TBD
BCM-02	Emission Reductions from Cooling Towers [PM]	TBD
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD
BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD
BCM-08	Further Emission Reductions from Agricultural, Prescribed and Training Burning [PM]	TBD
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD
EGM-01	Emission Reductions from New Development and Redevelopment Projects [All Pollutants]	TBD
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]	TBD
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]	TBD
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	TBD
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	TBD
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	TBD

105-1 Con't

[1] AQMD, Final Draft AQMP, Chapter 4

MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	TBD
MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	TBD
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	TBD
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	TBD
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	TBD
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	TBD

105-1 Con't

Given the clear demonstration that these measures are not needed for ozone or $PM_{2.5}$ attainment, they should be removed from the control strategy.

1. **The costs presented for proposed control measure CMB-05 (RECLAIM) in the Final Draft AQMP continue to be significantly understated. This understatement compromises the Governing Board's ability to make informed policy decisions. The proposed measure should be changed to reflect a range of potential emission reductions (e.g., 3-5 TPD NO_X), and the document should be revised to reflect the projected cost information which was previously supplied to AQMD Staff by industry as the result of a confidential cost survey conducted by a third party contractor under contract to WSPA.**

105-2

The Final Draft AQMP continues to report costs and cost effectiveness for proposed measure CMB-05 which we believe are understated. The figures are supposedly based on information in the Staff Report for the December 2015 amendments to Regulation XX. However, as previously noted by WSPA in several other comment letters, the District has been provided information that demonstrates that the projected cost for refinery sector emission reductions, beyond those required under the December 2015 amendments would be significantly higher than AQMD Staff estimates. Please see WSPA's comment letter (dated 19 December 2016) on the Draft Socioeconomic Report.

Proposed measure CMB-05 should be changed to reflect a range of potential emission reductions (e.g., 3-5 TPD NO_X), and the cost effectiveness and socioeconomic analyses should be revised to reflect the far more realistic cost information previously supplied to AQMD Staff.

2. **The proposed Low-Emission Diesel Fuel Requirement measure is poorly defined and inadequately analyzed.**

105-3

Under the Low-Emission Diesel Fuel Requirement measure, the portion of the heavy-duty fleet that chooses to continue operating on internal combustion engines, instead of adopting the expectedly more cost-effective zero and near-zero emission technologies, is anticipated to incur additional costs due to the proposed requirement to utilize low-emission diesel fuel.

WSPA continues to have several key questions regarding Low-Emissions Diesel (LED).

970 West 190th Street, Suite 304, Torrance, CA 90502 (310) 808-2144
psenecal@wspa.org www.wspa.org

- While the Report limits its analysis of this measure to off-road equipment, the discussion suggests this LED requirement could apply to all diesel sales (i.e., on-road and off-road). Please explain/confirm the following:
- Whether this measure is actually limited to off-road equipment?
- What is the disposition of conventional gas to liquids (GTL) fuels and other like fuels in this strategy?
- Has AQMD or the Air Resources Board considered the negative fuel efficiency impacts associated with high percentage blends of renewable diesel?
- Why add the carbon intensity component to the low emission diesel when the LCFS standard and Cap & Trade program already does this?

105-3 Con't

By CARB's own projections, later model year trucks equipped with NO_X traps and PM filters would constitute more than 90% of the off-road equipment fleet by 2023. In addition, there is another measure in the Mobile Source Strategy that drives the engine manufacturers to even lower exhaust emission targets. With those two key elements, it is not clear what the benefits of requiring this potentially costly fuel would be.

- CARB and AQMD should provide a forecast of market share for legacy on-road diesel vehicles in 2025 as well as the projected off-road fleet. Such analysis should separate the impact of vehicle technology from the potential emissions impacts of low emission diesel fuel.
- Such analysis should explain the incremental benefit of the low emission diesel fuel over new technology vehicles.

Creating a new LED fuel standard for off-road equipment would force a separate distribution requirement on the industry which would carry with it significant new costs which have not been analyzed.

WSPA appreciates the opportunity to submit these comments. Lastly, we remain concerned about the late and non-sequential release of important AQMP products. This includes a December 2016 revision to the State SIP Strategy which has not yet been made fully available to stakeholders, and a Draft Socioeconomic Report which does not correspond to the Final Draft AQMP. Given these circumstances, stakeholder review and comment on this AQMP has been made extremely challenging. WSPA may be left with no alternative but to submit additional comments during this process as the District and CARB release additional revisions to the AQMP documents. We understand all submissions will be given due consideration by the District staff and the Governing Board.

105-4

If you have any questions, please contact me at (310) 808-2144 or at psenecal@wspa.org.

Sincerely,

Patty Senecal

cc: Wayne Nastri, Executive Officer, SCAQMD
cc: Catherine Reheis-Boyd, President, WSPA

970 West 190th Street, Suite 304, Torrance, CA 90502 (310) 808-2144
psenecal@wspa.org www.wspa.org

Responses to Comment Letter from Western States Petroleum Association
(Comment Letter #105)

Response to Comment 105-1:

Please see Response to Comment 7-5 regarding the proposed "TBD" measures and Response to Comment 38-5 regarding mobile source measures.

Also, see Responses to Comments 88-9 and 93-5.

Response to Comment 105-2:

See Response to Comment 72-13 regarding costs and cost-effectiveness for the proposed measure CMB-05. Also, see Response to Comment 26-13 regarding a range of potential emission reductions.

Response to Comment 105-3:

The Low-Emissions Diesel (LED) measure is a proposal in the State SIP Strategy and discussed in Appendix IV-B of the Draft Final 2016 AQMP. At this time, LED-type fuels such as renewable diesel fuel show some NOx emission reduction benefits when used in vehicles and off-road equipment that do not have selective catalytic reduction (SCR) after-treatment. The use of LED fuels is not limited to off-road equipment. At this time, SCAQMD staff believes that this may be a more cost-effective strategy for off-road equipment since many of these equipment do not have SCR after-treatment. Additional tailpipe emissions and fuel economy measurements will be conducted to confirm the level of NOx emission benefits. If there are additional benefits for older on-road diesel trucks, staff would encourage the use of such fuels. Staff believes that with the additional greenhouse gas benefits of certain low-emissions diesel fuels, that producing one fuel product meeting any future LED fuel standard for off-road and on-road vehicles may be more cost-effective, but welcomes a discussion regarding the costs associated with producing such fuels.

Also, see Response to Comment 27-9 in the Socioeconomic Report.

Your comments will be forward to CARB for their consideration.

Response to Comment 105-4:

See Responses to Comments 102-8 and 30-3 with regards to schedule and release of the AQMP and supporting documents.

Comment Letter from California Interfaith Power & Light
(Comment Letter #106)









January 6, 2017

Dr. William Burke, Chairman
South Coast Air Quality Management District Governing Board
21865 Copley Drive
Diamond Bar, California 91865

Dear Dr. Burke,

We, a coalition of religious community organizations, representing hundreds of thousands in the faith community in the South Coast region, are writing to you in regards to the proposed revision of the SCAQMD's Air Quality Management Plan. Our diverse faith traditions share a commitment to the common good, teach and advocate care for neighbor and Creation. We believe all people should have healthy air to breathe and that the strong should look out for the vulnerable. Our sisters and brothers with respiratory illnesses, our community elders, and children all suffer the most as a result of the poor air quality in our district. We hope you will take these four comments into consideration as you finalize your Air Quality Management Plan. 106-1

First, in the Air Quality Management Plan (AQMP) Draft Plan, analysis and solutions pertaining to Environmental Justice need to be outlined in greater detail. We were grateful to see this language: *"The SCAQMD will prioritize distribution of incentive funding in environmental justice (EJ) areas and seek opportunities to expand funding to benefit the most disadvantaged communities."* However, this is not specific enough. Most anyone can agree with the spirit of the language but the AQMD needs to outline what types of projects will be funded. Projects that increase clean energy creation and jobs, expand energy efficiency in low-income households, and protect public health are what our communities need most. Due to expected decreases in funding for these types of projects from the federal government, local governments and regulatory agencies must strengthen efforts to clean up the air and invest in the green economy.

Second, the language surrounding the Regional Clean Air Incentives Market (RECLAIM) is very vague. This program, successful in its early years, has fallen very short goals in the last seven years. This program must be transitioned to direct control approach, using already-existing technologies. The December, 2015 Board decision to adopt less stringent nitrogen oxide levels, despite AQMD staff recommendations, is in direct opposition to RECLAIM's original aims of 106-2

strong pollution reduction. We encourage language in the AQMP that will commit the AQMD to sunset RECLAIM by 2022. 106-2 Con't

Third, the AQMP plan still has no clear assurances that the indirect pollution related to warehouses and other large facilities will be reduced. The District needs to commit to direct regulation of warehouses and other indirect sources of emissions, both for local communities as well as warehouse workers. 106-3

Fourth, the Air Quality Management Plan relies heavily on funds raised through incentives for projects to reduce air pollution. To date, there is no fundraising plan, and as stated earlier, there is great concern that the incoming federal administration will make fundraising difficult. We encourage clearer language in terms of where funds will come from for important pollution reductions needed in our basin. We are concerned that funds may inadvertently end up being passed on to the public, especially those who are already most vulnerable to pollution and poverty issues. 106-4

We appreciate the gains made by the SCAQMD in the last several decades in cleaning up our air. We also recognize that we have some of the most heavily polluted air in the country and low-income communities of color suffer disproportionately from its effects. We encourage the strongest policies possible within the updated version of the AQMP so that all persons in our region may breathe easier.

Thank you for your attention in this matter.

Sincerely,

California Interfaith Power & Light, Susan Stephenson, Executive Director

Orange County Interfaith Coalition for the Environment, Sherri Davison, President

UU Ministry for the Earth, Rev. Earl W. Koteen, Environmental Justice Minister

Southwest California Synod ELCA (Lutheran) Green Faith Team, Rev. Peg Schultz-Akerson, Rev. Scott Bartlett, Rev. Marsh Harris, Leah Chang, Jane Affonso

Responses to Comment Letter from California Interfaith Power & Light
(Comment Letter #106)

Response to Comment 106-1:

SCAQMD staff appreciates the comments regarding public health protection for all residents in the region. The Draft Final 2016 AQMP is an overarching planning document that provides a blueprint for the region to attain federal air quality standards. Specific activities such as the types of projects to be funded will be discussed as incentive funding is realized. The primary focus of the incentive funds is to accelerate the turnover of older, dirtier vehicles and equipment (stationary and off-road equipment). Historically, the SCAQMD focuses on vehicle and equipment replacement with an emphasis that the projects occur in environmental justice communities or, if the projects are mobile source related, that the sources operate in environmental justice communities. Many of the mobile source funding programs have guidelines that require a certain portion of the funding directly benefit residents living in environmental justice and disadvantaged communities. Typically, funding to projects in environmental justice communities has exceeded these minimum guidelines. The SCAQMD has funded projects to provide solar power to residents and residential electric vehicle (EV) chargers, both of which were primarily located in environmental justice communities. The SCAQMD will continue to seek funding for these types of projects and prioritize funding to environmental justice communities as appropriate.

Response to Comment 106-2:

As stated in the draft final control measure CMB-05, a NOx RECLAIM re-assessment working group will be convened in the spring of 2017 to examine various aspects of the RECLAIM program and consider options for an orderly transition into command and control. Participants of the working group will include RECLAIM facilities and the timing of a transition to command and control will be a key focus of the assessment.

The RTC reduction schedule for the 2015 amendments will end after 2022. If the RECLAIM program is transitioned into a command and control regulatory structure, additional time may be required to ensure that all source category equipment complies with command and control regulations. The 2017 AQMP calls for full implementation by 2031. Control measure CMB-05 commits to a five ton per day reduction of NOx, which must be achieved whether or not the program is market-based or a command and control regulatory structure.

Response to Comment 106-3:

The mobile source emissions associated with sources such as warehouses and other large facilities are proposed to be reduced through the State SIP Strategy (Appendix IV-B of the 2016 AQMP). The SCAQMD has been identified as an implementing agency along with state and federal agencies. To achieve the emission reductions identified in the State SIP Strategy, the California Air Resources Board (CARB) indicated that there will be four general approaches: incentive funding in the near-term, rule development as advanced technologies are commercialized, quantifying the emission reduction benefits of operational efficiencies, and quantifying potential emission reduction benefits from intelligent transportation systems and connected vehicles. The SCAQMD staff is proposing to help meet the emission reductions through a public process of identifying actions that can be taken at warehouses and other large facilities such as marine ports, railyards, and airports. If actions are identified and have potential emission reductions, the emission reductions would need to be "enforceable" in order for the reductions to be included in the SIP. Any emission reductions that are identified will need to be enforceable through a formal rule or regulation

or other enforceable mechanisms that have gone through a public process and will be approvable by the U.S. EPA.

Response to Comment 106-4:

A Draft Financial Incentives Funding Action Plan was released on December 16, 2016 that identifies potential opportunities for additional incentives funding. The Draft Action Plan can be found on the SCAQMD website at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draftfinancialincentivefunddec2016.pdf. The Draft Funding Action Plan proposes a set of guiding principles and activities to pursue new funding. The proposed guiding principles include a consideration of the economic impact on the funding source. Staff will be seeking the SCAQMD Governing Board's approval to pursue additional funding. The potential funding opportunities will be discussed as part of the public process, including economic impacts.

Comment Letter from Public Solar Power Coalition (Harvey Eder)
(Comment Letter #107)

The commenter provided printed copies of the following publications as comments to the 2016 AQMP. Since these materials listed are copyrighted materials (e.g., published papers or books), these copyrighted materials are not reprinted here, and instead, we are providing the title of the document received, and link(s) to a website(s) where the book may be available for viewing and possible download. If anyone from the public would like to read the provided, please contact the SCAQMD AQMP staff in the Planning Division at aqmp@aqmd.com.

- **Exhibit 1:** "1982 Air Quality Management Plan Appendix VII-A: Short Range Tactics for the South Coast Air Basin." South Coast Air Quality Management District, Southern California Association of Governments. October 1982. **(Attachment 1)**

- **Exhibit 2:** "1979 Air Quality Management Plan Appendix IX: Status Report on ARB Model Rules for Reasonably Available Control Measures." South Coast Air Quality Management District, Southern California Association of Governments. January 1979. **(Attachment 2)**

- **Exhibit 3**: "1991 Air Quality Management Plan Appendix IV-B: Stationary Source Control Measures Area Sources." South Coast Air Quality Management District. July 1991. **(Attachment 3)**

- **Exhibit 4**: "Sunshot Success – Five Years in what has the Government-led Solar Initiative Accomplished?" Solar Industry Magazine, Volume 9, Number 6. July 2016.

- **Exhibit 5**: "Center for Disease Control and Prevention (CDC) Announces 4th Superbug Case in US Patient." CNN website article. September 9, 2016.

- **Exhibit 6**: "Drug-Resistant Superbugs Are a 'Fundamental Threat', WHO Says." NBC website article. September 21, 2016

- **Exhibit 7:** "Deadly Superbugs from hospitals get stronger in the sewers and could end up in the Pacific Ocean." Los Angeles Times website article. March 7, 2016.

- **Exhibit 8:** "A 'slow catastrophe' unfolds as the golden age of antibiotics comes to an end." Los Angeles Times website article. July 11, 2016.

- **Exhibit 9:** "Editorial - What we don't know about superbugs could kill us." Los Angeles Times website article. October 12, 2016.

- **Exhibit 10:** "No one knows how many patients are dying from superbug infections in California hospitals." Los Angeles Time website article. December 5, 2016.

- **Exhibit 11:** "Utility-Scale Solar 2015: An empirical Analysis of Project Cost, Performance, and Pricing Trends in the United States." Lawrence Berkeley National Laboratory. August 2016.

- **Exhibit 12:** "Tracking the Sun IX – The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States." Lawrence Berkeley National Laboratory, U.S. Department of Energy. August 2016.

- **Exhibit 13: "**Legislative Developments in Solar Energy during 1980." UCLA Journal of Environmental Law & Policy. 1981.

- **Exhibit 14:** "Ranking List of European Large Scale Solar Heating Plants." Solar District Heating website page. September 8, 2016.

- **Exhibit 15:** "Q2/Q3 2016 Solar industry Update." Sun Shot U.S Department of Energy. October 11.2016.

- **Exhibit 16:** "A Study of United States Hydroelectric Plant Ownership." Idaho National Laboratory. June2006.

- **Exhibit 17:** "Energy Storage Requirement for Achieving 50% Solar Photovoltaic Energy Penetration in California." National Renewable Energy Laboratory. August 2016.

- **Exhibit 18:** "Status and Trends in the U.S. Voluntary Green Power Market (2015 Data)." National Renewable Energy Laboratory. October 2016.

- **Exhibit 19A:** "Inland Choice Power Community Choice Aggregation Business Plan." EES Consulting, Inc. December 8, 2016.

- **Exhibit 19B:** "How much Energy Storage Would Be Needed for California to Reach 50 Percent Solar?" Green Tech Media. January 5, 2017.

- **Exhibit 20A:** "Shared Solar: Current Landscape, Market Potential, and the Impact of Federal Securities Regulation." National Renewable Energy Laboratory. April 2015.

- **Exhibit 20B:** "16 Democrat AGs Begin inquisition Against 'Climate Change Disbelievers." Daily Signal. April 04, 2016.

- **Exhibit 21:** "County of Los Angeles – CCE Business Plan." County of Los Angeles Internal Services Department. July 28.2016.

- **Exhibit 22:** "SCE's Community Renewables Program." Southern California Edison. February 25, 2016.

- **Exhibit 23:** "Public - private partnership." Wikipedia. January 1, 2017.

- **Exhibit 24: (Attachment 4)**

- **Exhibit 25:** "Changing of the Guard." Solar Industry Magazine, Volume 9, Number 12. January 2017.

- **Exhibit 26:** "PG& E facing maximum sentence." Los Angeles Times. January 23, 2017.

- **Exhibit 27**: "Control Strategies and Technologies for Particular Matter under 2.5 Microns (PM2.5) and Ultra Fine Particulate Emissions from Natural Gas-Fired Turbine Power Plants." South Coast Air Quality Management District. April 2014. **(Attachment 5)**

- **Exhibit 28**: "Article 13. Review and Evaluation of EIRs and Negative Declarations." The California environmental Quality Act. January 21, 2017.

- **Exhibit 29:** "Article 7. EIR Process." The California Environmental Quality Act. January 21, 2017.

- **Exhibit 30:** "Fourth District Exposed on CEQA's Responses To Comments Tiles – And Abuses of the Process- As well as Other Issues in upholding Supplemental EIR F for Expanded Orange County Jail Facility." CEQA Developments. January 21, 2017.

Attachment 1 to Comment Letter 107:

SCAQMD/TIC
87004260

OCT

FINAL
AIR QUALITY MANAGEMENT PLAN 1982 REVISION

FINAL
APPENDIX No. VII-A SHORT RANGE TACTICS FOR THE SOUTH COAST AIR BASIN

EX. #1

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

AQMP

Attachment 2 to Comment Letter 107:

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January, 1979

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Air Quality Management Plan

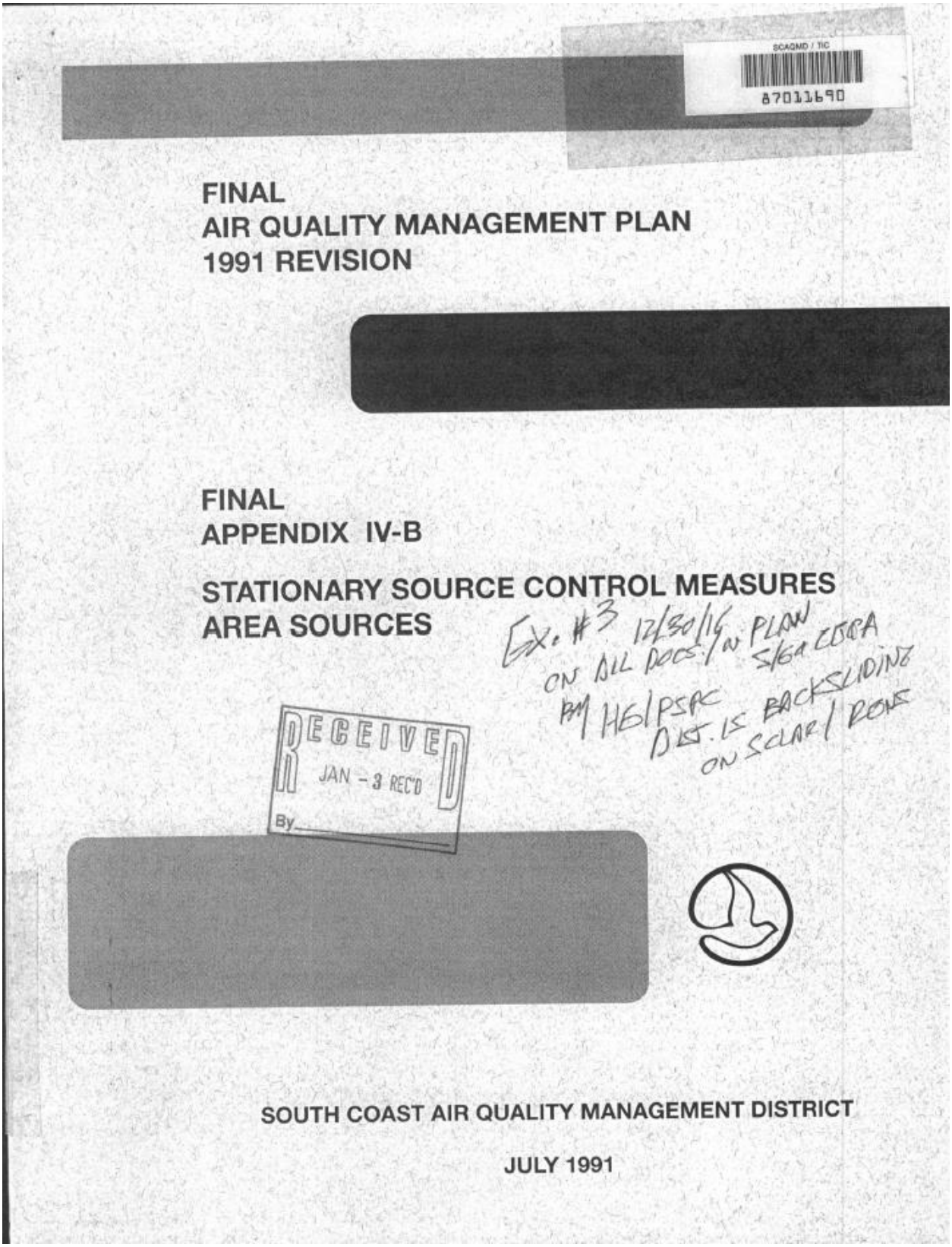
AQMP

South Coast Air Quality Management District

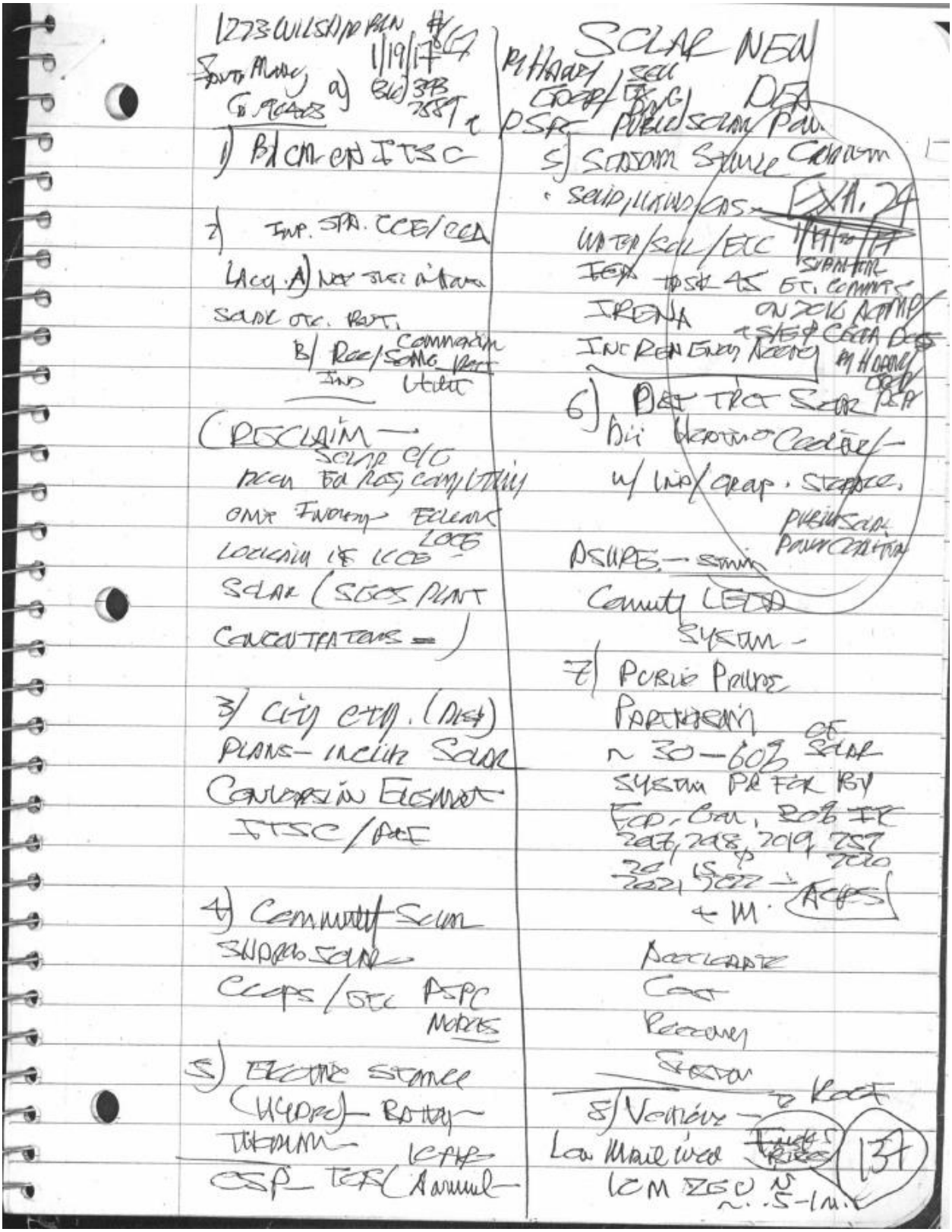
Southern California Association of Governments

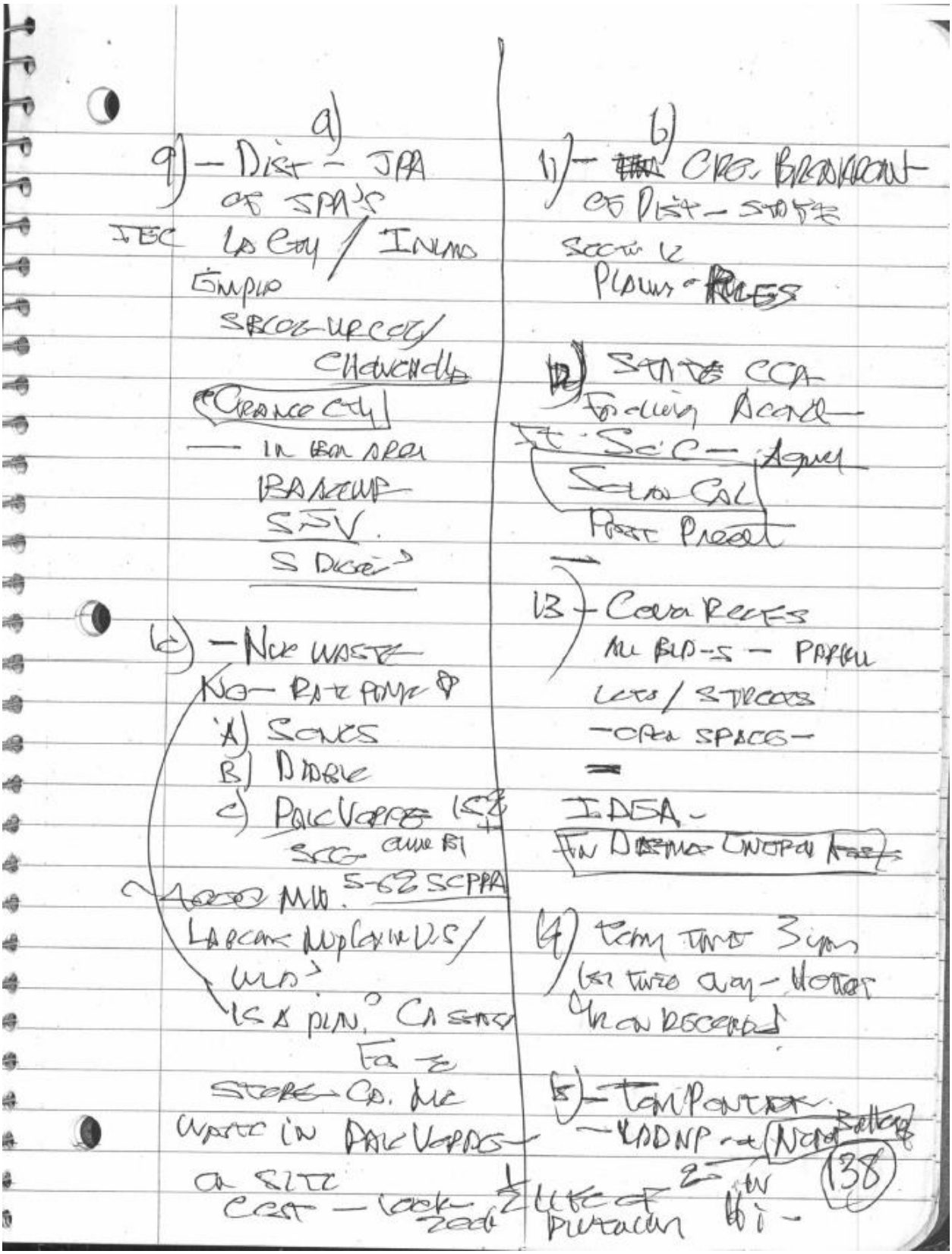
APPENDICES

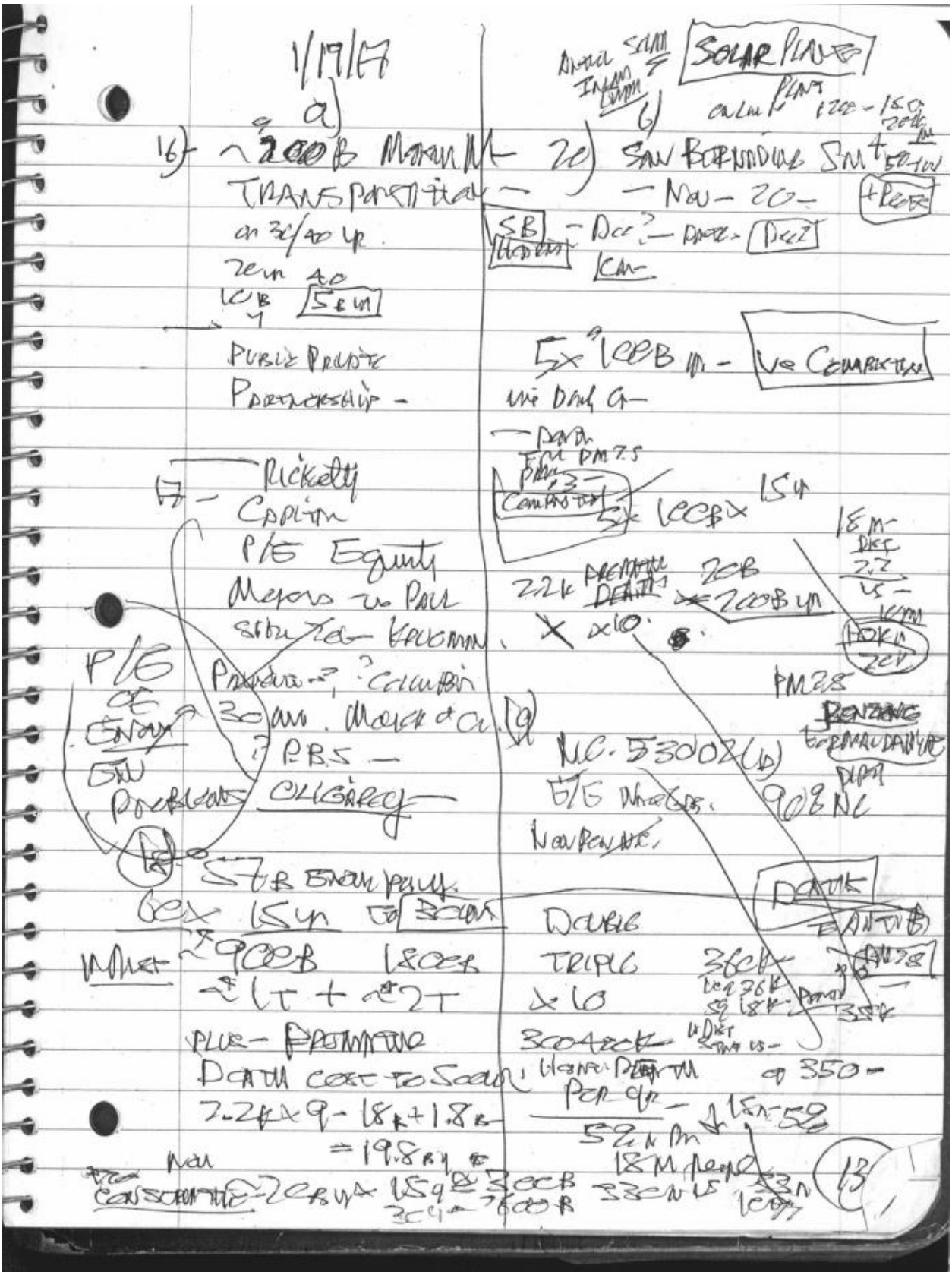
Attachment 3 to Comment Letter 107:

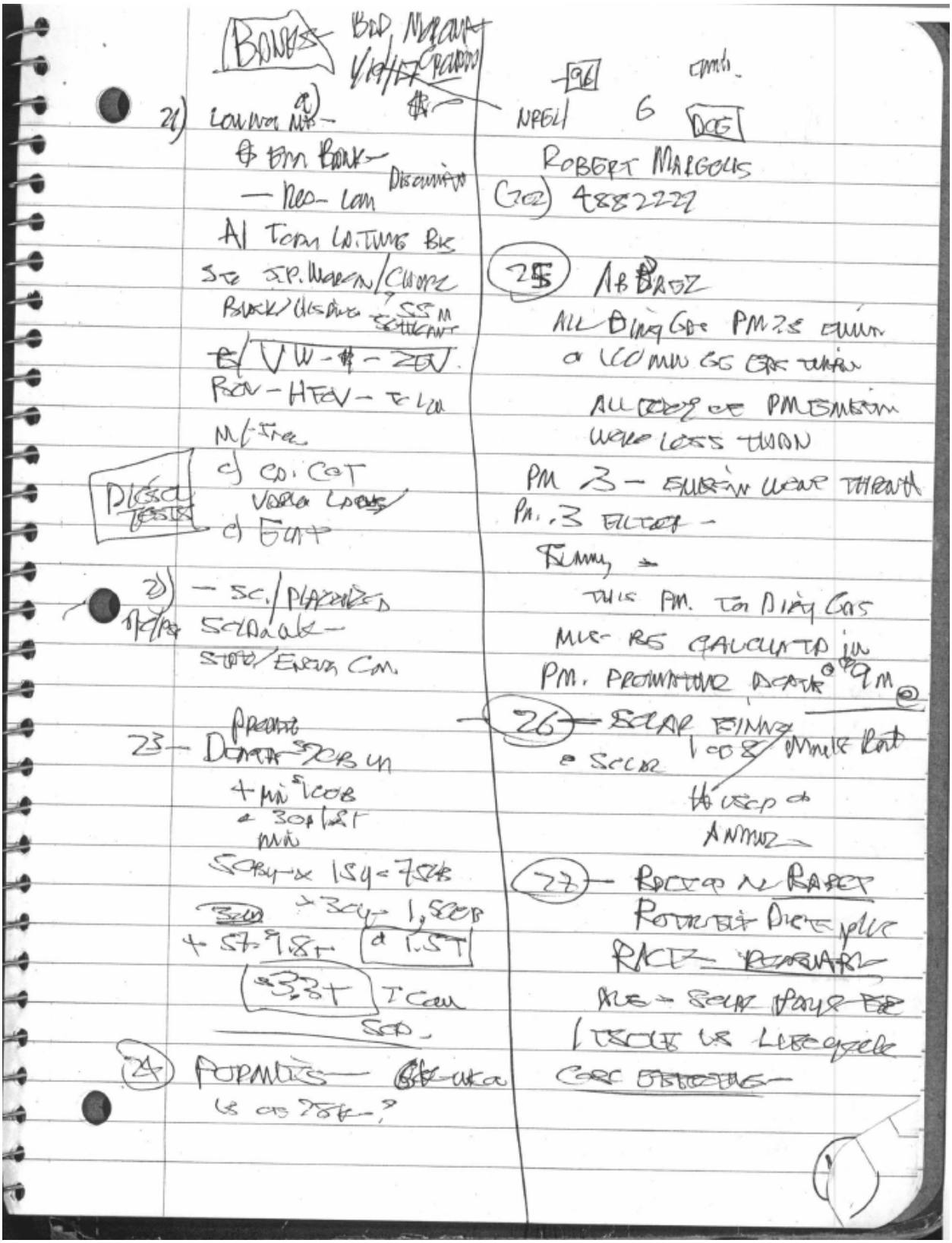


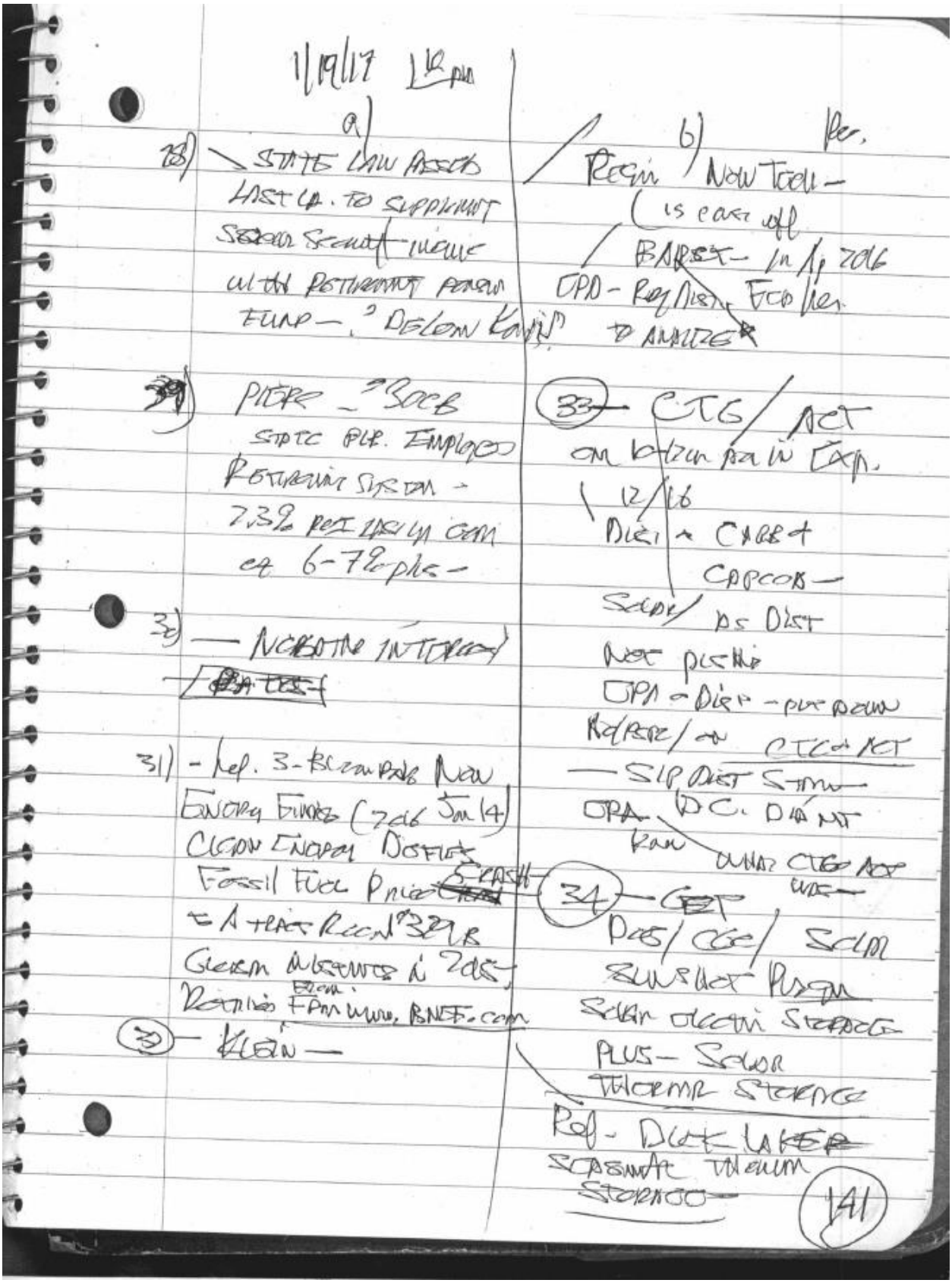
Attachment 4 to Comment Letter 107:











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a)

28) STATE LAW PASSED LAST LA. TO SUPPLEMENT SOLAR SECURITY INCOME WITH RETIREMENT PENSION FUND — "DELOAN KAMIN"

29) PIERS — "30CB STATE PLR. EMPLOYEES RETIREMENT SYSTEM — 2.3% PER LAST LA COM at 6-7% plus —

30) — NORBATING INTEREST

~~[illegible]~~

31) — Ref. 3-BLOOMBERG NEW ENERGY FINANCE (2016 Jan 14) CLEAN ENERGY DEFIES FOSSIL FUEL PRICE CRASH — A TRACT RECORD 329B GLOBAL INVESTMENTS in 2015, RETRIEVED FROM www.BNEF.com

32) — KLEIN —

b) Ref.

REGIN NOW TECH — (is cost off

BARST — in Ap 2016

EPA — Reg Dist. Fed Ref. TO ANALYZE

33 — CTG / ACT on 10/2 in Exp. 12/16

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EPA + DIST — PLT DOWN

NO/PSPC / on CTG + ACT

— SIP DIST STAND

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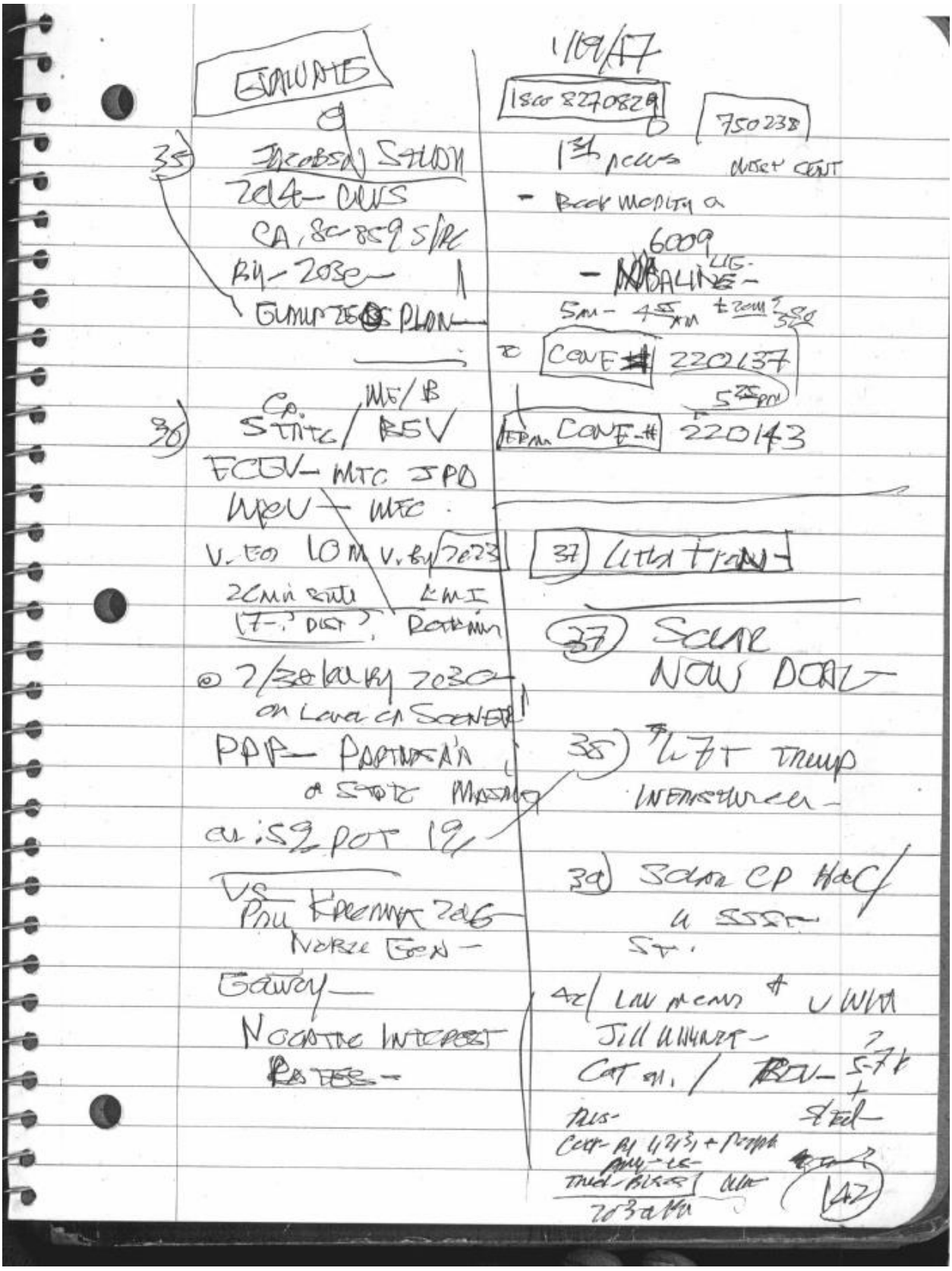
34 — GET DOE / CGC / SOLAR SUNSHOT PLAN

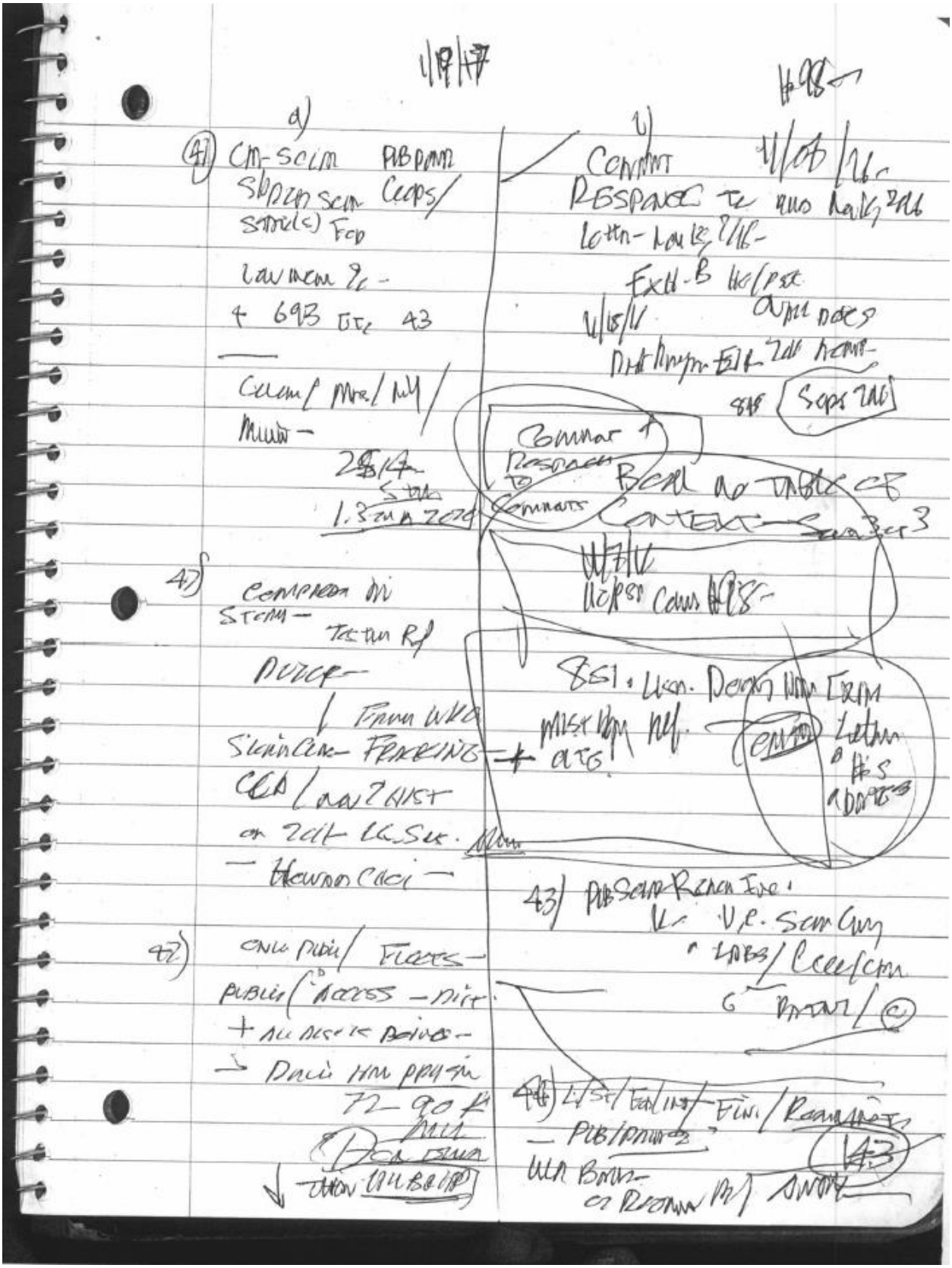
SOLAR ELECTRIC STORAGE

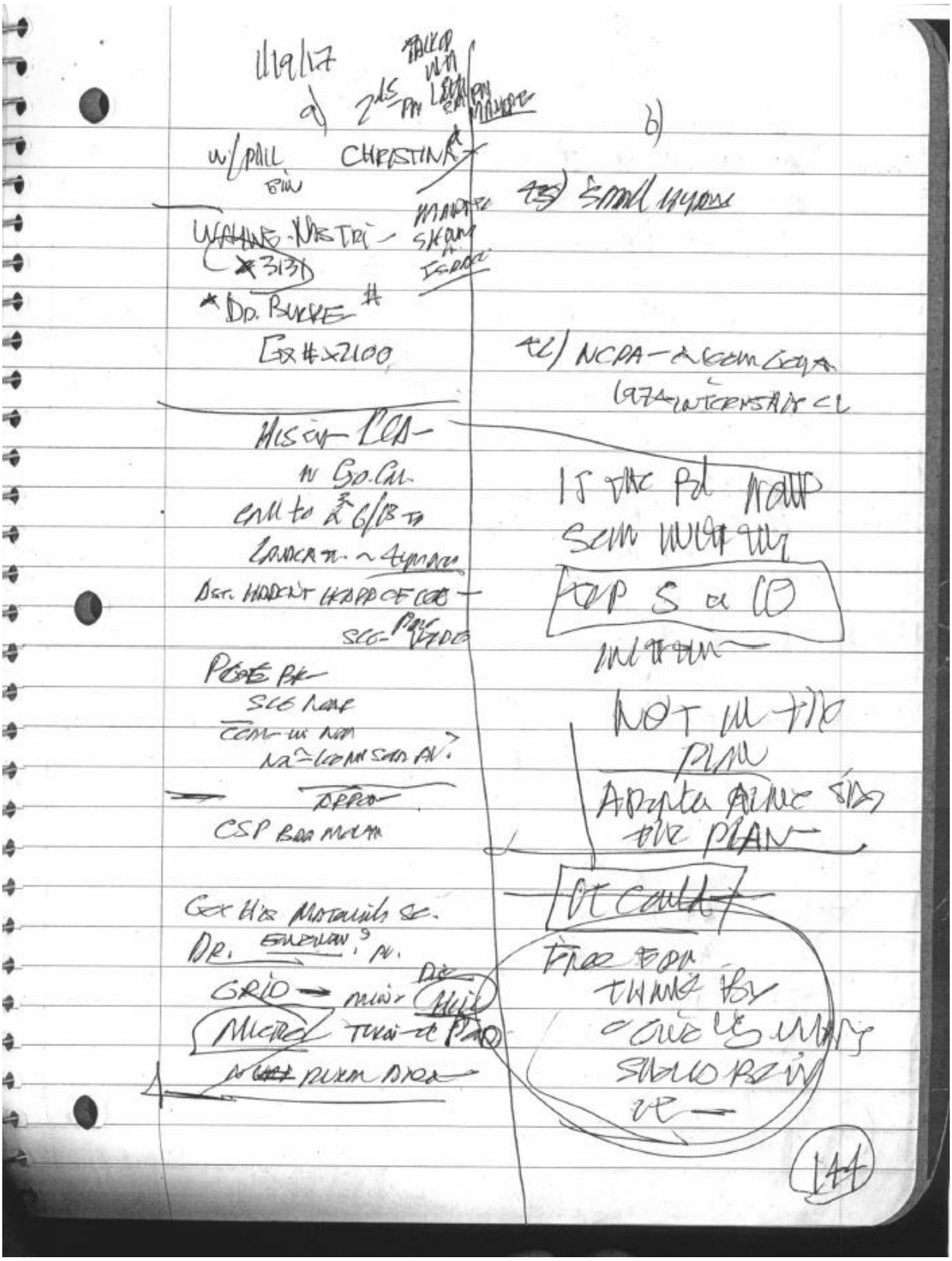
PLUS — SOLAR THERMAL STORAGE

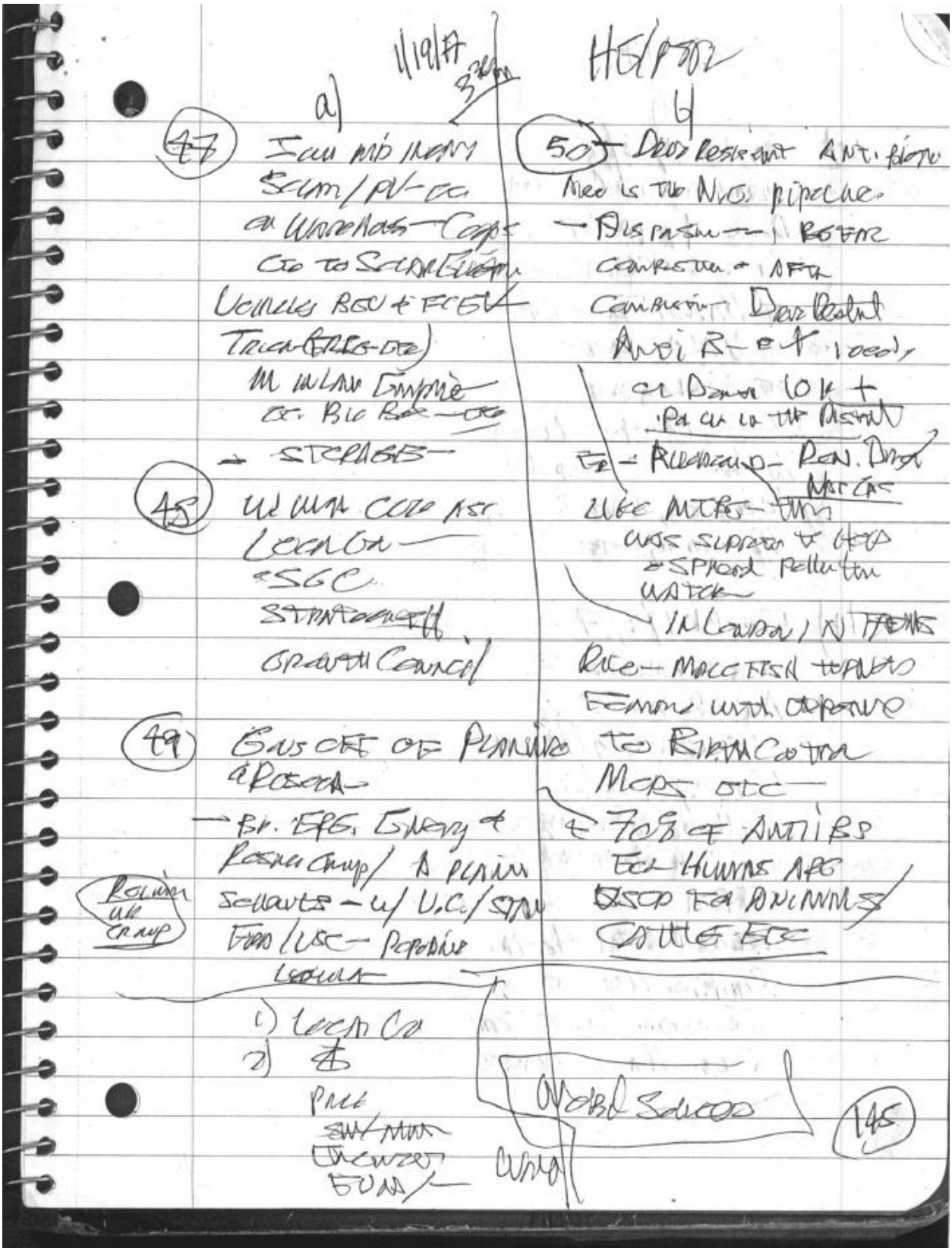
Ref — DICK LAKER SEASONAL THERMAL STORAGE —

141









Attachment 5 to Comment Letter 107:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

CONTROL STRATEGIES AND TECHNOLOGIES FOR PARTICULATE MATTER UNDER 2.5 MICRONS ($PM_{2.5}$) AND ULTRA FINE PARTICULATE EMISSIONS FROM NATURAL GAS-FIRED TURBINE POWER PLANTS

FINAL REPORT

Prepared for:

South Coast Air Quality Management District
Diamond Bar, California

EXH#27
1/24/17
SUB/COMMISSION
2016 AQMP @ S/E @ CEQA
CEQA Docs/DOC
BY HARVEY EDER
ENSEC & PSR
PUBLIC SOLAR
POWER COALITION

Prepared by:

Fossil Energy Research Corporation
Laguna Hills, California
DELTA Air Quality Services
Orange, California
University of California, Riverside
Riverside, California
University of California, Irvine
Irvine, California

April 2014

FERCo

Fossil Energy Research Corp.
23342-C South Pointe Drive, Laguna Hills, California
92653Telephone: (949) 859-4466 Fax: (949) 859-7916

Response to Comment Letter from Public Solar Power Coalition (Harvey Eder)
(Comment Letter #107)

Several of the submitted publications include references to solar renewable energy. Solar panels are becoming more efficient, well established, and prices are declining rapidly making them cost-effective. However, there are still a number of concerns regarding the reliability, transmission, demand spikes, and intermittency associated with renewable generation. Due to these issues, technologies that provide ancillary services and grid support, such as energy storage and improved demand side management need to be further developed and integrated into the grid. Without incorporating these technologies as higher levels of renewables are incorporated, the stability of the electrical grid can be compromised and emissions could increase as peaking generating units are increasingly used.

Overall, the submitted publications do not clearly identify any specific issue that is relevant to the SCAQMD's proposed action on the 2016 AQMP. To the extent the commenter intended to encourage additional evaluation of potential solar power installations that may reduce pollution in the South Coast area, SCAQMD encourages the commenter to participate in the regulatory processes carried out by the SCAQMD, CARB, and other State/local agencies involved in the development of air quality management plans in the South Coast. SCAQMD finds no basis in these comments to change its proposed action on the Plan. Staff will continue to promote and encourage the use of solar energy systems and technology in applications where it can be shown to be cost-effective and result in emission reductions, such as being proposed in the 2016 AQMP under control measures ECC-03, CMB-01 and CMB-02. These efforts include incorporating renewable resources towards powering alternative transportation technologies.

Comment Letter from Truck and Engine Manufacturers Association (EMA)
(Comment Letter #108)

STATE OF CALIFORNIA
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

SCAQMD's 2016 Air Quality Management Plan; Final Draft	)))	**Public Hearing Date: February 3, 2017**

COMMENTS OF
THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

January 24, 2017

Jed R. Mandel
Timothy A. French
Truck and Engine Manufacturers Association
333 West Wacker Drive, Suite 810
Chicago, Illinois 60606

STATE OF CALIFORNIA
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

SCAQMD's 2016 Air Quality Management Plan; Final Draft	)))	**Public Hearing Date: February 3, 2017**

COMMENTS OF
THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

Introduction

The Truck and Engine Manufacturers Association ("EMA") hereby submits its comments on the Final Draft 2016 Air Quality Management Plan (the "Final Draft AQMP") that the South Coast Air Quality Management District ("SCAQMD" or the "District") released for public review on December 9, 2016.

EMA is the not-for-profit trade association that represents the world's leading manufacturers of internal combustion engines, and the vehicles and equipment that those engines power, other than passenger cars. Heavy-duty on-highway ("HDOH") engines and vehicles are included among the broad array of products that EMA's members design and manufacture. Since one of the core regulatory strategies at the heart of the Final Draft AQMP is the adoption of new low-NO_x emission standards for HDOH engines and vehicles (*see* AQMP, Table 4-5) – indeed, the SCAQMD previously petitioned the U.S. EPA to initiate a rulemaking to adopt such standards – EMA's members have a direct and very significant interest in ensuring that the Final Draft AQMP is based on accurate, well-reasoned and validated emissions inventory assumptions and modeling. As discussed below, that is not the case. 108-1

EMA submitted detailed comments on the previous version of the Draft AQMP on August 19, 2016. Unfortunately, the Final Draft AQMP still contains most, if not all, of the deficiencies that EMA noted with respect to the previous Draft AQMP. Accordingly, in these comments, EMA will reiterate several of its previously-submitted concerns and objections.

EMA is fully prepared to lend its (and its consultants') expertise and analysis to resolve the issues discussed in these comments and to assist in completing the necessary attainment model validation work in a timely manner. In that regard, EMA remains committed to genuine collaboration to improve the predictive capabilities of the underlying ozone modeling efforts, and we are prepared to facilitate and expedite the recommended dynamic evaluations of the Districts' air quality modeling, as detailed below.

The Final Draft AQMP, as it relates to HDOH engines and vehicles, is still premised on significant over-estimations of future ozone levels in the South Coast Air Basin ("SoCAB"). The SCAQMD and the California Air Resources Board ("CARB") have derived those over-estimations from their use and application of the Community Multi-Scale Air Quality ("CMAQ") model, which, as applied in this context, has consistently over-predicted future ozone levels in the SoCAB for many years, including as recently as 2012 when CARB and the SCAQMD developed their last SIP submissions. In light of those consistent over-predictions of ozone, the SCAQMD's assertion (including in its rulemaking petition to EPA) that ozone attainment requires an additional 90% reduction in NO_x emissions from HDOH engines and vehicles – over and above the rigorous NO_x-control regulations that are already in place – is not proven out by the relevant data. While some future HDOH emission requirements may be warranted and reasonable, the model-based premises for adopting a 90% lower NO_x standard in 2019 are not accurate.

CARB's EMFAC model – the tool for estimating future levels of individual precursor emissions, and in particular NO_x – also is still over-estimating the magnitude of future-year emission inventories, and is utilizing emission inputs and related data that are significantly out-of-date. That, too, is a significant error that needs to be remedied before the District proceeds to implement any specific menu of SIP strategies, especially strategies that it estimates will cost in excess of $30 billion, including approximately $14 billion in incentive funding. 108-1 Con't

EMA recognizes that the District is facing firm SIP deadlines that will not accommodate the completion at this juncture of all the necessary data-analyses and modeling improvements that EMA is recommending. Nevertheless, it is vitally important that the District Board commit, in the text of any resolution relating to the Final Draft SIP, to undertake and complete those necessary analyses and modeling improvements as soon as possible, and most certainly in advance of the adoption of any specific SIP control measures, as well as in advance of the next round of AQMP/SIP updates.

In that regard, it is particularly important that the District Board commit to undertake in a timely and comprehensive manner the "dynamic evaluation" that U.S. EPA recommends as a way to assess the predictive capability of a model-based ozone attainment demonstration. (*See* EPA's "Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, $PM_{2.5}$, and Regional Haze," December 3, 2014 (the "EPA Modeling Guidance") at pp. 62-63, 92-93.) In its Modeling Guidance, EPA recommends four different approaches for evaluating air quality models: operational evaluations, diagnostic evaluations, dynamic evaluations, and probabilistic evaluations. Out of those four evaluation methods, *dynamic evaluations* are particularly important. The Modeling Guidance states, "dynamic evaluation is always recommended," because it is the only evaluation method that compares model-predicted historical trends with observed trends, and so is the only evaluation method for assessing model performance in a way that can assess the model's predictive capabilities – specifically, "in a way closely related to how models are used to support [predict] an attainment demonstration." (*Id.*) As EPA further explains it its Modeling Guidance, a dynamic evaluation "is a direct assessment of what is most important in an attainment demonstration: does the model accurately predict changes in air quality as a result of changes in emissions?" (*Id.*)

While the Final Draft AQMP claims that the AQMP "covers all four types of model performance evaluation that the EPA guidance (2014) recommends," (*see* AQMP, p.V-5-9), that is simply not correct. SCAQMD Staff has not presented the results of any actual dynamic evaluation of the current model-based results compared against observed historical trends, nor has SCAQMD Staff even undertaken such a dynamic retrospective analysis "comparing model-predicted historical trends with observed trends." (*Id.* at 92.) That significant omission needs to be rectified through an explicit commitment and direction from the District Board.

More specifically, the SCAQMD Board should direct the SCAQMD Staff to undertake a comprehensive dynamic evaluation of its air quality modeling — with a full assessment of the model's ability to match historical trends — and to demonstrate whether such a dynamic evaluation actually validates the model's predictive capability. The stakes are too high for the SCAQMD to proceed to adopt SIP control measures based on model-driven results that have not undergone a comprehensive dynamic evaluation. Without that type of evaluation – which, as EPA states, "is always recommended" – the actual predictive capabilities of the District's modeling results will remain untested and unvalidated, and the basis for the AQMP and its many proposed control measures will remain open to challenge.

108-1 Con't

This is not just an academic or hypothetical concern. Leading technical experts from Ramboll Environ ("Ramboll") have undertaken a dynamic evaluation of the District's air quality modeling – the EPA-recommended evaluation that District Staff did not do. The results from that dynamic evaluation have been presented to District Staff and are very telling. The results confirm, as noted above, that the District's air quality modeling still consistently under-predicts the rate of ozone reduction in the SoCAB and so still over-estimates the need for future additional NO_x reductions. While District Staff have attempted to rebut the Ramboll analyses and critique (*see* District's Responses to Comment Letters #52 and #58, pp. 358-370, 496-499), that rebuttal misstates what Ramboll has done. This issue is discussed in further detail below, and Ramboll's response to Staff's attempted rebuttal is attached hereto as Exhibit A. The point is that the significant modeling issues that EMA and Ramboll have raised previously, and the clear need for Staff to undertake a comprehensive dynamic evaluation of their modeled attainment demonstration, still remain and need to be addressed.

In addition, the Board also should take steps to ensure that the Final AQMP accurately reflects U.S. EPA's recent response to the District's petition requesting that EPA adopt, in the 2017 timeframe, an FTP-based HDOH low-NO_x standard of 0.02 g/bhp-hr. As EPA has now confirmed, the District cannot and should not presume that the Agency will adopt the petitioned-for low-NO_x standard premised on existing test procedures. The Final AQMP should be revised to reflect that reality, and should not hinge its ozone attainment demonstration on such a standard, since, without a federal low-NO_x engine standard (as the District has conceded) a California-only low-NO_x HDOH engine standard is not viable as a cost-effective control measure, as it would impact only a small fraction of the HDOH inventory.

The following detailed comments on the Final Draft AQMP focus on six main points. As noted, several of these points are carry-overs from EMA's earlier comments, since District Staff did not address the issues raised in EMA's prior comments.

1. The District Board Should Direct Staff To Conduct A Comprehensive Dynamic Validation Of The Predictive Capability Of The Modeling Used To Estimate Future Ozone Design Values (DVs) And Carrying Capacities

Review of the District's current and past AQMP attainment modeling efforts indicates that the model-derived results consistently under-estimate projected ozone reductions and over-estimate needed emission reductions. (*See* EMA's Prior Comments (August 19, 2016); *see also* Exhibit A.) In particular, the Final Draft AQMP continues the trend of under-estimating future ozone reductions and, thus, over-estimating ozone design values in the applicable future attainment years (2023 and 2031). This necessarily yields incorrect conclusions regarding the extent to which multi-billion dollar controls and incentives are required to reach attainment in the SoCAB.

Accordingly, before proceeding to implement any specific control measures, and in advance of the next SIP update, the SCAQMD Board should direct Staff to undertake the necessary retrospective dynamic evaluation to validate the operative predicted ozone reduction rates by comparing modeled backcasts against measured historic ozone design values ("DVs") and trends. The discrepancies between modeled and measured levels of ozone and NO_x in the SoCAB are too significant at this juncture to serve as an adequate basis for the implementation of multi-billion dollar public policy choices based on the current modeling.

As noted, above, EMA recognizes that the District needs to proceed to adopt an AQMP. Nonetheless, in that process, it is important that the Board explicitly direct Staff to undertake comprehensive analyses of the current modeled attainment demonstration utilizing the validation methods and analyses that U.S. EPA recommends, including "dynamic evaluations" that assess and take into account the past performance of air quality modeling efforts. If such retrospective evaluations show, as expected, that the 2016 AQMP models under-predict ozone trends going back in time 10 to 15 years (backcasts), the model-based forecasts can and should be adjusted accordingly. Accordingly, the District Board, in any resolutions relating to the pending AQMP, should specifically direct Staff to undertake those analyses before the Board adopts any particular SIP control measure, and in advance of the next round of SIP updates. The potential under-estimates in ozone reduction rates (which appear to be on the order of 2 times or more) could result in billions of dollars being spent unnecessarily. Thus, EMA recommends that prioritized dynamic evaluations and other validation studies be initiated as soon as possible to assess the actual predictive capability of the modeling results at issue. 108-2

In that regard, EMA appreciates the meeting of the Scientific, Technical and Modeling Peer Review Advisory Group ("STMPRAG") that District Staff convened on October 26, 2016. During that meeting, experts from Ramboll and District Staff discussed the need to assess and validate the relevant CMAQ-based results, and Staff attempted to rebut the findings of the Ramboll work. (*See also*, District's Response to Comments, pp. 358-370, 469-499.) However, as noted, that attempted rebuttal missed the point and did not dispel the clear need for a full dynamic evaluation of the District's ozone NAAQS attainment modeling.

In particular, District Staff has tried to rebut Ramboll's observations regarding the inaccurate performance of its attainment modeling by, in essence, making two main arguments: (i) ozone formation is a non-linear response to multiple precursor inputs, so linear extrapolations or

projections of future ozone levels are "overly simplified;" and (ii) the Ramboll analysis should have utilized 5-year weighted design values. Those arguments misstate what Ramboll did and are incorrect.

As detailed below, Ramboll's dynamic evaluation work involves comparing observed *historical* levels of ozone design values against model-based assessments of those *historical* design values. Linear projections into the future are not involved. Thus, Staff's first argument is not relevant. With respect to Staff's second argument, that is simply wrong; Ramboll's dynamic evaluations *do* include and incorporate 5-year design values.

As explained more fully in Exhibit A, Ramboll's dynamic evaluation involved CMAQ simulations using historical emissions over approximately 25 years (1990-2015) in order to compare observed and modeled ozone trends over time. The analysis was performed first using the 2012 AQMP CMAQ 2008 modeling database, and then using the 2016 AQMP CMAQ 2012 modeling database. Although the observed rate of ozone reduction is somewhat lower using the 2016 observed ozone end-point, it does not change the basic conclusions regarding the fact that the modeled ozone trends are not coming down as fast as the observed trends. (*See* Figure 1) (below).

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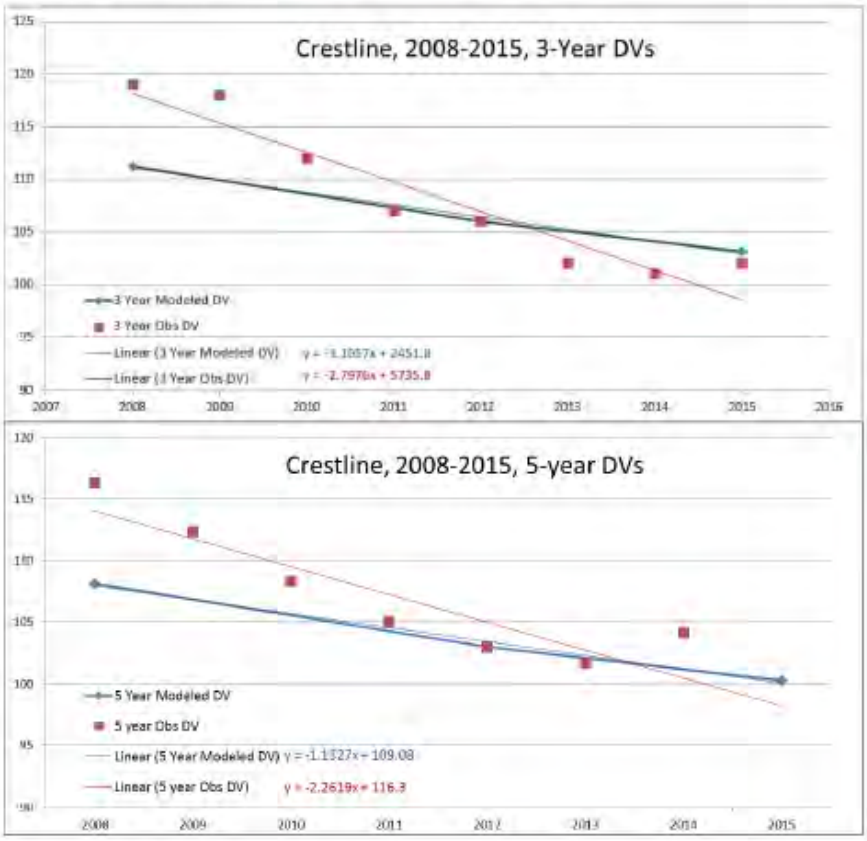
During the STMPRAG meeting (and in their Response to Comments), SCAQMD Staff also argued that the Ramboll dynamic evaluation should have used the 5-year ozone design value (5-yr DV) instead of the 3-year ozone design value (3- yr DV). However, the ozone National Ambient Air Quality Standard (NAAQS) is based on the ozone design value that is defined as the *three-year average* of the fourth highest maximum daily average 8-hour (MDA8) ozone concentrations (i.e., the 3-yr DV). That definition is mandated in the code of federal regulations (40 CFR Part 50) and ultimately determines whether the SoCAB attains the NAAQS or not. Nonetheless, EPA's modeling guidance does recommend deriving ozone projections using the 5-yr DVs (average of three years of official 3-yr DVs) in order to moderate the effects of year-to-year variations in ozone concentrations. In light of that, and contrary to Staff's rebuttal, Ramboll *did* perform the dynamic evaluation of the 2012 and 2016 AQMP CMAQ databases using both the 3-yr DVs and 5-yr DVs. Significantly, the conclusion that the modeled rate underestimates the observed rate of ozone reduction over time still holds whether the 3-year or 5-year ozone DV is used.

Figure 1 (below) presents Ramboll's dynamic model evaluation comparing observed ozone trends at Crestline, which generally corresponds to the Basin-wide maximum ozone design value, with the 2016 AQMP CMAQ 2012 modeling database for the period of 2008 to 2014/2015. Even when including the unusually high observed ozone level from 2016, the rate of the modeled ozone reduction trend using the 2016 AQMP CMAQ 2012 is still at least a factor of 2 lower than the observed trend.

Figure 1. Observed and modeled ozone Design Value (DV) trends at Crestline using the 3-yr DV (top) and 5-yr DV (bottom), and the draft 2016 AQMP CMAQ 2012 modeling platform using observed trends through 2016 ozone season data.



108-2 Con't

Table 1. Comparison of observed and modeled ozone Design Value (DV) trends (ppb/year) for 2008-2014/2015 using the draft 2016 AQMP CMAQ 2012 modeling database.

Ozone DV	Observed	Modeled	Ratio (Obs/Mod)
3-Yr DV	2.80	1.17	2.40
5-Yr DV	2.26	1.13	2.00

As should be clear, Ramboll's dynamic evaluation presentation never extrapolated or otherwise projected the ozone DVs at issue into the future. Rather, it compared *historical* observed ozone trends with modeled changes in ozone over different *historical* periods dating as far back as 1990 (2012 AQMP) or 1995 (2016 AQMP) to current (2014/2015) values. The comparison of the historical observed and modeled ozone trends clearly shows that the modeled rate of ozone reduction over time is significantly lower than the observed trend. Thus, Ramboll's dynamic evaluation compares the observed ozone rate of ozone reduction over time with modeled values

using linear regression equations within the 1990-2015 time periods, with no extrapolation, and also includes the observed 2016 ozone data in the dynamic evaluation.

The results of that dynamic evaluation, not extrapolation, are significant. At the Crestline DV site (*see* Figure 1 above), the observed rate of ozone reductions is almost twice as high as the modeled rate, and the basin-wide rate of 5-yr DV reductions is over 50% faster than the modeled rate. This holds even when using the unusually high 2016 ozone season as the ending year anchor-point in the observed ozone trend.

From the foregoing, it remains clear that the CMAQ models used in developing the AQMPs underestimate the rate of observed ozone reduction over time. That is, the "predictive capability" of CMAQ, as it is applied to the difficult topography and meteorological conditions of the South Coast Air Basin, does not match the rate of ozone reduction that has been observed. While SCAQMD Staff have raised various arguments in their response to comments and in their presentation at the October 26, 2016 STMPRAG meeting, none of those arguments dispels the fundamental fact that the CMAQ-based attainment model that forms the basis for the AQMP underestimates the observed rate of ozone reductions over time by at least a factor of 2. 108-2 Con't

There may be identifiable reasons for this significant consistent underestimation of ozone reduction. The initial indications from comparisons of the 2012 emissions inventories used in the CMAQ modeling with the actual measured ambient-concentration VOC/NO_x ratios are that the precursor inventory ratios are underestimated, suggesting that current 2012 emission inventories may understate VOC emissions, overstate NO_x emissions, or some combination of the two.

In sum, the dynamic validation work that EPA (and EMA) recommends is not simply an academic exercise. There are real model-performance issues that need to be addressed and resolved, especially since the costs of erroneous model-based projections in this context are extremely high. In fact, the SCAQMD is anticipating that its Final Draft AQMP will have an implementation price tag in excess of $30 billion. Those enormous costs raise very serious questions about the unintended adverse consequences of inaccurate air quality modeling and emission inventory estimates. Consequently, the Board should specifically direct Staff to undertake the model-validation work that EPA, EMA and Ramboll recommend.

2. The Current And Recent AQMPs Significantly Underestimate Ozone DV Rates of Reduction When Compared Against Measured SoCAB Ozone DVs

As noted previously and as discussed in Exhibit A, the CMAQ modeling tool, as applied in this context, is yielding significantly different results compared to the trends in actual observed and measured ozone concentrations. Consequently, since the District Staff cannot point to any new validation efforts demonstrating that the "updated modeling platform" is significantly better at predicting future trends or rates of ozone reductions/increases over time, there is no basis for assuming that the past over-estimates of future ozone levels will not continue. District Staff argues that it has assessed the accuracy (uncertainty) of the models against the "base year" (2012). However, that type of "base year" validation – which really only amounts to a re-anchoring of the model to more recently updated inventory numbers – does not assess the accuracy or predictive capability of the model with respect to actual forecasts or backcasts. It is that type of "dynamic" 108-3

validation work that is required, but has not been done.

Page 5-4 of the Final Draft AQMP is very telling in this regard. There, presumably in response to EMA's previous comments, the District seeks to delete its prior statement that: *"The trend of Basin ozone design values is presented in Fig 5-1. The 8-hour design values have averaged a reduction of approximately 2.3 ppb per year over the 14-year period…"* In place of that factual assertion, Staff now proposes to state more generically in the Final Draft that: "Both the 8-hour and 1-hour ozone design values have decreased over the 14-year period." The District's edit to include less specific language seems to be at odds with the full and fair disclosure that underlies the notice and comment process.

The referenced "14 year period" covers the years from 2001 through 2014. While the District tries now to downplay the average rate of ozone DV reductions over that time period, the District also fails to acknowledge that the previous 2007 and 2012 AQMPs, as well as the current Draft AQMP, continue to predict rates of ozone design value ("DV") reductions that are much lower than those actually measured (see charts below). A review of the three most recent AQMPs shows that the model-predicted ozone DV reduction rates have been as follows:

2007 AQMP: 1.38 ppb per year (years 2002 to 2023)
2012 AQMP: 0.60 ppb per year (years 2008 to 2023)
2016 AQMP: 0.73 ppb per year (years 2012 to 2023)

108-3
Con't

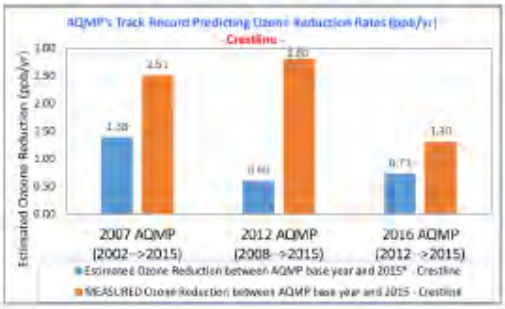
In a separate analysis that is different from Ramboll's dynamic evaluation, we have evaluated the accuracy of the above CMAQ-derived ozone DV trend predictions. In this separate additional analysis, we have used the following data, assumptions and methods:

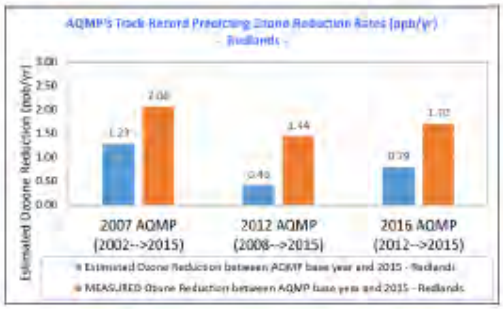
- The 2007 AQMP contains predicted ozone DV changes from 2002 to 2023
- The 2012 AQMP contains predicted ozone DV changes from 2008 to 2023
- The 2016 Draft AQMP contains predicted ozone DV changes from 2012 to 2023
- Actual measurements of ozone changes (reductions) between 2002 and 2015 are readily available from CARB and District databases
- Prior analysis by Ramboll using 2012 AQMP CMAQ-ready files, has shown that ozone predictions between 2001 and 2023 are fairly linear (i.e., the slope of reductions between 2001-2014 is almost the same as the slope between 2014 and 2023 for all the SoCAB monitoring sites). It is thus likely that the AQMPs' predictions of ozone changes between 2002, 2008, or 2012 to 2023 also are fairly linear
- AQMP ozone reductions can be calculated between the base year and 2023, and, for this analysis, the reduction rate is assumed to be the same between the base year and 2015 (linearity)

- Using this approach, we can compare ozone DV reduction rates (ppb/year) between the various AQMP's predictions and those actually measured at the critical monitoring sites in the SoCAB for the relevant years used in each AQMP
    - For example, the blue bar depicting the 2016 Draft AQMP's estimated ozone reductions for Crestline (0.60 ppb/yr) (see chart below) is calculated as follows: subtracting the 2023 Baseline DV (Table 5-2) from the 2012 5-yr (baseline) Weighted DV (Table 5-1), and then dividing by 11 years (2023-2012). This resulting 0.60 ppb/yr reduction rate is assumed to be the same between 2012-2015 and 2015-2023.
- The actual measured DVs between either 2002, 2008, or 2012 and 2015 are estimated using the slope of a linear regression calculation applied to each ozone data set
- It is recognized that the 2012-2015 period does not offer enough years to obtain a very robust estimate of ozone DV reductions (ppb/yr). Nevertheless, the comparisons can be made for illustrative purposes, keeping this caveat in mind

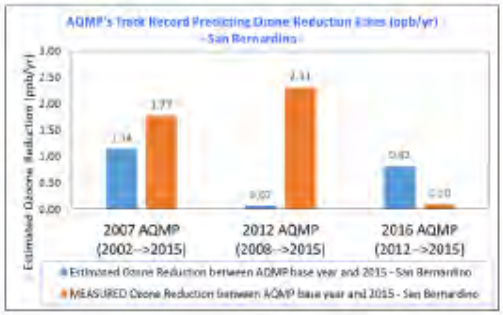
108-3 Con't

Using the approach described above, the following charts compare ozone DV reductions (ppb/year) between the various AQMP predictions and the actual corollary measurements obtained at the key air quality monitoring sites in the SoCAB:







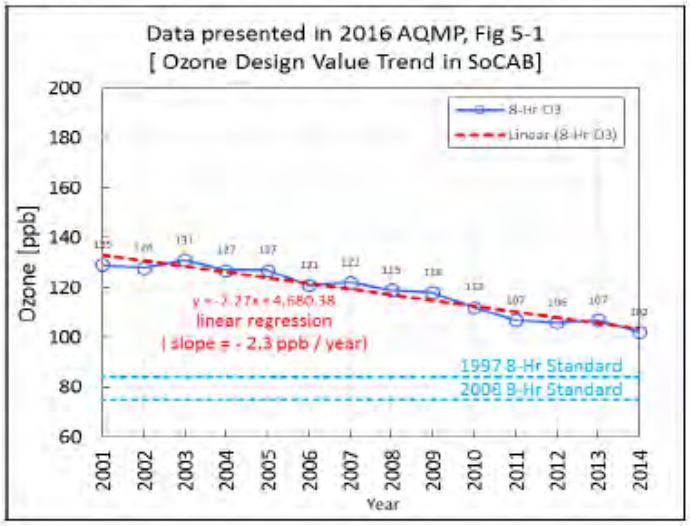


The foregoing data clearly indicate that the Final Draft AQMP is still predicting very slow reduction rates in ozone DVs similar to the previous AQMPs. In the case of Crestline, for example, the current modeling predicts a reduction rate of just 0.73 ppb/year. However, a review of CMAQ-predictions versus measured ozone DVs over the last decade, as depicted above, does not support the model predictions. As previously noted, the measured reductions are nearly 2 times greater. Moreover, there is no evidence presented in the Final Draft AQMP to increase the level of confidence in the more recent predictions. To the contrary, it remains likely that the reduction rates predicted for the various monitoring sites in the SoCAB are still under-predicting reality to a significant extent. 108-3 Con't

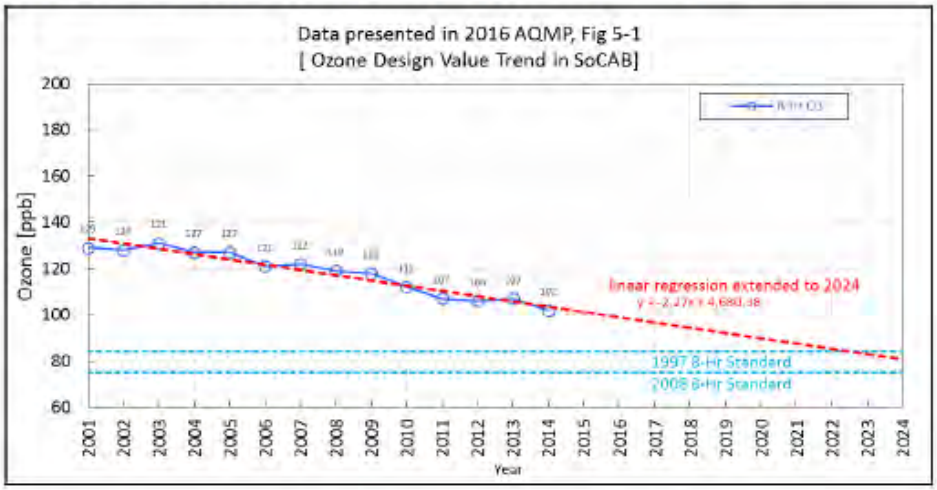
3. If The AQMP Under-Estimates Future Ozone DV Reduction Rates, The SoCAB Is Closer To Ozone Attainment In 2023 And 2031

Despite Staff's recent editing, the fact remains that the measured 8-hour ozone design value in the SoCAB has been declining at a rate of 2.3 ppb per year over the 14-year period from 2001 to 2014. At that same rate, the ozone level at Crestline (which was 101 ppb in 2014) would be 80 ppb in 2023 and 62 ppb in 2031. That rate of decline would result in an ozone level that would be well below the targeted attainment level in 2031 (of 75 ppb) and in attainment with the applicable NAAQS in 2023 (i.e., a DV less than 85 ppb), without any additional control measures. While expecting a constant linear 2.3 ppb/year reduction between 2012 and 2023 may not be reasonable, a rate of 0.73 is arguably even more unlikely based on the analyzed data to date.

Figure 5-1 from the Final Draft AQMP (p. 5-4) shows the ozone DV trend, and compares it against the 1997 8-hr standard (84 ppb when accounting for allowable rounding). Figure 5-1 is reproduced below. For clarity, we have added labels to each data point. We have also included a linear regression through the data (which yields the estimated 14-year ozone-reduction slope of -2.3 ppb/year). It is interesting to note that the DV during those 14 years was set by Crestline each year, except in 2013. In that year, Crestline's DV was 102 ppb while Redlands' DV was 107 ppb. The ozone DV rate of reduction for Crestline during that time period was -2.42 ppb/year. 108-4



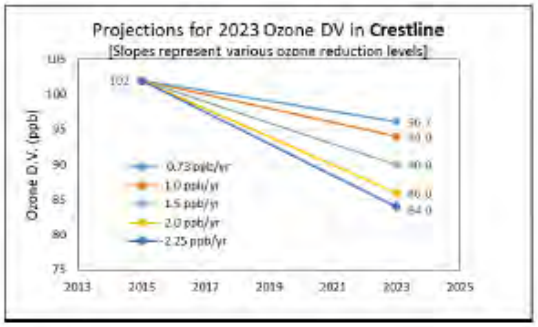
For additional insight, the same data shown are below, extended to 2024, the year when attainment with the 1997 8-hr ozone standard of 84 ppb must be demonstrated. When the established trend is extended to 2024, again simply for illustrative purposes (not for dynamic evaluation purposes), the DV appears to meet the 1997 8-hr standard on time.

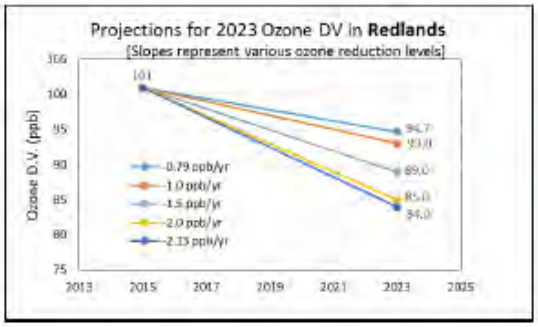


108-4 Con't

While we have heard from CARB and SCAQMD Staff that the measured ozone DV trends are expected to change (slow down) in the future, that trends are already changing at some monitoring stations given recent extreme meteorological conditions, and that linear projections are too simplistic, the conclusion still remains that CMAQ-modeled results, as derived for prior AQMPs and the Final Draft, have significantly under-predicted the pace of ozone DV reductions. In that regard, the 2012 AQMP discussed an expected slowing of the ozone DV reduction rates beyond 2008, but those slower-paced reductions were not confirmed by the subsequently measured data. Moreover, the 2012 AQMP did include emissions inventory updates to account for the 2008-2010 recession, so the recession cannot serve as a potential rationale for the significant discrepancies between AQMP-estimated and actual (measured) ozone DV reductions.

There are other ways to explore this same fundamental concern. For example, the chart below illustrates the estimated ozone DV levels for Crestline and Redlands in 2023. Since the actual ozone DVs for 2015 are already known (102 and 101 ppb, respectively, pursuant to CARB's published records), one can predict the 2023 ozone DVs assuming various reduction rates. The Crestline chart shows that the Final Draft AQMP-predicted rate of 0.73 ppb/yr results in a 2023 ozone DV of 96.2 ppb (12 ppb above attainment). However, if the 0.73 ppb/yr is under-estimated, and, if for instance, the real reduction rates between 2015 and 2023 are more on the order of 1.5 ppb/yr, the 2023 ozone DV would be 90 ppb (just roughly 6 ppb out of attainment). Furthermore, if the actual reduction rate between 2015 and 2023 ends up being closer to 2.25 ppb/yr, Crestline would be in full attainment with the 84 ppb standard. Similar conclusions can be drawn for Redlands or any other monitoring station in the SoCAB. These seemingly small differences in 2023 ozone levels can have a profound effect on the necessary extent and cost of attainment-strategy emission reductions. While these projections all have inherent limitations and imprecision (and over-simplification), they all caution against implementing a $30 billion-plus AQMP (including approximately $14 billion in incentive funding) before all of the significant modeling uncertainties at issue are resolved.





108-4 Con't

4. The AQMP Needs To Include A Quantitative Uncertainty Analysis Of Baseline And Future-Year Emission Estimates

A section of Chapter 3 of the Final Draft AQMP, entitled "Uncertainties in the Emissions Inventory" (p. 3-9), stresses the importance of an accurate inventory and describes general improvements to emissions models. However, the District fails to include any quantitative uncertainty estimates for the baseline or future-year emissions estimates. Similarly, the District does not discuss or attempt to quantify the uncertainties associated with the methods and datasets used to prepare the emissions estimates for air quality modeling (e.g., spatial and temporal allocation, and chemical speciation).

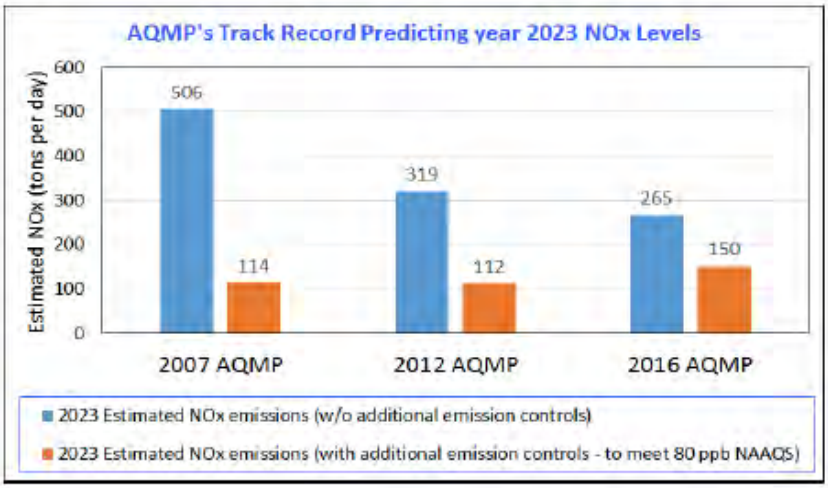
108-5

Of particular interest are the uncertainties associated with the on-road mobile source emissions estimates that are generated from EMFAC2014. Mobile source NO_x emissions estimates are an area of active research, and several recent studies have found that photochemical grid modeling results show better agreement with ambient monitoring data when NO_x emissions are decreased by 50% or more. (See Anderson et al., 2014; Kota et al., 2014; Canty et al., 2015; Jacob et al., 2015.)[1] Generally, those studies attribute the NO_x overestimates to the mobile source sector. For example, Anderson et al. (2014) suggest that emission control systems deteriorate more slowly than is assumed in EPA's MOVES. In its prior comments, EMA has highlighted similar concerns relating to the over-stated zero-mile emission rate, and the over-estimated tampering, malfunction and malmaintenance ("TM&M") rates incorporated into EMFAC2014.

[1] Canty, et al., "Ozone and NO_x Chemistry in Eastern US: Evaluation of CMAQ/CB05 with Satellite (OMI) Data," Atmos. Chem. Phys., 15: 10965-10982 (2015); Anderson, et al., "Measured and Modeled CO and NO_y in DISCOVER-AQ: Evaluation of Emissions and Chemistry Over the Eastern U.S.," Atmos. Environ., 96:78-87 (2014); Kota, et al., "Evaluation of On-Road Vehicle CO and NO_x National Emission Inventories Using and Urban-Scale Source-Oriented Air Quality Model," Atmos. Environ., 85:99-108; Zhou, et al., "Reconciling NO_x Emissions Reductions and Ozone Trends in the U.S., 2002-2006," Atmos. Environ., 70:236-244 (2013); and Jacob, et al., "Factors Controlling PM and Ozone Over the Southeast US as Emissions Decrease: Insights From the NASA SEAC^{4}RS Campaign," EPRI Envision Conference (2015).

While page 3-9 of the Draft AQMP states: *"forecasts are made with the best information available; nevertheless, there is uncertainty in emissions projections,"* this section on uncertainties does not describe or quantify the specific uncertainties related to the District's emissions forecasts. That omission is especially concerning given the dramatic differences in future-year emission projections among the various versions of the AQMP. For example, as shown on the chart below, for the same future-year of 2023, the 2007, 2012, and 2016 AQMPs project baseline NO_x emissions of 506 tpd (2007), 319 tpd (2012), and 265 tpd (2016) – results that vary by nearly 50%. Because those NO_x emissions projections play a critical role in the accuracy of modeled future-year ozone projections, additional understanding of the significant differences in forecasted NO_x emissions is required before finalizing the Draft AQMP. [2]

108-5 Con't

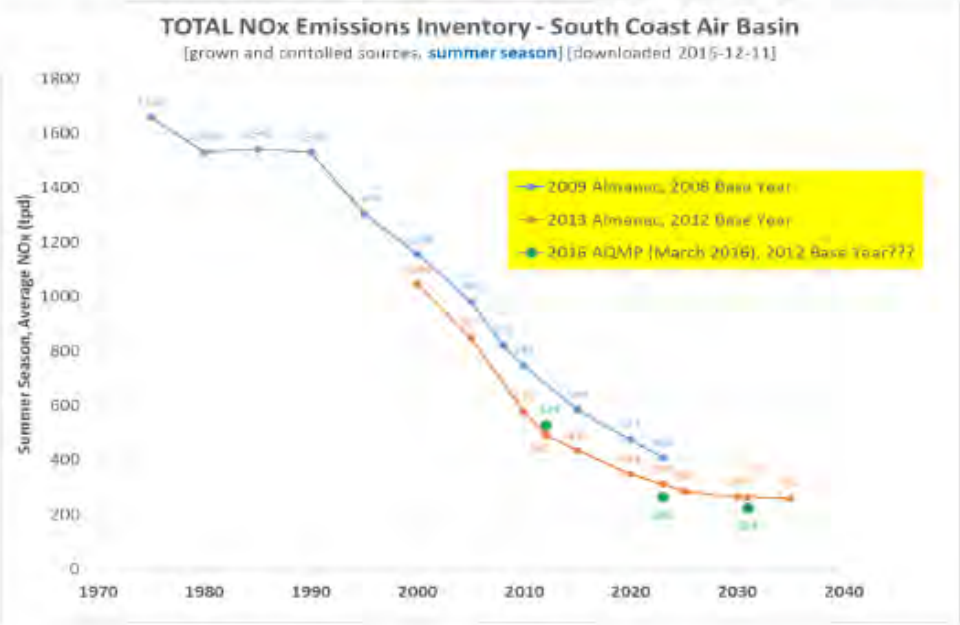


[2] Even accounting for the various emission control regulations adopted between the 2007 AQMP and the 2016 Draft AQMP, the baseline NO_x emission projections would still vary by more than 100 tpd (more than 35%). EMA's concerns regarding the out-of-date assumptions underlying CARB's HDOH NO_x emission inventories were explained in detail in EMA's prior comments, submitted on August 19, 2016. They are incorporated by reference here.

5. The Impact Of The 2008-10 Recession Was Already Accounted For In The 2012 AQMP, And Should Not Be Considered An Improvement To The 2016 AQMP Modeling

At page 5-8 of the Final Draft AQMP, the District states: *"... Lower 2023 baseline VOC and NO_x emissions in the 2016 AQMP relative to the 2012 AQMP reflect the impact of ... the recession occurring between 2008 and 2010."* That is not a fair statement.

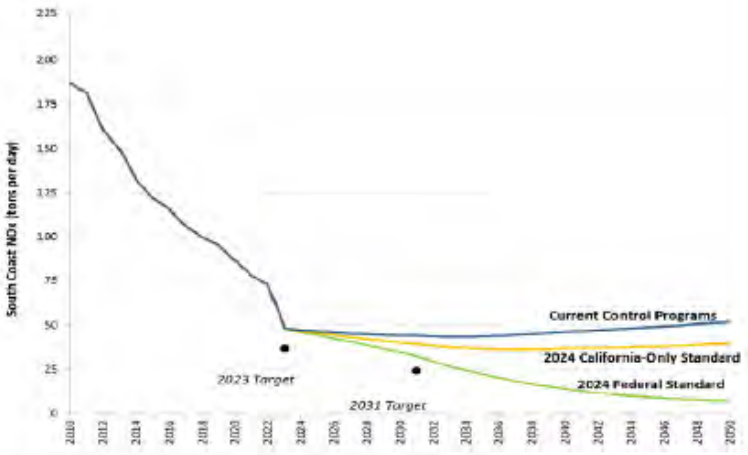
Review of the 2012 AQMP reveals that the emissions inventory used for that analysis was based on the 2013 CARB Almanac. Significantly, that set of inventory numbers already appears to have accounted for the 2008-2010 recession. The figure below shows a comparison of NO_x inventory values from the 2009 and 2013 Almanacs, along with the most recent NO_x values used in the Draft AQMP. It is clear that the 2013 Almanac NO_x emissions (which were used for the 2012 AQMP) show an "additional reduction" of NO_x between the 2008 and 2010 time frame. The NO_x slopes of the 2009 and 2013 Almanac values are clearly different during the recession period. Additionally, the NO_x values used in the Draft AQMP (shown in green) seem to line up quite closely to those of the previous inventory. From this, it seems unjustified to attribute a significant portion of the NO_x inventory changes in the 2016 AQMP model to the 2008-2010 recession. 108-6



6. The District Board Should Note That The Proposed HDOH "Low-NO_x Engine Standard" Should Be Viewed Simply As A Placeholder SIP Control Measure

A key component of the Final Draft Plan is the adoption of a new nationwide 90%-lower FTP-based NO_x standard for HDOH engines and vehicles, set at 0.02 g/bhp-hr (i.e., 90% lower than the current FTP-based standard of 0.20 g/bhp-hr). The District estimates that a nationwide low-NO_x standard would yield NO_x reductions in the SoCAB of 7 tons per day (tpd) in 2031, which would be additive to a California-only low-NO_x standard that would yield 5 tpd in NO_x reductions as of 2031. (*See* Final Draft AQMP, p. 4-35.) This is depicted in Figure 18 of CARB's Mobile Source Strategy Document, as follows:

Figure 18: The Importance of Federal Standards for Heavy-Duty Vehicles*



*The scenarios illustrated in this figure reflect natural turnover rates

108-7

As the District notes in its AQMP, "in order to achieve the maximum emission reductions from this proposed [low-NO_x HDOH engine] measure, a federal standard is necessary." (Final Draft AQMP, p. IV-B-32, 33.) The District goes on to state:

> Federal action is necessary to implement this [0.02 g/bhp-hr] emission standard, since emission reductions would come mostly from Class 4-6 vehicles (as most Class 7 and 8 vehicles operating in California were originally purchased outside the State) from a California-only ARB regulation. Due to the preponderance of interstate trucking's contribution to emissions in California, timely federal action to implement a national low-NO_x engine standard is critical to provide the emission reductions needed for attainment. The State SIP Strategy thus calls for U.S. EPA to develop a national low-NO_x standard .... [A] California-only low-NO_x standard would only impact a fraction of the heavy-duty activity and emissions in California. (*Id.* at IV-B-33.)

On December 20, 2016, EPA responded to the District's specific petition requesting that EPA adopt, in 2017, a nationwide 90%-lower NOx standard for HDOH engines and vehicles. In that response, the Agency made it clear that, as an initial matter, "it will take on the order of 24 months to complete the technical work and prepare a notice of proposed rulemaking for a new on-highway heavy-duty NO_x program." (EPA Memorandum is Response to Petition, p.16.) EPA then went on to state as follows:

> A more rapid timeframe would limit the inquiry to standards based on current regulatory test procedures and test cycles. EPA believes a more robust assessment and regulatory development process will lead to more real-world emission reductions …. EPA also believes that in order to achieve cost-effective real-world reductions, we must look beyond simply reducing the HDOH NOx standard over the test procedures and test cycles that we currently require. Therefore, **it should not be presumed that EPA would eventually propose a NOx standard of 0.02 g/bhp-hr** …. EPA believes it is premature to commit to a particular level or form of a future low-NOx standard for heavy-duty engines or vehicles, especially in advance of developing the robust technical record necessary to propose and promulgate such standards. (Id. at 16-17.) (Emphasis added.)

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EPA's response to the District's petition makes it absolutely clear that " it should not be presumed" that EPA will eventually propose an FTP-based 0.02 g/bhp-hr NOx standard for HDOH engines. Rather, it is far more likely that EPA will develop an alternative regulatory NOx-control program that targets real-world HDOH emission reductions in a manner that "looks beyond simply reducing the NOx standard over the [current] test procedures and test cycles."

The SCAQMD Board needs to ensure that the Final Draft AQMP is revised to reflect this reality. More specifically, the AQMP should be revised to reflect the fact that a federal nationwide 0.02 g/bhp-hr HDOH NO_x standard cannot be presumed, and that, as a result, the SIP control measures that call for the adoption of that specific low-NO_x standard should simply be viewed as placeholder measures pending the more robust data-driven regulatory development process that EPA envisions, and that will play out over the next 24 months. Adopting an AQMP without those necessary caveats would be inherently misleading.

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EXHIBIT A

RAMBOLL ENVIRON

December 13, 2016

DRAFT MEMORANDUM

To: Sang-Mi Lee and Phillip Fine, South Coast Air Quality Management District (SCAQMD)

From: Ralph Morris and Prakash Karamchandani, Ramboll Environ US Corporation (RE)
Steve Reid and Hilary Hafner, Sonoma Technology, Inc. (STI)

Subject: Response to SCAQMD's Presentation on RE-STI Dynamic Evaluation and Ambient/Emissions Data Analyses

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Thank you for allowing us to present some of the dynamic model performance evaluation results at the October 26, 2016 STMPRAG meeting, and for taking the time to analyze our results and data, and to formulate your presentation at the meeting. As you know, dynamic model performance evaluation is one of the four types of model performance evaluation approaches (Operational, Diagnostic, Dynamic and Probabilistic) that EPA recommends in the Agency's current (EPA, 2007[1]) and proposed draft (EPA, 2014[2]) modeling guidance for ozone and $PM_{2.5}$ State Implementation Plan (SIP) modeling. In our dynamic evaluation, we used the 2012 AQMP CMAQ 2008 and draft 2016 AQMP CMAQ 2012 modeling databases, and modeled historical emission periods to compare the modeled and observed ozone trends in the South Coast Air Basin (SoCAB). In our STMPRAG meeting presentation we also discussed a comparison of observed ambient concentrations of ozone precursor data (NOx, VOC and CO) and their ratios with 2012 emissions inventory data used in the draft 2016 AQMP. Our technical analysis was conducted by staff at Ramboll Environ (RE) and Sonoma Technology Inc. (STI) under contract with the Truck and Engine Manufacturers Association (EMA).

Below we clarify our results and respond to your STMPRAG meeting presentation and comments. These responses are intended to help you better understand our analyses and their implications, which could potentially lead to improved modeling tools that can be used in your modeling refinement process to make more accurate and reliable future year ozone projections in future AQMPs. Our responses below are based on comments from the STMPRAG meeting, our presentation (Item 3a), and the SCAQMD's presentation (Item 3b) from the October 26, 2016 STMPRAG meeting. The presentations can be found at the following links:

http://www.aqmd.gov/docs/default-source/Agendas/STMPR-Advisory-Group/Oct2016/3a_reema.pdf?sfvrsn=4

[1] https://www3.epa.gov/ttn/scram/guidance/guide/final-03-pm-rh-guidance.pdf

[2] https://www3.epa.gov/ttn/scram/guidance/guide/Draft_O3-PM-RH_Modeling_Guidance-2014.pdf

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http://www.aqmd.gov/docs/default-source/Agendas/STMPR-Advisory-Group/Oct2016/3b_emaresponse.pdf?sfvrsn=4

DYNAMIC EVALUATION PRESENTATION COMMENTS

STMPRAG Comments on Dynamic Evaluation Presentation

During the RE presentation at the STMPRAG meeting on our dynamic model performance evaluation and ambient/emissions inventory analyses, the SCAQMD and others at the meeting had several comments that we discuss below.

Uncertainties in Historical Emissions and Boundary Condition Inputs

Our dynamic evaluation involved CMAQ simulations using historical emissions over approximately 25 years (1990-2015) in order to compare observed vs. modeled ozone trends over time. This analysis was performed first using the 2012 AQMP CMAQ 2008 modeling database, and then using the draft 2016 AQMP CMAQ 2012 modeling database when it was released in August 2016. The spatial and temporal distribution of the emissions for the historical CMAQ simulations using the CMAQ 2008 (2012 AQMP) or CMAQ 2012 (2016 AQMP) modeling databases were held constant and scaled according to the basin-wide changes in emissions with VOC speciation adjustments. Comments during the STMPRAG meeting noted that this approach fails to account for the changes in spatial distribution over time (e.g., urban growth) as well as the effects of new sources (e.g., freeways) or retired sources. The limitation of this assumption is recognized and introduces uncertainty in the analysis, especially the farther the historical year is from the base year (i.e., 2008 for 2012 AQMP or 2012 for 2016 AQMP CMAQ databases). To address this issue, we emphasize the observed/modeled ozone trends for more recent years (e.g., 2008-2015) in our dynamic evaluation more than the farther back historical years (e.g., 1990 and 1995). Generating model-ready historical emissions using first principles (e.g., historical fleet distribution networks) were not feasible since some of the underlying data are unavailable and the ARB/SCAQMD use custom emissions modeling software that is not used by others or readily available to the public. If the ARB/SCAQMD could provide more refined model-ready historical emission inventory inputs using their custom emissions modeling software, we would be happy to include it in our historical ozone modeling to reduce the uncertainties in this assumption.

A second source of uncertainty raised in comments during the STMPRAG meeting was that boundary conditions (BCs) for the 4 km Southern California domain were held constant at 2008 (2012 AQMP) or 2012 (2016 AQMP) levels in the historical simulations. Comments noted that ozone has been coming down in California and this effect may overstate the ozone from BCs for the historical year simulations, especially for the northern BC. However, the amount of ozone coming in from Asia has increased during this period so ozone coming through the western BC may be understated in the historical simulations. Thus, how the BCs should be adjusted is unclear. Again, focusing on the comparisons between more recent observed and modeled ozone trends (e.g., 2008-2015) will minimize the impact of this uncertainty on the dynamic evaluation results. If ARB/SCAQMD could provide historical BC inputs for the 2012 base

meteorological year and 4 km SoCAB domain used in the 2016 AQMP (e.g., BCs for the 2008, 2005, 2000 and/or 1995 emission years) using historical MOZART GCM and CMAQ 12 km California domain simulations, we could include them in the historical CMAQ simulations for the SoCAB to reduce the effects of this uncertainty on the dynamic evaluation.

2016 Ozone Season Results

The SCAQMD commented that ozone concentrations in 2016 were higher than previous years, and including them in the observed ozone trends results in more favorable comparisons of the observed and modeled ozone trends. We recognize that the observed ozone was unusually higher in 2016. At the STMPRAG meeting, SCAQMD staff attributed the 2016 high observed ozone concentrations in part to anomalous meteorological conditions that were in the top 0.5% of ozone formation potential conditions based on analysis of observations going back 70 years (1946-2016). We did not include 2016 observations in our ozone trend presentation since much of the analysis was conducted before the end of the 2016 ozone season so the data did not exist. Furthermore, the 2016 ozone observations have not yet been validated so are not available on EPA's website. However, as shown below, we have re-analyzed our dynamic performance evaluation using the un-validated 2016 ozone observations. Although the observed rate of ozone reduction is reduced using the 2016 observed ozone end point, it does not change the basic conclusions regarding the fact that the modeled ozone trends are not coming down as fast as observed (See Figure 1).

Use of 3-Year vs 5-Year Ozone Design Values

During the STMPRAG meeting, the SCAQMD commented that the RE dynamic evaluation should have used the 5-year ozone Design Value (5-yr DV) instead of the 3-year ozone Design Value (3-yr DV). The ozone National Ambient Air Quality Standard (NAAQS) is based on the ozone Design Value that is defined as the three-year average of the fourth highest maximum daily average 8-hour (MDA8) ozone concentrations (i.e., the 3-yr DV). This definition is mandated by law in the code of federal regulations (40 CFR Part 50) and determines whether the SoCAB attains the NAAQS or not. However, EPA's current (EPA, 2007) and proposed draft (EPA, 2014) modeling guidance recommends making ozone projections using the 5-yr DVs (average of three years of official 3-yr DVs) in order to somewhat moderate the effects of year-to-year variations in ozone concentrations. Although we performed the dynamic evaluation of the 2012 and draft 2016 AQMP CMAQ databases using both the 3-yr DVs and 5-yr DVs, due to time limitations for the STMPRAG meeting presentation we just presented the more regulatory relevant 3-yr DV ozone trend results. As discussed below, the conclusion that the model underestimates the observed rate of ozone reduction over time holds whether the 3-year or 5-year ozone DV is used.

Figure 1 presents our dynamic model evaluation comparing observed ozone trends at Crestline, which corresponds to the Basin-wide ozone maximum most of the time, with the draft 2016 AQMP CMAQ 2012 modeling database for the period of 2008 to 2014/2015. This dynamic evaluation addresses SCAQMD's comments by:

- Showing the observed and modeled ozone trends using both the 3-yr DV (Figure 1, top) and 5-yr DV (Figure 1, bottom).
- Including observed ozone data from 2016 in the trends analysis (i.e., observed ozone trends end using 2015 3-year DV (2014-2016) or 2014 5-year DV (2012-2016)).
- Limiting the trends analysis between 2008 and 2014/2015 when the uncertainties associated with using 2012 spatial distribution of emissions and BCs is minimized.

The SCAQMD is correct, when including the higher observed ozone data from 2016, the observed and modeled ozone trends are closer together as shown in Table 1 below. However, even when including the unusually high observed ozone from 2016, the modeled ozone trend reduction using the 2016 AQMP CMAQ 2012 is still at least a factor of 2 or more less steep than the observed trend. Figure 1 also shows how the trends were calculated using regression equations through the available ozone data between 2008 and 2015. Note that for the 5-yr DV trends, the observed data only go through 2014, since that is the last year the observed ozone data are available for calculating the 5-yr DV (i.e., 2012-2016), whereas for the 3-yr DV the trends go through 2015 (2015 3-yr DV based on 2014-2016 data).

Table 1. Comparison of observed and modeled ozone Design Value (DV) trends (ppb/year) using for 2008-2014/2015 using the draft 2016 AQMP CMAQ 2012 modeling database.

• Ozone DV	• Observ	• Modele	• Ratio
• 3-Yr DV	• 2.	• 1.1	• 2
• 5-Yr DV	• 2.	• 1.1	• 2

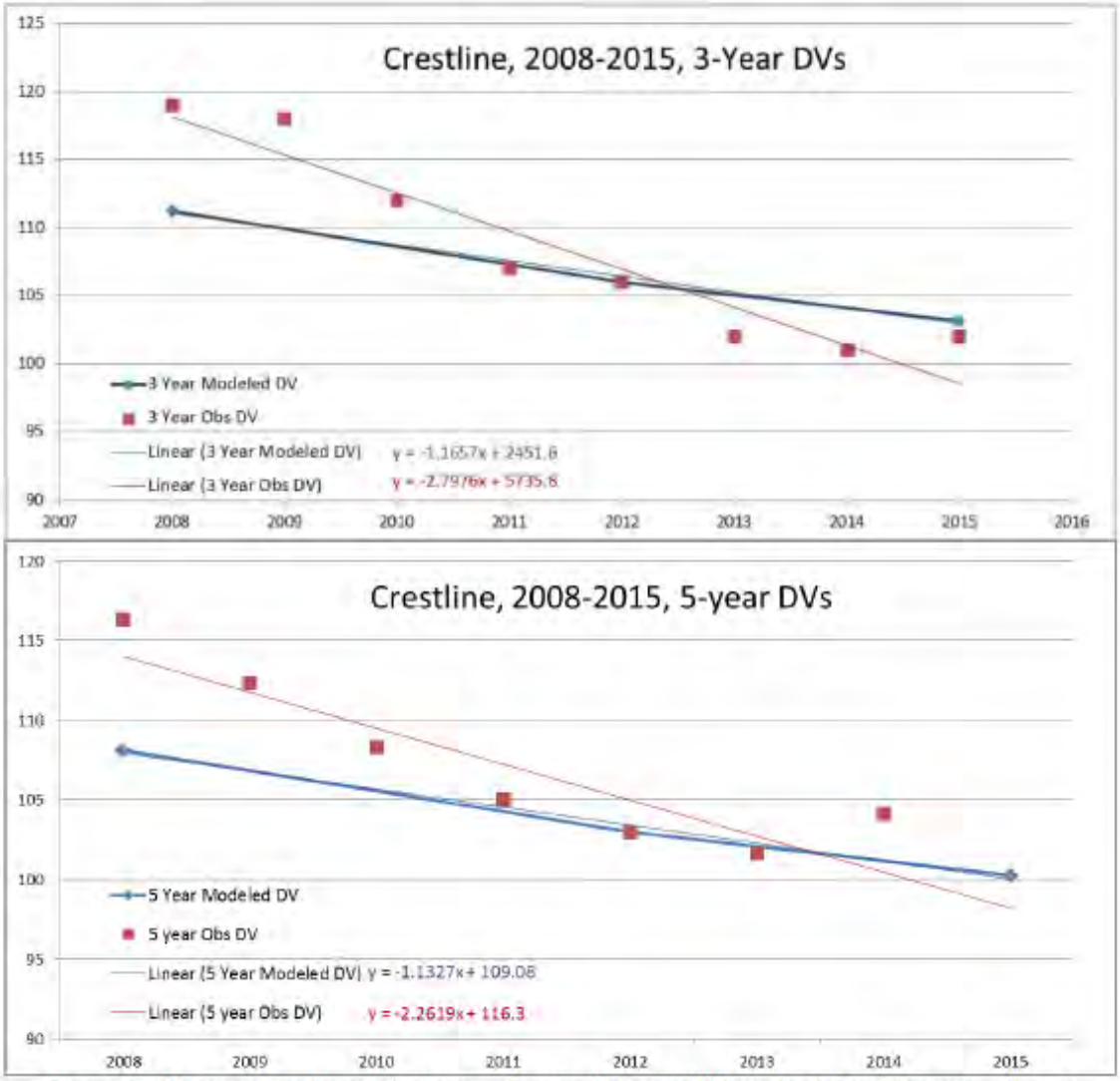


Figure 1. Observed and modeled ozone Design Value (DV) trends at Crestline using the 3-yr DV (top) and 5-yr DV (bottom) and the draft 2016 AQMP CMAQ 2012 modeling platform using observed trends through 2016 ozone season data.

SCAQMD Presentation of Comments on the RE-STI Dynamic Evaluation

The SCAQMD presentation on the RE-STI dynamic model performance evaluation at the STMPRAG meeting commented on several issues. Our response to each of these issues is discussed below. The sections headings using *Italic Underline* correspond to slide titles or statements from the SCAQMD's STMPRAG presentation.

Design Values Can Not be Linearly Extrapolated (SCAQMD Slides No. 2 and 3)

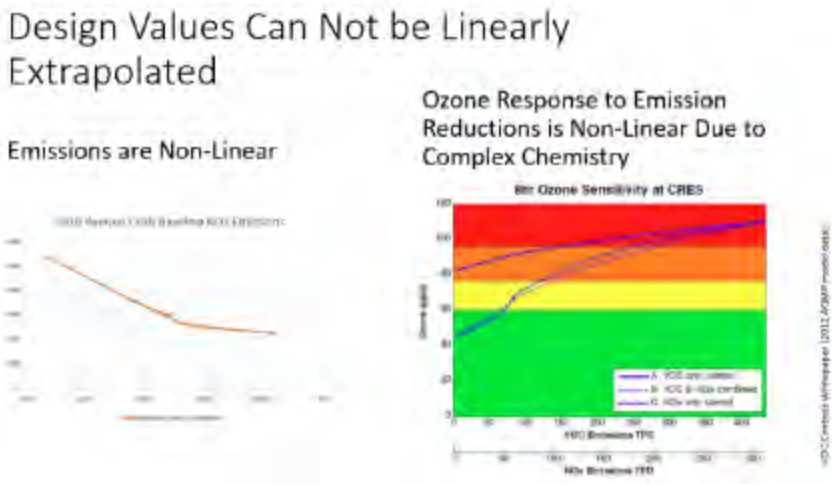
Slides number 2 and 3 from the SCAQMD STMRAG meeting presentation are reproduced in Figure 2 below. These slides imply that our dynamic evaluation extrapolated the ozone DVs. However, our dynamic evaluation presentation never extrapolated the ozone DVs. Rather it compared historical observed ozone trends with modeled changes in ozone over different historical periods dating as far back as 1990 (2012 AQMP) or 1995 (2016 AQMP) to current (2014/2015). The comparison of the historical observed and modeled ozone trends clearly shows that the modeled rate of ozone reduction over time is significantly lower than observed. Our dynamic evaluation compares the observed ozone rate of ozone reduction over time with modeled values using linear regression equations within the 1990-2015 time periods, with no extrapolation. In the discussion below, we have included the observed 2016 ozone data in the dynamic evaluation that was not available at the time of our previous analysis.

Emissions are Non-Linear: The SCAQMD slides also state that the change in emissions over time is nonlinear. We recognize that and it was accounted for in the dynamic evaluation by adjusting the emissions to historical levels using the nonlinear changes in emissions between the base year (2008 for 2012 AQMP and 2012 for 2016 AQMP) and historical year.

Ozone Response to Emission Reductions is Non-Linear Due to Complex Chemistry: The SCAQMD slides also indicate that the ozone response to emission changes is non-linear. This is also accounted for in the dynamic evaluation by using the SAPRC photochemical mechanism in the CMAQ model that includes complex non-linear photochemistry that accounts for the nonlinearities in ozone formation.

As noted above, we do calculate the observed and modeled trend in ozone reductions using a linear regression equation. In fact, the linear regression equation matches the observed and modeled ozone trends very well (see Figure 1). There is year-to-year variability in the observed ozone concentrations due to meteorological variations (especially apparent in the unusual 2016 observed data), but in general the linear regressions do a good job in replicating the observed and modeled ozone trends over longer periods of time (e.g., 5+ years).

Thus, all issues raised in the SCAQMD slides were addressed in our dynamic evaluation.



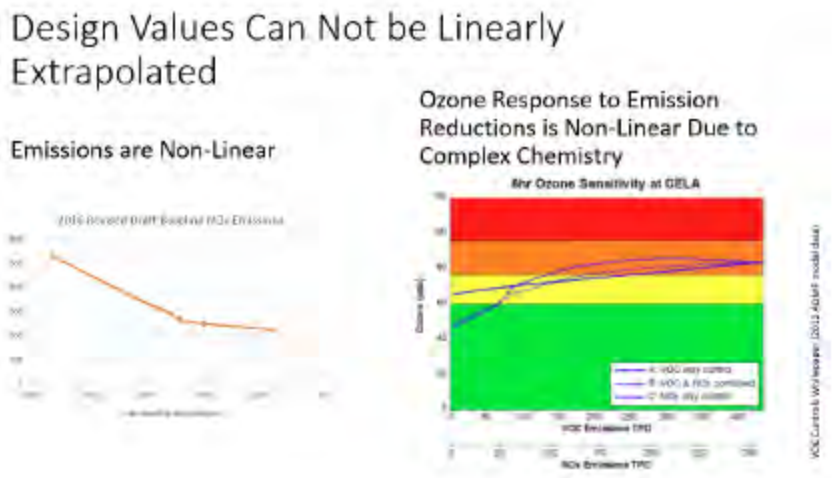


Figure 2. Slides No. 2 (top) and 3 (bottom) from SCAQMD's presentation Item 3b from the October 26, 2016 STMPRAG meeting (Source: SCAQMD, 2016).

Time Window that Slopes are Calculated Matters (SCAQMD Slides No. 4 and 5)

Figure 3 reproduces SCAQMD slides number 4 and 5 from the SCAQMD's STMPRAG meeting presentation that make the point that the time window chosen for analyzing observed and modeled ozone trends can make a difference. We agree, which is why we analyzed ozone trends over several different time windows and tried to examine trends over sufficiently long periods so that they are meaningful and not unduly influenced by year-to-year variations in ozone due to meteorological variations. For example, the observed rate of ozone reductions between 1990 and 2000 was greater than in more recent years. In order for the ozone trends to have meaning, they need to be calculated over a sufficient amount of years so that year-to-year variability due to meteorology does not dominate the trends.

Figures 4a, 4b, and 4c display our dynamic evaluation for the draft 2016 AQMP CMAQ 2012 modeling database using the 5-yr DVs at Crestline for five different time windows ranging from 25 to 4 years in length, with the tabular summary of the observed and modeled ozone trends comparison given in Table 2. With the exception of the 2011-2015/2014 trend based on 4 data points with the end point being the 2014 5-yr DV (2012-2016) that is highly influenced by the unusually high 2016 ozone levels (Figure 4c), the rate of the observed ozone reduction is 1.3 to 2.8 times faster than modeled. The last time window, from 2011-2015/2014 not only is highly influenced by the unusual 2016 ozone levels, but does not provide enough time (4 years of 5-yr DV data) to establish a "trend" that can be used for robust comparisons.

Table 2. Comparison of observed and modeled 5-yr DV ozone trends (ppb/year) for five time windows at Crestline using the draft 2016 AQMP CMAQ 2012 modeling database.

Time Window	Observed Trend (ppb/year)	Modeled Trend (ppb/year)	Ratio Trend Obs/Mod
1995-2015/2014	2.94	2.30	1.28
2000-2015/2014	2.41	1.76	1.37
2005-2015/2014	2.59	0.92	2.82
2008-2015/2014	2.26	1.13	2.00
2011-2015/2014	0.40	0.91	0.44

The following paragraphs present our response to the three bullet points in SCAQMD's presentation slide number 4 (Figure 3, top).

Slope between 2000 and 2014 or 2008 and 2015 is not predictive of future behavior (SCAQMD slide no 4): This is not our statement; what we are demonstrating is that previous "future predictions" in AQMPs systematically underestimated ambient "future" concentration reductions from emission reductions and that the AQMP modeling databases (2012 and 2016 AQMP) do not estimate as great a rate in ozone reductions as observed when performing modeling of historical years. Our conclusion would be that there is a high probability that the current 2016 AQMP modeling would be affected by the same systematic underestimation. The CMAQ 2023 ozone projections in the 2012 AQMP has greatly understated the observed rate of

ozone reduction, as well as the CMAQ model underestimating the rate of observed ozone reduction in historical years. The draft 2016 AQMP exhibits similar underestimation of observed rate of ozone reductions in historical years. Although it is difficult to predict the future, the draft 2016 CMAQ 2012 modeling database ozone reduction rate still appears to be less responsive to changes in emissions than observed.

Recession reduced emissions within these periods (SCAQMD slide no. 4): The Great Recession occurred between December 2007 and June 2009. The 2012 AQMP, which was developed after the end of the recession, spent considerable effort in accounting for the effects of the recession on NOx and VOC emissions, so they were accounted for in the modeling. The 2016 AQMP was developed well after (~5 years) the end of the recession, so its emissions also include the effect of the recession. Consequently, the effects of the recession are reflected in both the modeled and observed ozone trends in both of the 2012 and 2016 AQMPs.

Slope depends on time period, i.e. 2011-2014 slope is 0.43 ppb/year (SCAQMD slide no. 4): As noted in the SCAQMD presentation, the observed 5-yr DV ozone trend over 2011-2014 period is 0.4 ppb/year as stated in SCAQMD's slide number 4 (Figure 3, top) and shown in our analysis in Figure 4c and Table 2. However, 4 data points of 5-yr DVs is not a sufficiently long time to establish a trend, especially when using the 2016 year end point that SCAQMD noted at the STMPRAG meeting was in the top 0.5% of ozone formation conducive meteorological conditions over the last 70 years (1946-2016). As shown in the 1995-2015 20-year ozone time series plot at the top panel of Figure 4a, the observed ozone reduction trend has experienced numerous shoulders of lower reduction along with steeper slopes of faster ozone reductions when looking at short time periods. For example, the observed ozone reduction trend between 1997 and 1998 was 0.7 ppb/year followed by an ozone reduction rate of 8.3 ppb/year, neither of which represents a true ozone trend due to too short of a time period for analysis.

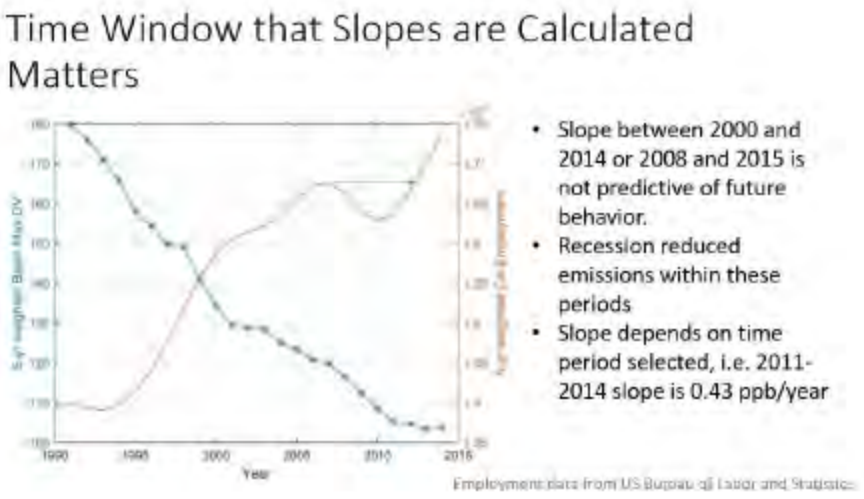
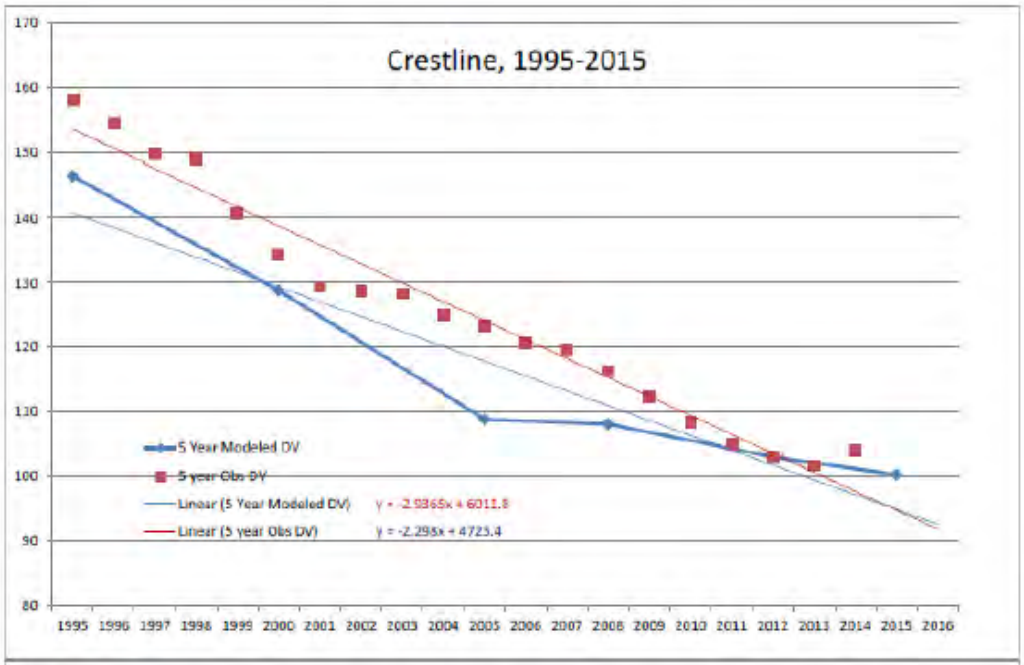




Figure 3. Slides No. 4 (top) and 5 (bottom) from SCAQMD's presentation Item 3b from the October 26, 2016 STMPRAG meeting (Source: SCAQMD, 2016).



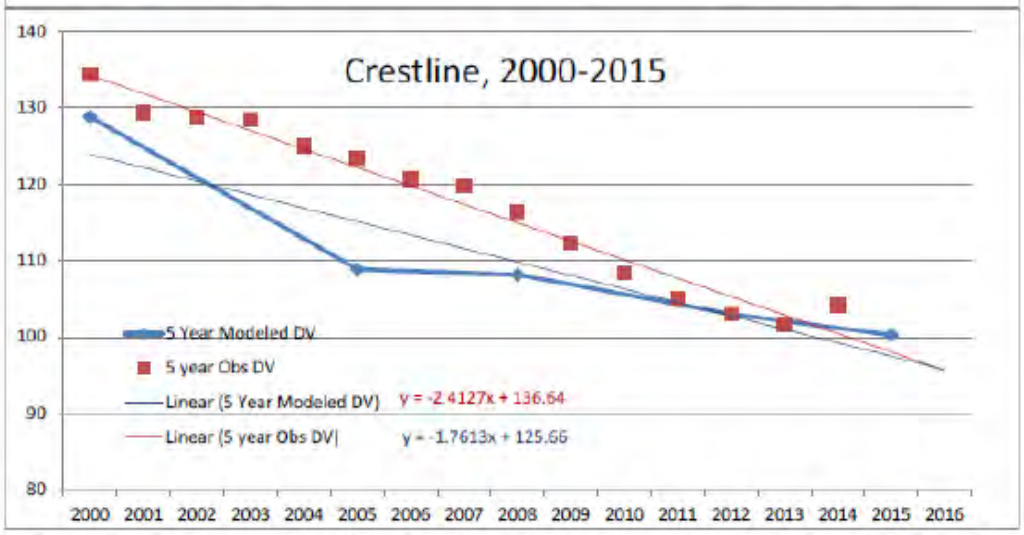


Figure 4a. Observed and modeled 5-yr DV ozone trends using the draft 2016 AQMP CMAQ 2012 modeling database at Crestline for 1995-2015 (top) and 2000-2015 (bottom).

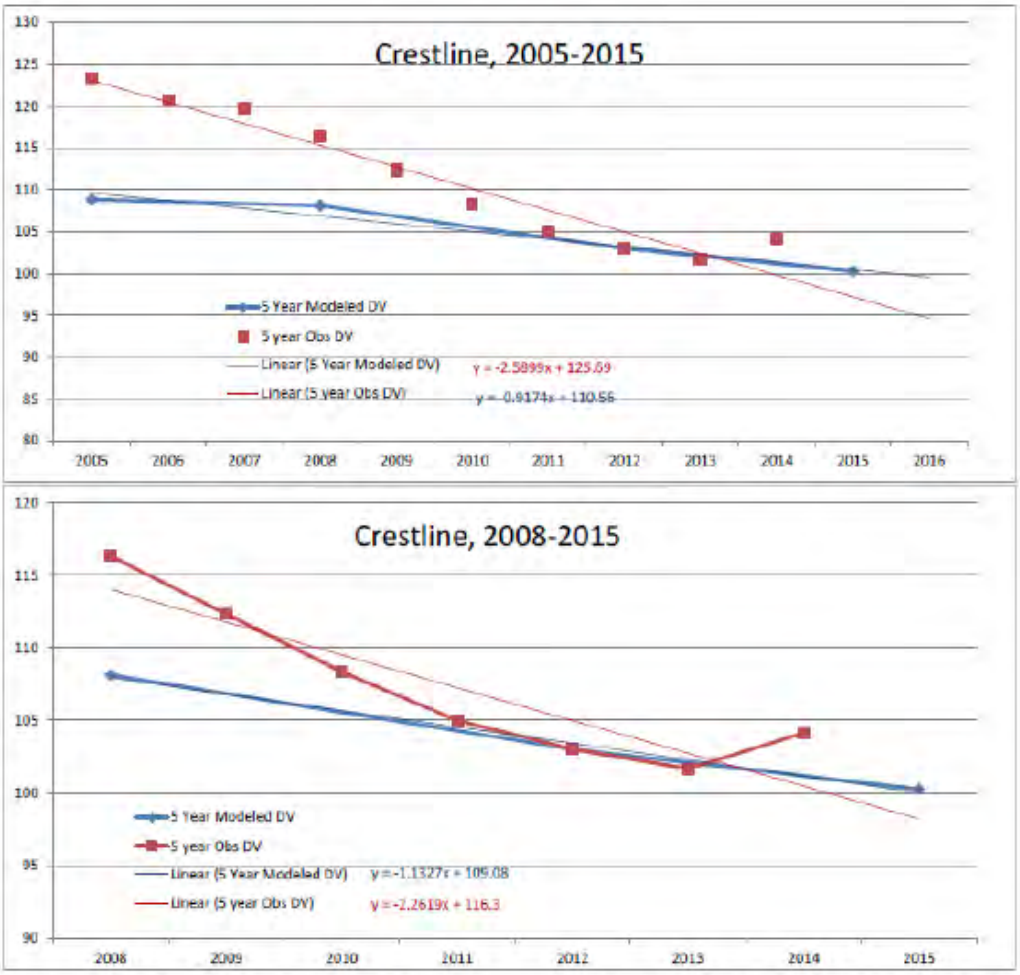


Figure 4b. Observed and modeled 5-yr DV ozone trends using the draft 2016 AQMP CMAQ 2012 modeling database at Crestline for 2005-2015 (top) and 2008-2015 (bottom).

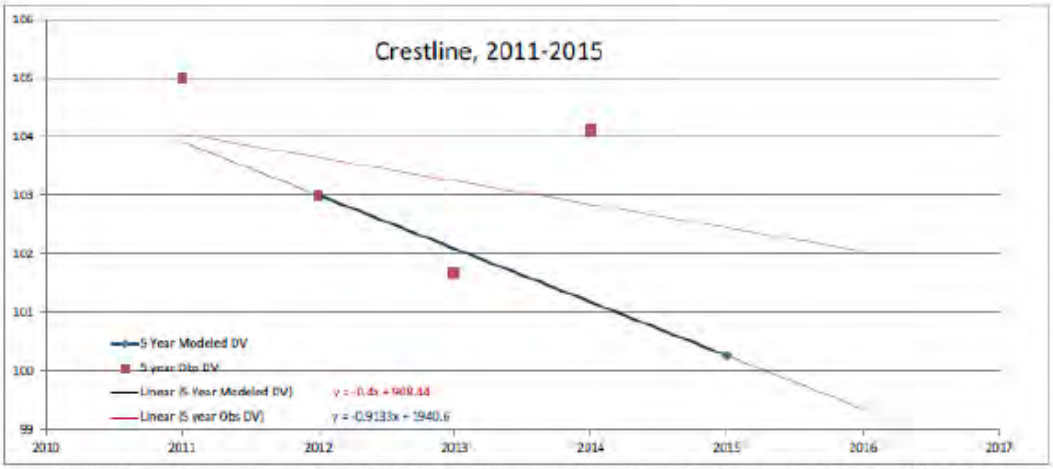


Figure 4c. Observed and modeled 5-yr DV ozone trends using the draft 2016 AQMP CMAQ 2012 modeling database at Crestline for 2011-2015.

Future Year Ozone Projections using New Projection Methodology

In December 2014, EPA published draft modeling guidance that updated the future-year ozone projection procedures (i.e., the relative response factor or RRF approach) from the current 2007 modeling guidance. RRFs refer to the ratio of future year to current year modeled ozone concentrations that is used to scale the current year observed ozone 5-yr DV to project the future year ozone DV. One of the biggest differences between EPA's current ozone projection procedure (EPA, 2007) and the proposed draft procedure (EPA, 2014), which especially affects the SoCAB, is that many more modeled days were used in the RRFs under the old guidance, whereas just the top 10 modeled ozone days are used under the new guidance. As modeled ozone tends to be more responsive to changes in emissions under higher concentrations, the modeled ozone reductions are expected to be greater using the new guidance.

Slides numbered 6, 7 and 8 from the STMPRAG SCAQMD presentation show 2023 ozone projections using the current 2007 and draft 2014 ozone guidance, with slide number 6 reproduced in Figure 5 below showing the results for Crestline. As expected, using the 2012 AQMP CMAQ modeling results for 2008 and 2023, the projected 2023 ozone DV using the new guidance is lower than using the old guidance. This is consistent with our modeling results that are shown in Figure 6, which show the 2023 projected ozone DV using the 2012 AQMP modeling results to be 107.0 ppb using the old and 98.3 ppb using the new RRF guidance. That is, the rate of ozone reduction between 2008 and 2023 using the 2012 AQMP modeling results is 0.6 ppb/year using the old and 1.2 ppb/year using the new EPA guidance. However, that is still a modeled rate of ozone reduction (1.2 ppb/year) that is almost a factor of two lower than observed ozone reduction between 2008 and 2014 (2.3 ppb, see Table 2).

Thus, the new EPA guidance RRF ozone projection approach (EPA, 2014) does produce modeled ozone reductions over time that are greater than under the 2007 EPA guidance. Significantly, in all of our dynamic model performance evaluation using the 2012 AQMP and draft 2016 AQMP CMAQ modeling databases, we have always used the new EPA guidance RRF ozone projection approach using EPA's Modeled Attainment Test Software (MATS[3]). Thus, this issue raised by SCAQMD regarding differences between EPA's 2007 and 2014 modeling guidance has no effect on our dynamic evaluation.

[3] https://www.epa.gov/scram/photochemical-modeling-tools

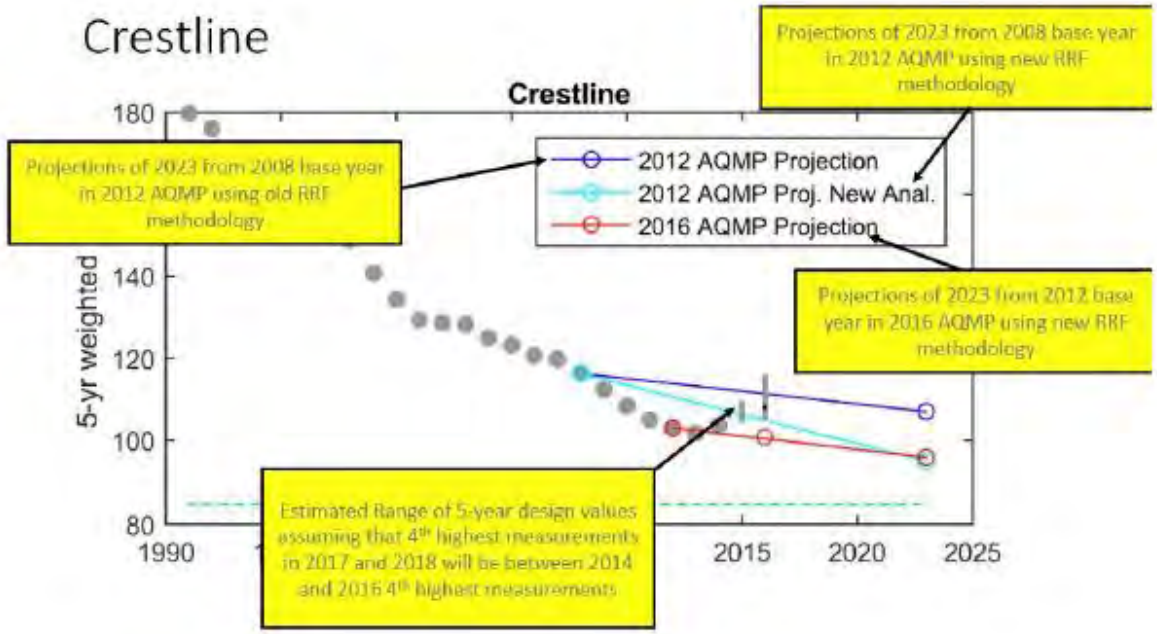


Figure 5. Slide NO. 6 from SCAQMD's presentation Item 3b from the October 26, 2016 STMPRAG meeting (Source: SCAQMD, 2016).

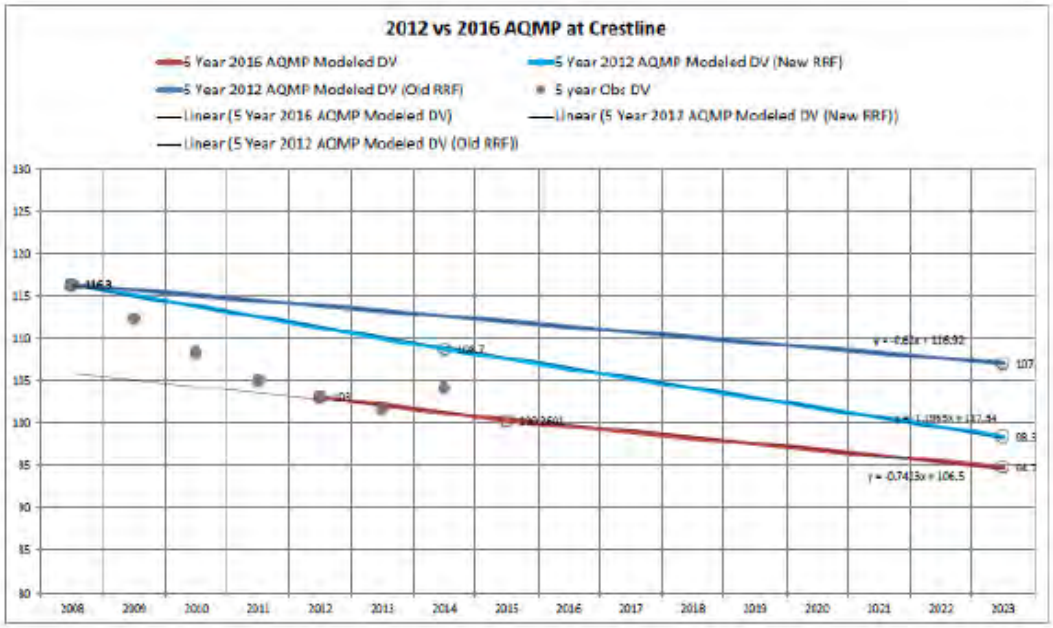


Figure 6. Comparison of 2008 to 2023 ozone projections from 2012 AQMP using old RRF approach (dark blue) vs. using new RRF approach (light blue) calculated by Ramboll Environ and 2016 ozone projections (red).

Predicted vs. Measured Ozone Reduction Rates

The final slide from SCAQMD's presentation compares 5-yr DV ozone reduction rates at four sites plus the basin-wide maximum for: (1) the 2012 AQMP CMAQ 2008 model and the 2008-2014 time period; (2) the draft 2016 AQMP and CMAQ 2012 model and the 2008-2015 time period; (3) measured ozone for the 2008-2015 time period; and (4) measured ozone for the 2008-2016 time period. It appears that the SCAQMD's point in presenting this slide is that the measured ozone trend reduction rate over the 2008-2016 time period is more like the modeled values over the 2008-2015 time period. The problem with the SCAQMD analysis is that they are using observed ozone trends based on observed 2015 and 2016 5-yr DV ozone values that don't yet exist. The 2015 5-yr ozone DV is based on observed ozone concentrations from 2013-2017, which includes the year 2017 that has not yet occurred. Similarly, the 2016 5-yr DV uses observed ozone from 2014-2018 that includes two years (2017 and 2018) that have not yet occurred. Since ozone observations for 2017 and 2018 do not exist, we cannot reproduce the SCAQMD's analysis. Rather, it appears that the SCAQMD made an assumption that the 2017 and 2018 meteorological conditions and resultant ozone concentrations would be between the ozone levels in 2014 and 2016 to prepare figures to make the point that the observed ozone trend is getting closer to the modeled ozone trend. However, this type of assumption is not warranted given that the 2016 meteorology was in the top 0.5% of ozone formation potential conditions; it is essentially assuming that ozone formation conducive meteorological conditions occur in 2017 and 2018 that approach the unusual 2016 meteorological conditions would occur three years in a row.

Rather than relying on highly unlikely extrapolated values for ozone in 2017 and 2018, we will continue to base our discussions on actual recent year observed ozone values. Figure 8 compares the modeled and observed 5-yr DV ozone reduction rate at four sites plus the basin-wide maximum using ozone observations as far out as currently available (i.e., the 2014 5-yr DV based on 2012-2016 observations). At Crestline, the observed rate of ozone reductions is almost twice as high as the modeled rate, and the basin-wide rate of 5-yr DV reductions is over 50% faster than the modeled rate. This holds even when using the unusually high 2016 ozone season as the ending year anchor point in the observed ozone trend.

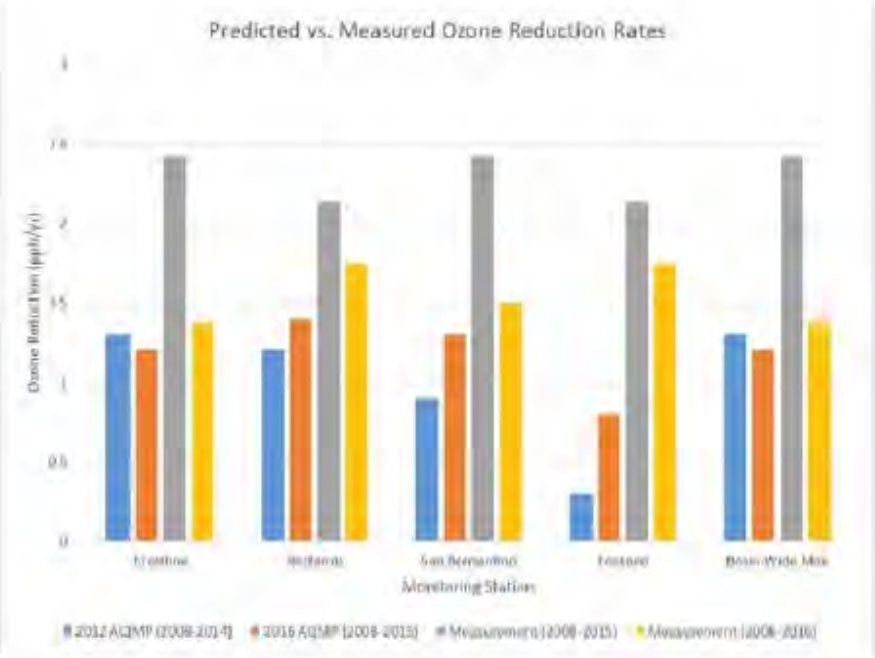


Figure 7. Slide No. 6 from SCAQMD's presentation Item 3b from the October 26, 2016 STMPRAG meeting (Source: SCAQMD, 2016).

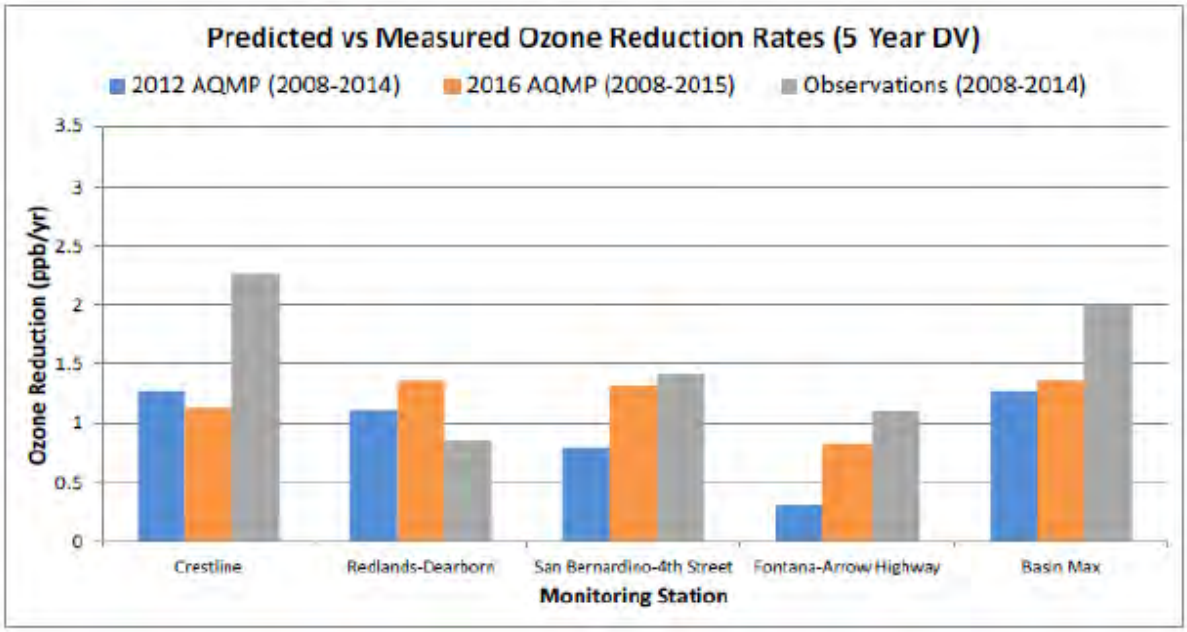


Figure 8. Comparison of modeled 2012 AQMP 2008-2014, modeled 2016 AQMP 2008-2015 and observed 2008-2014 5-yr DV ozone reduction trends.

SCAQMD Comments on Ambient Data/Emissions Inventory Comparisons

During the STMPRAG meeting, the SCAQMD had two comments on the comparisons of the measured ambient VOC, NOx and CO concentration data and the emissions inventories, which we address below.

Should Compare Observed Ambient Concentrations with Modeled Concentrations not Emissions: The SCAQMD makes a good point and the analysis will be extended to include this comparison. We expect these results to be available in December 2016.

PAMS VOC Species Not Consistent with Emissions/Modeled VOC Species: The SCAQMD rightly points out that the VOC species measured by the PAMS network does not include all VOC species that are represented in the emissions inventory and modeling. We recognize this fact and factor it into our interpretation of the results. The ambient data/emissions inventory comparisons conducted for 2012 indicate that the measured VOC/NOx ratios using PAMS data are much higher than the emissions inventory-derived VOC/NOx ratios. However, if the VOC species not detectable by the PAMS network were excluded from the emissions data, the emissions-based VOC/NOx ratios would decrease, making comparisons with ambient-based ratios even less favorable (i.e., the emission inventory underestimation of the observed ambient VOC/NOx ratio would be even greater). So the disconnect between PAMS VOC species and modeled SAPRC-07 species does not weaken the conclusions of our analysis that the 2012 emission inventory VOC/NOx ratio understates the actual observed VOC/NOx ambient ratios in the SoCAB.

SUMMARY

We again thank you for the opportunity to engage in this scientific discussion, and are hopeful for continued discussions going forward. The higher level overarching comment from all of this work is that the CMAQ models used in the past AQMPs underestimate the rate of observed ozone reduction over time. That is, the "predictive capability" of CMAQ, as it is applied to the difficult topography and meteorological conditions of the South Coast Air Basin, does not match the rate of ozone reduction that has been observed. SCAQMD raised several issues in their comments and presentation at the October 26, 2016 STMPRAG meeting, but none of them contradict the fundamental fact that the AQMP CMAQ model underestimates the observed rate of ozone reductions over time.

The initial indications from the comparison of 2012 emissions inventories used in the modeling with the measured ambient-concentration VOC/NOx ratios are that the ratios are underestimated, suggesting that current 2012 emission inventories may understate VOC emissions, overstate NOx emissions or some combination of the two. Further analysis of the ambient ratios compared against the CMAQ modeling results are underway and may refine these findings. We also are proceeding with sensitivity modeling to help identify some of the potential causes of CMAQ's underestimation of the observed ozone reduction rate, which hopefully can lead to more accurate and reliable future year ozone predictions. We welcome the opportunity to work collaboratively on these issues, so that the "predictive capability" of CMAQ, as it is applied to the SoCAB, can be improved.

Responses to Comment Letter from Truck and Engine Manufacturers Association (Comment Letter #108)

Response to Comment 108-1:

SCAQMD is bounded to follow U.S. EPA's guidance to demonstrate attainment. EMA's technical consultant presented their dynamic evaluation results at the STMPR held on October 26th, 2016. Staff believes this approach contains serious flaws because it fails to account for the changes in ozone background concentration and improvement in ozone pollution in California, including Kern County which borders with the Basin. In essence, it is not scientifically correct to presume a linear response of ozone to emission reductions.

Please refer to Response to Comment Letter #58 regarding Dynamic evaluation and other details.

Response to Comment 108-2:

EMA's technical consultant, Ramboll, presented their dynamic evaluation at an STMPR meeting in October, 2016. Staff believes their approach contains serious technical flaws because critical spatial changes in emissions inventories were not incorporated and the use of static boundary conditions when back casting concentrations were also not incorporated. Both omissions will likely lead to underestimations in past concentrations. The emissions in China is in a rapid increasing trend, and its transport impact is a growing concern in California as well as many southwestern and mountain states. The ozone design values observed in Kern County decreased almost by 8 ppb during 2008–2015. While Ramboll confined their latest analysis in a relatively narrow time window (2008–2015) to avoid such transport impact, the 7-year time period still poses significant changes in the ozone transport into the Basin, therefore, the Ramboll's approach is inconclusive and misleading without providing a full account of the proper boundary values. In addition, the economic growth and accompanying demographics changed the spatial and temporal distribution of emissions significantly. Many regulatory programs and incentive funding projects such as Proposition 1B, Goods Movement Emissions Reduction Program focus on specific facilities, which reduces emissions from the area subject to the rule at a faster rate than other areas in the Basin.

Also, the consultant presented analysis based on 3-year design value, which staff was unable to reproduce. Later on December 13, 2016, Ramboll emailed responses, which are attached as Exhibit A in the comment letter. In that response, the 5-year design value was included. Still, the values are do not agree with U.S. EPA's official approved design values. In order to clarify the discrepancy, Ramboll will need to disclose the design values used in their analysis.

Response to Comment 108-3:

Please refer to the Responses to Comment Letters 52 and 58.

Again, ozone concentration is not expected to response linearly to emission reductions and the rate of change cannot be expected to stay constant over several decades.

Response to Comment 108-4:

The scientific community does not support the linear extrapolation of past ozone trend into future, as discussed clearly during the STMPR meeting held on October 26, 2016 at the SCAQMD.

Response to Comment 108-5:

Please refer to Response to Comment 58-6.

The changes in baseline emissions reflect the impact of rules and regulations implemented after the finalization of an AQMP, as well as changes in methodology. It should be noted that each AQMP proposes new control measures which result in additional emission reductions beyond the level estimated in the previous AQMP. This is one of main reasons to update emissions inventory periodically.

Response to Comment 108-6:

We have a reasonable doubt that the impact of the recession was not fully incorporated in the growth projection made by SCAG RTP 2012. Selected growth parameters used in transportation sectors indicated monotonic growth in years 2011–2012, while the gasoline and diesel consumption were decreased till 2012 and 2013 when they reached the minimum level.

Response to Comment 108-7:

Comments were noted.

Detailed Responses to Exhibit A:

Page 2: The failure to incorporate spatial changes in emissions inventories and the use of static boundary conditions when back casting concentrations are critical flaws that both will likely lead to underestimations in past concentrations. For example, the historical Kern County design values to qualify how the northern boundary concentrations have changed. Between 2008 and 2015, the Kern County design value decreased by ~8ppb, while the background ozone concentrations at the western boundary increased on the order of ~3ppb (estimates from OMI measurements). The response provided to this issue is that focusing on the comparison between more recent trends during the 2008–2015 period will minimize these uncertainties, however, staff believes the uncertainties arising from the failure to properly account for these changes are likely significant.

Page 6: It is not advisable to draw a linear line in the historical design values. Our slides on page 7 support the idea that design values cannot be linearly extrapolated. Those same reasons support the fact that design values do not necessarily follow a linear trend. In fact, all plots of design values from 2008 to 2014 do not show a linear trend. Moreover, it is incorrect to fit data to a line when 1) it does not appear linear as sign of the residuals are not randomly distributed along the curve and 2) the underlying functions, namely emissions and the ozone concentration response from those emissions, are not linear. Intuitively, in the base-case scenario, the decrease in marginal emission reductions with time along with the shape of the ozone isopleth in the upper right corner suggests that yearly reductions in future ozone concentration would decrease over time. This is clear when looking at the change in the observed and modeled slope as the time window is narrowed by removing earlier years (see Table 2 on page 8).

Page 6: The authors say that their dynamic evaluation never extrapolated the ozone design values. However on page 14 of this document, the authors extrapolate the observed linear ozone reduction between 2008 and 2014 so that they can compare it to the rate of ozone reduction between 2008 and 2023 from the U.S. EPA approved guidance.

> "That is, the rate of ozone reduction between 2008 and 2023 using the 2012 AQMP modeling results is 0.6 ppb/year using the old and 1.2 ppb/year using the new EPA guidance. However, that is still a modeled rate of ozone reduction (1.2 ppb/year) that is almost a factor of two lower than observed ozone reduction between 2008 and 2014 (2.3 ppb, see Table 2)."

Page 17: The authors incorrectly suggest that we are assuming that the unusual meteorological conditions experienced in 2016 will reoccur in 2017 and 2018 for the development of Slide 6 in the SCAQMD presentation. We merely use a range of possible 2017 and 2018 4th highest values that are bounded by the lowest and highest 2014-2016 values. This analysis indicates that even if 2017 and 2018 4th highest values are on the low end, the model will underestimate 2016 5-year design values at Crestline. This illustrates that 2016 will continue to influence 5-year design values for the next few years (2016 only has a small influence on 2014 5-year design values, yet there is a sharp upswing. 2016 will influence 2015 design values by a factor of 2 and will influence 2016 design values by a factor of 3).

Page 19: Staff supports the suggestion that missing species from the PAMS database will only strengthen the indication that there are missing VOC sources or an overestimation of NOx sources in the model.

Comment Letter from the Undersigned Organizations
(Comment Letter #109)



January 23, 2017

Via First Class Mail and e-Mail

Wayne Nastri (wnastri@aqmd.gov)
Executive Officer
South Coast Air Quality
Management District
21865 Copley Drive
Diamond Bar, California 91765

Re: Comments on the SCAQMD's Final Draft 2016 Air Quality Management Plan

Dear Mr. Nastri:

The undersigned organizations are submitting the following comments relating to the Final Draft 2016 Air Quality Management Plan (the "Final Draft AQMP") that the South Coast Air Quality Management District ("SCAQMD" or "District") released for public review on December 9, 2016. As you will see from our specific comments, included as Attachment "A," the relevant data suggest that the District's air quality modeling – the modeling that underlies the Final Draft AQMP –consistently has been over-predicting future ozone levels in the last three AQMPs (2007, 2012, and 2016). In light of that, we are requesting that the District commit, in any Board resolution relating to the final Draft AQMP, to undertake a thorough validation of the capability of the District's air quality model to predict/forecast ozone levels (reductions) into the future. 109-1

In that regard, we understand that the last three AQMPs have attempted to evaluate the model's capability to predict ozone levels for the baseline year used in the AQMP. However, that is not sufficient to validate the air quality model's ability to predict ozone into *future* years. In fact, work performed independent of the District suggests that the AQMP models have been

consistently over-predicting future ozone levels. We encourage the SCAQMD to perform its own model validation so that any needed corrections and revisions can be made before the District proceeds to implement significant and costly SIP control measures, including those set forth in the 2016 AQMP.

We fully recognize that the District is facing firm SIP deadlines that will not accommodate the completion at this juncture of all the necessary data-analyses and modeling improvements that we are recommending. Nevertheless, it is vitally important that the District Board commit, in the text of any resolution relating to the Final Draft SIP, to undertake and complete those necessary analyses and modeling improvements. 109-1 Con't

To that end, the SCAQMD Board should direct the SCAQMD Staff to undertake a comprehensive dynamic evaluation of its air quality modeling — with a full assessment of the model's ability to match historical trends — and to demonstrate whether such a dynamic evaluation actually validates the model's predictive capability. The stakes are too high for the SCAQMD to proceed to adopt SIP control measures based on model-driven results that have not undergone a comprehensive peer-reviewed dynamic evaluation.

The undersigned are fully prepared to lend their collective expertise and analysis to this effort, and stand ready to assist in completing the necessary model-validation work in a timely manner. In that regard, we understand that experts from Ramboll/Environ and Sonoma Technology, Inc. have offered to collaborate on this important work. We fully endorse that spirit of collaboration and will work to facilitate and expedite the recommended dynamic evaluations of the District's air quality modeling.

In conclusion, the undersigned organizations appreciate the opportunity to submit comments on the Final Draft AQMP. In doing so, we are aware of the specific SIP-related deadlines facing the SCAQMD. Accordingly, while we understand that the Board needs to take action on the Final AQMP, we urge the Board to include language in the operative Board resolution that explicitly directs District Staff to conduct, in a timely manner, and before adopting any of the specific control measures set forth in the AQMP, a rigorous dynamic evaluation of the CMAQ-modeled attainment demonstration to fully assess the predictive capability of the model. Until the predictive capability of the modeling tools at issue are validated in a robust, scientific and peer-reviewed manner, the District runs the risk of implementing misinformed public policy choices.

109-1 Con't

Respectfully submitted,

Alliance of Automobile Manufacturers
American Trucking Associations
California Business Properties Association
California Class I Railroads
California Small Business Alliance
Construction Industry Air Quality Association
FuturePorts
International Warehouse Logistics Association
Los Angeles Area Chamber Of Commerce
Los Angeles County Business Federation
Maersk Line
NAIOP Inland Empire
NAIOP SoCal
Pacific Merchant Shipping Association
San Gabriel Valley Economic Partnership
Truck & Engine Manufacturers Association

cc: SCAQMD Board Members (via e-mail)
Jill Whynot (via e-mail)
Phillip M. Fine (via e-mail)
Henry Hogo (via e-mail)

Attachment "A"

Comments on the Final Draft 2016 AQMP

Submitted by:

Alliance of Automobile Manufacturers	**Los Angeles Area Chamber Of Commerce**
American Trucking Associations	**Los Angeles County Business Federation**
California Business Properties Association	**Maersk Line**
California Class I Railroads	**NAIOP Inland Empire**
California Small Business Alliance	**NAIOP SoCal**
Construction Industry Air Quality Association	**Pacific Merchant Shipping Association**
FuturePorts	**San Gabriel Valley Economic Partnership**
International Warehouse Logistics Association	**Truck & Engine Manufacturers Association**

The Final Draft AQMP is premised on significant over-estimations of future ozone levels in the South Coast Air Basin ("SoCAB"). The SCAQMD has derived those over-estimations from the application of the Community Multi-Scale Air Quality ("CMAQ") model, which has consistently over-predicted future ozone levels in the SoCAB for many years.

In light of that, it is particularly important that the District Board commit to undertake in a timely and comprehensive manner the "dynamic evaluation" that U.S. EPA recommends as a way to assess the predictive capability of a model-based ozone attainment demonstration. (*See* EPA's "Draft Modeling Guidance for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze," December 3, 2014 (the "EPA Modeling Guidance") at pp. 62-63, 92-93.) In its Modeling Guidance, EPA states, "dynamic evaluation is always recommended," because it is the only evaluation method that compares model-predicted historical trends with observed trends, and is therefore one of the only evaluation methods for assessing model performance in a way that can assess the model's predictive capabilities – specifically, "in a way closely related to how models are used to support [predict] a future year attainment demonstration." (*Id.*) As EPA further explains in its Modeling Guidance, a dynamic evaluation "is a direct assessment of what is most important in an attainment demonstration: does the model accurately predict changes in air quality as a result of changes in emissions?" (*Id.*) 109-2

While the Final Draft AQMP claims that the AQMP "covers all four types of model performance evaluation that the EPA guidance (2014) recommends," (*see* AQMP, p.V-5-9), that assertion does not appear to be entirely correct. SCAQMD Staff has not presented the results of any actual dynamic evaluation of the current model-based results compared against observed historical trends, nor has SCAQMD Staff even undertaken such a dynamic retrospective analysis "comparing model-predicted historical trends with observed trends." (*Id.* at 92.) That significant omission needs to be rectified through an explicit commitment and direction from the District Board.

This is not just an academic or hypothetical concern. Leading technical experts from Ramboll Environ ("Ramboll"), have undertaken a dynamic evaluation of the District's air quality modeling – using the EPA-recommended method that District Staff did not do. The results from that dynamic evaluation have been presented to District Staff and are very telling. The results confirm that the District's air quality modeling still consistently under-predicts the rate of ozone reduction in the SoCAB, and so still over-estimates the amount of future additional NO_x reductions needed for attainment of the ozone NAAQS.

As explained more fully in the comments being submitted by the Truck and Engine Manufactures Association ("EMA"), Ramboll's dynamic evaluation involved CMAQ simulations using historical emissions over approximately 25 years (1990-2015) in order to compare observed and modeled ozone trends over time. Figure 1 (below) presents Ramboll's dynamic model evaluation comparing observed ozone trends at Crestline, which generally corresponds to the historical Basin-wide maximum ozone design value, with the relevant modeling database for the period of 2008 to 2015. Even when factoring-in the unusually high observed ozone level from 2016, the rate of the modeled ozone reduction trend is still at least a factor of 2 lower than the observed trend. (*See* Table 1, below.)

109-2 Con't

Figure 1. Observed and modeled ozone Design Value (DV) trends at Crestline using the 3-yr DV (top) and 5-yr DV (bottom), and the draft 2016 AQMP CMAQ 2012 modeling platform using observed trends through 2016 ozone season data.

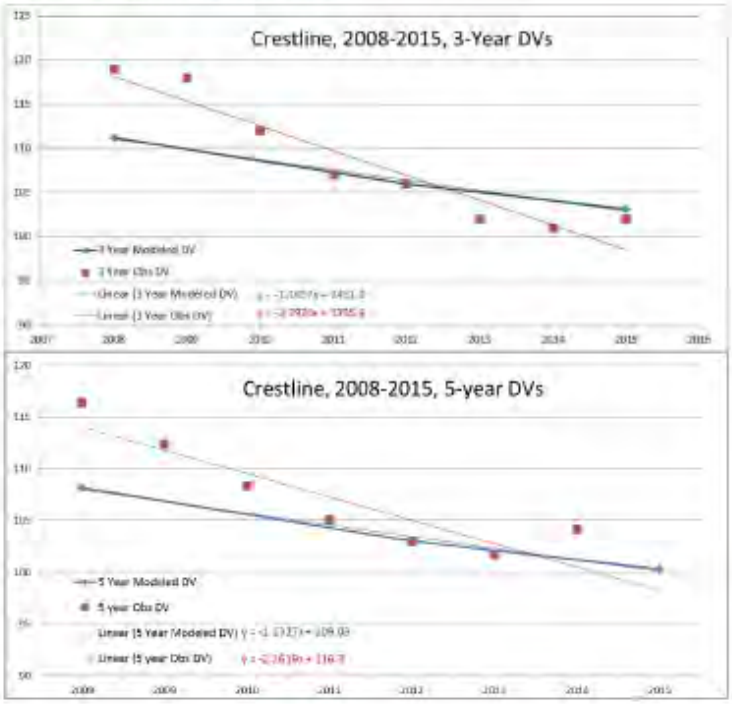


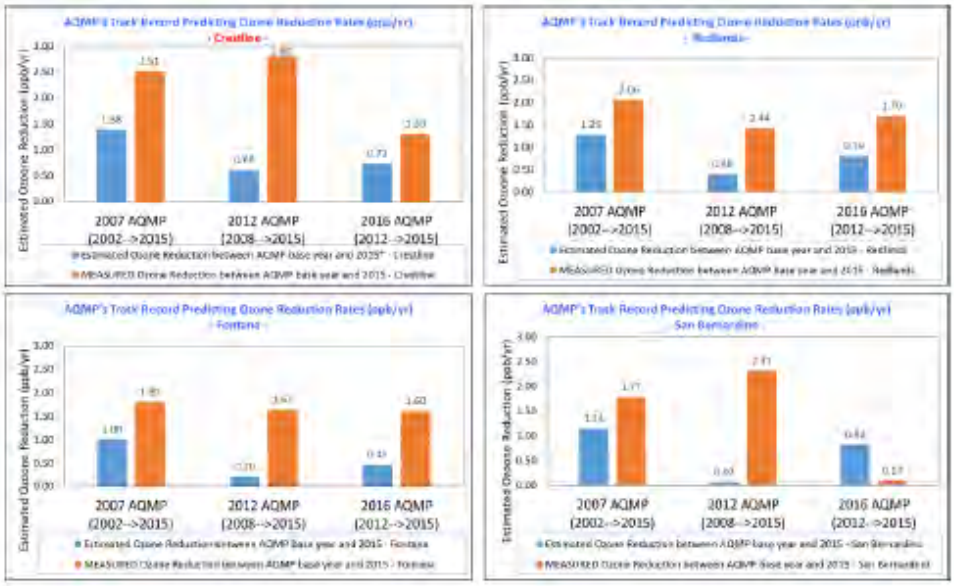
Table 1. Comparison of observed and modeled ozone Design Value (DV) trends (ppb/year) for 2008-2014/2015 using the draft 2016 AQMP CMAQ 2012 modeling database.

Ozone DV	Observed	Modeled	Ratio (Obs/Mod)
3-Yr DV	2.80	1.17	2.40
5-Yr DV	2.26	1.13	2.00

From the foregoing, it remains clear that the current CMAQ models used in developing the Final Draft AQMPs continue to underestimate the rate of observed ozone reduction over time. That is, the "predictive capability" of CMAQ, as it is applied to the difficult topography and

meteorological conditions of the South Coast Air Basin, does not match the rate of ozone reduction that has been observed.

Another way to look at this issue is to compare the CMAQ-predicted rates of ozone reduction (on a ppb/year basis) with the measured rates of ozone reduction in the SoCAB. Using that approach, the following charts compare ozone DV reductions (ppb/year) between the various AQMP predictions and the actual corollary measurements obtained at the key air quality monitoring sites in the SoCAB.



109-2 Con't

The foregoing data confirm that the Final Draft AQMP is still under-predicting the measured reduction rates in ozone DVs similar to the previous AQMPs. In the case of Crestline, for example, the current modeling predicts a reduction rate of just 0.73 ppb/year. However, the measured reductions are nearly two (2) times greater. Moreover, there is no evidence presented in the Final Draft AQMP to increase the level of confidence in the latest predictions. To the contrary, it remains likely that the reduction rates predicted for the various monitoring sites in the SoCAB are still under-predicting reality to a significant extent.

All the information presented here, as well as other more comprehensive studies performed by Ramboll, have been presented to SCAQMD and CARB staff, separately. In those instances, staff have presented arguments why the Ramboll dynamic evaluation was incomplete, or how newer AQMP models would improve on the model's past predictive deficiencies. Those attempted rebuttals, however, have not dispelled the facts, and are unpersuasive in any event. Accordingly, the Board should direct SCAQMD staff to perform their own dynamic evaluation and submit it for public comment. Alternatively, SCAQMD staff should be directed to work collaboratively with Ramboll and other experts to assess and modify Ramboll's already-completed dynamic evaluations, and to find solutions to improve the underlying modeling approaches used for ozone predictions in the South Coast Air Basin.

Responses to Comment Letter from the Undersigned Organizations
(Comment Letter #109)

Response to Comment 109-1:

Thank you for the comments received and participation in the development of the 2016 AQMP. Please refer to Responses to Comment Letters 52, 58 and 108.

While SCAQMD is open to suggestions from public members and encourage collaboration with stakeholders, the agency is legally bounded to follow U.S. EPA's approved guidance and methodology. The modeling approach presented in the 2016 AQMP is conducted by the state-of-the art modeling tools and complies with the latest U.S. EPA approved guidance and methodology. The emission reductions needed for attainment and benefits from attainment are greater than the uncertainties associated with modeling approach.

SCAQMD's modeling approach includes the U.S. EPA's alternative definition of 'dynamic evaluation.' The version of dynamic evaluation presented by EMA's technical consultant contains serious scientific flaws. Without addressing the changes in ozone background concentration and improvement in ozone design values in California, one cannot properly conclude ozone trend and model predictability.

Response to Comment 109-2:

Thank you for the comments received. Please refer to Responses to Comment Letters 52, 58 and 108.

Comment Letter from National Fuel Cell Research Center (Comment Letter #110)

Final Draft of the 2016 Air Quality Management Plan
Comments of the National Fuel Cell Research Center

January 18, 2017

Submitted by:
Dr. Scott Samuelsen
Director, National Fuel Cell Research Center
Co-Chair, California Stationary Fuel Cell Collaborative
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I. Introduction

The National Fuel Cell Research Center (NFCRC) at the University of California, Irvine (UCI) was established by the U.S. Department of Energy and the California Energy Commission to facilitate and accelerate the development and deployment of fuel cell systems, promote strategic alliances to address the market challenges associated with the installation and integration of fuel cell systems and renewable energy systems, and educate and develop resources for global fuel cell and self-generation stakeholders. The NFCRC is working with Bloom Energy; Doosan Fuel Cell America; FuelCell Energy; GE-Fuel Cells, LLC; and LG Fuel Cell Systems Inc. All these stakeholders support the outstanding Final Draft 2016 Air Quality Management Plan (AQMP) from the South Coast Air Quality Management District (SCAQMD) and offer additional recommendations for consideration in the ultimate AQMP that is adopted.

110-1

II. Comments on Final Draft AQMP

A. The NFCRC Supports Review of BACT Standards to Enable More Stringent Regulations of Criteria Air Pollutants

The discussion of CMB-01 in Chapter 4 (page 4-14) outlines a strategy whereby *"new businesses can be required or incentivized to install and operate zero-emission equipment, control equipment, technology and processes beyond the current BACT requirements."* The NFCRC recommends that (1) BARCT requirements be updated, as appropriate, to reflect the lowest achievable emissions given advances in technology, and (2) MCS-02, which outlines SCAQMD's intent to review and update the BARCT requirements, be cited within CMB-01. As stated on page 4-19, *"BARCT continually evolves as new technology becomes available, feasible, and cost-effective."* Review of these standards will allow changes to reflect and capture the ability of current technologies, including fuel cells, to both achieve low emissions of criteria air pollutants and contribute fully to the protection of the environment and public health.

110-1 Con't

B. The NFCRC Supports Incentivizing the Replacement of Diesel Back-up Generators and Encourages Adoption of Grid-Islanding Fuel Cells to Reduce the Population of Diesel Back-up Generators in the Near-Term

The NFCRC supports the concept outlined in measure CMB-01 on page IV-A-32 to incentivize replacement of diesel back-up generators, in particular the inclusion of fuel cells as an example of technologies that are a suitable lower emissions replacement.

110-2

The NFCRC also agrees with the statement on page IV-A-29 that "*incentivizing the replacement of higher-emitting equipment with lower-emitting technology … could allow facilities to be more efficient and lessen grid dependence.*" In addition to incentivizing diesel

generator replacement, incentives should be directed towards encouraging grid-islanding projects. The always-on nature of fuel cells provides reliable power 24x7. This firm power generation can be configured to be grid-islanding, thereby reducing the need for diesel back-up generators and lessening a facility's grid dependence. For example, in the event of a grid outage, data centers can take advantage of fuel cell reliability to maintain operations and thereby reduce their reliance on diesel back-up generators and provide significant environmental and health benefits of avoided air pollutants. 110-2 Con't

C. Stationary Sources of Emissions at Ports Should be Addressed in the AQMP

The ports of California face both challenges and opportunities in managing and meeting future energy and public health requirements. While the SCAQMD plan addresses mobile port emissions as part of the suite of mobile source strategies (MOB-01), stationary sources of port emissions should also be recognized as a significant opportunity for air quality improvement. 110-3 Three types of proven fuel cell systems can facilitate meeting future energy requirements, contribute co-benefits to port energy and environmental goals, [1, 2] and contribute to the goals of the environmental justice community. Power generation can be provided by solid oxide, molten carbonate, and phosphoric acid fuel cell systems, while combined cooling, heat, and power applications from the same systems can further enhance environmental and energy benefits, and reduce costs. A Tri-Generation system (stationary fuel cell based technology that produces on-site hydrogen, electricity, and high quality recoverable heat) can support both port operations and customer requirements. In contrast to other combustion-based self-generation technologies, fuel

[1] *Requirements at the Port of Long Beach.* MacKinnon, M and Samuelsen, S. Advanced Power and Energy Program, University of California Irvine, April 31, 2016.
[2] *Assessment of Fuel Cell Technologies to Address Power Requirements at the Port of Long Beach.* MacKinnon, M and Samuelsen, S. Advanced Power and Energy Program, University of California Irvine, June 28, 2016. http://polb.com/environment/energyisland.asp

cells have the benefits of zero local pollutant emissions, very low GHG emissions, and virtually net zero water consumption. [3]

As an example, the Port of Long Beach (POLB) is a source of high levels of air pollution. The deployment of stationary fuel cell systems can provide a means of distributed self-generation for the POLB without the addition of emissions.[4] This key co-benefit is unique to fuel cells as combustion-driven self-generation methods such as gas turbines and reciprocating engines produce pollutant emissions which create air quality and permitting challenges. The use of fuel cells for stationary power provides a path for the POLB to secure its resilient energy-island future and thereby (1) reduce local criteria pollutant emissions, (2) enhance regional air quality, (3) improve health benefits to disadvantaged communities in the surrounding area, and (4) meet goals established under the San Pedro Bay Ports Clean Air Action Plan [5] and the Green Port Policy. [6, 7]

110-3 Con't

Stationary emission sources at ports could either be addressed in the AQMP through a new standalone control measure or specifically discussed in the current CMB-01: Transition to Zero and Near-Zero Emission Technologies for Stationary Sources.

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[3] *Id.*
[4] *Assessment of Fuel Cell Technologies to Address Power Requirements at the Port of Long Beach.* MacKinnon, M and Samuelsen, S. Advanced Power and Energy Program, University of California Irvine, June 28, 2016. http://polb.com/environment/energyisland.asp
[5] http://www.cleanairactionplan.org/
[6] http://www.polb.com/environment/green_port_policy.asp
[7] *Assessment of Fuel Cell Technologies to Address Power Requirements at the Port of Long Beach.* MacKinnon, M and Samuelsen, S. Advanced Power and Energy Program, University of California Irvine, June 28, 2016. http://polb.com/environment/energyisland.asp

D. The Stated Efficiency Range of Fuel Cells in Appendix IV-A Should Be Updated from 45-50% to 45-60%.

The NFCRC requests that the statement on Page IV-A-25 that currently reads:

"Fuel cells are capable of producing power with very low pollutant emissions while producing electricity much more efficiently (between 45–50 percent efficiency) than single-cycle combustion-based engines and turbines (between 25–35 percent efficiency)" 110-4

be updated to reflect the most recent technological improvements to read:

*"Fuel cells are capable of producing power with **virtually zero** pollutant emissions while producing electricity much more efficiently **(between 45–60 percent efficiency)** than single-cycle combustion-based engines and turbines (between 25–35 percent efficiency)"*

E. Fuel Cell Systems Should be Broadly Referenced to Accommodate Existing and New Commercial Systems With Improved Emissions Reduction and Efficiency

In the main document of the AQMP, the NFCRC requests that the phrases "*fuel cell for combined heat and power*" and *"fuel cells for CHP"* be replaced with the phrase "***fuel cell systems.***" The NFCRC recommends that these replacements be made on the following pages of the AQMP: 110-5 Con't

- Page 4-8
- Page 4-14
- Page 4-19

Fuel cell systems operating on any fuel, in both combined heat and power and electric-only mode, (1) lower criteria pollutant emissions more than all other CHP systems, [8,9,10] and

[8] California Energy Commission, CEC-500-2011-042, Final Report, National Fuel Cell Research Center, August 2011, available on-line at: http://www.energy.ca.gov/2011publications/CEC-500-2011-042/CEC-500-2011-042.pdf
[9] Y Yi, VG McDonell, J Brouwer, M Fujiwara, M Adachi, Emissions sensors for high temperature fuel cell applications, IEEE Transactions – Sensors Conference, 2005.

(2) operate at higher electrical efficiency than all other CHP systems.[9,10] Fuel cells also have extremely high capacity factors (>98%) with greater potential for energy savings and emissions reductions.

Figure 2 in the 2015 SGIP Impact Evaluation Report[11] which is based on actual performance data, clearly shows that both CHP fuel cells and electric-only fuel cells reduce GHG emissions, and far exceed CHP combustion technologies such as internal combustion engines, and microturbines in these reductions.

110-5 Con't

While stationary fuel cells are a clean-energy alternative to combustion engines (e.g., gas turbines and reciprocating engines), stationary fuel cells can also be integrated with a heat engine to create a "hybrid" that (1) substitutes combustion with electrochemistry for the energy conversion, and (2) garners performance enhancing synergies through the integration of the two power generation systems. The product is an ultra-high efficiency hybrid power generator with virtually zero emission of criteria pollutants. As this hybrid technology evolves, commercial distributed generation applications will include all-electric installations, where a viable use for the heat is not available. Detailed analyses of these hybrid power plants show that they will likely eclipse combined cycle power plant technology as the preferred future central and distributed power plant technology by offering greater efficiency, dispatchability, and lower emissions.[12,13]

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[10] Y Yi, A Rao, J Brouwer, S Samuelsen, Ammonia as a Contaminant in the Performance of an Integrated SOFC Reformer System, ASME Paper FC2006-97037, June, 2006.

[11] Itron. 2013 SGIP Impact Evaluation Submitted to PG&E and the SGIP Working Group, April 2015. http://www.cpuc.ca.gov/NR/rdonlyres/AC8308C0-7905-4ED8-933E-387991841F87/0/2013_SelfGen_Impact_Rpt_201504.pdf Page 7-6

[12] Yi, Y., Rao, A.D., Brouwer, J., and Samuelsen, G.S., *Analysis and Optimization of a Solid Oxide Fuel Cell and Intercooled Gas Turbine (SOFC-ICGT) Hybrid Cycle*, Journal of Power Sources, Volume 132, pp. 77-85, 2004.

[13] McLarty, Dustin, Kuniba, Yusuke, Brouwer, Jack, and Scott Samuelsen, Experimental and theoretical evidence for control requirements in solid oxide fuel cell gas turbine hybrid systems, Journal of Power Sources, Volume 209, pp. 195– 203, 2012.

III. Conclusion

The NFCRC strongly supports the Final Draft 2016 AQMP, which appropriately proposes the inclusion of fuel cell systems that are available today to reduce emissions and criteria air pollutants. The ability of fuel cell systems to most efficiently produce electricity, heating, cooling and generate hydrogen is unique. Fuel cell systems are also well-suited as an integral part of a renewable grid that can exclusively manage the dynamics of an intermittent renewable grid through critical attributes such as load-following and 0-100% ramping ability in combination with firm, local capacity. The NFCRC appreciates the opportunity to further enhance the desired outcomes of the AQMP with the above described recommended changes.

110-5 Con't

Responses to Comment Letter from National Fuel Cell Research Center (Comment Letter #110)

Response to Comment 110-1:

Identification of Best Available Retrofit Control Technology (BARCT) is ongoing, updated periodically and is updated beyond the context of the development of the Air Quality Management Plan (AQMP) as it is required by the Health and Safety Code as noted in §40406. CMB-01 prioritizes projects using zero and near-zero technologies that are most cost-effective and feasible. In addition, Best Available Control Technology (BACT) requirements are continually being updated with new technologies that have been achieved in practice, technologically feasible or contained in the State Implementation Plan. These BACT requirements are implemented through the New Source Review process.

Response to Comment 110-2:

Staff appreciates the support in CMB-01. Staff notes the information on grid-island fuel cells. A working group will be formed for CMB-01 to discuss specific details of zero and near-zero technology options. Staff encourages the commenter to participate in the working group.

Response to Comment 110-3:

SCAQMD staff appreciates the comments regarding the use of fuel cell technologies to reduce emissions at marine ports. As part of the working group discussions for Control Measure MOB-01, there will be a focus on reducing emissions on the five port-related mobile source categories. Staff will discuss the use of fuel cells during the working group discussion. The identified actions can potentially be greater use of fuel cell technologies at the ports to help realize overall emission reductions at the ports.

Response to Comment 110-4:

Staff notes the information provided. A working group will be formed to discuss the details of zero and near-zero technology efficiencies. The intent of CMB-01 is to prioritize and incentivize zero and near zero technology. Technology listed includes the minimum expected efficiency levels.

Response to Comment 110-5:

Staff appreciates the clarification on “fuel cell for combined heat and power (CHP)” and “fuel cell systems”; however, by its’ nature, CHP is a system. It is also known as cogeneration, is the production of electricity or power and thermal energy (heating/cooling) from a single source of energy. Staff appreciates the support and notes the information provided on fuel cell systems.

Comment Letter from Santa Clarita Valley Economic Development Corporation (SCVEDC)
(Comment Letter #111)

SANTA CLARITA VALLEY
ECONOMIC DEVELOPMENT CORPORATION

January 24, 2017

Michael Krause
Program Supervisor
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765
mkrause@aqmd.gov

Re: 2016 Air Quality Management Plan

Dear Mr. Krause:

The Santa Clarita Valley Economic Development Corporation (SCVEDC) appreciates this opportunity to comment on the Final Draft 2016 Air Quality Management Plan (AQMP or Plan), as made available to the public in December 2016. SCVEDC is a unique private/public partnership representing the united effort of regional industry and government leaders to adopt an integrated approach to attracting, retaining, and expanding a diversity of businesses, especially those in key industry clusters.

At the outset, SCVEDC commends the South Coast Air Quality Management District (SCAQMD or District) for its ongoing and successful efforts to significantly reduce pollution in the South Coast Air Basin, including in the Santa Clarita Valley. While the community health risks and emissions have sharply and beneficially declined over the years, employment, population and GDP continue to grow. Indeed, the City of Santa Clarita, with a population of 214,000, is the third largest city within the County of Los Angeles, falling only behind the cities of Los Angeles and Long Beach. As such, we are here to express support for the continued optimization of economic growth and how emissions reductions are achieved. 111-1

As compared to the June 2016 Draft AQMP, we note that the Final Draft AQMP puts an increased emphasis on regulations. However, the facts show that, even if all stationary sources under the District's jurisdiction are regulated to achieve a zero-emissions level, the region will still not reach attainment. In other words, we cannot regulate our way to attainment — the District has already reached its regulatory limit.

SCVEDC supports non-regulatory approaches to emission reductions that are cost-effective, minimize operational disruptions, and do not drive business out of the region. Programs or control measures must allow for and should incentivize voluntary and collaborative approaches to achieving air quality goals. Further, the AQMP should not be punitive, especially as the region has made tremendous strides in lowering emissions from stationary and mobile sources; special care must be taken to ensure that programs or control measures do not penalize "early adopters" of technology.

SCVEDC relatedly believes there must be an enhanced analysis of the economic consequences of the AQMP to more fully capture the costs and more accurately assess the public health benefits associated with the AQMP as the Air District moves forward to further develop the control measures. The District should look at the long-

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term, cumulative impacts of its regulations on economic growth and on jobs. Similarly, a "look-back" audit process, whereby actual implementation costs are compared with District staff's initial projections, may help provide a more refined assessment of relevant factors.

In closing, SCVEDC believes that, given the substantial air quality gains we have already seen and are projected to continue, additional emissions savings should not come at the expense of economic activity. We anticipate that the Santa Clarita Valley will continue to grow in a variety of ways to accommodate the Air Basin's projected population and employment growth. We want to work with our local partners to ensure that such growth is accommodated responsibly, equitably and without economic disadvantage while also helping ensure good air quality.

111-1 Con't

We appreciate the District's engagement with the business community during development of the AQMP. We are committed to working with the District to ensure the Plan facilitates continued improvements in regional air quality while also protecting and promoting job creation and economic success for Santa Clarita Valley and Southern California.

Sincerely,



Holly Schroeder
President & CEO
Santa Clarita Valley Economic Development Corporation

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Response to Comment Letter from Santa Clarita Valley Economic Development Corporation (SCVEDC) (Comment Letter #111)

Response to Comment 111-1:

Staff appreciates the support of the incentive programs that are intended to make it more cost-effective to replace equipment, transition to zero or near-zero technologies, encourage earlier change-out of higher-emitting equipment, and drive technology development and cost reductions. Per comments received, two incentive-only stationary source measures have been modified since the Draft Plan to include a future rulemaking when the technology has become more commercially available, achieved in practice in more applications and cost effective. In addition, rulemaking ensures emission reductions continue in the future when incentives might not be necessary and the emission reductions are permanent.

Staff will continue to conduct socioeconomic analysis on our future proposed programs and rules that will evaluate potential economic and job impact, and appreciates the participation of SCVEDC in the development of the 2016 AQMP.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Program Environmental Impact Report

2016 AIR QUALITY MANAGEMENT PLAN



SCH #2016071006

January 2017

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PREFACE

This document constitutes the Final Program Environmental Impact Report (EIR) for the 2016 Air Quality Management Plan (AQMP). The Draft Program EIR was released for a 60-day public review and comment period from September 16, 2016 to November 15, 2016. It was concluded in the Draft Program EIR that the 2016 AQMP has the potential to generate significant adverse environmental impacts to the following environmental topic areas: aesthetics, construction air quality and GHG emissions, energy (increased electricity demand), hazards and hazardous materials, water demand, construction noise and vibration, solid waste, and transportation and traffic. Measures were identified to mitigate to the maximum extent feasible potentially significant adverse impacts to all environmental topics identified above. Despite implementation of all feasible mitigation measures, impacts to all environmental topic areas identified above remained significant. In addition, the Draft Program EIR: (1) included analyses of potentially significant adverse cumulative environmental impacts; (2) identified and evaluated the relative merits of four project alternatives, including a No Project Alternative; and (3) compared impacts from the project alternatives to the potential impacts from the 2016 AQMP. Eleven comment letters were received from the public during the public comment period regarding the environmental analyses in the Draft Program EIR. These comment letters and the responses to individual comments are included in Appendix E of this document. No comments in these letters identified other potentially significant adverse environmental impacts from the proposed project not already analyzed in the Draft Program EIR.

Since the proposed project was determined to have statewide, regional or areawide significance, a CEQA scoping was required pursuant to Public Resources Code §21083.9 (a)(2). Two CEQA scoping meetings were held on each of the following dates at various locations throughout the District: July 14, 2016, July 20, 2016, and July 21, 2016. No CEQA comments were raised at any of the CEQA scoping meetings.

Modifications to the proposed project were made between the release of the Draft 2016 AQMP (released to the public on June 30, 2016) and the Revised Draft 2016 AQMP (released to the public on October 7, 2016). The specific changes are documented in the following online overview: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/revised-draft-aqmp-plan/overview.pdf.
Several additional modifications to the proposed project were made between the release of the Revised Draft 2016 AQMP and the Draft Final AQMP (released to the public on December 2, 2016), including the addition of prioritized funding distribution to benefit disadvantaged communities, the addition of the latest emission reductions based on the latest attainment modeling, updates to Chapter 2 to reflect public health comments received on Appendix I, additional consideration of "life cycle" emissions analysis, clarification of engine inventory and acknowledgement of the need for reliable emergency power in certain circumstances (CMB-01), highlighting of the small wastewater treatment inventory among non-refinery flare facilities (CMB-03), an expanded discussion of RECLAIM re-assessment (CMB-05), clarification of the review of NPDES permits to avoid conflicting requirements (BCM-03), and the addition of the incentive funding shortfall procedure in Appendix IV-B. None of the above modifications caused additional significant adverse environmental impacts from the proposed project not already analyzed in the Draft Program EIR.

To facilitate identifying changes in this Final Program EIR, modifications to the document are included as underlined text and text removed from the document is indicated by ~~strikethrough~~. To avoid confusion, minor formatting changes are not shown in underline or strikethrough mode. Staff has reviewed the modifications to the proposed project and concluded that none of the modifications alter any conclusions reached in the Draft Program EIR nor provide new information of substantial importance relative to the draft document. As a result, none of the revisions to the Draft Program EIR reflected in this document require recirculation of the document pursuant to CEQA Guidelines section 15088.5. Therefore, this document now constitutes the Final Program EIR for the 2016 AQMP.

CHAPTER 1

INTRODUCTION AND EXECUTIVE SUMMARY

1.1 Introduction
1.2 California Environmental Quality Act
1.3 Executive Summary: Chapter 2 – Project Description
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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 INTRODUCTION

The California Legislature adopted the Lewis Air Quality Act in 1976, creating the South Coast Air Quality Management District (SCAQMD) from a voluntary association of air pollution control districts in Los Angeles, Orange, Riverside, and San Bernardino counties. The new agency was charged with developing uniform plans and programs for the South Coast Air Basin (Basin) to attain federal air quality standards by the dates specified in federal law. While the Basin has one of the worst air quality problems in the nation, there have been significant improvements in air quality in the Basin over the last two decades, although some air quality standards are still exceeded relatively frequently, and by a wide margin. The SCAQMD was also required to meet state standards by the earliest date achievable through the use of reasonably available control measures.

The Lewis Air Quality Act (now known as the Lewis-Presley Air Quality Management Act) requires that the SCAQMD prepare an Air Quality Management Plan (AQMP) consistent with federal planning requirements. In 1977, amendments to the federal Clean Air Act (CAA) included requirements for submitting State Implementation Plans (SIPs) for non-attainment areas that fail to meet all federal ambient air quality standards (standards) (Health & Safety Code (H&S) §40462). The federal CAA was amended in 1990 to specify attainment dates and SIP requirements for ozone, carbon monoxide (CO), nitrogen dioxide (NO2) and particulate matter less than 10 microns in diameter (PM10). The California Clean Air Act (CCAA), adopted in 1988, requires the SCAQMD to endeavor to achieve and maintain state ambient air quality standards for ozone, CO, sulfur dioxide (SO2), and NO2 by the earliest practicable date (H&S §40910), and establish requirements to update the plan periodically.

The first AQMP was prepared and approved by SCAQMD in 1979. The 2016 AQMP will be the eleventh plan prepared by SCAQMD, not including certain SIPs for specific pollutants, e.g., PM10 for the Coachella Valley and the Basin, and CO and lead for Los Angeles County. The following bullets summarize the main components of the past AQMP updates and revisions:

- The 1982 AQMP was revised to reflect better data and modeling tools.

- In 1987, a federal court ordered the U.S. Environmental Protection Agency (EPA) to disapprove the 1982 AQMP because it did not demonstrate attainment of all federal standards by 1987 as required by the CAA. This, in part, led to the preparation of the 1989 AQMP.

- The 1989 AQMP was adopted on March 17, 1989 and was specifically designed to attain all federal standards. This plan called for three "tiers" of measures as needed to attain all standards and relied on significant future technology advancement to attain these standards.

- In 1991, the SCAQMD prepared and adopted the 1991 AQMP to comply with the CCAA.

- In 1992, the 1991 AQMP was amended to add a control measure containing market-based incentive programs (subsequently SCAQMD's Regional Clean Air Incentives Market (RECLAIM)).

- In 1994, the SCAQMD prepared and adopted the 1994 AQMP to comply with the CCAA three-year update requirement and to meet the federal CAA requirement for an ozone SIP. The AQMP, as adopted in 1994, included the following:

  - All geographical areas under the jurisdiction of the SCAQMD, compared to just the Basin;
  - The basic control strategies remained the same as in the earlier plans, although the three-tiered structure of control measures was replaced and measures previously referred to as Tier I, II, or III were replaced with short-/intermediate-term or long-term control measures;
  - Updated and refined control measures carried over from 1991;
  - Best Available Control Measure PM10 Plan;
  - The ozone attainment demonstration plan;
  - Amendments to the federal Reactive Organic Compound Rate-of-Progress Plan (also referred to as the VOC Rate-of-Progress Plan); and
  - Attainment Demonstration Plans for the federal PM10, NO2, and CO air quality standards; etc.

- The 1997 AQMP was designed to comply with the three-year update requirements specified in the CCAA as well as to include an attainment demonstration for PM10 as required by the federal CAA. Relative to ozone, the 1997 AQMP contained the following changes to the control strategies compared to the 1994 AQMP:

  - Less reliance on transportation control measures (TCMs);
  - Less reliance on long-term control measures that rely on future technologies as allowed under §182(e)(5) of the CAA; and
  - Removal of other infeasible control measures and indirect source measures that had been substantially impacted by the state legislature in enacting new provisions in the Health and Safety Code.

- In 1999, the ozone plan portion of the 1997 AQMP was amended to address partial disapproval of the 1997 AQMP by the U.S. EPA and a settlement of litigation by environmental groups challenging the 1997 AQMP to provide the following:

  - Greater emission reductions in the near-term than would occur under the 1997 AQMP;
  - Early adoption of the measures that would otherwise be contained in the next three-year update of the AQMP; and
  - Additional flexibility relative to substituting new measures for infeasible measures and recognition of the relevance of cost effectiveness in determining feasibility.

- In April 2000, U.S. EPA approved the 1999 ozone SIP to the 1997 plan. The 1999 Amendment in part addressed the state's requirements for a triennial plan update.

- The 2003 AQMP was approved and adopted by the SCAQMD in August 2003. The 2003 AQMP was partially approved and partially disapproved by U.S. EPA, based on CARB's withdrawal of mobile source measures after the 1-hour ozone standard was revoked. The 2003 AQMP addressed the following control strategies:

  - Attaining the federal PM10 ambient air quality standard for the Basin and Coachella Valley - these portions were approved by the U.S. EPA: in both areas, the attainment demonstration was disapproved after CARB withdrew its measures;
  - Attaining the federal 1-hour ozone standard;
  - 1997/1999 control measures not yet implemented;
  - Revisions to the Post 1996 VOC Rate-of-Progress Plan and SIP for CO; and
  - Initial analysis of emission reductions necessary to attain the PM2.5 and 8-hour ozone standards.

- The SCAQMD Governing Board approved the 2007 AQMP for both ozone and PM10 on June 1, 2007. On September 27, 2007, CARB adopted the State Strategy for the 2007 SIP and the 2007 AQMP as part of the SIP. The 2007 SIP was then forwarded to U.S. EPA for approval. The following summarizes the major components of the 2007 AQMP:

  - The most current air quality setting at the time (i.e., 2005 data);
  - Updated emission inventories using 2002 as the base year, which also incorporated measures adopted since adopting the 2003 AQMP;
  - Updated emission inventories of stationary and mobile on-road and off-road sources;
  - 2003 AQMP control measures not yet implemented (eight of the control measures originally contained in the 2003 AQMP were updated or revised for inclusion into the 2007 AQMP);
  - 24 new measures were incorporated into the 2007 AQMP based on replacing the SCAQMD's long-term control measures from the 2003 AQMP with more defined or new control measures and control measure adoption and implementation schedules;
  - SCAQMD's recommended control measures to reduce emissions from sources that are primarily under state and federal jurisdiction, including on-road and off-road mobile sources, and consumer products;
  - Southern California Association of Governments (SCAG)'s regional transportation strategy and control measures; and
  - Analysis of emission reductions necessary and attainment demonstrations to achieve the federal 8-hour ozone and PM2.5 air quality standards.

- On November 22, 2010, U.S. EPA issued a notice of proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards

and the corresponding 2007 State Strategy. Specifically, U.S. EPA proposed approving the SIP's inventory and regional modeling analyses, but it also proposed disapproving the attainment demonstration because it relied too extensively on commitments to emission reductions in lieu of fully adopted, submitted, and SIP-approved rules. The notice also cited deficiencies in the SIP's contingency measures.

- In response to U.S. EPA's proposed partial disapproval of the 2007 SIP, on March 4, 2011, the SCAQMD Governing Board approved Revisions to the 2007 PM2.5 and Ozone SIP for the Basin and Coachella Valley. The revisions to the 2007 PM2.5 and Ozone SIP consisted of the following:

  - Updated implementation status of SCAQMD control measures necessary to meet the 2015 PM2.5 attainment date;
  - Revisions to the control measure adoption schedule;
  - Changes to the emission inventory resulting from CARB's December 2010 revisions to the on-road truck and off-road equipment rules; and
  - An SCAQMD commitment to its "fair share" of additional NOx emission reductions, if needed, in the event U.S. EPA does not voluntarily accept the "federal assignment."

- In response to the July 14, 2011 U.S. EPA notice of proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards, at the October 7, 2011 public hearing, the SCAQMD Governing Board approved Further Revisions to PM2.5 and Ozone SIP for the Basin and Coachella Valley. Revisions to the PM2.5 SIP included a three-prong approach for identifying contingency measures needed to address U.S. EPA's partial disapproval:

  - Equivalent emissions reductions achieved through improvements in air quality;
  - Relying on committed emissions reductions for the 2007 ozone plan; and
  - Quantifying excess emissions reductions achieved by existing rules and programs that were not originally included in the 2007 PM2.5 SIP.

- U.S. EPA fully approved the 2007 SIP for the 8-hour ozone standard on March 1, 2012.

- The SCAQMD Governing Board approved the 2012 AQMP on December 7, 2012. The 2012 AQMP was primarily designed to demonstrate attainment of the 2006 24-hour PM2.5 standard (35 ug/m3). The adopted Final 2012 AQMP was forwarded to CARB on December 20, 2012, with subsequent approval at its January 23, 2013, Board meeting. On February 1, 2013, the SCAQMD Governing Board approved Control Measure IND-01, Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities, for inclusion in the Final 2012 AQMP. The following summarizes the major components of the 2012 AQMP:

  - The most current science and analytical tools;

- A comprehensive strategy aimed at controlling pollution from stationary (point) sources, on-road and off-road mobile sources, and area sources;
- Attainment demonstration of the federal 24-hour PM2.5 standard by 2014 in the Basin through adoption of control measures;
- Update of the U.S. EPA approved 8-hour ozone control plan with new measures designed to reduce reliance on the CAA Section 182 (e)(5) long-term measures for NOx and VOC reductions;
- Address several state and federal planning requirements, incorporating new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and new meteorological air quality models;
- Update on the air quality status of the SSAB in the Coachella Valley;
- Discussion of the emerging issues of ultrafine particles and near-roadway exposures;
- Analysis of the energy supply and demand issues that face the Basin and their relationship to air quality;
- Demonstrations of 1-hour ozone attainment and vehicle miles travelled (VMT) emissions offsets, as per U.S. EPA requirements based on the recent court case of Association of Irritated Residents (AIR) vs. U.S. EPA (2012); and
- Specific measures to further implement the ozone strategy in the 2007 AQMP.

- A Supplement to the 24-Hour PM2.5 (35 ug/m3) SIP was approved by the SCAQMD Governing Board on February 6, 2015. The purpose of the Supplement was to demonstrate attainment of the 2006 24-hour PM2.5 NAAQS by 2015 under the CAA (Title 1, Part D, Subpart 4) that had been required based on a recent court case. This plan included a discussion of the effects of the drought on the attainment date. New transportation conformity budgets for 2015 were also developed.

- The SCAQMD requested and received in January 2016 from the U.S. EPA a redesignation of the 24-hour PM2.5 standard to "serious" non-attainment area with a new attainment deadline of 2019.

- On April 14, 2016, U.S. EPA partially approved and partially disapproved the 2012/2015 PM2.5 and 2015 Supplement Plans. The U.S. EPA approved the following elements of the Plan: Emission inventories; demonstration that the Basin cannot practicably attain by the Moderate area attainment date of December 31, 2015; the control strategy commitments; and the general conformity budgets. The U.S. EPA did not approve the following portions of the Plan: The demonstration that the Plan provides for the implementation of reasonably available control measures and reasonably available control technology due to deficiencies in the 2010 version of the area's RECLAIM included in the Plan; and the demonstration that the Plan provides for reasonably further progress. Furthermore, the U.S. EPA did not act on the motor vehicle emission budgets or the ports backstop measure.

- On August 24, 2016, the U.S. EPA released the final PM2.5 implementation rule that established PM2.5 planning requirements for states with areas that do not meet the NAAQS for PM2.5. This rule establishes plan requirements for plan due dates, attainment dates, emission inventories, attainment demonstrations, provisions for demonstrating reasonable further progress, milestones, contingency measures, and new source review requirements. It also responds to a January 2103 court decision of EPA's previous PM2.5 standards.

1.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the California Environmental Quality Act (CEQA), this Program Environmental Impact Report (EIR) has been prepared to address the potential environmental impacts associated with the SCAQMD's Draft 2016 AQMP. The 2016 AQMP is the planning document that sets forth policies and measures to achieve federal and state air quality standards in the region. CEQA Public Resources Code §21000 et seq., requires that the potential environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid identified significant adverse environmental impact from these projects be identified.

To fulfill the purpose and intent of CEQA, the SCAQMD staff has prepared this Program EIR to address the potential environmental impacts associated with the 2016 AQMP. Prior to making a decision on the 2016 AQMP, the lead agency decision makers must review and certify the Program EIR as providing adequate information on the potential adverse environmental impacts of the 2016 AQMP.

1.2.1 NOTICE OF PREPARATION/INITIAL STUDY

The original Notice of Preparation and Initial Study (NOP/IS, Appendix A) were distributed to responsible agencies and interested parties for a 30-day review and comment period on June 30, 2016. The Initial Study identified potential adverse impacts in the following environmental topics: air quality and greenhouse gas (GHG) emissions; energy; hazards and hazardous materials; hydrology and water quality; noise; solid/hazardous waste; and transportation and traffic. Further evaluation of aesthetic impacts was determined to also be necessary in the Program EIR. The Program EIR also includes comments and responses to comment letters received on the NOP/IS (Appendix B).

1.2.2 EIR FORMAT

The overall format of the EIR is as follows:

Executive Summary

Chapter 1: Introduction

Chapter 2: Project Description

Chapter 3: Existing Environmental Setting

Chapter 4: Environmental Impacts and Mitigation Measures

Chapter 5: Cumulative Impacts

Chapter 6: Alternatives

Chapter 7: References

Chapter 8: Acronyms

1.3 EXECUTIVE SUMMARY: CHAPTER 2 – PROJECT DESCRIPTION

Implementation of the 2016 AQMP control strategies requires a cooperative partnership of governmental agencies at the federal, state, regional and local level. At the federal level, the U.S. EPA is charged with regulation of on-road motor vehicle standards; trains, airplanes, and ships; certain non-road engines; and off-shore oil development. CARB also oversees on-road emission standards, fuel specifications, some off-road sources and consumer product standards. At the regional level, SCAQMD is responsible for stationary sources and some mobile sources. In addition, SCAQMD has lead responsibility for the development of the AQMP. Furthermore, at the local level, the Southern California Association of Governments (SCAG) has a dual role of leader and coordinator. In their leadership role, they, in cooperation with local jurisdictions and sub-regional associations, develop strategies for these jurisdictions to implement. As a coordinator, they facilitate the implementation of these strategies (i.e., transportation control measures).

Chapter 2 describes existing air quality regulations and details the proposed approach for the 2016 AQMP.

1.3.1 CURRENT CONTROL STRATEGY

The ozone portion of the 2007 AQMP has been approved by the U.S. EPA into the SIP. Certain of the "moderate" 24-hour PM2.5 elements of the 2012 AQMP have also been approved by the U.S. EPA, and in January 2016 the U.S. EPA approved the Basin's re-designation as a "serious" nonattainment area for PM2.5. SCAQMD continues to implement the 2012 AQMP, which received a limited approval and limited disapproval by U.S. EPA on April 14, 2016. For the control measures adopted by SCAQMD over this period, 11.7 tons per day of PM2.5 reductions

were achieved by 2014 and 2.4 tons per day of VOC reductions and 19.5 tons per day of NOx reductions will be achieved by 2023.

1.3.2 2016 AQMP CONTROL STRATEGY

The overall control strategy for the 2016 AQMP is designed to meet applicable federal and state requirements. The 2016 AQMP focuses on NOx reductions to attain ozone and PM2.5 standards, both federal and state. In addition, the 2016 AQMP also discusses the recently adopted federal 8-hour ozone standard (70 ppb). The proposed control measures in the 2016 AQMP are based on implementing all feasible control measures through the accelerated deployment of available cleaner technologies, best management practices, co-benefits from existing programs, and incentive measures. Public and private funding will help to further the development and deployment of advanced technologies. Similar to the approaches taken in previous AQMPs, the SIP commitment includes an adoption and implementation schedule for each control measure. Many of the same technologies will address both air quality and climate needs, such as increased energy efficiency. To ultimately achieve the ozone ambient air quality standards and demonstrate attainment, significant NOx emissions reductions will be necessary, not only from non-vehicular sources under the jurisdiction of SCAQMD, but substantial reductions will be necessary from sources primarily under the jurisdiction of CARB (e.g., on-road motor vehicles, off-road equipment, and consumer products) and U.S. EPA (e.g., aircraft, ships, trains, and pre-empted off-road equipment). Without an adequate and fair-share level of reductions from all sources, the emissions reduction burden would be unfairly shifted to stationary sources that are already stringently regulated. SCAQMD will continue to work closely with CARB to further control mobile source emissions where federal or state actions do not meet regional needs.

Implementation of the 2016 AQMP will be based on a series of control measures and strategies that vary by source type (i.e., mobile or stationary) as well as by the pollutant that is being addressed. Control measures were developed from a number of sources, including the AQMP Advisory Group, AQMP Control Strategy Symposium, Reasonably Available Control Technology (RACT) / Reasonable Available Control Measures Analysis (RACM), Best Available Control Technology (BACT) / Best Available Control Measures (BACM) analysis, (2016 AQMP, Appendix VI), SCAQMD staff and public input, and previous AQMPs.

The 2016 AQMP control measures consist of three main components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) suggested State and Federal Source Control Measures; and 3) RTP/SCS Transportation Control Measures provided by SCAG. These measures rely on not only the traditional command-and-control approach, but also public incentive programs, as well as advanced technologies expected to be developed and deployed in the next several years. See subchapter 2.8 of the Program EIR for a full description of all of the 2016 AQMP control measures.

1.4 EXECUTIVE SUMMARY: CHAPTER 3 – EXISTING ENVIRONMENTAL SETTING

Chapter 3 provides a detailed description of the existing setting of environmental resources identified as having potential significant impacts from the 2016 AQMP.

1.4.1 AIR QUALITY AND GREENHOUSE GASES

It is the responsibility of SCAQMD to ensure that state and federal standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, CO, NO_2, PM10, PM2.5, SO_2, and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards and in the case of PM10 and SO_2, far more stringent. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride.

SCAQMD also has a general responsibility pursuant to H&S §41700 to control emissions of air contaminants and prevent endangerment to public health. Additionally, state law requires SCAQMD to implement airborne toxic control measures (ATCM) adopted by CARB, and to implement the Air Toxics "Hot Spots" Act. As a result, SCAQMD has regulated pollutants other than criteria pollutants such as TACs, GHG, and stratospheric ozone depleting compounds. SCAQMD has developed a number of rules to control non-criteria pollutants from both new and existing sources. These rules originated through state directives, CAA requirements, or the SCAQMD rulemaking process.

Two inventories are prepared for the 2016 AQMP for the purpose of regulatory and SIP performance tracking and transportation conformity: an annual average inventory, and a summer planning inventory. Baseline emissions data presented in this chapter are based on average annual day emissions (e.g., total annual emissions divided by 365 days) and seasonally adjusted summer planning inventory emissions. The 2016 AQMP uses annual average day emissions to estimate the cost-effectiveness of control measures, to rank control measure implementation, and to perform PM2.5 modeling and analysis. The summer planning inventory emissions are developed to capture the emission levels during a poor ozone air quality season, and are used to report emission reduction progress as required by the federal and California CAAs.

Stationary sources can be divided into two major subcategories: point and area sources. Point sources are large emitters with one or more emission sources at a permitted facility with an identified location (e.g., power plants, refineries). Area sources consist of many small emission sources (e.g., residential water heaters, architectural coatings, consumer products, as well as, permitted smaller sources), which are distributed across the region. The emissions from these sources are estimated using activity information and emission factors.

Mobile sources consist of two subcategories: on-road and off-road sources. On-road sources are from vehicles that are licensed to drive on public roads. Off-road sources are typically registered

with the state and cannot be typically driven on public roads (construction & mining equipment, lawn & gardening equipment, ground support equipment, agricultural equipment).

In the 2012 base year model of the 2016 AQMP, total mobile source emissions account for 28 percent of the VOC and 87 percent of the NOx emissions based on the summer planning inventory. The on-road mobile category alone contributes about 33 and 56 percent of the VOC and NOx emissions, respectively, and approximately 63 percent of the CO for the annual average inventory. For directly emitted PM2.5, mobile sources represent 22 percent of the emissions with another 13 percent due to vehicle-related entrained road dust.

Demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry), developed by SCAG for the 2016 RTP/SCS, were used. Industry growth factors for 2012, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2025, 2026, 2031, and 2037 were also provided by SCAG, and interim years were calculated by linear interpolation. Current forecasts indicate that this region will experience a population growth of 7 percent between 2008 and 2023, with a seven percent increase in vehicle miles traveled (VMT); and a population growth of 12 percent by the year 2031 with an eight percent increase in VMT.

Without any additional controls, VOC and NOx, emissions are expected to decrease due to existing regulations, such as controls on off-road equipment, new vehicle standards, and the RECLAIM programs. However, emissions of SOx and PM2.5 show an increase after 2022, when most of the rules and regulations will be fully implemented. Emission increases due to increases in population and activity outpace the emission reductions from introducing newer and cleaner equipment and vehicles. Due to already-adopted regulations, 2023 on-road mobile sources are expected to account for: about 14 percent of total VOC emissions compared to 33 percent in 2012; about 30 percent of total NOx emissions compared to 56 percent in 2012; and about 26 percent of total CO emissions compared to 63 percent in 2012. Meanwhile, area sources are expected to become the major contributor to VOC emissions from 37 percent in 2012 to 54 percent in 2031.

Inventories were developed for 2012, 2019, 2022, 2023, 2025, and 2031. 2012 is the base-year for the attainment demonstrations. 2023 and 2031 are the attainment years for the federal 8-hour ozone standards of 80 ppb (revoked) and 75 ppb, respectively. The 2022 inventory was developed to show attainment for the revoked 1-hour ozone standard (120 ppb). The 2019 and 2025 inventories were used to demonstrate attainment for the federal 24-hour and annual PM2.5 standards, respectively.

1.4.2 ENERGY

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation (U.S. DOT), United States Department of Energy (U.S. DOE), and U.S. EPA are three agencies with substantial influence over energy policies and programs. Generally, federal agencies influence transportation energy consumption through establishment and enforcement of fuel economy standards for automobiles and light trucks, through funding of energy related research and development projects, and through funding for transportation infrastructure projects.

On the state level, the California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are two agencies with authority over different aspects of energy policy and regulations. The CPUC regulates privately-owned utilities in the energy, rail, passenger transportation, telecommunications, and water fields. The CEC collects and analyzes energy-related data, prepares state-wide energy policy recommendations and plans, promotes and funds energy efficiency and renewable energy resources programs, plans and directs state response to energy emergencies, and regulates the power plant siting and transmission process.

In 2014, 67 percent of the electricity used in California came from in-state sources, while 33 percent was imported into the state. The electricity imported totaled 97,870 gigawatt hours (GWh), with 37,261 GWh coming from the Pacific Northwest, and 60,609 GWh from the Southwest. (Note: A gigawatt is equal to one million kilowatts). For natural gas in 2013, 38 percent of the natural gas used in California came from the Southwest, 16 percent from Canada, 10 percent from in-state, and 36 percent from the Rockies. Also in 2014, 38 percent of the crude oil came from in state, with 10 percent coming from Alaska, and 52 percent being supplied by foreign sources.

One of the key areas of concern in the energy sector is reducing the amount of petroleum based fuels in the Basin. Consumption of these fuels is a major factor in the amount of criteria pollutants in southern California. Alternative fuels play an important role in the strategy to reach attainment in the region. Renewable energy resources include: biomass, hydroelectric, geothermal, solar, and wind.

1.4.3 HAZARDS AND HAZARDOUS MATERIALS

The potential for hazards exist in the production, use, storage, and transportation of hazardous materials. Hazardous materials may be found at industrial production and processing facilities. Some facilities produce hazardous materials as their end product, while others use such materials as an input to their production process. Examples of hazardous materials used as consumer products include gasoline, solvents, and coatings/paints. Hazardous materials are stored at facilities that produce such materials and at facilities where hazardous materials are a part of the production process. Specifically, storage refers to the bulk handling of hazardous materials before and after they are transported to the general geographical area of use. Currently, hazardous materials are transported throughout the district via all modes of transportation including rail, highway, water, air, and pipeline.

Hazard concerns are related to the risks of explosions or the release of hazardous substances or exposure to air toxics. State law requires detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of to prevent or mitigate injury to health or the environment in the event that such materials are accidentally released. Federal laws, such as the Emergency Planning and Community-Right-To-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act or SARA) impose similar requirements. These requirements are enforced by the California Emergency Management Agency (CalEMA).

In 2012, there were a total of 872 hazardous materials incidents (releases, accidents, spills, etc.) reported for Los Angeles, Orange, Riverside and San Bernardino counties, in 2013 a total of 791 incidents were reported in these four counties, and in 2014 a total of 776 incidents were reported

across the four counties. Over this period, San Bernardino and Los Angeles counties accounted for the largest number of incidents, followed by Orange and Riverside counties.

1.4.4 HYDROLOGY AND WATER QUALITY

The Federal Safe Drinking Water Act, enacted in 1974 and implemented by the U.S. EPA, imposes water quality and infrastructure standards for potable water delivery systems nation-wide. The California Safe Drinking Water Act was enacted in 1976. Potable water supply is managed through local agencies and water districts, the State Department of Water Resources (DWR), the Department of Health Services (DHS), the State Water Resources Control Board (SWRCB), the U.S. EPA, and the U.S. Bureau of Reclamation. The DWR manages the State Water Project (SWP), and compiles planning information on supply and demand within the state.

The DWR divides the state into ten hydrologic regions. Some regions contain a great deal of water, some regions are very dry and must have their water imported by aqueducts. The Basin lies within the South Coast Hydrologic Region. More than half of the state's population resides in the region (about 19.6 million people or about 54 percent of the state's population), which covers 11,000 square miles or seven percent of the state's total land. The cities of Los Angeles, Long Beach, Santa Ana, San Bernardino, and Big Bear Lake are among the many urban areas in this section of the state. The Santa Clara, Los Angeles, San Gabriel, and Santa Ana Rivers are among the area's hydrologic features. Most lakes in this area are actually reservoirs, made to hold imported water.

Imported sources account for approximately 75 percent of the total water used in the region. Local water resources, which include groundwater and captured surface water runoff, are fully developed and are expected to remain relatively stable in the future on a region-wide basis. Several groundwater basins in the region are threatened by overdraft conditions, increasing levels of salinity, and contamination by agricultural land to urban development, thereby reducing the land surface available for groundwater recharge. Increasing demand for groundwater may also be limited by water quality, since levels of salinity in sources currently used for irrigation could be unacceptably high for domestic use without treatment.

The SWRCB, and the nine regional water quality control boards (RWQCB), are responsible for protecting surface and groundwater supplies in California. In particular, the SWRCB establishes water-related policies and approves water quality control plans, which are implemented and enforced by the RWQCBs. Five RWQCBs have jurisdiction over areas within the boundaries of the SCAQMD. These agencies also regulate discharges to state waters through federal pre-treatment requirements enforced by the publicly owned treatment works (POTWs).

Water quality of regional surface water and groundwater resources is affected by point source and non-point source discharges occurring throughout individual watersheds. Regulated point sources, such as wastewater treatment effluent discharges, usually involve a single discharge into receiving waters. Non-point sources involve diffuse and non-specific runoff that enters receiving waters through storm drains or from unimproved natural landscaping. Within the regional water basin plans, the RWQCBs establish water quality objectives for surface water and groundwater resources and designate beneficial uses for each identified waterbody.

Much of the urbanized areas of Los Angeles and Orange Counties are serviced by three large POTWs operating on the coast: the City of Los Angeles Bureau of Sanitation Hyperion Facility, the Joint Outfall System of the Los Angeles County Sanitation Districts (LACSD), and the Orange County Sanitation District (OCSD) treatment plant. These three facilities handle more than 70 percent of the wastewater generated in the entire region.

1.4.5 NOISE

The federal government sets noise standards for transportation-related noise sources that are closely linked to interstate commerce, such as aircraft, locomotives, and trucks, and, for those noise sources, the state government is preempted from establishing more stringent standards. The state government sets noise standards for those transportation noise sources that are not preempted from regulation, such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies.

Since environmental noise levels typically fluctuate across time of day, different types of noise descriptors are used to account for this variability and have been developed to differentiate between cumulative noise over a given period and single noise events. Individual noise events, such as train pass-bys or aircraft overflights, are further described using single-event and cumulative noise descriptors.

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The Federal Transit Administration (FTA) states that in contrast to airborne noise, ground-borne vibration is not a common environmental problem and most people consider groundborne vibration to be an annoyance that may affect concentration or disturb sleep. However, high levels of vibration may damage fragile buildings or interfere with equipment that is highly sensitive to groundborne vibration (e.g., electron microscopes).

Some land uses (residences, schools, hospitals, etc.) are considered more sensitive to ambient noise levels than others due to the amount of noise exposure and the types of activities typically involved and are assigned more stringent noise standards. A noise level of 55 to 60 decibels outdoors is the upper limit for intelligible speech communication inside a typical home. In addition, social surveys and case studies have shown that complaints and community annoyance in residential areas begin to occur at about 55 decibels.

1.4.6 SOLID AND HAZARDOUS WASTE

A total of 32 Class III active landfills and two transformation facilities (i.e., waste-to-energy facilities) are located within the Basin with a total capacity of 112,592 tons per day and 3,240 tons per day, respectively. Permit requirements, capacity and surrounding land use are three of the dominant factors limiting the operations and life of landfills in the Basin. Landfills are permitted by the local enforcement agencies with concurrence from CalRecycle (formerly known as the California Integrated Waste Management Board). Local agencies establish the maximum amount

of solid waste that can be received by a landfill each day, and the operational life of a landfill. Landfills are operated by both public and private entities. Landfills in the district are also subject to SCAQMD requirements as they pertain to gas collection systems, dust and nuisance impacts.

There are no hazardous waste disposal sites within the Basin. Hazardous waste generated at area facilities, which is not reused on-site, or recycled off-site is disposed of at a licensed in-state hazardous waste disposal facility. Two such facilities are the Chemical Waste Management (CWM) Kettleman Hills facility in King's County, and the Laidlaw Environmental Services (LES) facility in Buttonwillow (Kern County). Kettleman was permitted to increase its capacity by about five million cubic yards in May 2014. CMW applied to both the Department of Toxic Substances Control (DTSC) and the U.S. EPA to expand the facility to provide another 12-14 years of life. Buttonwillow receives approximately 900 tons of hazardous waste per day and has a remaining capacity of approximately 8,890,000 cubic yards. The expectant life of the Buttonwillow Landfill is approximately 40 years. Hazardous waste also can be transported to permitted facilities outside of California such as the U.S. Ecology Inc. facility in Beatty, Nevada or the LES facility in Lake Point, Utah.

While DTSC has primary responsibility in the state for regulating the generation, transfer, storage and disposal of hazardous materials, DTSC may further delegate enforcement authority to local jurisdictions. In addition, DTSC is responsible and/or provides oversight for contamination cleanup, and administers state-wide hazardous waste reduction programs. DTSC conducts annual inspections of hazardous waste facilities. Other inspections can occur on an as-needed basis.

California Department of Transportation (Caltrans) sets standards for trucks transporting hazardous wastes in California. The regulations are enforced by the California Highway Patrol (CHP). Trucks transporting hazardous wastes are required to maintain a hazardous waste manifest. The manifest is required to describe the contents of the material within the truck so that wastes can readily be identified in the event of a spill.

1.4.7 TRANSPORTATION AND TRAFFIC

The southern California transportation system is a complex intermodal network that consists of roads, highways, public transit, paratransit, bus, rail, airports, seaports and intermodal terminals designed to carry both people and goods. The transportation system supports the region's economic needs, as well as the demand for personal travel.

Numerous agencies are responsible for transportation planning and investment decisions within the southern California area. SCAG helps integrate the transportation-planning activities in the region to ensure a balanced, multimodal plan that meets regional as well as county, subregional, and local goals, while each of the four counties within the Basin has a Transportation Commission or Authority. These agencies are charged with countywide transportation planning activities, allocation of locally generated transportation revenues, and in some cases operation of transit services.

The existing transportation network serving the southern California area supports the movement of people and goods. On a typical weekday in the four-county region the transportation network

supports a total of approximately 448 million VMT and 13 million vehicle hours of travel (VHT). Of this total, over half occurs in Los Angeles County.

Much of the existing travel in the southern California area takes place during periods of congestion, particularly during the morning (AM peak period, 6:00 AM to 9:00 AM) and evening peak periods (PM peak period, 3:00 PM to 7:00 PM). Congestion can be quantified as the amount of travel that takes place in delay (vehicle hours of delay or VHD), and alternately, as the percentage of all travel time that occurs in delay (defined as the travel time spent on the highway due to congestion, which is the difference between VHT at free-flow speeds and VHT at congested speeds). Regional travel time in delay represents approximately 24 percent of all daily, 25 percent of all AM peak period, and 25 percent of all PM peak period travel times.

The regional freeway and highway system is the primary means of person and freight movement for the region. This system provides for direct automobile, bus and truck access to employment, services and goods. The network of freeways and state highways serves as the backbone of the system offering very high capacity limited-access travel and serving as the primary heavy duty truck route system.

Transit use is growing in southern California. As of 2012, transit agencies in the southern California area reported 716 million annual boarding. This represents growth of 14 percent in the ten years between 2001 and 2012, but only three percent growth in per capita trips due to population growth. Metrolink saw annual ridership grow by 78 percent and Metro Rail (Los Angeles County) has seen annual ridership growth of 64 percent.

1.4.8 AESTHETICS

Aesthetic resources on federal lands are managed by the federal government using various visual resource management programs, such as the Visual Resource Management System utilized by the Federal Bureau of Land Management (BLM) and the Visual Management System utilized by the U. S. Forest Service (FS).

The California Coastal Commission (CCC) regulates development projects within the coastal zone for jurisdictions that do not have a local coastal program (LCP) or land use plan (LUP). California's Scenic Highway Program helps to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of land adjacent to those highways. The nearest officially designated Scenic Highway to either the Ports and downtown Los Angeles would be Route 2 (Angeles Crest Scenic Byway) near La Canada/Flintridge, in the northeastern portion of Los Angeles County.

General plans, the primary document that establishes local land use policies and goals, are prepared by the counties and incorporated cities within the Basin. These general plans establish local policies related to aesthetics and the preservation of scenic resources within their communities or subplanning areas, and may include local scenic highway programs.

1.5 EXECUTIVE SUMMARY: CHAPTER 4 – ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Chapter 4 provides a detailed review of the environmental topics that were identified in the NOP/IS where potentially significant adverse impacts were identified (see Appendix A). Each of the proposed control measures was evaluated to determine the environmental topics that would potentially be impacted, if the control measure or strategy was adopted. The following subsections provide a brief discussion of the potential environmental impacts and mitigation measures for each environmental category analyzed. Table 1-1 provides a summary of the impacts identified under each resource category, identifies mitigation measures that were imposed (if applicable), and identifies the remaining impacts following mitigation.

1.5.1 AIR QUALITY AND GREENHOUSE GASES

Subchapter 4.1 identifies and quantifies direct air quality effects, that is, emission reductions anticipated to occur as a result of implementing the various control measures. This subchapter also examines indirect air quality impacts, that is, potential air pollutant emission increases that could occur as a consequence of efforts to improve air quality (e.g., emissions from control equipment such as afterburners). The NOP/IS (Appendix A) determined the air quality impacts of the proposed project are potentially significant. In particular some of the control measures could: 1) generate emissions during the construction phases needed to implement the proposed control measures; 2) generate additional emissions from power plants that would need to expand to produce additional electricity to operate zero and near-zero technologies; 3) generate additional toxic air contaminants (e.g., increased ammonia use and additional TACs associated with reformulated products); 4) generate additional emissions from refineries to produce reformulated or alternative fuels; and 5) generate additional trips to transport materials.

It is expected that many 2016 AQMP control measures will be promulgated as rules, laws, or ordnances by state (California), regional (SCAQMD, special districts, and counties), and local (cities) agencies. Because requirements of rules, laws, and ordinances can be enforced by the adopting agency, a conservative approach maximizing potential air quality and GHG impacts is the appropriate approach to analyzing potential secondary air quality impacts in this Program EIR. A number of control measures, however, involve incentives or voluntary compliance to achieve emission reductions. Since these types of control measures are not enforceable as they do not involve adoption by applicable agencies, the magnitude of impacts is uncertain. To further provide a conservative analysis of potential air quality and GHG impacts from adopting and implementing the 2016 AQMP, incentive or voluntary control measures will be treated like control measures that are expected to be adopted by applicable agencies, thus, maximizing potential impacts from these control measures.

The 2016 AQMP would result in a reduction of criteria pollutants in the Basin, thereby attaining the air quality standards. Additionally, during operation, less than significant air quality and GHG impacts are anticipated. However, significant adverse construction air quality and GHG impacts could be caused by the proposed project. As improved emission reduction technologies become available and as specific control measures are developed and projects proposed, construction mitigation measures will be updated and implemented. Further, future projects that implement

2016 AQMP control measures, including promulgating control measures such as SCAQMD rules or regulations or individual projects that implement the requirements of such promulgated rules where subsequent CEQA construction analyses have been performed, shall rely upon the results of these subsequent CEQA analyses, including whether or not mitigation measures will continue to be required. Implementation of mitigation measures AQ-1 to AQ-23 would reduce construction emissions but the overall construction air quality and GHG impacts after mitigation would likely remain significant.

1.5.2 ENERGY

Subchapter 4.2 examines impacts on the supply and demand of energy sources from implementing the proposed control measures in the 2016 AQMP. The NOP/IS for the 2016 AQMP (Appendix A) identified the following activities associated with implementing the proposed control measures as having potentially significant energy impacts: 1) potential increase in electricity demand due to increase penetration of near-zero and zero emission technologies; 2) potential increase in natural gas demand; 3) potential increase in electricity demand associated with operating new control equipment; and 4) potential increase in the use of alternative fuels.

All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect energy impacts based on the anticipated methods of control. Some of the control measures would require increased energy use, for example through the increased penetration of zero emission mobile sources. Other measures would alter the form of energy used, for example switching from gasoline or diesel power to alternative fuels. Evaluation of control measures was based on examination of the impact of the control measures and technologies in light of current energy trends. All control measures were analyzed to identify both beneficial effects (energy conserving) and adverse impacts (energy consuming).

The 2016 AQMP will result in less than significant impacts to the increased demand of alternative fuels, alternative energy, renewable energy, petroleum fuels, and natural gas. However, the electricity consumption impacts are significant because the potential 2024 electricity usage increase would exceed baseline electricity consumption by 7.8 to 12.7 percent. Even with implementation of mitigation measures E-1 to E-7, electricity consumption impacts would remain significant.

1.5.3 HAZARDS AND HAZARDOUS MATERIALS

Subchapter 4.3 identifies the potential hazard impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS (Appendix A) for the 2016 AQMP identified the following types of control measures as having potentially significant hazards and hazardous materials impacts: 1) use of reformulated coatings, solvents, and consumer products; 2) increase in the transportation and disposal of reformulated products; 3) the use of ammonia in selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) air pollution control technology; 4) use of alternative fuels; and, 5) use of catalysts. Although the NOP/IS concluded that there were no impacts from sites included on a list of hazardous materials sites that would create a hazard to the public and the environment, comments were received on the NOP/IS on this topic area. Therefore, an analysis of this topic area has also been included in this subchapter.

The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the 2016 AQMP are expected to be significant, as more flammable materials may be used. The SCAQMD cannot predict which coatings, solvents, adhesives, and sealants each affected facility might choose to use in the future as reformulated products become available or estimate the amount of coatings to be used. Mitigation measures were crafted to inform consumers about any potential fire hazards that may be associated with those reformulated products that may have increased flammability. While the promotion of consumer awareness may be helpful for safety reasons, these mitigation measures do not physically reduce any fire hazards in the reformulated products themselves. Thus, after implementation of mitigation measures HZ-1 and HZ-2, the fire hazards impacts are expected to remain significant.

The impacts from tank rupture of LNG and ammonia (in the non-refinery sector), and transport of LNG and ammonia are expected to remain significant even after implementation of mitigation measures HZ-3 to HZ-6.

In addition to the federal, state, and local regulations that facilities and sites listed on lists pursuant to Government Code §65962.5 must comply with, implementation of mitigation measures HZ-7 to HZ-15 will reduce the impacts to less than significant.

Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites. The location of the facilities that may use hazardous materials as a result of the 2016 AQMP control measures is currently unknown. While mitigation measures HZ-16 through HZ-18 would reduce the potentially significant hazard impacts and additional mitigation measures may be available on a site-specific basis (e.g., containment facilities, appropriate placement of tanks, etc.), the potential hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school site remain significant.

1.5.4 HYDROLOGY AND WATER QUALITY

Subchapter 4.4 identifies the potential hydrology and water quality impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS for the 2016 AQMP identified the following potentially significant hydrology and water quality impacts that may occur: 1) potential increase in water demand; 2) potential increase in wastewater discharge and related water quality impacts; 3) water quality impacts associated with increased use of alternative fuels; 4) water quality impacts associated with the accidental release of ammonia from operation of selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) air pollution control technology; 5) water quality impacts associated with accidental releases from battery disposal and processing including acid spills; and, 6) wastewater discharge from the use of reformulated products.

Wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be generated by the 2016 AQMP. Any accidental spills and

wastewater discharged due to the 2016 AQMP would not be expected to violate water quality standards and thus, these impacts would be less than significant. Furthermore, the increased use of alternative fuels, electric cars, ammonia, and SBS were also concluded to have less than significant hydrology and water quality impacts.

The water demand associated with certain air pollution control technologies the use of waterborne coatings could exceed the significance threshold of 262,820 gallons per day for potable water demand and five million gallons per day of total water demand. Thus, the overall water demand from implementing the 2016 AQMP is concluded to have significant hydrology (water demand) impacts. The source of water to meet the projected demand will vary from jurisdiction to jurisdiction but can include additional use of ground water and recycled water resources. Most of the ground water basins used for water supply are managed to minimize and prevent overdraft conditions.

The increased water demand is expected to be associated with existing sources within the Basin which already have water conveyance infrastructure. Therefore, the construction of new water conveyance infrastructure is not expected to be required.

While mitigation measures WQ-1 through WQ-4 could help minimize some of the water demand on an individual facility-basis, the availability of water supplies varies throughout the region; thus, not all mitigation measures will be applied in all situations. For this reason, the mitigation measures are not expected to fully eliminate the significant water demand impacts. Therefore, water demand and groundwater depletion impacts generated by the 2016 AQMP are expected to remain significant.

1.5.5 NOISE

Subchapter 4.5 identifies the potential noise impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS (Appendix A) for the 2016 AQMP identified the following types of control measures as having potentially significant noise impacts: 1) potential temporary changes in noise volume due to construction activities needed for installation of equipment and potential new roadway infrastructure; and 2) increased street sweeping activities.

Installing air pollution control equipment on stationary sources could generate noise and vibration impacts, but virtually all of the control equipment would be installed within industrial and commercial facilities. Further, noise requirements and noise ordinances would continue to apply to stationary sources, so that noise impacts on sensitive receptors are expected to be less than significant.

Control measures are not expected to require street sweeping in areas where there is no current street sweeping. Rather it may increase the number of times that roads in certain areas are swept. The roads that are most likely to require additional sweeping are those in industrial and commercial areas where sensitive receptors are not located. Therefore, because additional street sweeping is not expected to be required in residential or other noise-sensitive areas, additional street sweeping activities that may be required are not expected to result in significant noise impacts.

Construction activities are often limited to daytime hours to prevent noise impacts during the more sensitive nighttime hours. However, transportation-related construction activities often occur during the evening/nighttime hours to minimize traffic impacts during the more heavy traffic periods. For example, construction activities related to catenary overhead lines may occur during the evening/nighttime hours to minimize traffic conflicts, as construction would be expected along existing roads and transportation corridors. While mitigation measures NS-1 to NS-17 would minimize some of the noise and vibration impacts from construction, the SCAQMD cannot predict how a lead agency or responsible agency might choose to mitigate a significant construction noise and vibration impacts for a future project. Therefore, noise and vibration impacts from construction of implementing the 2016 AQMP are expected to remain significant.

1.5.6 SOLID/HAZARDOUS WASTE

Subchapter 4.6 identifies the potential solid and hazardous waste impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS (Appendix A) for the 2016 AQMP identified the following types of control measures as having potentially significant solid and hazardous waste impacts due to potential increases in waste from: 1) construction; 2) the disposal of old equipment; 3) spent catalysts; 4) street sweeping activities; 5) spent filters and baghouses; 6) limitations on waste burning; and, 7) vehicle/equipment scrapping and car battery disposal.

Due to the recycling value of the materials involved, the increased use of electric or hybrid vehicles and subsequent generation of batteries and other types of waste from air pollution control technology and devices were found to result in less than significant impacts to solid and hazardous waste.

For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, the high volume of vehicle and equipment to retire in a short timeframe and uncertainty of their outcome would result in potential significant solid and hazardous waste impacts due to implementation of the 2016 AQMP. Furthermore, the extent and timing of construction needed to implement the 2016 AQMP is not known at this time, but the potential to exceed landfill capacities in the short term was found to be significant. No mitigation measures were identified and the impacts remain significant.

1.5.7 TRANSPORTATION AND TRAFFIC

Subchapter 4.7 identifies the potential transportation and traffic impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS (Appendix A)for the 2016 AQMP identified the following types of control measures as having potentially significant transportation and traffic impacts: 1) changes in traffic volumes and patterns due to construction activities; 2) operational traffic increases due to increased transportation of catalyst, alternative fuels, or other chemicals such as ammonia, waste disposal, and agricultural materials (from chipping, grinding, or composting facilities); 3) increases in congestion due to increased street sweeping; and 4) operation of new transportation infrastructure.

Construction activities necessary to modify existing rail and truck routes/corridors would vary depending on the location and the specific traffic impacts are unknown. Project specific impacts would require a separate CEQA evaluation. However, all traffic impacts, although temporary in nature, could be significant and result in a reduction of LOS at local intersections, result in partial or temporary road or lane closures, result in additional traffic congestion, and potentially impact roadways within the County's congestion management plan.

Additional traffic will be generated by the 2016 AQMP due to the need to transport increased waste for disposal (e.g., construction debris, waste from scrapping of old equipment/vehicles, and waste from air pollution control equipment, such as filters), increased waste material for recycling (e.g., catalysts), increased use of products (e.g., ammonia), and increased transportation or agricultural material for chipping, grinding or composting facilities. Transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines may occur which could adversely affect traffic and congestion for all other vehicles on the road. Furthermore, if the barge-based bonnet technology is used to reduce emissions from ocean going vessels, the increase in barges at the harbors could create a significant congestion and traffic hazard impact.

While mitigation measure TR-1 could help minimize some of the significant construction impacts, the SCAQMD cannot predict how a future lead agency might choose to mitigate a particular significant traffic and transportation impact. Thus, the future traffic and transportation impacts are considered to be significant due to implementation of the 2016 AQMP control measures.

1.5.8 AESTHETICS

Subchapter 4.8 identifies the potential aesthetics impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS for the 2016 AQMP did not identify any control measures as having potentially significant aesthetic impacts. However, comments were received on the NOP/IS relative to aesthetics impacts. After consideration of these comments and further review of the control measures, implementation of some 2016 AQMP control measures could change the existing visual character or quality of any site on which certain types of technologies may be installed and its surroundings and result in glare. Therefore, analysis of these potentially significant impacts have been included.

During construction, the equipment staging and laydown areas would be in close proximity to the each affected site and could create a temporary, but potentially significant aesthetic impact due to the degradation of the existing visual character of the each affected sites.

Implementation of the 2016 AQMP may substantially degrade the existing visual character or quality of a site and its surroundings from the installation of catenary lines and use of bonnet technology on vessels at the Ports. Furthermore, the installation of solar panels and cool roof technology would significantly increase the amount of glare generated. While mitigation measures

AE-1 through AE-5 could minimize some of the aesthetics impacts, the SCAQMD cannot predict how a lead agency might choose to mitigate a particular significant aesthetics impact for future project(s) located in areas with project-specific features and issues. Thus, the potential exists for impacts for future projects to be significant even after feasible mitigation measures are identified and imposed. Therefore, aesthetics impacts that may occur as a result of implementing the 2016 AQMP are expected to remain significant after mitigation.

1.6 EXECUTIVE SUMMARY: CHAPTER 5 – CUMULATIVE IMPACTS

CEQA Guidelines §15130 (a) requires an EIR to discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in §15065 (a)(3). The 2016 AQMP is a regional plan that includes broad policy criteria and as such, the 2016 AQMP Program EIR evaluates the environmental impacts associated with implementing the 2016 AQMP stationary and mobile source control measures to determine whether or not the impacts of the project are cumulatively considerable when combined with potential impacts associated with other similar regional projects involving regulatory activities or other projects with similar impacts.

The 2016 AQMP control measures consist of three components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) State and Federal Mobile Source Control Measures; and 3) Regional Transportation Strategy and Control Measures provided by SCAG. The cumulative impacts analysis for the 2016 AQMP Program EIR includes the project-specific analyses of the SCAQMD's stationary and mobile source control measures and CARB's mobile source control measures, as well as the transportation control measures (TCMs) that were developed and adopted by SCAG as part of the 2016 RTP/SCS and the 2015 Federal Transportation Improvement Program (FTIP) (SCAG 2016) (2016 AQMP, Appendix IV-C). The TCMs are appropriately part of the cumulative impact analysis because they include regulatory activities associated with measures that could also generate related environmental impacts within the Basin.

The following sections summarize the project-specific and cumulative impacts analyses from the Final Program EIR for the 2016 RTP/SCS. The discussions also summarize project-specific impacts from the 2016 AQMP, which includes both SCAQMD control measures as well as control measures included in CARB's State SIP Strategy. The discussions also include an evaluation regarding whether or not impacts from the 2016 AQMP contribute to cumulative impacts from the 2016 RTP/SCS, which have already been evaluated in a Program EIR certified by SCAG.

1.6.1 AESTHETICS

Aesthetic impacts from zero or near-zero emission equipment are primarily associated with the installation of catenary poles and overhead wires, use of bonnet technology to reduce emissions from ocean going vessels at the ports, and increased glare from solar panels and use of cool roof technology. During construction, the equipment staging and laydown areas would be in close proximity to the each affected site and could create a temporary, but potentially significant aesthetic impact due to the degradation of the existing visual character of the each affected sites. The areas where these facilities may be located are not expected to be near an officially designated Scenic Highway or a roadway eligible for State Scenic Highway Designation. The overhead power lines and catenary system would not be visible from this distance to an officially designated Scenic

Highway or to a roadway eligible for designation as a Scenic Highway. However, the catenary poles and overhead electric wires could degrade the existing visual character or quality of the surrounding area and are considered to be potentially significant.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS would adversely affect aesthetics and views. Expected significant impacts would include the obstruction of scenic views and vista points due to the construction of highways, connectors, interchanges, goods movement roadway facilities, high speed rail, and sound walls for anticipated RTP/SCS transportation projects, which would potentially block or impede views of mountains, oceans, or rivers. Development in floodplains, wetlands, wooded areas, coastal bluffs, lagoons, reservoirs, regional parks, recreational areas, agricultural lands, or in areas that include steep slopes or scenic vistas has the potential to adversely impact visual resources.

The 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to aesthetic resources identified in the 2016 RTP/SCS because potential aesthetic resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential aesthetic impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect aesthetic resources impacted by the 2016 RTP/SCS.

Impacts from implementation of the 2016 AQMP to aesthetic resources were determined to generate significant adverse aesthetic impacts. Therefore, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to aesthetic resources identified in the 2016 RTP/SCS.

1.6.2 AGRICULTURAL RESOURCES

For the 2016 AQMP, impacts to agriculture and forestry resources were determined to be below the level of significance in the NOP/IS. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to agricultural resources identified in the 2016 RTP/SCS because potential agriculture and forestry resource impacts identified in the 2016 RTP/SCS Program EIR are different than the potential agricultural impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect agricultural resources impacted by the 2016 RTP/SCS.

1.6.3 AIR QUALITY AND GREENHOUSE GASES

Construction Impacts: Construction activities associated with the 2016 AQMP would result in significant impacts to the air quality resource and any concurrent emissions-generating activities from reasonably foreseeable construction activities would add an additional air emission burden to these significant levels. Therefore, construction air quality impacts from the 2016 AQMP are

considered to be cumulatively considerable and would contribute to significant adverse cumulative impacts from the 2016 RTP/SCS.

Operational Impacts – Criteria Pollutants: The 2016 AQMP is expected to result in an emissions reduction in NOx, VOC, SOx, and PM emissions, providing an air quality benefit. The federal annual PM2.5 standards are predicted to be achieved in 2023 with implementation of the proposed ozone strategy and the California annual PM2.5 standard will be achieved in 2025. The 2016 AQMP is also expected to achieve the ozone 8-hour standard by 2023. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 are needed to meet the 70 ppb ozone standard.

Although existing and future air quality rules and regulations are expected to minimize emissions associated with increased generation of electricity, the 2016 AQMP will result in a substantial increase in electricity generation. The electricity providers have committed to meeting the increased energy demand and the emissions from the generation of this increase demand has been included in the emission inventory of the 2016 AQMP. No significant air quality impacts from control of stationary sources were identified associated with implementation of the 2016 AQMP. Control measures in the 2016 AQMP would also reduce emissions from mobile sources and VOC emissions from reformulation of coatings.

Under the 2016 RTP/SCS, mobile source criteria pollutants are expected to have a short term increase during construction activities, but long term air quality impacts are expected to remain the same or decrease compared to baseline (2012) levels.

Implementation of the 2016 AQMP would not in itself result in significant adverse operational air quality impacts associated with operational activities. For this reason, the 2016 AQMP would not be expected to contribute to significant adverse cumulative impacts from transportation projects projected in the 2016 RTP/SCS.

Operational Impacts – TACs: Control measure CMB-05 may result in the use of ammonia in SCRs and SNCRs. BACT (i.e. catalyst) for ammonia slip from SCR units is restricted to five ppm or less, which has been shown through source-specific permit modeling to have no significant impact on surrounding communities. The 2016 AQMP is expected result in an overall reduction in TAC emissions as it includes a number of measures to reduce TAC emissions. The 2016 AQMP would also accelerate the penetration of partial-zero and zero emission vehicles and other mobile sources, reducing the use of conventional fuels and the related air emissions, which include TACs (such as DPM). Therefore, implementing 2016 AQMP control measures is not expected to generate significant adverse air quality impacts from increased exposure to TAC emissions.

Under the 2016 RTP/SCS, the maximum cancer potential is less than existing conditions even though vehicle miles traveled (VMT) is expected to increase. However, despite an overall cancer risk reduction, minor exposure of sensitive receptors to pollutants exceeds the cancer risk threshold, mainly around areas of high traffic volume areas such as freeways, which was deemed to be significant. A focus on creating more high quality transit areas (HQTAs) is expected to further reduce public health risks by promoting an increase in active transportation (e.g. biking and walking) which in turn contributes to pollutant level reductions.

Implementation of the 2016 AQMP would not in itself result in significant air quality impacts associated with non-criteria pollutants. Moreover, the 2016 AQMP would not contribute to impacts associated with transportation projects projected in the 2016 RTP/SCS and, therefore, would not be expected to contribute to a cumulatively considerable impact.

Greenhouse Gas Emissions: Electricity is expected to be the predominant alternative fuel because it is more available, affordable, and can be used to power zero emission vehicles. Existing power generating facilities are subject to AB32 and will be required to reduce GHG emissions by 2020 and any future power generating stations would be subject to stringent emission control requirements, including GHG emissions. As a result, GHG emissions associated with the use of alternative fuels are expected to be less than GHG emissions associated with the use of petroleum-based fuels. Therefore, no increase in GHG emissions is expected from the increased production and use of alternative fuels and GHG emission impacts are expected to be less than significant.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS projects would result in a 24 percent decrease in GHG emissions by 2040 for both mobile source and residential/commercial buildings. The 2016 RTP/SCS meets or exceeds emission reduction targets for cars and light duty trucks set forth by SB375, and as such would result in a less than significant impact related to per capita emissions and SB375. Additionally, the 2016 RTP/SCS is expected to comply with reduction targets outlined in AB32 as the 2016 RTP/SCS contributes its reductions share for responsible sectors. However, there are potential significant GHG impacts if other responsible agency implementation activities do not achieve their respective GHG emission reduction goals to the appropriate level.

Implementation of the 2016 AQMP would not result in significant GHG impacts. Moreover, the 2016 AQMP would not contribute to impacts associated with transportation projects projected in the 2016 RTP/SCS and, therefore, would not be expected to contribute to a cumulatively considerable impact requiring mitigation.

1.6.4 BIOLOGICAL RESOURCES

Impacts to biological resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse biological impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to biological resources identified in the 2016 RTP/SCS because potential biological resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential biological impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect biological resources impacted by the 2016 RTP/SCS.

1.6.5 CULTURAL RESOURCES

Impacts to cultural resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse cultural impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to cultural resources identified in the 2016 RTP/SCS because potential cultural resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential cultural impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect cultural resources impacted by the 2016 RTP/SCS.

1.6.6 ENERGY

The 2016 AQMP could result in significant adverse electricity consumption impacts because the potential electricity usage increase would exceed baseline electricity consumption by 7.8 to 12.7 percent. No significant impacts on natural gas supplies and petroleum fuels associated with the 2016 AQMP were identified because of the anticipated reduction in future demand and wide availability of natural gas. Additionally, potential alternative energy demand impacts are expected to be less than significant as adequate supplies are available.

The 2016 RTP/SCS Program EIR concluded that overall energy demand would increase as a result of implementation of the 2016 RTP/SCS. Under the 2016 RTP/SCS, the regional transportation system has the potential to increase petroleum and non-renewable fuel consumption but the increase in active transportation, the encouragement of carpooling and transit use, and better fuel economy would result in less transportation related fuel consumption. Despite an expected per capita decrease in energy consumption, overall residential and commercial building energy consumption would increase due to a growth in the population and an increased number of households and is expected to be significant.

The 2016 AQMP control measures would result in significant adverse energy demand impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to energy identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

1.6.7 GEOLOGY AND SOILS

Impacts to geology and soils were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse geology and soil impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to geology and soil resources identified in the 2016 RTP/SCS because potential geology and soil impacts identified in the 2016 RTP/SCS Program EIR are different than the potential geology and soil impacts that could be generated by the 2016 AQMP

and, geographically, there is no overlap between the 2016 AQMP projects that may affect geology and soils impacted by the 2016 RTP/SCS.

1.6.8 HAZARDS AND HAZARDOUS MATERIALS

The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the 2016 AQMP are expected to be significant, as more flammable materials may be used. The impacts from tank rupture of LNG and ammonia (in the non-refinery sector), and transport of LNG and ammonia are expected to remain significant even after implementation of mitigation. In addition to the federal, state, and local regulations that facilities and sites listed on lists pursuant to Government Code §65962.5 must comply with, implementation of mitigation measures will reduce the impacts to less than significant.

Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites. The location of the facilities that may use hazardous materials as a result of the 2016 AQMP control measures is currently unknown. While mitigation measures would reduce the potentially significant hazard impacts and additional mitigation measures may be available on a site-specific basis (e.g., containment facilities, appropriate placement of tanks, etc.), the potential hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school site remain significant.

Furthermore, implementation of the 2016 RTP/SCS could potentially take place on sites which are included on a list of hazardous material sites and as such potentially disturb contaminated property during construction activities. The 2016 RTP/SCS also has the potential to impair or interfere with emergency response procedures and emergency evacuation plans due to roadway closures and congestion as a result of construction. There is the potential for the 2016 RTP/SCS to expose people to significant impacts from wildland fires due to possible development in areas with a high fire hazard risk. Finally, the 2016 RTP/SCS Program EIR concluded that the forecasted urban development and growth that would occur under the 2016 RTP/SCS and the increased mobility provided by the 2016 RTP/SCS would result in increased hazardous materials transport outside of the SCAG region and as such would contribute to cumulatively considerable hazard impacts.

The 2016 AQMP control measures would result in significant adverse hazards and hazardous waste impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to hazards and hazardous waste identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

1.6.9 HYDROLOGY AND WATER QUALITY

Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies that may be required to comply with the 2016 AQMP control measures, such as wet ESPs and WGSs, are potentially significant as they would exceed SCAQMD water demand significance thresholds.

The impacts of the 2016 AQMP on water demand are expected to be significant prior to mitigation. While generally the mitigation measures could help minimize some of the water demand, on an individual facility-basis, the availability of water supplies varies throughout the region, thus, not all mitigation measures will be applied in all situations. For this reason, the mitigation measures are not expected to fully eliminate the potential water demand impacts and water demand impacts remain significant. The hydrology and water quality impacts associated with wastewater generation, use of alternative fuels, increased use of electric vehicles, use of SBS, and ammonia are expected to be less than significant.

The 2016 RTP/SCS impacts associated with hydrology and water quality would be reduced following the implementation of the 2016 RTP/SCS Program EIR mitigation measures. However, 2016 RTP/SCS impacts would remain significant following mitigation for ground water resources (water demand), alteration of existing drainage patterns that could result in flooding, increased water runoff, and potential for inundation by seiche, tsunami or mudflow.
The 2016 AQMP control measures would result in significant adverse water demand impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to hydrology and water quality identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

1.6.10 LAND USE AND PLANNING

Impacts to land use and planning were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse land use and planning impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to land use and planning identified in the 2016 RTP/SCS because potential land use and planning impacts identified in the 2016 RTP/SCS Program EIR are different than the potential land use and planning impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect land use and planning impacted by the 2016 RTP/SCS.

1.6.11 MINERAL RESOURCES

Impacts to mineral resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse mineral impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to mineral resources identified in the 2016 RTP/SCS because

potential mineral resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential mineral impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect mineral resources impacted by the 2016 RTP/SCS.

Potential mineral resource impacts from the 2016 RTP/SCS would be reduced following the implementation of 2016 RTP/SCS Program EIR mitigation measures. However, 2016 RTP/SCS impacts would remain significant following mitigation as the population growth projected by 2040 in combination with projects identified in the 2016 RTP/SCS would still impact mineral resources. Moreover, the 2016 AQMP would not contribute to that impact, so adverse cumulative mineral resource impacts are concluded to be less than significant.

1.6.12 NOISE

Construction Impacts: Implementation of the 2016 AQMP control measures associated with air pollution control technologies and exhaust standards would not result in noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas, impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected. However, implementation of the 2016 AQMP control measures associated with construction of overhead catenary lines could result in significant noise and vibration impacts due to the geographic proximity of sensitive receptors.

According to the 2016 RTP/SCS Program EIR, grading and construction activities associated with the proposed transportation projects, as well as anticipated development, would intermittently and temporarily generate noise and vibration levels above ambient background levels in such a way that would not have occurred without the project. Noise and vibration levels in the immediate vicinity of the construction sites would increase substantially at times for an extended duration, resulting in temporary noise increases at nearby sensitive receptors, creating significant adverse noise impacts.

Although impacts would be reduced following implementation of noise mitigation measures, noise and vibration impacts associated with the construction of catenary lines would remain significant in areas where sensitive receptors are located near transportation corridors. The 2016 RTP/SCS impacts associated with noise would be reduced following the implementation of 2016 RTP/SCS Program EIR mitigation measures. However, 2016 RTP/SCS impacts would remain significant following mitigation for noise and vibration during construction activities and operational activities. Therefore, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with the 2016 RTP/SCS transportation projects, would contribute to cumulatively considerable noise and vibration impacts during construction.

Operational Impacts: Implementation of the 2016 AQMP control measures is not expected to result in significant adverse operational noise impacts because the 2016 AQMP control measures affect existing commercial or industrial facilities typically located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently,

or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. Although overhead catenary lines could be installed to comply with certain control measures, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors.

According to the 2016 RTP/SCS Program EIR, noise sensitive land uses could be exposed to operational noise in excess of normally acceptable noise levels. These areas could experience substantial increases in noise as a result of the following: operation of expanded or new transportation facilities (i.e., increased traffic resulting from new or expanded highways, the use of new transit corridors or increased use of existing corridors, and a capacity increase in freight and passenger rail), and increased vehicle activity (autos, trucks, buses, trains etc.) associated with development and resulting in increased ambient noise next to transportation facilities.
The 2016 AQMP control measures would result in significant adverse noise impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to noise identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

1.6.13 POPULATION AND HOUSING

Impacts to population and housing were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse population and housing impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to population and housing identified in the 2016 RTP/SCS because potential population and housing impacts identified in the 2016 RTP/SCS Program EIR are different than the potential population and housing impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect population and housing impacted by the 2016 RTP/SCS.

1.6.14 PUBLIC SERVICES

Impacts to public services were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse public service impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to public services identified in the 2016 RTP/SCS because potential public service impacts identified in the 2016 RTP/SCS Program EIR are different than the potential public service impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect public services impacted by the 2016 RTP/SCS.

1.6.15 RECREATION

Impacts to recreation were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse recreation impacts. Further, the 2016

AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to recreation identified in the 2016 RTP/SCS because potential recreation impacts identified in the 2016 RTP/SCS Program EIR are different than the potential recreation impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect recreation impacted by the 2016 RTP/SCS.

1.6.16 SOLID AND HAZARDOUS WASTE

Implementation 2016 AQMP control measures would not significantly increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, would not generate significant additional waste. Since spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries. In addition, solid waste impacts due to 2016 AQMP air pollution control technologies would not be significant because spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the District (except for vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, the impacts from waste generated from construction of 2016 AQMP control measures and from vehicle scrapping programs could result in significant impacts.

Impacts from solid waste were discussed under the combined category of Utilities and Service Systems in the 2016 RTP/SCS Program EIR, whereas impacts from hazardous waste were considered under the Hazardous Materials Section of the 2016 RTP/SCS Program EIR. Implementing the 2016 RTP/SCS would result in significant amounts of solid waste associated with construction activities of transportation projects and urban development. Construction debris would be used as fill, recycled or transported to the nearest landfill and disposed of appropriately. The 2016 RTP/SCS also has the potential to result in significant impacts when the landfill designated for the project area is insufficient in capacity to accommodate solid waste disposal needs. All projects in 2016 RTP/SCS must comply with federal, state, and local statues and regulations related to solid waste.

The 2016 AQMP control measures would result in significant adverse solid and hazardous waste impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to solid and hazardous waste identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

1.6.17 TRANSPORTATION AND TRAFFIC

Some 2016 AQMP control measures could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, were considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road. Furthermore, if the barge-based bonnet technology is used to reduce emissions from ocean going vessels, the increase in barges at the harbors could create a significant congestion and traffic hazard impact. Significant adverse operational traffic impacts are, therefore, anticipated to be generated by the 2016 AQMP. Other than this impact, no new streets, roads, freeways, or rail lines would be required and the 2016 AQMP control measures would apply to existing transportation corridors, so no additional significant traffic impacts are expected.

The 2016 AQMP relies on transportation and related control measures developed by SCAG in the 2016 RTP/SCS. According to the Transportation, Traffic, and Safety section of the 2016 RTP/SCS Program EIR, implementation of the proposed plan has the potential to result in several significant impacts such as increased VMT, increased VHD for heavy-duty trucks, and emergency access, and less than significant impacts such as decreased VHD, lower system-wide fatality accident rate, and air traffic patterns.

The 2016 AQMP control measures would result in significant adverse transportation and traffic impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to transportation and traffic identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

1.7 EXECUTIVE SUMMARY: CHAPTER 6 – ALTERNATIVES

1.7.1 ALTERNATIVES EVALUATED IN THE PROGRAM EIR

This Program EIR provides a discussion of alternatives to the proposed project as required by CEQA. Pursuant to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project but would avoid or substantially lessen any of the significant effects of the project, and provide means for evaluating the comparative merits of each alternative (CEQA, Guidelines, §15126.6(a)). In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines §15126.6(a)). The key issue is whether the selection and discussion

of alternatives fosters informed decision making and public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines, §15126.6(f)(3). Six alternatives were rejected as infeasible. A total of four alternatives were evaluated in the Program EIR.

Alternative 1 – No Project Alternative: CEQA requires the evaluation of the No Project Alternative, which consists of what would occur if the proposed project was not approved; in this case, not adopting the 2016 AQMP. The net effect of not adopting the 2016 AQMP would be a continuation of the 2012 AQMP and the 2007 AQMP.

Alternative 2 – Mobile Source Reduction Only: Under Alternative 2, no stationary control measures would be implemented. Only the mobile source control measures proposed by both CARB and the SCAQMD would be implemented. In order to be a viable alternative to be considered, the shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would need to be classified as CAA §182(e)(5) measures.

Alternative 3 – Regulation Only: The 2016 AQMP includes a control strategy constructed from traditional regulatory control measures, co-benefit measures and incentive-based measures that will require adopted guidelines and secured funding, along with federal enforceable commitments pursuant to U.S. EPA. Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. By removing the emission reductions from the incentive-based measures, attainment of the standards is at risk. Therefore, by way of public comment suggestion, Alternative 3 would propose additional control measures to assist in making up the remaining emission reductions necessary to demonstration attainment of the ozone standards. If the emission reductions from the additional proposed control strategies are determined to not be enough to demonstrate attainment the ozone standards, the remaining NOx emission reductions would be classified as CAA §182(e)(5) measures.

Alternative 4 – Expanded Incentive Funding: Alternative 4 would expand the incentive funding programs to increase the penetration of cleaner vehicles and technologies, allowing for more emission reductions and possibly earlier attainment of ambient air quality standards. Depending on the method of funding, current incentive costs are in the range of 4.25 to 15.8 billion dollars. Under this alternative it would be assumed that additional incentive funding sources would be found. This alternative has the opportunity to provide for more emission reductions and ease the need for additional regulatory action. However, the attainment goals would still need to be achieved as expeditiously as practicable.

1.7.2 ALTERNATIVES ANALYSIS SUMMARY

Of the project Alternatives, Alternative 1 would generate the least severe and fewest number of environmental impacts compared to the 2016 AQMP. However, compared to the other project alternatives, Alternative 1 would achieve the fewest of the project objectives (see Chapter 2 for the comprehensive list of objectives) and would not accomplish critical objectives such as demonstrating attainment of the 2006 24-hour PM2.5 standard (35 $\mu g/m^3$) (*Objective #3*), 2012

annual PM2.5 standard (12 µg/m^3) (*Objective #4*) and the 2008 8-hour ozone standard (75 ppb) (*Objective #5*) applying the latest SCAG's 2016 RTP information and CARB's 2014 EMFAC data (*Objective #6*). Without submitting a Plan that makes these demonstrations, the region is in violation of the Clean Air Act (CAA) and at risk for sanctions and consequences. Although not required by the CAA, other objectives not fulfilled by Alternative 1 include eliminating reliance on CAA§182(e)(5) measures to the extent feasible (*Objective #12*) , taking co-benefit reductions from other planning efforts (e.g., GHG reduction targets, energy efficiency and transportation) (*Objective #13*), developing a fair share reduction strategy with federal, state and local levels (*Objective #14*), seeking funding for incentive programs (*Objective #16*), and enhancing the socioeconomic analysis (*Objective #17*).

Alternative 2 would be expected to generate equivalent impacts to the proposed project in all environmental topic areas analyzed except water demand which is primarily generated from stationary sources that are not implemented under Alternative 2. The only exception is the consumer products control measure proposed and implemented by CARB's SIP Strategy. Therefore, the potentially significant increase in water demand associated with the proposed project would be substantially less under Alternative 2 but not fully eliminated since consumer products will still be implemented. More importantly, however, is that Alternative 2 will need to rely on classifying the emission reductions not achieve from stationary sources as long-term or "black box" measure in order to demonstrate attainment of the ozone and PM2.5 standards. This would not achieve the objective to eliminate reliance on future technologies (CAA §182(e)(5)) measures to the extent feasible.

Similarly, Alternative 3 would be expected to generate overall equivalent impacts to the proposed project in all environmental topic areas analyzed except construction noise expected from the construction of the catenary line for heavy-duty truck transport on freeways. Other actions will generate construction noise under Alternative 3 but not as significant as the proposed project. Alternative 3 proposes additional control measures that will benefit air quality equal to the proposed projects with no incentive measures, but could also rely on long-term or "black box" measures for any shortfall in attainment demonstration of the ozone and PM2.5 standards. Similar to Alternative 2, if this is the case, Alternative 3 would not achieve an important objective to eliminate reliance on future technologies (CAA §182(e)(5)) measures to the extent feasible.

As discussed earlier, Alternative 4 has the potential to be the environmentally superior alternative if the additional incentive funding is secured, the programs are more effective than the proposed project and the potential secondary impacts from the additional funded projects are outweighed by the additional emission reductions achieved, thus more overall air quality benefit. Alternative 4 achieves all the project objectives as does the proposed project.

Based on the above information and discussion, the proposed project has been proven to be the most effective project that achieves the all the project objectives relative to environmental impacts generated. While adverse secondary impacts will be difficult to avoid, mitigation measures are proposed and an overall air quality benefit will result along with reductions in toxics and GHGs. The proposed project will satisfy the CAA and not put the region in legal vulnerability that could harm the environment, communities and businesses.

1.8 EXECUTIVE SUMMARY: CHAPTERS 7 AND 8

Chapter 7 provides the references and Chapter 8 provides the acronyms for the 2016 AQMP Program EIR.

TABLE 1.9-1

Summary of Environmental Impacts, Mitigation Measures and Residual Impacts

Impact	Mitigation Measures	Residual Impacts
AIR QUALITY AND GREENHOUSE GASES		
The construction phases of the proposed project will exceed the regional significance thresholds.	AQ-1 During construction, require the use of 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export). If the Lead Agency determines that 2010 model year or newer diesel trucks cannot be obtained, the Lead Agency shall instead requires the use of trucks that meet EPA 2007 model year NOx emissions requirements. AQ-2 Require all on-site construction equipment to meet the following: • All off road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. • A copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit of equipment. • Encourage construction contractors to apply for SCAQMD "SOON" funding incentives. The "SOON" program provides funds to accelerate the clean up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/tao/Implementation/SOONProgram.htm. AQ-3 Prohibit vehicles and construction equipment from idling longer than five minutes at the construction site by including these restrictions in the construction company contract(s) and by posting	Impacts remain significant and unavoidable.

	signs on-site, unless the exceptions in the CARB regulations which pertain to idling requirements are applicable. AQ-4 All on-road heavy-duty diesel trucks or equipment with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater shall comply with EPA 2007 on-road emission standards for PM and NOx (0.01 gram per brake horsepower - hour (g/bhp-hr) and at least 0.2 g/bhp-hr, respectively). AQ-5 Maintain construction equipment tuned up and with two to four-degree retard diesel engine timing or tuned to manufacturer's recommended specifications that optimize emissions without nullifying engine warranties. AQ-6 The project proponent shall survey and document the proposed project's construction areas and identify all construction areas that are served by electricity. Onsite electricity, rather than temporary power generators, shall be used in all construction areas that are demonstrated to be served by electricity. AQ-7 Provide temporary traffic controls such as a flag person, during all phases of significant construction activity to maintain smooth traffic flow. AQ-8 Provide dedicated turn lanes for the movement of construction trucks and equipment on- and off-site. AQ-9 Re-route construction trucks away from congested streets or sensitive receptor areas. AQ-10 Improve traffic flow by signal synchronization. AQ-11 Reduce traffic speeds on all unpaved roads to 15 mph or less. AQ-12 Prohibit truck idling in excess of five minutes, on- and off-site. AQ-13 Schedule construction activities that affect traffic flow on the arterial system to off-peak hours to the extent practicable. AQ-14 Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 mph. AQ-15 Suspend all construction activities that generate air pollutant emissions during first stage smog alerts. AQ-16 Configure construction parking to minimize traffic interference.	

	AQ-17 Use alternative clean fueled off-road equipment or give extra points in the bidding process for contractors committing to use such equipment. AQ-18 Require covering of all trucks hauling dirt, sand, soil, or other loose materials. AQ-19 Install wheel washers where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site for each trip. AQ-20 Apply non-toxic soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for ten days or more). AQ-21 Replace ground cover in disturbed areas as quickly as possible to minimize dust. AQ-22 Pave road and road shoulders. AQ-23 Sweep streets at the end of the day with SCAQMD Rule 1186 and 1186.1 compliant sweepers if visible soil is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water).	
Operational emissions will not exceed the regional significance threshold and are less than significant.	None required.	Impacts remain less than significant.
Impacts from increased electricity demand are less than significant.	None required.	Impacts remain less than significant.
Impacts from operating air pollution control equipment would be less than significant.	None required.	Impacts remain less than significant.
Impacts from using lower VOC materials such as future coating, solvent, adhesive, and sealant rules and incentives to paint existing or new structures are expected to be less than significant.	None required.	Impacts remain less than significant.

Impacts from mobile sources are less than significant.	None required.	Impacts remain less than significant.
Impacts from miscellaneous sources are less than significant.	None required.	Impacts remain less than significant.
The 2016 AQMP will result in a reduction in TAC emissions and impacts are less than significant.	None required.	Impacts remain less than significant.
Impacts from GHG emissions for both construction and operation are less than significant.	None required.	Impacts remain less than significant.
ENERGY		
Impacts from increased electrical demand are considered significant.	E-1 Project sponsors should pursue incentives to encourage the use of energy efficient equipment and vehicles and promote energy conservation. E-2 Utilities should increase the capacity of existing transmission lines to meet forecast demand that supports sustainable growth, where feasible and appropriate, in coordination with local planning agencies. E-3 Project sponsors should submit projected electricity calculations to the local electricity provider for any project anticipated to require substantial electricity consumption. Any infrastructure improvements necessary should be completed according to the specifications of the electricity provider. E-4 Project sponsors should include energy analyses in environmental documentation (e.g., CEQA document) with the goal of conserving energy through the wise and efficient use of energy. E-5 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the charging of electrical vehicles and other mobile sources during off-peak hours. E-6 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of catenary or way-side electrical systems developed for transportation systems to operate during off-peak hours.	Impacts remain significant and unavoidable.

	E-7 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of electrified stationary sources during off-peak hours (e.g., cargo handling equipment).	
Impacts from the increased demand of alternative fuels, alternative energy, renewable energy, petroleum fuels, and natural gas are less than significant.	None required.	Impacts remain less than significant.
HAZARDS AND HAZARDOUS MATERIALS		
Impacts from the routine use of alternative fuels are less than significant.	None required.	Impacts remain less than significant.
Impacts from the routine use of caustic, catalysts, acidifiers, and sodium bisulfate are less than significant.	None required.	Impacts remain less than significant.
Impacts from spills are less than significant.	None required.	Impacts remain less than significant.
Impacts from the transportation of alternative fuels are less than significant, except for LNG.	None required.	Impacts remain less than significant.
Impacts associated with increased flammability of potential replacement solvents, reformulated coatings, adhesives, and sealants are significant.	HZ-1 Add consumer warning requirements for all reformulated products that are flammable and extremely flammable. HZ-2 Add requirements to conduct a public education and outreach program in joint cooperation with local fire departments regarding reformulated products that are flammable and extremely flammable, especially for reformulated consumer paint thinners and multi-purpose solvents.	Impacts remain significant and unavoidable.
Impacts from the storage and accidental release of ammonia in the refinery sector are less than significant.	None required.	Impacts remain less than significant.

Impacts from the storage and accidental release of ammonia in the non-refinery sector are significant.	Although there are a number of existing regulations which would reduce these impacts, mitigation measures would need to be identified on a project-by-project basis.	Impacts remain significant and unavoidable.
Impacts from the storage and transportation of LNG are significant.	HZ-3 Install secondary containment (e.g., berms). HZ-4 Install valves that fail shut. HZ-5 Install emergency release valves and barriers around LNG storage tanks to prevent the physical damage to storage tanks or limit the release of LNG from storage tanks. HZ-6 Perform integrity testing of LNG storage tanks to assist in preventing failure from structural problems. Construct a containment system to be used for deliveries during off-loading operations.	Impacts remain significant and unavoidable.
Impacts from the transportation of ammonia are significant.	No feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
Impacts from facilities and sites which might be identified on lists pursuant to Government Code §65962.5 could be significant during construction.	HZ-7 Conduct a Phase I Environmental Site Assessment prior to construction. If known contamination is discovered, a Phase II environmental Site Assessment should be conducted and provided to the Lead Agency. The recommendations in the Environmental Site Assessments should be implemented. HZ-8 Consult with the appropriate local, state, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps. HZ-9 Cease work if soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums, or other hazardous materials or wastes are encountered), in the vicinity of the suspect material. Secure the area as necessary and take all	Impacts are reduced to less than significant.

	appropriate measures to protect human health and the environment, including but not limited to: notification of regulatory agencies and identification of the nature and extent of contamination. Stop work in the areas affected until the measures have been implemented consistent with the guidance of the appropriate regulatory oversight authority. HZ-10 Use best management practices (BMPs) regarding potential soil and groundwater hazards. HZ-11 Soil generated by construction activities should be stockpiled on-site in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. Complete sampling and handling and transport procedures for reuse or disposal, in accordance with applicable local, state and federal laws and policies. HZ-12 Groundwater pumped from the subsurface should be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies. Utilize engineering controls, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building. HZ-13 Prior to issuance of any demolition, grading, or building permit, submit for review and approval by the Lead Agency (or other appropriate government agency) written verification that the appropriate federal, state and/or local oversight authorities, including but not limited to the Regional Water Quality Control Board (RWQCB), have granted all required clearances and confirmed that the all applicable standards, regulations, and conditions have been met for previous contamination at the site. HZ-14 Develop, train, and implement appropriate worker awareness and protective measures to assure that worker and public exposure is minimized to an acceptable level and to prevent any further environmental contamination as a result of construction.	

	HZ-15 Where a project site is determined to contain materials classified as hazardous waste by state or federal law, submit written confirmation to appropriate local agency that all state and federal laws and regulations will be followed when profiling, handling, treating, transporting, and/or disposing of such materials.	
Impacts to schools located within a quarter mile of facilities are significant.	HZ-16 The temporary storage and handling of potentially hazardous materials/wastes should be in areas away from sensitive receptors such as schools or residential areas. These areas should be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-project personnel. All project personnel that may come into contact with potentially hazardous materials/wastes will have the appropriate health and safety training commensurate with the anticipated level of exposure. HZ-17 Where the construction or operation of projects involves the transport of hazardous materials, avoid transport of such materials within one-quarter mile of schools, when school is in session, wherever feasible. HZ-18 Where it is not feasible to avoid transport of hazardous materials, within one-quarter mile of schools on local streets, provide notification of the anticipated schedule of transport of such materials.	Impacts remain significant and unavoidable.
HYDROLOGY AND WATER QUALITY		
Impacts to wastewater treatment facility capacities are less than significant.	None required.	Impacts remain less than significant.
Impacts to water quality standards from accidental spills and discharge are less than significant.	None required.	Impacts remain less than significant.
Impacts from the increased use of alternative fuels, electric cars, ammonia, and sodium bisulfate are less than significant.	None required.	Impacts remain less than significant.

Impacts to water conveyance systems are less than significant.	None required.	Impacts remain less than significant.
Impacts on groundwater depletion and both potable and total water demand exceed thresholds and are significant.	WQ-1 Local water agencies should continue to evaluate future water demand and establish the necessary supply and infrastructure to meet that demand, as documented in their Urban Water Management Plans. WQ-2 Project sponsors should coordinate with the local water provider to ensure that existing or planned water supply and water conveyance facilities are capable of meeting water demand/pressure requirements. In accordance with State Law, a Water Supply Assessment should be required for projects that meet the size requirements specified in the regulations. In coordination with the local water provider, each project sponsor will identify specific on- and off-site improvements needed to ensure that impacts related to water supply and conveyance demand/pressure requirements are addressed prior to issuance of a certificate of occupancy. Water supply and conveyance demand/pressure clearance from the local water provider will be required at the time that a water connection permit application is submitted. WQ-3 Project sponsors should implement water conservation measures and prioritize the use recycled water over potable or groundwater whenever available and appropriate for end uses. WQ-4 Project sponsors should consult with the local water provider to identify feasible and reasonable measures to reduce water consumptions.	Impacts remain significant and unavoidable.
NOISE		
Impacts from increased noise and vibration during operation are less than significant.	None required.	Impacts remain less than significant.
Impacts from increased noise and vibration during construction are significant.	NS-1 Install temporary noise barriers during construction. NS-2 Use noise barriers to protect sensitive receptors from excessive noise levels during construction.	Impacts remain significant and unavoidable.

	NS-3	Schedule construction activities consistent with the allowable hours pursuant to applicable general plan noise element or noise ordinance. Ensure noise-generating construction activities (including truck deliveries, pile driving, and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors. Where construction activities are authorized outside the limits established by the noise element of the general plan or noise ordinance, notify affected sensitive noise receptors and all parties who will experience noise levels in access of the allowable limits for the specified land use, of the level of exceedance and duration of exceedance; and provide a list of protective measures that can be undertaken by the individual, including temporary relocation or use of hearing protective devices.	
	NS-4	Limit speed and/or hours of operation of rail and transit systems during the selected periods of time to reduce duration and frequency of conflict with adopted limits on noise levels.	
	NS-5	Post procedures and phone numbers at the construction site for notifying the Lead Agency staff, local Police Department, and construction contractor (during regular construction hours and off-hours), along with permitted construction days and hours, complaint procedures, and who to notify in the event of a problem.	
	NS-6	Notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance.	
	NS-7	Hold a preconstruction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.	
	NS-8	Designate an on-site construction complaint and enforcement manager for the project.	
	NS-9	Ensure that construction equipment are properly maintained per manufacturers' specifications and fitted with the best available noise	

		suppression devices (e.g., mufflers, silencers, wraps). All intake and exhaust ports on power equipment shall be muffled or shielded.	
	NS-10	Ensure that impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction are hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust can and should be used. External jackets on the tools themselves can and should be used, if such jackets are commercially available and this could achieve a reduction of 5 dBA. Quieter procedures can and should be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.	
	NS-11	Ensure that construction equipment is not idling for an extended time in the vicinity of noise-sensitive receptors.	
	NS-12	Locate fixed/stationary equipment (such as generators, compressors, rock crushers, and cement mixers) as far as possible from noise-sensitive receptors.	
	NS-13	Consider using flashing lights instead of audible back-up alarms on mobile equipment.	
	NS-14	For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the potential vibration impacts to the structural integrity of the adjacent buildings within 50 feet of pile driving locations.	
	NS-15	For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the threshold levels of vibration and cracking that could damage adjacent historic or other structure, and design means and construction methods to not exceed the thresholds.	
	NS-16	For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as predrilling the piles to the maximum feasible depth, where feasible. Predrilling pile holes will reduce the number of blows required to completely seat the pile and will concentrate the pile	

	driving activity closer to the ground where pile driving noise can be shielded more effectively by a noise barrier/curtain. NS-17 For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as the use of more than one pile driver to shorten the total pile driving duration.	
SOLID AND HAZARDOUS WASTE		
Impacts from solid and hazardous waste generated by the increase in electrical vehicle use and air pollution control technology are less than significant.	None required.	Impacts remain less than significant.
Impacts from the solid and hazardous waste generated during construction are significant.	It is anticipated that most of the construction waste will be recycled due to their monetary value. No feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
Impacts from the solid and hazardous waste generated from vehicle and equipment scrapping are significant.	It is anticipated that most of the equipment and vehicles to be replaced will be recycled due to their monetary value. No feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
TRANSPORTATION AND TRAFFIC		
Impacts on traffic and circulation are significant.	TR-1 Develop a construction management plan that includes at least the following items and requirements, if determined to be feasible by the Lead Agency: • A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes; • Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur; • Location of construction staging areas for materials, equipment, and vehicles at an approved location;	Impacts remain significant and unavoidable.

	• A process for responding to and tracking complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. The Lead Agency shall be informed who the Manager is prior to the issuance of the first permit; • Provision for accommodation of pedestrian flow; • As necessary, provision for parking management and spaces for all construction workers to ensure that construction workers do not park in street spaces; • Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the project sponsor's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat to public health or safety shall be repaired immediately. The street shall be restored to its condition prior to the new construction as established by the Lead Agency (or other appropriate government agency) and/or photo documentation, at the sponsor's expense, before the issuance of a Certificate of Occupancy; • Any heavy equipment brought to the construction site shall be transported by truck, where feasible; • No materials or equipment shall be stored on the traveled roadway at any time; • Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion; • All equipment shall be equipped with mufflers; • Prior to the end of each work-day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on	

	the property, within the public rights-of-way, or properties of adjacent or nearby neighbors; and • Promote "least polluting" ways to connect people and goods to their destinations.	
Impacts to traffic and circulation on roadways and in the harbor are significant.	No feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
AESTHETICS		
Impacts from increasing glare are significant.	Ne feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
Impacts from construction are significant. catenary lines and use of bonnets at the Ports could degrade the visual	AE-1 To the extent feasible, the sites selected for use as construction staging and laydown areas would be areas that are already disturbed and/or are in locations of low visual sensitivity. Where feasible, construction staging and laydown areas for equipment, personal vehicles, and material storage would be sited to take advantage of natural screening opportunities provided by existing structures, topography, and/or vegetation. Temporary visual screens would be used where helpful, if existing landscape features did not screen views of the areas. AE-2 All construction, operation, and maintenance areas would be kept clean and tidy, including the re-vegetation of disturbed soil and storage of construction materials and equipment would be screened from view and/or are generally not visible to the public, where feasible.	Impacts remain significant and unavoidable.
Impacts from catenary lines and use of bonnets at the Ports could degrade the visual character or quality of a site and are significant.	AE-3 Siting projects and their associated elements next to important scenic landscape features or in a setting for observation from State scenic highways, national historic sites, national trails, and cultural resources should be avoided to the greatest extent feasible. AE-4 Apply development standards and guidelines to maintain compatibility with surrounding natural areas, including site coverage, building height and massing, building materials and color, landscaping, site grading, and so forth in accordance with general	Impacts remain significant and unavoidable.

		plans, master plans, and adopted design guidelines, where applicable.	
	AE-5	To reduce glare, provide structural and/or vegetative screening from light-sensitive uses, where feasible.	

CHAPTER 2

PROJECT DESCRIPTION

2.1 Introduction

2.2 Background

2.3 Agency Authority

2.4 Project Location

2.5 Overall Attainment Strategy

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2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

The South Coast Air Quality Management District (SCAQMD or District) was created by the California legislature in 1977[1] as the public agency responsible for developing and enforcing air pollution control regulations in the South Coast Air Basin (Basin). The SCAQMD also includes portions of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB). The Lewis Air Quality Act (now known as the Lewis-Presley Air Quality Management Act) requires the SCAQMD to prepare and adopt an Air Quality Management Plan (AQMP) consistent with federal planning requirements. The 1977 amendments to the federal Clean Air Act (CAA) included requirements for submitting State Implementation Plans (SIPs) for nonattainment areas that fail to meet all federal ambient air quality standards (CAA § 172) and similar requirements exist in state law (Health & Safety Code §40462). The federal CAA was amended in 1990 to specify attainment dates and SIP requirements for ozone, carbon monoxide (CO), nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 microns (PM10). In 1997, the United States Environmental Protection Agency (U.S. EPA) promulgated ambient air quality standards for particulate matter with an aerodynamic diameter less than 2.5 microns (PM2.5). The California Clean Air Act (CCAA), adopted in 1988, requires the SCAQMD to achieve and maintain state ambient air quality standards for ozone, CO, sulfur dioxide (SO_2), and NO_2 by the earliest practicable date (Health & Safety Code §40910). The CCAA also requires a three-year plan review and, if necessary, an update to the AQMP. The U.S. EPA is required to periodically update the national ambient air quality standards (NAAQS).

The 2016 AQMP identifies control measures and strategies to demonstrate that the region will attain the revoked 1997 8-hour ozone NAAQS (80 ppb) by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual PM2.5 standard (12 ug/m3) by 2025; the 2006 24-hour PM2.5 standard (35 ug/m3) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023.

The Basin, which includes all of Orange County and the non-desert portions of Los Angeles, San Bernardino and Riverside counties, has one of the worst air quality problems in the nation. Though there have been significant improvements in air quality in the Basin over the last two decades, some ambient air quality standards are still exceeded relatively frequently and by a wide margin. The 2012 AQMP, submitted to the California Air Resources Board (CARB) for SIP inclusion in December 2012, concluded that further reductions in PM2.5 and oxides of nitrogen (NOx) emissions would be necessary to attain the air quality standards for 24-hour PM2.5 and 8-hour ozone by the dates mandated by federal law. Less emphasis was placed on emission reductions from volatile organic compounds (VOCs) because of the greater emphasis on NOx emission reductions, which is a precursor to ozone and PM2.5. Ozone, a criteria pollutant, is formed when VOCs react with NOx in the atmosphere. Ozone has been shown to adversely affect human health. NOx also contributes to the formation of PM2.5.

[1] The Lewis-Presley Air Quality Management Act, 1976 Cal. State. ch. 324 (codified at H & S Code, Sections 40400 - 40540).

2.2 BACKGROUND

The first AQMP was prepared and approved by the SCAQMD in 1979. The 2016 AQMP will be the eleventh plan prepared by the SCAQMD, not including certain SIPs for specific pollutants, e.g., PM10 for the Coachella Valley and the Basin, and CO and lead for Los Angeles County. The following bullets summarize the main components of the past AQMP updates and revisions:

- The 1982 AQMP was revised to reflect better data and modeling tools.
- In 1987, a federal court ordered the U.S. EPA to disapprove the 1982 AQMP because it did not demonstrate attainment of all NAAQS by 1987 as required by the CAA. This, in part, led to the preparation of the 1989 AQMP.
- The 1989 AQMP was adopted on March 17, 1989 and was specifically designed to attain all NAAQS. This plan called for three "tiers" of measures as needed to attain all standards and relied on significant future technology advancement to attain these standards.
- In 1991, the SCAQMD prepared and adopted the 1991 AQMP to comply with the CCAA.
- In 1992, the 1991 AQMP was amended to add a control measure containing market-based incentive programs (subsequently SCAQMD's Regional Clean Air Incentives Market (RECLAIM)).
- In 1994, the SCAQMD prepared and adopted the 1994 AQMP to comply with the CCAA three-year update requirement and to meet the federal CAA requirement for an ozone SIP. The AQMP, as adopted in 1994, included the following:
  - All geographical areas under the jurisdiction of the SCAQMD, compared to just the Basin;
  - The basic control strategies remained the same as in the earlier plans, although the three-tiered structure of control measures was replaced and measures previously referred to as Tier I, II, or III were replaced with short-/intermediate-term or long-term control measures;
  - Updated and refined control measures carried over from 1991;
  - Best Available Control Measure PM10 Plan;
  - The ozone attainment demonstration plan;
  - Amendments to the federal Reactive Organic Compound Rate-of-Progress Plan (also referred to as the VOC Rate-of-Progress Plan); and
  - Attainment Demonstration Plans for the federal PM10, NO2, and CO air quality standards; etc.
- The 1997 AQMP was designed to comply with the three-year update requirements specified in the CCAA as well as to include an attainment demonstration for PM10 as required by the

federal CAA. Relative to ozone, the 1997 AQMP contained the following changes to the control strategies compared to the 1994 AQMP:

- Less reliance on transportation control measures (TCMs);
- Less reliance on long-term control measures that rely on future technologies as allowed under §182(e)(5) of the CAA; and
- Removal of other infeasible control measures and indirect source measures that had been substantially impacted by the state legislature in enacting new provisions in the Health and Safety Code.

- In 1999, the ozone plan portion of the 1997 AQMP was amended to address partial disapproval of the 1997 AQMP by the U.S. EPA and a settlement of litigation by environmental groups challenging the 1997 AQMP to provide the following:
  - Greater emission reductions in the near-term than would occur under the 1997 AQMP;
  - Early adoption of the measures that would otherwise be contained in the next three-year update of the AQMP; and
  - Additional flexibility relative to substituting new measures for infeasible measures and recognition of the relevance of cost effectiveness in determining feasibility.
- In April 2000, U.S. EPA approved the 1999 ozone SIP to the 1997 plan. The 1999 Amendment in part addressed the state's requirements for a triennial plan update.

- The 2003 AQMP was approved and adopted by the SCAQMD in August 2003. The 2003 AQMP was partially approved and partially disapproved by U.S. EPA, based on CARB's withdrawal of mobile source measures after the 1-hour ozone standard was revoked. The 2003 AQMP addressed the following control strategies:
  - Attaining the federal PM10 ambient air quality standard for the Basin and Coachella Valley - these portions were approved by the U.S. EPA: in both areas, the attainment demonstration was disapproved after CARB withdrew its measures;
  - Attaining the federal 1-hour ozone standard;
  - 1997/1999 control measures not yet implemented;
  - Revisions to the Post 1996 VOC Rate-of-Progress Plan and SIP for CO; and
  - Initial analysis of emission reductions necessary to attain the PM2.5 and 8-hour ozone standards.
- The SCAQMD Governing Board approved the 2007 AQMP for both ozone and PM10 on June 1, 2007. On September 27, 2007, CARB adopted the State Strategy for the 2007 SIP and the 2007 AQMP as part of the SIP. The 2007 SIP was then forwarded to U.S. EPA for approval. The following summarizes the major components of the 2007 AQMP:
  - The most current air quality setting at the time (i.e., 2005 data);
  - Updated emission inventories using 2002 as the base year, which also incorporated measures adopted since adopting the 2003 AQMP;

- Updated emission inventories of stationary and mobile on-road and off-road sources;
- 2003 AQMP control measures not yet implemented (eight of the control measures originally contained in the 2003 AQMP were updated or revised for inclusion into the 2007 AQMP);
- 24 new measures were incorporated into the 2007 AQMP based on replacing the SCAQMD's long-term control measures from the 2003 AQMP with more defined or new control measures and control measure adoption and implementation schedules;
- SCAQMD's recommended control measures to reduce emissions from sources that are primarily under state and federal jurisdiction, including on-road and off-road mobile sources, and consumer products;
- Southern California Association of Governments (SCAG)'s regional transportation strategy and control measures; and
- Analysis of emission reductions necessary and attainment demonstrations to achieve the federal 8-hour ozone and PM2.5 air quality standards.

- On November 22, 2010, U.S. EPA issued a notice of proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards and the corresponding 2007 State Strategy. Specifically, U.S. EPA proposed approving the SIP's inventory and regional modeling analyses, but it also proposed disapproving the attainment demonstration because it relied too extensively on commitments to emission reductions in lieu of fully adopted, submitted, and SIP-approved rules. The notice also cited deficiencies in the SIP's contingency measures.

- In response to U.S. EPA's proposed partial disapproval of the 2007 SIP, on March 4, 2011, the SCAQMD Governing Board approved Revisions to the 2007 PM2.5 and Ozone SIP for the Basin and Coachella Valley. The revisions to the 2007 PM2.5 and Ozone SIP consisted of the following:

  - Updated implementation status of SCAQMD control measures necessary to meet the 2015 PM2.5 attainment date;
  - Revisions to the control measure adoption schedule;
  - Changes to the emission inventory resulting from CARB's December 2010 revisions to the on-road truck and off-road equipment rules; and
  - An SCAQMD commitment to its "fair share" of additional NOx emission reductions, if needed, in the event U.S. EPA does not voluntarily accept the "federal assignment."

- In response to the July 14, 2011 U.S. EPA notice of supplemental proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards, at the October 7, 2011 public hearing, the SCAQMD Governing Board approved Further Revisions to PM2.5 and Ozone SIP for the Basin and Coachella Valley. Revisions to the PM2.5 SIP included a three-prong approach for identifying contingency measures needed to address U.S. EPA's partial disapproval:

  - Equivalent emissions reductions achieved through improvements in air quality;

- Relying on committed emissions reductions for the 2007 ozone plan; and
- Quantifying excess emissions reductions achieved by existing rules and programs that were not originally included in the 2007 PM2.5 SIP.

- U.S. EPA finalized a partial approval and partial disapproval on November 9, 2011. The disapproval was for the SIP's contingency measures and rejection of federal NOx emission reduction assignment.

- U.S. EPA fully approved the 2007 SIP for the 8-hour ozone standard on March 1, 2012.

- The SCAQMD Governing Board approved the 2012 AQMP on December 7, 2012. The 2012 AQMP was primarily designed to demonstrate attainment of the 2006 24-hour PM2.5 standard (35 ug/m3). The adopted Final 2012 AQMP was forwarded to CARB on December 20, 2012, with subsequent approval at its January 23, 2013, Board meeting. On February 1, 2013, the SCAQMD Governing Board approved Control Measure IND-01, Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities, for inclusion in the Final 2012 AQMP. The following summarizes the major components of the 2012 AQMP:

  - The most current science and analytical tools;
  - A comprehensive strategy aimed at controlling pollution from stationary (point) sources, on-road and off-road mobile sources, and area sources;
  - Attainment demonstration of the federal 24-hour PM2.5 standard by 2014 in the Basin through adoption of control measures;
  - Update of the U.S. EPA approved 8-hour ozone control plan with new measures designed to reduce reliance on the CAA Section 182 (e)(5) long-term measures for NOx and VOC reductions;
  - Address several state and federal planning requirements, incorporating new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and new meteorological air quality models;
  - Update on the air quality status of the SSAB in the Coachella Valley;
  - Discussion of the emerging issues of ultrafine particles and near-roadway exposures;
  - Analysis of the energy supply and demand issues that face the Basin and their relationship to air quality;
  - Demonstrations of 1-hour ozone attainment and vehicle miles travelled (VMT) emissions offsets, as per U.S. EPA requirements based on the recent court case of Association of Irritated Residents (AIR) vs. U.S. EPA (2012); and
  - Specific measures to further implement the ozone strategy in the 2007 AQMP.

- A Supplement to the 24-Hour PM2.5 (35 ug/m3) SIP was approved by the SCAQMD Governing Board on February 6, 2015. The purpose of the Supplement was to demonstrate attainment of the 2006 24-hour PM2.5 NAAQS by 2015 under the CAA (Title 1, Part D, Subpart 4) that had been required based on a recent court case. This plan included a

discussion of the effects of the drought on the attainment date. New transportation conformity budgets for 2015 were also developed.

- The SCAQMD requested and received in January 2016 from the U.S. EPA a redesignation of the 24-hour PM2.5 standard to "serious" non-attainment area with a new attainment deadline of 2019.

- On April 14, 2016, U.S. EPA partially approved and partially disapproved the 2012/2015 PM2.5 and 2015 Supplement Plans. The U.S. EPA approved the following elements of the Plan: Emission inventories; demonstration that the South Coast cannot practicably attain by the Moderate area attainment date of December 31, 2015; the control strategy commitments; and the general conformity budgets. The U.S. EPA did not approved the following portions of the Plan: The demonstration that the Plan provides for the implementation of reasonably available control measures and reasonably available control technology due to deficiencies in the 2010 version of the area's RECLAIM included in the Plan; and the demonstration that the Plan provides for reasonably further progress. Furthermore, the U.S. EPA did not act on the motor vehicle emission budgets or the ports backstop measure.

- On August 24, 2016, the U.S. EPA released the final PM2.5 implementation rule that established PM2.5 planning requirements for states with areas that do not meet the NAAQS for PM2.5. This rule establishes plan requirements for plan due dates, attainment dates, emission inventories, attainment demonstrations, provisions for demonstrating reasonable further progress, milestones, contingency measures, and new source review requirements. It also responds to a January 2103 court decision of EPA's previous PM2.5 standards.

2.2.1 PROGRESS IMPLEMENTING THE 2007/2012 AQMP

The ozone portion of the 2007 AQMP has been approved by the U.S. EPA into the SIP. Certain of the "moderate" 24-hour PM2.5 elements of the 2012 AQMP have also been approved by the U.S. EPA, and in January 2016 the U.S. EPA approved the Basin's re-designation as a "serious" nonattainment area for PM2.5. These approvals include SIP revisions submitted in response to U.S. EPA's findings.

The District continues to implement the 2012 AQMP, which received a limited approval and limited disapproval by U.S. EPA on April 14, 2016. Table 2.2-1 summarizes the progress achieved toward fulfilling SCAQMD's emissions reductions commitments to attain the federal standards by the required dates. As shown in Table 2.2-1, for the control measures adopted by the District over this period, 11.7 tons per day of PM2.5 reductions were achieved by 2014 and 2.4 tons per day of VOC reductions and 19.5 tons per day of NOx reductions will be achieved by 2023. Other VOC control measures are undergoing rulemaking development and are on on track to achieve reductions.

TABLE 2.2-1

Total 2012 AQMP Emission Reductions
from SCAQMD Control Measures (tons/day)

	COMMITMENT		ACHIEVED	
Pollutant	**2014**	**2023**	**2014**	**2023**
VOC	0	5.8	0.4	2.4
NOx	2.0	10.7	0	19.5
PM2.5	11.7	--	11.7	--

Source: 2016 AQMP, Chapter 1, Table 1-1

2.3 AGENCY AUTHORITY

2.3.1 AGENCY AUTHORITY - 2016 AQMP

The 2016 AQMP sets forth emission reduction programs which require the cooperation of all levels of government: local, regional, state, and federal, as well as public engagement. Each level is represented in the AQMP by the appropriate agency or jurisdiction that has the authority over specific emissions sources. Accordingly, each agency or jurisdiction commits to specific planning and implementation responsibilities.

At the federal level, U.S. EPA is charged with establishing emission standards including motor vehicle standards; train, airplane, and ship pollutant exhaust and fuel standards; and regulation of non-road engines less than 175 horsepower. CARB, representing the state level, also oversees development of 2016 AQMP control measures for on-road vehicle emission standards in California; motor vehicle fuel specifications; some off-road source emission standards and fuel standards, including marine vessels; and consumer product standards. At the regional level, the SCAQMD is responsible primarily for non-vehicular sources and has limited authority over mobile sources (e.g., fleet regulations, incentives for accelerated vehicle turnover, reduction in average vehicle ridership, etc.). In addition, the SCAQMD has lead responsibility for developing stationary, some area, and indirect source control measures and coordinating the development and adoption of the 2016 AQMP. Lastly, at the local level, the cities and counties and their various departments (e.g., harbors and airports) have a dual role related to transportation and land use. Their efforts are coordinated through the regional metropolitan planning organization for the Basin, the SCAG, which is responsible for preparing the transportation control measure component of the 2016 AQMP. Interagency commitment and cooperation are keys to success of the 2016 AQMP.

2.3.2 AGENCY AUTHORITY - CEQA

California Environmental Quality Act (CEQA), Public Resources Code §21000 et seq., requires that the environmental impacts of proposed projects implemented or approved by governmental agencies be evaluated and that feasible methods to reduce, avoid or eliminate significant adverse impacts of these projects be identified and implemented. The lead agency is the "public agency

that has the principal responsibility for carrying out or approving a project that may have a significant effect upon the environment" (Public Resources Code Section 21067). Since the SCAQMD has the primary responsibility for supervising or approving the entire project as a whole, it is the most appropriate public agency to act as lead agency (CEQA Guidelines Section 15051(b)).

A Program Environmental Impact Report (Program EIR) for the 2016 AQMP is considered to be the appropriate document pursuant to CEQA Guidelines Section 15168(a)(3), because the 2016 AQMP constitutes a series of actions that can be characterized as one large project and are related in the connection with the issuance or rules, regulations, plans, or other criteria to govern the conduct of a continuing program.

As the lead agency for the proposed 2016 AQMP, SCAQMD staff released the Notice of Preparation/Initial Study (NOP/IS) 2016 AQMP Program EIR on July 5, 2016 for a 30-day public review and comment period. A copy of the NOP/IS can be found in Appendix A. Comments and responses to comments received on the NOP/IS can be found in Appendix B.

2.4 PROJECT LOCATION

The SCAQMD has jurisdiction over an area of approximately 10,743 square miles, consisting of the four-county Basin, and the Riverside County portions of the SSAB and MDAB, referred to hereafter as the District. The Basin, which is a sub-region of the SCAQMD's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. It includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Valley Planning Area) is a sub-region of the Riverside County and the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (Figure 2.4-1).

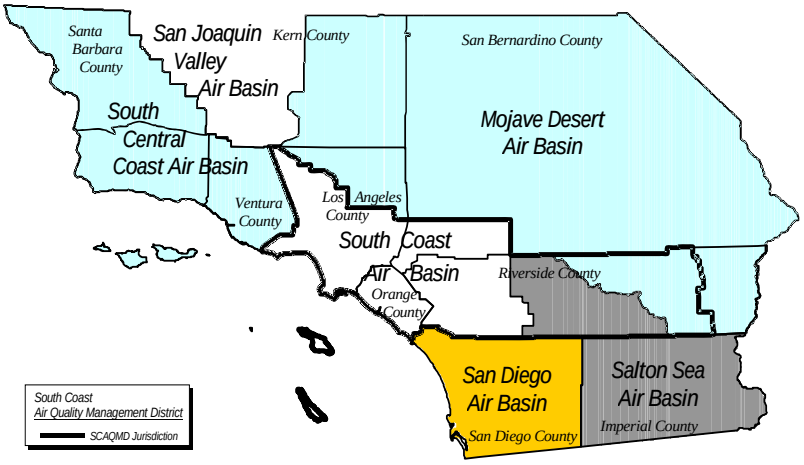


FIGURE 2.4-1

Southern California Air Basins

2.5 OVERALL ATTAINMENT STRATEGY

The overall control strategy for the 2016 AQMP is designed to meet applicable federal and state standards as follows:

- Revoked 1979 1-hour federal ozone standard (120 ppb) by 2023.
- Revoked 1997 8-hour federal ozone standard (80 ppb) by 2024;
- 2006 24-hour federal PM2.5 standard (35 µg/m3) by 2019;
- 2008 8-hour federal ozone standard (75 ppb) by 2032; and
- 2012 annual federal and state PM2.5 standards (12 µg/m3) by 2025.

The 2016 AQMP also discusses the recently adopted new federal 8-hour ozone standard (70 ppb), as well as incorporates toxics, climate change, energy, transportation, goods movement, infrastructure and other planning efforts that affect future air quality.

The proposed attainment strategy focuses on reduction of ozone precursors (NOx and VOC), direct PM2.5, and PM2.5 precursors (NOx and ammonia). NOx emissions lead to the formation of both ozone and PM2.5. Therefore, the most significant air quality challenge faced by the SCAQMD is to reduce NOx emissions sufficiently to meet the upcoming ozone and PM2.5 federal standard deadlines. The 2016 AQMP analyses indicate that an additional 43 percent

NOx emission reduction is needed in 2023 and 55 percent is needed in 2031 to attain the 8-hour ozone standard.

The majority of NOx emission reductions are expected to come from mobile sources. Mobile sources consist of two main categories: on-road mobile sources, which typically include automobiles, trucks, buses, and other vehicles that operate on public roadways; and off-road mobile sources, which include aircraft, ships, trains, and construction equipment that operate off public roadways. The authority to regulate mobile emission sources is divided between CARB and U.S. EPA.

The magnitude of emission reductions needed for the attainment of these NAAQS requires an aggressive mobile source control strategy supplemented with focused, strategic stationary source control measures and close collaboration with federal, state, and regional governments, local agencies, businesses, and the public. The 2016 AQMP uses a variety of implementation approaches such as accelerated deployment of available cleaner technologies (e.g., zero and near-zero emission technologies), best management practices (BMP), co-benefits from existing programs (e.g., greenhouse gas [GHG]), and incentive measures. Further demonstration and commercialization projects will be crucial to help deploy zero and near-zero emission technologies. Another key element to the 2016 AQMP implementation will be private and public funding to help further the development and deployment of advanced technology. Many of the same technologies will address both air quality and climate needs, such as increased energy efficiency. Without an adequate and fair-share level of reductions from all sources, the emissions reduction burden would be shifted to stationary sources, while mobile sources account for about 80 percent of the NOx emissions. The SCAQMD will continue to work closely with CARB to further control mobile source emissions where federal or state actions do not meet regional needs.

Implementation of the 2016 AQMP will be based on a series of control measures and strategies that vary by source type (i.e., mobile or stationary) as well as by the pollutant that is being addressed. Control measures were developed from a number of sources, including the AQMP Advisory Group, AQMP Control Strategy Symposium, Reasonably Available Control Technology (RACT) / Reasonable Available Control Measures Analysis (RACM), Best Available Control Technology (BACT) / Best Available Control Measures (BACM) analysis, (2016 AQMP, Appendix VI), SCAQMD staff and public input, and previous Plan proposals.

The control measures were developed based on technical and economic feasibility, as well as other factors such as promoting fair share responsibility for sources under different regulatory authorities and maximizing private/public partnerships. The following basic criteria were used in evaluating and selecting feasible control measures and establishing the proposed adoption schedule:

- Cost-Effectiveness: The cost of a control measure per reduction of emissions of a particular pollutant (cost includes purchasing, installing, operating, and maintaining the control technology).

- Emission Reduction Potential: The total amount of pollution that a control measure can feasibly reduce.

- Enforceability: The ability to ensure compliance with a control measure.
- Legal Authority: Ability of the SCAQMD or other adopting agency to legally implement the measure.
- Public Acceptability: The likelihood that the public will approve or cooperate in the implementation of a control measure.
- Rate of Emission Reduction: The time it will take for a control measure to reduce a certain amount of air pollution.
- Technological Feasibility: The likelihood that the technology for a control measure is or will be available.

2.6 PURPOSE OF THE 2016 AQMP

The 2016 AQMP will provide an updated air pollution control strategy to attain federal ambient air quality standards and has been developed as an integrated Plan taking into consideration: air quality improvement needs, climate change, transportation, and energy reliability. The proposed 2016 AQMP focuses on NOx reductions to attain ozone and PM2.5 standards identified in Section 2.5. The 2016 AQMP also includes ozone reduction strategies to make expeditious progress in attaining the federal and state standards not yet met (identified in Section 2.5).

It is expected that implementing the proposed 2016 AQMP control measures will provide substantial benefits of improved air quality. From a public health standpoint, air pollution has been linked to long-term health problems affecting the lungs, heart, blood, brain and immune and nervous systems. Therefore, improving air quality is expected to result in improvements to public health. Additional public welfare benefits include improved visibility, reduced destruction of materials and buildings, reduced damage to agricultural crops and habitat for wildlife and, more efficient land use patterns and transportation systems. The proposed 2016 AQMP control measures also have the potential to reduce reliance on traditional petroleum fuels, thus, providing reductions in GHG emissions. The following sections summarize the overall components of the 2016 AQMP and the specific control measures that comprise the 2016 AQMP.

2.7 PROJECT OBJECTIVES

CEQA Guidelines §15124(b) requires an EIR to include a statement of objectives, which describes the underlying purpose of the proposed project. The purpose of the statement of objectives is to aid the lead agency in identifying alternatives and the decision-makers in preparing a statement of findings and a statement of overriding considerations, if necessary. The objectives of the proposed 2016 AQMP are summarized in the following bullet points. These objectives may be refined or modified as part of the Program EIR preparation process.

1. Demonstrate attainment of the revoked 1-hour federal ozone standard (120 ppb) by 2022 with no reliance on future technology CAA §182(e)(5) measures.

2. Demonstrate attainment of the revoked 8-hour federal ozone standard (80 ppb) by 2023.
3. Demonstrate attainment of the 24-hour federal PM2.5 standard (35 µg/m3) in 2019.
4. Demonstrate attainment of the federal and state annual PM2.5 standards (12 µg/m3) by 2025.
5. Demonstrate attainment of the 8-hour federal ozone standard (75 ppb) by 2031.
6. Update planning assumptions and the best available information such as SCAG's 2016 Regional Transportation Plan (RTP), CARB's latest EMFAC2014 for the on-road mobile source emissions inventory, and CARB's OFF-ROAD 2011 model.
7. Update emission inventories using 2012 as the base year and incorporate emission reductions achieved from all applicable rules and regulations and the latest demographic forecasts.
8. Utilize SCAG's growth forecast to project future baseline emissions.
9. Update any remaining control measures from the 2012 AQMP and incorporate into the 2016 AQMP as appropriate.
10. Comply with federal contingency measure requirements.
11. Continue to work closely with businesses and industry groups to identify the most cost-effective and efficient path to meeting clean air goals while being sensitive to their economic concerns.
12. Eliminate reliance on future technology (CAA §182(e)(5)) measures to the extent feasible by providing specific control measures which have quantifiable emission reductions and associated cost.
13. Calculate and take credit for co-benefits from other planning efforts (e.g., GHG reduction targets, energy efficiency, and transportation).
14. Develop a strategy with fair-share emission reductions at the federal, state, and local levels.
15. Invest in strategies and technologies meeting multiple objectives regarding air quality, climate change, air toxics exposure, energy, and transportation.
16. Seek substantial funding for incentives to implement early deployment and commercialization of zero and near-zero technologies.
17. Enhance the socioeconomic analysis and pursue the most efficient and cost-effective path to achieve multi-pollutant and multi-deadline targets.
18. Prioritize regulatory opportunities and innovative non-regulatory "win-win" approaches for emission reduction.

2.8 PROJECT DESCRIPTION

The 2016 AQMP control measures consist of three main components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) state and suggested Federal Source Control Measures; and 3) RTP/SCS Control Measures provided by SCAG. These measures rely on not only the traditional command-and-control approach, but also public incentive programs, as well as advanced technologies expected to be developed and deployed in the next several years. A summary of these measures is provided in the following subsections. The following bullet points summarize the major components of the 2016 AQMP:

- The air quality baseline (i.e., 2012 data);
- Updated emission inventories using 2012 as the base year and measures implemented since adopting the 2012 AQMP;
- Future baseline emissions projected using SCAG's approved growth forecasts;
- New SCAQMD measures for stationary, area, and mobile sources to be incorporated into the 2016 AQMP;
- SCAG's 2016 RTP/SCS and related TCMs (2016 AQMP, Appendix IV-C);
- CARB's 2016 SIP Strategy;
- Analysis of emission reductions necessary to achieve the federal 8-hour ozone, 24-hour PM2.5, and annual PM2.5 air quality standards, as well as the (revoked) 1-hour ozone standard;
- Overview of state and federal CAA planning requirements; and
- Implementation schedule for adoption of the proposed control measures.

The 2016 AQMP relies on the regional demographic projections and transportation programs, measures, and strategies from SCAG's 2016 RTP/SCS. The RTP TCMs are required by Health and Safety Code 40460 to be combined with the SCAQMD's portion of the AQMP; however, the 2016 RTP/SCS is considered a separate project under CEQA because the land use and transportation strategies program are within SCAG's jurisdictional authority and the 2016 RTP/SCS will move forward with or without adoption of the 2016 AQMP. The environmental impacts from the 2016 RTP/SCS were analyzed and disclosed in the Draft Program EIR released by SCAG on December 4, 2015 for a 60-day public review and comment period ending on February 1, 2016. On April 7, 2016, the SCAG Regional Council adopted the 2016 RTP/SCS and certified the Final Program EIR. Since SCAQMD will not be adopting rules or regulations to implement the TCMs and the two projects are not dependent on each other, the environmental impacts from the 2016 RTP/SCS were only analyzed as part of the cumulative analysis.

The project-specific environmental impacts from implementing CARB's mobile source control measures were analyzed herein as SCAQMD is expected to enter into rulemaking to implement CARB's strategies within the District. Furthermore, at the time of release of the Draft Program EIR, the environmental impacts associated with CARB's SIP strategy were not fully evaluated under CEQA.

2.8.1 SCAQMD STATIONARY SOURCE CONTROL MEASURES

The stationary source control measures included in the 2016 AQMP would further reduce emissions from both point sources (permitted facilities) and area sources (generally small and non-permitted sources). These measures target a number of source categories, including Energy and Climate Change Programs (ECC), Combustion Sources (CMB), Petroleum Operations and Fugitive VOC Emissions (FUG), Coatings and Solvents (CTS), Multiple Component Sources (MCS), Best Control Measures (BCM), and Compliance Flexibility Programs (FLX). Each control measure may rely on a number of control methods. Table 2.8-1 provides a list of the SCAQMD proposed ozone measures for stationary sources along with the anticipated adoption date, implementation period, and emission reductions. These control measures are further categorized by the type of the measures, for example, recognition of co-benefits or incentives. Some VOC measures recognize co-benefit VOC reductions from other NOx or PM2.5 measures. Limited, strategic VOC control measures are also proposed.

TABLE 2.8-1

SCAQMD Proposed Stationary Source 8-Hour Ozone Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
SCAQMD Stationary Source NOx Measures					
Stationary Source Regulatory Measures:					
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	2017	2020	SCAQMD	1.4 / 1.5
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking [NOx]	2018	2022	SCAQMD	0.8 / 1.6
CMB-05	Further NOx Reductions from RECLAIM Assessment [NOx]	2022	2023–2031	SCAQMD	0 / 5
Recognition of Co-Benefits:					
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives [All Pollutants]	N/A	Ongoing	Various Agencies	TBD [a]
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	N/A	Ongoing	SCAQMD	0.3 / 1.1
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology [All Pollutants]	N/A	Ongoing	SCAQMD, CEC	TBD [a]
Incentive-Based Measures:					
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	N/A	Ongoing	SCAQMD	1.2 / 2.1
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	N/A	Ongoing	SCAQMD	2.5 / ~~5~~6
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating [NOx]	2018	2020–2031	SCAQMD	1.1 / ~~1.5~~ 2.8
Other Measures:					
FLX-01	Improved Education and Public Outreach [All Pollutants]	N/A	Ongoing	SCAQMD, Other Parties	N/A [b]
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	TBD	TBD	SCAQMD	N/A [b]
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD	TBD	SCAQMD	TBD [a]

TABLE 2.8-1 (CONCLUDED)

SCAQMD Proposed Stationary Source 8-Hour Ozone Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
SCAQMD Stationary Source VOC Measures					
VOC Control Measures:					
FUG-01	Improved Leak Detection and Repair [VOC]	2019	2022	SCAQMD	2 / 2
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	2017/2021	2020–2031	SCAQMD	1 / 2
FLX-02	Stationary Source VOC Incentives [VOC]	N/A	Ongoing	SCAQMD	TBD[a]
Corresponding VOC Reductions from NOx and PM Measures:					
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	N/A	Ongoing	SCAQMD	0.07 / 0.29 [c]
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	N/A	Ongoing	SCAQMD	0.2 / 0.3 [c]
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	N/A	Ongoing	SCAQMD	~~0.9 / 1.8~~ [c] 1.2 / 2.8
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	2017	2020	SCAQMD	~~1.7 / 1.8~~ [c] 0.4 / 0.4
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	TBD	TBD	SCAQMD	1.5 / 1.8 [c]

[a] TBD are reductions to be determined once the inventory and control approach are identified, and are not relied upon for attainment demonstration purposes.

[b] N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur.

[c] Corresponding VOC reductions from other measures.

Source: 2016 AQMP, Table 4-2.

The following text provides a brief description of the proposed control measures presented in Table 2.8-1.

2.8.1.1 Stationary Source Regulatory Measures

There are three additional stationary source measures for NOx. The first measure seeks to reduce NOx and utilize excess gas from non-refinery flares, the second measure would seek reductions from commercial restaurant burners and residential cooking appliances, and the third measure would involve suggested actions for REgional CLean Air Incentives Market (RECLAIM) program assessment.

CMB-03 – EMISSION REDUCTIONS FROM NON-REFINERY FLARES: Flare NOx emissions are regulated through new source review and BACT, but there are currently no source-specific rules regulating NOx emissions from existing flares at non-refinery sources, such as organic liquid loading stations, tank farms, and oil and gas production. This control measure proposes that, consistent with the all feasible control measures, all non-refinery flares meet current BACT for NOx emissions and thermal oxidation of VOCs. The preferred method of control would involve capturing the gas that would typically be flared and converting it into an energy source (e.g., transportation fuel, fuel cells). If gas recovery is not cost-effective or feasible, the installation of newer flares implementing BACT will be considered.

CMB-04 – EMISSION REDUCTIONS FROM RESTAURANT BURNERS AND RESIDENTIAL COOKING: This control measure applies to retail restaurants and quick service establishments utilizing commercial cooking ovens, ranges and charbroilers by funding development of, promoting and incentivizing the use and installation of low-NOx burner technologies. In addition, the SCAQMD would consider developing a manufacturer based rule to establish emission limits for cooking appliances used by restaurants and residential applications. Finally, co-benefit reductions will be sought through existing or enhanced energy efficiency programs being implemented by other entities.

CMB-05 – FURTHER NOX REDUCTIONS FROM RECLAIM ASSESSMENT: The California Health and Safety Code requires the SCAQMD to implement BARCT in the RECLAIM program as well as other stationary sources, and if BARCT advances, the SCAQMD is required to periodically re-assess the overall facility caps, and reduce the RECLAIM Trading Credit (RTC) holdings to a level equivalent to command-and-control BARCT levels. The emission reductions resulting from the programmatic RTC reductions will help the Basin attain the NAAQS for ozone and PM2.5 as expeditiously as practicable. When considering future emission reductions for AQMP purposes, the NOx RECLAIM program works differently than traditional command-and-control regulations. When projecting future emissions for SIP purposes, all RECLAIM holdings must be assumed to be emitted in the air. Under command-and-control regulations, future year emissions estimates for many sources are based on actual emissions in a base year which are then projected into the future using the best available estimates of economic growth for a particular industry. The RECLAIM program has traditionally, and perhaps necessarily, included more RTCs than actual emissions. This margin may be needed for market liquidity, but also precludes taking future year SIP credit for these unused credits. For attainment demonstration purposes, these emission reductions would then need to be achieved from non-RECLAIM sources. This control measure identifies a series of approaches, assessments, and analyses that can be explored to make the program more effective in ensuring equivalency with command and control regulations implementing BARCT, and to potentially generate further NOx emission reductions at RECLAIM facilities.

2.8.1.2 Recognition of Co-Benefits

This category includes three proposed emission reduction measures that recognize emission reductions from energy and climate change related programs that consist of general GHG programs, existing residential and commercial building energy efficiency improvement, and cool roof technology.

ECC-01 – CO-BENEFIT EMISSION REDUCTIONS FROM GHG PROGRAMS, POLICIES, AND INCENTIVES: Combustion sources that emit GHGs are typically sources of criteria pollutants. Significant efforts are currently being planned and implemented to reduce GHG emissions under the State's 2020, 2030 and 2050 targets. As these GHG reduction efforts continue across multiple sectors, the reductions of criteria pollutants should be considered along with any additional enhancements needed to achieve further criteria pollutant reductions under the GHG programs. Existing and further GHG emission reductions mechanisms, including market programs, renewable energy targets, incentive and rebate programs, and promoting implementation and development of new technologies, would be evaluated and refined to maximize criteria pollutant emission reductions.

ECC-02 – CO-BENEFITS FROM EXISTING RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES: This control measure would seek to account for criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and SB 350 (Clean Energy Pollution Reduction Act). The 2020 target for Title 24 will be to achieve net zero energy consumption from new residential buildings by utilizing new building materials and more efficient appliances. SB 350 doubles the additional achievable energy efficiency savings in electricity and natural gas energy uses in existing buildings and increases renewable energy sources as a share of a utility's power sources from 33 to 50 percent by 2030. This control measure will take advantage of the co-benefit emission reductions from implementation of these state regulations.

ECC-04 – REDUCED OZONE FORMATION AND EMISSION REDUCTIONS FROM COOL ROOF TECHNOLOGY: Cool roofs reflect a higher fraction of incident sunlight than traditional roofing materials. Widespread adoption of cool roofs can mitigate the urban heat island effect and can lower daytime ambient temperatures, thus slowing the rate of ozone formation. In addition, buildings equipped with cool roofs require less electricity for cooling, leading to reductions in emissions from the power generation sector. This control measure has the potential to reduce ambient ozone concentrations directly along with NOx, CO, PM, and CO2 emissions from the power generation sector. Evaporative VOC emissions will be reduced due to lower ambient temperatures in the urban areas of the Basin. However, ultra-violet solar energy can also be reflected, leading to increased ozone formation in the air column above the building. Depending on the extent of this potential adverse impact, additional physical property requirements on cool roof materials may be necessary. Three possible aspects of cool roof technology, including solar reflectance, radiative properties, and roof replacements will be incorporated into a technical modeling analysis to quantify the impact of this control measure on air quality.

2.8.1.3 Incentive-Based Measures

The 2016 AQMP includes voluntary incentive measures that are part of the overall Plan to satisfy the CAA emission reduction requirements needed to achieve attainment of the federal ozone standards in 2023 and 2031. Prior AQMPs relied primarily on the adoption of rules to implement the measures provided in those AQMPs. Such regulations involve mandatory requirements and result in generally straightforward and enforceable reductions. With heavy reliance on voluntary incentive measures to achieve attainment of the federal air quality standards, the SCAQMD must design programs such that the emission reductions from these

incentive measures are proven to be real, quantifiable, surplus, enforceable, and permanent in order for U.S. EPA to approve the emission reduction as part of the Plan.

There are key components required of a SIP submittal in order to rely on discretionary incentive programs to satisfy the CAA emission reduction requirements. The components include a demonstration satisfying "integrity elements," an enforceable commitment, technical support, funding, legal authority, public disclosure and provisions to track results in accordance with U.S. EPA's economic incentive programs (EIP) guidelines.[2] The following lists the necessary elements that will be included in each of the incentive measures:

- Integrity Elements
- Commitment (Federal Enforceability)
- Technical Analyses
- Funding
- Resources
- Outreach and Public Disclosure
- Legal Authority

This category includes three proposed incentive-based measures for additional enhancements in building energy efficiency, facility modernization, and commercial and multi-unit residential space and water heating. These measures may partially or exclusively rely on incentives to achieve NOx reductions from the corresponding emission sources.

ECC-03 – ADDITIONAL ENHANCEMENTS IN REDUCING EXISTING RESIDENTIAL BUILDING ENERGY USE: This control measure would seek to provide incentives to go beyond the goals within ECC-02 and CMB-02. Incentive programs would be developed for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. Incorporating newer, efficient appliance technologies, weatherization measures along with renewables such as solar thermal and solar photovoltaics can provide emission reductions within the residential sector above current SCAQMD and state regulations along with reduced energy costs.

[2] References:

- "Guidance on Incorporating Voluntary Mobile Source Emission Reduction Programs in SIPs," October 24, 1997.
- "Improving Air Quality with Economic Incentive Programs," January 2001.
- "Guidance on SIP Credits for Emission Reductions from Electric-Sector Energy Efficiency and Renewable Energy Measures," August 5, 2004.
- "Incorporating Emerging and Voluntary Measure in a SIP," October 4, 2004.
- "Guidance on Incorporating Bundled Measures in a SIP" August 16, 2005.
- "Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs into State and Tribal Implementation Plans," July 2012.
- "Diesel Retrofits: Quantifying and Using Their Emission Benefits in SIPs and Conformity: Guidance for State and Local Air and Transportation Agencies," February 2014.

CMB-01 – TRANSITION TO ZERO AND NEAR-ZERO EMISSION TECHNOLOGIES FOR STATIONARY SOURCES: This proposed control measure would seek emission reductions of NOx from traditional combustion sources by replacement with zero and near-zero emission technologies including low NOx emitting equipment, electrification, alternative process changes, efficiency measures, or fuel cells for combined heating and power (CHP). Replacing older higher-emitting equipment with newer lower or zero-emitting equipment can apply to a single source or an entire facility. These sources include engines, turbines, microturbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production. New businesses can be required or incentivized to install and operate zero-emission equipment, technology and processes beyond the current BACT requirements. Fuel cells are also an alternative to traditional combustion methods, resulting in a reduction of NOx emissions with the co-benefit of reducing other criteria air pollutants and GHGs. This control measure would also seek energy storage systems and smart grid control technologies that provide a flexible and dispatchable resource with zero emissions. Grid based storage systems can replace the need for new peaking generation, be coupled with renewable energy generation, and reduce the need for additional energy infrastructure. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these zero and near-zero emission technologies sooner.

CMB-02 – EMISSION REDUCTIONS FROM COMMERCIAL AND RESIDENTIAL SPACE AND WATER HEATING: This control measure seeks annual average NOx emission reductions from unregulated commercial space heating furnaces and from incentive programs to replace existing older boilers, water heaters, and space heating furnaces. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial boilers, water heaters and furnaces used for heating. The control measure has two components. The first component is to continue to implement the Rule 1111 emission limit of NOx for residential space heaters which is 14 ng/J (20 ppm) starting in 2014. The second component is to incentivize the replacement of older boilers, water heaters and space heaters with newer and more efficient low NOx boilers, water heaters and space heaters, and/or "green technologies" such as solar heating or heat pumps. The new boilers and water heaters would comply with SCAQMD rule emission limits and new space heaters would meet a specified emission limit. If required, the SCAQMD will consider amending Rules 1121 and 1111 to put in place a heat input based emission limit which will result in lower NOx emissions for high efficiency units compared with standard efficiency units. Because of the rules' heat output based limits, high efficiency water heaters and furnaces emit the same amount of NOx per day as standard efficiency units. In addition, the SCAQMD will also consider developing a rule to limit NOx emissions from those commercial and residential heating furnaces which are currently unregulated.

2.8.1.4 Other Measures

There are three proposed measures in this category. One measure seeks improved education and public outreach. The next measure proposes breakdown limitations to be consistent with federal requirements. The third measure involves implementation of all feasible measures for stationary sources consistent with state law.

FLX-01 – IMPROVED EDUCATION AND PUBLIC OUTREACH: This proposed control measure seeks to provide education, outreach, and incentives for consumers and businesses to contribute to clean air efforts. Examples include consumer choices such as the use of energy efficient products, new lighting technology, "super-compliant" coatings, tree planting, and the use of lighter colored roofing and paving materials, which reduce energy usage by lowering the ambient temperature. In addition, this proposed measure intends to increase the effectiveness of energy conservation programs through public education and awareness as to the environmental and economic benefits of conservation. Educational and incentive tools to be used include social comparison applications (comparing your personal environmental impacts with other individuals), social media, and public/private partnerships.

This control measure is a voluntary program that provides education and outreach to consumers, business owners, and residences regarding the benefits of making clean air choices in purchases, conducting efficiency upgrades, installing clean energy sources, and approaches to conservation. These efforts will be complemented with currently available incentive programs and developing additional incentive programs. Lastly, the SCAQMD staff may develop an EIP to offer technical and financial assistance to help implement efficiency measures and other low emission technologies.

MCS-01 – IMPROVED BREAKDOWN PROCEDURES AND PROCESS RE-DESIGN: SCAQMD Rule 430 applies to breakdowns that result in a violation of any rule or permit condition, with some exceptions. U.S. EPA's May 2015 final action on startups, shutdowns, and malfunctions (SSM) stipulates that exemptions from emission limits during periods of breakdown are not allowed. This control measure would introduce breakdown limits and procedures and potential process re-designs that would apply to breakdowns from all emission sources, providing pollutant concentration or emission limits to comply with U.S. EPA's SSM policy, as applicable.

MCS-02 – APPLICATION OF ALL FEASIBLE MEASURES: This control measure is to address the state law requirement for all feasible measures for ozone. Existing rules and regulations for pollutants such as VOC, NOx, SOx and PM reflect current BARCT. However, BARCT continually evolves as new technology becomes available that is feasible and cost-effective. The SCAQMD staff will continue to review new emission limits or controls introduced through federal, state or local regulations to determine if SCAQMD regulations remain equivalent or more stringent than rules in other regions. If not, a rulemaking process will be initiated to perform a BARCT analysis with potential rule amendments if deemed feasible. In addition, the SCAQMD will consider adopting and implementing new retrofit technology control standards, based on research and development and other information, that are feasible and cost-effective.

2.8.1.5 VOC Control Measures

This category seeks limited, strategic VOC controls that contribute to controlling ozone levels in the Basin. The first measure utilizes more advanced, fugitive VOC leak detection systems. The second measure targets limited reductions of VOC emissions from VOC-containing products such as coatings, solvents, adhesives, and lubricants, or utilization of alternative products/equipment. The last measure proposes to incentivize efficient clean equipment

purchases, efficiency projects, and conservation techniques that lead to VOC and other emission reductions.

FUG-01 – IMPROVED LEAK DETECTION AND REPAIR: This control measure seeks to reduce emissions from a variety of VOC emission sources including, but not limited to, oil and gas production facilities, petroleum refining and chemical products processing, storage and transfer facilities, marine terminals, and other sources, where VOC emissions occur from fugitive leaks in piping components, wastewater system components, and process and storage equipment leaks. Most of these facilities are required under SCAQMD and federal rules to maintain a leak detection and repair (LDAR) program that involves individual screening of all of their piping components and periodic inspection programs of equipment to control and minimize VOC emissions. This measure would utilize advanced remote sensing techniques (Smart LDAR), such as Fourier transform infrared spectroscopy, Ultraviolet Differential Optical Absorption Spectroscopy, Solar Occultation Flux, and infrared cameras, that can identify, quantify, and locate VOC leaks in real time allowing for faster repair in a manner that is less time consuming and labor intensive than traditional LDAR.

This control measure would pursue two goals. The first is to upgrade a series of SCAQMD's inspection/maintenance rules (Rules 462, 1142, 1148.1, 463, 1178, 1173, and 1176) to require, at a minimum, a self-inspection program, or utilization of an optical gas imaging-assisted LDAR program where feasible. The second is to explore the use of new technologies to detect and verify VOC fugitive emissions in order to supplement existing programs and achieve additional emission reductions.

For new detection technology this control measure will be implemented in two phases: Phase I will be a pilot LDAR program to demonstrate feasibility with the new technology and to establish implementation protocols. The completion of Phase I will result in the identification of facilities/industries currently subject to LDAR programs and identification of those where the new technology is not yet ready to be utilized. Based on the results of Phase I, fugitive VOC rules will be amended as appropriate under the subsequent phase (Phase II) to enhance their applicability and effectiveness, and to further achieve emission reductions.

CTS-01 – FURTHER EMISSION REDUCTIONS FROM COATINGS, SOLVENTS, ADHESIVES, AND SEALANTS: This control measure seeks limited VOC emission reductions by focusing on select coating, adhesive, solvent and sealant categories by further limiting the allowable VOC content in formulations or incentivizing the use of super-compliant technologies. Examples of the categories to be considered include, but are not limited to, coatings used in aerospace applications, adhesives used in a variety of sealing applications, solvents for graffiti abatement activities. Reductions could be achieved by lowering the VOC content of a few categories within SCAQMD source-specific Rules 1113, 1124, 1144, 1168, and 1171 where possible, especially where the majority of products already meet lower limits. For solvents, reductions could be achieved by promoting the use of alternative low-VOC products or non-VOC product/equipment at industrial facilities. The tightening of regulatory exemptions can also lead to reduced emissions across multiple use categories.

FLX-02 – STATIONARY SOURCE VOC INCENTIVES: This control measure seeks to incentivize VOC emission reductions from various stationary sources through incentive

programs for the use of clean, low VOC emission technologies. Facilities would be able to qualify for incentive funding if they utilize equipment or accept permit conditions which result in cost-effective emission reductions that are beyond existing requirements. The program would establish procedures for quantifying emission benefits from clean technology implementation and develop cost-effectiveness thresholds for funding eligibility. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these technologies sooner. For stationary sources, the SCAQMD staff has compiled an initial list of potential incentives to encourage businesses to use zero- or near-zero technologies or enhancements to the SCAQMD's existing programs to reduce or eliminate barriers to implement state of the art technologies. Potential incentive concepts include incentive funding, permitting and fee incentives and enhancements, New Source Review (NSR) incentives and enhancements, branding incentives, and recordkeeping and reporting incentives. The SCAQMD staff is committed to further investigating these concepts.

2.8.1.6 Corresponding VOC Reductions from NOx and PM Measures

The following four measures recognize corresponding VOC reductions from other measures designed to achieve NOx and NH3 reductions.

ECC-02 – CO-BENEFITS FROM EXISTING RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES: This control measure would seek to account for criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and SB 350 (Clean Energy Pollution Reduction Act). The 2020 target for Title 24 will be to achieve net zero energy consumption from new residential buildings utilizing new building materials and more efficient appliances. SB 350 doubles the additional achievable energy efficiency savings in electricity and natural gas energy uses in existing buildings and increases renewable energy sources as a share of a utility's power sources from 33 to 50 percent by 2030. This control measure will take advantage of the co-benefit VOC emission reductions from implementation of these State regulations.

ECC-03 – ADDITIONAL ENHANCEMENTS IN REDUCING EXISTING RESIDENTIAL BUILDING ENERGY USE: This control measure would seek to provide incentives to go beyond the goals within ECC-02 and CMB-02. Incentive programs would be developed for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. Incorporating newer, efficient appliance technologies, weatherization measures along with renewables such as solar thermal and solar photovoltaics can provide emission reductions within the residential sector above current SCAQMD and State regulations along with reduced energy costs.

CMB-01 – TRANSITION TO ZERO AND NEAR-ZERO EMISSION TECHNOLOGIES FOR STATIONARY SOURCES: This proposed control measure would seek corresponding VOC reductions from NOx-focused measures addressing traditional combustion sources by replacement with zero and near-zero emission technologies including low NOx emitting equipment, electrification, alternative process changes, efficiency measures, or fuel cells for CHP. Replacing older higher-emitting equipment with newer lower or zero-emitting equipment

can apply to a single source or an entire facility. These sources include engines, turbines, microturbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production. New businesses can be required or incentivized to install and operate zero-emission equipment, technology and processes beyond the current BACT requirements. Fuel cells are also an alternative to traditional combustion methods, resulting in a reduction of NOx emissions with the co-benefit of reducing VOCs and GHGs. This control measure would also seek energy storage systems and smart grid control technologies that provide a flexible and dispatchable resource with zero emissions. Grid based storage systems can replace the need for new peaking generation, be coupled with renewable energy generation, and reduce need for additional energy infrastructure. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these zero and near-zero emission technologies sooner.

BCM-10 – EMISSION REDUCTIONS FROM GREENWASTE COMPOSTING: VOCs and ammonia, which are PM precursor gases, are emitted from composting of organic waste materials including greenwaste and foodwaste and are currently regulated by existing SCAQMD Rule 1133.3. Although Rule 1133.3 covers foodwaste composting, the level of emissions from foodwaste composting has not been fully characterized, mainly due to the lack of related emissions test data. This control measure proposes potential emission minimization through emerging organic waste processing technology and potential emission reductions through restrictions on the direct land application of chipped and ground uncomposted greenwaste and through increased diversion to anaerobic digestion. This proposed control measure includes a 15-day pathogen reduction process of chipped and ground uncomposted greenwaste with composting BMPs to reduce potential VOC and ammonia emissions from land applied greenwaste.

2.8.2 SCAQMD MOBILE SOURCE CONTROL MEASURES

SCAQMD staff analyzed the need to accelerate the penetration of cleaner engine technologies and assist in implementing CARB's proposed mobile source strategy. Specifically, there are several measures under CARB's proposed mobile source strategy that are title "Further Deployment of Cleaner Technologies" (see Appendix IV-A and IV-B, 2016 AQMP), which identifies the SCAQMD as an implementing agency along with CARB and U.S. EPA. CARB indicated that the implementation of the "Further Deployment" measures is based on a combination of incentives funding, development of regulations, and quantification of emission reduction benefits from operational efficiency actions and deployment of autonomous vehicles, connected vehicles, and intelligent transportation systems. As such, the SCAQMD mobile source measures proposed in this Appendix will help implement the "Further Development" measures. In addition, the SCAQMD is implementing several incentives funding programs that have resulted in early emission reductions (e.g., the Carl Moyer Memorial Air Quality Standards Attainment Program, the Surplus Off-Road Opt-In for NOx (SOON) program, and Proposition 1B – Goods Movement Emissions Reduction Program). The emission reduction benefits of the funding programs are quantified and are proposed to be included as part of the overall emission reductions for attainment of the NAAQS.

The proposed SCAQMD mobile source measures are based on a variety of control technologies that are commercially available and/or technologically feasible to implement in the next several years. The focus of these measures includes accelerated retrofits or replacement of existing vehicles or equipment, acceleration of vehicle turnover through voluntary vehicle retirement programs, and greater use of cleaner fuels in the near-term. The measures will encourage greater deployment of commercially-available zero-emission vehicle and equipment technologies such as plug-in hybrids, battery-electric, and fuel cells to the maximum extent feasible as such technologies are commercialized and near-zero emission technologies everywhere else. In the longer-term, there is a need to significantly increase the penetration and deployment of near-zero and zero-emission vehicles (ZEVs), greater use of cleaner, renewable fuels (either alternative fuels or new formulations of gasoline and diesel fuels), and additional emission reductions from federal and international sources such as locomotives, ocean-going vessels, and aircraft.

In implementing the SCAQMD mobile source measures, the SCAQMD will focus on collaborative approaches to achieve additional emission reductions to help implement the proposed State "Further Deployment" measures. During the public process, SCAQMD staff will assess the progress in identifying actions (voluntary and regulatory) that will result in additional emission reductions. SCAQMD staff will report to the Governing Board on the progress on a routine basis, but no later than six months after the adoption of the Final 2016 AQMP. If progress is not made in identifying specific actions within one year from adoption of the Final 2016 AQMP, the SCAQMD staff will recommend to the Governing Board to consider proceeding with the development of rules or other enforceable mechanisms within its existing legal authority or seek additional authority to adopt and implement measures to cost-effectively reduce mobile source emissions. Such authority includes development of new or expanding existing clean vehicle fleet rules or indirect source regulations.

A total of 15 measures are proposed as actions to reduce mobile source emissions. One measure is proposed to identify actions to help mitigate and potentially provide emission reductions due to new development and redevelopment projects. Four measures seek to identify actions that will result in additional emission reductions at commercial marine ports, rail yards and intermodal facilities, warehouse distribution centers, and commercial airports to help meet the emission reductions associated with the State Mobile Source Strategy "Further Deployment" measures for on-road heavy-duty vehicles, off-road equipment, and federal and international sources. Five measures focus on on-road mobile sources and four measures focus on off-road mobile sources. Lastly, one measure seeks to recognize the criteria pollutant emission reduction benefits of existing incentives programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B – Goods Movement Emission Reduction Program. The measures call for greater emission reductions through accelerated turnover of older vehicles to the cleanest vehicles and equipment currently available and increased penetration of commercially-available near-zero and zero-emission technologies through incentives programs in the near-term. In the longer-term, CARB has identified regulatory actions that will lead to additional emission reductions and further greater deployment of zero-emission vehicle technologies everywhere feasible.

Partial-zero and zero-emission technologies are rapidly being introduced into the on-road light- and medium-duty vehicle categories in large part due to the CARB Advanced Clean Car

Program, which includes the Low Emission Vehicle (LEV) and the ZEV Regulations. In addition, next-generation electric hybrid trucks are being commercialized for light-heavy and medium-heavy heavy-duty on-road vehicles. However, additional research and demonstration are needed to commercialize zero- and near-zero emission technologies for the heavier heavy-duty vehicles (with gross vehicle weight [GVW] ratings greater than 26,000 pounds).

For many of the off-road mobile sources such as cargo handling equipment, commercial harbor craft, and off-road equipment, some form of "all zero-emission range" or hybridization is being demonstrated and implementation is expected to begin over the next few years. For other sectors such as locomotives, marine vessels and aircraft, the development of cleaner combustion technologies beyond existing emission standards will be needed. The 2016 AQMP White Papers covering Passenger Transportation, Goods Movement, and Off-Road Equipment provide a general discussion on the need for new emission standards and development of cleaner combustion technologies. In addition, CARB's Technology Assessment documents provide in-depth evaluation of current emissions control technologies and the state of development/commercialization of zero- and near-zero advanced technologies. A summary of the 15 measures is provided in Table 2.8-2.

TABLE 2.8-2

SCAQMD Proposed Mobile Source 8-Hour Ozone Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
Emission Growth Management Measure:					
EGM-01	Emission Reductions from New Development and Redevelopment Projects [All Pollutants]	2017	2018–2031	SCAQMD	TBD [a]
Facility-Based Mobile Source Measures:					
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]	2017	2018–2031	SCAQMD	TBD [b]
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]	2017	2018–2031	SCAQMD	TBD
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	2018	2019–2031	SCAQMD	TBD
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	2018	2019–2031	SCAQMD	TBD [b]
On-Road Mobile Source Measures:					
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	N/A	Ongoing	CARB, SCAQMD	TBD [a]
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	N/A	Ongoing	CARB, Bureau of Automotive Repair, SCAQMD	TBD [a]

TABLE 2.8-2 (CONCLUDED)

SCAQMD Proposed Mobile Source 8-Hour Ozone Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	N/A	Ongoing	CARB, SCAQMD	TBD [a]
Off-Road Mobile Source Measures:					
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	2017 (if needed)	2018–2031	CARB, SCAQMD	TBD [a]
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	2017	2018–2027	CARB, SCAQMD	TBD [a]
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	N/A	Ongoing	SCAQMD	2.0 / 2.0
MOB-11	Extended Exchange Program [VOC, NOx, CO]	N/A	Ongoing	SCAQMD	2.9 / 1.0 [NOx]
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	Ongoing	Beginning 2017–2023	SoCal Regional Rail Authority	TBD [b]
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	2017	2018–2027	SCAQMD	TBD [a]
Incentive Programs Measure:					
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	N/A	2016–2024	SCAQMD	11 / 7.8 [NOx]

[a] Emission reductions will be determined after projects are identified and implemented.
[b] Submitted into the SIP as part of Rate-of-Progress reporting or in baseline inventories for future AQMP/SIP Revisions.

Source: 2016 AQMP, Table 4-3.

The following text provides a brief description of the proposed control measures presented in Table 2.8-2.

2.8.2.1 Emission Growth Management Measure

There is one proposed control measure within this category. The measure addresses emission reductions from new or redevelopment projects with significant air emissions pursuant to CEQA. The SCAQMD will encourage developers and local agencies to identify actions that

will result in mitigation of new criteria pollutant emissions and potentially further reduce criteria pollutant emissions from affected projects.

EGM-01 – EMISSION REDUCTIONS FROM NEW OR REDEVELOPMENT PROJECTS: Since San Joaquin Valley Air Pollution Control District Rule 9510 has been approved by U.S. EPA to be included in the SIP for the San Joaquin Valley, the SCAQMD must consider Rule 9510 under the "all feasible measures" requirement of state law. As such, the applicability of Rule 9510 in the South Coast Air Basin and Coachella Valley will be evaluated. The proposed measure seeks to capture emission reduction opportunities during the project development phase and opportunities to enable greater deployment of zero and near-zero emission technologies. The SCAQMD will reconvene the working group made up of stakeholders from industry, local governments, and community representatives as part of the rulemaking process. The working group will provide input and comments and help identify actions that potentially result in emission reductions to mitigate any new emissions or further reduce emissions. As part of the public process, the SCAQMD staff will evaluate the need to develop a rule or other enforceable mechanisms to ensure that the emission reductions are real, surplus, quantifiable, and enforceable as defined by U.S. EPA if the emission reductions are proposed to be included in the SIP.

2.8.2.2 Facility-Based Mobile Source Measures

With economic growth projected out to 2040 by SCAG, there may be a potential increase in emissions associated with mobile sources in the goods movement sector even with the deployment of newer, cleaner vehicles and equipment. As such, four facility-based mobile source control measures are proposed. The first measure focuses on commercial marine ports in the Basin. Port-related emission sources include on-road heavy-duty trucks, locomotives, ocean-going vessels, commercial harbor craft, and cargo handling equipment. The Ports of Los Angeles and Long Beach have been implementing the San Pedro Bay Ports Clean Air Action Plan (CAAP) since 2006. Implementation of strategies under the CAAP has led to early emission reductions as state, federal, and international regulations are developed. The Ports are in the process of updating the CAAP to implement long-term sustainable strategies that could potentially result in criteria pollutant and GHG emission reductions, while improving operational efficiencies and reducing dependence on fossil-based fuels. To the extent that criteria pollutant emission reductions associated with such actions can be quantified, a mechanism will be developed that recognizes the actions and credits the associated emission reductions into the SIP.

The second measure focuses on mobile source related vehicles and equipment operating in rail yards and intermodal facilities in the Basin. Such vehicles and equipment include cargo handling equipment, locomotives, on-road heavy-duty trucks, and passenger cars. The third and fourth measures focus on warehouse distribution centers and commercial airports. An approach similar to the marine ports measure will be taken to quantify criteria pollutant emission reductions associated with activities occurring at these facilities.

As part of the public process in implementing the four measures, the SCAQMD staff will be assessing the progress in identifying and quantifying emission reductions that may or anticipate to occur at the various facilities. The SCAQMD staff will report to the SCAQMD Governing

Board on a regular basis on the progress of implementing the four measures. If after one year (from the date of adoption of the Final 2016 AQMP), potential emission reductions are not realized either through voluntary actions or from CARB (since these measures are to help implement CARB's "Further Development" measures), the SCAQMD staff may recommend that the SCAQMD Governing Board consider regulatory approaches or other enforceable mechanisms to achieve the emission reductions from the mobile source sectors associated with the various facilities.

MOB-01 – EMISSION REDUCTIONS AT COMMERCIAL MARINE PORTS: The Ports of Los Angeles and Long Beach have been implementing the CAAP since 2006 and is currently in the process of updating the CAAP. The Ports have been successful for the most part in implementing the CAAP and have exceeded emission reduction goals set in the CAAP. The CAAP update has the potential to assist the region in attaining air quality standards in a timely manner. Many of the actions that have been implemented in the CAAP are voluntary in nature since these reductions are not committed in the SIP. Over time, these actions have been subsumed through regulatory actions by CARB, U.S. EPA, or international entities such as the International Maritime Organization. Regardless, the actions have led to early emission reductions. The Ports are in a unique position to work with their tenants (terminal and railroad operators) to develop strategies to further reduce emissions. This measure seeks to quantify the emission reductions realized from the CAAP and credit the reductions into the SIP to the extent that these actions are real and surplus to the SIP. Emission reductions that occurred through the identified actions as reported by the Ports on an annual basis will be incorporated in the revised baseline emissions as part of the SIP revision process (either as part of the Rate-of-Progress reporting requirements of the CAA or reflected in new baseline emissions inventory for future AQMP/SIP revisions). Since many of these actions are voluntary in nature, any emission reductions credited towards attainment of the federal air quality standards must contain an enforceable commitment that the emission reductions remain real and permanent (as defined by U.S. EPA) if for some reason the emission reductions are not maintained after they are reported into the SIP. As such, the enforceable commitment may be in the form of a regulation by the SCAQMD within its existing legal authority, or by the state or federal government, or other enforceable mechanisms. Regardless, the types of enforceable commitments will be developed through a public process. The proposed measure will replace control measures MOB-03 in the 2007 AQMP and IND-01 in the 2012 AQMP.

MOB-02 – EMISSION REDUCTIONS AT RAIL YARD AND INTERMODAL FACILITIES: The goal of this measure is to assess and identify potential actions to further reduce emissions associated with mobile sources operating in and out of rail and intermodal yards. The SCAQMD staff will convene a stakeholders working group to discuss and identify actions or approaches to further reduce emissions at railyards and intermodal facilities. The identified actions can be voluntary or regulations or other enforceable mechanisms adopted by local, state, or federal governmental agencies. To the extent that these actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms.

MOB-03 – EMISSION REDUCTIONS AT WAREHOUSE DISTRIBUTION CENTERS: The goal of this measure is to assess and identify potential actions to further reduce emissions associated with emission sources operating in and out of warehouse distribution centers. The SCAQMD is currently working with industry stakeholders on conducting in-use truck trip studies and obtaining emissions information from various warehouse distribution types. This information along with emissions occurring in and around individual warehouse distribution centers will serve as the basis for seeking opportunities to reduce emissions beyond existing requirements. A stakeholder working group will be convened to discuss warehouse emissions related issues and provide input and comments on identifying actions that will result in further emission reductions. To the extent that these actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms.

MOB-04 – EMISSION REDUCTIONS AT COMMERCIAL AIRPORTS: Due to projected increases in airline passenger transportation and expansion of operations at various commercial airports, potential increases in emissions may result unless the increased emissions are fully mitigated. Several airport authorities are implementing emissions mitigation measures, while other airports have initiated actions that can lead to additional emission reductions. This measure seeks to quantify such actions and identify additional actions that can lead to additional emission reductions to assist in attainment of federal air quality standards and reduce local exposure to air toxic emissions. Quantified emission reductions that are real, surplus, permanent, and enforceable will be reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or in baseline emission inventories as part of future AQMP/SIP development. In addition, such emission reductions can be used for general conformity purposes. A working group will be convened with affected stakeholders to discuss airport emissions related issues and provide input to identify actions and develop mechanisms to implement this measure. To the extent that the identified actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms.

2.8.2.3 On-Road Mobile Source Measures

Five on-road mobile source control measures are proposed. The first two measures focus on on-road light- and medium-duty vehicles operating in the Basin. It is estimated that about 12 million registered vehicles will be operating in the Basin. The first measure would implement programs to accelerate the penetration and deployment of partial ZEV and ZEV in the light- and medium-duty vehicles categories. The second control measure would seek to accelerate retirement of older gasoline and diesel powered vehicles up to 8,500 pounds GVWR (gross vehicle weight rating). These vehicles include passenger cars, sports utility vehicles, vans, and light-duty pick-up trucks.

The remaining three measures focus on heavy-duty vehicles. The first of these measures seeks additional emission reductions from the early deployment of partial zero-emission and zero-emission light- and medium-heavy-duty vehicles with GVWs between 8,501 pounds to 26,000 pounds. The second control measure for heavy-duty vehicles seeks additional emission reductions from older, pre-2010 heavy-duty vehicles beyond the emission reductions targeted in CARB's Truck and Bus Regulation. Additional emission reductions beyond the compliance requirements of the Truck and Bus Regulation could be achieved as affected fleets purchase trucks with engines that meet an optional NOx emissions standard to replace their existing heavy-duty vehicles. In addition, fleets or trucks that are not subject to the Truck and Bus Regulation would be targeted through incentives or through regulatory actions that are within the SCAQMD's legal authority such as the SCAQMD Rule 1190 series of clean fleet vehicle rules, to purchase trucks with engines meeting an optional NOx emissions standard. The third measure will seek to accelerate the introduction of zero- and near-zero emission on-road heavy-duty trucks through mobile source emission reduction credits (MSERC) generating programs. SCAQMD Rules 1612 and 1612.1 have been in place since 1995 and 2001, respectively. However, the current versions of the rules need to be updated to reflect heavy-duty vehicle technologies available today and in the near-future.

MOB-05 – ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION VEHICLES: This measure proposes to continue incentives for the purchase of ZEV and hybrid vehicles with a portion of their operation in an "all-electric range" mode. The State Clean Vehicle Rebate Pilot (CVRP) program is proposed to continue from 2016 to 2030 with proposed funding up to $5,000 per vehicle and for low-income eligible residents, additional funding of up to $1,500 for a total of $6,500 per vehicle. The California state legislature has appropriated $133 million statewide for the CVRP in Fiscal Year 2016-17. The proposed measure seeks to provide funding rebates for at least 15,000 zero-emission or partial-zero emission vehicles per year.

MOB-06 – ACCELERATED RETIREMENT OF OLDER LIGHT-DUTY AND MEDIUM-DUTY VEHICLES: This proposed measure calls for promoting the permanent retirement of older eligible vehicles through financial incentives currently offered through local funding incentive programs and the AB 118 Enhanced Fleet Modernization Program. The proposed measure seeks to retire up to 2,000 older light- and medium-duty vehicles (up to 8,500 pounds GVW) per year. Funding incentives of up to $4,500 per vehicle are available to low- and moderate-income residents for the scrapping of the vehicle, which includes a replacement voucher for a newer cleaner conventional powered vehicle, plug-in hybrid electric or dedicated ZEV. For low- and moderate-income residents living in a disadvantaged community, additional funding of up to $5,000 is available for a fuel efficient conventional powered vehicle, plug-in hybrid electric vehicle or dedicated ZEV. The proposed measure seeks to provide funding assistance for at least 2,000 replacement vehicles per year.

MOB-07 – ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION LIGHT-HEAVY- AND MEDIUM-HEAVY-DUTY VEHICLES: The objective of the proposed action is to accelerate the introduction of advanced hybrid and zero-emission technologies for Class 4 through 6 heavy-duty vehicles. The state is currently implementing a Hybrid Vehicle Incentives Project (HVIP) program to promote zero-emission and hybrid heavy-duty vehicles and CARB allocated $12 million statewide to the program. The

proposed measure seeks to continue the program from 2016 to 2030 to deploy up to 120 zero- and partial-zero emission vehicles per year with up to $50,000 funding assistance per vehicle based on the current allocated funding (funding levels vary depending on technology types). Zero-emission vehicles and hybrid vehicles with a portion of their operation in an "all-electric range" mode would be given the highest priority. In addition, the California state legislature appropriated $150 million from the Greenhouse Gas Reduction Fund to invest in zero and near-zero emission on-road heavy-duty vehicles and off-road equipment.

MOB-08 – ACCELERATED RETIREMENT OF OLDER ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure seeks to replace up to 2,000 heavy-duty vehicles per year with newer or new vehicles that meet one of the optional NOx standards adopted by CARB. The funding assistance will be prorated to offer the most funding for heavy-duty engines meeting the optional NOx exhaust emissions standard of 0.02 g/bhp-hr or cleaner. Funding assistance of up to $25,000 per vehicle is proposed and the level of funding will depend upon the NOx emissions certification level of the replacement vehicle meeting one of the optional NOx emission standards. In addition, the SCAQMD may within its authority, adopt a regulation to require purchase of the cleanest commercially available engine, which may include a provision similar to the Surplus Off-Road Opt-In for NOx (SOON) provision of the Statewide In-Use Off-Road Fleet Vehicle Regulation or developing new or expanding existing clean fleet vehicle rules, will be sought to ensure that additional NOx emission reduction benefits are achieved. Other enforceable mechanisms may be considered providing that such mechanisms can be approved into the SIP.

MOB-09 – ON-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM: This proposed measure seeks to accelerate deployment of near-zero and zero-emission on-road heavy-duty trucks through the generation of mobile source emission reduction credits (MSERCs) that can be used for purposes of recognizing mobile source emission reductions at facilities affected by proposed AQMP measures MOB-01 through MOB-04, MOB-08, and EGM-01. The SCAQMD staff will develop amendments to SCAQMD Rules 1612 and 1612.1 to reflect the latest advanced near-zero and zero-emission technologies and revise the quantification methodologies in Rules 1612 and 1612.1. MSERCs generated will be discounted to provide additional benefits to the environment and to help meet air quality standards.

2.8.2.4 Off-Road Mobile Source Measures

Four control measures are proposed to seek further emission reductions from off-road mobile sources and industrial equipment. The first measure calls for the continuation of the SOON provision of the Statewide In-Use Off-Road Diesel Fleet Regulation beyond 2023. The SOON provision implemented to-date has realized additional NOx reductions beyond the Statewide regulation. The second measure seeks to continue the successful lawnmower and leaf blower exchange programs and expand the programs to include a greater variety of zero-emission equipment into the commercial lawn and garden maintenance activities. A significant portion of the NOx emissions from lawn and garden equipment are attributed to larger lawn and garden equipment operating on diesel fuel. The extended exchange program will focus on replacing this equipment with newer equipment. The third measure calls for additional emission reductions from passenger locomotives. The Southern California Regional Rail Authority

(SCRRA or Metrolink), the region's commuter rail service, is in the process of procuring 40 Tier 4 passenger locomotives. This measure will recognize these efforts and continue the purchase of Tier 4 cleaner locomotives. The fourth measure seeks to accelerate the introduction of zero- and near-zero emission off-road equipment through MSERC generating programs. SCAQMD Rule 1620 has been in place since 1995. However, the current version of the rule needs to be revised to reflect current off-road equipment technologies available today and the near-future.

MOB-10 – EXTENSION OF THE SOON PROVISION FOR CONSTRUCTION/INDUSTRIAL EQUIPMENT: To promote turnover (i.e., retire, replace, retrofit, or repower) of older in-use construction and industrial diesel engines, this proposed measure seeks to continue the SOON provision of the Statewide In-Use Off-Road Fleet Vehicle Regulation beyond 2023 through the 2031 timeframe. Historically, the SCAQMD Governing Board has allocated up to $30 million per year for the program. However, more recently, the Governing Board has allocated up to $10 million per year. This measure proposes to extend the current SOON Program beyond 2023 to 2031 with a minimum allocation of $10 million and potentially higher levels upon the Governing Board's approval. In order to implement the SOON program in this timeframe, funding of up to $30 million per year would be sought to help fund the repower or replacement of older Tier 0 and Tier 1 equipment to Tier 4 or cleaner equipment, with approximately 2 tons per day of NOx reductions.

MOB-11 – EXTENDED EXCHANGE PROGRAM: This measure seeks to continue the successful lawnmower and leaf blower exchange programs in order to increase the penetration of electric equipment or new low emission gasoline-powered equipment used in the region. The lawnmower exchange program has resulted in over 55,000 gasoline lawnmowers replaced with zero-emission lawnmowers and over 12,000 older, dirtier gasoline-powered commercial leaf blowers replaced with newer, and cleaner leaf blowers. The SCAQMD is currently conducting a lawn and garden equipment loan program with various public entities to demonstrate the feasibility of zero-emission lawn and garden equipment in various public and commercial settings. Such demonstrations will provide valuable information to lawn and garden equipment manufacturers to produce zero-emission products for the commercial environment. A segment of the lawn and garden equipment population comprised of diesel powered equipment represents a significant fraction of the total NOx emissions associated with this category. As such, the proposed extended exchange program will focus on incentives to accelerate the replacement of older equipment with new Tier 4 or cleaner equipment or zero-emission equipment where applicable. In addition, other small off-road equipment (SORE) equipment may also be considered for exchange programs for accelerating the turnover of existing engines.

MOB-12 – FURTHER EMISSION REDUCTIONS FROM PASSENGER LOCOMOTIVES: This measure recognizes recent actions by the SCRRA to replace their existing passenger locomotives with Tier 4 locomotives. The SCRRA is in the process of procuring 40 Tier 4 passenger locomotives to replace their older existing Tier 0 and Tier 2 passenger locomotives by 2020. The SCRRA Board has indicated a desire to work with the SCAQMD and other stakeholders to evaluate technologies that will further reduce NOx emissions beyond Tier 4 emissions level.

MOB-13 – OFF-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM: This measure seeks to accelerate the early deployment of near-zero and zero-emission off-road equipment through the generation of MSERCs that can be used for purposes of recognizing mobile source emission reductions at facilities affected by proposed AQMP measures MOB-01 through MOB-04 and EGM-01. The SCAQMD staff will develop amendments to SCAQMD Rule 1620 to reflect the latest advanced near-zero and zero-emission technologies and revise the quantification methodologies in Rule 1620. In addition to Rule 1620, the SCAQMD staff has been working on two additional off-road MSERC generation rules to incentivize the early deployment of the cleanest ocean-going vessels that are not subject to the State Vessels At-Berth Regulation or vessel calls that are considered surplus to the Statewide regulation and locomotives that have lower NOx emissions than the current Tier 4 locomotive engine standards. The two rules will be further developed under this measure. MSERCs generated may be discounted to provide additional benefits to the environment and to help meet air quality standards.

2.8.2.5 Incentive Programs Measure

A measure is proposed to recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B. The San Joaquin Valley Air Pollution Control District adopted Rule 9610 to recognize the emission reduction benefits of incentive programs in their region. A similar action is proposed under the current measure. The proposed measure describes the six general elements identified by U.S. EPA that will be needed in order for such benefits to be accounted in the SIP.

MOB-14 – EMISSION REDUCTIONS FROM INCENTIVE PROGRAMS: This measure seeks to develop a rule similar to the San Joaquin Valley Air Pollution Control District Rule 9610 to recognize emission reduction benefits associated with incentive programs. The proposed rule would recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B such that the emission reductions can be accounted for in the SIP. As previously mentioned, the U.S. EPA indicated that there are six general elements that need to be incorporated in a proposed rule in order for the reductions to be credited in the SIP. The six general elements are the minimal amount of information, documentation, or commitment needed for U.S. EPA to consider approval of emission reduction benefits associated with incentives programs. Additional elements may be identified during the implementation of this measure.

2.8.3 SCAQMD PROPOSED PM2.5 STRATEGY

Despite the attainment demonstration in the 2012 AQMP, the Basin did not meet the 24-hour PM2.5 standard by 2015, mainly due to the drought conditions that persisted for the past several years. The preliminary 2015 data showed that the 24-hour PM2.5 design value was greater than the federal standard of 35 µg/m3. U.S. EPA re-designated the Basin from a "moderate" nonattainment to a "serious" nonattainment area, effective February 12, 2016, which set 2019 as the new attainment deadline. The 2016 AQMP demonstrates that the 24-hour standard will be met by 2019 with no additional reductions beyond already adopted and implemented measures (2016 AQMP, Chapter 5).

For the annual PM2.5 standard (12 µg/m3), the attainment target year is 2021 for a "moderate" nonattainment area and 2025 for a "serious" nonattainment are. Modeling projections show that the annual standard will not be met by 2021 if emission reductions beyond the already adopted control measures are not introduced. The aggressive NOx and VOC reductions proposed to meet the 1997 8-hour ozone standard also do not ensure attainment of the annual PM2.5 standard by 2021. An analysis of the feasibility of additional measures focused on direct PM2.5 and its other precursors did not identify a practical path towards annual PM2.5 attainment by 2021. Therefore, the SCAQMD is requesting a reclassification of the Basin as a "serious" nonattainment area with a new attainment deadline as "expeditiously as practicable," but no later than 2025. While CAA Section 182(e)(5) measures cannot be relied on to show future attainment of PM standards, the NOx strategy to meet ozone standards will still ensure achieving the annual standard by 2025.

However, to further ensure attainment of the annual PM2.5 standards, a series of control measures specifically addressing PM2.5 are being proposed. Table 2.8-3 provides an example of the type of proposed PM2.5 BCM and typical corresponding control methods.

TABLE 2.8-3

SCAQMD Proposed PM2.5 Control Measure Methods

Source Category	Control Method
BCM for PM2.5 and Ammonia Sources	• Add-On Controls • Best Management Practices • Best Available Control Technology • Best Available Retrofit Control Technology • Process Improvement • Targeted Controls • Preventative Measures • Seasonal or Episodic Controls • Market Incentives • Mandatory Curtailments

Source: 2016 AQMP, Table 4-5.

Table 2.8-4 provides a list of the proposed SCAQMD stationary source PM2.5 control measures along with the anticipated adoption/implementation period, implementing agency, and projected emission reductions. The measures cover a variety of source types for PM sources.

TABLE 2.8-4

SCAQMD Proposed Stationary Source PM2.5 Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2021/2025)
BCM-01[3]	Further Emission Reductions from Commercial Cooking [PM]	2018	2023–2025	SCAQMD	~~3.3~~0/3.3*
BCM-02	Emission Reductions from Cooling Towers [PM]	2018	2022 & beyond	SCAQMD	TBD [a]
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-04[4]	Emission Reductions from Manure Management Strategies [NH3]	TBD	TBD	SCAQMD	TBD [a]
BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD	TBD	SCAQMD	TBD [a]
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD	TBD	SCAQMD	TBD [a]

[3] Formerly BCM-03 in the 2012 AQMP and BCM-05 in the 2007 AQMP.
[4] Formerly BCM-04 in the 2012 AQMP.

TABLE 2.8-4 (CONCLUDED)

SCAQMD Proposed Stationary Source PM2.5 Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2021/2025)
BCM-08	Further Emission Reductions from Agricultural, Prescribed and Training Burning [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	TBD	TBD	SCAQMD	0.1 / 0.1 [NH3]

[*] Will be a contingency measure in the 2016 AQMP.

[a] TBD are reductions to be determined once the technical assessment is complete, and inventory and cost-effective control approach are identified.

Source: 2016 AQMP, Table 4-6.

The following text provides a brief description of the proposed control measures presented in Table 2.8.-4

BCM-01 – FURTHER EMISSION REDUCTIONS FROM COMMERCIAL COOKING: Commercial cooking activities are the largest source of directly emitted PM2.5 emissions in the Basin, and under-fired charbroilers are responsible for the majority of emissions from this source category. To date, a variety of control device technologies have been tested by CE-CERT at the University of California, Riverside, and SCAQMD staff and the inter-agency working group are reviewing draft test results. This control measure is a contingency control measure which would seek additional emission reductions if the annual average PM2.5 standard is not met by 2025. If necessary, the control program would seek to establish a tiered program targeting higher efficiency controls for under-fired charbroilers at large volume restaurants, with more affordable lower efficiency controls at smaller restaurants. As with existing Rule 1138 requirements, a potential future control program for under-fired charbroilers could establish control device efficiency requirements based on restaurant throughput. Efforts could also be taken to develop a control device registration program as an alternative to the SCAQMD permit process. Small business incentive programs funded by mitigation fees or other sources could also be explored to help offset initial purchase and installation costs for restaurants.

BCM-02 – EMISSION REDUCTIONS FROM COOLING TOWERS: This control measure seeks reductions of PM emissions from industrial cooling towers through the use of the latest drift eliminator technologies. This control measure will seek to phase-in the use of drift eliminators with 0.001 percent drift rate for existing cooling towers. This could be achieved by retrofitting older cooling towers with modification to the cooling fans to accompany the drift eliminators, which will also result in water conservation. Newly constructed cooling towers have demonstrated ultra-low drift rates down to 0.0005 percent. This drift rate has been achieved in practice and could be considered a BACT for new construction.

BCM-03 – FURTHER EMISSION REDUCTIONS FROM PAVED ROAD DUST SOURCES: Although fugitive dust emissions from agriculture and construction are primarily in the coarse size fraction (PM10-2.5), entrained road dust is still one of the major direct PM2.5 sources due to the large number of roadways and high traffic volumes in the region. Existing SCAQMD Rules 1157 and 403 requirements to reduce track out from stationary sources are based on a list of options. Further emission reductions could be achieved by specifying the most effective track out prevention measures, such as use of a wheel washing system, for sites with high vehicular activity exiting the site, or those with repeated track-out violations. Existing SCAQMD Rule 1186 requires that certified equipment be used on public roads currently subject to routine street sweeping but does not specify frequency. Further paved road dust PM2.5 emission reductions could be sought through specifying the frequency of street sweeping. Street sweeping is a portion of some local jurisdiction's National Pollutant Discharge Elimination System (NPDES) permits to reduce debris from entering the storm drain system. A review of existing NPDES mandates would be conducted in conjunction with any potential future rulemaking efforts. As part of efforts to reduce paved road dust silt loadings and the corresponding PM emissions, an evaluation of existing SCAQMD fugitive dust rules will be conducted to determine if additional PM2.5 emissions can be achieved.

BCM-04 – EMISSION REDUCTIONS FROM MANURE MANAGEMENT STRATEGIES: This control measure seeks to use manure management systems to reduce ammonia, a PM precursor, from fresh manure. Examples include acidifier application, dietary manipulation, feed additives, and other manure control strategies which can be applied on a year-around basis. To minimize costs, some control technologies can be seasonally or episodically applied during times when high ambient PM2.5 levels are of concern. Dietary manipulation such as lowering the protein content and including high-fiber ingredients is an effective method to decrease ammonia emission from monogastric animals' and ruminants' manure. Feed additives can be considered as a seasonal or episodic control strategy when ambient PM2.5 concentrations are highest. New approaches to reduce ammonia emissions from manure can be considered that include manure slurry injection, microbial manure additives, manure belt cleaning in laying hen houses, cage-free egg laying manure removal, and poultry manure thermal gasification.

BCM-05 – AMMONIA EMISSION REDUCTIONS FROM NOx CONTROLS: This control measure seeks to reduce ammonia from NOx controls such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction. These systems are capable of reducing NOx emissions from combustion sources very effectively. However, the use of systems also results in potential emissions of ammonia that "slip" past the control equipment and into the atmosphere. Ammonia is a precursor gas for secondary PM formation. Recent advances in catalyst technology have resulted in the development of ammonia slip catalysts that selectively convert ammonia into nitrogen gas. These catalysts could be installed post-SCR and would result in less ammonia slip.

BCM-06 – EMISSION REDUCTIONS FROM ABRASIVE BLASTING OPERATIONS: Existing SCAQMD Rule 1140 regulates opacity requirements for confined and unconfined abrasive blasting operations using various abrasives. The California Health and Safety Code prohibits local districts from requiring emission and performance standards more or less stringent than the State regulation. Rule 1140 has been developed with the ultimate goal of

consistency. Rule 1140 establishes the emission and performance standards, including prohibition against visible emissions from confined or unconfined abrasive blasting operations, which is conforming to the California Code of Regulations Title 17, Subchapter 6 – Abrasive Blasting. Current permit conditions for abrasive blasting require venting to a PM air pollution control equipment when in full use. Baghouses or dry filters are the most frequently used air pollution control equipment. This control measure proposes voluntary applications of a portable blasting enclosure/booth with a dust collection system by providing incentives, primarily focusing on dry abrasive blasting operations conducted in open areas using portable blasting equipment with or without a written SCAQMD permit.

BCM-07 – EMISSION REDUCTIONS FROM STONE GRINDING, CUTTING AND POLISHING OPERATIONS: Stone fabricating operations, including, but not limited to, grinding, cutting, and polishing generate airborne dust emissions containing PM10, some PM2.5, and silica particles that are known to cause lung diseases. Many of these operations are done at confined or unconfined worksites by construction workers, remodeling contractors and individuals, and may not be sufficiently controlled for dust emissions. This control measure seeks both wet and dry methods of control, local exhaust emissions control, no visible emissions requirements, and financial incentives as a regulatory alternative for exchanging existing wet or dry equipment with new equipment that includes integrated add-on controls.

BCM-08 – FURTHER EMISSION REDUCTIONS FROM AGRICULTURAL, PRESCRIBED AND TRAINING BURNING: This control measure proposes to further reduce PM emissions from open burning sources. Further PM emission reductions could be achieved through use of a fee schedule and/or an incentive program to limit agricultural burning and promote burning alternatives (e.g., chipping/grinding or composting). One approach to reduce emissions could involve establishing an administrative fee as part of the burn permit program based on acreage or amount of material burned for the purposes of processing and enforcing. Fees would not be charged to producers using burning alternatives. Another approach could involve providing incentives to agricultural producers, especially in peak PM2.5 areas, to implement alternatives to burning. A demonstration project could also be established where a SCAQMD contractor could conduct chipping/grinding and removal activities in peak PM2.5 areas at no, or reduced, cost to producers.

BCM-09 – FURTHER EMISSION REDUCTIONS FROM WOOD-BURNING FIREPLACES AND WOOD STOVES: This control measure seeks additional emission reductions from residential wood burning activities. Residential wood burning results in directly emitted PM2.5 and curtailment programs and emission reductions can be very cost-effective relative to other source categories. Based on a review of U.S. EPA guidance documents and other air district wood smoke control programs, the existing SCAQMD curtailment program (Rule 445) threshold could be lowered. A lower curtailment criteria (e.g., 20 or 25 µg/m3) could be established, which would increase the number of no burn days but not completely prohibit wood burning during the winter. Based on historical data (2013–2015) for the November through February winter season, it is estimated there would be 11 and 28 additional curtailment days, on average, at the 25 and 20 µg/m3 thresholds, respectively, above the estimate of 24 days at the current threshold. The Check Before You Burn program could also be extended to include the months of October and/or March as high PM2.5 levels can occur during these periods. All of these potential control options would increase the number of no

burn days which could lower the contribution of wood smoke to ambient PM2.5 levels in the winter months. Although these episodic reductions are designed to address 24-hour PM2.5 concentrations, a consistent reduction in wintertime PM2.5 from reduced wood burning could have an impact on annual average PM2.5 concentrations. Further analysis will be conducted to determine the appropriate approach to achieve the emission reductions necessary to demonstrate attainment of both the 24-hour and annual average federal PM2.5 standards. The current SCAQMD program encourages households within high PM2.5 areas to upgrade wood-burning devices through SCAQMD incentives of up to $1,600 to offset purchase and installation costs. Although this program has been effective, additional reductions may be achieved through the use of higher incentives or expansion of the eligible geographic area. Experience has shown that education and outreach to targeted households is vital to ensure program participation, and an additional element of this control measure would focus on expanding the awareness of the incentive programs.

BCM-10 – EMISSION REDUCTIONS FROM GREENWASTE COMPOSTING: VOCs and ammonia, which are PM precursor gases, are emitted from composting of organic waste materials including greenwaste and foodwaste and are currently regulated by existing SCAQMD Rule 1133.3. Although Rule 1133.3 covers foodwaste composting, the level of emissions from foodwaste composting has not been fully characterized, mainly due to the lack of related emissions test data. This control measure proposes potential emission minimization through emerging organic waste processing technology and potential emission reductions through restrictions on the direct land application of chipped and ground uncomposted greenwaste and through increased diversion to anaerobic digestion. This proposed control measure could seek a 15-day pathogen reduction process of chipped and ground uncomposted greenwaste with composting BMPs to reduce potential VOC and ammonia emissions from land applied greenwaste.

2.8.4 SCAQMD AIR TOXIC CONTROL MEASURES

In addition to the criteria pollutant control measures, the SCAQMD is proposing additional measures to control toxic air contaminants (TACs) from stationary sources in the SCAQMD. To the extent feasible, the 2016 AQMP is capturing co-benefit opportunities in achieving multi-pollutant reductions to meet ambient air quality standards having multiple deadlines. For example, some criteria pollutant control measures will concurrently reduce air toxics and some air toxics control measures will reduce criteria pollutants. The proposed control measures, their objectives, and expected control approaches are summarized in Table 2.8-5.

TABLE 2.8-5

SCAQMD Proposed Air Toxic Control Measures

Number	Measure	Objective	Potential TAC	Control Approach
TXM-01	Control of Metal Particulate from Metal Grinding Operations	Reduce metal particulate emissions from metal grinding activities at forging facilities, metal foundries, and plating operations	• Cadmium • Hexavalent Chromium • Cobalt • Nickel • Particulate (metal)	• Enclosures • Pollution controls • Housekeeping measures
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations	Further reduce fugitive metal particulate emissions from electroplating and chromic acid anodizing processes	• Hexavalent Chromium • Nickel • Cadmium • Copper • Lead • Particulate (metal)	• Enclosures • Pollution controls • Enhanced housekeeping measures • Physical modifications to increase capture efficiency and reduce fugitive emissions
TXM-03	Control of Hexavalent Chrome from Chrome Spraying Operations	Further control hexavalent chromium emissions from spraying of paints and coatings containing hexavalent chromium	• Hexavalent Chromium • Particulate (metal)	• Increased housekeeping and best management practices
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soil	Control toxic metal particulates during soil cleanup/remediation activities.	• Lead • Hexavalent Chromium • Cadmium • Nickel • Arsenic • Possibly Other Metal TACs • Particulate (metal)	• Soil covering • Chemical treatment • Barriers • Wheel knockout and cleaning stations • Other suppression techniques
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting	Control toxic metal particulates from laser and plasma cutting operations	• Nickel • Cadmium • Hexavalent chromium • Possibly Other Metal TACs)	• Filter technology including HEPA filters • Alternative technologies such as flame and water jet cutting
TXM-06	Control of Toxic Emissions from Metal Melting Facilities	Further reduce metal toxic emissions from melting, pouring, casting, degating, heat treating, surface cleaning, and finishing operations at foundries	• Arsenic • Cadmium • Nickel • Other toxic metals • Particulate (metal)	• Particulate filter technologies for furnaces • Enclosures • Increased housekeeping and best management practices • Possibly ambient air monitoring

TABLE 2.8-5 (CONCLUDED)

SCAQMD Proposed Air Toxic Control Measures

Number	Measure	Objective	Potential TAC	Control Approach
TXM-07	Control of Lead Emissions from Stationary Sources	Further control of lead emissions from non-vehicular sources	• Lead • Particulate (metal)	• Reduce ambient lead concentration • Increased housekeeping and best management practices
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings	Reduce methylene chloride emissions from furniture chemical stripping operations	• Methylene Chloride	• Reformulation • Activated carbon
TXM-09	Control of Emissions from Oil and Gas Well Activities	Reduce toxic emissions during well drilling, maintenance, and stimulation activities at oil and gas production sites	• Benzene • Toluene • Ethylbenzene • Xylene • Diesel particulate matter • Particulate Matter	• Pollution control and best management practices to minimize emissions from portable storage tanks, circulation tanks, and portable totes with particulates • Use of the cleanest diesel equipment available for off-road engines • Housekeeping provision

TXM means toxic air contaminant control measure.

The following text provides a brief description of the proposed control measures presented in Table 2.8-5.

TXM-01 - METAL GRINDING OPERATIONS: The objective of this control measure is to control fugitive toxic metal particulate emissions at forging facilities, metal foundries, and plating operations. In general, there are no current SCAQMD regulatory requirements for metal grinding operations, and this activity is exempt from permitting. Metal grinding is a material removal and surface preparation process used to shape and finish metal parts. Grinding employs an abrasive product, usually a rotating wheel brought into controlled contact with the metal surface that removes tiny pieces of metal from the part generating metallic chips and dust. This activity is common in both heavy and light industrial processes such as metal foundries and forging and plating operations that commonly produce parts for the aerospace, automotive, and oil and gas industries. Potential metal particulate emission control approaches include conducting grinding within permanent enclosures, capture and control through add-on controls, and housekeeping measures. Examples of add-on controls include, cyclones, baghouses, scrubbers and high efficiency particulate arrestors (HEPA) filters. Effective housekeeping measures may include routine wet washing or vacuuming, proper material storage and disposal, and routine maintenance of emission control devices. This measure will be implemented as individual source-specific rules are adopted or amended.

TXM-02 – PLATING AND ANODIZING OPERATIONS: The purpose of this control measure is to further control metal (hexavalent chrome, nickel, cadmium, copper, arsenic and lead) emissions from plating and anodizing operations. Hexavalent chromium electroplating and chromic acid anodizing are processes currently regulated under SCAQMD Rule 1469 – Hexavalent Chromium Emissions from Chromium Electroplating and Chromic Acid and

Anodizing Operations. Other non-hexavalent chromium plating operations are regulated under SCAQMD Rule 1426 – Emissions from Metal Finishing Operations. Electroplating processes involve the creation of desired metal surfaces or substrates. Both nickel and copper plating are commonly performed prior to chrome plating in order to provide a substrate for the chrome to adhere to or to add additional properties such as strength. In many cases, nickel plating is performed as the only or final stage of plating where appearance is the primary desired quality of the end product. Other sources of fugitives can come from air sparging, openings or cross-draft conditions within buildings or enclosures, poor housekeeping, improper handling of waste, and improper handling of raw products. Hexavalent chromium electroplating and chromic acid anodizing processes are used in various industries including aerospace, automotive, computer electronics, machinery, and industrial equipment, and defense government. Current point source control approaches include chemical or mechanical methods to control surface tension of the baths in the tank, or capture of emissions using add-on air pollution controls such as scrubbers, mesh pads, and HEPA filters. Fume suppressants are extremely effective at minimizing process fugitive emissions from the tank, especially in situations where facilities have cross draft conditions in buildings where tanks are located, or conduct operations around tanks that may affect the release or behavior of the emissions. When used in combination with add-on air pollution control equipment, fume suppressants serve as the primary control of both point source and fugitive emissions prior to collection by the control device, and optimizes the overall emission reduction potential of the system. Facilities also can utilize best housekeeping and best management practices to mitigate fugitive emissions. In some cases, facilities may use alternative materials or plating processes. Additionally, alternative methods of applying a metal coating may be used such as aluminum ion vapor deposition, physical vapor deposition, or metal spray coating. This measure would be implemented through amendments to SCAQMD Rules 1426 and 1469.

TXM-03 – CHROME SPRAYING OPERATIONS: The objective of this control measure is to further control hexavalent chromium emissions from spraying of paints and coatings. Spraying of paints and coatings containing chromium or hexavalent chromium is currently regulated under SCAQMD Rule 1469.1 - Spraying Operations Using Coatings Containing Chromium. During the uncontrolled application of coatings, hexavalent chromium emissions are generated by the inefficient transfer of paint to the part or from overspray. Spraying operations are typically conducted within a paint spray booth and emissions are exhausted through a wall of filter media or stack, assuming a properly designed booth and ventilation system. However, there is also a potential for fugitive emissions to occur from an open booth face, if capture into the ventilation system is not complete. Additionally, fugitive hexavalent chromium emissions can be generated by poor housekeeping, improper use of control equipment, and improper handling of waste or painted products. SCAQMD Rule 1469.1 currently includes requirements for spray enclosures, transfer efficiency, and housekeeping practices within spray enclosures. Paints and coatings containing hexavalent chromium occur in a variety of industries including aerospace, electroplating, and coating facilities. Current housekeeping requirements of SCAQMD Rule 1469.1 include general measures and best management practices for the clean-up, handling, storage, and disposal of waste generated within spray booth enclosures. The existing provisions for enclosures can be enhanced by requiring routine and periodic housekeeping inspections, in addition to new housekeeping and work practice requirements outside of spray enclosures in order to comprehensively reduce

fugitive emissions from the facility. This measure would be implemented through amendments to SCAQMD Rule 1469.1.

TXM-04 – TOXIC AIR CONTAMINANT EMISSIONS FROM DECONTAMINATION OF SOIL: Currently the SCAQMD has a rule regulating VOC emissions from contaminated soil that establishes requirements to ensure the release of VOC emissions are minimized. There is currently no rule to address metal particulate emissions that can become airborne during the handling and disturbance of soils contaminated with toxic metals. Examples of metal toxic air contaminants that can be in contaminated soil include, but are not limited to, hexavalent chromium, lead, nickel, cadmium, and arsenic. This control strategy would establish specific requirements to ensure that fugitive toxic air contaminant emissions from soils contaminated with toxic metals are minimized during the excavation, storage, and/or transportation. This control strategy would include soil covering, watering, chemical treatment, barriers, tire and wheel knockout and cleaning stations, and other dust suppression techniques. Air monitoring of the site may also be a part of the control strategy. This measure would be implemented as a new SCAQMD Rule.

TXM-05 – LASER AND PLASMA CUTTING: The control measure would control metal particulate emissions from laser and plasma cutting operations. Laser and plasma cutting technologies are used for cutting and fabricating large sheets of metal goods. Laser cutting directs a laser onto most metals (except reflective metals including aluminum, brass and copper) which melts or vaporizes the metal. Plasma cutting uses electrically conductive gas to transfer energy from an electrical power source through the plasma to the metal being cut. The high temperature of the plasma melts the metal. The intense energy of both the laser and plasma cutting process creates fumes and smoke from vaporizing the molten material from the bottom of the cut (kerf). Uncontrolled vaporized metals such as cadmium and nickel present environmental and health concerns. Additionally, high energy processes, such as laser and plasma cutting, can oxidize the elemental chrome in stainless steel into hexavalent chrome. Control approaches under this measure would include filter technologies such as HEPA filters or possibly other pollution controls. Alternative processes are available including flame cutting, water jet cutting, welding, and conventional machining. This measure would be implemented as a new SCAQMD Rule.

TXM-06 – CONTROL OF TOXIC EMISSIONS FROM METAL MELTING FACILITIES: This control measure seeks to further reduce metal toxic emissions such as arsenic, cadmium, and nickel from foundries and other metal melting facilities (smelting, tinning, galvanizing and other miscellaneous processes where metals are processed in molten form). Other metal melting operations include smelting, tinning, galvanizing, and other miscellaneous processes where metals are processed in molten form. Metal foundries are facilities which produce metal castings. The process involves melting metal into a liquid, pouring the liquid metal into a mold or casting, allowing the metal to cool and solidify, removing the mold or casting, degating, heat treating, surface cleaning, and finishing. Possible emission sources from such operations include, but are not limited to, fume, particulate, or dust from the melting, pouring, casting, degating, heat treating, coating, brazing, finishing, or surface cleaning processes, leftover metal or slag, and housekeeping. Emissions can potentially be reduced through venting operations to an emission collection system or improvements to existing collection systems, such as the addition of high efficiency filters. Fugitive emissions can be

reduced through housekeeping measures which may include, but are not limited to, sweeping, mopping or filtered vacuuming and enclosed material storage. Equipment may require new or updated source testing and potentially new or updated permits. Additionally, an ambient air monitoring requirement is under consideration. This measure would be implemented through amendments to SCAQMD Rule 1407 and possibly a new SCAQMD Rule.

TXM-07 – CONTROL OF LEAD EMISSIONS FROM STATIONARY SOURCES: The objective of this control measure is to further control lead emissions from non-vehicular sources. Lead and arsenic emissions from large lead-acid battery recycling facilities are regulated by SCAQMD Rule 1420.1. Emissions of lead from large (>100 ton per year) metal melting facilities are regulated by SCAQMD Rule 1420.2. All other non-vehicular sources of lead are regulated by SCAQMD Rule 1420. Lead is found in metals and aggregate processed either as an alloy or as a contaminant. Facilities process lead in aggregate processing, metal melting, metal finishing, metal machining operations, and also use lead solder for electronic circuit boards. Possible emission sources from such operations include, but are not limited to, fume, particulate, or dust from the mining, melting, finishing, or surface cleaning processes, leftover metal or slag, and poor housekeeping. Control of lead emissions often occurs concurrently with the control of other toxic metals. Emissions can be controlled through improved housekeeping requirements and best management practices similar to those included in SCAQMD Rule 1420.1, including provisions for general cleaning, rooftop cleaning, and handling, storage, and disposal of waste generated to comprehensively reduce fugitive lead emissions. This measure would be implemented through amendments to SCAQMD Rule 1420.

TXM-08 – CHEMICAL STRIPPING OF CURED COATINGS: This proposed control measure would restrict the use of methylene chloride during chemical stripping operations. Methylene chloride is a suspect carcinogen and is classified as a Hazardous Air Pollutant by U.S. EPA and as a TAC by the state of California. A typical chemical stripping product contains between 70 and 85 percent methylene chloride by weight. Methylene chloride is the active ingredient that penetrates the coating film and lifts the coating off the surface. Most chemical stripper usage is done without any equipment or controls. The chemical stripper is applied by brush and then rinsed off afterwards. Larger users of chemical strippers are usually furniture stripping shops which sometimes utilize tanks and flow trays to use the chemical stripper. Other uses include automobile rim coating operations and residential furniture restoration. Reformulation is the preferred method for reducing methylene chloride emissions. The use of control equipment may also be a consideration. This measure would be implemented through a new SCAQMD Rule.

TXM-09 – OIL AND GAS PRODUCTION: Existing oil and gas field production facilities are required to notify the SCAQMD of a planned well maintenance or stimulation event under SCAQMD Rule 1148.2 – Notification and Reporting Requirements for Oil and Gas wells and Chemical Suppliers. In addition to the notification requirements, SCAQMD Rule 1148.2 also requires operators to report chemical usage during each operation, although trade secret chemicals are not revealed to the public. Oil and gas field production well maintenance and stimulation activities release emissions such as diesel particulate matter (DPM), fugitive dust, and other air toxic emissions such as benzene, toluene, ethylbenzene, and xylene (BTEX) compounds. This control measure seeks to develop a series of BMPs to reduce the emission impact from the well maintenance and stimulation activities. The implementation of the BMPs

specified may be contingent upon the proximity to sensitive receptors. The BMPs may include: (1) reduction of BTEX compounds from return fluids during gravel packing and hydraulic fracturing events by the use of carbon absorbers to control emissions venting from portable storage tanks, covering circulation tanks, and closing access hatches on portable storage tanks; (2) reduction of BTEX compounds from drilling mud return processing equipment by covering areas open to atmosphere; (3) reduction of fugitive silica dust from the use of portable plastic totes; (4) reduction of DPM from the use of Tier 3 and 4 off-road engines, or engines equipped with a CARB certified Level 3 diesel particulate filter (DPF); and (5) work area plastic ground coverings to collect spills and reduce fugitive dust. The implementation of this control measure would be through an amendment to SCAQMD Rule 1148.2.

2.8.5 STATE AND FEDERAL CONTROL MEASURES

The 2016 AQMP also includes control measures to reduce emissions from sources that are primarily under the state and federal jurisdiction, including on-road and off-road mobile sources. These reductions are needed to achieve the remaining emission reductions necessary for ozone and PM2.5 attainment. CARB released the Proposed 2016 State Strategy for the SIP (State SIP Strategy) on May 17, 2016. The new measures contained in the State SIP Strategy commitment reflect a combination of state actions, petitions for federal action, as well as actions that outline a pathway for achieving further deployment of the cleanest technologies in each sector. The NOx and VOC emission reductions from the proposed new State SIP Strategy measures in 2023 and 2031 are summarized in Table 2.8-6. CARB's proposed state SIP Strategy for on-road vehicles, locomotives, ocean going vessels, and off-road equipment are also briefly summarized in this section.

TABLE 2.8-6

Expected Emission Reductions (tons/day) in the Basin from State SIP Strategy Measures

CM Number	Title	Action	Implementation Begins	2023 Reduction (tons/day)	2031 Reduction (tons/day)
On-Road Light-Duty					
ORLD-01	Advanced Clean Cars 2	2020	2026	-	0.6 (NOx) ~~0.3~~ 0.4 (ROG)
ORLD-02	Lower In-Use Emission Performance Assessment	NA	ongoing	nyq	nyq
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles	Ongoing	2016	7 (NOx) 16 (ROG)	5 (NOx) 16 (ROG)

TABLE 2.8-6 (CONT.)

Expected Emission Reductions (tons/day) in the Basin from State SIP Strategy Measures

CM Number	Title	Action	Implementation Begins	2023 Reduction (tons/day)	2031 Reduction (tons/day)
On-Road Heavy-Duty					
ORHD-01	Lower In-Use Emission Performance Level for Heavy-Duty Vehicles	2016	2017	nyq	nyq
ORHD-02	Low-NOx Engine Standard	2017-2019	CA Implementation: 2023 Federal Implementation: 2024	-	5 (NOx – CA action), 7 (NOx – Federal action)
ORHD-03	Medium and Heavy-Duty GHG Phase 2	2016 – 2019	2018	nyq	nyq
ORHD-04	Advanced Clean Transit	2017	2018	<0.1 (NOx) <0.1 (ROG)	0.1 (NOx) <0.1 (ROG)
ORHD-05	Last Mile Delivery	2018	2020	<0.1 (NOx) <0.1 (ROG)	0.4 (NOx) <0.1 (ROG)
ORHD-06	Innovative Technology Certification Flexibility	2016	2016	nyq	nyq
ORHD-07	Zero Emission Airport Shuttle Buses	2018	2023	nyq	nyq
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles	on-going	2016	3 (NOx) 0.4 (ROG)	3 (NOx) 0.4 (ROG)
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles	ongoing	2016	34 (NOx) 4 (ROG)	11 (NOx) 1 (ROG)

TABLE 2.8-6 (CONCLUDED)

Expected Emission Reductions (tons/day) in the Basin from State SIP Strategy Measures

CM Number	Title	Action	Implementation Begins	2023 Reduction (tons/day)	2031 Reduction (tons/day)
Marine, Rail, and Aircraft Off-Road					
ORFIS-01	More Stringent National Locomotive Emission Standards	2016	2023	0.7 <0.1 (ROG)	8 (NOx) 0.3 ROG
ORFIS-02	Tier 4 Vessel Standards	2015-2018	2025	-	4 (NOx)
ORFIS-03	Incentivize Low Emission Efficient Ship Visits	2017-2018	2018	nyq	nyq
ORFIS-04	At-Berth Regulation Amendments	2017-2018	2022	0.3 (NOx) <0.1 (ROG)	1 (NOx) <0.1 (ROG)
ORFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources	ongoing	2016	~~13~~9 (NOx) nyq (ROG)	~~10~~13 (NOx) nyq (ROG)
Other Off-Road					
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	2020	2023	-	1 (NOx) 0.1 (ROG)
OFFS-02	Zero Emission Off-Road Emission Reduction Assessment	2025	-	nyq	nyq
OFFS-03	Zero Emission Off-Road Worksite Emission Reduction Assessment	tbd	-	nyq	nyq
OFFS-04	Zero Emission Airport Ground Support Equipment	2018	2023	<0.1 (NOx) <0.1 (ROG)	<0.1 (NOx) <0.1 (ROG)
OFFS-05	Small Off-Road Engines	2018	2022	0.7 (NOx) 7 (ROG)	2 (NOx) 16 (ROG)
OFFS-06	Transport Refrigeration Units Used for Cold Storage	2017-2018	2020	nyq	nyq
OFFS-07	Low-Emission Diesel Requirement	By 2020	2023	~~0.6~~0.3 (NOx)	~~2~~1 (NOx)
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment	Ongoing	2016	21 (NOx) 21 (ROG)	~~17~~18 (NOx) 20 (ROG)
Consumer Products					
CPP-01	Consumer Products Program	2019-2021	2020	-	5 (ROG)

nyq means not yet quantified.

The following text provides a brief description of the proposed control measures presented in Table 2.8-6.

2.8.5.1 On-Road Light-Duty Vehicles

ORLD-01 - ADVANCED CLEAN CARS 2: This proposed measure is designed to ensure that zero and near-zero emission technology options continue to be commercially available, with range improvements to address consumer preferences for greater ease of use, and maximize electric vehicle miles travelled. The regulation may include lowering fleet emissions further beyond the super-ultra-low-emission vehicle standard for the entire light-duty fleet through at least the 2030 model year, and look at ways to improve real world emissions through implementation programs. Additionally, new standards would be considered to further increase the sales of ZEVs and plug-in hybrid electric vehicles beyond the levels required in 2025.

ORLD-02 - LOWER IN-USE EMISSION PERFORMANCE ASSESSMENT: This proposed measure is designed to ensure that vehicles continue to operate at their cleanest possible level by evaluating California's in-use performance-focused inspection procedures and, if necessary, make improvements to further the program's effectiveness. Results from the assessment could be used to improve inspection test procedures, address program fraud, improve the effectiveness and durability of emission-related repair work, and to improve the regulations governing the design of in-use performance systems on motor vehicles to the extent necessary.

ORLD-03 - FURTHER DEPLOYMENT OF CLEANER TECHNOLOGY: ON-ROAD LIGHT-DUTY VEHICLES: This proposed measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with increased transportation efficiencies, as well as the potential for autonomous vehicles and advanced transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

2.8.5.2 On-Road Heavy-Duty Vehicles

ORHD-01 - LOWER IN-USE EMISSION PERFORMANCE LEVEL FOR HEAVY-DUTY VEHICLES: This proposed measure is designed to ensure that heavy-duty vehicles continue to operate at the cleanest possible level. CARB would develop new, supplemental actions, in the form of regulatory amendments or new regulations, to address in-use compliance and to decrease engine deterioration. This suite of actions includes: revising the warranty requirements to better reflect the operation of these vehicles; revising the current opacity limit in CARB's existing roadside and fleet inspection programs to better reflect the capability of current technology; revising the not to exceed supplemental test procedures for heavy-duty diesel engines; revising the durability demonstration provisions within the certification requirements; and developing a comprehensive inspection and maintenance program for heavy-duty trucks to test for excessive emissions of multiple pollutants.

ORHD-02 - LOW-NOx ENGINE STANDARD: This proposed measure is designed to require near-zero emission engine technologies that will substantially lower NOx emissions from on-road heavy-duty vehicles. CARB will begin development of a new heavy-duty low-NOx emission standard in California in 2017, with Governing Board action expected in 2019. A California-only low-NOx standard would apply to all vehicles with new heavy-duty engines sold in California starting in 2023. In order to achieve the maximum emission reductions from this proposed measure, CARB may also petition U.S. EPA to establish a new federal heavy-duty engine emission standard. If U.S. EPA fails to initiate the rule development process by 2017, CARB would continue with its development and implementation efforts to establish a California-only low-NOx standard. If U.S. EPA begins the regulatory development process for new federal heavy-duty emission standards by 2017, CARB will coordinate its regulatory development efforts with the federal regulation.

ORHD-03 - MEDIUM AND HEAVY-DUTY GHG PHASE 2: This proposed measure is designed to advance fuel efficiency improvements and achieve greater GHG emission reductions through the introduction of the next generation of integrated engine, powertrain, vehicle and trailer technologies designed to reduce climate emissions and fuel use. U.S. EPA has recently finalized new federal Phase 2 standards for GHG emissions from medium- and heavy-duty vehicles. These new standards will build upon the Phase 1 standards and will push technology improvements beyond what is currently in widespread commercial use. CARB staff plans to present a California Phase 2 proposal for the Governing Board's consideration in 2017. In addition to harmonizing with the federal Phase 2 standards where applicable, staff's proposal may include some more stringent, California-only provisions that are necessary to meet California's unique air quality challenges.

ORHD-04 - ADVANCED CLEAN TRANSIT: This measure is designed to continue the transition of transit fleets to cleaner technologies to support NOx and GHG emission reduction goals. The measure will consider a variety of approaches to enhance the deployment of advanced clean technology and increase the penetration of the first wave of zero-emission heavy-duty technology into transit applications that are well suited to its use. CARB staff will develop and propose an Advanced Clean Transit measure with a combination of incentives, and/or other methods that would result in transit fleets purchasing advanced technology buses during normal replacement and using renewable fuels when contracts are renewed.

ORHD-05 - LAST MILE DELIVERY: This measure is designed to increase the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. This proposed measure will require the use of low-NOx engines and the purchase of zero-emission trucks for certain class 3-7 last mile delivery trucks in California starting in 2020, with a low fraction initially and gradually ramping up to a higher percentage of the fleet at time of normal replacement through 2030.

ORHD-06 - INNOVATIVE TECHNOLOGY CERTIFICATION FLEXIBILITY: This proposed measure is designed to encourage early deployment of the next generation of truck and bus technologies through defined, near-term CARB certification and on-board diagnostic compliance flexibility for medium- and heavy-duty vehicles. This regulation is intended to balance the need to provide key, promising technologies with a predictable and practical CARB-certification pathway, while ensuring the expected emission benefits of advanced truck

and bus technologies are achieved in-use. This regulation would provide flexibility for potentially transformational engine and vehicle technologies, such as robust hybrids and heavy-duty engines meeting the optional low-NOx standard.

ORHD-07 - ZERO-EMISSION AIRPORT SHUTTLE BUSES: This proposed measure is designed to achieve NOx and GHG emission reductions goals through advanced clean technology, and to increase the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. Like transit buses, the inclusion of zero-emission airport shuttles would serve as a stepping stone to encourage broader deployment of zero-emission technologies in the on-road sector. CARB would develop and propose a regulation or other measures to deploy zero-emission airport shuttles in order to further support market development of zero-emission technologies in the heavy-duty sector.

ORHD-08 - INCENTIVE FUNDING TO ACHIEVE FURTHER EMISSION REDUCTIONS FROM ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure would use existing CARB and SCAQMD incentive and other innovative funding programs for on-road, heavy-duty vehicles to increase the penetration of zero and near-zero vehicles. Funding mechanisms would target technologies that meet CARB's current optional low-NOx standard through 2023, consistent with the current round of Moyer funding.

ORHD-09 - FURTHER DEPLOYMENT OF CLEANER TECHNOLOGY: ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, emission benefits associated with increased operational efficiency strategies, and the potential for new driver assist and intelligent transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

2.8.5.3 Locomotives

ORFIS-01 - MORE STRINGENT NATIONAL LOCOMOTIVE EMISSION STANDARDS: This proposed measure is designed to reduce emissions from new and remanufactured locomotives. CARB would petition U.S. EPA for both new Tier 5 national locomotive emission standards for new locomotives, and for more stringent national requirements for remanufactured locomotives. CARB staff estimates that the U.S. EPA could require manufacturers to implement the new locomotive emission regulations as early as 2023 for remanufactured locomotives, and 2025 for newly manufactured locomotives. A new federal standard could also facilitate development and deployment of zero-emission track mile locomotives and zero-emission locomotives by building incentives for those technologies into the regulatory structure.

2.8.5.4 Ocean Going Vessels

ORFIS-02 - TIER 4 VESSEL STANDARDS: This measure is designed to reduce emissions from ocean going vessels. CARB would advocate with U.S. EPA, the U.S. Coast Guard, and international partners for the International Maritime Organization to adopt more stringent emission standards. Specifically, CARB would advocate for new Tier 4 NOx and PM standards,

plus efficiency targets for existing vessels, and new vessel categories not covered by International Marine Organization efficiency standards.

ORFIS-03 - INCENTIVIZE LOW EMISSION EFFICIENT SHIP VISITS: This measure is designed to achieve early implementation of clean vessel technologies (e.g., liquefied natural gas, Tier 3 standards or better), and to incentivize vessels with those technologies in California service. CARB staff would work with California seaports, ocean carriers, and other stakeholders to develop the criteria and to identify the best way to incentivize introduction of Low Emission Efficient Ships into the existing fleet of vessels that visit California seaports.

ORFIS-04 - AT-BERTH REGULATION AMENDMENTS: This measure is designed to further reduce emissions from ships auxiliary engines at-berth. CARB would investigate expanding the current At-Berth Regulation to include smaller fleets and/or additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers).

ORFIS-05 - FURTHER DEPLOYMENT OF CLEANER TECHNOLOGIES: OFF-ROAD FEDERAL AND INTERNATIONAL SOURCES: This measure is designed to achieve further emission reductions for the Basin's attainment needs. This proposed measure outlines a series of actions that would be taken at the state and local level to achieve further reductions among the three categories off-road federal and international sources: ocean-going vessels, aircraft, and locomotives. These actions include: expanding and enhancing incentive programs to increase the deployment of cleaner technologies; incentivizing cleaner ships and aircraft to come to California; partnering with engine manufacturers to encourage production of cleaner, more efficient engines; continuing to support demonstration projects; and encouraging efficiency improvements. Achieving the magnitude of emission reductions necessary from this category will require strong action at the federal and international level, coupled with state and local advocacy and action to facilitate these efforts.

2.8.5.5 Off-Road Equipment

OFFS-01 - ZERO-EMISSION OFF-ROAD FORKLIFT REGULATION PHASE 1: This measure is designed to increase penetration of ZEVs in off-road applications, advance ZEV commercialization, and to set a market signal to technology manufacturers and investors. CARB staff would develop and propose a regulation with specific focus on forklifts with lift capacities equal to or less than 8,000 pounds for which zero-emission technologies have already gained appreciable customer acceptance and market penetration.

OFFS-02 - ZERO-EMISSION OFF-ROAD EMISSION REDUCTION ASSESSMENT: This measure is designed to transfer zero and near-zero emission technologies in non-freight, off-road applications to heavier equipment, such as high lift-capacity forklifts or other equipment in the construction, industrial, and mining sectors. Through this assessment, CARB would provide the Governing Board with an informational update regarding the status of ZEVs in off-road applications once the Phase 1 forklift regulation is in place in 2025 or later, which would focus primarily on the scalability and transferability of zero-emission technologies to larger, higher power-demand equipment types, and would be used to inform the development of the Phase 2 regulation.

OFFS-03 - ZERO-EMISSION OFF-ROAD WORKSITE EMISSION REDUCTION ASSESSMENT: This measure is designed to foster the development of a robust worksite efficiency program and to facilitate the deployment of technologies and/or strategies that increase worksite efficiency, such as connected vehicles, automation, and fleet management technologies in off-road sectors. Through this assessment, CARB would identify opportunities to further expand the use of the aforementioned strategies and/or zero and near-zero emission technologies, and would provide the Governing Board with an informational update regarding the status of the aforementioned technologies and/or strategies, with a focus on business return on investment, scalability and sustainability of the system. CARB would also encourage deployment via incentives or by providing credit in the off-road rule.

OFFS-04 - ZERO-EMISSION AIRPORT GROUND SUPPORT EQUIPMENT: This measure is designed to increase the penetration of the first wave of zero-emission heavy-duty technology in applications that are well suited to its use, and to facilitate further technology development and infrastructure expansion. CARB would develop and propose a regulation to accelerate the transition of diesel and large spark ignition airport ground support equipment to zero-emission technology.

OFFS-05 - SMALL OFF-ROAD ENGINES: This measure is designed to reduce emissions from SORE, and to increase the penetration of zero-emission technology. SORE that are subject to CARB regulations are used in residential and commercial lawn and garden equipment, and other utility applications. CARB will develop and propose tighter exhaust and evaporative emission standards, encourage increased use of zero-emission equipment, and enhance enforcement of current emission standards for SORE.

OFFS-06 - TRANSPORT REFRIGERATION UNITS USED FOR COLD STORAGE: This measure is designed to advance zero and near-zero emission technology commercialization by increasing the early penetration of hybrid electric and electric standby equipped transport refrigeration units used for cold storage, and supporting the needed infrastructure developments. CARB would develop a regulation to limit stationary operating times of internal, combustion engines in phases.

OFFS-07 - LOW-EMISSION DIESEL REQUIREMENT: This measure is designed to reduce emissions from the portion of the heavy-duty fleet that will continue to operate on internal combustion engines. The proposed measure would put into place standards for Low Emission Diesel and require that diesel fuel providers sell steadily increasing volumes of Low-Emission Diesel until it comprises 50 percent of total diesel sales by 2031. Due to the magnitude of needed NOx reductions in the Basin and the large volumes of Low-Emission Diesel needed for full statewide implementation, the proposed measure would be phased-in with an implementation strategy that starts in the Basin, and subsequently expands statewide.

OFFS-08 - FURTHER DEPLOYMENT OF CLEANER TECHNOLOGIES: OFF-ROAD EQUIPMENT: This measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle

technologies. These emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

2.8.5.6 Consumer Products Program

CPP-01 – CONSUMER PRODUCTS PROGRAM - The CARB SIP Strategy also includes measures to further reduce emissions of ROG from consumer products. CARB staff propose to evaluate the 2013-2015 data reported to the Consumer Products Program to identify strategies to achieve emission reductions from consumer products. The proposed measure may involve establishing new ROG limits for categories currently unregulated and/or lowering ROG limits for categories already regulated. Staff may investigate opportunities to establish alternative compliance options to provide flexibility to industry to comply with regulations, such as an emission cap to reduce ROG emissions from consumer products. This measure calls for an implementation schedule between 2020 and 2023.

2.8.6 SCAG'S REGIONAL TRANSPORTATION PLAN/SUSTAINABLE COMMUNITIES STRATEGY AND TRANSPORTATION CONTROL MEASURES

The SCAG, the Metropolitan Planning Organization for Southern California, is mandated to comply with federal and state transportation and air quality regulations. Further, SCAG has the responsibility of preparing and approving the portions of the AQMP related to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. The SCAQMD combines its portion of the AQMP with those portions prepared by SCAG.

The transportation strategy and TCMs to be included as part of the 2016 AQMP are based on SCAG's adopted 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which were developed in consultation with federal, state and local transportation and air quality planning agencies and other stakeholders.

The 2016 RTP/SCS TCMs portion of the 2016 AQMP consists of the following four related sections:

- Section I. As required by federal and state laws, SCAG is responsible for ensuring that the regional transportation plan, program, and projects are supportive of the goals and objectives of AQMPs/SIPs. SCAG is also required by state law to develop demographic projections and RTP/SCS control measures for the AQMPs/SIPs. SCAG prepares the RTP/SCS, which is updated every four years, and the Federal Transportation Improvement Plan biennially.
- Section II. RTP/SCS and TCMs. The 2016 RTP/SCS makes a concerted effort to integrate the region's transportation network with land uses in order to achieve a sustainable region over the coming decades. Accordingly, the Final 2016 RTP/SCS includes a host of regional strategies for addressing growth, land use and improving the region's transportation system.
  - Land Use Strategies
    - Focus New Growth around Transit/High Quality Transit Areas (HQTAs)
    - Plan for Growth around Livable Corridors

- Provide More Options for Short Trips/Neighborhood Mobility Areas
- Support Zero Emission Vehicles & Expand Electric Vehicle Charging Stations
- Support Local Sustainability Planning
- Protect Natural and Farm Lands
- Balance Growth Distribution between 500-Foot Buffer Areas and HQTAs

- Transportation Strategies
  - Preserve Our Existing System
  - Manage Congestion through Transportation Demand Management and Transportation System Management
  - Expand Regional Transit System
  - Expand Passenger Rail and Maintain High-Speed Rail Commitments
  - Promote Active Transportation
  - Improve Highway and Arterial Capacity
  - Strengthen Regional Transportation Network for Goods Movement
  - Improve Airport Ground Access

  Included within these transportation system improvements are TCM projects that reduce vehicle use or improve traffic flow or congestion conditions. TCMs include the following three main categories of transportation improvement projects and programs:

  - Transit, intermodal transfer, and active transportation measures;
  - High occupancy vehicle lanes, high occupancy toll lanes, and their pricing alternatives; and
  - Information-based transportation strategies.

Appendix B herein and Appendix IV-C of the AQMP presents a list of TCM projects specifically identified and committed to in the 2016 AQMP.

- Section III. Reasonably Available Control Measure Analysis. As required by the CAA, a RACM analysis must be included as part of the overall control strategy in the AQMP to ensure that all potential control measures are evaluated for implementation and that justification is provided for those measures that are not implemented. 2016 AQMP, Appendix IV-C contains the RACM TCM component for the Basin's ozone and $PM_{2.5}$ control strategy. In accordance with U.S. EPA procedures, this analysis considers TCMs in the Final 2016 RTP/SCS, measures identified by the CAA, and relevant measures adopted in other ozone and $PM_{2.5}$ nonattainment areas of the country. Based on this comprehensive review, it is determined that the TCMs being implemented in the Basin are inclusive of all TCM RACM.

- Section IV. TCM BACM Analysis for 2006 PM2.5 NAAQS. The Basin has been reclassified as a "serious" nonattainment area under the 2006 PM2.5 NAAQS effective February 12, 2016. As a result, the Basin is required to implement BACMs including TCMs

for the control of direct PM2.5 and PM2.5 precursors from on-road mobile sources. This section serves as the TCM BACM component for the 2006 PM2.5 SIP.

Following the applicable U.S. EPA guidance, the TCM BACM analysis consists of a review of on-going implementation of TCMs in the Basin, a review of TCM measures implemented in other "moderate" and "serious" PM2.5 nonattainment areas as well as "serious" PM10 nonattainment areas throughout the country, and a review of TCMs not implemented in the SCAG region. The analysis demonstrates that the TCM projects being implemented in the Basin constitute TCM BACM.

The emission benefits associated with the Final 2016 RTP/SCS are reflected in the 2016 AQMP projected baseline emissions. Tables 1-1 and 1-2 in the 2016 AQMP Appendix IV-C show that the amount of emission reductions from the RTP/SCS are significantly impacted by the change in vehicle fleet mix and vehicle emission factors. For example, assuming that the future EMFAC2014 vehicle fleet mix and emission factors remain the same as in 2012 (the 2016 RTP/SCS and 2016 AQMP base year), the 2016 RTP/SCS would yield a NOx emission reduction of 5.4 tons per day in 2021 and 9.8 tons per day in 2031 compared with the 2016 RTP/SCS baseline. However, if the future improvement in the fleet mix and emission factors as reflected in the EFMAC2014 are factored in, the estimated NOx emission reduction from the 2016 RTP/SCS would drop to 2.8 tons per day in 2023 and 4.5 tons per day in 2031.

2.8.7 SCAQMD PROPOSED CONTINGENCY MEASURES

Pursuant to federal CAA Section 172(c)(9), contingency measures are emission reduction measures that are to be automatically triggered and implemented if an area fails to attain the national ambient air quality standard by the applicable attainment date, or fails to make reasonable further progress toward attainment. Per U.S. EPA guidance (76 FR 57891), the contingency measure requirement may be satisfied with already adopted control measures, provided that the controls are above and beyond what is needed to demonstrate attainment with the NAAQS.

Chapter 4 of the 2106 AQMP discusses in detail how the contingency measure requirements are satisfied for the 24-hour PM2.5, the annual PM2.5 and the 8-hour ozone NAAQS.

2.8.8 COORDINATION WITH THE STATE'S GREENHOUSE GAS REDUCTION EFFORTS

The 2016 AQMP states that the path to achieving cleaner air and mitigating climate change requires the continued transformation of the energy sector. To encourage this transformation and maximize its co-benefits, SCAQMD will integrate a variety of implementation approaches in collaboration with other agencies with focus on the air quality benefits from GHG reduction measures such as renewable energy, smart grid technologies, and efficiency.

To this end, the 2016 AQMP incorporates several control measures to account for criteria pollutant co-benefits from federal, state and local mandates and programs to reduce GHG emissions, increase energy efficiency, along with renewable power sources. These control measures include ECC-01 and ECC-02 which account for co-benefits of GHG, efficiency, and renewable energy mandates

such as AB 32, SB 350 and Title 24. Furthermore, control measure ECC-03 will pursue incentive programs to accelerate the implementation of onsite renewable energy, solar thermal, efficiency measures, along with smart grid adaptations.

CHAPTER 3

EXISTING ENVIRONMENTAL SETTING

3.1 Introduction
3.2 Air Quality
3.3 Energy
3.4 Hazards and Hazardous Materials
3.5 Hydrology and Water Quality
3.6 Noise
3.7 Solid and Hazardous Waste
3.8 Transportation and Traffic
3.9 Aesthetics

3.0 EXISTING ENVIRONMENTAL SETTING

3.1 INTRODUCTION

CEQA Guidelines §15360 (Public Resources Code Section 21060.5) defines "environment" as "the physical conditions that exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance." According to CEQA Guidelines §15125 (a), a CEQA document must include a description of the physical environment in the vicinity of the project, as it exists at the time the Notice of Preparation (NOP) is published from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant. The description of the environmental setting shall be no longer than is necessary to provide an understanding of the significant effects of the proposed project and its alternatives. Since this CEQA document is a programmatic EIR that covers SCAQMD's entire jurisdiction, the existing setting for each category of impact is described on a regional level.

The following subchapters describe the existing environmental setting for those environmental areas identified in the Initial Study (see Appendix A) that could be adversely affected by the proposed project. These areas include the following topics: aesthetics; air quality; energy; hazards and hazardous materials; hydrology and water quality; land use and planning; noise; solid and hazardous waste; and, transportation and traffic.

3.2 AIR QUALITY

3.2.1 CRITERIA AIR POLLUTANTS

The purpose of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard. This chapter summarizes emissions that occurred in the Basin during the 2012 base year, and projected emissions in the years 2019, 2022, 2023, 2025, and 2031. More detailed emission data analyses are presented in Appendix III of the 2016 AQMP. The 2012 base year emissions inventory reflects adopted air regulations with current compliance dates as of 2012; whereas future baseline emissions inventories are based on adopted air regulations with both current and future compliance dates. A list of SCAQMD's and CARB's rules and regulations that are part of the base year and future year baseline emissions inventories is presented in Appendix III of the 2016 AQMP. SCAQMD is committed to implementing rules that are incorporated in the 2016 AQMP future baseline emissions inventories.

The emissions inventory is divided into four major classifications: point, area, on-road, and off-road sources. The 2012 base year point source emissions are based principally on reported data from facilities using SCAQMD's Annual Emissions Reporting Program. The area source emissions are estimated jointly by CARB and SCAQMD. The on-road emissions are calculated by applying CARB's EMFAC2014 emission factors to the transportation activity data provided by SCAG from their adopted 2016 RTP/SCS. CARB provides emissions inventories for off-road equipment which include construction, mining, gardening and agricultural equipment, ocean-going vessels, commercial harbor craft, locomotives and cargo handling equipment. Aircraft emissions are based on an updated analysis by SCAQMD in coordination with the local airport authorities. The future emission forecasts are primarily based on demographic and economic growth projections provided by SCAG. In addition, emission reductions resulting from SCAQMD regulations adopted by December 2015 and CARB regulations adopted by November 2015 are included in the future baseline projections.

It should be noted that 2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions in the 2016 AQMP. However, the latest verifiable air quality data (from approved monitoring stations) is from 2015, which can be found in Chapter 2 of the 2016 AQMP and Subchapter 3.2 of the ~~Draft~~Final Program EIR. The most recent environmental topic data is from 2016 and was used for the CEQA baseline in determining environmental impacts because that was the time of the release of the NOP/IS, in accordance with CEQA requirements.

This chapter summarizes the major components of developing the base year and future baseline inventories. More detailed information, such as CARB's and SCAQMD's emission reductions resulting from adopted rules and regulations since the 2012 AQMP, growth factors, and demographic trends, are presented in Appendix III of the 2016 AQMP. In addition, the top ten source categories contributing to the emission inventories are identified in this chapter.

Understanding information about the highest emitting source categories leads to the identification of potentially more effective and/or cost effective control strategies for improving air quality.

3.2.1.1 Assumptions used to Develop Current Emission Inventories

Two inventories are prepared for the 2016 AQMP for the purpose of regulatory and SIP performance tracking and transportation conformity: an annual average inventory and a summer planning inventory. Baseline emissions data presented in this chapter are based on average annual day emissions (e.g., total annual emissions divided by 365 days) and seasonally adjusted summer planning inventory emissions. The 2016 AQMP uses annual average day emissions to estimate the cost-effectiveness of control measures, to rank control measure implementation, and to perform ozone and PM2.5 modeling and analysis. The summer planning inventory emissions are developed to capture the emission levels during a poor ozone air quality season, and are used to report emission reduction progress as required by the federal and California CAAs.

Detailed information regarding the emissions inventory development for the base year and future years, the emissions by major source category of the base year, and future baseline emission inventories are presented in Appendix III of the 2016 AQMP. Attachments A and B to Appendix III list the annual average and summer planning emissions, respectively by major source category for base year 2012, and attainment demonstration years of 2019, 2022, 2023, 2025 and 2031. Attachment C to Appendix III of the 2016 AQMP has the top VOC and NOx point sources which emitted greater than or equal to ten tons per year in 2012. Attachment D to Appendix III of the 2016 AQMP contains the on-road emissions by vehicle class and by pollutant. Attachment E to Appendix III of the 2016 AQMP shows emissions associated with the combustion of diesel fuel for various source categories.

3.2.1.1.1 Stationary Sources

Stationary sources can be divided into two major subcategories: point and area sources. Point sources are large emitters with one or more emission sources at a permitted facility with an identified location (e.g., power plants, refineries). These facilities have annual emissions of four tons or more of either VOC, NOx, SOx, PM, or annual emissions of over 100 tons of CO or toxic air contaminants (TACs). Facility owners/operators are required to report their criteria pollutant emissions and selected TACs to SCAQMD on an annual basis, if any of these thresholds are exceeded.

Area sources consist of many small emission sources (e.g., residential water heaters, architectural coatings, consumer products, as well as, permitted sources smaller than the above thresholds), which are distributed across the region. There are about 400 area source categories for which emissions are jointly developed by CARB and SCAQMD. The emissions from these sources are estimated using activity information and emission factors. Activity data are usually obtained from survey data or scientific reports (e.g., Energy Information Administration (EIA) reports for fuel consumption other than natural gas fuel, Southern California Gas Company for natural gas consumption, paint suppliers, and SCAQMD databases). The emission factors are based on rule compliance factors, source tests, manufacturers' product or technical specifications data, default factors (mostly from AP-42, U.S. EPA's published emission factor compilation), or weighted

emission factors derived from the point sources in annual emissions reports. Socioeconomic data may also be used to estimate emissions over specific areas.

Appendix III of the 2016 AQMP has more detail regarding emissions from specific source categories such as architectural coatings, dairy cattle, oil and gas production operations, gasoline dispensing facilities, and green waste composting. Since the 2012 AQMP was finalized, new area source categories, such as liquefied petroleum gas (LPG) transmission losses, storage tank and pipeline cleaning and degassing, and architectural colorants were characterized and included in the emission inventories. These updates and new additions are listed below:

- Architectural Coatings Category: Over 60 area sources in this category were updated based on information provided as part of SCAQMD Rule 314 – Fees for Architectural Coatings annual reports.
- Oil and Gas Production Category: The emission estimation methodology for this area source category was revised to incorporate U.S. EPA's oil and gas production inventory model modified with California-specific emission factors and technologies.
- Gasoline Dispensing Facilities Category: The emission estimation methodology for this area source category was revised to include CARB staff's updated emission factors and activity data.
- Dairy Cattle: Ammonia and VOC emissions from dairy farms were revised based on the animal head count data reported to the Santa Ana Regional Water Quality Control Board.
- LPG Combustion Categories: The emissions from this category were revised based on the LPG consumption estimation for the Basin. The fraction of California LPG use in the Basin was estimated based on GHG data reported to CARB. The statewide total LPG consumption was retrieved from state Energy Data in 2013.
- Commercial and Industrial Natural Gas Combustion Categories: 2012 actual natural gas consumption data were used, instead of the projection from the 2012 AQMP.
- Composting Waste Disposal: Ammonia and VOC emissions expected from mulch making processes and natural decay were added in this category.
- Regional Clean Air Incentives Market (RECLAIM) NOx emissions: The future baseline was revised to include the 12 tons per day of RECLAIM Trading Credits (RTCs) reduction by December 2022 that was approved by the SCAQMD Governing Board in December 2015.

3.2.1.1.2 Mobile Sources

Mobile sources consist of two subcategories: on-road and off-road sources. On-road sources are from vehicles that are licensed to drive on public roads. Off-road sources are typically registered with the state and cannot be typically driven on public roads. On-road vehicle emissions are calculated by applying CARB's EMFAC2014 emissions factors to the transportation activity data provided by SCAG in their adopted 2016 RTP/SCS. Spatial distribution data from Caltrans's Direct Travel Impact Model (DTIM4) are used to generate gridded emissions for regional air quality modeling. Off-road emissions are calculated using CARB's category specific inventory models.

3.2.1.1.3 On-Road

CARB's EMFAC2014 model has undergone extensive revisions from the previous version (EMFAC2011) to make it more user-friendly, flexible, and to allow incorporation of larger amounts of data demanded by the current regulatory and planning processes. In addition to the model structural changes, other changes include:

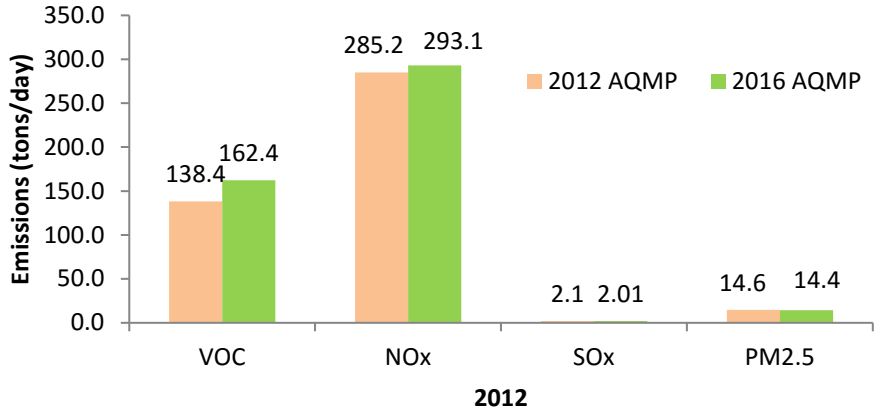
- Revision of heavy-duty diesel (HD Diesel) truck emission rates: The emission factors for heavy heavy-duty diesel trucks were also updated using new test data on newer trucks (Model Year 2007 and newer) that more accurately represent the effectiveness of the control equipment used to meet the more stringent 2007 and 2010 emission standards.
- Incorporation of natural gas vehicles for select vehicle classes: Emission factors for natural gas powered solid waste collection vehicles and urban buses are now included in EMFAC2014 as these classes of vehicles have sufficient penetration of natural gas engines to warrant separate treatment.
- Accounting for federal and California regulations and standards adopted post-2010: The adopted regulations and standards include the state's Advanced Clean Car Program (LEV3), the April 2014 amendment to the Truck and Bus Regulation, the Tractor-Trailer Greenhouse Gas Regulation and the federal Heavy-Duty Greenhouse Gas Regulation.
- Socio-econometric modeling of population and VMT: EMFAC2014 incorporates the use of socioeconomic regression model forecasting methods to predict new vehicle sales and VMT growth trends. This allows the use of state and national economic indicators, fuel prices, and regional human population and vehicle ownership characteristics as parameters to more accurately predict vehicle sales and VMT trends.

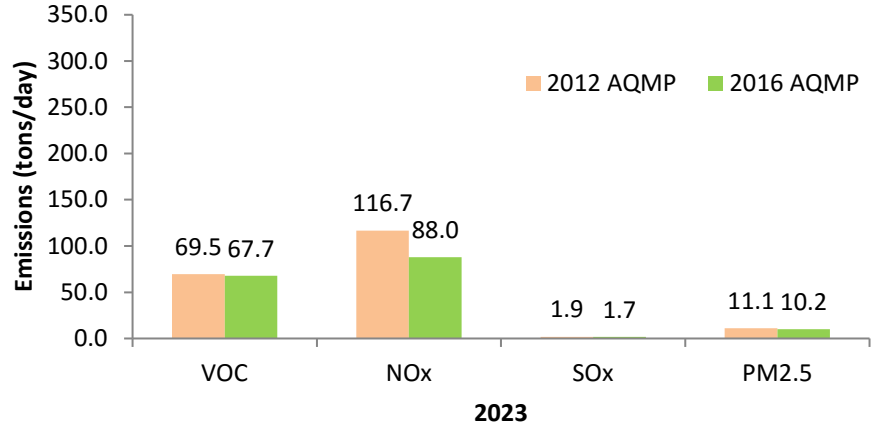
More detailed information on the changes incorporated in EMFAC2014 can be found at http://www.arb.ca.gov/msei/categories.htm.

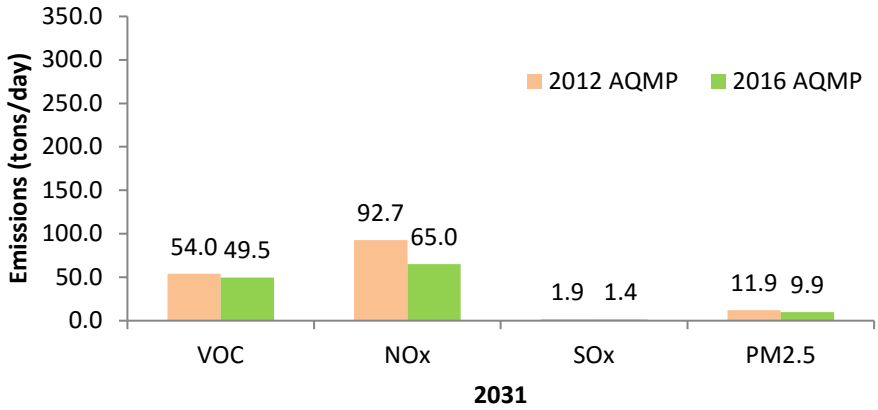
Figure 3.2-1 compares the on-road emissions estimated using EMFAC2011 in the 2012 AQMP and EMFAC2014 used in the 2016 AQMP, respectively for base year 2012, and attainment demonstration years of 2023, and 2031. It should be noted that the comparison for 2012 reflects changes in methodologies, whereas the comparison for 2023 and 2031 also includes adopted rules and updated growth projections since the release of EMFAC2011, which was the basis of the 2012 AQMP on-road emissions.

FIGURE 3.2-1 (REVISED)

Comparison of On-Road Emissions Estimated using EMFAC2011 in the 2012 AQMP and EMFAC2014 in the 2016 AQMP
VOC and NOx emissions represent Summer Planning and SOx & PM2.5 are Annual Average Inventory.







For 2012, EMFAC2014's newer methodologies show higher emissions of NOx and VOCs. For the future years 2023 and 2031, in general, the emissions are lower in EMFAC2014 as compared to EMFAC2011. The lower emissions can be attributed to additional rules and regulations, more stringent standards, and updates to the heavy-duty emission factors.

Also evident in Figure 3.2-1 is the change in the rate of emission reductions. The rate of change in the emissions in the early years (2012 to 2023) is significantly larger than that shown further in the later years (2023 to 2031). This is due to the implementation of the rules and regulations, most of which will be fully implemented by 2023 (e.g., CARB's Truck and Bus rule requires all trucks to meet the 2010 standards by 2023). The effect of the rules and regulations are significant, showing reductions of over 67 percent in NOx emissions and close to 60 percent in VOC emissions between 2012 and 2023, even with increases in fleet population. More modest reductions are predicted from continued fleet turnover, but fleet growth is beginning to outpace the emissions benefits of fleet turnover in the later years. Further emission reductions will require fleets to adopt the use of even cleaner equipment than the current standards require.

3.2.1.1.4 Off-Road

Emissions from off-road vehicle categories are primarily based on estimated activity levels and emission factors. Separate emission estimation models have been developed for the many categories of off-road equipment. More information on these models can be found at the following link: http://www.arb.ca.gov/msei/categories.htm. Several of these models have been updated since the release of the 2012 AQMP. The major updates include:

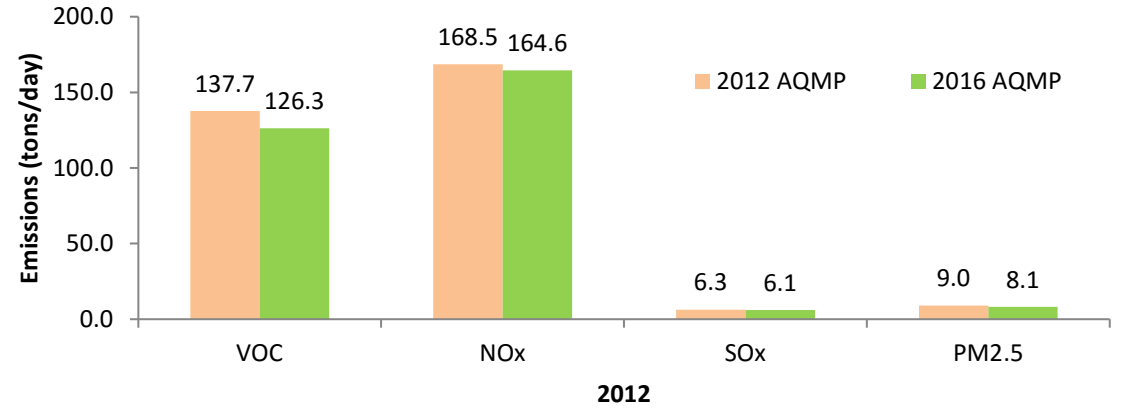
- Locomotives: The emissions model methodology for the freight locomotive category was completely revised. In addition, activity was updated using data from the Surface Transportation Board and Federal Highway Administration's Freight Analysis Framework. Population information was derived from the Association of American Railroads' population data.
- Ocean Going Vessels: New lower growth projections were developed and incorporated into the model using more recent information from the Federal Highway Administration's Freight Analysis Framework model and other forecasts performed for the San Pedro Bay Ports. NOx control factor calculations were updated to more appropriately represent the engine Tier levels.
- Commercial Harbor Craft: The vessel turnover rate methodology was improved to better reflect the observed age distribution. A more representative reduced turnover rate is used, which improves consistency with other off-road emissions model methodologies.
- Pleasure Craft and Off-Highway Recreational Vehicles: New survey information and DMV data were used to update the population and activity, and new emissions testing data were used to update the emission factors in newly developed models for these two categories.
- Cargo Handling Equipment: The model was updated to use growth factors consistent with those developed for ocean going vessels.

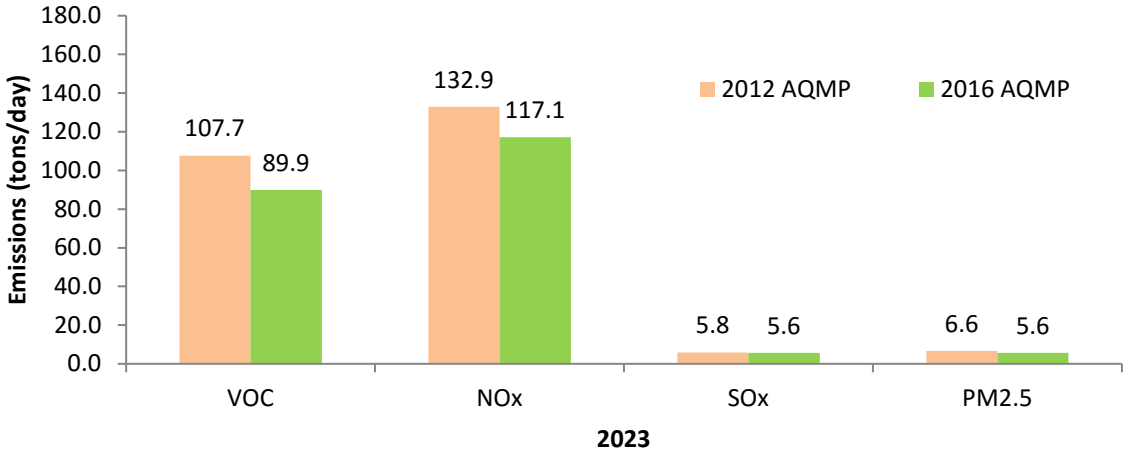
- Farm Equipment: The inventory was completely revised resulting in a new inventory based on updated equipment population, equipment age distribution, activity, load factors, and turnover practices.
- Aircraft: The aircraft emissions inventory is updated for the 2012 base year and the 2023 and 2031 forecast years based on the latest available activity data and calculation methodologies. A total of 43 airports were identified as having aircraft operations within the SCAQMD boundaries including commercial air carrier, air taxi, general aviation, and military aircraft operations. The sources of activity data included airport operators (for several commercial and military airports), Federal Aviation Administration's (FAA) databases (i.e., Bureau of Transportation Statistics, Air Traffic Activity Data System, and Terminal Area Forecast), and SCAG's projections. For commercial air carrier operations, SCAG's 2023 and 2031 forecasts, which are consistent with the forecast adopted for the 2016 RTP, were used reflecting the future aircraft fleet mix. The emissions calculation methodology was primarily based on the application of the FAA's Emissions and Dispersion Modeling System (EDMS) model for airports with detailed activity data for commercial air carrier operations (by aircraft make and model). For other airports and aircraft types (i.e., general aviation, air taxi, and military), the total number of landing and takeoff activity data was used in conjunction with the U.S. EPA's average emission factors by major aircraft type (e.g., general aviation, air taxi, and military). For the intermediate milestone years, the emissions inventories were linearly interpolated between 2012, 2023 and 2031.

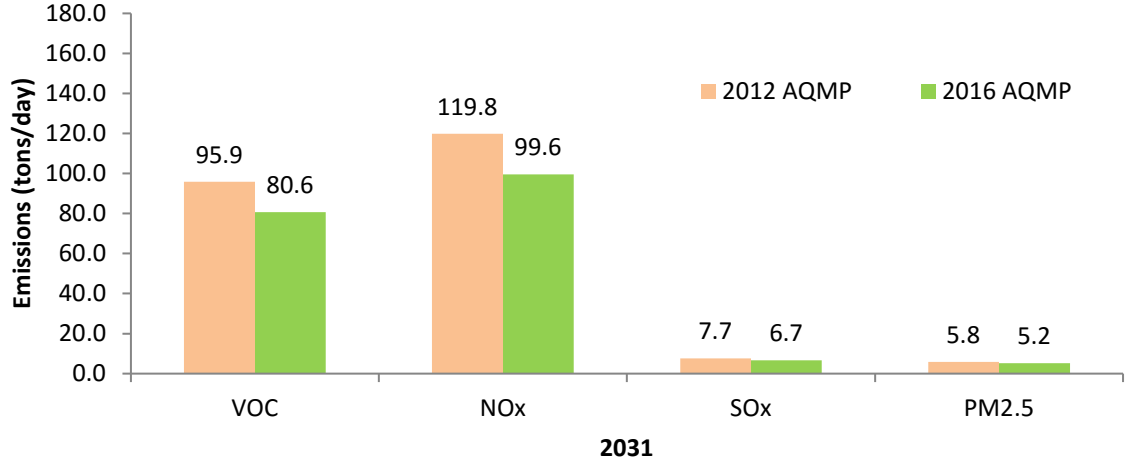
Figure 3.2-2 shows a comparison between the off-road baseline emissions in the 2012 AQMP and the 2016 AQMP for the base year 2012, and attainment demonstration years of 2023, and 2031. Overall, the updates to the off-road categories result in lower emissions than those used in the 2012 AQMP. It should be noted that the comparison for 2012 reflects changes in methodology, but the comparison for the rest of the years also includes adopted rules and updated growth projections since the release of off-road inventory in the 2012 AQMP. Similar to what is shown for the on-road category, the rate of reductions in emissions of NOx and VOC is significantly larger in early years (2012 to 2023) compared to the rate seen in the later years (2023 to 2031). This is the result of the rules and regulations adopted at the state and federal levels for most of the off-road categories. As most will be fully implemented by 2023, only modest reductions will be achieved as a result of continued fleet turnover beyond 2023. Without additional rules or programs for further reductions, growth in emissions from increases in vehicle population outweighs the emissions benefits associated with fleet turnover to newer equipment. As projected for the on-road fleet, further emission reductions will require off-road fleets to use even cleaner equipment than current standards require.

FIGURE 3.2-2 (REVISED)

Comparison of Off-Road Emissions between 2012 AQMP and 2016 AQMP.
VOC & NOx – Summer Planning; SOx & PM2.5 – Annual Average Inventory







3.2.1.1.5 Uncertainty in the Inventory

An effective AQMP relies on complete and accurate emissions inventories. Over the years, significant improvements have been made in emission estimates for sources affected by control measures. Increased use of continuous monitoring and source tests has contributed to the improvement in point source inventories. Technical assistance to facilities and auditing of reported emissions by SCAQMD staff have also improved the accuracy of emissions inventories. Area source inventories that rely on average emission factors and regional activities have inherent uncertainty. Industry-specific surveys and source-specific studies during rule development have provided much needed refinement to the emissions estimates.

Mobile source inventories remain the greatest challenge due to new information continuously collected from the large number and types of equipment and engines. Every AQMP revision provides an opportunity to further improve the current knowledge of mobile source inventories. The 2016 AQMP is not an exception. As described earlier, many improvements were included in EMFAC2014, and such work is ongoing. However, it should be acknowledged that there are still areas that could be significantly improved if better data were available. Technological changes and advancement in the area of electric, hybrid, flexible fuel, and fuel cell vehicles coupled with changes in future gasoline prices all add uncertainty to the on-road emissions inventory. Overall, the 2016 AQMP inventory is based on the most current data and methodologies, resulting in the most accurate inventory available.

Relative to future growth, there are many challenges inherent in making accurate projections, such as where vehicle trips will occur, the distribution between various modes of transportation (such as trucks and trains), as well as estimates for population growth and the number and type of jobs. Forecasts are made with the best information available; nevertheless, there is uncertainty in emissions projections. AQMP updates are generally developed every three to four years, thereby allowing for frequent updates and improvements to the inventories.

3.2.1.1.6 Gridded Emissions

The air quality modeling region for the 2016 AQMP extends to Southern Kern County in the north, the Arizona border in the east, northern Mexico in the south and more than 100 miles offshore to the west. The modeling area is divided into a grid system comprised of four kilometer square grid cells defined by Lambert Conformal coordinates. Both stationary and mobile source emissions are allocated to individual grid cells within the modeled area. In general, daily modeling emissions are used. Variations in temperature, hours of operation, speed of motor vehicles, and/or other factors are considered in developing gridded motor vehicle emissions. The gridded emissions data used for both PM2.5 and ozone modeling applications differ from the average annual day or planning inventory emission data in two respects: (1) the air quality modeling region covers larger geographic areas than the Basin; and (2) emissions used in air quality modeling represent day-specific instead of average or seasonal conditions. For PM2.5, the annual average day is used in the air quality modeling, which represents the characteristic of emissions that contribute to year-round particulate impacts. The summer planning inventory, which is used for ozone modeling analyses, focuses on the warmer months (May through October) when evaporative VOC emissions play an important role in ozone formation.

3.2.1.2 Base Year Emissions - 2012 Emissions Inventory

Table 3.2-1A compares the summer planning emissions between the 2012 base year in the 2016 AQMP and the projected 2012 emissions in the 2012 AQMP by major source category for VOC and NOx. Table 3.2-1B compares the annual average emissions between the 2012 base year in the 2016 AQMP and the projected 2012 emissions in the 2012 AQMP for SOx and PM2.5. It should be noted that the comparison for 2012 reflects updates in methodology, differences between growth projections and actual data, and adopted rules since the release of the 2012 AQMP. Specifically, the growth projection employed in the 2012 AQMP did not fully capture the impact of the economic recession which occurred between 2008 and 2010.

TABLE 3.2-1A

Comparison of VOC and NOx Emissions By Major Source Category of 2012 Base Year in Draft 2016 AQMP and Projected 2012 in Final 2012 AQMP Summer Planning Inventory (tons/day[1])

SOURCE CATEGORY	2012 AQMP	Draft 2016 AQMP	% Change	2012 AQMP	Draft 2016 AQMP	% Change
	VOC			NOx		
STATIONARY SOURCES						
Fuel Combustion	12.9	11.~~3~~4	-12%	29.4	29.2	~~-1~~5%
Waste Disposal	12.1	14.~~2~~1	17%	1.5	2.3	50%
Cleaning and Surface Coatings	41.7	35.6	-15%	0	0	0%
Petroleum Production and Marketing	40.2	29.~~9~~2	~~-26~~27%	0	0	0%
Industrial Processes	13.8	10.8	-21%	0	0	0%
Solvent Evaporation:						
Consumer Products	86.6	86.5	0%	0	0	0%
Architectural Coatings	21.5	13.3	-38%	0	0	0%
Others	2.0	2.4	17%	0	0	0%
Misc. Processes	9.7	~~6.7~~7.8	~~-31~~20%	15.5	14.~~6~~5	-6%
RECLAIM SOURCES	0	0	0%	27.2	19.6	-28%
Total Stationary Sources	**240**	**211**	**-12%**	**74**	**~~66~~65**	**-13~~1~~%**
MOBILE SOURCES						
On-Road Vehicles	138.4	~~164.9~~162.4	~~19~~17%	285.2	~~297.2~~293.1	4~~3~~%
Off-Road Vehicles	137.7	126.~~1~~3	-8%	168.5	~~165.7~~164.6	-2%
Total Mobile Sources	**276**	**~~291~~289**	**5%**	**454**	**~~463~~458**	**~~2~~1%**
TOTAL	**516**	**~~502~~500**	**-3%**	**528**	**~~529~~522**	**~~0~~-1%**

[1] Values may not sum due to rounding errors

TABLE 3.2-1B

Comparison of SOx and PM2.5 Emissions By Major Source Category of 2012 Base Year in 2016 AQMP and Projected 2012 in 2012 AQMP Annual Average (tons/day[1])

SOURCE CATEGORY	2012 AQMP	Draft 2016 AQMP	% Change	2012 AQMP	Draft 2016 AQMP	% Change
	SOx			PM2.5		
STATIONARY SOURCES						
Fuel Combustion	1.9	1.9	~~0~~-1%	5.6	5.~~7~~6	1%
Waste Disposal	0.4	0.5	20%	0.2	0.2	~~0~~-13%
Cleaning and Surface Coatings	0	0	0%	1.5	1.4	-5%
Petroleum Production and Marketing	0.6	0.4	-26%	1.6	1.5	-6%
Industrial Processes	0.02	0.1	400%	6.7	6.4	-6%
Solvent Evaporation:						
Consumer Products	0	0	0%	0	0	0%
Architectural Coatings	0	0	0%	0	0	0%
Others	0	0	0%	0	0	0%
Misc. Processes	1.0	0.5	-47%	32.5	~~29.1~~28.8	-11%
RECLAIM SOURCES	11.8	6.9	-42%	0	0	0%
Total Stationary Sources	**16**	**10**	**-34%**	**48**	**44**	**~~-8~~9%**
MOBILE SOURCES						
On-Road Vehicles	2.1	2.~~1~~0	~~0~~-2%	14.6	14.~~6~~4	~~0~~-1%
Off-Road Vehicles	6.3	6.1	~~-3~~2%	9.0	~~7.9~~8.1	~~-12~~10%
Total Mobile Sources	**8**	**8**	**-2%**	**24**	**23**	**-5%**
TOTAL	**24**	**18**	**-23%**	**72**	**~~67~~66**	**-7%**

[1] Values may not sum due to rounding errors

Overall, there is a minor net decrease in VOC emissions in the 2016 AQMP inventory as compared to the 2012 AQMP projections. Estimates of stationary source VOC emissions have decreased by approximately 12 percent, but mobile VOC source emissions have increased by five percent. Overall NOx emissions remain unchanged between the 2016 AQMP inventory and the 2012 AQMP projection. As in the VOC category, stationary source NOx emissions have been revised downward and mobile source emissions have been revised slightly upward. Of note in the stationary source categories are the emission changes associated with the architectural coatings, RECLAIM categories, natural gas and LPG combustion sources, and farming operations. Architectural coatings emissions were updated for the 2016 AQMP using information provided as part of SCAQMD Rule 314 – Fees for Architectural Coatings annual reports, resulting in the lower emission estimate. The RECLAIM emissions cap was used to project the NOx emissions in the 2012 AQMP inventory, while in 2012, the actual emissions were lower than the cap by seven tons per day (tpd). Use of additional actual reported information in lieu of projected emissions (used in the 2012 AQMP to estimate the 2012 emissions) explain the majority of the remaining emission differences. Refer to Appendix III for details.

For the mobile source category, the updates described earlier to the on-road emissions model EMFAC2014 resulted in the 19 percent and four percent increase in VOC and NOx emissions, respectively. Updates to several of the off-road category emission estimates resulted in the eight percent decrease in VOC emissions and a modest two percent decrease in NOx emissions. Updates were completed for locomotives, ocean going vessels, cargo handling equipment, commercial harbor craft, farming equipment, pleasure craft, and off-highway recreational vehicles.

Estimates of SOx emissions are 23 percent lower in the 2016 AQMP emissions inventory than 2012 AQMP projections. This is largely due to the difference in the use of actual reported information in lieu of projected emissions in the RECLAIM sources. Estimates of direct PM2.5 from stationary and mobile sources are modestly lower in the 2016 AQMP leading to a decrease of seven percent. This revised estimation is largely due to changes in the emissions estimates from miscellaneous stationary processes and decreases in off-road vehicle emissions.

Table 3.2-2 shows the 2012 annual average and summer planning emissions inventory by major source category. Stationary sources are subdivided into point (e.g., chemical manufacturing, petroleum production, and electric utilities) and area sources (e.g., architectural coatings, residential water heaters, consumer products, and permitted sources smaller than the emission reporting threshold – generally 4 tons per year (tpy)). Mobile sources consist of on-road (e.g., passenger cars and heavy-duty trucks) and off-road sources (e.g., trains and ships). Entrained road dust is also included.

Figure 3.2-3 characterizes relative contributions by stationary and mobile source categories to the baseline inventory. On- and off-road sources continue to be major contributors for each of the five pollutants. Overall, total mobile source emissions account for almost 60 percent of the VOC and 90 percent of the NOx emissions for these two ozone-forming pollutants and 95 percent of the CO emissions. The on-road mobile category alone contributes over 30 percent of the VOC and almost 56 percent of the NOx emissions. For directly emitted PM2.5, mobile sources represent approximately 35 percent of the emissions with another 12 percent due to vehicle-related entrained road dust. Stationary sources emit the majority of the SOx emissions with the point source

category contributing 50 percent of the SOx emissions in the Basin. Area sources play a major role in VOC emissions, emitting about 3.5 times more than point sources. Area sources, including sources such as commercial cooking, are the predominant source of directly emitted PM2.5 emissions (42 percent).

Figure 3.2-4 shows the fraction of the 2012 inventory by responsible agency for VOC, NOx, SOx, and directly emitted PM2.5. U.S. EPA and CARB have primary authority to regulate emissions from mobile sources. U.S. EPA's authority applies to aircraft, locomotives, ocean going vessels, and some categories of on-road and off-road mobile equipment. CARB has authority over the remainder of the mobile sources, and consumer products. SCAQMD has authority over most area sources and all point sources. As can be seen in Figure 3.2-4, most of the NOx and VOC emissions in the SCAQMD are from sources that fall under the primary jurisdiction of U.S. EPA and CARB. For example, almost 90 percent of the NOx and over 75 percent of the VOC emissions are from sources primarily under CARB and U.S. EPA control. Conversely, 56 percent of the SOx emissions and 65 percent of the directly emitted PM2.5 emissions are from sources under SCAQMD control. NOx and VOC are important precursors to ozone and PM2.5 formation, and SOx along with directly emitted PM2.5, contribute to the region's PM2.5 nonattainment challenges. This illustrates that actions at the local, state, and federal level are needed to ensure the region attains the federal ambient air quality standards.

TABLE 3.2-2

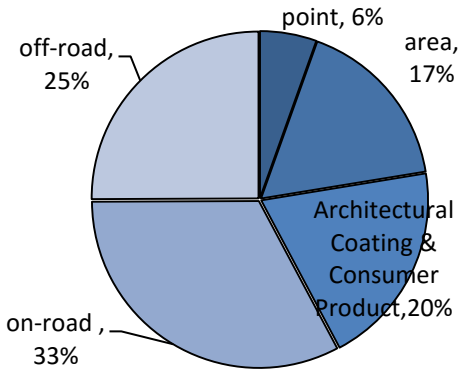
Summary of Emissions By Major Source Category: 2012 Base Year Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	$PM_{2.5}$	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	28	49	2	6	9	11	~~29~~28
Waste Disposal	14	2	1	0	0	~~9~~5	14	2
Cleaning and Surfacings	34	0	0	0	1	0	36	0
Petroleum Production and Marketing	~~30~~29	0	5	0	2	0	~~30~~29	0
Industrial Processes	10	0	0	0	6	9	11	0
Solvent Evaporation								
Consumer Products	87	0	0	0	0	0	87	0
Architectural Coatings	13	0	0	0	0	0	13	0
Others	2	0	0	0	0	1	2	0
Misc. Processes[2]	~~12~~13	21	~~55~~54	1	29	~~35~~38	~~7~~8	15
RECLAIM Sources	0	19	0	7	0	0	0	20
Total Stationary Sources	**~~213~~212**	**70**	**110**	**10**	**44**	**~~64~~63**	**211**	**~~66~~65**
MOBILE SOURCES								
On-Road Vehicles	~~160~~158	~~321~~317	~~1354~~1328	2	~~15~~14	18	~~165~~162	~~297~~293
Off-Road Vehicles	100	~~155~~153	686	6	8	0	126	~~166~~165
Total Mobile Sources	**~~260~~258**	**~~476~~470**	**~~2040~~2014**	**8**	**23**	**18**	**~~291~~289**	**~~463~~458**
TOTAL	**~~473~~470**	**~~546~~540**	**~~2151~~2123**	**18**	**~~67~~66**	**~~82~~81**	**~~502~~500**	**~~529~~522**

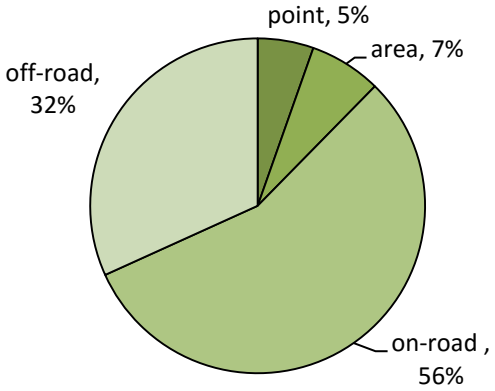
[1] Values may not sum due to rounding errors

[2] Includes entrained road dust

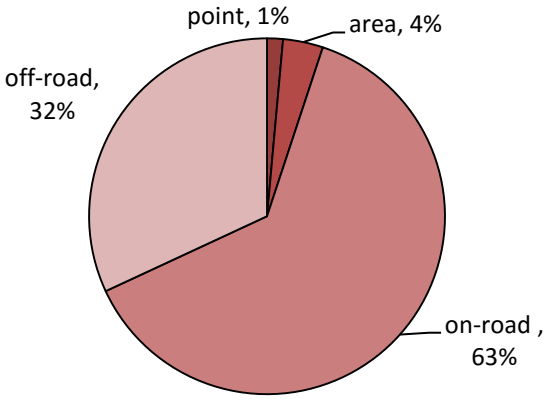
FIGURE 3.2-3 (REVISED)
Relative Contribution by Source Category to 2012 Emission Inventory.
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)



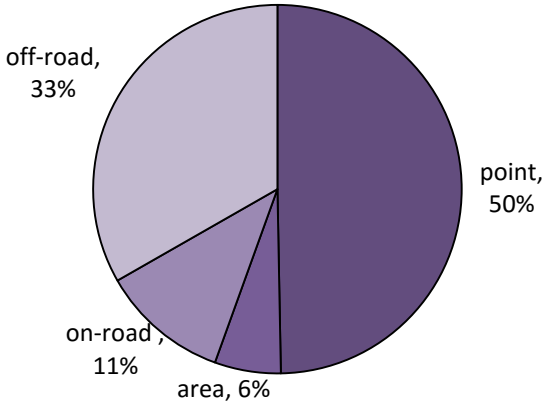
VOC Emissions: 500 tons/day



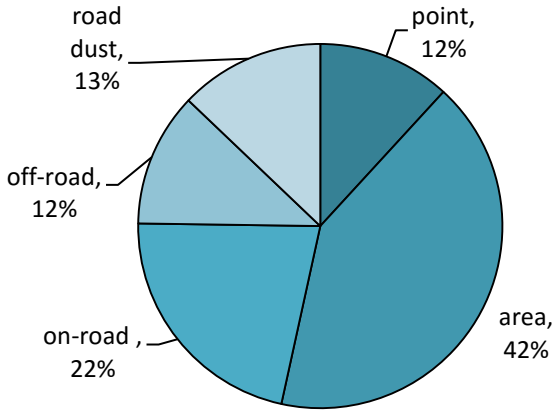
NOx Emissions: 522 tons/day



CO Emissions: 2123 tons/day



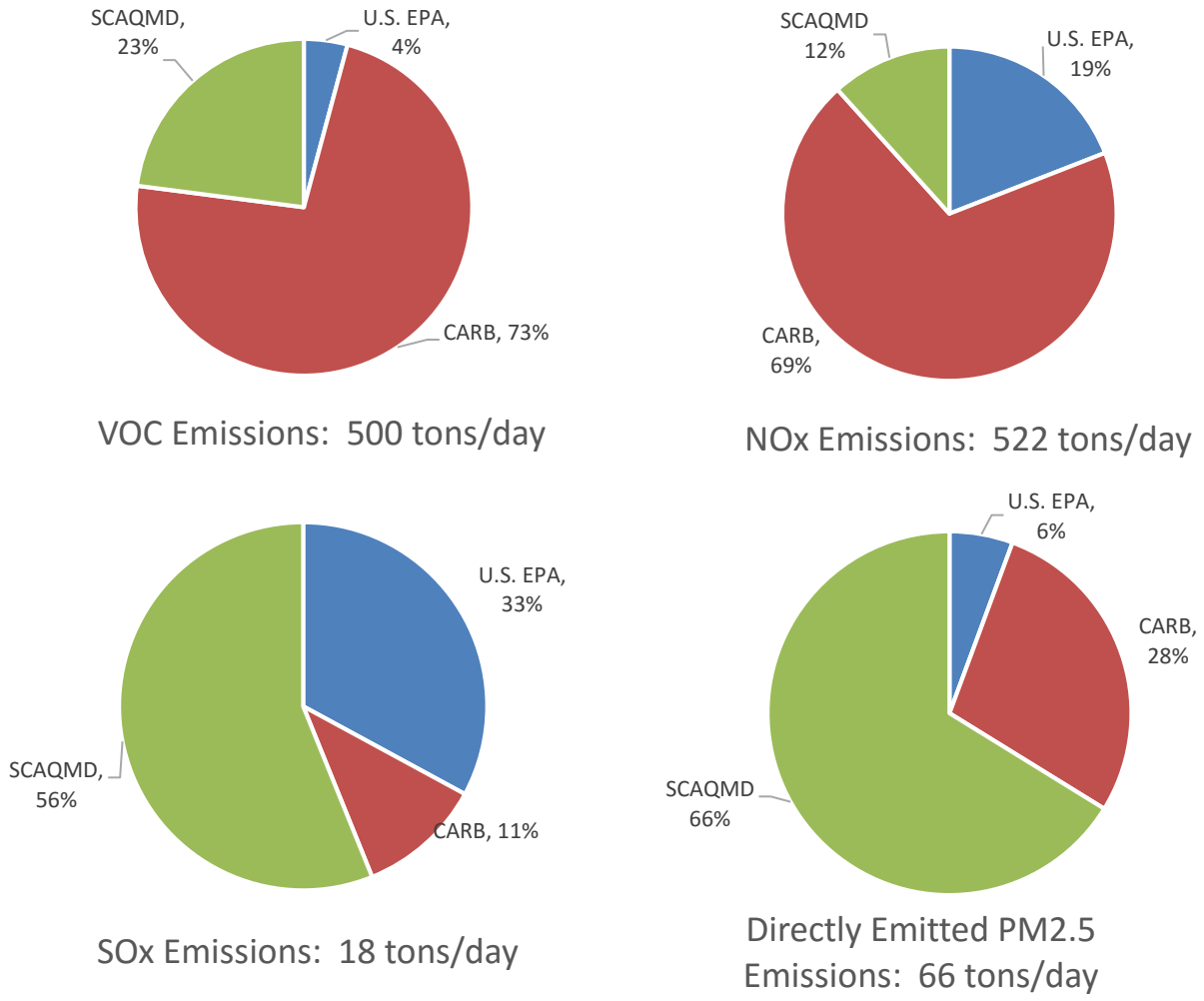
SOx Emissions: 18 tons/day



Directly Emitted PM2.5 Emissions: 66 tons/day

FIGURE 3.2-4 (REVISED)

2012 Emission Inventory Agency Primary Responsibility
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



(Taken from 2016 AQMP – Chapter 3)

3.2.1.3 Future Emissions

3.2.1.3.1 Data Development

Inventories were developed for 2012, 2019, 2022, 2023, 2025, and 2031. Year 2012 is the base-year for the attainment demonstrations. Years 2023 and 2031 are the attainment demonstration years for the federal 8-hour ozone standards of 80 ppb (revoked) and 75 ppb, respectively. The 2022 inventory was developed to show attainment for the revoked 1-hour ozone standard (120 ppb). The 2019 and 2025 inventories were used to demonstrate attainment for the federal 24-hour and annual PM2.5 standards, respectively.

Future-year stationary source emissions were divided into RECLAIM and non-RECLAIM emissions. Future NOx and SOx emissions from RECLAIM sources are estimated based on their allocations as specified by SCAQMD Rule 2002 –Allocations for NOx and SOx. The forecasts for non-RECLAIM emissions were derived using: (1) emissions from the 2012 base year, (2) expected controls after implementation of SCAQMD rules adopted by December 2015 and CARB rules adopted as of November 2015, and (3) activity growth in various source categories between the base and future years.

Demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry), developed by SCAG for the 2016 RTP/SCS, were used. Industry growth factors for 2012, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2025, 2026, 2031, and 2037 were also provided by SCAG, and interim years were calculated by linear interpolation. Table 3.2-3 summarizes key socioeconomic parameters used in the 2016 AQMP for emissions inventory development.

Current forecasts indicate that this region will experience a population growth of seven percent between 2012 and 2023, with a seven percent increase in VMT and a population growth of 12 percent by the year 2031 with an eight percent increase in VMT.

As compared to the projections in the 2012 AQMP, the current 2023 projections in the 2016 AQMP predict a population of about 200,000 fewer people (2.8 percent less), 100,000 more total employment (1.2 percent more), and 11 million miles more in the daily VMT forecast (2.7 percent more).

3.2.1.3.2 Summary of Future Baseline Emissions

To illustrate trends in the future baseline emissions inventories, emissions data by source categories (point, area, on-road mobile and off-road mobile sources) and by pollutant are presented in Tables 3.2-4A through 3.2-4E for the years 2019, 2022, 2023, 2025, and 2031. Baseline inventories are projected future emissions that reflect already adopted rules and regulations, but not additional controls proposed in the 2016 AQMP. This is in contrast to the 2012 base year emission inventory, which captures the actual 2012 emissions and is used as a basis for the projection of future inventories. Tables 3.2-4A through 3.2-4E provide annual average, as well as summer planning inventories. Emissions inventories for 2021, the "moderate" annual PM2.5 attainment deadline, can be found in Appendix III of the 2016 AQMP.

TABLE 3.2-3

Baseline Demographic Forecasts in the 2016 AQMP and the Final 2012 AQMP

CATEGORY	2012	2023	2023 % GROWTH FROM 2012	2031	2031 % GROWTH FROM 2012
Population (Millions)	15.9	17.1	7%	17.9	12%
Housing Units (Millions)	5.1	5.7	10%	6.0	16%
Total Employment (Millions)	6.7	7.8	16%	8.2	23%
Daily VMT (Millions)	380	407	7%	409	8%

Without any additional control measures, VOC and NOx emissions are expected to decrease due to existing regulations, such as controls for on- and off-road equipment, new vehicle standards, and the RECLAIM program. However, consistent with what was shown earlier with the mobile source categories, the emissions of SOx and PM2.5 show increases after 2022, when most of the rules and regulations will be fully implemented. Increases in emissions due to increase in population and activity outpace the emission reductions from introducing newer and cleaner equipment and vehicles. Figure 3.2-5 illustrates the relative contribution to the 2031 inventory by source category. A comparison of Figures 3.2-3 and 3.2-5 indicates that the on-road mobile category continues to be a major contributor to CO and NOx emissions. However, because of the implementation of most of the mobile source rules and regulations by 2023, 2031 on-road mobile sources account for much less of the VOC, NOx, and CO emissions as compared to 2012; about 14 percent of total VOC emissions compared to 33 percent in 2012; about 30 percent of total NOx emissions compared to 56 percent in 2012; and about 26 percent of total CO emissions compared to 63 percent in 2012. For directly emitted PM2.5, mobile sources will represent 23 percent of the emissions with another 14 percent due to vehicle-related entrained road dust, a reduction from the mobile source contribution in the base-year. It is projected that stationary sources will emit the majority of the SOx emissions, with the point source category contributing 57 percent of the SOx emissions in the Basin. In 2031, area sources will play even a larger role in VOC emissions, emitting more than point sources and mobile sources combined. Area sources will become the major contributor to VOC emissions from 37 percent in 2012 to 54 percent in 2031 and are projected to remain as the predominant source of directly emitted PM2.5 emissions (49 percent).

TABLE 3.2-4A

Summary of Emissions By Major Source Category: 2019 Baseline (24-hr PM2.5 attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	23	~~49~~48	2	6	~~8~~9	11	~~24~~23
Waste Disposal	15	2	1	1	0	~~8~~6	~~15~~16	2
Cleaning and Surface Coatings	42	0	0	0	2	0	~~44~~43	0
Petroleum Production and Marketing	21	0	5	0	2	0	21	0
Industrial Processes	12	0	1	0	7	9	13	0
Solvent Evaporation:								
Consumer Products	88	0	0	0	0	0	88	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	2	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	~~15~~14	~~57~~56	1	31	~~34~~35	~~6~~7	10
RECLAIM Sources[3]	0	23	0	6	0	0	0	23
Total Stationary Sources	**~~215~~214**	**~~6~~362**	**~~113~~111**	**10**	**47**	**60**	**213**	**~~60~~59**
MOBILE SOURCES								
On-Road Vehicles	~~84~~82	~~170~~167	~~653~~639	2	11	14	~~87~~86	~~159~~155
Off-Road Vehicles	79	~~130~~124	~~698~~697	5	6	0	~~99~~98	~~139~~133
Total Mobile Sources	**~~163~~161**	**~~300~~291**	**~~1351~~1336**	**7**	**17**	**14**	**~~186~~184**	**~~298~~289**
TOTAL	**~~378~~376**	**~~363~~353**	**~~1464~~1447**	**~~16~~17**	**64**	**74**	**~~399~~398**	**~~358~~347**

[1] Values are rounded to nearest integer and may not sum due to rounding

[2] Includes entrained road dust

[3] Includes 2015 RECLAIM NOx shaves

TABLE 3.2-4B

Summary of Emissions By Major Source Category: 2022 Baseline (1-hr ozone attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	$PM_{2.5}$	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	~~23~~22	~~50~~49	2	6	9	11	23
Waste Disposal	15	2	1	1	0	~~8~~6	~~16~~17	3
Cleaning and Surface Coatings	45	0	0	0	2	0	47	0
Petroleum Production and Marketing	~~21~~20	0	5	0	2	0	~~21~~20	0
Industrial Processes	~~13~~12	0	1	0	~~8~~7	9	13	0
Solvent Evaporation:								
Consumer Products	90	0	0	0	0	0	90	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	3	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	~~14~~13	56	1	~~32~~31	~~33~~35	~~6~~7	10
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**220~~1~~**	**53**	**~~113~~112**	**10**	**48**	**60**	**~~219~~220**	**~~51~~50**
MOBILE SOURCES								
On-Road Vehicles	~~69~~68	~~128~~125	~~509~~498	2	10	13	~~72~~71	~~120~~117
Off-Road Vehicles	74	~~119~~113	~~716~~715	5	6	0	92	~~126~~120
Total Mobile Sources	**~~144~~142**	**~~247~~238**	**~~1226~~1213**	**7**	**16**	**13**	**~~165~~163**	**~~246~~237**
TOTAL	**~~365~~362**	**~~300~~290**	**~~1339~~1325**	**17**	**64**	**73**	**383**	**~~297~~287**

[1] Values are rounded to nearest integer and may not sum due to rounding

[2] Includes entrained road dust

[3] Includes 2015 RECLAIM NOx shaves

TABLE 3.2-4C

Summary of Emissions By Major Source Category: 2023 Baseline (1997 8-hr ozone attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	~~23~~22	~~50~~49	2	6	9	11	~~23~~22
Waste Disposal	~~16~~15	2	1	1	0	~~8~~6	~~16~~17	3
Cleaning and Surface Coatings	46	0	0	0	2	0	~~48~~47	0
Petroleum Production and Marketing	20	0	5	0	2	0	~~21~~20	0
Industrial Processes	13	0	1	0	8	9	14	0
Solvent Evaporation:								
Consumer Products	90	0	0	0	0	0	90	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	~~3~~2	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	13	56	1	32	~~33~~35	~~6~~7	10
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**222**	**~~53~~52**	**~~113~~112**	**10**	**~~49~~48**	**60**	**220**	**~~51~~50**
MOBILE SOURCES								
On-Road Vehicles	65	~~97~~94	~~476~~465	2	10	13	~~69~~68	~~91~~88
Off-Road Vehicles	73	~~116~~110	~~722~~721	~~5~~6	6	0	90~~1~~	~~123~~117
Total Mobile Sources	**~~139~~137**	**~~213~~204**	**~~1198~~1186**	**7**	**16**	**13**	**~~159~~158**	**~~214~~205**
TOTAL	**~~361~~359**	**~~266~~257**	**~~1312~~1298**	**17**	**~~65~~64**	**~~73~~72**	**379**	**~~264~~255**

[1] Values are rounded to nearest integer and may not sum due to rounding

[2] Includes entrained road dust

[3] Includes 2015 RECLAIM NOx shaves

TABLE 3.2-4D

Summary of Emissions By Major Source Category: 2025 Baseline (annual PM2.5 attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	22	50	2	6	9	11	~~23~~22
Waste Disposal	16	2	1	1	0	~~8~~6	~~16~~18	3
Cleaning and Surface Coatings	47	0	0	0	2	0	49	0
Petroleum Production and Marketing	~~20~~19	0	5	0	2	0	20	0
Industrial Processes	13	0	1	0	8	9	14	0
Solvent Evaporation:								
Consumer Products	91	0	0	0	0	0	91	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	3	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	13	56	1	32	~~34~~35	~~6~~7	9
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**~~225~~224**	**52**	**~~114~~112**	**10**	**49**	**60**	**223**	**~~50~~49**
MOBILE SOURCES								
On-Road Vehicles	~~59~~58	~~88~~85	~~413~~403	2	10	12	~~62~~61	~~82~~79
Off-Road Vehicles	71	~~110~~104	~~732~~731	6	5	0	~~88~~87	~~116~~110
Total Mobile Sources	**~~131~~129**	**~~197~~189**	**~~1145~~1134**	**7**	**~~16~~15**	**12**	**~~150~~148**	**~~198~~190**
TOTAL	**~~356~~353**	**~~250~~241**	**~~1259~~1247**	**17**	**~~65~~64**	**~~73~~72**	**~~373~~372**	**~~249~~239**

[1] Values are rounded to nearest integer and may not sum due to rounding

[2] Includes entrained road dust

[3] Includes 2015 RECLAIM NOx shaves

TABLE 3.2-4E

Summary of Emissions By Major Source Category: 2031 Baseline (2008 8-hr ozone attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	~~23~~22	51	2	6	9	11	~~23~~22
Waste Disposal	~~17~~16	2	1	1	0	~~8~~6	~~17~~19	3
Cleaning and Surface ngs	50	0	0	0	2	1	52	0
Petroleum Production and Marketing	~~19~~18	0	5	0	2	0	~~19~~18	0
Industrial Processes	13	0	1	0	8	9	14	0
Solvent Evaporation								
Consumer Products	94	0	0	0	0	0	94	0
Architectural ngs	13	0	0	0	0	0	13	0
Others	3	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	11	56	1	33	~~35~~36	~~6~~7	9
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**~~232~~231**	**51**	**~~115~~113**	**10**	**~~51~~50**	**~~62~~61**	**~~230~~231**	**50**
MOBILE SOURCES								
On-Road Vehicles	~~48~~47	~~72~~69	~~316~~309	1	10	12	~~50~~49	~~68~~65
Off-Road Vehicles	~~68~~66	~~100~~94	~~768~~766	~~6~~7	5	0	~~82~~81	~~105~~100
Total Mobile Sources	**~~115~~114**	**~~172~~163**	**~~1084~~1074**	**8**	**15**	**12**	**~~132~~130**	**~~173~~165**
TOTAL	**~~347~~345**	**~~223~~214**	**~~1199~~1188**	**18**	**~~66~~65**	**73**	**362**	**~~223~~214**

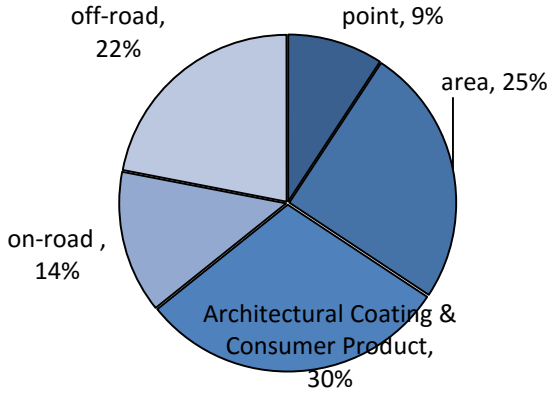
[1] Values may not sum due to rounding

[2] Includes entrained road dust

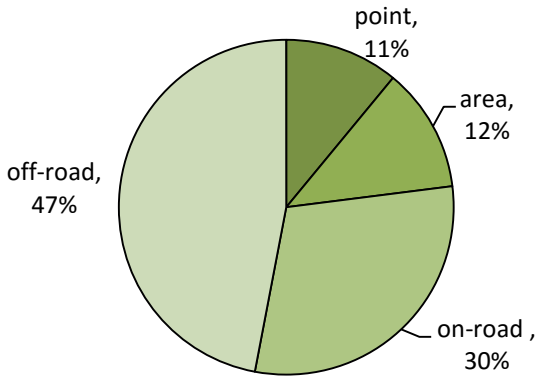
[3] Includes 2015 RECLAIM NOx shaves

Figure 3.2-6 shows the fraction of the 2031 inventory by responsible agency for VOC, NOx, SOx, and directly emitted PM2.5. In 2031, a larger fraction of the NOx and VOC emissions will fall under SCAQMD control. However, the majority of VOC and NOx emissions will remain primarily under CARB and U.S. EPA jurisdiction. The fraction of SOx emissions that fall under SCAQMD control will remain largely unchanged from the 2012 base-year inventory. However, the increasing contribution of area and point sources towards direct PM2.5 emissions in 2031 will result in a larger fraction of emissions falling under SCAQMD control.

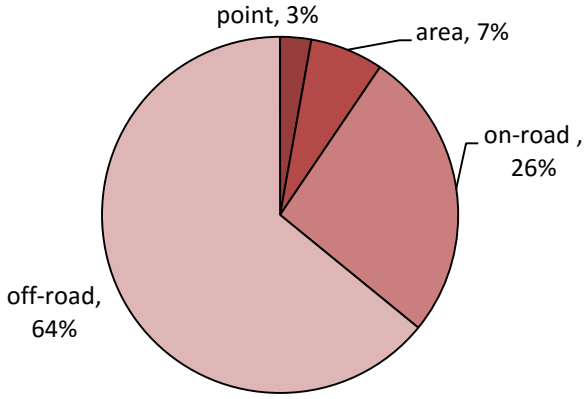
FIGURE 3.2-5 (REVISED)
Relative Contribution by Source Category to 2031 Emission Inventory.
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)



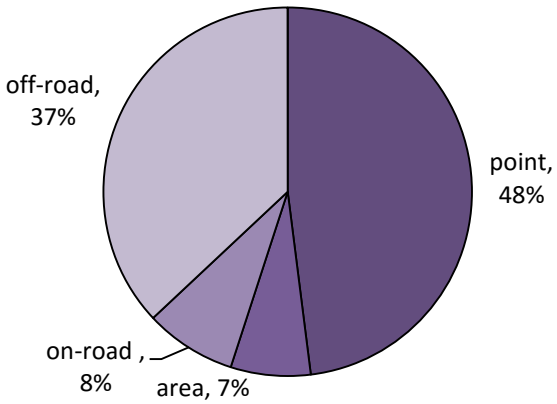
VOC Emissions: 362 tons/day



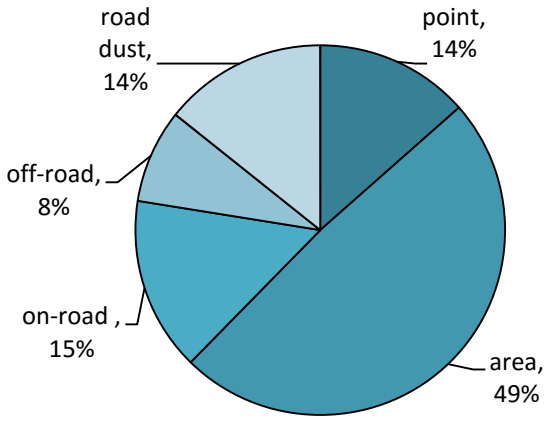
NOx Emissions: 214 tons/day



CO Emissions: 1118 tons/day



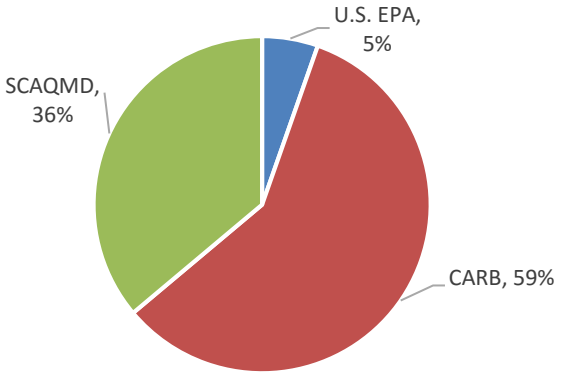
SOx Emissions: 18 tons/day



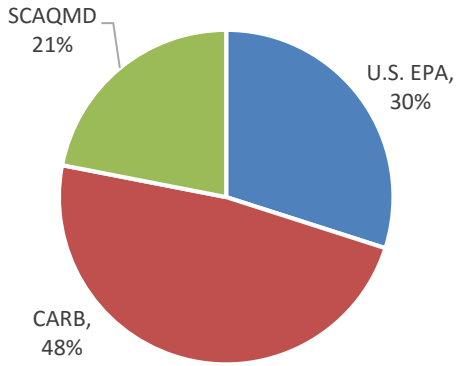
Directly Emitted PM2.5 Emissions: 65 tons/day

FIGURE 3.2-6 (REVISED)

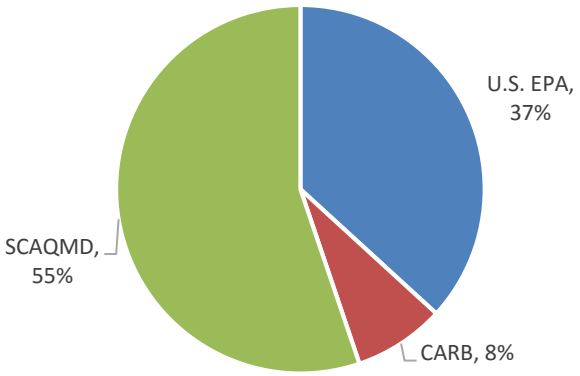
2031 Emission Inventory Agency Responsibility
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



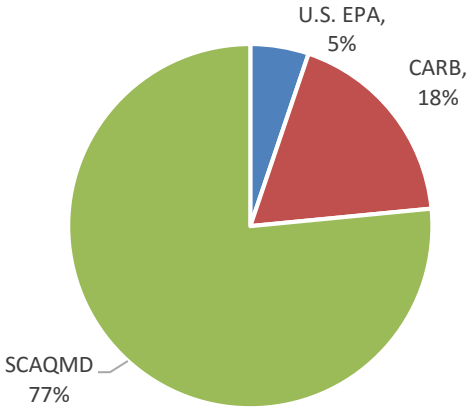
VOC Emissions: 362 tons/day



NOx Emissions: 214 tons/day



SOx Emissions: 18 tons/day



Directly Emitted PM2.5 Emissions: 65 tons/day

(Taken from 2016 AQMP – Chapter 3)

3.2.1.4 Air Quality Monitoring

This section provides an overview of air quality in the Basin. A more detailed discussion of current and projected future air quality in the Basin, with and without additional control measures can be found in the 2016 AQMP (Chapter 3).

It is the responsibility of SCAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, CO, NO2, PM10, PM2.5 SO2 and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards and in the case of PM10 and SO2, far more stringent. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride. The state and national ambient air quality standards for each of these pollutants and their effects on health are summarized in Table 3.2-5. SCAQMD monitors levels of various criteria pollutants at 34 monitoring stations. The 2015 air quality data (the latest data available) from SCAQMD's monitoring stations are presented in Table 3.2-6.

TABLE 3.2-5
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard[a]	Federal Primary Standard[b]	Most Relevant Effects
Ozone (O_3)	1-hour	0.09 ppm (180 µg/m3)	No Federal Standard	(a) Short-term exposures: 1) Pulmonary function decrements and localized lung edema in humans and animals; and, 2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; and, (d) Property damage.
	8-hour	0.070 ppm (137 µg/m3)	0.075 ppm (147 µg/m3)	
Suspended Particulate Matter (PM10)	24-hour	50 µg/m3	150 µg/m3	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; and (b) Excess seasonal declines in pulmonary function, especially in children.
	Annual Arithmetic Mean	20 µg/m3	No Federal Standard	
Suspended Particulate Matter (PM2.5)	24-hour	No State Standard	35 µg/m3	(a) Increased hospital admissions and emergency room visits for heart and lung disease; (b) Increased respiratory symptoms and disease; and (c) Decreased lung functions and premature death.
	Annual Arithmetic Mean	12 µg/m3	12.0 µg/m3	
Carbon Monoxide (CO)	1-Hour	20 ppm (23 mg/m3)	35 ppm (40 mg/m3)	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and, (d) Possible increased risk to fetuses.
	8-Hour	9 ppm (10 mg/m3)	9 ppm (10 mg/m3)	

TABLE 3.2-5 (Concluded)

State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard[a]	Federal Primary Standard[b]	Most Relevant Effects
Nitrogen Dioxide (NO2)	1-Hour	0.18 ppm (339 µg/m3)	0.100 ppm (188 µg/m3)	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and, (c) Contribution to atmospheric discoloration.
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	0.053 ppm (100 µg/m3)	
Sulfur Dioxide (SO2)	1-Hour	0.25 ppm (655 µg/m3)	75 ppb (196 µg/m3)–	Broncho-constriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
	24-Hour	0.04 ppm (105 µg/m3)	No Federal Standard	
Sulfates	24-Hour	25 µg/m3	No Federal Standard	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; and, (f) Property damage
Hydrogen Sulfide (H2S)	1-Hour	0.03 ppm (42 µg/m3)	No Federal Standard	Odor annoyance.
Lead (Pb)	30-Day Average	1.5 µg/m3	No Federal Standard	(a) Increased body burden; and (b) Impairment of blood formation and nerve conduction.
	Calendar Quarter	No State Standard	1.5 µg/m3	
	Rolling 3-Month Average	No State Standard	0.15 µg/m3	
Visibility Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more due to particles when relative humidity is less than 70 percent.	No Federal Standard	The statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. This is a visibility based standard not a health based standard. Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent.
Vinyl Chloride	24-Hour	0.01 ppm (26 µg/m3)	No Federal Standard	Highly toxic and a known carcinogen that causes a rare cancer of the liver.

a. The California ambient air quality standards for O3, CO, SO2 (1-hour and 24-hour), NO2, PM10, and PM2.5 are values not to be exceeded. All other California standards shown are values not to be equaled or exceeded.

b. The national ambient air quality standards, other than O3 and those based on annual averages are not to be exceeded more than once a year. The O3 standard is attained when the expected number of days per calendar year with maximum hourly average concentrations abpve the standards is equal to or less than one.

KEY: ppb = parts per billion parts of air, by volume; ppm = parts per million parts of air, by volume; µg/m3 = micrograms per cubic meter; mg/ m3 = milligrams per cubic meter

TABLE 3.2-6

2015 Air Quality Data – South Coast Air Quality Management District

CARBON MONOXIDE (CO)[a]				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. ppm, 1-hour	Max.Conc.8ppm, 8-hour
LOS ANGELES COUNTY				
1	Central Los Angeles	365	3.2	1.8
2	Northwest Coastal Los Angeles County	365	1.6	1.4
3	Southwest Coastal Los Angeles County	357	1.7	1.4
4	South Coastal Los Angeles County 1	--	--	--
4	South Coastal Los Angeles County 2	--	--	--
4	South Coastal Los Angeles County 3	364	3.3	2.2
6	West San Fernando Valley	365	3.0	2.5
8	West San Gabriel Valley	365	2.6	1.6
9	East San Gabriel Valley 1	352	2.1	1.3
9	East San Gabriel Valley 2	363	1.2	1.0
10	Pomona/Walnut Valley	346	1.8	1.6
11	South San Gabriel Valley	365	2.8	1.7
12	South Central Los Angeles County	363	4.4	3.3
13	Santa Clarita Valley	359	1.2	0.9
ORANGE COUNTY				
16	North Orange County	365	3.0	1.6
17	Central Orange County	365	3.1	2.2
18	North Coastal Orange County	365	3.0	2.2
19	Saddleback Valley	364	1.4	0.7
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riverside County 1	364	2.5	1.7
23	Mira Loma	362	2.3	1.6
24	Perris Valley	--	--	--
25	Lake Elsinore	364	0.8	0.6
26	Temecula	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley 1**	365	2.0	0.7
30	Coachella Valley 2**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	364	2.1	1.3
34	Central San Bernardino Valley 1	358	2.8	1.2
34	Central San Bernardino Valley 2	362	2.3	1.8
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--
SCAQMD MAXIMUM			4.4	3.3
SOUTH COAST AIR BASIN			4.4	3.3

KEY: ppm = parts per million -- = Pollutant not monitored ** Salton Sea Air Basin

[a] The federal 8-hour standard (8-hour average CO > 9 ppm) and state 8-hour standard (8-hour average CO > 9.0 ppm) were not exceeded. The federal and state 1-hour standards (35 ppm and 20 ppm) were not exceeded either.

TABLE 3.2-6 (Continued)

2015 Air Quality Data – South Coast Air Quality Management District

OZONE (O3)										
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. in ppm 1-hr	Max. Conc. in ppm 8-hr	4th High Conc. ppm 8-hr	No. Days Standard Exceeded				
						Federal			State	
						Old > 0.124 ppm 1-hr	1997 > 0.084 ppm 8-hr	Current >0.075 ppm 8-hr*	Current > 0.09 ppm 1-hr	Current > 0.070 ppm 8-hr
LOS ANGELES COUNTY										
1	Central Los Angeles	365	0.104	0.074	0.072	0	6	0	2	6
2	Northwest Coastal Los Angeles County	353	0.102	0.072	0.069	0	2	0	2	3
3	Southwest Coastal Los Angeles County	365	0.096	0.077	0.069	0	3	1	1	3
4	South Coastal Los Angeles County 1	--	--	--	--	--	--	--	--	--
4	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--
4	South Coastal Los Angeles County 3	364	0.087	0.066	0.056	0	0	0	0	0
6	West San Fernando Valley	365	0.119	0.094	0.087	0	32	15	11	34
8	West San Gabriel Valley	361	0.111	0.084	0.082	0	18	7	12	18
9	East San Gabriel Valley 1	352	0.122	0.096	0.088	0	27	17	21	28
9	East San Gabriel Valley 2	362	0.127	0.102	0.095	2	48	34	37	51
10	Pomona/Walnut Valley	347	0.136	0.098	0.094	2	53	36	30	55
11	South San Gabriel Valley	346	0.107	0.081	0.075	0	11	2	6	11
12	South Central Los Angeles County	361	0.091	0.072	0.065	0	1	0	0	1
13	Santa Clarita Valley	358	0.126	0.108	0.091	1	52	37	23	55
ORANGE COUNTY										
16	North Orange County	365	0.103	0.082	0.073	0	7	2	4	8
17	Central Orange County	365	0.100	0.080	0.065	0	1	1	1	1
18	North Coastal Orange County	364	0.099	0.079	0.068	0	2	1	1	2
19	Saddleback Valley	358	0.099	0.088	0.075	0	8	3	2	8
RIVERSIDE COUNTY										
22	Norco/Corona	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	361	0.132	0.105	0.096	1	55	39	31	59
23	Mira Loma	356	0.127	0.104	0.093	1	51	36	29	51
24	Perris Valley	365	0.124	0.102	0.094	0	49	31	25	50
25	Lake Elsinore	362	0.131	0.098	0.093	1	31	19	18	35
26	Temecula	365	0.100	0.087	0.079	0	20	6	1	23

29	Banning Airport	359	0.124	0.097	0.091	0	46	25	16	49
30	Coachella Valley 1**	365	0.102	0.092	0.086	0	47	26	3	51
30	Coachella Valley 2**	287	0.093	0.085	0.079	0	11	4	0	12
SAN BERNARDINO COUNTY										
32	Northwest San Bernardino Valley	364	0.136	0.106	0.101	2	66	53	49	69
34	Central San Bernardino Valley 1	358	0.133	0.111	0.100	3	57	39	36	59
34	Central San Bernardino Valley 2	356	0.134	0.117	0.105	6	78	57	52	79
35	East San Bernardino Valley	329	0.137	0.115	0.102	2	76	54	44	77
37	Central San Bernardino Mountains	365	0.144	0.127	0.107	3	86	61	46	86
38	East San Bernardino Mountains	--	--	--	--	--	--	--	--	--
	SCAQMD MAXIMUM		0.144	0.127	0.107	6	86	61	52	86
	SOUTH COAST AIR BASIN		0.144	0.127	0.107	10	113	81	71	115

KEY:

ppm = parts per million -- = Pollutant not monitored ** Salton Sea Air Basin

- = Incomplete data

TABLE 3.2-6 (Continued)

2015 Air Quality Data – South Coast Air Quality Management District

NITROGEN DIOXIDE (NO2)[b]					
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	1-hour Max. Conc. ppb, 1,	1-hour 98th Percentile Conc. ppb,	Annual Average AAM Conc. ppb
LOS ANGELES COUNTY					
1	Central Los Angeles	365	79.1	62.4	22.2
2	Northwest Coastal Los Angeles County	365	67.6	49.4	11.7
3	Southwest Coastal Los Angeles County	365	87.0	58.1	10.9
4	South Coastal Los Angeles County 1	--	--	--	--
4	South Coastal Los Angeles County 2	--	--	--	--
4	South Coastal Los Angeles County 3	353	101.8	64.4	19.8
6	West San Fernando Valley	354	72.5	51.7	13.5
8	West San Gabriel Valley	365	74.9	55.9	15.3
9	East San Gabriel Valley 1	351	71.0	58.5	15.4
9	East San Gabriel Valley 2	365	66.2	52.6	11.2
10	Pomona/Walnut Valley	346	72.3	60.3	21.2
11	South San Gabriel Valley	345	70.4	61.6	20.5
12	South Central Los Angeles County	363	73.6	58.7	16.9
13	Santa Clarita Valley	360	64.6	43.5	11.8
ORANGE COUNTY					
16	North Orange County	334	58.0	50.8	15.0
17	Central Orange County	365	59.1	54.6	14.6
18	North Coastal Orange County	357	52.4	47.9	11.6
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riverside County 1	361	57.4	52.3	14.4
23	Mira Loma	362	68.1	49.2	13.4
24	Perris Valley	--	--	--	--
25	Lake Elsinore	357	47.2	38.8	8.7
26	Temecula	--	--	--	--
29	Banning Airport	365	49.6	44.3	8.4
30	Coachella Valley 1**	365	41.5	37.7	6.2
30	Coachella Valley 2**	--	--	--	--
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	359	71.6	55.7	15.9
34	Central San Bernardino Valley 1	358	89.1	66.1	18.7
34	Central San Bernardino Valley 2	362	71.4	52.7	15.2
35	East San Bernardino Valley	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--
SCAQMD MAXIMUM			101.8	66.1	22.2
SOUTH COAST AIR BASIN			101.8	66.1	22.2

KEY:

ppb = parts per billion AAM = Annual Arithmetic Mean -- = Pollutant not monitored ** Salton Sea Air Basin

b The NO2 federal 1-hour standard is 100 ppb and the annual standard is annual arithmetic mean NO2 > 0.0534 ppm (53.4 ppb). The state 1-hour and annual standards are 0.18 ppm (180 ppb) and 0.030 ppm (30 ppb).

TABLE 3.2-6 (Continued)

2015 Air Quality Data – South Coast Air Quality Management District

SULFUR DIOXIDE (SO2)[c]				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Maximum Conc. ppb, 1-hour	99th Percentile Conc. ppb, 1-hour
LOS ANGELES COUNTY				
1	Central Los Angeles	364	12.6	6.3
2	Northwest Coastal Los Angeles County	--	--	--
3	Southwest Coastal Los Angeles County	358	14.9	6.8
4	South Coastal Los Angeles County 1	--	--	--
4	South Coastal Los Angeles County 2	--	--	--
4	South Coastal Los Angeles County 3	296	37.5	11.8
6	West San Fernando Valley	--	--	--
8	West San Gabriel Valley	--	--	--
9	East San Gabriel Valley 1	--	--	--
9	East San Gabriel Valley 2	--	--	--
10	Pomona/Walnut Valley	--	--	--
11	South San Gabriel Valley	--	--	--
12	South Central Los Angeles County	--	--	--
13	Santa Clarita Valley	--	--	--
ORANGE COUNTY				
16	North Orange County	--	--	--
17	Central Orange County	--	--	--
18	North Coastal Orange County	352	4.5	3.1
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riverside County 1	363	1.9	1.6
23	Mira Loma	--	--	--
24	Perris Valley	--	--	--
25	Lake Elsinore	--	--	--
26	Temecula	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley 1**	--	--	--
30	Coachella Valley 2**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	--	--	--
34	Central San Bernardino Valley 1	352	4.0	3.1
34	Central San Bernardino Valley 2	--	--	--
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--
SCAQMD MAXIMUM		364	37.5	11.8
SOUTH COAST AIR BASIN		364	37.5	11.8

KEY:

ppb = parts per billion -- = Pollutant not monitored ** Salton Sea Air Basin

[c] The federal SO2 1-hour standard is 75 ppb (0.075 ppm). The state standards are 1-hour average SO2 > 0.25 ppm (250 ppb) and 24-hour average SO2 > 0.04 ppm (40 ppb).

TABLE 3.2-6 (Continued)
2015 Air Quality Data – South Coast Air Quality Management District

SUSPENDED PARTICULATE MATTER PM10[d]						
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. µg/m^3, 24-hour	No. (%) Samples Exceeding Standard		Annual Average AAM Conc.[e] µg/m^3
				Federal > 150 µg/m^3, 24-hour	State > 50 µg/m^3, 24-hour	
LOS ANGELES COUNTY						
1	Central Los Angeles	58	73	0	2	27.3
2	Northwest Coastal Los Angeles County	-	-	-	-	-
3	Southwest Coastal Los Angeles County	57	42	0	0	21.2
4	South Coastal Los Angeles County 1	-	-	-	-	-
4	South Coastal Los Angeles County 2	58	62	0	2	26.5
4	South Coastal Los Angeles County 3	59	80	0	6	31.5
6	West San Fernando Valley	-	-	-	-	-
8	West San Gabriel Valley	-	-	-	-	-
9	East San Gabriel Valley 1	59	101	0	12	37.1
9	East San Gabriel Valley 2	-	-	-	-	-
10	Pomona/Walnut Valley	-	-	-	-	-
11	South San Gabriel Valley	-	-	-	-	-
12	South Central Los Angeles County	-	-	-	-	-
13	Santa Clarita Valley	52	41	0	0	18.4
ORANGE COUNTY						
16	North Orange County	-	-	-	-	-
17	Central Orange County	56	59	0	2	25.4
18	North Coastal Orange County	-	-	-	-	-
19	Saddleback Valley	51	49	0	0	19.0
RIVERSIDE COUNTY						
22	Norco/Corona	44	87	0	3	29.6
23	Metropolitan Riverside County 1	114	69	0	9	31.7
23	Mira Loma	102	110	0	38	43.3
24	Perris Valley	57	74	0	3	30.3
25	Lake Elsinore	-	-	-	-	-
26	Temecula	-	-	-	-	-
29	Banning Airport	59	139	0	2	22.2
30	Coachella Valley 1**	55	33	0	0	16.7
30	Coachella Valley 2**	91	145	0	18	38.6
SAN BERNARDINO COUNTY						
32	Northwest San Bernardino Valley	-	-	-	-	-
34	Central San Bernardino Valley 1	55	96	0	13	37.8
34	Central San Bernardino Valley 2	57	78	0	3	29.9
35	East San Bernardino Valley	59	95	0	2	24.7
37	Central San Bernardino Mountains	58	41	0	0	16.1
38	East San Bernardino Mountains	-	-	-	-	-
	SCAQMD MAXIMUM		145+	0+	38+	43.3+
	SOUTH COAST AIR BASIN		139+	0+	49+	43.3+

KEY:

µg/m^3 = micrograms per cubic meter of air AAM = Annual Arithmetic Mean -- = Pollutant not monitored ** Salton Sea Air Basin

\+ = High FRM and FEM PM10 data samples recorded at locations in Coachella Valley and the Basin are excluded due to the high wind in accordance with the U.S. EPA Exceptional Event Regulation.

d - Federal Reference Method (FRM) PM10 samples were collected every 6 days at all sites except for Stations 4144 and 4157, where samples were collected every 3 days. PM10 statistics listed above are for the FRM data only. Federal Equivalent Method (FEM) PM10 continuous monitoring instruments were operated at some of the above locations. Max 24-hour average PM10 at sites with FEM monitoring was 152 µg/m3, at Indio.

e - State standard is annual average (AAM) > 20 µg/m3. Federal annual PM10 standard (AAM > 50 µg/m3) was revoked in 2006.

TABLE 3.2-6 (Continued)

2015 Air Quality Data – South Coast Air Quality Management District

SUSPENDED PARTICULATE MATTER PM2.5 [f]						
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. µg/m^3, 24-hour	98th Percentile Conc. in µg/m^3 24-hr	No. (%) Samples Exceeding Federal Std > 35 µg/m^3, 24-hour	Annual Average AAM Conc.[g] µg/m^3
LOS ANGELES COUNTY						
1	Central Los Angeles	342	56.4	38.0	7	12.38
2	Northwest Coastal Los Angeles County	-	-	-	-	-
3	Southwest Coastal Los Angeles County	-	-	-	-	-
4	South Coastal Los Angeles County 1	338	54.6	32.1	3	10.81
4	South Coastal Los Angeles County 2	347	48.3	31.2	4	10.26
4	South Coastal Los Angeles County 3	-	-	-	-	-
6	West San Fernando Valley	113	36.8	28.4	1	8.84
8	West San Gabriel Valley	119	48.5	32.4	2	9.85
9	East San Gabriel Valley 1	120	70.3	30.0	2	9.88
9	East San Gabriel Valley 2	-	-	-	-	-
10	Pomona/Walnut Valley	-	-	-	-	-
11	South San Gabriel Valley	118	52.7	41.8	3	11.52
12	South Central Los Angeles County	111	41.3	37.2	3	11.78
13	Santa Clarita Valley	-	-	-	-	-
ORANGE COUNTY						
16	North Orange County	-	-	-	-	-
17	Central Orange County	295	45.8	29.8	3	9.38
18	North Coastal Orange County	-	-	-	-	-
19	Saddleback Valley	115	31.5	15.1	0	7.05
RIVERSIDE COUNTY						
22	Norco/Corona	-	-	-	-	-
23	Metropolitan Riverside County 1	341	54.7	38.1	9	11.89
23	Mira Loma	343	56.6	43.2	17	13.34
24	Perris Valley	-	-	-	-	-
25	Lake Elsinore	-	-	-	-	-
26	Temecula	-	-	-	-	-
29	Banning Airport	-	-	-	-	-
30	Coachella Valley 1**	108	22.7	17.1	0	5.76
30	Coachella Valley 2**	94	24.6	19.7	0	7.54
SAN BERNARDINO COUNTY						
32	Northwest San Bernardino Valley	-	-	-	-	-
34	Central San Bernardino Valley 1	114	50.5	37.7	3	11.05
34	Central San Bernardino Valley 2	110	53.5	33.6	2	10.74
35	East San Bernardino Valley	-	-	-	-	-
37	Central San Bernardino Mountains	-	-	-	-	-
38	East San Bernardino Mountains	58	39.4	35.3	1	7.59
SCAQMD MAXIMUM			70.3	43.2	17	13.34
SOUTH COAST AIR BASIN			70.3	43.2	25**	13.34

KEY:

µg/m^3 = micrograms per cubic meter of air AAM = Annual Arithmetic Mean -- = Pollutant not monitored ** Salton Sea Air Basin

[f] PM2.5 samples were collected every 3 days at all sites except for station numbers 072, 077, 087, 3176, 4144 and 4165, where samples were taken daily, and station number 5818 where samples were taken every 6 days. PM2.5 statistics listed above are for the FRM data only. FEM PM2.5 continuous monitoring instruments were operated at some of the above locations for special purposes studies. .

[g] Both federal and state standards are annual average (AAM) > 12.0 µg/m^3.

TABLE 3.2-6 (Concluded)

2015 Air Quality Data – South Coast Air Quality Management District

Source Receptor Area No.	Location of Air Monitoring Station	LEAD[h]		SULFATES (SOx)[i]	
		Max. Monthly Average Conc. [m] µg/m³	Max. 3-Month Rolling Average [m] µg/m³	No.. Days of Data	Max. Conc. µg/m³, 24-hour
LOS ANGELES COUNTY					
1	Central Los Angeles	0.013	0.01	--	--
2	Northwest Coastal Los Angeles County	--	--	--	--
3	Southwest Coastal Los Angeles County	0.008	0.01	--	--
4	South Coastal Los Angeles County 1	--	--	--	--
4	South Coastal Los Angeles County 2	0.010	0.01	--	--
4	South Coastal Los Angeles County 3	--	--	--	--
6	West San Fernando Valley	--	--	--	--
8	West San Gabriel Valley	--	--	--	--
9	East San Gabriel Valley 1	--	--	--	--
9	East San Gabriel Valley 2	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--
11	South San Gabriel Valley	0.014	0.01	--	--
12	South Central Los Angeles County	0.014	0.01	--	--
13	Santa Clarita Valley	--	--	--	--
ORANGE COUNTY					
16	North Orange County	--	--	--	--
17	Central Orange County	--	--	--	--
18	North Coastal Orange County	--	--	--	--
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riverside County 1	0.008	0.01	--	--
23	Mira Loma	--	--	--	--
24	Perris Valley	--	--	--	--
25	Lake Elsinore	--	--	--	--
26	Temecula	--	--	--	--
29	Banning Airport	--	--	--	--
30	Coachella Valley 1**	--	--	--	--
30	Coachella Valley 2**	--	--	--	--
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	0.010	0.01	--	--
34	Central San Bernardino Valley 1	--	--	--	--
34	Central San Bernardino Valley 2	0.012	0.01	--	--
35	East San Bernardino Valley	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--
SCAQMD MAXIMUM		0.014	0.010	--	--
SOUTH COAST AIR BASIN		0.014	0.010	--	--

KEY:

µg/m³ = micrograms per cubic meter of air -- = Pollutant not monitored ** Salton Sea Air Basin

h Federal lead standard is 3-months rolling average > 0.15 µg/m³; state standard is monthly average ≥ 1.5 µg/m³. .Lead standards were not exceeded.

i Sulfate data is not available at this time. State sulfate standard is 24-hour □ 25 µg/m3. There is no federal standard for sulfate.

3.2.1.4.1 Carbon Monoxide

CO is a primary pollutant, meaning that it is directly emitted into the air, not formed in the atmosphere by chemical reaction of precursors, as is the case with ozone and other secondary pollutants. Ambient concentrations of CO in the Basin exhibit large spatial and temporal variations due to variations in the rate at which CO is emitted and in the meteorological conditions that govern transport and dilution. Unlike ozone, CO tends to reach high concentrations in the fall and winter months. The highest concentrations frequently occur on weekdays at times consistent with rush hour traffic and late night during the coolest, most stable portion of the day.

Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of worsening oxygen supply to the heart.

Inhaled CO has no direct toxic effect on the lungs, but exerts its effect on tissues by interfering with oxygen transport by competing with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include patients with diseases involving heart and blood vessels, fetuses, and patients with chronic hypoxemia (oxygen deficiency) as seen in high altitudes.

Reductions in birth weight and impaired neurobehavioral development have been observed in animals chronically exposed to CO resulting in COHb levels similar to those observed in smokers. Recent studies have found increased risks for adverse birth outcomes with exposure to elevated CO levels. These include preterm births and heart abnormalities.

CO concentrations were measured at 23 locations in the Basin and neighboring Salton Sea Air Basin areas in 2014. CO concentrations did not exceed the standards in 2014. The highest 1-hour average CO concentration recorded (4.4 ppm in the South Central Los Angeles County area) was 22 percent of the federal 1-hour CO standard of 20 ppm. The highest 8-hour average CO concentration recorded (3.3 ppm in the South Central Los Angeles County area) was 37 percent of the federal 8-hour CO standard of 9.0 ppm. The state 1-hour standard is also 9.0 ppm. The highest 8-hour average CO concentration is 17 percent of the state 8-hour CO standard of 20 ppm.

In 2004, SCAQMD formally requested the U.S. EPA to re-designate the Basin from nonattainment to attainment with the CO NAAQS. On February 24, 2007, U.S. EPA published in the Federal Register its proposed decision to re-designate the Basin from nonattainment to attainment for CO. The comment period on the re-designation proposal closed on March 16, 2007 with no comments received by the U.S. EPA. On May 11, 2007, U.S. EPA published in the Federal Register its final decision to approve SCAQMD's request for re-designation from non-attainment to attainment for CO, effective June 11, 2007.

On August 12, 2011 U.S. EPA issued a decision to retain the existing NAAQS for CO, determining that those standards provided the required level of public health protection. However, U.S. EPA added a monitoring requirement for near-road CO monitors in urban areas with population of one million or more, utilizing stations that would be implemented to meet the 2010 NO2 near-road

monitoring requirements. The two new CO monitors are at the I-5 near-road site, located in Orange County near Anaheim, and the I-10 near-road site, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The near-road CO measurements began at these two locations in late December 2014. From that time to the end of 2015, the preliminary data shows that while the near-road measurements were often higher than the nearest ambient monitors, as would be expected in the near-road environment, they did not exceed the levels of the 1-hour or 8-hour CO NAAQS. The preliminary 2015 near-road peak 1-hour CO concentration measured was 2.6 ppm, measured at the I-10 near-road site, while the peak 8-hour CO concentration was 3.1 ppm at the I-5 near-road site, both well below the respective NAAQS levels (35 ppm and 9 ppm, respectively). Based on this limited period of data, it appears that the near-road CO design values will be unlikely to affect the Basin's attainment status for the state and federal CO standards.

3.2.1.4.2 Ozone

Ozone (O3), a colorless gas with a sharp odor, is a highly reactive form of oxygen. High ozone concentrations exist naturally in the stratosphere. Some mixing of stratospheric ozone downward through the troposphere to the earth's surface does occur; however, the extent of ozone transport is limited. At the earth's surface in sites remote from urban areas ozone concentrations are normally very low (e.g., from 0.03 ppm to 0.05 ppm).

The propensity of ozone for reacting with organic materials causes it to be damaging to living cells and ambient ozone concentrations in the Basin are frequently sufficient to cause health effects. Ozone enters the human body primarily through the respiratory tract and causes respiratory irritation and discomfort, makes breathing more difficult during exercise, and reduces the respiratory system's ability to remove inhaled particles and fight infection.

Individuals exercising outdoors, children and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible subgroups for ozone effects. Short-term exposures (lasting for a few hours) to ozone at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in multiple sports and live in high ozone communities. Elevated ozone levels are also associated with increased school absences.

Ozone exposure under exercising conditions is known to increase the severity of the above mentioned observed responses. Animal studies suggest that exposures to a combination of pollutants which include ozone may be more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.
In 2015, SCAQMD regularly monitored ozone concentrations at 29 locations in the Basin and the Coachella Valley portion of the Salton Sea Air Basin. Maximum ozone concentrations for all

areas monitored were below the stage 1 episode level (0.20 ppm) and below the health advisory level (0.15 ppm) (see Table 3.2-6). All counties in the Basin, as well as the Coachella Valley, exceeded the level of the new 2015 (0.070 ppm), the former 2008 (0.075 ppm), and/or the 1997 (0.08 ppm) 8-hour ozone NAAQS in 2015. While not all stations had days exceeding the previous 8-hour standards, all monitoring stations had at least one day over the 2015 federal standard.

In 2015, the maximum ozone concentrations in the Basin continued to exceed federal standards by wide margins. Maximum 1-hour and 8-hour average ozone concentrations were 0.144 ppm and 0.107 ppm, respectively (the maximum 1-hour and 8-hour average was recorded in the Central San Bernardino Mountain area). The maximum 8-hour concentration of 0.127 ppm was 181 percent of the new federal standard. The maximum 1-hour concentration was 160 percent of the 1-hour state ozone standard of 0.09 ppm. The 8-hour average concentration was 160 percent of the 8-hour state ozone standard of 0.070 ppm.

The objective of the 2016 AQMP is to attain and maintain ambient air quality standards. Implementation of all control measures contained in the 2016 AQMP is anticipated to bring the Basin into compliance with the federal 8-hour ozone standard by 2023 and the state 8-hour ozone standard beyond 2032.

3.2.1.4.3 Nitrogen Dioxide

NO2 is a reddish-brown gas with a bleach-like odor. Nitric oxide (NO) is a colorless gas, formed from the nitrogen (N2) and oxygen (O2) in air under conditions of high temperature and pressure which are generally present during combustion of fuels; NO reacts rapidly with the oxygen in air to form NO2. NO2 is responsible for the brownish tinge of polluted air. The two gases, NO and NO2, are referred to collectively as NOx. In the presence of sunlight, NO2 reacts to form nitric oxide and an oxygen atom. The oxygen atom can react further to form ozone, via a complex series of chemical reactions involving hydrocarbons. Nitrogen dioxide may also react to form nitric acid (HNO3) which reacts further to form nitrates, components of PM2.5 and PM10.

Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposures to NO2 at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to NO2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma and/or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these subgroups. More recent studies have found associations between NO2 exposures and cardiopulmonary mortality, decreased lung function, respiratory symptoms and emergency room asthma visits.

In animals, exposure to levels of NO2 considerably higher than ambient concentrations results in increased susceptibility to infections, possibly due to the observed changes in cells involved in maintaining immune functions. The severity of lung tissue damage associated with high levels of ozone exposure increases when animals are exposed to a combination of ozone and NO2.

In 2015, nitrogen dioxide concentrations were monitored at 24 locations. No area of the Basin or Salton Sea Air Basin exceeded the federal or state standards for NO2. The Basin has not exceeded the federal standard for NO2 (0.0534 ppm) since 1991, when the Los Angeles County portion of the Basin recorded the last exceedance of the standard in any county within the United States. The current 1-hour average NO2 NAAQS (100 ppb) was last exceeded on two days in 2014 in the South Coastal Los Angeles County area at the Long Beach-Hudson air monitoring station. However, the 98th percentile form of the standard was not exceeded and the 2013-2015 design value is not in violation of the NAAQS. The higher relative concentrations in the Los Angeles area are indicative of the concentrated emission sources, especially heavy-duty vehicles. NOx emission reductions continue to be necessary because it is a precursor to both ozone and PM (PM2.5 and PM10) concentrations.

With the revised NO2 federal standard in 2010, near-road NO2 measurements were required to be phased in for larger cities. The four near-road monitoring stations are: (1) I-5 near-road, located in Orange County near Anaheim; (2) I-710 near-road, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; (3) SR-60 near-road, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland; and (4) I-10 near-road, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The longest operating near-road station in the Basin, adjacent to I-5 in Orange County, has not exceeded the level of the 1-hour NO2 NAAQS (100 ppb) since the measurements began on January 1, 2014. The peak 1-hour NO2 concentration at that site in 2014 was 78.8 ppb and the peak concentration for 2015 was 70.2 ppb. This can be compared to the annual peak values measured at the nearest ambient monitoring station in Central Orange County (Anaheim station), where the 2014 and 2015 peaks were 75.8 and 59.1, respectively. In terms of the design value form of the NAAQS, the 98th percentile daily maximum 1-hour concentrations at the Anaheim near-road site were 66.0 ppb and 61.4 ppb, respectively, for 2014 and 2015, compared to 59.8 ppb and 54.6 ppb from the Anaheim ambient monitoring station. The annual average NO2 NAAQS (0.053 ppm, or 53 ppb) was also not exceeded. Thus, while the Anaheim near-road NO2 measurements are higher than the ambient Orange County measurements, as would be expected close to traffic emissions sources, it does not appear that NO2 design values will violate the NAAQS or CAAQS at this location. Likewise, the shorter period of data available from the remaining three near-road stations indicates that these locations will also likely measure higher NO2 than the nearest ambient stations, but they have not exceeded the level of the 1-hour or annual NO2 NAAQS or CAAQS through the end of 2015. Based on this limited period of data, it appears that the near-road NO2 measurements will be unlikely to affect the Basin's attainment status for the state and federal NO2 standards.

3.2.1.4.4 Sulfur Dioxide

SO2 is a colorless gas with a sharp odor. It reacts in the air to form sulfuric acid (H2SO4), which contributes to acid precipitation, and sulfates, which are components of PM10 and PM2.5. Most of the SO2 emitted into the atmosphere is produced by burning sulfur-containing fuels.

Exposure of a few minutes to low levels of SO2 can result in airway constriction in some asthmatics. All asthmatics are sensitive to the effects of SO2. In asthmatics, increase in resistance

to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, is observed after acute higher exposure to SO2. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO2.

Animal studies suggest that despite SO2 being a respiratory irritant, it does not cause substantial lung injury at ambient concentrations. However, very high levels of exposure can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract.

Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO2 levels. In these studies, efforts to separate the effects of SO2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.

No exceedances of federal or state standards for sulfur dioxide occurred in 2015 at any of the six locations monitored the Basin. The maximum 1-hour SO2 concentration was 37.5 ppb, as recorded in the South Coastal Los Angeles County area. The maximum 24-hour SO2 concentration was 11.8 ppb, as recorded in South Coastal Los Angeles County area. Though SO2 concentrations remain well below the standards, SO2 is a precursor to sulfate, which is a component of fine particulate matter, PM10, and PM2.5. Historical measurements showed concentrations to be well below standards and monitoring has been discontinued.

3.2.1.4.5 Particulate Matter (PM10 and PM2.5)

Of great concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Respirable particles (particulate matter less than about 10 micrometers in diameter (PM10)) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to adverse health effects of PM10 and PM2.5.

A consistent correlation between elevated ambient fine particulate matter (PM2.5) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. Studies have reported an association between long-term exposure to air pollution dominated by PM2.5 and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

Daily fluctuations in fine particulate matter concentration levels have also been related to hospital admissions for acute respiratory conditions, to school and kindergarten absences, to a decrease in respiratory function in normal children and to increased medication use in children and adults with asthma. Studies have also shown lung function growth in children is reduced with long-term exposure to particulate matter. In addition to children, the elderly, and people with preexisting respiratory and/or cardiovascular disease appear to be more susceptible to the effects of PM10 and PM2.5.

SCAQMD monitored PM10 concentrations at 19 locations in 2015. The federal 24-hour PM10 standard (150 $\mu g/m^3$) was not exceeded in 2015. The Basin has remained in attainment of the PM10 NAAQS since 2006. The maximum three-year average 24-hour PM10 concentration of 145 $\mu g/m^3$ was recorded in the Coachella Valley area and was 97 percent of the federal standard and 290 percent of the much more stringent state 24-hour PM10 standard (50 µg/m3). The state 24-hour PM10 standard was exceeded at several of the monitoring stations. The maximum annual average PM10 concentration of 43.3 $\mu g/m^3$ was recorded in the Mira Loma area. The latest three-year annual average PM10 concentration of 44.1 $\mu g/m^3$ was recorded in the San Gabriel Valley (based on 2012 through 2014 monitoring data). The federal annual PM10 standard has been revoked. The much more stringent state annual PM10 standard (20 $\mu g/m^3$) was exceeded in most stations in each county in the Basin and in the Coachella Valley.

In 2015, PM2.5 concentrations were monitored at 17 locations throughout the Basin. U.S. EPA revised the federal 24-hour PM2.5 standard from 65 µg/m3 to 35 $\mu g/m^3$, effective December 17, 2006. In 2015, the maximum PM2.5 concentrations in the Basin exceeded the new federal 24-hour PM2.5 standard in all but three locations. The maximum 24-hour PM2.5 concentration of 70.3 $\mu g/m^3$ was recorded in the East San Gabriel Valley area. The 98th percentile 24-hour PM2.5 concentration of 43.2 $\mu g/m^3$ was recorded in the Mira Loma area, which exceeds the federal standard of 35 µg/m3. The maximum annual average concentration of 13.34 $\mu g/m^3$ was recorded in Mira Loma, which represents 89 percent of the 2006 federal standard of 15 $\mu g/m^3$. The 3-year high state annual average PM2.5 concentration of 19 $\mu g/m^3$ was recorded in Metropolitan Riverside County (based on 2013 through 2015 monitoring), which represents 158 percent of the state standard of 12 $\mu g/m^3$.

On December 14, 2012, U.S. EPA strengthened the annual NAAQS for PM2.5 to 12 $\mu g/m^3$ and, as part of the revisions, a requirement was added to monitor near the most heavily trafficked roadways in large urban areas. Particle pollution is expected to be higher along these roadways as a result of direct emissions from cars and heavy-duty diesel trucks and buses. SCAQMD has installed the two required PM2.5 monitors by January 1, 2015, at locations selected based upon the existing near-roadway NO2 sites that were ranked higher for heavy-duty diesel traffic. The locations are: (1) I-710, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; and (2) SR-60, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland. These near-road sites measure PM2.5 daily with FRM filter-based measurements.

The preliminary 2015 PM2.5 annual averages from the I-710 and SR-60 Near-road sites were 12.89 and 14.48 $\mu g/m^3$, respectively. The nearby ambient stations in South Coastal Los Angeles County (North Long Beach Station) and in Metropolitan Riverside County (Mira Loma station) measured 12.81 and 13.34 µg/m3, respectively, for the preliminary 2015 annual average. Thus, the preliminary PM2.5 measurements from these sites for 2015 indicate that the near-road sites do indeed measure higher than the nearby ambient stations, on average. If this pattern holds for the long term, the SR-60 near-road station could potentially become the three-year design value site for the Basin for the PM2.5 annual average NAAQS, once sufficient data is collected.

While it reasonably could be expected that the highest near-road site would also become the Basin-maximum design value site for the 24-hour PM2.5 NAAQS, this may not be the case for the Basin.

The 2015 98th percentile 24-hour PM2.5 concentration is higher at the I-710 near-road than at the nearby North Long Beach station. However, the 98th percentile 24-hour concentration remains higher at Mira Loma (43.2 $\mu g/m^3$) than at the SR-60 Near-road site (39.9 $\mu g/m^3$). The number of days over the 24-hour PM2.5 NAAQS was also significantly higher at the Mira Loma station, with 17 days over the 24-hour NAAQS compared to 10 days at the SR-60 near-road site. PM2.5 24-hour concentrations at the Mira Loma station are likely higher than the near-road site on the highest days, due to the influence of enhanced secondary particle formation at Mira Loma.

The 2016 AQMP demonstrates how the region will achieve the 2012 annual PM2.5 (12.0 $\mu g/m^3$) as expeditiously as practicable, but no later than the statutory attainment deadline of 2025.

3.2.1.4.6 Lead

Lead in the atmosphere is present as a mixture of a number of lead compounds. Leaded gasoline and lead smelters have been the main sources of lead emitted into the air. Due to the phasing out of leaded gasoline, there was a dramatic reduction in atmospheric lead in the Basin over the past three decades.

Fetuses, infants, and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure.

Lead poisoning can cause anemia, lethargy, seizures, and death. It appears that there are no direct effects of lead on the respiratory system. Lead can be stored in the bone from early-age environmental exposure, and elevated blood lead levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland), and osteoporosis (breakdown of bone tissue). Fetuses and breast-fed babies can be exposed to higher levels of lead because of previous environmental lead exposure of their mothers.

The state standards for lead were not exceeded in any area of the SCAQMD in 2015. There have been no violations of these standards at SCAQMD's regular air monitoring stations since 1982, as a result of removal of lead from gasoline. However, monitoring at two stations immediately adjacent to stationary sources of lead recorded exceedances of the standard in Los Angeles County over the 2007-2009 time period. These data were used for designations under the revised standard that also included new requirements for near-source monitoring. As a result, a nonattainment designation was finalized for much of the Los Angeles County portion of the Basin when the current standard was implemented.

The current lead concentrations in Los Angeles County are now below the NAAQS. The maximum quarterly average lead concentration (0.01 $\mu g/m^3$ at several monitoring) was seven percent of the federal quarterly average lead standard (0.15 $\mu g/m^3$). The maximum monthly average lead concentration (0.014 $\mu g/m^3$ in South San Gabriel and South Central Los Angeles County) was one percent of the state monthly average lead standard. As a result of the 2012-2014 design value below the NAAQS, SCAQMD will be requesting that U.S. EPA re-designate the

nonattainment area as attaining the federal lead standard. Stringent SCAQMD rules governing lead-producing sources will help to ensure that there are no future violations of the federal standard. Furthermore, one business that had been responsible for the highest measured lead concentrations in Los Angeles County has closed and is in the process of demolition and site clean-up.

3.2.1.4.7 Sulfates

Sulfates are chemical compounds which contain the sulfate ion and are part of the mixture of solid materials which make up PM10. Most of the sulfates in the atmosphere are produced by oxidation of SO2. Oxidation of sulfur dioxide yields sulfur trioxide (SO_3) which reacts with water to form sulfuric acid, which contributes to acid deposition. The reaction of sulfuric acid with basic substances such as ammonia yields sulfates, a component of PM10 and PM2.5.

Most of the health effects associated with fine particles and SO2 at ambient levels are also associated with sulfates. Thus, both mortality and morbidity effects have been observed with an increase in ambient sulfate concentrations. However, efforts to separate the effects of sulfates from the effects of other pollutants have generally not been successful.

Clinical studies of asthmatics exposed to sulfuric acid suggest that adolescent asthmatics are possibly a subgroup susceptible to acid aerosol exposure. Animal studies suggest that acidic particles such as sulfuric acid aerosol and ammonium bisulfate are more toxic than nonacidic particles like ammonium sulfate. Whether the effects are attributable to acidity or to particles remains unresolved.

The most current data available for sulfates is for 2014. In 2014, the state 24-hour sulfate standard (25 $\mu g/m^3$) was not exceeded in any of the 20 monitoring locations in the Basin. The maximum 24-hour sulfate concentration was 14.3 ppb, as recorded in the Central Los Angeles County area. There are no federal sulfate standards.

3.2.1.4.8 Vinyl Chloride

Vinyl chloride is a colorless, flammable gas at ambient temperature and pressure. It is also highly toxic and is classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as A1 (confirmed carcinogen in humans) and by the International Agency for Research on Cancer (IARC) as 1 (known to be a human carcinogen) (Air Gas, 2010). At room temperature, vinyl chloride is a gas with a sickly sweet odor that is easily condensed. However, it is stored as a liquid. Due to the hazardous nature of vinyl chloride to human health there are no end products that use vinyl chloride in its monomer form. Vinyl chloride is a chemical intermediate, not a final product. It is an important industrial chemical chiefly used to produce polymer polyvinyl chloride (PVC). The process involves vinyl chloride liquid fed to polymerization reactors where it is converted from a monomer to a polymer PVC. The final product of the polymerization process is PVC in either a flake or pellet form. Billions of pounds of PVC are sold on the global market each year. From its flake or pellet form, PVC is sold to companies that heat and mold the PVC into end products such as PVC pipe and bottles.

In the past, vinyl chloride emissions have been associated primarily with sources such as landfills. Risks from exposure to vinyl chloride are considered to be a localized impacts rather than regional impacts. Because landfills in the SCAQMD are subject to Rule 1150.1 – Control of Gaseous Emissions from Municipal Solid Waste Landfills, which contains stringent requirements for landfill gas collection and control, potential vinyl chloride emissions are expected to be below the level of detection. Therefore, SCAQMD does not monitor for vinyl chloride at its monitoring stations.

3.2.1.4.9 Volatile Organic Compounds

It should be noted that there are no state or national ambient air quality standards for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because limiting VOC emissions reduces the rate of photochemical reactions that contribute to the formation of ozone. VOCs are also transformed into organic aerosols in the atmosphere, contributing to higher PM10 and lower visibility levels.

Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOCs because of interference with oxygen uptake. In general, ambient VOC concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis, even at low concentrations. Some hydrocarbon components classified as VOC emissions are thought or known to be hazardous. Benzene, for example, one hydrocarbon component of VOC emissions, is known to be a human carcinogen.

3.2.2 NON-CRITERIA POLLUTANTS

Although SCAQMD's primary mandate is attaining the state and NAAQS for criteria pollutants within the Basin, SCAQMD also has a general responsibility pursuant to H&S §41700 to control emissions of air contaminants and prevent endangerment to public health. Additionally, state law requires SCAQMD to implement airborne toxic control measures (ATCM) adopted by CARB and to implement the Air Toxics "Hot Spots" Act. As a result, SCAQMD has regulated pollutants other than criteria pollutants such as TACs, greenhouse gases and stratospheric ozone depleting compounds. SCAQMD has developed a number of rules to control non-criteria pollutants from both new and existing sources. These rules originated through state directives, CAA requirements, or SCAQMD rulemaking process.

In addition to promulgating non-criteria pollutant rules, SCAQMD has been evaluating AQMP control measures as well as existing rules to determine whether or not they would affect, either positively or negatively, emissions of non-criteria pollutants. For example, rules in which VOC components of coating materials are replaced by a non-photochemically reactive chlorinated substance would reduce the impacts resulting from ozone formation, but could increase emissions of toxic compounds or other substances that may have adverse impacts on human health.

The following subsections summarize the existing setting for the two major categories of non-criteria pollutants: compounds that contribute to TACs, global climate change, and stratospheric ozone depletion.

3.2.2.1 Air Quality – Toxic Air Contaminants

3.2.2.1.1 Federal

Under Section 112 of the CAA, U.S. EPA is required to regulate sources that emit one or more of the 187 federally listed hazardous air pollutants (HAPs). HAPs are air toxic pollutants identified in the CAA, which are known or suspected of causing cancer or other serious health effects. The federal HAPs are listed on the U.S. EPA website at http://www.epa.gov/ttn/atw/orig189.html. In order to implement the CAA, approximately 100 National Emission Standards for Hazardous Air Pollutants (NESHAPs) have been promulgated by U.S. EPA for major sources (sources emitting greater than 10 tpy of a single HAP or greater than 25 tpy of multiple HAPs). SCAQMD can either directly implement NESHAPs or adopt rules that contain requirements at least as stringent as the NESHAP requirements. However, since NESHAPs often apply to sources in the Basin that are controlled, many of the sources that would have been subject to federal requirements already comply or are exempt.

In addition to the major source NESHAPs, U.S. EPA has also controlled HAPs from urban areas by developing Area Source NESHAPs under their Urban Air Toxics Strategy. U.S. EPA defines an area source as a source that emits less than 10 tons annually of any single hazardous air pollutant or less than 25 tons annually of a combination of hazardous air pollutants. The CAA requires the U.S. EPA to identify a list of at least 30 air toxics that pose the greatest potential health threat in urban areas. U.S. EPA is further required to identify and establish a list of area source categories that represent 90 percent of the emissions of the 30 urban air toxics associated with area sources, for which Area Source NESHAPs are to be developed under the CAA. U.S. EPA has identified a total of 70 area source categories with regulations promulgated for more than 30 categories so far.

The federal toxics program recognizes diesel engine exhaust (diesel particulate matter or DPM) as a health hazard, however, DPM itself is not one of their listed toxic air contaminants. Rather, each toxic compound in the speciated list of compounds in exhaust is considered separately. Although there are no specific NESHAP regulations for DPM, DPM reductions are realized through federal regulations including diesel fuel standards and emission standards for stationary, marine, and locomotive engines; and idling controls for locomotives.

3.2.2.1.2 State

The California air toxics program was based on the CAA and the original federal list of hazardous air pollutants. The state program was established in 1983 under the Toxic Air Contaminant Identification and Control Act, Assembly Bill (AB) 1807, Tanner. Under the state program, toxic air contaminants are identified through a two-step process of risk identification and risk management. This two-step process was designed to protect residents from the health effects of toxic substances in the air.

Control of TACs under the TAC Identification and Control Program: California's TAC identification and control program, adopted in 1983 as AB 1807, is a two-step program in which substances are identified as TACs and ATCMs are adopted to control emissions from specific

sources. CARB has adopted a regulation designating all 188 federal hazardous air pollutants (HAPs) as TACs.

ATCMs are developed by CARB and implemented by SCAQMD and other air districts through the adoption of regulations of equal or greater stringency. Generally, the ATCMs reduce emissions to achieve exposure levels below a determined health threshold. If no such threshold levels are determined, emissions are reduced to the lowest level achievable through the best available control technology unless it is determined that an alternative level of emission reduction is adequate to protect public health.

Under California law, a federal NESHAP automatically becomes a state ATCM, unless CARB has already adopted an ATCM for the source category. Once a NESHAP becomes an ATCM, CARB and each air pollution control or air quality management district have certain responsibilities related to adoption or implementation and enforcement of the NESHAP/ATCM.

Control of TACs under the Air Toxics "Hot Spots" Act: The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588) establishes a statewide program to inventory and assess the risks from facilities that emit TACs and to notify the public about significant health risks associated with the emissions. Facilities are phased into the AB 2588 program based on their emissions of criteria pollutants or their occurrence on lists of toxic emitters compiled by SCAQMD. Phase I consists of facilities that emit over 25 tons per year of any criteria pollutant and facilities present on SCAQMD's toxics list. Phase I facilities entered the program by reporting their TAC emissions for calendar year 1989. Phase II consists of facilities that emit between 10 and 25 tpy of any criteria pollutant, and submitted air toxic inventory reports for calendar year 1990 emissions. Phase III consists of certain designated types of facilities which emit less than 10 tons per year of any criteria pollutant, and submitted inventory reports for calendar year 1991 emissions. Inventory reports are required to be updated every four years under the state law.

Air Toxics Control Measures: As part of its risk management efforts, CARB has passed state ATCMs to address air toxics from mobile and stationary sources. Some key ATCMs for stationary sources include reductions of benzene emissions from service stations, hexavalent chromium emissions from chrome plating, perchloroethylene emissions from dry cleaning, ethylene oxide emissions from sterilizers, and multiple air toxics from the automotive painting and repair industries.

Many of CARB's recent ATCMs are part of the CARB Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Diesel Risk Reduction Plan) which was adopted in September 2000 (http://www.arb.ca.gov/diesel/documents/rrpapp.htm) with the goal of reducing DPM emissions from compression ignition engines and associated health risk by 75 percent by 2010 and 85 percent by 2020. The Diesel Risk Reduction Plan includes strategies to reduce emissions from new and existing engines through the use of ultra-low sulfur diesel fuel, add-on controls, and engine replacement. In addition to stationary source engines, the plan addresses DPM emissions from mobile sources such as trucks, buses, construction equipment, locomotives, and ships.

OEHHA Health Risk Assessment Guidelines: In 2003, OEHHA developed and approved its Health Risk Assessment Guidance document (2003 OEHHA Guidelines) and prepared a series of Technical Support Documents, reviewed and approved by the Scientific Review Panel (SRP), that provided new scientific information showing that early-life exposures to air toxics contribute to an increased estimated lifetime risk of developing cancer and other adverse health effects, compared to exposures that occur in adulthood. As a result, OEHHA developed the Revised OEHHA Guidelines in March 2015 which incorporated this new scientific information. The new method utilizes higher estimates of cancer potency during early life exposures. There are also differences in the assumptions on breathing rates and length of residential exposures.

3.2.2.1.3 SCAQMD

SCAQMD has regulated criteria air pollutants using either a technology-based or an emissions limit approach. The technology-based approach defines specific control technologies that may be installed to reduce pollutant emissions. The emissions limit approach establishes an emission limit, and allows industry to use any emission control equipment, as long as the emission requirements are met. The regulation of TACs often uses a health risk-based approach, but may also require a regulatory approach similar to criteria pollutants, as explained in the following subsections.

Rules and Regulations: Under SCAQMD's toxic regulatory program there are 23 source-specific rules that target toxic emission reductions that regulate over 10,000 sources such as metal finishing, spraying operations, dry cleaners, film cleaning, gasoline dispensing, and diesel-fueled stationary engines to name a few. In addition, other source-specific rules targeting criteria pollutant reductions also reduce toxic emissions, such as Rule 461 – Gasoline Transfer and Dispensing which reduces benzene emissions from gasoline dispensing and Rule 1124 – Aerospace Assembly and Component Manufacturing Operations which reduces perchloroethylene, trichloroethylene, and methylene chloride emissions from aerospace operations. Table 3.2-7 shows the recently amended or adopted toxics rules.

New and modified sources of toxic air contaminants in the SCAQMD are subject to Rule 1401 - New Source Review of Toxic Air Contaminants and Rule 212 - Standards for Approving Permits. Rule 212 requires notification of SCAQMD's intent to grant a permit to construct a significant project, defined as a new or modified permit unit located within 1000 feet of a school (a state law requirement under AB 3205), a new or modified permit unit posing a maximum individual cancer risk of one in one million (1×10^6) or greater, or a new or modified facility with criteria pollutant emissions exceeding specified daily maximums. Distribution of notice is required to all addresses within a quarter mile radius, or other area deemed appropriate by SCAQMD. Rule 1401 currently controls emissions of carcinogenic and non-carcinogenic (health effects other than cancer) air contaminants from new, modified and relocated sources by specifying limits on cancer risk and hazard index (explained further in the following discussion), respectively. The rule lists nearly 300 TACs that are evaluated during SCAQMD's permitting process for new, modified or relocated sources. During the past decade, more than ten compounds have been added or had risk values amended. The addition of DPM from diesel-fueled internal combustion engines as a TAC in March 2008 was the most significant of recent amendments to the rule.

TABLE 3.2-7

SCAQMD Air Toxic Rules Recently Amended or Adopted[1]

Rule	Source Category	Key Adoption/ Amendment Dates	TAC	Number of Facilities	Estimated Emission Reductions	Final Emission Limit	Final Ambient Limit
1156	Cement Manufacturing	3/6/2009 *(amended)* 11/6/2015 *(amended)*	Hexavalent Chromium	2	32 lbs/yr (Cr+6)	N/A	0.2 ng/m3 (Cr+6)
1401	New Source Review of Toxic Air Contaminants	6/5/2015 *(amended)*	Multiple TACs	All permitted facilities	N/A	N/A	N/A
1401.1	Requirements for New and Relocated Facilities Near Schools	6/5/2015 *(amended)*	Multiple TACs	All permitted facilities	N/A	N/A	N/A
1402	Control of Toxic Air Contaminants from Existing Sources	6/5/2015 *(amended)*	Multiple TACs	All permitted facilities	N/A	N/A	N/A
1420.1	Lead-acid Battery Recycling	11/5/2010 *(adopted)* 1/10/2014 *(amended)* 3/6/2015 *(amended)* 9/4/2015 *(amended)*	Lead Arsenic Benzene 1,3-Butadiene	2	31 lbs/yr (Arsenic) 3,673 lbs/yr (Benzene) 485 lbs/yr (1,3-Butadiene)	0.00114 lb/hr (Arsenic) 0.003 lb/hr (Lead)	10.0 ng/m3 (Arsenic) 0.100 µg/m3 (Lead)
1420.2	Metal Melting Facilities	10/2/2015 *(adopted)*	Lead	13	N/A	99% control efficiency or 0.0003 lb/hr (Lead)	0.100 µg/m3 (Lead)
1470[1]	Stationary Diesel-Fueled Engines	5/4/2012 *(amended)*	Diesel PM	~4900	N/A	0.01 to 0.15 g/bhp-hr for new engines near a sensitive receptor	N/A

[1] Implements ATCM for stationary compression and ignition engines

Rule 1401.1 – Requirements for New and Relocated Facilities Near Schools sets risk thresholds for new and relocated facilities near schools. The requirements are more stringent than those for other air toxics rules in order to provide additional protection to school children.

Air Toxics Control Plan: On March 17, 2000, the SCAQMD Governing Board approved the Air Toxics Control Plan (2000 ATCP) which was the first comprehensive plan in the nation to guide future toxic rulemaking and programs. The ATCP was developed to lay out SCAQMD's air toxics control program which built upon existing federal, state, and local toxic control programs as well as co-benefits from implementation of SIP measures. The concept for the plan was an outgrowth of the Environmental Justice principles and the Environmental Justice Initiatives adopted by SCAQMD Governing Board on October 10, 1997. Monitoring studies and air toxics regulations that were created from these initiatives emphasized the need for a more systematic approach to reducing toxic air contaminants. The intent of the plan was to reduce exposure to air toxics in an equitable and cost-effective manner that promotes clean, healthful air in the SCAQMD. The plan proposed control strategies to reduce TACs in the SCAQMD implemented between years 2000 and 2010 through cooperative efforts of SCAQMD, local governments, CARB and U.S. EPA.

Cumulative Impact Reduction Strategies (CIRS): The CIRS was presented to the SCAQMD Governing Board on September 5, 2003 as part of the White Paper on Regulatory Options for Addressing Cumulative Impacts from Air Pollution Emissions. The resulting 25 cumulative impacts strategies were a key element of the Addendum to March 2000 Final Draft Air Toxics Control Plan for Next Ten Years (2004 Addendum). The strategies included rules, policies, funding, education, and cooperation with other agencies. Some of the key SCAQMD accomplishments related to the cumulative impacts reduction strategies were:

- Rule 1401.1 which set more stringent health risk requirements for new and relocated facilities near schools
- Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines which established DPM emission limits and other requirements for dieselfueled engines
- Rule 1469.1 – Spraying Operations Using Coatings Containing Chromium which regulated chrome spraying operations
- Rule 410 – Odor from Transfer Stations and Material Recovery Facilities which addresses odors from transfer stations and material recovery facilities
- Intergovernmental Review comment letters for CEQA documents
- SCAQMD's land use guidance document
- Additional protection in toxics rules for sensitive receptors, such as more stringent requirements for chrome plating operations and diesel engines located near schools

2004 Addendum: The 2004 Addendum was adopted by the SCAQMD Governing Board on April 2, 2004 and served as a status report regarding implementation of the various mobile and stationary source strategies in the 2000 ATCP and introduced new measures to further address air toxics. The main elements of the 2004 Addendum were to address the progress made in the implementation of the 2000 ATCP control strategies provide a historical perspective of air toxic emissions and current air toxic levels; incorporate the CIRS approved in 2003 and additional measures identified in the 2003 AQMP; project future air toxic levels to the extent feasible; and

summarize future efforts to develop the next ATCP. Significant progress had been made in implementing most of SCAQMD strategies from the 2000 ATCP and the 2004 Addendum. CARB has also made notable progress in mobile source measures via its Diesel Risk Reduction Plan, especially for goods movement related sources, while the U.S. EPA continued to implement their air toxic programs applicable to stationary sources.

Clean Communities Plan: On November 5, 2010, the SCAQMD Governing Board approved the 2010 Clean Communities Plan (CCP). The CCP was an update to the 2000 ATCP and the 2004 Addendum. The objective of the 2010 CCP was to reduce the exposure to air toxics and air-related nuisances throughout the SCAQMD, with emphasis on cumulative impacts. The elements of the 2010 CCP are community exposure reduction, community participation, communication and outreach, agency coordination, monitoring and compliance, source-specific programs, and nuisance. The centerpiece of the 2010 CCP is a pilot study through which SCAQMD staff works with community stakeholders to identify and develop solutions community-specific to air quality issues in two communities: (1) the City of San Bernardino; and (2) Boyle Heights and surrounding areas.

Control of TACs under the Air Toxics "Hot Spots" Act: On October 2, 1992, the SCAQMD Governing Board adopted public notification procedures for Phase I and II facilities. These procedures specify that AB 2588 facilities must provide public notice when exceeding the following risk levels:

- Maximum Individual Cancer Risk: greater than 10 in one million (10×10^6)
- Total Hazard Index: greater than 1.0 for TACs except lead, or > 0.5 for lead

Public notice is to be provided by letters mailed to all addresses and all parents of children attending school in the impacted area. In addition, facilities must hold a public meeting and provide copies of the facility risk assessment in all school libraries and a public library in the impacted area.

The AB 2588 Toxics “Hot Spots” Program is implemented through Rule 1402 - Control of Toxic Air Contaminants from Existing Sources. SCAQMD continues to review health risk assessments submitted. Notification is required from facilities with a significant risk under the AB 2588 program based on their initial approved health risk assessments and will continue on an ongoing basis as additional and subsequent health risk assessments are reviewed and approved.

There are currently about 361 facilities in SCAQMD’s AB 2588 program. Since 1992 when the state Health and Safety Code (H&S) incorporated a risk reduction requirement in the program, SCAQMD has reviewed and approved over 335 HRAs; 50 facilities were required to do a public notice and 24 facilities were subject to risk reduction. Currently, over 96 percent of the facilities in the program have cancer risks below ten in a million and over 97 percent have acute and chronic hazard indices of less than one (SCAQMD, 2015a).

CEQA Intergovernmental Review Program: SCAQMD staff, through its Intergovernmental Review (IGR) provides comments to lead agencies on air quality analyses and mitigation measures in CEQA documents. The following are some key programs and tools that have been developed

more recently to strengthen air quality analyses, specifically as they relate to exposure of mobile source air toxics:

- SCAQMD's Mobile Source Committee approved the "Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions" (August 2002). This document provides guidance for analyzing cancer risks from DPM from truck idling and movement (e.g., truck stops, warehouse and distribution centers, or transit centers), ship hoteling at ports, and train idling.
- CalEPA and CARB's "Air Quality and Land Use Handbook: A Community Health Perspective" (April 2005), provides recommended siting distances for incompatible land uses.
- Western Riverside Council of Governments' Regional Air Quality Task Force developed a policy document titled, "Good Neighbor Guidelines for Siting New and/or Modified Warehouse/Distribution Facilities" (September 2005). This document provides guidance to local government on preventive measures to reduce neighborhood exposure to toxic air contaminants from warehousing facilities.

Environmental Justice (EJ): Environmental justice has long been a focus of SCAQMD. In 1990, SCAQMD formed an Ethnic Community Advisory Group that was restructured as the Environmental Justice Advisory Group (EJAG) in 2008. EJAG's mission is to advise and assist SCAQMD in protecting and improving public health in SCAQMD's most impacted communities through the reduction and prevention of air pollution.

In 1997, the SCAQMD Governing Board adopted four guiding principles and ten initiatives (http://www.aqmd.gov/ej/history.htm) to ensure environmental equity. Also in 1997, the SCAQMD Governing Board expanded the initiatives to include the "Children's Air Quality Agenda" focusing on the disproportionate impacts of poor air quality on children. Some key initiatives that have been implemented were the Multiple Air Toxics Exposure Studies (MATES, MATES II, MATES III, and MATES IV); the Clean Fleet Rules; CIRS; funding for lower emitting technologies under the Carl Moyer Program; the Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning; a guidance document on Air Quality Issues in School Site Selection; and the 2000 ATCP and its 2004 Addendum. Key initiatives focusing on communities and residents include the Clean Air Congress; the Clean School Bus Program; Asthma and Air Quality Consortium; Brain and Lung Tumor and Air Pollution Foundation; air quality presentations to schools and community and civic groups; and Town Hall meetings. Technological and scientific projects and programs have been a large part of SCAQMD's EJ program since its inception. Over time, the EJ program's focus on public education, outreach, and opportunities for public participation have greatly increased. Public education materials and other resources for the public are available on SCAQMD's website (www.aqmd.gov)

AB 2766 Subvention Funds: AB 2766 subvention funds, money collected by the state as part of vehicle registration and passed through to SCAQMD, is used to fund projects in local cities that reduce motor vehicle air pollutants. The Clean Fuels Program, funded by a surcharge on motor vehicle registrations in SCAQMD, reduces TAC emissions through co-funding projects that develop and demonstrate low-emission clean fuels and advanced technologies, and to promote commercialization and deployment of promising or proven technologies in Southern California.

Carl Moyer Program: Another program that targets diesel emission reductions is the Carl Moyer Program which provides grants for projects that achieve early or extra emission reductions beyond what is required by regulations. Examples of eligible projects include cleaner on-road, off-road, marine, locomotive, and stationary agricultural pump engines. Other endeavors of SCAQMD's Technology Advancement Office help to reduce DPM emissions through co-funding research and demonstration projects of clean technologies, such as low-emitting locomotives.

Control of TACs with Risk Reduction Audits and Plans: Senate Bill (SB) 1731, enacted in 1992 and codified at H&S §44390 et seq., amended AB 2588 to include a requirement for facilities with significant risks to prepare and implement a risk reduction plan which will reduce the risk below a defined significant risk level within specified time limits. SCAQMD Rule 1402 was adopted on April 8, 1994 to implement the requirements of SB 1731.

In addition to the TAC rules adopted by SCAQMD under authority of AB 1807 and SB 1731, SCAQMD has adopted source-specific TAC rules, based on the specific level of TAC emitted and the needs of the area. These rules are similar to the state's ATCMs because they are source-specific and only address emissions and risk from specific compounds and operations.

Multiple Air Toxics Exposure Studies

Multiple Air Toxics Exposure Study (MATES): In 1986, SCAQMD conducted the first MATES report to determine the Basin-wide risks associated with major airborne carcinogens. At the time, the state of technology was such that only 20 known air toxic compounds could be analyzed and diesel exhaust particulate did not have an agency accepted carcinogenic health risk value. TACs are determined by U.S. EPA, and by CalEPA, including OEHHA and CARB. For purposes of MATES, the California carcinogenic health risk factors were used. The maximum combined individual health risk for simultaneous exposure to pollutants under the study was estimated to be 600 to 5,000 in one million.

Multiple Air Toxics Exposure Study II (MATES II): At its October 10, 1997 meeting, the SCAQMD Governing Board directed staff to conduct a follow up to the MATES report to quantify the magnitude of population exposure risk from existing sources of selected air toxic contaminants at that time. MATES II included a monitoring program of 40 known air toxic compounds, an updated emissions inventory of toxic air contaminants (including microinventories around each of the 14 microscale sites), and a modeling effort to characterize health risks from hazardous air pollutants. The estimated Basin-wide carcinogenic health risk from ambient measurements was 1,400 per million people. About 70 percent of the Basin-wide health risk was attributed to DPM emissions; about 20 percent to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde); about 10 percent of Basin-wide health risk was attributed to stationary sources (which include industrial sources and other certain specifically identified commercial businesses such as dry cleaners and print shops.)

Multiple Air Toxics Exposure Study III (MATES III): MATES III was part of the SCAQMD Governing Board's 2003-04 Environmental Justice Workplan approved on September 5, 2003. The MATES III report consisted of several elements including a monitoring program, an updated

emissions inventory of toxic air contaminants, and a modeling effort to characterize carcinogenic health risk across the Basin. Besides toxics, additional measurements included organic carbon, elemental carbon, and total carbon, as well as, Particulate Matter (PM), including PM2.5. It did not estimate mortality or other health effects from particulate exposures. MATES III revealed a general downward trend in air toxic pollutant concentrations with an estimated Basin-wide lifetime carcinogenic health risk of 1,200 in one million. Mobile sources accounted for 94 percent of the basin-wide lifetime carcinogenic health risk with diesel exhaust particulate contributing to 84 percent of the mobile source Basin-wide lifetime carcinogenic health risk. Non-diesel carcinogenic health risk declined by 50 percent from the MATES II values.

Multiple Air Toxics Exposure Study IV (MATES IV): MATES IV, the current version, includes a monitoring program, an updated emissions inventory of toxic air contaminants, and a modeling effort to characterize risk across the Basin. The study focuses on the carcinogenic risk from exposure to air toxics but does not estimate mortality or other health effects from particulate exposures. An additional focus of MATES IV is the inclusion of measurements of ultrafine particle concentrations. MATES IV incorporates the updated health risk assessment methodology from OEHHA. Compared to previous studies of air toxics in the Basin, this study found decreasing air toxics exposure, with the estimated Basin-wide population-weighted risk down by about 57 percent from the analysis done for the MATES III time period. The ambient air toxics data from the ten fixed monitoring locations also demonstrated a similar reduction in air toxic levels and risks. On average, diesel particulate contributes about 68 percent of the total air toxics risk. This is a lower portion of the overall risk compared to the MATES III estimates of about 84 percent.

3.2.2.1.4 Health Effects

Carcinogenic Health Risks from TACs: One of the primary health risks of concern due to exposure to TACs is the risk of contracting cancer. The carcinogenic potential of TACs is a particular public health concern because it is currently believed by many scientists that there is no "safe" level of exposure to carcinogens. Any exposure to a carcinogen poses some risk of causing cancer. It is currently estimated that about one in four deaths in the United States is attributable to cancer. The proportion of cancer deaths attributable to air pollution has not been estimated using epidemiological methods.

Non-Cancer Health Risks from TACs: Unlike carcinogens, for most non-carcinogens it is believed that there is a threshold level of exposure to the compound below which it will not pose a health risk. CalEPA's OEHHA develops Reference Exposure Levels (RELs) for TACs which are health-conservative estimates of the levels of exposure at or below which health effects are not expected. The non-cancer health risk due to exposure to a TAC is assessed by comparing the estimated level of exposure to the REL. The comparison is expressed as the ratio of the estimated exposure level to the REL, called the hazard index (HI).

3.2.2.2 Climate Change

Global climate change is a change in the average weather of the Earth, which can be measured by wind patterns, storms, precipitation, and temperature. Historical records have shown that

temperature changes have occurred in the past, such as during previous ice ages. Data indicate that the current temperature record differs from previous climate changes in rate and magnitude.

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs), comparable to a greenhouse, which captures and traps radiant energy. GHGs are emitted by natural processes and human activities. The accumulation of GHGs in the atmosphere regulates the Earth's temperature. Global warming is the observed increase in average temperature of the Earth's surface and atmosphere. The primary cause of global warming is an increase of GHGs in the atmosphere. The six major GHGs are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), and perfluorocarbon (PFCs). The GHGs absorb longwave radiant energy emitted by the Earth, which warms the atmosphere. The GHGs also emit longwave radiation both upward to space and back down toward the surface of the Earth. The downward part of this longwave radiation emitted by the atmosphere is known as the "greenhouse effect." Emissions from human activities such as fossil fuel combustion for electricity production and vehicles have elevated the concentration of these gases in the atmosphere.

CO2 is an odorless, colorless greenhouse gas. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human-caused) sources of CO2 are from burning coal, oil, natural gas, and wood.

CH4 is a flammable gas and is the main component of natural gas. N2O, also known as laughing gas, is a colorless greenhouse gas. Some industrial processes such as fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions also contribute to the atmospheric load of N2O. HFCs are synthetic man-made chemicals that are used as a substitute for chlorofluorocarbons (whose production was stopped as required by the Montreal Protocol) for automobile air conditioners and refrigerants. The two main sources of PFCs are primary aluminum production and semiconductor manufacture. SF6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Scientific consensus, as reflected in reports issued by the United Nations Intergovernmental Panel on Climate Change, is that the majority of the observed warming over the last 50 years can be attributed to increased concentration of GHGs in the atmosphere due to human activities. Industrial activities, particularly increased consumption of fossil fuels (e.g., gasoline, diesel, wood, coal, etc.), have heavily contributed to the increase in atmospheric levels of GHGs. The United Nations Intergovernmental Panel on Climate Change constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. It concluded that a stabilization of GHGs at 400 to 450 ppm carbon dioxide-equivalent concentration is required to keep global mean warming below two degrees Celsius, which is assumed to be necessary to avoid dangerous impacts from climate change.

The potential health effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme events, air quality impacts, and sea level rise. There may be direct temperature effects through increases in average temperature leading to more extreme heat

waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems (e.g., heat rash and heat stroke). In addition, climate sensitive diseases may increase, such as those spread by mosquitoes and other disease carrying insects. Those diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding, hurricanes, and wildfires can displace people and agriculture, which would have negative consequences. Drought in some areas may increase, which would decrease water and food availability. Global warming may also contribute to air quality problems from increased frequency of smog and particulate air pollution.

The impacts of climate change may also affect projects in various ways. Effects of climate change are rising sea levels and changes in snow pack. The extent of climate change impacts at specific locations remains unclear. It is expected that federal, state and local agencies will more precisely quantify impacts in various regions. As an example, it is expected that the California Department of Water Resources will formalize a list of foreseeable water quality issues associated with various degrees of climate change. Once state government agencies make these lists available, they could be used to more precisely determine to what extent a project creates global climate change impacts.

3.2.2.2.1 Federal

Greenhouse Gas Endangerment Findings: On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA. The Endangerment Finding stated that CO2, CH4, N2O, HFCs, PFCs, and SF6, taken in combination, endanger both the public health and the public welfare of current and future generations. The Cause or Contribute Finding stated that the combined emissions from motor vehicles and motor vehicle engines contribute to the greenhouse gas air pollution that endangers public health and welfare. These findings were a prerequisite for implementing GHG standards for vehicles. The U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) finalized emission standards for light-duty vehicles in May 2010 and for heavy-duty vehicles in August of 2011.

Renewable Fuel Standard (RFS): The RFS program was established under the Energy Policy Act (EPAct) of 2005, and required 7.5 billion gallons of renewable-fuel to be blended into gasoline by 2012. Under the Energy Independence and Security Act (EISA) of 2007, the RFS program was expanded to include diesel; required the volume of renewable fuel blended into transportation fuel be increased from nine billion gallons in 2008 to 36 billion gallons by 2022; established new categories of renewable fuel; and required U.S. EPA to apply lifecycle GHG performance threshold standards so that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces. The RFS program is expected to reduce greenhouse gas emissions by 138 million metric tons, about the annual emissions of 27 million passenger vehicles, replacing about seven percent of expected annual diesel consumption and decreasing oil imports by $41.5 billion.

GHG Tailoring Rule: On May 13, 2010, U.S. EPA finalized the Tailoring Rule to phase in the applicability of the Prevention of Significant Deterioration (PSD) and Title V operating permit programs for GHGs. The rule was tailored to include the largest GHG emitters, while excluding smaller sources (restaurants, commercial facilities and small farms). The first step (January 2, 2011 to June 30, 2011) addressed the largest sources that contributed 65 percent of the stationary GHG sources. Title V GHG requirements were triggered only when affected facility

owners/operators were applying, renewing or revising their permits for non-GHG pollutants. PSD GHG requirements were applicable only if sources were undergoing permitting actions for other non-GHG pollutants and the permitted action would increase GHG emission by 75,000 metric tons of CO2 equivalents (MTCO2e) per year or more.

On June 23, 2014, the U.S. Supreme Court issued its decision in Utility Air Regulatory Group v. EPA, 134 S.Ct. 2427 (2014) ("UARG"). The Court held that U.S. EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required to be subject to PSD (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of BACT. In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in Coalition for Responsible Regulation, Inc. v. Environmental Protection Agency, Nos. 09-1322, 10-073, 10-1092 and 10-1167 (D.C. Cir. April 10, 2015), which, among other things, vacated the PSD and Title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or Title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds.

GHG Reporting Program: U.S. EPA issued the Mandatory Reporting of Greenhouse Gases Rule (40 CFR Part 98) under the 2008 Consolidated Appropriations Act. The Mandatory Reporting of Greenhouse Gases Rule requires reporting of GHG data from large sources and suppliers under the Greenhouse Gas Reporting Program. Suppliers of certain products that would result in GHG emissions if released, combusted or oxidized; direct emitting source categories; and facilities that inject CO2 underground for geologic sequestration or any purpose other than geologic sequestration are included. Facilities that emit 25,000 metric tons or more per year of GHGs in CO2 equivalents (CO2e) are required to submit annual reports to U.S. EPA. For the 2014 calendar, there were over 8,000 entities that reported 3.20 billion metric tons of GHG emissions under this program. CO2 emissions accounted for largest share of direct emissions with 91.5 percent, followed by methane with seven percent, and nitrous oxide and fluorinated gases representing the remaining 1.5 percent (U.S. EPA, 2016a).

National Program to Improve Fuel Economy: On September 15, 2009, the National Highway Traffic Safety Administration (NHTSA) and U.S. EPA announced a proposed joint rule that would explicitly tie fuel economy to GHG emissions reductions requirements. The proposed new corporate average fuel economy (CAFE) Standards would cover automobiles for model years 2012 through 2016, and would require passenger cars and light trucks to meet a combined, per mile, carbon dioxide emissions level. It is estimated that by 2016, this GHG emissions limit could equate an overall light-duty vehicle fleet average fuel economy of as much as 35.5 miles per gallon. The proposed standards would require model year 2016 vehicles to meet an estimated combined average emission level of 250 grams of carbon dioxide per mile under U.S. EPA's GHG program. On November 16, 2011, U.S. EPA and NHTSA issued a joint proposal to extend the national program of harmonized GHG and fuel economy standards to model year 2017 through 2025 passenger vehicles. In August 2012, the President of the United States finalized standards that will increase fuel economy to the equivalent of 54.5 mpg for cars and light-duty trucks by model year 2025.

Clean Power Plan: On August 3, 2015, the President of the United States and the U.S. EPA announced the Clean Power Plan. The Clean Power Plan sets achievable standards to reduce carbon dioxide emissions by 32 percent from 2005 levels by 2030. This Plan establishes final emissions guidelines for states to follow in developing plans to reduce GHG emissions from existing fossil fuel-fired electric generating units (EGUs). Specifically, U.S. EPA is establishing: (1) carbon dioxide emission performance rates representing the best system of emission reduction (BSER) for two subcategories of existing fossil fuel-fired EGUs, fossil fuel-fired electric utility steam generating units and stationary combustion turbines; (2) state-specific carbon dioxide goals reflecting the carbon dioxide emission performance rates; and (3) guidelines for the development, submittal and implementation of state plans that establish emission standards or other measures to implement the carbon dioxide emission performance rates, which may be accomplished by meeting the state goals. This final rule will continue progress already under way in the United States to reduce carbon dioxide emissions from the utility power sector. Recently, the U.S. Supreme Court issued a stay of this rule pending final determination on litigation challenging the rule.

Executive Order (EO) 13693 (2015): Published June 10, 2015, EO 13693, *Planning for Federal Sustainability in the Next Decade*, revokes multiple prior EOs and memorandum including EO 13423 and EO 13514. The new EO outlines forward-looking goals for federal agencies in the area of energy, climate change, water use, vehicle fleets, construction, and acquisition. The goal is to maintain federal leadership in sustainability and GHG emission reductions. Federal agencies shall, where life-cycle cost-effective, beginning in FY 2016:

- Reduce agency building energy intensity as measured in Btu/ft2 by 2.5 percent annually through FY 2025
- Improve data center energy efficiency at agency buildings
- Ensure a minimum percentage of total building electric and thermal energy shall be from clean energy sources
- Improve agency water use efficiency and management (including stormwater management)
- Improve agency fleet and vehicle efficiency and management by achieving minimum percentage GHG emission reductions

3.2.2.2.2 State

EO S-3-05 (2005): In June 2005, then Governor Schwarzenegger signed EO S-3-05, which established emission reduction targets. The goals would reduce GHG emissions to 2000 levels by 2010, then to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

AB 32: Global Warming Solutions Act: On September 27, 2006, AB 32, the California Global Warming Solutions Act of 2006, was enacted by the State of California and signed by Governor Schwarzenegger. AB 32 expanded on EO S-3-05. The Legislature stated that "global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." AB 32 represents the first enforceable statewide program in the

United States to cap all GHG emissions from major industries that includes penalties for non-compliance. While acknowledging that national and international actions will be necessary to fully address the issue of global warming, AB 32 lays out a program to inventory and reduce greenhouse gas emissions in California and from power generating facilities located outside the state that serve California residents and businesses.

Authorized by AB 32, the Cap-and-Trade program is one of several strategies that California uses to reduce greenhouse gas emissions. CARB adopted the California Cap-and-Trade Program final regulations on October 20, 2011 and adopted amended regulations on September 12, 2012, with the first auction for GHG allowances on November 14, 2012. Funds received from the program are deposited into the Greenhouse Gas Reduction Fund and appropriated by the Legislature. It sets a GHG emissions limit that will decrease by two percent each year until 2015, and then three percent from 2015 to 2020 to achieve the goals in AB 32. The program initially applies to large electric power plants and large industrial plants, and included fuel distributors in 2015. These rules encompass 85 percent of all of California's GHG emissions.

SB 97 - CEQA: Greenhouse Gas Emissions: On August 24, 2007, Governor Schwarzenegger signed into law Senate Bill (SB) 97 – CEQA: Greenhouse Gas Emissions stating, "This bill advances a coordinated policy for reducing greenhouse gas emissions by directing the Office of Planning and Research (OPR) and the California Natural Resources Agency to develop CEQA guidelines on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions." OPR's amendments provided guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The amendments did not establish a threshold for significance for GHG emissions. The amendments became effective on March 18, 2010. SB 97 was repealed on January 1, 2010.

Office of Planning and Research Technical Advisory on CEQA and Climate Change: Consistent with SB 97, on June 19, 2008, OPR released its Technical Advisory on CEQA and Climate Change (Technical Advisory) which was developed in cooperation with the Resources Agency, the CalEPA, and CARB. According to OPR, the Technical Advisory offers the informal interim guidance regarding the steps lead agencies should take to address climate change in their CEQA documents, until CEQA guidelines are developed pursuant to SB 97 on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions.

According to OPR, Lead Agencies should determine whether GHGs may be generated by a proposed project, and if so, quantify or estimate the greenhouse gas emissions by type and source. Second, the Lead Agency must assess whether those emissions are individually or cumulatively significant. When assessing whether a project's effects on climate change are "cumulatively considerable" even though the GHG contribution of the project may be individually limited, the Lead Agency must consider the impact of the project when viewed in connection with the effects of past, current, and probable future projects. Finally, if the Lead Agency determines that the greenhouse gas emissions from the project as proposed are potentially significant, it must investigate and implement ways to avoid, reduce, or otherwise mitigate the impacts of those emissions.

In 2014, total California GHG emissions were 441.5 million metric tons (or tonnes) of carbon dioxide equivalent (MMTCO2e). This represents a 2.58 percent decrease in total GHG emissions from 2013. Since the peak in 2001, GHG emissions have decreased by 28 percent.

In 2014, the transportation sector is the largest source of emissions, accounting for approximately 36 percent of the total emissions. On-road vehicles accounted for the majority of emissions in the transportation sector. Transportation related GHG emissions have dropped 13 percent since peak levels in 2005. The industrial sector accounted for approximately 21 percent of the total emissions. Emissions from this sector declined through 2009, then remain relatively consistent over the past few years. Emissions from electricity generation were about 20 percent of total emissions. Emissions from this sector declined by 1.6 percent in 2014 compared to 2013

Per capita emissions in California have decreased by 18 percent from 2000 to 2014, in spite of the overall increase in population during the same period. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product (GDP)) is declining, representing a 28 percent decline since the 2001 peak, while the state's GDP has grown 28 percent during this period (CARB, 2016).

From a broader geographical perspective, California ranks second in the United States in total GHG emissions; Texas remains the leading GHG emitting state. However, from a per capita and per GDP standpoint, California has the 45th and 46th lowest emissions respectively. On an international scale, California has the 20th largest GHG emissions and the 38th largest per capita emissions for year 2010 (CARB, 2014).

AB 1493 Vehicular Emissions: Carbon Dioxide: Prior to the U.S. EPA and NHTSA joint rulemaking, Governor Schwarzenegger signed AB 1493 (2002). AB 1493 requires that CARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state."

CARB originally approved regulations to reduce GHGs from passenger vehicles in September 2004, with the regulations to take effect in 2009 (see amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961) and adoption of Section 1961.1 (13 CCR 1961.1)). California's first request to the U.S. EPA to implement GHG standards for passenger vehicles was made in December 2005 and denied in March 2008. The U.S. EPA then granted California the authority to implement GHG emission reduction standards for new passenger cars, pickup trucks and sport utility vehicles on June 30, 2009.

On April 1, 2010, CARB filed amended regulations for passenger vehicles as part of California's commitment toward the National Program to reduce new passenger vehicle GHGs from 2012 through 2016. The amendments will prepare California to harmonize its rules with the federal Light-Duty Vehicle GHG Standards and CAFE Standards (discussed above).

Senate Bill 1368 (2006): SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (PUC) to establish a GHG emission performance standard for baseload generation from investor

owned utilities by February 1, 2007. The California Energy Commission (CEC) must establish a similar standard for local, publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

EO S-1-07 (2007): Governor Schwarzenegger signed EO S-1-07 in 2007 which finds that the transportation sector is the main source of GHG emissions in California. The EO proclaims the transportation sector accounts for over 40 percent of statewide GHG emissions. The EO also establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

In particular, the EO established a Low-Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the CEC, CARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the SIP for alternative fuels (State Alternative Fuels Plan adopted by CEC on December 24, 2007) and was submitted to CARB for consideration as an "early action" item under AB 32. CARB adopted the LCFS on April 23, 2009.

Senate Bill 375 (2008): SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. As part of the alignment, SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) which prescribes land use allocation in that MPO's Regional Transportation Plan (RTP). CARB, in consultation with MPOs, is required to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned GHG emission reduction targets. CARB set the following reduction targets for SCAG: reduce per capita eight percent of GHG emissions below 2005 levels by 2020 and 13 percent below 2005 levels by 2035.

SB 375 has three major components:

- Using the regional transportation planning process to achieve reductions in GHG emissions consistent with AB 32's goals.
- Offering streamlined environmental review opportunities for eligible projects, should project proponents decide to pursue.
- Coordinating the Regional Housing Needs Allocation Assessment (RHNA) process with the regional transportation process while maintaining local authority over land use decisions.

EO S-13-08 (2008): Governor Schwarzenegger signed EO S-13-08 on November 14, 2008 which directs California to develop methods for adapting to climate change through preparation of a statewide plan. The EO directs OPR, in cooperation with the California Natural Resources

Agency, to provide land use planning guidance related to sea level rise and other climate change impacts.

Senate Bills 1078 and 107 and EO S-14-08 (2008): SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, then Governor Schwarzenegger signed EO S-14-08, which expands the state's Renewable Portfolio Standard to 33 percent renewable power by 2020.

SB X-1-2 and the Clean Energy and Pollution Reduction Act of 2015: SB X-1-2 was signed by Governor Edmund G. Brown, Jr., in April 2011. SB X-1-2 created a new Renewables Portfolio Standard (RPS), which preempted CARB's 33 percent Renewable Electricity Standard. The new RPS applies to all electricity retailers in the state including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators. These entities must adopt the new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirements by the end of 2020.

Clean Energy and Pollution Reduction Act of 2015, SB 350 (Chapter 547, Statutes of 2015) was approved by Governor Brown on October 7, 2015. SB 350 will (1) increase the standards of the California RPS program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030; (2) require the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030; (3) provide for the evolution of the Independent System Operator (ISO) into a regional organization; and (4) require the state to reimburse local agencies and school districts for certain costs mandated by the state through procedures established by statutory provisions. Among other objectives, the Legislature intends to double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.

SB 862: In June 2014, SB 862 (Chapter 36, Statutes of 2014) established long-term funding programs from the Cap and Trade program for transit, sustainable communities and affordable housing, and high speed rail. SB 862 allocates 60 percent of ongoing Cap and Trade revenues, beginning in 2015–2016, to these programs. The remaining 40 percent is to be determined by future legislatures. A minimum of 25 percent of Cap and Trade dollars must go to projects that provide benefits to disadvantaged communities, and a minimum of ten percent must go to projects located within those disadvantaged communities. In addition, this bill established the CalRecycle Greenhouse Gas Reduction Revolving Loan Program and Fund.

Senate Bills 32 and 350 and EO B-30-15 (2015): Governor Brown signed EO B-30-15 in 2015 in order to reduce GHG emissions by 40 percent below 1990 levels by 2030 to ensure California meets its target of reducing GHG emissions to 80 percent of 1990 levels by 2050.

In particular, the EO commissioned CARB to update the Climate Change Scoping Plan and the California Natural Resources Agency to update the state climate adaption strategy, Safeguarding California, every three years. The Safeguarding California Plan will identify vulnerabilities to climate change by sector and regions, including, at a minimum, the following sectors: water, energy, transportation, public health, agriculture, emergency services, forestry, biodiversity and habitat, and ocean and coastal resources; outline primary risks to residents, property, communities and natural systems from these vulnerabilities, and identify priority actions needed to reduce these risks; and identify a Lead Agency or group of agencies to lead adaptation efforts in each sector.

3.2.2.2.3 SCAQMD

SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits SCAQMD to consider global impacts in rulemaking and in drafting revisions to the AQMP. On March 6, 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include support of the adoption of a California GHG emission reduction goal.

Basin GHG Policy and Inventory: SCAQMD has established a policy, adopted by the SCAQMD Governing Board at its September 5, 2008 meeting, to actively seek opportunities to reduce emissions of criteria, toxic, and climate change pollutants. The policy includes the intent to assist businesses and local governments implementing climate change measures, decrease the agency's carbon footprint, and provide climate change information to the public. SCAQMD will take the following actions:

1. Work cooperatively with other agencies/entities to develop quantification protocols, rules, and programs related to GHGs;
2. Share experiences and lessons learned relative to the Regional Clean Air Incentives Market (RECLAIM) to help inform state, multi-state, and federal development of effective, enforceable cap-and-trade programs. To the extent practicable, staff will actively engage in current and future regulatory development to ensure that early actions taken by local businesses to reduce GHGs will be treated fairly and equitably. SCAQMD staff will seek to streamline administrative procedures to the extent feasible to facilitate the implementation of AB 32 measures;
3. Review and comment on proposed legislation related to climate change and GHGs, pursuant to the 'Guiding Principles for SCAQMD Staff Comments on Legislation Relating to Climate Change' approved at the SCAQMD Governing Board Retreat in April 2008;
4. Provide higher priority to funding Technology Advancement Office projects or contracts that also reduce GHG emissions;
5. Develop recommendations through a public process for an interim GHG CEQA significance threshold, until such time that an applicable and appropriate statewide GHG significance level is established. Provide guidance on analyzing GHG emissions and identify mitigation measures. Continue to consider GHG impacts and mitigation in SCAQMD Lead Agency documents and in comments when SCAQMD is a responsible agency;
6. Revise SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning to include information on GHG strategies as a resource for local

governments. The Guidance Document will be consistent with state guidance, including CARB's Scoping Plan;

7. Bring recommendations to the SCAQMD Governing Board on how the agency can reduce its own carbon footprint, including drafting a Green Building Policy with recommendations regarding SCAQMD purchases, building maintenance, and other areas of products and services. Assess employee travel as well as other activities that are not part of a GHG inventory and determine what GHG emissions these activities represent, how they could be reduced, and what it would cost to offset the emissions;
8. Provide educational materials concerning climate change and available actions to reduce GHG emissions on the SCAQMD website, in brochures, and other venues to help cities and counties, businesses, households, schools, and others learn about ways to reduce their electricity and water use through conservation or other efforts, improve energy efficiency, reduce vehicle miles traveled, access alternative mobility resources, utilize low emission vehicles and implement other climate friendly strategies; and
9. Conduct conferences, or include topics in other conferences, as appropriate, related to various aspects of climate change, including understanding impacts, technology advancement, public education, and other emerging aspects of climate change science.

On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for projects where SCAQMD is the Lead Agency. SCAQMD's recommended interim GHG significance threshold proposal uses a tiered approach to determining significance. Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA. Tier 2 consists of determining whether or not the project is consistent with a GHG reduction plan that may be part of a local general plan, for example. Tier 3 establishes a screening significance threshold level to determine significance using a 90 percent emission capture rate approach, which corresponds to 10,000 MTCO2e emissions per year. Tier 4, to be based on performance standards, is yet to be developed. Under Tier 5 the project proponent would allow offsets to reduce GHG emission impacts to less than the proposed screening level. If CARB adopts statewide significance thresholds, SCAQMD staff plans to report back to the SCAQMD Governing Board regarding any recommended changes or additions to SCAQMD's interim threshold.

Table 3.2-8 presents the GHG emission inventory by major source categories in calendar year 2008. The emissions reported herein are based on in-Basin energy consumption and do not include out-of-Basin energy production (e.g., power plants, crude oil production) or delivery emissions (e.g., natural gas pipeline loss). These GHG emissions are reported in MMTCO2e. Mobile sources generate 59.4 percent of the equipment, airport equipment, oil and gas drilling equipment. The remaining 40.6 percent of the total Basin GHG emissions are from stationary and area sources. The largest stationary/area source is fuel combustion, which is 27.8 percent of the total Basin GHG emissions (68.6 percent of the GHG emissions from the stationary and area source category).

Table 3.2-9 presents the GHG emission inventory by fuel type in calendar year 2012 for the Basin. These GHG emissions are reported in metric tons of CO2. Gasoline generates 53 percent of the GHG emissions from fuel combustion. Natural gas generates 31 percent of the GHG emissions from fuel combustion. The remaining 20 percent of the total Basin GHG emissions from fuel combustion are from diesel, jet fuel, LPG, and fuel oil (2016 AQMP, Chapter 10).

TABLE 3.2-8

2008 GHG Emissions for the Basin

Source Category	Emissions						
	CO2	N2O	CH4	CO2	N2O	CH4	CO2e
	(TPD)			(TPY)			(MMT)
Fuel Combustion							
Electric Utilities	34,303	0.08	0.71	12,520,562	29.0	258	11.4
Cogeneration	872	0.00	0.02	318,340	0.60	6.00	0.29
Oil and Gas Production (Combustion)	2,908	0.01	0.08	1,061,470	4.71	29.5	0.96
Petroleum Refining (Combustion)	44,654	0.06	0.57	16,298,766	20.7	207	14.8
Manufacturing and Industrial	22,182	0.06	0.48	8,096,396	20.9	174	7.35
Food and Agricultural Processing	927	0.00	0.02	338,516	0.84	7.16	0.31
Service and Commercial	21,889	0.08	0.59	7,989,416	30.8	215	7.26
Other	2,241	0.02	0.16	818,057	8.58	58	0.75
Total Fuel Combustion	**129,977**	**0.32**	**2.62**	**47,441,523**	**116**	**956**	**43.1**
Petroleum Production and Marketing							
Oil and Gas Production	92.1	0.00	0.92	33,605	0.06	336	0.04
Petroleum Refining	770	0.00	1.65	280,932	0.36	603	0.27
Petroleum Marketing			83.8	0	0.00	30,598	0.58
Other			0.00	0	0.00	0	0.00
Total Petroleum Production and Marketing	**862**	**0.00**	**86.4**	**314,536**	**0.42**	**31,537**	**0.89**
Other Source Categories							
Total Waste Disposal[(b)]	3,772	0.04	508	1,376,870	14.9	185,278	4.78
Total Cleaning and Surface Coatings[(c)]	2,648	0.00	0.33	966,628	1.22	122	0.88
Total Industrial Processes[(d)]	279	0.00	1.49	101,832	0.19	543	0.10
Total Solvent Evaporation[(e)]	0.00	0.00	0.07	0.00	0.00	24.20	0.00
Total Miscellaneous Processes[(f)]	38,850	0.12	27.9	14,180,326	45.3	10,179	13.1
Total On-Road Motor Vehicles[(g)]	217,480	6.11	8.26	79,380,188	155	187	72.7
Total Other Mobile Sources[(h)]	57,572	1.83	8.95	21,013,816	668	3,268	19.3
Total Other Source Categories	**320,601**	**8.10**	**555**	**117,019,660**	**885**	**199,601**	**111**
Total 2008 Baseline GHG Emissions for Basin	**451,440**	**8.42**	**644**	**164,775,719**	**1,001**	**232,094**	**155**

Source: (SCAQMD, 2012)

(a) MMT = million metric tons.

(b) Waste Disposal includes sewage treatment, landfills, incineration, and other waste disposal.

(c) Cleaning and Surface Coatings includes laundering, degreasing, coatings and related processes, printing, adhesives and sealants, and other cleaning and surface coatings.

(d) Industrial Processes include chemical, food and agriculture, mineral processes, metal processes, wood and paper, glass and related products, electronic, and other industrial processes.

(e) Solvent Evaporation includes consumer products, architectural coating and related solvents, pesticides and fertilizers, and asphalt paving and roofing.

(f) Miscellaneous Processes include residential fuel combustion, farming operations, construction and demolition, paved road dust, unpaved road dust, fugitive windblown dust, fires, waste burning and disposal, utility equipment, cooking, and other miscellaneous processes.

(g) On-Road Motor Vehicles include trucks (all sizes), motorcycles, buses (all types), and motorhomes.

(h) Other Mobile Sources include aircraft; trains; ships; commercial boats, construction, airport, and oil and gas drilling equipment.

TABLE 3.2-9

2012 GHG Emissions from Fuel Use in the Basin

Fuel Type	Consumption (Gallons)	Gas Supply (Therms)	CO2 Emissions (MT)
Gasoline	7,647,883,106	-	67,148,414
On-Road	7,108,714,450		62,414,512.87
Off-Road	539,168,656		4,733,900.80
Diesel	1,423,889,933	-	14,537,916
On-Road	872,963,200		8,912,954.27
Commercial Harborcraft	21,912,232		223,723.89
Trains	33,129,134		338,248.46
Off-Road	495,885,367		5,062,989.59
Jet Fuel	508,249,568.11		4,955,433.29
Fuel Oil - OGV (Residual Fuel Oil 5/6)	23,960,515.63		282,734.08
Natural Gas	8,831,724,016	7,359,770,013	39,389,489
Residential	2,445,612,164	2,038,010,137	10,907,430.25
Commercial	990,525,700	825,438,083	4,417,744.62
Industrial	1,592,974,552	1,327,478,793	7,104,666.50
NGV	132,285,600	110,238,000	589,993.78
EG	3,670,326,000	3,058,605,000	16,369,653.96
LPG	182,009,738		1,053,836
Residential	115,838,116		670,702.69
Commercial	43,807,549		253,645.71
Industrial	22,364,073		129,487.98
Total	**18,671,716,877**		**127,367,823**

Source: 2016 AQMP

3.3 ENERGY

The purpose of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. Some of the proposed control measures intended to improve overall air quality may have direct or indirect energy impacts associated with their implementation. This subsection describes the existing setting relate to energy production and demand within California and the Basin.

3.3.1 REGULATORY SETTING

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation (U.S. DOT), United States Department of Energy (U.S. DOE), and United States Environmental Protection Agency (U.S. EPA) are three agencies with substantial influence over energy policies and programs. Generally, federal agencies influence transportation energy consumption through establishment and enforcement of fuel economy standards for automobiles and light trucks, through funding of energy related research and development projects, and through funding for transportation infrastructure projects.

On the state level, the California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are two agencies with authority over different aspects of energy. The CPUC regulates privately-owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. The CEC collects and analyzes energy-related data; forecasts future energy needs; promotes energy efficient and conservation by setting appliance and building energy efficiency standards; supports energy research; develops renewable energy resources, promotes alternative and renewable transportation fuels and technologies; certifies thermal power plants 50 megawatts (MW) and larger; and plans for and directs state response to energy emergencies. Some of the more relevant federal and state transportation-energy-related laws and plans are discussed in the following subsections.

3.3.1.1 Federal Regulations

3.3.1.1.1 Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 (EPCA) was enacted for the purpose of serving the nation's energy demands and promoting conservation methods when feasibly obtainable. Since being enacted on December 22, 1975, EPCA has been amended to:

- Grant specific authority to the President to fulfill obligations of the United States under the international energy program;

- Provide for the creation of a Strategic Petroleum Reserve capable of reducing the impact of severe energy supply interruptions;

- Conserve energy supplies through energy conservation programs, and the regulation of certain energy uses;

- Provide for improved energy efficiency of motor vehicles, major appliances, and certain other consumer products;

- Provide a means for verification of energy data to assure the reliability of energy data; and,

- Conserve water by improving the water efficiency of certain plumbing products and appliances.

3.3.1.1.2 National Energy Act of 1978

The National Energy Act of 1978 included the following statutes: Public Utilities Regulatory Policies Act of 1978 (PURPA; Public Law 95-617), Energy Tax Act, National Energy Conservation Policy Act (NECPA), Power Plant and Industrial Fuel Use Act, and the National Gas Policy Act. The Power Plant and Industrial Fuel Use Act restricted the fuel used in power plants, however, these restrictions were lifted in 1987. The Energy Tax Act was superseded by the Energy Policy Acts of 1992 (EPACT92) and 2005. The National Gas Policy Act gave the Federal Energy Regulatory Commission authority over natural gas production and established pricing guidelines. NECPA set minimum energy performance standards, which replaced those in EPCA and the federal standards preempted those set by the state. NECPA was amended by the EPCA Amendments of 1985. Of the five statutes, PURPA, is relevant to the consideration of the 2016 AQMP.

3.3.1.1.3 PURPA

PURPA was passed in response to the unstable energy climate of the late 1970s. PURPA sought to promote conservation of electric energy. Additionally, PURPA created a new class of non-utility generators, small power producers, from which, along with qualified co-generators, utilities are required to buy power.

PURPA was in part intended to augment electric utility generation with more efficiently produced electricity and to provide equitable rates to electric consumers. Utility companies are required to buy all electricity from a qualifying facility (QF). PURPA expanded participation of non-utility generators in the electricity market and demonstrated that electricity from non-utility generators could successfully be integrated with a utility's own supply. PURPA requires utilities to buy whatever power is produced by QFs (usually cogeneration or renewable energy). The Fuel Use Act of 1978 (FUA) (repealed in 1987) also helped QFs become established. Under the FUA, utilities were not allowed to use natural gas to fuel new generating technologies, but QFs, which were by definition not utilities, were able to take advantage of abundant natural gas and abundant new technologies (such as combined-cycle).

3.3.1.1.4 EPACT92

EPACT92 is comprised of 27 titles. It was passed by Congress and set goals, created mandates, and amended utility laws to increase clean energy use and improve overall energy efficiency in the United States. EPACT92 established regulations requiring certain federal, state, and alternative fuel provider fleets to build an inventory of alternative fuel vehicles. EPACT92 was amended as part of the Energy Conservation and Reauthorization Act of 1998 and via the Energy Policy Act in 2005 which emphasized alternative fuel use and infrastructure development.

3.3.1.1.5 Energy Policy Act of 2005

The Energy Policy Act of 2005 addresses energy efficiency; renewable energy requirements; oil, natural gas and coal; alternative-fuel use; tribal energy, nuclear security; vehicles and vehicle fuels; hydropower and geothermal energy; and climate change technology. The act provides revised annual energy reduction goals (two percent per year beginning in 2006), revised renewable energy purchase goals, federal procurement of Energy Star or Federal Energy Management Program designated products, federal green building standards, and fuel cell vehicle and hydrogen energy system research and demonstration.

3.3.1.1.6 Clean Air Act (CAA): Renewable Fuel Standard (RFS)

CAA §211 (o), as amended by the Energy Policy Act of 2005, requires the Administrator of the U.S. EPA to annually determine an RFS which is applicable to refiners, importers, and certain blenders of gasoline and publish the standard in the Federal Register by November 30 of each year. On the basis of this standard, each obligated party determines the volume of renewable fuel that it must ensure is consumed as motor vehicle fuel. This standard is calculated as a percentage, by dividing the amount of renewable fuel that the CAA requires to be blended into gasoline for a given year by the amount of gasoline expected to be used during that year, including certain adjustments specified by the CAA.

3.3.1.1.7 Corporate Average Fuel Economy (CAFE) Standards

Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. The CAFE standards were created to determine vehicle manufacturers' compliance with the fuel economy standards and are administered by the U.S. EPA. The U.S. EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE standards, the U.S. DOT is authorized to assess penalties for noncompliance.

3.3.1.1.8 Energy Independence and Security Act of 2007 (EISA)

EISA was signed into law on December 19, 2007. The objectives EISA are to move the United States toward greater energy independence and security, increase the production of clean renewable fuels, protect consumers, increase the efficiency of products, buildings and vehicles, promote greenhouse gas (GHG) research, improve the energy efficiency of the federal government, and improve vehicle fuel economy.

The renewable fuel standard in EISA requires the production of 36 billion gallons of ethanol per year by 2022, with corn-based ethanol limited to 15 billion gallons. The CAFE standard for light duty vehicles is 35 miles per gallon by 2020. EISA also specifies that vehicle attribute-based standards are to be developed separately for cars and light trucks. EISA creates a CAFE credit and transfer program among manufacturers and across a manufacturer's fleet. It would allow an extension through 2019 of the CAFE credits specified under the Alternative Motor Fuels Act. It established appliance energy efficiency standards for boilers, dehumidifiers, dishwashers, clothes washers, external power supplies, commercial walk-in coolers and freezers; federal buildings; lighting energy efficiency standards for general service incandescent lighting in 2012; and standards for industrial electric motor efficiency.

3.3.1.1.9 Moving Ahead for Progress in the 21st Century (MAP-21)

MAP-21 replaced the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) as the nation's surface transportation program and extended the provisions for fiscal year (FY) 12 with new provisions for FY 13. MAP-21 funds surface transportation programs and is intended to create a streamlined, performance-based, and multimodal program to address challenges facing the United States transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. MAP-21 addresses economic growth, accessibility, social equity, energy security and public health by setting transparent performance benchmarks.

3.3.1.1.10 Heavy-Duty National Program

The Heavy-Duty National Program was adopted on August 9, 2011, to establish the first fuel efficiency requirements for medium- and heavy-duty vehicles beginning with model year 2014.

3.3.1.1.11 Proposed Phase 2 GHG Emissions Standards (Phase 2) and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles

In June 2015, the U.S. EPA and U.S. DOT's National Highway Traffic Safety Administration (NHTSA) are jointly proposing a national program that would establish GHG and fuel efficiency standards for medium- and heavy-duty vehicles. The Phase 2 standards are expected to reduce fuel consumption and GHG emissions by one billion metric tons; they would begin in model year 2021 and culminate in standards for model year 2027.

3.3.1.2 State Regulations

3.3.1.2.1 California Building Energy Efficiency Standards: Title 24

California established statewide building energy efficiency standards following legislative action. The legislation required the standards to be cost-effective based on the building life cycle and to include both prescriptive and performance-based approaches. The 2005 Building Energy Efficiency Standards were first adopted in November 2003 and took effect October 1, 2005. Subsequently the standards have undergone two updates: 2008 and 2013. The 2013 Building Energy Efficiency Standards went into effect on July 1, 2014. The 2016 standards, which will go into effect on January 1, 2017 and will continue to improve upon the current 2013 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings.

The 2013 standards focus on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings, and include requirements that will enable both demand reductions during critical peak periods and future solar electric and thermal system installations.

3.3.1.2.2 AB 1007 – Alternative Fuels Plan

The Alternative Fuels Plan adopted in 2007 by the State Energy Resources Conservation and Development Commission and CARB, as required under state law AB 1007, recommends that the Governor set targets on a gasoline gallon equivalent (GGE) basis for ten different alternative motor fuels used in the on- and off-road sectors by nine percent by 2012, 11 percent by 2017, and 26 percent by 2022. These targets do not apply to air, rail, or marine fuel uses. These goals will require a dramatic expansion in the use of such fuels as electricity, compressed natural gas, hydrogen, renewable diesel, bio-diesel, and ethanol in motor vehicles.

Also built into the Alternative Fuels Plan is a multi-part strategy to develop hybrid and electric vehicle technologies; build the infrastructure to deliver the alternative fuels; increase the blending of more biofuels into gasoline and diesel; improve the fuel efficiency of vehicles; and reduce vehicle miles traveled by California motorists with more effective land use planning.

3.3.1.2.3 AB 1493 – Vehicle Climate Change Standards

The Advanced Clean Cars Program under AB 1493 (Pavley I), requires CARB to develop and adopt standards for vehicle manufacturers to reduce GHG emissions coming from passenger vehicles and light-duty trucks at a "maximum feasible and cost effective reduction" by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG" will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction by 2012 and 30 percent by 2016.

In January 2012, CARB adopted the Advanced Clean Cars program to extend AB 1493 through model years 2017 to 2025. This program will promote all types of clean fuel technologies such as plug-in hybrids, battery electric vehicles, compressed natural gas (CNG) vehicles, and hydrogen powered vehicles while reducing smog.

3.3.1.2.4 Senate Bill (SB) 1368 – GHG Emissions Performance Standards for Major Power Plant Investments

SB 1368 was passed in September 2006 and requires the CEC to develop and adopt by regulation a GHG emissions performance standard for long-term procurement of electricity by local publicly owned utilities. The CPUC and CEC had adopted specific regulations regarding GHG emissions performance standards for electricity service providers. Compliance with these standards is expected to improve fuel use.

3.3.1.2.5 California Solar Initiative

On January 12, 2006, the CPUC approved the California Solar Initiative (CSI), which provides $2.9 billion in incentives between 2007 and 2017. CSI is part of the Go Solar California campaign, and builds on ten years of state solar rebates offered to areas services by California's Investor-owned utilities (IOU): Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E.) The CSI is overseen by the CPUC and includes a $2.5 billion program for commercial and existing residential customers, funded through revenues and collected from gas and electric utility distribution rates. Furthermore, the CEC will manage $350 million targeted for new residential building construction, utilizing funds already allocated to the CEC to foster renewable projects between 2007 and 2011.

Current incentives provide an upfront, capacity-based payment for a new system. In its August 24, 2006 decision, the CPUC shifted the program from volume-based to performance-based incentives and clarified many elements of the program's design and administration. These changes were enacted in 2007.

3.3.1.2.6 Reducing California's Petroleum Dependence

The CEC and CARB produced a joint report "Reducing California's Petroleum Dependence" to highlight petroleum consumption and to establish a performance based goal to reduce petroleum consumption in California over the next thirty years. The report includes the following recommendations to the Governor and Legislature regarding petroleum:

- Adopt the recommended statewide goal of reducing demand for on-road gasoline and diesel to 15 percent below the 2003 demand level by 2020 and maintaining that level for the foreseeable future.

- Work with the California delegation and other states to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles.

- Establish a goal to increase the use of non-petroleum fuels to 20 percent of on-road fuel consumption by 2020, and 30 percent by 2030.

The CEC will also use these recommendations when developing its series of recommendations to the Governor and Legislature for the integrated energy plan for electricity, natural gas, and transportation fuels.

3.3.1.2.7 AB 2514 – Energy Storage Systems

AB 2514 requires the CPUC to adopt an energy storage system procurement target, if determined to be appropriate, to be achieved by each load-serving entity by December 31, 2015 and a second target to be achieved by December 31, 2020. The bill would require the governing board of a local publicly owned electric utility to adopt an energy storage system procurement target, if determined to be appropriate, to be achieved by that utility by December 31, 2016; second target by December 31, 2021. The bill would require each load-serving entity and local publicly owned electric utility to report certain information to the CPUC (load-serving entity) or to the Energy Commission (local publicly owned electric utility).

3.3.1.2.8 EO B-16-2012

EO B-16-2012 establishes long-term targets of reaching 1.5 million zero-emission vehicles (ZEV) on California's roadways by 2025 and sets ZEV purchasing requirements for state government fleets. EO B-16-2012 also sets a target for 2050 of a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels. In February 2013, an interagency working group developed the ZEV Action Plan, which identifies specific strategies and actions that state agencies will take to meet the milestones of the EO. The ZEV Action Plan states:

> *ZEVs are crucial to achieving the state's 2050 greenhouse gas goal of 80 percent emission reductions below 1990 levels, as well as meeting federal air quality standards. Achieving 1.5 million ZEVs by 2025 is essential to advance the market and put the state on a path to meet these requirements.*

3.3.1.2.9 Renewables Portfolio Standard (RPS)

California's RPS requires retail sellers of electricity to increase their procurement of eligible renewable energy resources by at least one percent per year so that 20 percent of their retail sales are procured from eligible renewable energy resources by 2017. If a seller falls short in a given year, they must procure more renewables in succeeding years to make up the shortfall. Once a retail seller reaches 20 percent, they need not increase their procurement in succeeding years. RPS was enacted via SB 1078, signed in September 2002. The CEC and the CPUC are jointly implementing the standard. In 2006, RPS was modified by SB 107 to require retail sellers of electricity to reach the 20 percent renewables goal by 2010. In 2011, RPS was further modified by SB 2 to require retailers to reach 33 percent renewable energy by 2020.

3.3.1.2.10 SB 350

SB 350 was approved on October 7, 2015. SB 350 will: (1) increase the standards of the California RPS program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030; (2) require the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end

uses of retail customers by January 1, 2030; (3) provide for the evolution of the Independent System Operator (ISO) into a regional organization; and (4) require the state to reimburse local agencies and school districts for certain costs mandated by the state through procedures established by statutory provisions. Among other objectives, the Legislature intends to double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.

3.3.1.2.11 EO B-18-12

EO B-18-12 was signed into law on April 25, 2012 and directed state agencies to reduce their grid-based energy purchases by at least 20 percent by 2018, as compared to a 2003 baseline. Pursuant to EO B-18-12, all new state buildings and major renovations beginning design after 2025 shall be constructed as Zero Net Energy facilities with an interim target for 50 percent of new facilities beginning design after 2020 to be Zero Net Energy. State agencies shall also take measures toward achieving Zero Net Energy for 50 percent of the square footage of existing state-owned building area by 2025 and reduce water use by 20 percent by 2020. Additionally, the following measures relevant to energy are required:

- Any proposed new or major renovation of state buildings larger than 10,000 square feet shall use clean, on-site power generation, such as solar photovoltaic, solar thermal and wind power generation, and clean back-up power supplies, if economically feasible;

- New or major renovated state buildings and build-to-suit leases larger than 10,000 square feet shall obtain a Leadership in Energy and Environmental Design (LEED) "Silver" certification or higher using the applicable version of LEED;

- New and existing buildings shall incorporate building commissioning to facilitate improved and efficient building operation; and

- State agencies shall identify and pursue opportunities to provide electric vehicle charging stations and accommodate future charging infrastructure demand, at employee parking facilities in new and existing buildings.

3.3.1.2.12 California Environmental Quality Act (CEQA)

Appendix F of the CEQA Guidelines describes the types of information and analyses related to energy conservation that are to be included in Environmental Impact Reports (EIR) that are prepared pursuant to CEQA. Energy conservation is described in Appendix F of the CEQA Guidelines in terms of decreased per capita energy consumption, decreased reliance on natural gas and oil, and increased reliance on renewable energy sources. To assure that energy implications are considered in project decisions, EIRs must include a discussion of the potentially significant energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy.

3.3.1.3 Local Regulations

3.3.1.3.1 Clean Cities Program

The U.S. DOE Clean Cities Program promotes voluntary, locally based government/industry partnerships for the purpose of expanding the use of alternatives to gasoline and diesel fuel by accelerating the deployment of alternative fuel vehicles and building a local alternative fuel vehicle refueling infrastructure. The mission of the Clean Cities Program is to advance the nation's energy security by supporting local decisions to adopt practices that contribute to the reduction of petroleum consumption. Clean Cities carries out this mission through a network of more than 80 volunteer coalitions, which develop public/private partnerships to promote alternative fuels and vehicles, fuel blends, fuel economy, hybrid vehicles, and idle reduction.

3.3.1.3.2 San Gabriel Valley Energy Efficiency Partnership

In April 2006, SCAG's Regional Council authorized SCAG's Executive Director to enter into a partnership with SCE to incentivize energy efficiency programs in the San Gabriel Valley subregion. The San Gabriel Valley Energy Wise Program (SGVEWP) agreement was fully executed on October 20, 2006 with the main goal to save a combined three million kilowatt-hours (kWh) by providing technical assistance and incentive packages to cities by 2008. The program has been extended and seeks to reduce energy usage in the region by approximately five million kWh by 2012. The SGVEWP is funded by California utility customers and administered by SCE under the auspices of the CPUC.

3.3.2 ENERGY TRENDS IN GENERAL

In 2014, 67 percent of the electricity came from in-state sources, while 33 percent was imported into the state. In 2014, the electricity generated in-state totaled 198,973 gigawatt-hours (GWh) while imported electricity totaled 97,870 GWh, with 37,261 GWh (13 percent) coming from the Pacific Northwest and 60,609 GWh (20 percent) coming from the Southwest (CEC, 2015a). For natural gas in 2013, 38 percent came from the Southwest, 16 percent came from Canada, ten percent came from in-state, and 36 percent came from the Rocky Mountains (CEC, 2015b). Also in 2014, 38 percent of the crude oil came from in-state, with ten percent coming from Alaska and 52 percent being supplied by foreign sources (CEC, 2014).

3.3.2.1 Electricity

Power plants in California provided approximately 67 percent of the total in-state electricity demand in 2014 of which 22.5 percent came from renewable sources such as biomass, geothermal, small hydro, solar, and wind. The Pacific Northwest provided another 13 percent of the total electricity demand of which 31 percent came from renewable sources. The Southwest provided 21 percent of the total electricity demand, with six percent coming from renewable sources. In total, approximately 20 percent of the total in-state electricity demand for 2014 came from renewable sources (CEC, 2015a).

Four of the state's largest power plants are located in Basin. The largest power plants in California are located in northern California: the Moss Landing Natural Gas Power Plant (2,484 MW) located in Monterey Bay, Monterey County and the Diablo Canyon Nuclear Plant (2,323 MW) located in

Avila Beach, San Luis Obispo County. The third and fourth largest power plants in California are located inside the Basin: the AES Alamitos Natural Gas Power Generating Station (1,970 MW) in Long Beach, Los Angeles County and the Los Angeles Department of Water and Power (LADWP) Haynes Natural Gas Power Plant (net summer capacity 1,724 MW) also in Long Beach. The fifth and sixth largest power plants in California are located outside of the Basin: the Ormond Beach Natural Gas Power Plant (1,613 MW) in Oxnard, Ventura County and Pittsburg Natural Gas Power Plant (1,370 MW) in Pittsburg, Contra Costa County. The AES Redondo Beach Natural Gas Power Plant (1,343 MW) is the seventh largest power plant followed by the LADWP's Castaic Pump-Storage Power Plant 7 in Castaic (1,331 MW). The ninth and tenth largest power plants in California are also located outside of the Basin: the Helms Pumped Storage Facility (1,212 MW) in the Sierra National Forest portion of Fresno County and La Paloma Generating Project (1,200 MW) in West Elk Hills, Kern County (SCAQMD, 2015).

Local electricity distribution service is provided to customers within Southern California by both IOUs and Publicly Owned Utilities (POU). The two IOUs operating in the region are SCE and SDG&E. SCE is the largest electricity utility in Southern California with a service area that covers all, or nearly all, of Orange, San Bernardino, and Ventura Counties and most of Los Angeles and Riverside Counties. SCE coverage also includes areas outside the Southern California region including Inyo, Tulare, and Mono County as well as portions of Kern, Fresno, and Tuolumne Counties. SDG&E provides local distribution service to the southern portion of Orange County. Also in the region, the Southern California Public Power Authority (SCPPA) members consist of the municipal utilities of Anaheim, Azusa, Banning, Burbank, Cerritos, Colton, Glendale, Los Angeles, Pasadena, Riverside, Vernon, and the Imperial Irrigation District. Together, these municipal utilities deliver electricity to over two million customers in the Southern California region that spans an area of 7,000 square miles and has a total population that exceeds five million. LADWP is the largest of the publicly owned electric utilities in southern California (SCAG, 2016).

Table 3.3-1 shows the amount of electricity delivered in 2014 to residential and non-residential entities in the counties in the Basin.

TABLE 3.3-1

2014 Electricity Use in SCAQMD (GWh)

Sector	Los Angeles	Orange	Riverside	San Bernardino	Total
Residential	20,758	7,035	6,775	4,750	39,318
Non-Residential	49,239	13,688	8,747	9,968	81,642
Total	**69,997**	**20,723**	**15,522**	**14,718**	**120,960**

Source: CEC, 2016h

3.3.2.2 Natural Gas

There are three regions outside the state supplying a combined 90 percent of natural gas consumed in California: the Southwest (38 percent), the Rocky Mountains (36 percent) and Canada (16 percent). The remaining ten percent of natural gas consumed was supplied from within the state (CEC, 2015b).

Southern California Gas Company (SoCalGas), an IOU, provides natural gas service throughout Southern California, except for portions of San Bernardino County and the southern portion of Orange County (SDG&E). In San Bernardino County, Southwest Gas Corporation provides natural gas service to Big Bear and three cities outside the SCAQMD jurisdiction: Victorville, Barstow, and Needles.

LADWP utilizes natural gas for electrical generation in the City of Los Angeles (SCAG, 2016) Electrical generation accounted for about 40 percent of natural gas consumption in California in 2014 (CGR, 2014). Table 3.3-2 provides the estimated use of natural gas in California by residential, commercial and industrial sectors. Table 3.3-3 provides the estimated use of natural gas in the Basin by county.

TABLE 3.3-2

California Natural Gas Demand 2014
(Million Cubic Feet per Day – MMcf/day)

Sector	Utility	Non-Utility	Total
Residential	1,218	--	1,218
Commercial	505	--	505
Natural Gas Vehicles	43	--	43
Industrial	934	--	934
Electric Generation	2,026	466	2,492
Enhanced Oil Recovery (EOR) Steaming	44	497	541
Wholesale / International + Exchange	235	--	235
Company Use and Unaccounted-for	80	--	80
EOR Cogeneration / Industrial	--	128	128
Total	**5,085**	**1,090**	**6,175**

Source: California Gas Report (CGR), 2014
Note: Totals may not equal sum of components due to independent rounding

TABLE 3.3-3

2014 Natural Gas Use in SCAQMD (Millions of Therms)

Sector	Los Angeles	Orange	Riverside	San Bernardino	Total
Residential	1,078.3	319.2	207.3	213.7	1,818.5
Non-Residential	1,779.2	231.0	126.5	237.1	2,373.8
Total	**2,857.5**	**550.2**	**333.8**	**450.8**	**4,192.3**

Source: CEC, 2016n
Note: Totals may not equal sum of components due to independent rounding

3.3.2.3 Liquid Petroleum Fuels

California relies on oil produced within the state, Alaska, and foreign nations to supply its refineries and produce the petroleum that is used in automobiles and for other purposes. The percentage of oil that is imported from foreign nations has increased dramatically over the past 20 years. For example, in 1991, California imported just four percent of oil from foreign sources (30.7 million barrels out of a total of 683.5 million barrels). In 2014, however, California imported 51.6 percent of oil from foreign sources (328 million barrels out of a total of 635.7 million barrels) (CEC, 2014).

As of July 2015, California is currently ranked third among the oil producing states behind Texas and North Dakota, respectively (USEIA, 2015). California also ranked third in the nation in refining capacity as of January 2014, with a combined capacity of almost two million barrels per calendar day from its 18 operable refineries (USEIA, 2015a).

California also ranked first in the consumption of petroleum products used by the transportation sector (USEIA, 2013). Most gasoline and diesel fuel sold in California for on-road motor vehicles is refined in California to meet state-specific formulations required by CARB. Major petroleum refineries in California are concentrated in three counties: Contra Costa County in Northern California, Kern County in Central California, and Los Angeles County in Southern California. In Los Angeles County, petroleum refineries are located mostly in the southern portion of the county. According to the California State Board of Equalization, in FY 14, 14,573,637,973 gallons of gasoline (CSBE, 2014) and 2,741,781,694 gallons of diesel fuel (CSBE, 2014a) were sold in California. The volume of gasoline also includes aviation fuel. Fuel use in the Basin is provided in Table 3.2-9.

3.3.3 ALTERNATIVE CLEAN TRANSPORTATION FUELS

Alternative fuels, as defined by the Energy Policy Act of 1992, include:

- Biodiesel
- Natural Gas
- Electric Vehicles (EVs)
- Ethanol (E85) – Flexible Fuel Vehicles
- Hydrogen & Fuel Cell Vehicles
- Liquefied Natural Gas (LNG)
- Liquefied Petroleum Gas (LPG)
- Neighborhood Electric Vehicles (NEVs)

These fuels are being used worldwide in a variety of vehicle applications. Use of these fuels for transportation can generally reduce air pollutant emissions and can be domestically produced and derived from renewable sources. The Energy Policy Act of 2005 further directed the U.S. DOE to carry out a study to plan for the transition from petroleum to hydrogen in a significant percentage of vehicles sold by 2020. AB 118 (2007) created the CEC's Alternative and Renewable Fuel and Vehicle Technology Program. The statute, subsequently amended by AB 109 (2008), and AB 8 (2013), authorizes the CEC to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. The CEC has an annual program budget of approximately $100 million to support projects that develop and improve alternative and renewable low-carbon fuels; optimize alternative and renewable fuels for existing and developing engine technologies; produce alternative and renewable low-carbon fuels in California; decrease, on a full fuel cycle basis, the overall impact and carbon footprint of alternative and renewable fuels and increase sustainability; expand fuel infrastructure, fueling stations, and equipment; improve light-, medium-, and heavy-duty vehicle technologies; retrofit medium- and heavy-duty on-road and non-road vehicle fleets; expand infrastructure connected with existing fleets, public transit, and transportation corridors; establish workforce training programs; conduct public education and promotion; and create technology centers (SCAG, 2106).

There are a growing number of alternative fuel vehicles in California as a result of the joint efforts of the CEC, CARB, local air districts, federal government, transit agencies, utilities, and other public and private entities. There are more than 10,000 EVs on the road as well as more than 61,000 cars, transit buses, and trucks currently operating on natural gas and LPG. Southern California also has hundreds of fueling stations dispensing a variety of non-petroleum fuels (see Table 3.3-4) (CEC, 2015c).

3.3.3.1 Biodiesel

Biodiesel is an alternative fuel produced from renewable resources, such as soybeans or used restaurant grease. Biodiesel contains no petroleum and can be used in diesel engines with no major modifications. Biodiesel is simple to use, biodegradable, non-toxic, and essentially free of sulfur and aromatics. Biodiesel can be used as a pure fuel (neat biodiesel or B100) or as a biodiesel blend with petroleum in any percentage. B20 (a blend of 20 percent by volume biodiesel with 80 percent by volume petroleum diesel), B2, and B5 are common fuel blends (CEC, 2015d).

Biodiesel is registered as a fuel and fuel additive with the U.S. EPA and meets clean diesel standards established by CARB. Biodiesel is the only alternative fuel to have fully completed the health effects testing requirements under the CAA. The use of biodiesel in a conventional diesel engine results in substantial reductions of unburned hydrocarbons, carbon monoxide, and particulate matter compared to emissions from diesel fuel (CEC, 2015d).

TABLE 3.3-4

Alternative Fueling Stations in the Southern California Region

County	Fuel Type	Count
Los Angeles		
	BD	9
	CNG	93
	E85	13
	ELEC	658
	HY	19
	LNG	18
	LPG	90
Orange		
	BD	1
	CNG	30
	E85	9
	ELEC	191
	HY	11
	LNG	2
	LPG	26
Riverside		
	BD	4
	CNG	34
	E85	8
	ELEC	111
	HY	2
	LNG	5
	LPG	17
San Bernardino		
	BD	4
	CNG	24
	E85	6
	ELEC	79
	HY	2
	LNG	8
	LPG	24
Total Count		**1498**

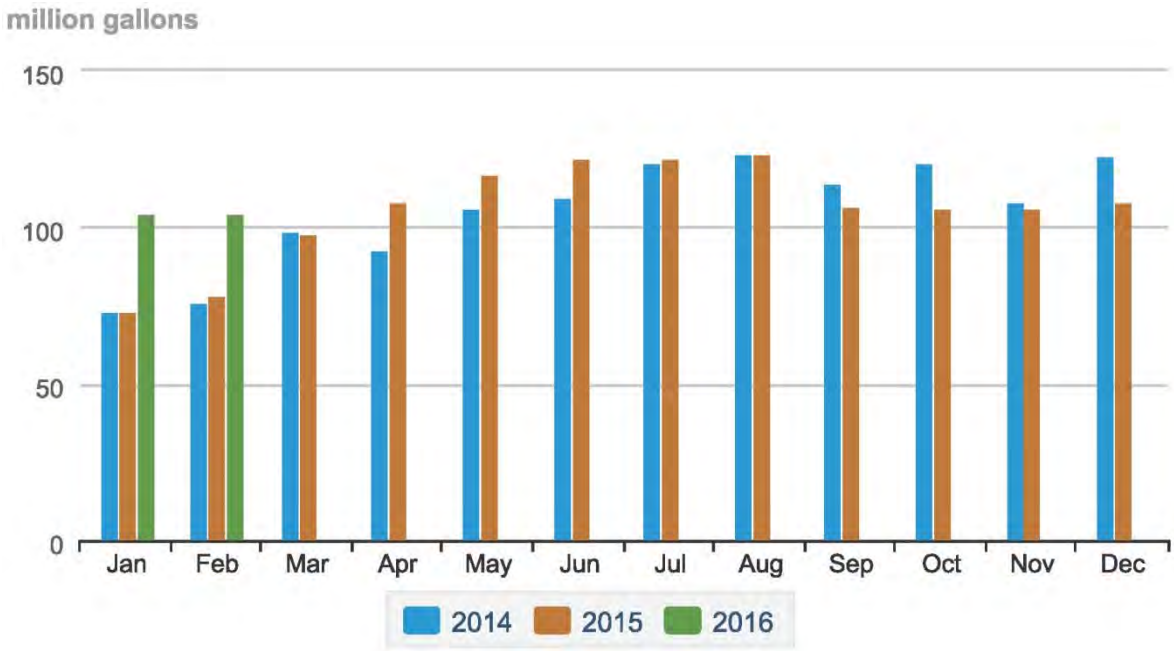
Source: SCAG, 2016
Note: BD = Biodiesel; CNG = Compressed Natural Gas; ELEC = Electric; E85 = Ethanol; HY = Hydrogen; LNG = Liquefied Natural Gas; LPG = Propane

Production of biodiesel in the United States dramatically increased in response to federal legislation that went into effect in 2005 and included a $1 per gallon blending credit for all biodiesel blended with conventional diesel fuel, but declined in 2009 and 2010 with the temporary loss of the subsidy in conjunction with poor production economics (high feedstock costs relative to market price of diesel fuel). Output has rebounded as refiners and other obligated parties strive to meet biodiesel blending requirements mandated by the RFS (CEC, 2013).

United States production of biodiesel was 123 million gallons in August 2015. Biodiesel production during August 2015 was about 2 million gallons higher than production in July 2015. Biodiesel production from the Midwest region was about 70 percent of the United States total. Production came from 101 biodiesel plants with capacity of 2.0 billion gallons per year. Producer sales of biodiesel during August 2015 included 75 million gallons sold as B100 and an additional 46 million gallons of B100 sold in biodiesel blends with diesel fuel derived from petroleum. There were a total of 909 million pounds of feedstocks used to produce biodiesel in August 2015. Soybean oil remained the largest biodiesel feedstock during August 2015 with 464 million pounds consumed. Figure 3.3-1 shows the monthly biodiesel production totals for the U.S. from 2013 – 2015 (USEIA, 2015b).

FIGURE 3.3-1

U.S. Monthly Biodiesel Production 2013 – 2015



Source: (USEIA, 2015b)

Biodiesel use has been gradually increasing over the past few years in California, but there is a potential constraint in securing enough low-carbon intensity feedstock to produce biodiesel and renewable diesel. The bulk of the renewable diesel is produced in Singapore and shipped to California (CEC, 2013). As such, biodiesel use in California is estimated to have been nearly 136 million gallons in 2013.

3.3.3.2 Natural Gas

Natural gas is a mixture of hydrocarbons, mainly methane, and is produced either from gas wells or in conjunction with crude oil production. Compressed natural gas, or CNG, is natural gas under pressure which remains clear, odorless, and non-corrosive. Although vehicles can use natural gas as either a liquid or a gas, most vehicles use the gaseous form compressed to pressures above 3,100 pounds per square inch. Most natural gas comes from three types of wells: natural gas-and-condensate wells, oil wells, and coal bed methane wells. In 2003, California had over 1,200 natural gas-and-condensate wells operating. Well-extracted natural gas requires a cleanup process before it can be used in vehicles or residences. (CEC, 2015e)

More than 99 percent of the natural gas used in the United States comes from domestic or other North American sources. However, increasing demand for natural gas in power plants may require new supplies from non-North American countries. The United States Energy Information Administration (USEIA) predicts that, by 2025, more than 15 percent of the United States natural gas supplies will be imported from countries other than Canada and Mexico. California gas utilities such as PG&E, SoCalGas, and SDG&E, distribute the fuel to customers. Most CNG vehicle fueling stations are owned and operated by private companies and local governments (CEC, 2015e).

Natural gas is produced both worldwide and domestically, and is cleaner burning than gasoline or diesel fuel. Natural gas vehicles show an average reduction in ozone-forming emissions of 80 percent compared to gasoline vehicles. CNG vehicles have been introduced in a wide variety of commercial applications, from light-duty trucks and sedans, (e.g. taxi cabs) to medium-duty trucks, to heavy-duty vehicles like transit buses, street sweepers, and school buses. In California, transit agency buses are some of the most visible CNG vehicles. (CEC, 2015e)

With the consumption of CNG increasing nationwide by 145 percent over the past six years, the fueling infrastructure for natural gas vehicles continues to grow. In 2005, California has more than 200 CNG fueling stations. In Southern California, there are more than 100 public fueling stations in major metropolitan areas from Los Angeles to the Mexican border. Another 50 stations are now under construction (CEC, 2015e).

3.3.3.3 EVs

Electricity can be used as a transportation fuel to power plug-in and fuel cell vehicles. When used to power plug-in electric vehicles or EVs, electricity is stored in an energy storage device such as a battery. Fuel cell vehicles use electricity produced from an electrochemical reaction that takes place when hydrogen and oxygen are combined in the fuel cell "stack." The production of

electricity using fuel cells takes place without combustion or pollution and leaves only two byproducts, heat and water.

Electric vehicles have several different charging systems: 120-volt, 240-volt, and direct-current. An electric vehicle that accepts 120-volt power can do so from any standard electrical outlet with a 12- or 16-amp dedicated branch circuit (with no other receptacles or loads on the circuit). A 240-volt system (Level 2 charging station) requires the installation of a home charging station and is available at most public charging stations. Direct-current fast charging equipment (480 volt) provides 50 kW to the battery. Many plug-in vehicle owners will do the majority of their charging at home (or at fleet facilities, in the case of fleets). Some employers offer access to charging at the workplace. In many states, plug-in vehicle drivers also have access to public charging stations at libraries, shopping centers, hospitals, and businesses. Charging infrastructure is expanding, providing drivers with the convenience, range, and confidence to meet more of their transportation needs with plug-in vehicles (SCAG, 2016).

Well-designed EVs can travel at the same speeds as conventional vehicles and provide the same safety and performance capabilities. In some instances, the EVs have better acceleration because of the characteristics of motors at low speeds (CEC, 2015f). The range for EVs, however, is more limited than conventional vehicle ranges and spans from 50 to 130 miles. Variables include the vehicle's weight, engineering, design, type of battery, weather extremes, and the use of heating and air conditioning (CEC, 2015f).

3.3.3.4 Ethanol – Flexible Fuel Vehicles

Ethanol, or ethyl alcohol, is the same alcohol found in alcoholic beverages, but ethanol also makes an effective motor fuel. There have been decades of motor fuel application experience in the United States and other countries with ethanol.

Most ethanol used for fuel is being blended into gasoline at concentrations of five to 10 percent. In California, ethanol has replaced methyl tertiary butyl ether (MTBE) as a gasoline component. More than 95 percent of the gasoline supplied in the state today contains six percent ethanol. There is a small but growing market for E85 fuel (85 percent ethanol and 15 percent gasoline), primarily found in the Midwest corn-producing states, for use in flexible fuel vehicles (FFVs) several million of which have been produced by United States automakers. FFVs are cars and trucks built with special fuel system components designed to be compatible with higher ethanol concentrations allowing them to use any level of ethanol up to E85 (CEC, 2015g). Ethanol is also being used to formulate a blend with diesel fuel, known as "E-Diesel" and as a replacement for leaded aviation gasoline in small aircraft (CEC, 2015g).

Ethanol has a lower energy content than gasoline, meaning that about one-third more ethanol is required to travel the same distance as on gasoline. But other ethanol fuel characteristics, including a high octane rating, result in increased engine efficiency and performance.

The 15 percent gasoline used to formulate E85 is to assure cold weather engine starting and to enhance flame luminosity in case of fire, as burning alcohol does not produce a flame. In low-percentage blends with gasoline, ethanol results in increased vapor pressure, which can be adjusted

for in the fuel formulation process and/or controlled with on-board vehicle systems. All gasoline vehicles in use in the U.S. today can accept gasoline blended with up to 10 percent ethanol (sometimes called gasohol).

Today's expanding ethanol fuel industry in the United States uses mostly corn as its basic ingredient. It is processed via fermentation and distillation to produce ethanol, animal feed, and other by-products. Iowa, Illinois, Minnesota, and Nebraska are the largest ethanol-producing states; however, there is some ethanol production in 20 states.

More states and foreign countries are becoming ethanol producers, employing traditional crop feedstocks and processes. In addition, new technologies for producing ethanol from agricultural, forestry, and municipal wastes and residues are the focus of major research and development efforts around the world. Future ethanol production projects are being planned in California using agricultural crops such as sugar cane and, eventually, various waste and residual feedstocks when technologies for processing these materials become commercially available (CEC, 2015g).

Produced renewably from agricultural crops or from recycled wastes and residues, ethanol used as motor fuel offers a way to reduce greenhouse gas emissions from transportation sources. With respect to other motor vehicle emissions, differences between ethanol and gasoline are becoming less significant as new motor vehicles are produced with extremely low emission levels on all fuels. California's replacement of MTBE with ethanol was based on a determination that ethanol presents less of a pollution risk to drinking water sources.

Most of California's current ethanol fuel supply is delivered from the producing states via standard rail tank cars, with some import shipments via marine vessels. It is then stored at fuel terminals and added to gasoline when tank trucks are filled for delivery to fueling stations, where it is stored and dispensed the same as non-ethanol gasoline.

E85 dispensers require use of upgraded materials compatible with ethanol's chemical properties. Also, due to certain ethanol properties, fuel transport pipelines in the United States do not currently ship ethanol or gasoline containing ethanol, although experience in Brazil and elsewhere indicates that pipeline shipment can be feasible. To prevent diversion for human consumption, federal regulations require ethanol produced for fuel use to have a denaturant (usually gasoline) added before shipping (CEC, 2015g).

3.3.3.5 Hydrogen

Hydrogen gas is the simplest and lightest fuel. Hydrogen is in a gaseous state at atmospheric pressure and ambient temperatures. Hydrogen is being explored for use in combustion engines and fuel cell electric vehicles. The ability to create hydrogen from a variety of sources (water, hydrocarbons, and other organic matter) and its clean-burning properties make it a desirable alternative fuel. One of the challenges of using hydrogen as fuel comes from being able to efficiently extract hydrogen from these compounds. Although there is no significant transportation distribution system currently for hydrogen transportation use, hydrogen could be transported and delivered using the established hydrogen infrastructure, for significant market penetration, the infrastructure will need further development.

California is leading the nation in hydrogen fueling stations for fuel cell vehicles. By the end of 2015, there should be more than 50 public stations available fuel cell vehicles. Vehicle manufacturers are beginning to offer fuel cell vehicles to consumers who live in regions where these hydrogen stations exist (SCAG, 2016).

3.3.3.6 Liquefied Natural Gas (LNG)

Liquefied natural gas, or LNG, is natural gas in a liquid form that is clear, colorless, odorless, non-corrosive, and non-toxic. LNG is produced when natural gas is cooled to minus 259°F through a process known as liquefaction. During this process, the natural gas, which is primarily methane, is cooled below its boiling point, whereby certain concentrations of hydrocarbons, water, carbon dioxide, oxygen, and some sulfur compounds are either reduced or removed. LNG is also less than half the weight of water, so it will float if spilled on water (CEC, 2015i).

A majority of the world's supply comes from countries with the largest natural gas reserves: Algeria, Australia, Brunei, Indonesia, Libya, Malaysia, Nigeria, Oman, Qatar, Trinidad and Tobago. LNG is transported in double-hulled ships specifically designed to handle the low temperature of LNG. These carriers are insulated to limit the amount of LNG that evaporates. LNG carriers are up to 1,000 feet long and require a minimum water depth of 40 feet when fully loaded. In 2004, there were approximately 140 LNG ships operating worldwide (CEC, 2015i).

Benefits of LNG in transportation applications:

- LNG is produced both worldwide and domestically at a relatively low cost and is cleaner burning than diesel fuel. Since LNG has a higher storage density, it is a more viable alternative to diesel fuel than compressed natural gas for heavy-duty vehicle applications.

- In addition, LNG in heavy-duty natural gas engines achieves significantly lower NOx and particulate emission levels than diesel.

Because of LNG's increased driving range, it is used in heavy-duty vehicles, typically vehicles that are classified as "Class 8" (33,000 - 80,000 pounds, gross vehicle weight). Typical transportation applications are refuse haulers, local delivery (grocery trucks), and transit buses (CEC, 2015i).

3.3.3.7 Liquefied Petroleum Gas (LPG)

Liquefied Petroleum Gas (LPG), is produced as part of natural gas processing and crude oil refining. In natural gas processing, the heavier hydrocarbons that naturally accompany natural gas, such as LPG, butane, ethane, and pentane, are removed prior to the natural gas entering the pipeline distribution system. In crude oil refining, LPG is the first product that results at the start of the refining process and is therefore always produced when crude oil is refined (CEC, 2015j).

Propane is a gas that can be turned into a liquid at a moderate pressure, 160 pounds per square inch (psi), and is stored in pressure tanks at about 200 psi at 100°F. When propane is drawn from a tank, it changes to a gas before it is burned in an engine. Propane has been used as a transportation

fuel since 1912 and is the third most commonly used fuel in the United States, behind gasoline and diesel. More than four million vehicles fueled by propane are in use around the world in light-, medium-, and heavy-duty applications. Propane holds approximately 86 percent of the energy of gasoline and so requires more storage volume to drive a range equivalent to gasoline, but it is price-competitive on a cents-per-mile-driven basis (CEC, 2015j).

LPG has a long and varied history in transportation applications. It has been used in rural and farming settings since its inception as a motor vehicle fuel.

Over time, propane has been used in several niche applications such as for forklifts, both inside and outside warehouses, and at construction sites. Use of propane can result in lower vehicle maintenance costs, lower emissions, and fuel costs savings when compared to conventional gasoline and diesel. Presently, domestic automakers have reduced their offerings of vehicles that can operate using propane and other gaseous fuels; this has placed renewed emphasis for the conversion or "upfitting" of new vehicles to operate on propane and compressed natural gas.

Vehicle conversions in the 1970s started a very large upswing in the numbers of vehicles capable of using propane, as rising gasoline prices compelled drivers to find more economical fuel sources. The propane industry is once again focused on the conversion or upfitting of vehicles, to maintain the fuel as a viable motor fuel alternative that can provide both emission and petroleum displacement benefits, in the absence of original engine manufacturer (OEM) offerings (CEC, 2015j).

Approximately 1,200 facilities in California dispense propane. Nearly all of these facilities are used primarily to fuel residential and commercial applications such as heaters, recreational vehicles and barbecues. About half of all these facilities are capable of providing propane as a motor fuel, though only about 3 percent of all the fuel dispensed is used for transportation applications.

Since 2000, the state fleet is operating in daily use nearly 1,600 bi-fuel (vehicles that can operation on either gasoline or LPG) Ford F-150 pickup trucks. The potential use of LPG in those vehicles constitutes the largest petroleum displacement for the state fleet; it could displace approximately 4.4 percent of the total fleet fuel use, if these vehicles were exclusively operated on LPG (CEC, 2015j).

Accordingly, the CEC and the U. S. DOE have provided funding to establish 25 LPG stations across the state. These stations are situated for convenient use by Caltrans, the Department of Water Resources (DWR), and the public. The LPG stations, operated by CleanFuel USA and Delta Liquid Energy, are similar to gasoline filling stations: they have dispensers on the fueling island, use fleet fueling cards or credit cards, and offer fuel that is priced competitively with gasoline or diesel on a fuel equivalency basis.

Propane is a low-emission, economic and easily used fuel that can play an important role as an alternative, non-petroleum fuel for our state and the nation. Given the right conditions and incentives, propane can steadily displace a growing volume of petroleum fuels in California and

therefore help provide a broader, more competitive transportation fuel market in the state (CEC, 2015j).

As shown in Table 3.2-9, approximately 182 million gallons of LPG were consumed in the Basin in 2012. Of the LPG consumed, approximately 64 percent was consumed by the residential sector, 24 percent was consumed by the commercial sector, and 12 percent was consumed by the industrial sector (see Table 3.2-9 and the 2016 AQMP).

3.3.3.8 Neighborhood Electric Vehicles (NEVs)

Neighborhood Electric Vehicles (NEVs) are one-to four-passenger, three- or four-wheeled vehicles that, when empty, weigh 2,200 pounds or less. They are designed for low-speed use in neighborhoods and urban areas, to run errands, commute to and from work or school, and to make small local deliveries. Because NEVs are limited in their application, a federal standard was created classifying NEVs as low-speed vehicles (CEC, 2015k).

According to this standard, low-speed vehicles are four-wheeled vehicles that can travel no faster than 25 miles per hour. California's Vehicle Codes limit these vehicles to operation on streets with posted speed limits of 35 mph or less.

Some of the major auto companies have begun to develop NEVs that can travel up to 55 mph. This may appeal to some consumers who may need to occasionally travel freeways.

A major demonstration of NEVs - called "Station Cars" - was completed in 1999 in the San Francisco Bay Area. About 70 commuters used small battery-powered electric cars between home and mass transit stations, or between mass transit stations and workplaces. They also used the vehicles for errands during the day or for short trips evening and weekends (CEC, 2105k).

Station cars might become an integrated, mobility system, providing electric vehicles for trips to mass transit and other stations. A station could be at any point that requires high and regular access such as a college campus, a business park, an airport, or a dense residential area.

Besides operating as station cars, NEVs can be used in other places as well. In Palm Springs, California, NEVs are used as police patrol cars in enclosed neighborhoods. Plans are also underway to incorporate NEVs as part of Palm Springs' local government fleet (CEC, 2105k).

3.3.4 RENEWABLE ENERGY

Renewable energy is energy that comes from sources that regenerate and can be sustained indefinitely, unlike fossil fuels, which are exhaustible. The five most common renewable sources are biomass, hydropower, geothermal, wind, and solar. Unlike fossil fuels, non-biomass renewable sources of energy do not directly emit greenhouse gasses. The use of renewable fuels is expected to continue to grow over the next 30 years, although projections show that reliance on non-renewable fuels to meet most energy needs will continue.

In 2014, consumption of renewable resources in the United States totaled about 9.6 quadrillion British thermal units (Btu) or about 10 percent of all energy used nationally (USEIA, 2014a). About 13 percent of U.S. electricity was generated from renewable resources in 2014 (USEIA, 2014b). In 2014, 20 percent of all electricity came from renewable resources in California (CEC, 2015a).

The RPS requires investor-owned utilities, electric service providers, and community choice aggregators regulated by the CPUC to procure 33 percent of retail sales per year from eligible renewable sources by 2020. CPUC issues quarterly renewable energy progress reports to the state Legislature. The quarterly reports focus on California's three large investor-owned utilities: PG&E, SCE, and SDG&E. These investor-owned utilities currently provide approximately 68 percent of the state's electric retail sales. On April 1, 2014, the large investor owned utilities reported in their 33 percent RPS Procurement Progress Reports that they served 20.9 percent of their retail electric load with RPS-eligible electricity during the first compliance period from 2011 to 2013 (CPUC, 2014).

3.3.4.1 Hydroelectric Power

Hydroelectric power, or hydropower, is generated when hydraulic turbines connected to electrical generators are turned by the force of flowing or falling water. In 2014, hydroelectric-produced electricity used by California totaled 14,052 GWh or 7.1 percent of the total system power. In-state production accounted for around 86 percent of all hydroelectricity, while imports from other states totaled 14 percent (CEC, 2015a).

California has 287 hydrogeneration plants, which are mostly located in the eastern mountain ranges and have a total dependable capacity of about 21,000 MW (CEC, 2016). The larger hydro plants located on dams in California (such as Shasta, Folsom, Oroville, etc.) are operated by the U.S. Bureau of Reclamation and the DWR (CEC, 2016a).

In 2014, California's in-state hydroelectric generation continued its multiyear decline due to ongoing drought conditions, dropping 32 percent (7,619 GWh) from 2013 generation levels and 61 percent since 2011, the last "wet" year in California. These declines were directly due to multi-year dry weather conditions impacting the state, especially snowpack accumulations. With below average annual precipitation for 2014, the precipitation deficits from previous years along with record setting warm weather kept California in serious drought conditions. California's annual precipitation was very low by the end of 2014 resulting in low hydroelectric availability for 2014 (CEC, 2015a).

3.3.4.2 Geothermal Energy

Geothermal energy technologies use the clean, sustainable heat from the Earth. Geothermal resources include the heat retained in shallow ground, hot water and rock found a few miles beneath the Earth's surface, and extremely high-temperature molten rock, also known as magma, located deep in the Earth. Geothermal energy can be used to generate electricity or used directly in many commercial and industrial applications.

Heat from the earth—geothermal energy—heats water that has seeped into underground reservoirs. These reservoirs can be tapped for a variety of uses, depending on the temperature of the water. The energy from high-temperature reservoirs (225°-600°F) can be used to produce electricity. The most common type of geothermal power plant, flash steam plants use water at temperatures of more than 360ºF. As this hot water flows up through wells in the ground, the decrease in pressure causes some of the water to boil into steam. The steam is then used to power a generator, and any leftover water and condensed steam is returned to the reservoir. Binary cycle plants use the heat from lower-temperature reservoirs (225°-360°F) to boil a working fluid, which is then vaporized in a heat exchanger and used to power a generator. The water, which never comes into direct contact with the working fluid, is then injected back into the ground to be reheated (USDOE, 2013).

The most developed of the high-temperature resource areas of the state is the Geysers. North of San Francisco, the Geysers were first tapped as a geothermal resource to generate electricity in 1960. It is one of only two locations in the world where a high-temperature, dry steam is found that can be directly used to turn turbines and generate electricity. Dry steam does not create condensation, which damages steam turbine blades. Other major geothermal locations in the state include the Imperial Valley area east of San Diego and the Coso Hot Springs area near Bakersfield.

Due to its location on the Pacific's "Ring of Fire" and because of tectonic plate conjunctions, California contains the largest amount of geothermal electric generation capacity in the United States. In 2015, geothermal energy in California produced 11,994 GWh of electricity. Combined with another 700 GWh of imported geothermal power, geothermal energy produced 6.13 percent of the state's total system power. There are a total of 44 operating geothermal power plants in California with an installed capacity of 2,716 MW (CEC, 2016b).

46 of California's 58 counties have lower temperature resources for direct-use geothermal. In fact, the City of San Bernardino has developed one of the largest geothermal direct-use projects in North America, heating at least three dozen buildings, including a 15-story high-rise and government facilities, with fluids distributed through 15 miles of pipelines (CEC, 2016c).

3.3.4.3 Biomass Electricity

Biomass technologies break down organic matter to release stored energy from the sun. There are many types of biomass—organic matter such as plants, residue from agriculture and forestry, and the organic component of municipal and industrial wastes—that can now be used to produce fuels, chemicals, and power. Wood has been used to provide heat for thousands of years. According to the U.S. EIA, 53 percent of all renewable energy consumed in the United States was biomass-

based in 2007 (USDOE, 2016a). Biopower is the production of electricity or heat from biomass resources by technologies including direct combustion, co-firing, and anaerobic digestion.

3.3.4.3.1 Direct Combustion

Direct combustion using conventional boilers is the most common method of producing electricity from biomass. Boilers primarily burn waste wood products from the agriculture and wood-processing industries to produce steam that spins a turbine connected to a generator to produce electricity. Municipal solid waste power plants use direct combustion to create electricity through three methods:

- Mass Burn: Sorted municipal refuse is fed into a hopper to feed a boiler. The heat from the combustion process is used to turn water into steam to power a turbine-generator.

- Refuse-Derived Fuel: Pelletized or fluff municipal refuse, which comes from a by-product of a resource recovery operation where non-combustible materials are removed, are used to feed a boiler. The heat from the combustion process is used to turn water into steam to power a turbine generator.

- Pyrolysis/Thermal Gasification: Related technologies where thermal decomposition of organic material at elevated temperatures with little (Thermal Gasification) to no (Pyrolysis) oxygen or air produces combustible gases. The gases are combusted to produce heat and turn water into steam to power a turbine-generator.

3.3.4.3.2 Co-Firing

Co-firing involves replacing a portion of the petroleum-based fuel in high-efficiency coal-fired boilers with biomass. Co-firing has been successfully demonstrated in most boiler technologies, including pulverized coal, cyclone, fluidized bed, and spreader stoker units. Co-firing biomass can significantly reduce the sulfur dioxide emissions of coal-fired power plants and is a least-cost renewable energy option for many power producers.

3.3.4.3.3 Anaerobic Digestion

Anaerobic digestion, or methane recovery, is a common technology used to convert organic waste to electricity or heat. In anaerobic digestion, organic matter is decomposed by bacteria in the absence of oxygen to produce methane and other byproducts that form a renewable natural gas.

The Los Angeles County Sanitation District (LACSD) operates three Solar Mars gas turbines in Carson, each rated for a gross output of 9.9 MW. These turbines exhaust into heat recovery steam generators for production of steam that is used for digester heating and/or the production of electricity with a steam turbine (LACSD, 2016). Additionally, the LACSD operates landfill gas-to-energy facilities at the Calabasas Landfill (7 MW), Puente Hills Landfill (46 MW), and the Spadra Landfill (5 MW) in Walnut to produce approximately 58 MW (LACSD, 2016a).

At Royal Farms No. 1 in Tulare, California, hog manure is slurried and sent to a Hypalon-covered lagoon for biogas generation. The collected biogas fuels a 70 kilowatt (kW) engine-generator and a 100 kW engine-generator. The electricity generated on the farm is able to meet monthly electric and heat energy demand (CEC, 2016d).

Three other swine farms (Sharp Ranch, Fresno, and Prison Farm) have also installed floating covers on lagoons. The Knudsen and Sons project in Chico, California treated wastewater which contained organic matter from fruit crushing and wash down in a covered and lined lagoon. The biogas produce is burned in a boiler. And at Langerwerf Dairy in Durham, California, cow manure is scraped and fed into a plug flow digester. The biogas produced is used to fire an 85 kW gas engine. The engine operates at 35 kW capacity level and drives a generator to produce electricity. Electricity and heat generated is able to offset all dairy energy demand. The system has been in operation since 1982 (CEC, 2016d).

3.3.4.4 Wind Power

Wind power plants are turbines which use the energy in the motion of the wind to make mechanical energy, which is then converted to electrical energy. In 2015, wind energy generated within California totaled 11,856 GWh or 6.06 percent of the in-state total power generation. Current operating wind energy power plants in California have an installed capacity of about 6,288 megawatts (CEC, 2016e). More than 13,000 of California's wind turbines, or 95 percent of all of California's wind generating capacity and output, are located in three primary regions: Altamont Pass, Tehachapi, and San Gorgonio.

The components of a utility-scale "wind farm" include wind turbines, an underground power transmission system, control and maintenance facilities, and a substation that connects the farm with the utility power grid. Utility-scale wind turbines are classified by size as follows: small (less than 50 kW); intermediate (50 to 500 kW); and large (above 500 kW). Small and intermediate turbines make up the bulk of the older installed turbine base, but new turbines installed in the late 1990s are generally 600 kW and larger (CEC, 2016f).

Utility-scale wind farms are generally located in areas with average annual wind speeds of at least 13 miles per hour. Wind power is more available during certain seasons because climatic conditions affect wind speed. In California, wind speeds are highest in the hot summer months, and approximately three-fourths of all annual wind power output is produced during the spring and summer (CEC, 2016f). While the power produced by many of California's older wind turbines is not cost-competitive with other forms of electricity generation, some of the newest wind turbine designs may be able to match or beat the power prices from many coal and nuclear plants (CEC, 2016f).

3.3.4.5 Solar

Solar electricity production in California falls into two categories - solar thermal, using the concentrated heat of sunlight to heat a fluid to make steam to turn a traditional turbine and generator making electricity; and solar photovoltaic (PV), the direct conversion of sunlight into electricity. Additionally, the heat from the sun is used in solar thermal systems for hot water in

homes and businesses and in heating swimming pools. Most electricity from PV is not counted into the total electricity production of the utility companies as the solar panels are mounted on individual homes or businesses (CEC, 2016g).

3.3.4.5.1 PV Cells

PV materials and devices convert sunlight into electrical energy. PV cells are electricity-producing devices made of semiconductor materials coming in many sizes and shapes, often connect together to form PV systems. When light shines on a PV cell, the energy of absorbed light transfers to electrons in the atoms of the PV cell causing electrons to escape from their normal positions in the atoms and become part of the electric flow, or current, in an electrical circuit. While small PV systems can provide electricity for homes, businesses, and remote power needs, larger PV systems provide much more electricity for contribution to the electric power grid.

A single PV device is known as a cell. An individual PV cell is usually small, typically producing about one or two watts of power. To boost the power output of PV cells, they are connected together in chains to form larger units known as modules or panels. Modules can be used individually, or several can be connected to form arrays. One or more arrays are then connected to the electrical grid as part of a complete PV system. Because of this modular structure, PV systems can be built to meet almost any electric power need, small or large (USDOE, 2016c).

The largest PV systems in the country are located in California and produce power for utilities to distribute to their customers. The Solar Star PV power station produces 579 MW of electricity, while the Topaz Solar Farm and Desert Sunlight Solar Farm each produce 550 MW (USDOE, 2016c). California's cumulative installed capacity of PV systems in 1998 was 6.3 MW. In 2015, the capacity of PV systems reached about 5,458 MW, netting 12,507 GWh of electricity (CEC, 2016g). In 2014, the average Californian resident consumed 562 KWh per month (USEIA 2015c) or 6,744KWh per year. Thus, in 2015, PV systems provided enough energy to supply approximately 1.85 million people at 2014 rates of consumption.

3.3.4.5.2 Solar Thermal Energy (STE)

STE is the technology for converting the sun's energy into thermal energy (heat) through solar thermal collectors. The USEIA classifies solar thermal collectors into three categories:

- Low-temperature: Flat plate collectors are used to warm homes, buildings, and swimming pools.
- Medium-temperature: Flat plate collectors are used to heat water or air for residential and commercial uses.
- High-temperature: Mirrors or lenses are used to concentrate STE for electric power production.

Low and medium-temperature collectors can be further classified as either passive or active heating systems. In a passive system, air is circulated past a solar heat surface and through the building by convection (meaning that less dense warm air tends to rise while denser cool air moves downward). No mechanical equipment is needed for passive solar heating. Active heating systems require a collector to absorb and collect solar radiation. Fans or pumps are used to circulate the heated air or heat absorbing fluid. Active systems often include some type of energy storage system.

High-temperature systems used in solar thermal power plants use the sun's rays to heat a fluid to very high temperatures through the use of mirrors or lenses. The fluid is then circulated through pipes so it can transfer its heat to water to produce steam. The steam, in turn, is converted into mechanical energy in a turbine and into electricity by a conventional generator coupled to the turbine.

Solar thermal facilities are concentrated in the desert areas of the state in the Mojave area. In 2015, Solar thermal power plants produced electricity in California totaling 14,953 GWh or 7.64 percent of the state's total electricity production (CEC, 2016g).

Prior to the RPS in 2002, 13 solar thermal power projects were planned in California, with 11 of those filing applications with the CEC. Nine projects, totaling 354 MW, were built. Approximately 4,500 MW of solar thermal is in the license review process (CEC, 2016g).

3.4 HAZARDS AND HAZARDOUS MATERIALS

3.4.1 INTRODUCTION

The goal of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard. Some of the proposed control measures intended to improve overall air quality may have direct or indirect hazards associated with their implementation. Hazard concerns are related to the potential for fires, explosions or the release of hazardous materials/substances in the event of an accident or upset conditions.

The potential for hazards exist in the production, use, storage, and transportation of hazardous materials. Hazardous materials may be found at industrial production and processing facilities. Some facilities produce hazardous materials as their end product, while others use such materials as an input to their production process. Examples of hazardous materials used as consumer products include gasoline, solvents, and coatings/paints. Hazardous materials are stored at facilities that produce such materials and at facilities where hazardous materials are a part of the production process. Specifically, storage refers to the bulk handling of hazardous materials before and after they are transported to the general geographical area of use. Currently, hazardous materials are transported throughout the Basin in large quantities via all modes of transportation including rail, highway, water, air, and pipeline.

The NOP/IS for the 2016 AQMP identified the use of reformulated fuels, potential exposure to toxic air contaminants, flammability of reformulated products, add-on control devices (e.g., SCRs and catalysts), use of alternative fuels and fuel additives as possibly increasing the potential for hazards, and potential impacts associated with the application of acidifier sodium bisulfate (SBS) to control ammonia emissions from manure.

3.4.2 HAZARDOUS MATERIALS REGULATIONS

Incidents of harm to human health and the environment associated with hazardous materials have created a public awareness of the potential for adverse effects from careless handling and/or use of these substances. As a result, a number of federal, state, and local laws have been enacted to regulate the use, storage, transportation, and management of hazardous materials and wastes. The most relevant hazardous materials laws and regulations are summarized in the following subsection of this section.

3.4.2.1 Definitions

A number of properties may cause a substance to be hazardous, including toxicity, ignitability, corrosivity, and reactivity. The term "hazardous material" is defined in different ways for different regulatory programs. For the purposes of this Program EIR, the term "hazardous materials" refers to both hazardous materials and hazardous wastes. A hazardous material is defined as hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local regulatory agency

or if it has characteristics defined as hazardous by such an agency. The (H&S) §25501(k) defines hazardous material as follows:

> "Hazardous material" means any material that because of its quantity, concentrations, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include but are not limited to hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Examples of the types of materials and wastes considered hazardous are hazardous chemicals (e.g., toxic, ignitable, corrosive, and reactive materials), radioactive materials, and medical (infectious) waste. The characteristics of toxicity, ignitability, corrosivity, and reactivity are defined in Title 22, CCR, §66261.20-66261.24 and are summarized below:

> **Toxic Substances:** Toxic substances may cause short-term or long-lasting health effects, ranging from temporary effects to permanent disability, or even death. For example, such substances can cause disorientation, acute allergic reactions, asphyxiation, skin irritation, or other adverse health effects if human exposure exceeds certain levels. (The level depends on the substances involved and are chemical-specific.) Carcinogens (substances that can cause cancer) are a special class of toxic substances. Examples of toxic substances include benzene (a component of gasoline and a suspected carcinogen) and methylene chloride (a common laboratory solvent and a suspected carcinogen).
>
> **Ignitable Substances:** Ignitable substances are hazardous because of their ability to burn. Gasoline, hexane, and natural gas are examples of ignitable substances.
>
> **Corrosive Materials:** Corrosive materials can cause severe burns. Corrosives include strong acids and bases such as sodium hydroxide (lye) or sulfuric acid (battery acid).
>
> **Reactive Materials:** Reactive materials may cause explosions or generate toxic gases. Explosives, pure sodium or potassium metals (which react violently with water), and cyanides are examples of reactive materials.

3.4.2.2 Federal Regulations

The U.S. EPA is the primary federal agency charged with protecting human health and with safeguarding the natural environment from pollution into air, water, and land. The U.S. EPA works to develop and enforce regulations that implement environmental laws enacted by Congress. The U.S. EPA is responsible for researching and setting national standards for a variety of environmental programs, and delegates to states and Indian tribes the responsibility for issuing permits and for monitoring and enforcing compliance. Since 1970, Congress has enacted numerous environmental laws that pertain to hazardous materials, for the U.S. EPA to implement as well as to other agencies at the federal, state and local level, as described in the following subsections.

3.4.2.2.1 Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) was enacted by Congress in 1976 (see 15 U.S.C. §2601 et seq.) and gave the U.S. EPA the authority to protect the public from unreasonable risk of injury to health or the environment by regulating the manufacture, sale, and use of chemicals currently produced or imported into the United States. The TSCA, however, does not address wastes produced as byproducts of manufacturing. The types of chemicals regulated by the act fall into two categories: existing and new. New chemicals are defined as "any chemical substance which is not included in the chemical substance list compiled and published under [TSCA] section 8(b)." This list included all of chemical substances manufactured or imported into the United States prior to December 1979. Existing chemicals include any chemical currently listed under section 8 (b). The distinction between existing and new chemicals is necessary as the act regulates each category of chemicals in different ways. The U.S. EPA repeatedly screens both new and existing chemicals and can require reporting or testing of those that may pose an environmental or human-health hazard. The U.S. EPA can ban the manufacture and import of those chemicals that pose an unreasonable risk.

3.4.2.2.2 Emergency Planning and Community Right-to-Know Act

The Emergency Planning and Community Right-to-Know Act (EPCRA) is a federal law adopted by Congress in 1986 that is designed to help communities plan for emergencies involving hazardous substances. EPCRA establishes requirements for federal, state and local governments, Indian tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. The Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment. There are four major provisions of EPCRA:

1. Emergency Planning (§§301 – 303) requires local governments to prepare chemical emergency response plans, and to review plans at least annually. These sections also require state governments to oversee and coordinate local planning efforts. Facilities that maintain Extremely Hazardous Substances (EHS) on-site (see 40 CFR Part 355 for the list of EHS chemicals) in quantities greater than corresponding "Threshold Planning Quantities" must cooperate in the preparation of the emergency plan.

2. Emergency Release Notification (§304) requires facilities to immediately report accidental releases of EHS chemicals and hazardous substances in quantities greater than corresponding Reportable Quantities (RQs) as defined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to state and local officials. Information about accidental chemical releases must be made available to the public.

3. Hazardous Chemical Storage Reporting (§§311 – 312) requires facilities that manufacture, process, or store designated hazardous chemicals to make Safety Data Sheets (SDSs, formerly referred to as material safety data sheets or MSDSs) describing the properties and health effects of these chemicals available to state and local officials and local fire departments. These sections also require facilities to report to state and local officials and local fire departments, inventories of all on-site chemicals for which SDSs exist. Lastly, information about chemical inventories at facilities and SDSs must be available to the public.

4. Toxic Chemical Release Inventory (§313) requires facilities to annually complete and submit a Toxic Chemical Release Inventory Form for each Toxic Release Inventory (TRI) chemical that are manufactured or otherwise used above the applicable threshold quantities.

Implementation of EPCRA has been delegated to the State of California. The California Emergency Management Agency requires facilities to develop a Hazardous Materials Business Plan if they handle hazardous materials in quantities equal to or greater than 55 gallons, 500 pounds, or 200 cubic feet of gas or extremely hazardous substances above the threshold planning quantity. The Hazardous Materials Business Plan is provided to state and local emergency response agencies and includes inventories of hazardous materials, an emergency plan, and implements a training program for employees.

3.4.2.2.3 Hazardous Materials Transportation Act

The Hazardous Material Transportation Act (HMTA), adopted in 1975 (see 49 U.S.C. §§5101 – 5127), gave the Secretary of Transportation the regulatory and enforcement authority to provide adequate protection against the risks to life and property inherent in the transportation of hazardous material in commerce. The United States Department of Transportation (U.S. DOT) (see 49 CFR Parts 171-180) oversees the movement of hazardous materials at the federal level. The HMTA requires that carriers report accidental releases of hazardous materials to U.S. DOT at the earliest practical moment. Other incidents that must be reported include deaths, injuries requiring hospitalization, and property damage exceeding $50,000. The hazardous material regulations also contain emergency response provisions which include incident reporting requirements. Reports of major incidents go to the National Response Center, which in turn is linked with CHEMTREC, a public service hotline established by the chemical manufacturing industry for emergency responders to obtain information and assistance for emergency incidents involving chemicals and hazardous materials.

Hazardous materials regulations are implemented by the Research and Special Programs Administration (RSPA) branch of the U.S. DOT. The regulations cover the definition and classification of hazardous materials, communication of hazards to workers and the public, packaging and labeling requirements, operational rules for shippers, and training. These regulations apply to interstate, intrastate, and foreign commerce by air, rail, ships, and motor vehicles, and also cover hazardous waste shipments. The Federal Aviation Administration Office of Hazardous Materials Safety is responsible for overseeing the safe handling of hazardous materials aboard aircraft. The Federal Railroad Administration oversees the transportation of hazardous materials by rail. The U.S. Coast Guard regulates the bulk transport of hazardous materials by sea. The Federal Highway Administration (FHWA) is responsible for highway routing of hazardous materials and issuing highway safety permits.

3.4.2.2.4 Hazardous Materials and Waste Regulations

Resource Conservation and Recovery Act: The Resource Conservation and Recovery Act (RCRA) of 1976 authorizes the U.S. EPA to control the generation, transportation, treatment, storage, and disposal of hazardous waste. Under RCRA regulations, hazardous wastes must be tracked from the time of generation to the point of disposal. In 1984, RCRA was amended with addition of the Hazardous and Solid Waste Amendments, which authorized increased enforcement by the U.S. EPA, stricter hazardous waste standards, and a comprehensive underground storage

tank program. Likewise, the Hazardous and Solid Waste Amendments focused on waste reduction and corrective action for hazardous releases. The use of certain techniques for the disposal of some hazardous wastes was specifically prohibited by the Hazardous and Solid Waste Amendments. Individual states may implement their own hazardous waste programs under RCRA, with approval by the U.S. EPA. California has been delegated authority to operate its own hazardous waste management program.

CERCLA: CERCLA, which is often commonly referred to as Superfund, is a federal statute that was enacted in 1980 to address abandoned sites containing hazardous waste and/or contamination. CERCLA was amended in 1986 by the Superfund Amendments and Reauthorization Act, and by the Small Business Liability Relief and Brownfields Revitalization Act of 2002.

CERCLA contains prohibitions and requirements concerning closed and abandoned hazardous waste sites; establishes liability of persons responsible for releases of hazardous waste at these sites; and establishes a trust fund to provide for cleanup when no responsible party can be identified. The trust fund is funded largely by a tax on the chemical and petroleum industries. CERCLA also provides federal jurisdiction to respond directly to releases or impending releases of hazardous substances that may endanger public health or the environment.

CERCLA also enabled the revision of the National Contingency Plan (NCP) which provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP also established the National Priorities List, which identifies hazardous waste sites eligible for long-term remedial action financed under the federal Superfund program.

Prevention of Accidental Releases and Risk Management Programs: Requirements pertaining to the prevention of accidental releases are promulgated in §112 (r) of the CAA Amendments of 1990 [42 U.S.C. §7401 et. seq.]. The objective of these requirements was to prevent the accidental release and to minimize the consequences of any such release of a hazardous substance. Under these provisions, facilities that produce, process, handle or store hazardous substance have a duty to: 1) identify hazards which may result from releases using hazard assessment techniques; 2) design and maintain a safe facility and take steps necessary to prevent releases; and 3) minimize the consequence of accidental releases that occur.

In accordance with the requirements in §112 (r), U.S. EPA adopted implementing guidelines in 40 CFR Part 68. Under this part, stationary sources with more than a threshold quantity of a regulated substance shall be evaluated to determine the potential for and impacts of accidental releases from any processes subject to the federal risk management requirements. Under certain conditions, the owner or operator of a stationary source may be required to develop and submit a Risk Management Plan (RMP). RMPs consist of three main elements: a hazard assessment that includes off-site consequences analyses and a five-year accident history, a prevention program, and an emergency response program. At the local level, RMPs are implemented by the local fire departments.

3.4.2.2.5 Hazardous Material Worker and Public Safety Requirements

Occupational Safety and Health Administration Regulations: The federal Occupational Safety and Health Administration (OSHA) is an agency of the United States Department of Labor that was created by Congress under the Occupational Safety and Health Act in 1970. OSHA is the agency responsible for assuring worker safety in the handling and use of chemicals in the workplace. Under the authority of the Occupational Safety and Health Act of 1970, OSHA has adopted numerous regulations pertaining to worker safety (see 29 CFR Part 1910). These regulations set standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries. Some OSHA regulations contain standards relating to hazardous materials handling to protect workers who handle toxic, flammable, reactive, or explosive materials, including workplace conditions, employee protection requirements, first aid, and fire protection, as well as material handling and storage. For example, facilities which use, store, manufacture, handle, process, or move hazardous materials are required to conduct employee safety training, have available and know how to use safety equipment, prepare illness prevention programs, provide hazardous substance exposure warnings, prepare emergency response plans, and prepare a fire prevention plan.

Procedures and standards for safe handling, storage, operation, remediation, and emergency response activities involving hazardous materials and waste are promulgated in 29 CFR Part 1910, Subpart H. Some key subsections in 29 CFR Part 1910, Subpart H are §1910.106 -Flammable Liquids and §1910.120 - Hazardous Waste Operations and Emergency Response. In particular, the Hazardous Waste Operations and Emergency Response regulations contain requirements for worker training programs, medical surveillance for workers engaging in the handling of hazardous materials or wastes, and waste site emergency and remediation planning, for those who are engaged in specific clean-up, corrective action, hazardous material handling, and emergency response activities (see 29 CFR Part 1910 Subpart H, §1910.120 (a)(1)(i-v) and §1926.65 (a)(1)(i-v)).

Process Safety Management: As part of the numerous regulations pertaining to worker safety adopted by OSHA, specific requirements that pertain to Process Safety Management (PSM) of Highly Hazardous Chemicals were adopted in 29 CFR Part 1910 Subpart H, §1910.119 and 8 CCR §5189 to protect workers at facilities that have toxic, flammable, reactive or explosive materials. PSM program elements are aimed at preventing or minimizing the consequences of catastrophic releases of chemicals and include process hazard analyses, formal training programs for employees and contractors, investigation of equipment mechanical integrity, and an emergency response plan. Specifically, the PSM program requires facilities that use, store, manufacture, handle, process, or move hazardous materials to conduct employee safety training; have an inventory of safety equipment relevant to potential hazards; have knowledge on use of the safety equipment; prepare an illness prevention program; provide hazardous substance exposure warnings; prepare an emergency response plan; and prepare a fire prevention plan.

Emergency Action Plan: An Emergency Action Plan (EAP) is a written document required by OSHA standards promulgated in 29 CFR Part 1910, Subpart E, §1910.38 (a) to facilitate and organize a safe employer and employee response during workplace emergencies. An EAP is required by all that are required to have fire extinguishers. At a minimum, an EAP must include the following: 1) a means of reporting fires and other emergencies; 2) evacuation procedures and emergency escape route assignments; 3) procedures to be followed by employees who remain to

operate critical plant operations before they evacuate; 4) procedures to account for all employees after an emergency evacuation has been completed; 5) rescue and medical duties for those employees who are to perform them; and 6) names or job titles of persons who can be contacted for further information or explanation of duties under the plan.

National Fire Regulations: The National Fire Codes (NFC), Title 45, published by the National Fire Protection Association (NFPA) contains standards for laboratories using chemicals, which are not requirements, but are generally employed by organizations in order to protect workers. These standards provide basic protection of life and property in laboratory work areas through prevention and control of fires and explosions, and also serve to protect personnel from exposure to non-fire health hazards.

In addition to the NFC, the NFPA adopted a hazard rating system which is promulgated in NFPA 704 - Standard System for the Identification of the Hazards of Materials for Emergency Response. NFPA 704 is a "standard (that) provides a readily recognized, easily understood system for identifying specific hazards and their severity using spatial, visual, and numerical methods to describe in simple terms the relative hazards of a material. It addresses the health, flammability, instability, and related hazards that may be presented as short-term, acute exposures that are most likely to occur as a result of fire, spill, or similar emergency." In addition, the hazard ratings per NFPA 704 are used by emergency personnel to quickly and easily identify the risks posed by nearby hazardous materials in order to help determine what, if any, specialty equipment should be used, procedures followed, or precautions taken during the first moments of an emergency response. The scale is divided into four color-coded categories, with blue indicating level of health hazard, red indicating the flammability hazard, yellow indicating the chemical reactivity, and white containing special codes for unique hazards such as corrosivity and radioactivity. Each hazard category is rated on a scale from 0 (no hazard; normal substance) to 4 (extreme risk). Table 3.4-1 summarizes what the codes mean for each hazards category.

In addition to the information in Table 3.4-1, a number of other physical or chemical properties may cause a substance to be a fire hazard. With respect to determining whether any substance is classified as a fire hazard, SDS lists the NFPA 704 flammability hazard ratings (e.g., NFPA 704). NFPA 704 is a standard that provides a readily recognized, easily understood system for identifying flammability hazards and their severity using spatial, visual, and numerical methods to describe in simple terms the relative flammability hazards of a material.

TABLE 3.4-1
NFPA 704 Hazards Rating Code

Hazard Rating Code	Health (Blue)	Flammability (Red)	Reactivity (Yellow)	Special (White)
4 = Extreme	Very short exposure could cause death or major residual injury (extreme hazard).	Will rapidly or completely vaporize at normal atmospheric pressure and temperature, or is readily dispersed in air and will burn readily. Flash point below 73°F.	Readily capable of detonation or explosive decomposition at normal temperatures and pressures.	W = Reacts with water in an unusual or dangerous manner.
3 = High	Short exposure could cause serious temporary or moderate residual injury.	Liquids and solids that can be ignited under almost all ambient temperature conditions. Flash point between 73°F and 100°F.	Capable of detonation or explosive decomposition but requires a strong initiating source, must be heated under confinement before initiation, reacts explosively with water, or will detonate if severely shocked.	**OXY** = Oxidizer
2 = Moderate	Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury.	Must be moderately heated or exposed to relatively high ambient temperature before ignition can occur. Flash point between 100°F and 200°F.	Undergoes violent chemical change at elevated temperatures and pressures, reacts violently with water, or may form explosive mixtures with water.	**SA** = Simple asphyxiant gas (includes nitrogen, helium, neon, argon, krypton, and xenon).
1 = Slight	Exposure would cause irritation with only minor residual injury.	Must be heated before ignition can occur. Flash point over 200°F.	Normally stable, but can become unstable at elevated temperatures and pressures.	Not applicable
0 = Insignificant	Poses no health hazard, no precautions necessary.	Will not burn.	Normally stable, even under fire exposure conditions, and is not reactive with water.	Not applicable

Although substances can have the same NFPA 704 Flammability Ratings Code, other factors can make each substance's fire hazard very different from each other. For this reason, additional chemical characteristics, such as auto-ignition temperature, boiling point, evaporation rate, flash point, lower explosive limit (LEL), upper explosive limit (UEL), and vapor pressure, are also considered when determining whether a substance is fire hazard. The following is a brief description of each of these chemical characteristics.

Auto-ignition Temperature: The auto-ignition temperature of a substance is the lowest temperature at which it will spontaneously ignite in a normal atmosphere without an external source of ignition, such as a flame or spark.

Boiling Point: The boiling point of a substance is the temperature at which the vapor pressure of the liquid equals the environmental pressure surrounding the liquid. Boiling is

a process in which molecules anywhere in the liquid escape, resulting in the formation of vapor bubbles within the liquid.

Evaporation Rate: Evaporation rate is the rate at which a material will vaporize (evaporate, change from liquid to a vapor) compared to the rate of vaporization of a specific known material. This quantity is a represented as a unit less ratio. For example, a substance with a high evaporation rate will readily form a vapor which can be inhaled or explode, and thus have a higher hazard risk. Evaporation rates generally have an inverse relationship to boiling points (i.e., the higher the boiling point, the lower the rate of evaporation).

Flash Point: Flash point is the lowest temperature at which a volatile liquid can vaporize to form an ignitable mixture in air. Measuring a liquid's flash point requires an ignition source. At the flash point, the vapor may cease to burn when the source of ignition is removed. There are different methods that can be used to determine the flashpoint of a solvent but the most frequently used method is the Tagliabue Closed Cup standard (ASTM D56), also known as the TCC. The flashpoint is determined by a TCC laboratory device which is used to determine the flash point of mobile petroleum liquids with flash point temperatures below 175 degrees Fahrenheit (79.4 degrees Centigrade).

Flash point is a particularly important measure of the fire hazard of a substance. For example, the Consumer Products Safety Commission (CPSC) promulgated Labeling and Banning Requirements for Chemicals and Other Hazardous Substances in 15 U.S.C. §1261 and 16 CFR Part 1500. Per the CPSC, the flammability of a product is defined in 16 CFR Part 1500.3 (c)(6) and is based on flash point. For example, a liquid needs to be labeled as: 1) “Extremely Flammable” if the flash point is below 20 degrees Fahrenheit; 2) “Flammable” if the flash point is above 20 degrees Fahrenheit but less than 100 degrees Fahrenheit; or 3) “Combustible” if the flash point is above 100 degrees Fahrenheit up to and including 150 degrees Fahrenheit.

Lower Explosive Limit (LEL): The lower explosive limit of a gas or a vapor is the limiting concentration (in air) that is needed for the gas to ignite and explode or the lowest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source (e.g., arc, flame, or heat). If the concentration of a substance in air is below the LEL, there is not enough fuel to continue an explosion. In other words, concentrations lower than the LEL are "too lean" to burn. For example, methane gas has a LEL of 4.4 percent (at 138 degrees Centigrade) by volume, meaning 4.4 percent of the total volume of the air consists of methane. At 20 degrees Centigrade, the LEL for methane is 5.1 percent by volume. If the atmosphere has less than 5.1 percent methane, an explosion cannot occur even if a source of ignition is present. When the concentration of methane reaches 5.1 percent, an explosion can occur if there is an ignition source.

Upper Explosive Limit (UEL): The upper explosive limit of a gas or a vapor is the highest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source (e.g., arc, flame, or heat). Concentrations of a substance in air above the UEL are "too rich" to burn.

Vapor Pressure: Vapor pressure is an indicator of a chemical's tendency to evaporate into gaseous form.

Health Hazards Guidance: In addition to fire impacts, health hazards can also be generated due to exposure of chemicals present in both conventional as well as reformulated products. Using available toxicological information to evaluate potential human health impacts associated with conventional solvents and potential replacement solvents, the toxicity of the conventional solvents can be compared to solvents expected to be used in reformulated products. As a measure of a chemical's potential health hazards, the following values need to be considered: the Threshold Limit Values established by the American Conference of Governmental Industrial Hygiene, OSHA's Permissible Exposure Limits, the Immediately Dangerous to Life and Health levels recommended by the National Institute for Occupational Safety and Health (NIOSH), and health hazards developed by the National Safety Council. The following is a brief description of each of these values.

Threshold Limit Values (TLVs): The TLV of a chemical substance is a level to which it is believed a worker can be exposed day after day for a working lifetime without adverse health effects. The TLV is an estimate based on the known toxicity in humans or animals of a given chemical substance, and the reliability and accuracy of the latest sampling and analytical methods. The TLV for chemical substances is defined as a concentration in air, typically for inhalation or skin exposure. Its units are in parts per million (ppm) for gases and in milligrams per cubic meter (mg/m^3) for particulates. The TLV is a recommended guideline by ACGIH.

Permissible Exposure Limits (PEL): The PEL is a legal limit, usually expressed in ppm, established by OSHA to protect workers against the health effects of exposure to hazardous substances. PELs are regulatory limits on the amount or concentration of a substance in the air. A PEL is usually given as a time-weighted average (TWA), although some are short-term exposure limits (STEL) or ceiling limits. A TWA is the average exposure over a specified period of time, usually eight hours. This means that, for limited periods, a worker may be exposed to concentrations higher than the PEL, so long as the average concentration over eight hours remains lower. A short-term exposure limit is one that addresses the average exposure over a 15 to 30 minute period of maximum exposure during a single work shift. A ceiling limit is one that may not be exceeded for any period of time, and is applied to irritants and other materials that have immediate effects. The OSHA PELs are published in 29 CFR 1910.1000, Table Z1.

Immediately Dangerous to Life and Health (IDLH): IDLH is an acronym defined by NIOSH as exposure to airborne contaminants that is "likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment." IDLH values are often used to guide the selection of breathing apparatus that are made available to workers or firefighters in specific situations.

3.4.2.2.6 Oil and Pipeline Regulations and Oversight

Oil Pollution Act: The Oil Pollution Act was signed into law in 1990 to give the federal government authority to better respond to oil spills. The Oil Pollution Act improved the federal

government's ability to prevent and respond to oil spills, including provision of money and resources. The Oil Pollution Act establishes polluter liability, gives states enforcement rights in navigable waters of the state, mandates the development of spill control and response plans for all vessels and facilities, increases fines and enforcement mechanisms, and establishes a federal trust fund for financing clean-up.

The Oil Pollution Act also establishes the National Oil Spill Liability Trust Fund to provide financing for cases in which the responsible party is either not readily identifiable, or refuses to pay the cleanup/damage costs. In addition, the Oil Pollution Act expands provisions of the National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the National Contingency Plan, requiring the federal government to direct all public and private oil spill response efforts. It also requires area committees, composed of federal, state, and local government officials, to develop detailed, location-specific area contingency plans. In addition, the Oil Pollution Act directs owners and operators of vessels, and certain facilities that pose a serious threat to the environment, to prepare their own specific facility response plans. The Oil Pollution Act increases penalties for regulatory non-compliance by responsible parties; gives the federal government broad enforcement authority; and provides individual states the authority to establish their own laws governing oil spills, prevention measures, and response methods.

Oil Pollution Prevention Regulation: In 1973, the U.S. EPA issued the Oil Pollution Prevention regulation (see 40 CFR 112)**,** to address the oil spill prevention provisions contained in the Clean Water Act of 1972. The Spill Prevention, Control, and Countermeasure (SPCC) Rule is part of the Oil Pollution Prevention regulations (see 40 CFR Part 112, Subparts A - C). Specifically, the SPCC rule includes requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires specific facilities to prepare, amend, and implement SPCC Plans. SPCC Plans require applicable facilities to take steps to prevent oil spills including: 1) using suitable storage containers/tanks; 2) providing overfill prevention (e.g., high-level alarms); 3) providing secondary containment for bulk storage tanks; 4) providing secondary containment to catch oil spills during transfer activities; and 5) periodically inspecting and testing pipes and containers.

(U.S. DOT) Office of Pipeline Safety: The Office of Pipeline Safety, within the U.S. DOT's Pipeline and Hazards Material Safety Administration, has jurisdictional responsibility for developing regulations and standards to ensure the safe and secure movement of hazardous liquid and gas pipelines under its jurisdiction in the United States. The Office of Pipeline Safety has the following key responsibilities:

- Support the operation of, and coordinate with the United States Coast Guard on the National Response Center and serve as a liaison with the Department of Homeland Security and the Federal Emergency Management Agency (FEMA) on matters involving pipeline safety;
- Develop and maintain partnerships with other federal, state, and local agencies, public interest groups, tribal governments, and the regulated industry and other underground utilities to address threats to pipeline integrity, service, and reliability and to share responsibility for the safety of communities;

- Administer pipeline safety regulatory programs and develops regulatory policy involving pipeline safety;

- Oversee pipeline operator implementation of risk management and risk-based programs and administer a national pipeline inspection and enforcement program;

- Provide technical and resource assistance for state pipeline safety programs to ensure oversight of intrastate pipeline systems and educational programs at the local level; and

- Support the development and conduct of pipeline safety training programs for federal and state regulatory and compliance staff and the pipeline industry.

49 CFR Parts 178 – 185 relates to the role of transportation, including pipelines, in the United States. 49 CFR Parts 186-199 establishes minimum pipeline safety standards. The Office of the State Fire Marshal works in partnership with the Federal Pipeline and Hazardous Materials Safety Administration to assure pipeline operators are meeting requirements for safe, reliable, and environmentally sound operation of their facilities for intrastate pipelines within California.

Chemical Facility Anti-Terrorism Standards: The Federal Department of Homeland Security established the chemical facility anti-terrorism standards in 2007 (see 6 CFR Part 27). These regulations established risk-based performance standards for the security of chemical facilities and require covered chemical facilities to prepare Security Vulnerability Assessments, which identify facility security vulnerabilities, and to develop and implement Site Security Plans.

3.4.2.3 State Regulations

3.4.2.3.1 Hazardous Materials and Waste Regulations

California Hazardous Waste Control Law: The California Hazardous Waste Control Law is administered by CalEPA to regulate hazardous wastes within the State of California. While the California Hazardous Waste Control Law is generally more stringent than RCRA, both the state and federal laws apply in California. The California Department of Toxic Substances Control (DTSC) is the primary agency in charge of enforcing both the federal and state hazardous materials laws in California. The DTSC regulates hazardous waste, oversees the cleanup of existing contamination, and pursues avenues to reduce hazardous waste produced in California. The DTSC regulates hazardous waste in California under the authority of RCRA, the California Hazardous Waste Control Law, and the H&S. Under the direction of the CalEPA, the DTSC maintains the Cortese List and Envirostor databases of hazardous materials and waste sites as specified under Government Code §65962.5. The Cortese List consists of the following:

1. **Subsection 65962.5. (a)**
   List provided by DTSC that includes:
   a. All hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code.

   b. All land designated as hazardous waste property or border zone property pursuant to Article 11 (commencing with Section 25220) of Chapter 6.5 of Division 20 of the Health and Safety Code.
   c. All information received by the Department of Toxic Substances Control pursuant to Section 25242 of the Health and Safety Code on hazardous waste disposals on public land.
   d. All sites listed pursuant to Section 25356 of the Health and Safety Code.
   e. All sites included in the Abandoned Site Assessment Program.
2. **Subsection 65962.5. (b)**
   The State Department of Health lists of all public drinking water wells that contain detectable levels of organic contaminants and that are subject to water analysis pursuant to Section 116395 of the Health and Safety Code.
3. **Subsection 65962.5. (c)**
   The State Water Resources Control Board shall list of all of the following:
   a. All underground storage tanks for which an unauthorized release report is filed pursuant to Section 25295 of the Health and Safety Code.
   b. All solid waste disposal facilities from which there is a migration of hazardous waste and for which a California regional water quality control board has notified the Department of Toxic Substances Control pursuant to subdivision (e) of Section 13273 of the Water Code.
   c. All cease and desist orders issued after January 1, 1986, pursuant to Section 13301 of the Water Code, and all cleanup or abatement orders issued after January 1, 1986, pursuant to Section 13304 of the Water Code, that concern the discharge of wastes that are hazardous materials.
4. **Subsection 65962.5. (d)**
   The appropriate local enforcement agency will list of all solid waste disposal facilities from which there is a known migration of hazardous waste.

The Hazardous Waste Control Law (22 CCR Chapter 11, Appendix X) also lists 791 chemicals and approximately 300 common materials which may be hazardous; establishes criteria for identifying, packaging, and labeling hazardous wastes; prescribes management controls; establishes permit requirements for treatment, storage, disposal, and transportation; and identifies some wastes that cannot be disposed of in landfills.

California Occupational Safety and Health Administration: The California Occupational Safety and Health Administration (CalOSHA) is the primary agency responsible for worker safety in the handling and use of chemicals in the workplace. The CalOSHA requires the employer to monitor worker exposure to listed hazardous substances and notify workers of exposure (8 CCR Sections 337-340). The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substance exposure warnings. CalOSHA standards are generally more stringent than federal regulations.

Hazardous Materials Release Notification: Many state statutes require emergency notification of a hazardous chemical release, including:

- H&S §25270.7, §25270.8, and §25507;

- California Vehicle Code §23112.5;
- California Public Utilities Code §7673 (General Orders #22-B, 161);
- California Government Code §51018 and §8670.25.5(a);
- California Water Code §13271 and §13272; and
- California Labor Code §6409.1(b)10.

California Accident Release Prevention (CalARP) Program: The California Accident Release Prevention Program (19 CCR Division 2, Chapter 4.5) requires the preparation of RMPs. CalARP requires stationary sources with more than a threshold quantity of a regulated substance to be evaluated to determine the potential for and impacts of accidental releases from any processes on-site (not transport) subject to state risk management requirements. RMPs are documents prepared by the owner or operator of a stationary source containing detailed information including: (1) regulated substances held onsite at the stationary source; (2) offsite consequences of an accidental release of a regulated substance; (3) the accident history at the stationary source; (4) the emergency response program for the stationary source; (5) coordination with local emergency responders; (6) hazard review or process hazard analysis; (7) operating procedures at the stationary source; (8) training of the stationary source's personnel; (9) maintenance and mechanical integrity of the stationary source's physical plant; and (10) incident investigation. The CalARP Program is implemented at the local government level by Certified Unified Program Agencies (CUPAs) also known as Administering Agencies (AAs). Typically, local fire departments are the administering agencies of the CalARP Program because they frequently are the first responders in the event of a release. California is proposing modifications to the CalARP Program along with the state's PSM program in response to an accident at the Chevron Richmond Refinery. The proposed regulations were released for public comment on July 15, 2016 and the public comment period closes on September 15, 2016.

Hazardous Materials Disclosure Program: The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) as promulgated by CalEPA in CCR, Title 27, Chapter 6.11 requires the administrative consolidation of six hazardous materials and waste programs (program elements) under one agency, a CUPA. The Unified Program administered by the State of California consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities for the state's environmental and emergency management programs, which include Hazardous Waste Generator and On-Site Hazardous Waste Treatment Programs ("Tiered Permitting"); Above ground SPCC Program; Hazardous Materials Release Response Plans and Inventories (business plans); the CalARP Program; the UST Program; and the Uniform Fire Code Plans and Inventory Requirements. The Unified Program is implemented at the local government level by CUPAs.

Hazardous Materials Management Act: The State of California (H&S Division 20, Chapter 6.95) requires any business that handles more than a specified amount of hazardous or extremely hazardous materials, termed a "reportable quantity," to submit a Hazardous Materials Business

Plan to its CUPA. Business plans must include an inventory of the types, quantities, and locations of hazardous materials at the facility. Businesses are required to update their business plans at least once every three years and the chemical portion of their plans every year. Also, business plans must include emergency response plans and procedures to be used in the event of a significant or threatened significant release of a hazardous material. These plans need to identify the procedures to follow for immediate notification to all appropriate agencies and personnel of a release, identification of local emergency medical assistance appropriate for potential accident scenarios, contact information for all company emergency coordinators, a listing and location of emergency equipment at the business, an evacuation plan, and a training program for business personnel. The requirements for hazardous materials business plans are specified in the H&S and 19 CCR.

Hazardous Materials Transportation in California: California regulates the transportation of hazardous waste originating or passing through the State in Title 13, CCR. The California Highway Patrol (CHP) and Caltrans have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies. The CHP enforces materials and hazardous waste labeling and packing regulations that prevent leakage and spills of material in transit and provide detailed information to cleanup crews in the event of an incident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP. Caltrans has emergency chemical spill identification teams at locations throughout the state.

California Fire Code: While NFC Standard 45 and NFPA 704 are regarded as nationally recognized standards, the California Fire Code (24 CCR) also contains state standards for the use and storage of hazardous materials and special standards for buildings where hazardous materials are found. Some of these regulations consist of amendments to NFC Standard 45. State Fire Code regulations require emergency pre-fire plans to include training programs in first aid, the use of fire equipment, and methods of evacuation.

3.4.2.4 Local Regulations

South Coast Air Quality Management District – Rule 1166: SCAQMD Rule 1166 - Volatile Organic Compound Emissions from Decontamination of Soil establishes requirements to control the emission of VOCs from excavating, grading, handling, and treating soil contaminated from leakage, spillage, or other means of VOCs deposition. Rule 1166 stipulates that any parties planning on excavating, grading, handling, transporting, or treating soils contaminated with VOCs must first apply for and obtain, and operate pursuant to, a mitigation plan approved by the Executive Officer prior to commencement of operation. BACT is required during all phases of remediation of soil contaminated with VOCs. Rule 1166 also sets forth testing, record keeping and reporting procedures that must be followed at all times. Non-compliance with Rule 1166 can result in the revocation of the approved mitigation plan, the owner and/or the operator being served with a Notice of Violation for creating a public nuisance, or an order to halt the offending operation until the public nuisance is mitigated to the satisfaction of the Executive Officer.

Los Angeles County: The Office of Emergency Management is responsible for organizing and directing the preparedness efforts of the Emergency Management Organization of Los Angeles

County. Los Angeles County's policies towards hazardous materials management include enforcing stringent site investigations for factors related to hazards; limiting the development in high hazard areas, such as floodplains, high fire hazard areas, and seismic hazard zones; facilitating safe transportation, use, and storage of hazardous materials; supporting lead paint abatement; remediating Brownfield sites; encouraging the purchase of homes on the FEMA Repeat Hazard list and designating the land as open space; enforcing restrictions on access to important energy sites; limiting development downslope from aqueducts; promoting safe alternatives to chemical-based products in households; and prohibiting development in floodways. The county has defined effective emergency response management capabilities to include supporting county emergency providers with reaching their response time goals; promoting the participation and coordination of emergency response management between cities and other counties at all levels of government; coordinating with other county and public agency emergency planning and response activities; and encouraging the development of an early warning system for tsunamis, floods and wildfires.

Orange County: Orange County's Hazardous Materials Program Office is responsible for facilitating the coordination of various parts of the County's hazardous materials program; assisting in coordinating county hazardous materials activities with outside agencies and organizations; providing comprehensive, coordinated analysis of hazardous materials issues; and directing the preparation, implementation, and modification of the county's Hazardous Waste Management Plan (HWMP). Orange County is responsible for its own emergency plans concerning a nuclear power plant accident, and the Incident Response Plan is updated regularly.

The regulatory agency responsible for enforcement, as well as inspection of pipelines transporting hazardous materials, is the California State Fire Marshal's Office, Hazardous Liquid Pipeline Division. The Orange County Health Care Agency (OCHCA) has been designated by the Board of Supervisors as the agency to enforce the underground storage tank (UST) program. The OCHCA UST Program regulates approximately 7,000 of the 9,500 underground tanks in Orange County. The program includes conducting regular inspections of underground tanks; oversight of new tank installations; issuance of permits; regulation of repair and closure of tanks; ensuring the mitigation of leaking USTs; pursuing enforcement action; and educating and assisting the industries and general public as to the laws and regulations governing USTs. Under mandate from the California HSC, the Orange County Fire Authority is the designated agency to inventory the distribution of hazardous materials in commercial or industrial occupancies, develop and implement emergency plans, and require businesses that handle hazardous materials to develop emergency plans to deal with these materials.

San Bernardino County: San Bernardino County's HWMP serves as the primary planning document for the management of hazardous waste in San Bernardino County. The HWMP identifies the types and amounts of wastes generated; establishes programs for managing these wastes; identifies an application review process for the siting of specified hazardous waste facilities; identifies mechanisms for reducing the amount of waste generated; and identifies goals, policies, and actions for achieving effective hazardous waste management. One of the county's stated goals is to minimize the generation of hazardous waste and reduce the risk posed by storage, handling, transportation, and disposal of hazardous wastes. In addition, the county will protect its residents and visitors from injury and loss of life and protect property from fires by deploying firefighters and requiring new land developments to prepare site-specific fire protection plans.

Riverside County: Through its membership in the Southern California Hazardous Waste Management Authority (SCHWMA), the County of Riverside has agreed to work on a regional level to solve problems involving hazardous waste. SCHWMA was formed through a joint powers agreement between Santa Barbara, Ventura, San Bernardino, Orange, San Diego, Imperial, and Riverside Counties and the Cities of Los Angeles and San Diego. Working within the concept of "fair share," each SCHWMA county has agreed to take responsibility for the treatment and disposal of hazardous waste in an amount that is at least equal to the amount generated within that county. This responsibility can be met by siting hazardous waste management facilities (transfer, treatment, and/or repository) capable of processing an amount of waste equal to or larger than the amount generated within the county, or by creating intergovernmental agreements between counties to provide compensation to a county for taking another county's waste, or through a combination of both facility siting and intergovernmental agreements. When and where a facility is to be sited is primarily a function of the private market. However, once an application to site a facility has been received, the county will review the requested facility and its location against a set of established siting criteria to ensure that the location is appropriate and may deny the application based on the findings of this review. The County of Riverside does not presently have any of these facilities within its jurisdiction and, therefore, must rely on intergovernmental agreements to fulfill its fair share responsibility to SCHWMA.

3.4.3 EMERGENCY RESPONSE TO HAZARDOUS MATERIALS AND WASTE INCIDENTS

The California Emergency Management Agency (Cal EMA) exists to enhance safety and preparedness in California through strong leadership, collaboration, and meaningful partnerships. The goal of Cal EMA is to protect lives and property by effectively preparing for, preventing, responding to, and recovering from all threats, crimes, hazards, and emergencies. Cal EMA under the Fire and Rescue Division coordinates statewide implementation of hazardous materials accident prevention and emergency response programs for all types of hazardous materials incidents and threats. In response to any hazardous materials emergency, Cal EMA is called upon to provide state and local emergency managers with emergency coordination and technical assistance.

Pursuant to the Emergency Services Act, California has developed an Emergency Response Plan to coordinate emergency services provided by federal, state, and local government agencies and private persons. Response to hazardous materials incidents is one part of this Emergency Response Plan. The Emergency Response Plan is administered by Cal EMA which coordinates the responses of other agencies. Six mutual aid and Local Emergency Planning Committee (LEPC) regions have been identified for California that are divided into three areas of the state designated as the Coastal (Region II, which includes 16 counties with 151 incorporated cities and a population of about eight million people.), Inland (Region III, Region IV and Region V, which includes 31 counties with 123 incorporated cities and a population of about seven million people), and Southern (Region I and Region VI, which includes 11 counties with 226 incorporated cities and a population of about 22 million people). The SCAQMD jurisdiction covers portions of Region I and Region VI.

In addition, pursuant to the Hazardous Materials Release Response Plans and Inventory Law of 1985, local agencies are required to develop "area plans" for response to releases of hazardous materials and wastes. These emergency response plans depend to a large extent on the business plans submitted by persons who handle hazardous materials. An area plan must include pre-emergency planning of procedures for emergency response, notification, coordination of affected government agencies and responsible parties, training, and follow-up.

3.4.4 HAZARDOUS MATERIALS INCIDENTS

Hazardous materials move through the region by a variety of modes: Truck, rail, air, ship, and pipeline. The movement of hazardous materials implies a degree of risk, depending on the materials being moved, the mode of transport, and numerous other factors (e.g., weather and road conditions). According to the Office of Hazardous Materials Safety (OHMS) in the U.S. DOT, hazardous materials shipments can be regarded as equivalent to deliveries, but any given shipment may involve one or more movements or trip segments, which may occur by different routes (e.g., rail transport with final delivery by truck). According to the Commodity Flow Survey data (U.S. DOT, 2015), there were approximately 2.6 billion tons of hazardous materials shipments in the United States in 2012 (the last year for which data are available). Table 3.4-2 indicates that trucks move more than 50 percent and pipeline accounts for approximately 24 percent of all hazardous materials shipped from a location in the United States. By contrast, rail accounts for only 4.3 percent of shipments (U.S. DOT, 2015).

TABLE 3.4-2

Hazardous Material Shipments in the United States in 2012

Mode	Total Commercial Freight (thousand tons)	Hazardous Materials Shipped (thousand tons)	Percent of Total Hazardous Materials Shipped by Mode of Transportation	Percent of Total Commercial Freight Shipped that is Hazardous
Truck	8,060,166	1,531,405	59.4%	19.0%
Rail	1,628,537	110,988	4.3%	6.8%
Water	575,996	283,561	11.0%	49.2%
Pipeline	635,975	626,652	24.3%	98.5%
Other	398,735	27,547	1.1%	6.9%

Total	**11,299,409**	**2,580,153**	**100.0%**	**22.8%**

Source: U.S. DOT, 2016 and U.S. DOT, 2016a

The movement of hazardous materials through the U.S. transportation system represents about 22.8 percent of total tonnage for all freight shipments as measured by the Commodity Flow Survey. Comparatively, the total commercial freight moved in 2012 in California by all transportation modes was 718,345 thousand tons. (U.S. DOT, 2016b).

The California Hazardous Materials Incident Reporting System (CHMIRS) is a post incident reporting system to collect data on incidents involving the accidental release of hazardous materials in California. Information on accidental releases of hazardous materials are reported to and maintained by Cal EMA. While information on accidental releases are reported to Cal EMA, Cal EMA no longer conducts statistical evaluations of the releases, e.g., total number of releases per year for the entire State, or data by county. The U.S. DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) provides access to retrieve data from the Incident Reports Database, which also includes non-pipeline incidents, e.g., truck and rail events. Incident data and summary statistics, e.g., release date, geographical location (state and county) and type of material released, are available online from the Hazmat Incident Database.

Table 3.4-3 provides a summary of the reported hazardous material incidents for Los Angeles, Orange, Riverside, and San Bernardino counties for 2012 through 2014 from the Hazmat Incident Database (PHMSA, 2015). Data presented is for the entire county and not limited to the portion of the county located within the jurisdiction of the SCAQMD.

TABLE 3.4-3

Reported Hazardous Materials Incidents for 2012 - 2014

County	2012	2013	2014
Los Angeles	286	337	287
Orange	270	63	88
Riverside	55	43	50
San Bernardino	261	348	351
Total	**872**	**791**	**776**

In 2012, there were a total of 872 incidents reported for Los Angeles, Orange, Riverside and San Bernardino counties. In 2013, there were a total of 791 incidents reported for Los Angeles, Orange, Riverside and San Bernardino counties, and in 2014 a total of 776 incidents for these four counties. Over the three year period, San Bernardino and Los Angeles counties accounted for the largest

number of incidents, followed by Orange and Riverside counties. As noted in Table 3.4-3, the number of incidents have reduced over the years.

3.4.5 HAZARDS ASSOCIATED WITH AIR POLLUTION CONTROL, PRODUCT REFORMULATIONS AND ALTERNATIVE FUELS

The SCAQMD has evaluated the hazards associated with previous AQMPs, proposed SCAQMD rules, and non-SCAQMD projects where the SCAQMD is the Lead Agency pursuant to CEQA. The analyses covered a range of potential air pollution control technologies and equipment. EIRs prepared for the previous AQMPs have specifically evaluated hazard impacts from: (1) add-on control equipment; (2) alternative coating methods; and (3) alternative fuels.

Add-on pollution control technologies which have been previously analyzed for hazards include: carbon adsorption, incineration, post-combustion flue-gas treatment, SCR and selective non-catalytic reduction (SNCR), scrubbers, bag filters, and electrostatic precipitators. The use of add-on pollution control equipment may concentrate or utilize hazardous materials. A malfunction or accident when using add-on pollution control equipment could potentially expose people to hazardous materials, explosions, or fires. The SCAQMD has determined that the transport, use, and storage of ammonia, both aqueous and anhydrous, (used in SCR systems) may have significant hazard impacts in the event of an accidental release. Further analyses have indicated that the use of aqueous ammonia (instead of anhydrous ammonia) can usually reduce the hazards associated with ammonia use in SCR systems to less than significant.

The potential hazards associated with alternative coating methods have been analyzed including powder coatings, radiation-curable coatings, high solids coatings, and waterborne coatings. The greatest hazard associated with both current and alternative coating methods is flammability.

Alternative fuels may be used to reduce emissions from both stationary source equipment and motor vehicles. The 2016 AQMP is technology neutral but does seek emission reductions from lower emitting and zero-emission technologies that could be accomplished with alternative fuels and electric batteries. The alternative fuels which have been analyzed include reformulated gasoline, methanol, compressed natural gas, LPG or propane, and electrically charged batteries. Like conventional fossil fuels, alternative fuels may create fire hazards, explosions or accidental releases during fuel transport, storage, dispensing, and use. Electric batteries also present a slight fire and explosion hazards due to the presence of reactive compounds, which may be subjected to high temperatures.

3.4.5.1 Ammonia

Ammonia is the primary hazardous chemical identified with the use of air pollution control equipment (e.g., SCR and SNCR systems). Ammonia, though not a carcinogen, can have chronic and acute health impacts. Therefore, a potential increase in the use of ammonia may increase the current existing risk setting associated with deliveries (e.g., truck and road accidents) and onsite or offsite spills for each facility that currently uses or will begin to use ammonia. Exposure to a toxic gas cloud is the potential hazard associated with this type of control equipment. A toxic gas cloud is the release of a volatile chemical such as anhydrous ammonia that could form a cloud that

migrates off-site, thus exposing individuals. Anhydrous ammonia is heavier than air such that when released into the atmosphere, would form a cloud at ground level rather than be dispersed. "Worst-case" conditions tend to arise when very low wind speeds coincide with the accidental release, which can allow the chemicals to accumulate rather than disperse. Though there are facilities that may be affected by the proposed 2016 AQMP control measures that are currently permitted to use anhydrous ammonia, for new construction, however, current SCAQMD policy no longer allows the use of anhydrous ammonia. Instead, to minimize the hazards associated with ammonia used in the SCR or SNCR process, aqueous ammonia, 19 percent by volume, is typically required as a permit condition associated with the installation of SCR or SNCR equipment for the following reasons: 1) 19 percent aqueous ammonia does not travel as a dense gas like anhydrous ammonia; and 2) 19 percent aqueous ammonia is not on any acutely hazardous material lists unlike anhydrous ammonia or aqueous ammonia at higher percentages.

3.4.5.2 LNG

LNG is essentially no different from the natural gas used in homes and businesses every day, except that it has been refrigerated to minus 259 degrees Fahrenheit at which point it becomes a clear, colorless, and odorless liquid. As a liquid, natural gas occupies only one six-hundredth of its gaseous volume and can be transported economically between continents in special tankers. LNG weighs slightly less than half as much as water, so it floats on fresh or sea water. However, when LNG comes in contact with any warmer surface such as water or air, it evaporates very rapidly ("boil"), returning to its original, gaseous volume. As the LNG vaporizes, a vapor cloud resembling ground fog will form under relatively calm atmospheric conditions. The vapor cloud is initially heavier than air since it is so cold, but as it absorbs more heat, it becomes lighter than air, rises, and can be carried away by the wind. An LNG vapor cloud cannot explode in the open atmosphere, but it could burn.

LNG is considered a hazardous material. The primary safety concerns are the potential consequences of an LNG spill. LNG hazards result from three of its properties:

- Cryogenic temperatures
- Dispersion characteristics
- Flammability characteristics

The extreme cold of LNG can directly cause injury or damage. Although momentary contact on the skin can be harmless, extended contact will cause severe freeze burns. On contact with certain metals, such as ship decks, LNG can cause immediate cracking. Although not poisonous, exposure to the center of a vapor cloud could cause asphyxiation due to the absence of oxygen. LNG vapor clouds can ignite within the portion of the cloud where the concentration of natural gas is between a five and a 15 percent (by volume) mixture with air. To catch fire, however, this portion of the vapor cloud must encounter an ignition source. Otherwise, the LNG vapor cloud will simply dissipate into the atmosphere. An ignited LNG vapor cloud is very dangerous, because of its tremendous radiant heat output. Furthermore, as a vapor cloud continues to burn, the flame could burn back toward the evaporating pool of spilled liquid, ultimately burning the quickly evaporating

natural gas immediately above the pool, giving the appearance of a "burning pool" or "pool fire." An ignited vapor cloud or a large LNG pool fire can cause extensive damage to life and property.

Spilled LNG would disperse faster on the ocean than on land, because water spills provide very limited opportunity for containment. Furthermore, LNG vaporizes more quickly on water, because the ocean provides an enormous heat source. For these reasons, most analysts conclude that the risks associated with shipping, loading, and off-loading LNG are much greater than those associated with land-based storage facilities. Preventing spills and responding immediately to spills should they occur are major factors in the design of LNG facilities (CEC, 2003).

Beyond routine industrial hazards and safety considerations, LNG presents specific safety considerations. In the event of an accidental release of LNG, the safety zone around a facility protects neighboring communities from personal injury, property damage or fire. The one and only case of an accident that affected the public was in Cleveland, Ohio in 1944. Research stemming from the Cleveland incident has influenced safety standards used today. Indeed, during the past four decades, growth in LNG use worldwide has led to a number of technologies and practices that will be used in the U.S. and elsewhere in North America as the LNG industry expands. Generally, multiple layers of protection create four critical safety conditions, all of which are integrated with a combination of industry standards and regulatory compliance. The four requirements for safety – primary containment, secondary containment, safeguard systems and separation distance apply across the LNG value chain, from production, liquefaction and shipping, to storage and re-gasification. The term "containment" means safe storage and isolation of LNG (Foss, 2012).

3.4.5.3 LPG

LPG is a mixture of several gases that is generally called "propane," in reference to the mixture's chief ingredient. LPG changes to the liquid state at the moderately high pressures found in an LPG vehicle's fuel tank. LPG is formed naturally, interspersed with deposits of petroleum and natural gas. Natural gas contains LPG, water vapor, and other impurities that must be removed before it can be transported in pipelines as a salable product. Approximately 1,200 facilities in California dispense propane. Nearly all of these facilities are used primarily to fuel residential and commercial applications such as heaters, recreational vehicles and barbeques. About half of all these facilities are capable of providing propane as a motor fuel, though only about three percent of all the fuel dispensed is used for transportation applications (CEC, 2016i).

Propane vehicles emit about one-third fewer reactive organic gases than gasoline-fueled vehicles. Nitrogen oxide and carbon monoxide emissions are also 20 percent and 60 percent less, respectively. Unlike gasoline-fueled vehicles, there are no evaporative emissions while LPG vehicles are running or parked, because LPG fuel systems are tightly sealed. Small amounts of LPG may escape into the atmosphere during refueling, but these vapors are 50 percent less reactive than gasoline vapors, so they have less of a tendency to generate smog-forming ozone. LPG's extremely low sulfur content means that the fuel does not contribute significantly to SOx or particulate emissions.

Many propane vehicles are converted gasoline vehicles. The relatively inexpensive conversion kits include a regulator/vaporizer that changes liquid propane to a gaseous form and an air/fuel mixer that meters and mixes the fuel with filtered intake air before the mixture is drawn into the engine's combustion chambers. Also included in conversion kits is closed-loop feedback circuitry that continually monitors the oxygen content of the exhaust and adjusts the air/fuel ratio as necessary. This device communicates with the vehicle's onboard computer to keep the engine running at optimum efficiency. LPG vehicles additionally require a special fuel tank that is strong enough to withstand the LPG storage pressure of about 130 pounds per square inch. The gaseous nature of the fuel/air mixture in an LPG vehicle's combustion chambers eliminates the cold-start problems associated with liquid fuels. In contrast to gasoline engines, which produce high emission levels while running cold, LPG engine emissions remain similar whether the engine is cold or hot. Also, because LPG enters an engine's combustion chambers as a vapor, it does not strip oil from cylinder walls or dilute the oil when the engine is cold. This helps LPG powered engines to have a longer service life and reduced maintenance costs. Also helping in this regard is the fuel's high hydrogen-to-carbon ratio (C3H8), which enables propane powered vehicles to have less carbon build-up than gasoline- and diesel powered vehicles. LPG delivers roughly the same power, acceleration, and cruising speed characteristics as gasoline. It does yield a somewhat reduced driving range, however, because it contains only about 70-75 percent of the energy content of gasoline. Its high octane rating (around 105) means, though, that an LPG engine's power output and fuel efficiency can be increased beyond what would be possible with a gasoline engine without causing destructive "knocking." Such fine-tuning can help compensate for the fuel's lower energy density. Fleet owners find that propane costs are typically five to 30 percent less than those of gasoline. The cost of constructing an LPG fueling station is also similar to that of a comparably sized gasoline dispensing system. Fleet owners not wishing to establish fueling stations of their own may avail themselves of over 3,000 publicly accessible fueling stations nationwide.

Propane is an odorless, nonpoisonous gas that has the lowest flammability range of all alternative fuels. High concentrations of propane can displace oxygen in the air, though, causing the potential for asphyxiation. This problem is mitigated by the presence of ethyl mercaptan, which is an odorant that is added to warn of the presence of gas. While LPG itself does not irritate the skin, the liquefied gas becomes very cold upon escaping from a high-pressure tank, and may therefore cause frostbite, should it contact unprotected skin. As with gasoline, LPG can form explosive mixtures with air. Since the gas is slightly heavier than air, it may form a continuous stream that stretches a considerable distance from a leak or open container, which may lead to a flashback explosion upon contacting a source of ignition (U.S. DOE, 2003).

While LPG is classified as a fire hazard, it is not classified as a toxic or as a hazardous air pollutant. LPG is a regulated substance subject to both the California and Federal RMP programs in accordance with the CCR, Title 19, §2770.4.1 and Chapter 40 of the CFR Part 68, §68.1263. The threshold quantity for LPG (as propane) as a regulated substance for accidental release prevention is 10,000 pounds. However, when LPG is used as a fuel by an end user (as is frequently the case with residential portable and stationary storage tanks), or when it is held for retail sale as a fuel, it is excluded from RMP requirements, even if the amount exceeds the threshold quantity. On June 1, 2012, SCAQMD adopted Rule 1177 - Liquefied Petroleum Gas Transfer and Dispensing to reduce fugitive VOC emissions released during the transfer and dispensing of LPG at residential, commercial, industrial, chemical, agricultural and retail sales facilities. Rule 1177 applies to the

transfer of LPG to and from stationary storage tanks, cylinders and cargo tanks, including bobtails, truck transports and rail tank cars, and into portable refillable cylinders. In addition, Rule 1177 requires the use of low emission fixed liquid level gauges or equivalent alternatives during filling of LPG-containing tanks and cylinders, use of LPG low emission connectors, routine leak checks and repairs of LPG transfer and dispensing equipment, and recordkeeping and reporting to demonstrate compliance. With respect to suppliers and sellers of LPG, H&S §25506 specifically requires all businesses handling hazardous materials to submit a business emergency response plan to assist local administering agencies in the emergency release or threatened release of a hazardous material. Business emergency response plans generally require the following:

1. Identification of individuals who are responsible for various actions, including reporting, assisting emergency response personnel and establishing an emergency response team;

2. Procedures to notify the administering agency, the appropriate local emergency rescue personnel, and the California Office of Emergency Services;

3. Procedures to mitigate a release or threatened release to minimize any potential harm or damage to persons, property or the environment;

4. Procedures to notify the necessary persons who can respond to an emergency within the facility;

5. Details of evacuation plans and procedures;

6. Descriptions of the emergency equipment available in the facility;

7. Identification of local emergency medical assistance; and

8. Training (initial and refresher) programs for employees in: (a) the safe handling of hazardous materials used by the business; (b) methods of working with the local public emergency response agencies; (c) the use of emergency response resources under control of the handler; and (d) other procedures and resources that will increase public safety and prevent or mitigate a release of hazardous materials.

In general, every county or city and all facilities using a minimum amount of hazardous materials are required to formulate detailed contingency plans to eliminate, or at least minimize, the possibility and effect of fires, explosion, or spills. In conjunction with the California Office of Emergency Services, local jurisdictions have enacted ordinances that set standards for area and business emergency response plans. These requirements include immediate notification, mitigation of an actual or threatened release of a hazardous material, and evacuation of the emergency area. Lastly, operators who currently transfer and dispense LPG are well aware of the hazardous nature of LPG, including its flammability and receive periodic training for the safe handling of LPG for the following reasons. Facility operators with a dispensing system for LPG are required to comply with operating pressures pursuant to the standards developed by the American Society of Mechanical Engineers (ASME) Pressure Vessel Code, Section 8; NFPA 58 with regard to venting LPG to the atmosphere; and for LPG tanks that are subject to RMP

requirements, operators must obtain permits from, and submit RMPs to, the local CUPA which is typically the city or county fire department. For similar reasons, industrial and commercial customers on the receiving end of LPG deliveries are also well aware of the safety issues associated with LPG. Residential customers, through warning labels on the portable cylinders and on the units to which the portable cylinders connect, are notified of the flammability dangers associated with LPG.

3.4.5.4 Biodiesel

Biodiesel is a domestically produced, renewable fuel derived from biological sources such as vegetable oils, animal fats, or recycled restaurant greases. The process for creating biodiesel involves mixing the oil with alcohol (e.g., methanol or ethanol) in the presence of a chemical such as sodium hydroxide. This process produces a methyl ester if methanol is used or an ethyl ester if ethanol is used. Methyl ester from soy beans is more economical to produce, and, therefore, is more common in the U.S. Biodiesel can be used pure (B100) or blended with conventional diesel. According to the U.S. DOE, pure biodiesel (B100) is considered an alternative fuel under Energy Policy Act. Like petroleum diesel, biodiesel is used to fuel compression-ignition engines, which run on petroleum diesel. Lower-level biodiesel blends are not considered alternative fuels, but covered fleets can earn one Energy Policy Act credit for every 450 gallons of B100 purchased for use in blends of 20 percent or higher (SCAG, 2016). Biodiesel is not flammable, is biodegradable, and reduces air pollutants such as particulates, carbon monoxide, hydrocarbons, and air toxics. However, the materials used to manufacture biodiesel may be hazardous, e.g., ethanol, methanol, sulfuric, and hydrochloric acids. The most common blended biodiesel is B20, which is 20 percent biodiesel and 80 percent conventional diesel

3.4.5.5 Hydrogen

Hydrogen is the simplest, lightest and most plentiful element in the universe. In its normal gaseous state, hydrogen is a colorless, odorless, tasteless, non-toxic and burns invisible. Most hydrogen is made from natural gas through a process known as steam reforming. Reforming separates hydrogen from hydrocarbons by adding heat. Hydrogen can also be produced from a variety of sources including water and biomass. Hydrogen can be used as a combustion fuel or in fuel cell vehicles to produce electricity to power electric motors. Hydrogen is a clean fuel with almost no emissions. The only emission from vehicles is water vapor.

Hydrogen is different from convention gasoline and diesel fuels. It is a gas that must be stored onboard at high pressure or as a cryogenic liquid. It tends to dissipate when released and does not pool. Hydrogen has a much broader flammability range than convention fuels, is flammable, and can cause a fire. Fire represents a hazard for gaseous fueled vehicles, including hydrogen, because, if not mitigated, it can cause fuel containers to explode. Hydrogen and other gaseous fuel storage and delivery systems are designed to prevent rupture by venting hydrogen contents of fuel tanks through thermally activated pressure relief devices in case of an encroaching fire. Further, hydrogen flames are invisible making them difficult to see (NHTSA, 2009).

3.5 HYDROLOGY AND WATER QUALITY

The goal of the 2016 AQMP is to address the federal 2008 eight-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS, thereby improving air quality and protecting public health. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard (70 ppb). Some of the proposed control measures intended to improve overall air quality may have direct or indirect hydrology and water quality impacts associated with their implementation. Hydrology and water quality concerns are related to implementation of control measures that could result in increased water demand and wastewater generation, e.g., wet gas scrubbers and electrostatic precipitators. This section describes the current hydrology and water quality resources in Southern California.

3.5.1 REGULATORY BACKGROUND

Water resources are regulated by an overlapping network of local, state, federal and international laws and regulations. As a result, the authority to address a given discharge or activity is not always clear. Therefore, the regulatory background is broken down by the following topics: Water Quality; Regional Water Quality Management; Watershed Management; Wastewater Treatment; Drinking Water Standards; and, local regulations. This subchapter describes existing regulatory setting relative to hydrology and water quality, including water supply, water demand, and drought trends within California and the SCAQMD.

3.5.1.1 Water Quality

The principal laws governing water quality in Southern California are the federal Clean Water Act (CWA) and the corresponding California law, the Porter-Cologne Water Quality Act. The U.S. EPA is the federal agency responsible for water quality management and administration of the federal CWA. The U.S. EPA has delegated most of the administration of the CWA in California to the California State Water Resources Control Board (SWRCB). The SWRCB was established through the California Porter-Cologne Water Quality Act of 1969, and is the primary state agency responsible for water quality management issues in California. Much of the responsibility for implementation of the SWRCB's policies is delegated to the nine Regional Water Quality Control Boards (RWQCBs).

3.5.1.1.1 National Pollutant Discharge Elimination System Permit Program

The CWA §402 established the National Pollutant Discharge Elimination System (NPDES) to regulate discharges into "navigable waters" of the United States. The U.S. EPA authorized the SWRCB to issue NPDES permits in the State of California in 1974. The NPDES permit establishes discharge pollutant thresholds and operational conditions for industrial facilities and wastewater treatment plants. For point source discharges (e.g., wastewater treatment facilities), the RWQCBs prepare specific effluent limitations for constituents of concern such as toxic

substances, total suspended solids (TSS), bio-chemical oxygen demand (BOD), and organic compounds. The limitations are based on the Basin Plan objectives and are tailored to the specific receiving waters, allowing some discharges, for instance deep water outfalls in the Pacific Ocean, and more flexibility with certain constituents due to the ability of the receiving waters to accommodate the effluent without significant impact. Non-point source NPDES permits are also required for municipalities and unincorporated communities of populations greater than 100,000 to control urban stormwater runoff. These municipal permits include Storm Water Management Plans (SWMPs). A key part of the SWMP is the development of Best Management Practices (BMPs) to reduce pollutant loads. Certain businesses and projects within the jurisdictions of these municipalities are required to prepare Storm Water Pollution Prevention Plans (SWPPPs) which establish the appropriate BMPs to gain coverage under the municipal permit. On October 29, 1999, the U.S. EPA finalized the Storm Water Phase II rule which requires smaller urban communities with a population less than 100,000 to acquire individual storm water discharge permits.

The Phase II rule also requires construction activities on one to five acres to be permitted for storm water discharges. Individual storm water NPDES permits are required for specific industrial activities and for construction sites greater than five acres. Statewide general storm water NPDES permits have been developed to expedite discharge applications. They include the statewide industrial permit and the statewide construction permit. A prospective applicant may apply for coverage under one of these permits and receive Waste Discharge Requirements (WDRs) from the appropriate RWQCB. WDRs establish the permit conditions for individual dischargers. The Stormwater Phase II Rule automatically designates, as small construction activity under the NPDES stormwater permitting program, all operators of construction site activities that result in a land disturbance of equal to or greater than one and less than five acres. Site activities that disturb less than one acre are also regulated as small construction activity if they are part of a larger common plan of development or sale with a planned disturbance of equal to or greater than one acre and less than five acres, or if they are designated by the NPDES permitting authority. The NPDES permitting authority or U.S. EPA Region may designate construction activities disturbing less than one acre based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to waters of the United States.

3.5.1.1.2 Municipal Stormwater and Urban Runoff Discharge Permits

The Municipal Stormwater Permitting Program regulates stormwater discharges from municipal separate storm sewer systems (MS4s). The RWQCB, with oversight by U.S. EPA, administers the MS4 permitting program in the Los Angeles area. The MS4 permits require the municipal discharger (typically, a city or county) to develop and implement a SWMP with the goal of reducing the discharge of pollutants to the maximum extent practicable. The SWMP program specifies what BMPs will be applied to address certain program areas such as public education and outreach, illicit discharge detection and elimination, construction and port-construction, and good housekeeping for municipal operations. MS4 permits also generally include a monitoring program.

3.5.1.1.3 CWA §303 – Total Maximum Daily Loads

The CWA §303(d) requires the SWRCB to prepare a list of impaired water bodies in the state and determine total maximum daily loads (TMDLs) for pollutants or other stressors impacting water quality of these impaired water bodies. A TMDL is a quantitative assessment of water quality conditions, contributing sources, and the load reductions or control actions needed to restore and protect bodies of water in order to meet their beneficial uses. All sources of the pollutants that caused each body of water to be included on the list, including point sources and non-point sources, must be identified. The California §303 (d) list was completed in March 1999. On July 25, 2003, U.S. EPA gave final approval to California's 2002 revision of §303 (d) List of Water Quality Limited Segments. A priority schedule has been developed to determine TMDLs for impaired waterways. TMDL projects are in various stages throughout the Basin for most of the identified impaired water bodies. The RWQCBs will be responsible for ensuring that total discharges do not exceed TMDLs for individual water bodies as well as for entire watersheds.

3.5.1.1.4 State Water Quality Certification Program

The RWQCBs also coordinate the State Water Quality Certification program, or CWA §401. Under CWA §401, states have the authority to review any federal permit or license that will result in a discharge or disruption to wetlands and other waters under state jurisdiction to ensure that the actions will be consistent with the state‘s water quality requirements. This program is most often associated with CWA §404 which obligates the U.S. Army Corps of Engineers to issue permits for the movement of dredge and fill material into and from “waters of the United States.”

3.5.1.2 Regional Water Quality Management

Water quality of regional surface water and groundwater resources is affected by point source and non-point source discharges occurring throughout individual watersheds. Regulated point sources, such as wastewater treatment effluent discharges, usually involve a single discharge into receiving waters. Non-point sources involve diffuse and non-specific runoff that enters receiving waters through storm drains or from unimproved natural landscaping. Common non-point sources include urban runoff, agriculture runoff, resource extraction (on-going and historical), and natural drainage. Within the regional basin plans, the RWQCBs establish water quality objectives for surface water and groundwater resources and designate beneficial uses for each identified water body.

The Water Quality Control Plan: Los Regional Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan) is designed to preserve and enhance water quality and to protect beneficial uses of regional waters. The Basin Plan was first approved in 1994 and has been amended numerous times since then. The Basin Plan designates beneficial uses of surface water and ground water, such as contact recreation or municipal drinking water supply. The Basin Plan also establishes water quality objectives, which are defined as “the allowable limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance in a specific area.” The Basin Plan specifies objectives for specific constituents, including bioaccumulation, chemical constituents,

dissolved oxygen, oil and grease, pesticides, pH, polychlorinated biphenyls, suspended solids, toxicity, and turbidity.

California Water Code, Division 7, Chapter 5.6 established a comprehensive program within the SWRCB to protect the existing and future beneficial uses of California's enclosed bays and estuaries. The Bay Protection and Toxic Cleanup Plan (BPTCP) has provided a new focus on the SWRCB and the RWQCBs' efforts to control pollution of the State's bays and estuaries by establishing a program to identify toxic hot spots and plans for their cleanup. In June 1999, the SWRCB published a list of known toxic hot spots in estuaries, bays, and coastal waters.

Other statewide programs run by the SWRCB to monitor water quality include the California State Mussel Watch Program and the Toxic Substances Monitoring Program. The Department of Fish and Wildlife (DFW) collects water and sediment samples for the SWRCB for both of these programs and provides extensive statewide water quality data reports annually. In addition, the RWQCBs conduct water sampling for Water Quality Assessments required by the CWA and for specific priority areas under restoration programs such as the Santa Monica Bay Restoration Program.

3.5.1.3 Watershed Management

In February 1998, the Clean Water Action Plan (CWAP) was established to require states and tribes, with assistance from federal agencies and input from stakeholders and private citizens, to convene and work collaboratively to develop Unified Watershed Assessments (UWA). The CWAP designated watersheds to one of the following categories:

Category I: Watersheds that are candidates for increased restoration because of poor water quality or the poor status of natural resources.

Category II: Watersheds that have good water quality but can still improve.

Category III: Watersheds with sensitive areas on federal, state, or tribal lands that need protection.

Category IV: Watersheds for which there is insufficient information to categorize them.

Targeted watersheds and watershed priorities and activities were identified for each of California's nine RWQCBs. Examples of targeted watersheds include the Santa Monica Bay Restoration Commission and the Malibu Creek Watershed Non-Point Source Pilot Project.

3.5.1.4 Wastewater Treatment

The federal government enacted the CWA to regulate point source water pollutants, particularly municipal sewage and industrial discharges, to waters of the United States through the NPDES permitting program. In addition to establishing a framework for regulating water quality, the CWA authorized a multibillion dollar Clean Water Grant Program, which together with the California Clean Water Bond funding, assisted communities in constructing municipal wastewater treatment facilities. These financing measures made higher levels of wastewater treatment possible for both

large and small communities throughout California, significantly improving the quality of receiving waters statewide. Wastewater treatment and water pollution control laws in California are codified in the CWC and CCR, Titles 22 and 23. In addition to federal and state restrictions on wastewater discharges, most incorporated cities in California have adopted local ordinances for wastewater treatment facilities. Local ordinances generally require treatment system designs to be reviewed and approved by the local agency prior to construction. Larger urban areas with elaborate infrastructure in place would generally prefer new developments to hook into the existing system rather than construct new wastewater treatment facilities. Other communities promote individual septic systems to avoid construction of potentially growth accommodating treatment facilities. The RWQCBs generally delegate management responsibilities of septic systems to local jurisdictions. Regulation of wastewater treatment includes the disposal and reuse of biosolids.

3.5.1.5 Drinking Water Standards

The federal Safe Drinking Water Act, enacted in 1974 and implemented by the U.S. EPA, imposes water quality and infrastructure standards for potable water delivery systems nationwide. The primary standards are health-based thresholds established for numerous toxic substances. Secondary standards are recommended thresholds for taste and mineral content. The State of California was first granted primary enforcement responsibility for public water systems under section 1413 of the Safe Drinking Water Act on June 2, 1978 (43 FR 25180, June 9, 1978).

The California Safe Drinking Water Act, enacted in 1976, is codified in Title 22 of the CCR. The California Safe Drinking Water Act provides for the operation of public water systems and imposes various duties and responsibilities for the regulation and control of drinking water in the State of California including enforcing provisions of the federal Safe Drinking Water Act. The California Safe Drinking Water Program was originally implemented by the California Department of Public Health until July 1, 2014 when the program was transferred to the SWRCB via an act of legislation, SB 861. This transfer of authority means that the SWRCB has regulatory and enforcement authority over drinking water standards and water systems under Health and Safety Code §116271.

Potable water supply is managed through the following agencies and water districts: the California Department of Water Resources (DWR), the California Department of Health Services (DHS), the SWRCB, the U.S. EPA, and the U.S. Bureau of Reclamation. Water right applications are processed through the SWRCB for properties claiming riparian rights. The DWR manages the State Water Project (SWP) and compiles planning information on water supply and water demand within the state. Primary drinking water standards are promulgated in the CWA §304 and these standards require states to ensure that potable water retailed to the public meets these standards. Standards for a total of 88 individual constituents, referred to as Maximum Contaminant Levels (MCLs) have been established under the Safe Drinking Water Act as amended in 1986 and 1996. The U.S. EPA may add additional constituents in the future. The MCL is the concentration that is not anticipated to produce adverse health effects after a lifetime of exposure. State primary and secondary drinking water standards are codified in CCR Title 22 §§64431 - 64501. Secondary drinking water standards incorporate non-health risk factors including taste, odor, and appearance. The 1991 Water Recycling Act established water recycling as a priority in California. The Water Recycling Act encourages municipal wastewater treatment districts to implement recycling

programs to reduce local water demands. The DHS enforces drinking water standards in California.

3.5.1.6 Local Regulation

In addition to federal and state regulations, cities, counties and water districts may also provide regulatory advisement regarding water resources. Many jurisdictions incorporate policies related to water resources in their municipal codes, development standards, storm water pollution prevention requirements, and other regulations.

3.5.2 HYDROLOGY

3.5.2.1 Water Sources

The State of California is divided into ten hydrologic (see Figure 3.5-1) regions corresponding to the state‘s major water drainage basins. The hydrologic regions define a river basin drainage area and are used as planning boundaries, which allows consistent tracking of water runoff, and the accounting of surface water and groundwater supplies.

The Basin is within the South Coast Hydrologic Region. The South Coast Hydrologic Region is the most urbanized and populous region in the state of California. More than half the population of the state resides in the region, which covers 11,000 square miles, or seven percent of the state’s total area. The region extends from the Pacific Ocean east to mountains of the Transverse and Peninsular ranges, and from the Ventura-Santa Barbara County line south to the international border with Mexico. It includes all of Orange County and portions of Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties.

The topography of the South Coast Hydrologic Region, excluding the mountainous portions, provides the ideal conditions to accommodate the steady expansion of the residential, commercial, and industrial developments throughout. Yet there remains sufficient land to sustain the important agricultural operations in Ventura and San Diego Counties and the Chino and San Jacinto Valleys. The coastal zone encompasses the Oxnard Plain (or the Ventura Basin), the Los Angeles Basin, and the Coastal Plain of Orange County. These alluvial basins are heavily utilized for urban, agricultural, or a combination of both uses. These same uses are also occurring in the warmer interior basins of the south coast region. These regions are often separated from their coastal counterparts by hills (Chino Hills) and small to moderately sized mountain ranges (Santa Ana and the Santa Monica mountains).

Prominent mountain ranges provide the northern and eastern boundaries of the region. In the north, there are the San Gabriel Mountains and several mountain ranges known collectively as the Ventura County Mountains, which includes the Topatopa Mountains. To the east, there are the San Bernardino, San Jacinto, Borrego, and Vallecito Mountains.

FIGURE 3.5-1

Hydrologic Regions of California



The cities of Ventura, Los Angeles, Long Beach, Santa Ana, San Bernardino, and Big Bear Lake are among the many urban areas in this section of the state which contain moderated-sized mountains, inland valleys, and coastal plains. The Santa Clara, Los Angeles, San Gabriel, and Santa Ana Rivers are among the area's hydrologic features. In addition to water sources with the South Coast Hydrologic Region, imported water makes up a major portion of the water used in the Basin. Water is brought into the South Coast Hydrologic Region from three major sources: the Sacramento-San Joaquin Delta (Delta), Colorado Rivers, and Owens Valley/Mono Basin. Most lakes in the area are actually reservoirs, made to hold water coming from the SWP, the Los Angeles Aqueduct, and the Colorado River Aqueduct (CRA) including Castaic Lake, Lake Mathews, Lake Perris, Silverwood Lake, and Diamond Valley Lake. In addition to holding water, Lake Casitas, Big Bear Lake and Lorena Lake regulate local runoff.

Although much of the land in the region is urbanized or is part of agriculture, all or portions of several national and state parks are located in the South Coast Hydrologic Region. They are the Santa Monica Mountains Recreational Area; Los Padres, Angeles, San Bernardino, and Cleveland National Forests; and Cuyamaca-Rancho, Malibu State, and Chino Hills State Parks (DWR, 2013a).

3.5.2.2 Surface Water Hydrology

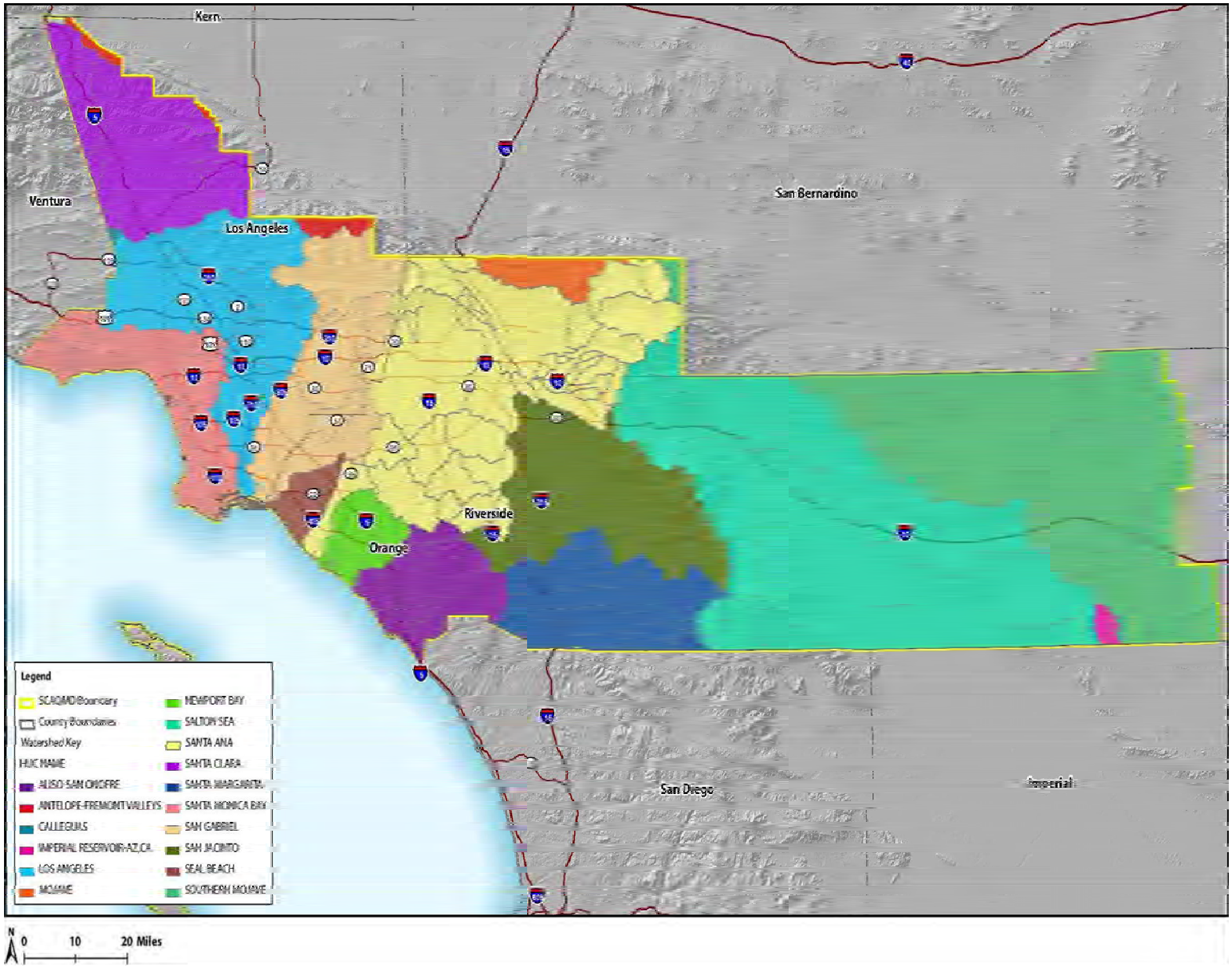
Surface water hydrology refers to surface water systems, including watersheds, floodplains, rivers, streams, lakes and reservoirs, and the inland Salton Sea.

3.5.2.2.1 Watersheds

The South Coast Hydrologic Region is bounded peripherally by a drainage divide and features leading to bodies of water. The boundary that separates neighboring drainage basins from another is called a watershed boundary. The area that separates one boundary from another is a watershed, an area with land or basin in which all waterways drain to one specific outlet, or body of water, such as a river, lake, ocean, or wetland. Watersheds have topographical divisions such as ridges, hills, or mountains. All precipitation that falls in a given watershed, or basin, eventually drains into the same body of water.

Over 20 of these watersheds are major watersheds within the Southern California region (see Figure 3.5-2), all of which are outlined and shaped by the various topographic features of the region. Given the physiographic characteristics of the region, most of the watersheds are located along the Transverse and Peninsular Ranges, and only a small number are in the desert areas (Mojave and Colorado Desert) (SCAG, 2016).

FIGURE 3.5-2
Watersheds in the South Coast Hydrologic Region



3.5.2.2.2 Rivers

Because the climate of Southern California is predominantly arid, many of the natural rivers and creeks are intermittent or ephemeral, drying up in the summer or flowing only after periods of precipitation. For example, annual rainfall amounts vary depending on elevation and proximity to the coast. Some waterways such as Ballona Creek and the Los Angeles River, maintain a perennial flow due to agricultural irrigation and urban landscape watering. Major natural streams and rivers in the Southern California region include the Ventura River, Santa Clara River, Los Angeles River, San Gabriel River, Santa Ana River, San Jacinto River, and upstream portions of the Santa Margarita River (see Figure 3.5-3).

The Ventura River is fed by Lake Casitas on the western border of Ventura County and empties out into the ocean. It is the northernmost river system in Southern California, supporting a large number of sensitive aquatic species. Water quality decreases in the lower reaches due to urban and industrial impacts. The Santa Clara River starts in Los Angeles County, flows through the center of Ventura County, and remains in a relatively natural state. Threats to water quality include increasing development in floodplain areas, flood control measures such as channeling, erosion, and loss of habitat.

The Los Angeles River is a highly disturbed system due to the flood control features along much of its length. Due to the high urbanization in the area around the Los Angeles River, runoff from industrial and commercial sources as well as illegal dumping contribute to reduce the channel's water quality. The San Gabriel River is similarly altered with concrete flood control embankments and impacted by urban runoff.

The Santa Ana River drains the San Bernardino Mountains, cuts through the Santa Ana Mountains, and flows onto the Orange County coastal plain. Recent flood control projects along the river have established reinforced embankments for much of the river's path through urbanized Orange County. The Santa Margarita River begins in Riverside County, draining portions of the San Jacinto Mountains and flowing to the ocean through northern San Diego County (SCAG, 2016).

3.5.2.2.3 Lakes and Reservoirs

Since Southern California is a semiarid region, many of its lakes are drinking water reservoirs which were created either through damming of rivers, or manually dug and constructed. Reservoirs also serve as flood control for downstream communities. Table 3.5-1 lists the major lakes and reservoirs in Southern California. Some of the most significant lakes, including reservoirs, in the Southern California region are Big Bear Lake, Lake Arrowhead, Lake Casitas, Castaic Lake, Pyramid Lake, Lake Elsinore, Diamond Valley Lake, and the Salton Sea.

FIGURE 3.5-3
Rivers within the South Coast Hydrologic Region

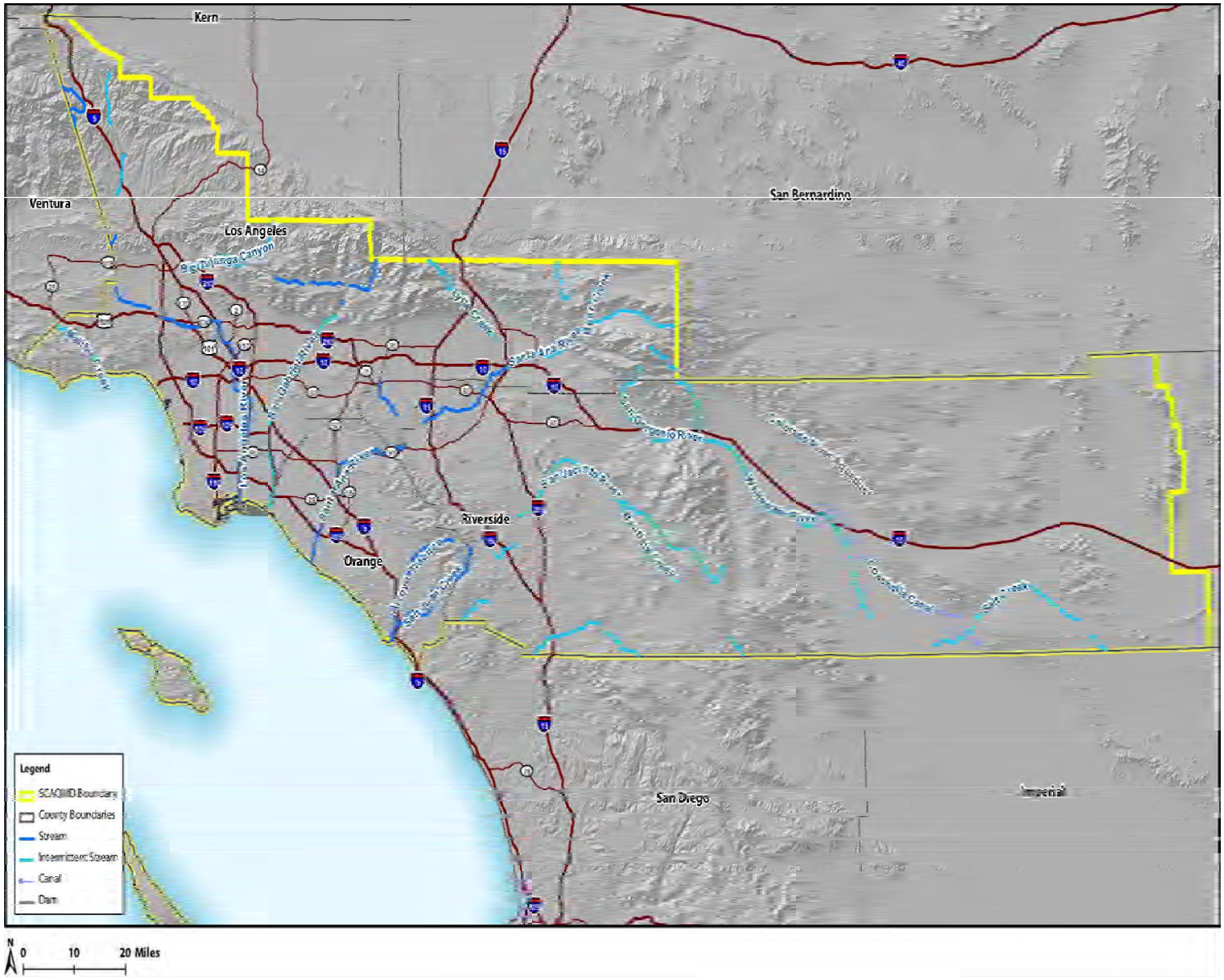


TABLE 3.5-1
Major Surface Water Resources in Southern California

Los Angles Basin (Region 4)
Ventura River Estuary Sespe Creek Lake Casitas
Santa Clara River Estuary Piru Creek Lake Piru
McGrath Lake Ventura River Pyramid Lake
Ormond Beach Wetlands Santa Clara River Castaic Lake
Mugu Lagoon Los Angeles River Bouquet Reservoir
Trancas Lagoon Big Tahunga Canyon Los Angeles Reservoir
Topanga Lagoon San Gabriel River Chatsworth Reservoir
Los Cerritos Wetlands
Sepulveda Reservoir
Los Angeles River San Gabriel Reservoir
Ballona Wetlands Morris Reservoir
Whittier Narrows Reservoir
Santa Fe Reservoir
Lahontan Basin (Region 6)
Mojave River Silver Lake
Amargosa River Silverwood Lake
Mojave River Reservoir
Lake Arrowhead
Soda Lake
Colorado River Basin (Region 7)
Colorado River Lake Havasu
Whitewater River Gene Wash Reservoir
Alamo River Copper Basin Reservoir
New River Salton Sea
Lake Cahulla
Santa Ana (Region 8)
Hellman Ranch Wetlands Santa Ana River Prado Reservoir
Anaheim Bay San Jacino River Big Bear Lake
Bolsa Chica Wetlands
Lake Perris
Huntington Wetlands Lake Matthews
Santa Ana River Lake Elsinore
Laguna Lakes Vail Lake
San Juan Creek Lake Skinner
Upper Newport Bay Lake Hemet
San Joaquin Marsh
Prado Wetlands
San Diego Basin (Region 9)
Santa Margarita River Vail Lake
Aliso Creek Skinner Reservoir

Source: SCAG, 2016

Big Bear Lake is a reservoir in San Bernardino County, in the San Bernardino Mountains. It was created by a granite dam in 1884, which was expanded in 1912, and holds back approximately 73,000 acre-feet of water. The lake has no tributary inflow, and is replenished entirely by snowmelt. It provides water for the community of Big Bear, as well as nearby communities. Lake Arrowhead is also in San Bernardino County, at the center of an unincorporated community also called Lake Arrowhead. The lake is a man-made reservoir, with a capacity of approximately 48,000 acre-feet. In 1922, the dam at Lake Arrowhead was completed. It is currently used for recreation and as a potable water source for the surrounding community.

Castaic Lake is on the Castaic Creek, and was formed by the completion of the Castaic Dam. The lake is in northwestern Los Angeles County. It is the terminus of the West Branch of the California Aqueduct, and holds over 323,000 acre-feet of water. Much of the water is distributed throughout northern Los Angeles County, though some is released into Castaic Lagoon, which feeds Castaic Creek. The creek is a tributary of the Santa Clara River. Pyramid Lake is just above Castaic Lake, and water flows from Pyramid into Castaic through a pipeline, generating electricity. Pyramid Lake is on Piru Creek, and holds 180,000 acre-feet of water.

Lake Elsinore is in the City of Lake Elsinore, in Riverside County. The lake has dried up and been replenished throughout the last century. It is now managed to maintain a consistent water level, with outflow piped into the Temescal Canyon Wash. Diamond Valley Lake, also in Riverside County, is Southern California's newest and largest reservoir. Diamond Valley Lake was a project of the Metropolitan Water District (MWD) to expand surface storage capacity in the region. A total of three dams were required to create the lake. Completed in 1999, it was full by 2002, holding 800,000 acre-feet of water, effectively doubling MWD's surface water stores in the region. The lake is connected to the existing water infrastructure of the SWP. The lake is situated at approximately 1,500 feet above sea level, well above most of the users of the lake's water; this enables the lake to also provide hydroelectric power, as water flows through the lowest dam.

The Salton Sea is the largest lake in California at nearly 400 square miles in size. The basin of the Salton Sea is over 200 feet below sea level, and has flooded and evaporated many times over when the Colorado overtops its banks during extreme flood years. This cycle of flooding and evaporation has re-created the Salton Sea several times over at least the last thousand years. Its most recent formation occurred in 1905 after an irrigation canal was breached and the Colorado River flowed into the basin for 18 months creating the current lake. The principal inflow to the Salton Sea is from agricultural drainage, which is high in dissolved salts; approximately four million tons of dissolved salts flow into the Salton Sea every year. The evaporation of water from the Salton Sea, plus the addition of highly saline water from agriculture, has created one of the saltiest bodies of water in the world. The Salton Sea has been a highly successful fishery and is a habitat and migratory stopping and breeding area for 380 different bird species; however, the high, and ever-increasing, salinity of the water is a continual challenge for the fish and birds that inhabit it. The 2001 agriculture-to-urban water transfer agreement between the Imperial Valley Irrigation District and San Diego County Water Authority had significant implications for the Salton Sea, and the watershed. The reduction in agricultural water flowing into the Salton Sea has lowered water levels, shrinking its overall size (SCAG, 2016).

3.5.2.2.4 Coastal Waters

Coastal waters in the Southern California region include bays, harbors, estuaries, beaches, and open ocean. Santa Monica Bay dominates a large portion of the SCAQMD's open coastal waters. Deep-draft commercial harbors include the Los Angeles/Long Beach Harbor, while shallower, small-craft harbors, such as Marina del Rey, King Harbor and Newport Bay, occur at a number of locations.

Wetlands along the coast include a number of small coastal wetlands such as Ballona Wetlands and Los Cerritos Wetlands. Recreational beaches occur along large stretches of the coastal waters. These coastal waters are impacted by a variety of activities, including:

- Municipal and industrial wastewater discharges;
- Cooling water discharges;
- Non-point source runoff (urban and agricultural runoff in particular), including leaking
- septic systems, construction, and recreational activities;
- Oil spills;
- Aqueduct vessel wastes;
- Dredging, increased development, and loss of habitat;
- Offshore operations, illegal dumping; and
- Natural oil seeps.

3.5.2.3 Groundwater Hydrology

Groundwater is the part of the hydrologic cycle representing underground water sources. Groundwater is present in many forms: in reservoirs, both natural and constructed; in underground streams; and, in the vast movement of water in and through sand, clay, and rock beneath the earth's surface. The place where groundwater comes closest to the surface is called the water table, which in some areas may be very deep, and in others may be right at the surface. Groundwater hydrology is, therefore, connected to surface water hydrology, and cannot be treated as a separate system. One example of how groundwater hydrology can directly impact surface water hydrology is when surface streams are partly filled by groundwater. When that groundwater is pumped out and removed from the system, the stream levels will fall, or even dry up entirely, even though no water was removed from the stream itself.

Groundwater represents most of the Basin's fresh water supply, making up approximately 34 percent of total water use, depending on the year and precipitation levels (DWR, 2013a). The majority of groundwater supplies (about 76 percent) are used to meet urban use, while the rest goes to agricultural uses (DWR, 2013a). Groundwater basins are replenished mainly through

infiltration – precipitation soaking into the ground and making its way into the groundwater. Threats to the function of this system are increases in impervious surfaces, overdraft, and contamination.

Impervious surface decreases the area available for groundwater recharge, as precipitation runoff flows off of streets, buildings, and parking lots directly into storm sewers, and straight into either river channels or into the ocean. This prevents the natural recharge of groundwater, effectively removing groundwater from the system without any pumping. Impervious surface also deteriorates the quality of the water, as it moves over streets and buildings, gathering pollutants and trash before entering streams, rivers, and the ocean.

Groundwater resources in the South Coast Hydrologic Region are supplied by alluvial and fractured rock aquifers. Alluvial aquifers are composed of sand and gravel or finer grained sediments, with groundwater stored within the voids, or pore space, between the alluvial sediments. Fractured-rock aquifers consist of impermeable granitic, metamorphic, volcanic, and hard sedimentary rocks, with groundwater being stored within cracks, fractures, or other void spaces. The distribution and extent of alluvial and fractured-rock aquifers and water wells vary within the region (DWR, 2013a). A brief description of the aquifers in the region is provided below.

The South Coast Hydrologic Region contains 73 alluvial groundwater basins and sub-basins that underlie approximately 3,500 square miles, or 32 percent, of the region. Most of the groundwater used in the South Coast region is derived from alluvial aquifers. The most heavily extracted groundwater basins in the region are the Coastal Plain of Los Angeles, Coastal Plain of Orange County, the Upper Santa Ana Valley, and the Santa Clara River Valley Groundwater Basins (DWR, 2013a).

Metropolitan Los Angeles and Santa Ana planning areas are the largest users of groundwater in the region. Major groundwater basins in the Metropolitan Los Angeles planning area serve the intensely urbanized and industrialized inland areas of Los Angeles County, as well as the heavily urbanized coastal portions of Los Angeles County. A substantial portion of the water supply needed by the residents, businesses, and industries in the coastal areas comes from groundwater pumping. Similarly, major groundwater basins in the Santa Ana planning area serve the urbanized areas within it. Much of the pumping operations in the groundwater basins in these planning areas are limited by the courts via adjudication of water rights (DWR, 2013a).

To prevent seawater intrusion in coastal basins in Orange County, recycled water is injected into the ground to form a mound of groundwater between the coast and the main groundwater basin. In Los Angeles County, imported and recycled water is injected to maintain a seawater intrusion barrier.

3.5.2.3.1 Groundwater Quality

Groundwater quality in the south coast region has been degraded substantially from background levels, and much of the degradation reflects land use practices. For example, fertilizers and pesticides, typically used on agricultural lands, can degrade groundwater when irrigation-return

waters containing such substances seep into the subsurface. In areas with failing or improperly sited septic systems, nitrogen, and pathogenic bacteria can seep into groundwater and result in health risks to those who rely on groundwater for domestic supply. In areas with industrial or commercial activities, above ground and underground storage tanks contain hazardous substances. Thousands of these tanks in the region have leaked or are leaking, discharging petroleum fuels, solvents, and other substances into the subsurface. These leaks as well as other discharges to the subsurface can seep into and pollute groundwater aquifers, which is often difficult, costly, and extremely slow to clean up (DWR, 2013a).

In the San Gabriel Valley and San Fernando Valley Groundwater Basins, volatile organic compounds (VOCs) from industry and nitrates from subsurface sewage disposal and past agricultural activities are the primary pollutants in these groundwater basins. These deep alluvial basins do not have a continuous effective confining layer above the groundwater, and as a result pollutants have seeped through the upper sediments into the groundwater. Approximately 20 percent of groundwater production capacity for municipal use in the San Gabriel Valley has been shut down as a result of this pollution. The Department of Toxic Substances Control (DTSC) has designated large areas of these basins as high-priority Hazardous Substances Cleanup sites and the U.S. EPA has designated these areas as Superfund sites. The RWQCB and U.S. EPA are overseeing investigations to further define the extent of pollution, identify the responsible parties, and begin remediation in these areas (DWR, 2013a)

Similar problems exist in the Bunker Hills sub-basin of the Upper Santa Ana River Basin where VOC and perchlorate groundwater contamination has been detected. Treatment plants are operating to remove VOC contamination. A number of wells and treatment plants to remove these contaminants are being operated in the cities of Redlands, Loma Linda, and Riverside (DWR, 2013a). Other areas with known groundwater contamination include Cherry Valley (northeast of Beaumont); the Chino Basin, Cucamonga, and Rialto Management Zones; and middle and lower portions of the Santa Ana River Basin (DWR, 2013a).

3.5.3 WATER DEMAND AND FORECAST

California's water-related assets and services are provided by many interdependent systems that historically have been managed on a project-by-project basis. The gap between water supplies and water demand decreased substantially between 2001 and 2010, meaning that the available water supplies have decreased while the demand for water has increased. This narrowing gap has been further exacerbated in Southern California by record low snowpack in the Sierra Nevada Mountains (Sierra Nevada) in 2013 and 2014 and severe drought conditions. There are typically three sources of supply water: (1) natural sources, (2) manmade sources, and (3) reclamation. Natural water sources include rivers, lakes, streams, and groundwater stored in aquifers. Manmade sources include runoff water that is treated and stored in reservoirs and other catchment structures. Reclaimed water is wastewater that has been conveyed to a treatment plant and then treated to a sufficient degree that it may again be used for certain uses (such as irrigation) (SCAG, 2016).

The water supply in Southern California comes from a variety of sources. While the MWD imports water from Colorado River and SWP and provides wholesale water supply to its coverage area, many cities and some county areas rely on groundwater, especially those along the coast. San

Bernardino and Riverside Counties, for example, rely on a mixture of groundwater and surface water (SCAG, 2016).

The increase in California's water demand is due primarily to the increase in population. By employing a multiple future scenario analysis, the California Water Plan Update 2009 (DWR, 2010) provides a growth range for future annual water demand. According to the California Water Plan Update 2009, statewide future annual water demands range from an increase of fewer than 1.5 million acre-feet (MAF)[1] for the Slow and Strategic Growth scenario, to an increase of about 10 MAF under the Expansive Growth scenario by year 2050. If Southern California maintains its share of 12 percent of the state's water demand, the region could be expected to require an additional 500,000 acre-feet by 2030 (SCAG, 2016).

Water demand forecasting is essential for planning total water requirements in MWD's service area. Water demand can be met with conservation, local supplies, or imported supplies. As a wholesale imported water supplier, MWD's long-term plans focus on the future demands for MWD's supplies. In order to project the need for resources and system capacity, MWD begins with a long-term projection of water demands. Total water demands include: 1) Municipal and Industrial (M&I); 2) Agricultural Demand; 3) Seawater Barrier Demand; and 4) Replenishment Demand (MWD, 2016).

Actual water demand in 2015 was 3.1 MAF, which is approximately the same as in 1980. This is due to a number of factors including an aggressive outreach campaign due the severe drought since 2012, advancement in conservation, and mandatory water use restriction. Of the estimated 3.1 MAF of total water use in 2015, agricultural water use was only about 99 thousand acre-feet (TAF). This is due to severe drought, water rate increases, and water use restrictions. By 2040, under average conditions, agricultural demand is expected to be about 160 TAF (MWD, 2016).

It is estimated that total water use from M&I will grow from an annual average of 3.0 MAF in 2015 to 3.8 MAF in 2040. All water demand projections assume normal weather conditions. Future changes in estimated water demand assume continued water savings due to conservation measures such as water savings resulting from plumbing codes, price effects, and the continuing implementation of utility-funded conservation programs. Water demand was greatly reduced in 2015 due to extraordinary response to statewide calls for a 25 percent reduction in water use in light of historic drought conditions. Regional water use is projected to increase slightly until 2020 as demands rebound towards more normal levels. Between 2020 and 2040, regional water use is expected to grow slowly as driven by population and economic growth while water use efficiency increases (MWD, 2106).

3.5.3.1 Water Suppliers

Southern California is served by many water suppliers, both retail and wholesale with MWD being the largest. Created by the California legislature in 1931, MWD serves the urbanized coastal plain from Ventura in the north, to the Mexican border in the south, to parts of the rapidly urbanizing counties of San Bernardino and Riverside in the east. MWD is a regional wholesaler that delivers water to 26 member public agencies – 14 cities, 11 municipal water districts, one county water

[1] One acre-foot of water is equal to approximately 325,851 gallons.

authority – which in turn provide water to more than 19 million people in Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties (MWD, 2016a). The MWD provides water to about 90 percent of the urban population of Southern California.

MWD owns and operates an extensive water system including: the Colorado River Aqueduct, 16 hydroelectric facilities, nine reservoirs, 819 miles of large-scale pipes and five water treatment plants. Four of these treatment plants are among the ten largest plants in the world. MWD is the largest distributor of treated drinking water in the United States. The MWD imports water from the Feather River in Northern California and the Colorado River along the California/Arizona border to supplement local supplies. It also helps its member agencies develop water recycling, storage and other local resource programs to provide additional supplies and conservation programs to reduce regional demands (MWD, 2016a).

MWD currently delivers an average of 1.7 billion gallons of water per day to a 5,200-square-mile service area. Investments to maintain the reliability of imported supplies are complemented by an expansion of local supply development along with a reduction in demand through a variety of conservation and water-use efficiency initiatives (MWD, 2106b).

Over the past ten years, MWD's largest water customers are the San Diego County Water Authority (27 percent), City of Los Angeles (17 percent), and Municipal Water District of Orange County (MWDOC) (13 percent). Local supplies fluctuate in response to variations in rainfall. During prolonged periods of below normal rainfall, local water supplies decrease. Conversely, prolonged periods of above-normal rainfall increase local supplies. Sources of groundwater basin replenishment include local precipitation, runoff from the coastal ranges, and artificial recharge with imported water supplies. In addition to runoff, recycled water provides an increasingly important source of replenishment water for the region (MWD, 2016).

MWD monitors demographics in its service area since water demand is heavily influenced by population size, geographical distribution, variation in precipitation levels, and water conservation practices. In 1990, the population of MWD's service area was approximately 15.0 million people. By 2015, it had reached an estimated 18.7 million, representing almost half of the state's population. In the past, annual growth has varied from about 200,000 annually in the 1970s and early-to-mid-1980s to more than 300,000 annually in the late 1980s. Growth has generally averaged 120,000 persons per year during the last 10 years from 2006 to 2015. The latest demographic and economic projections for the region anticipate much lower growth into the future than was forecasted in 2010. Lower growth signifies slower increases in water demand, which has major implications for prudent planning and investment in future water supplies. The MWD service area is estimated to reach an estimated population of 20.1 million in 2025, 21.2 million by 2035, and 21.8 million by 2040 (MWD, 2016b).

Since 1980, water demands varied from 2.9 MAF in 1983 to nearly 4.2 MAF in 2007. In 2000, demands reached 3.9 MAF, surpassing the early peak level for the first time in a decade. Since 2000, demands reached a new peak level in 2007 with nearly 4.2 MAF. Since the peak demand in 2007, a decrease in demand was observed during the economic recession of 2008-2012. Starting in 2012, the severe drought in California led to a massive conservation campaign and water use restriction by the state, MWD, and local water agencies resulting in a decrease in demand in 2015

(MWD, 2016). A gradual increase in total estimated water demand is expected between 2020 and 2040 (see Table 3.5-2), and it is expected the water authorities will act appropriately to meet the demand.

TABLE 3.5-2

2020 – 2040 Projected Water Demand (MAF)

Water District	2020 Demand	2025 Demand	2030 Demand	2035 Demand	2040 Demand
MWD[(a)]	5.22	5.39	5.53	5.66	5.79
LADWP[(b)]	0.612	0.645	0.653	0.662	0.676
Antelope Valley/East Kern Water Agency[(c)]	0.084	0.086	0.087	0.087	N/A (e)
Castaic Lake Water Agency[(d)]	0.069	0.075	0.081	0.086	0.089
Coachella Valley Water District[(e)]	0.120	0.146	0.178	0.199	0.204
Crestline-Lake Arrowhead Water Agency[(f)]	0.0017	0.0018	0.0019	0.0019	0.0019
Palmdale Water Agency[(g)]	0.021	0.022	0.023	0.024	0.025
San Bernardino Valley Municipal[(h)]	0.243	0.258	0.272	0.286	0.299
Municipal Water District of Orange County[(i)]	0.483	0.515	0.517	0.515	0.515

Source: (a) MWD, 2016 (b) LADWP, 2016 (c) AVEK, 2016 (d) CLWA, 2016 (d) CVWD, 2016 (f) LACSD, 2016 (g) PWD, 2016 (h) SBVMWD, 2016 (i) MWDOC, 2016

In 2015, about 97 percent of the demands were used for municipal and industrial purposes, and three percent for agricultural purposes. The relative share of agricultural water use has declined due to urbanization and market factors, including the price of water. Agricultural water use accounted for 19 percent of total regional water demand in 1970, 12 percent in 1980, 10 percent in 1990, and 3.5 percent in 2010 (MWD, 2016).

A number of other water agencies also supply water into Southern California (see Table 3.5-2), with the Los Angeles Department of Water and Power (LADWP) and MWDOC being the next biggest suppliers. Since MWD is the major supplies approximately 75 percent of the water to Southern California, no further details of the other water suppliers will be discussed herein.

3.5.3.2 Water Uses

The South Coast Hydrologic Region is the most populous and urbanized area in the state. Most of the land use in the region is urban, however, other land uses include forest and a small amount of agricultural uses. Urban water users require more than 80 percent of the total water use in the region. Almost 75 percent of the urban water uses occurred in the Metropolitan Los Angeles and Santa Ana areas, with slightly more than 40 percent occurring in Metropolitan Los Angeles (DWR, 2103a). In some portions of the region, water users consume more water than is locally available, which has result in an overdraft of groundwater resources and increasing dependence on imported water supplies.

As a result of recent droughts, Southern California water users have generally become more water efficient. Municipal water agencies have been engaged in aggressive water conservation and efficiency programs to reduce per capita water demand. A variety of water-use efficiency programs have been implemented in the region. These include rebates and direct installation programs for high-efficiency toilets for residential and commercial customers, residential and commercial audit/surveys, and irrigation system audits for large landscape areas. Some are handled quite adequately by individual water agencies, while the daily operations of others are handled by regional wholesale agencies (DWR, 2013a). As a result of changes in plumbing codes, energy and water efficiency innovations in appliances, and trends toward more water efficient landscaping practices, urban water demand has become more efficient. A summary of water users in Southern California is provided in the following section.

3.5.3.2.1 Residential Water Use

While single-family homes are estimated to account for about 60 percent of the total occupied housing stock in 2015, they are responsible for about 77 percent of total residential water demands. This is consistent with the fact that single-family households are known to use more water than multifamily households (e.g., those residing in duplexes, triplexes, apartment buildings, and condo developments) on a per housing-unit basis. This is because single-family households tend to have more persons living in the household; they are likely to have more water-using appliances and fixtures; and they tend to have more landscaping (MWD, 2016).

3.5.3.2.2 Non-residential Water Use

Non-residential water use represented approximately 25 percent of the total M&I demands in MWD's service area in 2015. This includes water that is used by businesses, services, government, institutions (such as hospitals and schools), and industrial (or manufacturing) establishments. Within the commercial/institutional category, the top water users include schools, hospitals, hotels, amusement parks, colleges, laundries, and restaurants. In Southern California, major industrial users include electronics, aircraft, petroleum refining, beverages, food processing, and other industries that use water as a major component of the manufacturing process (MWD, 2016).

3.5.3.2.3 Agricultural Water Use

In 2015, agricultural water use comprised about three percent of total regional water demand in MWD's service area. The relative share of agricultural water use has declined due to urbanization and market factors, including the price of water. Agricultural water use accounted for 19 percent of total regional water demand in 1970, 12 percent in 1980, 10 percent in 1990, and 3.5 percent in 2010 (MWD, 2016).

3.5.4 WATER SUPPLY

The region has a diverse mix of both local and imported water supply sources. Local water sources include water recycling, groundwater storage and conjunctive use, conservation, brackish water desalination, water transfer and storage, and infrastructure enhancements. The region imports water through the SWP, the Colorado River Aqueduct, and the Los Angeles Aqueduct. These resources allow the region flexibility in managing supplies and resources in wet and dry years (DWR, 2013a)

To meet current and growing demands for water, the South Coast Hydrologic Region is leveraging all available water resources: imported water, water transfers, conservation, local surface water, groundwater, recycled water, and desalination. Given the level of uncertainty about water supply from the Delta and the Colorado River, local agencies have emphasized diversification. Local water agencies have always utilized a mixture of local and imported waters and water management strategies to adequately meet urban and agricultural demands each year. This diverse mix of sources provides flexibility in managing resources in wet and dry years (DWR, 2013a).

Water used in MWD's service area comes from both local and imported sources. Local sources include groundwater, surface water, and recycled water. Sources of imported water include the Colorado River, the SWP, and the Owens Valley/Mono Basin. On average over the last ten years (from 2006 to 2015), local sources met about 45 percent of the water needs, while imported sources supplied the remaining 55 percent (MWD, 2016).

The City of Los Angeles imports water from the Owens Valley/Mono Basin east of the Sierra Nevada through the Los Angeles Aqueduct. This water currently meets about four percent of the region's water needs based on a ten-year average from 2006 to 2015, but is dedicated for use by the City of Los Angeles. MWD provides imported water supplies to meet the remaining 51 percent of the region's water needs based on the same ten-year period. These imported supplies are received from MWD's Colorado River Aqueduct (CRA) and the SWP's California Aqueduct.

3.5.4.1 Imported Water Supplies

Water is brought into the South Coast Hydrologic Region from three major sources: the Delta, Colorado River, and Owens Valley/Mono Basin. All three are facing water supply cutbacks because of climate change and environmental issues. Although imported water supplies historically served to help the South Coast Hydrologic Region grow, imported supplies are now relied on to sustain the existing population and economy. As such, parties in the South Coast Hydrologic Region are working closely with other regions, the state, and various federal agencies

to address the challenges facing these imported supplies. Meanwhile, the South Coast Hydrologic Region is working to develop new local supplies to meet the needs of future population and economic growth.

DWR administers long-term imported water supply contracts with 29 agencies for SWP supplies. In return for State financing, operation, and maintenance of SWP facilities, the agencies contractually agree to repay all associated capital and operating costs. LADWP owns and operates the Los Angeles Aqueduct for conveyance of imported water from the Owens Valley to Los Angeles. Legal decisions regarding environmental concerns in the Delta have recently limited the volume of water that can be delivered south of the Delta through the SWP (DWR, 2013a).

The Colorado River is managed and operated by the U.S. Department of the Interior Bureau of Reclamation under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River." This collection of documents gives entitlements to the water and regulates the use and management of the Colorado River among the seven basin states and Mexico. The MWD, the largest SWP contractor and primary South Coast Hydrologic Region wholesaler, delivers an average of 1.4 MAF of SWP and CRA supplies (depending on the availability of surplus water) to its 26 cities and member agencies.

The South Coast Hydrologic Region is served by many water suppliers, both retail and wholesale; the largest of these agencies is MWD. MWD serves the urbanized coastal plain from Ventura to the Mexican border in the west to parts of the rapidly urbanizing counties of San Bernardino and Riverside in the east. MWD provides water to about 90 percent of the urban population of Southern California (SCAG, 2016).

3.5.4.1.1 State Water Project (SWP)

The SWP supplies water to Southern California via the California Aqueduct, with delivery points in Los Angeles, San Bernardino, and Riverside Counties. Much of the SWP water supply passes through the San Francisco-San Joaquin Bay-Delta (Bay-Delta). The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR. This statewide water supply infrastructure provides water to 29 urban and agricultural agencies throughout California. More than two-thirds of California's residents obtain some of their drinking water from the Bay-Delta.

The SWP was constructed and is managed by DWR, and is the largest state-owned, multipurpose water project in the country. SWP contractors in the region take delivery of and convey the supplies to regional wholesalers and retailers. Contractors in the region include the MWD, Castaic Lake Water Agency (CLWA), San Bernardino Valley Municipal Water District (SBVMWD), San Gorgonio Pass Water Agency (SGPWA), and San Gabriel Valley Municipal Water District (DWR, 2013a) SWP has historically provided 25 to 50 percent of MWD's water, anywhere from 450,000 acre-feet to 1.75 MAF annually. Southern California's maximum SWP yield is about 2.0 MAF per year. The SWP provides water to approximately 25 million people and irrigation water for roughly 750,000 acres of agricultural lands annually (SCAG, 2016).

In 2007, a federal judge ordered the pumps that bring water from the Sacramento Bay Delta into Southern California be shut off, to protect an endangered fish species, the Delta smelt. Although pumping later resumed, it did so at only two-thirds of capacity, reducing by one-third the amount of water coming into Southern California through that system. It is unclear when, or even if, full capacity pumping will resume. The situation in the Sacramento Bay Delta highlights the uncertainty and vulnerability of the region's dependence on imported water (SCAG, 2016).

Another important concern for MWD is sustained improvement in SWP water quality. MWD must be able to meet the increasingly stringent drinking water regulations that are expected for disinfection by-products and pathogens in order to protect public health. Meeting these regulations will require improving the Bay-Delta water supply by cost effectively combining alternative source waters, source improvement, and treatment facilities. Additionally, MWD requires water quality improvements of Bay-Delta water supplies to meet its 500 mg/L salinity blending objective in a cost-effective manner, while minimizing resource losses and helping to ensure the viability of regional recycling and groundwater management programs (MWD, 2016).

In July 2015, DWR released the 2015 SWP Delivery Capability Report. The 2015 Delivery Capability Report provides estimates of the current (2015) and future (2035) SWP delivery capability for each SWP contractor under a range of hydrologic conditions. These estimates incorporate regulatory requirements in accordance with U.S. Fish and Wildlife Service and National Fisheries Service biological opinions. In addition, these estimates of future capability also reflect potential impacts of climate change and sea level rise.

MWD's implementation approach for the SWP depends on the full use of the current State Water Contract provisions, including its basic contractual amount. In addition, it requires successful negotiation and implementation of a number of water agreements. MWD is committed to working collaboratively with DWR, SWP contractors, and other stakeholders to ensure the success of these extended negotiations and programs (MWD, 2016).

3.5.4.1.2 Colorado River System

The Colorado River is a major source of water for the region and is imported via the Colorado River Aqueduct. The Colorado River Region is of particular concern because it encompasses the Coachella Valley in the West Basin and the desert in the East Basin. Irrigation needs in the Coachella Valley are met almost exclusively by water imported from the Colorado River. Historical extraction of groundwater in the Coachella Valley has caused overdraft. Currently, an extensive groundwater recharge project is being undertaken by the Coachella Valley Water District that recharges Colorado River Water into spreading basins. Within the East Basin, irrigation and domestic water is provided by the Colorado River with only approximately one percent groundwater use and little direct reclamation. Agricultural runoff and some domestic wastewater do get returned to the Colorado River. Therefore, the water source at the southern end of the watershed is actually a mixture of Colorado River water, agricultural runoff, and reclaimed water (SCAG, 2016).

Under water delivery contracts with the United States, California entities have enjoyed legal entitlements to Colorado River water since the early twentieth century. California water agencies

have a legal entitlement of 4.4 MAF annually of Colorado River water, as well as any surplus. Of the 4.4 MAF of water, 3.85 MAF are assigned in aggregate to agricultural users; MWD's annual entitlement is 550,000 acre-feet. There have been several compacts, treaties, and negotiations between the seven states the use Colorado River, beginning with the 1922 Colorado River Compact. MWD is the fourth priority for Colorado River supplies (see Table 3.5-3).

The MWD diverts Colorado River supplies based on the agreements in the 1931 California Seven-Party Agreement and the Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement of 2003, which further quantifies priorities established in the 1931 document. Table 3.5-3 shows the historic apportionment of each agency, and the priority accorded that apportionment. The MWD diversions, within its legal entitlements, are less now than they were in the early 2000s. Surplus supplies, which existed on the river then, have been reduced as other states have increased their diversions in accord with their authorized entitlements.

TABLE 3.5-3

Priorities of the Seven Party Agreement

Priority	Description	TAF[(a)] Annually
1	Palo Verde Irrigation District – gross area of 104,500 acres of land in the Palo Verde Valley	3,850
2	Yuma Project (Reservation Division) – not exceeding a gross area of 25,000 acres in California	N/A[(b)]
3[(c)]	Imperial Irrigation District and land in Imperial and Coachella Valleys to be served by All American Canal	N/A
3[(d)]	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	N/A
4	MWD of Southern California for use on the coastal plain of Southern California	550
Subtotal		**4,400**
5(a)	MWD of Southern California for use on the coastal plain of Southern California	550
5(b)	MWD of Southern California for use on the coastal plain of Southern California	112
6(a)	Imperial Irrigation District and land in Imperial and Coachella Valleys to be served by the All American Canal	300
6(b)	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	N/A
7	Agricultural Use in the Colorado River Basin in California	
	Total Prioritized Appointment	**5,362**

Source: MWD, 2016
(a) TAF = thousand acre-feet.
(b) N/A = Not Available
(c) The Coachella Valley Water District now serves Coachella Valley

(d) In 1946, the City of San Diego, the San Diego County Water Authority, MWD, and the Secretary of the Interior entered into a contract that merged and added the City of San Diego's rights to store and deliver Colorado River water to the rights of MWD. The conditions of that agreement have long since been satisfied.

With increased urbanization in the Colorado River Basin states and limitation agreements between those states, surplus water for California was eliminated; the state will gradually return to its original allotment of 4.4 MAF. Given these new terms, California water agencies are pursuing various strategies to offset this gradual, but certain loss of future water supply. Examples of these strategies include additional reservoir and storage agreements, new water transfers between agricultural and urban users, and more water conservation and recycling. A record eight-year drought in the Colorado River Basin has reduced current reservoir storage throughout the river system to just over 50 percent of the total storage capacity (SCAG, 2016).

3.5.4.1.3 Owens Valley Mono Basin (Los Angeles Aqueduct)

High-quality water from the Owens Valley/Mono Basin is delivered through the Los Angeles Aqueduct to the City of Los Angeles. Construction of the original 233-mile aqueduct from the Owens Valley was completed in 1913, with a second aqueduct completed in 1970 to increase capacity. These two aqueducts have historically supplied an average of approximately 256,000 acre-feet per year in normal years, and as little as 106 acre-feet per year in drier years. Recent deliveries have been almost cut in half due to dwindling Sierra snowpack and a court decision restricting the amount of water that can be removed from the Owens Valley/Mono Basin in order to restore their damaged ecosystems (SCAG, 2016).

Since its construction the Los Angeles Aqueduct historically provided the vast majority of water for the City of Los Angeles. Annual Los Angeles Aqueduct deliveries are dependent on snowfall in the eastern Sierra Nevada. Years with abundant snowpack result in larger water deliveries from the Los Angeles Aqueduct, and typically reduced purchases of supplemental water from MWD. Conversely, low Los Angeles Aqueduct deliveries in dry years increase the demand for supplemental water from MWD. The impact to Los Angeles Aqueduct water supplies due to varying hydrology in the Owens Valley/Mono Basin is amplified by the requirements to release water for environmental enhancement efforts in the eastern Sierra Nevada.

The cyclical nature of hydrology is exhibited best by Los Angeles Aqueduct deliveries over the last fifteen years. This general period was characterized by a series of wet years, followed by a series of dry years that have extended into the current drought period. Beginning in 2012, a multiple-year drought impacted the entire State of California and Los Angeles Aqueduct deliveries reached a new record low of 53,500 acre-feet during fiscal year 2014/15. From fiscal 2010/11 through 2014/15, Los Angeles Aqueduct deliveries supplied an average of 29 percent of the city's water needs which is substantially lower than average aqueduct deliveries supplying 40 percent of the city's needs since fiscal year 1989/90. In the last decade environmental considerations have required that the city reallocate approximately 182,000 acre-feet per year (AFY) of Los Angeles Aqueduct water supply to environmental mitigation and enhancement projects leaving approximately 43 percent of the supply available for export to the city. Reducing water deliveries to the city from the Los Angeles Aqueduct to comply with environmental enhancement efforts coupled with the drought has led to increased dependence on imported water supply from MWD (LADWP, 2016).

3.5.4.2 Local Water Supplies

Approximately 50 percent of the region's water supplies come from resources controlled or operated by local water agencies. These resources include water extracted from local groundwater basins, catchment of local surface water, non-MWD imported water supplied through the Los Angeles Aqueduct, and Colorado River water exchanged for MWD supplies (MWD, 2016). Local sources of water available to the region include surface water, groundwater, and recycled water.

3.5.4.3 Surface Water

In addition to the groundwater basins, local agencies maintain surface reservoir capacity to capture local runoff. The average yield captured from local watersheds is estimated at approximately 104 TAF per year. The majority of this supply comes from reservoirs within the service area of the San Diego County Water Authority.

3.5.4.4 Groundwater

The groundwater basins that underlie the region provide nearly 35 percent of the water supply in Southern California. The major groundwater basins provide an annual average supply of approximately 1.35 MAF. Natural recharge of the groundwater basins is supplemented by active recharge of captured stormwater, recycled water, and imported water to support this level of annual production.

Estimates indicate that available storage space in the region's groundwater basins in mid-2015 is approximately 4.8 MAF. Successive dry years have resulted in groundwater depletions that will need to be replaced with natural recharge during wet years and active spreading of captured stormwater, recycled water, and imported water. Groundwater basin managers and water suppliers have taken steps to store water in advance of dry years to soften the potential impact on groundwater aquifers and to maintain reliable local water supplies during dry years (MWD, 2016).

3.5.4.5 Recycled Water

Recycled water has been successfully used in the South Coast Hydrologic Region since the 1960s. Although it meets only a small fraction of the overall demands, recycled water supplies are being used in Southern California. Key factors in the continued increases in use include the upgrades of existing and construction of new wastewater treatment facilities with the latest technology to treat and produce these supplies and the continued expansion of the local infrastructures to store and convey the supplies to potential users, primarily for landscape irrigation. In Los Angeles County, recycled water is also recharged into the Central and West Coast Basins via the county flood control district's spreading grounds and injection wells that form the district's seawater barrier projects (DWR, 2013a).

Additionally, the Los Angeles RWQCB adopted Non-Irrigation General Water Reuse (Order No. R4-2009-0049) General Waste Discharge and Water Recycling Requirements for Title 22 Recycled Water for Non-Irrigation Uses over the Groundwater Basins Underlying the Coastal

Watersheds of Los Angeles and Ventura Counties. The purpose of this General Waste Discharge Requirement (WDR) is to serve as a region-wide general permit for non-irrigation uses of recycled water, such as industrial cooling or dust control during construction.

Recycled water use in the South Coast Hydrologic Region (354,000 acre-feet) was determined by the 2009 Recycled Water Survey. This accounts for more than 7.5 percent of the total applied water (4.7 MAF) in the region. Almost one-third of the recycled water is used to augment or protect groundwater resources either by spreading basins for groundwater recharge or coastline injection to act as a barrier to saltwater intrusion. Landscape irrigation, agricultural irrigation, and industrial use are also significant uses of recycled water.

Recycled water is produced and used by dozens of cities and agencies throughout the South Coast Hydrologic Region, with the primary producers being the Sanitation Districts of Los Angeles County, the City of Los Angeles, and Orange County Water District (OCWD). These producers, as well as other recycled water producers in the region, are continuing to expand capacity and planning for uses of existing supplies (DWR, 2013a).

3.5.4.6 Desalination Plants

Multiple groundwater desalination facilities are in operation in the South Coast Hydrologic Region. In the Santa Ana planning area, the Chino Desalter Authority operates the Chino I and Chino II facilities; Eastern Municipal Water District operates Menifee and Perris I; the city of Riverside has Arlington; and the city of Corona has Temescal. The Irvine Desalter is a joint project between the Irvine Ranch Water District and OCWD; and the 17th Street Desalter is a project between the City of Tustin, OCWD, and MWD.

In Metropolitan Los Angeles, there is the West Basin Municipal Water District's Goldsworthy Desalter. In San Diego County, the city of Oceanside operates the Mission Basin Groundwater Purification Facility, and the Sweetwater Authority operates the Reynolds Groundwater Desalination Facility. Additionally, the Southwest Water Company operates the San Juan Capistrano Groundwater Recovery Plant.

A seawater desalination project is moving forward in the South Coast Hydrologic Region. The Carlsbad Desalination Plant in San Diego County, and the conveyance system needed to deliver the desalted water to consumers, are under construction by Poseidon Resources, a private company. This facility will be able to produce up to 50 million gallons per day (mgd) of potable water supplies to SDCWA member water agencies (DWR, 2013a). Poseidon is currently seeking permits for a 50 million gallon per day desalination plant in Huntington Beach.

3.5.4.7 Drought

California's most recent statewide drought in water years 2007-2009 was followed by near average hydrologic conditions in water year 2010, and a wet year in 2011. Water year 2012 was the first generally dry year statewide since the last drought. Water year 2013 was one of the driest on record. California received its full basic interstate apportionment of Colorado River water throughout this period. In response to the widespread Midwestern drought in the summer of 2012, the U.S. Department of Agriculture (USDA) streamlined its methodology for the USDA Secretary to make county level drought disaster designations. The new methodology is based on counties' short-term status as depicted in the U.S. Drought Monitor, which primarily relies on precipitation and soil moisture conditions at a weekly time scale, and is essentially independent of any characterization of drought impacts. Application of the new methodology nationwide resulted in almost all of California's counties automatically receiving drought disaster designations in 2012.

Scientific capability for intraseasonal to interannual climate forecasting (ISI forecasting) remains unreliable. Since 2008, DWR has annually funded an experimental research forecast for the coming winter season. This forecast, like the NOAA Climate Prediction Center's seasonal outlook, can be used to explore research approaches associated with ISI forecasting, but it is not suitable for decision-making. A single dry year, such as 2012, is a reminder of the need to prepare for the possibility that the following year may also be dry, in which case the impacts of dry conditions will likely be more pronounced (DWR, 2013).

Water years 2012 and 2013 were dry statewide, especially in parts of the San Joaquin Valley and Southern California. Water year 2014, which began October 1, 2013, continues this trend. Precipitation in some areas of the state is tracking at about the driest year on record. On January 17, 2014, a drought state of emergency was declared and State officials were directed to take all necessary actions in response.

Immediately thereafter, DWR announced several actions to protect Californians' health and safety from more severe water shortages. Those actions include dropping the anticipated allocation of water to customers of the SWP from five percent to zero; notifying long-time water rights holders in the Sacramento Valley that they may be cut by 50 percent, depending on future snow survey results; and asking the SWRCB to adjust requirements that hinder conservation of currently stored water. This marks the first zero allocation announcement for all customers of the SWP in the 54-year history of the project.

State officials were directed to take all necessary actions to prepare for water shortages. California Department of Forestry and Fire Protection (CAL FIRE) recently announced it hired additional firefighters to help address the increased fire threat, the Department of Public Heath identified and offered assistance to communities at risk of severe drinking water shortages, and DFW restricted fishing on some waterways owing to low water flows that have become much worse during the drought. Also in January, the California Natural Resources Agency (CNRA), CalEPA, and the California Department of Food and Agriculture released the California Water Action Plan, which will guide state efforts to enhance water supply reliability, restore damaged and destroyed ecosystems, and improve the resilience of the infrastructure.

All Californians were asked to voluntarily reduce their water usage by 20 percent and the Save Our Water campaign has announced four new public service announcements that encourage residents to conserve. In December 2012, the governor formed a Drought Task Force to review expected water allocations and California's preparedness for water scarcity. In May 2013, an executive order was issued to direct State water officials to expedite the review and processing of voluntary transfers of water.

In many areas of the state, drought conditions also mean a shift toward greater reliance on groundwater to meet agricultural demands. The drought-related increase in groundwater demand also resulted in a large increases in well drilling and installation. Installation of large capacity production wells in 2008 and 2009 were the highest since 1991 — another critically dry year (DWR, 2013).

3.5.5 WATER CONSERVATION

MWD's water conservation programs focus on two main areas: (1) residential water use, and (2) commercial, industrial, and institutional water use. MWD directly implements regional programs, and provides financial support for local programs that are implemented by the member agencies. MWD's Water Use Efficiency team provides program development, implementation, administration, monitoring, evaluation, and research (MWD, 2016).

Demand management through conservation is a core element of MWD's long-term water management strategy. Conservation has resulted in the replacement of more than 3.4 million toilets with more water efficient models, distribution of more than 530,000 high-efficiency clothes washers, and removal of approximately 170 million square feet of grass from both commercial and residential properties. Collectively, MWD's conservation programs and other conservation in the region is expected to reduce Southern California's reliance on imported water by more than 1.0 MAF per year by 2025 (MWD, 2016).

Conservation savings result from active, code-based, and price-effect conservation efforts. Active conservation consists of water-agency funded programs such as rebates and incentives for water efficient fixtures and equipment and turf removal. Code-based and price-based conservation consists of demand reductions attributable to conservation-oriented plumbing codes and usage reductions resulting from increases in the price of water. MWD does not currently assign a savings value for public awareness campaigns and conservation education because any initial effect on demand reduction and the longevity of the effect are difficult to measure. It is generally accepted that these outreach programs prompt consumers to install water saving fixtures and change water-use behavior, thereby creating a residual benefit of increasing the effectiveness of complementary conservation programs (MWD, 2016).

MWD's approach for achieving the conservation target includes implementing a suite of demand management measures, including public education and outreach, a variety of conservation programs, metering, research and development, and asset management. These programs include cost-effective conservation programs and new, innovative programs that address regional water uses. MWD also provides support to member agencies for local programs that assist with implementing BMPs and reducing per capita water use (MWD, 2016).

3.5.5.1 Residential Programs

MWD's residential conservation consists of the following programs:

- SoCal Water$mart: MWD provides a region-wide residential rebate program named SoCal Water$mart. Since its inception in 2008, rebate activity has increased dramatically as many residential customers became increasingly aware of the financial incentives available to them to help offset the purchase of water-efficient devices. To date, this program helped to replace over 3.3 million toilets, 530,000 washing machines, 37,000 urinals, 300,000 smart irrigation controllers, 2.3 million rotating nozzles, and hundreds of thousands of other devices and appliances.

- Residential Programs Administered by Member Agencies - MWD's member and retail agencies also implement local residential water conservation programs within their respective service areas and receive MWD incentives for qualified retrofits and other water-saving actions. Typical projects include high-efficiency toilet distributions, locally administered clothes washer rebate programs, turf removal programs, and residential water audits.

MWD has provided incentives on a variety of water efficient devices for the residential sector, including: 1) turf removal (residential); 2) high-efficiency clothes washers; 3) high-efficiency toilets; 4) rotating nozzles for sprinklers; and 5) irrigation controllers.

3.5.5.2 Commercial, Industrial and Institutional Programs

MWD's commercial industrial and institutional (CII) conservation consists of three major rebate and incentive programs:

- SoCal Water$mart - The majority of the commercial conservation activity comes from MWD's regional SoCal Water$mart program, which also extends rebates to multi-family properties. This program had its largest year in fiscal year 2014-15, providing CII rebates for about 328,000 product replacements.

- Water Savings Incentive Program – This program provides financial incentives for customized landscape irrigation and industrial process improvements. This program allows large-scale water users to create their own conservation projects and receive incentives for up to ten years of water savings for measured water-use efficiency improvements.

- Commercial Programs Administered by Member Agencies – Member and retail agencies also implement local commercial water conservation programs using MWD incentives. Projects target specific commercial sectors, with some programs also receiving assistance from state or federal grant programs. MWD incentives are also used as the basis for meeting cost-share requirements for the grants.

MWD's CII programs provide rebates for water-saving plumbing fixtures, landscaping equipment, turf removal, food-service equipment, cleaning equipment, heating, ventilation, air conditioning

equipment, and medical equipment. Commercial devices that have contributed to projected conservation savings include:

- Connectionless Food Steamers
- Cooling Tower Conductivity Meters
- Dry Vacuum Pumps
- High-Efficiency Clothes Washers
- High-Efficiency Toilets
- High-Efficiency Urinals
- Ice Machines
- In-Stem Flow Regulators
- Large Rotors – High Efficiency Nozzles
- Multi Stream Rotating Nozzles
- pH Cooling Tower Controllers
- Plumbing Flow Control Valves
- Pre-rinse Spray Heads
- Steam Sterilizers
- Ultra-Low-Flush Toilets
- Ultra-Low-Flush Urinals
- Water Brooms
- Weather-Based Irrigation Controllers
- X-ray Processors
- Zero Water Urinals

In the City of Los Angeles, conservation has had a tremendous impact on water use patterns and has become a permanent part of LADWP's water management philosophy. Water conservation is at the core of multiple strategies to improve overall water supply reliability. In the future conservation will continue to be an important part of maintaining supply reliability and calling for a 25 percent reduction in per capita water use by 2035 over 2013 levels (LADWP, 2016).

Water usage in Los Angeles is about the same as it was in the 1970s despite an increase in population of more than 30 percent (over 1,000,000 additional people) based on installation of conservation devices subsidized through rebates and incentives. Cumulative annual hardware savings since the inception of LADWP's conservation program totals 118,034 AFY. Additional conservation has been achieved through changes in customer behavior and lifestyle.

As a result of mandatory conservation and reduced deliveries of imported water from MWD, residential customers have attained conservation levels exceeding 30 percent during the period between fiscal year 2006-07 and fiscal 2014-15. In response to the current water supply shortage, the City of Los Angeles has updated its Emergency Water Conservation Plan Ordinance's enforceable water waste provisions and mandatory outdoor watering restrictions. In addition, the city has implemented water shortage year rates reducing Tier 1 water allotments for customers by 15 percent. As a direct result of conservation, imported water purchases from MWD are well below baseline allocations for fiscal year 2014/15 (LADWP, 2016).

MWDOC committed to water use efficiency in 1991 by voluntarily signing the memorandum of understanding (MOU) Regarding Urban Water Conservation in the California Urban Water Conservation Council. The council was formed through adoption of this MOU and is considered the "keeper" of the BMPs, with the authority to add, change, or remove BMPs. The California Urban Water Conservation Council also monitors implementation of the MOU. As a signatory to the MOU, MWDOC has committed to a good-faith-effort to implement all cost-effective BMPs.

Retail water agencies throughout Orange County also recognize the need to use existing water supplies efficiently – implementation of BMP-based efficiency programs makes good economic sense and reflects responsible stewardship of the region's water resources. All retail water agencies in Orange County are actively implementing BMP-based programs; however, not all retail water agencies are signatory to the MOU. As a signatory to the California Urban Water Conservation Council MOU regarding urban water use efficiency, MWDOC's commitment to implement BMP-based water use efficiency program continues today (MWDOC, 2016).

3.5.6 WATER QUALITY

Water quality is a key issue in the South Coast Hydrologic Region. Population and economic growth not only affect water demand but add contamination challenges from increases in wastewater and industrial discharges, urban runoff, agricultural chemical usage, livestock operations, and seawater intrusion. Three RWQCBs have jurisdiction in the South Coast Hydrologic Region: Los Angeles RWQCB (Region 4), Santa Ana RWQCB (Region 8), and San Diego RWQCB (Region 9). Each RWQCB identifies impaired water bodies, establishes priorities for the protection of water quality, issues waste discharge requirements (WDRs), and takes appropriate enforcement actions within in its jurisdiction. Specific water quality issues include beach closures, contaminated sediments, agricultural discharges, salinity management, and port and harbor discharges (DWR, 2013a).

Major surface waters of the South Coast Hydrologic Region flow from head waters in pristine mountain areas (largely in two national forests and the Santa Monica Mountains), through urbanized foothill and valley areas, high density residential and industrial coastal areas, and terminate at highly utilized recreational beaches and harbors. Uncontrolled pollutants from non-point sources are believed to be the greatest threats to rivers and streams within the South Coast Hydrologic Region (SCAG, 2016). Table 3.5-4 lists Impaired Surface Water Bodies in the Basin.

3.5.6.1 Point and Non-Point Source Pollution

Portions of the Los Angeles River in Los Angeles County and the Santa Ana River in Orange County have been lined with concrete for flood control purposes. One of the effects of these projects has been to reduce the natural recharge of groundwater basins. A second has been to make these rivers conveyance systems that concentrate and transfer urban pollutants and waste to the ocean. With regard to the rivers themselves, the State's Water Quality Assessment Report estimated in 1992 that approximately two-thirds of California's water bodies were threatened or impaired by non-point sources of pollution. Point source pollution refers to contaminants that enter a watershed, usually through a pipe. The location of the end of the pipe is documented and the flow out of that pipe is subject to a discharge permits issued by an RWQCB. Examples of point source pollution are discharges from sewage treatment plants and industrial facilities. Because point sources are much easier to regulate than non-point sources, they were the initial focus of the 1972 CWA. Regulation of point sources since then has dramatically improved the water quality of many rivers and streams throughout the country. In contrast to point source pollution, non-point source pollution, also known as "pollution runoff," is diffuse. Non-point pollution comes from everywhere in a community and is significantly influenced by land uses. A driveway or the road in front of a house may be a source of pollution if spilled oil, leaves, pet

waste or other contaminants leave the site and runoff into a storm drain. Non-point source pollution is now considered one of the major water quality problems in the United States (SCAG, 2016).

3.5.6.2 Runoff Pollutants

The problem of non-point source pollution is especially acute in urbanized areas where a combination of impermeable surfaces, landscape irrigation, highway runoff and illicit dumping increase the pollutant loads in stormwater. The SWRCB has identified the following pollutants found in urban runoff as being a particular concern:

- Sediment: Excessive sediment loads in streams can interfere with photosynthesis, aquatic life respiration, growth, and reproduction;
- Nutrients: Nitrogen and phosphorus can result in eutrophication of receiving waters (excessive or accelerated growth of vegetation or algae), reducing oxygen levels available for other species;
- Bacteria and viruses: Pathogens introduced to receiving waters from animal excrement in the watershed and by septic systems can restrict water contact activities;
- Oxygen demanding substances: Substances such as lawn clippings, animal excrement and litter can reduce dissolved oxygen levels as they decompose;
- Oil and grease: Hydrocarbons from automobiles are toxic to some aquatic life;
- Metals: Lead, zinc, cadmium and copper are heavy metals commonly found in stormwater. Other metals introduced by automobiles include chromium, iron, nickel and manganese. These metals can enter waterways through storm drains along with sediment, or as atmospheric deposition;
- Toxic pollutants: Pesticides, phenols and polynuclear aromatic hydrocarbons (PAHs) are toxic organic chemicals found in stormwater; and
- Floatables: Trash in waterways increases metals and toxic pollutant loads in addition to undesirable aesthetic impacts.

TABLE 3.5-4

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
Los Angeles	
Algae	Lindero Creek Reach 1
	Lindero Creek Reach 2 (Above Lake)
	Medea Creek Reach 1 (Lake to Confl. with Lindero)
	Medea Creek Reach 2 (Abv Confl. with Lindero)
	Ventura River Estuary
	Ventura River Reach 1 and 2 (Estuary to Weldon Canyon)
Ammonia	Calleguas Creek Reach 2 (estuary to Potrero Rd- was Calleguas Creek Reaches 1 and 2 on 1998 303d list)
	Calleguas Creek Reach 3 (Potrero Road upstream to confluence with Conejo Creek on 1998 303d list)
	Calleguas Creek Reach 6 (was Arroyo Las Posas Reaches 1 and 2 on 1998 303d list)
	Calleguas Creek Reach 7 (was Arroyo Simi Reaches 1 and 2 on 1998 303d list)
	Calleguas Creek Reach 9B (was part of Conejo Creek Reaches 1 and 2 on 1998 303d list)
	Calleguas Creek Reach 10 (Conejo Creek (Hill Canyon)-was part of Conejo Crk Reaches 2 & 3, and lower Conejo Crk/Arroyo Conejo N Fk on 1998 303d list)
	Calleguas Creek Reach 11 (Arroyo Santa Rosa, was part of Conejo Creek Reach 3 on 1998 303d list)
	Calleguas Creek Reach 12 (was Conejo Creek/Arroyo Conejo North Fork on 1998 303d list)
	Calleguas Creek Reach 13 (Conejo Creek South Fork, was Conejo Cr Reach 4 and part of Reach 3 on 1998 303d list)
	Coyote Creek
	Dominguez Channel (lined portion above Vermont Ave)
	Los Angeles River Reach 1 (Estuary to Carson Street)
	Los Angeles River Reach 2 (Carson to Figueroa Street)
	Los Angeles River Reach 3 (Figueroa St. to Riverside Dr.)
	Los Angeles River Reach 4 (Sepulveda Dr. to Sepulveda Dam)
	Los Angeles River Reach 5 (within Sepulveda Basin)
	San Jose Creek Reach 1 (SG Confluence to Temple St.)
	Santa Clara River Reach 3 (Freeman Diversion to A Street)
	Sepulveda Canyon
	Tujunga Wash (LA River to Hansen Dam)
Beach Closures	Robert H. Meyer Memorial Beach
Benthic-Macroinvertebrate Bioassessments	Arroyo Seco Reach 1 (LA River to West Holly Ave.)
	Compton Creek
	Las Virgenes Creek
	Malibu Creek
	Triunfo Canyon Creek Reach 2
	Walnut Creek Wash (Drains from Puddingstone Res)
Bis(2ethylhexyl)phthalate (DEHP)	Sawpit Creek

Table 3.5-4 (Cont.)

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
Boron	Calleguas Creek Reach 8 (was Tapo Canyon Reach 1)
	Fox Barranca (tributary to Calleguas Creek Reach 6)
	Santa Clara River Reach 11 (Piru Creek, from confluence with Santa Clara River Reach 4 to gaging station below Santa Felicia Dam)
Cadmium	Ballona Creek Estuary
Cadmium (sediment)	Ballona Creek
ChemA (tissue)	Calleguas Creek Reach 5 (was Beardsley Channel on 1998 303d list)
	Calleguas Creek Reach 9A (was lower part of Conejo Creek Reach 1 on 1998 303d list)
	Duck Pond Agricultural Drains/Mugu Drain/Oxnard Drain No 2
	Rio De Santa Clara/Oxnard Drain No. 3
Chloride	Piru Creek (from gaging station below Santa Felicia Dam to headwaters)
	Santa Clara River Reach 5 (Blue Cut gaging station to West Pier Hwy 99 Bridge) (was named Santa Clara River Reach 7 on 2002 303(d) list)
	Santa Clara River Reach 6 (W Pier Hwy 99 to Bouquet Cyn Rd) (was named Santa Clara River Reach 8 on 2002 303(d) list)
	Sespe Creek (from 500 ft below confluence with Little Sespe Cr to headwaters)
Cholrpyrifos (tissue)	Calleguas Creek Reach 4 (was Revolon Slough Main Branch: Mugu Lagoon to Central Avenue on 1998 303d list)
Coliform Bacteria	Arroyo Seco Reach 2 (West Holly Ave to Devils Gate Dam)
	Bell Creek
	Big Rock Beach
	Dan Blocker Memorial (Coral) Beach
	Las Flores Beach
	Leo Carillo Beach (South of County Line)
	Long Point Beach
	Los Angeles River Reach 6 (Above Sepulveda Flood Control Basin)
	Malibu Lagoon Beach (Surfrider)
	Palo Comado Creek
	Redondo Beach
	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)
	Rio Hondo Reach 2 (At Spreading Grounds)
	San Gabriel River Reach 1 (Estuary to Firestone)
	San Gabriel River Reach 2 (Firestone to Whittier Narrows Dam
	San Jose Creek Reach 2 (Temple to I-10 at White Ave.)
	Santa Clara River Reach 7 (Bouquet Canyon Rd to above Lang Gaging Station) (was named Santa Clara River Reach 9 on 2002 303(d) list)
	Stokes Creek
	Topanga Beach
	Torrance Beach
	Torrance Carson Channel
	Verdugo Wash Reach 1 (LA River to Verdugo Rd.)
	Wilmington Drain
Copper	Aliso Canyon Wash
	Burbank Western Channel
	San Gabriel River Estuary

Table 3.5-4 (Cont.)

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
DDT (Dichlorodiphenyltrichloroethane)	Amarillo Beach
	Bluff Cove Beach
	Cabrillo Beach (Outer)
	Carbon Beach
	Castlerock Beach
	Escondido Beach
	Flat Rock Point Beach Area
	Inspiration Point Beach
	La Costa Beach
	Las Tunas Beach
	Malaga Cove Beach
	Malibu Beach
	Nicholas Canyon Beach
	Paradise Cove Beach
	Point Dume Beach
	Point Fermin Park Beach
	Portuguese Bend Beach
	Puerco Beach
	Royal Palms Beach
	Sea Level Beach
	Trancas Beach (Broad Beach)
	Ventura Marina Jetties
	Whites Point Beach
	Zuma Beach (Westward Beach)
DDT (sediment)	Abalone Cove Beach
Fecal Coliform	Canada Larga (Ventura River Watershed)
	Dry Canyon Creek
	McCoy Canyon Creek
Fish Barriers (Fish Passage)	Matilija Creek Reach 1 (Jct. With N. Fork to Reservoir)
	Matilija Creek Reach 2 (Above Reservoir)
Indicator Bacteria	Artesia-Norwalk Drain
	Avalon Beach
	Bull Creek
	Channel Islands Harbor Beach
	Coyote Creek, North Fork
	Dockweiler Beach
	Hermosa Beach
	Hobie Beach (Channel Islands Harbor)
	Long Beach City Beach
	Lunada Bay Beach
	Manhattan Beach
	Marina del Rey Harbor Beach
	Ormond Beach
	Peninsula Beach
	Point Vicente Beach
	Promenade Park Beach
	Puente Creek

Table 3.5-4 (Cont.)

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
	Resort Point Beach
	Rincon Beach
	San Antonio Creek (Tributary to Ventura River Reach 4)
	San Buenaventura Beach
	San Gabriel River Reach 3 (Whittier Narrows to Ramona)
	Santa Monica Beach
	Santa Monica Canyon
	Surfers Point at Seaside
	Venice Beach
	Ventura River Reach 3 (Weldon Canyon to Confl. w/ Coyote Cr)
	Will Rogers Beach
Invasive Species	Solstice Canyon Creek
Lead	Monrovia Canyon Creek
	Topanga Canyon Creek
	Triunfo Canyon Creek Reach 1
Nitrate and Nitrite	Brown Barranca/Long Canyon
	Mint Canyon Creek Reach 1 (Confl to Rowler Cyn)
	Torrey Canyon Creek
	Wheeler Canyon/Todd Barranca
Pathogens	Palo Verde Shoreline Park Beach
Pumping	Ventura River Reach 4 (Coyote Creek to Camino Cielo Rd)
Sulfates	Hopper Creek
	Pole Creek (trib to Santa Clara River Reach 3)
Toxicity	Santa Clara River Reach 1 (Estuary to Hwy 101 Bridge)
Trash	San Gabriel River, East Fork
	Verdugo Wash Reach 2 (Above Verdugo Road)
Santa Ana	
Ammonia (Unionized)	Bolsa Chica Channel
	Borrego Creek (from Irvine Blvd to San Diego Creek Reach 2)
	East Garden Grove Wintersburg Channel
	Serrano Creek
Cadmium	Cucamonga Creek Reach 1 (Valley Reach)
	Rathbone (Rathbun) Creek
	Santa Ana River Reach 6
Chemical oxygen demand (COD)	Chino Creek Reach 1B (Mill Creek confl to start of concrete lined channel)
Coliform bacteria	Chino Creek Reach 2 (Beginning of concrete channel to confl w San Antonio Creek)
Copper	
DDT (Dichlorodiphenyltrichloroethane)	Balboa Beach
	Peters Canyon Channel
Enterococcus	Newport Slough
	Seal Beach

Table 3.5-4 (Concluded)

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
Fecal Coliform	Buck Gully Creek
	Los Trancos Creek (Crystal Cove Creek)
	San Diego Creek Reach 1
Indicator Bacteria	Goldenstar Creek
	Morning Canyon Creek
	San Diego Creek Reach 2
	Santa Ana Delhi Channel
	Santa Ana River, Reach 2
	Temescal Creek, Reach 6 (Elsinore Groundwater sub basin boundary to Lake Elsinore Outlet)
Nutrients	Chino Creek Reach 1A (Santa Ana River R5 confl to just downstream of confl with Mill Creek)
	Grout Creek
	Mill Creek (Prado Area)
	Summit Creek
Pathogens	Knickerbocker Creek
	Lytle Creek
	Mill Creek Reach 1
	Mill Creek Reach 2
	Mountain Home Creek
	Mountain Home Creek, East Fork
	Santa Ana River, Reach 4
	Silverado Creek
PCB (Polychlorinated biphenyls)	Huntington Beach State Park
pH	Cucamonga Creek Reach 2 (Mountain Reach)
	San Antonio Creek
	Temescal Creek, Reach 1
Salinity/TDS/Chlorides	Santiago Creek, Reach 4

Source: SCAG, 2016

3.5.6.3 Salinity

The general quality of groundwater in the South Coast Hydrologic Region tends to be degraded as a result of land uses and water management practices. Fertilizers and pesticides typically used on agricultural lands infiltrate and degrade groundwater. Septic systems and leaking underground storage tanks can also impact groundwater. Overpumping can result in saltwater intrusion from the ocean, further degrading groundwater quality. In addition, wastewater discharges in inland regions can result in salt buildup from fertilizer and dairy waste.

To address the salinity problem, an increasing number of water agencies are working with other water, groundwater and wastewater agencies, state and local government agencies, and interested associations on researching and developing salinity management goals and action plans. Examples include the recently adopted Malibu Valley Groundwater Basin Salt and Nutrient Management Plan and the Central and West Coast Groundwater Basin Salt and Nutrient Management Plan.

Strategies currently in use include blending low and high salinity water and the desalination of brackish water based on recycled water guidance from the RWQCB (SCAG, 2016).

3.5.6.4 Perchlorate

Ammonium perchlorate is a primary ingredient of solid rocket propellant and is used in the manufacture of some types of munitions and fireworks. Ammonium perchlorate and other perchlorate salts are readily soluble in water, dissociating into the perchlorate ion that is highly mobile in groundwater. Small amounts of perchlorate have been found in the Colorado River with higher concentrations in a number of groundwater basins in Southern California. The primary human health concern related to perchlorate is its effects on the thyroid. While perchlorate cannot be removed using conventional water treatment, nanofiltration and reverse osmosis do work effectively, but at very high cost. Irvine Ranch Water District is using a fluidized bed biological treatment and is reinjecting the treated water back into the ground. A number of companies have developed an ion exchange process that removes perchlorate but creates hazardous waste brine. Nonetheless, a number of sites in Southern California have successfully installed ion exchange systems. Thus, while effective treatment options are available, the overriding consideration in decisions about whether to recover perchlorate contaminated groundwater is the cost effectiveness of available technologies (SCAG, 2016).

3.5.6.5 Total Organic Carbon (TOC) and Bromide

When source water containing high levels of TOC and bromide is treated with disinfectants such as chlorine or ozone, disinfection byproducts (DBPs) form. Studies have shown a link between certain cancers and DBP exposure. In addition, some studies have shown an association between reproductive and developmental effects and chlorinated water. In December 1998, the U.S. EPA adopted more stringent regulations for DPBs, especially in old industrial sites and Gateway Cities Corridor where historic use of disinfectants is having residual effects. Existing levels of TOCs and bromide in water supplies present challenges to agencies receiving water from the SWP to monitor and maintain safe drinking water supplies. A primary objective of the CALFED Bay-Delta Program (CALFED) is protection and improvement of the water quality of the SWP to ensure compliance with future drinking water regulations. Although exact future drinking water standards are unknown, significant source water protection of SWP water supplies will almost certainly be a necessary component of meeting these requirements cost-effectively (SCAG, 2016).

3.5.6.6 Methyl Tertiary Butyl Ether and Tertiary Butanol (MTBE)

The use of MTBE (and other oxygenates) in gasoline was mandated to achieve reductions in air pollution, including emissions of benzene, a known human carcinogen. However, this reduction in air pollution has been achieved at the expense of creating a serious groundwater and surface water problem. MTBE is very soluble in water and moves quickly into the groundwater. It is introduced into surface water bodies from the motor exhausts of recreational watercraft. MTBE is also resistant to chemical and microbial degradation in water, making treatment more difficult than the treatment of other gasoline components. MTBE presents a significant problem for local groundwater basins. Leaking underground storage tanks and poor fuel handling practices at local

gas stations may provide a large source for MTBE. One gallon of MTBE alone (11 percent MTBE by volume) is enough to contaminate about 16.5 million gallons of water at 5 µg/L.

Such contamination has caused some water agencies to close wells. The City of Santa Monica, for example, lost about 50 percent of its production wells as a result of MTBE contamination during the 1990s. A combination of advanced oxidation processes followed by granular activated carbon has been found to be effective in reducing the levels of MTBE contaminants by 80 to 90 percent. This may make it possible for local water agencies to treat their groundwater sources to comply with water quality standards. The cost of such treatment, however, could cause some agencies to increase imports as a means of avoiding this cost (SCAG, 2016).

3.5.7 WASTEWATER TREATMENT

The CWA requires wastewater treatment facilities discharging to waters of the U.S. to provide a minimum level of treatment commonly referred to as tertiary treatment. Modern wastewater treatment facilities consist of staged processes with the specific treatment systems authorized through NPDES permits. Primary treatment generally consists of initial screening and clarifying. Primary clarifiers are large pools where solids in wastewater are allowed to settle out over a period of hours. The clarified water is pumped into secondary clarifiers and the screenings and solids are collected, processed through large digesters to break down organic contents, dried and pressed, and either disposed of in landfills or used for beneficial agricultural applications. Secondary clarifiers repeat the process of the primary clarifiers further, refining the effluent.

Other means of secondary treatment include flocculation (adding chemicals to precipitate solids removal) and aeration (adding oxygen to accelerate breakdown of dissolved constituents). Tertiary treatment may consist of filtration, disinfection, and reverse osmosis technologies. Chemicals are added to the wastewater during the primary and secondary treatment processes to accelerate the removal of solids and to reduce odors. Hydrogen peroxide can be added to reduce odors and ferric chloride can be used to remove solids. Polymers are added to secondary effluent as flocculate. Chlorine is often added to eliminate pathogens during final treatment and sulfur dioxide is often added to remove the residual chlorine. Methane produced by the treatment processes can be used as fuel for the plant's engines and electricity needs. Recycled water must receive a minimum of tertiary treatment in compliance with DHS regulations. Water used to recharge potable groundwater supplies generally receives reverse osmosis and microfiltration prior to reuse. Microfiltration technologies have improved substantially in recent years and have become more affordable. As levels of treatment increase, greater volumes of solids and condensed brines are produced. These by-products of water treatment are disposed of in landfills or discharged to local receiving waters.

Treated wastewater is generally discharged into a water body, evaporation pond or percolation basin, or used for irrigation of farmland and landscaping. The U.S. EPA's NPDES permit program areas affect how a municipality handles its sanitary wastewater. Tertiary treatment, which involves the removal of nutrients and nearly all suspended organic matter from wastewater, is now commonly required for discharges to bodies of water, particularly where there is potential for human contact. Municipalities rely on assistance from other partners, such as industry, developers, and homeowners, to ensure that they can meet the requirements contained in their municipal

NPDES permits. Properly managed municipal facilities, such as publicly owned treatment works (POTWs), and wastewater systems, such as separate and combined storm sewer systems, play an important role in protecting community health and local water quality (SCAG, 2016).

There are 66 major wastewater treatment facilities that serve the SCAG region (see Table 3.5-5). Several smaller municipal wastewater systems and agencies also serve incorporated cities within Southern California. Where municipal wastewater systems are absent, permits are available for private onsite sewage disposal systems. Most of the major wastewater treatment facilities are located in areas of higher population density. Many of the major facilities are located along the coastline to provide a close proximity of a water body for discharge of the treated water (SCAG, 2016).

TABLE 3.5-5

Active Wastewater Treatment Facilities in the Basin

County	Design Flow (mgd)
Los Angeles	**1,238.8**
Avalon Wastewater Treatment Plant	1.2
Burbank Water Reclamation Plant	12.5
Donald C. Tillman Water Reclamation Plant	80
Edward C. Little Water Recycling Facility	5.2
Hyperion Treatment Plant	450
Joint Water Pollution Control Plant, Carson	400
Juanita Millender-McDonald Carson Regional Water Recycling Plant	1.2
Long Beach Water Reclamation Plant	25
Los Angeles – Glendale Water Reclamation Plant	20
Los Coyotes Water Reclamation Plant	37.5
Newhall Ranch	2
Pomona Water Reclamation Plant	15
San Jose Creek Water Reclamation Plant	100
Saugus Water Reclamation Plant	6.5
Tapia Water Reclamation Facility	16.1
Terminal Island Water Reclamation Plant	30
Valencia Water Reclamation Plant	21.6
Whittier Narrows Water Reclamation Plant, El Monte	15
Orange	**1,097.62**
City of San Clemente Water Reclamation Facility	38.78
El Toro Water District Water Recycling Plant	34.37
Irvine Desalter Project Shallow Ground Water Unit	34.37
IRWD Los Alisos Water Recycling Plant	34.37
Latham Treatment Plant	38.78
Michelson Water Recycling Plnat	33.5
Orange County Sanitation District Plant 1	332
Orange County Sanitation District Plant Plant 2	332

TABLE 3.5-5

Active Wastewater Treatment Facilities in the Basin (concluded)

Santa Margarita Water District Oso Creek Water Reclamation Plant	38.78
Santa Margarita Water District Chiquita Water Reclamation Plant	38.78
South Orange County Wastewater Authority Aliso Creek Ocean Outfall	34.37
South Orange County Wastewater Authority Coastal Treatment Plant	34.37
South Orange County Wastewater Authority Regional Treatment Plant	34.37
South Orange County Wastewater Authority San Juan Creek Ocean Outfall	38.78
Riverside	**128.4**
Beaumont Wastewater Treatment Plant No. 1	4
Coachella Sanitation Division Wastewater Treatment Plant	2.4
Coachella Valley Water District Wastewater Treatment Plant	7
Corona Water Reclamation Facility No. 1	11.5
Corona Water Reclamation Facility No. 3	1
Elsinore Valley Municipal Water District Water Recycling Facility	8
Riverside City Water Recycling Facility	46
Temescal Creek Outfall	26
Valley Sanitation District Wastewater Treatment Plant	8.5
County	**Design Flow (mgd)**
Western Riverside County Regional Wastewater Authority Water Recycling Facility	14
San Bernardino	**413**
Colton Water Recycling Facility	0
Colton/San Bernardino Secondary Treatment Plant, Rapid Infiltration-Extraction	40
Henry N. Wochholz Wastewater Treatment Facility	6.7
Inland Empire Utilities Agency Carbon Canyon Water Recycling Facility	84.4
Inland Empire Utilities Agency Regional Water Recycling Plant No. 1	84.4
Inland Empire Utilities Agency Regional Water Recycling Plant No. 4	84.4
Inland Empire Utilities Agency Regional Water Recycling Plant No. 5	84.4
Margaret H Chandler Water Reclamation Plant	4.5
Rialto Wastewater Treatment Plant	11.7
Victor Valley Wastewater Reclamation Authority Wastewater Treatment Plant	12.5
TOTAL	**1,911.3**

Source: SCAG, 2016

3.6 NOISE

The purpose of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. Some of the proposed control measures intended to improve overall air quality may have direct or indirect noise impacts associated with their implementation. This subsection describes the existing setting relate to noise within California and the South Coast Air Basin.

The environmental setting section describes the noise, and noise sources that are associated with construction activities in the Basin, where the Basin includes Orange County, and portions of Los Angeles, Riverside, and San Bernardino Counties.

Sound waves, traveling outward from a source, exert a sound pressure level (commonly called "sound level"), measured in decibels (dB). "Noise" is often defined as unwanted sound, and environmental noise is usually measured in "A-weighted" decibels, which is a decibel corrected for the variation in frequency response of the typical human ear at commonly-encountered noise levels. All noise levels discussed herein reflect A-weighted decibels. In general, people can perceive a two- to three-dB difference in noise levels; a difference of 10 dB is perceived as a doubling of loudness.

3.6.1 TERMINOLOGY USED IN NOISE ANALYSIS

Because all humans perceive and interpret sound differently, the types of sound which comprise noise are subjective. The objectionable nature of sound can be caused by its pitch or its loudness. Pitch of a tone or sound depends on the relative rapidity (frequency) of the vibrations by which it is produced. Loudness is the amplitude of sound waves combined with the reception characteristics of the ear. Amplitude may be compared with the height of an ocean wave. Technical acoustical terms commonly used in this section and Subchapter 4.6 in Chapter 4 are defined in Table 3.6-1.

Noise is a by-product of urbanization and there are numerous noise sources and receptors in an urban community. Noise is generally defined as unwanted sound. The range of sound pressure perceived as sound is extremely large. The decibel is the preferred unit for measuring sound since it accounts for these variations using a relative scale adjusted to the human range for hearing (referred to as the A-weighted decibel or dBA). The dBA is a method of sound measurement which assigns weighted values to selected frequency bands in an attempt to reflect how the human ear responds to sound. The range of human hearing is from 0 dBA (the threshold of hearing) to about 140 dBA which is the threshold for pain. Examples of noise and their dBA levels are shown in Figure 3.6-1.

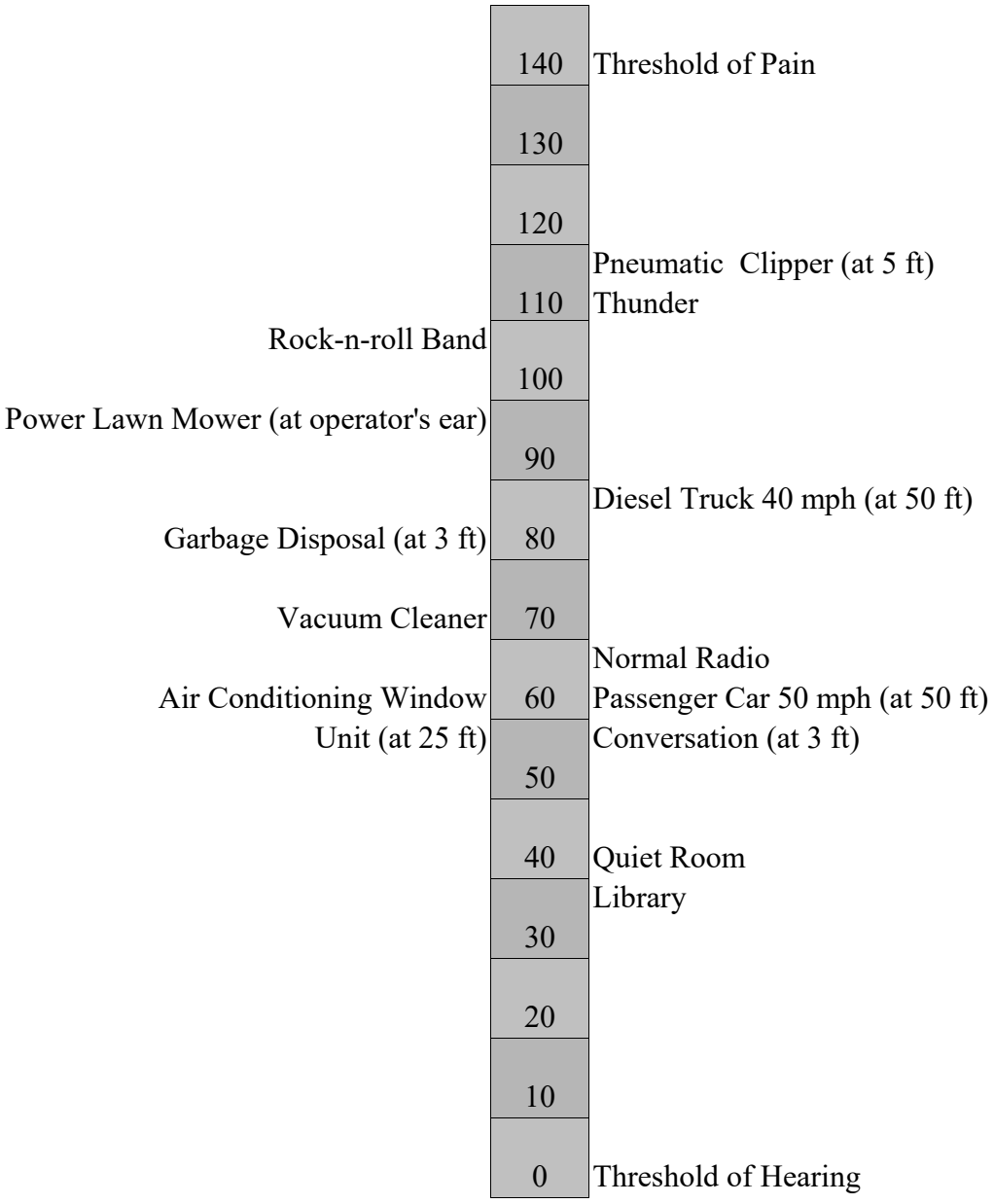
TABLE 3.6-1

Definition of Acoustical Terms

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Community Noise Equivalent Level (CNEL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and after addition of 10 decibels to sound levels in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level (L_{dn})	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level during the measurement period.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, and tonal or informational content as well as the prevailing ambient noise level.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1 percent, 10 percent, 50 percent, and 90 percent of the time during the measurement period.
L_{max}, L_{min}	The maximum and minimum noise levels during the measurement period.
Loudness	The amplitude of sound waves combined with the reception characteristics of the human ear.
Pitch	The height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced.
Sound Exposure Level (SEL)	Sound Exposure Level is a measure of cumulative noise exposure of a noise event expressed as the sum of the sound energy over the duration of a noise event, normalized to a one-second duration.
Sound Pressure	Sound pressure or acoustic pressure is the local pressure deviation from the ambient atmospheric pressure caused by a sound wave. Sound pressure can be measured using a microphone. The unit for sound pressure (p) is the Pascal [symbol: Pa or 1 Newton exerted over an area of 1 square meter (N/m^2).
Sound Pressure Level	The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals in air). Sound pressure level is the quantity that is directly measured by a sound level meter.
Vibration	Vibration means mechanical motion of the earth or ground, building, or other type of structure, induced by the operation of any mechanical device or equipment. The magnitude of vibration is stated as the acceleration in "g" units (1 g is equal to 32.2 $feet/second^2$ or 9.3 $meters/second^2$).

FIGURE 3.6-1

General Noise Sources and Associated Sound Pressure Levels



3.6.2 REGULATORY SETTING

The federal government sets noise standards for transportation-related noise sources that are closely linked to interstate commerce, such as aircraft, locomotives, and trucks; for those noise sources, the state government is preempted from establishing more stringent standards. The state government sets noise standards for those transportation noise sources that are not preempted from regulation, such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies.

3.6.2.1 Federal Agencies and Regulations

3.6.2.1.1 Code of Federal Regulations (CFR)

Federal regulations for railroad noise are contained in 40 CFR Part 201 and 49 CFR Part 210. The regulations set noise limits for locomotives and are implemented through regulatory controls on locomotive manufacturers. Federal regulations also establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR Part 205, Subpart B. The federal truck pass-by noise standard is 80 dB at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers. The Federal Highway Administration (FHWA) regulations for noise abatement must be considered for federal or federally-funded projects involving the construction of a new highway or significant modification of an existing freeway when the project would result in a substantial noise increase or when the predicted noise levels approach or exceed the "Noise Abatement Criteria."

Under the regulations, a "substantial increase" is defined as an increase in L_{eq} of 12 dB during the peak hour of traffic noise. The L_{eq} provides a time-weighted average of the noise measured. For sensitive uses, such as residences, schools, churches, parks, and playgrounds, the Noise Abatement Criteria for interior and exterior spaces is L_{eq} 57 and 66 dB, respectively, during the peak hour of traffic noise.

3.6.1.1.2 Federal Transit Administration (FTA)

The FTA has prepared guidance noise and vibration impacts assessments for proposed mass transit projects: Transit Noise and Vibration Impact Assessment (FTA Assessment) (U.S. FTA, 2006). The May 2006 version is the second edition of a guidance manual originally issued in 1995, which presented procedures for predicting and assessing noise and vibration impacts of proposed mass transit projects. The guidance is required to evaluate the noise and vibration impacts in environmental review process for project proponents seeking funding from FTA. All types of bus and rail projects are covered. The guidance contains procedures for assessing impacts at different stages of project development, from early planning before mode and alignment have been selected through preliminary engineering and final design. The focus is on noise and vibration impacts during operations, but construction impacts are also covered. The guidance describes a range of measures for controlling excessive noise and vibration.

3.6.2.1.3 Federal Aviation Administration (FAA)

Aircraft operated in the U.S. are subject to certain federal requirements regarding noise emissions levels. These requirements are set forth in Title 14 of the Code of Federal Regulations (14 CFR), Part 36. Part 36 establishes maximum acceptable noise levels for specific aircraft types, taking into account the model year, aircraft weight, and number of engines. Pursuant to the federal Airport Noise and Capacity Act of 1990, the FAA established a schedule for complete transition to Part 36 "Stage 3" standards by year 2000. This transition schedule applies to jet aircraft with a maximum takeoff weight in excess of 75,000 pounds and, thus, applies to passenger and cargo airlines but not to operators of business jets or other general aviation aircraft.

3.6.2.1.4 Federal Railroad Administration (FRA)

On March 24, 2009, the Federal Highway Administration (FHA) and the FTA issued final rule that modified FRA regulations to make certain changes mandated by the Safe, Accountable, Flexible, Efficient, Transportation, Equity Act: A Legacy for Users (SAFETEA-LU). The SAFETEA-LU prescribes requirements for environmental review and project decision making. This rule became effective April 23, 2009.

The FRA provides implementation procedures for predicting and assessing noise and vibration impacts of high-speed trains within their High-Speed Ground Transportation Noise and Vibration Impact Assessment. The document provides three levels of analysis, including a preliminary impact screening, a general assessment, and a detailed analysis, as well as a range of mitigation measures for dealing with adverse noise and vibration impacts. The report also includes noise criteria for potential impacts .

3.6.2.1.5 Department of Housing and Urban Development (HUD)

The noise regulation 24 CFR Part 51 Subpart B, Noise Abatement and Control presents the HUD noise program. Within the HUD Noise Assessment Guidelines, potential noise sources are examined for projects located within 15 miles of a military or civilian airport, 1,000 feet from a road or 3,000 feet from a railroad. HUD exterior noise regulations state that 65 dBA L_{dn} noise levels or less are acceptable for residential land uses and noise levels exceeding 75 dBA L_{dn} are unacceptable. HUD's regulations do not contain standards for interior noise levels. A goal of 45 decibels is set forth for interior noise and the attenuation requirements are based upon this level. HUD's standards assume that internal noise levels would be met if exterior standard are met under standard construction practices.

3.6.2.1.6 Federal Vibration Policies

The FRA and FTA have published guidance relative to vibration impacts. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. The decibel notation,

VdB, is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration.

According to the FRA, fragile buildings can be exposed to groundborne vibration levels of 0.5 inches per second PPV without experiencing structural damage. The FTA has identified the human annoyance response to vibration levels as 80 VdB (U.S. FTA, 2006).

3.6.2.2 State Agencies and Regulations

3.6.2.2.1 California's Airport Noise Standards

The State of California's Airport Noise Standards, found in Title 21 of the California Code of Regulations, identify a noise exposure level of 65 dB CNEL as the noise impact boundary around airports. Within the noise impact boundary, airport proprietors are required to ensure that all land uses are compatible with the aircraft noise environment or obtain a variance for Caltrans.

3.6.2.2.2 California Department of Transportation (Caltrans)

Caltrans establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the state pass-by standard is consistent with the federal limit of 80 dB. The state pass-by standard for light trucks and passenger cars (less than 4.5 tons gross vehicle rating) is also 80 dB at 15 meters from the centerline. For new roadway projects, Caltrans employs the Noise Abatement Criteria discussed above in connection with the FHWA.

3.6.2.2.3 California Noise Insulation Standards

The California Noise Insulation Standards found in the California Code of Regulations, Title 24, set requirements for new multi-family residential units, hotels, and motels that may be subject to relatively high levels of transportation-related noise. For exterior noise, the noise insulation standard is L_{dn} 45 dB in any habitable room and requires an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than L_{dn} 60 dB. L_{dn} is the average noise level over a 24 hour period. The noise between the hours of 10:00 p.m. and 7:00 a.m. is artificially increased by 10 dB. This takes into account the decrease in community background noise during nighttime hours.

3.6.2.2.4 State Vibration Policies

There are no adopted state policies or standards for ground-borne vibration. However, Caltrans recommends that extreme care be taken when sustained pile driving occurs within 7.5 meters (25 feet) of any building, and 15 to 30 meters (50 to 100 feet) of a historic building or a building in poor condition.

3.6.2.3 Local Agencies and Regulations

To identify, appraise, and remedy noise problems in the local community, each county and city within the SCAQMD has adopted a noise element as part of its General Plan. Each noise element

is required to analyze and quantify current and projected noise levels associated with local noise sources, including, but not limited to, highways and freeways, primary arterials and major local streets, rail operations, air traffic associated with the airports, local industrial plants, and other ground stationary sources that contribute to the community noise environment. Beyond statutory requirements, local jurisdictions are free to adopt their own goals and policies in their noise elements, although most jurisdictions have chosen to adopt noise/land use compatibility guidelines that are similar to those recommended by the state. The overlapping L_{dn} ranges indicate that local conditions (existing noise levels and community attitudes toward dominant noise sources) should be considered in evaluating land use compatibility at specific locations.

In addition to regulating noise through noise element policies, local jurisdictions regulate noise through enforcement of local ordinance standards. These standards generally relate to noisy activities (e.g., use of loudspeakers and construction) and stationary noise sources and facilities (e.g., air conditioning units and industrial activities). Two cities within the SCAQMD, Los Angeles and Long Beach, operate port facilities. Noise from the Ports of Los Angeles and Long Beach are regulated by the noise ordinances and noise elements of the Los Angeles and Long Beach General Plans.

In terms of airport noise, some of the actions that airport proprietors have been allowed to take to address local community noise concerns include runway use and flight routing changes, aircraft operational procedure changes, and engine run-up restrictions. These actions generally are subject to approval by the FAA, which has the authority and responsibility to control aircraft noise sources, implement and enforce flight operational procedures, and manage the air traffic control system.

3.6.3 ENVIRONMENTAL SETTING

3.6.3.1 Noise Descriptors

Environmental noise levels typically fluctuate across time of day; different types of noise descriptors are used to account for this variability, and different types of descriptors have been developed to differentiate between cumulative noise over a given period and single noise events. Cumulative noise descriptors include the L_{eq}, L_{dn}, and CNEL. The L_{eq} is the actual time-averaged, equivalent steady-state sound level, which, in a stated period, contains the same acoustic energy as the time-varying sound level during the same period. L_{dn} and CNEL values result from the averaging of L_{eq} values (based on dBAs) over a 24-hour period, with weighting factors applied to different periods of the day and night to account for their perceived relative annoyance. For L_{dn}, noise that occurs during the nighttime period (10:00 p.m. to 7:00 a.m.) is "penalized" by 10 dB. CNEL is similar to L_{dn}, except that it also includes a "penalty" of approximately five dB for noise that occurs during the evening period (7:00 p.m. to 10:00 p.m.). Cumulative noise descriptors, L_{dn} and CNEL, are well correlated with public annoyance due to transportation noise sources. Table 3.6-2 shows the compatibility between various land uses and CNEL.

Individual noise events, such as train pass-bys or aircraft overflights, are further described using single-event and cumulative noise descriptors. For single events, L_{max} is often cited, as is the SEL. The SEL is the energy-based sum of a noise event of given duration that has been "squeezed" into

a reference duration of one second and is typically a value that is five to 10 dB higher than the L_{max}.

3.6.3.2 Ambient Noise Levels

The approximately 11,000-square-miles in the SCAQMD include all or portions of 4 counties and 196 cities. It covers a diverse array of land uses that range from quiet, undeveloped rural areas to loud, dense, urban areas. Ambient noise levels for areas where sensitive receptors may be located can range from 46 dBA for a small town or quiet suburban area to greater than 87 dBA for an urban area next to a freeway. Given the size of the SCAQMD and the variation in sources, it is not feasible to complete a detailed noise monitoring study for this PEIR. Rather, this PEIR presents a discussion of noise levels associated with different noise sources, thereby allowing the reader to infer the noise level at different locations depending on the proximity of a location to a noise source. Ambient noise levels for a variety of land uses and locations as developed by SCAG are used to represent the range of ambient noise conditions by land use types (see Table 3.6-3).

TABLE 3.6-2

Noise Land Use Compatibility Matrix

Land Use Category	Community Noise Expsosure (dBA, CNEL)						
	55	60	65	70	75	80	
Residential - Low Density Single-Family, Duplex, Mobile Homes							
Residential - Multi-Family							
Transient Lodging - Motels, Hotels							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditoriums, Concert Halls, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

Normally Acceptable - Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable - New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply system or air condionally will normally suffice.

Normally Unacceptable - New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and deeded noise insulation features including in the design.

Clearly Unacceptable - New construction or development should generally not be undertaken.

Source: Office of Planning and Research, 2003.

TABLE 3.6-3

Representative Ambient Noise Sampling Data

LOCATION	LAND USE	PEAK HOUR NOISE LEVEL (dBA, Leq)
City of Los Angeles	Recreation (Elysian Reservoir)	42
City of Los Angeles	Residential Area	51
City of Los Angeles	Industrial Area (Port)	67
City of Redlands	Freeway	65
City of Santa Monica	Residential Area	50
City of West Covina	Commercial Area	60

Source: SCAG, 2016

3.6.3.2 Vibration Measuring and Reporting

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The FTA Assessment states that background vibration velocity levels in residential areas is usually 50 VdB or lower, well below the threshold of perception for humans which is around 65 VdB. The upper range for rapid transit vibration is around 80 VdB and the high range for commuter rail vibration is 85 VdB (U.S. FTA, 2006).

The FTA Assessment states that in contrast to airborne noise, ground-borne vibration is not a common environmental problem. Although the motion of the ground may be noticeable to people outside structures, without the effects associated with the shaking of a structure, the motion does not provoke the same adverse human reaction to people outside. Within structures, the effects of ground-borne vibration include noticeable movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. The maximum vibration amplitudes of the floors and walls of a building often will be at the resonance frequencies of various components of the building. However, the FTA Assessment states that noticeable vibration inside a building is typically caused by equipment or activities within the building itself, such as heating and ventilation systems, footsteps or doors closing.

The FTA Assessment states that it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. However, some common sources of vibration are trains, buses on rough roads, and construction activities, such as blasting, pile driving, and heavy earth-moving equipment.

Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. Several different methods are used to quantify vibration. High levels of vibration may cause physical personal injury or damage to buildings. However, ground-borne vibration levels rarely affect human health. Instead, most people consider ground-borne vibration to be an annoyance that may affect concentration or disturb sleep. In addition, high levels of ground-borne vibration may

damage fragile buildings or interfere with equipment that is highly sensitive to ground-borne vibration (e.g., electron microscopes).

3.6.3.3 Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others due to the amount of noise exposure (in terms of both exposure time and "insulation" from noise) and the types of activities typically involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, natural areas, parks and outdoor recreation areas are generally more sensitive to noise than are commercial and industrial land uses. Consequently, the noise standards for sensitive land uses are more stringent than those for less sensitive uses, such as commercial and industrial.

To protect various human activities and sensitive land uses (e.g., residences, schools, and hospitals) lower noise levels are needed. A noise level of 55 to 60 dB L_{dn} outdoors is the upper limit for intelligible speech communication inside a typical home. In addition, social surveys and case studies have shown that complaints and community annoyance in residential areas begin to occur at 55 dB L_{dn}. Sporadic complaints associated with the 55 to 60 dB L_{dn} range give way to widespread complaints and individual threats of legal action within the 60 to 70 dB L_{dn} range. Noise levels at 70 dB L_{dn} and above are unacceptable in residential communities (SCAG, 2016).

3.6.3.4 Noise Sources

Many principal noise generators within the SCAQMD are associated with transportation (e.g., airports, freeways, arterial roadways, seaports, and railroads). Additional noise generators include stationary sources, such as industrial manufacturing plants and construction sites. Local collector streets are not considered to be a significant source of noise since traffic volume and speed are generally much lower than for freeways and arterial roadways. Generally, transportation-related noise sources characterize the ambient noise environment of an area.

3.6.3.4.1 Airports

Southern California contains six established airports, including Los Angeles International (LAX), Bob Hope (formerly Burbank), John Wayne, Long Beach, Ontario, and Palm Springs. There are also four new and emerging airports in the Inland Empire and North Los Angeles County. These include San Bernardino International Airport (formerly Norton Air Force Base), March Inland Port (joint use with March Air Reserve Base), Southern California Logistics Airport (formerly George Air Force Base), and Palmdale Airport (joint use with Air Force Plant 42).

Airport noise is generated primarily by aircraft takeoffs and landings, which will vary depending on the aircraft's weight and the number, type, and location of the engines. Typically, most major public airports will have an airport land use plan that provides guidance on noise levels and land use in adjacent areas. The FAA measures airport-related noise in communities in terms of overall exposure rather than single events such as takeoffs and landings since overall exposure would account for the overall number of noise events and the time when these events occur. The day night average sound level (L_{dn}) is the standard federal (FAA and U.S. EPA) metric for this

measurement; however, the FAA also accepts the CNEL when a state requires that metric to assess noise effects. The State of California Department of Transportation Division of Aeronautics adopted the CNEL as their methodology for describing airport noise exposure. Noise levels computed by these two methods typically differ by less than 1 dBA. The resulting noise contour map identifies geographic areas that are exposed to various levels of impacts from airport noise. Areas that are within the noise contours of 65 dBA CNEL and above, associated with airport activities, are considered to be incompatible with certain land uses, including residences, schools, hospitals, and childcare facilities (SCAG, 2016).

3.6.3.4.2 Freeways and Arterial Roadways

The SCAG regional has over 12,000 miles of freeway, including 938 miles of High Occupancy Vehicle (HOV) lanes. In addition, the local street system provides for access to local businesses and residents and accounts for over 80 percent of the total road network, with over 16,000 miles of principal arterials and almost 20,000 miles of minor arterials (SCAG, 2016). Additionally, the SCAG region has a growing network of tolled lanes and High-Occupancy Toll (HOT) lanes. Regionally significant arterials provide access to the freeway system and often serve as parallel alternate routes; in some cases, they are the only major system of transportation available to travelers. Traffic noise is generated primarily from vehicles and dominated by trucks. In general, higher traffic volumes, higher speeds, and greater numbers of trucks will increase the noise level. Vehicle noise comes from noises generated by the engine, exhaust, and tires, and is often exacerbated by vehicles in a state of disrepair, such as defective mufflers or struts (SCAG, 2016).

The extent to which traffic noise levels affect sensitive land uses depends upon a number of factors. These include whether the roadway itself is elevated above grade or depressed below grade, whether there are intervening structures or terrain between the roadway and the sensitive uses, and the distance between the roadway and such uses. For example, measurements show that depressing a freeway by approximately 12 feet yields a reduction in traffic noise relative to an at-grade freeway of seven to 10 dB at all distances from the freeway. Traffic noise from an elevated freeway is typically two to 10 dB less than the noise from an equivalent at-grade facility within 300 feet of the freeway, but beyond 300 feet, the noise radiated by an elevated and at-grade freeway (assuming equal traffic volumes, fleet mix, and vehicle speed) is the same (SCAG, 2016).

Additionally, southern California has an enormous number of arterial roadways. Typical arterial roadways have one or two lanes of traffic in each direction, with some containing as many as four lanes in each direction. Noise from these sources can be a significant environmental concern where buffers (e.g., buildings, landscaping, etc.) are inadequate or where the distance from centerline to sensitive uses is relatively small. Given typical daily traffic volumes of 10,000 to 40,000 vehicle trips, noise levels along arterial roadways typically range from 65 to 70 dB L_{dn} at a distance of 50 feet from the roadway centerlines.

3.6.3.4.3 Railroad Operations

Railroad operations generate high, relatively brief, intermittent noise events. These noise events are an environmental concern for sensitive uses located along rail lines and in the vicinities of switching yards. Locomotive engines and the interaction of steel wheels and rails primarily generate rail noise. The latter source creates three types of noise: 1) rolling noise due to continuous rolling contact, 2) impact noise when a wheel encounters a rail joint, turnout or crossover, and 3) squeal generated by friction on tight curves. For very high speed rail vehicles, air turbulence can be a significant source of noise as well. In addition, use of air horns and crossing bell gates contribute to noise levels in the vicinity of grade crossings (U.S. FTA, 2006).

3.6.3.4.4 Freight Trains

Noise levels generated by freight train pass-by events reflect locomotive engine noise and rail car wheel rail interaction. The former depends upon track grade conditions (e.g., uphill versus downhill) and is largely independent of speed, whereas the latter is highly speed dependent, increasing approximately six dB for each doubling of train velocity (SCAG, 2016). In addition to noise, freight trains also generate substantial amounts of ground-borne noise and vibration in the vicinity of the tracks. Ground-borne noise and vibration is a function of both the quality of the track and the operating speed of the vehicles.

Southern California has an extensive network of railroad lines belonging primarily to two major railroads: Union Pacific Railroad (Union Pacific) and Burlington Northern Santa Fe Railway (BNSF). SCAG's Inland Empire Railroad Main Line Study suggest that the number of freight trains on most BNSF and UP lines will more than double between 2000 and 2025 in response to a tripling of container volume at the San Pedro Bay Ports. A rail line supporting 40 freight trains per day generates approximately 75 dB L_{dn} at 200 feet from the tracks. BNSF rail lines extend south from switching yards in eastern Los Angeles to the Los Angeles and Long Beach ports complex and east to Arizona and points beyond via San Bernardino County. BNSF generates approximately 75 dB L_{dn} at a distance of 200 feet from the tracks (SCAG, 2016).

3.6.3.4.5 Commuter and Inter-City Passenger Trains

In general, the noise generated by commuter rail facilities (powered by either diesel or electric locomotives) is from the locomotives themselves. In the SCAQMD, there are two commuter and inter-city passenger train operators: AMTRAK and the Southern California Regional Rail Authority/Metrolink. AMTRAK operates trains with destinations in Seattle, Chicago, Orlando, San Diego, and San Luis Obispo. A typical AMTRAK pass-by event generates 107 dB SEL at 50 feet; two such events during the daytime or evening periods generate approximately 61 dB L_{dn} at 50 feet and approximately 52 dB L_{dn} at 200 feet. Nine such events generate approximately 67 dB L_{dn} at 50 feet and 58 dB L_{dn} at 200 feet (SCAG, 2016).

The Southern California Regional Rail Authority operates the Metrolink commuter rail system. This system currently includes 57 rail stations and seven rail lines, with destinations in Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties. Noise levels generated by Metrolink are similar to those associated with AMTRAK (SCAG, 2016).

3.6.3.4.6 Steel Wheel Urban Rail Transit

Heavy rail is generally defined as electrified rapid transit trains with dedicated guideway, and light rail as electrified transit trains that do not require dedicated guideway. In general, noise increases with speed and train length. Sensitivity to rail noise generally arises when there is less than 50 feet between the rail and sensitive receptors. A significant percentage of complaints about noise can be attributed to the proximity of switches, rough or corrugated track, or wheel flats (SCAG, 2016).

Within the SCAQMD, the Los Angeles County Metropolitan Transit Authority (Metro) provides urban rail transit service on two subway lines (Purple and Red) and four light-rail lines (Blue, Expo, Gold, and Green). The Purple Line extends from downtown Los Angeles west to the Koreatown neighborhood with eight existing stations. The Red Line extends from Downtown Los Angeles west to the Koreatown neighborhood and then north to North Hollywood with 14 stations. The Blue Line extends from Long Beach to Downtown Los Angeles with 22 stations. The Expo Line extends from Downtown Los Angeles to Culver City with 21 existing stations. The Gold Line connects Union Station with Pasadena. The Green Line extends from Norwalk west to El Segundo and south to Redondo Beach with 14 existing stations.

Other Metro operated urban transit systems include the two bus rapid transit ways (Orange and Silver). The Orange Line extends from North Hollywood, through Woodland Hills to Chatsworth with 18 existing stations. The Silver Line extends from El Monte to Downtown Los Angeles then south to Gardena with 10 existing stations.

3.6.3.4.7 Port Operations

The Ports of Long Beach and Los Angeles are major regional economic development centers and provide a major link between the United States and the Pacific Rim countries. These ports currently handle approximately 40 percent of the volume imported into the country. Noise at the ports is generated from three sources: ships using the port facilities, equipment associated with cargo activity within the port, and truck and rail traffic moving cargo to and from the ports. All sources affect the ambient noise levels in the port areas. Residential areas in San Pedro (City of Los Angeles) and West Long Beach are affected most by truck and rail traffic related to the Ports (SCAG, 2016).

The Alameda Corridor provides a substantial long-term reduction in noise and vibration associated with rail operations in the vicinities of the Ports of Long Beach and Los Angeles. The Alameda Corridor consolidates the operations of Union Pacific and BNSF on 90 miles of existing branch line tracks into one 20-mile corridor along Alameda Street. This corridor provides a direct connection between the Ports of Long Beach and Los Angeles and the Union Pacific and BSNF switching yards in eastern Los Angeles. The Alameda Corridor includes four overpasses and three underpasses at intersections south of State Route 91 (SR-91) that allow vehicles to pass above the trains. North of SR-91, trains pass through a 10-mile, 33-foot-deep trench. The construction of tracks in a below-grade trench, track construction on new base materials, and the use of continuous-welded track reduce noise impacts on adjacent uses from freight trains associated with

the ports. Also, the Alameda Corridor includes sound walls in certain locations to mitigate vehicle noise along Alameda Street in residential neighborhoods and other sensitive areas.

3.6.3.4.8 Industrial, Manufacturing, and Construction

Noise from industrial complexes, manufacturing plants, and construction sites are characterized as stationary, or point, sources of noise even though they may include mobile sources, such as forklifts and graders. Local governments typically regulate noise from industrial, manufacturing, and construction equipment and activities through enforcement of noise ordinance standards, implementation of general plan policies, and imposition of conditions of approval for building or grading permits (SCAG, 2016).

Industrial complexes and manufacturing plants are generally located away from sensitive land uses, and, as such, noise generated from these sources generally has less effect on the local community. In contrast to industrial and manufacturing plants, construction sites are located throughout the region and are often located within, or adjacent to, residential districts. In general, construction activities generate high noise levels intermittently on and adjacent to the construction sites, and the related noise impacts are short-term in nature. The dominant source of noise from most construction equipment is the engine, usually a diesel engine, with inadequate muffling. However, in a few cases, such as impact pile driving or pavement breaking, noise generated that activity dominates. Construction equipment can be considered to operate in two modes, stationary and mobile. Stationary equipment operates in one location for one or more days at a time, with either a fixed-power operation (pumps, generators, compressors) or a variable noise operation (pile drivers, pavement breakers). Mobile equipment moves around the construction site with power applied in cyclic fashion (bulldozers, loaders), or movement to and from the site (trucks) (SCAG, 2016).

Construction-related noise levels generally fluctuate depending on the construction phase, equipment type and duration of use, distance between noise source and receptor, and presence or absence of barriers between noise source and receptor. The FTA has established typical noise levels associated with various types of construction-related equipment (see Table 3.6-4). The Standard convention is that noise levels decrease by approximately six dB with each doubling of distance from the construction site (e.g., noise levels from excavation might be approximately 83 dB at 100 feet from the site, and so the noise level at 200 feet from the site would be about 77 dB). Interior noise levels from construction are approximately ten dB (open windows) to 20 dB (closed windows) less than exterior noise levels due to the attenuation provided by building facades (SCAG, 2016).

3.6.3.5 Existing Vibration Sources

Similar to the environmental setting for noise, the vibration environment is typically dominated by traffic from nearby roadways and activity on construction sites. Heavy trucks can generate groundborne vibrations that vary depending on vehicle type, weight, and road/pavement conditions. Heavy trucks typically operate on major streets. Nonetheless, vibration levels adjacent to roadways are typically not perceptible.

TABLE 3.6-4

Construction Equipment Noise Levels

Equipment	Typical Noise Level 50 ft from Source (dBA)
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88

Source: U.S. FTA, 2006.

3.7 SOLID AND HAZARDOUS WASTE

The purpose of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. Some of the proposed control measures intended to improve overall air quality may have direct or indirect impacts on solid and hazardous waste associated with their implementation, and in particular, the discarding of old equipment and vehicles. This subsection describes the existing setting related to solid and hazardous waste within California and the South Coast Air Basin.

3.7.1 REGULATORY BACKGROUND

The Regulatory Background is divided into two sections: Solid Waste and Hazardous Waste.

3.7.1.1 Solid Waste

3.7.1.1.1 Federal

The U.S. EPA is the primary federal agency charged with protecting human health from pollution and with safeguarding the natural environment: air, water, and land. The U.S. EPA works to develop and enforce regulations that implement environmental laws enacted by Congress. The U.S. EPA is also responsible for researching and setting national standards for a variety of environmental programs, and delegates to states and tribes the responsibility for issuing permits and for monitoring and enforcing compliance. Since 1970, Congress has enacted numerous environmental laws including the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Toxic Substances Control Act (TSCA). 40 CFR, Part 258 Subtitle D of the RCRA establishes minimum location standards for siting municipal solid waste landfills. Because California laws and regulations governing the approval of solid waste landfills meet the requirements of Subtitle D, the U.S. EPA delegated the enforcement responsibility to the State of California.

3.7.1.1.2 State

California Integrated Waste Management Act (AB 939): With regard to solid non-hazardous wastes, the California Integrated Waste Management Act of 1989 (AB 939), as amended, requires every city and county in the state to prepare a Source Reduction and Recycling Element (SRRE) with its Solid Waste Management Plan that identifies how each jurisdiction will meet the mandatory state waste diversion goals of 25 percent by the year 1995, and 50 percent by the year 2000. Senate Bill 2202 (SB 2202) mandates that jurisdictions continue 50 percent diversion on and after January 1, 2000. The purpose of AB 939 is to facilitate the reduction, recycling, and re-use of solid waste to the greatest extent possible. AB 939 has recognized that landfills and transformation facilities are necessary components of any integrated solid waste management system and an essential component of the waste management hierarchy. AB 939 establishes a

hierarchy of waste management practices in the following order and priority: (1) source reduction; (2) recycling and composting; and (3) environmentally safe transformation/land disposal.

CalRecycle (formerly known as the California Integrated Waste Management Board) has numerous responsibilities in implementing the federal and state regulations summarized above. CalRecycle is the state agency responsible for permitting, enforcing and monitoring solid waste landfills, transfer stations, material recovery facilities (MRFs), and composting facilities within California. Permitted facilities are issued Solid Waste Facility Permits (SWFPs) by CalRecycle. CalRecycle also certifies and appoints Local Enforcement Agencies (LEAs), county or city agencies which monitor and enforce compliance with the provisions of SWFPs. CalRecycle is also responsible for monitoring implementation of AB 939 by the cities and counties. In addition to these responsibilities, CalRecycle also manages the Recycled-Content Materials Marketing Program to encourage the use of specific recycled-content products in road applications, public works projects and landscaping. These products include recycled aggregate, tire-derived aggregate, rubberized asphalt concrete, and organic materials.

AB 939 requires that each county in the State of California prepare a Countywide Integrated Waste Management Plan (CIWMP). The CIWMP is a countywide planning document that describes the programs to be implemented in unincorporated and incorporated areas of the county that will effectively manage solid waste, and promote and implement the hierarchy of CalRecycle. CIWMPs consist of an Integrated Waste Management Summary Plan (Summary Plan), an SRRE, a Household Hazardous Waste Element, a Non-Disposal Facility Element, and a Countywide Siting Element.

California Solid Waste Reuse and Recycling Act (CSWRRA, AB 2176): In 1991, the California Solid Waste Reuse and Recycling Act (CSWRRA) was enacted to assist local jurisdictions in accomplishing the goals set forth in AB 939. AB 2176 requires that any development projects that have submitted an application for a building permit must also include adequate and accessible areas for the collection and loading of recyclable materials.

Solid Waste Diversion Rule (AB 341): In 2011, AB 341 directed CalRecycle to develop and adopt regulations to mandate commercial recycling. In 2012, the final regulation was approved and a policy goal declared that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020.

Prohibition on Local Disposal Limits (AB 845): AB 845 was signed by Governor Brown on September 25, 2012 and prohibits an ordinance enacted by a city or county from otherwise restricting or limiting the importation of solid waste into a privately owned solid waste facility in that city or county based on place of origin.

Engineered Municipal Solid Waste (AB 1126): AB 1126 was signed on September 28, 2013 and defines the terms "engineered municipal solid waste (EMSW) conversion" and "EMSW facility." AB 1126 stipulates that solid waste processed through an EMSW conversion facility would be considered disposal and the energy generated by such a facility would not be considered renewable.

Reducing GHG Emissions in California (AB 32): As part of the California Global Warming Solutions Act of 2006, CARB was directed to adopt a scoping plan by 2009 which lays out initial measures needed to meet the 2020 target of reducing GHG emissions back to 1990 levels. The First Update to the Climate Change Scoping Plan was approved in 2014 stated that CARB and CalRecycle will work to eliminate landfill disposal of organic materials, a major source of GHG (methane).

Organic State Laws (AB 1594 and 1826): On September 28, 2014, Governor Brown signed two bills into law that are intended to substantially reduce the amount of organic waste that is disposed in California landfills. AB 194 states that for the purposes of complying with the waste diversion mandates of AB 939, beginning January 1, 2020, the use of green waste will be considered disposal and not recycling. A jurisdiction must include information on how it intends to address compliance with the waste diversion mandates of AB 939, beginning August 1, 2018. Jurisdictions which are not able to comply with AB 939 will be required to identify and address barriers to recycling green material, if sufficient capacity at organic waste recycling facilities is not available. AB 1826 requires jurisdictions to implement an organic waste recycling program for businesses that would include outreach, education, and monitoring of affected businesses by January 1, 2016.

Conversion Technology (SB 498): Governor Brown signed into law SB 498 on September 28, 2014, which requires 50 percent diversion of solid waste, of which 10 percent can come from transformation or biomass conversion. State law formerly limited biomass conversion to only the controlled combustion of organic materials, such as wood, lawn and garden clippings, agricultural waste, leaves, tree pruning, and non-recyclable producing electricity or heat. SB 498 expanded the definition of biomass conversion to include non-combustion thermal conversion technologies. In doing so, SB 498 allows for cleaner and more efficient non-combustion conversion technologies to be used to convert biomass into fuels and products in addition to heat and/or electricity.

3.7.1.1.3 Local

A Summary Plan is a solid waste planning document required by Public Resources Code § 41751, in which counties or regional agencies provide an overview of significant waste management problems faced by the jurisdiction, along with specific steps to be taken, independently and in concert with cities within their boundaries, to achieve the 50 percent waste diversion mandate (LADPW, 2015).

Each county is required to prepare and administer a CIWMP. The plan is comprised of the county's and cities' solid waste reduction planning documents, a Summary Plan, and a Countywide Siting Element. The CIWMP consists of the following components: waste characterization, source reduction, recycling, composting, solid waste facility capacity, education and public information, funding, special waste, and integration. The CIWMP also provides an estimate of the total permitted disposal capacity needed for a 15-year period if counties determine that their existing disposal capacity will be exhausted within 15 years or if additional capacity is desired.

Each city and county is required to prepare, adopt, and submit to CalRecycle a Household Hazardous Waste Element which identifies a program for the safe collection, recycling, treatment, and disposal of hazardous wastes that are generated by households. The Household Hazardous

Waste Element specifies how household hazardous wastes generated within the jurisdiction must be collected, treated, and disposed. An adequate Household Hazardous Waste Element contains the following components: Evaluation of alternatives, program selection, funding, implementation schedule and education and public information.

Each city and county is required to prepare, adopt, and submit to CalRecycle a Non-Disposal Facility Element which includes a description of new facilities and expansion of existing facilities and all solid waste facility expansions (except disposal and transformation facilities) that recover for reuse at least five percent of the total volume.

Each county in the SCAG region has created a CIWMP in accordance with AB 939. Below is a brief description of the recent updates to these plans by county.

Los Angeles County

The latest update to the Los Angeles County CIWMP was in 2014. AB 939 requires each county to prepare a Countywide Siting Element that describes how the county and the cities within the county plan to manage the disposal of their solid waste for a 15-year planning period. The Los Angeles County revised its Countywide Siting Element to:

- Remove two potential landfill sites: Elsmere and Blind Canyon Landfills;
- Include the proposed expansion of two in-county Class III landfills (Chiquita Canyon and School Canyon Landfills) in order to increase landfill capacity within the county;
- Update the goals and policies to be more aligned with a new solid waste management paradigm, to enhance the comprehensiveness of the county's solid waste management system, and to incorporate current and upcoming solid waste management processes and technologies;
- Promote development of alternatives to landfilling, such as conversion technologies, on a countywide basis; and
- Promote development and use of infrastructure to transport solid waste to out-of-county landfills, such as Mesquite Regional Landfill.

Los Angeles County's 2014 Annual Report details the revision process, assesses remaining permitted capacity for the mandated 15-year planning horizon, outlines seven disposal capacity scenarios, capacity to meet future demand through the use of alternative technologies, and out-of-county disposal facilities. The 2014 Annual Report outlines county solid waste management challenges, including a projected shortfall of permitted disposal capacity in the county in the 15-year planning period. In order to maintain adequate disposal capacity, the county and cities within the county need to: (1) maximize waste reduction and recycling; (2) expand existing landfills; (3) study, promote, and develop alternative technologies; (4) expand transfer and processing infrastructure; and (5) use out-of-county disposal, including waste-by-rail (LACDPW, 2015).

Orange County

Orange County completed the first review of its CIWMP in April 2003. It found sufficient disposal capacity for the 15-year planning horizon, but identified other challenges, including the lack of an operational materials recovery facility in the southern portion of the county, changes in records management to comply with the Disposal Recovery System, and determination of accurate base year data. The 2007 Strategic Plan Update for this planning project summarizes progress to maximize capacity at existing landfills, assess alternative technologies and potential out-of-county disposal sites, and expand the Frank R. Bowerman and Olinda Alpha Landfills.

The Orange County Waste and Recycling Department prepared a 2015 Annual Report to evaluate the status of its waste management system. The report indicates that the three existing landfills, Olinda Alpha, Frank R. Bowerman, and Prima Deshecha, are expected to provide sufficient capacity to serve Orange County for at least 50 additional years (OC Waste & Recycling, 2015).

Riverside County

Riverside County's CIWMP was approved in 1996. Its 2010 Annual Report found the original plan remained applicable, so no comprehensive update was planned. The Non-Disposal Facility Element was updated in 2009 and includes plans for four possible solid waste material recovery and transfer facilities; two of which would include household hazardous waste disposal facilities. The Non-Disposal Facility Element also includes an additional proposed solid waste material recovery facility with capacity for household hazardous waste disposal and one composting facility. The 2013 Five-Year Review Report for the CIWMP concluded that the overall framework of the CIWMP is still applicable and the goals, objectives, policies, waste management infrastructure, funding sources, and responsible administrative organization units noted throughout the CIWMP are still accurately described and that a revision of the CIWMP is not warranted (Riverside County Waste Management Department, 2013).

San Bernardino County

San Bernardino County CIWMP Five-Year Review Report was completed in 2007. The report reflects updates to the county's goals and policies, changes to its disposal facilities, and assesses disposal capacity for the mandated 15-year planning horizon. Updated policies include programs to help jurisdictions reach diversion goals, such as additional recycling and composting programs and the development of regional material recovery facilities. The 2007 Five-Year Review Report found that based on the remaining permitted refuse capacity and projected refuse generation for disposal, the landfills within the county have approximately 26 years of capacity. San Bernardino County's 2012 CIWMP Annual Report determined that no revisions were necessary to the County's CIWMP.

Regional Water Quality Control Boards (RWQCB)

New or expanded landfills must submit Reports of Waste Discharge to RWQCBs prior to landfill operations. In conjunction with the CIWMB approval of SWFPs, RWQCBs issue Waste Discharge Orders which regulate the liner, leachate control and removal, and groundwater monitoring systems at Class III landfills.

South Coast Air Quality Management District (SCAQMD)

SCAQMD regulates emissions from landfills. Landfill owners/operators must obtain permits to construct and operate landfill flares, cogeneration facilities or other facilities used to handle landfill gas. Owner/operators also are subject to the provisions of SCAQMD Rule 1150.1 - Control of Gaseous Emissions from Municipal Solid Waste Landfills. This rule requires the submittal of a compliance plan for implementation of a landfill gas control system, periodic ambient monitoring of surface emissions, and the installation of probes to detect the lateral migration of landfill gas.

3.7.1.2 Hazardous Waste

3.7.1.2.1 Federal

Hazardous material, as defined in 40 CFR Part 261.20 and 22 CCR Article 9, is required to be disposed of in Class I landfills. California has enacted strict legislation for regulating Class I landfills. The California Health and Safety Code (H&S) requires Class I landfills to be equipped with liners, a leachate collection and removal system, and a groundwater monitoring system.

The Hazardous Materials Transportation Act (HMTA) is the federal legislation regulating the trucks that transport hazardous wastes. The primary regulatory authorities are the U.S. Department of Transportation (U.S. DOT), the Federal Highway Administration (FHWA), and the Federal Railroad Administration (FRA). The HMTA requires that carriers report accidental releases of hazardous materials to U.S. DOT at the earliest practicable moment (49 CFR Subchapter C, Part 171).

The Resource Conservation and Recovery Act (RCRA) gives the U.S. EPA the authority to control hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste by "large-quantity generators" (1,000 kilograms/month or more). Under RCRA regulations, hazardous wastes must be tracked from the time of generation to the point of disposal. At a minimum, each generator of hazardous waste must register and obtain a hazardous waste activity identification number. If hazardous wastes are stored for more than 90 days or treated or disposed at a facility, any treatment, storage, or disposal unit must be permitted under RCRA. Additionally, all hazardous waste transporters are required to be permitted and must have an identification number. RCRA allows individual states to develop their own program for the regulation of hazardous waste as long as it is at least as stringent as RCRA. In California, the U.S. EPA has delegated RCRA enforcement to CalEPA.

3.7.1.2.2 State

Authority for the statewide administration and enforcement of RCRA rests with CalEPA's Department of Toxic Substances Control (DTSC). While the DTSC has primary state responsibility in regulating the generation, transfer, storage and disposal of hazardous materials, DTSC may further delegate enforcement authority to local jurisdictions. In addition, DTSC is responsible and/or provides oversight for contamination cleanup, and administers statewide hazardous waste reduction programs. DTSC operates programs to accomplish the following: (1) deal with the aftermath of improper hazardous waste management by overseeing site cleanups; (2) prevent releases of hazardous waste by ensuring that those who generate, handle, transport, store, and dispose of wastes do so properly; and (3) evaluate soil, water, and air samples taken at sites. DTSC conducts annual inspections of hazardous waste facilities. Other inspections can occur on an as-needed basis.

The California Department of Transportation (Caltrans) sets standards for trucks transporting hazardous wastes in California. The regulations are enforced by the California Highway Patrol (CHP). Trucks transporting hazardous wastes are required to maintain a hazardous waste manifest. The manifest is required to describe the contents of the material within the truck so that wastes can readily be identified in the event of a spill.

The storage of hazardous materials in underground storage tanks (UST) is regulated by CalEPA's State Water Resources Control Board (SWRCB), which has delegated authority to the RWQCBs and, typically at the local level, to the local fire department.

The Hazardous Waste Control Act (HWCA) created the state's Hazardous Waste Management Program, which is similar to, but more stringent than, the federal RCRA program. The act is implemented by regulations contained in Title 26 of the CCR, which describes the following required aspects for the proper management of hazardous waste: identification and classification; generation and transportation; design and permitting of recycling, treatment, storage, and disposal facilities; treatment standards; operation of facilities and staff training; and closure of facilities and liability requirements. These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the HWCA and Title 26, the generator of hazardous waste must complete a manifest that accompanies the waste from generator, to transporter, to the ultimate disposal location. Copies of the manifest must be filed with DTSC.

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) required the administrative consolidation of six hazardous materials and waste programs (Program Elements) under one agency, a Certified Unified Program Agency (CUPA). The Program Elements consolidated under the Unified Program are: Hazardous Waste Generator and On-site Hazardous Waste Treatment Programs (Tiered Permitting); the Aboveground Petroleum Storage Tank Spill Prevention Control and Countermeasure Plan (SPCC); the Hazardous Materials Release Response Plans and Inventory Program (Hazardous Materials ARP); the UST Program; and Uniform Fire Code Plans and Inventory Requirements. The Unified Program is intended to provide relief to businesses complying with the overlapping, and sometimes conflicting, requirements of formerly independently managed programs. The Unified Program is

implemented at the local government level by CUPAs. Most CUPAs have been established as a function of a local environmental health or fire department. Some CUPAs have contractual agreements with another local agency, a participating agency, which implements one or more Program Elements in coordination with the CUPA.

The Hazardous Waste Source Reduction and Management Review Act of 1989 requires generators of 12,000 kilograms/year of typical/operational hazardous waste to conduct an evaluation of their waste streams every four years and to select and implement viable source reduction alternatives. This act does not apply to non-typical hazardous waste (such as asbestos and polychlorinated biphenyls).

3.7.1.2.3 Local

Fire departments and other agencies in the SCAQMD have a variety of local laws that regulate reporting, storage and handling of hazardous materials and wastes.

3.7.2 SOLID WASTE MANAGEMENT

Permit requirements, capacity, and surrounding land use are three of the dominant factors limiting the operations and life of landfills. Landfills are permitted by the local enforcement agencies with concurrence from CalRecycle. Local agencies establish the maximum amount of solid waste which can be received by a landfill each day and the operational life of a landfill. Landfills are operated by both public and private entities. Landfills in the SCAQMD are also subject to requirements of the SCAQMD as they pertain to gas collection systems, dust, and nuisance impacts.

Landfills throughout the region typically operate between five and seven days per week. Landfill operators weigh arriving and departing deliveries to determine the quantity of solid waste delivered. At landfills that do not have scales, the landfill operator estimates the quantity of solid waste delivered (e.g., using aerial photography). Landfill disposal fees are determined by local agencies based on the quantity and type of waste delivered.

Over the past 20 years, disposal tonnage has decreased significantly in the SCAG region as the emphasis on recycling to meet the requirements of AB 939 has served to divert tonnage from landfills and conserve landfill capacity. Table 3.7-1 shows data from CalRecycle regarding the number of tons disposed in 2014 (the most recent year for which information is available) for each county within the jurisdiction of the SCAQMD (CalRecycle, 2015).

The state had an estimated 4.4 pounds per person per day capita disposal rate in 2013, which results in a 2013 disposal rate of about 65 percent. With approximately 1.7 billion tons of landfill capacity remaining statewide as of January 2014, models project that under a high disposal/conservative approach method, landfills will last about 25 years. Using a low disposal rate, California landfills should last until 2080 or longer (LA County, 2015).

TABLE 3.7-1

Solid Waste Disposed in 2014 by County

County	Total Tonnage[1]
Los Angeles	4,641,671
Orange	4,436,932
Riverside	3,531,326
San Bernardino	1,628,675
Total	**14,238,604**

Source: 2014 Landfill Summary Tonnage Report, CalRecycle, 2015

1. Data presented is for county totals and is not limited to the portion of the county within SCAQMD jurisdiction

In viewing facilities on a county-by-county basis, it is important to note that landfills in one county may import waste generated elsewhere. Currently, Orange County offers capacity to out-of-county waste at a "tipping fee" low enough to attract waste from Los Angeles and San Bernardino Counties. In Riverside County, the El Sobrante Landfill is licensed to accept up to 10,000 tons of waste per day (tpd) from Riverside, Los Angeles, Orange, San Diego, and San Bernardino Counties (SCAG, 2016).

Since the enactment of AB 939 in 1989, local governments have implemented recycling programs on a widespread basis, making efforts to meet the 25 percent and 50 percent diversion mandates of AB 939. Statewide, the CWIMB reports that diversion increased from ten percent in 1989 to 42 percent in 2000 and to 48 percent in 2002. Recent legislation, AB 341, requires that 75 percent of the waste stream be recycled by 2020 and planning is under way to achieve that goal (SCAG, 2016).

A total of 32 Class III active landfills and two transformation facilities are located within the SCAQMD with a total capacity of 112,592 tpd and 3,240 tpd, respectively (see Tables 3.7-2 and 3.7-3). The status of landfills within each county in the SCAQMD is described in Tables 3.7-4 through 3.7-7.

TABLE 3.7-2

Number of Class III Landfills Located and Related Landfill Capacity

County[(1)]	Number of Landfills	Permitted Capacity (tpd)
Los Angeles	12	43,649
Orange	3	23,500
Riverside[(1)]	7	26,314
San Bernardino[(1)]	10	19,129
Total	**32**	**112,592**

Source: CalRecycle, 2015a *State of Disposal in California* and Solid Waste Information System (SWIS)

1. Data presented is for the entire county and not limited to the portion of the county within the SCAQMD jurisdiction.

TABLE 3.7-3

Waste Transformation Facilities within the SCAQMD and Related Capacity

Facility	County	Permitted Capacity (tpd)
Commerce Refuse-to-Energy Facility	Los Angeles	1,000
Southeast Resource Recovery Facility	Los Angeles	2,240
Total	**-**	**3,240**

Source: Los Angeles County 2015, *CIWMP 2013 Annual Report*

3.7.2.1 Los Angeles County

The Los Angeles Countywide Siting Element addresses landfill disposal. The purpose of the Countywide Siting Element is to provide a planning mechanism to address the solid waste disposal capacity needed by the 88 cities in Los Angeles County and the unincorporated communities for each year of the 15-year planning period through a combination of existing facilities, expansion of existing facilities, planned facilities, and other strategies.

In 2014, residents and businesses in the county disposed of 9.2 million tons of solid waste at Class III landfills and transformation facilities located in and out of the county (see Tables 3.7-4 and 3.7-5). The amount of inert waste disposed at permitted inert waste landfills totaled 315,884 tons (LACDPW, 2015a).

TABLE 3.7-4

Annual Disposal Tonnage for 2014 (County of Los Angeles)

Facility Type	Weight	Units
In-County Class III Landfills	4,610,340	tons per year
Transformation Facilities	562,685	tons per year
Exports to Out-of-County Landfills	3,699,963	tons per year
Subtotal MSW Disposed	**8,872,988**	tons per year
Permitted Inert Waste Landfills	315,884	tons per year
Grand Total Disposed	**9,188,872**	tons per year

Source: LA County, 2015a

TABLE 3.7-5

Average Daily Disposal Rate for 2014 (Based on Six Operating Days) (County of Los Angeles)

Facility Type	Weight	Units
In-County Class III Landfills	14,777	tons per day
Transformation Facilities	1,803	tons per day
Exports to Out-of-County Landfills	11,859	tons per day
Subtotal MSW Disposed	**28,439**	tons per day
Permitted Inert Waste Landfills	1,012	tons per day
Grand Total Disposed	**29,451**	tons per day

Source: LA County, 2015a

3.7.2.1.1 Waste Generation

Based on a total disposal of 8.76 million tons (excluding inert waste and imports of 116 tons) and the 60 percent diversion rate, the county generated approximately 21.89 million tons or an average of 70,170 tpd (LA County, 2015a). In addition to waste generated within the county, Class III landfills and transformation facilities in the County also received 115,752 tons, or 371 tpd, of waste from jurisdictions outside the county in 2014.

Table 3-7.6 summarizes the lifespan and daily disposal of individual Los Angeles County landfills.

TABLE 3.7-6

Los Angeles County Landfill Status[(1)]

Solid Waste Facilities	2014 Average Tons/Day	Permitted Tons/Day	Remaining Permitted Capacity (million tons)	Estimated Remaining Life (years)
Landfills:				
Antelope Valley	1433	1,800	14.94	27
Burbank	100	240	2.92	39
Calabasas	748	3,500	6.53	14
Chiquita Canyon	3,558	6,000	1.83	2
Lancaster	311	3,000	12.01	27
Pebbly Beach (Avalon)	11	49	0.05	15
Puente Hills	-	-	-	CLOSED
San Clemente Island	1	10	0.04	18
Scholl Canyon	745	3,400	3.82	16
Sunshine Canyon	7,582	12,100	64.69	23
Whittier (Savage Canyon)	286	350	5.26	41
Total	**14,775**	**30,449**	**112.09[(2)]**	**N/A**
Transformation Facilities:				
Commerce Refuse-to-Energy Facility	333	1,000	400	N/A
Southeast Resource Recovery Facility	1,470	2,240	1,370	N/A
Total	**1,711**	**3,240**	**1,770**	**N/A**
Permitted Inert Landfills				
Azusa	1,012	6,500	59.83	31

Source: LA County, 2015a.

Over the last decade, Los Angeles County has encouraged waste diversion and recycling activities at landfills located in the unincorporated county areas through the land use permit process. The permit process includes a Waste Plan Conformance Agreement, which requires a landfill operator to implement waste diversion and recycling programs as well as other activities, both on- and off-

site to assist individual jurisdictions within the county in achieving the diversion mandate of AB 939. In addition, the agreement contains provisions to encourage and assist residents in properly disposing their waste. These active Class III landfills that have a Waste Plan Conformance Agreement with the county include Chiquita Canyon, Lancaster, and Sunshine Canyon City/County Landfills. Together, these landfills handle over 75 percent of in-county Class III waste.

Because of community resistance to the extension of operating permits for existing facilities and to the opening of new landfills in the county, and the dwindling capacity of those landfills with operating permit time left, the exact date on which landfill capacity within the county will be exceeded is uncertain. Landfill remaining life based on Solid Waste Facility Permits in the county ranges from three years at one facility, to as many as 42 years at another (L.A. County, 2015a).

Several landfills have recently been expanded or are proposing permit changes. The Solid Waste Facility Permit (SWFP) for the Azusa Reclamation Company Landfill received approval in November 2014 to accept 8,000 tpd of waste. The total proposed permitted boundary is approximately 302 acres with 266 acres designated for waste disposal (L.A. County, 2015a). The Whittier (Savage Canyon) Landfill's SWFP was recently revised in October 2013 to allow for the continued disposal of 350 tpd of non-hazardous refuse, acceptance of 3,000 tpd or non-hazardous inert debris or beneficial use, and an additional capacity of 4.39 million cubic yards (L.A. County, 2015a).

The Chiquita Canyon Landfill submitted an application in 2011 to request an expansion of disposal area from 257 acres to 400 acres and to increase the maximum elevation from 1,430 feet to 1,573 feet, as well as an increase the permitted daily disposal from 6,000 t to 12,000 tpd. The DEIR was circulated on July 10, 2014, but has yet to be approved (L.A. County, 2015a).

A DEIR was released for the Scholl Canyon Landfill on April 1, 2014 by the City of Glendale. The proposed expansion consists of two variations. A solely vertical expansion would add 5.5 million tons of additional disposal capacity, whereas a vertical and horizontal expansion that would provide an additional eight million tons of disposal capacity. Both variations retain the current permitted capacity of 3,400 tpd of non-hazardous solid waste. The Puente Hills Landfill closed as of October 31, 2013. Waste has been contractually diverted to other local transfer facilities and landfills (L.A. County, 2015a).

The Los Angeles County Department of Public Works (LACDPW) has reviewed the County's ability to meet daily disposal demands under different scenarios (e.g., landfill expansions, alternative technologies, waste-by-rail systems, and reduction/recycling). Under some of the scenarios, the county will have a difficult time meeting future disposal demands. In order to ensure disposal capacity to meet the county needs, jurisdictions in Los Angeles County must continue to pursue all of the following strategies: (1) expand existing landfills; (2) study, promote, and develop conversion technologies; (3) expand transfer and processing infrastructure; (4) develop a waste-by-rail system; and (5) maximize waste reduction and recycling.

3.7.2.2 Orange County

Orange County currently has three active Class III landfills. These landfills accepted more than 4 million tons of solid waste in 2014 and provides disposal services for 3.1 million residents in 34 cities and thousands of businesses. The three landfills include Prima Deshecha, Frank R. Bowerman and Olinda Alpha. The Prima Deshecha Landfill has a permitted capacity of 4,000 tpd and an expected closure date of 2067. The Frank R. Bowerman Landfill has a maximum capacity of 11,500 tpd, and an expected closure date of 2053. The Olinda Alpha Landfill has a permitted capacity of 8,000 tpd. The current permit expiration of the Olinda Alpha Landfill is 2021 (see Table 3.7-7).

TABLE 3.7-7

Orange County Landfill Status

Landfill	Total Tons Disposed 2014[1]	Permitted Tons/Day[2]	Remaining Permitted Capacity (million cubic yards)[2]	Estimated Year of Closure[2]
Frank R. Bowerman	1,977,367	11,500	205.00	2053
Olinda Alpha	2,075,885	8,000	36.59	2021
Prima Deshecha	386,724	4,000	87.38	2067
Total	**4,439,976**	**23,500**	**328.97**	**N/A**

1. CalRecycle 2015b Disposal Reporting System (DRS) California Solid Waste Statistics
2. CalRecycle, 2015c Solid Waste Information System (SWIS) Search

CalRecycle is responsible for ensuring that county waste is disposed of in a way that protects public health, safety and the environment. Long-range strategic planning is necessary to ensure that waste generated by the county is safely disposed of and that the county's future disposal needs are met. The Regional Landfill Options for Orange County (RELOOC) program was created for this reason. RELOOC is a 40-year strategic plan prepared by the Integrated Waste Management District (IWMD). The purpose of RELOOC is to evaluate options for solid waste disposal for Orange County citizens. The plan was last updated in September 2007 (RELOOC, 2007).

Orange County cities and unincorporated areas have completed, adopted and implemented a CIWMP. Orange County cities and unincorporated areas have residential curbside recycling programs in place. The three existing landfills are expected to provide sufficient capacity to serve Orange County for at least 50 additional years (OC Waste & Recycling, 2015).

3.7.2.3 Riverside County

Riverside County has six active sanitary landfills with a total permitted capacity of 26,314 tpd. Each of these landfills is located within the unincorporated area of the county and is classified as Class III. El Sobrante Landfill is a privately operated landfill open to the public. Assuming no expansion, the six major sites have closure dates projected from as early as 2021 to as late as 2098. The projected date of closure for each landfill is tentative and could be affected by engineering, environmental, and waste flow issues (see Table 3.7-8).

TABLE 3.7-8

Riverside County Landfill Status

Landfill	Total Tons Disposed 2014[(1)]	Permitted Tons/Day[(2)]	Remaining Permitted Capacity (million cubic yards) [(2)]	Estimated Year of Closure[(2)]
Badlands	838,052	4,000	14.73	2024
Blythe	17,802	400	4.16	2047
Desert Center	26	60	35.71	2087
El Sobrante	2,032,798	16,054	145.53	2045
Lamb Canyon	590,117	5,000	18.96	2021
Mecca	2	400	0.01	2098
Oasis	31,918	400	0.43	2055
Total	**3,510,715**	**26,314**	**219.53**	N/A

3. CalRecycle 2015b Disposal Reporting System (DRS) California Solid Waste Statistics
4. CalRecycle, 2015c Solid Waste Information System (SWIS) Search

3.7.2.4 San Bernardino County

The County of San Bernardino Solid Waste Management Division (SWMD) is responsible for the operation and management of the County of San Bernardino's solid waste disposal system and regional landfills.

San Bernardino County has seven public landfills within the SCAQMD's boundaries with a combined permitted capacity of 19,129 tpd. Mid-Valley/Fontana Landfill is estimated to reach final capacity by the end of 2033, San Timoteo by 2043, Victorville by 2047, Barstow by 2071, Landers by 2018, and California Street by 2042. The Colton Landfill was closed in 2014 (see Table 3.7-9).

TABLE 3.7-9

San Bernardino County Landfill Status

Landfill	Total Tons Disposed 2014[1]	Permitted Tons/Day[2]	Remaining Permitted Capacity (million cubic yards)[2]	Estimated Year of Closure[2]
Barstow	61,934	1,500	71.48	2071
California Street	64,146	829	6.80	2042
Colton	23,491	3,100	2.70	INACTIVE
Landers	41,390	1,200	0.77	2018
Mid-Valley	894,583	7,500	67.52	2033
San Timoteo	261,283	2,000	13.61	2043
Victorville	267,802	3,000	81.51	2047
Total	**1,614,629**	**19,129**	**244.39**	**N/A**

1. CalRecycle 2015b Disposal Reporting System (DRS) California Solid Waste Statistics
2. CalRecycle, 2015c Solid Waste Information System (SWIS) Search

3.7.3 HAZARDOUS WASTE MANAGEMENT

Hazardous material, as defined in 40 CFR 261.20 and 22 CCR Article 9, is disposed of in Class I landfills. California has enacted strict legislation for regulating Class I landfills. H&S requires Class I landfills to be equipped with liners, a leachate collection and removal system, and a groundwater monitoring system.

There are no hazardous waste disposal sites within the jurisdiction of the SCAQMD. Hazardous waste generated at area facilities, which is not reused on-site, or recycled off-site, is disposed of at a licensed in-state hazardous waste disposal facility. Two such facilities in California are the Chemical Waste Management Kettleman Hills (CWM Kettleman) facility in Kings County, and the Laidlaw Environmental Services (Buttonwillow) facility in Buttonwillow, Kern County.

CWM Kettleman hazardous waste facility was permitted to increase its capacity by about five million cubic yards in May of 2014 (DTSC News Release, 2014). CWM Kettleman has also applied to the U.S. EPA to both renew and modify its existing permits to allow for the expansion of the landfill. The expansion would provide another 12-14 years of life. CWM Kettleman is permitted to dispose of, or treat and store, hazardous waste from all over California. The facility accepts almost all solid, semi-solid, and liquid hazardous waste. However, CWM Kettleman is not permitted to accept biological agents or infectious wastes, regulated radioactive materials, or compressed gases and explosives.
Buttonwillow is a 320-acre facility operated by Clean Harbors Environmental Services and can accept in excess of 200 loads of waste per day. Typical waste streams include contaminated soils,

hazardous waste for treatment of metals, plating waste, and hazardous and non-hazardous liquids. The permitted capacity at Buttonwillow is in excess of 10 million cubic yards (Clean Harbors, 2015). Buttonwillow is expected to continue receiving waste for an additional 70 years (Clean Harbors, 2015).

Hazardous waste also can be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada; Laidlaw Environmental Services located in Lake Point, Utah; Envirosafe Services in Grandview, Idaho; Chemical Waste Management Inc. in Carlyss, Louisiana; and Waste Control Specialists in Andrews, Texas. U.S. Ecology, Inc. is in the process of extending its operational capacity for an additional 35 years. Incineration is provided at Laidlaw Environmental Services, Inc., located in Deer Park, Texas.

In 2013, about 2.49 million tons of hazardous waste was generated in the four counties that comprise the SCAQMD, and about 4.02 million tons of hazardous waste was generated in California (see Table 3.7-10). Those amounts have increased from the totals in 2011 by approximately 201 and 202 percent respectively. The most common types of hazardous waste generated in the SCAQMD include contaminated soils, waste oil and mixed oil, inorganic solid waste, organic solids, asbestos-containing waste, and unspecified oil-containing wastes. Because of the population and economic base in Southern California, a large portion of California's hazardous waste is generated within the SCAQMD. Not all wastes are disposed of in a hazardous waste facility or incinerator. Many of the wastes generated, including waste oil, are recycled within the Basin.

TABLE 3.7-10

Hazardous Waste Generation in the Basin – 2014
(By County) (tons per year)

Waste Name	Los Angeles	Orange	Riverside	San Bernardino	County Total (Basin)	Statewide Total
Contaminated Soils from Site Clean-Up	554,482	23,562	1,228	18,928	598,200	891,590
Blank / Unknown	44,958	343,816	330	2,342	391,447	577,174
Other Inorganic Solid Waste	250,893	54,948	1,325	11,226	318,393	476,716
Other Organic Solids	268,199	7,834	3,479	9,671	289,182	186,903
Waste Oil and Mixed Oil	220,827	16,549	6,618	38,857	282,851	526,315
Unspecified Oil-Containing Waste	47,804	4,713	1,765	18,781	73,063	116,426
Asbestos-Containing Waste	33,195	8,054	3,013	3,131	47,392	101,246
Baghouse Waste	38,074	58	1	1,793	39,926	75,269
Polychlorinated Biphenyls & Matls W/ PCBs	31,718	2,537	164	280	34,700	50,555
Off-Spec, Aged, or Surplus Organics	23,369	1,840	952	1,691	27,852	23,442
Aq Sol (2 < pH < 12.5) W Org Residues < 10%	16,570	3,888	616	4,633	25,707	48,323
Unspecified Organic Liquid Mixture	22,802	1,142	429	1,072	25,445	26,039
Unspecified Solvent Mixture	22,660	1,279	403	586	24,928	61,874
Unspecified Aqueous Solution (2 < pH < 12.5)	19,428	1,488	754	1,998	23,669	35,152
Aq Sol (2 < pH < 12.5) W Org Residues >= 10%	18,007	499	134	211	18,851	37,539
Oxygenated Solvents	14,065	584	118	329	15,096	20,137
Oil/Water Separation Sludge	9,788	739	356	455	11,338	18,438
Liquids W pH<=2	2,149	518	4,936	225	7,828	10,092
Off-Spec, Aged, or Surplus Inorganics	6,619	361	239	392	7,612	10,972
Household Wastes	3,619	2,259	235	588	6,701	13,179
Totals	**1,649,226**	**476,669**	**27,097**	**117,189**	**2,270,181**	**3,262,195**

Source: DTSC, 2015 Hazardous Waste Tracking System. Total Yearly Tonnage by Waste Code Report.
(1) Data presented is for county totals and is not limited to the portion of the county within AQMD jurisdiction.
(2) Waste names and totals are reported verbatim, rounded to the nearest ton.

3.8 TRANSPORTATION AND TRAFFIC

3.8.1 INTRODUCTION

The goal of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS, thereby improving air quality and protecting public health. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard (70 ppb). Some of the proposed control measures intended to improve overall air quality may have direct or indirect traffic impacts associated with their implementation. Traffic concerns are related to modifications to the existing transportation system that may generate significant impacts, primarily during the construction phases. This section describes the current transportation system in Southern California.

The Southern California transportation system is a complex intermodal network designed to carry both people and goods. It consists of roads and highways, public transit, paratransit, bus, rail, airports, seaports, and intermodal terminals. The regional highway system consists of an interconnected network of local streets, arterial streets, freeways, carpool lanes, and toll roads. This highway network allows for the operation of private autos, carpools, private and public buses, and trucks. Active transportation modes, such as bicycles and pedestrians, share many of these facilities. The regional public transit system includes local shuttles, municipal and area-wide public bus operations, rail transit operations, regional commuter rail services, and interregional passenger rail service. The freight railroad network includes an extensive system of rail lines serving industrial cargo and goods. The airport system consists of commercial, general, and military aviation facilities serving passenger, freight, business, recreational, and defense needs. The region's seaports support substantial international and interregional freight movement and tourist travel. Intermodal terminals consisting of freight processing facilities, which transfer, store, and distribute goods. The transportation system supports the region's economic needs, as well as the demand for personal travel.

3.8.2 TRANSPORTATION REGULATORY FRAMEWORK

3.8.2.1 Federal Regulatory Framework

In 2005, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU; Public Law 109–59) was signed into law. SAFETEA-LU provides funding for highways, highway safety, and public transportation. The act followed two bills that highlighted surface transportation funding needs—the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21). Signed into law in 1998, TEA-21 shaped the highway program to meet changing transportation needs throughout the nation. SAFETEA-LU addresses challenges such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. SAFETEA-LU also gives state and local transportation agencies more flexibility to solve transportation problems.

SAFETEA-LU expired in 2009 but Congress extended the legislation; the most recent extension is known as Moving Ahead for Progress in the 21st Century (MAP-21; Public Law 112-141). MAP-21, enacted in 2012, reauthorized most SAFETEA-LU highway, transit and safety programs.

The provisions of Title 23 USC Section 134 et seq. provide direct authority for Metropolitan Planning Organizations (MPOs), such as SCAG, to act as a regional transportation planning organization with direct responsibility for carrying out a regional transportation plan (RTP). SCAG is tasked with carrying out the transportation planning process and adopting long-range transportation plans for six counties, including the four within the SCAQMD jurisdiction. Collaborating with state and public transportation operators, SCAG undertakes a performance-driven, outcome-based approach to planning for the six county region. SCAG must prepare a transportation plan to be updated every four years, including identification of transportation facilities and factors for each mode of non-motorized transport to major roadways, transit, multimodal and intermodal facilities, and connectors that should function as an integrated system serving regional transportation functions.

3.8.2.1.1 MAP-21

MAP-21 replaced SAFETEA-LU as the nation's surface transportation program and extended the provisions for fiscal year 2012 with new provisions for 2013. MAP-21 funds surface transportation programs for 2013 and 2014 and provides additional funding by the passage of continuing resolutions. It is intended to create a streamlined, performance-based, and multimodal program to address challenges facing the United States transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. MAP-21 builds on and refines many of the highway, transit, bike, and pedestrian programs and policies first established under ISTEA in 1991. One of most significant changes from MAP-21 affecting MPOs, states, and transit operators is the new requirement for performance-based planning that involves use of performance measures and target setting. The U.S. Department of Transportation (U.S. DOT) is in the process of the rulemaking effort to implement these MAP-21 requirements.

3.8.2.1.2 Intelligent Transportation System (ITS)

ITSs are advanced applications aiming to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and smarter use of transport networks. With the passage of MAP-21, the ITS has fundamentally shifted from a program of research and development to one focused on infrastructure deployment. Traditionally, an ITS project is one that has information and communication technologies applied to the field of road transport, including infrastructure, vehicles, users, and in-traffic and mobility management, as well as interfaces with other modes of transport. One way to incorporate the MAP-21 vision and implement safety and security into transportation planning is through greater collaboration between transportation planning and operations. Collaboration is particularly critical in metropolitan regions and congested corridors where numerous jurisdictions, agencies, and service providers are responsible for the safety, security, and efficient operation of various aspects of the transportation system. Not only are

roadway and transit system operators themselves dependent on the transportation system, but so are police, fire, and medical services, emergency response and domestic security systems, and port authorities. Because the successful operation of ITS projects usually depend on coordination and communication between different agencies and the systems they operate, it is essential that there be a region-wide framework for cooperation to help achieve that coordination and communication in the most cost-effective manner. In California, this framework is SCAG's Southern California Regional ITS Architecture, which strives to improve multimodal transportation system management and operation. Local components to the Southern California Regional ITS Architecture exist for Los Angeles, Orange, Ventura, and Imperial Counties, and the Inland Empire (Riverside and San Bernardino Counties).

3.8.2.1.3 Critical Needs Assessment under MAP-21: Statewide Transportation System Needs

There have also been several assessments of the critical state transportation infrastructure, which include identification of the key transportation facilities. In order for the SCAG region to be eligible to receive federal aid for transportation projects, it is required by federal law to prepare periodic assessments of its complex freeways, roads, bridges, rail systems, airports, public transit, and other transportation infrastructure. In 2011, the California Transportation Commission (CTC) commissioned a study that summarizes the state of transportation systems in the SCAG region and other Regional Transportation Planning areas from 2011 to 2020. This report includes the total cost of system preservation, system management, and system expansion projects during the ten-year study period.

3.8.2.1.4 Aviation and Transportation Security Act (ATSA) by the 107th Congress: The Mission of the Transportation Security Administration (TSA)

Following the September 11, 2001, terrorist attacks, the ATSA was created by the 107th Congress as Public Law 107–71. The ATSA created the TSA to oversee the security of the nation's transportation systems. With state, local, and regional partners, the TSA oversees security for highways, railroads, buses, mass transit systems, and ports. A vast majority of its resources are dedicated to aviation security, and it is primarily tasked with screening passengers and baggage.

3.8.2.1.5 Maritime Transportation Security Act of 2002

The Maritime Transportation Security Act of 2002 (Public Law 107–295), signed on November 25, 2002, is designed to protect the nation's ports and waterways from a terrorist attack. This law is the national equivalent to the International Ship and Port Facility Security Code (ISPS) and was fully implemented on July 1, 2004. It requires vessels and port facilities to conduct vulnerability assessments and develop security plans that may include passenger, vehicle, and baggage screening procedures; security patrols; establishing restricted areas; personnel identification procedures; access control measures; and/or installation of surveillance equipment.

3.8.2.1.6 The Disaster Mitigation Act of 2000 (DMA 2000)

DMA 2000 (Public Law 106–390) provides an opportunity for states, tribes, and local governments to take a new and revitalized approach to mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 by adding Section 322 – Mitigation Planning. Section 322 placed new emphasis on mitigation planning requiring governments to develop and submit mitigation plans as a condition of receiving any funding from the Hazard Mitigation Grant Program (HMGP) project grants. DMA 2000 reinforces the importance of pre-disaster infrastructure mitigation planning to reduce disaster losses nationwide and is aimed primarily at the control and streamlining of the administration of federal disaster relief and programs to promote mitigation activities.

3.8.2.2 State Regulatory Framework

3.8.2.2.1 Sustainable Communities and Climate Protection Act of 2008

The Sustainable Communities and Climate Protection Act of 2008 (Senate Bill [SB] 375, Chapter 728, Statutes of 2008) requires MPOs to prepare a sustainable communities strategy (SCS) that demonstrates how the region will meet its greenhouse gas (GHG) reduction targets through integrated land use, housing, and transportation planning. Specifically, the SCS must identify a transportation network that is integrated with the forecasted development pattern for the plan area and will reduce GHG emissions from automobiles and light duty trucks in accordance with targets set by CARB (California Govt. Code Section 65080(b)(2)(B)). Based on Executive Order (EO) G-12-039, the targets accepted by CARB for GHG quantification for SCAG are an eight percent reduction in per capita GHG emissions by 2020, and a 13 percent per capita reduction by 2035, in both cases with 2005 as a base year.

3.8.2.2.2 Changes to CEQA for Transit-Oriented Development

Senate Bill 743 (2013) codified the addition of Chapter 2.7, §21099 to the Public Resources Code (PRC) to provide for changes to CEQA for transit oriented development and establishes alternative metrics used for traffic levels of service (LOS) for transportation impacts inside transit priority areas. Key SB 743 language includes the following:

1. The Office of Planning and Research shall prepare, develop, and transmit to the Secretary of the Natural Resources Agency for certification and adoption proposed revisions to the guidelines adopted pursuant to §21083 establishing criteria for determining the significance of transportation impacts of projects within transit priority areas. Those criteria shall promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses. In developing the criteria, the office shall recommend potential metrics to measure transportation impacts that may include, but are not limited to, vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated. The office may also establish criteria for models used to analyze transportation impacts to ensure the models are accurate, reliable, and consistent with the intent of this section.

2. Upon certification of the guidelines by the Secretary of the Natural Resources Agency pursuant to this section, automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to the division, except in locations specifically identified in the guidelines, if any.

Pursuant to PRC §21099(b)(1), the Office of Planning and Research (OPR) was required to prepare a draft revision to the CEQA Guidelines establishing new significance criteria within transit priority areas. Upon certification of those guidelines, LOS may no longer be used except if specifically identified in the guidelines (PRC § 21099(b)(2) and (c)(1)). On January 20, 2016, OPR released a revised proposal for changes to the CEQA Guidelines that will change the way transportation impacts are analyzed under CEQA. The guidelines propose to use vehicle-miles traveled (VMT) as the primary metric of transportation impacts across the state. The intent for using VMT as a criterion for measurement is to encourage good incremental, walkable, and transit-accessible projects.

3.8.2.2.3 California Transportation Plan (CTP)

The CTP (SB 64; Chapter 711 §14536 amended 65073.1) is prepared by the California Department of Transportation (Caltrans) every five years to provide a long-range policy framework to meet our future mobility needs and reduce GHG emissions. The CTP defines goals and performance-based policies, and strategies to achieve our collective vision for California's future statewide. The CTP is developed in collaboration with transportation stakeholders such as SCAG. Through ongoing engagement, the CTP is intended to provide goals and visions to support a fully integrated, multimodal, sustainable transportation system that improves mobility and supports quality of life criteria such as a prosperous economy, human and environmental health, and social equity. The CTP fulfills the state's goal to meet the Federal Transportation Improvement Program (FTIP).

3.8.2.2.4 Congestion Management Programs (CMP) Established in Accordance with Proposition 111

Proposition 111 (1990), or the Traffic Congestion Relief and Spending Limitation Act (Government Code 65088) enacted a statewide CMP and provides revenues to reduce traffic congestion by building state highways, local streets, and public mass transit facilities. The CMP was established to link land use, transportation, and air quality while prompting reasonable growth management programs that would effectively utilize existing transportation funds to alleviate traffic congestion (and its related impacts) and improve air quality. Under California law, CMPs are prepared and maintained by the Congestion Management Agencies (CMAs). The Los Angeles County Metropolitan Transportation Authority (Metro), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), and Ventura County Transportation Commission (VCTC) are the designated CMAs of each county and are subject to state requirements.

CMPs differs in form and local procedure because the magnitude of congestion and degree of urbanization differs amongst the counties.. Under state law, all CMPs are responsible for performing the monitoring and management functions shown below.

- *Highway Performance*. Each CMA monitors the performance of an identified highway system. This monitoring allows each county to track how their system, and its individual components, is performing against established standards, and how performance changes over time.

- *Multi-Modal Performance*. In addition to highway performance, each CMP contains an element to evaluate the performance of other transportation modes including transit.

- *Transportation Demand Management (TDM)*. Each CMP contains a TDM component geared at reducing alternative transportation methods.

- *Land Use Programs and Analysis.* Each CMP incorporates a program for analyzing the effects of local land use decisions on the regional transportation system.

- *Capital Improvement Program (CIP).* Using data and performance measures developed through the activities identified above, each CMP develops a CIP. This becomes the first step in developing the County Transportation Improvement Program (TIP). Under state law, projects funded through the Regional Transportation Improvement Program (RTIP) must first be contained in the county CIP.

- *Deficiency Planning*. The CMP contains provisions for "deficiency plans" to address unacceptable levels of congestion. Deficiency plans can be developed for specific problem areas or on a system-wide basis. Projects implemented through the deficiency plans must, by statute, have both mobility and air quality benefits. In many cases, the deficiency plans capture the benefits of transportation improvements that occur outside the county TIPs and RTIP such as non-traditional strategies and/or non-regionally significant projects.

The county CMPs, together with SCAG's 2016 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) and FTIP, fulfill the federal requirements for a "congestion management" process in transportation management areas to provide for integrated management and operation of the multimodal transportation system through the use of travel demand reduction and operational management strategies. To ensure consistency, SCAG and the CMAs have developed the Regional Consistency and Compatibility Criteria for CMPs. Information on the CMP activities and resulting data is updated on a biennial basis by each CMA and supplied to SCAG and air quality management districts.

3.8.2.2.5 EO B-16-2012 on Zero Emission Vehicles

EO B-16-2-12 was signed on March 23, 2012, to encourage development of the ZEVs to protect the environment in the region. The goals that are promulgated include setting targets to meet goals in 2015, 2020, and 2025, supporting the commercialization of clean vehicles, and pursuing policies to promote private sector investment and made-in California technologies. EO B-16-2012 also sets a target for 2050 of a reduction of GHG emissions from the transportation sector equal equaling 80 percent less than 1990 levels.

In February 2013, an interagency working group developed the ZEV Action Plan which identifies specific strategies and actions that state agencies will take to meet the milestones of the EO B-16-2012. The ZEV Action Plan states:

> *ZEVs are crucial to achieving the state's 2050 greenhouse gas goal of 80 percent emission reductions below 1990 levels, as well as meeting federal air quality standards. Achieving 1.5 million ZEVs by 2025 is essential to advance the market and put the state on a path to meet these requirements.*

3.8.2.2.6 EO B-32-15 Integrated Action Plan to Improve California's Freight System

EO B-32-15 was issued on July 16, 2015, which orders the Secretary of the California State Transportation Agency, the Secretary of CalEPA, and the Secretary of the Natural Resources Agency to lead other relevant state departments including CARB, Caltrans, the California Energy Commission (CEC), and the Governor's Office of Business and Economic Development to develop an integrated action plan by July 2016 that establishes clear targets to improve freight efficiency, transition to zero-emission technologies, and increase competitiveness of California's freight system. The action plan shall identify state policies, programs, and investments to achieve these targets, and be informed by existing state agency strategies, including the California Freight Mobility Plan, Sustainable Freight Pathways to Zero and Near-Zero Emissions, Integrated Energy Policy Report, as well as broad stakeholder input.

3.8.2.2.7 Rail Operations

The California Public Utilities Commission (CPUC) has regulatory authority over rail operations and grade crossings throughout the state. No grade crossings would be added as part of the proposed project.

3.8.2.3 Regional Regulatory Framework

3.8.2.3.1 SCAG Active Transportation Strategies

The 2016 Active Transportation Plan included in the 2016 RTP/SCS proposes strategies to continue progress made in developing regional bikeway network, assumes all local active transportation plans will be implemented, and dedicates resources to maintain and repair thousands of miles of dilapidated sidewalks. The 2016 Active Transportation Plan also considers new strategies and approaches beyond those proposed in the 2012 RTP/SCS, focusing on ways to augment the plan and active transportation analysis tools in order to:

- Better align active transportation investments with land use and transportation strategies to reduce costs and maximize mobility benefits.
- Increase the competitiveness of local agencies for federal and state funding.
- Develop strategies that serve the 8-80 crowd to reflect changing demographics and make active transportation attractive to a wider audience.

Expand regional understanding of the role short-trips play in achieving 2016 RTP/SCS goals and performance objectives, and provide a strategic framework to support local planning and project development geared toward serving these trips.

3.8.2.3.2 SCAG Bicycle Route 66 Concept Plan (Bike 66 Route)

SCAG's Bike Route 66 is a general guide to improve awareness of Route 66 throughout the region and state. Bike Route 66 traverses 32 cities within Los Angeles and San Bernardino Counties, from Needles to Santa Monica. Establishing a designated route with signage and dedicated bikeways offers commuting, utilitarian, and recreational cyclists a comfortable facility that enhances commute options. For Bike Route 66, a mix of bikeway types is proposed. Class I bikeways cover off-street trails. This class of bikeway incorporates bike paths created from historic transportation assets to provide less stressful alternatives to higher speed streets along Route 66. Class II bikeways cover on-street bike lanes, including Route 66 areas suitable for bicycles or shared-use roadways. Class III bikeways are a series of bike-friendly or low-speed streets that are optimized by bicycle traffic. Overall, Bike Route 66 is a part of the functional network of regional bicycle routes connecting the region and serving commuter, recreational, and touring cyclists. Local jurisdictions are encouraged to use this concept plan to develop, refine, and manage Bike Route 66 in a manner that best serves their areas.

3.8.2.3.3 SCAG Regional Bikeway Plan

The proposed 2016 Active Transportation Plan has developed goals for increasing bikeway miles, increase commute mode share of bicycling and walking, and improve trip connections to transit, and increases the number of sidewalks that are compliant with the Americans with Disabilities Act. To achieve implementation of these goals, SCAG will collaborate with other transportation agencies, local and regional government, and the California Active Transportation Program (ATP) to implement a sustainability program in the six counties region. Currently, the shares of walking and biking in SCAG region combined is approximately 18 percent of the total modes available. SCAG is working with local jurisdictions to increase this percentage. By 2035, at least two-thirds of all trips shorter than three miles or half of all trips that are five miles or less could be converted to active transportation.

3.8.2.3.4 Plans and Policies Related to the Complete Street Act of 2008 (AB 1258; S. 2686)

Complete Streets are designed and operated to enable safe access for all users: pedestrians, bicyclists and motorists, and transit riders of all ages and abilities. The Complete Streets Act of 2008 (AB 1358) required cities and counties to incorporate Complete Streets in their general plan updates to ensure that transportation plans met the needs of all users to travel safely and conveniently on streets and highways. All four counties in the SCAQMD have developed their own bicycle and pedestrian plans. The majority of these bicycle pathways are part of existing Class II paths which provide on-street bike lanes. A few paths are Class I (paths separate from automobile traffic), and some are Class III (pathways with on-street bike lanes further designated by signs).

3.8.2.3.5 Los Angeles County Bicycle Transportation Strategic Plan (BTSP)

Metro developed the BTSP in 2006 to be used by "the cities, the County of Los Angeles and transit agencies in planning bicycle facilities around transit and setting priorities that contribute to regional improvements. The goal is to integrate bicycle use in transportation projects." In addition, Metro also created a Bicycle Transportation Account Compliance Document (BTA Document) to provide an "inventory and mapping of existing and proposed facilities, and an estimate of past and future expenditures for bicycle facilities." In 2013, SCAG and Metro developed the Bike County Data Clearinghouse to assist the county in conducting bicycle counts. The Los Angeles County Department of Public Works adopted a Countywide Bicycle Master Plan in 2012, which was developed with the over-arching goal of increasing "bicycling throughout the County of Los Angeles through the development and implementation of bicycle-friendly policies, programs, and infrastructure." The plan recommends the development of an interconnected network of bicycle corridors, with approximately 695 miles of bikeway facilities. This plan looks at the ridership and air quality benefits from cycling and also includes a list of existing and proposed bikeways in Los Angeles County.

3.8.2.3.6 2011 Orange County Bikeways Strategic Plan

The 2011 Orange County Bikeways Strategic Plan was developed "to encourage the enhancement of Orange County's regional bikeways network, in order to make bicycle commuting a more viable and attractive travel option." The plan identifies approximately 116 miles of priority bikeway projects. In 2012, the OCTA provided an addendum to the existing plan with the Commuter Bikeways Strategic Plan (CBSP) that refines the regional bikeway networks and specified which bikeways are connected to priority locations including major transit investment areas, employment centers, stations, colleges, and universities.

3.8.2.3.7 Riverside County Non-Motorized Transportation Plans

The Western Riverside Council of Governments (WRCOG) and the Coachella Valley Association of Governments (CVAG) have developed Non-Motorized Transportation Plans in 2010 for their respective jurisdictions covering most of Riverside County. WRCOG's 2010 Non-Motorized Transportation Plan proposes the development of over 440 miles of bikeways in order to provide a "regional backbone network of bicycle and pedestrian facilities to provide enhanced transportation mobility options." The 2010 CVAG Non-Motorized Transportation plan recognizes the "value of providing opportunities for local residents and visitors to bicycle for work and recreation, as well as to use off-road trails for hiking, equestrians and jogging."

3.8.2.3.8 San Bernardino County Non-Motorized Transportation Plans

The Revised 2015 San Bernardino County Non-Motorized Transportation Plan's goals include: (1) improving pedestrian access to transit; (2) removing existing barriers to pedestrian travel; (3) developing regional trails and pathways, which provide improved pedestrian access to destinations; and (4) improving the pedestrian environment on major regional arterials and at

regional activity centers. Pedestrian access, mobility, and health benefits are captured in the revised plan.

3.8.2.3.9 Active Transportation Plans

In addition to county plans, many local jurisdictions have developed their own active transportation plans or include active transportation components in the circulation element of their general plans. Many street enhancement projects or capital improvement projects include active transportation elements as well. For example, many street improvement projects may include the striping of bikeways or new developments may include sidewalk enhancements.

3.8.2.4 Local Regulatory Framework

3.8.2.4.1 County General Plans-Circulation Element

Each of the four counties within the SCAQMD region have prepared a transportation or circulation element, as a required component of the general plan. The transportation or circulation element provides a summary of the existing conditions in the planning area, major issues, goals, and policies, as well as pertinent action programs related to traffic and circulation related to a variety of transportation systems (highway and local road networks, bus, rail, high speed rail, aviation network, harbors, bicycles, pedestrians, and rideshare). The transportation or circulation Element describes the major locations and corridors for existing and future travel based on land use patterns in order to develop a comprehensive, coordinated, and continuing transportation system for the region. Relevant policies include encouraging provision of transit service at a reasonable cost to the users and the community, encouraging the efficient use and conservation of energy and ease congestion, and, where the land use would support, providing for development of a mass transportation system that will provide a viable alternative to the automobile, and support a balance in transportation modes with public transit system that provides accessible service, particularly to the transit dependent. A transportation system will operate at regional, countywide, community, and neighborhood scales to provide connectivity between communities and mobility between jobs, residences, and recreational opportunities.

3.8.2.4.2 County General Plans-Safety Element

Each of the four counties in the SCAQMD has prepared a safety element as a required component of the general plan. The safety element generally discusses measures to abate the impacts in case of catastrophe for maintenance of the transportation infrastructure. The Traffic and Transportation Division under each county is responsible for developing plans and guidelines for the maintenance of traffic control devices, emergency travel routes in the event of an emergency, placement of barricades, and control of traffic and coordination with other departments to promote integrated disaster planning, response and mitigation efforts. Included in the safety element discussion are strategies for continuation of adequate critical infrastructure systems and services to assure adequate circulation, communications, and transportation services for emergency response in the event of disaster related systems disruptions.

3.8.2.4.3 City of Los Angeles Mobility Plan

The City of Los Angeles Transportation Element of the General Plan was adopted in 1999. In 2015, the city adopted the Mobility Plan 2035, which is an update to the 1999 Transportation Element (City of Los Angeles, 2015). The purpose of the Mobility Plan is to present a guide to the further development of a citywide transportation system which provides for the efficient movement of people and goods. This Mobility Plan recognizes that primary emphasis must be placed on maximizing the efficiency of existing and proposed transportation infrastructure through advanced transportation technology, through reduction of vehicle trips, and through focusing growth in proximity to public transit. The Mobility Plan also recognizes that locating land uses that better serve the needs of the population closer to where they work and live reduces the number and distance of vehicle trips and decreases the amount of pollution from mobile sources. The Mobility Plan provides numerous policies to enhance transportation systems in the city. For example, Policy 5.2 supports ways to reduce VMT per capita. The Mobility Element identifies the major roadways and designated truck routes throughout the City.

3.8.3 EXISTING TRANSPORTATION AND TRAFFIC SETTING

The Southern California transportation system is a complex intermodal network designed to carry both people and goods. It consists of roads and highways, transit, passenger and freight rail, airports, seaports, and intermodal terminals. The regional roadway system consists of an interconnected network of interstates, freeways, highways, toll roads, arterial streets, and local streets. This roadway network allows for the operation and movement of private vehicles, commercial vehicles, private and public buses, and heavy-duty trucks. Active transportation modes, such as biking and walking use non-motorized transportation facilities, including bikeways and walkways that often share spaces with roadway facilities. SCAG is currently working on engaging local jurisdictions to expand bicycle and pedestrian networks to encourage use of active transportation modes, establish safe routes to school, and educate bicyclists and pedestrians on activities around sensitive communities. The regional public transit system includes local shuttles, municipal and area-wide bus operations, light rail transit operations, regional commuter rail services, and interregional passenger rail service. The freight railroad network includes an extensive system of rail lines serving industrial cargo and goods. The airport system consists of commercial, general, and military aviation facilities serving passenger, freight, business,

recreational, and defense needs. The region's seaports support substantial international and interregional freight movement and tourist travel. Intermodal terminals consist of freight processing facilities, which transfer, store, and distribute goods. The interconnected and complex transportation system advances the region's mobility and supports the region's economic growth, as well as the demand for safe personal travel.

3.8.3.1 Transportation Planning

Numerous agencies are responsible for transportation planning and investment decisions within the Southern California area. SCAG helps integrate the transportation-planning activities in the region to ensure a balanced, multimodal plan that meets regional as well as county, sub-regional, and local goals.

Table 3.8-1 identifies local and state agencies that participate in the development of an RTP. Seven major entities and agencies are involved (including SCAG) as designated MPOs: the County Transportation Commissions, Subregional Councils of Governments, local and county governments, transit and transportation owners, operators and implementing agencies, resource/regulating agencies and other private non-profit organizations, interest groups and tribal nations.

TABLE 3.8-1

Stakeholders in Transportation in the Southern California Area

COUNTY TRANSPORTATION COMMISSIONS
Los Angeles County Metropolitan Transportation Authority (Metro)
Orange County Transportation Authority (OCTA)
Riverside County Transportation Commission (RCTC)
SUBREGIONAL COUNCILS OF GOVERNMENTS
Southern California Association of Governments (SCAG)
San Bernardino Associated Governments (SANBAG)[(1)]
Coachella Valley Association of Governments (CVAG)
City of Los Angeles
North Los Angeles County
Orange County Council of Governments
San Fernando Council of Governments
San Gabriel Valley Council of Governments
Western Riverside County Council of Governments
Westside Cities Council of Governments
OTHERS
Caltrans
Airport Authorities
Port Authorities
Transportation Corridor Agencies
Transit/Rail Operators

Source: SCAG, 2016

(1) SANBAG is the transportation planning agency for San Bernardino County and is responsible for cooperative regional planning and furthering an efficient multi-modal transportation system countywide.

Each of the four counties within the jurisdiction of the SCAQMD has a Transportation Commission or Authority. These agencies are charged with countywide transportation planning activities, allocation of locally generated transportation revenues, and in some cases operation of transit services. In addition, there are many subregional Councils of Government within the Southern California area. A Council of Governments is a group of cities and communities geographically clustered and sometimes comprises an entire county (e.g., Orange County), which work together to identify, prioritize, and seek transportation funding for needed investments in their respective service areas.

3.8.3.2 Circulation System

3.8.3.2.1 Commute Patterns and Travel Characteristics

The existing transportation network serving the Southern California region supports the movement of people and goods. On a typical weekday in the six-county region, the transportation network supports a total of nearly 448 million VMT and nearly 13 million vehicle hours of travel (VHT). Of this total, over half occur in Los Angeles County and less in Orange, San Bernardino, and Riverside Counties (see Tables 3.8-2 and 3.8-3) (SCAG, 2016). For more information on the daily vehicle miles, please refer to SCAG's Final 2016 RTP/SCS.

TABLE 3.8-2

Summary of Existing Daily Vehicle Miles

	Vehicle-Miles Travel (VMT)					
	AM Peak Period		PM Peak Period		Daily	
County	Miles	% of Region	Miles	% of Region	Miles	% of Region
Los Angeles	43,216,977	54%	74,635,000	54%	225,544,016	53%
Orange	14,756,181	19%	24,793,000	18%	76,505,802	18%
Riverside	10,424,649	13%	18,817,000	14%	58,224,510	14%
San Bernardino	11,118,720	14%	18,944,000	14%	62,311,825	15%
Total	**79,156,527**	**100%**	**137,189,000**	**100%**	**422,586,153**	**100%**

Source: SCAG, 2016

Note: Data presented is for the entire counties and not limited to the portion of counties located within the jurisdiction of the SCAQMD.

Much of the existing travel in the Southern California region takes place during periods of congestion, particularly during the morning (6:00 a.m. to 9:00 a.m.) and evening peak periods (3:00 p.m. to 7:00 p.m.) (SCAG, 2016).

TABLE 3.8-3

Summary of Existing Daily Vehicle Hours of Travel

	Vehicle Hours of Travel (VHT)					
	AM Peak Period		PM Peak Period		Daily	
County	Hours	% of Region	Hours	% of Region	Hours	% of Region
Los Angeles	1,462,755	60%	2,639,343	61%	7,159,240	59%
Orange	463,633	19%	841,818	20%	2,265,450	19%
Riverside	240,365	10%	402,747	9%	1,287,880	11%
San Bernardino	263,319	11%	429,208	10%	1,391,850	11%
Total	**2,430,072**	**100%**	**4,313,116**	**100%**	**12,104,420**	**100%**

Source: SCAG, 2016

Note: Data presented is for the entire counties and not limited to the portion of counties located within the jurisdiction of the SCAQMD.

Congestion can be quantified as the amount of travel that takes place in delay (vehicle hours of delay or VHD) and, alternately, as the percentage of all travel time that occurs in delay (defined as the travel time spent on the highway due to congestion, which is the difference between VHT at free-flow speeds and VHT at congested speeds). Existing travel delays and percent of regional VHT in delay on freeways and arterials is the greatest (67 percent) in Los Angeles County, with an average of 17 percent in the Southern California region (see Table 3.8-4). While there is a relatively small variation in average travel distance from home to work (from 13 miles in Orange County, to 18 miles in Riverside and San Bernardino Counties), the average travel time during the peak hours ranges from a low of 21 minutes in the a.m. peak hour in Orange County to a high of 116 minutes in San Bernardino County (see Table 3.8-4). Home-to-work trip duration and distance are both greater for the inland counties of Riverside and San Bernardino, reflecting regional housing and employment distribution patterns.

TABLE 3.8-4

Summary of Existing Delay and Work Trip Length

County	Vehicle Hours of Delay			% of Travel in Delay			Average Home-to-Work Trip Distance (miles)	Average Home-to-Work Trip Duration (miles)	
	A.M. Peak Period	P.M. Peak Period	Daily	A.M Peak Period	P.M. Peak Period	Daily	Vehicle Trips (A.M. Only)	Vehicle Trips (A.M. Only)	Transit Trips (A.M. Only)
Los Angeles	472,560	1,039,218	2,000,016	67%	67%	67%	14	26	69
Orange	140,319	320,755	578,293	20%	21%	19%	13	21	78
Riverside	33,522	73,436	149,383	5%	5%	5%	18	29	95
San Bernardino	45,114	85,902	186,160	6%	6%	6%	18	29	116
Total/Avg.	**691,515**	**1,519,311**	**2,913,852**	**25%**	**25%**	**24%**	**16**	**26**	**90**

Source: SCAG, 2016

The characteristics of home-to-work trip and all daily trips vary widely among counties (see Table 3.8-5). On average, vehicular trips account for nearly 90 percent of home to work trips, including 75.8 percent in single occupancy trips, 3.6 percent in two person carpools, 1.8 percent in three-person carpools, and 8.2 percent in auto passenger trips. When accounting for all daily trips, on average vehicular trips account for approximately 86 percent of all daily trips, including 43.3 percent in single occupancy trips, 8.0 percent in two-person carpools, 7.7 percent in three-person carpools, and 27.6 percent in auto passenger trips. Public transit in all forms (including school buses) carries approximately 2.4 percent of all trips in the Southern California region. Of these, the greatest number of travelers is carried by buses, with lesser patronage on Metro Rail, paratransit, commuter rail, and other forms of public transit services. Trips made via public transit account for 6.1 percent of all home-to-work trips in the region and 2.4 percent of all daily trips (Table 3.8-3). Non-motorized trips account for 4.0 percent of all home-to-work trips in the region and 11 percent of all daily trips (see Table 3.8-5) (SCAG, 2016).

TABLE 3.8-5

Existing Travel Mode Split (Percentage of County Total)

County	Person Type Trip	Drive Alone	Two-Person Carpool	Three-Person Carpool	Auto Passenger Trip	Transit	Non-Motorized	Total
Los Angeles	Home-Work/Univ	73.8%	3.5%	1.9%	8.2%	7.5%	5.1%	100%
	All Day Trips	39.9%	7.5%	8.2%	28.5%	3.2%	12.7%	100%
Orange	Home-Work/Univ	79.0%	3.9%	1.8%	8.4%	2.2%	4.6%	100%
	All Day Trips	44.2%	7.9%	8.0%	28.2%	1.0%	10.7%	100%
Riverside	Home-Work/Univ	81.2%	3.5%	2.2%	9.1%	0.7%	3.3%	100%
	All Day Trips	45.6%	8.2%	7.5%	27.1%	0.4%	11.1%	100%
Ventura	Home-Work/Univ	80.1%	3.6%	2.4%	9.6%	1.0%	3.4%	100%
	All Day Trips	45.5%	8.2%	7.6%	27.3%	0.4%	11.0%	100%

3.8.3.2.2 Regional Freeway, Highway, and Arterial System

The regional freeway, highway, and arterial system is the primary means of person and freight movement for the region (see Table 3.8-6). This system provides for direct auto, bus and truck access to employment, services and goods. The network of freeways, interstates, and highways serves as the backbone of the system offering very high capacity limited-access travel and serving as the primary heavy-duty truck route system. The rate of deterioration is expected to accelerate significantly as maintenance cost continues to be deferred on to roadway systems such that to bring back these assets to a state of good repair would improve security and lead to efficiency although costly. The Southern California region will focus on preserving the existing transportation network, including preservation of roads, highways, bridges, railways, bicycle and pedestrian

facilities, and transit infrastructures that lead to maintain mobility and provide cost-efficiency without increasing capacity (SCAG, 2016).

TABLE 3.8-6

Existing Regional Freeway Route Miles and Lane Miles by County

County	Freeway Route Miles	Freeway Lane Miles
Los Angeles	538	4,231
Orange	201	1,525
Riverside	298	1,697
San Bernardino	453	2,471
Total	**1,490**	**9,924**

Source: SCAG, 2016

3.8.3.2.3 Regional High-Occupancy Vehicle (HOV) System and Park and Ride System

The regional HOV system consists of exclusive lanes on freeways and arterials, as well as busways and exclusive rights-of-way dedicated to the use of high-occupancy vehicles (HOVs). It includes lanes on freeways, ramps and freeway-to-freeway connectors (see Table 3.8-7). The regional HOV system is designed to maximize the person-carrying capacity of the freeway system through the encouragement of shared-ride travel modes. HOV lanes operate at a minimum occupancy threshold of either two or three persons. Many include on-line and off-line park and ride facilities, and several HOV lanes are full "transitways" including on-line and off-line stations for buses to board passengers (SCAG, 2016).

TABLE 3.8-7

Existing Regional HOV Lane Miles by County

County	HOV Total Lane Miles
Los Angeles	507
Orange	244
Riverside	82
San Bernardino	105
Total	**938**

Source: SCAG, 2016

Park & Ride facilities are generally located at the urban fringe along heavily traveled freeway and transit corridors and support shared-ride trips, either by transit or by carpool or vanpool. Most rail transit stations have park and ride lots nearby. Park & Ride lots in the Southern California region include: 106 in Los Angeles County; 25 in Orange County; 26 in Riverside County; and, 18 in San Bernardino County.

3.8.3.2.4 Arterial Street System

The local street system provides access for local businesses and residents. Arterials account for over 80 percent of the total road network and carry a high percentage of total traffic (see Table 3.8-8). In many cases arterials serve as alternate parallel routes to congested freeway corridors. Peak period congestion on the arterial street system occurs generally in the vicinity of activity centers, at bottleneck intersections, and near many freeway interchanges.

TABLE 3.8-8

Existing Regional Arterial Route Miles and Lane Miles by County

County	Arterials	Lane Miles
Los Angeles	Principal	8,349
	Minor	8,946
Orange	Principal	3,493
	Minor	2,729
Riverside	Principal	1,208
	Minor	2,871
San Bernardino	Principal	1,799
	Minor	3,865
Total	**Principal**	**14,849**
	Minor	**18,411**

Source: SCAG, 2016

3.8.3.2.5 Goods Movement

Wholesale and retail trade, transportation, and manufacturing support approximately 3.3 million jobs in the southern California region according to statistics provided by the state's Employment Development Department. Goods movement includes trucking, rail freight, air cargo, marine cargo, and both domestic and international freight, the latter entering the country via the seaports, airports, and the international border with Mexico. Additionally, many cargo movements are intermodal, for example, sea to truck, sea to rail, air to truck, or truck to rail. The goods movement system includes not only highways, railroads, sea lanes, and airways, but also intermodal terminals, truck terminals, railyards, warehousing, freight consolidation/de-consolidation terminals, freight forwarding, package express, customs inspection stations, truck stops, and truck queuing areas (SCAG, 2016).

3.8.3.2.6 Heavy-Duty Trucks

One of the key components of the Southern California regional goods movement system is the fleet of heavy-duty trucks, defined as cargo-carrying vehicles with a gross weight rating in excess of 8,500 pounds. Trucks provide a vital link in the distribution of all types of goods between the region's ports (sea and air), railroads, warehouses, factories, farms, construction sites and stores. The size and weight of heavy-duty trucks gives them unique operating characteristics; that is, they accelerate and decelerate more slowly than lighter vehicles and require more road space to maneuver. Dedicated truck lanes currently exist at two major freeway interchanges: the junction of Interstate 5 (I-5) with Interstate 210 and State Route 14 and the junction of Interstate 405 with Interstate 110. In addition, truck climbing lanes are located on northbound I-5 in northern Los Angeles County.

The trucking industry, including common carrier, private carrier, contract carrier, drayage and owner-operator services, handles both line-haul and pick-up and delivery. The industry uses the public highway system for over-the-road and local service. However, it is also served by a considerable infrastructure of its own. This infrastructure includes truck terminals, warehousing, consolidation and trans-loading facilities, freight forwarders, truck stops and maintenance facilities. These various facilities are especially prevalent in the case in the South Bay and Gateway Cities areas, including Wilmington and Carson and extending generally between Los Angeles International Airport (LAX) and the San Pedro Bay Ports, along the I-710 Corridor north to Vernon, Commerce, and Downtown Los Angeles, east through the San Gabriel Valley to Industry, Pomona, and Ontario and then to the Inland Empire in Fontana and Rialto as well as in Glendale, Burbank and Bakersfield. Specialized facilities for trucking that provide air cargo ground transport are located around regional airport facilities, notably LAX and Ontario International Airport (SCAG, 2016).

3.8.3.2.7 Railroads

The Basin is served by two main line commercial freight railroads—the Burlington Northern Santa Fe Railway Co. (BNSF) and the Union Pacific Railroad (UP). These railroads link Southern California with other United States regions, Mexico, and Canada either directly or via their connections with other railroads. They also provide freight rail service within California. In 2012, railroads moved approximately 154.8 million tons of cargo throughout California (SCAG, 2016).

The Basin is also served by two short line or switching railroads. The Pacific Harbor Line (formerly the Harbor Belt Railroad), which handles all rail coordination involving the Ports of Los Angeles and Long Beach, including dispatching and local switching in the harbor area, and the Los Angeles Junction Railway Company (owned by BNSF) which provides switching service in the Vernon area for both BNSF and UP. These railroads perform specific local functions and serve as feeder lines to the trunk line railroads for moving goods to and from Southern California.

The two main line railroads also maintain and/or serve major facilities in Southern California. Intermodal facilities in Commerce (BNSF-Hobart), East Los Angeles (UP), San Bernardino (BNSF), and Carson near the San Pedro Bay Ports (UP, Intermodal Container Transfer Facility or ICTF); the Los Angeles Transportation Center (UP-LATC); and the UP-City of Commerce yards

serve to transport containers received at the Ports of Los Angeles (UP/BNSF) and Long Beach (UP/BNSF) to eastern customers.

All of the major rail freight corridors in the region have some degree of grade separation, but most still have a substantial number of at-grade crossings on major streets with high volumes of vehicular traffic. These crossings cause both safety and reliability problems for the railroads and for those in motor vehicles at the affected crossings. Trespassing on railroad rights-of-way by pedestrians is another safety issue affecting both freight and commuter railroads. As an example of grade separation for rail corridors, the Alameda Corridor, a 20-mile, four-lane freight rail expressway, began operations in April 2002. In 2014, approximately 17,061 intermodal trains transited the Alameda Corridor, an approximate increase of 2.9 percent since 2013 (SCAG, 2016).

3.8.3.2.8 Public Transit

In Southern California public transit service is comprised of local and express buses, transitways, bus rapid transit (BRT), urban rail, including subway and light rail principally centered in the core of Los Angeles County, commuter rail that spans five counties and shuttles/circulators that feed all transportation modes and activity centers (see Table 3.8-9. Transit service is provided by approximately 67 separate public agencies. 12 of these agencies provide 91 percent of the existing public bus transit service. Local service is supplemented by municipal lines and shuttle services. Private bus companies provide additional regional service (SCAG, 2016).

TABLE 3.8-9

Region Annual Fixed Route Transit Ridership

Total Trips	2001	2005	2008	2012
Metro Rail	61,802,000	74,243,000	86,707,000	101,516,533
Commuter Rail	7,398,000	10,693,000	12,681,000	13,155,790
Bus	548,728,000	609,795,000	622,286,000	587,830,836
Total	**617,928,000**	**694,731,000**	**721,674,000**	**702,503,159**
Passenger Miles	**2001**	**2005**	**2008**	**2012**
Metro Rail	339,799,942	442,916,123	524,813,417	597,916,365
Commuter Rail	274,625,402	359,938,222	436,565,493	433,650,956
Bus	2,206,840,397	2,375,502,229	2,461,654,000	2,487,359,821
Total	**2,821,265,741**	**3,178,356,574**	**3,423,032,910**	**3,518,927,142**

Source: SCAG, 2016

Many people depend on reliable transit in Southern California and transit use is growing in the region (see Table 3.8-10). As of 2010, transit agencies in the Southern California region reported approximately 695 million annual boarding (see Table 3.8-10, total for Annual Boardings). This represents growth of 14 percent between 2001 and 2012, but only three percent growth in per capita trips due to population growth. In the same period, Metrolink saw annual ridership grow by 78 percent, and Metro Rail (Los Angeles County) by 64 percent.

TABLE 3.8-10

Statistics For Major Transit Operators for 2010

County	Largest Transit Operator	Average Weekday Boardings	Annual Boardings	Annual Vehicle Revenue Miles (VRM)	Passenger Fares as a percent of Operation Expenses
Fixed Route Bus Service					
Los Angeles	Metro	1,579,000	503,071,000	139,274,000	24.4%
Orange	OCTA	182,000	58,104,000	21,66,000	25.1%
Riverside	RTA	36,000	11,368,000	10,613,000	15.2%
San Bernardino	Omnitrans	49,000	15,685,000	10,035,000	22.9%
Metro Rail – Heavy Rail					
Los Angeles	Metro	150,000	47,906,000	5,885,000	38.7%
Metro Rail – Light Rail					
Los Angeles	Metro	146,000	46,409,000	9,646,000	18.3%
Regional Commuter Rail(1)					
Various	SCRRA(1) (Metrolink)	38,000	12,006,000	10,479,000	42.4%
	TOTAL:	**2,180,000**	**694,549,000**	**185,932,000**	**N/A**

Source: SCAG, 2016

Notes: (1) Metrolink is operated by the Southern California Regional Rail Authority, a joint powers authority much of an 11-member board representing the transportation commissions of Los Angeles (Metro), Orange (OCTA), Riverside (Riverside County Transportation Commission), San Bernardino (SANBAG), and Ventura (Ventura County Transportation Commission) Counties

3.8.3.2.9 Active and Non-Motorized Transport

The ATP was created by Senate Bill 99 (Chapter 359, Statutes of 2013) and Assembly Bill 101 (Chapter 354, Statutes of 2013) to ensure all active modes of transportation, such as biking and walking, would provide active transportation plans in disadvantaged communities as well as the implementation of non-infrastructure projects (i.e. education, enforcement activities). The use of bicycle as a means of transportation has several appealing aspects for an increasing share of travelers.

Biking and walking primarily constitute non-motorized transportation. Non-motorized transportation plays a bigger role in the densely-populated, mixed-landuse areas of the region. Bicycling has positive air quality, economic, and health impacts, and can reduce automobile-related congestion and energy use. Similar to bicycle use, walking can also reduce auto emissions of both criteria pollutants and GHGs from auto trips.

Currently, the average walking and bicycling distances in commutes from the Southern California region is between zero to three miles, although approximately 34 percent of the population walks

or bicycles one-quarter to one-half mile, and more than 15 percent walk between one half and one mile per day. Both modes of non-motorized transport would not require consumption of fuel, and can be used for work and non-work purposes. In 2012, biking and walking accounted for approximately 13.4 percent of total trips in Southern California region; 18.7 percent of these trips are originated from school, and 10.4 percent are shopping trips.

Class I bikeways are separate shared-use paths also used by pedestrians, Class II bikeways are striped lanes in streets, and Class III bikeways are signed routes. There are approximately 3,919 bikeway miles in the region, with the majority in Los Angeles County, followed by Riverside and Orange County. Approximately 746 miles are Class I bikeways, 2,150 Class II Bikeways, and 1,021 Class III Bikeways. Bike rack, locker, and station programs are ongoing in a number of cities and among transit operators. In addition, transit operators are integrating bicycle transportation with transit via bus bike racks, bike-on-train programs and bicycle lockers at transit centers (SCAG, 2016).

3.8.3.2.10 Regional Aviation

The Southern California region supports the nation's largest regional airport system in terms of number of airports and aircraft operations, operating in a very complex airspace environment. The region contains 56 public use airports, including six active commercial service airports, 44 general aviation, two active limited-commercial service (commuter) airports, two former military airfields (now public use airports) and two joint-use facilities. The existing following active commercial service airports handle the majority of passenger air traffic.

- Los Angeles International Airport
- John Wayne/Orange County Airport
- Ontario International Airport
- Long Beach Airport
- Burbank/Bob Hope Airport
- Palm Springs International Airport
- Riverside County/March Air Force Base
-

In all, approximately 86.4 million annual passengers (MAP) were served in the region in 2012, more than double the number served in 1980. In 2013, the regional total aviation demand was 88 MAP. In 2014, LAX led the largest share of air passengers with approximately 76.1 percent, followed by John Wayne Airport at 10.1 percent, Ontario International Airport at 4.5 percent, and Burbank/Bob Hope Airport at 4.3 percent. While none of the individual airports is the largest in the U.S., the region's airports collectively are the busiest of any region in the country. LAX accounts for the largest portion of passenger volume, cargo, and annual operations (SCAG, 2016).

3.8.3.2.11 Port System

The area within the jurisdiction of the SCAQMD is served by two major deep-water seaports. These ports — Long Beach and Los Angeles—handle Asia–North America trade and are served by the two major railroads and numerous trucking companies in Southern California. The Ports of Long Beach and Los Angeles are full-service ports with facilities for containers, autos and various bulk cargoes. With an extensive landside transportation network, the ports moved approximately 310 million metric tons of cargo in 2010. In particular, the San Pedro Bay Ports (Long Beach and Los Angeles) dominate the container trade in the Americas by shipping and receiving more than 11.8 million 20-foot Equivalent Units (TEUs) of containers in 2009. Together these two ports rank third in the world, behind Rotterdam and Hong Kong, as the busiest maritime ports (SCAG, 2016).

3.8.3.2.12 Transportation Security

Southern California is home to significant natural disasters, including earthquakes, wildfires, flooding, and mudslides. Transportation and transit agencies throughout the United States are taking increasing steps to protect their facilities against the threats of crime, terrorist activity, and natural disasters. A large-scale evacuation would be difficult in the Southern California region. The region already has severe traffic congestion and mobility issues. The region encompasses 38,000 square miles with a diverse geography, ranging from dense urban areas, to mountain ranges, to vast deserts. The interdependency of the jurisdictions and organizations makes regional cooperation and coordination essential to security and emergency preparedness. Typically, no single agency is responsible for transportation security. At the local level, especially within transit agencies, safety may be handled within one office. However, it is far less likely that the security of a surface transportation mode is managed by one entity and that this entity is even controlled by the transportation organization. For example, highways and transit networks traverse multiple police jurisdictions, local fire departments generally fill the incident command role after terrorist events, regional command and control centers respond to both natural and intentional disasters, and federal agencies intervene as needed and based on specific guidelines such as the crossing of state boundaries.

The complexity of the Southern California region, with a range of potential terrorism targets, presents significant challenges in coordinating and implementing effective homeland security programs. The unexpected and complex nature of these natural and human-caused incidents require extensive coordination, collaboration and flexibility among all of the agencies and organizations involved in planning, mitigation, response and recovery (SCAG, 2016).

The Department of Homeland Security (DHS) has designated the seaports of Long Beach and Los Angeles as at risk for potential terrorist actions. Security at the ports is the joint responsibility of the U.S. Coast Guard, the U.S. Customs and Border Protection Agency, federal and State Homeland Security offices, Port police agencies, Harbor Patrols and emergency service agencies. The U.S. Coast Guard leads the local Area Maritime Security Commission, which coordinates activities and resources for all port stakeholders. The Port of Los Angeles has a dedicated police force, the Los Angeles Port Police, to patrol the area within the jurisdiction of the Port of Los Angeles. The Port Police enforce federal, State, and local public safety statutes, as well as

environmental and maritime safety regulations, in order to maintain the free flow of commerce and produce a safe, secure environment that promotes uninterrupted Port operations. In addition, the Port Police partner with other law enforcement agencies, such as the Los Angeles Police Department, CHP, and Customs and Border Protection in the Cargo Theft Interdiction Program (CTIP), which investigates cargo theft, and the High Intensity Drug Trafficking Area, which targets drug trafficking at the Ports of Los Angeles and Long Beach. Furthermore, per the Maritime Transportation Security Act of 2002, the Port of Los Angeles works with the Coast Guard to develop security plans for facilities at the port.

Similar to the Port of Los Angeles, security at the Port of Long Beach entails physical security enhancements, police patrols, coordination with federal, State, and local agencies to develop security plans for the port area and investigate suspicious incidents, and obtaining federal funding to pay for these enhancements. As with the Port of Los Angeles, the Port of Long Beach works with the Coast Guard to develop security plans for facilities at the port. In contrast to the Port of Los Angeles, however, the Port of Long Beach does not have its own dedicated police force. Instead, the Long Beach Police Department is responsible for patrolling the port area. In doing so, the Port reimburses the Long Beach Police and Fire Departments for their port-related activities and expenses. The Port also funds its own Harbor Patrol to supplement law enforcement work conducted by other agencies such as the Coast Guard (SCAG, 2106).

3.9 AESTHETICS

3.9.1 INTRODUCTION

This subchapter of the 2016 AQMP EIR contains an overview of existing aesthetic resources, including scenic highways and coastal zones within the SCAQMD.

3.9.2 REGULATORY SETTING

3.9.2.1 Federal

Aesthetic resources on federal lands are managed by the federal government using various visual resource management programs, depending on the type of federal land and/or the federal agency involved with a given project. Examples of federal visual resource management programs include the Visual Resource Management System utilized by the Federal Bureau of Land Management (BLM) and the Visual Management System utilized by the United States Forest Service (USFS).

3.9.2.2 State

3.9.2.2.1 California Coastal Act

The California Coastal Act of 1976 was enacted to regulate development projects within California's Coastal Zone. The act includes requirements that protect views and aesthetic resources through siting and design control measures, which are typically implemented at the local planning level through local coastal programs (LCPs) or land use plans (LUPs). According to the California Coastal Act:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting (California Public Resources Code. California Coastal Act [Chapter 3 (Coastal Resources Planning and Management Policies) Article 6, Section 30251]).*

For local jurisdictions that do not have an approved LCP, regulation of development projects within the coastal zone remains under the jurisdiction of the California Coastal Commission (CCC).

3.9.2.2.2 State Scenic Highway Program

California's Scenic Highway Program was created by the California Legislature in 1963 to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of land adjacent to those highways. When a city or county nominates an eligible scenic highway for official designation, it must adopt ordinances to preserve the scenic quality of the corridor or document such regulations that already exist in various portions of local codes. These ordinances make up the scenic corridor protection program.

Scenic corridor protection programs include policies intended to preserve the scenic qualities of the highway corridor, including regulation of land use and density of development, detailed land and site planning, control of outdoor advertising (including a ban on billboards), careful attention to and control of earthmoving and landscaping, and careful attention to design and appearance of structures and equipment (California Streets and Highways Code § 260 et seq.).

3.9.2.3 Local

3.9.2.3.1 Counties and Cities

The geographic area encompassed by the Basin includes numerous cities and unincorporated communities in the counties of Los Angeles, Orange, San Bernardino, and Riverside. Each of these counties and incorporated cities has prepared a general plan, which is the primary document that establishes local land use policies and goals. Many of these general plans also establish local policies related to aesthetics and the preservation of scenic resources within their communities or sub-planning areas, and may include local scenic highway programs.

3.9.2.3.2 Local Coastal Programs

The CCC and the local governments along the coast share responsibility for managing the state's coastal resources. Through coordination with the CCC, coastal cities and counties develop LCPs. These programs are the primary means for carrying out the policies of the California Coastal Act at the local level. In general, these policies are intended to promote public access and enhance recreational use of the coast as well as protection of natural resources in the coastal zone. Examples of counties, cities and local jurisdictions within the SCAQMD that do have an approved LCP or LUP include Los Angeles County and the County of Orange and the cities of Santa Monica, El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, Palos Verdes Estates, Rancho Palos Verdes, Long Beach, Avalon, Huntington Beach, Newport Beach, Irvine, Laguna Beach, Laguna Niguel, Dana Point, and San Clemente.

Following approval by the CCC, an LCP is certified and the local governments implement the programs. LCPs include two main components, a land use plan and an implementation plan. These components may include policies or regulations that apply to preservation of

visual and scenic resources within the coastal zone. Typically, these policies relate to preservation of views of the coast.

3.9.3 ENVIRONMENTAL SETTING

This environmental setting subchapter describes the aesthetics resources settings that may be adversely affected by the proposed project. Specifically, this environmental setting subchapter describes visual character and quality, visual resources, scenic highways, and coastal zones within the Basin.

3.9.3.1 Visual Character and Quality

Visual character and quality are defined by the built and natural environment. The ***visual character*** of a view is descriptive cataloguing of underlying landforms and landcover including the topography, general land use patterns, scale, form, and the presence of natural areas. Urban features, such as structures, roads, utility lines, and other development associated with human activities also help to define visual character. ***Visual quality*** is an evaluative appraisal of the aesthetics of a view and is established using a well-established approach to visual analysis adopted from the Federal Highway Administration (FHWA) based upon the relative degree of vividness, intactness, and unity found within the visual setting, as defined in the following bullet points (FHWA, 1981):

- Vividness is the visual power or memorability of landscape components as they combine in striking and distinctive patterns.

- Intactness is the visual integrity of the landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, as well as in natural settings.

- Unity is the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.

Each of the three criteria is independent and intended to evaluate one aspect of visual quality; however, no one criterion considered alone equates to visual quality.

The perception of visual quality can vary significantly among viewers depending on their level of visual sensitivity (interest). Sensitive viewers' perceptions can vary seasonally and even hourly as weather, light, shadow, and the elements that compose the viewshed change. Form, line, color, and texture are the basic components used to describe visual character and quality for most visual assessments (FHWA, 1981). Sensitivity depends upon the length of time the viewer has access to a particular view. Typically, residential viewers have extended viewing periods and are often concerned about changes in views from their homes. Visual sensitivity is, therefore, considered to be high for neighborhood residential areas. Visual sensitivity is considered to be less important for commuters and other people driving along surrounding streets. Views from vehicles are generally more

fleeting and temporary, yet under certain circumstances are sometimes considered important (e.g., viewers who are driving for pleasure, views/vistas from scenic corridors).

Various jurisdictions within the SCAQMD, including cities, counties, and federal or regional agencies, provide guidelines regarding the preservation and enhancement of visual quality in their plans or regulations. An example of such guidance can be found in Caltrans Scenic Highway Guidelines which contains examples of visual intrusions (Caltrans, 2008), which are presented in Table 3.9-1. As the table illustrates, a given visual element may be considered desirable or undesirable, depending on design, location, use, and other considerations. Because of the size and diversity of the area within the SCAQMD's jurisdiction, it is not possible to apply uniform standards to all areas within the Basin.

The viewshed can be defined as all of the surface area visible from a particular location or sequence of locations, and is described in terms of the dominance of landforms, landcover, and manmade development constituting visual character. Views of high visual quality in urban settings generally have several of the following additional characteristics:

- Harmony in scale with the surroundings;
- Context sensitive architectural design; and
- Impressive landscape design features.

Areas of medium visual quality have interesting forms but lack unique architectural design elements or landscape features. Areas of low visual quality have uninteresting features and/or undistinguished architectural design and/or other common elements.

TABLE 3.9-1

Caltrans Scenic Highway Program – Examples of Visual Quality Intrusions

Minor Intrusion	Moderate Intrusion	Major Intrusion
Buildings: *Residential, Commercial, and Industrial Developments*		
Widely dispersed buildings. Natural landscape dominates. Wide setbacks and buildings screened from roadway. Forms, exterior colors and materials are compatible with landscape. Buildings have cultural or historical significance.	Increased numbers of buildings, not well integrated into the landscape. Smaller setbacks and lack of roadway screening. Buildings do not dominate the landscape or obstruct scenic view.	Dense and continuous development. Highly reflective surfaces. Buildings poorly maintained. Visible blight. Development along ridgelines. Buildings dominate the landscape or obstruct scenic view.
Unsightly Land Uses: *Sumps, Quarries, Concrete Plants, Tank Farms, Auto Dismantling*		
Screened from view so that most of facility is not visible from the highway.	Not screened and visible but programmed/funded for removal and site restoration. Land use is visible but does not dominate the landscape or obstruct scenic view.	Not screened and visible by motorists. Will not be removed or modified. Land use dominates the landscape or obstructs scenic view.
Commercial Retail Development		
N/A	Neat and well landscaped. Single story. Generally blends with surroundings. Development is visible but does not dominate the landscape or obstruct scenic view.	Not harmonious with surroundings. Poorly maintained or vacant. Blighted. Development dominates the landscape or obstructs scenic view.
Parking Lots:		
Screened from view so that most of the vehicles and pavement are not visible from the highway.	Neat and well landscaped. Generally blends with surroundings. Pavement and/or vehicles visible but do not dominate the landscape or degrade scenic view.	Not screened or landscaped. Pavement and/or vehicles dominate the landscape or degrade scenic view.
Off-Site Advertising Structures		
N/A	N/A	Billboards degrade or obstruct scenic view.

TABLE 3.9-1 (CONT.)

Caltrans Scenic Highway Program – Examples of Visual Quality Intrusions

Minor Intrusion	Moderate Intrusion	Major Intrusion
Noise Barriers		
N/A	Noise barriers are well landscaped and complement the natural landscape. Noise barriers do not degrade or obstruct scenic view.	Noise barriers degrade or obstruct scenic view.
Power Lines and Communication Facilities		
Not easily visible from road.	Visible, but do not dominate scenic view.	Towers, poles or lines dominate view. Scenic view is degraded.
Agriculture: *Structures, Equipment, Crops*		
Generally blends in with scenic view. Is indicative of regional culture.	Not compatible with the natural landscape. Scale and appearance of structures and equipment visually competes with natural landscape.	Scale and appearance of structures and equipment are incompatible with and dominates natural landscape. Structures, equipment or crops degrade or obstruct scenic view.
Exotic Vegetation		
Used as screening and landscaping. Generally is compatible with scenic view.	Competes with native vegetation for visual dominance.	Incompatible with and dominates natural landscape. Scenic view is degraded.
Clearcutting		
N/A	Clearcutting or deforestation is evident, but is in the distant background.	Clearcutting or deforestation is evident. Scenic view is degraded.
Erosion		
Minor soil erosion (i.e., rill erosion).	Rill erosion starting to form gullies.	Large slip outs and/or gullies with little or no vegetation. Scenic view is degraded.
Grading		
Grading generally blends with adjacent landforms and topography.	Some changes, less engineered appearance and restoration are taking place.	Extensive cut and fill. Unnatural appearance, scarred hillsides or steep slopes with little or no vegetation. Canyons filled in. Scenic view is degraded.
Road Design		
Blends in and complements scenic view. Roadway structures are suitable for location and compatible with landscape	Large cut and fill slopes are visible. Scale and appearance of roadway, structures, and appurtenances are incompatible with landscape.	N/A

Source: Caltrans, 2008

3.9.3.2 Visual Resources

Visual resources include historic buildings that uniquely identify a setting, views identified as significant in local plans, and/or views from scenic highways. The importance of a view to viewers is related to the position of the viewers relative to the resource and the distinctiveness of a particular view. The visibility and visual dominance of landscape elements are usually described with respect to their placement in the viewshed.

Visual resources occur in a diverse array of environments within the boundaries of the SCAQMD, ranging in character from urban centers to rural agricultural land, natural woodlands, and coastal views. The extraordinary range of visual features in the region is afforded by the mixture of climate, topography, flora, and fauna found in the natural environment, and the diversity of style, composition, and distribution of the built environment. Views of the coast from locations in Los Angeles and Orange Counties are considered valuable visual resources, while views of various mountain ranges are prevalent throughout the Basin. Other natural features that may be visually significant in the Basin include rivers, streams, creeks, lakes, and reservoirs.

The Los Angeles County Draft 2014 General Plan identifies regional open space and recognized scenic areas, generally including the Santa Monica Mountains, as well as the San Gabriel Mountains, Verdugo Hills, Santa Susana Mountains, Simi Hills, Santa Monica Mountains, and Puente Hills. In addition, ridgelines and hillsides are generally considered to be scenic resources, with specific measures for the protection of these areas (Los Angeles County, 2014).

The Orange County General Plan identifies the Santa Ana Mountains, along with their distinctive twin peaks known as "Saddleback," as the county's signature landmark. The Plan designates ten scenic "viewscape corridors," which include among others Pacific Coast Highway, Oso Parkway, Ortega Highway, Jamboree Road, Santiago Canyon Road, and Laguna Canyon Road. These designated viewscape corridors provide scenic views of the Santa Ana Mountains, Lomas de Santiago and the San Joaquin Hills, as well as numerous canyons and valleys including the Santa Ana Canyon, Capistrano Valley, Laguna, Aliso, Wood, Moro, San Juan, Trabuco Santiago, Modjeska, Silverado, Limestone, and Black Star Canyons. Finally, the General Plan identifies nearly 42 miles of coastline and approximately 33 miles of sandy beaches as defining scenic resources (Orange County, 2011).

The Riverside County General Plan identifies regional scenic resources, including Santa Ana River basin, Lake Mathews, Lake Perris, Lake Elsinore, Lake Skinner, Vail Lake, the San Jacinto River, Murrieta Creek, the Santa Margarita River, the vineyard/citrus region near Temecula, the Diamond Valley Reservoir, Joshua Tree National Park, Whitewater River, the Santa Rosa Mountains, and a portion of the Salton Sea (Riverside County, 2014).

The County of San Bernardino 2007 General Plan identifies several scenic areas, including the San Gabriel Mountains, the San Bernardino Mountains, La Loma Hills, Jurupa Hills, Chino Hills, Yucaipa Hills, Holcomb Valley, and the Mojave Desert. In addition, Big Bear

Lake, Silverwood Lake, Lake Arrowhead, and Lake Gregory, along with associated waterways, serve as defining characteristics of the mountain regions within the County. San Bernardino County has a wide variety of scenic and wilderness areas respectively categorized as the Mountain, Valley, and Desert regions. Each region has its own defined measures for protecting the specific resources contained in this region. San Bernardino County also considers desert night-sky views to be scenic resources and has enacted measures to reflect this (San Bernardino County, 2014).

In addition to county plans, many of the cities within the SCAQMD have general plan policies, and in some cases, ordinances, related to the protection of visual resources. In addition to the visual resources related to natural areas, many features of the built environment that may also have visual significance include individual or groups of structures that are distinctive due to their aesthetic, historical, social, or cultural significance or characteristics, such as architecturally appealing buildings or groups of buildings, landscaped freeways, bridges or overpasses, and historic resources.

3.9.3.3 Scenic Highways

Within the SCAQMD, there are numerous officially designated state and county scenic highways and one historic parkway, as listed in Table 3.9-2. There are also a number of roadways that have been determined eligible for state scenic highway designation, as listed in Table 3.9-3.

TABLE 3.9-2

Scenic Highways Within SCAQMD Borders

Route	County	Location	Description	Miles	Designation
2	Los Angeles	From near La Cañada Flintridge north to the San Bernardino County line.	This U.S. Forest Service Scenic Byway and State Scenic Highway winds along the spine of the San Gabriel Mountains. It provides views of the mountain peaks, the Mojave Desert, and the Los Angeles Basin.	55	Officially Designated State Scenic Highway(a) (ODSSH)
38	San Bernardino	From east of South Fork Campground to State Lane.	This U.S. Forest Service Scenic Byway and State Scenic Highway crosses the San Bernardino Mountains at Onyx Summit. It features forested mountainsides with far-off desert vistas near the summit.	16	ODSSH
62	Riverside	From I-10 north to the San Bernardino County line.	This highway features high desert country scenery and leads to or from Joshua Tree National Monument. Large "windmill farms," where wind power is used to generate electricity, can be seen along the way.	9	ODSSH

Source: Caltrans, 2015

TABLE 3.9-3

Highways Within SCAQMD Boundaries Eligible for State Scenic Highway Designation

Route	County	Location (From/To)	Postmiles
1	Orange/LA	I-5 south of San Juan Capistrano/SR-19 near Long Beach	0.0-3.6
1	LA/(Ventura)	SR-187 near Santa Monica/SR-101 near El Rio	32.2-21.1
2	LA/SBD	SR-210 in La Cañada Flintridge/SR 138 via Wrightwood	22.9-6.36
5	(SD)/Orange	Opposite Coronado/SR-74 near San Juan Capistrano	R14.0-9.6
5	LA	I-210 near Tunnel Station/SR-136 near Castaic	R44.0-R55.5
10	SBD/Riverside	SR-38 near Redlands/SR-62 near Whitewater	T0.0-R10.0
15	(SD)/Riverside	SR-76 near San Luis Rey River/SR-91 near Corona	R46.5-41.5
15	SBD	SR-58 near Barstow/SR-127 near Baker	76.9-R136.6
18	SBD	SR-138 near Mt. Anderson/SR-247 near Lucerne Valley	R17.7-73.8
27	LA	SR-1/Mulholland Drive	0.0-11.1

TABLE 3.9-3 (CONT.)

Highways Within SCAQMD Boundaries Eligible for State Scenic Highway Designation

Route	County	Location (From/To)	Postmiles
30	SBD	SR-330 near Highland/I-10 near Redlands	T29.5-33.3
38	SBD	I-10 near Redlands/SR-18 near Fawnskin	0.0-49.5
39	LA	SR-210 near Azusa/SR-2	14.1-44.4
40	SBD	Barstow/Needles	0.0-154.6
57	Orange/LA	SR-90/SR-60 near City of Industry	19.9-R4.5
58	(Kern)/SBD	SR-14 near Mojave/I-15 near Barstow	112.0-R4.5
62	Riverside/SBD	I-10 near Whitewater/Arizona State Line	0.0-142.7
71	Riverside	SR-91 near Corona/SR-83 north of Corona	0.0-G3.0
74	Orange/Riverside	I-5 near San Juan Capistrano/I-111 (All)	0.0-R96.0
79	(SD)/Riverside	SR-78 near Santa Ysabel/SR-371 near Aguanga	20.2-2.3
91	Orange/Riverside	SR-55 near Santa Ana Canyon/I-15 near Corona	R9.2-7.5
101	LA/(Ventura)/(SBar)/(SLO)	SR-27 (Topanga Canyon Blvd)/SR-46 near Paso Robles	25.3-57.9
111	(Imperial)/Riverside	Bombay Beach-Salton Sea/SR-195 near Mecca	57.6-18.4
111	Riverside	SR-74 near Palm Desert/I-10 near Whitewater	39.6-R63.4
118	(Ventura)/LA	SR-23/Desoto Avenue near Browns Canyon	17.4-R2.7
126	(Ventura)/LA	SR-150 near Santa Paula/I-5 near Castaic	R12.0-0R5.8
127	SBD/(Inyo)	I-15 near Baker/Nevada State Line	L0.0-49.4
138	SBD	SR-2 near Wrightwood/SR-18 near Mt. Anderson	6.6-R37.9

TABLE 3.9-3 (CONCLUDED)

Highways Within SCAQMD Boundaries Eligible for State Scenic Highway Designation

142	SBD	Orange County Line/Peyton Drive	0.0-4.4
173	SBD	SR-138 near Silverwood Lake/SR-18 south of Lake Arrowhead	0.0-23.0
210	LA	I-5 near Tunnel Station/SR-134	R0.0-R25.0
215	Riverside	SR-74 near Romoland/SR-74 near Perris	23.5-26.3
243	Riverside	SR-74 near Mountain Center/I-10 near Banning	0.0-29.7
247	SBD	SR-62 near Yucca Valley/I-15 near Barstow	0.0-78.1
330	SBD	SR-30 near Highland/SR-18 near Running Springs	29.5-44.1

Source: Caltans, 2015a

Notes: LA = Los Angeles SBD = San Bernardino SD = San Diego
SBar = Santa Barbara SLO = San Luis Obispo SR = State Route
( ) = County not within the SCAQMD

3.9.3.4 Coastal Zones

According to the California Coastal Act of 1976, a coastal zone is the land and water area of the State of California from the Oregon border to the border of Mexico, extending seaward to the state's outer limit of jurisdiction (including all offshore islands), and extending inland generally 1,000 yards from the mean high tide line of the sea. In significant coastal estuarine, habitat, and recreational areas, the coastal zone extends inland to the first major ridgeline paralleling the sea or five miles from the mean high tide line of the sea, whichever is less, and in developed urban areas the coastal zone generally extends inland less than 1,000 yards.

The coastal zone within the Basin generally extends from Leo Carrillo State Park in Malibu in the northwestern corner of Los Angeles County to San Clemente Beach in San Clemente near the southern tip of Orange County.

LCPs typically contain policies on visual access and site development review. LCPs are basic planning tools used by local governments to guide development in the coastal zone, in partnership with the CCC. LCPs contain the ground rules for future development and protection of coastal resources in the 75 coastal cities and counties. The LCPs specify appropriate location, type, and scale of new, or changed, uses of land and water. Each LCP includes a land use plan and measures to implement the plan (such as zoning ordinances). Prepared by local government, these programs govern decisions that determine the short- and long-term conservation and use of coastal resources. While each LCP reflects unique characteristics of individual local coastal communities, regional and statewide interests and concerns must also be addressed in conformity with California Coastal Act goals and policies.

CHAPTER 4

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 Introduction
4.1 Air Quality and Greenhouse Gas Emissions
4.2 Energy
4.3 Hazards and Hazardous Materials
4.4 Hydrology and Water Quality
4.5 Noise
4.6 Solid and Hazardous Waste
4.7 Transportation and Traffic
4.8 Aesthetics
4.9 Potential Impacts Found Not to be Significant
4.10 Other CEQA Topics

4.0 INTRODUCTION

The CEQA Guidelines require EIRs to identify significant environmental effects that may result from a proposed project [CEQA Guidelines §15126.2(a)]. Direct and indirect significant effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited to, the resources involved; physical changes; alterations of ecological systems; health and safety impacts caused by physical changes; and other aspects of the resource base, including water quality, public services, etc. If significant adverse environmental impacts are identified, the CEQA Guidelines require a discussion of measures that could either avoid or substantially reduce any adverse environmental impacts to the greatest extent feasible (CEQA Guidelines §15126.4).

The CEQA Guidelines indicate that the degree of specificity required in a CEQA document depends on the type of project being proposed (CEQA Guidelines §15146). The detail of the environmental analysis for certain types of projects cannot be as great as for others. For example, an EIR for a project, such as the adoption or amendment of a comprehensive zoning ordinance or a local general plan, should focus on the secondary effects that can be expected to subsequently occur as a result of the adoption or amendment, but the analysis need not be as detailed as the analysis of any specific construction project(s) that may also occur. As a result, this Program EIR analyzes impacts on a regional level, impacts on the subregional level, and impacts on the level of individual projects or individual facilities only where feasible.

Chapter 4 analyzes the potential environmental impacts of implementing the 2016 AQMP. The goal of the 2016 AQMP is to address the federal 2008 eight-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, in order to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard (70 ppb). Some of the proposed control measures intended to improve overall air quality may have direct or indirect energy impacts associated with their implementation. The energy subsection describes the existing setting related to energy production and demand within California and the Basin.

This chapter is subdivided into the following sections based on the area of potential impacts: air quality and greenhouse gases, energy, hazards and hazardous materials, hydrology and water quality, noise, traffic and transportation, and solid and hazardous waste. Included for each impact category is a discussion of project-specific impacts, project-specific mitigation (if necessary and feasible), remaining impacts, and a summary of impacts for each resource. Also, included within each resource evaluation is a summary of impacts that would be expected for implementation of the various Control Measures. Full descriptions of all 2016 AQMP control measures are provided in Chapter 4 of the Draft Final 2016 AQMP and Appendices IV-A, IV-B, and IV-C.

In order to address the full range of potential environmental impacts several assumptions were made for purposes of evaluation. First, to provide a "worst-case" analysis, the environmental analysis contained herein assumes that the control measures contained in the AQMP apply to the entire SCAQMD jurisdiction (i.e., the Basin and those portions of the MDAB and SSAB under the SCAQMD's jurisdiction). If control equipment, which may create secondary adverse

environmental impacts, could be used to comply with a particular control measure, it was assumed that such equipment would be employed even if it may not be the only technology or method of compliance available. For example, in the analysis of energy impacts, all vehicles in ONRD-01 were assumed to be electrified. However, the energy impacts analysis also included that alternative fuels (e.g., natural gas) may also be utilized when implementing ONRD-01. To take into account the wide variety of implementation possibilities and corresponding potential environmental effects, this approach was applied when analyzing each environmental topic. In practice, there are typically a number of ways to comply with requirements of SCAQMD rules, but often only one type of compliance option may actually be implemented. For this reason, this conservative approach to analyzing the environmental effects has the potential to substantially overestimate impacts.

Every control measure in the 2016 AQMP was evaluated to determine whether or not it has the potential to generate adverse environmental impacts. Each environmental topic subchapter in Chapter 4 contains a table identifying control measures with the potential to generate significant adverse impacts for that environmental topic. Table 4.0-1 lists the various control measures which were evaluated and determined not to have significant adverse impacts on the environment and, therefore, were not evaluated further.

There are several reasons why the control measures in Table 4.0-1 are not expected to generate significant adverse impacts. First, ECC-01 and ECC-02 are measures that seek to take credit for the emission reductions of criteria pollutants which would occur due to existing regulations targeting energy efficiency and GHG reductions. FUG-01, MCS-01, and ORHD-01 would largely control emissions through enhanced inspection and maintenance practices. Inspection and maintenance practices contain procedures to ensure the proper operation of equipment, and thus, are not expected to generate secondary impacts. MOB-14 is an administrative control measure that would allow the SCAQMD to take credit for past emissions reductions and would not generate any additional physical environmental impacts. ORLD-02 would not result in environmental impacts because it would only study the Smog Check Inspection program. Finally, ORFIS-02 would seek emissions reductions from marine vessels and would also not result in environmental impacts.

In addition, there are several control measures proposed in the 2016 AQMP for which there is insufficient information regarding compliance options or how they would be implemented to determine the potential impacts (see Table 4.0-2). For example, because MCS-02, ORHD-03, OFFS-02, and OFFS-03 depend on future technologies, it would be speculative to determine what, if any, impacts could be expected from these control measures when the type of technologies that may actually be utilized is unknown. FLX-01 involves outreach and education so that consumers can make informed choices when making purchasing decisions, conducting efficiency upgrades, installing clean energy sources, and employing approaches for energy conservation. FLX-01 is a voluntary measure that would educate the public in general; thus, any impacts associated with changes in behavior would also be considered speculative. Therefore, the impacts of MCS-02, ORHD-03, OFFS-02, OFFS-03, and FLX-01 would be considered speculative and no further environmental analysis is required (CEQA Guidelines §15145).

TABLE 4.0-1

Control Measures With No Expected Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	REASON NOT SIGNIFICANT
ECC-01	Co-Benefit Emission Reductions from GHG Programs	Take credit for criteria pollutant reductions due to compliance with state regulations targeting GHG reductions.	This measure will quantify the co-benefits from emission reductions achieved by existing regulations already in place with no new physical impacts.
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures (NOx, VOC)	Take credit for NOx and VOC emission reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	This measure will quantify the co-benefits from emission reductions achieved by existing regulations already in place with no physical impacts.
FUG-01	Improved Leak Detection and Repair (VOC)	Changes in testing, increase self-inspection, and enforcement procedure for leaks.	Increased inspection and enforcement would not generate physical impacts.
MCS-01	Improved Breakdown Procedures and Process Re-design (all pollutants)	Changes in operating practices, testing, increase self-inspection, and enforcement procedures for equipment breakdowns.	Increased inspection, enforcement, and testing would not generate physical impacts.
MCS-02	Application of All Feasible Measures (all pollutants)	Implementation of rulemaking to establish emission limits for future BARCT analysis.	Impacts are speculative as it would depend on unknown future technologies.
FLX-01	Improved Education and Public Outreach (all pollutants)	Increased education and public outreach to guide consumer behavior.	Impacts are speculative as the effectiveness of education and outreach is unknown.
ORLD-02	Lower In-Use Emission Performance Assessment (TBD)[1]	Study to evaluate effectiveness of the ongoing Smog Check Inspection program.	No physical impacts are associated with the effectiveness evaluation.
ORHD-01	Lower In-Use Emissions Performance Level for Heavy Duty Vehicles (TBD)	Changes in operating practice, vehicle testing, increase self-inspection and enforcement of violations.	Increased testing, inspection, and enforcement would not generate physical impacts.
ORHD-03	Medium and Heavy Duty GHG Phase 2 (all pollutants)	Promote changes in car design to improve energy efficiency.	Impacts are speculative as the design of future cars is unknown.
ORFIS-02	Tier 4 Vessel Standards (NOx)	Petition that new vessels must meet Tier 4 IMO standards by 2025.	No physical impacts associated with the development of new standard for new vessels.
OFFS-02	Zero Emission Off-Road Emission Reduction Assessment (TBD)	Reliance on the development of future technologies to transition to zero emission off- road equipment.	Impacts are speculative as it would depend on unknown future technologies.
OFFS-03	Zero Emission Off-Road Worksite Emission Reduction Assessment (TBD)	Reliance on the development of future technologies to transition to zero emission off- road worksites.	Impacts are speculative as it would depend on unknown future technologies.

TBD means the pollutants that will be impacts are to be determined.

4.1 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

The purpose of the 2016 AQMP is 1) to address the federal 2008 eight-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, in order to satisfy the planning requirements of the federal CAA, and 2) to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard (70 ppb). The 2016 AQMP continues the SCAQMD's strategy of advancing clean technologies, promoting their use, and increasing the penetration of partial-zero and zero emission mobile sources and equipment into the Basin. This subchapter examines potential direct and indirect air quality impacts associated with the implementation of the proposed control measures in the 2016 AQMP.

4.1.1 INTRODUCTION

The analysis of air quality and GHG impacts in the Program EIR identifies the net effect on air quality (e.g., criteria air pollutants, GHGs, and TACs) from implementing the 2016 AQMP. The NOP/IS (Appendix A) determined the air quality impacts of the proposed project are potentially significant. In particular some of the control measures could: 1) generate emissions during the construction phases needed to implement the proposed control measures; 2) generate additional emissions from power plants that would need to expand to produce additional electricity to operate zero and near-zero technologies; 3) generate additional toxic air contaminants (e.g., increased ammonia use and additional TACs associated with reformulated products); 4) generate additional emissions from refineries to produce reformulated or alternative fuels; and 5) generate additional trips to transport materials.

The potentially significant project-specific and cumulative adverse air quality impacts associated with increased emissions of air contaminants (e.g., criteria air pollutants, GHGs, and TACs) during the construction and operation phases of the proposed project have been evaluated in this Program EIR. Potential adverse health impacts to sensitive receptors have also been analyzed in this Program EIR. Potential construction and operational air quality impacts associated with the 2016 AQMP control measure areas are provided in this subchapter.

This subchapter identifies and quantifies direct air quality effects, that is, emission reductions anticipated to occur as a result of implementing the various control measures. This subchapter also examines indirect or air quality impacts, that is, potential air pollutant emission increases that could occur as a consequence of efforts to improve air quality (e.g., emissions from control equipment such as afterburners). The analysis is divided in to the following sections: 2016 AQMP Control Measures with Air Quality Impacts, Future Air Quality Emission Inventories, 2016 AQMP Air Quality Modeling Results, Significance Criteria, Future Air Quality Emission Inventories, 2016 AQMP Air Quality Modeling Results, Impact Analysis, Mitigation Measures, and Impacts After Mitigation.

4.1.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL AIR QUALITY AND GREENHOUSE GAS IMPACTS

The air quality impact analysis in this Program EIR identifies the net effect on air quality from implementing the 2016 AQMP. All control measures were analyzed to identify the potentially adverse impacts. Evaluation of control measures was based on examination of the impacts of each of the control measures and technologies focusing on all potential air quality impacts. Table 4.1-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant air quality impacts. Table 4.1-4 contains a summary of control measures that could generate significant greenhouse gas impacts

TABLE 4.1-1

Control Measures with Potential Air Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential air quality impacts associated with construction activities.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx and VOC emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential air quality impacts associated with construction activities.
CMB-01	Transition to Zero- and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources.	Potential for emissions as a result of construction activities to replace or retrofit older high emitting equipment (e.g., ICEs) with zero and near zero equipment and potential air quality and GHG emissions from increased electricity demand during operation.
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating (NOx)	Installation of new commercial space heating furnaces boilers, water heaters, and space heating furnaces.	Potential for emissions as a result of construction activities to replace or retrofit older high emitting equipment.
CMB-03	Emission Reductions from Non-Refinery Flares (NOx, VOC)	Installation of newer flares implementing the best available control technology.	Potential emissions as a result of construction activities needed to replace old flares.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR/SNCR equipment.	Potential emissions as a result of construction to install new equipment, generation of ammonia emissions from the operation of SCR/SNCR equipment, and potential air quality and GHG emissions from electricity to operate additional equipment.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants (VOC)	Reformulation of coatings using different solvents, adhesives, and sealants.	New product reformulations could benefit from reductions in VOC emissions, but may contain toxic materials which could generate adverse emissions.
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion-based equipment.	Potential construction emissions as a result of replacing old equipment with new coatings/methods (UV/EB/LED) or reformulate with potential toxic materials. Potential air quality and GHG emissions if electricity is needed.
BCM-01	Further Emissions Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	Potential construction emissions from installation activities and potential air quality and GHG emissions from electricity to operate additional equipment.
BCM-02	Emission Reductions from Cooling Towers (PM)	Installation of drift elimination technologies into cooling towers.	Potential construction emissions from installing new or modifying existing control equipment.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure.	Potential air quality and GHG emissions from poultry and dairy manure thermal gasification.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia.	Potential emissions from construction activities associated with installing equipment.
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of portable, permanent or temporary enclosures with in-building abrasive blasting activities vented to fume extractors, and dust collectors with HEPA filters and the use of negative air machines.	Potential emissions from construction activities associated with installing control equipment and/or constructing outdoor workspaces and potential air quality and GHG emissions from additional electricity use.
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential emissions as a result of construction activities to install engineering controls and potential air quality and GHG emissions from additional electricity use.
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning (PM)	Incentivize chipping/grinding or composting in the place of agricultural burning as well as the increased utilization of clean fuels for training burns.	Potential emissions from chipping/grinding activities as well as potential pollution from training burns using clean fuels.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves (PM)	Incentivize upgrades of wood burning hearths to cleaner hearths and increase the stringency of the curtailment program and education.	Potential emissions from construction activities to change wood burning hearths to cleaner hearths.
BCM-10	Emission Reductions from Greenwaste Composting (NH3, VOC)	Use of control such as anaerobic digestion and organic processing technology and restrictions for direct applications of un-composted waste to public lands.	Potential emissions from construction and from energy use for anaerobic digestion.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, PM)	Financial incentives for cleaner vessels, vehicles, and equipment to use alternative fuels or fuel additives.	Potential emissions from construction activities to install new equipment and potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Accelerate the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity, alternative fuels, and fuel additives.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near-zero emission equipment in/around warehouses.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivize zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
MOB-05	Accelerated Penetration of Partial-Zero Emission and Zero Emissions Vehicles (VOC, NOx, CO)	Incentivize the "Clean Vehicle Rebate Project" to promote use of vehicles with zero and near-zero emissions.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
MOB-07	Accelerated Penetration of Partial Zero and Zero Emission Light Heavy and Medium Heavy Duty Vehicles (NOx, PM)	Accelerate the penetration of zero and near-zero emission vehicles and the use of alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity, alternative fuels, and fuel additives.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivize the use of zero emission technologies and the building of electric or magnetic power into roadway infrastructure to reduce emissions.	Potential emissions from construction activities and from the additional use of electricity use and alternative fuels.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivize the SOON program and phasing-in vehicles that meet Tier 4 standards in place of older, high-emitting equipment.	Potential emissions from the use of alternative fuels.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Accelerate the penetration of zero and near-zero off-road mobile sources and the use of alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity, alternative fuels, and fuel additives.
MOB-14	Emissions Reductions from Incentive Programs (NOx)	Implementation of the Prop 1B and Carl Moyer Programs to accelerate the penetration of clean air vehicles.	Potential emissions from construction activities.
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerate the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of things like dust control, alternative fuels, diesel PM filter, low-emitting engines, low VOC materials and mitigation fees.	Potential air quality and GHG emissions from the additional use of electricity and alternative fuels.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential emissions from construction and operation of enclosures and control equipment, and air quality and GHG emissions from additional electricity use.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential emissions from construction and operation of enclosures and control equipment, and air quality and GHG emissions from additional electricity use.
TXM-04	Control of Toxic Metal Particulate Emissions from Soil Decontamination (TACs, PM)	Construction and operation of chemical treatment, barriers, tire and wheel knockout and cleaning stations, and other dust suppression techniques.	Potential emissions from construction activities to construct dust control equipment.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	Potential emissions from construction and operation of enclosures and control equipment and air quality and GHG emissions from additional electricity use.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential emissions from construction and operation of enclosures and control equipment and air quality and GHG emissions from additional electricity use.
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment, including baghouses and HEPA filters and the use of best management practices, to minimize lead emissions.	Potential emissions from construction and operation of enclosures and control equipment and air quality and GHG emissions from additional electricity use.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon in carbon adsorbers.	Potential emissions from reformulated solvents and air quality and GHG emissions from additional electricity use.
TXM-09	Control of Toxic Emissions from Oil and Gas Productions (TACs, PM)	Construction of enclosures and control equipment and implementation of methods to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Potential emissions from construction and operation of enclosures and control equipment and air quality and GHG emissions from additional electricity use.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expand and/or set new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Accelerate the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
ORHD-02	Low-NOx Engine Standards (NOx	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
ORHD-05	Last Mile Delivery (NOx, ROG)	Accelerate the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential emissions from additional electricity use, the use of alternative fuels, and the construction of new roadway infrastructure.
ORHD-06	Innovative Technology Certification Flexibility (NOx)	Accelerate the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential emissions from additional electricity use, the use of alternative fuels, and the construction of new roadway infrastructure.
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Accelerate the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential emissions from additional electricity use, the use of alternative fuels, and the construction of new roadway infrastructure.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Accelerate the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential emissions from additional electricity use, the use of alternative fuels, and the construction of new roadway infrastructure.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Potential emissions from the installation and use of Tier 5 control equipment; and the use of alternative fuels.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentivize the use of control equipment such as SCRs.	Potential emissions from the generation of ammonia emissions from the use of SCR equipment and potential air quality and GHG emissions from electricity needed to operate additional equipment.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	Potential air quality impacts from construction activities and increased electricity generation.

TABLE 4.1-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	Potential air quality impacts from construction activities, increased electricity generation, and the use of alternative fuels.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Accelerate the penetration of zero emission technologies to be used in off-road forklifts.	Potential air quality impacts from construction activities and increased electricity generation.
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	Potential air quality impacts from construction activities, from increased electricity generation, and the use of alternative fuels.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Accelerate the penetration of zero emission technologies to be used in small off-road engines.	Potential air quality impacts from construction activities and increased electricity generation.
OFFS-06	Transport Refrigeration Units Used For Cold Storage (NOx, ROG, GHG)	Accelerate penetration of zero emission technologies in cold store refrigeration unites.	Potential air quality impacts from construction activities and increased electricity generation.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to achieve lower emissions.	Potential air quality impacts from construction activities at refineries, increased electricity generation, and the use of alternative fuels.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment (NOx, ROG, PM2.5)	Accelerate the implementation of zero emission technologies in off-road equipment.	Potential air quality impacts from construction activities, increased electricity generation, and the use of alternative fuels.
CPP-01	Consumer Products Program (ROG)	Reformulation of consumer products.	New product formulations could potentially generate increased toxic emissions.

4.1.3 SIGNIFICANCE CRITERIA

The NOP/IS concluded that the 2016 AQMP would not conflict with or obstruct implementation of the applicable air quality plan, create objectionable odors affecting a substantial number of people, diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s), or conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

A threshold of significance is an identifiable quantitative, qualitative, or performance level of a particular environmental effect. Proposed projects that do not exceed the significance threshold for the effect under evaluation normally will be determined to be less than significant. Exceeding any significance threshold means the effect will normally be determined to be significant by the lead agency (CEQA Guidelines Section 15064(a)). To determine whether or not air quality impacts from the proposed project are significant, impacts will be evaluated and compared to the significance criteria in Table 4.1-2. If impacts equal or exceed any of the criteria in Table 4.1-2, they will be considered significant.

TABLE 4.1-2

Air Quality Significance Thresholds

Mass Daily Thresholds[a]		
Pollutant	**Construction[b]**	**Operation[c]**
NO_x	100 lb/day	55 lb/day
VOC	75 lb/day	55 lb/day
PM10	150 lb/day	150 lb/day
PM2.5	55 lb/day	55 lb/day
SOx	150 lb/day	150 lb/day
CO	550 lb/day	550 lb/day
Lead	3 lb/day	3 lb/day
Toxic Air Contaminants, Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk $\geq$ 10 in 1 million Chronic and Acute Hazard Index $\geq$ 1.0 (project increment) Cancer Burden $\geq$ 0.5 excess cancer cases (in areas $\geq$ 1 in 1 million)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000MT/yr CO_2eq for industrial facilities	
Ambient Air Quality for Criteria Pollutants[d]		
NO_2 1-hour average annual average	In attainment; significant if project causes or contributes to an exceedance of any standard: 0.18 ppm (state) and 0.100 (federal)[e] 0.03 ppm (state) and 0.0534 ppm (federal)	
PM10 24-hour annual average	10.4 $\mu g/m^3$ (construction)[f] and 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$	
PM2.5 24-hour average	10.4 $\mu g/m^3$ (construction)[f] and 2.5 $\mu g/m^3$ (operation)	
SO_2 1-hour average 24-hour average	0.255 ppm (state) and 0.075 ppm (federal – 99th percentile) 0.04 ppm (state)	
Sulfate 24-hour average	25 $\mu g/m^3$ (state)	
CO 1-hour average 8-hour average	In attainment; significant if project causes or contributes to an exceedance of any standard: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
Lead 30-day average Rolling 3-month average	1.5 $\mu g/m^3$ (state) 0.15$\mu g/m^3$ (federal)	

a) Source: SCAQMD CEQA Handbook (SCAQMD, 1993)
b) Construction thresholds apply to both the SCAB and Coachella Valley (Salton Sea and Mojave Desert Air Basin)
c) For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
d) Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
e) The federal threshold has not been adopted for general use yet by SCAQMD, but as it is a federal requirement for permits being issued for this project.
f) Ambient air quality threshold based on SCAQMD Rule 403.

KEY: ppm = parts per million; $\mu g/m^3$ = microgram per cubic meter; lb/day = pounds per day; MT/yr CO2eq = metric tons per year of CO_2 equivalents, $\geq$ greater than or equal to, > = greater than

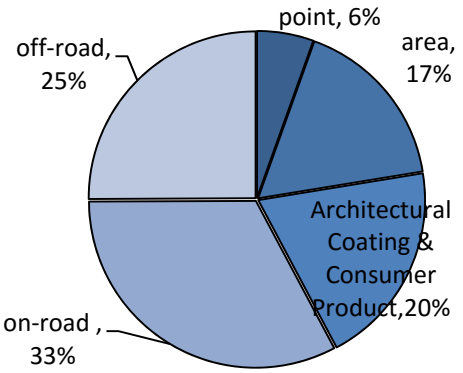
4.1.4 FUTURE AIR QUALITY EMISSION INVENTORIES

It should be noted that 2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions in the 2016 AQMP. However, the latest verifiable air quality data (from approved monitoring stations) are from 2015, which can be found in Chapter 2 of the 2016 AQMP and Chapter 3 of the ~~Draft~~Final Program EIR. The most recent environmental topic data is from 2016 and was used for the CEQA baseline in determining environmental impacts because that was the time of the release of the NOP/IS, in accordance with CEQA requirements.

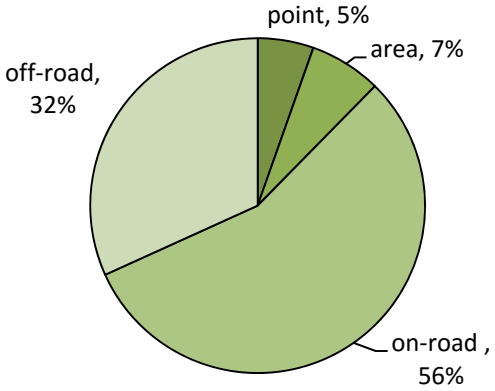
Figures 4.2-1 and 4.2-2 show 2012 and 2013 emission inventories, respectively, by major source categories. These figures are included here to show projected air quality trends through 2031. Baseline emissions for major source categories (i.e., point, area, on-road, and off-road) in 2012 are provided in Figure 4.1-1. Figure 4.1-2 shows the projected future 2031 emission inventory that would be expected if no new AQMP control measures are subsequently promulgated as rules. It does, however, take into account emission reductions anticipated to be achieved for existing rules with future compliance dates.

A comparison of Figures 4.1-1 and 4.1-2 indicates that the on-road mobile category continues to be a major contributor to CO and NOx emissions. However, because implementation of most of the mobile source rules and regulations will occur by 2023, the contribution of on-road mobile sources by 2031 account for much less of the VOC, NOx, and CO emissions as compared to 2012, as follows: about 14 percent of total VOC emissions compared to 33 percent in 2012; about 30 percent of total NOx emissions compared to 56 percent in 2012; and about 26 percent of total CO emissions compared to 63 percent in 2012. For directly emitted PM2.5 emissions, mobile sources will represent 23 percent of the emissions with another 14 percent attributable to vehicle-related entrained road dust and a reduction from the mobile source contribution in the base year. Stationary sources are projected to emit the majority of the SOx emissions from the point source category, contributing 57 percent of the SOx emissions in the Basin. In 2031, area sources will play even a larger role in VOC emissions, emitting more than point sources and mobile sources combined. Area sources will become the major contributor to VOC emissions from 37 percent in 2012 to 54 percent in 2031 and are projected to remain the predominant source of directly emitted PM2.5 emissions (49 percent).

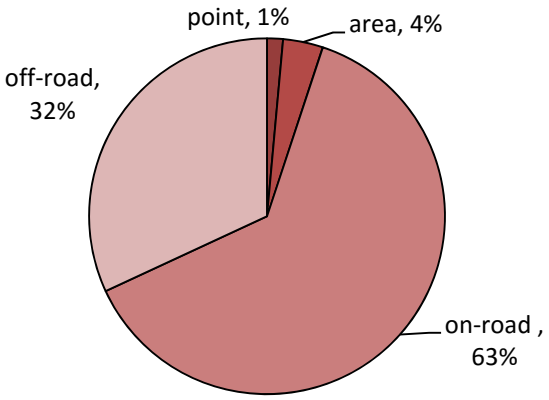
FIGURE 4.1-1 (REVISED)
CONTRIBUTION BY SOURCE CATEGORY TO 2012 EMISSION INVENTORY.
(VOC & NOX – SUMMER PLANNING; CO, SOX, & PM2.5 – ANNUAL AVERAGE)



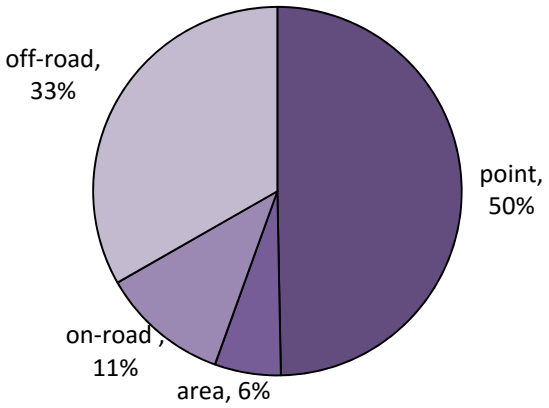
VOC Emissions: 500 tons/day



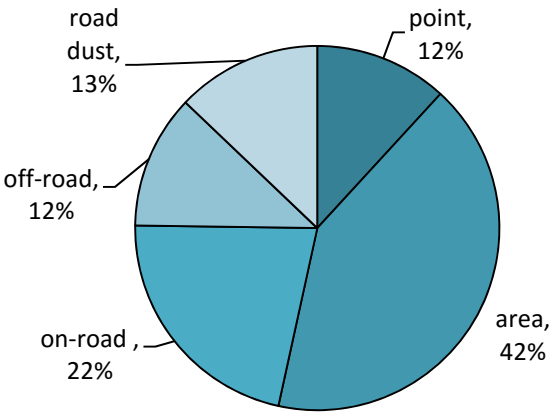
NOx Emissions: 522 tons/day



CO Emissions: 2123 tons/day

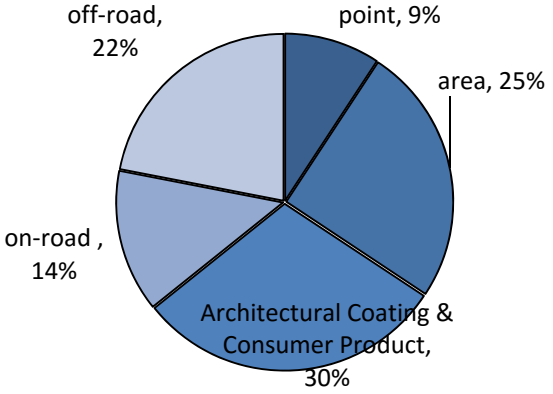


SOx Emissions: 18 tons/day

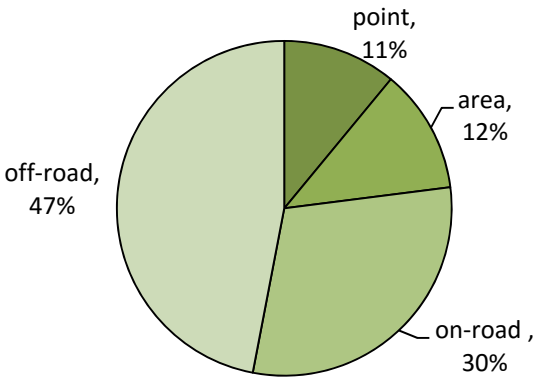


Directly Emitted PM2.5 Emissions: 66 tons/day

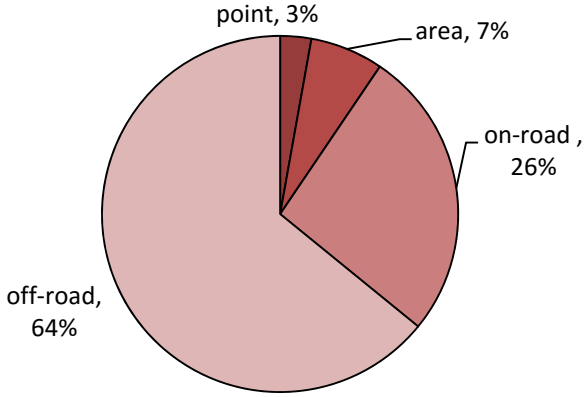
FIGURE 4.1-2 (REVISED)
CONTRIBUTION BY SOURCE CATEGORY TO 2031 EMISSION INVENTORY.
(VOC & NOX – SUMMER PLANNING; CO, SOX, & PM2.5 – ANNUAL AVERAGE)



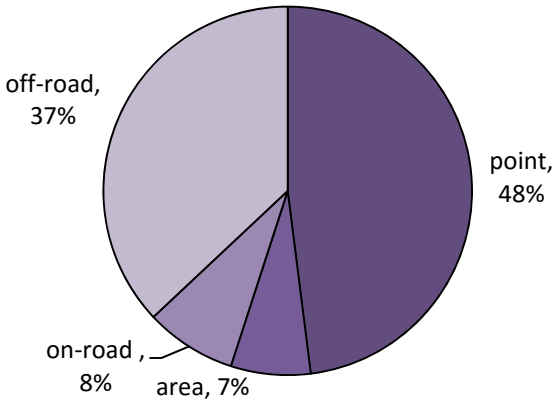
VOC Emissions: 362 tons/day



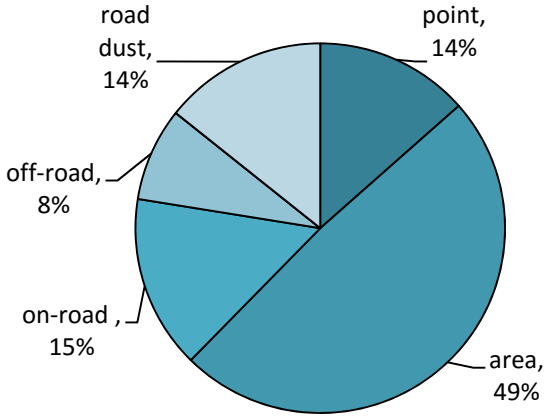
NOx Emissions: 214 tons/day



CO Emissions: 1118 tons/day



SOx Emissions: 18 tons/day



Directly Emitted PM2.5 Emissions: 65 tons/day

4.1.5 2016 AQMP AIR QUALITY MODELING RESULTS

The 2016 AQMP ozone and PM2.5 attainment demonstration has been developed using the U.S. EPA- supported Community Multiscale Air Quality (CMAQ) (version 5.0.2) modeling platform with SAPRC07 chemistry, and the Weather Research and Forecasting Model (WRF) (version 3.6) meteorological fields. PM2.5 and ozone were modeled simultaneously using the one-atmosphere modeling platform. Ozone attainment demonstrations focused on the period from May through September, while PM2.5 was analyzed for the entire year. The simulations were conducted over an area with a western boundary over 100 miles west of the Ports of Los Angeles and Long Beach. The eastern boundary extends slightly beyond the Colorado River while the northern and southern boundaries of the domain extend to the San Joaquin Valley and the Northern portions of Mexico, respectively. CMAQ was simulated with a 4-kilometer grid resolution.

For the 2016 AQMP, WRF was updated with the most recent version (version 3.6.1) available at the time of protocol preparation and was evaluated with a set of input data, which includes land-use classification and sea-surface temperature initialization fields. The WRF simulations were initialized from National Centers for Environmental Prediction (NCEP) analyses and run for 3-day increments with four-dimensional data assimilation (FDDA).

Day-specific point source emissions were extracted from the SCAQMD stationary source and RECLAIM inventories. Mobile source emissions included day and hour real-time profiles based on the CALTRANS Performance Measurement System and weight-in-motion profiles, CARB's EMFAC2014 emissions model, and vehicle population data and transportation analysis zone (TAZ) data provided by SCAG. The mobile source data and selected area source data were subjected to daily WRF-derived temperature corrections to account for enhanced evaporative emissions on warmer days. Gridded daily biogenic VOC emissions were provided by CARB using the MEGAN biogenic emissions model. The simulations benefited from enhancements made to the emissions inventory, such as day-specific adjustments in traffic volumes when generating on-road emissions and improvements in gridding surrogates for spatial allocations of area and off-road emissions.

Detailed information on the modeling approach, data retrieval, model development and enhancement, model application, emissions inventory development, and interpretation of results is presented in Chapter 5 of the 2016 AQMP. The following sections summarize the results of the 8-hour/1-hour ozone and annual/24-hour PM2.5 attainment demonstration modeling efforts and provide an update to the future projected ozone and PM2.5 levels given new emissions estimates, the latest air quality measurements, and modeling tools.

4.1.5.1 PM2.5 Air Quality

Within the Basin, PM2.5 particles are either directly emitted into the atmosphere (primary particles), or are formed through atmospheric chemical reactions from precursor gases (secondary particles). Primary PM2.5 includes road dust, diesel soot, combustion products, and other sources of fine particles. Secondary products, such as sulfates, nitrates, and complex carbon compounds are formed from reactions with oxides of sulfur, oxides of nitrogen, VOCs, and ammonia.

PM2.5 speciation data measured at four sites during 2012 provided the chemical characterization for evaluation and validation of the CMAQ model predictions. With one site in each county, the four sites are strategically located to represent aerosol characteristics in the four counties in the Basin. Riverside-Rubidoux was traditionally the Basin's maximum location. Fontana and Anaheim experience high concentrations within their respective counties, and the Central Los Angeles site was intended to capture the characteristics of an emission source area. The close proximity of Mira Loma to Rubidoux combined with the common in-Basin air flow and transport patterns enable the use of the Rubidoux speciated data as being representative of the particulate speciation at Mira Loma. Both sites are located directly downwind of the dairy production areas in Chino and the warehouse distribution centers in the northwestern corner of Riverside County. Speciated data were monitored at the selected sites for MATES IV during the period from June 2012 to June 2013, and were analyzed to corroborate the applicability of using the 2012 chemical profiles.

Model performance was evaluated against concentrations of ammonium, nitrates, sulfates, secondary organic matter, elemental carbon, primary, and total mass of PM2.5 measured at the four monitoring sites (Rubidoux, Central Los Angeles, Anaheim, and Fontana).

The federal annual PM2.5 standards are predicted to be achieved in 2023 due to the implementation of the proposed ozone strategy. However, the federal CAA does not allow 182(e)(5) measures in the attainment demonstration of PM2.5; therefore, an additional scenario using only non-182(e)(5) measures was developed for 2025 in order to comply with the CAA requirements. With only the non-182(e)(5) measure reductions, the annual PM2.5 standard is expected to be met in 2025. The California annual PM2.5 standard will be achieved in 2025 under this scenario.

4.1.5.2 Ozone Air Quality

The set of 153 days from May 1, 2012 through September 30, 2012 was analyzed to determine the 8-hour maximum ozone for the base year 2012 and future attainment years of 2023 and 2031—the attainment years for the 1997 standard of 80 ppb and the 2008 standard of 75 ppb, respectively. Both baseline and controlled cases were simulated. The former represents the level of emissions with no additional reductions beyond existing measures, and the latter contains additional emission reductions proposed in the 2016 AQMP to reach attainment.

Finally, a set of simulations with incremental VOC and NOx emission reductions from 2023 and 2031 baseline emissions were generated to create ozone isopleths for each station in the Basin. The ozone isopleths provide guidance in developing control strategies by depicting ozone concentrations as a function of both NOx and VOC reductions. They provide the basis for estimating the Basin carrying capacity, e.g., the maximum allowable emissions of NOx and VOC that can occur while still being able to reach attainment.

The 2016 AQMP baseline ozone simulations reflect the changes made to the 2023 and 2031 baseline inventories. The 2016 AQMP summer planning inventory for 2023 has a similar VOC-to-NOx emissions ratio (1.35 vs. 1.37) as the 2012 AQMP, although the total tonnages of both precursor emissions are lower than those presented in the 2012 AQMP. Lower 2023 baseline VOC and NOx emissions in the 2016 AQMP relative to the 2012 AQMP reflect the impact of the

recession occurring between 2008 and 2010. The 2012 AQMP, for which the base year was 2008, did not fully capture the duration of the economic downturn and over-estimated near-term growth. The new 2016 AQMP inventory has been revised to properly account for these circumstances. With the controls proposed in the 2016 AQMP, the future year ozone concentrations are expected to meet the federal standards.

The carrying capacities, the maximum allowable NOx emissions that can occur while still being able to meet the ozone standards, are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Approximately 16 percent of NOx reductions from the 2012 baseline are needed to meet the 1-hour ozone standard by 2022, confirming that the 8-hour standard is more stringent than the 1-hour standard. The strategies developed for attainment of the 2023 and 2031 8-hour standards will ensure attainment of the 1-hour standard by 2022.

The California standard for 8-hour ozone is 70 ppb, the same level as the 2015 revised federal standard, but this state standard will not be achieved by 2031. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 will be needed in order to meet the 70 ppb standard.

4.1.6 IMPACT ANALYSIS

Air quality impacts are potential increases in air pollutants that can occur directly or indirectly from implementing the control measures in the 2016 AQMP. SCAQMD staff evaluated all 2016 AQMP control measures to identify those control measures that have the potential to generate adverse air quality impacts.

It is expected that many 2016 AQMP control measures will be either incentivized or promulgated as rules, laws, or ordinances by state (California), regional (SCAQMD, special districts, and counties), and local (cities) agencies. Because requirements in rules, laws, and ordinances can be enforced by the adopting agency, maximizing potential impacts has been determined to be the most appropriate, conservative approach needed in order to properly analyze and disclose the potential air quality impacts in this Program EIR. A number of control measures, however, involve incentives or voluntary compliance in order to achieve emission reductions. Since these types of control measures are not enforceable because they do not involve the adoption of a rule, law or ordinance by applicable agencies, the magnitude of impacts is uncertain. To further provide a conservative analysis of potential air quality impacts from adopting and implementing the 2016 AQMP, the incentive or voluntary control measures will be considered in the same manner as control measures that are expected to be adopted by applicable agencies in order to maximize the potential impacts from these control measures.

Table 4.1-1 identifies only those control measures that have the potential to generate air quality impacts and the types of air quality impacts for each control measure. Therefore, the analyses of air quality impacts in the following subsections are based on the evaluation of control measures identified in Table 4.1-1.

4.1.6.1 Criteria Pollutants – Construction Activities

While implementing the 2016 AQMP control measures, operational emissions are expected to be reduced while construction-related activities associated with installing or replacing equipment, for example, are expected to generate emissions from construction worker vehicles, transport trucks, and construction equipment. Implementing some of the measures in the 2016 AQMP would require constructing the following categories of new infrastructure including: 1) the demolition or removal of an existing envelope (existing building components or structures), mechanical systems, and/or water heating systems, and the construction or replacement with new energy efficient structures, mechanical systems, and/or water heating systems; 2) the construction of additional infrastructure to support alternative-fueled vehicles (electric, hydrogen, natural gas) and the electrification of new sources (e.g., additional on-road vehicles and marine vessels, "wayside" electric or magnetic power such as catenary lines); and 3) the construction of control equipment at stationary sources (e.g., SCRs, SNCRs particulate controls, and vapor recovery systems) or the use of cleaner stationary sources (e.g. Tier 4 engines and newer boilers). The following paragraphs identify the 2016 AQMP control measures that have the potential to generate construction emissions described in the aforementioned categories.

Control measures in the 2016 AQMP that have the potential to generate construction impacts from the demolition or removal of an existing envelope (existing building components or structures), mechanical systems, and/or water heating systems and constructing or replacing these with new energy efficient structures, mechanical systems, and/or water heating systems include the following: ECC-03 and ECC-04.

Control measures in the 2016 AQMP that have the potential to generate construction emission impacts from constructing infrastructure to provide support for new cleaner equipment or vehicles include the following: MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-10, MOB-13, MOB-14, ORHD-05, ORHD-08, ORHD-09, ORFIS-04, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-06, OFFS-07, and OFFS-08.

Control measures in the 2016 AQMP that may require construction activities in connection with the construction of control equipment at stationary sources or cleaner stationary sources (e.g., SCRs, SNCRs, particulate controls, and vapor recovery systems) include the following: CMB-01, CMB-02, CMB-03, CMB-05, FLX-02, BCM-01, BCM-02, BCM-05, BCM-06, BCM-07, BCM-09, BCM-10, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, and TXM-09.

In addition to control measures designed to bring the Basin into attainment with all AAQSs, the 2016 AQMP includes baseline and future regional emission inventories for all quantifiable emissions sources in the Basin (see 2016 AQMP Appendix IV-A). The baseline and future emission inventories in Appendix IV-A include the construction and demolition category, which is primarily related to dust generating activities such as trenching, grading, loading, etc. To capture emissions from construction equipment, Appendix III also includes baseline and future inventories for off-road equipment. The analysis of construction air quality impacts from implementing the 2016 AQMP control measures assumes that all off-road equipment is comprised of construction equipment. The analysis of construction emission impacts from implementing 2016 AQMP control measures also assumes that those control measures previously discussed and listed in Table 4.1-1 as having the potential to generate construction emissions will contribute to future regional

construction and demolition emission inventories. The exact scope of the construction activities necessary to implement the proposed control measures is not known at this time. However, the control measures required to implement the 2016 AQMP are similarly crafted to some control measures which have been implemented at facilities due to SCAQMD rulemaking.

The typical construction scenario of an air pollution control device at an existing facility consists of the following phases and associated on-road and off-road construction equipment:

- Grading/Site Preparation: Rubber Tired Dozers, Tractors/Loaders/Backhoes, Construction Workers' Vehicles, and Medium Duty Trucks
- Paving: Pavers, Cement/Mortar Mixers, Rollers, Construction Workers' Vehicles, and Medium Duty Trucks
- Installing/Constructing Air Pollution Control Device(s): Cranes, Forklifts, Tractors/Loaders/Backhoes, Construction Workers' Vehicles, and Medium Duty Trucks

Construction emissions were estimated for these various construction phases associated with the installation of air pollution control devices[1]. In addition, criteria pollutant emissions were calculated for all on-road vehicles transporting workers, vendors, and material removal and delivery. The analysis assumes that each phase must be entirely completed before the next phase can commence such that there would be no overlap of construction phases for the construction of the new control devices. Table 4.1-3 summarizes the construction emissions that would be expected to occur as a result of installing one air pollution control device at one facility. (See Appendix C for detailed assumptions and calculations.) Although the construction emissions at each individual facility might not exceed the SCAQMD's CEQA significance thresholds, it is foreseeable and likely that on any given day, construction of one or more control devices in order to comply with the 2016 AQMP could occur at more than one facility. Based on the results in Table 4.1-3, if more than four facilities or more than four control devices were concurrently constructed on any given day, the emissions would exceed the SCAQMD's air quality significance thresholds. Therefore, construction emissions are considered significant.

[1] In general, no or limited construction emissions from grading are anticipated because modifications or installation of new equipment would occur at existing industrial/commercial facilities and, therefore, would not be expected to require earthmoving, grading, etc.

TABLE 4.1-3

Typical Peak Daily Construction Emissions for Control Devices in the Basin (lbs/day)

Source Category	VOC	NOx	CO	SOx	PM10	PM2.5
Grading/Site Preparation	2.7	25	11	0.0	3.9	1.6
Paving	0.2	12	8	0.01	0.7	0.7
Device Installation	3.4	30	15	0.0	1.4	1.3
Maximum Emissions (1 Facility)	3.4	30	15	0.01	3.9	1.6
Maximum Emissions (4 Facilities)	13.6	120	60	0.04	15.6	6.4
SCAQMD Significance Thresholds	75	100	550	150	150	55
Significant? (YES/NO)	NO	YES	NO	NO	NO	NO

Source: Appendix C

Note: Each construction phase includes emissions from worker vehicles and truck trip deliveries and hauling

The SCAQMD has developed localized significance thresholds for criteria pollutant emissions to determine whether or not a project may generate significant adverse localized air quality impacts. An analysis of localized air quality impacts for criteria pollutant emissions is not applicable to regional projects such as local general plans, specific plans, or AQMPs (SCAQMD, 2008) because the details of the individual projects to implement these types of plans and their locations are not known at this time. Therefore, a localized air quality impact analysis has not been performed for the 2016 AQMP in this Program EIR.

4.1.6.2 Criteria Pollutants – Operational Activities

The federal annual PM2.5 standards are predicted to be achieved by 2023 via the implementation of the proposed ozone strategy. However, the federal CAA does not allow 182(e)(5) measures in the attainment demonstration of PM2.5; therefore, an additional scenario using only non-182(e)(5) measures was developed to comply with the CAA requirements by 2025. With only the non-182(e)(5) measure reductions, the annual PM2.5 standard is expected to be met by 2025. As shown in Figure 4.1-3, the California annual PM2.5 standard is also expected to be achieved by 2025 under this scenario.

The carrying capacities, the maximum allowable NOx emissions that can occur will still being able to meet ozone standards, are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Approximately 16 percent of NOx reductions from the 2012 baseline are needed in order to meet the 1-hour ozone standard by 2022, confirming that the 8-hour standard is more stringent than the 1-hour standard. The strategies developed for the attainment of the 2023 and 2031 8-hour standards will ensure attainment of the 1-hour standard by 2022.

The California standard for 8-hour ozone is 70 ppb, the same level as the 2015 revised federal standard, but this state standard will not be achieved by 2031. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 will be needed in order to meet the 70 ppb standard (see Figure 4.1-4).

FIGURE 4.1-3
PROJECTION OF FUTURE ANNUAL PM2.5 CONCENTRATIONS

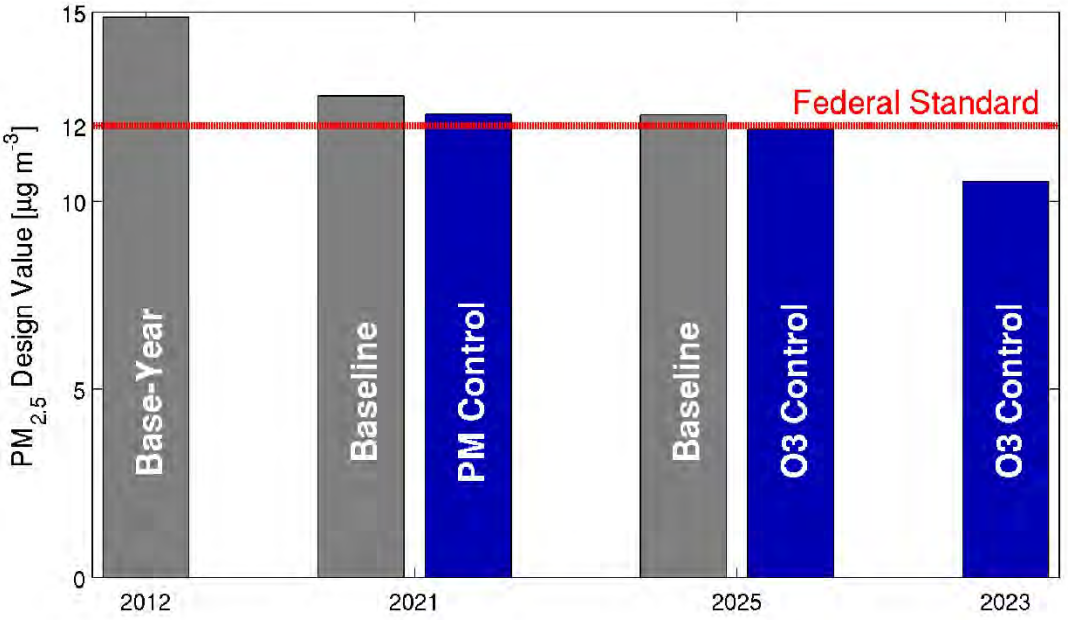
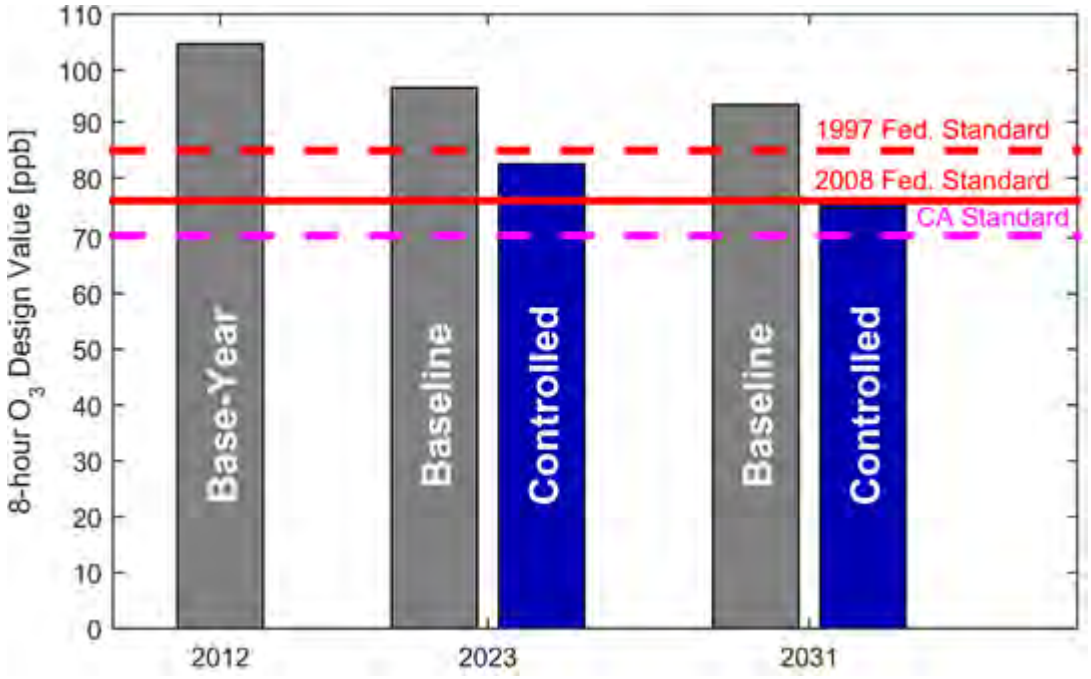


FIGURE 4.1-4
PROJECTION OF FUTURE 8-HOUR OZONE CONCENTRATIONS



4.1.6.2.1 Impacts from Increased Electricity Demand

Implementation of the control measures in the 2016 AQMP is expected to increase the future demand for electricity in two ways. First, electricity is often used as the power source to operate various components of add-on air pollution control equipment and electric construction equipment that may be required, in lieu of diesel- or gasoline-fueled construction equipment, by future rules in order to reduce emissions from the combustion of fuels. Second, a number of 2016 AQMP control measures may increase the future demand for electricity as a result of projected increases in the penetration of electric on-road and off-road vehicles in fleets regulated by the SCAQMD and by replacing existing equipment with zero or near-zero equipment.

Electricity Demand Impacts from Operating Air Pollution Control Equipment

There are a variety of different types of air pollution control equipment that use electricity to reduce criteria pollutant emissions including, but not limited to, the following: electrostatic precipitators (ESPs), ventilation systems, fan motors, vapor recovery systems, SCR, SNCR, etc. As such, an increased demand for electricity may cause electricity providers to increase the generation of power, which in turn could result in increased indirect emissions of criteria pollutants in the Basin and in other portions of California if electricity is imported to the Basin. The stationary source measures that may result in an increased demand for electrical energy due to operation of add-on air pollution control equipment are included in Table 4.1-1 and the types of air pollution control equipment that may increase demand for electricity are described in the following bullet points. Due to a variety of factors such as the number of pieces of equipment, the size of the equipment, and the type of operations, etc., it is difficult to accurately quantify electricity demand impacts. Therefore, the following discussion provides a qualitative analysis of the potential future electricity demand impacts that may be expected to occur from the installation and operation of air pollution control equipment:

- ECC-03 would result in the installation of energy efficient equipment, but there may be an increase in electricity usage from construction.

- CMB-01 would result in the further control of NOx and VOC emissions through either the use of add-on air pollution control technologies or by replacing existing stationary combustion sources (e.g., ICEs and boilers) with zero or near-zero equipment performing the same function, including equipment that is powered by electricity.

- CMB-05 would control NOx emissions from RECLAIM sources which use electricity to operate various components of the equipment.

- BCM-01 would result in the further control of PM emissions from commercial cooking sources by installing air pollution control devices or technologies such as ESPs, filters, centrifugal separators, and misters which typically require electricity to operate.

- BCM-06 would result in the further control of PM emissions from abrasive blasting sources by installing air pollution control devices such as fume extractors, dust collectors with HEPA filters, or negative air machines which typically require electricity to operate.

- BCM-07 would result in the further control of PM emissions from stone grinding and polishing operations by using exhaust ventilation with dust collectors, wet methods like wet-wiping or wet sweeping, or by vacuuming with a HEPA filter which typically require electricity to operate.

- EGM-01 would promote infrastructure in redevelopment projects to accelerate the penetration of zero and near-zero emission technologies which typically require electricity to operate.

- TXM-01 would result in the further control of TAC and PM emissions from metal grinding operations by using cyclones, baghouses, scrubbers, and HEPA filters which typically require electricity to operate.

- TXM-02 would result in the further control of TAC and PM emissions from plating and anodizing operations by using equipment such as scrubbers, mesh pads, and HEPA filters which typically require electricity to operate.

- TXM-05 would result in the further control of TAC and PM emissions from laser plasma cutting operations by using add-on air pollution control equipment such as HEPA filters which typically require electricity to operate.

- TXM-06 would result in the further control of TAC and PM emissions from metal melting facilities by using add-on controls such as HEPA filters and filtered vacuuming which typically require electricity to operate.

- TXM-07 would result in the further control of TAC and PM emissions from stationary sources of lead by using controls such as baghouses and HEPA filters which typically require electricity to operate.

- TXM-08 would result in the further control of TAC emissions (methylene chloride) from chemical stripping operations by using carbon adsorbers which typically require electricity to operate.

- TXM-09 would result in the further control of TAC and PM emissions from oil and gas producing operations by using carbon adsorbers which typically require electricity to operate.

Electricity Demand Impacts from Electric Vehicles

In the past, AQMP control measures that were promulgated as rules or regulations were performance based in that they did not mandate a particular control technology or fuel provided that the emission control requirement or emission standard could be achieved. However, because more stringent emission control regulations are necessary in order to achieve all AAQSs, the reliance on electricity is becoming a more important component to reducing emissions from a variety of economic sectors, especially mobile sources. With regard to some of the 2016 AQMP

mobile source control measures, the analysis in the Program EIR contains assumptions regarding future electricity demand. For example, several 2016 AQMP control measures would increase the future demand for electricity as part of achieving the control measures' targets of zero and near-zero emissions from on-road and off-road vehicles. Increasing the penetration of zero and near-zero vehicles in fleets regulated by the SCAQMD would in turn increase the future demand for electricity on providers located in the Basin and in other areas of California that provide imported electricity to the Basin. For the purpose of this analysis, a zero emission vehicle is assumed to be an electric vehicle and a near-zero vehicle, also known as an AT-PZEV (an acronym for Advanced Technology Partial Zero Emission Vehicle) is assumed to be a vehicle that meets the super ultra-low emission vehicle (SULEV) and PZEV tailpipe emissions requirements.

While the electrification of motor vehicles and other commercial and industrial equipment would greatly reduce fossil fuel usage in the Basin, concurrently, there may be an increased demand for electricity and a corresponding increase in emissions associated with electricity generation. SCAQMD staff met[2] with representatives from representatives from Southern California Edison (SCE) and the Los Angeles Department of Water and Power (LADWP), two power producers in the Basin, to discuss the potential adverse impacts on the current electrical grid, the need for additional power generation, and any reliability concerns that may be caused by the adoption of their proposed Protocol. Both SCE and LADWP have forecasted the potential load impacts on electricity demand that would be expected to occur from increased charging of electric vehicles in the future. Representatives from the SCE and LADWP have indicated that they currently do not have the need to build any new electric generation facilities or alter the transmission system due to projected EV charging demands. Additionally, according to the most recent Integrated Resource Plan (IRP) published in December 2014, the LADWP has determined that the doubling of electric vehicles will not require additional generation or transmission beyond currently planned upgrades. Both of these electric utility companies have indicated that they will be able to meet the increased energy demands if the 2016 AQMP is implemented because excess power from renewable sources of energy such as solar and wind power is expected. The associated emissions from the increased electricity generation needed to meet this projected energy demand have been included in the emissions inventory of the 2016 AQMP.

Relative to existing electricity use and projected future peak electricity demand from the 2016 AQMP, implementation of the AQMP control measures is expected to result in an overall worst-case increase from baseline year 2016 of approximately 10,227 gigawatt-hours (GWh) in the year 2023 and 18,029 GWh in 2031 (see Subchapter 4.2 – Energy of this Program EIR). The 2012 AQMP Final Program EIR, which also evaluated increased electricity demand from AQMP control measures, noted that there were a number of power plant projects planned in southern California to meet future electricity needs. From year 2012 through 2014, in southern California, new power plants representing over 2,900 MW of electricity generation have become operational while additional power plant projects representing 785 MW are currently under construction[3], and a number are in the planning stages (CEC, 2016m).

[2] Meeting with representatives from SCE, LADWP, and SCAQMD at SCAQMD Headquarters on December 12, 2014.

[3] Neither of the power plant facilities currently under construction is located within the boundaries of the SCAQMD.

Electricity generation within the Basin is subject to applicable SCAQMD rules such as Rule 1134 – Emissions Oxides of Nitrogen from Stationary Gas Turbines, Rule 1135 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines, and Regulation XX – RECLAIM. These rules and regulations specifically regulate NOx emissions (the primary pollutant of concern from natural gas combustion to generate electricity) from existing power generating equipment. Although emissions from existing electric utilities in the Basin are capped under the RECLAIM program (or under Rule 1135), any new power generating facilities needed in the Basin to accommodate increased electricity demand would be subject to SCAQMD Regulation XIII – New Source Review or Rule 2005 – New Source Review for RECLAIM. Both Regulation XIII and Rule 2005 require: 1) the installation of BACT; 2) air quality modeling to demonstrate that the emission increases would not result in significant air quality impacts (so there would be no localized impacts); and 3) emission offsets (through either the facility's own emission reduction credits (ERCs) via Regulation XIII or RECLAIM trading credits (RTCs) via Regulation XX before permits can be issued. If a facility provides ERCs to offset the increase in NOx emissions, the facility would be required to provide the ERCs at a ratio of 1.2 to 1.0. For example, 1.2 pounds of NOx ERCs would be required to offset an increase of 1.0 pound of NOx emission from the new power generating source. However, if a facility is in the NOx RECLAIM program, the NOx RTC offset ratio is 1.0 to 1.0 such that 1.0 pound of NOx RTCs would be required to offset 1.0 pound of NOx emissions from the new power generating source at a RECLAIM facility. Going forward, any new power generating projects would be incorporated into the emission inventories used in future AQMPs and additional control measures would be identified, if necessary and feasible, to limit NOx emissions from power generating sources. The 2016 AQMP is expected to achieve an overall net NOx emission reduction sufficient to maintain attainment with all NO2 ambient air quality standards and, because NOx is an ozone precursor, continue making expeditious progress in achieving the federal one-hour and eight-hour ozone standards.

Concurrent with the anticipated increased demand for electricity generated as a result of implementing the 2016 AQMP control measures, the amount of gasoline and diesel fuels and the corresponding emissions from combustion would be expected to be reduced. In particular, combustion emissions from gasoline and diesel fuels would be displaced by combustion emissions from natural gas, which is the primary fuel used for generating electricity in the Basin. The quantity of emissions from diesel and gasoline combustion are much higher than emissions from the combustion of natural gas. For this reason, the amount of combustion emissions from electricity generation are expected to decline in the future.

It is important to note that there could be an increase in emissions from generators that may be used to charge batteries in remote locations where no grounded power source is available. Generators are regulated sources in the Basin and existing SCAQMD regulations that apply to generators and emergency generators would also apply to generators used to charge batteries. New generators would be subject to SCAQMD Rule 1470 - Requirements for Stationary Diesel Fueled Internal Combustion (IC) and other Compression Ignition (CI) Engines in addition to Regulation XIII or Rule 2005 for RECLAIM facilities. Existing generators are subject to SCAQMD Rule 1110.2 – Emissions from Gaseous and Liquid Fueled Internal Combustion Engines. While Rule 1110.2 does not establish a facility emission cap, per se, it contains a stringent NOx emission rate based on the engine category. Small portable equipment may also be regulated under the state registration program, which contains emission limitations for NOx, VOCs, and CO.

For electricity generating facilities located outside of the Basin, the SCAQMD rules and regulations discussed above do not apply. In 2014, about 67 percent of the electricity used in California was generated in-state and about 33 percent was imported (see Section 3.3.2 of this Program EIR). While the electricity generating facilities located outside of the Basin would not be subject to SCAQMD rules and regulations, rules and regulations of the local air pollution control agencies and the U.S. EPA would still apply. Depending on an area's attainment status, state or local air pollution control agencies are required to establish New Source Review regulations for new and modified facilities that generally require compliance with BACT or lowest achievable emission reduction technology. Most in-state electricity generating plants use natural gas, which provides a relatively clean source of fuel (as compared to coal- or diesel-fueled power plants).

As of year 2014, approximately 21 percent of electricity generated in California was generated by renewable sources such as biomass, geothermal, small hydro, solar, and wind, which are clean sources of energy. Renewable sources of electricity generate little, if any, air pollutant emissions. An increased use of renewables and other clean technologies is expected to continue minimizing emissions from the generation of electricity. State law requires power producers to increase the amount of renewable energy used to generate electricity by 20 percent in 2017, by 33 percent in 2020, and by 50 percent in 2030.

SB 1368 (Perata, Chapter 598, Statutes of 2006) set an Emission Performance Standard (EPS) for California load-serving entities (LSE) such as Pacific Gas and Electric (PG&E) and Los Angeles Department of Water & Power (LADWP). The EPS has been a driving force behind California's utilities ending or planning to end, affiliations (contracts and/or ownership) with coal- and petroleum coke-fired generation resources, especially with large out-of-state plants. As a result, according to the CEC, by 2026, virtually all electricity generated by known coal- and petroleum coke-fired generation resources to serve California loads is expected to end (CEC, 2015). Further, oil-fired generators are also unlikely to be able to meet the EPS.

As noted earlier, the 2016 AQMP is designed to reduce criteria pollutant emissions in order to meet federal air quality standards and achieve corresponding beneficial reductions in toxic risk and GHG emissions for an overall air quality benefit. The 2016 AQMP has the potential to create a significant impact on electricity demand; however, the existing and future air quality and GHG rules and regulations are expected to minimize operational emissions associated with increased electrical generation. Furthermore, the electricity providers have committed to meeting the increased demand while complying with applicable regulations. Therefore, implementation of the 2016 AQMP control measures are not likely to generate significant adverse air quality impacts due to increased demand for electricity. In addition, future sources of electricity are increasingly being generated by renewable resources. For example, 700 MW of electricity is currently being generated by solar projects located in the four-county region[4].

[4] https://www.californiasolarstatistics.ca.gov/reports/locale_stats/

4.1.6.2.2 Impacts from Control of Stationary Sources

A number of 2016 AQMP control measures are expected to generate emission reductions from the installation and operation of air pollution control equipment. The various types of air pollution control equipment typically target one or more criteria and TAC pollutants. Although control measures generally identify the most effective types of air pollution control equipment for the target pollutant for each source category, operation of the air pollution control equipment may have the potential to generate other pollutants. The following discussions identify the 2016 AQMP control measures that may result in the installation of control equipment that will reduce emissions of the target pollutant(s), but will also have the potential to generate emissions of a different pollutant, resulting in potential air quality impacts. The following discussions focus only on those air pollution control technologies with the potential to generate air pollutants. Other types of air quality impacts such as construction emissions to install air pollution control equipment, emissions from electricity production due to increased electricity demand, etc., are not discussed in this subsection as they are addressed elsewhere in this subchapter.

Control Measure CMB-02 seeks annual average NOx emission reductions from unregulated commercial space heating furnaces by incentivizing the replacement of existing older boilers, water heaters, and space heating furnaces. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial boilers, water heaters and furnaces used for heating. The control measure has two components: 1) to continue to implement the NOx emission limit (14 ng/J (20 ppm) in SCAQMD Rule 1111 - Reduction of NOx Emissions From Natural-Gas-Fired, Fan-Type Central Furnaces, for residential space heaters starting in 2014; and 2) to incentivize the replacement of older boilers, water heaters, and space heaters with newer and more efficient low NOx boilers, water heaters, space heaters, and/or "green technologies" such as solar heating or heat pumps. The new boilers and water heaters would be required to comply with SCAQMD rule emission limits and the new space heaters would be required to meet a specified emission limit. If needed, the SCAQMD will consider amending Rule 1111 along with SCAQMD Rule 1121 – Control of Nitrogen Oxides from Residential Type, Natural Gas-Fired Water Heaters, to add a heat input based emission limit which will result high efficiency units with lower NOx emissions when compared to standard efficiency units. Currently these rules contain heat output based limits which means that high efficiency water heaters and furnaces emit the same amount of NOx per day as standard efficiency units. In addition, the SCAQMD will also consider developing a new rule to limit NOx emissions from certain commercial and residential heating furnaces which are currently unregulated.

Control Measure CMB-05 includes further NOx reductions such as reducing the NOx annual allocation and available RTCs for some NOx RECLAIM facilities. Under RECLAIM program, operators of affected facilities are currently able to choose the most effective method for reducing NOx emissions. Options to comply with NOx RECLAIM could include: reducing operations, installing NOx control equipment, using excess RTCs generated by the facility, or purchasing excess RTCs from other RECLAIM facilities.

The RECLAIM program is subject to several legal mandates. The Health and Safety Code requires the SCAQMD to monitor the advancement in BARCT, and if BARCT advances, the SCAQMD is required to periodically re-assess the overall facility caps, and to reduce the RTC holdings to a

level equivalent to command-and-control BARCT levels. CMB-05 identifies a series of approaches that can be explored to make the RECLAIM program more effective in ensuring equivalency with command-and-control regulations implementing BARCT, and to potentially generate further NOx emission reductions at RECLAIM facilities.

One of the approaches in CMB-05 for obtaining further NOx emission reductions would be to apply command-and-control regulation overlays to certain RECLAIM facilities. Such an approach would likely require installation of air pollution control technologies to further control NOx emissions. The most likely air pollution control technology expected to be installed is SCR which has been used to control NOx emissions from stationary sources for many years. Although SNCRs could also be used as a control device, the use of SCRs would result in larger emission reductions than SNCRs and a corresponding lower use of ammonia. In order to estimate impacts from the worst-case, it is assumed that SCRs will be constructed as part of the 2016 AQMP. SCR operates by injecting ammonia into the exhaust stream to promote chemical reactions through contact with a catalyst to prevent the formation of NOx. The ammonia converts NOx to elemental nitrogen and oxygen in an oxidizing environment. As the exhaust gases along with the ammonia pass over the catalyst, 75 to 90 percent of NOx emissions that would otherwise be formed would be reduced. In addition, SCR is effective at reducing 50 to 90 percent of the VOC emissions, and 30 to 50 percent of the PM10 emissions.

When using SCR, there is the potential for the secondary formation of particulate matter (PM) from ammonia slip due to excess ammonia in the exhaust stream. Over the years, the CEQA documents prepared by the SCAQMD for NOx control rules have evaluated the potential for secondary PM formation from SCR systems. As part of the analyses prepared for multiple CEQA documents specific to the SCAQMD's NOx control rules, the SCAQMD conducted an extensive literature review and contacted a number of SCR manufacturers and vendors. The results of this data collection effort indicated that the amount of ammonia slip remaining in the exhaust stream depends on a variety of factors including space velocity, ammonia to NOx molar ratio, temperature, and NOx inlet concentration.

Initially, the analysis indicated that SCRs in use at that time typically had an ammonia slip level ranging from approximately 10 to 20 ppm. Ammonia slip levels in this range were the result of the following factors. First, to ensure maximum NOx reduction efficiency, SCR operators typically injected excess ammonia (e.g., a higher ammonia to NOx molar ratio, into the flue gas to ensure achieving the appropriate NOx reduction reaction). Any excess ammonia that did not react with the NOx, passed or "slipped" through the reactor vessel and was released into the atmosphere. To account for an inevitable decline in the effectiveness of the catalyst over time, to achieve the same NOx reductions, it often became necessary to increase the amount of ammonia injected into the flue gas, which in turn increased the amount of ammonia slip. The analysis also found that one of the main operational problems that contributed to ammonia slip was due to an uneven distribution of NOx in the duct ahead of the catalyst, which created a non-uniform mixture of ammonia and NOx over the entire cross-section of the duct and resulted in high levels of ammonia slip. Finally, the early CEQA documents prepared by SCAQMD staff for NOx control rule projects indicated that ammonium nitrate (NH4NO3) could also be formed at temperatures less than 169° C.

The SCAQMD's early CEQA documents for NOx control rule projects concluded that the formation of ammonium nitrate (NH4NO3) would not create a significant adverse air quality impact if ammonia slip was reduced to 10 ppm or less. However, since the early 1990s, the SCR technology has progressed substantially through development of better injection systems that result in a more even distribution of NOx ahead of the catalyst so that the potential to generate ammonia slip is reduced. Further, ammonia injection rates are now more precisely controlled by model control logic units that work in combination of feed-back control and feed forward control using a proportional/integral controller that sets flow rates by predicting SCR outlet ammonia concentrations and calibrating them to a set reference value. Other approaches for reducing ammonia slip include: maintaining a proper ammonia to NOx molar ratio, decreasing the exhaust gas flow rate, maintaining consistent exhaust velocity, and maintaining an optimal temperature regime. As a result of these advances, SCAQMD revised its NOx control rules by limiting ammonia slip to 5.0 ppm or less and this is included as an enforceable permit condition on the SCAQMD permit to construct/operate. In addition, operators are required to monitor ammonia slip by conducting an annual source test and to operate a continuous emissions monitoring system (CEMS) to accurately monitor the ammonia-to-emitted-NOx mole ratio at the inlet of the SCR. Lastly, amendments to SCAQMD Rule 1325 – Federal PM2.5 New Source Review Program are currently being proposed that will regulate ammonia (NH3) as a pollutant that will require offsets, BACT, and modeling.

Another type of potential air quality impact from SCRs is the potential for SCR catalysts to promote SO2 to SO3 oxidation. Since the early 1990s, catalyst research has focused on reducing SO2 oxidation. Over 25 years ago, SCR vendors reported that SO2 oxidation of their catalysts was less than one to four percent (SCAQMD, 1990). SO2 to SO3 conversion has been reduced by decreasing the amount of active ingredient (typically vanadium pentoxide) in the catalyst, adding an active element as a promoter and improving the dispersion of active elements. SCR vendors have indicated that problems with ammonium particulates tend to be minimal if the amount of ammonia slip in the flue gas averages less than five to 10 ppm. Generation of particulate matter due to the creation of ammonium bisulfate (NH4HSO4) and ammonium sulfate ((NH4)2SO4), can be alleviated by reducing the amount of ammonia slip (SCAQMD, 1990).

In addition to the current limit of ammonia slip (e.g., 5.0 ppm or less), the 2016 AQMP contains control measure BCM-05, which would further limit the amount of ammonia slip from air pollution control equipment such as SCR. This control measure would require continued advances in SCR catalyst technologies to reduce potential ammonia slip to less than currently required levels.

Control measure BCM-04 is expected to reduce ammonia emissions (a PM2.5 precursor) from livestock waste, with an emphasis on reducing emissions from dairy manure. There are a number of control approaches that could be implemented to achieve ammonia emission reductions, but only thermal gasification was identified as having the potential to generate air quality impacts from control equipment operation. Gasification is a thermal conversion process in which both heat and a combustible product gas are produced. Thermal gasification, as applied to chicken manure generated during egg-laying, for example, requires a reduction in the manure moisture content by approximately 20 percent. To achieve this reduction in moisture content, the chicken manure is fed into a thermal gasifier where moisture is evaporated, organic solids are converted into

"syngas," and mineral-rich ash is produced. Because thermal gasification requires a combustion source, combustion emissions are generated, including NOx emissions.

Although thermal gasifiers generate combustion emissions, there are a number of environmental benefits associated with the process. For example, gaseous products formed during the gasification may be further used for heating or electricity production. The main combustible gas components are CO, CO2, H2O, H2, CH4, and other hydrocarbons. Combustible gas, produced during gasification, can be cleaned and used for the synthesis of special chemical products or for the generation of heat and/or electricity. Syngas produced by the process could be ducted to a thermal oxidizer for heat generation and combustion pollutants would be generated.

Gasification producing syngas is a form of biomass energy conversion which produces a fuel that could substitute for fossil fuels in high efficiency power generation as well as in clean heat and power applications. For example, the gasification process could produce heat, this heat could in turn be used to reduce the moisture content of fresh manure. Similarly, renewable biomass and biomass-derived fuels could readily replace fossil fuels in many of the current energy utilization applications with concomitant environmental benefits. Since biomass is a carbon neutral fuel, the net emissions of CO2 (a GHG) would amount to zero (U.S. Department of Energy, 2010). Although its neutrality affects global conditions, the GHG benefits will occur locally in California.

Ash is a useful byproduct of this process and it can be used in an animal feed supplement. The ash can also be repurposed as a soil amendment to substantially increase the efficiency of and reduce the need for traditional chemical fertilizers, while greatly enhancing crop yields. The production and transportation of chemical fertilizers is fossil fuel intensive, so by reducing their use reduces the associated carbon emissions that would otherwise be generated. Moreover, ash-amended soils have the potential to reduce runoff of phosphorus into surface waters, and reduce leaching of nitrogen into groundwater.

Although the thermal gasification process is an established technology, its use as a means of reducing ammonia emissions from animal manure production is considered to be an emerging technology. However, in other applications, if the desired product is only heat, whether for industrial process heat, space heating, or water heating, the thermal gasification product may be cost effective (U.S. Department of Energy, 2010). Because thermal gasification related to manure management is in the testing stages, the costs of installing and maintaining the system may not be cost effective at this time. As a result, until further testing is done, it is not likely that this technology will become widespread, so any air quality impacts will be minimal.

4.1.6.2.3 Impacts from Using Lower VOC Materials

Unlike past AQMPs, the 2016 AQMP contains only one control measure, CTS-01, that would further reduce the VOC content of coatings, solvents, adhesives, and sealants through the promulgation of future SCAQMD rules. This is due in part because the 2016 AQMP control strategy continues to focus primarily on NOx emission reductions, with additional strategic and cost-effective VOC reductions, as the best way to minimize the general public's exposure to unhealthy ozone pollution not only in the target attainment year, but also during the course of the NOx control effort. In addition, control measure CPP-01 would further reduce VOC emissions by

revising or eliminating the exemption for low vapor pressure solvents in consumer products. Consumer products include, but are not limited to: detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products such as antiperspirants and hairsprays; home, lawn, and garden products; disinfectants; sanitizers; automotive specialty products; and aerosol paints.

The majority of the VOC emission reductions from CTS-01 are projected to come from continuing the development of the proposed amendments to SCAQMD Rule 1168 – Adhesive and Sealant Applications, where were suspended in 2014. In addition, the following SCAQMD rules may be affected by this control measure, RACT evaluations and potential loophole elimination: Rule 1106 – Marine Coating Operations; Rule 1106.1 – Pleasure Craft Coating Operations; Rule 1124 – Aerospace Assembly and Component Manufacturing Operations; Rule 1128 – Paper, Fabric, and Film Coating; Rule 1107 – Coating of Metal Parts; Rule 1136 – Wood Product Coatings; Rule 314 – Fees for Architectural Coatings; Rule 1113 – Architectural Coatings; Rule 1143 – Consumer Paint Thinners and Multi-Purpose Solvents; and Rule 1171 – Solvent Cleaning Operations.

The analysis of emissions that may result from reducing the VOC content of potentially affected materials focuses on potential emission increases of other possibly toxic pollutants that may result from changing coating formulations. To further reduce the content of affected materials, products would likely be reformulated with water-based or exempt compound formulations. The following subsections identify potential air quality impacts from reducing the VOC content of affected materials. While the following analysis focuses primarily on coatings, some of the discussion points (e.g., substitution, more reactivity, and low vapor pressure) could also apply to consumer products[5].

Control measure CTS-01 is expected to lower the VOC content of many coatings from 50 grams per liter to 25 grams per liter. Control measure CPP-01 is expected to reduce VOC emissions from consumer products by revising the exemptions for the use of low vapor pressure VOC solvents. To achieve further VOC reductions, control measure CPP-01 would further reduce VOC limits in various consumer product categories, setting limits for other categories and revisiting chemical-specific exemptions in existing product categories. The following issues have been raised with regard to reformulated coatings in the 2003, 2007, and 2012 AQMPs.

The potential air quality impacts associated with reformulation of coatings have been extensively evaluated in previous AQMPs starting with the 2003 AQMP, as well as in a number of new rules and amendments to existing coatings rules starting in the late 1990s. Some of the early coatings rules and rule amendments adopted by the SCAQMD, as well as evaluations of coatings control measures in the 2003 and subsequent AQMPs, included evaluations of the possible effects of shifting coating formulations primarily from solvent-based to water-based and/or exempt-solvent formulations. During the promulgation of coating rules and rule amendments and previous AQMPs, commenters raised the potential for the following air quality impacts that could result from reformulated products: more thickness of the coating due to multiple applications; illegal thinning to reduce the viscosity of the reformulated coatings; more priming; more topcoats; more

[5] Aerosol coating products are regulated by CARB under a reactivity-based regulation. This regulation limits the ozone formation potential of all aerosol coating product emissions. As a result, the reactivity discussion below would not apply to this consumer products category.

touch-ups and repair work; more frequent recoating; product substitution; more reactivity; and the synergistic effects of these issues combined. Even though CTS-01 is not expected to substantially change coating components, these or similar issues could continue to be raised. Each issue is summarized in the following bullet points along with the associated conclusions reached in previous AQMPs for each issue. This analysis assumes that the conclusions reached in the previous AQMPs would continue to apply for CTS-01.

- **More Thickness –** In the past, it has been asserted that reformulated compliant water- and solvent-borne coatings: 1) can be very viscous because they are formulated using a high-solids content) and, therefore, are difficult to handle during application; and 2) tend to produce a thick film when applied directly from the can which indicates that a smaller surface area is covered with a given amount of material, thereby increasing the amount of coatings and VOC emissions per unit of area covered.

  Response – Past research has shown that compliant low-VOC coatings are not necessarily formulated with higher solids content than conventional coatings. A low-VOC coating is expected to cover the same or larger surface area than a high-VOC coating. Further, there is no evidence that there is an inverse correlation between solids content and coverage area (SCAQMD, 2007a).

- **Illegal Thinning –** In the past, it has been asserted that thinning occurs in the field in excess of what is allowed by the SCAQMD rule limits. Further, because reformulated compliant water- and solvent-borne coatings are more viscous (e.g., high-solids content), painters need to adjust the properties of the coatings to make them easier to handle and apply. In particular for solvent-borne coatings, this adjustment consists of thinning the coating as supplied by the manufacturer by adding some solvent to reduce its viscosity. The added solvent increases VOC emissions back to or sometimes above the level of older formulations.

  Response - SCAQMD staff conducted extensive research prior to 1998 to determine whether the thinning of materials beyond the allowable levels actually occurred in the field. SCAQMD staff conducted unannounced site visits to evaluate contractor practices, collected samples as applied and supplied from contractors, and analyzed paint samples from retail outlets. No thinning beyond SCAQMD rule limits was identified. In addition, the CARB 2005 Architectural Coating Survey provided results of compliance with the CARB Suggested Control Measure for Architectural Coatings. In most cases, the percent of complying market share from the 2005 survey improved or was approximately the same as the 2001 CARB survey. Therefore, the 2007 AQMP Final Program EIR concluded that widespread thinning happens rarely; when it does occur, it is unlikely to occur at a level that would lead to a substantial overall emissions increase when compared to emissions from higher VOC coatings (SCAQMD, 2007a).

  Currently, a majority of architectural coatings available in the marketplace are waterborne. Thinning is not an issue for waterborne coatings as thinning with water would not increase the VOC content of affected coatings. Of the total coatings sold in 2008, for example, only seven percent were solvent-based which equates to approximately three million gallons. Subsequent amendments to Rule 1113 have further reduced the availability of solvent-based coatings.

Amendments that reduced the scope of the small container exemption in Rule 1113 have also resulted in a reduction in solvent-based coatings, further lessening the potential adverse impact of thinning with a solvent. For the years between 2009 and 2011, the overall volume of solvent-based coatings was reduced by approximately 22 percent, so the potential for thinning was reduced by an equivalent amount. Amendments to Rule 1113 in 2011, 2013, and 2016 have further reduced the overall volume of solvent-based coatings. Finally, the adoption and implementation of Rule 1143 – Consumer Paint Thinner and Multi-Purpose Solvents, requires the use of paint thinners that have a VOC content of less than or equal to 25 grams per liter, resulting in paint thinners that are based on exempt solvents, further reducing the VOC impacts from thinning of solvent-based architectural coatings.

- **More Priming –** It has been previously asserted that reformulated compliant low-VOC water- and solvent-borne topcoats do not adhere as well as higher-VOC solvent-based topcoats to unprimed substrates. Therefore, the substrates must be primed with typical solvent-based primers to enhance the adherence quality. Industry representatives have testified that the use of water-borne compliant topcoats could require more priming to occur in order to promote adhesion. Additionally, it has been asserted that water-borne sealers do not penetrate and seal porous substrates like wood, as well as traditional solvent-borne sealers. This allegedly results in three or four coats of the sealer per application compared to one coat for a solvent-based sealer, resulting in an overall increase in VOC emissions for the coating system.

  Response - SCAQMD staff evaluated surface preparation information in coating product data sheets and studies on the topic and concluded that low-VOC coatings do not require a substantially different surface preparation than conventional coatings. Both low-VOC and conventional coatings for both architectural and industrial maintenance applications were demonstrated to have the ability to adhere to a variety of surfaces. Based on the coating sheets, the material needed and the time necessary to prepare a surface for coating was approximately equivalent for low-VOC and conventional coatings (SCAQMD, 2007a).

  A more recent trend for coating manufacturers is to produce ultra-low VOC coatings that are a primer and topcoat in one, thus, eliminating an entire step in the coating process. Most major coatings manufacturers now offer such products, some of which have a VOC content as low as 5.0 grams per liter. Therefore, any impacts from priming have been substantially reduced as a result of reformulation.

- **More Topcoats –** It has been previously asserted that reformulated compliant water- and low-VOC solvent-borne topcoats may not cover, build, or flow-and-level as well as the solvent-borne formulations. Therefore, more coats are necessary to achieve equivalent cover and coating build-up.

  Response - Based on information in the product data sheets, SCAQMD staff found that while the average drying time for lower-VOC coatings increased when compared to conventional coatings, the development of non-volatile, reactive diluents combined with hypersurfactants caused the performance of the lower-VOC coatings to equal or outperform the traditional, solvent containing coatings. Resistance to chemicals, corrosion, chalk, impact, and abrasion; adhesion; and the ability to retain gloss and color was found to be similar in lower-VOC and

conventional coatings. Coating manufacturer data also indicated that low-VOC and conventional coatings for both architectural and industrial maintenance applications are durable and long lasting and that more frequent recoating was not necessary for low-VOC coatings when compared to conventional coatings (SCAQMD, 2007a).

- **More Touch-Ups and Repair Work –** It has been previously asserted that reformulated compliant water- and low-VOC solvent-borne formulations dry slowly, and are susceptible to damage such as sagging, wrinkling, alligatoring, or becoming scraped and scratched. Claims have also been made that the high-solids solvent-borne alkyd enamels tend to yellow in dark areas, and that water-borne coatings tend to blister or peel, and also result in severe blocking problems. All of these problems were reported to require additional coatings for repair and touch-up.

  Response - Based on SCAQMD staff's evaluation of the durability characteristics information contained in the coating product data sheets, low-VOC coatings and conventional coatings have comparable durability characteristics. These conclusions are supported by the National Technical Systems and other coating studies. As a result, it is not anticipated that more touch up and repair work would be needed if low-VOC coatings are used.

- **More Frequent Recoating –** It has been previously asserted that the durability of the reformulated compliant water- and low-VOC solvent-based coatings is inferior to the durability of the traditional solvent-borne coatings. Durability problems include cracking, peeling, excessive chalking, and color fading, which all typically result in more frequent recoating. As a result, more frequent recoating would be necessary resulting in greater total emissions than would be the case for conventional coatings.

  Response - The latest data from the coating manufacturers that was obtained by SCAQMD staff indicate that the new generation of waterborne coatings is performing as well if not better than their solvent-based counterparts. These commercialized products are formulated with better performing raw materials, including superior resin chemistry and higher performing pigments, resulting in better hiding and coverage and overall durability. Therefore, a reduction in coating usage is expected.

- **Substitution -** It has been previously asserted that reformulated compliant water- and low-VOC solvent-borne coatings are inferior in durability and are more difficult to apply, so consumers and contractors will substitute better performing high VOC coatings in other categories for use in categories with low compliance limits. An example of this substitution could be the use of a higher VOC product currently sold under the small container exemption, which has a higher VOC content limit requirement, in place of a lower-VOC coating.

  Response - SCAQMD staff determined that substitution is not expected to occur because CARB and SCAQMD rules prohibit the application of certain coatings on substrates for which they are not intended. In addition, based on product data sheets and studies, there are generally a substantial number of low-VOC coatings in a wide variety of coating categories that are currently available. Further, as coating rules become more stringent, VOC content limits have and will continue to converge to similarly low levels for many coating categories.

With advances in resin chemistry and higher performing pigments, compliant coatings that are as durable as solvent-based coatings are widely available. In the rare event that substitution does occur, it is expected that future compliant coatings would still achieve overall VOC emission reductions. If substitution occurs, the net effect is that anticipated overall VOC emission reductions would be less than expected, but there would not be an overall increase in emissions as compared to the existing setting. Consequently, it is not expected that control measure CTS-01 requiring a lower overall VOC content for affected products will result in significant adverse air quality impacts from the substitution of low-VOC coatings with higher-VOC coatings (SCAQMD, 2007a).

- **Reactivity -** It has been previously asserted that reformulated compliant low-VOC water- and solvent-borne coatings contain solvents that are more reactive than the solvents used in conventional coating formulations. Water-borne coatings perform best under warm, dry weather conditions, and are typically recommended for use between the months of May and October. Since ozone formation is also dependent on the meteorological conditions, it has been asserted that the use of waterborne coatings during this period increases the formation of ozone. As a result, coating solvent, adhesive, and sealant rules should be based on reactivity rather than a mass based approach.

  Response - Different types of solvents have different degrees of reactivity, which is the ability to accelerate the formation of ground-level ozone. As noted in the 2003 AQMP Final Program EIR, the speciated organic gas emissions from use of solvent-borne architectural coatings, for example, are 24 percent more reactive than the official VOC inventory would suggest. This observation suggests that solvent-borne architectural coatings, for example, may actually be more reactive than low-VOC coatings especially water-based coatings. Further, the percent of solvent content found in solvent-borne formulations is much greater than the quantity of solvents found in waterborne coatings, which would make the weighted maximum incremental reactivity (MIR) in solvent-borne coatings greater than the already higher average MIR (SCAQMD, 2003). Therefore, based on the above information, SCAQMD staff has continued to monitor all reactivity-related research since the 2007 AQMP. Finally, based on the latest research and analysis, as well as the recommendations of the research, staff supports the continuation of a mass-based ozone control strategy, with future consideration for a reactivity-based approach.

- **Synergetic Effects of the Combined Issues –** Individually, each of the issues do not individually result in a significant adverse air quality impact; but it has been suggested that acting together in combination, they may have the potential to generate significant adverse air quality impacts. Based on the previous discussions, several of the potential issues have been shown to be untrue, not occur, or their effects are generally minor. Therefore, it can be concluded that the synergistic effect of all the issues combined would not be expected to generate a significant adverse air quality impact. The Final Program EIR for the 2007 AQMP concluded that even if it is assumed that some of the alleged activities do occur, the net overall effect of reducing the VOC content of coatings and other consumer products is expected to result in a reduction in VOC emissions.

In addition to control measure CTS-01, the 2016 AQMP contains control measure FLX-02, which notes that owners of many existing homes and businesses will, in the future, update and improve their facilities and many have the option to modernize using cleaner, lower emission, less toxic alternative processes and materials. However, since many of these cleaner options may not be the lowest-cost option, their use may need to be incentivized. This control measure envisions providing incentives to owners of residences and businesses to choose the cleanest technologies as they replace equipment or material and upgrade facilities and to provide incentives to encourage businesses to move into these technologies sooner. The potential air quality impacts from replacing or retrofitting stationary or mobile sources are evaluated elsewhere in this subchapter. The analysis of control measure FLX-02 focuses on potential incentives for owners to paint new and existing structures, thereby generating VOC emissions.

As indicated in control measure FLX-02, incentives such as reduced recordkeeping pursuant to SCAQMD Rule 109 – Recordkeeping for Volatile Organic Compound Emissions, may incentivize the use of super compliant coatings (e.g., coatings that contain 50 grams or less of VOC per liter of material). This control measure is not expected to generate significant adverse air quality impacts because there is a larger number of super compliant coatings that have VOC contents substantially less than 50 grams per liter. Further, assuming a coating with a VOC content of 50 grams per liter is used on new or existing structures, emissions may be low based on other constraints such as the number of workers available, the size of the structure, and the amount of an area that can be covered in one day. A large number of owners would not be expected to paint their structures on the same day, but would instead determine when to repaint depending on resources, finances, available workforce, etc. Similarly, owners would not be expected to apply for and receive the applicable incentives at the same time, which would also reduce the likelihood that a large number of structures would be painted on the same day. Finally, with regard to painting or repainting existing structures, there are a variety of factors that determine how often a structure would need to be repainted, including weather, chemical and physical properties of the area, and activities that occur at the structure. Based on all of these factors, air quality impacts from control measure FLX-02 are expected to be limited. Thus, implementation of FLX-02 should not cause increased painting, but instead would replace higher emitting coating products with cleaner products or methods.

Based on the preceding analysis of potential air quality impacts from implementing future coatings rules and incentive programs, the overall air quality effects would be a VOC emission reduction and beneficial to air quality in the Basin. Consequently, implementing control measures CTS-01, FLX-02, and CPP-01 into future rules or providing incentives to use super compliant coatings would not be expected to generate significant adverse air quality impacts.

4.1.6.2.4 Impacts from Mobile Sources

There are a number of 2016 control measures that would reduce emissions from mobile sources by accelerating the penetration of partial zero-emission and zero emission vehicles. Air quality impacts from mobile source control measures could occur from control measures that would require or provide incentives to increase penetration of zero and near-zero emission vehicles. Increasing penetration of these vehicles may take the form of providing incentive funding to scrap an older vehicle and purchase a zero and near-zero emission vehicle instead. Alternatively, some

control measures would incentivize the accelerated removal of older vehicles from fleets within the Basin. Under both of these scenarios, vehicles eliminated from fleets would likely be scrapped and car scrapping operations have the potential to generate PM emissions and other emissions depending on the scrapping process chosen to specifically scrap the vehicle. It should be noted that some control measures that would accelerate the penetration of zero and near-zero emission vehicles would allow the replacement of older vehicles upon the normal retirement of that vehicle. However, these types of control measures are not considered in the following analysis of PM impacts that may result from vehicle scrapping.

Control measure MOB-05 would accelerate the penetration of zero and near-zero emission light-duty vehicles. Light-duty vehicles are defined as passenger cars and light trucks up to 8,500 pounds in gross vehicle weight (GVW). Currently, CARB implements a "Clean Vehicle Rebate Project" (CVRP) that provides individual vehicle incentives of up to $5,000 for fuel cell vehicles, $2,500 for full zero-emission vehicles, $1,500 for plug-in hybrid vehicles, $900 for neighborhood electric vehicles, and $900 for zero-emission motorcycles. This control measure would continue the CVRP through 2023 with a minimum number of 15,000 additional vehicles per year to be incentivized through the CVRP.

Control measure MOB-06 would implement a strategy to accelerate the retirement of older light-duty gasoline- and diesel-powered vehicles up to 8,500 pounds GVW. This control measure is expected to retire at a minimum, 2,000 light- and medium-duty vehicles per year. The proposed incentives would be up to $9,500, which includes a replacement voucher under the AB 118 Enhanced Fleet Modernization Program (EFMP) program and Greenhouse Gas Reduction Fund.

Control measure MOB-06 would seek emission reduction benefits through the early deployment of near-zero, partial zero-emission, and zero-emission light-heavy- and medium-heavy-duty vehicles with gross vehicle weight ratings (GVWR) from 8,501 lbs to 33,000 pounds. This control measure would generate additional emission reductions through the early introduction of electric hybrid vehicles. The proposed actions would continue the state hybrid truck and bus voucher incentive project (HVIP) which accelerates the deployment of hybrid and zero-emission medium-heavy-duty vehicles in the Basin.

Control measure MOB-08 would generate additional emission reductions from existing heavy heavy-duty vehicles greater than 33,000 pounds GVWR through an accelerated vehicle replacement program with new engines that meet the cleanest optional NOx emissions standard or through regulatory actions. In addition, for heavy-duty vehicles not replaced with new models, existing vehicle engines would be repowered with commercially available engines meeting one of the optional NOx exhaust emission standards established by CARB or modified with retrofit kits to achieve lowest possible emission levels. This control measure seeks additional emission reductions from on-road heavy-duty vehicles beyond the emission reductions targeted in CARB's Truck and Bus Regulation.

Control measure MOB-09 would incentivize the early deployment of zero and near-zero emission trucks through the generation of mobile source emission reduction credits that can be used by other entities for compliance with other SCAQMD rules. This control measure requires amending SCAQMD Rule 1612.1 – Mobile Source Credit Generation Pilot Program and/or Rule 1612 –

Credits for Clean On-Road Vehicles to provide greater flexibility for entities to initiate projects in order to accelerate the deployment of zero- and near-zero emission trucks in the Basin and Coachella Valley. The focus of these amendments would be to encourage the deployment of commercially available zero and near-zero emission trucks that do not receive or cannot receive public funding assistance.

Control measure MOB-14 seeks to develop a rule similar to the San Joaquin Valley Air Pollution Control District Rule 9610 to recognize emission reduction benefits associated with incentive programs. The proposed rule would need to be crafted to recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B so that the emission reductions can be accounted for in the SIP. As previously mentioned, the U.S. EPA indicated that there are six general elements that need to be incorporated in a proposed rule in order for the reductions to be credited in the SIP.

Similar to control measure MOB-05, control measure ORLD-03 would also accelerate the penetration of zero and near-zero emission light-duty vehicles and, in addition, would promote in-use efficiency gains related to vehicle miles traveled (VMT) through the use of autonomous vehicles and advanced transportation systems. In particular, this control measure would provide additional incentives, beyond CARB's and the Bureau of Automotive Repair's Enhanced Fleet Modernization Program, for lower-income vehicle owners who replace their scrapped vehicles with cleaner, more fuel-efficient vehicles. Assuming incentive funding is the primary mechanism to achieve the scope of further technology deployment, funding would be required for approximately 70,000 to 85,000 vehicles per year over a seven-year period to achieve the anticipated emission reductions.

Control measure ORHD-05 would achieve NOx and GHG emission reduction goals through advanced clean technology and increasing the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. The source category includes Classes 3 through 7 heavy-duty delivery trucks operated within California that are used in last mile freight delivery applications. Most of the last mile delivery trucks are within vehicle classes 3 through 6 (10,000-26,000 pounds) and some are in the vehicle class 7 (26,001-33,000 pounds). Last mile delivery fleets are predominately used in urban areas to deliver freight from warehouses and distribution centers to its final point of sale or use (last mile delivery).

Control measure ORHD-08 would provide incentive funding to accelerate the penetration of zero and near-zero emission equipment beyond the rate of natural turnover achieved through implementation of the other proposed measures identified for on-road heavy-duty vehicles. This control measure would use existing incentive and other innovative funding programs to help increase the penetration of zero and near-zero heavy-duty trucks. Funding mechanisms would target technologies that meet or exceed an optional low-NOx standard through 2023, when implementation of a new federal low-NOx standard is expected to begin.

To evaluate potential air quality impacts from scrapping vehicles that may occur as a result of promulgating the aforementioned control measures into rules or regulations or providing incentive funding, the methodology in the following discussion is used. It should be noted that the actual number of vehicles scrapped would depend on the availability of incentive funding, actual number

of vehicles scrapped instead of relocated outside the Basin, the number of vehicles scrapped at facilities within and outside the Basin, and the available capacity of legal scrapping facilities within the Basin to scrap vehicles.

During the development of Rule 1610, emissions associated with vehicle scrapping were estimated to be 0.088 pound of PM10 emissions per vehicle scrapped (SCAQMD, 1992). According to an internet search conducted on August 15, 2016, there are eight legal auto recycling facilities in the Basin (State of California Auto Dismantlers Association, 2016). Assuming that six vehicles can be crushed per hour (Martin, 2011) and facilities operate 10 hours per day, 480 vehicles can be crushed per day in the Basin (8 facilities x 6 cars/hour x 10 hours/day = 480 cars/day). Therefore, vehicle scrapping has the potential to generate 42 pounds of PM10 per day, which is less than the SCAQMD's operational significance threshold of 150 pounds per day. By applying the CEIDARS profile 900 ratio of 0.6 pound of PM2.5 per pound of PM10, 25 pounds per day of PM2.5 emissions would be generated, which is below the PM2.5 significance threshold of 55 pounds per day.

In addition to air quality impacts from vehicle scrapping, the installation of some types of add-on control devices have the potential to increase the overall vehicle emissions by a small amount. For example, add-on control devices, such as particulate filters installed onto off-road construction equipment, in some cases have resulted in increased fuel use, typically estimated at less than one percent, due to a decrease in fuel economy associated with this type of device. Therefore, there is a potential for an increase in emissions from increased fuel use. Control measures in the 2016 AQMP where add-on control devices may be used to reduce PM emissions include MOB-10, MOB-13, and OFFS-08. These three control measures involve further reducing emissions from off-road equipment and may involve installing particulate filters.

A qualitative evaluation of the potential for increased emissions from off-road mobile sources shows that other factors may minimize or offset potential emission increases from add-on control equipment. In the case of exhaust pollutants, Manufacturers of Emission Controls Association (MECA) reports that the use of oxidization catalysts to reduce PM10 emissions from diesel-fueled vehicles should not increase other exhaust pollutants. In fact, combining an oxidation catalyst with engine management techniques can be used to reduce NOx emissions from diesel engines. This is achieved by adjusting the engine for low NOx emissions, which is typically accompanied by increased CO, VOC, PM10, and PM2.5 emissions. An oxidation catalyst can be added to offset these increases, thereby lowering the exhaust levels for all of the pollutants. Often, the increases in CO, VOC, and PM10 can be reduced to levels lower than otherwise could be achieved. In fact, a system which uses an oxidation catalyst combined with proprietary ceramic engine coatings and injection timing retard can achieve significant NOx reductions (e.g., greater than 40 percent) while maintaining low PM10 and PM2.5 emissions (MECA, 1999). Therefore, no increases in pollutant emissions due to add-on controls on mobile sources is anticipated.

Control measures that may increase the use of SCRs, may generate potential adverse air quality impacts associated with the use of SCRs in diesel-fueled vehicles if this technology resulted in the increase of other exhaust pollutants at the expense of reducing PM10 and PM2.5 or a reduction in fuel economy. However, applying SCR to diesel-powered vehicles provides simultaneous reductions of NOx, PM10, PM2.5, and VOC emissions.

Like an oxidation catalyst, SCR promotes chemical reactions in the presence of a catalyst. However, unlike oxidation catalysts, a reductant is added to the exhaust stream in order to convert NOx to elemental nitrogen and oxygen in an oxidizing environment. The reductant can be ammonia but in mobile source applications, urea is normally preferred. As exhaust gases along with the reductant pass over the catalyst, 75 to 90 percent of NOx emissions, 50 to 90 percent of the VOC emissions, and 30 to 50 percent of the PM10 and PM2.5 emissions are reduced. SCR also reduces the characteristic odor produced by a diesel engine and the diesel smoke.

In the case of exhaust pollutants, the catalyst composition of SCR and its mode of operation are such that sulfates could form. However, with the use of ultra-low sulfur diesel fuel, which has been required for stationary and on-road applications since September 2006, sulfate formation is expected be negligible. In particular, even at temperatures exceeding 500 degrees Centigrade, only five percent of the sulfur in the fuel would be converted to sulfate, which still allows for significant net PM10 and PM2.5 emission reductions. Applying SCR to diesel-powered vehicles also provides simultaneous reductions of NOx, PM10, PM2.5, and VOC emissions.

As to a reduction in fuel economy, because of the large NOx reductions afforded by SCR, it is possible that low NOx emissions can be achieved with an actual fuel economy benefit. Compared to internal engine NOx abatement strategies like exhaust gas recirculation and timing retard, SCR offers a fuel economy benefit in the range of three to 10 percent as a result of being able to optimize engine timing for fuel economy and relying on the SCR system to reduce NOx emissions. Therefore, no significant adverse air quality impacts were identified from the use of particulate filters or SCRs in conjunction with ultra-low sulfur diesel fuel to potentially comply with the applicable control measures.

Control measures MOB-02 and ORFIS-01 would potentially accelerate the replacement of locomotive engines in freight service or employ add-on devices to meet the lower emission standard. As such, control measures MOB-02 and ORFIS-01 may generate air quality impacts from add-on devices. Therefore, the impacts of the replacement of locomotives and use of add-on devices are similar to those discussed for OFFRD-01. Similar to control measures MOB-10, MOB-13, and OFFS-08, locomotives are typically refurbished and a new engine installed so no scrapping of the locomotives are expected. Add-on devices, such as particulate filters have an increase in fuel use associated with the decrease in fuel economy associated with the type of add-on device, which is estimated to be less than one percent. Therefore, there is a potential for an increase in emissions from the increase in fuel use. However, the number of locomotives to be equipped with add-on devices versus replaced is not known. Therefore, quantification of the air quality impacts would be speculative.

Control measures MOB-01, MOB-02, MOB-04, MOB-05, MOB-06, MOB-07, MOB-09, MOB-10, MOB-13, MOB-14, EGM-01, ORLD-01, ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-05, OFFS-04, OFFS-07, and OFFS-08 have the potential to increase the use of alternative fuels such as biodiesel, LNG, CNG, ethanol, and hydrogen. The availability of the producers of alternative fuels to meet the increase in demand has the potential for an increase in emissions associated with the increased production. Production of the alternative fuels such as LNG, CNG require little processing with less emissions than the production of refined petroleum products such as gasoline, diesel, and jet fuel. While

biodiesel and ethanol production do require more processing than LNG and CNG, the production processes are less complicated than petroleum refining. Biodiesel is made from a catalytic chemical process similar to one or two processes in a typical refinery, which will have many units available to produce refined products from crude oil. Ethanol is produced by fermentation. Biodiesel and ethanol can be made from renewable sources such as vegetable oils, sugar cane, corn, and animal fats. Therefore, the production of alternative fuels, especially biofuels, typically generates less air emissions than a petroleum refinery would when producing similar gasoline or gasoline equivalent amounts. Any increase in emissions attributable to an increased production of alternative fuels would be offset by reduced levels of petroleum fuel production and transportation of crude oil primarily from overseas and possibly by rail, as diesel and gasoline demand decreases.

In general, the 2016 AQMP mobile source control measures are expected to result in emission reductions.

4.1.6.2.5 Impacts from Miscellaneous Sources

Miscellaneous source control measures would regulate a variety of different types of emission sources including both area and point sources. As a result, these control measures are expected to reduce a variety of VOC, criteria pollutant, and precursor emissions. However, the following control measures were identified as also having the potential to create adverse air quality impacts.

Control measure BCM-04 includes several strategies for reducing the pH level in manure. One strategy includes the application of acidifiers, such as sodium bisulfate (SBS). SBS is being considered for use in animal housing areas where high concentrations of fresh manure are located. Research indicates best results with the use of SBS on hot spots. SBS can also be applied to manure stock piles and at fence lines, and upon scraping manure as part of efforts to reduce ammonia spiking from the leftover remnants of manure and urine. In California, SBS has been used at dairies in Tulare, Fresno, Merced, Stanislaus, San Joaquin, Kings, Kern, San Bernardino, Riverside, San Benito, and Sacramento counties, mainly to prevent cow lameness and nuisance flies. Outside of California, SBS has also been used at dairies in Washington (Walla Walla, Columbia, and Whitman), Oregon (Wallowa), and Wisconsin.

Based on historical data, application of SBS may only be needed for eight weeks out of the year; hence, seasonal or episodic application of SBS may be effective when high ambient PM2.5 levels are of concern. Additional delivery truck trips would be required to deliver SBS and SBS may be applied by hand or by tractor.

Another strategy in control measure BCM-04 for reducing the pH level in manure would require increasing the cleaning frequency of the manure belt in laying hen houses from once every four days to once every two days. Doing so would also have the potential to reduce ammonia emissions by 45 percent. More frequent cleaning would be conducted when ambient PM2.5 concentrations are highest in the region. Although this strategy would increase vehicle trips to haul away the manure, the additional haul truck trips would not occur on the same days as haul truck trips are currently occurring. As result, haul truck trips are not expected to exceed baseline peak daily haul truck trip emissions.

Control measure BCM-04 is not expected to generate a substantial number of new vehicle trips on a peak day, if any, related to control requirements. Control Measure BCM-04 could require additional vehicle travel to deliver and apply acidifier. At this time, it is not known what control strategies may be applied, which facilities may require additional trips or how often these trips may be necessary. Therefore, no emission estimates could be prepared at this time. However, while these trips would be routine, they are not expected to be frequent.

Control measure BCM-08 would further reduce PM emissions from open burning sources. Based on burn permit acreage data from 2015, over 90 percent of agricultural burns are conducted within the Coachella Valley area (Salton Sea Air Basin) while a limited amount of agricultural burning continues to occur within the western Riverside/San Bernardino County portions of the Basin. Prescribed burns also occur on the northern and eastern boundaries of the Basin and are sometimes incorporated into fire suppression activities. Training burns occur throughout the region.

One approach for reducing emissions from burn sources could involve establishing an administrative fee as part of the burn permit program based on acreage or amount of material burned, to the extent these factors are related to efforts required for processing and enforcing. Fees would not be charged to producers using alternatives to burning. Another approach could involve providing incentives to agricultural producers, especially in peak PM2.5 areas, to implement alternatives to burning. Since BCM-08 provides incentives for alternatives to agricultural burns, BCM-08 would actually reduce emissions from agricultural burn operations.

Control measure BCM-08 identifies several alternatives to burning. Of the potential alternatives to burning, only chipping and grinding were identified as having the potential to generate adverse air quality impacts and these activities are subject to SCAQMD Rule 1133.1 – Chipping and Grinding Activities. The SCAQMD prepared an analysis in a CEQA document that evaluated the potential adverse environmental impacts from implementing Rule 1133.1 along with Rule 1133 – Composting and Related Operations – General Administrative Requirements, and Rule 1133.2 – Emission Reductions from Co-Composting Operations (SCAQMD, 2002). The analysis concluded that implementing all three of these rules would not generate significant adverse air quality impacts. Since Rule 1133.1 was a new rule at the time it was considered for adoption, the number of sources that were identified at the time as being subject to its requirements would likely far exceed the number of sources that would be subject to control measure BCM-08.

4.1.6.3 Toxic Air Contaminants

The air toxics control strategy in the 2016 AQMP contains a number of control measures specifically targeted at reducing TAC emissions from stationary sources. In addition, some criteria pollutant control measures will concurrently reduce air toxics while some air toxics control measures will reduce criteria pollutants. For example, mobile source control measures that result in replacing diesel engines with zero or near-zero emission equipment have the potential to reduce criteria pollutant emissions, as well as providing a co-benefit of reducing diesel PM emissions, which are considered to be carcinogenic.

One control measure, CMB-05, in the 2016 AQMP may result in the use of ammonia in SCRs. SCAQMD policy generally requires the use of 19 percent aqueous ammonia by volume for air

pollution control equipment in order to avoid the greater hazards that are associated with the use of anhydrous ammonia and higher percentage concentrations of aqueous ammonia. Nonetheless, aqueous ammonia at 19 percent by volume can still create vapors, which are toxic and irritating to the eyes, nose, throat, and skin. Although aqueous ammonia has a low flammability rating, it is flammable under limited conditions. BACT for ammonia slip from SCR units is restricted to five ppm or less, which has been shown through source-specific permit modeling to have no significant toxic impact on surrounding communities.

In general, implementation of the 2016 AQMP control measures would be expected to reduce TAC emissions. The basis for this conclusion is that many TACs are also classified as VOCs and the 2016 AQMP includes some VOC control measures. To the extent that control measures reduce VOC emissions, it is expected that associated TAC emission reduction could also occur. Control measure CTS-01 is expected to reduce VOCs by reducing the solvent content of coatings, solvents, adhesives, and sealants. Concerns have been previously raised that reformulated products may be more hazardous than products formulated with conventional coatings.

Subchapter 4.3 includes an analysis that compares the potential replacement solvents that may be used in future formulations to conventional solvents. For example, if future compliant products are formulated with chemicals that may have new or different health hazards than are currently used, potentially significant adverse health hazard impacts could occur from using some low VOC reformulated products. However, as indicated in the discussion in Subsection 4.3.4.2, the physical and chemical properties such as flammability rating exposure ratings (threshold limit value (TLV), permissible exposure limit (PEL), immediately dangerous to life and health (IDLH), and health effects) of future coating formulations are generally less or no worse than conventional solvents overall. Further, many compliant future products are expected to be formulated with water, which tend to contain less flammable and less toxic materials than solvent-based coatings and products. Finally, as with the use of all chemicals, facilities and their workers would be required to continue to comply with existing health protective equipment and procedures when handling both flammable and toxic materials. Consequently, future reformulated coatings and solvents are not expected to increase exposures to TAC emissions.

FUG-01 is expected to result in reduced VOCs from fugitive emissions at oil and gas production facilities, petroleum and chemical products processing, storage and transfer facilities, marine terminals, and other sources by improving leak detection and repair requirements, thus providing an air quality benefit.

Some measures for motor vehicle and transportation source categories (MOB-01, MOB-02, MOB-04, MOB-07, MOB-10, MOB-12, MOB-13, MOB-14, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-03, ORFIS-04, ORFIS-05, OFFS-01, OFFS-04, and OFFS-07) would reduce mobile source emissions, in particular, emissions of diesel particulate matter (DPM) from engine exhaust, which is a known carcinogen, as well as toxic components of gasoline such as benzene and 1,3-butadiene. These mobile source control measures would result in replacing existing vehicles or equipment with more efficient vehicles or equipment, zero emission electric vehicles or equipment, or alternative fueled vehicles or equipment. Combustion emissions of alternative fuels have trace amounts of methanol and aldehyde, but, generally, are considered to be cleaner and less toxic than diesel or gasoline fueled vehicles.

Emissions from power generating equipment may include trace amounts of benzene, aldehydes, metals, and polynuclear aromatic hydrocarbons. However, if the process being electrified was previously powered by direct combustion of fossil fuels, then electrification is expected to result in an overall decrease in toxic emissions.

Based upon the information in the preceding discussion, potential impacts associated with implementing the 2016 AQMP are expected to be an overall reduction in TAC emissions.

4.1.6.4 Greenhouse Gas Emissions

In September 2011, the SCAQMD Governing Board adopted the SCAQMD Air Quality-Related Energy Policy (AQREP). This policy integrates energy, air quality, and climate change by explaining how the current dependence upon fossil fuels for energy generation and consumption within the Basin results in the emission of criteria pollutants, toxic pollutants, and greenhouse gases (GHGs). The SCAQMD's AQREP articulates policies and actions to ensure clean air by promoting the development of reliable, safe, cost effective, and clean energy. Efforts to clean the air and meet mandated air quality standards, focused on the adoption of cleaner energy sources, also achieve the co-benefit of reducing GHG emissions, thus helping to meet state and global climate goals.

Any newly adopted programs, as well as those under development and included within the proposed 2016 AQMP, may have impacts on future energy usage in California that are not yet fully accounted for in future energy use projections. However, adopting the 2016 AQMP control measures would be expected to not only reduce criteria pollutant emissions, but would also provide co-benefits of reducing GHG emissions and increasing energy efficiency, along with renewable power sources. To the extent that 2016 AQMP control measures reduce or eliminate combustion processes in favor of near-zero or zero emission technologies, GHG emission reduction co-benefits would also be expected to occur. Table 4.1-4 qualitatively shows the GHG emission impacts of implementing 2016 AQMP control measures. The relative impacts (e.g., either an increase (+) or decrease (-)) are presented along with the activities associated with the impact (e.g., construction necessary to implement the control measure).

TABLE 4.1-4

Potential Impacts on Climate Change and Global Warming from Implementation of 2016 AQMP Control Measures

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	+ (construction emissions) - (co-benefits from federal, state and local mandates and programs to reduce GHG emissions and increase energy efficiency)
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx and VOC emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	+ (construction emissions) - (reduction in emissions and energy use)
CMB-01	Transition to Zero- and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources.	+ (construction, increased energy usage) - (reduction in conventional fuel combustion)
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating (NOx)	Installation of new commercial space heating furnaces boilers, water heaters, and space heating furnaces.	+ (construction) - (more efficient heaters)
CMB-03	Emission Reductions from Non-Refinery Flares (NOx)	Installation of newer flares implementing the best available control technology.	+ (construction) - (more efficient flares)
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment	+ (construction, increased electricity usage from control equipment)
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion based equipment.	+ (construction)
BCM-01	Further Emissions Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	+ (construction, increased energy usage from control equipment)
BCM-02	Emission Reductions from Cooling Towers (PM)	Installation of drift elimination technologies into cooling towers.	+ (construction)
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure	+ (construction, control equipment)
BCM-05	Ammonia Emission Reduction from Nox Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia	+ (construction)

TABLE 4.1-4 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of portable, permanent or temporary enclosures with in-building abrasive blasting activities vented to fume extractors, and dust collectors with HEPA filters and the use of negative air machines.	+ (construction, increased electricity usage from control equipment)
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	+ (construction, increased electricity usage from control equipment)
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and equipment to use alternative fuels or fuel additives.	+ (construction, increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	+ (increased energy) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near-zero emission equipment in/around warehouse.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivizing zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Incentivizing the "Clean Vehicle Rebate Project" to promote the use of vehicles with zero and near-zero emissions.	+ (increased energy usage) - (electrification, conversion to alt fuels/reduction in conventional fuel combustion emissions)
MOB-07	Accelerated Penetration of Partial Zero and Zero Emission Light Heavy and Medium Heavy Duty Vehicles (NOx, PM)	Acceleration of the penetration of zero and near-zero emission vehicles as well as the use of alternative fuels and fuel additives.	+ (increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)

TABLE 4.1-4 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivizing SOON program and phasing in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	- (reduction in conventional fuel emissions)
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, Sox, PM)	Acceleration of the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives	+ (increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
MOB-14	Emissions Reductions from Incentive Programs	Implementation of the Prop 1B and Carl Moyer Programs to accelerate the penetration of clean air vehicles.	- (reduction in conventional fuel emissions)
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerating the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of things like dust control, alternative fuels, diesel PM filter, and low-emitting engines.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	+ (construction, increased electricity usage from control equipment)
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	+ (construction, increased electricity usage from control equipment)
TXM-04	Control of Toxic Metal Particulate Emissions from Soil Decontamination (TACs, PM)	Construction and operation of chemical treatment, barriers, tire and wheel knockout and cleaning stations, and other dust suppression techniques.	+ (construction)
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	+ (construction, increased electricity usage from control equipment)
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	+ (construction, increased electricity usage from control equipment)

TABLE 4.1-4 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment, including baghouses and HEPA filters and the use of best management practices, to minimize lead emissions.	+ (construction, increased electricity usage from control equipment)
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon in carbon adsorbers.	+ (construction, increased electricity usage from control equipment)
TXM-09	Control of Toxic Emissions from Oil and Gas Productions (TACs, PM)	Construction of enclosures and control equipment and implementation of methods to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	+ (construction, increased electricity usage from control equipment)
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	+ (increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
ORHD-02	Low-NOx Engine Standards (Nox)	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	+ (increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORHD-06	Innovative Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)

TABLE 4.1-4 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	+ (construction, increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	+ (construction, increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentives for the use of control equipment such as SCRs.	+ (construction, increased electricity usage from control equipment)
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	+ (construction, increased electricity usage)
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Measure to accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in off-road forklifts.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Measure to accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)

TABLE 4.1-4 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
OFFS-05	Small Off-Road Engines (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in small off-road engines.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-06	Transport Refrigeration Units Used For Cold Storage (NOx, ROG, GHG)	Measure to accelerate penetration of zero emission technologies in cold store refrigeration unites.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower emissions.	+ (construction, increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment (NOx, ROG, PM2.5)	Measure to accelerate the implementation of zero emission technologies in off-road equipment.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)

(a) + Control measure is expected to result in an increase in GHG emissions
- Control measure is expected to result in a decrease in GHG emissions

Because of the qualitative nature of Table 4.1-4, it is not possible to show the magnitude of GHG emission effects from implementing 2016 AQMP control measures. For example, a positive effect (i.e., a GHG emission increase) for one control measures may be substantially less than the positive GHG emission effect of a different control. Many of the sources affected by the 2016 AQMP may already be required to control emissions, and any increase in construction emissions may simply involve the removal and replacement of existing filters, catalysts, and carbon (for adsorbers) with more efficient components. As a result, construction emissions associated with these activities would be less than if an entirely new control technology is installed. Further, the GHG effects shown in Table 4.1-4 likely overestimate GHG emissions from some stationary source control measures because, instead of increasing GHG emissions, they may actually result in reducing GHG emissions from combustion because more efficient types of control equipment would likely be installed. Finally, replacing older control equipment with new control equipment would likely result in a reduction in electricity demand and usage because newer equipment tends to be more efficient than older equipment.

Of the total fuel used in the Basin, transportation sources account for over 50 percent of in-Basin use. These sources are also the main contributors to NOx emissions. Within the transportation sector, diesel-powered sources emit the majority of NOx. With regard to mobile source control measures, increasing the penetration of electric vehicles or alternative fueled vehicles into fleets

regulated by SCAQMD may produce emissions from increased electricity generation. However, the net effect of removing gasoline and diesel mobile sources is expected to have greater overall emission reduction benefits because emissions from electricity generation needed to power one electric vehicle are much less than the combustion emissions from one gasoline or diesel vehicle, including for GHGs.

Implementing the 2016 AQMP control measures is expected to reduce GHG emissions consistent with the AB32 scoping plan. Compared to the 2014 baseline, energy demand from 2016 AQMP control measures is expected to increase by 10,227 GWh, a 7.8 percent increase, by the year 2023 and produce 3.4907 million metric tons (MMT) of GHG emissions. Similarly, compared to the 2014 baseline, energy demand from 2016 AQMP control measures is expected to increase by 18,029 GWh, a 12.7 percent increase, by the year 2031 and produce 6.1496 MMT of GHG emissions.

Concurrent with projected increases in electricity demand and associated emissions from implementing 2016 AQMP mobile source control measures is a reduction in the use of petroleum fuels and their associated emissions. Control measures for which the reduction in petroleum fuels can be quantified are shown in Table 4.1-5.

As shown in Table 4.1-5, by milestone year 2023, implementing 2016 AQMP mobile source control measures has the potential to reduce total annual petroleum fuel use by approximately 530 million gallons. By milestone year 2031, total annual petroleum fuel use is expected to reduce by approximately 870 million gallons.

Using a CO2 emission factor of 8.78 kg/gal for gasoline and a CO2 emission factor of 10.05 kg/gal the GHG emission reductions can be calculated for both gasoline and diesel for each milestone year. As shown in Table 4.1-6, in both milestone years 2023 and 2031, the net effect of implementing the 2016 AQMP control measures while concurrently reducing petroleum fuel use from mobile sources is expected to result in an overall reduction of GHG emissions.

TABLE 4.1-5

Estimated Reduction in Petroleum Fuel Usage

CONTROL MEASURE NO.	CONTROL MEASURE DESCRIPTION	VEHICLE CLASS INCLUDED	ESTIMATED INCREASE IN VEHICLES		ESTIMATED FUEL DISPLACEMENT (GAL/YEAR)	
			2023	2031	2023	2031
MOB-05, MOB-14, ONLD-01, and ORLD-03	Accelerated Penetration of Partial-Zero and Zero Emission Vehicles	EMFAC: Light-Duty Automobiles, Light-Duty Trucks	357,000	714,000	161,088,494	241,517,781
ORHD-04	Advanced Clean Transit, Accelerated Penetration of Partial-Zero and Zero Emission Buses	EMFAC: Urban Buses	11,000	~~11,000~~	88,902,832	77,251,722
MOB-06, MOB-07, MOB-08, ORHD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-08	Accelerated Penetration of Partial-zero and Zero Emissions Light, Medium and Heavy-Duty Trucks	EMFAC: Light Heavy-Duty Trucks, Medium-Duty Vehicles, Heavy-Duty Trucks, T6 Category Trucks, T7 Category Trucks	115,000	245,000	135,824,593	256,266,318
MOB-01, MOB-02, MOB-03, MOB-04, OFFS-01, OFFS-04, OFFS-06	Accelerate the Penetration of Zero Emission TRUs, Forklifts and Ground Support Equipment	OFFROAD: Ground Support	50,000	100,000	49,113,693	106,056,813
OFFS-02, OFFS-08	Further Deployment of Cleaner Technologies for Larger Off-Road Diesel/Gasoline Equipment	OFFROAD: Construction and Mining	30,000	60,000	57,095,698	114,191,396
MOB-10, OFFS-03, OFFS-08	Penetration of Zero Emission Off-Road Construction and Industrial Equipment	OFFROAD: Construction and Mining	20,000	40,000	38,063,799	75,187,576
Totals			583,000	1,170,000	530,089,109	870,471,606

Note: Based on EMFAC2014 emissions for 2023 and 2031 and OFFROAD emissions for 2023 and 2029. Fuel use scaled by population. Assumes diesel fuel (7 lb/gal density) for all OFFROAD applications.

TABLE 4.1-6

Estimated GHG Emission Impacts from 2016 AQMP Control Measures

Description	2023 CO_{2eq} Emissions[(a)] (million metric tons)	2031 CO_{2eq} Emissions[(a)] (million metric tons)
Increased Electricity[(b)]	3.4907	6.1496
Change in Gasoline Use	-2.9766	-3.1238
Change in Diesel Use	-4.2970	-3.4305
Net Change in Emissions	-3.7829	-0.4047

(a) Source: Emission factors are from CARB, et al., 2010.
(b) Electricity generation is weighted by population in the LADWP and SCE service areas.
Negative numbers represent emission reductions.

Control Measures ECC-03, CMB-01, CMB-02, CMB-03, CMB-05, FLX-02, BCM-01, BCM-02, BCM-04, BCM-05, BCM-06, BCM-07. MOB-01, MOB-09, MOB-14, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, TXM-08, TSM-09, ORHD-05, ORHD-06, ORHD-08, ORHD-09, ORFIS-01, ORFIS-03, ORFIS-04, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-06, OFFS-07, and OFFS-08 are expected to have GHG emissions associated with construction. SCAQMD policy regarding GHG emissions from construction is to amortize construction emissions over a 30-year timeframe and add the result to operational emissions. Implementing the 2016 AQMP control measures results in operational GHG emissions reductions, which reductions exceed the increase in GHG emissions resulting from construction activities, as amoritized over 30 years. Thus, increased GHG emissions from construction is not expected to generate significant adverse GHG impacts.

Some of the 2016 AQMP control measures have the potential to increase energy demand by implementing control measures that would use electricity to power add-on control devices or power catenary systems for fixed-route mobile sources. Projects involving catenary systems would reduce diesel combustion emissions. As with the on-road control measures discussed previously, converting from diesel-fired sources to electricity generated by primarily natural gas, GHG emissions are expected to decrease. Further, add-on control devices are designed and sized for the specific source that is being controlled, so the additional increase in electricity demand will be highly variable from source to source. The electricity needed to power these control measures is expected to be provided by public utility companies. Existing power generating facilities are subject to AB-32 and will be required to reduce GHG emissions by 2020 and any future power generating stations would be subject to stringent emission control requirements, including GHG emissions. Therefore, the need for additional electricity generation in order to provide power to operate the projected add-on control devices and catenary systems is not expected to generate significant adverse GHG emissions, after taking into account the reductions expected to result from the decreased use of gasoline and diesel fuels.

The 2016 AQMP control measures have the potential to increase the use of alternative fuels. Alternative fuels generally generate less or equivalent GHG emissions when combusted compared to gasoline and diesel. For example, in on-road vehicles, the use of biodiesel, electricity, E85 (ethanol), CNG, LPG, and LNG results in less or equivalent GHG emissions when compared to

gasoline (Argonne, 2016). The use of fossil fuel-based CNG in on-road motor vehicles has approximately the same carbon footprint as gasoline or diesel. However, the use of renewable CNG (generated from biogas) has only about 20 percent of the carbon footprint when compared to gasoline (18.4 percent) and diesel (21.7 percent). The use of fossil fuel-based CNG in off-road equipment is approximately twice the carbon footprint of gasoline and approximately 50 percent more than diesel. The use of renewable CNG in off-road equipment only has about half the carbon footprint of gasoline (44.1 percent) and one-third of the carbon footprint of diesel (29.2 percent) (Argonne, 2016).

The use of electricity or other alternative fuels such as E85, and LNG results in less GHG emissions than diesel fuel. In on-road applications and small off-road equipment (forklifts), LPG generates less or approximately the same amount of GHG emissions as gasoline or diesel. However, LPG generates approximately double the GHG emissions of gasoline (218 percent) or diesel (144 percent) in heavy off-road applications (Argonne, 2016). Unlike biodiesel and electricity, other alternative fuels such as E85, CNG, or LNG, LPG cannot be generated from a renewable resources to reduce these effects.

Hydrogen can be used in gaseous or liquid form. In the gaseous form, hydrogen generates less or equivalent GHG emissions when combusted as compared to gasoline or diesel. In liquid form, hydrogen generates more GHG emissions than gasoline or diesel (Argonne, 2016).

The 2016 AQMP provides incentives to increase the penetration of zero emission and partial zero emission vehicles. The priority for incentives will be zero emission vehicles to provide the largest emission reductions. Zero emission vehicles are currently available in the form of electric vehicles and are expected to be the primary choice for compliance as they are already popular and commercially available today, and do not require significant progress in the development of new technologies, as would be the case with other alternative fuels (e.g., hydrogen fuel cells).

Alternative fueled vehicles, such as LPG-fueled vehicles are not commonly used today. Further, most (if not all) LPG-fueled vehicles are dual fueled vehicles in that they operate on both LPG and gasoline, so the emissions reductions are not as great as they would be if 100 percent of LPG or other alternative fuel were used instead. Therefore, AQMP incentives for these types of vehicles are not expected. Further, cleaner off-road equipment is likely to transition to a higher tier emission standard or commercially available battery-electric or fuel cell operated and the use of fossil fuel, LPG, or CNG is not expected to be incentivized as part of the 2016 AQMP.

Similarly, the availability and popularity of hydrogen vehicles in California is very limited. There are only 331 registered vehicles in the California (CARB, 2016), therefore, the use of hydrogen as an alternative fuel is not expected to be substantial as part of the 2016 AQMP incentives.

Because electric vehicles are commercially available and in wide use today, substantial infrastructure has already been developed such as charging stations along major highways. Infrastructure for other alternative fuels (e.g., hydrogen, CNG, LPG, etc.) is not as readily available as electricity. As shown in Table 3.3-3, 69 percent of available alternative fuel stations are electric, followed by CNG at 12 percent. Therefore, while other alternative fuels may be used, it is expected that electricity will be the predominant alternative fuel in the future.

Based on the above analysis, electricity is expected to be the predominant alternative fuel because it is more available, affordable, and can be used to power zero emission vehicles. As a result, GHG emissions associated with the use of alternative fuels are expected to be less than GHG emissions associated with the use of petroleum-based fuels. Therefore, no increase in GHG emissions is expected from the increased production and use of alternative fuels and GHG emission impacts are expected to be less than significant.

4.1.7 MITIGATION MEASURES

Based on the analysis above, implementation of the 2016 AQMP will result in less than significant impacts to operational air quality and GHG. However, construction air quality impacts from implementing 2016 AQMP control measures are concluded to be potentially significant. As a result, mitigation measures are required in order to minimize the significant air quality impacts associated with implementing 2016 AQMP control measures. The following mitigation measures should be implemented, where applicable and if feasible:

AQ-1 During construction, require the use of 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export). If the Lead Agency determines that 2010 model year or newer diesel trucks cannot be obtained, the Lead Agency shall instead requires the use of trucks that meet EPA 2007 model year NOx emissions requirements.

AQ-2 Require all on-site construction equipment to meet the following:

- All off road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.
- A copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit of equipment.
- Encourage construction contractors to apply for SCAQMD "SOON" funding incentives. The "SOON" program provides funds to accelerate the clean up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/tao/Implementation/SOONProgram.htm.

AQ-3 Prohibit vehicles and construction equipment from idling longer than five minutes at the construction site by including these restrictions in the construction company contract(s) and by posting signs on-site, unless the exceptions in the CARB regulations which pertain to idling requirements are applicable.

AQ-4 All on-road heavy-duty diesel trucks or equipment with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater shall comply with EPA 2007 on-road emission standards for PM and NOx (0.01 gram per brake horsepower - hour (g/bhp-hr) and at least 0.2 g/bhp-hr, respectively).

AQ-5 Maintain construction equipment tuned up and with two to four-degree retard diesel engine timing or tuned to manufacturer's recommended specifications that optimize emissions without nullifying engine warranties.

AQ-6 The project proponent shall survey and document the proposed project's construction areas and identify all construction areas that are served by electricity. Onsite electricity, rather than temporary power generators, shall be used in all construction areas that are demonstrated to be served by electricity.

AQ-7 Provide temporary traffic controls such as a flag person, during all phases of significant construction activity to maintain smooth traffic flow.

AQ-8 Provide dedicated turn lanes for the movement of construction trucks and equipment on- and off-site.

AQ-9 Re-route construction trucks away from congested streets or sensitive receptor areas.

AQ-10 Improve traffic flow by signal synchronization.

AQ-11 Reduce traffic speeds on all unpaved roads to 15 mph or less.

AQ-12 Prohibit truck idling in excess of five minutes, on- and off-site.

AQ-13 Schedule construction activities that affect traffic flow on the arterial system to off-peak hours to the extent practicable.

AQ-14 Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 mph.

AQ-15 Suspend all construction activities that generate air pollutant emissions during first stage smog alerts.

AQ-16 Configure construction parking to minimize traffic interference.

AQ-17 Use alternative clean fueled off-road equipment or give extra points in the bidding process for contractors committing to use such equipment.

AQ-18 Require covering of all trucks hauling dirt, sand, soil, or other loose materials.

AQ-19 Install wheel washers where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site for each trip.

AQ-20 Apply non-toxic soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for ten days or more).

AQ-21 Replace ground cover in disturbed areas as quickly as possible to minimize dust.

AQ-22 Pave road and road shoulders.

AQ-23 Sweep streets at the end of the day with SCAQMD Rule 1186 and 1186.1 compliant sweepers if visible soil is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water).

As improved emission reduction technologies become available and as specific control measures are developed and projects proposed, construction mitigation measures will be updated and implemented. Further, future projects that implement 2016 AQMP control measures, including promulgating control measures such as SCAQMD rules or regulations or individual projects that implement the requirements of such promulgated rules where subsequent CEQA construction analyses have been performed, shall rely upon the results of these subsequent CEQA analyses, including whether or not mitigation measures will continue to be required.

4.1.8 IMPACTS AFTER MITIGATION

The 2016 AQMP would result in a reduction of criteria pollutants in the Basin, thereby attaining the air quality standards. Additionally, during operation, less than significant air quality and GHG impacts are anticipated. However, significant adverse construction air quality and GHG impacts could be caused by the proposed project. Implementation of the construction mitigation measures would reduce construction emissions but the overall construction air quality and GHG impacts after mitigation would likely remain significant.

4.2 ENERGY

4.2.1 INTRODUCTION

This subchapter examines impacts on the supply and demand of energy sources from implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether they could generate direct or indirect energy impacts based on the anticipated methods of control. Some of the control measures would require increased energy use. For example, the increased penetration of zero emission mobile sources will require additional electricity to be generated even though the use of conventional fuels will be reduced. Other control measures would alter the type of energy used such as switching from using gasoline or diesel fuels to using alternative fuels instead.

The NOP/IS for the 2016 AQMP (see Appendix A) identified the following activities associated with implementing the proposed control measures as having potentially significant energy impacts: 1) potential increase in electricity demand due to increase penetration of near-zero and zero emission technologies; 2) potential increase in natural gas demand; 3) potential increase in electricity demand associated with operating new control equipment; and 4) potential increase in the use of alternative fuels. Project-specific and cumulative energy impacts associated with increased electricity demand, increased natural gas demand, and increased use of alternative fuels are evaluated in this Program EIR.

4.2.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL ENERGY IMPACTS

The 2016 AQMP strategy will further incentivize the penetration of partial-zero and zero emission technologies and these incentives would increase the demand for electricity. In addition, some types of control equipment would need electricity to operate and thus cause an increase the demand for electricity. Similarly, increased demand for natural gas could be required for combustion devices, especially for generating electricity. Finally, alternative fuels could be used as substitutes for gasoline and diesel for mobile sources. Each control measure proposed in the 2016 AQMP was evaluated and 47 control measures were identified as having potential adverse energy impacts. Evaluation of the control measures was based conducting an examination of the potential impacts for each control measure and the technologies that may be involved in light of current energy trends. All control measures were analyzed to identify both beneficial effects (energy conserving) and adverse impacts (energy consuming). Table 4.2-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that in turn, could generate significant energy impacts.

TABLE 4.2-1

Control Measures with Potential Energy Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating (NOx)	Installation of new commercial space heating furnaces, boilers, water heaters, and residential space heating furnaces.	Potential change in the type and amount of fuel combusted due to increased efficiencies.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR/SNCR equipment.	Potential increased demand for electricity to operate the new control equipment.
FLX-02	Stationary Source VOC Incentives	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification replacing combustion-based equipment.	Electrification in the place of combustion-based equipment may potentially increase the amount of electricity needed.
BCM-01	Further Emission Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	Potential increased demand for electricity to operate the new control equipment.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure	Potential increased demand for fuel used and fuel generated by poultry manure thermal gasification.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia.	Potential increased demand for electricity to operate the control equipment.
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of exhaust ventilation with a fabric filter for permanent use in building abrasive blasting activities and the use of additional portable equipment like negative air machines, fume extractors, and dust collectors with HEPA filters.	Potential increased demand for electricity to operate the control equipment.
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential increased demand for electricity due to the use of engineering controls.

TABLE 4.2-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves (PM)	Construction/upgrading of wood burning hearths to cleaner hearth as well as an increase in the stringency of the curtailment program and education.	Potential increased demand for natural gas or electricity needed due to converting wood burning hearths to natural gas or electric hearths.
BCM-10	Emission Reductions from Greenwaste Composting (NH3, VOC)	Use of control such as anaerobic digestion and organic processing technology and restrictions for direct applications of un-composted waste to public lands.	Potential increased demand for natural gas needed for anaerobic digestion.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near-zero emission equipment in/around warehouses.	Potential increased demand for natural gas, electricity, and alternative fuels.
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivizing zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	Potential increased demand for natural gas, electricity, and alternative fuels.
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Acceleration of the penetration of zero and near-zero emission vehicles; use of alternative fuels and fuel additives.	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-07	Accelerated Penetration of Partial-Zero and Zero Emission Light Heavy and Medium Heavy Duty Vehicles (NOx, PM)	Acceleration of the penetration of zero and near-zero emission vehicles as well as the use of alternative fuels and fuel additives.	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure.	Potential increased demand for natural gas, electricity, and alternative fuels.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivizing SOON program and phasing in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	Potential increased demand for natural gas, electricity, and alternative fuels.

TABLE 4.2-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Acceleration of the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-14	Emissions Reductions from Incentive Programs (NOx)	Implementation of Prop 1B and Carl Moyer Programs to accelerate the penetration of clean air vehicles.	Potential increased demand for natural gas, electricity, and alternative fuels.
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerating the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of dust control, alternative fuels, diesel PM filters, low-emitting engines, low VOC materials and mitigation fees.	Potential increased demand for natural gas, electricity, and alternative fuels.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential increase in electricity demand needed to operate control equipment.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential increase in electricity demand needed to operate control equipment.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soil (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Potential increase in electricity demand needed to operate control equipment.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	Potential increase in electricity demand needed to operate control equipment.

TABLE 4.2-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential increase in electricity demand needed to operate control equipment.
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Potential increase in electricity demand needed to operate control equipment.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon.	Potential increase in electricity demand needed to operate control equipment.
TXM-09	Control of Toxic Emissions from Oil and Gas Well Activities (TACs, PM)	Construction of enclosures and control equipment and implementation of methods to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Potential increased demand in electricity needed to operate control equipment.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	Potential increased demand for electricity, natural gas, and alternative fuels/additives; reduced demand for gasoline and diesel fuels.
ORHD-02	Low-NOx Engine Standards (NOx)	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	Potential increased demand for electricity, natural gas, and alternative fuels/additives; reduced demand for gasoline and diesel fuels.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel.

TABLE 4.2-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx)	Incentives for the use of control equipment such as SCRs.	Potential increase in electricity demand.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of zero and near-zero emission technologies.	Potential increase in electricity demand.
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Measure to accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in off road forklifts.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.

TABLE 4.2-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Measure to accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in small off-road engines.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
OFFS-06	Transport Refrigeration Units Used For Cold Storage (NOx, PM, GHG)	Measure to accelerate penetration of zero emission technologies in cold store refrigeration unites.	Potential increased demand for electricity and reduced demand for gasoline and diesel fuels.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment (NOx, ROG, PM2.5)	Measure to accelerate the implementation of zero emission technologies in off-road equipment.	Potential increased demand for electricity, natural gas, and alternative fuels.

4.2.3 SIGNIFICANCE CRITERIA

The NOP/IS concluded that the 2016 AQMP would not conflict with adopted energy conservation plans or standards, would comply with existing energy standards, and would not use non-renewable resources in a wasteful or inefficient manner. However, implementation of the 2016 AQMP would cause significant adverse energy impacts if any of the following conditions occur:

- The project results in substantial depletion of existing energy resource supplies.
- An increase in demand for utilities impacts the current capacities of the electric and natural gas utilities.

4.2.4 IMPACT ANALYSIS

Project-specific energy impacts associated with the projected increased demand for electricity, natural gas, and alternative fuels have been evaluated in this section.

4.2.4.1 Electricity

Potential electricity impacts relative to the energy baseline are discussed below. The potential increase in electricity demand due to the implementation of the 2016 AQMP is partially associated with the potential installation of add-on air pollution control equipment. A number of control measures could result in the installation of air pollution control equipment on existing sources including: CMB-05, BCM-01, BCM-05, BCM-06, BCM-07, BCM-10, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, TXM-08, and TXM-09. Add-on air pollution control equipment can reduce air emissions in a number of different ways (e.g., by using filters to remove particulates,

or by installing units that produce a chemical reaction to remove a pollutant), but they generally require electricity to operate. The use of add-on air pollution control equipment and associate chemicals (e.g., wet scrubbers, low NOx burners, and catalysts) could result in an increase in electricity demand. For example, a wet gas electrostatic precipitator (ESP) and wet gas scrubber (WGS) were installed on the Fluid Catalytic Cracking Unit (FCCU) at the ConocoPhillips Los Angeles Refinery. The estimated electricity required to operate the ESP and WGS was about 715 kilowatts (kW) (SCAQMD, 2007). FCCUs are large emission sources and the electricity need to operate the ESP and WGS at the ConocoPhillips Refinery would be representative of air pollution control equipment for large sources. The electricity use to operate air pollution control equipment at smaller sources would generally be less.

There is the potential increase in electricity demand and use associated with the electrification of stationary sources, including: CMB-01, CMB-02, FLX-02, and BCM-09.

In December 2015, the SCAQMD certified a Final Program Environmental Assessment (December 2015 Final PEA) for Proposed Amendments to Regulation XX - RECLAIM (SCAQMD, 2015) which evaluated the potential increase in electricity demand associated with the implementation of additional emission reductions under RECLAIM. CMB-05 would seek further NOx reductions under the RECLAIM program which may cause related energy impacts. Table 4.2-1 summarizes the estimated number of NOx emission control devices that were estimated in the December 2015 Final PEA prepared for NOx RECLAIM per sector and per equipment/source category. Similarly, control measure CMB-05 may encourage the installation of different types of control devices including SCR, SNCRs, a proprietary Low Temperature Oxidation technology (LoTOx^{TM}) with or without a WGS, and catalyst impregnated filters with a Dry Gas Scrubber (UltraCat DGS). In total, the December 2015 Final PEA for NOx RECLAIM estimated that the following new NOx air pollution control equipment could be installed: up to 117 SCRs, eight LoTOx^{TM} with WGSs, one LoTOx^{TM} without WGS, and three UltraCat DGSs. Control measure CMB-05 would be expected to result in similar, but fewer impacts, because CMB-05 would require the approximately five tons per day of NOx emission reduction by 2031, while the analysis in the December 2015 Final PEA was based on achieving 14 tons per day of NOx reductions by 2022).

TABLE 4.2-2

Estimated Number of NOx Control Devices Per Sector and Equipment/Source Category

Sector	Equipment/Source Category	Number of Affected Facilities	Estimated Number of Control Devices
Refinery	Fluid Catalytic Cracking Units (FCCUs)	5	2 SCRs 2 LoTOxTM with WGSs 1 LoTOxTM without WGS
Refinery	Refinery Process Heaters and Boilers	8	74 SCRs
Refinery	Refinery Gas Turbines	5	7 SCRs
Refinery	Sulfur Recovery Unit / Tail Gas Units (SRU/TGUs)	5	5 LoTOxTM with WGSs 1 SCR
Refinery	Petroleum Coke Calciner	1	1 LoTOxTM with WGS or 1 UltraCat with DGS
Non-Refinery	Container Glass Melting Furnaces	1	2 SCRs or 1 UltraCat with DGS
Non-Refinery	Sodium Silicate Furnaces	1	1 SCR or 1 UltraCat with DGS
Non-Refinery	Metal Heat Treating Furnaces	1	1 SCR
Non-Refinery	Internal Combustion Engines (Non-Refinery/Non-Power Plant)	3	16 SCRs
Non-Refinery	Turbines (Non-Refinery/Non-Power Plant)	7	13 SCRs and 1 SCR replacement
TOTAL:			**114 to 117 SCRs** **7 to 8 LoTOxTM with WGSs** **1 LoTOxTM without WGS** **0 to 3 UltraCat**

SCAQMD, 2015

If add-on air pollution control devices are installed and operating, adverse energy impacts (e.g., increased demand in energy) may occur during operation due to the need for electricity to operate the air pollution control devices. Tables 4.2-3 and 4.2-4 summarize the estimated impacts on operational electricity use based on the analysis contained the December 2015 Final PEA for NOx RECLAIM on a per facility and per sector basis, respectively.

TABLE 4.2-3

Potential Operational Energy Use Per Refinery Facility

Refinery ID	Affected Equipment/ Source Category and Potential NOx Control Equipment	Potential Increased Electricity Demand (kWh/day)	Potential Increased Instantaneous Electricity Demand (MW)
1	SRU/TGU: 1 LoTOxTM with WGS Gas Turbine: 1 SCR Boilers/Heaters: 5 SCRs	41,307	1.72
2	Coke Calciner: 1 LoTOxTM with WGS or 1 Ultracat DGS	17,711	0.74
3	Boilers/Heaters: 2 SCRs	1,628	0.07
4	FCCU: 1 LoTOxTM with WGS Gas Turbine: 1 SCR Boilers/Heaters: 2 SCRs	25,162	1.05
5	FCCU: 1 SCR SRU/TGU: 2 LoTOxTM with WGSs SRU/TGU: 1 SCR Gas Turbine: 3 SCRs Boilers/Heaters: 4 SCRs	24,733	1.03
6	FCCU: 1 SCR SRU/TGU: 1 LoTOxTM with WGSs Gas Turbine: 1 SCR Boilers/Heaters: 5 SCRs	21,878	0.91
7	FCCU: 1 LoTOxTM without WGS Gas Turbine: 1 SCR Boilers/Heaters: 3 SCRs	8,168	0.34
8	SRU/TGU: 1 LoTOxTM with WGS Boilers/Heaters: 3 SCRs	14,307	0.60
9	FCCU: 1 LoTOxTM with WGS Boilers/Heaters: 2 SCRs	20,445	0.85
TOTAL		**168,170**	**7.01**

SCAQMD, 2015

TABLE 4.2-4

Potential Operational Energy Use Per Non-Refinery Facility

Non-Refinery ID	Affected Equipment/ Source Category and Potential NOx Control Equipment	Potential Increased Electricity Demand (kWh/day)	Potential Increased Instantaneous Electricity Demand (MW)
1	ICEs: 5 SCRs Gas Turbines: 3 SCRs	14,368	0.60
2	ICEs: 6 SCRs Gas Turbines: 4 SCRs	3,088	0.13
3	ICEs: 5 SCRs	462	0.02
4	Gas Turbines: 1 SCR	608	0.03
5	Gas Turbines: 2 SCRs	1,217	0.05
6	Gas Turbines: 1 SCR	608	0.03
7	Gas Turbines: 2 SCRs	9,370	0.39
8	Glass Melting Furnace: 2 SCRs	2,916	0.12
9	Sodium Silicate Furnace: 1 Tri-Mer	1,248	0.05
10	Metal Heat Treating Furnace: 1 SCR	11,458	0.48
11	Gas Turbines: 1 SCR (replacement of existing)	0	0
TOTAL		45,344	1.89

SCAQMD, 2015

Based on Tables 4.2-3 and 4.2-4, the analysis in the December 2015 Final PEA concluded that the total increase in electricity demand at the affected NOx RECLAIM facilities was 213,514 kwh/day or 8.9 MW. Thus, CMB-05 would likely encourage the installation of similar additional air pollution control equipment with similar electrical requirements, but on a smaller scale since the projected NOx emission reductions and corresponding increase in electricity demand under CMB-05 are expected to be much less for five tons per day of NOx emission reduction than the electricity demand estimated for 14 tons per day of NOx emission reductions as analyzed in the December 2015 Final PEA.

The actual potential increase in the amount of electricity use due to the implementation of the 2016 AQMP is unclear at this time because specific information regarding the number and size of the air pollution control devices that may be installed are currently unknown. Additionally, alternative processing equipment is expected to be the primary method of control for some of the control measures. For example, the primary method for reducing VOC emissions from coatings and solvents (FLX-02) is expected to be achieved without installing any air pollution control equipment but instead by manufacturers reformulating coatings and solvents and developing more efficient application techniques, which would likely be energy neutral.

Mobile source control measures in the 2016 AQMP are expected to increase the electricity demand in the Basin. A number of control measures would result in increased electricity demand due to the electrification of mobile sources, including: MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, EGM-01, ORLD-01,ORLD-03, ORHD-02, OFHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-03, ORFIS-04, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-06, and OFFS-08. Electrification is expected to shift some of the fuel sources for cars, trucks, off-road vehicles and marine vessels from gasoline

and diesel fuels to electricity as well as create an additional electrical load demand due to CNG refueling.

Between March 2011 and July 2015, more than 146,000 electric vehicles were sold in California, with about 2,248 public electric charging stations operating throughout California (CEC, 2016i). Assuming about 0.01 gigawatts per hour (GWh), the total electricity used by vehicles in California was about 1,460 GWh. The CEC projects that there will be 1.5 million electric vehicles in use by 2025, in support of the Executive Order by Governor Brown which encourages zero-emission vehicles by 2025. The 2016 AQMP, as well as CARB's SIP Strategy, are expected to encourage the use of additional electric vehicles.

The estimated baseline electricity use in Los Angeles, Orange, Riverside, and San Bernardino counties was about 120,960 GWh in 2014 (CEC, 2016h, see Table 3.3-1). Therefore, electricity needed to charge vehicles currently represents a relatively small portion of the overall electricity used (about 1 percent) in the four counties. The CEC estimates an increase in electricity demand of about 1 to 1.3 percent per year through 2026 (CEC, 2016k). Assuming that growth rate, the total projected electricity use would be an approximately 135,475 to 140,000 GWh by 2024 and an approximately 141,532 to 147,692 GWh by 2031.

The potential increase in electricity demand can be estimated for Control Measures MOB-05, ORLD-03, ORHD-04, and ORHD-09 from the projected increase in the number of zero and near-zero emission vehicles that will be introduced into the market (Table 4.2-5).

MOB-09, ORHD-08, ORHD-06, and ORHD-09 could result in the construction of electric or magnetic power built into roadway infrastructures to boost the pulling capacity or range of the heavy-duty vehicles. The electric or magnetic power for specially equipped heavy-duty trucks would require additional electricity. The Draft EIR/EIS prepared for the Interstate 710 (I-710) Corridor Project included an alternative which included the installation of an electric roadway infrastructure. The Draft EIR/EIS concluded that this alternative would increase electricity demand between 157 and 183 GWh per year (Caltrans, 2012). Caltrans is currently in the process of revising the Draft EIR/EIS for the I-710 Corridor and the corresponding alternatives analysis which is expected to be available for review and comment in Spring 2017. Thus, the electrical use estimates for these control measures are preliminary.

In addition to the I-710 Corridor Project, another potential location for electric roadway infrastructure is being considered for the State Route 60 (SR-60) Freeway. To estimate the potential electrical demand for an electric roadway infrastructure along the SR-60 Freeway, the electrical demand per mile would likely be equivalent or similar to the electricity demand estimates for the I-710 Corridor Project, except for a distance that is twice as long. Therefore, the estimated electricity demand for retrofitting the SR-60 Freeway with an electric roadway infrastructure would be between 320 and 380 GWh. No other projects have been proposed that would include the use of an electric roadway infrastructure elsewhere in the Basin. Therefore, the estimated peak electricity demand associated with the possible installation of roadway electric power on both the I-710 and SR-60 is 563 GWh (see Table 4.2-4).

Control measure ORFIS-04 would reduce emissions from ships at berth if more ships use cold ironing, which is the process of providing shoreside power electrical power to a ship at berth while its main and auxiliary engines are turned off. Electricity can be provided to ships shoreside via electrical cables. Shoreside power can be locally generated at the port using clean technologies such as fuel cells, gas turbines, microturbines, and combined cycle units or obtained from the electrical grid. Shoreside power can be locally generated. Due to technical and operational reasons, cold ironing may not be a viable option for all types of ships.

TABLE 4.2-5
Electricity Impacts for Los Angeles, Orange, Riverside, and San Bernardino Counties (GW-h)

CONTROL MEASURE	2014	2023[a]	2031
Electricity Supply/Capacity	120,960	131,846	141,523
MOB-05, MOB-14, ONLD-01, and ORLD-03 – Penetration of Partial-Zero and Zero Emission Vehicles (357,000 vehicles by 2023, 714,000 by 2031)[b]	--	1,530	3,059
ORHD-04 – Advanced Clean Transit (11,000 buses)[c]	--	183	183
ORHD-03, ~~ORHD-04,~~ ORHD-05, ORHD-06, ORHD-08 – Partial-zero and zero emissions Light, Medium and Heavy-Duty Trucks (115,000 by 2023 and 245,000 by 2031)[c]	--	1,909	4,067
OFFS-01, OFFS-04, OFFS-06 – TRUs, Forklifts and Ground Support Equipment (50,000 by 2023 and 100,000 by 2031)[d]	--	85	170
OFFS-05 – Lawn Equipment (2 million by 2023 and 4 million by 2031)[e]	--	3,200	6,400
OFFS-02, OFFS-08 – Larger Off-road Diesel/Gasoline Equipment (30,000 by 2023 and 60,000 by 2031)[c]	--	498	996
OFFS-03, OFF-08 – Construction and Industrial Equipment (20,000 by 2023 and 40,000 by 2031)[c]	--	332	664
Electric Roadway Infrastructure of the I-710 and 60 Freeways (MOB-09, ORHD-06, ORHD-08, and ORHD-09)[f]	--	563	563
ORFIS-04 – At-Berth Regulation Amendments[g]	--	1,927	1,927
Total Electrical Use for Mobile Source Measures	**--**	**10,227**	**18,029**
Percent of Capacity	--	7.8%	12.7%

(a) Projections based on CEC, 2016h, assuming an average increase in electricity use of 1% per year.
(b) Based on 12,600 miles/year and 0.34 kWh/mile.
(c) Based on 16,600 miles/year and one kWh/mile.
(d) Based on 5,000 miles/year and 0.34 kWh/mile
(e) Based on 200 days/year of operation at 1 kWh per hour
(f) Based on Caltrans, 2012.
(g) Based on Port of Los Angeles, 2014. Assumes 220 MW is operating 24 hours per day for 365 days per year.

To handle the potential increase in electricity demand which is projected to quadruple by 2030 at the Port of Long Beach (Port of Long Beach, 2015), the Port of Long Beach has implemented their Energy Island Initiative, which is a comprehensive strategy for transitioning the Port of Long Beach to renewable power sources and self-generation systems. One goal of this initiative is for the Port of Long Beach to operate independently from the electricity grid in times of emergency or other needs.

An EIR was prepared for the Middle Harbor development in the Port of Long Beach and the analysis estimated that the electricity consumption would be about 986 megawatt-hours (0.2 MW, assuming 365 days of operation for 24 hours per day) if the Middle Harbor container terminal operations used cold ironing and if electrical connections were made to buildings and other wharf structures (e.g., lighting). While the projected increased demand in electricity was considered extensive, the quantity was determined to not be substantial relative to the existing and projected regional electricity supply (Port of Long Beach, 2009).

Similarly, the Port of Los Angeles has prepared their Energy Management Action Plan which outlines actions that the Port of Los Angeles needs to take to meet future increases in electricity demands which are projected to double or potentially triple over the next decade due to anticipated increases in throughput and expanded use of alternative maritime power (AMP), electric equipment (including electric cargo handling equipment), and terminal automation. The Port of Los Angeles estimated the annual average hourly demand for electricity was 27 MW per hour (peak of 55 MWh) in 2012. With the combined increased use of AMP and the automation of container terminals, peak electricity demands are expected to increase from 55 MW to a range of 96 MW to 161 MW at the container terminals (Port of Los Angeles, 2014). For purposes of the analysis herein, the electricity demand at both ports in response to implementation of control measure ORFIS-04 is expected to double from about 110 MW to 220 MW (assuming that the ports are operating 24 hours per day and 365 days per year).

Renewable energy will be relied upon to supply the projected increases in electricity demand due to general population growth, both inside and outside of California. Increases in electricity demand are projected to occur with or without implementing the 2016 AQMP. The 2012 AQMP Final Program EIR evaluated the projected increases in electricity demand from AQMP control measures proposed at that time and the analysis noted that there were a number of power plant projects planned in southern California to meet future electricity needs. In fact, from year 2012 through 2014, in southern California alone, new power plants representing over 2,900 MW of electricity generation have become operational, power plants representing 785 MW are currently under construction[1], and a number are in the planning stages (CEC, 2016m). Relative to the existing electricity use and the projected future peak electricity demand, implementation of all the control measures is expected to result in an overall increase of 7.86 percent of the existing electricity use by 2024 and 12.7 percent of the existing electricity use by 2031 (see Table 4.2-4). While these projected increases are expected to be within the electric generating capacity of the region, an increase in electricity of one percent or greater is considered to exceed the SCAQMD's energy significance threshold. Further, there could be electrical requirements for other control measures for which the electrical demand cannot be estimated at this time. Thus, the energy impacts resulting from potential increases in electricity demand as part of implementing the 2016 AQMP are expected to be significant.

The energy impacts for electricity demand, as presented above for control measures where sufficient data exist are expected to be conservative. The peak daily demands for increased electricity associated with further electrification of mobile sources and the energy impacts could be minimized by charging electric vehicles or other equipment at night when the electricity demand is low. Further, the analysis assumes that all sources affected by a control measure with the

[1] Neither facility is located within the boundaries of the Basin.

potential to increase the demand for electricity and would use electricity rather than substituting other types of energy. In addition, any increase in electricity demand would likely result in a concurrent reduction in demand for other types of fuels, particularly petroleum-based fuels. The 2016 AQMP is not expected to result in the use of large amounts of fuel or energy resources or result in the use of fuel or energy resources in a wasteful manner. However, the 2016 AQMP includes incentives to shift from using diesel and gasoline fuels and instead shift to increasing the electrification of stationary and mobile sources. Depending on the location and the amount of energy needed, the electricity portions of existing energy conservation plans that have been adopted by facilities such as the ports may need to be updated. Therefore, the proposed project may conflict with existing adopted energy conservation plans. Because the 2016 AQMP could result in a substantial increase in electricity demand at a level greater than one percent of the existing electricity use in the Basin, the projected increases to electricity demand are potentially significant.

It should be noted that the 2016 AQMP would also have some beneficial impacts on energy use. For example, implementation of the 2016 AQMP is expected to cause a shift away from petroleum-based fuels towards the incentivized use of electric vehicles (including trucks) and other equipment. The types of vehicles and equipment that may be used to meet some of the goals of these incentives is currently unknown but could include partial-zero emissions vehicles (such as hybrids) and zero emission vehicles which include electric vehicles and hydrogen fuel cell vehicles. The electrical grid and hydrogen supply supporting these electric vehicles would need to generate 50 percent of renewable energy by 2030, as required by the Clean Energy and Pollution Reduction Act of 2015. A large portion of the fuels for combustion engine vehicles would also need to be sourced from renewable feedstock.

Implementation of the 2016 AQMP is expected to shift from the use of gasoline and diesel fuels to battery-electric, hydrogen, and natural gas instead. It would also promote the increased demand and supply of low-emission diesel fuels. However, the 2016 AQMP is not expected to result in an increase in the number of vehicles.

According to Appendix F of the CEQA Guidelines, Energy Conservation, the wise and efficient use of energy includes: 1) decreasing the overall per capita energy consumption; 2) decreasing the reliance on fossil fuel such as coal, natural gas, and oil; and, 3) increasing the reliance on renewable energy sources. Implementation of the 2016 AQMP would increase the amount of renewable energy supplies because the increased use of partial zero and zero emission vehicles would be powered more by electricity and biodiesel fuel instead of by petroleum-based fuels such as gasoline and diesel. Thus, the 2016 AQMP would support the efficient use of energy by decreasing the use of fossil fuels and increasing the reliance on renewable energy sources, which in turn will provide a beneficial long-term operational impact on energy conservation. Further, the 2016 AQMP includes a strategy that promotes energy conservation (FLX-01) without identifying specific targets so these benefits have not been quantified in this analysis. Nonetheless, the 2016 AQMP impacts on electricity resources are potentially significant.

4.2.4.2 Natural Gas

Control measures in the 2016 AQMP may result in an increased demand for natural gas associated with stationary sources due to the need for additional emission controls, including CMB-05, BCM-01, BCM-05, BCM-06, BCM-07, BCM-10, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, TXM-08, and TXM-09. Other mobile source control measures could encourage the use of natural gas as a fuel to offset the use of petroleum fuels including MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, EGM-01,ORLD-01, ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-02, ORFIS-03, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, and OFFS-08. In addition, the projected increased demand for electricity will also require additional natural gas since most of the power plants in California generate electricity from equipment that uses natural gas.

The total natural gas (utility) consumption in California in 2014 was approximately 6,175 million standard cubic feet (mmscf) per day in 2014 and 4,192 million therms within the Basin. The residential, commercial, industrial, and electrical generation sectors account for approximately 20, 8, 15, and 40 percent, respectively, of the total statewide natural gas consumption by utilities. As shown in Table 4.2-6, the demand for natural gas in California is expected to decrease in many sectors, as the use of renewable fuels increases.

TABLE 4.2-6
Actual (2011) and Modeled Natural Gas Demand in California (mmscf/day)

Reference Case	Million cubic feet per day				
	2011	2015	2020	2025	% Change 2011-2025
Residential	1,352	1,297	1,312	1,333	-1%
Commercial	554	544	574	593	7%
Industrial	1,486	1,478	1,437	1,398	-6%
Transportation	42	40	40	42	0%
Power Generation	2,180	2,670	2,204	2,157	-1%
EOR/Cogen	124	123	117	115	-7%
TOTAL	5,738	6,152	5,684	5,639	-2%
Low Demand/High Price Case					
Residential	1,352	1,273	1,311	1,346	0%
Commercial	554	530	556	582	5%
Industrial	1,486	1,382	1,363	1,340	-11%
Transportation	42	38	37	39	-8%
Power Generation	2,180	2,446	1,825	1,616	-35%
EOR/Cogen	124	116	111	107	-15%
TOTAL	5,738	5,786	5,203	5,030	-14%
High Demand/Low Price Case					
Residential	1,352	1,297	1,312	1,328	-2%
Commercial	554	549	579	593	7%
Industrial	1,486	1,491	1,447	1,408	-5%
Transportation	42	40	42	45	6%
Power Generation	2,180	3,026	1,895	2,864	31%
EOR/Cogen	124	157	158	166	34%
TOTAL	5,738	6,561	6,433	6,404	12%

Source: CEC, 2013

The natural gas demand by sector is shown in Table 4.2-6 and the entries for 2011 represent actual natural gas data while the fields for subsequent years contain natural projections. In all cases, demand for the residential sector remains relatively the same due to energy efficiency measures that are currently in effect and are expected to continue to reduce the natural gas demand per capita . For all cases, the demand for natural gas in the power generation sector shows an increase in 2015 followed by a decrease in demand in subsequent years. It is important to note that the demand for power generation from natural gas fired units was low in 2011 due to high precipitation levels occurring that year which caused greater supplies in electricity that was generated by hydroelectric power. The California's Renewables Portfolio Standard mandate which requires 33 percent of renewables by 2020 is driving an increase of generating electricity with renewable energy which otherwise would have been met by natural-gas fired generating units. However, because of the intermittent nature of renewable generation, natural gas-fired units may continue to be needed to provide coverage during short-term mismatches between supply and demand. Going forward, it is important that the natural gas system continues to have flexibility to be able to accommodate any short-term ramping up and down of natural gas units that will be required to integrate renewables. Thus, an increase in natural gas is still expected under certain scenarios (CEC, 2013).

The natural gas vehicle market is expected to continue to grow due to government (federal, state, and local) incentives and regulations related to the purchase and operation of alternative fuel vehicles, growing numbers of natural gas engines and vehicles, and the increasing cost differential between petroleum-based fuels (gasoline and diesel) and natural gas. At the end of 2013, there were 289 compressed natural gas fueling stations delivering 11.4 billion cubic feet of natural gas during that year. The natural gas vehicle market is expected to grow substantially from 11.4 billion cubic feet in 2013 to 23.3 billion cubic feet in 2035, a growth rate of just over 3.3 percent per year (CGR, 2014). The increase in natural gas as a transportation fuel would cause a decrease in the use of petroleum-based fuels.

Some of the control measures in the 2016 AQMP may cause an increase in the use of natural gas in medium- and heavy-duty on-road vehicles. The expanded use of alternative fuels in medium- and heavy-duty trucks using more efficient, advanced natural gas engine technologies would be expected to reduce diesel fuel use. Natural gas medium- and heavy-duty vehicles are considered to be an attractive environmental option to diesel-fueled vehicles because the natural gas vehicles emit fewer criteria pollutants and toxic components. However, hybrid vehicles and zero emission electric vehicles are further along in the development phase and expected to be the preferred over vehicles powered by natural gas.

For stationary sources, since natural gas is already BACT, new equipment is currently required to use natural gas. Under the 2016 AQMP control measures, a slight increase in natural gas demand is expected from the use of add-on air pollution control equipment associated with achieving NOx, VOC and PM emission reductions. The amount of natural gas needed to operate add-on air pollution control devices is unknown because the number of equipment required and the equipment sizes are not known. Equipment replacements or retrofits are expected to occur for implementation of some of the control measures, resulting in energy efficiency as newer and retrofitted equipment (e.g., low NOx burners) are generally more energy efficient.

Approximately 40 percent of the natural gas consumed in California is used at power plants to generate electricity. Southern California Edison projects that additional electricity generating capacity will be needed in order to accommodate future increases in population due to growth. The increased electricity demand expected in the Basin would be met by natural gas-fueled power plants resulting in an estimated increased demand for natural gas by about 2,864 mmscf by 2025 (Table 4.2-6).

As shown in Table 4.2-6, natural gas use in the residential sector is expected to remain relatively the same, as energy efficiency measures are expected to continue to stabilize or reduce demand in this sector. Further, an overall decline in the demand for natural gas in the power generation sector in California is expected to occur over the next decade as more renewable generation and efficiency measures will reduce the need for natural gas-fired electricity generation. By 2020, 33 percent of electricity generation will be met with renewable sources, which will result in less natural gas needed to meet the energy demands.

Natural gas supplies are abundant as a result of technological innovations. For example, some natural gas bearing formations such as shale reservoirs, previously inaccessible, are now producing in 31 states (including California) and causing a dramatic increase in North American natural gas availability. The natural gas outlook in 2007 predicted that 700 trillion cubic feet of natural gas would be economically recoverable, but that outlook has now increased to nearly 1,400 trillion cubic feet of natural gas, a 100 percent increase (CEC, 2013).

4.2.4.3 Petroleum Fuels

Implementation of the 2016 AQMP is expected to decrease the future demand for petroleum fuels (e.g., diesel, distillate, residual oil, and gasoline) due to mobile source control measures combined with improved engine efficiencies due to retrofits of new engines. Control measures that are expected to result in a decreased demand for petroleum fuels include control measures that would result in the installation of new, more fuel efficient engines in mobile sources, the use of alternative fuels, and, the increased electrification of mobile sources.

Control Measures MOB-05, ORLD-03, ORHD-04, and ORHD-09 are expected to encourage the introduction of 500,000 to 600,000 partial-zero and zero-emission vehicles, 11,000 buses, and 100,000 to 150,000 trucks (see Table 4.2-4). A number of other control measures that are expected to result in a decrease of petroleum fuel use include MOB-01, MOB-02, MOB-03, MOB-04, MOB-07, MOB-09, MOB-10, MOB-13, MOB-14, EGM-01,ORLD-01, ORHD-02, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORFIS-01, ORFIS-02, ORFIS-03, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, and OFFS-08. However, actual reductions in petroleum fuel use from these control measures, however, is not known at this time.

Table 4.2-7 shows that petroleum fuel use is projected to be 6.8 to 7.2 billion gallons in 2040which reflects a 22.5 to 27.4 percent net reduction in southern California from the 9.3 billion gallons consumed in 2012.

TABLE 4.2-7

Southern California Estimated Transportation Fuel Consumption

	Fuel Consumed		Percentage under Existing Use
	Billion Gallons per year	Thousand Gallons per Day	
2012	9.3	25,570	--
2040	7.2	19,805	-22.5
2040 (with RTP/SCS)	6.8	18,560	-27.4

Source: SCAG, 2016.

Construction activities that may be necessary in order to implement control measures in the 2016 AQMP would increase the use of gasoline and diesel. Construction activities may be necessary for a variety of control measures in order to develop and build a transportation infrastructure, install air pollution control equipment, and further develop and build an electricity infrastructure to support the electrification of sources. The amount of petroleum fuels needed for construction would depend on the extent of the specific construction activities employed. For example, larger construction projects typically use the most fuels and are likely to require project specific CEQA review to evaluate the specific energy needs.

There are currently adequate fuel supplies in California. For example, in fiscal year 2014, 14,573,637,973 gallons of gasoline and 2,741,781,694 gallons of diesel fuel were sold in California (CSBE, 2014). Construction activities are temporary and all construction equipment will cease once construction activities are finished. As the use of petroleum fuels by other mobile sources decreases, there is likely to be an excess supply of gasoline and diesel. Because implementation of the 2016 AQMP is expected to result in an overall reduction in the use of petroleum fuels (see Table 4.2-6), any increases in fuel use for construction purposes would be not be expected to be greater than the overall reduction in the use of petroleum fuels. Therefore, no significant adverse impacts on petroleum fuels are expected due to implementation of the 2016 AQMP.

Emissions from mobile sources are the largest contributors of emissions in the Basin. Overall, implementation of the 2016 AQMP is expected to result in a large emissions reduction from mobile sources which can be partly attributable to a reduction in the use of petroleum-based fuels due to requirements that would result in higher energy efficiencies or that would be displaced by less polluting alternative fuels. The largest reductions in the use of petroleum-based fuels are expected from the on-road mobile source sector switching to electricity or alternative fuels (see Table 4.2-6).

4.2.4.4 Alternative Fuels

4.2.4.4.1 Biodiesel

Biodiesel has similar fuel properties as petroleum-based diesel fuel which makes it an easy substitute for use in diesel engines. The advantages of combusting biodiesel in lieu of petroleum-based diesel include decreased emissions of net carbon dioxide (GHG), hydrocarbon, carbon

monoxide, and particulate matter.. However, biodiesel also has disadvantages which include poorer cold flow characteristics, lower heating values, and higher NOx emissions than petroleum-based diesel. In light of recent policies that provide incentives or require the use alternative fuels, such as the federal Renewable Fuel Standard and the California Low Carbon Fuel Standard, there has been more interest in the production of biodiesel. Biodiesel use has been gradually increasing over the past few years in California, but there is a potential constraint in securing enough low-carbon intensity feedstock to produce biodiesel and renewable diesel. The bulk of renewable diesel available on the market today is produced in Singapore and shipped to California (CEC, 2013). As such, biodiesel use in California is estimated to have been nearly 136 million gallons in 2013. There are 18 biodiesel fueling stations in southern California.

To the extent that partial-zero and zero emission technologies such as electrification are implemented as a result of implementing 2016 AQMP control measures, the demand for biodiesel would be expected to decline similar to the projected declines in demand for petroleum-based diesel fuel.

4.2.4.4.2 Ethanol and E85

There are a number of 2016 AQMP control measures that identify alternative fuels as a potential compliance option. Since many of the control measures ultimately call for low or zero emitting equipment, it is unclear whether ethanol or ethanol blends would be used as a compliance option Nonetheless, this analysis conservatively assumes that there would be an increased demand for ethanol and ethanol blends such as E85 as combustion fuels. Currently, most of the ethanol used in California is imported from corn-based ethanol plants in the Midwest and is transported into California via rail. In addition, three facilities produce ethanol in California at an estimated 220 million gallons per year (CEC, 2013). Because the 2016 AQMP seeks to convert emission sources to alternatives which are zero emissions, such as electricity, it is likely that there is sufficient ethanol production capacity to meet any increased demands that may result from implementing the control measures in the 2016 AQMP.

4.2.4.4.3 Hydrogen

There is a growing interest and financial support for the use of hydrogen-powered fuel cells to power cars, trucks, homes, and businesses. Hydrogen vehicles in California consist of demonstration fuel cell passenger cars, internal combustion engine passenger cars, fuel cell buses, and hybrid fuel cell buses. The California Fuel Cell Partnership, a public-private partnership between interested industry and state and local government agencies, has been leading the coordination of fuel cell vehicle demonstrations in California. As of June 2016, 20 hydrogen fueling stations are located in the southern California region plus an additional 18 stations are expected to be opened by the end of 2016, although station development has progressed at a slower pace than projected in 2015 (CARB, 2016b).

Hydrogen fuel cells are proven technology, but more work is needed to make them cost-effective for use in cars, trucks, homes, or businesses. There are currently 331 hydrogen fuel cell electric vehicles registered in California. Hydrogen fuel cell electric vehicles create electricity to power cars with minimal pollution. California has been developing the infrastructure of a hydrogen

highway to assure that hydrogen fueling stations are in place to meet the demands of fuel cell and other hydrogen vehicle technologies. CARB is focusing on putting additional emphasis on creating clusters of hydrogen fueling stations in key urban areas such as Los Angeles and Orange counties, Sacramento, and the San Francisco Bay area (CARB, 2016b).

CARB has projected that California's on-road hydrogen fuel cell vehicles will grow to about 13,500 vehicles in 2019 and 43,600 vehicles in 2022. Auto manufacturers continue to develop and bring to market their fuel cell electric vehicles. For example, in October 2015, Toyota launched the retail sale and lease of its Mirai sedan. Also in March 2016, Honda began sales of its new Clarity Fuel Cell sedan in Japan with an expected launch scheduled in the United States for the end of 2016. In May 2016, the Capitol Hyundai dealership in San Jose became the first Hyundai dealer in northern California to deliver a hydrogen fuel cell vehicle to a customer. Mercedes Benz is planning on releasing its hydrogen fuel cell SUV in 2017. Lexus, General Motors, and Audi have also debuted hydrogen fuel cell vehicle concept models (CARB, 2016b).

One of the goals of the 2016 AQMP is to shift from conventional petroleum-based fuels to less polluting alternative transportation fuels, including hydrogen. Although the 2016 AQMP does not mandate hydrogen fuel use by fleet operators, it does need further technology demonstration and deployment. In addition, at the current pace of developing hydrogen fueling stations, forecasts predict that there will not be a sufficient amount of hydrogen fueling capacity by 2020, unless additional funding sources are located. The development of hybrid and electric vehicles and deployment into the market are much further along in the development process than hydrogen fuel cell vehicles.

4.2.4.4.4 Propane (LPG)

There are a number of 2016 AQMP control measures that identify alternative fuels as a potential compliance option. Since many of the control measures ultimately call for low or zero emitting equipment, propane or liquid petroleum gas (LPG) could be used as a compliance option. Thus, this analysis assumes that there could be an increased demand for LPG as a combustion fuel. Propane is an unregulated fuel in California (except for storage and safety issues) and no data are collected by the state on LPG sales or usage.

Propane-fueled vehicles are used primarily by fleet vehicles (e.g., state-owned vehicles). Propane vehicle conversions were negatively affected by the EPA's Addendum to Memorandum 1A, which led to decreases in the number of vehicle conversions. Therefore, without regulatory requirements or market incentives, the use of propane attributable to the 2016 AQMP control measures is not expected to be significant. Further, the supply of propane used in transportation is expected to be sufficient in the near future, both worldwide and in the United States, should LPG-fueled vehicles meet the applicable vehicle tailpipe standards.

4.2.4.43.5 Renewable Energy

A number of 2016 AQMP control measures would encourage the use of clean alternative fuels or the electrification of sources. For example, MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, EGM-01, ORLD-01, ORLD-03, ORHD-02, ORHD-04,

PRHD-05, ORHD-06, ORHD-07,ORHD-08, ORHD-09, ORFIS-01, ORFIS-03,ORFIS-05, OFFS-01, OFFS-04, 0FFS-05, and OFFS-08 may result in the use of more electric or hybrid vehicles or equipment. While the primary method for control is expected to be electrification, alternative fuels may also be an option in some cases.

There are number of different types of renewable energy sources such as biomass, geothermal, hydroelectric, solar, and wind. With regard to the analysis of potential electricity impacts from the 2016 AQMP, refer to subsection 4.2.4.1. The 2016 AQMP control measures are aimed at incentivizing the use of near-zero and zero emission equipment which include vehicles, trucks, buses, and possibly other sources such as locomotive engines and marine ship engines at berth. The encouraged use of electricity is expected to result in potentially significant electricity impacts as more electrical capacity will be needed.

Large-scale renewable capacity of electricity generation has steadily increased from 6,600 MW in 2010 to nearly 14,300 MW in 2015. Since the end of 2010, 7,700 MW of large-scale (larger than 20 MW) renewable energy projects have become operational. Approximately 44 percent of the large-scale renewable projects operating in California from 2010 through 2015 is generated by wind power; 32 percent is generated by solar power, 20 percent is generated by geothermal, four percent is generated by biomass, and two percent is generated by small hydroelectric power (CEC, 2015l).

As of October 2015, more than 7,200 MW of distributed renewable energy generation capacity (projects smaller than 20 MW) was operating or installed in California. An additional 900 MW is pending California's existing programs to support renewable distributed generation, which if approved, could add another 2,200 MW when fully operational. Much of the nearly 1,700 MW of additional future capacity needed to achieve the 12,000 MW goal could occur through market mechanisms (CEC, 2015l). Table 4.2-8 provides a summary of the renewable projects that are currently online in California.

TABLE 4.2-8

Summary of Renewable Projects On-Line in Southern California (as of October 2015)

County	Biomass		Geothermal		Small Hydro		Solar PV		Solar Thermal		Wind		Total	
	No.	MW	No.	MW	No.	MW	No.	MW	No.	MW	No.	MW	No.	MW
Los Angeles	10	157			19	198	49	455	1	8			78	814
Orange	6	82			3	12							9	94
Riverside	3	59			6	50	17	618	1	250	33	713	59	1,683
San Bernardino	3	6			11	38	46	251	13	1,042	3	7	74	1,318
Total w/in Southern California	22	304			39	298	112	1,324	15	1,300	36	720	220	3,909
Total California	106	1,300	46	2,700	222	1,600	333	5,100	15	1,300	131	6,000	849	18,100

Source: CEC, 2015i

Past and current renewable distributed generation programs include utility fee-in tariffs along with state-mandated self-generation incentives such as the Self-Generation Incentive Program, the California Solar Initiative, the New Solar Homes Partnership, publicly owned electric utility solar programs, and the Emerging Renewables Program.

At the end of November 2015, approximately 11,800 MW of renewable capacity was permitted throughout California and these facilities could come on-line in the future. The CEC estimated that power purchase agreements had been secured for approximately 2,000 MW by projects with approved permits that are not yet on-line. Of the 2,000 MW with contracts, about half (1,080 MW) are expected to come on-line in 2016, almost all solar (CEC, 2015m).

Two control measures may affect biomass/biogas sources: BCM-04 and BCM-10. In particular, BCM-04 could result in the thermal gasification of manure which would potentially generate a biogas (e.g., methane gas similar to natural gas) for use in other processes, e.g., electricity production. BCM-10 could result in the anaerobic digestion of wastes which can also generate a usable biogas. Therefore, BCM-10 could result in an increase in biogas generation which could provide beneficial impacts to renewable energy sources.

The other 2016 AQMP control measures are not expected to have a significant adverse impact on any renewable fuel sources. Indirect impacts would include the increased use of electricity and potentially increasing the need to generate additional renewable energy sources to meet California's energy goals. California has an aggressive Renewables Portfolio Standard (RPS) with a requirement for using 20 percent of renewable energy by 2010, 33 percent by 2020, and 50 percent by 2030. California is ahead of schedule for meeting the RPS. The CEC estimates that nearly 25 percent of electricity in 2014 was from renewable energy generated by wind, solar, geothermal, biomass and hydroelectric sources (CEC, 2015m).

4.2.5 MITIGATION MEASURES

Mitigation measures are required since potentially significant impacts on electricity demand associated with the 2016 AQMP have been identified. As individual control measures are promulgated as new rules or rule amendments, specific mitigation measures will be identified as necessary to minimize electricity impacts. Mitigation measures are expected to include the following:

E-1 Project sponsors should pursue incentives to encourage the use of energy efficient equipment and vehicles and promote energy conservation.

E-2 Utilities should increase the capacity of existing transmission lines to meet forecast demand that supports sustainable growth, where feasible and appropriate, in coordination with local planning agencies.

E-3 Project sponsors should submit projected electricity calculations to the local electricity provider for any project anticipated to require substantial electricity consumption. Any infrastructure improvements necessary should be completed according to the specifications of the electricity provider.

E-4 Project sponsors should include energy analyses in environmental documentation (e.g., CEQA document) with the goal of conserving energy through the wise and efficient use of energy.

E-5 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the charging of electrical vehicles and other mobile sources during off-peak hours.

E-6 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of catenary or way-side electrical systems developed for transportation systems to operate during off-peak hours.

E-7 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of electrified stationary sources during off-peak hours (e.g., cargo handling equipment).

4.2.6 IMPACTS AFTER MITIGATION

The 2016 AQMP will result in less than significant impacts to the increased demand of alternative fuels, alternative energy, renewable energy, petroleum fuels, and natural gas. However, the electricity consumption impacts are significant because the potential 2024 electricity usage increase would exceed baseline electricity consumption by 7.8 to 12.7 percent. Even with implementation of the above mitigation measures, electricity consumption impacts would remain significant.

4.3 HAZARDS AND HAZARDOUS MATERIALS

4.3.1 INTRODUCTION

This subchapter examines hazards and hazardous materials impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether they could generate direct or indirect hazards and hazardous materials impacts based on the anticipated methods of control. Hazards and hazardous materials impacts are related to the risks of explosions or the release of hazardous substances in the event of an accident or upset conditions.

The NOP/IS for the 2016 AQMP identified the following types of control measures as having potentially significant hazards and hazardous materials impacts: 1) use of reformulated coatings, solvents, and consumer products; 2) increase in the transportation and disposal of reformulated products; 3) the use of ammonia in selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) air pollution control technology; 4) use of alternative fuels; and, 5) use of catalysts. Although the NOP/IS concluded that there were no impacts from sites included on a list of hazardous materials sites that would create a hazard to the public and the environment, comments were received on the NOP/IS on this topic area. Therefore, an analysis of this topic area has also been included in this subchapter.

4.3.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL HAZARDS AND HAZARDOUS MATERIALS IMPACTS

The 2016 AQMP strategy is to further the penetration of partial-zero and zero emission technologies. In particular, some control measures in the 2016 AQMP promote greater use of reformulated low VOC consumer products such as coatings, adhesives, solvents and lubricants, potentially resulting in additional hazards associated with their use while other control measures encourage the use of alternative fuels which could increase hazards associated with the use of these fuels. Each control measure proposed in the 2016 AQMP was evaluated and 37 control measures were identified as having potential adverse hazards and hazardous materials impacts. Table 4.3-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant hazards and hazardous materials impacts.

TABLE 4.3-1

Control Measures with Potential Hazards and Hazardous Materials Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	HAZARD IMPACTS
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR or SNCR equipment	Potential hazards associated with the use of additional ammonia and ammonia slip emissions from operating SCR or SNCR equipment.
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants (VOC)	Reformulation of coatings using different solvents, adhesives, and sealants to reduce VOC emissions.	Potential hazards associated with the reformulated coatings that may contain more flammable solvents.
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion based equipment.	Potential hazard with substances in UV cured resins and replacement coatings.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and feed additives to reduce ammonia in manure.	Potential hazards generated by acidifier application, manure removal, and manure slurry injection.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia.	Use of new catalysts could generate potential hazards.
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning (PM)	Incentivize chipping/grinding or composting in the place of agricultural burning as well as the increased utilization of clean fuels for training burns.	Increased utilization of clean fuels for training burns could generate potential hazards.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	The use of alternative fuels and fuel additives can generate hazards.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near zero emission equipment in/around warehouse.	The use of alternative fuels and fuel additives can generate hazards.
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivizing zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	The use of alternative fuels and fuel additives can generate hazards.

TABLE 4.3-1 (cont.)

Control Measures with Potential Hazards and Hazardous Materials Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	HAZARD IMPACTS
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Acceleration of the penetration of zero and near-zero emission vehicles as well as the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
MOB-07	Accelerated Penetration of Partial-Zero and Zero Emission Light-Heavy and Medium-Heavy Duty Vehicles (NOx, PM)	Acceleration of the penetration of zero and near-zero emission vehicles as well as the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	The use of alternative fuels and fuel additives can generate hazards.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivizing SOON program and phasing in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	The use of alternative fuels and fuel additives can generate hazards.
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Acceleration of the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives to reduce emissions	The use of alternative fuels and fuel additives can generate hazards.
MOB-14	Emissions Reductions from Incentives Programs (NOx, SOx, PM)	Implementation of the Prop 1B and Carl Moyer Programs to accelerate the penetration of clean air vehicles.	Increased utilization of clean air vehicles could generate potential hazards.
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerating the penetration of zero and near-zero emission technologies and the use of things like dust control, alternative fuels, diesel PM filter, low-emitting engines, low VOC materials and mitigation fees.	The use of alternative fuels and fuel additives can generate hazards as well as hazards that arise from dust control.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon.	Potential hazards generated from the reformulated solvents that may contain more flammable substances.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars including the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.

TABLE 4.3-1 (cont.)

Control Measures with Potential Hazards and Hazardous Materials Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	HAZARD IMPACTS
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-02	Low-NOx Engine Standards (NOx)	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	The use of alternative fuels and fuel additives can generate hazards.

TABLE 4.3-1 (concluded)

Control Measures with Potential Hazards and Hazardous Materials Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	HAZARD IMPACTS
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	The use of alternative fuels and fuel additives can generate hazards.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 Control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Potential hazards associated with the use of additional ammonia and ammonia slip emissions from operating SCR equipment, and the use of alternative fuels and fuel additives.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentives for the use of control equipment such as SCRs.	Potential hazards associated with the use of additional ammonia and ammonia slip emissions from operating SCR equipment.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	Potential hazards associated with the use of additional ammonia and ammonia slip emissions from operating SCR equipment.
ORFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Measure to accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in off road forklifts.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Measure to accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in small off-road engines.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower amount of emissions.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment (NOx, ROG, PM2.5)	Measure to accelerate the implementation of zero emission technologies in off-road equipment.	The use of alternative fuels and fuel additives can generate hazards.
CPP-01	Consumer Products Program (ROG)	Reformulation of consumer products.	Hazards could be generated by the use of reformulated products that may contain more toxic or flammable solvents.

4.3.3 SIGNIFICANCE CRITERIA

The NOP/IS concluded that the 2016 AQMP would not: 1) result in safety hazards for people residing or working in the project area due to proximity to a public use or private airport; 2) impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or, 3) expose people or structures to a significant risk of loss, injury or death involving wildland fires. However, implementation of the 2016 AQMP would be considered to have significant adverse hazards and hazardous material impacts if any of the following conditions occur:

- Non-compliance with any applicable design code or regulation.
- Non-conformance to National Fire Protection Association standards.
- Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.
- Exposure to hazardous chemicals in concentrations equal to or greater than the U.S. EPA's Emergency Response Planning Guideline (ERPG) 2 levels.

4.3.4 IMPACT ANALYSIS

4.3.4.1 Reformulated Coatings, Solvents, Adhesives, and Sealants

The 2016 AQMP control measure that could require the reformulation of coatings, adhesives, and solvents is CTS-01. To meet the lowered future VOC content limits, these products are expected to be reformulated. While reformulated products would be expected to have lower VOC contents, the reformulations could have widely varying flammability and health effects, depending on the chemical characteristics of the replacement solvents contained in the reformulated products. While most reformulations are expected to be made with water, which is not flammable or hazardous and does not have adverse health impacts, other reformulations could be made with a solvent that may be exempt from the definition of a VOC in SCAQMD Rule 102 – Definition of Terms, but still have hazardous properties. For example, acetone is a Group I exempt compound because of its low reactivity and is frequently used in reformulated products, but it is extremely flammable. In addition, coatings, solvents, adhesives, and sealants can also be reformulated with other solvents that are not necessarily exempt from the definition of a VOC, but that also have flammability and potential health effects issues.

Table 4.3-2 identifies a list of typical conventional solvents and possible replacement solvents that may be used in the manufacture of coatings, solvents, adhesives, and sealants along with their chemical characteristics pertaining to whether each substance is fire hazard.

As illustrated in Table 4.3-2, the flammability classifications by the National Fire Protection Association (NFPA) are the same for acetone as well as for other conventional solvents that are currently used in existing formulations such as tertiary butyl acetate (tBAc), toluene, xylene,

methyl ethyl ketone (MEK), isopropanol, butyl acetate, and isobutyl alcohol. Because acetone has the lowest flash point of all the chemicals listed, from a flammability perspective, reformulations made with acetone would represent the worst-case. However, it is important to note that acetone also has one of the highest Lower Explosive Level (LEL), 2.6 percent by volume, which means that acetone vapors will not cause an explosion unless the vapor concentration exceeds 26,000 ppm.

In contrast, a conventional solvent such as toluene can cause an explosion at 1.3 percent by volume or 13,000 ppm, which poses a much greater risk of explosion when compared to acetone. Similarly, the concentration of xylene, another conventional solvent, can cause an explosion at even lower concentrations than toluene at 1.0 percent by volume or 10,000 ppm. However, facility operators are required to follow operating guidelines when working with flammable chemicals. These guidelines specify well-ventilated areas, as prescribed by the fire department codes, so that LEL concentrations would be avoided when working with flammable chemicals.

While a "worst-case" flammability scenario could be that all of the affected 2016 AQMP coatings, solvents, adhesives, and sealants would be reformulated with acetone to meet the interim and final VOC content limits, most future reformulated products will likely be reformulated using primarily water due to its lower cost. Water-based coatings are generally not flammable and typically have a lower NFPA classification and a lower Consumer Product Safety Commission classification, when compared to coatings formulated with conventional solvents.

Chemistry classes at all levels from grade school to universities, as well as industrial laboratories, use acetone for wiping down counter tops and cleaning glassware. Additional uses for acetone include solvent for paint, varnish, lacquers, inks, adhesives, floor coatings, and cosmetic products including nail polish and nail polish remover. Further, it is currently used widely in coating and solvent formulations.

Labels and Material Safety Data Sheets (MSDSs) accompanying acetone-based products caution the user regarding acetone's flammability and advise the user to "*keep the container away from heat, sparks, flame and all other sources of ignition. The vapors may cause flash fire or ignite explosively. Use only with ventilation*." All of the large coating manufacturers currently offer pure acetone for sale with similar warnings. The Uniform Fire Code (UFC) treats solvents such as acetone, butyl acetate, and MEK as Class I Flammable Liquids. Further, the UFC considers all of these solvents to present the same relative degree of fire hazard (SCAQMD, 2003).

A list of conventional and potential replacement solvents and their related health hazards information are shown in Table 4.3-3. As illustrated in Table 4.3-3, some of the potential replacement solvents have lower or less severe threshold limit values (TLVs), permissible exposure levels (PELs), or immediately dangerous to life or health concentrations (IDLHs) than some of the conventional solvents. For example, acetone would be considered to have less health hazards than all of the conventional solvents listed. However, there are some replacement solvents that could have higher, more severe, or unknown toxicological effects. For example, the diisocyanate group of solvents appear to have more severe toxicological effects than the listed traditional solvents.

TABLE 4.3-2

Chemical Characteristics for Conventional and Potential Replacement Coating Solvents

CAS No.	Chemical Compound	Auto-ignition Temperature (°F)	Boiling Point (@760 mmHg, °F)	Evaporation Rate @ 25 °C (Butyl Acetate = 1)	Flash Point (°F)	LEL/ UEL [a] (% by Vol.)	Vapor Pressure (mmHg @ 20 °C)	NFPA Flammability Rating [b]	Flammability[c]
Conventional Solvents									
67-64-1	Acetone	538	56	6.1	-4	2.6/12.8	180	3	Extremely Flammable
80-05-7	Bisphenol A	N/A	428	N/A	N/A	N/A	N/A	0	N/A
123-86-4	n-Butyl acetate	N/A	257	1	73	1.7/7.6	15	3	Extremely Flammable
111-79-2	2-Butoxyethanol	471.2	340.7	N/A	141.8	1.1/12.7	0.8	2	Combustible
78-92-2	sec-Butyl alcohol	N/A	208	N/A	81	1.7/9.8	11.5	3	Flammable
108-94-1	Cylohexane	788	312.1	N/A	111	1.1/9.4	0.53	2	Combustible
25265-71-8	Diethylene glycol	444	471	N/A	255	1.6/10.8	1	1	Combustible
34590-94-8	Dipropylene glycol methyl ether	278.6	408	N/A	180	1.1/3	0.5	3	Combustible
29911-28-2	Dipropylene glycol monobutyl ether	N/A	441	N/A	205	N/A	0.06	1	Combustible
100-41-4	Ethylbenzene	809.6	276.8	0.84	70	0.8/7	6.75	3	Flammable
103-09-3	2-Ethylhexyl acetate	N/A	390	N/A	185	N/A	N/A	2	Combustible
107-21-1	Ethylene glycol	748	388	0.01	232	3.2/15.3	0.06	1	Combustible
109-59-1	Ethylene glycol isopropyl ether	N/A	109.5	N/A	109	1.6/13	2.6	2	Combustible
50-00-0	Formaldehyde	806	- 2	N/A	147	N/A	N/A	4	Combustible
78-83-1	Isobutyl alcohol	780	226	0.82	82	1.2/10.9	9	3	Flammable
108-21-4	Isopropyl acetate	N/A	109.5	N/A	39	1.8/8	47	3	Flammable
67-63-0	Isopropyl alcohol	399	180	2.3	53	2/12.7	33	3	Extremely Flammable
64742-95-6	Light aromatic hydrocarbons	880	335	0.3	180	0.6/7	11	2	Combustible
110-43-0	Methyl amyl ketone	N/A	301	N/A	106	1.1/7.9	2.14	2	Combustible
78-93-3	Methyl ethyl ketone	474	80	4	16	1.8/11.5	8.7	3	Extremely Flammable
108-10-1	Methyl isobutyl ketone	860	291	0.46	97	1/8.2	5	3	Flammable
107-87-9	Methyl n-propyl ketone	N/A	271.5	N/A	45	1.5/8.2	27	3	Flammable

TABLE 4.3-2 (Continued)

Chemical Characteristics for Conventional and Potential Replacement Coating Solvents

CAS No.	Chemical Compound	Auto-ignition Temperature (°F)	Boiling Point (@760 mmHg, °F)	Evaporation Rate @ 25 °C (Butyl Acetate = 1)	Flash Point (°F)	LEL/ UEL [a] (% by Vol.)	Vapor Pressure (mmHg @ 20 °C)	NFPA Flammability Rating [b]	Flammability[c]
Conventional Solvents									
64741-41-9	Mineral spirits (Stoddard)	232	154-188	0.1	109-113	1.0 / 7	1.1	2	Combustible[d]
64742-94-5	Heavy aromatic naphtha	830	719.6	>0.1	145	1.8/11.7	1	2	Combustible
91-20-3	Naphthalene	978.8	424	N/A	176	0.9/5.9	0.03	2	Combustible
8002-05-9	Petroleum distillate (Naphtha)	N/A	86-460	N/A	20 - 100	1.1/5.9	40	3	Extremely Flammable
108-88-3	Toluene	538	111	2	41	1.3/7	22	3	Flammable[d]
108-67-8	1,3,5-Trimethylbenzene	550	329	0.01	122	2.6/12.5	2	2	Combustible
95-63-6	1,2,4-Trimethylbenzene	932	337	0.01	112	0.9/6.4	1	2	Combustible
64742-89-8	V.M.&P Naphtha	288	266.9	1.2	53.1	1.2/6	20	3	Flammable
1330-20-7	Xylene	499	139	0.8	81	1.0/6.6	6	3	Flammable[d]
Potential Replacement Solvents									
67-64-1	Acetone	538	56	6.1	-4	2.6/12.8	180	3	Extremely Flammable
100-51-6	Benzyl alcohol	817	401	0.006	199	1.3/13	0.15	2	Combustible
71-36-3	n-Butanol	N/A	242.5	N/A	95	1.4/11.2	4	3	Flammable
123-86-4	n-Butyl acetate	N/A	257	1	73	1.7/7.6	15	3	Extremely Flammable
85-68-7	Butyl benzyl phthalate	797	698	N/A	390	N/A	8.6E-6	1	Combustible
616-38-6	Dimethyl carbonate	869	194	3.2	64	4.2/12.9	42	3	Flammable
108-01-0	2-Dimethylaminoethanol	455	282	N/A	104	1.6/11.9	3.18	2	Combustible
117-81-7	Dioctyl phthalate	735	446	N/A	405	0.3/	< 0.01	1	Combustible
25265-71-8	Dipropylene glycol	590	449	N/A	250	2.9/12.6	0.03	1	Combustible
763-69-9	Ethyl 3-Ethoxypropionate	N/A	338	N/A	138	N/A	< 1	2	Combustible
141-78-6	Ethyl acetate	800	171	N/A	25	2.2/9	73	3	Extremely Flammable
64-17-5	Ethyl alcohol	685	173	1.4	55	3.3/19	44	3	Extremely Flammable
111-76-2	Ethylene glycol monobutyl ether	460	340	0.07	144	1.1/12.7	0.8	2	Combustible
111-80-5	Ethylene glycol monoethyl ether	455	275	0.41	120	1.7/15.6	4	2	Combustible
109-86-4	Ethylene glycol monomethyl ether	545	256	0.53	100	1.8/19.8	6	2	Combustible

TABLE 4.3-2 (Concluded)

Chemical Characteristics for Conventional and Potential Replacement Coating Solvents

CAS No.	Chemical Compound	Auto-ignition Temperature (°F)	Boiling Point (@760 mmHg, °F)	Evaporation Rate @ 25 °C (Butyl Acetate = 1)	Flash Point (°F)	LEL/ UEL [a] (% by Vol.)	Vapor Pressure (mmHg @ 20 °C)	NFPA Flammability Rating [b]	Flammability[c]
Potential Replacement Solvents (continued)									
2807-30-9	Ethylene glycol monopropyl ether	455	300	0.22	124	1.3/15.8	1.3	2	Combustible
149-57-5	2-Ethylhexanoic acid	699	442	N/A	244	1/8.6	< 0.01	1	Combustible
822-06-0	Hexamethylene diisocyanate	N/A	415	N/A	284	1/	0.5	1	Combustible
64742-53-6	Hydrotreated light naphthenic distillate	>600	500	N/A	295	N/A	0.04	1	Combustible
79-20-9	Methyl acetate	501	135	5.3	14	3.1/16	173	3	Extremely Flammable
96-29-7	Methyl ethyl ketoxime	N/A	306	N/A	1380	N/A	0.9	2	Combustible
101-68-8	Methylene bisphenyl diisocyanate	464	597	N/A	390	N/A	5E-6	1	Combustible
98-56-6	Parachlorobenzotrifluoride	>500	282	0.9	109	0.9/10.5	5.3	1	Combustible
57-55-6	Propylene glycol	700	370	0.01	210	2.6/12.5	0.08	1	Combustible
108-65-6	Propylene glycol monomethyl ether acetate	N/A	294	N/A	109	1.1/13.1	2.53	2	Combustible
770-35-4	Propylene glycol phenyl ether	923	469	0.002	239	0.8/6.0	0.01	3	Flammable
1569-01-3	Propylene glycol propyl ether	N/A	302	N/A	118	N/A	N/A	2	Combustible
100-42-5	Styrene	914	293	0.5	88	1.1/6.1	4.5	3	Flammable
540-88-5	Tertiary butyl acetate	N/A	208	2.8	62	1.5 /N/A	N/A	3	Flammable
25265-77-4	Texanol	730	471	< 0.01	248	0.6/4.2	0.01	1	Combustible
26471-62-5	Toluene diisocyanate	1148	478	N/A	250	0.9/9.5	0.025	1	Combustible
121-44-8	Triethylamine	480	194	5.6	16	1.2/8.0	57.1	3	Extremely Flammable
144-19-4	Trimethyl 1,3-pentanediol	572	450	N/A	235	N/A	N/A	1	Combustible

[a] Lower Explosive Limit / Upper Explosive Limit

[b] NFPA Flammability Rating: 0 = Not Combustible; 1 = Combustible if heated; 2 = Caution: Combustible liquid flash point of 100° to 200°F; 3 = Warning: Flammable liquid flash point below 100°F; 4 = Danger: Flammable gas or extremely flammable liquid

[c] The Consumer Products Safety Commission (CPSC) has Labeling and Banning Requirements for Chemicals and Other Hazardous Substances which are located in 15 U.S.C.§1261 and 16 CFR Part 1500. Specifically, the flammability of a product is defined in 16 CFR Part 1500.3 (c)(6) and is based on flash point. For example, a flammable liquid needs to be labeled as: 1) "Extremely Flammable" if the flash point is below 20 °F; 2) "Flammable" if the flash point is above 20 °F but less than 100°F; or, 3) "Combustible" if the flash point is above 100 °F up to and including 150 °F.

[d] Requires Special Hazards Labeling per 16 CFR Part 1500.14 (a)(3) & (b)(3)

TABLE 4.3-3

Health Hazards of Conventional and Potential Replacement Solvents

CAS No.	Chemical Compound	NFPA Health Rating [a]	TLV (ACGIH)[b] (ppm)	PEL (OSHA) [c] (ppm)	IDLH (NIOSH)[d] (ppm)	Health Effects
Conventional Solvents						
67-64-1	Acetone	1	500	1,000	2,500	Mild irritation - eye, nose, throat, skin; narcosis
80-05-7	Bisphenol A	2	N/A	N/A	N/A	Mild irritation - eyes and skin
123-86-4	n-Butyl acetate	2	150	150	1,700	Moderate irritation – eye, nose, throat; narcosis
111-79-2	2-Butoxyethanol	1	20	50	5	Mild irritation - eyes, skin and respiratory
78-92-2	sec-Butyl alcohol	2	100	150	2,000	Mild irritation - eye, nose, throat, skin; narcosis
108-94-1	Cyclohexane	2	20	50	700	Moderate irritation- eye, skin, nose and throat
25265-71-8	Diethylene glycol	1	N/A	N/A	N/A	Mild irritation - eyes and skin
34590-94-8	Dipropylene glycol methyl ether	0	100	100	100	Mild irritation – eye, skin, respiratory, digestion
29911-28-2	Dipropylene glycol monobutyl ether	1	N/A	N/A	N/A	Potential severe irritation to eyes, nose and throat; moderate skin and digestion irritation
100-41-4	Ethylbenzene	2	100	100	800	Moderate irritation – eye, skin, nose, throat
103-09-3	2-Ethylhexyl acetate	2	N/A	N/A	N/A	Mild irritation – eye, skin, respiratory, digestion
107-21-1	Ethylene glycol	2	100	50	N/A	Mild irritation – respiratory, skin, kidney, reproductive
109-59-1	Ethylene glycol isopropyl ether	2	25	25	N/A	Mild irritation – eye, skin, respiratory, digestion
50-00-0	Formaldehyde	3	0.30	1	0.016	Irritation - skin, eyes, nose, and throat. High levels of exposure may cause some types of cancers.
78-83-1	Isobutyl alcohol	1	50	100	8,000	Mild irritation – eye, nose, throat; suspect carcinogen
108-21-4	Isopropyl acetate	1	100	250	1,800	Mild irritation – eye, skin, nose, throat
67-63-0	Isopropyl alcohol	1	200	400	2,000	Mild irritation – eyes, nose, throat; narcosis
64742-95-6	Light aromatic hydrocarbons	2	10-100	10-100	25-100	Mild irritation – eye, skin, respiratory, digestion
110-43-0	Methyl amyl ketone	1	50	100	100	Mild irritation - eyes and skin
78-93-3	Methyl ethyl ketone	1	200	200	3,000	Mild irritation – eye, nose, throat; narcosis; skin
108-10-1	Methyl isobutyl ketone	2	50	50	50	Potential serious eye irritation; mild skin and respiratory irritation
107-87-9	Methyl n-propyl ketone	2	150	200	150	Moderate irritation – eye, skin, respiratory

TABLE 4.3-3 (Continued)

Health Hazards of Conventional and Potential Replacement Solvents

CAS No.	Chemical Compound	NFPA Health Rating [a]	TLV (ACGIH)[b] (ppm)	PEL (OSHA) [c] (ppm)	IDLH (NIOSH)[d] (ppm)	Health Effects
Conventional Solvents						
64741-41-9	Mineral spirits (Stoddard)	1	100	500	5,000	Narcosis; mild irritant
64742-94-5	Heavy aromatic naphtha	2	N/A	N/A	N/A	Mild irritation – eye, skin, respiratory, digestion
91-20-3	Naphthalene	4	10	10	10	Moderate irritation - eye, skin; fatal if inhaled
8002-05-9	Petroleum distillate (Naphtha)	1	400	500	1,100	Mild irritation; narcosis
108-88-3	Toluene	2	50	200	500	Moderate irritation – eye, nose, throat; narcosis; skin; suspect teratogen; mutagen, nervous system
108-67-8	1,3,5-Trimethylbenzene	2	25	25	25	Mild irritation - skin, eye; harmful if inhaled
95-63-6	1,2,4-Trimethylbenzene	2	25	25	25	Mild irritation - skin; serious irritation- eye; harmful if inhaled
64742-89-8	V.M.&P Naphtha	1	300	500	N/A	Mild irritation - skin, eye
1330-20-7	Xylene	2	100	100	1,000	Mild irritation – eye, nose, throat; narcosis; skin
Potential Replacement Solvents						
67-64-1	Acetone	1	500	1,000	2,500	Mild irritation - eye, nose, throat, skin; narcosis
100-51-6	Benzyl alcohol	2	N/A	N/A	N/A	Mild irritation - skin, respiratory; severe eye and ingestion irritation
71-36-3	n-Butanol	2	20	100	1,400	Potential severe irritation to eyes, nose and throat; moderate skin, digestion and respiratory irritation
123-86-4	n-Butyl acetate	2	150	150	150	Mild irritation - skin, eye, respiratory, digestion
85-68-7	Butyl benzyl phthalate	1	N/A	N/A	N/A	Mild irritation - eye, nose, throat, skin
108-01-0	2-Dimethylaminoethanol	3	N/A	N/A	N/A	Potential severe irritation to eyes, skin, throat and digestion; high risk to unborn child
616-38-6	Dimethyl carbonate	0	N/A	N/A	N/A	Mild irritation - respiratory, skin, eye, digestive
117-81-7	Dioctyl phthalate	0	N/A	N/A	N/A	Mild irritation - respiratory, skin, eye, digestive
25265-71-8	Dipropylene glycol	1	N/A	N/A	N/A	Mild irritation - respiratory, skin, eye, digestive, nausea, dizziness; may cause liver and kidney damage
763-69-9	Ethyl 3-Ethoxypropionate	1	0.3	N/A	0.01	Mild irritation - respiratory, skin, eye, digestive

TABLE 4.3-3 (Continued)

Health Hazards of Conventional and Potential Replacement Solvents

CAS No.	Chemical Compound	NFPA Health Rating [a]	TLV (ACGIH)[b] (ppm)	PEL (OSHA) [c] (ppm)	IDLH (NIOSH)[d] (ppm)	Health Effects
Potential Replacement Solvents						
141-78-6	Ethyl acetate	1	400	400	400	Mild irritation - respiratory, skin, eye, digestive; may cause acute inhalation
64-17-5	Ethyl alcohol	2	1,000	1,000	1,000	Mild irritation - respiratory, skin, eye, digestive
111-76-2	Ethylene glycol monobutyl ether	2	20	50	700	Mild irritation – eye, nose, throat; anemia; skin
111-80-5	Ethylene glycol monoethyl ether	2	5	200	500	Cumulative blood damage; moderate irritation of eyes, throat, skin
109-86-4	Ethylene glycol monomethyl ether	2	5	25	N/A	Cumulative CNS; skin; suspect reproductive effects; blood disorders
2807-30-9	Ethylene glycol monopropyl ether	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
149-57-5	2-Ethylhexanoic acid	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
822-06-0	Hexamethylene diisocyanate	4	0.005	N/A	0.005	Potential fatality if inhaled; moderate skin, eye irritation; toxic if swallowed
64742-53-6	Hydrotreated light naphthenic distillate	1	N/A	N/A	N/A	Mild irritation - eye, skin, respiratory, digestive
79-20-9	Methyl acetate	2	200	200	200	Mild irritation - eye, nose, skin, respiratory, digestive
96-29-7	Methyl ethyl ketoxime	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
101-68-8	Methylene bisphenyl diisocyanate	3	0.01	0.02	40	Mild irritation – respiratory
98-56-6	Parachlorobenzotrifluoride	2	N/A	N/A	N/A	Mild irritation - eye, nose, respiratory, digestive
57-55-6	Propylene glycol	0	100	100	N/A	Mild irritation – slight eye, anesthesia
108-65-6	Propylene glycol monomethyl ether acetate	1	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
770-35-4	Propylene glycol phenyl ether	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
1569-01-3	Propylene glycol propyl ether	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
100-42-5	Styrene	2	20	100	5,000	Mild irritation – eye, respiratory, neurotoxicity

TABLE 4.3-3 (Concluded)

Health Hazards of Conventional and Potential Replacement Solvents

CAS No.	Chemical Compound	NFPA Health Rating [a]	TLV (ACGIH)[b] (ppm)	PEL (OSHA) [c] (ppm)	IDLH (NIOSH)[d] (ppm)	Health Effects
Potential Replacement Solvents						
540-88-5	Tertiary butyl acetate	2	200	200	200	Mild irritation - eye, nose, skin, respiratory, digestive; prolonged exposure may cause dermatitis, blood effects, central nervous system and kidney problems
25265-77-4	Texanol	1	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
26471-62-5	Toluene diisocyanate	3	0.005	0.02	10	Mild irritation – respiratory
121-44-8	Triethylamine	3	1	25	200	Mild irritation - eye; Cumulative eye, respiratory, and hematological effects.
144-19-4	Trimethyl 1,3-pentanediol	0	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive

[a] NFPA Health Rating: 0 = No unusual hazard; 1 = Caution: May be irritating; 2 = Warning: May be harmful if inhaled or absorbed; 3 = Warning: Corrosive or toxic. Avoid skin contact or inhalation; 4 = Danger: May be fatal on short exposure. Specialized protective equipment required.

[b] TLV = Threshold Limit Value, a recommended guideline established by the American Conference of Governmental Industrial Hygiene (ACGIH)

[c] PEL = Permissible Exposure Limit, established by OSHA

[d] IDLH = Immediately Dangerous to Life and Health, established by NIOSHA

In addition to the health hazard characteristics summarized in Table 4.3-3, there are several chemicals listed that are toxics, identified as TACs, including but not limited to the following: ethylbenzene, formaldehyde, MEK, methyl isobutyl ketone (MIBK), toluene, triethylamine, and xylene. Some of these TACs used in coatings are considered carcinogenic (cancer-causing) such as formaldehyde, while others may have other non-cancer health effects[1]. Thus, the use of materials that are toxic, carcinogenic, or could cause non-cancer health effects is of particular concern, in both existing formulations as well as in reformulated products, to the SCAQMD and other agencies such as U.S. EPA, CARB, OSHA, and OEHHA (which is part of the California Environmental Protection Agency (Cal/EPA)).

For these reasons, there are two local rules that regulate TAC emissions at facilities, including those using coatings: SCAQMD Rule 1401 – New Source Review of Toxic Air Contaminants, and SCAQMD Rule 1402 – Control of Toxic Air Contaminants From Existing Sources. Rule 1401 applies to new and modified facilities, including coating facilities, and Rule 1402 applies to facility-wide risk at existing facilities. Since the majority of coating facilities located within SCAQMD's jurisdiction are existing sources, the requirements in Rule 1402 are the main drivers for reducing overall risk and, therefore, TAC emissions from this industry.

For reasons of cost and to provide flexibility with stringent VOC content requirements for coatings, the SCAQMD has received requests to exempt two chemicals from the definition of a VOC in SCAQMD's Rule 102: t-butyl acetate (tBAc) and dimethyl carbonate (DMC). TBAc is not currently identified in any of SCAQMD's rules as a TAC. While tBAc has been delisted for automotive coatings as a VOC by the U.S. EPA[2], it has not been fully delisted as a VOC by CARB (automotive coatings) or by the SCAQMD. When delisting a compound from the definition of VOC, U.S. EPA only considers reactivity and does not address whether the compound is toxic, has global warming potential, or is an ozone depleting substance. Further, tBAc is not currently classified as a hazardous air pollutant under the federal Clean Air Act (CAA). While tBAc possesses a low photochemical reactivity as well as some other physical and chemical properties that are considered desirable by its manufacturer's representatives, tBAc may be unsuitable for consideration as a potential replacement for all conventional solvents because of tBAc's potential toxicity. Specifically, tBAc has the potential to form a metabolite called tert-butyl alcohol (TBA) which has cancer potency and acute non-carcinogenic values established by OEHHA. According to Acute Toxicity and Cancer Risk Assessment Values for TBA, (Budroe, et al., 2004), "tBAc should be considered to pose a potential cancer risk to humans because of the metabolic conversion to TBA."

To provide potential compliance flexibility while limiting use of tBAc because of the potential toxics concerns, , the SCAQMD incorporated limited use exemptions for tBAc in industrial

[1] Formaldehyde, toluene, triethylamine, and xylene are classified as having both chronic and acute health effects; ethylbenzene as having chronic health effects and zinc oxide proposed as having chronic health effects; MEK as having acute health effects with future proposed risk value for chronic; and, cobalt compounds as having future proposed risk values. In addition, MIBK is classified by U.S. EPA as a hazardous air pollutant (HAP), but the toxicology assessment is not finalized.

[2] U.S. EPA. 2004. Revision to Definition of Volatile Organic Compounds – Exclusion of t-Butyl Acetate, 40 CFR Part 51, Federal Register 69298, November 29, 2004. (http://www.gpo.gov/fdsys/pkg/FR-2004-11-29/pdf/04-26069.pdf)

maintenance coatings and non-topcoats into Rule 1113 - Architectural Coatings, and Rule 1151 - Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations, respectively.

DMC is also not currently identified in any of SCAQMD's rules as a TAC. The U.S. EPA revised the federal VOC definition to exclude DMC based on its negligible photochemical reactivity[3]. DMC is also currently not identified as a HAP under the federal CAA nor is it classified as an ozone depleting substance. No exposure guidelines have been established for DMC by the American Conference of Governmental Industrial Hygienists (ACGIH), or by the National Institute for Occupational Safety and Health (NIOSH). DMC is of concern because it forms a metabolite (an intermediate product of metabolism) consisting of methanol, which is a carcinogen.

Thus, when coatings and other products are reformulated as part of implementing the various control measures proposed in the 2016 AQMP, manufacturers could potentially use replacement chemicals that could pose new or different health risks, but SCAQMD Rules 1401 and 1402 would limit potential exposures to nearby receptors for manufacturers within the Basin. Further, as was the case with the limited use exemption of tBAc in Rules 1113 and 1151, future SCAQMD rulemaking would require individual evaluation of reformulations, the replacement chemicals and the corresponding potential health risks. Exposure typically occurs when applying the coatings, solvents, and adhesives.

When comparing the conventional solvents listed in Table 4.3-3, some of the replacement solvents (e.g., triethylamine) are likely to be present in trace amounts and accidental releases would be considered a one-time event that could be neutralized and cleaned up before all the solvent has evaporated, so no new chronic health risk is expected. No acute risk would be generated because the chemical would only be present in trace amounts. As shown in Table 4.3-3, the toxicity of replacement materials is generally less or no worse than conventional solvents overall but if a facility changes from using water-based products to using products that are reformulated with chemicals that may have new or different health hazards, significant adverse health hazard impacts could occur from using some low VOC reformulated products. However, as with the use of all chemicals, facilities and their workers would be required to continue to comply with existing health protective procedures when handling both flammable and toxic materials. In addition, any increase in the future use of low VOC compliant coating materials that are reformulated with water would be expected to result in a concurrent reduction in the number of accidental releases of high VOC coating materials. As a result, the net number of accidental releases would be expected to remain constant, allowing for population growth in southern California, or potentially be reduced.

Regarding fire hazards, if manufacturers use solvents such as Texanol, propylene glycol, etc., in future compliant water-borne coatings, significant adverse hazard impacts would not be expected to occur because these solvents are typically either equivalent or less flammable than conventional solvents based on NFPA ratings. However, if manufacturers reformulate with acetone, then more acetone-based and more extremely flammable products would be available on the market. Similarly, if manufacturers reformulate with products that have increased flammability than the

[3] U.S. EPA. 2009. Air Quality: Revision to Definition of Volatile Organic Compounds- Exclusion of Propylene Carbonate and Dimethyl Carbonate, 40 CFR Part 51, Federal Register 3437, January 21, 2009. (http://www.gpo.gov/fdsys/pkg/FR-2009-01-21/pdf/E9-1150.pdf

products manufactured with conventional solvents, an increased risk is expected during use of these products because consumers who may be familiar with using a higher VOC product with lower flammability, may be unaware that the reformulated products may have chemicals with increased flammability risk.

Lastly, in general, water-based coatings and products tend to contain less flammable and less toxic materials than solvent-based coatings and products. While the continued and potentially increased use of waterborne coatings and products would generally be expected to reduce the overall hazard impacts associated with solvent-based products, a switch from currently using water-based products to reformulated solvent-based products could offset any reduction realized. Without knowing how many facilities currently using water-based products would switch to using reformulated solvent-based products as a result of implementing the 2016 AQMP control measures, significant impacts on fire hazards associated with reformulated coatings, solvents, and consumer products could occur. While schools are generally not located in industrial areas, where the facilities that use or manufacture reformulated products are located, it is possible that there could be schools located within a quarter mile of a facility, creating a potential hazard to the school. Therefore, hazards and hazardous materials impacts associated with increased flammability of potential replacement solvents are concluded to be significant.

4.3.4.2 Use of Alternative Fuels

The 2016 AQMP would establish in-use strategies that may require or promote the use of alternative fuels including control measures MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, EGM-01, ORLD-01, ORLD-3, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORH-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-07, and OFFS-08.

4.3.4.2.1 Ethanol/Ethanol Blends

Ethanol is a clear colorless organic liquid with physical and chemical properties which do not change from source to source like conventional fuels. In the U.S., ethanol is typically produced from corn or other grain products, while some imported ethanol is produced from sugar cane. For commercial or industrial use, pure ethanol (E100) is usually denatured with a small amount of gasoline or similar substance to avoid federal alcoholic beverage tax and intentional ingestion. Heavy duty vehicles use E95 (95 percent ethanol and five percent gasoline) or E93 (93 percent ethanol, five percent methanol, and two percent kerosene). Light and medium duty vehicles use E85 (85 percent ethanol and 15 percent gasoline). Vapors from ethanol blended fuels will exhibit similar flammability characteristics as gasoline. E85 is sold at 2,787 public stations located in 42 states, 96 of which are located in California (Alternative Fuels Data Center (AFDC), 2016).

Ethanol is shipped via rail to distribution terminals. In May 2015, the U.S. DOT issued revised rules to improve the safe transportation of large quantities of flammable materials by rail, including ethanol. The bulk transfer of ethanol from terminals is usually done in standard petroleum tanker trucks. Since the NFPA classification of ethanol is the same as gasoline or diesel (Class IB flammable liquid), there is no reason to expect that ethanol transport will be more dangerous than gasoline or diesel transport. There are, however, certain physical properties of ethanol that must

be addressed during transport and storage when compared to gasoline or diesel. First, ethanol is incompatible with some types of materials used in petroleum storage and transfer systems; therefore, it is necessary to take some precaution to assure ethanol compatible materials are used. Second, E100 vapor/air mixtures at ambient temperatures and pressures can create a flammable mixture in the ullage space of a storage tank. Therefore, it is important to ensure that there are strong safeguards against any ignition sources inside tanks and that vent lines or other openings have flame arrestors. Furthermore, any fill lines must extend below the liquid ethanol level to provide a seal between an external ignition source and the vapor/air mixture in the tank. Ethanol blended fuel vapors are primarily composed of gasoline, and thus, the fire hazard associated with the transfer and storage of ethanol should be relatively the same as gasoline (DOT, 1999).

Compared with diesel fuel and gasoline, the following can be stated with respect to ethanol:

- Diesel fuel and gasoline contain components that are considerably more hazardous than ethanol. For example, diesel fuel contains highly toxic polynuclear aromatic hydrocarbons (PAHs) and gasoline contains an array of toxic compounds, including benzene, a known carcinogen;

- Diesel fuel and gasoline vapors are heavier than air (e.g., the specific gravity of air =1, gasoline = 3.4 and diesel > 4). Ethanol is heavier than air (e.g., specific gravity of ethanol = 1.6) but lighter than gasoline and diesel fuel and disperses more readily in air than gasoline or diesel fuel;

- Ethanol has a higher auto ignition temperature (684 degrees Fahrenheit [^{o}F]) than diesel fuel (500 ^{o}F) or gasoline (500 ^{o}F);

- Ethanol is more difficult to ignite since it has a larger "lower flammability limit" 3.3 percent than gasoline (approximately one percent) or diesel fuel (0.5 percent);

- Unlike gasoline, ethanol can ignite in enclosed spaces such as fuel tanks since its upper flammability limit is 15 percent and it is heavier than air. For gasoline in a confined space, the vapor concentration exceeds the higher flammability limit (7.6 percent) and is therefore too high to ignite in the tank. Modifications such as materials inside the fuel tank that can arrest and quench flame propagation and as well as other modifications to isolate the tank from sparks and ignition sources are required to avoid ignition in the fuel tanks; and

- In case of fire, water can extinguish an ethanol fire, but it will make a gasoline or diesel fuel fire spread.

Based upon the preceding information, hazards associated with ethanol are approximately equivalent or less compared to conventional fuels. Therefore, increased usage of ethanol with a concurrent decline in usage of conventional fuels will not significantly alter existing hazards associated with mobile source fuels.

4.3.4.2.2 Compressed Natural Gas (CNG)

Natural gas is a mixture of hydrocarbons, mainly methane, that are in gaseous form at ambient temperature and pressure. It is also odorless and tasteless; therefore, an odorant is added so personnel in the vicinity of a leak can detect the presence of natural gas before it has reached the flammability limit in the area. Unlike other alternative fuels, natural gas already has an extensive distribution system and supply network. The issues of bulk transfer and storage are very different from other fuels, which are usually transported via tanker truck. CNG is generally produced onsite using compressors fed from a nearby natural gas pipeline. The typical range of methane in pipeline quality natural gas is approximately 80 to 95 percent. However, CARB has specified that the methane content to be greater than 88 percent for vehicular grade CNG. CNG is sold at 941 public stations in 45 states, 173 of which are in California (AFDC, 2016).

The SCAQMD has had a history of promoting the use of CNG in the past and few issues have arisen from the transport of CNG, as most refueling applications have relied on the existing natural gas pipeline infrastructure. Furthermore, CNG compositions and storage cylinders in vehicles follow NFPA 52 (CNG Vehicular Fuel Systems) and Society of Automotive Engineers (SAE) J1616 (Recommended Practice for CNG Fuel) specifications. These specifications limit the potential hazards of CNG leaks related to fuel storage and use in vehicles. Furthermore, natural gas has a higher flammability limit (five percent) than gasoline (one percent) or diesel (0.5 percent). Natural gas also has a lower ignition temperature (1,200 ^{o}F) than gasoline or diesel (500 ^{o}F). Other hazards associated with compressed fuels are projectiles from openings and freeze burns from rapid vaporization.

The main additional hazard associated with the use of CNG versus conventional fuels is the exposure to high pressures employed during storage, dispensing and operations. Due to these high pressures a large amount of gas could escape in a short amount of time and, if present under flammable conditions, could explode in the presence of an ignition source. Another potentially significant hazard is a release of natural gas during vehicle maintenance (DOT, 1999).

Compared with diesel fuel and gasoline, the following can be stated with respect to CNG:

- Diesel fuel and gasoline are toxic to the skin and lungs while CNG is not;
- Diesel fuel and gasoline vapors are heavier than air (e.g., specific gravity of air =1, gasoline = 3.4, and diesel fuel > 4). CNG is lighter than air (specific gravity = 0.55) and disperses more readily in air;
- CNG has a higher auto ignition temperature (1,200 ^{o}F) than diesel fuel (500 ^{o}F) or gasoline (500 ^{o}F);
- CNG is more difficult to ignite since it has a larger “lower flammability limit” (5.3 percent) than gasoline (one percent) or diesel fuel (0.5 percent); and,

- Natural gas can be directly shipped via pipelines to the compressor station, rather than by on-road delivery trucks, and thus, has less delivery accident risk than vehicle shipments associated with gasoline and diesel fuel.

Based upon the preceding information, hazards associated with CNG are approximately equivalent or less compared to conventional fuels. Therefore, increased usage of CNG with a concurrent decline in usage of conventional fuels will not significantly alter existing hazards associated with mobile source fuels.

4.3.4.2.3 Liquefied Natural Gas (LNG)

Natural gas can be liquefied by refrigerating it below -160 degrees Celsius or -260 degrees Fahrenheit at relatively low pressure (20 to 150 psig). Like CNG, there are NFPA standards (NFPA 59A – Standards for Production, Storage, and Handling of LNG and NFPA 57 – Standard for LNG Vehicular Fuel Systems) for the handling, storage, production, and use of LNG, especially in vehicles. However, unlike CNG, most LNG is not generated on-site. Instead, LNG is typically delivered via insulated double walled tanker trucks to distribution facilities. The double walled construction of the LNG tanker trucks are more robust than standard petroleum tanker trucks; therefore, the transport of LNG is safer from spills and tank ruptures during accidents than conventional fuel tanker trucks.

The safety issues associated with LNG are similar to CNG, with the added hazards of handling a cryogenic liquid and the vaporization of the liquid. The cryogenic liquids have the potential to burn workers who come into contact with the liquid or uninsulated surfaces. This hazard can be mitigated by proper personal protective equipment and training. The vaporization of LNG in storage tanks can potentially cause a boiling liquid expanding vapor explosion (BLEVE). For a BLEVE to occur, there would need to be a catastrophic failure of all safety measures, including safety relief valves and burst discs, built into the vessel's design code.

The main additional hazard associated with the use of LNG versus conventional fuels are personal injuries from coming into contact with a cryogenic liquid and the potential for a large fire stemming from a release in the case of an accident (e.g., a tanker truck accident or storage tank failure). Another potentially significant hazard is a release of natural gas during vehicle maintenance (DOT, 1999).

Hazards associated with LNG are that, under certain conditions, it may explode or catch on fire. LNG is only explosive when confined and vapor concentrations are between five and 15 percent[4].

LNG is comprised mostly of methane, but may contain ethane, propane, and other heavier gaseous hydrocarbons. The main acute health effect associated with methane is asphyxia. Asphyxia is the condition of severely depleting the oxygen supply to the body. Methane causes asphyxia by displacing oxygen in air. Asphyxiation can occur when oxygen concentrations drop below 18 percent. The potential adverse health effects of oxygen deficiency are summarized in Table 4.3-4.

[4] Consumer Energy Center, http://www.consumerenergycenter.org/transportation/afvs/lng.html

TABLE 4.3-4

Effects of Oxygen Deficiency

Oxygen Concentration	Effects of Oxygen Deficiency
19%	Some adverse physiological effects occur, but they may not be noticeable.
15-19%	Impaired thinking and attention. Increased pulse and breathing rate. Reduced coordination. Decreased ability to work strenuously. Reduced physical and intellectual performance without awareness.
12-15%	Poor judgment. Faulty coordination. Abnormal fatigue upon exertion. Emotional upset.
10-12%	Very poor judgment and coordination. Impaired respiration that may cause permanent heart damage. Possibility of fainting within a few minutes without warning. Nausea and vomiting.
<10%	Inability to move. Fainting almost immediate. Loss of consciousness. Convulsions. Death

Source: Air Products and Chemicals, Inc., 2014.

It is unlikely that off-site receptors would be exposed to LNG concentrations that would generate adverse health effects, because the LEL for methane is five percent (50,000 ppm). The LEL is the concentration at which there is enough of the given gas to ignite or explode.

The methodology used for estimating the potential risk from a vapor explosion is that developed for off-site consequence analysis for the Risk Management Program (RMP) under 40 CFR 68 (EPA, 1999). For an RMP off-site consequence analysis, a gaseous release is assumed to produce a vapor explosion that results in a blast impact. For a vapor explosion, the significance level is a pressure wave (blast) of one pound per square inch (psi) and the metric examined is the modeled distance to the significant overpressure level.

Other safety issues associated with LNG are similar to those discussed previously for CNG, with the added hazards associated with handling a cryogenic liquid. The hazards posed by the use of LNG versus gasoline and diesel fuel are:

- Diesel fuel and gasoline are toxic to the skin and lungs and LNG is not;

- Diesel fuel and gasoline vapors are heavier than air (e.g., specific gravity of air = 1, gasoline = 3.4, diesel > 4). LNG is lighter than air (specific gravity = 0.55) and disperses more readily in air;

- LNG has a higher auto ignition temperature (1,200 ºF) than diesel (500 ºF) or gasoline (500 ºF). LNG is more difficult to ignite since it has a larger "lower flammability limit" (5.3 percent) than gasoline (one percent) or diesel fuel (0.5 percent);

- Cryogenic liquids such as LNG have the potential risk to workers of burns (frost-bite) that can be suffered if workers come in contact with the liquid or with surfaces that are not insulated. Proper safety equipment and training can minimize these hazards; and

- Since LNG is a cryogenic liquid, in the event of a release from an aboveground storage tank or tanker truck, a fraction of the liquid immediately flashes off to gas while the remainder will pool and boil violently emitting a dense vapor. The liquid transitions to a dense vapor and the dense vapor transitions to a gas as the liquid and vapor draw heat from the surroundings. If a source of ignition is present, the boiling liquid, vapor cloud and gas could explode and burn, threatening surrounding facilities and other storage vessels.

Based upon the preceding information, health hazards associated with LNG are approximately equivalent or less compared to conventional fuels. Therefore, increased usage of LNG with a concurrent decline in usage of conventional fuels will not significantly alter existing health hazards associated with mobile source fuels.

4.3.4.2.4 Liquefied Petroleum Gas (LPG)

LPG, also called propane, is a mixture of natural gases which are liquefied at ambient temperatures by compressing the gases to pressures above 120 psig. Propane is the major component of LPG, with the minor components being propylene, butane, and butene. In the U.S., almost all of the propane supply comes from stripping wellhead natural gas or as a by-product of petroleum refining. LPG for vehicle use is at least 95 percent propane and no more than 2.5 percent butane and heavier hydrocarbons. LPG has been used in fleet vehicles since the 1940s, so there is a substantial base of experience with LPG as an automotive fuel.

For a variety of reasons, however, LPG is not considered the alternative fuel of the future. Its place has been taken by natural gas. Consequently, there has been little development in dedicated LPG engine technology. On the other hand, other technologies and their emissions improved tremendously over the last decade. As a result of that development, some of the previous emission reduction advantages of LPG fuel, especially the low CO emissions, are now less pronounced[5]. Consequently, it is not likely that LPG would be used to any great extent in providing the fuel for near zero- or zero-emission technologies.

Since LPG is a compressed fuel, it has the physical hazards of projectiles, freeze burns, BLEVE, etc. However, since LPG is stored pressurized and at ambient temperatures, the physical hazards are not as high for storage and transport compared to compressed or liquefied natural gas (CNG or LNG). The flammability limit range for LPG is similar to gasoline, but the ignition temperature (920 ^{o}F) is higher than gasoline or diesel (500 ^{o}F). Therefore, the hazard from transport and storage of LPG should not be significantly different from the transport and storage of gasoline or diesel (DOT, 1999).

The main additional hazard associated with the use of LPG versus conventional fuels is the potential of a large fire stemming from a release in the case of an accident (e.g., a tanker truck accident).

Compared with diesel fuel and gasoline the following can be stated about LPG:

[5] Net Technologies, Inc. How Clean Are LPG Engines. http://www.nett.ca/faq/lpg-3.html.

- Diesel fuel and gasoline are toxic to the skin and lungs and LPG is not;

- Diesel fuel and gasoline vapors are heavier than air (e.g., specific gravity of air =1, gasoline = 3.4, diesel fuel > 4.0). LPG is lighter than gasoline and diesel fuel but heavier than air (specific gravity = 1.52). It disperses more readily in air than gasoline or diesel fuel;

- LPG has a higher auto ignition temperature (920 ^{o}F) than diesel fuel (500 ^{o}F) or gasoline (500 ^{o}F);

- LPG is more difficult to ignite since it has a larger "lower flammability limit" (2.0 percent) than gasoline (one percent) or diesel fuel (0.5 percent).

Based upon the preceding information, hazards associated with LPG are approximately equivalent or less as compared to conventional fuels. Therefore, increased usage of LPG with a concurrent decline in usage of conventional fuels will not significantly alter existing hazards associated with mobile source fuels.

4.3.4.2.5 Biodiesel/Renewable Diesel

Biodiesel is a fuel derived from biological sources such as vegetable oils or animal fats. The process for creating biodiesel involves mixing the oil with alcohol (e.g., methanol or ethanol) in the presence of a chemical such as sodium hydroxide. This process produces a methyl ester if methanol is used or an ethyl ester if ethanol is used. Methyl ester from soy beans is more economical to produce, and, therefore, is more common in the U.S. Biodiesel can be used pure (B100) or blended with conventional diesel. The most common blended biodiesel is B20, which is 20 percent biodiesel and 80 percent conventional diesel.

Renewable diesel is produced from non-petroleum renewable resources but is not a mono-alkyl ester. There are several different chemical approaches to producing renewable diesel. One is based on hydrotreating vegetable oils or animal fats. Hydrotreating frequently takes place in conventional refineries to reduce sulfur or aromatic hydrocarbon content in CARB diesel. A second method involves synthesis of hydrocarbons through enzymatic reactions. A third method involves partially combusting a biomass source to produce carbon monoxide and hydrogen (syngas) and utilizing the Fischer-Tropsch reaction to produce complex hydrocarbons. Compared to biodiesel, renewable diesel uses similar feedstocks but has different processing methods and can include chemically different components. Renewable diesel can be used pure (R100) or blended with conventional diesel. The most common blended renewable diesel is R20, which is 20 percent renewable diesel and 80 percent conventional diesel.

Biodiesel is significantly safer to store, handle and transport compared with petroleum diesel due to its low volatility, high flashpoint (266ºF), and low toxicity (US Dept. of Energy - http://www.afdc.energy.gov/fuels/biodiesel_benefits.html). The National Fire Protection Agency classifies biodiesel as a non-flammable liquid.

Biodiesel and renewable diesel are considered safer than conventional diesels; therefore, increased usage of biodiesel and renewable diesel with a concurrent decline in usage of conventional diesel will not significantly alter existing hazards associated with mobile source fuels.

4.3.4.2.6 Hydrogen

Hydrogen is the simplest, lightest and most plentiful element in the universe. In its normal gaseous state, hydrogen is colorless, odorless, tasteless, non-toxic and burns invisibly. Most hydrogen is made from natural gas through a process known as steam reforming. Reforming separates hydrogen from hydrocarbons by adding heat. Hydrogen can also be produced from a variety of sources including water and biomass. Hydrogen can be used as a combustion fuel or in fuel cell vehicles to produce electricity to power electric motors. Most automakers have placed fuel cell electric vehicles (FCEVs) with customers, or plan to introduce FCEVs to the early commercial market soon. By 2020, automakers expect to place tens of thousands of fuel cell electric vehicles in the hands of California consumers. Currently, about 300 FCEVs, which have been leased or joined fleet programs, have been placed on California's roads and fill at public and private hydrogen stations in the state (CARB, 2016a).

The generation and distribution of hydrogen as a consumer product is also still under development. Currently there are 26 hydrogen refueling stations in California, 20 of which have public access (California Fuel Cell Partnership, 2016). Most of the refueling stations depend on bulk liquid hydrogen delivery; however, a few hydrogen gas pipeline stations and on-site steam reformer stations exist. Furthermore, hydrogen is limited in its use as a transportation fuel. While hydrogen fuel cell technology is promising, its use in the future is dependent on many things (cost-effectiveness of the technology, availability of hydrogen, etc.), so that the extent to which it may be used in the future to replace petroleum fuels is currently unknown and, therefore, speculative. The physical hazards associated with bulk liquid transport and storage are similar to LNG, as they are both cryogenic liquids. The physical hazards associated with pipeline and steam reformer stations are similar to CNG, as they are both compressed gases. In general, the fire hazards associated with hydrogen spills or leaks is higher than conventional fuels. This is due to the wide flammability range and low ignition energy of hydrogen. However, hydrogen tanks are built to more rigorous standards than conventional fuel tanks, which reduces the likelihood of spills or leaks.

The main additional hazard associated with the use of hydrogen versus conventional fuels is the difficulty in seeing hydrogen fires and potentiality of a large fire stemming from a release in the case of an accident (e.g., a tanker truck accident). Another potentially significant hazard is a release of hydrogen in an enclosed space (e.g., garage or vehicle maintenance facility).

Compared with diesel fuel and gasoline, the following can be stated about hydrogen:

- Diesel fuel and gasoline are toxic to the skin and lungs and hydrogen is non-toxic and non-reactive, so if released, it does not present a health hazard to humans.

- Diesel fuel gasoline vapors are heavier than air (e.g., specific gravity of air = 1, gasoline = 3.4, diesel fuel > 4.0) while hydrogen is 14 times lighter than air. If released, hydrogen will quickly dissipate into the atmosphere.

- Hydrogen has an extremely low ignition energy requirement; about 20 microjoules can ignite hydrogen/air, which is about 10 times less than what is required to ignite a gasoline/air mixture (PNL, 2004).

- Hydrogen is clear, odorless, and tasteless. It burns with an extremely hot, but nonluminous flame which is difficult to see. The flame of burning hydrogen has few warning properties.

- Hydrogen has an unusually large flammability range and can form ignitable mixtures between four and 75 percent by volume in air. Given confinement and good mixing, hydrogen can be detonated over the range of 18 to 59 percent by volume in air.

Hydrogen is non-toxic and disperses more readily in air than gasoline or diesel. Based upon the preceding information, health hazards associated with hydrogen are approximately equivalent or less when compared to conventional fuels.

4.3.4.2.7 Electric/Hybrid

Electric (EVs) and hybrid vehicles (hybrids) both use electricity as part of their fuel system. EVs rely purely on electric power stored in batteries. Hybrids also use batteries as part of their fuel supply; however, hybrids supplement their electric demand by using gasoline engines to generate either mechanical or electric power on demand. Since gasoline is a conventional fuel, any difference in hazards associated with operating hybrid vehicles can be attributed to the batteries. The most common battery technologies used in modern EVs and hybrids are nickel-metal hydride (NiMH) and lithium ion (Li-ion) (AFDC, 2016a).

NiMH batteries can generate hydrogen gas if overcharged, which can lead to explosions without proper ventilation. In 1996, the International Center for Technology Assessment (ICTA) conducted a comprehensive review of the safety concerns associated with the use of EVs. The ICTA found risk of hydrogen emissions during stressful conditions; however, this risk has been virtually eliminated by the use of seals and proper valve regulation. By following the National Electric Codes (NECs) and the Society of Automotive Engineers (SAE) recommended safety practices and guidelines for the operation and maintenance of EVs and hybrids, any hydrogen gas risk during battery recharging would be eliminated (ICTA, 1996). There has been in a shift away from nickel metal hydride batteries in EV's to lithium-ion batteries (UN 2010).

Li-ion batteries can be fire hazards. There are a few reported cases of fires caused by Li-ion batteries in EVs. In response to these fires, the National Highway Traffic Safety Administration (NHTSA) performed an investigation on the fire hazards associated with Li-ion batteries in EVs. The NHTSA concluded that EVs do not pose a greater risk of fire than gasoline-powered vehicles. The NHTSA also developed an interim guidance, with the assistance of the NFPA, DOE, and others, to increase and identify the appropriate safety measures for handling an EV or hybrid automobile accident (NHTSA, 2012).

When Li-ion batteries are being charged, they can generate hydrogen gas that is explosive in certain concentrations. This hazard exists with lead-acid batteries as well as other types of batteries. Ventilation is the key to prevent the build-up of hydrogen gas during battery charging, as well as preventing any source of ignition (e.g., smoking) in the area where batteries are being charged. The hazards associated with charging Li-ion batteries are expected to be similar to the hazards associated with lead-acid batteries. The Society of Automotive Engineers has established a number of recommended practices that apply to the charging of batteries to assure adequate ventilation.

The hazards associated with Li-ion batteries have also included spontaneous combustion and related fire hazards. These hazards are usually associated with faulty construction or damage of the battery in the event of an accident. The National Highway Traffic Safety Administration (NHTSA) has investigated problems with Li-ion batteries and they have concluded that electric vehicles are not a greater risk for fire than gasoline-powered vehicles (NHTSA, 2011). The NHTSA has established safety precautions in the event of a crash involving an electric vehicle that include: 1) taking the same actions as a crash involving a gasoline-powered vehicle and exit the vehicle and move a safe distance away from the vehicle and notify authorities; 2) recommending that emergency responders disconnect the battery from an electric vehicle in the event of an accident; 3) applying large volumes of water if a fire is present; 4) storing damaged vehicles in an open area; and, 5) contacting vehicle dealers with questions regarding damaged electric vehicles (NHTSA, 2011). Overall, the fire hazards associated with an electric vehicle are expected to be less than a conventional vehicle because there would be no leak or spills of petroleum fuel (gas or diesel) that is flammable in the event of an accident.

Furthermore, all electrical propulsion vehicles must comply with Federal Motor Vehicle Safety Standard (FMVSS) 305. FMVSS 305 specifies performance requirements for limiting electrolyte spillage, retaining propulsion batteries, and electrically isolating the chassis from the high-voltage system during a crash event. FMVSS assures that accidents involving an EV or hybrid would cause no more electrical hazard than a gasoline- or diesel-powered vehicle.

Electric propelled vehicles are considered to be less hazardous than conventional fuel vehicles. The 2016 AQMP expects to replace between 600,000 and 750,000 conventional fuel vehicles with alternative fuel vehicles by 2025, which would generally result in a reduction in hazards associated with conventional fuel vehicles.

There are various existing regulations and recommended safety procedures that, when employed, will reduce hazards impacts associated with use of alternative clean fuels when compared to conventional fuels. Table 4.3-5 summarizes some of the regulations and safety procedures associated with use of alternative fuels. When affected vehicle owners and maintenance personnel comply with existing regulations and recommended safety procedures, hazards impacts associated with the use of alternative fuels will be the same or less than those of conventional fuels. Accordingly, significant hazards impacts are not expected from the implementation of the 2016 AQMP control measures that encourage the use of alternative fuels.

TABLE 4.3-5

Summary of Hazards and Existing Safety Regulations/Procedures Associated with Alternative Fuels

FUEL TYPE	HAZARD	REGULATION/PROCEDURE
Ethanol	Pure ethanol can ignite in enclosed spaces such as fuel tanks since its upper flammability limit is 19 percent and it is slightly heavier than air.	Modifications such as materials inside the fuel tank that can arrest and quench flame propagation and modifications to isolate the tank from sparks and ignition sources are required to avoid ignition in the fuel tanks.
CNG	CNG bottles are typically stored outside and are required to be above ground (NFPA 52) as opposed to below ground for gasoline or diesel tanks. There is a risk of vehicles colliding with the bottles causing a gas release.	Collisions can be minimized by installing curbing and bollards to protect the tanks from vehicle contact (LAFC57.42.16).
	Releasing gas in a maintenance shop can potentially create explosive hazards.	Installation of methane detection systems in the shop can provide early detection of leaks and alert the maintenance personnel. (If integrated with vent systems, vents are not required to operate continuously - CFC 2903.2.5). Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof (smoking and open flames are prohibited under CFC 2901.7). Providing adequate ventilation can prevent the occurrence of explosive conditions (required under CFC 2903.1). Procedures can be established to ensure that all vehicles requiring maintenance are defueled and depressurized before admission to the maintenance depot.
LPG	LPG is typically stored outside and are required to be above ground (NFPA 58) as opposed to below ground for gasoline or diesel tanks. There is a risk of vehicles colliding with the bottles causing a gas release.	Collisions can be minimized by installing curbing and bollards to protect the tanks from vehicle contact (LAFC57.42.16).
	Releasing LPG in an enclosed area where there are potential ignition sources such as a maintenance shop may pose an explosive hazard. (A flammable concentration within an enclosed space in the presence of an ignition source can explode.)	Installation of flammable gas detection systems in a maintenance shop can provide early detection of leaks and alert the maintenance personnel (which is required for LPG under CFC2902.5). Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof (smoking and open flames are prohibited under CFC 2901.7). Vehicle fuel shut-off valves shall be closed prior to repairing any portion of the vehicle fuel system (CFC2902.6).

TABLE 4.3-5 (Continued)

Summary of Hazards and Existing Safety Regulations/Procedures Associated with Alternative Fuels

FUEL TYPE	HAZARD	REGULATION/PROCEDURE
LNG	LNG is a cryogenic liquid and has the potential risk to workers of burns (frostbite) that can be suffered if workers come in contact with the liquid or with surfaces that are not insulated.	Proper safety equipment and training can mitigate these hazards.
	Releasing LNG in an enclosed area where there are potential ignition sources such as a maintenance shop may pose an explosive hazard. (A flammable concentration within an enclosed space in the presence of an ignition source can explode).	Installation of flammable gas detection systems in a maintenance shop can provide early detection of leaks and alert the maintenance personnel (which is required for LNG under CFC2903.3). Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof (smoking and open flames are prohibited under CFC 2901.7). Providing adequate ventilation can prevent the occurrence of explosive conditions (required under CFC2903.1). Vehicle fuel shut-off valves shall be closed prior to repairing any portion of the vehicle fuel system (CFC2903.4.1). Vehicles fueled by LNG, which may have sustained damage to the fuel system, shall be inspected for integrity with a gas detector before being brought into the garage (CFC2903.4.2).
	LNG is generally stored above ground. Since it is a cryogenic liquid, in the event of a release, a fraction of the liquid immediately flashes off to gas while the majority of the remainder will pool and boil violently emitting dense vapor. If a source of ignition is present, the boiling liquid, dense vapor and gas could explode and burn threatening surrounding facilities and other storage vessels.	Tanks can be protected by containment dikes (required if neighboring tanks can be affected LAFC57.42.11) and physically separated LAFC57.42.10) so that they do not interact in case of a fire or explosion. Deluge systems can be installed to cool neighboring tanks in case of a fire.
Biodiesel	Certain materials used in conventional petroleum storage are not compatible with pure biodiesel.	Use biodiesel compatible plastic and rubber for fittings.

TABLE 4.3-5 (Concluded)

Summary of Hazards and Existing Safety Regulations/Procedures Associated with Alternative Clean-Fuels

FUEL TYPE	HAZARD	REGULATION/PROCEDURE
Hydrogen	Releasing gas in enclosed spaces with its related explosive hazards may pose an explosive hazard. (A flammable concentration within an enclosed space in the presence of an ignition source can explode.)	Installation of combustible gas detection systems can provide early detection of leaks. Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof. Providing adequate ventilation can prevent the occurrence of explosive conditions. Procedures can be established to ensure that all vehicles are defueled prior to maintenance.
EV and Hybrid Vehicles	Certain types of batteries that are used in commercially available electric vehicles emit hydrogen during the charging process. Emission of hydrogen gas in an enclosed setting such as a garage presents the potential for the accumulation of flammable concentrations.	Forced ventilation can prevent build-up but if ventilation fails, a hazardous condition can occur. NEC and SAE recommended practices provide strict guidance for eliminating hydrogen gas risk.
	Li-ion batteries that are used in some commercially available electric vehicles can combust spontaneously.	Reinforced casing and battery cooling systems can prevent the combustion of Li-ion batteries. FMVSS 305 and SAE recommendations provide guidance for eliminating combustion risk.

FMVSS = Federal Motor Vehicle Safety Standard
NEC = National Electric Code
SAE = Society of Automotive Engineers

The use of alternative fuels requires additional knowledge and training of emergency responders and owners/operators of fueling stations regarding maintaining and operating alternative fuel refueling stations. Further, as use of alternative fuels increases in the Basin, use of conventional fuels such as gasoline and diesel will decline. As a result, explosion and flammability hazards associated with conventional fuels will also decline. In addition, hazards and hazardous clean-up associated with accidental releases of conventional fuels, especially diesel, are reduced with increasing use of alternative fuels.

When users of alternative fuels comply with existing regulations and recommended safety procedures, hazards impacts associated with the use of alternative fuels are expected to be the same or less than those of conventional fuels. Accordingly, hazards impacts from the increased use of alternative fuels are expected to be similar to or less than hazards associated with conventional fuels. Lastly, the hazard impacts associated with using batteries in electric/hybrid vehicles were concluded to be less than significant. Because no significant hazard impacts were identified that pertain to using batteries in electric/hybrid vehicles, no mitigation measures are required.

4.3.4.3 Ammonia Use in SCRs, SNCRs, and Dry Gas Scrubbers

Implementation of some control measures in the 2016 AQMP could result in the use of SCR or SNCR technology to reduce NOx emissions including CMB-05, BCM-05, ORFIS-01, and ORFIS-03. In addition, a greater use of SCRs, SNCRs, and dry gas scrubber (DGS) may occur on industrial combustion sources such as boilers and heaters, as well as large diesel engines on mobile sources to reduce NOx, including off-road diesel engines (e.g., locomotive engines and marine vessel engines).

SCR is post-combustion control equipment for NOx control of existing combustion sources like boilers, steam generators, and process heaters that is capable of reducing NOx emissions by as much as 90 percent or higher. A typical SCR system design can consist of an ammonia storage tank, ammonia vaporization and injection equipment, an SCR reactor with catalyst, ancillary electronic instrumentation, and operations control equipment. In some situations, an SCR system may also utilize a booster fan for the flue gas exhaust and an exhaust stack. The way an SCR system reduces NOx is through a matrix of nozzles injecting a mixture of ammonia and air directly into the flue gas exhaust stream from the combustion equipment. As this mixture flows into the SCR reactor that is replete with catalyst, ammonia, and oxygen (from the air), the flue gas exhaust reacts primarily (i.e., selectively) with NO and NO_2 to form nitrogen and water in the presence of a catalyst. The amount of ammonia introduced into the SCR system is approximately a 1.0-to-1.05 molar ratio of ammonia to NOx for optimum control efficiency, though the ratio may vary based on equipment-specific NOx reduction requirements. The ammonia injection rate is also regulated by the fuel flow rate to the unit.

SNCR is another post-combustion control technique typically used to reduce the quantity of NOx produced in the hot flue gas, by injecting ammonia. The main differences between SNCR and SCR is that the SNCR reaction between ammonia and NOx in the hot flue gas occurs without the need for a catalyst, but at much higher temperatures (i.e., between 1200 ºF to 2000 ºF). With a control efficiency ranging between 80 and 85 percent, SNCR does not achieve as great of NOx emission reductions as SCR. The need for the exhaust temperature to be high also limits the applicability of SNCR. SNCR would not be considered equivalent to BARCT alone, but it could be used if combined with other technologies.

DGS use a ceramic catalyst filter with ammonia injection at temperatures ranging from 350 ºF to 750 ºF. The filter removes particulate matter and, with the addition of calcium hydroxide (commonly referred to as, hydrated or slaked lime) or sodium bicarbonate (commonly referred to as baking soda), can also reduce SOx.

In SCR, SNCR, and DGS technology, ammonia or urea is used to react with the NOx, either in the presence of a catalyst or without a catalyst, respectively, to form nitrogen gas and water. Ammonia is the primary hazardous chemical identified with the use of air pollution control equipment (e.g., SCR and SNCR systems). Ammonia, though not a carcinogen, can have chronic and acute health impacts. Therefore, a potential increase in the use of ammonia may increase the current existing risk setting associated with deliveries (i.e., truck and road accidents) and onsite or offsite spills for each facility that currently uses or will begin to use ammonia. Exposure to a toxic gas cloud is the potential hazard associated with this type of control equipment. A toxic gas cloud is the release

of a volatile chemical such as anhydrous ammonia that could form a cloud that migrates off-site, thus exposing individuals. Anhydrous ammonia is heavier than air such that when released into the atmosphere, would form a cloud at ground level rather than be dispersed. "Worst-case" conditions tend to arise when very low wind speeds coincide with the accidental release, which can allow the chemicals to accumulate rather than disperse. Though there are facilities that may be affected by the proposed 2016 AQMP control measures that are currently permitted to use anhydrous ammonia, for new construction, however, current SCAQMD policy requires the use of aqueous ammonia, unless a hazard analysis shows that the impacts of the anhydrous ammonia tank would remain on-site and would be less than significant. To minimize the hazards associated with ammonia used in the SCR, SNCR, or DGS process, aqueous ammonia (100 percent anhydrous ammonia diluted with water to 19 percent by volume) is typically required as a permit condition associated with the installation of SCR, SNCR, or DGS equipment for the following reasons: 1) 19 percent aqueous ammonia does not travel as a dense gas like anhydrous ammonia; and, 2) 19 percent aqueous ammonia is not on any acutely hazardous material lists unlike anhydrous ammonia or aqueous ammonia at higher percentages. As such, aqueous ammonia is expected to be used, unless the applicant demonstrates that the use of anhydrous ammonia can be mitigated to less than significant. As a result, this analysis focuses on the use of 19 percent by volume aqueous ammonia. Thus, because aqueous ammonia (at 19 percent by weight) would be required for any permits issued for the installation of air pollution control equipment that utilize ammonia, no new hazards from toxic clouds are expected to be associated with the proposed project. For these safety reasons, aqueous ammonia is recommended for use in these technologies.

In addition, safety hazards related to the transport, storage and handling of ammonia exist (discussed later in Section 4.3.4.7). Ammonia has acute and chronic non-cancer health effects and also contributes to the formation of ambient PM10 and PM2.5 emissions under some circumstances. Since ammonia is not typically considered to be a flammable compound, other types of hazard impacts such as fires and explosions are not expected to occur and, therefore, will not be evaluated as part of this hazards analysis. To further evaluate the potential for significant adverse environmental impacts due to an accidental release of ammonia, various scenarios were evaluated that could occur during the onsite storage, transportation, and transfer of ammonia. These scenarios and their consequences are discussed in detail below.

A spill of any of the hazardous materials (including ammonia) used and stored at any of the affected facilities could occur under upset conditions such as an earthquake, tank rupture, or tank overflow. Spills could also occur from corrosion of containers, piping and process equipment, and leaks from seals or gaskets at pumps and flanges. A major earthquake would be a potential cause of a large spill. Other causes could include human or mechanical error. Construction of the vessels and foundations in accordance with the California Building Code requirements helps structures to resist major earthquakes without collapse, but may result in some structural and non-structural damage following a major earthquake. As required by U.S. EPA's spill prevention control and countermeasure regulations, all of the affected facilities are currently required to have emergency spill containment equipment and would implement spill control measures in the event of an earthquake. Storage tanks typically have secondary containment such as a berm, which would be capable of containing 110 percent of the contents of the storage tanks. Therefore, should a rupture occur, the contents of the tank would be collected within the containment system and pumped to an appropriate storage tank.

Spills at affected industrial or commercial facilities would be collected within containment structures. Large spills outside of containment areas at affected facilities that could occur when transferring the material from a transport truck to a storage tank are expected to be captured by the process water system where they could be collected and controlled. Spilled material would be collected on-site and pumped to an appropriate tank or sent off-site if the materials cannot be used on-site.

The impacts associated with an on-site ammonia tank rupture were evaluated extensively in SCAQMD's December 2015 Final Program Environmental Assessment (PEA) prepared for the Proposed Amended Regulation XX – Regional Air Incentives Market (RECLAIM) (SCAQMD, 2015). The ammonia tank rupture release scenarios evaluated in the December 2015 Final PEA are also included in this Program EIR.

Ammonia Tank Rupture Scenario 1 (Non-Refinery Sector):
Based on engineering estimates and discussion with control technology vendors, it was estimated that the largest aqueous ammonia tank that would be installed at a non-refinery facility would be 5,000 gallons. All ammonia tanks are required to be installed within berms that hold 110 percent of the contents of the tank. U.S. EPA's RMP*Comp was used to estimate the zone of impact from a worst-case release. Although it is SCAQMD policy to reduce potential hazards associated with ammonia by requiring a permit condition that limits the aqueous ammonia concentration to 19 percent, the U.S. EPA model only has the capability of evaluating the hazard potential of 20 percent aqueous ammonia. Therefore, the potential adverse impacts from aqueous ammonia were evaluated based on the 20 percent aqueous ammonia. Further, since it is assumed that an aqueous ammonia tank servicing one or more SCR systems would need to be relatively near to the existing equipment, the toxic endpoint for aqueous ammonia from a worst-case failure of a storage tank that would significantly adversely affect the sensitive receptors surrounding the existing equipment was analyzed.

Because a hazard analysis is dependent on knowing the exact location of the hazard within the site (e.g., location of the ammonia storage tank(s)), meteorological conditions, location of the receptor, etc., a site-specific hazard analysis is difficult to conduct without this information. Since SCAQMD staff does not currently know the exact location of ammonia storage tanks that would be installed in the future, to estimate a worst-case analysis, the RMP*Comp worst-case assumptions were used:

Location of tanks: Stand-alone tanks not within a building

Quantity Released: 5,500 gallons of aqueous ammonia will be spilled into a berm (the total of one 5,000 gallon tanks plus 10 percent to account for a rupture during filling)

Liquid Temperature at the time of the spill: 77 ^{o}F

Mitigation Measures: Release into an open berm, in direct contact with outside air

Topography: Urban surroundings with many obstacles in the immediate area

Toxic Endpoint: 0.14 milligrams per liter (basis: ERPG-2)

Wind Speed: 1.5 meters per second (3.4 miles per hour)

Air Temperature: 77 ^{o}F

The estimated distance to the toxic endpoint from the facility is 0.1 miles or 528 feet. SCR and systems are expected to be used at major industrial facilities and locations. These facilities are often large enough and have sufficient space to site new storage tanks more than 528 feet away from sensitive receptors, minimizing the potential impacts associated with new tanks. However, information on specific projects potentially affected by these control measures are unknown at this time. As such, to identify any impacts at this time without knowing the specific design features would be speculative. Nonetheless, there are a number of locations throughout the Basin where sensitive receptors are located within 528 feet of industrial facilities.

Ammonia Tank Rupture Scenario 2 (Refinery Sector):

Based on engineering estimates and discussion with control technology vendors, it was estimated that the largest aqueous ammonia tank that would be installed at a refinery facility would be 11,000 gallons. Although it is SCAQMD policy to reduce potential hazards associated with ammonia by requiring a permit condition that limits the aqueous ammonia concentration to 19 percent, the U.S. EPA model only has the capability of evaluating the hazard potential of 20 percent aqueous ammonia. Therefore, the potential adverse impacts from aqueous ammonia were evaluated based on the 20 percent aqueous ammonia. Further, since it is assumed that an aqueous ammonia tank servicing one or more SCR systems would need to be relatively near to the existing equipment, the toxic endpoint for aqueous ammonia from a worst-case failure of a storage tank that would significantly adversely affect the sensitive receptors surrounding the existing equipment was analyzed.

Because a hazard analysis is dependent on knowing the exact location of the hazard within the site (e.g., location of the ammonia storage tank(s)), meteorological conditions, location of the receptor, etc., a site-specific hazard analysis is difficult to conduct without this information. Since SCAQMD staff does not currently know the exact location of ammonia storage tanks that would be installed in the future, to estimate a worst-case analysis, the RMP*Comp worst-case assumptions were used:

Location of tanks: Stand-alone tanks not within a building

Quantity Released: 12,100 gallons of aqueous ammonia will be spilled into a berm (the total of one 11,000 gallon tanks plus 10 percent to account for a rupture during filling)

Release Rate: 11.7 pounds per minute

Liquid Temperature at the time of the spill: 77 degrees ^{o}F

Mitigation Measures: Release into an open berm, in direct contact with outside air

Topography: Urban surroundings with many obstacles in the immediate area

Toxic Endpoint: 0.14 milligrams per liter (basis: ERPG-2)

Wind Speed: 1.5 meters per second (3.4 miles per hour)

Air Temperature: 77 ^{o}F

The estimated distance to the toxic endpoint from any refinery facility is 0.1 miles or 528 feet. Refineries in the Basin are large and generally consist of hundreds of acres. Nonetheless, they all have sufficient space to site new storage tanks more than 528 feet away from sensitive receptors,

minimizing the potential impacts associated with new tanks. Further, the existing refineries already have ammonia storage tanks so that the need for new ammonia storage tanks is expected to be limited.

4.3.4.4 Use of Catalysts

Implementing various control measures proposed in the 2016 AQMP could result in the increased use of catalysts as well as an increase in the quantity of catalyst disposed of as hazardous materials, including in SCRs and DGSs per control measures CMB-05, BCM-05, ORFIS-01, and ORFIS-03.

There are two main types of catalysts used in SCRs: one in which the catalyst is coated onto a metal structure and the other is a ceramic-based catalyst onto which the catalyst components are calcified. Commercial catalysts used in SCRs are comprised of a base material of titanium dioxide (TiO_2) that is coated with tungsten trioxide (WO_3), molybdic anhydride (MoO_3), vanadium pentoxide (V_2O_5), or iron oxide (Fe_2O_3). SCR catalysts are typically replaced approximately once every five years. The key hazards associated with catalyst use are when the spent catalyst is crushed and transported for disposal or recycling. Recycling of catalyst means hauling the spent catalyst to a facility that either recycles or recovers the heavy metal components from the catalyst or that uses the catalyst as a ingredient for manufacturing cement. (The nearest cement plant is located outside of the Basin.)

With respect to hazards and hazardous materials, there will be an increase in the frequency of truck transportation trips to remove the spent catalyst as hazardous materials or hazardous waste from each affected facility. However, facilities that have existing catalyst-based operations currently recycle the catalysts blocks, in lieu of disposal. Moreover, due to the heavy metal content and relatively high cost of catalysts, recycling can be more lucrative than disposal. Thus, facilities that have existing SCR units and choose to employ additional SCR equipment, in most cases already recycle the spent catalyst and subsequently may continue to do so with any additional catalyst that may be needed.

Although recycling may be the more popular (and potentially lucrative) consideration, it is possible that facilities may choose to dispose of the spent catalyst in a landfill. The composition and type of the catalyst will determine the type of landfill that would be eligible to handle the disposal. For example, catalysts with a metal structure would be considered a metal waste, like copper pipes, and not a hazardous waste. Therefore, metal structure catalysts would not be a regulated waste requiring disposal in a Class I landfill, unless it is friable or brittle. As ceramic-based catalysts contain a fiber-binding material, they are not considered friable or brittle and, thus, would not be a regulated waste requiring disposal in a Class I landfill. Furthermore, typical catalyst materials are not considered to be water soluble, which also means they would not require disposal in a Class I landfill. In both cases, spent catalyst would not require disposal in a Class I landfill.

Based on the aforementioned information, it is likely that spent catalysts would be considered a "designated waste," which is characterized as a non-hazardous waste consisting of, or containing pollutants that, under ambient environmental conditions, could be released at concentrations in excess of applicable water objectives, or which could cause degradation of the waters of the state (California Code of Regulations, Title 23, Chapter 3 Subparagraph 2522(a)(1)). Depending on its

actual waste designation, spent catalysts would likely be disposed of in a Class II landfill or a Class III landfill that is fitted with liners.

4.3.4.5 Use of Caustic in Wet Gas Scrubbers

Implementation of some control measures proposed in the 2016 AQMP could result in the use of wet gas scrubber (WGS) technology to reduce NOx emissions including CMB-05. Use of WGS may occur on refinery sources such as fluidized catalytic cracking units (FCCU), sulfur recovery units (SRU), and tail gas treatment units (TGU).

For any operator that chooses to install a WGS for a FCCU, hazardous materials may be needed to operate the WGSs depending on the source category and additional solid waste is expected to be generated. Caustic is a key ingredient needed for the operation of a WGS. While there are several types of caustic solutions that can be used in WGS operations, caustic made from sodium hydroxide (NaOH) is the most commonly used for WGSs for FCCUs and it is considered an acutely hazardous substance. Sodium hydroxide is in use at refineries, so on-site storage is expected to exist, but if needed a new storage tank may be constructed. However, the increased use would likely require additional deliveries of NaOH.

It is expected that the affected facilities will receive NaOH from a local supplier located in the greater Los Angeles area. Deliveries of NaOH (50 percent by weight) would be made by tanker truck via public roads as is currently the case with existing NaOH deliveries. NaOH is typically delivered in 6,000 gallon trucks, so the proposed project would not introduce any new transportation hazards for NaOH.

The onsite storage and handling of NaOH creates the possibility of an accidental spill and release of NaOH. However, because NaOH has such a low vapor pressure (6.33 mm Hg at 40 ºC or 104 ºF) when compared to water (55.3 mm Hg at 40 ºC or 104 ºF) at the same temperature, any spill of NaOH would not be expected to evaporate faster than water. Thus, any spill of NaOH would be expected to stay in liquid form and would not likely exceed the ERPG-2 vapor concentration of five milligrams per cubic meter for NaOH. Further, operators at each affected facility who construct a new NaOH storage tank will need to build a containment berm large enough to hold 110 percent of the tank capacity in the event of an accidental release due to tank rupture. Thus, any spill of NaOH would not be expected to migrate beyond the boundaries of the berm on-site. Further, any spill of NaOH is not expected to present a potential offsite public and sensitive receptor exposure. Lastly, since NaOH is not a flammable compound, other types of heat-related hazard impacts such as fires, explosions, or BLEVE are not expected to occur and, therefore, will not be evaluated as part of this hazards analysis. In conclusion, the hazards and hazardous materials impacts due to the use, tank rupture, and the accidental release of NaOH will be less than significant for the proposed project.

For WGSs that may be installed to control NOx from SRU/TGUs, the caustic used in the WGS is made from soda ash, instead of NaOH. Soda ash is the common name for sodium carbonate (Na2CO3), a non-toxic, non-cancerous, and non-hazardous substance. Soda ash has a NFPA health rating 2 because it corrosive and may be harmful if inhaled and may cause skin irritation and workers handling soda ash will need to take the necessary precautions as required by OSHA

when dealing with this substance which include the use of protective clothing including goggles, rubber gloves and coveralls.

4.3.4.6 Use of Acidifiers

Control Measure BCM-04 would control ammonia emissions from livestock operations through the application of the acidifier sodium bisulfate (SBS). SBS has been used to reduce pH levels in dairy bedding (e.g., hay or straw) and manure, which in turn reduces bacterial and ammonia levels. In California, SBS has also been used by dairies in Tulare, Fresno, Merced, Stanislaus, San Joaquin, Kings, Kern, San Bernardino, Riverside, San Benito and Sacramento counties, to prevent cow lameness and nuisance flies.

While SBS is considered an irritant because of its low pH, it is safe for use in water treatment. In particular, SBS has been used as a disinfectant to prevent damage of the membrane used in reverse osmosis during water treatment. SBS is certified for treating drinking water (e.g., for chlorine removal, corrosion and scale control, and pH adjustment). SBS is used to lower the pH of water for effective chlorination, including water in swimming pools. SBS is also approved as a general use feed additive, including companion animal food.

SBS is considered Generally Recognized as Safe (GRAS) by the Food and Drug Administration (FDA) and meets their definition of a natural product (FDA, 1998). The FDA has approved of SBS as a food additive and food grade SBS is used in a variety of food products, including beverages, dressings, sauces, cake mixes, and fillings. It is also widely used in meat and poultry processing and in browning prevention of fresh cut produce.

Because SBS is a salt, the transportation and flammability risks of SBS are very low. In a worst case-scenario if a spill was to occur, the hazards impacts would be negligible.

4.3.4.7 Transport Hazards

4.3.4.7.1 LNG

LNG is non-toxic, disperses more readily in air than conventional fuels, and has more rigorous standards for transportation. It is expected that affected facilities will receive LNG from a local supplier located in the Basin. Deliveries of LNG would be made to the other affected facilities by tanker truck via public roads. The transport of LNG is regulated by the U.S. DOT. LNG trucks are double-walled aluminum and are designed to withstand accidents during the transport of LNG. LNG is loaded into delivery tanks at atmospheric pressure, which would be at its boiling point of -260ºF (-162ºC). The LNG is maintained at this temperature by evaporation of the boiling LNG and venting of the evaporated LNG. Because the vent is closed during shipment, the pressure in the tank builds and the temperature of the LNG increases. The FMCSA analyzed releases from delivery tanks with an average pressure of 30 psig, which would be -230ºF (-146ºC). At 30 psig, approximately 30 percent of the LNG will flash into vapor when released.

Transportation Release Scenarios: These LNG transport release scenarios were analyzed in the December 2007 Final EA for Proposed Amended Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Internal Combustion Engines (ICEs) (SCAQMD No. 280307JK). The following

description of LNG transportation and consequences is taken from the Federal Motor Carrier Safety Administration (FMCSA)[6].

Four scenarios were identified as having major consequences:

1. Release of LNG into a pool that evaporates and disperses without ignition. Approximately 40 percent of the liquefied LNG immediately flashes into vapor. The temperature of the liquid pool would be -44 ºF (-42ºC) and would therefore damage exposed vegetation and people.

2. A flammable cloud is formed that contacts an ignition source. The flame front can flash back and set the liquid pool on fire. Quantities of LNG shipped by truck would not typically cause vapor cloud explosions.

3. A BLEVE occurs. BLEVEs would occur when an LNG tank is exposed to fire and the increase in pressure within the tank exceeds the capacity of the relief valve.

4. The tank ruptures, rockets away, and ignites.

RMP*Comp was used for the consequence analysis for these four scenarios. The adverse impacts from the four scenarios were determined to be:

1. The area of the pool was estimated by assuming a depth of one centimeter as described in Example 29 in the U.S. EPA's Risk Management Program Guidance for Offsite Consequence Analysis.[7] A 6,000 gallon LNG pool would be 24,448 square feet. This distance would be a "worst-case" since as the LNG pool expands from the tank it will warm and evaporate.

2. A pool fire of 6,000 gallons that is released in one minute would result in a heat radiation endpoint (five kilowatts/square meter) of 0.2 mile. If a vapor cloud fire occurs, the estimated distance to the lower flammability limit would be 0.3 mile.

3. Based on 10,000 gallons the BLEVE would result in a fireball that may cause second-degree burns out to 0.3 mile.

4. The "worst-case" release estimate for 10,000 gallons in RMP*Comp is 0.3 mile from the vapor cloud explosion. Since, it is unclear as to how far away the tank would travel, it was assumed that the adverse impact would be 0.3 mile from where the tank lands. Damage to property and persons may occur from physical impact from the rocketing tank.

[6] Federal Motor Carrier Safety Administration, Comparative Risks of Hazardous Materials and Non-Hazardous Materials Truck Shipment Accidents/Incidents, Final Report, March 2001, www.fmcsa.dot.gov/documents/hazmatriskfinalreport.pdf.

[7] U.S. EPA, Risk Management Program Guidance for Offsite Consequence Analysis, EPA 550-B-99-009, April 1989.

During transportation of LNG, it was estimated that the adverse impacts from various releases would extend 0.3 mile. Because sensitive receptors may be within the endpoint distances above, the accidental release of LNG during transport could cause significant adverse hazards.

Based upon the preceding information, increased transport of LNG may substantially alter existing transportation hazards associated with mobile source fuels. Consequently, increased usage of LNG is expected to generate significant adverse hazard impacts during transport.

4.3.4.7.2 Alternative Fuels

As shown in Table 4.3-6, the energy content of alternative fuels is lower than conventional fuels which means that more fuel is needed in an alternative fuel-powered vehicle to achieve the same range as a conventional fuel-powered vehicle. Thus, more tanker deliveries to supply refueling stations would be required to provide the same available energy as conventional fuels. Since the probability of accidents is related to the amount of miles traveled, proportionally more delivery accidents can be expected with alternative fuels than conventional fuels (assuming that they are delivered from similar source locations in similar sized tankers). However, the truck accident rate is small, on the order of one accident per five million miles traveled and the accident rate with chemical releases is even less (U.S. DOT, 2014). Furthermore, any increase in alternative fuels use would decrease the use of conventional fuels and replace those miles traveled, so hazards associated with transportation and storage of all of the alternative fuels would not be a significant risk factor.

TABLE 4.3-6

Equivalent Fleet Miles
Associated with Alternative Clean-Fuels

FUEL TYPE	BY MASS	BY VOLUME
Diesel	1.00	1.0
CNG/LNG	1.15	1.9
LPG	1.15	2.1
Ethanol	1.90	2.3

Source: Clean Air Program: Summary of Assessment of the Safety, Health, Environmental and System Risks of Alternative Fuels. (DOT, 1999)

4.3.4.7.3 Ammonia

It is expected that affected facilities will receive ammonia from a local ammonia supplier located in the greater Los Angeles area. Deliveries of aqueous ammonia would be made to the other affected facilities by tanker truck via public roads. The maximum capacity of an ammonia tanker truck is approximately 7,000 gallons.

Ammonia Transportation Release Scenario:

The impacts associated with an accident involving aqueous ammonia were evaluated extensively in the SCAQMD's December 2015 Final PEA for the Proposed Amended Regulation XX –

Regional Air Incentives Market (RECLAIM) (SCAQMD, 2015). The ammonia transportation release scenarios evaluated in the December 2015 Final PEA are included in this Program EIR.

To analyze the effects of aqueous ammonia as a result of an accidental release due to tank rupture, a Consequence Analysis using the U.S. EPA RMP*Comp (Version 1.07) is typically performed. Aqueous ammonia trucks have a capacity of 7,000 gallons. U.S. EPA's RMP*Comp was used to estimate the zone of impact from a worst-case release. Although it is SCAQMD policy to reduce potential hazards associated with ammonia by requiring a permit condition that limits the aqueous ammonia concentration to 19 percent, the U.S. EPA model only has the capability of evaluating the hazard potential of 20 percent aqueous ammonia. Therefore, the potential adverse impacts from aqueous ammonia were evaluated based on 20 percent aqueous ammonia. Based on the worst-case defaults, the toxic endpoint from a delivery truck would be 0.4 miles.

Because a hazard analysis is dependent on knowing the exact location of the spill (e.g., meteorological conditions, location of the receptor, etc., a site-specific hazard analysis is difficult to conduct without this information. Since SCAQMD staff does not currently know the exact location of ammonia storage tanks that would be installed in the future, to estimate a worst-case analysis, the RMP*COMP worst-case assumptions were used:

Location of tanks: Stand-alone tanks (i.e., not within a building)

Quantity Released: 7,000 gallons of aqueous ammonia

Liquid Temperature at the time of the spill: 77 ºF

Mitigation Measures: None

Topography: Urban surroundings with many obstacles in the immediate area

Toxic Endpoint: 0.14 milligrams per liter (basis: ERPG-2)

Wind Speed: 1.5 meters per second (3.4 miles per hour)

Air Temperature: 77 ºF

The estimated distance to the toxic endpoint from a worst-case delivery truck release is 0.4 miles or 2,112 feet. Since sensitive receptors are expected to be found within 0.4 miles from roadways, the hazards and hazardous materials impacts due to a delivery truck accident will be potentially significant. Therefore, the proposed project has the potential to generate significant adverse hazard impacts during transportation as a result of the potential for accidental releases of delivered aqueous ammonia.

4.3.4.8 Sites Included on a List of Hazardous Materials Sites

The DTSC maintains a database of hazardous materials sites called EnviroStor, which replaced the CalSites database. EnviroStor contains: 1) information on properties located throughout California where hazardous substances were released; 2) identifies formerly contaminated properties which have been released for re-use; 3) identifies properties with environmental deed restrictions to prevent inappropriate land use development; and, 4) risk characterization information used to assess potential public health impacts and impacts to the environment. There are various federal, state, and local laws such as Government Code §65962.5; Occupational Safety

and Health Code 197; the Response Conservation, and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act; the Hazardous Materials Release and Clean-Up Act; the Uniform Building Code; and county and city building standards. Furthermore, SCAQMD Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil, regulates the emissions of VOCs from contaminated soils. SCAMQD Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities, regulates the presence of asbestos during construction. Finally, the 2016 AQMP contains TXM-04, which seeks to develop control measures that would control the toxic metal particulates generated during soil cleanup or remediation activities at these sites. The 2016 AQMP would be applicable to all facilities located within the Basin, of which some facilities are included on lists of hazardous materials sites (or are located adjacent to listed facilities) compiled pursuant to Government Code §65962.5. Thus, near-surface contaminated soil may be encountered during demolition and/or construction activities associated with implementation of the 2016 AQMP. Depending on the location of the nearest sensitive receptor(s), it is possible that construction activities would create a significant hazard to the public or environment. Furthermore, without knowing the types of contamination (i.e., VOCs, TACs, etc.) it is not possible to know in advance which regulations would apply.

4.3.5 MITIGATION MEASURES

Based on the impact analysis listed above, the routine use of alternative fuels such as ethanol, CNG, LNG, LPG, biodiesel, renewable diesel, and hydrogen will not create a significant hazard to the public and the impact is less than significant. The routine use of caustic, catalysts, and acidifiers will not create a significant hazard to the public and the impact is less than significant. The use of batteries in electric/hybrid vehicles were found to be less than significant. Spills are not expected to migrate from any affected facility due to the requirements for and design of containment systems; therefore, the impacts from spills are considered to be less than significant. The transportation of alternative fuels, except LNG, will not create a significant hazard to the public and the impact is less than significant. The transportation of LNG fuel is concluded to create a significant hazards and hazardous material impact from exposure to the one psi overpressure from the cataclysmic destruction of the LNG storage tank. However, there are no feasible mitigation measures to reduce this significant impact.

Since hazards and hazardous materials impacts associated with increased flammability of potential replacement solvents, reformulated coatings, adhesives, and sealants were found to be significant, the following mitigation measures are required:

HZ-1 Add consumer warning requirements for all reformulated products that are flammable and extremely flammable.

HZ-2 Add requirements to conduct a public education and outreach program in joint cooperation with local fire departments regarding reformulated products that are flammable and extremely flammable, especially for reformulated consumer paint thinners and multi-purpose solvents.

Although the impacts evaluated in the accidental release scenarios for aqueous ammonia and tank rupture in the refinery sector were concluded to be less than significant, the impacts due to tank rupture in the non-refinery sector were found to be significant. Mitigation measures are required, if feasible, to minimize the potentially significant "worst-case" hazard impacts. As discussed in Section 3.4.2, there are a number of rules, regulations, and laws governing storage tanks that will minimize the potential adverse impacts associated with hazards at a facility and which would minimize the hazards associated with ammonia storage tanks. Under federal OSHA, regulations have been promulgated that require the preparation and implementation of a PSM Program (40 CFR Part 1910, Section 119, and Title 8, CCR, Section 5189). A PSM that meets the requirements of the regulations will minimize the consequences of a release involving a toxic, reactive, flammable, or explosive chemical. Ultimately, mitigation measures would need to be identified on a project-by-project basis and would be the responsibility of the lead and responsible agencies based on their underlying legal authority to require mitigation.

Potentially significant impacts on hazards impacts associated with the storage and transportation of LNG as an alternative fuel are anticipated, so mitigation measures are required. The following mitigation measures are recommended to be implemented in accordance with design measures that are typically required by local fire departments:

HZ-3 Install secondary containment (e.g., berms).

HZ-4 Install valves that fail shut.

HZ-5 Install emergency release valves and barriers around LNG storage tanks to prevent the physical damage to storage tanks or limit the release of LNG from storage tanks.

HZ-6 Perform integrity testing of LNG storage tanks to assist in preventing failure from structural problems. Construct a containment system to be used for deliveries during off-loading operations.

The transportation release scenario for ammonia has potentially significant adverse hazards and hazardous materials impacts. Therefore, mitigation is required. However, no feasible mitigation measures have been identified, over and above the extensive safety regulations that currently apply to delivery trucks that transport ammonia.

The 2016 AQMP would affect facilities and sites which might be identified on lists pursuant to Government Code §65962.5 and in the event that construction occurs at any of those sites, a significant hazard to the public or environment could be created. Furthermore, schools could be located within a quarter mile of facilities that are identified on the aforementioned lists, creating a significant hazard for the students and teachers. In addition to compliance with existing federal, state, and local regulations, the following mitigation measures are proposed to reduce impacts at facilities that are identified on the aforementioned lists:

HZ-7 Conduct a Phase I Environmental Site Assessment prior to construction. If known contamination is discovered, a Phase II environmental Site Assessment should be conducted and provided to the Lead Agency. The recommendations in the Environmental Site Assessments should be implemented.

HZ-8 Consult with the appropriate local, state, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps.

HZ-9 Cease work if soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums, or other hazardous materials or wastes are encountered), in the vicinity of the suspect material. Secure the area as necessary and take all appropriate measures to protect human health and the environment, including but not limited to: notification of regulatory agencies and identification of the nature and extent of contamination. Stop work in the areas affected until the measures have been implemented consistent with the guidance of the appropriate regulatory oversight authority.

HZ-10 Use best management practices (BMPs) regarding potential soil and groundwater hazards.

HZ-11 Soil generated by construction activities should be stockpiled on-site in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. Complete sampling and handling and transport procedures for reuse or disposal, in accordance with applicable local, state and federal laws and policies.

HZ-12 Groundwater pumped from the subsurface should be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies. Utilize engineering controls, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building.

HZ-13 Prior to issuance of any demolition, grading, or building permit, submit for review and approval by the Lead Agency (or other appropriate government agency) written verification that the appropriate federal, state and/or local oversight authorities, including but not limited to the Regional Water Quality Control Board (RWQCB), have granted all required clearances and confirmed that the all applicable standards, regulations, and conditions have been met for previous contamination at the site.

HZ-14 Develop, train, and implement appropriate worker awareness and protective measures to assure that worker and public exposure is minimized to an acceptable level and to prevent any further environmental contamination as a result of construction.

HZ-15 Where a project site is determined to contain materials classified as hazardous waste by state or federal law, submit written confirmation to appropriate local agency that all state and federal laws and regulations will be followed when profiling, handling, treating, transporting, and/or disposing of such materials.

HZ-16 The temporary storage and handling of potentially hazardous materials/wastes should be in areas away from sensitive receptors such as schools or residential areas. These areas should be secured with chain-link fencing or similar barrier with controlled access to

restrict casual contact from non-project personnel. All project personnel that may come into contact with potentially hazardous materials/wastes will have the appropriate health and safety training commensurate with the anticipated level of exposure.

HZ-17 Where the construction or operation of projects involves the transport of hazardous materials, avoid transport of such materials within one-quarter mile of schools, when school is in session, wherever feasible.

HZ-18 Where it is not feasible to avoid transport of hazardous materials, within one-quarter mile of schools on local streets, provide notification of the anticipated schedule of transport of such materials.

4.3.6 IMPACTS AFTER MITIGATION

The SCAQMD cannot predict which coatings, solvents, adhesives, and sealants each affected facility might choose to use in the future as reformulated products become available or estimate the amount of coatings to be used. Mitigation measures were crafted to inform consumers about any potential fire hazards that may be associated with those reformulated products that may have increased flammability. While the promotion of consumer awareness may be helpful for safety reasons, these mitigation measures do not physically reduce any fire hazards in the reformulated products themselves. Thus, after implementation of mitigation measures HZ-1 and HZ-2, the fire hazards impacts are expected to remain significant.

The impacts from tank rupture of LNG and ammonia (in the non-refinery sector), and transport of LNG and ammonia are expected to remain significant even after implementation of mitigation measures HZ-3 to HZ-6.

In addition to the federal, state, and local regulations that facilities and sites listed on lists pursuant to Government Code §65962.5 must comply with, implementation of mitigation measures HZ-7 to HZ-15 will reduce the impacts to less than significant.

Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites. The location of the facilities that may use hazardous materials as a result of the 2016 AQMP control measures is currently unknown. While mitigation measures HZ-16 through HZ-18 would reduce the potentially significant hazard impacts and additional mitigation measures may be available on a site-specific basis (e.g., containment facilities, appropriate placement of tanks, etc.), the potential hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school site remain significant.

4.4 HYDROLOGY AND WATER QUALITY

4.4.1 INTRODUCTION

This subchapter examines hydrology and water quality impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect hydrology and water quality impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP identified the following potentially significant hydrology and water quality impacts that may occur: 1) potential increase in water demand; 2) potential increase in wastewater discharge and related water quality impacts; 3) water quality impacts associated with increased use of alternative fuels; 4) water quality impacts associated with the accidental release of ammonia from operation of selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) air pollution control technology; 5) water quality impacts associated with accidental releases from battery disposal and processing including acid spills; and, 6) wastewater discharge from the use of reformulated products.

4.4.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL HYDROLOGY AND WATER QUALITY IMPACTS

The hydrology and water quality analysis in this Program EIR identifies the potential hydrology and water quality impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential hydrology and water quality impacts. The NOP/IS determined that the proposed project could result in potentially significant hydrology (as water demand) water quality impacts.

The 2016 AQMP strategy is to further the penetration of partial-zero and zero emission technologies. Implementing some of the 2016 AQMP control measures could increase water demand in the region or impact water quality. Each control measure proposed in the 2016 AQMP was evaluated and 44 control measures were identified as having potential adverse hydrology and water quality impacts. Table 4.4-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant hydrology and water quality impacts.

TABLE 4.4-1

Control Measures with Potential Hydrology and Water Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential increase in water use associated with cleaning solar panels during routine maintenance.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx, CO, PM, CO2, and ozone emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential increase in water use associated with cleaning cool roofs during routine maintenance.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment	Potential increase in water use and wastewater discharge associated with new air pollution control equipment.
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants (VOC)	Reformulation of coatings using different solvents, adhesives, and sealants.	Potential increase in water use if coatings are reformulated with water and water is used for clean-up; potential impacts to water quality due to disposal of clean-up water.
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion based equipment.	Potential increases in water use if coatings are reformulated with water and water is used for clean-up; potential impacts to water quality due to disposal of clean-up water and products reformulated with exempt or non-exempt solvents.
BCM-01	Further Emissions Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	Potential increases in water use to operate wet ESPs and misters.
BCM-03	Further Emission Reductions from Paved Road Dust Sources	Reduction of track out from stationary sources by specifying street sweeping methods and frequency.	Potential increase in water use associated with wheel washing systems for dust suppression.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure	Potential increase in water use associated with the acidifier application process and slurry injections.

TABLE 4.4-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential increase in water use from applying wet methods to prevent dust.
BCM-10	Emission Reductions from Greenwaste Composting (NH3, VOC)	Use of control such as anaerobic digestion and organic processing technology and restrictions for direct applications of un-composted waste to public lands.	Potential increase in water use associated with waste treatment processes.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Accidental spills of alternative fuels/additives could affect surface and ground water quality.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	Accidental spills of alternative fuels/additives could affect surface and ground water quality.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near zero emission equipment in/around warehouse.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivizing zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Incentivizing the "Clean Vehicle Rebate Project" to promote use of vehicles with zero and near-zero emissions.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-07	Accelerated Penetration of Partial-Zero and Zero Emission Light-Heavy and Medium-Heavy Duty Vehicles (NOx, PM)	Early introduction of zero and near-zero emission vehicles such as hybrids and electric operated vehicles.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivizing SOON program and phasing in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	Accidental spills of alternative fuels could affect surface and ground water quality.

TABLE 4.4-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Acceleration of the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives	Accidental spills of alternative fuels could affect surface and ground water quality.
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerating the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of things like dust control, alternative fuels, diesel PM filter, low-emitting engines, low VOC materials and mitigation fees.	Accidental spills of alternative fuels could affect surface and ground water quality; potential increase in water use associated with dust control.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential increase in water use from applying wet methods to prevent dust.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential increase in water use from applying wet methods to prevent dust.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soils (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Potential increase in water use from applying wet methods to prevent dust.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	Potential increase in water use from applying wet methods to prevent dust.
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential increase in water use from applying wet methods to prevent dust.

TABLE 4.4-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Potential increase in water use changes due to changes in housekeeping methods.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon.	Potential increases in water use if coatings are reformulated with water and water is used for clean-up; potential impacts to water quality due to disposal of clean-up water and products reformulated with exempt or non-exempt solvents.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	Accidental spills of alternative fuels/additives could affect surface and ground water quality.
ORHD-02	Low-NOx Engine Standards (NOx)	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	Accidental spills of alternative fuels/additives could affect surface and ground water quality.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Accidental spills of alternative fuels could affect surface and ground water quality.

TABLE 4.4-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 Control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	Accidental spills of alternative fuels while ships are at berth could affect sea water quality.
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Measure to accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	Accidental spills of alternative fuels could affect surface and ground water quality.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in off road forklifts.	Accidental spills of alternative fuels could affect surface and ground water quality.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in small off-road engines.	Accidental spills of alternative fuels could affect surface and ground water quality.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower amount of emissions.	Accidental spills of reformulated fuels could affect surface and ground water quality.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment(NOx, ROG, PM2.5)	Measure to accelerate the implementation of zero emission technologies in off-road equipment.	Accidental spills of alternative fuels could affect surface and ground water quality.

TABLE 4.4-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
CPP-01	Consumer Products Program (ROG)	Reformulation of consumer products.	Potential increases in water use if coatings are reformulated with water and water is used for clean-up; potential impacts to water quality due to disposal of clean-up water and products reformulated with exempt or non-exempt solvents.

4.4.3 SIGNIFICANCE CRITERIA

The NOP/IS (Appendix A) concluded that the 2016 AQMP would not: substantially alter the existing drainage pattern or substantially increase the rate or amount of surface runoff in a manner that would result in substantial flooding, siltation, or flooding on- or off-site; create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial sources of polluted runoff; place housing or structures in a 100-year flood hazard area or flood hazard area which would impede flows; or expose people or structures to a significant risk of loss, injury, or death involving flooding. However, implementation of the 2016 AQMP would be considered to have significant hydrology and water quality impacts if any of the following conditions occur:

Water Demand:

- The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use more than 262,820 gallons per day of potable water.
- The project increases demand for total water by more than five million gallons per day.

Water Quality:

- The project will cause degradation or depletion of ground water resources substantially affecting current or future uses.
- The project will cause the degradation of surface water substantially affecting current or future uses.
- The project will result in a violation of National Pollutant Discharge Elimination System (NPDES) permit requirements.
- The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.

4.4.4 IMPACT ANALYSIS

4.4.4.1 Water Quality Impacts – Wastewater Treatment Capacity

The 2016 AQMP includes control measures for stationary sources that may require additional air pollution control equipment with the potential to generate additional wastewater (CMB-05 and BCM-01) associated with the use of wet electrostatic precipitators (ESPs) or wet gas scrubbers (WGS). The use of wet ESPs and WGSs has been shown to be effective at reducing PM2.5 emissions and is a potential control methodology, though the extent of the use of these types of control equipment is unknown.

To meet the lowered future VOC content limits as a result of implementing control measures CTS-01, FLX-02, TXM-08, and CPP-01, products are expected to be reformulated. While reformulated products would be expected to have lower VOC contents, the reformulations could have widely varying compositions depending on the chemical characteristics of the replacement solvents chosen. For example, most reformulations are expected to be made with water, but other reformulations could be made with an exempt solvent such as acetone or other solvents that are exempted from the definition of a VOC in SCAQMD's Rule 102. As a result, for those products reformulated with water, then water could also be used for clean-up and the resultant wastewater material could be disposed of into the public sewer system. Further, other reformulated products made with exempt or non-exempt solvents may also lead to adverse impacts to water quality if clean-up and disposal of reformulated solvents, coatings, or products are not handled properly. However, the use of water to reformulate coatings, solvents, and products would generally lead to products that would be less toxic than products reformulated with either exempt or non-exempt chemicals (that are typically petroleum-based) and as such, generate fewer impacts to water quality. In addition, CTS-01 could result in the use of UV-cured resins and coatings which would not be expected to use water or generate wastewater. Lastly, because the development of reformulated products is expected to require the same types of equipment (e.g., spray guns, rollers, and brushes) currently used in coating operations, the corresponding clean-up practices employed to clean the coating equipment would also not be expected to change.

Table 4.4-2 estimates the potential increase of wastewater to be received by wastewater treatment plants in the Basin as a result of implementing the 2016 AQMP control measures that pertain to product reformulations. The estimated increase in wastewater generated is considered to be within the projected capacity of the local wastewater treatment plants within the Basin. Wastewater generated from the reformulation of coatings and products is estimated to be about 31,273 gallons per day as compared to the estimated wastewater treatment capacity of about 1,911 million gallons in the Basin. These are expected to be "worst-case" estimated because a number of products on the market are already made with water or low VOC materials, so the need to reformulate products may be minor or not required at all.

As indicated in Table 4.4-1, several control measures proposed in the 2016 AQMP may require add-on air pollution control equipment (CMB-05 and BCM-01) such as wet electrostatic precipitators (ESPs) or wet gas scrubbers (WGS), which have been shown to be effective at reducing PM2.5 emissions. If installed, wet ESPs and WGSs would require water to operate and thus, would result in the generation of wastewater. While the extent of the use of these types of

control equipment to be installed and operated in the future is unknown, there are facilities that currently operate these technologies. For example, one wet ESP with one WGS were installed on the Fluid Catalytic Cracking Unit (FCCU) at the ConocoPhillips Refinery to reduce SOx emissions, as well as PM10 and PM2.5 emissions. The FCCU is a large source of emissions and the wet ESP and WGS installed were sized accordingly. The environmental analysis for this project indicated that the expected wastewater discharge from the combined operation of the wet ESP and WGS at ConocoPhillips was about 70 gallons per minute (about 100,800 gallons per day) (SCAQMD, 2007). Wet ESPs and WGSs of this size are primarily designed for large sources within the Basin (e.g., refineries and other large manufacturing facilities), but these technologies can also be scaled down for use on smaller sources. Thus, if the 2016 AQMP control measures encourage the installation of 20 additional wet ESP /WGS systems of this size, about two million gallons per day of wastewater would be generated. However, wastewater from larger facilities such as refineries is often treated at existing wastewater treatment facilities operated by the facility, so increased wastewater may not be discharged to publicly owned treatment facilities. However, making the conservative assumption that the 2016 AQMP could result in the construction and installation of 20 large-scale wet ESP/WGS systems, the estimated increase in wastewater would be well within the existing wastewater treatment capacity within the Basin (Table 4.4-2).

TABLE 4.4-2

Projected Wastewater Impacts from 2016 AQMP Control Measures

Control Measure	POTW Treatment Capacity (mgd)[a]	Estimated Affected Coating Usage[b] (gal per year)	Projected Wastewater Flow[c] (gallon per year)	Projected Wastewater Flow (gpd)	Total Impacts (% Increase to POTW Capacity)
CTS-01/ FLX-02, TXM-08	1,911.3	7,610,000	7,610,000	20,849	0.001
CPP-01	1,911.3	3,805,000	3,805,000	10,425	0.0005
Total Wastewater from Reformulated Materials	1,911.3	11,415,000	11,415,000	31,273	0.002
CMB-05, BCM-01	1,911.3	--	--	2,016,000	0.105
Total for all Control Measures:				2,078,547	0.109

(a) See Table 3.5-5, POTW = Publicly Operated Treatment Works.
(b) SCAQMD, 2012. Assuming same volume of materials impacted under the 2012 AQMP PEIR provides a conservative estimate of wastewater use as a number of the materials may have already been reformulated.
(c) Assume one gallon of wastewater is generated per each gallon of material.

The potential increase in the volume of wastewater estimated as a result of implementing all of the control measures in the 2016 AQMP identified as having potential wastewater impacts is also included in Table 4.4-2, and is estimated to be 2.1 million gallons per day, which represents about a 0.1 percent increase in wastewater generated within the Basin. Further, the increase in wastewater is well within the capacity of the existing wastewater treatment plants of about 1,911 million gallons. Therefore, the wastewater impacts pertaining to the existing capacity of wastewater treatment plants are expected to be less than significant.

4.4.4.2 Water Quality Impacts – Wastewater Discharge

For industrial facilities, a 25 percent increase in wastewater above discharge permit limits would trigger a permit revision to a facility's industrial waste discharge permit and this would be considered a significant adverse wastewater impact. Facilities that would install WGS and ESPs are likely to be larger industrial facilities that would be covered by industrial waste discharge permits and most large industrial facilities (e.g., refineries) have their own wastewater treatment system. The treatment of wastewater at POTWs is accomplished under the control of numerous regulatory permits (e.g., National Pollutant Discharge Elimination System Permits or NPDES Permits) which require monitoring of wastewater quality on a frequent basis. For example, NPDES permit requirements of a local refinery requires monthly sampling for arsenic, cadmium, chromium, copper, cyanides, lead, mercury, nickel, zinc, silver, total phenol, pH, dissolved sulfides, chlorides, suspended solids, chemical oxygen demand, biochemical oxygen demand, and ignitability. Daily sampling is required for ammonia, oil and grease, selenium, and thiosulfate. Wastewater that does not meet permit limits must be re-treated and monitored again prior to discharge.

In addition, wastewater impacts for refinery facilities that had the potential to install WGS or Wet ESP technologies were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Each affected refinery provided their wastewater discharge limits and these limits were compared to each refinery's estimated potential increase in wastewater that may result from installing WGS or Wet ESP technologies. The peak percentage increase from baseline levels was approximately nine percent. Since all of the affected facilities were shown to have a potential wastewater increase well below 25 percent, no modifications to any existing wastewater discharge permits are were anticipated at that time. Thus, the December 2015 Final PEA concluded that the operational impacts on each affected refinery's wastewater discharge and the Industrial Wastewater Discharge Permit would be less than significant. Similarly, for the analysis in this Program EIR, any facility operator that has increased wastewater generation due to the installation of WGS or Wet ESP technology, would be expected to have similar or fewer impacts than what was previously analyzed in the December 2105 Final PEA. Further, operators of affected facilities that install and operate WGS or Wet ESP technology would continue to comply with existing wastewater treatment requirements of the applicable Regional Water Quality Control Board or sanitation district. Therefore, wastewater generated from industrial facilities as a result of implementing control measures in the 2016 AQMP is not expected to result in significant water quality impacts.

ORFIS-04 could require additional controls to reduce emissions from ships at berth. The ports require all tenants to comply with applicable pollution control measures. Tenants are required to operate in accordance with industrial Storm Water Pollution Prevention Plans (SWPPP) and municipal stormwater and urban runoff ordinances and permits. Port operators would be required to implement water pollution control measures in compliance with the each port's stormwater program. In addition, monitoring would be conducted under SWPPP to observe the quality of stormwater runoff discharged into the harbor. This would allow the ports to ensure that the quality of any runoff would comply with the permit conditions and verify that Best Management Practices are performing as anticipated. Existing regulatory controls for runoff and storm drain discharges are designed to reduce impacts on water quality. These measures also minimize the potential for water quality impacts associated with releases. Based on the existing regulatory requirements,

water quality impacts from the requirement to install or use additional air pollution control equipment at the ports is not expected to result in significant water quality impacts.

Further, since no changes to existing wastewater treatment permits are expected to be required, the additional use of air pollution control equipment is not expected to generate significant adverse water quality impacts.

4.4.4.2.1 Coatings

Lowering the VOC content limit of coatings at affected facilities will have no direct or indirect impact water quality because the manufacture and application of reformulated coatings would not expected to change the current coating manufacturing processes, application practices by end users, or alter the coating formulations in a manner that would be more detrimental to water quality. Instead coating manufacturers will likely replace ingredients in conventional coating formulations with water or similar solvent-based compounds. In the past, the SCAQMD has received comments that the increased use of water-based reformulations to meet lower VOC content limits will cause waste generated from reformulated coatings to be improperly or illegally disposed of and that some of this waste would reach groundwater, storm drains, or sewer systems. However, there are no data to support this contention. In any event, there are several reasons why no significant increase over current disposal practices, including improper or illegal disposal, would occur solely because increased amounts of reformulated water-borne coatings may be made available by coating manufacturers. For example, results from a survey of contractors determined that a majority of waste material is either disposed of properly as required by the coating manufacturer's MSDS instructions or recycled regardless of type of coating and regardless of whether the coating is reformulated. Based upon these results, there is no reason to expect that paint contractors will change their disposal practices, especially those that currently dispose of these wastes properly, upon implementation of the various control measures in the 2016 AQMP. Based on discussions with coating manufacturers, the trend in developing coatings is to replace toxic/hazardous solvents with equal or less toxic/hazardous solvents. Therefore, disposal of reformulated coatings and associated clean-up materials is expected to contain less hazardous materials than conventional coatings, thereby reducing the potential for waste reaching groundwater, storm drains, or sewer systems tto be treated at wastewater treatment plants. Thus, the reformulation of materials is not expected to generate significant adverse water quality impacts.

4.4.4.2.2 Accidental Spills

Accidental spills from a number of control measures could result in water quality impacts to surface or ground water resources, including MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10 , EGM-01, ORLD-01,ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-05, OFFS-07, and OFFS-08. A spill at any of the affected facilities could occur under upset conditions such as an earthquake, tank rupture, or tank overflow. Spills could also occur from corrosion of containers, piping and process equipment, and leaks from seals or gaskets at pumps and flanges. A major earthquake would be a potential cause of a large spill. Other causes could include human or mechanical error. Construction of the vessels, and foundations in accordance with the California Building Code requirements helps structures to resist major earthquakes without

collapse, but may result in some structural and non-structural damage following a major earthquake. As required by U.S. EPA's spill prevention control and countermeasure regulations, all of the affected facilities are required to have emergency spill containment equipment and would implement spill control measures in the event of an earthquake. Storage tanks typically have secondary containment such as a berm, which would be capable of containing 110 percent of the contents of the storage tanks onsite. Therefore, should a rupture occur, the contents of the tank would be collected within the containment system and pumped to an appropriate storage tank.

Spills at affected industrial or commercial facilities would be collected within containment structures. Large spills outside of containment areas at affected facilities that could occur when transferring the material from a transport truck to a storage tank are expected to be captured by the process water system where they could be collected and controlled. Spilled material would be collected and pumped to an appropriate tank or sent off-site if the materials cannot be used on-site. The existing rules and requirements that limit the extent or prevent spills are expected to minimize impacts on water quality to less than significant levels. For this reason, accidental spills are not expected to create significant water quality impacts.

4.4.4.2.3 Alternative Fuels

The following control measures in the 2016 AQMP may contribute to the increased use of alternative fuels in the SCAQMD's jurisdiction: MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, EGM-01, ORLD-01,ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-05, OFFS-07, and OFFS-08. These control measures are expected to generally result in the increased penetration of electric vehicle vehicles, but may also result in the increased use of alternative fuels (e.g., biodiesel fuels, compressed natural gas, liquefied natural gas, and hydrogen).

SCAQMD Rule 431.2 - Sulfur Content of Liquid Fuelslimits the sulfur content in diesel fuel used in stationary and mobile sources to 15 ppm by weight. Thus, diesel fuels currently used in California are low sulfur fuels. As such, there is no evidence that the use of low sulfur diesel fuels has resulted in any water quality impacts, as the only difference in the fuel available on the market is the reduced concentration of sulfur. Further, even if diesel fuel is reformulated to also have lower NOx and PM emissions, as would be required by control measure OFFS-07, the reformulated diesel fuel would not likely result in any new significant water quality impacts in the event of a spill.

In general, alternative fuels are expected to be less toxic than conventional fuels and follow a similar path as the low sulfur diesel. Biodiesel is a fuel derived from biological sources such as vegetable oils or animal fats. Biodiesel can be used pure or blended with conventional diesel. Because the biodiesel typically comes from vegetable oils or animal fats, it is generally less toxic and more biodegradable than conventional diesel, so the water quality impacts from a spill of biodiesel would be less than a spill of conventional diesel. The most common blended biodiesel is B20, which is 20 percent biodiesel and 80 percent conventional diesel. Therefore, the potential water quality impacts from the transport and storage of biodiesel and biodiesel blends is not expected to be substantially different than the transport and storage of conventional diesel.

The other types of alternative fuels that may be used as part of implementing some control measures in the 2016 AQMP include compressed natural gas, liquefied natural gas and hydrogen. Because all of these fuels exist as a gas at standard temperatures and pressures, a leak of any of these fuels would result in an airborne release, and not a release that could adversely affect water quality. There are a number of rules and regulations currently in place that are designed to minimize the potential impacts from underground leaking storage tanks and spills from fueling activities, including requirements for the construction of the storage tanks, requirements for double containment, and installation of leak detection systems. These regulations would also apply to any leaks of alternative fuels from storage tanks. Thus, the use of alternative fuels is not expected to result in any greater adverse water quality impacts than the current use of conventional fuels like diesel or gasoline.

4.4.4.2.4 Electric Vehicles

Implementation of the 2016 AQMP could contribute to an increased use of electric vehicles and other mobile sources. Table 4.4-3 estimates the number of electric vehicles that are expected to be put into service as part of implementing the SCAQMD and CARB Control Measures. Since some batteries contain toxic materials, water quality impacts are possible if the batteries are disposed of in an unsafe manner, such as by illegal dumping or by disposal in a landfill.

As interest in the use of electric vehicles has increased over the years, battery technologies have been developing and improving. Most battery technologies employ materials that are recyclable, since regulatory requirements and market forces encourage recycling. California laws create incentives and requirements for disposal of recycling of batteries as follows.

- Under CARB regulations, to certify either a new ZEV or retrofit an existing ZEV, automakers must complete CARB's certification application, which must include a battery disposal plan. Thus, current regulations require ZEV manufacturers to take account for the full life-cycle of car batteries and to plan for safe disposal or recycling of battery materials. For example, Toyota has offered $200 per battery to minimize illegal disposal of batteries.

- California and federal law requires the recycling of lead-acid batteries (California Health & Safety Code §25215). Spent lead-acid batteries being reclaimed are regulated under 22 CCR §66266.80 and 66266.81, and 40 CFR part 266, Subpart G.

- California law requires state agencies to purchase car batteries made from recycled material (Public Resources Code §42440).

- California passed the Household Universal Waste Rule in February 2006, which prohibits the landfill disposal household wastes such as batteries, electronic devices, and fluorescent light bulbs by anyone.

TABLE 4.4-3

Estimated Increase in Electric Mobile Sources Due to the 2016 AQMP

CONTROL MEASURE NO.	CONTROL MEASURE DESCRIPTION	ESTIMATED INCREASE IN VEHICLES	
		2023	2031
MOB-05, MOB-14, ONLD-01, and ORLD-03	Accelerated Penetration of Partial-Zero and Zero Emission Vehicles	357,000	714,000
ORHD-04	Advanced Clean Transit, Accelerated Penetration of Partial-Zero and Zero Emission Buses	11,000	11,000
MOB-06, MOB-07, MOB-08, ORHD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-08	Accelerated Penetration of Partial-zero and Zero Emissions Light, Medium and Heavy-Duty Trucks	115,000	245,000
MOB-01, MOB-02, MOB-03, MOB-04, MOB-13 OFFS-01, OFFS-04, OFFS-06	Accelerate the Penetration of Zero Emission TRUs, Forklifts and Ground Support Equipment	50,000	100,00
OFFS-02, OFFS-08	Further Deployment of Cleaner Technologies for Larger Off-Road Diesel/Gasoline Equipment	30,000	60,000
MOB-10, OFFS-03, OFFS-08	Penetration of Zero Emission Off-Road Construction and Industrial Equipment	20,000	40,000

Existing battery recovery and recycling programs have limited the disposal of batteries in landfills. For example, the recycling of lead-acid and nickel-cadmium batteries is already a well-established activity. One secondary lead smelter (facilities that recycle lead-bearing materials) is currently located within the Basin. Another secondary lead smelter in the Basin ceased operations in 2015. The secondary lead smelter receives spent lead-acid batteries and other lead bearing material and processes them to recover lead and polypropylene (from the battery casings). Acid is collected and recycled as a neutralizing agent in the wastewater treatment system. Other facilities available for battery recycling are located outside of the Basin. Further penetration of partial-zero and zero emission mobile sources in the Basin is expected to result in a reduction in the use of lead-acid batteries and a subsequent reduction in the lead-acid batteries that need to be recycled, after the vehicle/equipment is scrapped or has left the Basin.

Implementation of the 2016 AQMP would be expected to result in an increased use of electric vehicles (EVs) and hybrid vehicles (hybrids) which use nickel-metal hydride (NiMh) and lithium ion (Li-ion) batteries, instead of lead-acid batteries. Nearly all hybrids use NiMH batteries. Due to the potential of obtaining higher specific energy and energy density, most electric vehicles use Li-ion batteries (Young, et al., 2013). EVs and hybrids both use electricity as part of their fuel system. EVs rely purely on electric power stored in batteries. Hybrids also use batteries as part of their fuel supply; however, hybrids supplement their electrical needs by using gasoline engines

to generate either mechanical or electric power on demand. Since gasoline is a conventional fuel, any difference in water quality impacts associated with hybrid vehicles would be from the batteries. The electrolyte in NiMh batteries is an alkaline electrolyte, usually potassium hydroxide. The electrolyte in Li-ion batteries is a lithium salt, while the electrolyte in lead-acid batteries is a sulfuric acid/water blend.

Batteries in hybrids are much larger than batteries in conventional vehicles. The current hybrid batteries weigh about 110 pounds and are composed of NiMH batteries which are charged by an internal combustion engine driven generator and/or by a regenerative braking system that captures power from deceleration and braking. These batteries have a longer life than conventional lead acid batteries. Most of these high voltage batteries are warranteed for 10 years or 150,000 miles under California regulations. Toyota has reported that its battery packs have lasted for more than 180,000 miles in testing. A large number of Ford Escape Hybrid and Toyota Prius taxicabs in New York and San Francisco have logged over 200,000 miles on their original battery packs (Edmunds, 2013).

The recycling of hybrid battery packs is still in its infancy as there have not been many battery packs surrendered for recycling. The NiMH batteries found in hybrid vehicles are basically "zero-landfill" products, meaning that whatever cannot be recycled is typically consumed in the recycling process. The primary metals recovered during recycling are nickel, copper, and iron. Some principal rare earth metals, neodymium and lanthanum, are also recovered (Edmunds, 2014). Improper disposal of NiMH batteries poses less environmental hazard than that of lead-acid or nickel-cadmium batteries because of the absence of lead and cadmium, which are considered to be toxic. Most industrial nickel is recycled, due to the relatively easy retrieval of the magnetic element from scrap using electromagnets, and due to its high value.

The Li-ion batteries are more common in electric vehicles and becoming more popular in hybrids. Li-ion batteries are much larger than batteries in conventional vehicles and range from approximately 400 pounds (in models such as the Chevy Volt and BMWi3) to 1,200 pounds (for the Tesla S), depending on the type of vehicle (Battery University, 2016). Li-ion batteries are between 70 and 100 percent recyclable, depending on the particular chemistry of the batteries. There are a number of different types of Li-ion batteries in use, and more are being developed. The battery types available are differentiated by the chemical formulation of the electrodes including, but not limited to, cobalt dioxide, nickel-cobalt-manganese (NCM), nickel-cobalt-aluminum (NCA), manganese oxide spinel (MnO), iron phosphate (FePo) and various different combinations of these elements. The makers of the Nissan Leaf, BMWi3, and other electric vehicles use lithium manganese batteries with a nickel, manganese, cobalt blend. Tesla uses a nickel cobalt aluminum battery that delivers more energy (Battery University, 2016). The components of Li-ion batteries that cannot be recycled are mostly consumed as fuel in the furnaces that are used to melt down the metals, which include cobalt, copper, iron, nickel, manganese, and lithium (Edmunds, 2014).

Because Li-ion batteries have a potential for after-automotive use, destructive recycling can be postponed for years even after an EV or hybrid battery can no longer hold and discharge sufficient electricity to power a car's motor. The battery pack can still carry a tremendous amount of energy. Battery manufacturers project that the battery packs will still be able to operate at about 80 percent of capacity the time they must be retired from automotive use (Edmunds, 2014). For example,

several major power utilities are working with companies (General Motors, Ford, Toyota, and Nissan) to explore the use of batteries for stationary storage of the power produced in off-peak periods by wind turbines and solar generation stations. Li-ion packs are also being tested as backup power storage systems for retail centers, restaurants, and hospitals, as well as residential solar systems (Edmunds, 2014). Auto companies are partnering with battery, recycling, and electronics firms to figure out and develop post-automotive markets and applications for Li-ion battery packs (Green Car Reports, 2016). With the opportunity for other uses, Li-ion battery recycling may not be as necessary as recycling of lead-acid batteries.

The switch to electric batteries has the potential to create water quality impacts from improper disposal. Although some electric cars have lead acid batteries, the increased use of EVs and hybrids will result in an overall decrease in the use of lead acid batteries, which use sulfuric acid/ blends as electrolytes and have a much shorter lifespan than NiMH or Li-ion batteries. NiMH and Li-ion batteries are generally recycled because the material within the batteries is valuable. Further some manufacturers offer incentives to prevent illegal disposal of the batteries. Most car manufacturers offer a program to take back used or damaged battery packs, including Toyota and Nissan (Green Car Reports, 2016).

Retriev Technologies (formerly Toxco) operation appears to be the recycler most widely used by companies that sell hybrids and EVs in North America when batteries reach their end of life. Retriev Technologies is the only company in North America with the capacity to recycle Li-ion batteries and they received federal grant to build and operate an advanced lithium battery recycling facility at their existing Lancaster, Ohio site (Edmunds, 2014). The facility uses a proprietary system to primarily recycle nickel-metal hydride batteries. Retriev Technologies also currently handles small volumes of Li-ion battery packs as they work with automakers to develop the best recycling processes. Because of the slow sales pace for EVs and hybrid cars and trucks, they expect a commercially viable market to take at least a decade to develop. Once the packs are at the proper distribution point, the recyclers break down their constituent parts to salvage any wiring, electrical components and plastics that can be separately recycled. A high temperature process is used to separate the battery content into metal alloys and slag, which concentrates the rare earth elements that the batteries contain (Edmunds, 2014).

While the switch to electric batteries has the potential to create water quality impacts from improper disposal, but the increased use of EVs and HVs will result in a concomitant decrease in the use of internal combustion engines and a reduction in the impacts of such engines. For instance, a decreased use of internal combustion engines such as gasoline- or diesel-burning engines will also result in a decreased generation of used engine oil since electric motors do not employ oil as a lubricant.

Specifically, approximately 282,900 tons per year of waste oil was generated in the Basin in 2014 (see Subchapter 3.7, Solid and Hazardous Waste, Table 3.7-10). Because of the widespread use and volume of waste oil, a portion of waste oil is illegally disposed of via sewers, in waterways, on land, and in landfills. Waste oil that is illegally disposed can contaminate the environment (via water, land, or air). In addition, a substantial amount of motor oil leaks from vehicles driving on roadways and this motor oil is eventually washed into storm drains which empty into the ocean.

Since electric motors do not require motor oil as a lubricant, replacing internal combustion engines with electric engines will eliminate the impacts of motor oil use and disposal. For example, a 50 percent penetration of light-duty electric vehicles will result in a corresponding 50 percent reduction in the release of motor oil into the environment due to illegal disposal and a 50 percent reduction in the generation of waste oil. Release of contaminants due to engine oil that burns up in, or leaks from engines or due to the burning of recovered engine oil for energy generation will also be reduced. Additional use of electric vehicles is expected to have a beneficial environmental impact by reducing the amount of motor oil used, recycled, potentially illegally disposed, or washed into storm drains and ending up in the ocean.

In conclusion, the illegal disposal of batteries from EVs and hybrids has the potential to result in significant water quality impacts by allowing toxic or hazardous metals or acids to leach into surface or ground waters. However, because battery recycling is required by law and because they have value, the illegal or improper disposal of batteries is expected to be uncommon. For example, because some manufacturers pay for used EV/hybrid batteries, the value, size, and length of life of NiMH and Li-ion batteries are such that recycling is expected to be more predominate than with lead acid batteries. Therefore, the use of EVs and hybrids are not expected to result in an increase in the illegal or improper disposal of batteries because these types of batteries are required to be recycled and thus, reducing the potential potential water quality impacts cause by illegal disposal. Based on the foregoing analysis, less than significant adverse water quality impacts are expected from the increased use of EV and hybrid vehicles.

4.4.4.2.5 Sodium Bisulphate

Control measure BCM-04 would control ammonia emissions from livestock operations through the application of sodium bisulfate (SBS). SBS is a hydroscopic salt that acts an acidifier. SBS has been used to reduce pH levels in dairy bedding (e.g., hay or straw) and manure, which in turn reduces bacterial and ammonia levels. In California, SBS, has also been used by dairies in Tulare, Fresno, Merced, Stanislaus, San Joaquin, Kings, Kern, San Bernardino, Riverside, San Benito, and Sacramento counties, to prevent cow lameness and nuisance flies.

When SBS is applied on manure, research indicates that most of the ammonia reductions occurred during the first day of SBS application and that the ammonia emissions continued to decrease over time with increasing levels of SBS applications. However, after 24 hours, the reduction rates declined and by day three, the ammonia emissions reduction rates were no longer different between dosages. SBS is most effective in reducing ammonia emissions from dairy corrals at either an application rate of 50 pounds per 1,000 square feet, three times per week; or 75 pounds per 1,000 square feet, two times per week. Based on historical data, application of SBS may only be needed for eight weeks out of the year; hence, seasonal or episodic application of SBS may be effective when high ambient PM2.5 levels are of concern.

While SBS is considered an irritant because of its low pH, it is safe for use in water treatment. In particular, SBS has been used as a disinfectant to prevent damage of the membrane used in reverse osmosis during water treatment. SBS is certified for treating drinking water (e.g., for chlorine removal, corrosion and scale control, and pH adjustment). SBS is used to lower the pH of water for effective chlorination, including water in swimming pools. SBS is also approved as a general

use feed additive, including companion animal food. Lastly, SBS is used as a urine acidifier to reduce urinary stones in cats.

SBS is considered Generally Recognized as Safe (GRAS) by the Food and Drug Administration (FDA) and meets their definition of a natural product (FDA, 1998). The FDA has approved of SBS as a food additive and food grade SBS bisulfate is used in a variety of food products, including beverages, dressings, sauces, cake mixes, and fillings. It is also widely used in meat and poultry processing and most recently in browning prevention of fresh cut produce.

Because SBS is a salt, the amount of SBS that is applied needs to be reviewed and controlled to prevent SBS contamination of water runoff that could result in water quality impacts and reduced pH levels. SBS use should be carefully considered in areas that are sensitive to salts and/or in areas with existing high salt loading in the soils. Because SBS loses its effectiveness over time, controlled and monitored application rates of SBS are needed to minimize the potential for water runoff and related water quality impacts.

4.4.4.5 Water Demand Impacts

There are several control measures that may require or encourage the use of air pollution control technologies that could result in an increased use of water demand from wet ESPs and WGS. As indicated in Table 4.4-1, the 2016 AQMP includes stationary sources that may require add-on air pollution control equipment with the potential to increase water demand including CMB-05 and BCM-01. The use of wet ESPs and WGSs would result in an increase in water demand. The extent of the use of these types of control equipment is unknown. However, the use of wet ESPs and WGSs has been shown to be effective at reducing PM2.5 emissions.

As mentioned earlier in this chapter, one wet ESP and one WGS were installed on the FCCU at the ConocoPhillips Refinery to control sulfur oxide emissions, as well as PM10 and PM2.5 emissions. The environmental analysis for this project indicated that the expected water demand associated with the WGS was about 300 gallons per minute (432,000 gallons per day) (SCAQMD, 2007). The increase in water use for this project was shown to be greater than the significance threshold of 262,820 gallons of potable water per day. If the 2016 AQMP control measures were to encourage the development of 20 additional wet ESP/WGS systems at a similar size, the potential water demand would also exceed the five million gallons per day significance threshold for total water use. Therefore, the 2016 AQMP would result in potentially significant water demand impacts associated with wet ESP and WGS technologies.

The possible control methods for BCM-01 have yet to be determined because cost-effective controls for the majority of under-fired charbroilers have not yet been developed. BCM-01 is focused on controlling PM10 and PM2.5 emissions and control measures could include ESPs, filters, centrifugal separators, and aerosol mist nebulizers. Water scrubbing or filtering devices could be employed as add-on controls for charbroiler exhaust and these devices could require water for their operation. An alternative to these water-based control technologies is the replacement of under-fired charbroilers with a smokeless broiler, which would prevent grease from dripping onto hot burner components while cooking food. A smokeless broiler is estimated to result in a 75 percent reduction in PM10 emissions and a 71 percent reduction in VOC emissions. Thus,

compliance with BCM-01 could be achieved by replacing older broilers with newer, more efficient broilers, which would not require water to operate.

Other control measures may have several control technology options to use for compliance, and these add-on air pollution control equipment options are generally not expected to result in a significant increase in water demand from their use. For example, particulate control devices such as baghouses and dry filters do not utilize water. These types of control technologies are likely to be used on smaller emission sources as they tend to be more cost effective than wet ESPs and WGSs.

Control measures ORFIS-04 and ORFIS-05 could employ WGSs, which would require water to operate, for particulate control. However, ORFIS-04 and ORFIS-05 are expected to rely primarily on the use of a variety of other control methods that do not require water for operation, including cold ironing, alternative fuels, PM filters, etc. While there are a variety of add-on air pollution control technologies available, and not all of these technologies require water for their operation, implementation of some of the control measures proposed in the 2016 AQMP is expected to result in significant adverse water demand impacts in the event that wet ESP/WGS systems are installed on large emission sources. Table 4.4-4 contains a summary of the potential water demand associated with implementing Control Measures CMB-05 and BCM-01.

Historically, potential water demand to reformulate conventional coatings into waterborne coatings and to clean up waterborne coatings has not resulted in significant adverse impacts on water demand. Using "worst-case" assumptions, increase water demand from implementing the 2016 AQMP has been estimated in Table 4.4-4 for both manufacturers of waterborne coatings and water used by consumers to clean coating equipment. As shown in Table 4.4-4, water demand associated with the manufacture and clean-up of waterborne formulations is estimated to be 62,547 gallons per day.

There are some other control measures that could result in an increase in water demand including ECC-03, ECC-04, BCM-03, BCM-07, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, and TXM-07. These control measures may encourage the use of wet methods to prevent dust release and improve housekeeping methods. ECC-03 and ECC-04 would likely result in the need for additional water to wash down the solar panels and roofs. Other types of activities that may also use water include improved housekeeping measures, best management practices, pollution controls (e.g., filters), wheel knockout and cleaning stations, and replacement with new equipment.

The environmental analysis for the control of toxic emissions from a facility in the basin that would use a wet scrubber combined with a mist eliminator was estimated to be about 3,450 gallons per day (gpd) (SCAQMD, 2015b). Assuming that an estimated 20 to 30 facilities could use this type of equipment, approximately 69,000 to 103,500 gpd of water would be needed. Individually, this increase in water demand would be less than the SCAQMD significance thresholds, but as shown in Table 4.4-4, the overall water demand from the 2016 AQMP would have a significant impact exceeding five million gallons per day of total water.

TABLE 4.4-4

Projected Water Demand from 2016 AQMP Control Measures

CONTROL MEASURE	PROJECTED WATER DEMAND[a] (BILLION GAL PER YEAR)	ESTIMATED COATING SALES[b] (GAL PER YEAR)	PROJECTED MFGR WATER DEMAND,[c] FLOW (GAL PER YEAR)	PROJECTED CLEAN UP WATER DEMAND,[d] (GALLONS PER YEAR)	TOTAL IMPACT,[e] (GALLONS PER DAY)
CTS-01	2,793	7,610,000	7,610,000	7,610,000	41,698
CPP-01	2,793	3,805,000	3,805,000	3,805,000	20,849
Estimated Total Water Demand		11,415,000	11,415,000	11,415,000	62,547
CMB-05, BCM-01	2,793	--	--	--	8,640,000[g]
BCM-03, BCM-07, TXM-01, TXM-02, TXM-04. TXM-05, TXM-06, TXM-07				69,000 – 103,500	69,000 – 103,500
Total Estimated Water Demand:					8,834,094 - 8,868,594[h]

a See Table 3.5-2. Demand is for 2035

b SCAQMD, 2012. Assuming same volume of materials impacted under the 2012 AQMP PEIR provides conservative estimate of water demand as a number of the materials may have already been reformulated.

c Assumes that one gallon of water would be used to manufacture one gallons of coating applied. This estimate includes the water used in humidifiers and for purging lines. This volume also assumes as "worst-case" scenario, that all affected coatings used in the Basin were manufactured here and does not take into consideration the fact that some affect coatings are already waterborne coatings

d Assumes that one gallon of water would be used to clean-up equipment for every gallon of coating applied.

e Total amount of manufactured and clean-up water demand.

g Assumes 20 large ESPs/WGS are installed as part of the AQMP.

h Does not include the water needed to wash solar panels and roofs. It is too speculative at the time to estimate the number of solar panels and cool roofs which would be installed due to the 2016 AQMP.

4.4.6 MITIGATION MEASURES

Based on the previous analysis, wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be generated by the 2016 AQMP. Any accidental spills and wastewater discharged due to the 2016 AQMP would not be expected to violate water quality standards and thus, these impacts would be less than significant. Furthermore, the increased use of alternative fuels, electric cars, ammonia, and SBS were also concluded to have less than significant hydrology and water quality impacts.

The water demand associated with certain air pollution control technologies the use of waterborne coatings could exceed the significance threshold of 262,820 gallons per day for potable water demand and five million gallons per day of total water demand. Thus, the overall water demand from implementing the 2016 AQMP is concluded to have significant hydrology (water demand) impacts. The source of water to meet the projected demand will vary from jurisdiction to jurisdiction but can include additional use of ground water and recycled water resources. Most of

the ground water basins used for water supply are managed to minimize and prevent overdraft conditions.

The increased water demand is expected to be associated with existing sources within the Basin which already have water conveyance infrastructure. Therefore, the construction of new water conveyance infrastructure is not expected to be required.

The mitigation measures that would be implemented for water demand impacts would depend on the characteristics of individual projects, the volume of water expected to be used, the type of water to be used (e.g., potable, groundwater, recycled water) and could vary amongst jurisdictions. Typical mitigation measures would include the following types of measures:

WQ-1 Local water agencies should continue to evaluate future water demand and establish the necessary supply and infrastructure to meet that demand, as documented in their Urban Water Management Plans.

WQ-2 Project sponsors should coordinate with the local water provider to ensure that existing or planned water supply and water conveyance facilities are capable of meeting water demand/pressure requirements. In accordance with State Law, a Water Supply Assessment should be required for projects that meet the size requirements specified in the regulations. In coordination with the local water provider, each project sponsor will identify specific on- and off-site improvements needed to ensure that impacts related to water supply and conveyance demand/pressure requirements are addressed prior to issuance of a certificate of occupancy. Water supply and conveyance demand/pressure clearance from the local water provider will be required at the time that a water connection permit application is submitted.

WQ-3 Project sponsors should implement water conservation measures and prioritize the use recycled water over potable or groundwater whenever available and appropriate for end uses.

WQ-4 Project sponsors should consult with the local water provider to identify feasible and reasonable measures to reduce water consumptions.

4.4.7 IMPACTS AFTER MITIGATION

While mitigation measures could help minimize some of the water demand on an individual facility-basis, the availability of water supplies varies throughout the region; thus, not all mitigation measures will be applied in all situations. For this reason, the mitigation measures are not expected to fully eliminate the significant water demand impacts. Therefore, water demand and groundwater depletion impacts generated by the proposed project are expected to remain significant.

4.5 NOISE

4.5.1 INTRODUCTION

This subchapter examines noise impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect noise impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP identified the following types of control measures as having potentially significant noise impacts: 1) potential temporary changes in noise volume due to construction activities needed for installation of equipment and potential new roadway infrastructure; and 2) increased street sweeping activities.

4.4.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL NOISE IMPACTS

The noise analysis in this Program EIR identifies the potential noise impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential noise impacts. The NOP/IS determined that the proposed project could result in potentially significant noise impacts.

The 2016 AQMP strategy is primarily to further the penetration of partial-zero and zero emission technologies, as well as implement PM and TAC controls. Implementing some of the 2016 AQMP control measures could result in noise impacts in the region. Each control measure proposed in the 2016 AQMP was evaluated and 25 control measures were identified as having potential adverse noise impacts. Table 4.5-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant noise impacts.

TABLE 4.5-1

Control Measures with Potential Noise Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	NOISE IMPACTS
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential temporary changes in noise volume due to construction activities.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx, CO, PM, CO2 and ozone emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential temporary changes in noise volume due to construction activities.
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
CMB-02	Emission Reductions from Water Heaters (NOx)	Installation of newer water heaters implementing the best available control technology.	Potential temporary changes in noise volume due to construction activities needed for installation of new water heaters.
CMB-03	Emission Reductions from Non-Refinery Flares (NOx)	Installation of newer flares implementing the best available control technology.	Potential temporary changes in noise volume due to construction activities needed for installation of new flares.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment.	Potential temporary changes in noise volume due to construction activities needed for installation of control equipment.
BCM-03	Further Emission Reductions from Paved Road Dust Sources (PM)	Reduction of track out from stationary sources by specifying street sweeping methods and frequency.	Increased street sweeping frequencies have the potential to increase noise frequency/volume.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of exhaust ventilation to a fabric filter for permanent in building abrasive blasting activities and the use of additional portable equipment like negative air machines, fume extractors, and dust collectors with HEPA filters.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.

TABLE 4.5-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	NOISE IMPACTS
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soils (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of and operation of enclosures and control equipment, such as HEPA filters.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.

TABLE 4.5-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	NOISE IMPACTS
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-09	Control of Toxic Emissions from Oil and Gas Well Activities (TACs, PM)	Construction of enclosures and control equipment and implementation of methods to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower amount of emissions.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.

4.5.3 SIGNIFICANCE CRITERIA

The NOP/IS (Appendix A) concluded that the 2016 AQMP would not expose people residing or working within an airport land use plan or within two miles of a public use or private airstrip to excessive noise levels and would not result in substantial noise or groundborne vibration impacts from project operation. The SCAQMD received comments on the NOP/IS relative to the operational noise analysis and conclusions reached; therefore, this impact is discussed in this section. However, implementation of the 2016 AQMP would be considered to have significant noise impacts if any of the following conditions occur:

- Construction noise levels exceed the local noise ordinances or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three decibels (dBA) at the site boundary. Construction noise levels will be considered significant if they exceed federal Occupational Safety and Health Administration (OSHA) noise standards for workers.

- The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

4.5.4 IMPACT ANALYSIS

The existing facilities and corridors likely to be modified are located primarily in commercial and industrial zones within the southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well as inland facilities and refineries. Since only existing facilities and corridors will be modified, no new facilities or corridors are anticipated as part of the proposed project, and project impacts will be temporary in nature and primarily limited to construction activities. In addition, control measures ECC-03, ECC-04, and CMB-02 would cause minor construction to install solar panels, cool roof technology, and water heaters at residences.

4.5.4.1 Construction Activities

Potential noise impacts associated with the 2016 AQMP relate primarily to construction activities which could include the construction related to the: 1) installation of air pollution control equipment, (e.g., enclosures and filtration systems); 2) replacement of existing equipment; 3) installation of roadway infrastructure (wayside power and catenary lines or other similar technologies); 4) installation of battery charging or fueling infrastructure; and, 5) installation of solar panels, cool roof technology, and water heaters. For purposes of evaluating potential noise impacts, it has been assumed herein that no new industrial facilities or corridors will be constructed, but rather some of the existing facilities and corridors will be modified to include installation of new equipment and roadway infrastructure.

Control measures that may result in noise impacts are included in Table 4.5-1. The control measures in the 2016 AQMP that may generate construction activities include: ECC-03, ECC-04,

CMB-01, CMB-02, CMB-03, CMB-05, BCM-05, BCM-06, BCM-07, MOB-01, MOB-09, TXM-01, TXM-02,TXM-04, TXM-05, TXM-06, TXM-07, TXM-09, ORHD-05, ORHD-06, ORHD-08, ORHD-09, ORFIS-04, and OFSS-07.

Control measures MOB-05, MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09 could require the installation of catenary overhead electrical lines within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. For purposes of evaluating potential noise impacts, the analysis in this Program EIR assumes that no new rail or truck traffic routes would be constructed, but rather some of these existing routes/corridors will be modified to include catenary overhead electrical lines or magnetic lines. In addition, a number of control measures could result in the construction of air pollution control equipment and require construction activities, including CMB-01, CMB-02, CMB-03, CMB-05, BCM-05, BCM-06, BCM-07, MOB-01, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, TXM-09, ORFIS-04 and OFSS-07. This may include the installation of control equipment, filtration systems, dust collectors, bag houses, and near-zero and zero emission technologies.

The existing rail and truck routes/corridors likely to be modified are located primarily in commercial and industrial zones within the Southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well inland railyards near downtown Los Angeles.

Construction activities may require the use of heavy construction equipment. As specific construction projects are not currently proposed, the specific types of construction equipment necessary to implement the proposed control measures are not currently known. The noise levels from typical construction equipment are presented in Table 4.5-2.

The construction equipment noise sources identified in Table 4.5-2 represent typical construction equipment that range from 74 decibels (dBA) to over 100 dBA for activities such as pile driving. The construction equipment, hours of operations, number of pieces of equipment operating at the same time, and construction phases, would vary depending on the specific project; therefore, the construction noise levels are also expected to vary. Each construction phase would use a combination of equipment and personnel that would vary throughout that phase. In addition, construction phases could overlap at the site. This would lead to a variety of possible construction activities and equipment that may occur at any given time throughout the construction process. Construction activities would generate noise from heavy construction equipment and construction-related traffic. A typical construction site would be expected to generate noise levels of about 85 dBA at 50 feet from the center of construction activity. Most of the construction noise sources would be located at or near ground level, which would help attenuate noise levels. The estimated noise from a representative construction site at increasing distances from the site is provided in Table 4.5-3.

TABLE 4.5-2

Example of Noise Levels from Construction Noise Sources

EQUIPMENT	TYPICAL NOISE LEVEL IN DECIBELS (dBA)[(a)]
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixers	85
Concrete Pumps	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generators	81
Grader	85
Jackhammers	88
Loader	85
Paver	89
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Pneumatic Tool	85
Pumps	76
Rock Drill	98
Roller	74
Saw	76
Scraper	89
Shovel	82
Truck	88

(a) FTA, 2006. Levels are in dBA at 50 feet from the source.

TABLE 4.5-3

Noise Level Attenuation at a Representative Construction Site

DISTANCE FROM CONSTRUCTION NOISE SOURCE (feet)	ESTIMATED NOISE LEVEL (dBA)
50	85
100	79
200	73
400	67
800	61
1,600	55
3,200	49
6,400	43

Table 4.5-3 assumes noise from construction activities of about 85 dBA at 50 feet from the center of construction activity and using an estimated six dBA reduction for every doubling of distance, the noise levels are expected to decrease to about 61 dBA at about 800 feet from construction activities. The potential noise impact of construction activities would vary depending on the existing noise levels in the environment and the location of sensitive receptors (e.g., residents, hotels, hospitals, etc.) with respect to construction activities. Because no specific projects are currently proposed, the noise impacts are speculative. Nonetheless, construction activities associated with control measures in the 2016 AQMP could occur throughout the Basin. The 2016 AQMP may require existing commercial or industrial owners/operators of affected facilities to install air pollution control equipment of modify their existing operations to reduce stationary source emissions. Potential modifications would occur at facilities typically located in appropriately zoned industrial or commercial areas. Installing air pollution control equipment could generate noise impacts, but virtually all of the control equipment would be installed within industrial and commercial facilities, so that construction noise impacts at stationary sources on sensitive receptors are expected to be less than significant.

The 2016 AQMP may also require construction of overhead catenary lines or other similar technologies along existing roadways and transportation corridors. Existing noise levels from the roadways and transportation corridors that could be impacted by these control measures (e.g., MOB-05, MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09) are expected to be high as they are currently heavily traveled transportation corridors (e.g., Terminal Island Freeway and Alameda Corridor). The construction of catenary lines or similar technologies would result in additional noise sources (e.g., heavy construction equipment) near these transportation corridors. There are residential areas and other sensitive receptors near some of these transportation corridors that include: 1) the western portions of the City of Long Beach near and adjacent to the Terminal Island Freeway and near Sepulveda Boulevard; 2) residents in the City of Wilmington near Alameda Street; and 3) residents in the City of Carson and other cities and jurisdictions along Alameda Street. Some of these residents are located within several hundred feet of the existing roadways so noise levels associated with construction activities could be in the range of 65-75 dBA, which could result in noise increases of three dBA or greater and generate significant noise impacts.

Vibration associated with ground-borne sources is generally not a common environmental problem. However, construction activities such as blasting, pile driving, and heavy earthmoving equipment are potential sources of vibration during construction activities. As described for construction noise impacts, some residents are located within several hundred feet of the existing roadways and construction activities could result in noticeable vibration impacts. Project construction would involve equipment and activities that may have the potential to generate groundborne vibration. In general, demolition of structures during construction generates the highest levels of vibration. The Federal Transit Administration (FTA) has published standard vibration levels and peak particle velocities for construction equipment operations (FTA, 2006). The approximate velocity level and peak particle velocities for large construction equipment are listed in Table 4.5-4. Groundborne vibration is quantified in terms of decibels, since that scale compresses the range of numbers required to describe the oscillations. The FTA uses vibration decibels (abbreviated as VdB) to measure and assess vibration amplitude. In the United States, vibration is referenced to one micro-inch/sec (25.4 micro-mm/sec) and presented in units of VdB.

TABLE 4.5-4

Representative Construction Equipment Vibration Impacts

EQUIPMENT	APPROXIMATE PEAK PARTICILE VEOLCITY AT 25 FT. (INCHES/SECOND)[(1)]	APPROXIMATE VELOCITY LEVEL AT 25 FT. (VBD) [(1)]	APPROXIMATE VELOCITY LEVEL AT 200 FT. (VDB) [(1)]
Pile Driver (typical)	0.644	100	82
Vibratory Roller	0.210	94	76
Large Bulldozers	0.089	87	69
Loaded Trucks	0.076	86	68
Jackhammer	0.035	79	61
Small Bulldozer	0.003	58	40

(1) Source: FTA, 2006. Data reflects typical vibration levels

The FTA recommends using an estimated six VdB reduction for every doubling of distance (FTA, 2006). Using the FTA methodology, the VdB would range from 40 to 82 VdB within 200 feet from construction activities, depending on the type of equipment used. The predicted vibration during construction activities can be compared to the significance threshold of 72 VdB. Vibration from construction activities could exceed the 72 VdB threshold for structures and sensitive receptors within 200 feet of construction activities, if certain types of construction equipment are used. Therefore, vibration impacts associated with construction activities associated with control measures in the 2016 AQMP are considered significant.

Construction activities are often limited to daytime hours to prevent noise impacts during the more sensitive nighttime hours, but construction in commercial and industrial zones can occur during the evenings. However, for construction occurring in residential areas, construction companies would be required to follow the local city or county noise ordinance or guidelines in the Noise Element which are typically stricter when compared to construction noise occurring in commercial or industrial areas. For example, construction in residential areas may have a narrower range of hours and days when construction can occur. In some cities, enforcement of noise ordinances is assigned to the local police department.

However, transportation-related construction activities often occur during the evening/nighttime hours to minimize traffic impacts during the more heavy traffic periods. For example, construction activities related to catenary overhead lines may occur during the evening/nighttime hours to minimize traffic conflicts, as construction would be expected along existing roads and transportation corridors. Therefore, the noise and vibration impacts during construction activities are considered significant. Workers exposed to noise sources in excess of 90 dBA for an eight-hour period would be required to wear hearing protection devices that conform to Occupational Safety and Health Administration/National Institute for Occupational Safety and Health (NIOSH) standards.

4.5.4.2 Operational Activities

As discussed above, the 2016 AQMP may require existing commercial or industrial owners/operators of affected facilities to install air pollution control equipment of modify their existing operations to reduce stationary source emissions. Potential modifications would likely occur at facilities typically located in appropriately zoned industrial or commercial areas. Installing air pollution control equipment on stationary sources could generate noise and vibration impacts, but virtually all of the control equipment would be installed within industrial and commercial facilities. Further, noise requirements and noise ordinances of the city or county would continue to apply to stationary sources, so that noise impacts on sensitive receptors are expected to be less than significant. Wayside electrification/magnetizing could be installed as a result of implementing Control Measures MOB-05, MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09. Installation of catenary lines/rail electrification would likely occur along existing transportation corridors and railways and is not expected to require constructing new roadways or corridors. It is not expected that trucks and locomotives using wayside sources of electricity would be louder than non-electrified mobile sources. Indeed, electric motors connected to wayside power would likely be quieter than diesel mobile sources because electric motors have fewer moving parts. Further, wayside power would likely be installed on major transportation corridors where noise levels are already high and, often, are the major noise sources in many areas, especially industrial areas and near the ports. Wayside power would be used to displace existing truck or rail traffic and would not be expected to generate additional traffic. Therefore, operational noise and vibration impacts associated with the 2016 AQMP are expected to be less than significant.

With control measures ECC-03, ECC-04, and CMB-02, once the solar panels, cool roof technology, and water heaters are installed, no operational noise or vibration impacts would be expected.

While nearly all noise impacts associated with the proposed control measures in the 2016 AQMP are associated with construction activities, BCM-03 could result in operational noise impacts due to an increase in street sweeping needed to reduce dust from paved road surfaces. BCM-03 could also result in additional wheel-washing systems to help prevent track out of dust onto paved roads. Street sweeping could be conducted by either manual sweeping which would not be a substantial source of noise or through the use of street sweepers which have noise levels ranging from 73 to 77 dBA at 75 feet, unless equipped with sound reduction technology. For example, TYMCO has street sweepers that are equipped with Sound Reduction Engineering and the noise levels generally range lower than typical street sweepers from 67 to about 71 dBA (Tymco, 2016).

Street sweepers generally travel at slow speeds, so to minimize traffic impacts, they are often used in the early morning or after peak hour traffic. The nominal operating speed for a street sweeper is about five miles per hour to ensure a thorough pickup of debris. In residential areas, street sweepers would likely be used during normal work hours as residential streets generally have less parking during these hours so the use of street sweepers on residential areas is generally conducted during the day time. Street sweeping in commercial and industrial areas is generally conducted during off-peak hours to avoid traffic conflicts. Control measure BCM-03 is not expected to require new street sweeping in areas where there is no current street sweeping program in place. Instead, in areas that street sweeping is currently conducted, the frequency when roads are swept

may increase. The roads that are most likely to require additional sweeping are those located in industrial and commercial areas where sensitive receptors are typically not located. Therefore, because additional street sweeping is not expected to be required in residential or other noise-sensitive areas, additional street sweeping activities that may be required under Control Measure BCM-03 are not expected to result in significant noise impacts.

4.5.5 MITIGATION MEASURES

The operational noise and vibration impacts from implementation of the 2016 AQMP were concluded to be less than significant.

The impact of the proposed project on local noise levels and vibration during construction, although temporary in nature, are considered significant. Therefore, the following mitigation measures should be implemented:

NS-1 Install temporary noise barriers during construction.

NS-2 Use noise barriers to protect sensitive receptors from excessive noise levels during construction.

NS-3 Schedule construction activities consistent with the allowable hours pursuant to applicable general plan noise element or noise ordinance. Ensure noise-generating construction activities (including truck deliveries, pile driving, and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors. Where construction activities are authorized outside the limits established by the noise element of the general plan or noise ordinance, notify affected sensitive noise receptors and all parties who will experience noise levels in access of the allowable limits for the specified land use, of the level of exceedance and duration of exceedance; and provide a list of protective measures that can be undertaken by the individual, including temporary relocation or use of hearing protective devices.

NS-4 Limit speed and/or hours of operation of rail and transit systems during the selected periods of time to reduce duration and frequency of conflict with adopted limits on noise levels.

NS-5 Post procedures and phone numbers at the construction site for notifying the Lead Agency staff, local Police Department, and construction contractor (during regular construction hours and off-hours), along with permitted construction days and hours, complaint procedures, and who to notify in the event of a problem.

NS-6 Notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance.

NS-7 Hold a preconstruction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.

NS-8 Designate an on-site construction complaint and enforcement manager for the project.

NS-9 Ensure that construction equipment are properly maintained per manufacturers' specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). All intake and exhaust ports on power equipment shall be muffled or shielded.

NS-10 Ensure that impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction are hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust can and should be used. External jackets on the tools themselves can and should be used, if such jackets are commercially available and this could achieve a reduction of 5 dBA. Quieter procedures can and should be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.

NS-11 Ensure that construction equipment is not idling for an extended time in the vicinity of noise-sensitive receptors.

NS-12 Locate fixed/stationary equipment (such as generators, compressors, rock crushers, and cement mixers) as far as possible from noise-sensitive receptors.

NS-13 Consider using flashing lights instead of audible back-up alarms on mobile equipment.

NS-14 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the potential vibration impacts to the structural integrity of the adjacent buildings within 50 feet of pile driving locations.

NS-15 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the threshold levels of vibration and cracking that could damage adjacent historic or other structure, and design means and construction methods to not exceed the thresholds.

NS-16 For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as predrilling the piles to the maximum feasible depth, where feasible. Predrilling pile holes will reduce the number of blows required to completely seat the pile and will concentrate the pile driving activity closer to the ground where pile driving noise can be shielded more effectively by a noise barrier/curtain.

NS-17 For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as the use of more than one pile driver to shorten the total pile driving duration.

4.5.6 IMPACTS AFTER MITIGATION

While mitigation measures NS-1 to NS-17 would minimize some of the noise and vibration impacts from construction, the SCAQMD cannot predict how a lead agency or responsible agency might choose to mitigate a significant construction noise and vibration impacts for a future project. Therefore, noise and vibration impacts from construction of implementing the 2016 AQMP are expected to remain significant.

4.6 SOLID AND HAZARDOUS WASTE

4.6.1 INTRODUCTION

This subchapter examines solid and hazardous waste impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether they could generate direct or indirect solid and hazardous waste impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP identified the following types of control measures as having potentially significant solid and hazardous waste impacts due to potential increases in waste from: 1) construction; 2) the disposal of old equipment; 3) spent catalysts; 4) street sweeping activities; 5) spent filters and baghouses; 6) limitations on waste burning; and, 7) vehicle/equipment scrapping and car battery disposal.

4.6.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL SOLID AND HAZARDOUS WASTE IMPACTS

The solid and hazardous waste analysis in this Program EIR identifies the potential solid and hazardous waste impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential solid and hazardous waste impacts.

The 2016 AQMP continues the air quality management strategy of advancing clean technologies and promoting their use. Implementing some of the 2016 AQMP control measures could result in solid and hazardous waste impacts in the region. The solid and hazardous waste analysis in this Program EIR identifies the potential solid and hazardous waste impacts from implementing the 2016 AQMP. Each control measure proposed in the 2016 AQMP was evaluated and 59 control measures were identified as having potential adverse solid and hazardous waste impacts. In particular, some control measures in the 2016 AQMP incentivize the upgrading or replacement of existing equipment with zero or near-zero emissions equipment/technology, while other control measures encourage the use of air pollution control technologies which could increase the amount of solid and hazardous waste. Table 4.6-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant solid and hazardous waste impacts.

TABLE 4.6-1

Control Measures with Potential Solid and Hazardous Waste Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
ECC-03	Additional Enhancement in Building Energy Efficiency and Smart Grid Technology (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Generation of waste from construction activities and disposal of old equipment.
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources	Generation of waste from disposal of old equipment.
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating	Implement regulations on commercial and residential heaters/burners and incentivize replacement of old heaters with new.	Generation of solid waste from disposal of old heaters/burners.
CMB-03	Emission Reductions from Non-Refinery Flares (NOx)	Installation of newer flares implementing the best available control technology.	Generation of solid waste from disposal of old flares.
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking	Incentivize the installation of low-NOx burner technologies.	Generation of solid waste from disposal of old burners.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment	Generation of waste from construction activities, generation of solid waste from disposal of old equipment, and use of additional catalysts.
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion based equipment.	Generation of solid waste from disposal of old equipment.
BCM-01	Further Emissions Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	Generation of solid waste from disposal of old equipment.
BCM-02	Emission Reductions from Cooling Towers (PM)	Installation of drift elimination technologies into cooling towers.	Generation of solid waste from disposal of old equipment.
BCM-03	Further Emission Reductions from Paved Road Dust Sources	Reduction of track out from stationary sources by specifying street sweeping methods and frequency.	Generation of waste from additional street sweeping activities.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure	Generation of additional waste matter from use of acidifiers and removal of manure.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia	Generation of waste from installing and maintaining new catalyst technologies and disposal of any replaced machinery.
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of exhaust ventilation to a fabric filter for permanent in building abrasive blasting activities and the use of additional portable equipment like negative air machines, fume extractors, and dust collectors with HEPA filters.	Generation of waste from portable control equipment such as dust collectors.
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Generation of waste from dust collection measures.
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning (PM)	Incentivize chipping/grinding or composting in the place of agricultural burning as well as the increased utilization of clean fuels for training burns.	Generation of additional waste due to limitations on burning.
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves (PM)	Incentivize upgrading of wood burning hearths to cleaner hearth as well as an increase in the stringency of the curtailment program and education.	Generation of waste from disposal of old hearths and additional limitations on wood burning.
BCM-10	Emission Reductions from Greenwaste Composting (NH3, VOC)	Use of controls such as anaerobic digestion and organic processing technology and restrictions for direct applications of uncomposted greenwaste onto public lands.	Generation of additional waste due to restrictions on application of uncomposted greenwaste.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, PM)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Generation of waste from battery disposal and turnover of older equipment.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	Generation of waste from battery disposal and turnover of older equipment.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near-zero emission equipment in/around warehouse.	Generation of waste from disposal of older equipment.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivize zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	Generation of waste from battery disposal and disposal of outdated equipment.
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Incentivize the "Clean Vehicle Rebate Project" to promote use of vehicles with zero and near-zero emissions.	Generation of waste from disposal of batteries and vehicle scrapping.
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles	Incentivize the retirement of older vehicles that do not meet current emission standards.	Generation of wastes from disposal of batteries and vehicle scrapping.
MOB-07	Accelerated Penetration of Partial-Zero and Zero Emission Light-Heavy and Medium-Heavy Duty Vehicles (NOx, PM)	Early introduction of zero and near-zero emission vehicles such as hybrids and electric operated vehicles.	Generation of wastes from disposal of batteries and vehicle scrapping.
MOB-08	Accelerated Retirement of Older On-Road Heavy Duty Vehicles	Replace older heavy-duty vehicles with new vehicles that meet CARB standards.	Generation of wastes from disposal of batteries and heavy-duty vehicle scrapping.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivize the use of zero emission technologies, including the building of electric or magnetic power into roadway infrastructure.	Generation of waste from disposal of batteries and vehicle scrapping.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivize the SOON program and phase in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	Generation of waste from disposal of batteries and vehicle scrapping.
MOB-11	Extended Exchange Program	Incentivize retirement of older off-road engines to be replaced with newer models.	Generation of waste from disposal of outdated equipment.
MOB-12	Further Emission Reductions from Passenger Locomotives	Incentivize replacement of Tier 0 locomotives with Tier 4 locomotives.	Generation of waste from disposal of outdated equipment.
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Accelerate the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives	Generation of waste from disposal of batteries or scrapping of older equipment.
MOB-14	Emissions Reductions from Incentives Programs (NOx, SOx, PM)	Implementation of the Carl Moyer Program to accelerate the penetration of clean air vehicles.	Generation of waste from disposal of batteries and vehicle scrapping.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerate the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of dust control, alternative fuels, diesel PM filter, low-emitting engines, low VOC materials and mitigation fees.	Generation of waste from disposal of outdated equipment and associated dust control methods.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Generation of waste from dust control methods like wet-wiping and vacuuming with HEPA filters.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Generation of waste from dust control methods like wet-wiping and vacuuming with HEPA filters.
TXM-03	Control of Hexavalent Chromium from Chrome Spraying Operations (TACs, PM)	Improved inspection and housekeeping and use of best management practices at chromium spraying operations.	Generation of waste from housekeeping activities.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soil (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Generation of waste from dust control methods like wet-wiping.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	Generation of waste from dust control methods like use of HEPA filters.
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Generation of waste from dust control methods like wet-wiping and vacuuming with HEPA filters.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Generation of waste from housekeeping activities.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon.	Generation of solid waste from use of activated carbon.
TXM-09	Control of Toxic Emissions from Oil and Gas Well Activities (TACs, PM)	Construction of enclosures and control equipment and implementation of method to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Generation of waste from dust control methods like wet-wiping and vacuuming with HEPA filters.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	Generation of wastes from disposal of batteries and vehicle scrapping.
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Accelerate the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	Generation of wastes from disposal of batteries and vehicle scrapping.
ORHD-02	Low-NOx Engine Standards (NOx	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	Generation of wastes from vehicle scrapping.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	Generation of wastes from disposal of batteries and bus scrapping.
ORHD-05	Last Mile Delivery (NOx, ROG)	Accelerate the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Generation of wastes from disposal of batteries and truck scrapping.
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Accelerate the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Generation of wastes from disposal of batteries and truck scrapping.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	Generation of wastes from disposal of batteries and scrapping of old buses.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Accelerate the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Generation of wastes from disposal of batteries and scrapping of old equipment.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Accelerate the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Generation of wastes from disposal of batteries and scrapping of old equipment.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 Control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Generation of waste from catalysts, DPM filters, electric batteries, and scrapping of old equipment.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentives for the use of control equipment such as SCRs.	Generation of waste associated with disposal of catalysts while ships are in port.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	Generation of waste associated with disposal of catalysts while ships are in port.
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	Generation of waste associated with battery disposal and scrapping of old equipment.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Accelerate the penetration of zero emission technologies to be used in off road forklifts.	Generation of wastes from disposal of batteries and scrapping of old equipment.
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	Generation of wastes from disposal of batteries and scrapping of old equipment.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Accelerate the penetration of zero emission technologies to be used in small off-road engines.	Generation of wastes from disposal of batteries and scrapping of old equipment.

TABLE 4.6-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower emissions.	Increased waste associated with catalyst use.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment(NOx, ROG, PM2.5)	Accelerate the implementation of zero emission technologies in off-road equipment.	Generation of waste associated with battery disposal.

4.6.3 SIGNIFICANCE CRITERIA

The NOP/IS (Appendix A) concluded that the 2016 AMQP would comply with federal, state, and local statutes and regulations related to solid and hazardous waste. However, implementation of the 2016 AQMP would be considered to have significant solid and hazardous waste impacts if the following condition occurs:

- The generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

4.6.4 IMPACT ANALYSIS

4.6.4.1 Spent Batteries from Electric Vehicles

Control measures that encourage early retirement of older vehicles and other mobile sources and replacement with newer equipment or newer vehicles (including electric or hybrid vehicles) could result in an increase in waste generated from batteries including control measures MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-06, MOB-07, MOB-08, MOB-09, MOB-10, MOB-11, MOB-12, MOB-13, MOB-14, ORLD-01, ORLD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIR-05, ORFFS-01, OFFS-04, OFFS-05, and OFFS-08. The most common battery currently used in gasoline and diesel powered vehicles within the Basin is the lead-acid battery found in conventional automobiles and trucks. These batteries are disposed of and processed by the lead recycling industry such as Quemetco which is located in southern California. Zero and near-zero emission vehicles operate with different battery types than the lead-acid battery. The common battery types available for hybrid and electric powered vehicles are comprised of nickel metal hydride (NiMH) and lithium ion (Li-ion).

The 2016 AQMP control measures would incentivize the penetration of fuel cell, electric, and electric hybrid vehicles as part of mobile source pollution control measures. The suggested control measures that have additional requirements for zero and partial-zero emission vehicles are shown in Table 4.6-2. The batteries that power these types of vehicles have useful lives similar to or less than the life of a vehicle. Since some batteries contain toxic materials, the increased use of batteries may result in an incremental increase in solid and hazardous waste impacts. In addition, environmental impacts could occur if batteries were disposed of in an unsafe manner, such as illegal dumping or by disposal in an unlined landfill.

TABLE 4.6-2

Control Measures and Potential Vehicle Retirement Quantities

CONTROL MEASURE NO.	CONTROL MEASURE DESCRIPTION	ESTIMATED NUMBER OF VEHICLES	
		2023	2031
MOB-05, MOB-14, ONLD-01, and ORLD-03	Accelerated Penetration of Partial-Zero and Zero Emission Vehicles	357,000	714,000
ORHD-04	Advanced Clean Transit, Accelerated Penetration of Partial-Zero and Zero Emission Buses	11,000	11,000
MOB-06, MOB-07, MOB-08, ORHD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-08	Accelerated Penetration of Partial-zero and Zero Emissions Light, Medium and Heavy-Duty Trucks	115,000	245,000
MOB-01, MOB-02, MOB-03, MOB-04, OFFS-01, OFFS-04, OFFS-06	Accelerate the Penetration of Zero Emission TRUs, Forklifts and Ground Support Equipment	50,000	100,00
OFFS-02, OFFS-08	Further Deployment of Cleaner Technologies for Larger Off-Road Diesel/Gasoline Equipment	30,000	60,000
MOB-10, OFFS-03, OFFS-08	Penetration of Zero Emission Off-Road Construction and Industrial Equipment	20,000	40,000

The 2016 AQMP control measures would also incentivize the penetration of fuel cell, electric, and electric hybrid vehicles as part of mobile source pollution control measures, which is expected to reduce the use of conventional vehicles within California and the Basin. Conventional vehicles use lead acid batteries; therefore, a reduction in the use of conventional vehicles would lead to a reduction in the use of lead-acid batteries. Lead-acid batteries have a three to five year life, which is much less than the life of the vehicle so that the batteries need to be periodically replaced. Electric vehicles and hybrid batteries last much longer than lead-acid batteries. For example, most of the batteries in electric vehicles have warranties for 10 years or 150,000 miles. However, Toyota has reported that its battery packs have lasted for more than 180,000 miles in testing. Further, a large number of Ford Escape Hybrid and Toyota Prius taxicabs in New York and San Francisco have logged over 200,000 miles on their original battery packs (Edmunds, 2014). Therefore, because electric and hybrid batteries tend to last substantially longer than lead-acid batteries in conventional vehicles, an increase in the use of electric/hybrid vehicles would result in a decrease in the amount of spent lead-acid batteries that require recycling.

Batteries in hybrid vehicles are much larger than batteries in conventional vehicles. The current hybrid batteries weigh about 110 pounds and are composed of NiMH batteries which are charged by an internal combustion engine driven generator and/or by a regenerative braking system that captures power from deceleration and braking.

The recycling of hybrid battery packs is still in its infancy as there have not been many battery packs surrendered for recycling. The NiMH batteries found in hybrid vehicles are basically "zero-landfill" products, meaning that whatever cannot be recycled is typically consumed in the recycling process. The primary metals recovered during recycling are nickel, copper, and iron. Some principal rare earth metals, neodymium and lanthanum, are also recovered (Edmunds, 2014). Improper disposal of NiMH batteries poses less of an environmental hazard than that of lead-acid or nickel-cadmium batteries because NiMH batteries do not contain lead and cadmium which are toxic. Most industrial nickel is recycled, due to the relatively easy retrieval of the magnetic element from scrap using electromagnets, and due to its high value.

Because Li-ion batteries have a potential for after-automotive use, destructive recycling can be postponed for years even after an EV or hybrid battery can no longer hold and discharge sufficient electricity to power a car's motor. The battery pack can still carry a tremendous amount of energy. Battery manufacturers have projected that Li-ion battery packs will still be able to operate at about 80 percent of capacity at the time they must be retired from automotive use (Edmunds, 2014). For example, several major power utilities are working with companies such as General Motors, Ford, Toyota, and Nissan to explore the use of Li-ion batteries for the stationary storage of power produced during off-peak periods by wind turbines and solar generation stations. The Li-ion battery packs are also being tested as backup power storage systems for retail centers, restaurants, and hospitals, as well as residential solar systems (Edmunds, 2014). Auto companies are partnering with battery, recycling, and electronics firms to figure out and develop post-automotive markets and applications for Li-ion battery packs (Green Car Reports, 2016). With the opportunity for other non-automotive aftermarket uses, Li-ion battery recycling may not be immediately necessary when compared to recycling of lead-acid batteries.

Most battery and fuel cell technologies, including NiMH and Li-ion batteries, generally contain materials that have high economic value and, therefore, are recyclable. Further, some manufacturers offer incentives to prevent the illegal disposal of the batteries. For example, most car manufacturers offer a program to take back used or damaged battery packs, including Toyota and Nissan (Green Car Reports, 2016). Once the packs are at the proper distribution point, the recyclers break down their constituent parts to salvage any wiring, electrical components and plastics that can be separately recycled. A high temperature process is used to separate the battery content into metal alloys and slag that concentrates the rare earth elements that the batteries contain (Edmunds, 2014).

Additionally, both regulatory requirements and market forces require or encourage recycling. The following is a brief listing of some of the more important Federal and California regulations that have created requirements or incentives for the proper disposal and recycling of EV battery packs:

- The federal Battery Act promulgated in 1996 requires that each regulated battery be labeled with a recycling symbol. NiCad batteries must be labeled with the words “NiCad” and the phrase “Battery must be recycled or disposed of properly.” Lead-acid batteries must be labeled with the words “Lead,” “Return,” and “Recycle.”

- Current California and federal regulations require ZEV manufacturers to take into account the complete life-cycle of car batteries and to plan for safe disposal and/or recycling of battery materials.

- The California Health and Safety Code does not allow the disposal of lead-acid batteries at a solid waste facility or on or in any land, surface waters, water courses, or marine waters. Legal disposal methods for used lead-acid batteries are to recycle/reuse the battery or to dispose of it at a hazardous waste disposal facility. A lead-acid battery dealer is required to accept spent batteries when a new one is purchased.

- California Public Resources Code requires state agencies to purchase car batteries made from recycled material.

- The Universal Waste Rule requires that spent batteries exhibiting hazardous waste characteristics and are not recycled need to be managed as hazardous waste. This includes lead-acid and NiCad batteries.

- Car manufacturers offer incentives to recycle batteries, e.g., Toyota offers $200 for spent battery packs to help promote battery recycling.

Because Li-ion batteries are composed of relatively inexpensive materials, recycling this type of batteries may not be profitable. However, recycling of these batteries may still be preferred over disposal because recycling supports a closed-loop supply chain and is consistent with the principles of environmentalism and sustainability. A closed-loop supply chain is attractive because it protects manufacturers from volatility in the lithium market since approximately 70 percent of the global lithium deposits are concentrated in and supplied by South America (MNTRC, 2014).

Only two recycling firm, Umicore and Retriev Technologies (previously known as Toxco), have the technology to recycle both NiMH and Li-ion batteries. Umicore, while based in Belgium as the leading metals recycling company in Europe, is expanding their operations in the United States. Retriev Technologies is the only company in North America with the capacity to recycle Li-ion batteries. Retriev Technologies was awarded a federal grant to build and operate an advanced lithium battery recycling facility at their existing Lancaster, Ohio site (Edmunds, 2014).

The Retriev Technologies facility appears to be the recycler that is most widely used by companies that sell hybrids and EVs in North America when batteries reach their end of life. The facility uses a proprietary system to primarily recycle Ni-MH batteries. Retriev Technologies also currently handles small volumes of Li-ion battery packs as it works with automakers to develop the best recycling processes.

Recycling of lead-acid and nickel-cadmium batteries is also a well-established activity. Eighty percent of lead consumed in the United States is used to produce lead-acid batteries and the lead recovery rate from batteries is approximately 80 to 90 percent. According to the Lead-Acid Battery Consortium, 95 to 98 percent of all battery lead is recycled.

Because most EV batteries are recycled, it is unlikely that the increase in battery use would significantly adversely affect landfill capacity in California. As mentioned earlier, electric batteries generally hold significant residual value, and 95 to 98 percent of all lead-acid batteries are recycled. In addition, the electric batteries that would power EVs are packaged in battery packs and cannot be as easily disposed of as a single 12-volt conventional vehicle battery, which some electric cars also have. It should be noted that the increased operation of EVs associated with the

implementation of the 2016 AQMP may actually result in a reduction of the amount of solid and hazardous waste generated within SCAQMD's jurisdiction, as NiMH and Li-ion in batteries have a much longer life span than conventional lead-acid batteries. Further, their larger size and heavy weight (over 100 pounds) makes them more difficult to handle and transport for unauthorized disposal. Additionally, the advanced-technology automotive battery recycling industry is setting up operations where processing will have no impact on landfills either locally or within the state.

EVs do not require the various oil and gasoline filters that are required by vehicles using internal combustion engines. Furthermore, EVs do not require the same type or amount of engine fluids (oil, antifreeze, etc.) that are required by vehicles using internal combustion engines. Specifically, approximately 282,900 tons per year of waste oil was generated in the Basin in 2014 (see Chapter 3.7, Solid/Hazardous Waste, Table 3.7-10). Because of the widespread use and volume of waste oil, a portion of waste oil is illegally disposed of via sewers, in waterways, on land, and disposed in landfills. Waste oil that is illegally disposed can contaminate the environment (via water, land, or air). In addition, a substantial amount of motor oil leaks from vehicles driving on roadways and this motor oil is eventually washed into storm drains which empty into the ocean.

Since electric motors do not require motor oil as a lubricant, replacing internal combustion engines with electric engines will eliminate the impacts of motor oil use and disposal. For example, a 50 percent penetration of light-duty electric vehicles will result in a corresponding 50 percent reduction in the release of motor oil into the environment due to illegal disposal and a 50 percent reduction in the generation of waste oil. Release of contaminants due to engine oil that burns up in or leaks from engines, or due to the burning of recovered engine oil for energy generation will also be reduced. Additional use of electric vehicles is expected to have a beneficial environmental impact by reducing the amount of motor oil used, recycled, potentially illegally disposed, or washed into storm drains and ending up in the ocean.

Illegal or improper disposal of batteries from EVs and hybrids could result in significant solid waste impacts if hazardous wastes are disposed of in municipal landfill. However, because battery recycling is required by law and because they have value, the illegal or improper disposal of batteries is expected to be uncommon. For example, because some manufacturers pay for used EV/hybrid batteries, the value, size, and length of life of NiMH and Li-ion batteries are such that recycling is expected to be more predominate than with lead acid batteries. Therefore, the use of EVs and hybrids are not expected to result in an increase in the illegal or improper disposal of batteries because these types of batteries are required to be recycled.

4.6.4.2 Air Pollution Control Technologies

4.6.4.2.1 Carbon Adsorption

Table 4.6-1 identifies those proposed control measures, including control measure TXM-08, that may have potential solid waste impacts due to the use of air pollution control equipment that utilizes carbon adsorption technology. Carbon adsorption eventually requires the disposal and replacement of the spent carbon. It is difficult to quantify the number of facilities that would employ this type of technology, the rate of disposal necessary to maintain the equipment, the type of waste generated by the equipment (i.e., hazardous or non-hazardous), and the timing by which

these technologies would come into use. However, known uses of carbon adsorption technology have been examined qualitatively in the following paragraphs.

Carbon adsorption is used to control VOC emissions primarily from stationary sources. The amount of solid waste which may be generated by the carbon adsorption process would depend on the number of carbon absorbers installed, the operating characteristics including the components in the exhaust stream, and the frequency of carbon replacement. Most of the control measures have alternative methods for preventing VOC emissions, such as reformulating materials.

However, if carbon adsorption systems are used, the amount of hazardous waste generated on an annual basis is expected to be minimal because most of activated or fresh carbon, after it becomes spent and no longer effective, is reclaimed and reactivated, resulting in negligible impacts on solid waste disposal facilities. Activated carbon can have a useful lifetime of five to 10 years; however, the operating characteristics of the control device and the chemistry of the waste stream may result in a shorter lifetime.

Spent carbon is usually recycled and reused rather than disposed in landfills. Most facilities contract out with vendors that take the spent carbon and deliver a fresh supply of activated carbon. Another alternative to disposing spent carbon is to burn it in a thermal incinerator. With thermal incineration, any organic materials contained in the carbon are oxidized to form carbon dioxide, water, and in most cases, harmless combustion by-products. Thermal incineration occurs at high temperatures and tends to destroy any toxic components while substantially reducing the volume of spent carbon to be disposed of, whereby reducing solid waste impacts. The disadvantage of employing thermal incineration is that it generates combustion by-products which may cause an increase in criteria pollutant emissions.

Further, it is not expected that carbon adsorption will be used in a majority of the cases because of the expense involved as a control option, especially when there are other more cost-effective options available that can better handle large exhaust streams. However, carbon adsorption may be cost-effective for use in smaller operations. Thus, facility operators will likely choose other more cost-effective options, such as using reformulated products, in lieu of installing control equipment, to comply with the control measures.

4.6.4.2.2 Particulate Traps, Filters, and Precipitators

A number of control measures in the 2016 AQMP could require the collection and disposal of additional particulate matter including BCM-01, BCM-03, BCM-04, BCM-06, BCM-07, EGM-01, TXM-01, TXM-02, TXM-03, TXM-03, TXM-04, TXM-05, TXM-06, TXM-07, TXM-08, TXM-09, ORFIS-01, ORFIS-03, ORFIS-04, and OFFS-07. These measures could result in increased collection of particulate matter that would then need to be disposed.

While it is speculative to identify the number of facilities and the quantity of equipment that would utilize filters, particulate traps, and precipitators, the quantity of particulate matter collected on filters and from electrostatic precipitators is expected to be small. Baghouses, pre-filters, filters, electrostatic precipitators, and HEPA filters collect particulate emissions from stationary and mobile sources of particulate emissions. These types of filtration control equipment can effectively remove particulate matter, including heavy metals, asbestos, as well as other toxic and

nontoxic compounds. Polytetrafluoroethylene (PTFE) membranes or HEPA filters can increase a system's removal efficiency up to 99.9 percent. In general, as particulate size decreases, the surface area-to-volume ratio increases, thus, increasing the capacity of these filters to catch smaller particles (including hazardous materials). An increase in the use of membranes and filters may result in an incremental increase in solid waste requiring disposal in landfills over what would be produced if the 2016 AQMP were not adopted. In some cases, waste generated will be hazardous (e.g., the collection of toxic emissions). The increase in the amount of waste generated from the use of filters and the collection of additional particulate matter are expected to be small, because filtration control equipment is already used in practice or required by existing rules, especially for stationary sources. Control measures that may include filtration control equipment will generally require increased control efficiencies and/or better housekeeping and maintenance requirements for the filtration devices. As a result the incremental amount of material collected by filters is expected to be small. Further, the larger filters used in baghouses are cleaned and reused so minimal additional waste would be expected from filters themselves.

The collected waste from filters, baghouses, and ESPs are considered solid waste (i.e., not hazardous) which can be disposed of at a number of landfills in southern California. The permitted capacity of the landfills in Los Angeles, Orange, Riverside, and San Bernardino counties is about 112,592 tons per day (see Table 3.7-2) and have sufficient capacity to handle the small increase in waste.

There are no hazardous waste landfills within the Southern California area. Hazardous waste can be transported to permitted facilities both within and outside of California. Hazardous waste is expected to be transported to Clean Harbors in Buttonwillow, California. The permitted capacity at the Buttonwillow landfill is in excess of 10 million cubic yards so it would have sufficient capacity to handle any small amounts of hazardous waste that could be collected by the filters, baghouses, or ESPs (Clean Harbors, 2015). The nearest out-of-state hazardous waste landfills are U.S. Ecology, Inc., located in Beatty, Nevada and Clean Harbors in Grassy Mountain, Utah. U.S. Ecology, Inc. is currently receiving waste and is in the process of extending the operational capacity for an additional 35 years (U.S. Ecology, 2015). Clean Harbors is currently receiving waste and expected to continue to receive waste for an additional 70 years (Clean Harbors, 2015).

4.6.4.2.3 Selective Catalytic Reduction

The 2016 AQMP could result in the increased use of SCR units to control emissions. The following control measures could rely on SCR technology for emission control including BCM-05, ORFIS-01, ORFIS-03, ORFIS-04, and OFFS-07. The catalyst in SCR beds generally uses various ceramic materials comprised of precious metals to aid in the capture and conversion of NOx into N_2 and water in an exhaust stream. SCRs require periodic regeneration or replacement of the catalyst bed. Regeneration of catalyst is preferred, due to the high cost to purchase new catalyst; however, if the catalyst cannot be regenerated, precious metals contained in the catalyst can be recovered. These metals could then be recycled and the remaining material would most likely need to be disposed of at a landfill.

If the catalyst is not hazardous, jurisdiction for its disposal then shifts to local agencies such as the Regional Water Quality Control Board (RWQCB) or the county environmental agencies. The RWQCB has indicated that if a spent catalyst is not considered a hazardous waste, it would

probably be considered a Designated Waste. A Designated Waste is characterized as a non-hazardous waste consisting of, or containing pollutants that, under ambient environmental conditions, could be released at concentrations in excess of applicable water objectives, or which could cause degradation of the waters of the state. The type of landfill that the material is disposed at will depend upon its final waste designation. The use of SCRs is expected to be limited to stationary sources in the RECLAIM program (e.g., refineries and electric generation facilities) or other heavy industrial uses (e.g., ports) so that its use is not expected to be wide-spread. Due to the regeneration of catalysts used in SCRs and the fact that this technology is not expected to be widely used because of cost, no significant impacts on waste disposal are expected.

4.6.4.3 Retirement of Equipment

Control measures ECC-03, CMB-01, CMB-02, CMB-03, CMB-04, CMB-05, FLX-02, BCM-01, BCM-02, BCM-09, MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-06, MOB-07, MOB-08, MOB-09, MOB-10, MOB-11, MOB-12, MOB-13, MOB-14, ORLD-01, ORLD-03, ORHD-02, ORHD-04, ORHD-06, ORHD-06, ORHD-07, ORHD-08, and ORHD-09 could result in the early retirement of equipment such as burners, on-road trucks and vehicles, off-road vehicles, gasoline-fueled engines, diesel-fueled engines, and locomotive and aircraft engines. Solid waste impacts could occur since the older equipment or vehicle parts would be taken out of service in the Basin and scrapped and disposed of in landfills. It is expected that some older trucks, vehicles, and locomotive engines could be relocated to other areas, such as other states, Mexico or China.

Approximately 80 percent of a vehicle can be recycled and reused in another capacity. During the scrapping process, batteries, catalytic converters, tires, and other recoverable materials (e.g., metal components) are removed and the metal components of the vehicle are shredded. The shredded material is then sent for recovery of metal content. Therefore, the amount of solid waste landfilled as a result of the proposed control measures would be relatively small since most of the parts being replaced have commercial value as scrap metal. Currently, there are a limited number of vehicles and parts that can be scrapped per year because of the limited number of scrapping and recycling facilities in the Basin. It is expected that gasoline and diesel engines could also be recycled for metal content, or rebuilt and sold to other areas. It is expected that parts and equipment would be scrapped in the near future, regardless of the 2016 AQMP control measures, as they are older vehicles or have older components. The primary solid waste impact is expected to be the accelerated replacement and disposal of equipment and parts before the end of their useful life. Further, these control measures are not expected to mandate that older vehicle, engines, or other equipment be scrapped. The control measures are expected to allow a number of different control methods to comply with the required emission reductions. The most cost effective control measures would be expected to be implemented. Control measures that would require new equipment will generally require that retirement occur when the life of the old equipment is exhausted and the new equipment is put into service. Alternatively, some measures can encourage advanced deployment of cleaner technologies ahead of natural retirement for the benefit of air quality. Based on the above, scrap metals from vehicle and engine replacements are expected to be recycled and not disposed of in landfills. Any small increase that may occur from miscellaneous parts is expected to be within the permitted capacity of over 112,000 tons per day so that no significant impacts would be expected.

The California Integrated Waste Management Act of 1989 (AB 939) requires cities and counties in California to reduce the amount of solid waste disposed in landfills and transformed by 25 percent by 1995 and by 50 percent by 2000, through source reduction, recycling, and composting activities. Subsequent legislation has been adopted that mandates a 50 percent diversion requirement to be achieved every year. SB 1016 (Wiggins) – Diversion: Alternative Compliance System (effective January 1, 2009) moves CalRecycle from the previously existing solid waste diversion accounting system to a per capita disposal based system. SB 1016 did not change the 50 percent requirement in AB 939, but measures it differently. Compliance is the same under the new system as it was under the old system. To evaluate compliance, CalRecycle looks at a jurisdiction's per capita disposal rate as an indicator of how well its programs are doing to keep disposal at or below a jurisdiction's unique 50 percent equivalent per capita disposal target. The 50 percent equivalent per capita disposal target is the amount of disposal a jurisdiction would have had during the base period had it been at exactly a 50 percent diversion rate. Compliance is based on CalRecycle evaluating whether a jurisdiction is continuing to implement the programs it chooses and is making progress in meeting its target (CalRecycle, 2016). In 2014, California's statewide disposal was 31.2 million tons and population was 38.4 million residents. This resulted in a per resident disposal rate of 4.5 pounds/resident/day. The diversion rate equivalent was 65 percent (CalRecycle, 2016a and 2016b).

Almost all (99 percent) of California's solid waste was disposed of in landfills in California, while approximately one percent was exported to landfills out of state. An additional 0.82 million tons were transformed at three permitted waste-to energy plants in California, but not included in the disposal rate estimate because of provisions in the law that allow limited diversion credit for transformation (CalRecycle, 2016a and 2016b).

Many cities and counties have met the 20 and 50 percent waste reduction goals of AB 939 prior to the adoption of the 50 percent equivalent per capita disposal target associated with SB 1016. Table 4.6-3 shows that for the counties within the Basin as well as statewide, the targets are still slightly short of meeting the diversion standards. The generation of additional waste associated with control measures in the 2016 AQMP could impact the abilities of cities and counties to further reduce wastes. However, as discussed above the increase in solid waste associated with implementation of the 2016 AQMP that is expected to be diverted to a landfill is small and many of the waste streams are recyclable.

The U.S. EPA has a policy to ensure that emission reductions programs seeking credit in the SIP are quantifiable, surplus (*not already required*), permanent, and enforceable. Thus, it is expected that when older vehicles are scrapped, they are put out of service permanently and there are mechanisms in place to ensure that this requirement is enforced. Even with the ability to recycle metals from vehicles, there are no guarantees that vehicles will continue to be scrapped in the future, especially if the market will not be saturated with a high numbers of vehicles being sought for turnover. So, in an abundance of caution, the potential solid and hazardous waste impacts from the retirement of equipment is concluded to be significant.

TABLE 4.6-3

Summary of Per Capita Target Compliance (2014)

LOCATION	NUMBER OF JURISDICTIONS WITHIN LOCATION	NUMBER OF JURISDICTIONS MEETING POPULATION TARGET	PERCENT OF JURISDICTIONS MEETING POPULATION TARGET	NUMBER OF JURISDICTIONS MEETING EMPLOYEE TARGET	PERCENT OF JURISDICTIONS MEETING EMPLOYEE TARGET
State of California	412	397	96%	388	64%
Los Angeles County	72	71	99%	72	100%
Orange County	35	35	100%	33	94%
Riverside County	29	29	100%	26	90%
San Bernardino County	25	25	100%	25	100%

Source: CalRecyle, 2016c

4.6.4.4 Construction Waste

Implementation of the 2016 AQMP will result in the construction of new control devices which will generate waste attributable to the removal of old control devices, soil, construction debris from demolition, etc., and some of this waste could be characterized as hazardous waste. At this time, it is speculative to estimate the amount of construction waste that may be generated as the 2016 AMQP is implemented, since the extent and timing of individual projects is not known. Therefore, the solid and hazardous waste impacts from construction are concluded to be significant.

4.6.5 MITIGATION MEASURES

Based on the preceding analysis, due to the recycling value of the materials involved, the increased use of electric or hybrid vehicles and subsequent generation of batteries and other types of waste from air pollution control technology and devices were found to result in less than significant impacts to solid and hazardous waste.

For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin. Equipment with no remaining useful life is expected to be recycled for metal content. However, the high volume of vehicle and equipment to retire in a short timeframe and uncertainty of their outcome would result in potential significant solid and hazardous waste impacts due to implementation of the 2016 AQMP. Furthermore, the extent and timing of construction needed to implement the 2016 AQMP is not known at this time, but the potential to exceed landfill capacities in the short term was found to be significant. No mitigation measures have been identified.

4.6.6 IMPACTS AFTER MITIGATION

Although the monetary value of scrapped engines, vehicles, and equipment would likely lead to recycling of these items, no mitigation measures have been identified to reduce the impacts to landfills and the impacts remain significant. Short-term impacts from construction also remain significant.

4.7 TRANSPORTATION AND TRAFFIC

4.7.1 INTRODUCTION

This subchapter examines the traffic impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect transportation and traffic impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP identified the following types of control measures as having potentially significant transportation and traffic impacts: 1) changes in traffic volumes and patterns due to construction activities; 2) operational traffic increases due to increased transportation of catalyst, alternative fuels, or other chemicals such as ammonia, waste disposal, and agricultural materials (from chipping, grinding, or composting facilities); 3) increases in congestion due to increased street sweeping; and 4) operation of new transportation infrastructure.

4.7.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL TRANSPORTATION AND TRAFFIC IMPACTS

The 2016 AQMP continues the air quality management strategy of advancing clean technologies and promoting their use. Implementing some of the 2016 AQMP control measures could result in transportation and traffic impacts in the region. The transportation and traffic analysis in this Program EIR identifies the potential traffic impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential transportation and traffic impacts. The NOP/IS determined that the proposed project could result in potentially significant transportation and traffic impacts.

Each control measure proposed in the 2016 AQMP was evaluated and 30 control measures were identified as having potential adverse transportation and traffic impacts. Table 4.7-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant transportation and traffic impacts.

TABLE 4.7-1

Control Measures with Potential Transportation and Traffic Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	TRAFFIC IMPACT
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential temporary changes in traffic pattern/volume due to construction activities.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx, CO, PM, CO2 and ozone emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential temporary changes in traffic pattern/volume due to construction activities.
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating (NOx)	Installation of new commercial space heating furnaces boilers, water heaters, and space heating furnaces.	Potential temporary changes in traffic pattern/volume due to construction activities.
CMB-03	Emission Reductions from Non-Refinery Flares (NOx)	Installation of newer flares implementing the best available control technology.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased catalyst use, ammonia use, and waste disposal.
BCM-03	Further Emission Reductions from Paved Road Dust Sources (PM)	Reduction of track out from stationary sources by specifying street sweeping methods and frequency.	Potential changes in traffic due to change in frequency of street sweeping activities.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and feed additives to reduce ammonia in manure.	Potential temporary changes in traffic pattern/volume due to operational impacts due to deliveries of SBS and increased waste disposal.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of catalyst and increased waste disposal.

TABLE 4.7-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	TRAFFIC IMPACT
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of exhaust ventilation to a fabric filter for permanent in building abrasive blasting activities and the use of additional portable equipment like negative air machines, fume extractors, and dust collectors with HEPA filters.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning (PM)	Incentivize chipping/grinding or composting in the place of agricultural burning as well as the increased utilization of clean fuels for training burns.	Potential traffic impacts associated with increased transportation of agricultural materials to chipping, grinding, or composting facilities.
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves (PM)	Incentivize upgrading of wood burning hearths to cleaner hearth as well as an increase in the stringency of the curtailment program and education.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of alternative fuels/additives and increased waste disposal.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	Potential changes in traffic pattern/volume due to construction activities and operation of new roadway infrastructure.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.

TABLE 4.7-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	TRAFFIC IMPACT
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soils (TACs, PM)	Construction of and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction and operation of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
TXM-09	Control of Toxic Emissions from Oil and Gas Well Activities (TACs, PM)	Construction and operation of enclosures and control equipment and implementation of method to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential changes in traffic pattern/volume due to construction activities, deliveries of alternative fuels, and operation of new roadway infrastructure.

TABLE 4.7-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	TRAFFIC IMPACT
ORHD-06	Innovative Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential changes in traffic pattern/volume due to construction activities, deliveries of alternative fuels, and operation of new roadway infrastructure.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential changes in traffic pattern/volume due to construction activities, deliveries of alternative fuels, and operation of new roadway infrastructure.
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential changes in traffic pattern/volume due to construction activities, deliveries of alternative fuels, and operation of new roadway infrastructure.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 Control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased ammonia and catalyst use and waste disposal.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentives for the use of control equipment such as SCRs.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased ammonia and catalyst use and waste disposal.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased ammonia and catalyst use and waste disposal.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower amount of emissions.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.

4.7.3 SIGNIFICANCE CRITERIA

The NOP/IS (Appendix A) concluded that the 2016 AQMP would not conflict with an applicable transportation plan, ordinance, or policy; result in a change in air traffic patterns; substantially increase hazards due to a design feature or incompatible uses; result in inadequate emergency access; or conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. However, implementation of the 2016 AQMP would be considered to have significant transportation and traffic impacts if any of the following conditions occur:

- Peak period levels on major arterials are disrupted to a point where level of service (LOS) is reduced to D, E, or F for more than one month.
- An intersection's volume to capacity ratio increase by 0.02 (two percent) or more when the LOS is already D, E or F.
- A major roadway is closed to all through traffic, and no alternate route is available.
- There is an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.
- The demand for parking facilities is substantially increased.
- Water borne, rail car, or air traffic is substantially altered.
- The need for more than 350 employees
- An increase in heavy-duty transport truck traffic to and/or from the facility by more than 350 truck round trips per day
- Increase customer traffic by more than 700 visits per day.

4.7.4 IMPACT ANALYSIS

For purposes of evaluating potential traffic impacts, it has been assumed herein that no new rail or truck traffic routes will be constructed, but rather some of the existing routes/corridors may be modified to include catenary overhead electrical lines. The Blue Line, Green Line, and Gold Line currently being operated in the Los Angeles County by the Metropolitan Transportation Authority are examples of existing catenary overhead electrical line systems within the southern California area. In addition, control measures ECC-03, ECC-04 and CMB-02 would cause minor traffic impacts associated with construction workers and material deliveries necessary to install solar panels, cool roof technology, and water heaters at residences.

4.7.4.1 Construction Impacts

The existing rail and truck routes/corridors that could be modified to construct electric and/or magnetic power infrastructure are located primarily in commercial and industrial zones within the

southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well as inland facilities. Since only existing transportation routes will be modified, no new transportation routes are anticipated as part of the proposed project, project impacts will be temporary in nature and limited to construction activities.

Implementation of Control Measures MOB-09, ORHD-05, ORHD-06, ORHD-08 and ORHD-09 could require the installation of catenary overhead electrical lines and fixed guideway systems, battery charging stations, and fueling infrastructure within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, and materials and supplies to the project site during the duration of the construction activities. Additional traffic will be generated by the 2016 AQMP due to the need to transport increased waste for disposal (e.g., construction debris). Heavy construction equipment such as backhoes, cranes, cherry pickers, front end loaders, and other types of equipment would be used to carry out the aforementioned construction activities. Construction activities would be expected to occur within or adjacent to existing roadways which could require lane closures to protect construction workers and avoid traffic conflicts. These construction activities are expected to occur along heavily travelled roadways (e.g., roads near the ports, such as Sepulveda Boulevard, Terminal Island Freeway, on Navy Way at the Port of Los Angeles, and Alameda Street). Construction traffic could potentially result in increased traffic volumes on heavily traveled streets and require temporary lane closures. Construction activities may result in the following impacts:

- Temporary reduction in the level of service on major arterials;
- Temporary closure of a roadway or major arterial;
- Temporary closure of a railroad line;
- Temporary impact on businesses or residents within the construction area;
- Removal of on-street parking; and
- Conflict with public transportation system (e.g., temporary removal of bus stops).

Construction activities necessary to modify existing rail and truck routes/corridors would vary depending on the location and the specific traffic impacts are unknown. Project specific impacts would require a separate CEQA evaluation. However, the above listed traffic impacts, although temporary in nature, could be significant and result in a reduction of LOS at local intersections, result in partial or temporary road or lane closures, result in additional traffic congestion, and potentially impact roadways within the County's congestion management plan.

4.7.4.2 Operational Activities

Because control measures MOB-09, ORHD-05, ORHD-06, ORHD-08 and ORHD-09 are expected to apply to existing transportation corridors, no new streets, roads, freeways, or rail lines are expected to be needed as part of implementing the 2016 AQMP. Implementation of control measures MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09 may contribute to significant adverse operational traffic impacts on roadways because transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines may occur which could adversely affect traffic and congestion for all other vehicles on the road.

MOB-01 might result in an increase of harbor traffic, if the ports decide to use the barge-based bonnet system to capture emissions from ocean-going vessels. The additional number of vessels is speculative at this time, but could potentially result in significant impacts to transportation and traffic by creating congestion and causing an increase in traffic hazards in the harbors.

The number of zero and near-zero emission vehicles that will be driving on roadways in the Basin are projected to substantially increase between year 2016 and year 2031, because a number of Control Measure would accelerate the penetration of zero emission vehicles, trucks, buses, and heavy-duty trucks (see Table 4.7-2). The 2016 AQMP would result in an estimated increase of over 700,000 partial-zero and zero emission vehicles, 11,000 partial-zero and zero emission buses, and 115,000 partial-zero and zero heavy emission trucks by 2031. The goal of proposed control measures is to replace older vehicles with new technology vehicles upon retirement. The transition to zero or near-zero trucks will replace existing trucks but will not change the number of trucks travelling in the Basin or affect the number of vehicle miles travelled on an annual basis. Incentives provided to increase the penetration of partial-zero and zero emission mobile sources would also be expected to include the retirement (removal of the sources from the Basin through scrapping or sold outside of the State) of the existing gasoline/diesel mobile sources to assure that the intended environmental and air quality benefits of the program are achieved. Therefore, no increase in mobile sources would be expected and no related traffic and circulation impacts would be generated.

TABLE 4.7-2

Estimated Increase in Electric Mobile Sources

CONTROL MEASURE NO.	CONTROL MEASURE DESCRIPTION	ESTIMATED INCREASE IN VEHICLES	
		2023	2031
MOB-05, MOB-14, ONLD-01, and ORLD-03	Accelerated Penetration of Partial-Zero and Zero Emission Vehicles	357,000	714,000
ORHD-04	Advanced Clean Transit, Accelerated Penetration of Partial-Zero and Zero Emission Buses	11,000	11,000
MOB-06, MOB-07, MOB-08, ORHD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-08	Accelerated Penetration of Partial-zero and Zero Emissions Light, Medium and Heavy-Duty Trucks	115,000	245,000

Similarly, implementation of MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09 may alter railway traffic due to infrastructure improvements pertaining to overhead catenary electrical lines. However, specific design features are unknown at this time. As such, to identify any impacts at this time without knowing the specific design features would be speculative. Nonetheless, when details of the project become available, any proposed modifications to an existing rail or truck traffic route/corridor will require a separate CEQA evaluation to analyze specific traffic impacts and identify appropriate mitigation measures. Regardless, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road.

Additional traffic will be generated by the 2016 AQMP due to the need to transport increased waste for disposal (e.g., waste from scrapping of old equipment/vehicles, and waste from air pollution control equipment, such as filters), increased waste material for recycling (e.g., catalysts), increased use of products (e.g., ammonia, catalysts, SBS, alternative fuels/additives), and increased transportation or agricultural material for chipping, grinding, or composting facilities. At this time, it is not known what control strategies may be applied, which facilities may require additional trips, or how often these trips may be necessary. Therefore, no traffic estimates can be prepared at this time. The impacts of the proposed project on traffic and transportation are expected to be significant prior to mitigation. While mitigation measures could help minimize some of the impacts, the SCAQMD cannot predict how a future lead agency might choose to mitigate a particular significant traffic and transportation impact. Thus, the future traffic and transportation impacts are considered to be significant due to implementation of the 2016 AQMP control measures.

4.7.5 MITIGATION MEASURES

The impact of the proposed project on traffic and circulation during construction, although temporary in nature, are considered significant. In addition, the impact of the proposed project on

traffic and circulation during operation, are considered significant if an existing roadway is dedicated exclusively as a truck lane for vehicles using the overhead catenary electrical lines or fixed guideway systems because traffic patterns and congestion may be altered. Furthermore, if the barge-based bonnet technology is used to reduce emissions from ocean going vessels, the increase in barges at the harbors could create a significant congestion and traffic hazard impact. No mitigation measures have been identified to reduce the operational transportation and traffic impacts.

In order to mitigate potential construction traffic impacts, project-specific information would be necessary in order to first identify the specific impacts (e.g., project location, distance of roadway to be altered, etc.) to develop appropriate mitigation measures. The following mitigation measures have been identified to reduce traffic and transportation impacts:

TR-1 Develop a construction management plan that includes at least the following items and requirements, if determined to be feasible by the Lead Agency:

- A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes;

- Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur;

- Location of construction staging areas for materials, equipment, and vehicles at an approved location;

- A process for responding to and tracking complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. The Lead Agency shall be informed who the Manager is prior to the issuance of the first permit;

- Provision for accommodation of pedestrian flow;

- As necessary, provision for parking management and spaces for all construction workers to ensure that construction workers do not park in street spaces;

- Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the project sponsor's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat to public health or safety shall be repaired immediately. The street shall be restored to its condition prior to the new construction as established by the Lead Agency (or other appropriate government agency) and/or photo documentation, at the sponsor's expense, before the issuance of a Certificate of Occupancy;

- Any heavy equipment brought to the construction site shall be transported by truck, where feasible;

- No materials or equipment shall be stored on the traveled roadway at any time;

- Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion;

- All equipment shall be equipped with mufflers;

- Prior to the end of each work-day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on the property, within the public rights-of-way, or properties of adjacent or nearby neighbors; and

- Promote "least polluting" ways to connect people and goods to their destinations.

4.7.6 IMPACTS AFTER MITIGATION

No mitigation measures were identified to reduce the significant impacts from the exclusive dedication of existing lanes of vehicle traffic travel as a truck lane for vehicles using the overhead catenary electrical lines or fixed guideway systems because traffic patterns and congestion may be altered or for the significant impacts associated with the increase in vessels in the harbor should the barge-based bonnet technology be used. Therefore, the ~~operational~~transportation and traffic impacts remain significant. Although mitigation measure TR-1 would reduce transportation and traffic impacts during construction, those impacts would still remain significant.

4.8 AESTHETICS

4.8.1 INTRODUCTION

This subchapter examines the aesthetic impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect aesthetic impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP did not identify any control measures as having potentially significant aesthetic impacts. However, comments were received on the NOP/IS relative to aesthetics impacts. After consideration of these comments and further review of the control measures, implementation of some 2016 AQMP control measures could change the existing visual character or quality of any site on which certain types of technologies may be installed and its surroundings and result in glare. Therefore, analysis of these potentially significant impacts have been included.

4.8.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL AESTHETICS IMPACTS

The 2016 AQMP continues the air quality management strategy of advancing clean technologies and promoting their use. Implementing some of the 2016 AQMP control measures could result in aesthetics impacts in the region. The aesthetics analysis in this Program EIR identifies the potential aesthetics impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential aesthetics impacts.

Each control measure proposed in the 2016 AQMP was evaluated and eight control measures were identified as having potential adverse aesthetics impacts. Table 4.8-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant aesthetics impacts.

TABLE 4.8-1

Control Measures with Potential Aesthetics Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AESTHETICS IMPACT
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential glare impacts due to the installation of solar panels on roofs.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx, CO, PM, CO2 and ozone emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential glare impacts due to solar reflectance from the use of cool roof technology.
MOB-1	Emission Reductions at Commercial Marine Ports (NOx, SOx, PM)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Change in visual character due to the use of bonnets on top of marine vessel stacks.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential aesthetics impacts due to construction and operation of new roadway infrastructure (e.g., overhead catenaries).
ORHD-06	Innovative Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential aesthetics impacts due to construction and operation of new roadway infrastructure (e.g., overhead catenaries).
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential aesthetics impacts due to construction and operation of new roadway infrastructure (e.g., overhead catenaries).
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential aesthetics impacts due to construction and operation of new roadway infrastructure (e.g., overhead catenaries).
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies.	Change in visual character due to the use of bonnets on top of marine vessel stacks.

4.8.3 SIGNIFICANCE CRITERIA

Implementation of the 2016 AQMP would be considered to have significant aesthetics impacts if any of the following criteria apply:

- Substantial adverse effect on scenic vistas;
- Substantial damage to scenic resources, including but not limited to trees, rock outcroppings, and historic building within a state scenic highway;
- Creation of a new source of substantial light or glare which would adversely affect day or nighttime views in the area

4.8.4 IMPACT ANALYSIS

Potential aesthetics impacts associated with the 2016 AQMP include: 1) substantial adverse effect on a scenic vista; 2) substantial damage to scenic resources, including, but not limited to, trees, rock outcropping, and historic buildings within a state scenic highway; 3) substantial degradation of the existing visual character or quality of the site and its surrounds; and, 4) creating a new source of substantial light or glare which would adversely affect day or nighttime views in the area. Four control measures could require the installation of catenary overhead electrical lines and fixed guideway systems, battery charging stations, and fueling infrastructure. For purposes of evaluating potential aesthetic impacts for these control measures, the analysis in this Program EIR assumes that no new rail or truck traffic routes will be constructed, but some of the existing routes/corridors may be modified to include catenary overhead electrical lines. The Blue Line, Green Line, and Gold Line currently being operated in the Los Angeles County by the Metropolitan Transportation Authority are examples of existing catenary overhead electrical line systems within the southern California area. Additionally, two control measures would promote the use of bonnets on top of marine vessel stacks to reduce emissions which could change the visual character of the area where these units are operated, and two other control measures would promote the addition of solar panels on roofs and the use of cool roof technology which could increase glare impacts.

4.8.4.1 Construction Impacts

The existing rail and truck routes/corridors that could be modified to construct electric and/or magnetic power infrastructure are located primarily in commercial and industrial zones within the southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, the Port of Long Beach, and other industrial areas located in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well as inland facilities.

Implementation of control measures ORHD-05, ORHD-06, and ORHD-08 and ORHD-09 could require the installation of catenary overhead electrical lines and fixed guideway systems, battery charging stations, and fueling infrastructure within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Implementation of ECC-03 and ECC-04 could require the installation of solar panels and cool roof technology such as solar reflectance. MOB-01 and

ORFIS-04 would lead to the use of bonnet technology, which could be either land-based or barge-based, to reduce emissions from marine vessels.

The potential locations for catenary overhead power lines (near Port facilities, transportation corridors, and railyards) would not be visible to Route 1 at State Route 19 due to the numerous structures and topography between the two locations. There are no officially designated Scenic Highways or highways eligible for State Scenic Highway Designation in areas affected by construction of zero or near-zero emission equipment associated with the 2016 AQMP. The bonnet technology would be used at the Port of Los Angeles and the Port of Long Beach, both of which are located in the Basin. While there would be no construction associated with the barge-based systems, dockside construction may be needed if the land-based systems are used.

The installation of solar panels or cool roof technology could potentially occur in both residential and commercial areas. During construction, the equipment staging and laydown areas would be in close proximity to the each affected site and could create a temporary, but potentially significant aesthetic impact due to the degradation of the existing visual character of the each affected sites.

4.8.4.2 Operational Activities

As discussed under construction activities, control measures associated with potential aesthetics impacts in the 2016 AQMP are due to the potential installation of permanent catenary lines (overhead power lines) to power zero and near-zero emission trucks and locomotives, the use of bonnet technology on marine vessel stacks, and the installation and use of solar panels and cool roof technology.

Aesthetic impacts from zero or near-zero emission equipment are primarily associated with the permanent placement of catenary poles and overhead wires. As previously stated, most of the areas within the Basin where such equipment is being considered are primarily heavily industrialized areas and major transportation corridors. The heavily industrialized areas around the ports, near the cargo transfer facilities serving the ports, along existing transportation corridors, and the cargo transfer railyards, are not near an officially designated Scenic Highway or a roadway eligible for State Scenic Highway Designation, i.e., the overhead lines would be at least five miles away. At this distance, the overhead power lines and catenary system would not be visible to an officially designated Scenic Highway or to a roadway eligible for designation as a Scenic Highway. As such, implementation of the 2016 AQMP would not result in significant aesthetic impacts to scenic highways. However, the catenary poles and overhead electric wires could degrade the existing visual character or quality of the surrounding area, especially in areas which extend the existing Metro lines to populated areas.

Similarly, while the use of bonnet technology could degrade the existing visual character or quality in the immediate surrounding area, it is unlikely that the use of bonnet technology would be visible from sensitive public vantage points due to the presence of intervening structures at the ports. One example of the use of this bonnet technology is the installation of a dockside catalytic control

system (DoCCS) at the Mitsubishi Cement Facility Modification Project at the Port of Long Beach[1].

Implementation of Control Measures ECC-03 and ECC-04 could lead to increased installation and use of solar panels and cool roof technology, such as solar reflectance, on existing structures. Therefore, these technologies could create a significant source of glare as a result of the 2016 AQMP.

Based on the above, implementation of the 2016 AQMP may substantially degrade the existing visual character or quality of a site and its surroundings from the installation of catenary lines and use of bonnet technology. Furthermore, the installation and use of solar panels and cool roof technology could create a significant source of glare. Therefore, aesthetics impacts during operation are considered potentially significant.

4.8.5 MITIGATION MEASURES

The aesthetics impacts that may result from implementing eight control measures in the 2016 AQMP during construction and operation is considered significant and mitigation measures are required to minimize these . The following feasible mitigation measures are required:

AE-1 To the extent feasible, the sites selected for use as construction staging and laydown areas would be areas that are already disturbed and/or are in locations of low visual sensitivity. Where feasible, construction staging and laydown areas for equipment, personal vehicles, and material storage would be sited to take advantage of natural screening opportunities provided by existing structures, topography, and/or vegetation. Temporary visual screens would be used where helpful, if existing landscape features did not screen views of the areas.

AE-2 All construction, operation, and maintenance areas would be kept clean and tidy, including the re-vegetation of disturbed soil and storage of construction materials and equipment would be screened from view and/or are generally not visible to the public, where feasible.

AE-3 Siting projects and their associated elements next to important scenic landscape features or in a setting for observation from State scenic highways, national historic sites, national trails, and cultural resources should be avoided to the greatest extent feasible.

AE-4 Apply development standards and guidelines to maintain compatibility with surrounding natural areas, including site coverage, building height and massing, building materials and color, landscaping, site grading, and so forth in accordance with general plans, master plans, and adopted design guidelines, where applicable.

AE-5 To reduce glare, provide structural and/or vegetative screening from light-sensitive uses, where feasible.

[1] The NOP/IS (http://www.polb.com/civica/filebank/blobdload.asp?BlobID=8645) for the project concluded that aesthetic impacts from the DoCCS would be less than significant.

4.8.6 IMPACTS AFTER MITIGATION

While the above mitigation measures could minimize some of the aesthetics impacts, the SCAQMD cannot predict how a lead agency might choose to mitigate a particular significant aesthetics impact for future project(s) located in areas with project-specific features and issues. Thus, the potential exists for impacts for future projects to be significant even after feasible mitigation measures are identified and imposed. Therefore, aesthetics impacts that may occur as a result of implementing the 2016 AQMP are expected to remain significant after mitigation.

4.9 POTENTIAL ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

The environmental effects of the proposed plan that may have potentially significant adverse effects on the environment are identified, evaluated, and discussed in detail in the preceding portions of Chapter 4 of this Program EIR and in the NOP/IS (Appendix A) per the requirements of the CEQA Guidelines (§§15126(a) and 15126.2). The potentially significant adverse environmental impacts as determined by the NOP/IS (Appendix A) include: air quality and greenhouse gas emissions; hazards and hazardous materials; hydrology and water quality; noise; solid and hazardous waste; and transportation and traffic. After circulation of the NOP/IS, aesthetic impacts were also included in the EIR for further review. The analysis provided in the NOP/IS concluded that the following environmental topics would be less than significant: agriculture and forestry resources, biological resources, cultural resources; energy; geology and soils; land use and planning; mineral resources; population and housing; public services and recreation. The reasons for finding the environmental resources to be less than significant are explained below.

4.9.1 AGRICULTURE AND FORESTRY RESOURCES

Implementation of the 2016 AQMP is not expected to generate any new construction of buildings or other structures that would require the conversion of farmland to non-agricultural use or conflict with zoning for agricultural uses or with a Williamson Act contract. Proposed control measures would typically affect existing facilities that are located in appropriately zoned areas and new facilities that may be affected by control measures would be constructed and operated for reasons other than complying with the control measures. Therefore, it is not expected that implementing 2016 AQMP control measures would conflict with any forest land zoning codes or convert forest land to non-forest uses. Control measure BCM-04 Emission Reduction from Manure Management would call for the application of ammonia reducing agents to manure but it is not expected to cause a cost increase high enough to result in conversion of farmland to other uses. Additionally, land use and other planning considerations are determined by local governments and no agricultural land use or planning requirements would be altered by the proposed project. The 2016 AQMP control measures could provide benefits to agricultural and forest land resources through the improvement of air quality in the region, thus reducing the adverse oxidation impacts of ozone on plants and animals.

4.9.2 BIOLOGICAL RESOURCES

Implementation of the 2016 AQMP is not expected to result in habitat modification, adversely affect any riparian habitat or interfere with the movement of any native resident or migratory fish or wildlife species. Facilities affected by modifications from the proposed control measures generally occur in areas zoned as commercial or industrial which typically do not support candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Furthermore, existing industrial or commercial facilities typically have little to no plant life or plant life supporting wildlife species for fire safety reasons. Construction that impacts affected species is

not reasonably foreseeable as part of implementation of the 2016 AQMP. Improving air quality is expected to provide health benefits to plant and animal species in the Basin.

Implementing some AQMP control measures may change or increase a facility's potential to generate wastewater. Affected industrial or commercial facilities are generally considered "point sources" and as such must release wastewater into POTWs under the NPDES permit program, administered by the RWQCB. Under CWA §404, direct discharge into federally protected wetlands is prohibited. Control measures promoting the installation of air pollution control at port facilities are not expected to have wastewater impacts. Port facilities are considered to be heavy industrial facilities consistent with this land use and are subject to water quality standards established in the California Ocean plan for any wastewater released into California's ocean waters. Therefore, the 2016 AQMP will not adversely affect protected wetlands as defined by CWA §404.

Land use plans, local polices, or ordinances, or regulations protecting biological resources are not expected to be affected by the proposed control measures as they primarily affect existing commercial and industrial facilities located in appropriately zones areas. The 2016 AQMP will not cause new development that would affect biological resources and such development would take place regardless of the 2016 AQMP. The SCAQMD does not have legal authority over land use decision except to impose certain air pollution requirements, which do not drive the land use approval process, and therefore, cannot alter or interfere with land use zoning ordinance or designations and cannot approve new land use projects. The 2016 AQMP is not expected to affect habitat conservation or natural community conservation plans, agricultural resources or operations, and would not create divisions in any existing communities for the reasons mentioned above.

4.9.3 CULTURAL RESOURCES

Facilities potentially affected by the implementation of the 2016 AQMP, where physical modification may occur, are typically located in appropriately zoned industrial or commercial areas that have previously been disturbed and are not typically considered to be historically significant. Further, it is unlikely that construction activities, including heavy construction activities like cut-and-fill excavation, at potentially affected existing facilities would uncover cultural resources as these existing facilities are located in previously disturbed areas. Affected facilities may have equipment older than 50 years old that needs to be modified, however such equipment does not typically meet criteria identified in CEQA Guidelines §15064.5(a)(3) to be considered historically significant. While the likelihood of encountering cultural or archaeological resources is low, there is still a potential that additional buried archaeological resources may exist. Any such impact from unexpected sub-surface resources would be eliminated by using standard construction practices and complying with state law including Public Resource Code §21083.2 and CEQA Guidelines §15064.5.

4.9.4 GEOLOGY AND SOILS

The Basin encompasses an area known to be seismically active. The 2016 AQMP control measures would not directly or indirectly expose people or structures to earthquake faults, seismic shaking, or seismic-related grounding failure. Control measures that would accelerate the

penetration of zero or low emission off-road equipment would not affect geology or soils as they would continue to operate on existing roadways and are not expected to affect construction activities. Any structural modifications, which typically would occur in areas zoned as industrial or commercial, may be in areas where seismic-related activities are part of the existing setting. Modifications to affected facilities would be required to comply with the relevant California Building Code in effect at the time of initial construction or modification of a structure. The California Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes.

Any potentially affected facilities located in areas with historic occurrence of liquefaction must comply with more stringent requirements under the California Building Code. No control measures would require the location of new or relocation of existing facilities in areas prone to liquefaction. Further, the hazards are part of the existing setting and are not made worse through the implementation of the 2016 AQMP. Adverse soil erosion impacts are not expected because the modifications required by the 2016 AQMP are not expected to require substantial grading or construction activities. Additionally, the control measures would not promote the construction of residential or other types of land use projects in remote areas that would require septic tanks or other alternative waste disposal systems. Most of the potentially affected facilities are industrial or commercial and as such would have their own sewage facility connections and would not require the use of septic tanks or alternative waste water disposal systems.

4.9.5 LAND USE AND PLANNING

Implementation of the 2016 AQMP will promote the installation of stationary source control equipment at existing commercial or industrial facilities and would not create land use impacts because construction of new structures affecting land use planning would occur for reasons other than implementation of control measures and would occur regardless of the 2016 AQMP. Furthermore, SCAQMD has no land use authority except to impose air pollution control requirements, which do not drive the land use approval process.

Potential land use impacts associated with the 2016 AQMP are associated primarily with the construction of support system (e.g. magnetic infrastructure related to the operation of zero and near-zero transport systems). In evaluating potential impacts, it has been assumed herein that no new rail or truck traffic routes would be constructed, but rather that existing ones would be modified. No land use conflicts, or inconsistencies with any general plan, or zoning ordinance are expected since only existing transportation routes would be modified. It is possible that construction activities to modify transportation routes could temporarily disrupt or divide the community. However, because construction of new traffic routes/corridors is not required, once construction activities are finished and physical barriers removed, no long term land use impacts are anticipated. Any proposed modification to an existing rail or truck traffic route/corridor will require a separate CEQA evaluation but no significant land use impacts were identified because the proposed control measures would be expected to comply with, not interfere with, applicable land use plans, policies, or regulations of an agency with jurisdiction over the project.

Land use planning is handled at a local level and contributes to development of the 2016 AQMP growth projections. The 2016 AQMP does not affect local government land use planning

decisions; instead the 2016 AQMP incorporates local land use planning decisions and population growth and complements SCAG's 2016 RTP/SCS.

4.9.6 MINERAL RESOURCES

The 2016 AQMP contains no provisions that would result in the loss of availability of a known mineral resource of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Incentives for the penetration of zero and near-zero emission technology in the 2016 AQMP are not expected to result in an increase in the use of mineral resources. Further, the 2016 AQMP is not expected to require substantial construction activities and would not have a significant impact on the use of important minerals, nor would the project result in covering over or otherwise making mineral resources unrecoverable. Therefore, no significant adverse mineral resource impacts are anticipated from implementing the 2016 AQMP.

4.9.7 POPULATION AND HOUSING

The 2016 AQMP would mainly affect existing commercial or industrial facilities in appropriately zones industrial or commercial areas and, as such, is not anticipated to generate any significant effects on the Basin's population or population distribution. It is expected that the existing labor pool within Southern California would accommodate labor requirements for any modifications required and that few or no new employees would need to be hired at affected facilities as the new control equipment is typically not labor intensive to operate or maintain. Implementing the mobile source control measures, like those that would accelerate the penetration of zero or low emission vehicles, would not induce population growth because there are a finite number of drivers in the region at any given time. Future population growth would occur in the region for reasons other than complying with the 2016 AQMP control measures and adopting the control measures is not expected to result in changes to population densities or induce significant growth in the population. The 2016 AQMP contains no provisions that would lead to displacement of a substantial number of people of existing housing nor necessitate the construction of replacement housing elsewhere.

4.9.8 PUBLIC SERVICES

No adverse public service impacts are expected as a result of adopting the 2016 AQMP as it would not result in the need for new of physically altered government facilities to maintain acceptable service ratios, response times, or other performance objectives. Most of the affected industrial facilities have on site security and fire protection personnel, so no increase in police or fire protection services is expected. In the absence of onsite police or fire protection services, the 2016 AQMP control measures would not hinder service ratios or response times. The control measures are not expected to require additional fire protection services to the extent that it would cause construction of new facilities because, pursuant to the Health and Safety Code, emergency or rescue vehicles used for responding to situations where potential threats to life or property exist are specifically exempt from regulations requiring alternative clean fueled vehicles. As noted in the discussion under "Population and Housing," implementing the 2016 AQMP would not cause a future population increase, this it is not expected to require the need for new of physically altered school facilities nor adversely affected existing public services or facilities. Anticipated

development to accommodate future population growth would occur for reasons other than complying with the 2016 AQMP.

4.9.9 RECREATION

No provision contained in the 2016 AQMP would affect land use plans, policies, ordinances, regulations, or population growth, as discussed under "Land Use and Planning" and "Population and Housing." Land use and other planning considerations are determined by local governments and none of the land use or planning requirements relating to recreational facilities will be altered by the 2016 AQMP. Because the 2016 AQMP does not have the potential to induce population growth, the control measures will not increase the use of, or demand for, existing neighborhood and/or regional parks and recreational facilities or require construction of recreational facilities that might have an adverse physical effect on the environment. Additionally, control measures that require the installation of control equipment typically affect facilities in industrial or commercial zones and would not impact land use, including recreational facilities, at all.

4.10 OTHER CEQA TOPICS

4.10.1 GROWTH-INDUCING IMPACTS

CEQA defines growth-inducing impacts as those impacts of a proposed project that "could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects, which would remove obstacles to population growth" (CEQA Guidelines §15126.2 (d)).

To address this issue, potential growth-inducing effects are examined through the following considerations:

- Facilitation of economic effects that could result in other activities that could significantly affect the environment;
- Expansion requirements for one or more public services to maintain desired levels of service as a result of the proposed project;
- Removal of obstacles to growth through the construction or extension of major infrastructure facilities that do not presently exist in the project area or through changes in existing regulations pertaining to land development;
- Adding development or encroachment into open space; and/or
- Setting a precedent that could encourage and facilitate other activities that could significantly affect the environment.

4.10.1.1 Economic and Population Growth and Related Public Services

The 2016 AQMP would not directly foster economic or population growth or the construction of new housing in the southern California area. The control measures accommodate the projected growth for the region while still resulting in attaining the federal ozone and PM2.5 standards. However, the 2016 AQMP would not be the cause of residential, commercial, or industrial growth.

A project would directly induce growth if it would directly foster economic or population growth or the construction of new housing in the surrounding environment (e.g., if it would remove an obstacle to growth by expanding existing infrastructure such as new roads or wastewater treatment plants). The 2016 AQMP would not remove barriers to population growth, as it involves no changes to general plans, zoning ordinances, or related land use policies. Alternatively, the 2016 AQMP would not create barriers to projected population growth because it would result in avoiding sanctions or implementation of a Federal Implementation Plan, which could increase the New Source Review emission offset ratio or result in highway funding sanctions.

The 2016 AQMP does not include policies that would encourage the development of new housing or population-generating uses or infrastructure that would directly encourage such uses. The 2016

AQMP does not change jurisdictional authority or responsibility concerning land use or property issues. Land use authority falls solely under the purview of the local governments. The SCAQMD is specifically excluded from infringing on existing city or county land use authority (California Health & Safety Code §40414). Therefore, the 2016 AQMP would not directly trigger new residential development in the area or alter land use policies.

The 2016 AQMP may result in construction activities associated with implementation of certain control measures (e.g., control equipment at existing stationary sources or electrification along existing roadways). However, the 2016 AQMP would not directly or indirectly stimulate substantial population growth, remove obstacles to population growth, or necessitate the construction of new community facilities that would lead to additional growth in the Basin. It is expected that construction workers will be largely drawn from the existing workforce pool in southern California.

Considering the existing workforce in the region, it is expected that a sufficient number of workers are available locally and that few or no workers would relocate for construction jobs potentially created by the 2016 AQMP as construction activities would be spread over a period of about 15 years. Further, the 2016 AQMP would not be expected to result in an increase in local population, housing, or associated public services (e.g., fire, police, schools, recreation, and library facilities) since no increase in population or the permanent number of workers is expected. Likewise, the 2016 AQMP would not create new demand for secondary services, including regional or specialty retail, restaurant or food delivery, recreation, or entertainment uses. As such, the 2016 AQMP would not foster economic or population growth in the surrounding area in a manner that would be growth-inducing.

4.10.1.2 Removal of Obstacles to Growth

The 2016 AQMP is located within an existing urbanized area where adequate infrastructure is already in place to serve the existing surrounding population. The 2016 AQMP would not employ activities or uses that would result in growth inducement, such as the development of new infrastructure (e.g., new roadway access) that would directly or indirectly cause the growth of new populations, communities, or currently undeveloped areas. The 2016 AQMP is not expected to result in the use of large amounts of fuel or energy resources or result in the use of fuel or energy resources in a wasteful manner. However, the 2016 AQMP includes incentives to shift from diesel and gasoline fuel use to increased electrification of stationary and mobile sources and the use of alternative fuels. The 2016 AQMP could result in a substantial increase in electricity (greater than one percent of the existing electricity use in the Basin), and increased electricity demand is potentially significant. The demands for electricity associated with increased electrification of mobile sources could be partially offset by charging equipment (e.g., electric vehicles) at night when the electricity demand is low, thus minimizing impacts on peak electricity demands. In addition, any increase in electricity demand would likely result in a concurrent reduction in demand for other types of fuels, particularly petroleum-based fuels. Therefore, the 2016 AQMP would support the efficient use of energy by decreasing the use of fossil fuels and increasing the reliance on renewable energy sources, which in turn will provide a beneficial long-term operational impact on energy conservation.

According to Appendix F of the CEQA Guidelines, Energy Conservation, the wise and efficient use of energy includes: (1) decreasing overall per capita energy consumption; (2) decreasing reliance on fossil fuel such as coal, natural gas, and oil; and (3) increasing reliance on renewable energy sources. Implementation of the 2016 AQMP would increase the amount of renewable energy usage because vehicular fuels would increase the use of electricity and decrease the use of petroleum-based fuels through increased use of partial-zero and zero emission technologies and use of biodiesel. Thus the 2016 AQMP would support the efficient use of energy by decreasing the use of fossil fuels and increasing the reliance on renewable energy sources, providing a beneficial long-term operational impact on energy conservation. Further, the 2016 AQMP includes strategies that promote energy conservation (FLX-01) without identifying specific targets; therefore, its benefits have not been quantified in this analysis. However, growth induced by the 2016 AQMP would be limited to the increase in electricity to support the increased penetration of partial-zero and zero emission technologies.

4.10.1.3 Development or Encroachments into Open Space

Development can be considered growth-inducing when it is not contiguous to existing urban development and introduces development into open space areas. The 2016 AQMP affects facilities situated within the existing Basin, which is urbanized. The areas of the Basin where construction activities may occur would be at existing stationary sources and along transportation corridors. Stationary sources are generally located within commercial and industrial (urbanized) areas. Any related construction activities would be expected to be within the confines of the existing facilities and would not encroach into open space. The 2016 AQMP may also result in the construction of overhead catenary lines to electrify roadways and transportation corridors. These transportation measures are expected to use existing roadways and are not expected to require the development of new roads or freeways. Therefore, the 2016 AQMP would not result in development within or encroachment into an open space area.

4.10.1.4 Precedent Setting Action

The 2016 AQMP demonstrates attainment of the ozone and PM2.5 standards by applicable dates as required by the CAA. The federal CAA requires ozone and PM2.5 nonattainment areas to prepare a SIP which must be submitted to the U.S. EPA. Therefore, the 2016 AQMP is being prepared to comply with state and federal air quality planning regulations and requirements. These required approvals are routine compliance actions and would not result in precedent-setting actions that might cause other significant environmental impacts (other than those evaluated in other sections of this Program EIR).

4.10.1.5 Conclusion

The 2016 AQMP was developed to comply with state and federal air quality planning requirements for ozone and PM2.5. The 2016 AQMP is not expected to foster economic or population growth or result in the construction of additional housing or other infrastructure, either directly or indirectly, that would further encourage growth. The 2016 AQMP could result in construction projects at existing stationary sources and along existing transportation corridors. However, the proposed project would not be considered growth-inducing, because it would not result in an

increase in production of resources or cause a progression of growth that could significantly affect the environment either individually or cumulatively, other than as evaluated in Chapters 4 and 5 of this Program EIR.

4.10.2 SIGNIFCANT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Section 15126.2 (b) of the CEQA Guidelines requires that an EIR describe significant environmental impacts that cannot be avoided, including those effects that can be mitigated but not reduced to a less than significant level. Irreversible changes include a large commitment of nonrenewable resources, committing future generations to specific uses of the environment (e.g., converting undeveloped land to urban uses), or enduring environmental damage due to an accident. The following is a summary of impacts associated with the 2016 AQMP that this Program EIR concluded are significant and unavoidable, even after mitigation.

- Air quality impacts associated with construction activities due to the implementation of the control measures in the 2016 AQMP were considered to be potentially significant.

- The 2016 AQMP could result in a substantial increase in electricity use (greater than one percent of the existing electricity use in the Basin), and the increased electricity demand is considered significant.

- The possibility exists that facilities currently using water-based products could switch to using reformulated solvent-based products made with acetone or other flammable or extremely flammable chemicals, resulting in a significant hazard impact.

- Hazard impacts associated with a tank rupture and the transportation of LNG were determined to be significant, and would remain significant after mitigation.

- The use of ammonia in SCR, SNCR, and DGS technologies could be potentially significant due to implementation of the control measures that would use aqueous ammonia. While the use of aqueous ammonia at concentrations less than 20 percent by volume is expected to reduce hazard impacts associated with ammonia use, the potential for an on-site spill of aqueous ammonia and an ammonia transportation accident would remain significant.

- Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. However, the location of the facilities that may use hazardous materials in unknown, therefore, hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school is considered significant.

- Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies such as wet ESPs and WGSs are considered significant.

- Noise and vibration impacts would be temporary in nature and related solely to construction activities, but are considered significant, even after mitigation.

- The extent and timing of construction needed to implement the 2016 AQMP is not known at this time, but the potential to exceed landfill capacities from construction waste was found to be significant. Additionally, the high volume of vehicle and equipment to retire in a short timeframe and uncertainty of their outcome would result in potential significant solid and hazardous waste impacts.

- Construction traffic impacts, though temporary in nature, are considered significant. The exclusive dedication of existing lanes of vehicle traffic travel as a truck lane for vehicles using the overhead catenary electrical lines or fixed guideway systems could lead to traffic congestion on those roadways and operational traffic impacts are considered significant.

- During construction, the equipment staging and laydown areas would be in close proximity to the location of the control measures and could create a temporary, but significant aesthetic impact due to the degradation of the existing visual character of the site. The installation of catenary lines and use of bonnet technology on ocean going vessels at the ports may substantially degrade the existing visual character or quality of a site and its surroundings and this impact is considered significant.

- The installation of solar panels and use of cool roof technology would create a significant source of glare.

Feasible mitigation measures were developed for the identified adverse significant impacts; however, those mitigation measures may not reduce the impacts to less than significant. The 2016 AQMP would place an incremental demand on nonrenewable and limited resources, such as energy and water supplies relative to the rate of use of these resources in response to population growth and increased consumer demand. The largely irretrievable conversion of undeveloped/agricultural land to urban uses is a function of the growing population and local land use authority, not the 2016 AQMP. The 2016 AQMP is expected to result in long-term benefits associated with achieving ambient air quality standards and a reduction in the use of petroleum-based fuels (e.g., increased use of alternative fuels).

Conversely, positive environmental changes are expected to result from implementation of the 2016 AQMP. The project will result in significantly reduced emissions of air pollutants, thereby improving air quality and related public health. Emission reductions will also directly improve the vitality of crops and other plants. The health of livestock, domestic animals and other wildlife will be indirectly enhanced by the positive effects on plant life, as well as by any direct benefits attributable to less air pollution. The damage to buildings and other structures attributable to air pollution also will be diminished, as well as an improvement in aesthetics and visibility.

4.10.3 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

An important consideration when analyzing the effects of a proposed project is whether it will result in short-term environmental benefits to the detriment of achieving long-term goals or maximizing productivity of these resources. Implementing the 2016 AQMP is not expected to

achieve short-term goals at the expense of long-term environmental productivity or goal achievement. The purpose of the 2016 AQMP is to set forth a comprehensive control program that will lead the Basin into compliance with the federal ozone and PM2.5 air quality standards. By attaining federal and state air quality standards, the 2016 AQMP is expected to enhance short and long-term environmental productivity in the region.

Implementing the 2016 AQMP does not narrow the range of beneficial uses of the environment. Although significant impacts have been identified, implementation of the recommended mitigation measures will ensure such impacts are mitigated to the greatest degree feasible.

Because no short-term environmental benefits are expected at the expense of long-term environmental goals being achieved, there is no justification for delaying the proposed action. This project must be implemented now as the SCAQMD is required by the federal and state CAAs to formally review the 2016 AQMP and adopt relevant plan revisions which will achieve the state and federal ambient air quality standards by the established deadlines. The SCAQMD is proceeding with the 2016 AQMP pursuant to this mandate.

CHAPTER 5

CUMULATIVE IMPACTS

5.1 Introduction
5.2 Aesthetics
5.3 Agriculture and Forestry Resources
5.4 Air Quality and Greenhouse Gases
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5.6 Cultural Resources
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5.0 CUMULATIVE IMPACTS

CEQA Guidelines §15130(a) requires an EIR to discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in §15065(a)(3). The 2016 AQMP is a regional air quality plan that includes broad policy criteria and as such, the 2016 AQMP Program EIR evaluates the environmental impacts associated with implementing the 2016 AQMP control measures to determine whether or not the impacts of the project are cumulatively considerable when combined with potential impacts associated with other similar regional projects involving regulatory activities or other projects with similar impacts.

5.1 INTRODUCTION

As noted in Chapter 2, the 2016 AQMP control measures consist of three components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) State and Federal Mobile Source Control Measures; and 3) Regional Transportation Strategy and Control Measures provided by SCAG. The project-specific analysis of environmental impacts in Chapter 4 includes analysis of control measures proposed by the SCAQMD and CARB because these are primary regulatory agencies with jurisdiction over promulgating and enforcing air quality regulations. The cumulative impacts analysis for the 2016 AQMP Program EIR includes the project-specific analyses of the SCAQMD's stationary and mobile source control measures and CARB's mobile source control measures, as well as the transportation control measures (TCMs) that were developed and adopted by SCAG as part of the 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)[1] and the 2015 Federal Transportation Improvement Program (FTIP) (SCAG 2016) (see Appendix IV-C of the 2016 AQMP). The TCMs are appropriately part of the cumulative impact analysis because they include regulatory activities associated with measures that could also generate related environmental impacts within the Basin. The basis for determining the appropriate scope of the cumulative impacts analysis for the 2016 AQMP is described in the following sections.

5.1.1 SCAG'S 2016 RTP/SCS

One of SCAG's primary responsibilities is fulfilling federal and state requirements that include the development of the RTP/SCS, the FTIP, and the annual Overall Work Program. SCAG's 2016 RTP/SCS is a long-range regional transportation plan that provides a vision for regional transportation investments, integrated with land use strategies, over the period from 2016 to 2040. In general, the long-term transportation planning requirements for emission reductions from on-road mobile sources within the Basin are met by SCAG's RTP/SCS, whereas the short-term implementation requirements of the Transportation Conformity Rule are met by SCAG's FTIP.

Some of the most important components of the 2016 RTP/SCS include: integrated land use and transportation strategies; a list of transportation projects; a description of regional growth trends that identify future needs for travel and goods movement; and a financial plan that identifies the

[1] Under SB 375, SCAG addresses GHG reduction in a Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan. SB 375 was established to implement the state's GHG emissions reduction goals, as set forth by AB 32, in the sector of cars and light trucks. SCS is intended to provide a vision for future growth in Southern California that would decrease per capita GHG emissions from passenger vehicles.

amount of funding that is reasonably expected to be available to build, operate, and maintain the region's surface transportation system through the forecast horizon year of 2040. Because the 2016 RTP/SCS is a land use and transportation strategies program developed within SCAG's jurisdictional authority, it is considered to be a regional plan separate from the 2016 AQMP. However, part of SCAG's responsibilities include working with the SCAQMD to incorporate 2016 RTP/SCS TCMs into the region's air quality management plans.

In general, TCMs are those control measures that provide emission reductions from on-road mobile sources, based on changes in the patterns and modes by which the regional transportation system is used. The 2016 RTP/SCS includes a host of strategies for addressing growth, land use, and improving the regional transportation system, which are listed below.

Land Use Strategies:

- Focus new growth around transit/high quality transit areas (HQTAs)
- Plan for growth around livable corridors
- Provide more options for short trips/neighborhood mobility areas
- Support zero emission vehicles and expand electric vehicle charging stations
- Support local sustainability planning
- Protect natural and farm lands
- Balance growth distribution between 500-foot buffer areas and HQTAs

Transportation Strategies:

- Preserve the existing transportation system
- Manage congestion through Transportation Demand Management (TDM) and Transportation System Management (TSM)
- Expand Regional Transit Systems
- Expand passenger rail and maintain high speed rail commitments
- Promote active transportation
- Improve highway and arterial capacity
- Strengthen regional transportation network for goods movement
- Improve airport ground access

Strategies included within these transportation system improvements include TCMs grouped into the following three main categories of transportation improvement projects and programs: (1) Transit, intermodal transfer, and active transportation measures; (2) High occupancy vehicle (HOV) lanes, high occupancy toll (HOT) lanes, and their pricing alternatives; and (3) Information-based transportation strategies. Appendix IV-C of the 2016 AQMP includes a list of transportation control measure projects that are specifically identified and committed to in the 2016 AQMP.

SCAG's Regional Council approved the TCMs and strategies included in the 2016 RTP/SCS and certified the 2016 RTP/SCS Program EIR and the investment commitments contained in the 2015 FTIP and its subsequent amendments. These measures and recommendations have accordingly been moved forward for inclusion in the 2016 AQMP.

Because the TCMs and their emissions reductions are included along with the 2016 AQMP in the PM2.5 and Ozone SIP submittal for the Basin and because the TCMs and other projects in the

2016 RTP/SCS have the potential to generate impacts similar to those identified in the 2016 RTP/SCS Program EIR, the 2016 RTP/SCS is considered to be a cumulatively related project. The impacts of implementing these TCMs were already evaluated in the 2016 RTP/SCS Program EIR (SCAG, 2016). The cumulative analysis in this chapter relies in large part on the environmental analyses in the 2016 RTP/SCS Program EIR for the evaluation of the environmental impacts of implementing the TCMs.

5.1.2 CARB'S STATE SIP STRATEGY

As indicated above and in Chapter 2 of this Program EIR, the 2016 AQMP includes control measures to reduce emissions from sources that are primarily under state and federal jurisdiction, including on-road and off-road mobile sources that are proposed by, and the responsibility of CARB. These emission reductions, along with the emission reductions from SCAQMD and SCAG control measures, are needed to achieve the remaining emission reductions necessary for ozone and PM2.5 attainment. Statewide emission reduction control measures proposed by CARB are included in the Proposed 2016 State Strategy for the SIP (State SIP Strategy), which was released on May 17, 2016. The new measures contained in the State SIP Strategy reflect a combination of state actions, petitions for federal action, as well as actions that outline a pathway for achieving further deployment of the cleanest technologies in each sector. These measures, in conjunction with the SCAQMD's existing regulatory programs, identify all of the reductions needed to achieve a 70 percent reduction in NOx emissions from mobile sources in 2023, and an 80 percent reduction in 2031 in the Basin. The SCAQMD's existing regulatory programs are expected to aid in reducing NOx emissions from today's levels by 209 tons per day by 2031. As part of the proposed State SIP Strategy, CARB will provide an enforceable commitment to achieve an additional 107 tons per day of NOx reductions in 2023, and 97 tons per day in 2031. The State SIP Strategy will also provide 48 and 60 tons per day, respectively, of VOC reductions in 2023 and 2031 which provide supplemental benefits in reducing ozone in some portions of the Basin. Any additional commitments to address PM2.5 attainment needs in 2025 will be identified separately, if needed.

CARB's State SIP Strategy not only includes control measures applicable within the SCAQMD's area of jurisdiction, but it includes control measures applicable to the entire state of California. In particular, the State SIP Strategy also includes control measures specifically for the San Joaquin Valley Air Pollution Control District's area of jurisdiction because this area along with the Basin are the only two extreme ozone non-attainment areas in the nation with an attainment deadline of 2031. In addition, the State SIP Strategy specifically applies to the following four areas in California designated as nonattainment for the 12 μg/m3 annual PM2.5 standard: the Basin; the San Joaquin Valley; the border region of Imperial County; and the City of Portola in Plumas County. With regard to the Imperial County and Portola nonattainment areas, the State SIP Strategy includes separate, tailored control programs.

CARB prepared a Draft Environmental Analysis (EA) for the State SIP Strategy, which evaluated the project-specific and cumulative environmental effects of the State SIP Strategy control measures implemented throughout the state. As is appropriate under CEQA, CARB's Draft EA relies on a number of other CEQA documents to assist with identifying cumulative environmental impacts that may be generated by the State SIP Strategy and other potentially related programs. CEQA documents that CARB relied on for evaluating cumulative impacts of the State SIP Strategy

include the following: the First Update to the Scoping Plan (adopted in 2014) and the 2030 Target Scoping Plan Update (currently in preparation), prepared in accordance with AB 32 (Statutes of 2006); the Low Carbon Fuel Standard and Alternative Diesel Fuel Commercialization Regulations; and RTP/SCSs prepared to comply with SB 375 (Statutes of 2008). With regard to the RTP/SCSs, in addition to relying on the Program EIR for SCAG's 2016 RTP/SCS[2], CARB's Draft EA relied on the CEQA documents for 16 other RTP/SCSs prepared throughout California. CARB is working on responses to comments received on the Draft EA and working on the Final EA, which is scheduled to be heard by the CARB Board on September 22, 2016.

It is appropriate that CARB's control measures be included as part of the analysis of project-specific impacts for the AQMPs. This approach has been done for the 2003, 2007, and 2012 AQMPs previously prepared and approved by both CARB and the SCAQMD. The 2016 AQMP Program EIR continues this strategy of evaluating the CARB SIP Strategy control measures as part of the 2016 AQMP. However, it is inappropriate to incorporate the cumulative impacts analysis from CARB's Draft EA into this Program EIR for the following reasons.

As already noted, the State SIP Strategy evaluated in CARB's Draft EA includes cumulative environmental impacts from control measures implemented throughout the state of California. Further, the cumulative impacts analysis relies on CEQA documents prepared for RTP/SCSs in areas such as Madera, Fresno, Tulare, San Jose, Sacramento, etc., that are located in areas distant from the Basin. Although implementing State SIP Strategy control measures in these other areas may produce impacts similar to those identified for the 2016 AQMP, it is unlikely that environmental impacts from the 2016 AQMP will influence or be influenced by environmental impacts in these other areas. The CEQA Guidelines define cumulative impacts as, "two or more individual effects which, when considered together, are considerable or which **compound or increase other environmental impacts.**" (Emphasis added) (CEQA Guidelines §15355). Further, the CEQA Guidelines also consider location when determining cumulatively related projects. As noted in CEQA Guidelines §15130(b)(2), factors to consider when determining whether to include a related project in the cumulative analysis include the nature of each environmental resource being examined and the location of the project. Further, "location may be important, for example, when water quality impacts are at issue since projects outside the watershed would probably not contribute to a cumulative effect." Clearly projects in the other areas evaluated in CARB's Draft EA are outside the area of influence of potential impacts generated by the 2016 AQMP. To include cumulative impacts from the areas that do not influence or are not influenced by the 2016 AQMP into the cumulative analysis is inconsistent with requirements in the CEQA Guidelines. Therefore, the cumulative impacts analyses from CARB's Draft EA are not included in the analysis of cumulative impacts from the 2016 AQMP and SCAG's 2016 RTP/SCS.

5.1.3 RELATED PROJECTS FOR THE CUMULATIVE ANALYSIS

The following sections summarize the project-specific and cumulative impacts analyses from the Final Program EIR for the 2016 RTP/SCS. The discussions also summarize project-specific

[2] Review of CARB's summary of impacts from SCAG's 2016-2040 RTP/SCS, included in the Draft EA (see Draft EA Table 5.3), indicates that some of the significance determinations in the Draft EA are inconsistent with the significance determinations in SCAG's 2016-2040 RTP/SCS Final Program EIR.

impacts from the 2016 AQMP, which includes both SCAQMD control measures as well as control measures included in CARB's State SIP Strategy. The discussions also include an evaluation regarding whether or not impacts from the 2016 AQMP contribute to cumulative impacts from the 2016 RTP/SCS, which have already been evaluated in the 2016 RTP/SCS Program EIR certified by SCAG (SCAG, 2016).

5.2 AESTHETICS

5.2.1 CUMULATIVE IMPACTS

The 2016 AQMP control measures are expected to have a less than significant impact on scenic resources such as scenic vistas and scenic highways. The proposed control measures would typically affect industrial, institutional, or commercial facilities located in appropriately zoned areas (e.g., industrial and commercial areas), which are not typically associated with scenic resources. Furthermore, modifications would typically take place inside the affected facilities or can easily blend with the facilities with little or no noticeable effect on adjacent areas due to the nature of the business (e.g. industrial or commercial). During construction, the equipment staging and laydown areas would be in close proximity to the each affected site and could create a temporary, but potentially significant aesthetic impact due to the degradation of the existing visual character of the each affected sites. Mobile source control measures are not expected to adversely affect scenic resources because they do not require construction or disturbance to such resources. Although, proposed zero and near-zero emissions control measures (e.g. increased penetration of near-zero and zero emission vehicles) that could result in the installation of catenary lines (overhead power lines) are expected to be located in industrial and commercial areas or along existing high activity transportation corridors (e.g. in areas within and adjacent to the Ports of Los Angeles and Long Beach), which are not in areas with officially designated scenic highways, it is possible that the existing visual character of the site and its surroundings could be significantly impacted. The use of control devices such as bonnet technology to reduce emission from ocean going vessels could also degrade the visual character of a site. The addition of solar panels on residences could introduce a new source of glare; therefore, this impact was determined to be significant.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS would adversely affect aesthetics and views. Expected significant impacts would include the obstruction of scenic views and vista points due to the construction of highways, connectors, interchanges, goods movement roadway facilities, high speed rail, and sound walls for anticipated RTP/SCS transportation projects, which would potentially block or impede views of mountains, oceans, or rivers. Development in floodplains, wetlands, wooded areas, coastal bluffs, lagoons, reservoirs, regional parks, recreational areas, agricultural lands, or in areas that include steep slopes or scenic vistas has the potential to adversely impact visual resources

In addition, implementation of the 2016 RTP/SCS would alter areas along state designated scenic highways and vista points, in particular along SR-74 in Riverside County, I-10 in San Bernardino County, the SR-57/SR-60 Interchange improvement in Los Angeles County, and the High Desert Corridor Project could obstruct scenic resources. Rail projects such as the Slauson Light Rail and Gold Line Extensions (from Azusa to the San Bernardino County line) could also obstruct scenic

views. Due to the large number of transportation projects and potential development influenced by land use strategies, it is expected that new and expanded highway and roadway facilities, new and expanded transit projects, and new and expanded goods movement projects could result in significant impacts to vistas of scenic resources in the region and also have the potential to result in changes to visual character of existing landscapes or natural areas.

The proposed transportation projects included in the 2016 RTP/SCS would have the potential to create a new source of substantial light or glare which would adversely affect day or nighttime views and expanded areas of shade and shadow in jurisdictions where there are no ordinances protecting night skies or local standards protecting shadow-sensitive land uses. These impacts are potentially significant and mitigation measures were imposed.

Because implementation of the 2016 RTP/SCS would include the extension of transportation and related infrastructure to areas outside the region and, as such, would indirectly result in changes to the visual character or to scenic areas outside of the SCAG region, the 2016 RTP/SCS would contribute to a cumulatively considerable loss of scenic resources.

Impacts from implementation of the 2016 AQMP to aesthetic resources were determined to generate significant adverse aesthetic impacts. Therefore, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to aesthetic resources identified in the 2016 RTP/SCS.

5.2.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to aesthetics have been identified.

5.2.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to aesthetics from implementation of the 2016 AQMP would remain significant and unavoidable.

5.3 AGRICULTURE AND FORESTRY RESOURCES

5.3.1 CUMULATIVE IMPACTS

Impacts to agriculture and forestry resources were considered and fully evaluated in the Notice of Preparation/Initial Study (NOP/IS, Appendix A) prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to agriculture and forestry resources. Implementation of the 2016 AQMP control measures are not expected to result in any new construction of buildings or other structures that would require conversion of farmland to non-agricultural use or conflict with zoning for agricultural uses or a Williamson Act contract. Further, the proposed control measures would typically affect existing facilities that are located in appropriately zoned areas. Any new facilities that may be affected by AQMP control measures would be constructed and operated for reasons

other than complying with the control measures. Therefore, it is not expected that implementation of the 2016 AQMP control measures would conflict with any forest land zoning codes or convert forest land to non-forest uses.

The 2016 RTP/SCS includes transportation projects and strategies that would have the potential to convert Prime Farmland, Farmland of Statewide Importance, and Unique Farmland in all six counties and affect Local Farmland and Grazing land in five of the six counties because these important farmlands are located in the vicinity (within a worst-case-scenario 500-foot construction radius) of the transportation projects in the Plan, constituting a significant impact when taken into consideration with other infrastructure and development project in the SCAG region and surrounding areas. In addition, the loss of forest land in patches near the wildland-urban interface as a result of transportation projects was analyzed in the 2016 RTP/SCS.

For the 2016 AQMP, impacts to agriculture and forestry resources were determined to be below the level of significance in the NOP/IS. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to agricultural resources identified in the 2016 RTP/SCS because potential agriculture and forestry resource impacts identified in the 2016 RTP/SCS Program EIR are different than the potential agricultural impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect agricultural resources impacted by the 2016 RTP/SCS.

5.3.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to agriculture and forestry resources, no further mitigation is necessary.

5.3.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative agriculture and forestry resource impacts from implementation of the 2016 AQMP would remain less than significant.

5.4 AIR QUALITY AND GREENHOUSE GASES

5.4.1 CUMULATIVE IMPACTS

Construction Impacts: Implementation of the 2016 AQMP is expected to result in significant adverse construction air quality impacts because emissions from construction of 2016 AQMP control measures have the potential to exceed the SCAQMD's CEQA significance thresholds. Mitigation measures were identified, but air quality impacts from construction would remain significant.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS transportation and development projects would result in substantial construction activities. The construction activities would create short-term temporary emissions from the following activities:

(1) demolition; (2) site preparation activities (grading/excavation); (3) fuel combustion from operation of construction equipment; (4) application of paints, coatings, and paving materials; (5) delivery and hauling of construction materials and supplies to and from sites; and (6) travel by construction workers to and from sites.

Operational Impacts – Criteria Pollutants: The 2016 AQMP is expected to result in emissions reductions in NOx, VOC, SOx, and PM emissions, providing an air quality benefit. As shown in Figure 4.1-3, the federal annual PM2.5 standards are predicted to be achieved in 2023 with implementation of the proposed ozone strategy and the California annual PM2.5 standard will be achieved in 2025 (see Figure 4.1-3). The 2016 AQMP is also expected to achieve the ozone 8-hour standard by 2023. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 are needed to meet the 70 ppb ozone standard (see Figure 4.1-4).

Although existing and future air quality rules and regulations are expected to minimize emissions associated with increased generation of electricity, the 2016 AQMP will result in a substantial increase in electricity generation. The electricity providers have committed to meeting the increased energy demand and the emissions from the generation of this increase demand has been included in the emission inventory of the 2016 AQMP. No significant air quality impacts from control of stationary sources were identified associated with implementation of the 2016 AQMP. Several control measures would reduce VOC emissions associated with reformulated products. The air quality impacts from implementing reformulated products would result in an overall reduction of VOC emissions. Control measures in the 2016 AQMP would also reduce emissions from mobile sources by accelerating the penetration of partial zero-emission and zero emission vehicles and other mobile sources. Additionally, the air quality impacts from miscellaneous source control measures were concluded to be less than significant. Therefore, operational air quality impacts are less than significant.

Under the 2016 RTP/SCS, mobile source criteria pollutants are expected to have a short term increase during construction activities, but long term air quality impacts are expected to remain the same or decrease compared to baseline (2012) levels.

Operational Impacts – TACs: Control measure CMB-05 may result in the use of ammonia in SCRs and SNCRs. BACT (i.e. catalyst) for ammonia slip from SCR units is restricted to five ppm or less, which has been shown through source-specific permit modeling to have no significant impact on surrounding communities. Implementation of the 2016 AQMP is expected to result in an overall reduction in TAC emissions as there are a number of measures to reduce TAC emissions. The 2016 AQMP would also accelerate the penetration of partial-zero and zero emission vehicles and other mobile sources, reducing the use of conventional fuels and the related air emissions, which include TACs (such as DPM). Therefore, implementing 2016 AQMP control measures is not expected to generate significant adverse air quality impacts from increased exposure to TAC emissions.

Under the 2016 RTP/SCS, the maximum cancer potential is less than existing conditions even though vehicle miles traveled (VMT) is expected to increase. However, despite an overall cancer risk reduction, minor exposure of sensitive receptors to pollutants exceeds the cancer risk threshold, mainly around areas of high traffic volume areas such as freeways, which was deemed to be significant. A focus on creating more high quality transit areas (HQTAs) is expected to

further reduce public health risks by promoting an increase in active transportation (e.g. biking and walking) which in turn contributes to pollutant level reductions.

Greenhouse Gas Emissions: Electricity is expected to be the predominant alternative fuel because it is more available, affordable, and can be used to power zero emission vehicles. As a result, GHG emissions associated with the use of alternative fuels are expected to be less than GHG emissions associated with the use of petroleum-based fuels. Therefore, no increase in GHG emissions is expected from the increased production and use of alternative fuels and GHG emission impacts are expected to be less than significant. . Existing power generating facilities are subject to AB-32 and will be required to reduce GHG emissions by 2020 and any future power generating stations would be subject to stringent emission control requirements, including GHG emissions. Therefore, the need for additional electricity generation in order to provide power to operate the projected add-on control devices and catenary systems is not expected to generate significant adverse GHG emissions, after taking into account the reductions expected to result from the decreased use of gasoline and diesel fuels.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS projects would result in a 24 percent decrease in GHG emissions by 2040 for both mobile source and residential/commercial buildings compared to emissions in the 2012 base year. The 2016 RTP/SCS meets or exceeds emission reduction targets for cars and light duty trucks set forth by SB375, and as such would result in a less than significant impact related to per capita emissions and SB375. Additionally, the 2016 RTP/SCS is expected to comply with reduction targets outlined in AB32 as the 2016 RTP/SCS contributes its reductions share for responsible sectors. However, there are potential significant GHG impacts if other responsible agency implementation activities do not achieve their respective GHG emission reduction goals to the appropriate level.

The 2016 AQMP control measures would result in significant adverse air quality impacts during construction and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to air quality identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

5.4.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to air quality have been identified.

5.4.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to air quality from implementation of the 2016 AQMP would remain significant and unavoidable.

5.5 BIOLOGICAL RESOURCES

5.5.1 CUMULATIVE IMPACTS

Impacts to biological resources were considered and fully evaluated in the NOP/IS (Appendix A) prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to biological resources because the 2016 AQMP control measures typically affect existing commercial or industrial facilities or establish specifications for fuels or mobile source exhaust emissions and as such are not expected to generate new construction of buildings or other structures that in areas with species identified as a candidate, sensitive, or special status species in local, or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

Transportation projects, and anticipated development projects resulting from the land use strategies, included in the 2016 RTP/SCS would result in substantial adverse effects to threatened and/or endangered species, fully protected and sensitive species, locally important species, or associated critical habitat through conversion of natural habitats capable of sustaining these species to development, constituting a significant impact. However, regional land use strategies set forth in the Plan include conversation of natural habitats capable of sustaining listed and sensitive species to development by including land use strategies that focus new growth in high quality transit areas (HQTAs), existing suburban town centers, and more walkable, mixed-use communities and support redirecting growth away from high value habitat areas to existing urbanized areas. The level of impacts to threatened and/or endangered species, fully protected and sensitive species, locally important species, or associated critical habitat will vary on a project-by-project basis.

Across the six counties and 191 cities within the SCAG region, there are records of and/or habitat for 66 federally or state-listed wildlife species and 76 federally or state-listed plant species, 208 sensitive wildlife species, 426 rare and locally important plant species, and nearly 6 million acres of designated critical habitat for 29 federally listed species. The development of transportation improvement projects, particularly projects involving large-scale ground disturbance during construction such as grade separation projects, mixed flow lane projects, and rail projects, within the SCAG region may result in significant impacts to these species and their habitats. Because implementation of 2016 RTP/SCS projects would cause loss of habitat as well as habitat fragmentation in habitat corridors that cross the SCAG region's boundaries, thereby limiting the movement of wildlife species beyond the SCAG region, the 2016 RTP/SCS Program EIR determined that implementation of the 2016 RTP/SCS would contribute to a cumulative biological resources impact.

For the 2016 AQMP, impacts to biological resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP control measures would not generate significant adverse biological resources impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to biological resources identified in the 2016 RTP/SCS because the potential biological resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential biological

impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect biological resources impacted by the 2016 RTP/SCS.

5.5.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to biological resources, no further mitigation is necessary.

5.5.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative biological resources impacts from implementation of the 2016 AQMP would remain less than significant.

5.6 CULTURAL RESOURCES

5.6.1 CUMULATIVE IMPACTS

Impacts to cultural resources were considered and fully evaluated in the NOP/IS (Appendix A) prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to cultural resources. The 2016 AQMP control measures typically affect existing facilities which would not require extensive cut-and-fill activities or excavation at undeveloped sites, and implementation of the 2016 AQMP would therefore not adversely affect historical or archaeological resources as defined in CEQA Guidelines §15064.5, destroy unique paleontological resources or unique geologic features, or disturb human remains interred outside formal cemeteries.

In a small number of cases, implementation of the 2016 AQMP may require minor site preparation and grading at an affected facility. Under this circumstance, it is possible that archaeological or paleontological resources could be uncovered. Even if this circumstance were to occur, significant adverse cultural resources impacts are not anticipated because construction activities would occur at previously disturbed industrial or commercial locations and there are existing laws in place that are designed to protect and mitigate potential adverse impacts to cultural resources. As with any construction activity, should archaeological resources be found during construction that result from implementation of the 2016 AQMP, the activity would cease until a thorough archaeological assessment is conducted and the Native American Heritage Commission (NAHC) is contacted, if necessary.

According to the 2016 RTP/SCS Program EIR, over 32,000 archaeological and historic locations have been identified in the SCAG region. Each of these sites is documented at the Office of Historic Preservation, which holds location information on archaeological sites for each region in California. Paleontological sites are also numerous in southern California. The development of new transportation facilities as part of the 2016 RTP/SCS may affect historical resources because many HQTAs would be located in older urban centers where structures of architectural or historical significance are likely to be located. In addition, 2016 RTP/SCS transportation projects would significantly affect archaeological and paleontological resources because the projects could be

located in previously undisturbed areas. Furthermore, since it is not always possible to predict where human remains may occur outside of formal burials, it is possible that excavation and construction activities associated with 2016 RTP/SCS projects may disturb previously undiscovered human remains not interred in marked, formal burials, resulting in significant impacts.

Finally, the 2016 RTP/SCS's influence on growth would contribute to regional impacts on existing and previously undisturbed and undiscovered cultural resources; impacts would combine with impacts in other areas of Southern California to contribute to a cumulative loss of cultural resources in California.

Impacts to cultural resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse cultural impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to cultural resources identified in the 2016 RTP/SCS because any such impact would be extremely unlikely given the required procedures in place and the fact that the 2016 AQMP projects would be located on previously disturbed land (existing, developed facilities).

5.6.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to cultural resources, no further mitigation is necessary.

5.6.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative cultural resources impacts from implementation of the 2016 AQMP would remain less than significant.

5.7. ENERGY

5.7.1 CUMULATIVE IMPACTS

The 2016 AQMP could result in significant adverse electricity consumption impacts because the potential electricity usage increase would exceed baseline electricity consumption by 7.8 to 12.7 percent. No significant impacts on natural gas supplies and petroleum fuels associated with the 2016 AQMP were identified because of the anticipated reduction in future demand and wide availability of natural gas. Additionally, potential alternative energy demand impacts are expected to be less than significant as adequate supplies are available.

The 2016 RTP/SCS Program EIR concluded that overall energy demand would increase as a result of implementation of the 2016 RTP/SCS. Under the 2016 RTP/SCS, the regional transportation system has the potential to increase petroleum and non-renewable fuel consumption but the increase in active transportation, the encouragement of carpooling and transit use, and better fuel economy would result in less transportation related fuel consumption. Despite an expected per

capita decrease in energy consumption, overall residential and commercial building energy consumption would increase due to a growth in the population and an increased number of households and the impact expected to be significant.

The 2016 AQMP control measures would result in significant adverse energy demand impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to energy identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

5.7.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to energy have been identified.

5.7.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to energy from implementation of the 2016 AQMP would remain significant and unavoidable.

5.8 GEOLOGY AND SOILS

5.8.1 CUMULATIVE IMPACTS

Impacts to geologic resources were considered and fully evaluated in the NOP/IS (Appendix A) prepared for the 2016 AQMP. As determined in the NOP/IS, implementation of the 2016 AQMP would typically affect existing facilities which would not require extensive cut-and-fill activities or excavation at undeveloped sites, and therefore would not adversely expose people or structures to earthquake faults, seismic shaking, seismic-related ground failure including liquefaction, landslides, mudslides or substantial soil erosion. Although some structural modifications at existing affected facilities may occur as a result of installing control equipment or making process modifications, existing affected facilities or modifications to existing facilities would be required to comply with relevant California Building Code requirements in effect at the time of initial construction or modification of a structure which are expected to mitigate geology and soils impacts to less than significant.

All of southern California is susceptible to impacts from seismic activity and numerous active faults are known to exist in the region that could potentially generate seismic events capable of significantly affecting transportation facilities proposed in the 2016 RTP/SCS. According to the 2016 RTP/SCS Program EIR, seismic events could damage transportation infrastructure through surface rupture, ground shaking, liquefaction, and landsliding. New transportation infrastructure and facilities associated with implementation of transportation projects included in the 2016 RTP/SCS could expose additional people and infrastructure to the effects of earthquakes and seismically-induced landslides. Similarly, the 2016 RTP/SCS includes a set of regional land use strategies that are intended to guide future land development patterns to focus new growth in HQTAs, existing suburban town centers, and walkable mixed-use communities. While the specific

impact of this pattern of development relative to seismic risk is unknown, it could result in more people being exposed to the effects of earthquakes and seismically induced landslides. The 2016 RTP/SCS Program EIR also determined that seismically induced tsunami and seiche waves could damage transportation infrastructure proximate to coastal areas, but that the potential for these impacts would be remote and was not considered significant.

The 2016 RTP/SCS Program EIR concluded that earthwork associated with implementation of the 2016 RTP/SCS could result in soil erosion and/or loss of topsoil and in some cases could result in slope failure. The 2016 RTP/SCS Program EIR further determined that location of 2016 RTP/SCS projects on expansive soils and unstable geologic units could have potentially significant impacts to property and public safety due to on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse. Finally, the 2016 RTP/SCS Program EIR concluded that implementation of the 2016 RTP/SCS would occur within the SCAG region, would be site-specific in nature and as such would not contribute to a cumulatively considerable increase in risk associated with geologic hazards.

For the 2016 AQMP, impacts to geology and soils were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse geology and soil impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to geology and soil resources identified in the 2016 RTP/SCS because potential geology and soil impacts identified in the 2016 RTP/SCS Program EIR are different than the potential geology and soil impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect geology and soils impacted by the 2016 RTP/SCS.

5.8.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to geology and soils, no further mitigation is necessary.

5.8.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative geology and soils impacts from implementation of the 2016 AQMP would remain less than significant.

5.9 HAZARDS AND HAZARDOUS MATERIALS

5.9.1 CUMULATIVE IMPACTS

The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the 2016 AQMP are expected to be significant, as more flammable materials may be used. The SCAQMD cannot predict which coatings, solvents, adhesives, and sealants each affected facility might choose to use in the future as reformulated products become available or estimate the amount of coatings to be used. Mitigation measures were crafted to inform consumers about any potential fire hazards that may be associated with those reformulated products that may have increased

flammability. While the promotion of consumer awareness may be helpful for safety reasons, these mitigation measures do not physically reduce any fire hazards in the reformulated products themselves. Thus, the fire hazards impacts are expected to remain significant.

The impacts from tank rupture of LNG and ammonia (in the non-refinery sector), and transport of LNG and ammonia are expected to remain significant even after implementation of mitigation.

In addition to the federal, state, and local regulations that facilities and sites listed on lists pursuant to Government Code §65962.5 must comply with, implementation of mitigation measures will reduce the impacts to less than significant.

Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites. The location of the facilities that may use hazardous materials as a result of the 2016 AQMP control measures is currently unknown. While mitigation measures would reduce the potentially significant hazard impacts and additional mitigation measures may be available on a site-specific basis (e.g., containment facilities, appropriate placement of tanks, etc.), the potential hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school site remain significant.

According to the 2016 RTP/SCS Program EIR, proposed freight rail enhancements and other goods movement capacity enhancements could result in increased or new transport of hazardous materials or wastes. In additions, construction and maintenance of such projects would result in use of equipment that contains or uses routine hazardous materials (e.g. diesel-fuel, paint and cleaning solutions), and the transportation of excavated soil and/or groundwater containing contaminants from previously contaminated areas. The 2016 RTP/SCS Program EIR concluded that although individual projects would be required to comply with all existing regulations, due to the volume of projects contained within the RTP/SCS it is possible that significant impacts would occur.

Because implementing the 2016 RTP/SCS would facilitate the movement of goods, including hazardous materials, through the region, transportation of goods, in general, and hazardous materials in particular, is expected to increase substantially with implementation of the 2016 RTP/SCS. The 2016 RTP/SCS Program EIR estimated that port traffic would triple from about 14 million Twenty-foot Equivalent Units (TEUs) in 2015 to 43 million TEUs in 2040. The 2016 RTP/SCS Program EIR concluded that there would be a potential to create a hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment during transportation. The 2016 RTP/SCS Program EIR also concluded that approximately 541 existing kindergarten through 12th grade school would be located within a one-quarter mile buffer of the 2016 RTP/SCS projects and as such could be impacted by an accidental release of hazardous materials.

Furthermore, implementation of the 2016 RTP/SCS could potentially take place on sites which are included on a list of hazardous material sites and as such potentially disturb contaminated property

during construction activities. The 2016 RTP/SCS also has the potential to impair or interfere with emergency response procedures and emergency evacuation plans due to roadway closures and congestion as a result of construction. There is the potential for the 2016 RTP/SCS to expose people to significant impacts from wildland fires due to possible development in areas with a high fire hazard risk. Finally, the 2016 RTP/SCS Program EIR concluded that the forecasted urban development and growth that would occur under the 2016 RTP/SCS and the increased mobility provided by the 2016 RTP/SCS would result in increased hazardous materials transport outside of the SCAG region and as such would contribute to cumulatively considerable hazard impacts.

The 2016 AQMP control measures would result in significant adverse hazards and hazardous waste impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to hazards and hazardous waste identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

5.9.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to hazards and hazardous materials have been identified.

5.9.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to hazards and hazardous materials from implementation of the 2016 AQMP would remain significant and unavoidable.

5.10 HYDROLOGY AND WATER QUALITY

5.10.1 CUMULATIVE IMPACTS

Wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be associated with 2016 AQMP control measures generated from reformulation of products and use of air pollution control equipment (e.g., wet ESPs and WGSs). Therefore, less than significant impacts associated with wastewater treatment or water quality would be expected. Implementation of 2016 AQMP control measures would not be expected to result in greater adverse water quality impacts from the use of alternative fuels than the use of conventional fuels and impacts would be less than significant. Less than significant adverse water quality impacts are expected from the increased use of EV and hybrid vehicles and the associated increase in battery use and disposal. Furthermore, the increased use of SBS was also concluded to have less than significant hydrology and water quality impacts.

The water demand associated with certain air pollution control technologies the use of waterborne coatings could exceed the significance threshold of 262,820 gallons per day for potable water demand and five million gallons per day of total water demand. Thus, the overall water demand from implementing the 2016 AQMP is concluded to have significant hydrology (water demand) impacts. The source of water to meet the projected demand will vary from jurisdiction to jurisdiction but can include additional use of ground water and recycled water resources. Most of

the ground water basins used for water supply are managed to minimize and prevent overdraft conditions.

The increased water demand is expected to be associated with existing sources within the Basin which already have water conveyance infrastructure. Therefore, the construction of new water conveyance infrastructure is not expected to be required.

According to the 2016 RTP/SCS Program EIR, general program level impacts from new transportation projects proposed in the 2016 RTP/SCS would degrade local surface water quality by increased roadway and urban runoff, potentially violating water quality standards associated with wastewater and storm water. In addition, the 2016 RTP/SCS could alter existing drainage patterns in such a way as to result in substantial erosion or siltation.

Implementation of the 2016 RTP/SCS would also increase impervious surfaces due to construction of additional miles of roadway, in addition to urban development associated with the increase in population expected by 2040, and as such, would increase runoff and potentially affect groundwater recharge rates. Furthermore, the 2016 RTP/SCS could potentially increase flooding hazards by placing structures within 100-year flood hazard areas and increase the rate or amount of surface runoff in a manner that would result in flooding or produce or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems on-site or off-site.

The 2016 RTP/SCS transportation projects and growth in urbanized areas would increase impervious areas which will generate additional runoff water that in turn has the potential to degrade the water quality of the receiving waters. The 2016 RTP/SCS also has the potential to expose people to the effects of levee or dam failure due to projects that are located downstream from these types of infrastructure. Inundation by seiche, tsunami, and mudflow is also a potential significant impact due to the 2016 RTP/SCS taking place in a seismically active region with a history of subsidence and because of the nature of ground disturbing construction activities.

The 2016 AQMP control measures would result in significant adverse water demand impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to hydrology and water quality identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

5.10.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to hydrology and water quality have been identified.

5.10.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to hydrology and water quality from implementation of the 2016 AQMP would remain significant and unavoidable.

5.11 LAND USE AND PLANNING

5.11.1 CUMULATIVE IMPACTS

Impacts to land use and planning were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to land use and planning because the 2016 AQMP control measures typically affect existing commercial or industrial facilities or establish specifications for fuels or mobile source exhaust emissions and as such are not expected to generate new construction of buildings or other structures that would require any changes to existing land use plans, policies, or regulations.

It should be noted that there are no provisions of the 2016 AQMP that would directly affect land use plans, policies, or regulations. The SCAQMD is specifically precluded from infringing on existing city or county land use authority (California Health & Safety Code §40414). Land use and other planning considerations are determined by local governments and no present or planned land uses in the region or planning requirements would be altered by the 2016 AQMP.

Land use and planning were considered in the 2016 RTP/SCS Program EIR. According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS would result in inconsistencies with general plans, disruption or division of established communities, changes to land uses by changing concentrations of development throughout SCAG, change patterns of growth and urbanization beyond the SCAG region, and cumulatively considerable changes to land use and the intensity of land use. Short-term construction related impacts and long-term or permanent displacement or offsite impacts from new facilities would potentially occur as a result of implementation of the 2016 RTP/SCS.

For the 2016 AQMP, impacts to land use and planning were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse land use and planning impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to land use and planning identified in the 2016 RTP/SCS because potential land use and planning impacts identified in the 2016 RTP/SCS Program EIR are different than the potential land use and planning impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect land use and planning impacted by the 2016 RTP/SCS.

5.11.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to land use and planning, no further mitigation is necessary.

5.11.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative land use and planning impacts from implementation of the 2016 AQMP would remain less than significant.

5.12 MINERAL RESOURCES

5.12.1 CUMULATIVE IMPACTS

Impacts to mineral resources were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to mineral resources. There are no provisions in the 2016 AQMP that would result in the loss of availability of a known mineral resource of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Some examples of mineral resources are gravel, asphalt, bauxite, and gypsum, which are commonly used for construction activities or industrial processes. The 2016 AQMP provides incentives for the penetration of zero and near-zero emission technologies which are not expected to result in an increase in the use of mineral resources. The proposed project is not expected to require substantial construction activities and would not have any significant effects on the use of important minerals, such as those described above (with the exception of the use of a minimal amount of gravel and asphalt for limited paving activities), nor would the project result in covering over or otherwise making mineral resources unrecoverable. Therefore, no new demand for mineral resources is expected to occur and no significant adverse mineral resources impacts from implementing the proposed project are anticipated.

According to the 2016 RTP/SCS Program EIR, implementing the proposed 2016 RTP/SCS transportation projects would result in the loss of availability of known aggregate and mineral resources that would be of value to the region. Transportation projects as well as development patterns influenced by land use strategies identified in the 2016 RTP/SCS would require substantial amounts of aggregate resources to construct, constituting a significant impact. The six-county and 191-city SCAG region has approximately 1,446 million tons of permitted aggregate reserves. The CGS estimates that the SCAG region would need approximately 4,728 million tons of aggregate over the next 50 years. The difference of 3,282 million tons would need to be permitted over the next 50 years to meet the projected demand. The 2016 RTP/SCS Program EIR also indicates that, of the eight areas of permitted aggregate resources, six have a minimum of 10 to 11 projected years remaining, and two have a minimum of 21 projected years remaining. The SCAG region's construction industry is greatly dependent on readily available aggregate deposits that are within a reasonable distance to market regions. Aggregate is a low-unit-value, high-bulk-weight commodity or material required for construction of most transportation projects and development projects that must be obtained from nearby sources in order to minimize costs to the consumer. If nearby sources do not exist, then transportation costs quickly could exceed the value of the aggregate.

For the 2016 AQMP, impacts to mineral resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse

mineral impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to mineral resources identified in the 2016 RTP/SCS because potential mineral resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential mineral impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect mineral resources impacted by the 2016 RTP/SCS.

5.12.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to mineral resources, no further mitigation is necessary.

5.12.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative mineral resources impacts from implementation of the 2016 AQMP would remain less than significant.

5.13 NOISE

5.13.1 CUMULATIVE IMPACTS

Construction Impacts: Although implementation of the 2016 AQMP control measures associated with air pollution control technologies and exhaust standards would not typically result in significant noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas and impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected. However, implementation of the 2016 AQMP control measures ~~associated with construction of overhead catenary lines~~ could result in significant noise and vibration impacts due to the geographic proximity of sensitive receptors.

According to the 2016 RTP/SCS Program EIR, grading and construction activities associated with the proposed transportation projects, as well as anticipated development, would intermittently and temporarily generate noise and vibration levels above ambient background levels in such a way that would not have occurred without the project. Noise and vibration levels in the immediate vicinity of the construction sites would increase substantially at times for an extended duration, resulting in temporary noise increases at nearby sensitive receptors, creating significant adverse noise impacts.

Operational Impacts: Implementation of the 2016 AQMP control measures is not expected to result in significant adverse operational noise impacts because the 2016 AQMP control measures affect existing commercial or industrial facilities typically located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. Although overhead catenary lines could be installed to comply with certain control

measures, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors.

Control measures are not expected to require street sweeping in areas where there is no current street sweeping. Rather it may increase the number of times that roads in certain areas are swept. The roads that are most likely to require additional sweeping are those in industrial and commercial areas where sensitive receptors are not located. Therefore, because additional street sweeping is not expected to be required in residential or other noise-sensitive areas, additional street sweeping activities that may be required are not expected to result in significant noise impacts.

According to the 2016 RTP/SCS Program EIR, noise sensitive land uses could be exposed to operational noise in excess of normally acceptable noise levels. These areas could experience substantial increases in noise as a result of the following: operation of expanded or new transportation facilities (i.e., increased traffic resulting from new or expanded highways, the use of new transit corridors or increased use of existing corridors, and a capacity increase in freight and passenger rail), and increased vehicle activity (autos, trucks, buses, trains etc.) associated with development and resulting in increased ambient noise next to transportation facilities.

The 2016 AQMP control measures would result in significant adverse noise impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to noise identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

5.13.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to noise have been identified.

5.13.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to noise from implementation of the 2016 AQMP would remain significant and unavoidable.

5.14 POPULATION AND HOUSING

5.14.1 CUMULATIVE IMPACTS

Impacts to population and housing were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to population and housing. The 2016 AQMP would affect existing commercial or industrial facilities located in predominantly industrial or commercial urbanized areas throughout the SCAQMD and, as such, is not anticipated to generate any significant effects, either directly or indirectly, on the SCAQMD's population or population distribution. Consistent with past experience, it is expected that the existing labor pool within the southern California area would accommodate the labor requirements for any modifications

requiring construction at affected facilities. Furthermore, the 2016 AQMP contains no provisions that would cause displacement of substantial numbers of people or housing necessitating construction of replacement housing elsewhere. Therefore, implementing the 2016 AQMP control measures is not expected to result in changes in population densities or induce significant growth in population.

Implementation of the 2016 RTP/SCS would have a potential to influence the distribution of population, households, and employment. It is anticipated that significant impacts would include substantial induced population growth within urban areas that are adjacent to transit and new ROW acquisitions that could result in the displacement of a substantial number of existing businesses and homes, separation of residences from community facilities and services. While the 2016 RTP/SCS encourage growth in existing urbanized area, the proposed land use strategies would not accommodate all of the growth anticipated in the region. Some development would still be expected to occur in areas that would have the potential to convert open and natural land areas near the edge of existing urbanized areas to urban development.

Short-term construction-related impacts and long-term or permanent displacement, as well as off-site impacts from new facilities, would occur as a result of implementation of the 2016 RTP/SCS. Indirect impacts from the changes in population distribution expected to occur due to the 2016 RTP/SCS's transportation investments and land use policies are also expected.

For the 2016 AQMP, impacts to population and housing were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse population and housing impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to population and housing identified in the 2016 RTP/SCS because there are no potential population and housing impacts that could be generated by the 2016 AQMP.

5.14.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to population and housing, no further mitigation is necessary.

5.14.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative population and housing impacts from implementation of the 2016 AQMP would remain less than significant.

5.15 PUBLIC SERVICES

5.15.1 CUMULATIVE IMPACTS

Impacts to public services were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to public services. Although implementing 2016 AQMP

control measures may increase the use of alternative clean fuels, for example, there would be a commensurate reduction in currently used petroleum fuels. As first responders to emergency situations, police and fire departments may assist local hazmat teams with containing hazardous materials, putting out fires, and crowd control to reduce public exposures to hazardous materials releases. In many situations, implementing AQMP control measures may reduce hazardous materials use, e.g., formulating coatings with less hazardous formulations. Most industrial facilities have on-site security that control public access to facilities and therefore, an increase in the need for police services is not expected. Furthermore, most industrial facilities have on-site fire protection personnel and/or have agreements for fire protection services with local fire departments. For these reasons, implementing the 2016 AQMP is not expected to require additional fire or police protection services. In addition, implementation of the 2016 AQMP is not expected to induce population growth and as such would not increase or otherwise alter the demand for schools and parks in the SCAQMD. Therefore, no significant adverse impacts to schools or parks are foreseen as a result of adopting the proposed 2016 AQMP.

According to the 2016 RTP/SCS Program EIR, implementing the 2016 RTP/SCS would adversely affect public services and utilities. The 2016 RTP/SCS also includes land use strategies that might influence development patterns in the region for the next 25 years. The Plan's land use strategies focus new growth in HQTAs, existing suburban town centers and walkable, mixed-use communities. According to the Plan, focusing new growth in HQTAs is an important aspect of the proposed land use strategies. The region is expected to add approximately 3.8 million new people, approximately 1.5 million new households, and approximately 2.4 million new jobs during the next 25 years. Moreover, the transportation projects included in the RTP/SCS that involve transit, passenger rail, and active transportation are concentrated in urban and suburban areas, including Palm Springs, Riverside, San Bernardino, Anaheim, Irvine, the Los Angeles Basin, the San Gabriel Valley, the San Fernando Valley, Santa Clarita, Palmdale, and Lancaster. As these urban and suburban areas experience a potentially higher density in terms of a higher housing/job ratio and more densified, mixed-use development, additional fire protection and emergency response services would be required to meet emergency response standards. Such increased density in these areas would have the potential to exceed the capacity of existing public services. Expected significant impacts would include demand for more police, fire, and emergency personnel and facilities, demand for more school facilities and teachers. The 2016 RTP/SCS concluded that impacts to fire services would contribute to regionally cumulatively considerable impacts to staffing levels and response times of police, fire and emergency services.

For the 2016 AQMP, impacts to public services were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse public service impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to public services identified in the 2016 RTP/SCS because potential public service impacts identified in the 2016 RTP/SCS Program EIR are different than the potential public service impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect public services impacted by the 2016 RTP/SCS.

5.15.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to public services, no further mitigation is necessary.

5.15.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative public services impacts from implementation of the 2016 AQMP would remain less than significant.

5.16 RECREATION

5.16.1 CUMULATIVE IMPACTS

Impacts to recreation were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to recreation. The proposed 2016 AQMP contains no provisions that would affect land use plans, policies, ordinances, regulations, or population growth. Land use and other planning considerations are determined by local governments. No land use or planning requirements, including those related to recreational facilities, will be altered by the 2016 AQMP. The 2016 AQMP does not have the potential to directly or indirectly induce population growth or redistribution that could adversely affect recreational resources. As a result, the control measures would not increase the use of, or demand for, existing neighborhood and/or regional parks or other recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. Therefore, no significant adverse impacts to recreation are foreseen as a result of adopting the proposed 2016 AQMP.

Implementation of the transportation projects and land use patterns anticipated by the strategies in the 2016 RTP/SCS would have the potential to increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated, constituting a potentially significant impact. The 2016 RTP/SCS provides transportation improvements to accommodate the anticipated population increase of approximately 3.8 million new people from 2014 to 2040, over the 25-year planning horizon. The 2016 RTP/SCS would encourage new growth in urbanized areas such as HQTAs and other livable corridors and neighborhood mobility areas sometimes within the HQTAs above their existing planned density levels; therefore, it would be expected to result in increased use of existing neighborhood parks and other recreational facilities such that substantial physical deterioration facilities may be anticipated. The 2016 RTP/SCS Program EIR concluded that implementation of 2016 RTP/SCS projects would result in significant impacts prior to mitigation.

Impacts to recreation were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse recreation impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to recreation identified in the 2016 RTP/SCS because no potential recreation

impacts could be generated by the 2016 AQMP, and, geographically, there is no overlap between the 2016 AQMP projects that may affect recreation impacted by the 2016 RTP/SCS.

5.16.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to recreation, no further mitigation is necessary.

5.16.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative recreation impacts from implementation of the 2016 AQMP would remain less than significant.

5.17 SOLID AND HAZARDOUS WASTE

5.17.1 CUMULATIVE IMPACTS

Implementation 2016 AQMP control measures would not significantly increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, would not generate significant additional waste. Since spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries. In addition, solid waste impacts due to 2016 AQMP air pollution control technologies would not be significant because spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, the impacts from waste generated from construction of 2016 AQMP control measures and from vehicle scrapping programs could result in significant impacts.

Impacts from solid waste were discussed under the combined category of Utilities and Service Systems in the 2016 RTP/SCS Program EIR, whereas impacts from hazardous waste were considered under the Hazardous Materials Section of the 2016 RTP/SCS Program EIR. Implementing the 2016 RTP/SCS would result in significant amounts of solid waste associated with construction activities of transportation projects and urban development. Construction debris would be used as fill, recycled or transported to the nearest landfill and disposed of appropriately. The 2016 RTP/SCS also has the potential to result in significant impacts when the landfill designated for the project area is insufficient in capacity to accommodate solid waste disposal needs. All projects in 2016 RTP/SCS must comply with federal, state, and local statutes and regulations related to solid waste.

The 2016 AQMP control measures would result in significant adverse solid and hazardous waste impacts and when combined with past, present, and reasonably foreseeable activities, and in

particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to solid and hazardous waste identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

5.17.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to solid and hazardous waste have been identified.

5.17.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to solid and hazardous waste from implementation of the 2016 AQMP would remain significant and unavoidable.

5.18 TRANSPORTATION AND TRAFFIC

5.18.1 CUMULATIVE IMPACTS

Some 2016 AQMP control measures could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, were considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road. Furthermore, if the barge-based bonnet technology is used to reduce emissions from ocean going vessels, the increase in barges at the harbors could create a significant congestion and traffic hazard impact. Significant adverse operational traffic impacts are, therefore, anticipated to be generated by the 2016 AQMP. Other than this impact, no new streets, roads, freeways, or rail lines would be required and the 2016 AQMP control measures would apply to existing transportation corridors, so no additional significant traffic impacts are expected.

The 2016 AQMP relies on transportation and related control measures developed by SCAG in the 2016 RTP/SCS. According to the Transportation, Traffic, and Safety section of the 2016 RTP/SCS Program EIR, implementation of the proposed plan has the potential to result in several significant and less than significant traffic and transportation impacts. The impacts from the 2016 RTP/SCS considered to be significant are as follows:

- Vehicle Miles Traveled (VMT): Substantial growth and development is expected to occur within the region. Based on SCAG's modeling results, average daily VMT are expected

to grow from 448 million miles to 504 million miles per day in 2040 which constitutes a 13.3 percent increase over the period and includes light, medium, and heavy-duty VMT in all six counties. Even though the 2016 RTP/SCS aims to reduce per capita VMT, total demand to move people and goods would continue to grow due to the region's population increase. The 2016 RTP/SCS, therefore, targets transportation systems that have room to grow including transit, rail sections, and express lanes. Although per capita VMT would decrease, the environment would experience an overall increase in VMT which would be significant.

- Vehicle Hours of Delay for Heavy-Duty Trucks: The transportation system is heavily influenced by goods movement, particularly by heavy duty trucks. Despite efforts to improve the efficiency of goods movement, increased demand for goods would lead to an increase from 118,000 to 184,000 average daily heavy-duty truck vehicle hours of delay by 2040, a 36 percent increase and thus, a significant impact.

- Emergency Access: Implementing the 2016 RTP/SCS has the potential to conflict with emergency access criteria. The timing, location, and duration of construction activities for the proposed transportation projects could result in delayed emergency vehicle response times or otherwise disrupt delivery of emergency response services and could result in significant impacts.

The impacts from the 2016 RTP/SCS considered less-than significant are as follows:

- Vehicle Hours of Delay: Average vehicle hours of delay would be reduced from 2,500,000 vehicle hours in 2012 to 2,118,000 vehicle hours in 2040, and as such would constitute a less than significant impact.

- System-Wide Fatality and Injury- Implementation of the 2016 RTP/SCS would contribute to a lower system-wide fatality accident rate and injury rate for all travel modes in 2040 compared to the existing conditions. The system-wide daily fatality rate would be 0.17 fatalities per million persons for all travel modes when compared to existing rate of 0.20. The system wide daily injury rate would be 12.93 injuries per million persons for all travel modes, a decrease of 5.34 daily injuries per million persons when compared to the existing rate of 18.27. The reductions in fatality and injury rates would be beneficial and would constitute less than significant impacts.

- Air Traffic Patterns- Population growth that is expected to occur by 2040 would likely result in increased air traffic in all nine major commercial airports in Southern California. Based on the statistics in SCAG's aviation forecast, there is adequate capacity in provisioning for goods and passenger services that the 2016 RTP/SCS is expected to have a less than significant impact on air traffic patterns.

The 2016 AQMP control measures would result in significant adverse transportation and traffic impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to

cumulatively considerable impacts to transportation and traffic identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

5.18.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to transportation and traffic have been identified.

5.18.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to transportation and traffic from implementation of the 2016 AQMP would remain significant and unavoidable.

CHAPTER 6

ALTERNATIVES

6.0 Introduction

6.1 Methodology for Developing Project Alternatives

6.2 Alternatives Rejected as Infeasible

6.3 Alternatives to the 2016 AQMP

6.4 Alternatives Analysis

6.5 Comparison of Project Alternatives to the 2016 AQMP

6.6 Environmentally Superior and Lowest Toxic Alternative

6.7 Conclusion

6.0 INTRODUCTION

This Program EIR provides a discussion of alternatives to the proposed project as required by CEQA. Pursuant to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project but would avoid or substantially lessen any of the significant effects of the project, and provide means for evaluating the comparative merits of each alternative (CEQA, Guidelines, §15126.6(a)). In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines, §15126.6(f)(3).

6.1 METHODOLOGY FOR DEVELOPING PROJECT ALTERNATIVES

The alternatives typically included in CEQA documents for proposed SCAQMD rules, regulations, or plans are developed by breaking down the project into distinct components (e.g., emission limits, compliance dates, applicability, exemptions, pollutant control strategies, etc.) and varying the specifics of one or more of the components. Different compliance approaches that generally achieve the objectives of the project may also be considered as project alternatives.

The 2016 AQMP identifies control measures and strategies to demonstrate that the region will: (1) attain the revoked 1997 8-hour ozone standard (80 ppb) by 2023; (2) attain the 2008 8-hour ozone standard (75 ppb) by 2032; (3) attain the 2012 annual PM2.5 standard (12 ug/m3) by 2025; (4) attain the 2006 24-hour PM2.5 standard (35 ug/m3) by 2019; and (5) attain the revoked 1979 1-hour ozone standard (120 ppb) by 2022. The 2016 AQMP also discusses the recently adopted new federal 8-hour ozone standard (70 ppb), as well as incorporates toxics, climate change, energy, transportation, goods movement, infrastructure and other planning efforts that affect future air quality.

The proposed attainment strategy focuses on reduction of ozone precursors (NOx and VOC), direct PM2.5, and PM2.5 precursors (NOx). NOx emissions lead to the formation of both ozone and PM2.5. Therefore, the most significant air quality challenge faced by the SCAQMD is to reduce NOx emissions sufficiently to meet the upcoming ozone and PM2.5 federal standard deadlines. The 2016 AQMP analyses indicate that an additional 43 percent NOx emission reduction is needed by 2023 and 55 percent is needed by 2031 to attain the 8-hour ozone standard. The majority of NOx emission reductions are expected to come from mobile sources.

The possible alternatives to the proposed 2016 AQMP are limited by the nature of the project. For example, the SCAQMD is required to prepare a PM2.5 and ozone AQMP that demonstrates attainment of the federal ambient air quality standards by applicable dates. The magnitude of emission reductions needed for the attainment of these NAAQS requires an aggressive mobile source control strategy supplemented with focused, strategic stationary source control measures and close collaboration with federal, state, and regional governments, local agencies, businesses, and the public.

Further, 2016 AQMP control measures are developed to achieve the maximum emission reduction potential that is technically feasible and cost-effective. Because, the 2016 AQMP includes all feasible control measures identified as part of the AQMP development process and control measures reflect the maximum emission reduction potential, it is difficult to develop alternatives that would still achieve the project objectives, including attaining the federal ozone and PM2.5 standard, but are substantially different than the 2016 AQMP.

In spite of the limitations identified above with regard to developing project alternatives, similar to previous AQMP Program EIRs, alternatives to the 2016 AQMP focus on emphasizing different pollutant control strategies. For example, alternatives could rely more only on regulation only versus greater reliance on incentive funding and mobile source control measures. Ultimately, all project alternatives must demonstrate attainment of the federal ozone and PM2.5 standards.

Development of the ozone and PM2.5 attainment control strategy relies on baseline emissions specified by the emissions inventory of all emissions sources in the Basin. The federal CAA §172(c)(3) requires all plan [AQMP] submittals to include a comprehensive, accurate, and current inventory of actual emissions from all sources of the relevant pollutant(s). To fulfill the intent of this requirement, the year 2012 was selected as the baseline year for analyzing the effectiveness of 2016 AQMP control measures in attaining the ozone and PM2.5 standard. Typically, the existing setting is established at the time the NOP/IS is circulated for public review, which was July 2016. This baseline is used for all environmental topics analyzed in this Program EIR.

6.2 ALTERNATIVES REJECTED AS INFEASIBLE

In accordance with CEQA Guidelines §15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Section 15126.6(c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives; (2) infeasibility; or (3) inability to avoid significant environmental impacts.

As noted in Section 6.2, the range of feasible alternatives to the 2016 AQMP is limited by the nature of the proposed project and associated legal requirements. Similarly, the range of alternatives considered, but rejected as infeasible is also relatively limited. The following subchapters identify six potential alternatives to the 2016 AQMP that were rejected for the reasons explained in each subchapter.

6.2.1 NO PROJECT ALTERNATIVE – NO FURTHER ACTION

CEQA documents typically assume that the adoption of a no project alternative would result in no further action on the part of the project proponent or Lead Agency. For example, in the case of a proposed land use project such as a housing development, adopting the No Project Alternative terminates further consideration of that housing development or any housing development alternative identified in the associated CEQA document. In that case, the existing setting would typically remain unchanged.

The concept of taking no further action (and thereby leaving the existing setting intact) by adopting a No Project Alternative does not readily apply to an update of an already adopted and legally mandated plan such as the AQMP. Adopting a no project alternative for an update to the AQMP does not imply that no further action will be taken (i.e., halting implementation of the existing AQMP). The federal and state Clean Air Acts require the SCAQMD to revise and implement the AQMP in order to attain all applicable ozone and PM2.5 state and national ambient air quality standards. A no further action No Project Alternative in the case of the AQMP is not a legally viable alternative. Consequently, the No Project Alternative presented in this Program EIR is the continued implementation of the 2012 AQMP. Continued implementation of the 2012 AQMP without additional reduction measures would not be a feasible alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates, as explained above. However, continued implementation of the 2012 AQMP as the No Project Alternative (see Section 6.3.1 below) is consistent with CEQA guidelines §15126.6(e)(2) (italics added):

"The 'no project' analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, *as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services*…"

It should be noted that, except for air quality, there would be no further incremental impacts on the existing environment if no further action is taken. Although there are existing rules that may have future compliance dates, potential adverse impacts from these rules have already been evaluated in the Final Program EIR for the 2012 AQMP and subsequent rule-specific CEQA documents. Air quality would continue to improve to a certain extent, but it is unlikely that all state or federal ozone standards would be achieved as required by the federal and California CAAs.

6.2.2 FULL SOLAR CONVERSION ONLY

Under this alternative, all electricity would be generated by solar power. Public comments provided on the 2016 AQMP and NOP/IS (Appendix B) have requested that the alternative of complete solar power be evaluated.

Under this alternative, electricity would be generated by the construction and operation of additional solar generating systems. Some of these would be expected to be on existing housing, structures, and buildings. However, the amount of electricity that would need to be generated would require new large solar installations, which have generally been placed in the desert areas of California (CEC, 2016g), due to the large demand for land that is required. In 2015, solar thermal facilities generated a total of 14,953 gigawatt-hours or about 7.64 percent of the state's total electricity production (CEC, 2016g). Therefore, the state would need a significant increase in the construction and operation of additional solar generating systems.

While the solar technology has made great advances in recent years, there are still a number of existing concerns regarding the reliability and transmission of solar power. Large solar installations have been located in the desert portions of the state. As such, transmission lines that connect solar installations to the more populated portions of the state are not currently available.

Further, electricity would only be generated when the sun was out. While this is common in California, there are times when it is cloudy, rainy or night time when electricity would not be produced. So some type of electricity storage system may be required. The technology for large battery backup systems has not yet been developed which would mean that there would still be a requirement for natural gas-generated electricity. Therefore, full solar conversion is not feasible at this time.

A full solar alternative would result in a number of additional potentially significant environmental impacts than the current proposed AQMP strategy. This alternative would require the conversion of large portion of presumably desert habitat to industrial facilities, resulting in potentially significant impacts to aesthetics (impacts to visual character and glare), biological impacts (destruction of native habitats for rare and endangered species such as the desert tortoise), cultural impacts, land use impacts (conversion of native habitat to industrial land uses), additional air, noise, and traffic impacts associated with construction activities, and other similar impacts.

Finally, converting to full solar is an ambitious goal that has future possibilities. A full solar alternative to the 2016 AQMP would not result in sufficient emission reductions to assure attainment of the federal or state ozone standards. As discussed in Chapter 4.1.5, the carrying capacities (the maximum allowable NOx emissions to meet ozone standards) are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Elimination of natural gas-fired electricity power plants would not result in sufficient emission reductions to comply with ozone standards. Therefore, a full solar alternative would not achieve the primary objective of the proposed project to demonstrate attainment of the federal or state standards for ozone. For this reason, the alternative is considered to be infeasible at this time.

6.2.3 HEAVY VOC REDUCTION STRATEGY

The Heavy VOC Reductions Alternative scenario would aim to implement more VOC emission reductions to achieve ozone attainment, as opposed to the current 2016 AQMP strategy which focuses on NOx emission reductions. NOx levels would be held at or nearly constant and attainment would be dependent upon the reduction of VOC emissions, primarily in the areas of cleaner mobile sources, consumer products and lower VOC solvents. The VOC heavy approach is technically more uncertain, because it would require technology breakthrough in formulations of solvents or consumer products, which are not currently available. One result of the strategy may be the development of potentially new toxic formulations; however, replacement of solvents with low VOC formulations tends to be less toxic than conventional solvents.

Table 6.2-1 shows the limited feasible VOC control measures that have been identified as part of the 2016 AQMP. The VOC emission reductions currently total about 7-10 tons per day. Under this alternative, significant additional VOC emissions reductions would be required. Sufficient feasible VOC emission reductions are not available to demonstrate compliance with the ozone ambient air quality standards because there is a limited number of VOC sources and limited number of feasible VOC emission reductions. As a matter of fact, the ozone isopleths[1] for the two

[1] April 2016 AQMP Advisory Group Meeting #9 – http://www.aqmd.gov/docs/default-source/Agendas/aqmp/advisory9-item2.pdf (Slides 7-8)

highest ozone stations (Fontana and Redlands), show that even if all the VOC emissions were eliminated, the 75 ppb ozone standard would still not be met without NOx emission reductions (SCAQMD, 2016).

TABLE 6.2-1

2016 AQMP VOC Control Measures

Number	Title	Emission Reductions (tons/day) (2023/2031)
FUG-01	Improved Leak Detection and Repair [VOC]	2 / 2
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	1 / 2
FLX-02	Stationary Source VOC Incentives [VOC]	TBD
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	0.07 / 0.29
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	0.2 / 0.3
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	0.9 / 1.8
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	1.7 / 1.8
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	1.5 / 1.8

Finally, air quality modeling completed as part of the 2016 AQMP shows that NOx emission reductions are much more effective in demonstrating attainment than VOC emission reductions and that sufficient VOC emission reductions are not expected to be available to demonstrate compliance with the ambient air quality standards, so that this is not considered to be a feasible alternative.

6.2.4 SEASONAL CONTROL OF VOCS

VOC control measures in this alternative would allow affected facilities to shift emissions from the high ozone formation season (summer) to the low ozone formations season (winter) defined as November through April. The mechanism by which this alternative could occur would be through additional incentives to build and/or take public transit during the summer months. Sensitivity runs were performed as part of the evaluation of the SCAQMD intercredit trading program (Rule 2501) that showed there could be some air quality benefits from shifting VOC emissions to the winter. This alternative was rejected because the benefit would not be enough to attain and the

need to fully implement all feasible control measures and all available control measures that are required to meet the applicable attainment demonstrations.

6.2.5 LOCALIZED PM2.5 EMISSION REDUCTIONS

Localized PM2.5 emission reductions have been evaluated in previous AQMP EIRs as a strategy for compliance with the PM2.5 ambient air quality standards. Under this alternative, sources near areas that violate PM2.5 ambient air quality standards would be targeted for additional control. Based on sensitivity modeling completed for the 2016 AQMP, localized PM2.5 emission reductions (as opposed to basin-wide reductions) would not help meet the annual federal annual PM2.5 standard. If feasible control measures become available in the future, this control strategy could help assist with the PM2.5 attainment. However, this alternative was rejected because feasible control measures to implement a localized PM2.5 emission reduction strategy are not currently available.

6.2.6 ALTERNATIVE LOCATION

CEQA requires consideration of an alternative location alternative if significant effects of the project would be avoided or substantially lessened by putting the project in another location. Pursuant to CEQA Guidelines §15126.6 (f)(2)(B), if the Lead Agency concludes that no feasible alternative locations exist, it must disclose the reasons for this conclusion, and should include the reasons in the EIR. For example, in some cases there may be no feasible alternative locations for a geothermal plant or mining project which must be in close proximity to natural resources at a given location. The 2016 AQMP applies to the entire area of the SCAQMD's jurisdiction. The SCAQMD has no authority to adopt and enforce 2016 AQMP control measures in areas outside its jurisdiction. CEQA does not grant an agency new powers independent of the powers granted to the agency by other laws (CEQA Guidelines §15040 (b)). Therefore, an alternative location is not considered to be a feasible alternative.

6.3 ALTERNATIVES TO THE 2016 AQMP

Because of the substantial emission reductions necessary to bring the region into attainment with the: (1) revoked 1997 8-hour ozone standard (80 ppb) by 2023; (2) the 2008 8-hour ozone standard (75 ppb) by 2032; (3) the 2012 annual PM2.5 standard (12 ug/m3) by 2025; (4) the 2006 24-hour PM2.5 standard (35 ug/m3) by 2019; and (5) the revoked 1979 1-hour ozone standard (120 ppb) by 2022, the SCAQMD is relatively limited with regard to the number of potential alternatives to the 2016 AQMP. As a result, with the exception of the No Project Alternative and the Regulation Only Alternative, all project alternatives include the same mobile source control measures because of the magnitude of the emissions generated by mobile sources and the substantial emission reductions required to attain the PM2.5 and ozone standards by the applicable dates. Alternatives being evaluated as part of the 2016 AQMP include a Mobile Source Reduction Only that would not result in additional control of stationary sources; a Regulation Only alternative that considers only those control measures where the SCAQMD or CARB have the authority to regulate; and an Expanded Incentive Funding alternative that would increase incentive funding. The following sections provide a brief description of the alternatives.

6.3.1 ALTERNATIVE 1: NO PROJECT ALTERNATIVE

CEQA requires the evaluation of the No Project Alternative, which consists of what would occur if the proposed project was not approved; in this case, not adopting the 2016 AQMP. The net effect of not adopting the 2016 AQMP would be a continuation of the 2012 AQMP and the 2007 AQMP. This approach is consistent with CEQA Guidelines §15126.6 (e)(3)(A), which states: "When the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the 'no project' alternative will be the continuation of the existing plan, policy, or operation into the future. Typically this is a situation where other projects initiated under the existing plan will continue while the new plan is developed. Thus, the projected impacts of the proposed plan or alternative plans would be compared to the impacts that would occur under the existing plan."

SCAQMD continues to implement the 2012 AQMP, which received a limited approval and limited disapproval by U.S. EPA on April 14, 2016. Table 2.2-1 of Section 2.2 summarizes the progress achieved toward fulfilling SCAQMD's emissions reductions commitments to attain the federal standards by the required dates. As shown in Table 2.2-1, for the control measures adopted by the SCAQMD over this period, 11.7 tons per day of PM2.5 reductions was achieved by 2014 and 2.4 tons per day of VOC reductions and 19.5 tons per day of NOx reductions will be achieved by 2023. Table 6.3-1 shows the control measures that have been implemented since 2012 and the ones for which further evaluation is underway. The No Project Alternative assumes that these control measures would still be implemented.

SCAQMD and CARB achieved their 2007 AQMP short-term emission reduction targets. Therefore, the 2007 AQMP does not contain any remaining short-term stationary source or mobile source control measures to be adopted. All remaining necessary emission reductions to demonstrate attainment from implementing the 2007 AQMP would be obtained through implementing CAA §182(e)(5) measures, which are also referred to as "black box" measures.

TABLE 6.3-1

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	Commitment		Achieved	
			2014	2023	2014	2023
PM2.5 EMISSIONS						
BCM-01	Further Reductions from Residential Wood Burning Devices (R445)	2013	7.1	--	7.1	--
BCM-02	Further Reductions from Open Burning (R444)	2013	4.6	--	4.6	--
BCM-03	Emission Reductions from Under-Fired Charbroilers	TBD	--	TBD	--	TBD
BCM-04	Further Ammonia Reductions from Livestock Waste	TBD	--	TBD	--	TBD
	TOTAL PM2.5 REDUCTIONS		**11.7**	**--**	**11.7**	**--**
NO_x EMISSIONS						
OFFRD-01	Extension of the SOON Provision for Construction/Industrial Equipment	Ongoing	--	7.5	--	7.5
CMB-01	Further Reductions from RECLAIM [Regulation XX]	2015	2	3	0	12
CMB-02	NO_x Reduction from Biogas Flares	Rulemaking Underway	--	TBD	--	TBD
CMB-03	Reductions from Commercial Space Heating	2016	--	0.18	--	TBD
	TOTAL NO_x EMISSIONS		**2**	**10.7**	**0**	**19.5**
VOC EMISSIONS						
CTS-01	Further VOC Reductions from Architectural Coatings [R1113]	2016	--	2	--	1
CTS-02	Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants	Rulemaking Underway	--	1	--	--
CTS-03	Further VOC Reductions from Mold Release Products [R1161]	Rulemaking Underway	--	0.8	--	--
FUG-01	VOC Reductions from Vacuum Trucks [R1188]	Rulemaking Underway	--	TBD	--	--
FUG-02	Emission Reduction from LPG Transfer and Dispensing [R1177]	Rulemaking Underway	--	1	--	--
FUG-03	Emission Reduction from Fugitive VOC Emissions	2016	--	1	--	--
MCS-01	Application of All Feasible Measure Assessment [R1114]	Ongoing	TBD	TBD	0.4	1.4
	TOTAL VOC EMISSIONS		**0**	**5.8**	**0.4**	**2.4**

TABLE 6.3-1 (concluded)

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	Commitment		Achieved	
			2014	2023	2014	2023
MULTI-POLLUTANT						
IND-01	Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities [PR4001]	Rulemaking Underway	N/A[1]	N/A	N/A	N/A
MCS-02	Further Emission Reductions from Greenwaste Processing (Chipping and Grinding Operations not associated with composting)	Rulemaking Underway	--	TBD	--	TBD
MCS-03	Improved Start-Up, Shutdown, and Turnaround Procedures [R1123]	2014	--	TBD[2]	--	TBD
INC-01	Economic Incentive Programs to Adopt Zero and Near-Zero Technologies	Ongoing	--	--	--	--
INC-02	Expedited Permitting and CEQA Preparation Facilitating the Manufacturing of Zero and Near-Zero Technologies [All Pollutants]	Ongoing	--	--	--	--
EDU-01	Further Criteria Pollutant Reductions from Education, Outreach, and Incentives [All Pollutants]	Ongoing	--	--	--	--

1. Measure is designed to ensure reductions projected to occur are achieved
2. Reductions to be determined once the technical assessment is complete, and inventory and control approach are identified.

Table 6.3-2 shows the "black box" measure or long-term strategies from the 2007 AQMP. Because all control measures in Table 6.3-2 regulate mobile sources or the VOC content in consumer products, they are all considered to be ozone reduction control measures. The only exceptions to this assumption are the renewable energy and AB32 implementation control measures, which primarily address GHG emissions. Otherwise, there are no new control measures in Alternative 1 that specifically address reducing PM2.5 emissions.

The No Project Alternative would implement any remaining control measures in the 2012 AQMP and fulfill the "black box" measure commitment in the future pursuant to the 2007 AQMP to achieve the 1997 8-hour ozone standard (80 ppb) by 2023 but would not propose enough reductions to achieve the 2008 8-hour ozone standard (75ppb) by 2032 or the 2012 annual PM2.5 standard (12 $\mu g/m^3$) by 2025 as accomplished in the 2016 AQMP.

The No Project Alternative analyzed here will take into account the most current air quality setting (2016) and will include updated and refined control measures, but no new control measures.

TABLE 6.3-2

Long-Term (Black Box) Control Measures from the 2007 AQMP

SOURCE CATEGORY	METHOD OF EMISSIONS CONTROL	2012 AQMP CONTROL MEASURES AFFECTING SAME SOURCE
Light Duty Vehicles (SCLTM-01A)	Extensive retirement of high-emitting vehicles and accelerated penetration of ATPZEVs and ZEVs	ONRD-01 & ADV-01
On-Road Heavy Duty Vehicles (SCLTM-01B)	• Expanded modernization and retrofit of heavy-duty trucks and buses • Expanded inspection and maintenance program • Advanced near-zero and zero-emitting cargo transportation technologies	ONRD-03, ONRD-05 & ADV-06
Off-Road Vehicles (SCLTM-02)	Expanded modernization and retrofit of off-road equipment	OFFRD-01 & ADV-06
Consumer Products (SCLTM-03)	Ultra Low-VOC formulations; Reactivity-based controls	CTS-04
Fuels	More stringent gasoline and diesel specifications; Extensive use of diesel alternatives	No update [a]
Marine Vessels	More stringent emission standards and programs for new and existing ocean-going vessels and harbor craft	IND-01, OFFRD-05 & ADV-05
Locomotives	Advanced near-zero and zero emitting cargo transportation technologies	OFFRD-03 & ADV-02
Pleasure Craft	Accelerated replacement and retrofit of high-emitting engines	No update [a]
Aircraft	More stringent emission standards for jet aircraft (engine standards, clean fuels, retrofit controls); Airport bubble	ADV-07
Renewable Energy	Accelerated use of renewable energy and development of hydrogen technology and infrastructure	No update [a]
AB32 Implementation	Concurrent criteria pollutant reduction technologies	No update [a]

[a] No update means that the control measures continue to remain in effect as part of the Ozone SIP portion of the 2007 AQMP, but have not been updated as part of the 2016 AQMP.

6.3.2 ALTERNATIVE 2: MOBILE SOURCE REDUCTION ONLY

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only CARB's mobile source and consumer product control measures and the SCAQMD's localized mobile source strategy would be implemented. In order to be a viable alternative to be considered, the shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would need to be classified as CAA §182(e)(5) measures. Attainment of the 2012 annual PM2.5 standards, similar to the conclusions in the 2016 AQMP, would be achieved with implementation of the ozone strategy. Table 6.3-3 summarizes the proposed mobile source control measures under this alternative.

TABLE 6.3-3

Proposed Control Measures Under Alternative 2

Number	Title	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
EGM-01	Emission Reductions from New Development and Redevelopment Projects [All Pollutants]	SCAQMD	TBD
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, CO]	SCAQMD	TBD
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]	SCAQMD	TBD
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	SCAQMD	TBD
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	SCAQMD	TBD
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	CARB, SCAQMD	TBD
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	CARB, Bureau of Automotive Repair, SCAQMD	TBD
MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	CARB, SCAQMD	TBD
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	CARB, SCAQMD	TBD
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	CARB, SCAQMD	TBD
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	SCAQMD	2.0 / 2.0
MOB-11	Extended Exchange Program [VOC, NOx, CO]	SCAQMD	2.9 / 1.0 [NOx]
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	SoCal Regional Rail Authority	TBD

TABLE 6.3-3 (cont.)

Proposed Control Measures Under Alternative 2

Number	Title	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	SCAQMD	TBD
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	SCAQMD	11 / 7.8 [NOx]
ORLD-01	Advanced Clean Cars 2	CARB	NQ/0.6 (NOx) NQ/0.3 (ROG)
ORLD-02	Lower In-Use Emission Performance Assessment	CARB	NYQ
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles	CARB	7/~~5~~5 (NOx) 16/16 (ROG)
ORHD-01	Lower In-Use Emission Performance Level for Heavy-Duty Vehicles	CARB	NYQ
ORHD-02	Low-NOx Engine Standard	CARB	5 (NOx – CA action), 7 (NOx – Federal action)
ORHD-03	Medium and Heavy-Duty GHG Phase 2	CARB	NYQ
ORHD-04	Advanced Clean Transit	CARB	<0.1/0.1 (NOx) <0.1/<0.1 (ROG)
ORHD-05	Last Mile Delivery	CARB	<0.1/0.4 (NOx) <0.1/<0.1 (ROG)
ORHD-06	Innovative Technology Certification Flexibility	CARB	NYQ
ORHD-07	Zero Emission Airport Shuttle Buses	CARB	NYQ
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles	CARB	3/3 (NOx) 0.4/0.4 (ROG)
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles	CARB	34/11 (NOx) 4/1 (ROG)
ORFIS-01	More Stringent National Locomotive Emission Standards	EPA	0.7/8 (NOx) <0.1/0.3 ROG
ORFIS-02	Tier 4 Vessel Standards	EPA	4 (NOx)
ORFIS-03	Incentivize Low Emission Efficient Ship Visits	CARB	NYQ
ORFIS-04	At-Berth Regulation Amendments	CARB	0.3/1 (NOx) <0.1/<0.1 (ROG)
ORFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources	CARB	13/10 (NOx) nyq (ROG)
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	CARB	1 (NOx) 0.1 (ROG)

TABLE 6.3-3 (concluded)

Proposed Control Measures Under Alternative 2

Number	Title	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
OFFS-02	Zero Emission Off-Road Emission Reduction Assessment	CARB	NYQ
OFFS-03	Zero Emission Off-Road Worksite Emission Reduction Assessment	CARB	NYQ
OFFS-04	Zero Emission Airport Ground Support Equipment	CARB	<0.1/<0.1 (NOx) <0.1/<0.1 (ROG)
OFFS-05	Small Off-Road Engines	CARB	0.7/2 (NOx) 7/16 (ROG)
OFFS-06	Transport Refrigeration Units Used for Cold Storage	CARB	NYQ
OFFS-07	Low-Emission Diesel Requirement	CARB	0.6/2 (NOx)
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment	CARB	21/17 (NOx) 21/20 (ROG)
CPP-01	Consumer Products Program	CARB	5 (ROG)

TBD means to be determined; NYQ means not yet quantified.

6.3.3 ALTERNATIVE 3: CARB OR SCAQMD REGULATION ONLY

The 2016 AQMP includes a control strategy constructed from traditional regulatory control measures, co-benefit measures and incentive-based measures that will require adopted guidelines and secured funding, along with federal enforceable commitments pursuant to U.S. EPA. Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. By removing the emission reductions from the incentive-based measures, attainment of the standards is at risk. Therefore, by way of public comment suggestion, Alternative 3 would propose the following additional control measures to assist in making up the remaining emission reductions necessary to demonstration attainment of the ozone standards.

- Zero or near-zero emitting space heating technologies in new construction, home additions, and multi-family housing
- Establish a Port backstop rule with commitments to meet certain air pollution reduction milestones
- Adopt new and update existing fleet rules from light duty vehicles to heavy-duty equipment requiring zero emission vehicles or technologies
- Ensure zero emission lawn and garden equipment at new developments
- Develop indirect source rule to control pollution from warehouse operations
- Require solar energy technology in new construction and major remodels

If the emission reductions from the additional proposed control strategies are determined to not be enough to demonstrate attainment the ozone standards, the remaining NOx emission reductions would be classified as CAA §182(e)(5) measures.

Table 6.3-4 summarizes the proposed control measures under Alternative 3 that would be implemented through regulation by the SCAQMD. Table 6.3-5 summarizes the proposed control measures under Alternative 3 that would be implemented through regulation by CARB.

TABLE 6.3-4

SCAQMD Proposed Control Measure under Alternative 3

Number	Title	Emission Reductions (tons/day) (2023/2031)
SCAQMD Stationary Source NOx Measures		
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	1.4 / 1.5
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking [NOx]	0.8 / 1.6
CMB-05	Further NOx Reductions from RECLAIM Assessment [NOx]	0 / 5
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives [All Pollutants]	TBD [a]
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	0.3 / 1.1
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology [All Pollutants]	TBD [a]
FLX-01	Improved Education and Public Outreach [All Pollutants]	N/A [b]
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	N/A [b]
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD [a]
SCAQMD Stationary Source VOC Measures		
FUG-01	Improved Leak Detection and Repair [VOC]	2 / 2
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	1 / 2
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	0.07 / 0.29 [c]
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	1.7 / 1.8 [c]
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	1.5 / 1.8 [c]
SCAQMD Stationary Source PM2.5 Measures		
BCM-01	Further Emission Reductions from Commercial Cooking [PM]	3.3/3.3
BCM-02	Emission Reductions from Cooling Towers [PM]	TBD [a]

TABLE 6.3-4 (concluded)

SCAQMD Proposed Control Measure under Alternative 3

Number	Title	Emission Reductions (tons/day) (2023/2031)
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD [a]
BCM-04	Emission Reductions from Manure Management Strategies [NH3]	TBD [a]
BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD [a]
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD [a]
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD [a]
BCM-08	Further Emission Reductions from Agricultural, Prescribed and Training Burning [PM]	TBD [a]
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD [a]
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	0.1 / 0.1 [NH3]
SCAQMD Toxic Air Contamination Measures		
TXM-01	Control of Metal Particulate from Metal Grinding Operations	TBD
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations	TBD
TXM-03	Control of Hexavalent Chrome from Chrome Spraying Operations	TBD
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soil	TBD
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting	TBD
TXM-06	Control of Toxic Emissions from Metal Melting Facilities	TBD
TXM-07	Control of Lead Emissions from Stationary Sources	TBD
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings	TBD
TXM-09	Control of Emissions from Oil and Gas Well Activities	TBD

[a] TBD are reductions to be determined once the inventory and control approach are identified, and are not relied upon for attainment demonstration purposes.

[b] N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur.

[c] Corresponding VOC reductions from other measures.

Source: 2016 AQMP, Table 4-2.

TABLE 6.3-5
CARB Proposed Control Measure under Alternative 3

CM Number	Title	Action	Implementation Begins	2023 Reduction (tons/day)	2031 Reduction (tons/day)
On-Road Light-Duty					
ORLD-01	Advanced Clean Cars 2	2020	2026	-	0.6 (NOx) 0.3 (ROG)
ORLD-02	Lower In-Use Emission Performance Assessment	NA	ongoing	NYQ	NYQ
On-Road Heavy-Duty					
ORHD-01	Lower In-Use Emission Performance Level for Heavy-Duty Vehicles	2016	2017	NYQ	NYQ
ORHD-02	Low-NOx Engine Standard (California Only)	2017-2019	CA Implementation: 2023	-	5 (NOx – CA action)
Marine, Rail, and Aircraft Off-Road					
ORFIS-04	At-Berth Regulation Amendments	2017-2018	2022	0.3 (NOx) <0.1 (ROG)	1 (NOx) <0.1 (ROG)
Other Off-Road					
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	2020	2023	-	1 (NOx) 0.1 (ROG)
OFFS-05	Small Off-Road Engines	2018	2022	0.7 (NOx) 7 (ROG)	2 (NOx) 16 (ROG)
OFFS-06	Transport Refrigeration Units Used for Cold Storage	2017-2018	2020	NYQ	NYQ
OFFS-07	Low-Emission Diesel Requirement	By 2020	2023	0.6 (NOx)	2 (NOx)
Consumer Products					
CPP-01	Consumer Products Program	2019-2021	2020	-	5 (ROG)

NYQ means not yet quantified.

6.3.4 ALTERNATIVE 4: EXPANDED INCENTIVE FUNDING

Alternative 4 would expand the incentive funding programs to increase the penetration of cleaner vehicles and technologies, allowing for more emission reductions and possibly earlier attainment of ambient air quality standards. Depending on the method of funding, current incentive costs are in the range of 4.25 to 15.8 billion dollars. Under this alternative it would be assumed that additional incentive funding sources would be found. This alternative has the opportunity to provide for more emission reductions and ease the need for additional regulatory action. However, the attainment goals would still need to be achieved as expeditiously as practicable.

6.4 ALTERNATIVES ANALYSIS

The following subsections include the same environmental topic areas evaluated for the 2016 AQMP. Under each environmental topic area, impacts and significance conclusions are summarized for the 2016 AQMP. In addition, potential impacts generated by each alternative to that environmental topic are described, a significance determination is made for the alternative, and environmental impacts from each alternative are compared to the environmental impacts identified for the 2016 AQMP.

6.4.1 AIR QUALITY

The potential air quality impacts from implementing the proposed project and project alternatives were evaluated. The following sections provide a summary of potential air quality impacts from the proposed project and evaluate potential air quality impacts from each alternative relative to the proposed project.

6.4.1.1 Proposed Project Impacts

The air quality impacts analysis concluded that the federal annual PM2.5 standards are predicted to be achieved in 2023 with implementation of the proposed ozone strategy. With only the non-182(e)(5) measure reductions, the annual PM2.5 standard would not be attained in 2021 (attainment date for moderate nonattainment areas). However, if the ozone strategy is fully implemented by 2023, both the federal and California annual PM2.5 standards could be achieved by 2023 under the proposed project scenario (see Section 4.1, Figure 4.1-3).

The carrying capacities, the maximum allowable NOx emissions to meet ozone standards, are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Approximately 16 percent NOx reductions from the 2022 baseline is needed to meet the revoked 1997 1-hour ozone standard by 2022, confirming that the 8-hour standard is a more stringent form than the 1-hour standard. Air quality modeling demonstrated that the strategies in the 2016 AQMP developed for attainment of the 1997 and 2008 8-hour ozone standards by 2023 and 2032 will ensure attainment of the 1-hour standard by 2022.

The California standard for 8-hour ozone is 70 ppb, the same level as the 2015 revised federal 8-hour ozone standard. This state standard will not be achieved by 2031. Preliminary analysis

suggests additional emission reductions beyond the level required in 2031 are needed to meet the 70 ppb standard (see Section 4.1, Figure 4.1-4).

It should be noted that 2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions in the 2016 AQMP, however, the latest verifiable air quality data (from the approved monitoring stations) is from 2015, which can be found in Chapter 2 of the 2016 AQMP and Chapter 3 (Existing Setting) of the Draft Program EIR. The most recent environmental topic data is from 2016 for the CEQA baseline in determining environmental impacts because that was time of the release of the NOP/IS in accordance with CEQA requirements.

The air quality analysis concluded that significant adverse construction air quality impacts could be created by the proposed project as construction activities needed to implement the 2016 AQMP control measures would exceed the SCAQMD's applicable significance thresholds. Mitigation measures were identified, but air quality impacts from construction would likely remain significant.

As noted above, the 2016 AQMP is designed to reduce criteria pollutants to meet federal air quality standards along with reductions in toxic risk and reductions in GHG emissions. Thus, there is an overall air quality benefit. The 2016 AQMP does have the potential to have a significant impact on energy demand. However the existing and future air quality and GHG rules and regulations are expected to minimize operational emissions associated with increased generation of electricity and the electricity providers have committed to meeting the increased energy demand while complying with applicable regulations; therefore, the 2016 AQMP control measures are not likely to generate significant adverse air quality impacts. In addition, future energy sources are increasingly being generated by renewable resources. One example is approximately 700 MW of electricity is now generated by solar projects in the four-county region[2].

Under the proposed project, no significant operational air quality impacts are expected from control of stationary sources, the change to the use of lower VOC materials, emissions from cleaner if not zero-emitting mobile sources, or miscellaneous emissions. Potential impacts associated with implementing the proposed project are expected to be an overall reduction in TAC emissions and GHG emissions, providing an environmental benefit. For the complete analysis of air quality impacts from the proposed project, refer to Section 4.2 – Air Quality.

6.4.1.2 No Project Alternative

Under Alternative 1, the black box measures from the 2007 AQMP and the yet-to-be implemented control measures from the 2012 AQMP would continue to be identified, adopted and implemented (see Table 6.3-1). The continuing implementation of these measures would generate construction impacts but not as many adverse impacts from the 2016 AQMP since there are less to implement. The one variable is what will constitute long-term measures in the future. Since the future technologies have not been identified or defined, it would be speculative to assume the construction air quality impacts from the long-term measures at this time. The construction air quality impacts from the 2012 AQMP were determined to be significant, however, the No Project

[2] https://www.californiasolarstatistics.ca.gov/reports/locale_stats/

Alternative is requiring what has already been adopted and analyzed to be implemented. Thus, the construction air quality impacts from not taking new action or proposing new control measures will not change the existing construction air quality baseline and thus, the construction air quality impacts from Alternative 1 are less than significant.

On the operational side, it is expected that air quality will continue to improve under Alternative 1 because of the adoption and implementation by the SCAQMD and CARB of the already adopted 2012 AQMP control measures, however the improvement would only attain the 1997 8-hour ozone standard (80 ppb). More measures would be needed under Alternative 1 to attain the 2008 8-hour ozone standard (75 ppb) but the No Project Alternative is not proposing any additional control measures. Thus, while Alternative 1 reduces criteria pollutant emissions and corresponding toxics and GHGs, the benefit will be less than what is accomplished with the proposed project.

6.4.1.3 Alternative 2 – Mobile Source Reductions Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB and localized mobile source measures proposed by the SCAQMD would be implemented. Under this alternative, the 19971-hour ozone standard (120 ppb) and the 1997 8-hour ozone standard (80 ppb) could be met by 2022 and 2023, respectively, without reliance on the stationary source control measures. However, the 2008 8-hour ozone standard (75 ppb) would not be met without the implementation of the stationary source control measures. To make this alternative viable, the shortfall in NOx emission reductions would be classified as CAA §182(e)(5) measures. As compared to the proposed project, there would be less overall operational air quality, toxics and GHG benefits, but the impacts from construction would be reduced albeit still likely significant.

6.4.1.4 Alternative 3 – CARB or SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative air quality impacts since the actual future technologies have not been identified or defined. However, the air quality impacts from the new proposed control strategies can be evaluated. Most of the proposals involve mobile sources that have limited construction impacts and beneficial operational impacts. Zero emission space heating technology would take place at new construction locations so no change from the baseline since there would be delivery and installation of natural gas heater without the proposed measure. Implementation of the proposed project regulatory measures will still generate adverse construction air quality impacts and provide operational air quality benefits. As compared to the proposed project, Alternative 3 would still have significant construction impacts, but less than the proposed project and there would be less overall operational air quality, toxics and GHG benefits.

6.4.1.5 Alternative 4 – Expanded Incentive Funding

Alternative 4 would expand the incentive funding to increase the penetration of cleaner vehicles and technologies, allowing for potentially more emission reductions. With more potential projects to be funded, the air quality construction impacts under Alternative 4 would be greater than the proposed project. However, greater emission reductions would be expected, thus more air quality, toxics, and GHG benefits than the proposed project.

6.4.2 ENERGY

The potential direct and indirect energy impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential direct and indirect energy impacts from the proposed project and evaluate potential direct and indirect energy impacts from each alternative relative to the proposed project.

6.4.2.1 Proposed Project Impacts

The environmental analysis for the proposed project concluded that the 2016 AQMP could result in a substantial increase in electricity demand that was concluded to be significant. No significant impacts were identified for natural gas supplies, petroleum fuels, or alternative energy demands. The proposed project is expected to decrease the use of fossil fuels and increase the reliance on renewable resources providing a beneficial long-term operational impact on energy conservation. For the complete analysis of energy impacts from the 2016 AQMP, refer to Section 4.3 – Energy.

6.4.2.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the energy impacts from the long-term measures at this time. The energy demand impacts from the 2012 AQMP were determined to be significant; however, the No Project Alternative would not require beyond what has already been adopted and analyzed to be implemented. Thus, the energy impacts from not taking new action or proposing new control measures in Alternative 1 are less than significant.

6.4.2.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB and localized mobile source measures proposed by the SCAQMD would be implemented. The energy used under Alternative 2 would be slightly less as no stationary sources would be modified. However, virtually all of the electricity demand associated with the proposed project is associated with the increased penetration of partial-zero and zero emission vehicles. Therefore, the increase in electricity demand is expected to be about 10,227 GW-hr in 2023 and 18,029 GW-hr in 2031, which represents an increase in electricity use of 7.8 to 12.7 percent, which is deemed to be

significant. This alternative would only eliminate CMB-01, the electrification of some stationary sources. Therefore, electricity demand would be less, but still is expected to be significant.

Alternative 2 would be expected to generate slightly less impacts on other energy sources since no stationary sources would be impacted. Therefore, no significant impacts are expected for natural gas supplies, petroleum fuels, or alternative energy demands under Alternative 2.

6.4.2.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative energy impacts since the actual future technologies have not been identified or defined. However, the energy impacts from the new proposed control strategies can be evaluated. Most of the proposed new control measures seek a zero emission solution so there will be an increased need for electricity whether for a vehicle, lawn and garden equipment, or a stationary source. Implementation of the proposed project regulatory measures will still generate significant adverse energy demand impacts but less than the proposed project since incentive-based measures would not be implemented.
The energy impacts under Alternative 3 are also expected to be less than the proposed project because some mobile source control measures that rely on incentives would not be implemented.

The demands for electricity under Alternative 3 could be partially offset by charging equipment (e.g., electric vehicles) at night when the electricity demand is low, thus minimizing impacts on peak electricity demands. .

Alternative 3 is expected to result in less energy impacts than the proposed project as fewer control measures would be implemented (no control measures with incentives). Therefore, as with the proposed project, Alternative 3 is not expected to result in significant impacts on natural gas supplies, petroleum fuels, or alternative energy resources.

6.4.2.5 Alternative 4 – Expanded Incentive Funding

Under Alternative 4, the electricity use would be the same or more as the increased funding could allow increased penetration of more partial-zero and zero emission vehicles than the proposed project; therefore, the electricity demand impacts are significant under Alternative 4 and likely more severe. As with the proposed project, no significant impacts are expected for natural gas supplies, petroleum fuels, or alternative energy demands under Alternative 4. Alternative 4 could decrease the use of petroleum fuels even more than the proposed project, providing a beneficial long term operational impact on energy conservation.

6.4.3 HAZARDS AND HAZARDOUS MATERIALS

The potential hazards and hazardous materials impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential

hazards and hazardous materials impacts from the proposed project and evaluate potential hazards and hazardous materials impacts from each alternative relative to the project.

6.4.3.1 Proposed Project Impacts

The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the 2016 AQMP are expected to be significant prior to mitigation, as more flammable materials may be used. The hazard impacts associated with the transport of LNG are potentially significant. The hazard impacts associated with using ethanol and ethanol blends, CNG, LNG, LPG, biodiesel/renewable fuels, hydrogen, electric/hybrids as an alternative fuel are expected to be less than significant.

The hazards associated with the use of LNG and ammonia in air pollution control equipment that may be used to comply with some of the proposed project control measures are potentially significant for a transportation release of ammonia and potentially significant as an ammonia tank rupture at a non-refinery facility may result in off-site impacts to sensitive receptors.

The hazards associated with the use of ammonia in air pollution control equipment that may be installed as part of the proposed project control measures is less than significant for water quality impacts due to existing regulations and spill containment and control requirements; less than significant for the use of catalysts; and less than significant for the use of caustic materials. The hazards associated with increased use of the acidifier SBS are also expected to be less than significant. For the complete analysis of hazards and hazardous materials impacts from the 2016 AQMP, refer to Section 4.4 – Hazards and Hazardous Materials.

6.4.3.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the hazards impacts from the long-term measures at this time. The fire hazards and risk of upset impacts from the 2012 AQMP were determined to be significant, however, the No Project Alternative would not requiring beyond what has already been adopted and analyzed to be implemented. Thus, the hazards impacts from not taking new action or proposing new control measures in Alternative 1 are less than significant.

6.4.3.3 Alternative 2 - Mobile Source Reduction Only

Alternative 2 would eliminate the stationary source control measures and some of the related hazards. The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the proposed project are expected to be significant however, these hazardous would be eliminated under Alternative 2 as no reformulated product control measures would be implemented. The hazard impacts associated with the transport of LNG are potentially significant and would remain significant under Alternative 2 as LNG could be used as a fuel source. The

hazard impacts associated with using ethanol and ethanol blends, CNG, LNG, LPG, biodiesel/renewable fuels, hydrogen, electric/hybrids as an alternative fuel are expected to be less than significant under the proposed project and they would be the same under Alternative 2 and would remain less than significant.

The significant impacts associated with the use of ammonia in air pollution control equipment that may be used to comply with some of the proposed project control measures would be eliminated under Alternative 2 as control measures for stationary sources would be eliminated. Alternative 2 would also eliminate the control measures that could increase the use of catalysts, caustic materials or the SBS acidifier.

6.4.3.4 Alternative 3 – CARB or SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative hazards impacts since the actual future technologies have not been identified or defined. However, the hazards impacts from the new proposed control strategies can be evaluated. Most of the proposed control measures involve zero-emission mobile sources and space heating that would have limited hazard impacts. However, depending on the alternative fuel used in the mobile sources, hazards has a potential impact. That impact is discussed in more detail in upcoming paragraphs. Implementation of the proposed project regulatory measures will still generate adverse hazards impacts but less than the proposed project since incentive-based measures would not be implemented.

The significant fire hazard impacts associated with reformulated coatings, solvents, and consumer products are expected to remain under Alternative 3 as most of the stationary source measures would be included, including the potential reformulation of products with low VOC materials.

The significant hazard impacts associated with the transport of LNG as an alternative fuel for vehicles and equipment are likely to be less than significant under Alternative 3 as most of the mobile source control measures would not move forward, including those that incentivize the use of partial-zero and zero emission mobile sources. The hazard impacts associated with using ethanol and ethanol blends, CNG, LNG, LPG, biodiesel/renewable fuels, hydrogen, electric/hybrids as an alternative fuel are expected to be less than significant under the proposed project and they would remain less than significant under Alternative 3.

The significant hazards from transportation release and tank rupture at a non-refinery facility associated with the use of ammonia in air pollution control equipment remain significant under Alternative 3 since those control measures requiring the use of NH3 would still be implemented.

The hazards associated with the use of ammonia in air pollution control equipment that may be installed as part of the proposed project control measures would still be implemented under Alternative 3. Therefore, the water quality impacts would be less than significant due to existing

regulations and spill containment and control requirements; less than significant for the use of catalysts; and less than significant for the use of caustic materials. The hazards associated with increased use of the acidifier SBS are also expected to be less than significant under Alternative 3.

6.4.3.5 Alternative 4 – Expanded Incentive Funding

Alternative 4 would expand incentive funding and expand the penetration of cleaner technologies and would be expected to result in similar hazard impacts as the proposed projects. The fire hazard impacts associated with reformulated coatings, solvents, and consumer products would be the same or worse under Alternative 4. The hazard impacts associated with the transport of LNG are expected to be significant under Alternative 4. The hazard impacts associated with using ethanol and ethanol blends, CNG, LNG, LPG, biodiesel/renewable fuels, hydrogen, electric/hybrids as an alternative fuel are expected to be less than significant under the proposed project and they would be expected to remain less than significant under Alternative 4.

Under Alternative 4, the hazards associated with the use of ammonia in air pollution control equipment will continue to be significant and worse for a transportation release of ammonia and potentially significant as an ammonia tank rupture at a non-refinery facility may result in off-site impacts to sensitive receptors, since the same or more control measures would be implemented compared to the proposed project.

The hazards associated with the proposed project for the use of ammonia in air pollution control equipment (less than significant for water quality impacts due to existing regulations and spill containment and control requirements); the use of catalysts (less than significant); and the use of caustic materials (less than significant), are also expected to be the same or worse under Alternative 4 as the same or more control measures would be implemented. The hazards associated with increased use of the acidifier SBS are also expected to be less than significant for both the proposed project and Alternative 4.

6.4.4 HYDROLOGY AND WATER QUALITY

The potential hydrology and water quality impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential hydrology and water quality impacts from the proposed project and evaluate potential hydrology and water quality impacts from each alternative relative to the proposed project.

6.4.4.1 Proposed Project Impacts

It was concluded that wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be associated with proposed project control measures generated from reformulation of products and use of air pollution control equipment (e.g., wet ESPs and WGSs). Therefore, less than significant impacts associated with wastewater treatment or water quality is expected. Implementation of proposed project control measures is not expected to result in greater adverse water quality impacts from the use of alternative fuels than the use of conventional fuels and impacts would be less than significant. Less than significant

adverse water quality impacts are expected from the increased use of EV and hybrid vehicles and the associated increase in battery use and disposal.

Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies that may be required to comply with the proposed project control measures, such as wet ESPs and WGSs, are potentially significant as they would exceed SCAQMD's water demand significance thresholds.

SBS is not a hazardous or toxic chemical and is used to treat drinking water. Therefore, the use of SBS is expected to create less than significant water quality impacts. Finally, potential spills associated with ammonia are expected to be contained on-site due to the requirement for secondary spill containment devices and berms and are expected to be less than significant. For the complete analysis of hydrology and water quality impacts from the proposed project, refer to Section 4.5 – Hydrology and Water Quality.

6.4.4.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the hydrology impacts from the long-term measures at this time. The water demand impacts from the 2012 AQMP were determined to be significant, however, the No Project Alternative would not requiring beyond what has already been adopted and analyzed to be implemented. Thus, the hydrology impacts from not taking new action or proposing new control measures in Alternative 1 are less than significant.

6.4.4.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB's SIP Strategy and localized mobile source measures proposed by SCAQMD would be implemented. The increased water demand and wastewater discharges associated with the proposed project is generated by the stationary source and consumer products measures. Therefore, the potentially significant increase in water demand associated with the proposed project would be substantially less under Alternative 2 but not fully eliminated since consumer products will still be implemented because they are part of CARB's SIP Strategy. Water quality impacts from the use of alternative fuels is not expected to be greater than from the use of conventional fuels and impacts would be less than significant under Alternative 2. Less than significant adverse water quality impacts would also be expected under Alternative 2 from the increased use of EV and hybrid vehicles and the associated increase in battery use and disposal. Finally, Alternative 2 would also eliminate the use of the acidifier SBS so no additional water quality impacts would be associated with its use.

6.4.4.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment of the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative hydrology impacts since the actual future technologies have not been identified or defined. However, the hydrology impacts from the new proposed control strategies can be evaluated. The primary hydrology impact would result from increased solar technology that requires periodic washing to maintain effectiveness. Implementation of the proposed project regulatory measures will still generate adverse hydrology impacts but less than the proposed project since incentive-based measures would not be implemented.

It was concluded that wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be associated with proposed project control measures generated from reformulation of products and use of air pollution control equipment (e.g., wet ESPs and WGSs). Therefore, less than significant impacts associated with wastewater treatment or water quality is expected under Alternative 3, as most of the stationary source control measures would still be implemented. Implementation of proposed project control measures, as well as the control measures under Alternative 3, is not expected to result in greater adverse water quality impacts from the use of alternative fuels than the use of conventional fuels and impacts would be less than significant. Under Alternative 3, these impacts would be less as there would be less penetration of partial-zero and zero emission vehicles.

Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies that may be required to comply with the proposed project control measures as well as that control measures under Alternative 3, such as wet ESPs and WGSs, are potentially significant as they could exceed SCAQMD water demand significance thresholds.

SBS is not a hazardous or toxic chemical and is used to treat drinking water. Therefore, the use of SBS is expected to create less than significant water quality impacts under both the proposed project and Alternative 3. Finally, potential spills associated with ammonia are expected to be contained on-site due to the requirement for secondary spill containment devices and berms and are expected to be less than significant under both the proposed project and Alternative 3.

6.4.4.5 Alternative 4 – Expanded Incentive Funding

The control measures implemented under Alternative 4 would be the same or more than the control measures implemented under the proposed project so that the hydrology and water quality impacts are expected to be the same.

Wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be associated with proposed project control measures generated from reformulation of products and use of air pollution control equipment (e.g., wet ESPs and

WGSs). Therefore, less than significant impacts associated with wastewater treatment or water quality is expected. Implementation of proposed project control measures is not expected to result in greater adverse water quality impacts from the use of alternative fuels than the use of conventional fuels and impacts would be less than significant. Less than significant adverse water quality impacts are expected from the increased use of EV and hybrid vehicles and the associated increase in battery use and disposal. The same or worse conclusions would also be expected under Alternative 4.

Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies that may be required to comply with the proposed project control measures, such as wet ESPs and WGSs, are potentially significant as they would exceed SCAQMD water demand significance thresholds.

Finally, SBS is not a hazardous or toxic chemical and is used to treat drinking water. Therefore, the use of SBS is expected to create less than significant water quality impacts. Finally, potential spills associated with ammonia are expected to be contained on-site due to the requirement for secondary spill containment devices and berms and are expected to be less than significant. The same or worse conclusions would be expected under Alternative 4.

6.4.5 NOISE

The potential noise impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential noise impacts from the 2016 AQMP and evaluate potential noise impacts from each alternative relative to the 2016 AQMP.

6.4.5.1 Proposed Project Impacts

Construction Impacts: Implementation of the proposed project control measures associated with air pollution control technologies and exhaust standards would not result in noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas, impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected.

Operational Impacts: Implementation of the proposed project control measures is not expected to result in significant adverse operational noise impacts because the proposed project control measures typically affect existing commercial or industrial facilities typically located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. Although overhead catenary lines could be installed to comply with certain control measures, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors. Further, the increasing operation of electric vehicles and equipment will lessen the noise typically experienced with combustion vehicles and equipment. For the complete analysis of noise impacts from the 2016 AQMP, refer to Section 4.6 – Noise.

6.4.5.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the noise impacts from the long-term measures at this time. The construction noise impacts from the 2012 AQMP were determined to be significant, however, the No Project Alternative is requiring what has already been adopted and analyzed to be implemented. Thus, the noise impacts from not taking new action or proposing new control measures will not change the impacts from those identified for the 2012 AQMP.

6.4.5.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB and localized mobile source measures proposed by the SCAQMD would be implemented. Under Alternative 2, noise and vibration from construction activities would be reduced as no construction activities at stationary sources would occur. However, implementation of the Alternative 2 would still include control measures associated with construction of overhead catenary lines that could result in significant noise and vibration impacts due to the geographic proximity of sensitive receptors.

Under Alternative 2, noise and vibration from operational activities would be reduced as no new noise sources (e.g., air pollution control technologies) would be constructed at stationary sources. Overhead catenary lines could be installed to comply with certain mobile source control measures under Alternative 2, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors or generate additional noise sources. In addition, Alternative 2 would increase the operation of electric vehicles that are traditionally quieter than combustion vehicles so operational noise will be reduced to less than significant.

6.4.5.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative noise impacts since the actual future technologies have not been identified or defined. However, the noise impacts from the new proposed control strategies can be evaluated. The construction noise impacts would not change at new development construction site, would increase at solar installation sites and unknown at the Ports depending on the project. The operation of zero-emitting vehicles and equipment is generally quieter than combustion vehicles and equipment. Implementation of the proposed project regulatory measures will still generate adverse noise impacts but less than the proposed project since incentive-based measures would not be implemented.

Construction Impacts: Implementation of the proposed project control measures, as well as the control measures under Alternative 3, associated with air pollution control technologies and exhaust standards would not result in noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas, impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected. The potential construction of overhead catenary lines would likely be eliminated under Alternative 3, therefore, the noise impacts associated with construction activities under the proposed project would be reduced to less than significant under Alternative 3.

Operational Impacts: Implementation of the proposed project, as well as the control measures under Alternative 3, is not expected to result in significant adverse operational noise impacts because the control measures that affect existing commercial or industrial facilities are expect to be located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. The potential construction of overhead catenary lines would likely be eliminated under Alternative 3 and the increased operation of electric vehicles that are traditionally quieter than combustion vehicles will reduce noise, therefore, the noise impacts associated with operational activities under the proposed project would be reduced to less than significant under Alternative 3.

6.4.5.5 Alternative 4 – Expanded Incentive Funding

The control measures implemented under Alternative 4 would be the same or more as the control measures implemented under the proposed project so that the noise impacts are expected to be the same.

Construction Impacts: Implementation of the proposed project control measures, as well as the control measures under Alternative 4, associated with air pollution control technologies and

exhaust standards would not result in noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas, impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected. However, implementation of the proposed project or the Alternative 4 control measures associated with construction of overhead catenary lines could result in significant noise and vibration impacts due to the geographic proximity of sensitive receptors.

Operational Impacts: Implementation of the proposed project, as well as the Alternative 4 stationary source control measures, is not expected to result in significant adverse operational noise impacts because the control measures typically affect existing commercial or industrial facilities are typically located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. Although overhead catenary lines could be installed to comply with certain control measures, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors and are not expected to generate additional noise impacts after the completion of construction. In addition, more electric vehicles are expected to be operated under Alternative 4 and since electric vehicles are traditionally quieter than combustion vehicles, the operational noise impacts are anticipated to be less than significant.

6.4.6 SOLID AND HAZARDOUS WASTE

The potential solid and hazardous waste impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential solid and hazardous waste impacts from the proposed project and evaluate potential solid and hazardous waste impacts from each alternative relative to the proposed project.

6.4.6.1 Proposed Project Impacts

Implementation of proposed project control measures would not significantly increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, would not generate significant additional waste. Because spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries. In addition, solid waste impacts due to proposed project air pollution control technologies would not be significant because spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. While these efforts assist in meeting goals reducing landfill waste the proposed project will advance deployment of high numbers of new vehicles and equipment and the assurance these will all be

recycled, destroyed and not be sent to a landfill is uncertain. Furthermore, waste associated with construction of control measures could be sent to a landfill. So out of an abundance of caution significant solid/hazardous waste impacts were concluded to be significant due to implementation of the 2016 AQMP control measures. For the complete analysis of solid and hazardous waste impacts from the 2016 AQMP, refer to Section 4.7 – Solid and Hazardous Waste.

6.4.6.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the solid and hazardous waste impacts from the long-term measures at this time. The solid and hazardous waste impacts from the 2012 AQMP were determined to be less than significant and since the No Project Alternative is not taking new action or proposing new control measures, the solid and hazardous waste impacts from Alternative 1 will remain less than significant.

6.4.6.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed in CARB's SIP Strategy and localized mobile source measures proposed by the SCAQMD would be implemented. Implementation of the proposed project control measures would increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, and thus could likely generate significant additional waste. The solid/hazardous waste generated under Alternative 2 is expected to be significant but less than the proposed project as there would not be any retirement of stationary source equipment.

Because spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries and the same would be true under Alternative 2. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, it is speculative to estimate the volume of waste sent to landfills from project construction or some control measures such as car scrapping. Therefore, significant solid/hazardous waste impacts were anticipated due to implementation of the proposed project control measures and the same would be true under Alternative 2 although less waste would be generated.

6.4.6.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area

and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative solid/hazardous waste impacts since the actual future technologies have not been identified or defined. However, the solid/hazardous waste impacts from the new proposed control strategies can be evaluated. With the advanced replacement of fleet vehicles and equipment and changes at the Ports could generate adverse solid/hazardous waste impacts. Some of these products have the potential for recycling and others could burden a landfill. Implementation of the proposed project regulatory measures will still generate significant solid/hazardous waste impacts but less than the proposed project since incentive-based measures would not be implemented.

Implementation of proposed project control measures, as well as the control measures under Alternative 3, would increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, thus could generate significant additional waste. The 2016 AQMP Program EIR concluded that because spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries. Under Alternative 3, more lead-acid batteries are expected to remain in use. Lead-acid batteries are required to be recycled, reducing the potential for illegal disposal of batteries. However, the large number of vehicles and high-emitting equipment to be scrapped has the potential to result in significant adverse solid/hazardous waste impacts.

Solid waste impacts due to air pollution control technologies that may be installed under the proposed project or under Alternative 3, are not expected to be significant because spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. The 2016 AQMP Program EIR concludes that control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. Therefore, potential significant solid/hazardous waste impacts were identified due to implementation of the proposed project or Alternative 3 control measures.

6.4.6.5 Alternative 4 – Expanded Incentive Funding

The control measures implemented under Alternative 4 would be the same or more as the control measures implemented under the proposed project so that the solid and hazardous waste impacts are expected to be the same.

Implementation 2016 AQMP control measures would increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, thus could generate significant additional waste. Because spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of

batteries. In addition, spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, it is not conclusive that equipment will be put out of service and that the high number of vehicles or equipment will be scrapped as solid/hazardous waste so there is a potential for significant solid/hazardous waste impacts. .

6.4.7 TRANSPORTATION AND TRAFFIC

The transportation and traffic impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential hydrology and water quality impacts from the proposed project and evaluate potential hydrology and water quality impacts from each alternative relative to the proposed project.

6.4.7.1 Proposed Project Impacts

Implementation of the proposed project is not expected to result in potentially significant adverse transportation and traffic impacts because the proposed project control measures typically affect existing commercial or industrial facilities or would increase the penetration of zero emission and partial-zero emission vehicles and other mobile sources, which are not expected to generate new construction or substantially increase vehicle trips or vehicle miles traveled in the Basin, as they would place existing vehicles. However, some proposed project control measures could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, were considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road. Significant adverse operational traffic impacts are anticipated to be generated by the proposed project because no new streets, roads, freeways, or rail lines would be required and the proposed project control measures would apply to existing transportation corridors. For the complete analysis of Transportation and Traffic impacts from the 2016 AQMP, refer to Section 4.9 – Transportation and Traffic.

Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the traffic and transportation impacts from the long-term measures at this time. The construction and operational traffic impacts from the 2012 AQMP were determined to be significant, however, the No Project Alternative is not requiring beyond what has already been adopted and analyzed to be implemented. Thus, the traffic and transportation impacts will not change the traffic and transportation impacts identified in the 2012 AQMP, and therefore, remain significant.

6.4.7.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by the CARB SIP Strategy and localized mobile source measures proposed by the SCAQMD would be implemented. Implementation of the mobile source control measures that increase the penetration of zero emission and partial-zero emission vehicles and other mobile sources would not be expected to generate new construction or substantially increase vehicle trips or vehicle miles traveled in the Basin as they would replace existing operating vehicles. However, some control measures in the 2016 AQMP and in Alternative 2 could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, are considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could significantly adversely affect traffic and congestion for all other vehicles on the road. Significant adverse operational traffic impacts are anticipated to be generated by the 2016 AQMP as well as under Alternative 2.

6.4.7.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative traffic/transportation impacts since the actual future technologies have not been

identified or defined. However, the traffic/transportation impacts from the new proposed control strategies can be evaluated. Traffic will have adverse impacts as new solar technology is delivered and installed but other equipment, such as space heating and landscaping equipment will occur at new development so no change from baseline. The new measures are not foreseen to increase the traffic during operation. Implementation of the proposed project regulatory measures will still generate adverse traffic/transportation impacts but less than the proposed project since incentive-based measures would not be implemented.

Implementation of the 2016 AQMP was expected to result in significant traffic impacts associated with the construction and operation of overhead catenary lines. Construction activities could require the potential closures of lanes along existing transportation corridors and were consider to be significant. Significant adverse operational traffic impacts are anticipated to be generated by the 2016 AQMP because the catenary lines could reduce the number of lanes available to other traffic. Alternative 3 does not include the control measures that may incentivize or require the construction of overhead catenary lines. Therefore, the potentially significant traffic impacts under the proposed project would be reduced to less than significant.

6.4.7.5 Alternative 4 – Expanded Incentive Funding

The control measures implemented under Alternative 4 would be the same or more as the control measures implemented under the proposed project so that the transportation and traffic impacts are expected to be the same.

Some 2016 AQMP control measures could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, were considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road. Significant adverse operational traffic impacts are anticipated to be generated by the 2016 AQMP and would also occur under Alternative 4.

6.4.8 AESTHETICS

The potential aesthetics impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential aesthetic impacts from the 2016 AQMP and evaluate potential aesthetic impacts from each alternative relative to the 2016 AQMP.

6.4.8.1 Proposed Project

The potential aesthetic impacts from implementing the proposed project include the degradation of the visual character of a site from the installation of catenary lines and the use of bonnet emissions control systems at the ports, and glare from solar panels and cool roof systems. For the complete analysis of aesthetic impacts from the proposed project, refer to Section 4.10 – Aesthetics.

6.4.8.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the aesthetics impacts from the long-term measures at this time. The aesthetics impacts from the 2012 AQMP were determined to be less than significant, however, the No Project Alternative is not taking new action or proposing new control measures and thus, the aesthetics impacts from Alternative 1 will be less than significant.

6.4.8.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB's SIP Strategy and localized mobile source measures proposed by the SCAQMD would be implemented. Under Alternative 2, aesthetic impacts would be similar as the proposed project as the control measure that could require the use of catenary lines and the use of bonnet technology for vessels would still be constructed, however other measures that involve the installation of solar panels and stationary source equipment with potential adverse aesthetic impacts are not included in this alternative. Therefore, aesthetic impacts would remain significant under Alternative 2, but less than the proposed project.

6.4.8.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment of the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative aesthetics impacts since the actual future technologies have not been identified or defined. However, the aesthetics impacts from the new proposed control strategies can be evaluated. Zero-emitting equipment and vehicles will improve visibility so an operational benefit to the aesthetics, although installation of solar panels could result in adverse aesthetics impacts. Implementation of the proposed project regulatory measures will still generate adverse aesthetics impacts but less than the proposed project since incentive-based measures would not be implemented.

Alternative 3 is expected to eliminate the potentially significant aesthetic impacts associated with the proposed project as the control measures that would incentivize or require the use of catenary lines would be eliminated however other measures that involve the installation of solar panels and stationary source equipment with potential adverse aesthetic impacts are not included in this alternative. Therefore, the potentially significant aesthetic impacts under the proposed project would remain significant under Alternative 3 but less than the proposed project.

6.4.8.5 Alternative 4 – Expanded Incentive Funding

Aesthetic impacts would be the same or more than the proposed project as the control measures that could require the use of catenary lines would still be constructed. Therefore, aesthetic impacts would remain significant under Alternative 4.

6.5 COMPARISON OF PROJECT ALTERNATIVES TO THE 2016 AQMP

Pursuant to CEQA Guidelines §15126.6 (d), "The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed." The sections above provide a comprehensive analysis of potential impacts generated by each project alternative and compares impacts to those generated by the 2016 AQMP. Table 6.5-1 provides a matrix displaying the major characteristics and significant environmental effects of each alternative compared to the 2016 AQMP.

TABLE 6.5-1

Comparison of the Project Alternatives to the Proposed 2012 AQMP

Environmental Topic	2016 AQMP	Alternative 1 No Project	Alternative 2 Mobile Source Reduction Only	Alternative 3 CARB / SCAQMD Regulation Only	Alternative 4 Expanded Incentive Funding
Air Quality					
Construction	**S**	**NS -** less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Operation	**NS**	**NS -** but less AQ benefit than proposed project	**NS** – less benefit than proposed project	**NS** – less benefit than proposed project	**NS** – more benefit than proposed project
Toxics	**NS**	**NS -** but less toxic reduction benefit than proposed project	**NS** – less benefit than proposed project	**NS** – less benefit than proposed project	**NS** – more benefit than proposed project
Greenhouse Gases	**NS**	**NS -** but less GHG reduction benefit than proposed project	**NS** – less benefit than proposed project	**NS** – less benefit than proposed project	**NS** – more benefit than proposed project
Energy					
Electricity Demand	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Natural Gas, Petroleum Fuels, Alternative Energy	**NS**	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – more than proposed project
Hazards/Hazardous Materials					
Transport	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Risk of Upset	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Flammability/ Fire	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Haz Material Sites	**NS**	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – more than proposed project
Proximity to School	**S**	**S** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project

TABLE 6.5-1 (concluded)

Comparison of the Project Alternatives to the Proposed 2012 AQMP

Environmental Topic	2016 AQMP	Alternative 1 No Project	Alternative 2 Mobile Source Reduction Only	Alternative 3 CARB / SCAQMD Regulation Only	Alternative 4 Expanded Incentive Funding
Hydrology and Water Quality					
Water Demand	**S**	**NS** – less than proposed project	**NS** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Water Quality	**NS**	**NS** – equal to proposed project	**NS** – equal to proposed project	**NS** – equal to proposed project	**NS** – equal to proposed project
Noise					
Construction	**S**	**NS** – less than proposed project	**S** – less than proposed project	**NS** – less than proposed project	**S** – more than proposed project
Operation	**NS**	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – more than proposed project
Solid/Hazardous Wastes					
Disposal at Landfill	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Traffic Transportation					
Construction	**S**	**NS** – less than proposed project	**S** – less than proposed project	**NS** – less than proposed project	**S** – more than proposed project
Operation	**S**	**NS** – less than proposed project	**S** – less than proposed project	**NS** – less than proposed project	**S** – more than proposed project
Aesthetics					
Visual Character	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Glare	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project

6.6 ENVIRONMENTALLY SUPERIOR AND LOWEST TOXIC ALTERNATIVE

Pursuant to CEQA Guidelines §15126.6(e)(2), if the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. Alternative 1 (No Project Alternative), continued implementation of the 2007 and 2012 AQMPs is considered to be the environmentally superior alternative because it is

not expected to generate any additional significant adverse impacts to any environmental topic areas beyond those identified for the 2007 and 2012 AQMPs. Alternative 1 was originally drafted to demonstrate compliance with the federal 1997 8-hour ozone standard (80 ppb) and PM2.5 standards but does not address attaining the 2008 federal 8-hour ozone standard (75 ppb).

Based on the above CEQA citation, since the No Project Alternative was deemed the environmentally superior alternative, an alternative from the remaining alternatives must be selected. The analysis of potential impacts from each of the project alternatives concludes that Alternative 2 (Mobile Source Reduction Only) is the environmentally superior alternative. This conclusion is based on the fact that removing the stationary source control measures eliminates small remaining NOx reductions needed to reach attainment, so less reductions would be classified as long-term or "black box" measures, generating more overall air quality benefit in the short-term. Alternative 3 (CARB and SCAQMD Regulation Only) would generate more potential secondary impacts as a result of additional control measures but would classify less long-term or "black box" measures as compared to Alternative 2. Therefore, the new and proposed project stationary and mobile sources that are implemented under Alternative 3 are more likely to have adverse secondary environmental impacts than the strategies in Alternative 2. The only exception is noise generated from the catenary projects to electrify heavy-duty trucks on the freeways that would be eliminated under Alternative 3. From an air quality perspective, electrifying the travel of high-emitting heavy-duty would greatly benefit Alternative 2 in overall air quality reductions, thus would be more environmentally superior. Depending on the amount of funding and the effectiveness of the incentive funding, Alternative 4 (Expanded Incentive Funding) theoretically has the potential to be environmentally superior as a result of more overall air quality benefit from more emission reduction projects but along with those project there is the potential for more secondary impacts from other environmental topics such as aesthetics, energy, hazards, water, noise, waste and traffic. The challenge is whether the additional air quality benefits outweigh the adverse secondary environmental impacts.

In accordance with SCAQMD's policy document Environmental Justice Program Enhancements for FY 2002-03, Enhancement II-1 recommends that all SCAQMD CEQA documents required to include an alternatives analysis, also include and identify a feasible project alternative with the lowest air toxics emissions. In other words, for any major equipment or process type under the scope of the proposed project that creates a significant environmental impact, at least one alternative, where feasible, shall be considered from a "least harmful" perspective with regard to hazardous or toxic air pollutants. It is expected that potential energy, hazards and hazardous materials, hydrology and water quality, and solid waste impacts associated with taking no further action and thus no potential secondary impacts, would be less under Alternative 1 (No Project Alternative) because it would avoid significant adverse impacts to all environmental topic areas evaluated compared to the remaining alternatives. Thus, from an air toxics perspective, when compared to the proposed project and the other alternatives under consideration, if implemented, Alternative 1 is considered the lowest toxic alternative. It should be noted however that the 2016 AQMP does include a toxic control strategy comprised of nine proposed measures. Depending on the effectiveness of the program as opposed to potential secondary impacts generated from those projects, the proposed project and remaining alternatives would reduce overall toxic risk. Since implementation of all nine toxic reduction measures would occur with the remaining alternatives, the least toxic alternative would be equivalent to the proposed project.

6.7 CONCLUSION

Of the project Alternatives, Alternative 1 would generate the least severe and fewest number of environmental impacts compared to the 2016 AQMP. However, compared to the other project alternatives, Alternative 1 would achieve the fewest of the project objectives (see Chapter 2 for the comprehensive list of objectives) and would not accomplish critical objectives such as demonstrating attainment of the 2006 24-hour PM2.5 standard (35 μg/m^3) (*Objective #3*), 2012 annual PM2.5 standard (12 μg/m^3) (*Objective #4*) and the 2008 8-hour ozone standard (75 ppb) (*Objective #5*) applying the latest SCAG's 2016 RTP information and CARB's 2014 EMFAC data (*Objective #6*). Without submitting a Plan that makes these demonstrations, the region is in violation of the Clean Air Act (CAA) and at risk for sanctions and consequences. Although not required by the CAA, other objectives not fulfilled by Alternative 1 include eliminating reliance on CAA§182(e)(5) measures to the extent feasible (*Objective #12*) , taking co-benefit reductions from other planning efforts (e.g., GHG reduction targets, energy efficiency and transportation) (*Objective #13*), developing a fair share reduction strategy with federal, state and local levels (*Objective #14*), seeking funding for incentive programs (*Objective #16*), and enhancing the socioeconomic analysis (*Objective #17*).

Alternative 2 would be expected to generate equivalent impacts to the proposed project in all environmental topic areas analyzed except water demand which is primarily generated from stationary sources that are not implemented under Alternative 2. The only exception is the consumer products control measure proposed and implemented by CARB's SIP Strategy. Therefore, the potentially significant increase in water demand associated with the proposed project would be substantially less under Alternative 2 but not fully eliminated since consumer products will still be implemented. More importantly, however, is that Alternative 2 will need to rely on classifying the emission reductions not achieve from stationary sources as long-term or "black box" measure in order to demonstrate attainment of the ozone and PM2.5 standards. This would not achieve the objective to eliminate reliance on future technologies (CAA §182(e)(5)) measures to the extent feasible.

Similarly, Alternative 3 would be expected to generate overall equivalent impacts to the proposed project in all environmental topic areas analyzed except construction noise expected from the construction of the catenary line for heavy-duty truck transport on freeways. Other actions will generate construction noise under Alternative 3 but not as significant as the proposed project. Alternative 3 proposes additional control measures that will benefit air quality equal to the proposed projects with no incentive measures, but could also rely on long-term or "black box" measures for any shortfall in attainment demonstration of the ozone and PM2.5 standards. Similar to Alternative 2, if this is the case, Alternative 3 would not achieve an important objective to eliminate reliance on future technologies (CAA §182(e)(5)) measures to the extent feasible.

As discussed earlier, Alternative 4 has the potential to be the environmentally superior alternative if the additional incentive funding is secured, the programs are more effective than the proposed project and the potential secondary impacts from the additional funded projects are outweighed by the additional emission reductions achieved, thus more overall air quality benefit. Alternative 4 achieves all the project objectives as does the proposed project.

Based on the above information and discussion, the proposed project has been proven to be the most effective project that achieves the all the project objectives relative to environmental impacts generated. While adverse secondary impacts will be difficult to avoid, mitigation measures are proposed and an overall air quality benefit will result along with reductions in toxics and GHGs. The proposed project will satisfy the CAA and not put the region in legal vulnerability that could harm the environment, communities and businesses.

CHAPTER 7

REFERENCES

7.1 References
7.2 Organizations and Persons Consulted

7.0 REFERENCES

7.1 REFERENCES

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7.2 ORGANIZATIONS AND PERSONS CONSULTED

South Coast Air Quality Management District:
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7.3 LIST OF ENVIRONMENTAL IMPACT REPORT PREPARERS

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CHAPTER 8

ACRONYMS

Acronyms

ACRONYMS

ABBREVIATION	DESCRIPTION
AAs	Administering Agencies
AB	Assembly Bill
AB32	Califonia's Global Warming Solutions Act of 2006
AB939	California Integrated Waste Management Act of 1989
AB 1807	Tanner Bill
AB2588	Air Toxic "Hot Spots" Information and Assessment Act
ACGIH	American Conference of Governmental Industrial Hygienists
AER	All Electric Range
af	acre-feet
AFDC	Alternative Fuels Data Center
AFV	Alternative Fuel Vehicles
AFY	acre-feet per year
AIR	Association of Irritated Residents
AMP	Alternative Marine Power
APS	Alternative Planning Strategy
AQMP	Air Quality Management Plan
AQREP	Air Quality-Related Energy Policy
ASTM	American Society for Testing and Materials
ASTM D56	Tagliabue Closed Cup standard
ASME	American Society of Mechanical Engineers
ATCM	Airborne Toxic Control Measure
ATCP	Air Toxics Control Plan
ATP	Active Transportation Program
ATSA	Aviation and Transportation Security Act
BACT	Best Available Control Technology
BACM	Best Available Control Measures
BCM	Best Control Measures
BARCT	Best Available Retrofit Control Technology
BART	Best Available Retrofit Technology
Basin	South Coast Air Basin
BLEVE	boiling liquid expanding vapor explosion
BLM	Bureau of Land Management
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe Railway
BOD	Bio-chemical Oxygen Demand
BPTCP	Bay Protection and Toxic Clean Up Plan
BRT	Bus Rapid Transit
BSER	Best System of Emission Reduction
BTA Document	Bicycle Transportation Account Compliance Document
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
BTSP	Bicycle Transportation Strategic Plan

Btu	British Thermal Units
Btu/hr	British Thermal Units per hour
CAA	Clean Air Act
CAAP	Clean Air Action Plan
CAFE	Corporate Average Fuel Economy
CalARP	California Accidental Release Prevention Program
CalEMA	California Emergency Management Agency
Cal/EPA	California Environmental Protection Agency
CALFED	Bay-Delta Program
CAL FIRE	California Department of Forestry and Fire Protection
CalRecycle	(formerly known as the California Integrated Waste Management Board)
Caltrans	California Department of Transportation
CalOSHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
CAA	Clean Air Act
CAAP	Clean Air Action Plan
CBSP	Commuter Bikeways Strategic Plan
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCP	Clean Communities Plan
CCR	California Code of Regulations
CDF	California Department of Forestry and Fire Protection
CDPR	California Department of Parks and Recreation
CEC	California Energy Commission
CE-CERT	College of Engineering - Center for Environmental Research and Technology
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQA	California Environmental Quality Act
CFCs	Chloroflorocarbons
CFR	Code of Federal Regulations
CH_4	Methane
CHMIRS	California Hazardous Materials Incident Reporting System
CHP	California Highway Patrol
CHP	Combined Heating and Power
CII	Commercial Industrial and Institutional
CIP	Capital Improvement Program
CIWMB	California Integrated Waste Management Board
CIWMP	Countywide Integrated Waste Management Plan
CLWA	Castaic Lake Water Agency
CMAs	Congestion Management Agencies
CMB	Combustion Sources
CMPs	Congestion Management Programs
CMAQ	Community Multiscale Air Quality
CNEL	Community Noise Equivalent Level

CNG	Compressed Natural Gas
CNRA	California Natural Resources Agency
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO2e	CO2 equivalents
COD	Chemical oxygen Demand
COHb	Carboxyhemoglobin
CPUC	California Public Utilities Commission
CPSC	Consumer Products Safety Commission
CRA	Colorado River Aqueduct
CRWDA	Colorado River Water Delivery Agreement
CSI	California Solar Initiative
CSWRRA	California Solid Waste Reuse and Recycling Act
CTC	California Transportation Commission
CTIP	Cargo Theft Interdiction Program
CTP	California Transportation Plan
CTS	Coatings and Solvents
CUPA	Certified Unified Program Agency
CUWCC	California Urban Water Conservation Council
CVRP	Clean Vehicle Rebate Project
CVAG	Coachella Valley Association of Governments
CVRP	Clean Vehicles Rebate Pilot Program
CWA	Clean Water Act
CWAP	Clean Water Action Plan
CWM	Chemical Waste Management
dB	decibels
dBA	decibels (A-weighted)
DBP	Disinfection Byproducts
DDT	Dichlorodiphenyltrichloroethane
Delta	Sacramento-San Joaquin Delta
DFW	Department of Fish and Wildlife
DGS	dry gas scrubber
DHS	Department of Health Services
DHS	Department of Homeland Security
District	South Coast Air Quality Management District
DMA	Disaster Mitigation Act
DMC	dimethyl carbonate
DOT	Department of Transportation
DPF	Diesel Particulate Filters
DPM	Diesel Particulate Matter
DRRP	Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (also known as the Diesel Risk Reduction Plan)
DRS	Disposal Reporting System
DTSC	California Department of Toxic Substances Control
DTIM	Direct Travel Impact Model

DWR	California Department of Water Resources
EAP	Emergency Action Plan
ECC	Energy and Climate Change Programs
EDMS	Emissions and Dispersion Modeling System
EFMP	Enhanced Fleet Modernization Program
EGUs	Electric Generating Units
EHS	Extremely Hazardous Substances
EIA	Energy Information Administration
EIP	Economic Incentive Programs
EIR	Environmental Impact Report
EISA	Energy Independence and Security Act of 2007
EJ	Environmental Justice
EJAG	Environmental Justice Advisory Group
EMFAC	Emission Factors Model
EMFAC 2011	2011 Emission Factors model
EMFAC 2014	2014 Emissions Factors Model
EMSW	Engineered Municipal Solid Waste
EMWD	Eastern Municipal Water District
EO	Executive Order
EOR	Enhanced Oil Recovery
EPA	Environmental Protection Agency
EPAct	Energy Policy Act
EPACT92	Energy Policy Act of 1992
EPCA	Energy Policy and Conservation Act of 1975
EPCRA	Emergency Planning and Community Right-to-Know Act
EPS	Emission Performance Standard
ERCs	emission reduction credits
ERPG	Emergency Response Planning Guideline
ERPG-2	Emergency Response Planning Guide Level 2
ERPG-3	Emergency Response Planning Guide Level 3
ESP	Electrostatic Precipitators
EVs	Electric Vehicles
E85	Ethanol
^{o}F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FCCU	Fluid Catalytic Cracking Unit
FCEVs	fuel cell electric vehicles
FDA	Food and Drug Administration
FDDA	four dimensional data assimilation
FEMA	Federal Emergency Management Agency
FePo	iron phosphate
Fe_2O_3	iron oxide
FFVs	Flexible Fuel Vehicles
FHA	Federal Highway Administration
FHWA	Federal Highway Administration
FLX	Compliance Flexibility Programs

FMVSS	Federal Motor Vehicle Safety Standard
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
FTIR	Fourier Transfer Infrared Spectroscopy
FUA	Fuel Use Act
FUG	Fugitive Emissions
FY	Fiscal Year
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GRAS	Generally Recognized As Safe
GVW	gross vehicle weight
GVWR	gross vehicle weight rating
GWh	gigawatt hours
g/bhp-hr	grams per brake horsepower hour
H_2	Hydrogen
H_2S	Hydrogen Sulfide
H_2SO_4	Sulfuric Acid
HAPs	Hazardous Air Pollutants
HCFCs	Hydrochlorofluorcarbons
HD Diesel	Heavy-Duty Diesel
HDRD	Hydrogenation Derived Renewable Diesel
HECW	High Efficiency Clothes Washers
HEPA	High Efficiency Particulate Air
HET	High Efficiency Toilet
HEV	Hybrid Efficiency Vehicle
HFCs	hydrofluorocarbons
HI	Hazard Index
HMGP	Hazard Mitigation Grant Program
HMTA	Hazardous Materials Transportation Act
HNO_3	Nitric Acid
HOT	High-Occupancy Toll
HOV	High Occupancy Vehicle
HQTA	High Quality Transit Areas
HRA	Health Risk Assessment
HOT	High-Occupancy Toll
HQTAs	High Quality Transit Areas
HUD	Housing and Urban Development
HVAC	Heating, Ventilation, Air Conditioning
HVIP	Hybrid Vehicle Incentives Project
HWCA	Hazardous Waste Control Act
HWMP	Hazardous Waste Management Plan
Hybrids	hybrid vehicles
Hz	Frequency
IARC	International Agency for Research on Cancer
ICEs	Internal Combustion Engines

ICTA	International Center for Technology Assessment
IDLH	Immediately Dangerous to Life and Health
IGR	Intergovernmental Review
IID	Imperial Irrigation District
IOUs	Investor Owned Utilities
IRWD	Irvine Ranch Water District
ISO	Independent System Operator
ISI Forecasting	Intra-seasonal to Inter-annual Climate Forecasting
ISPS	International Ship and Port Facility Security Code
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	Intelligent Transportation Systems
IWMD	Integrated Waste Management District
kW	Kilowatt
kWh	Kilowatt Hour
LAA	Los Angeles Aqueduct
LACDPW	Los Angeles County Department of Public Works
LACSD	Los Angeles County Sanitation Districts
LADPW	Los Angeles Department of Public Works
LADWP	Los Angeles Department of Water and Power
LAX	Los Angeles International Airport
LBGOD	Long Beach Gas & Oil Department
lbs	pounds
lbs/day	pounds per day
lbs/gal	pounds per gallon
lbs/hr	pounds per hour
LCFS	Low-Carbon Fuel Standard
LCP	Local Coastal Program
LDAR	Leak Detection and Repair
Ldn	Day/Night Noise Level
LEAs	Local Enforcement Agencies
LED	Light Emitting Diode
LEL	Lower Explosive Limit
LEPC	Local Emergency Planning Committee
LES	Laidlaw Environmental Services
LEV	Low Emission Vehicle
Leq	Equivalent Noise Level
Li-ion	lithium ion
Lmax	maximum measured noise level
LNG	Liquefied Natural Gas
LOS	Level of Service
LoTOxTM	Low Temperature Oxidation technology
LPG	Liquefied Petroleum Gas
LSE	load-serving entities
LUPs	land use plans
MAF	Million acre-feet
MAP	Million Annual Passengers

MAP-21	Moving Ahead for Progress in the 21st Century
MATES	Multiple Air Toxic Exposure Study
MATES II	Multiple Air Toxic Exposure Study II
MATES III	Multiple Air Toxic Exposure Study III
MATES IV	Multiple Air Toxic Exposure Study IV
MCLs	Maximum Containment Levels
MCS	Multiple Component Sources
MDAB	Mojave Desert Air Basin
MECA	Manufacturer's of Emission Controls Association
MEK	methyl ethyl ketone
Metro	Los Angeles County Metropolitan Transit Authority
mgd	million gallons per day
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
M&I	Municipal and Industrial
MIBK	methyl isobutyl ketone
MIR	Maximum Incremental Reactivity
MMTCO2e	million metric tons of carbon dioxide equivalent
MnO	manganese oxide spinel
MoO_3	molybdic anhydride
MOU	Memorandum of Understanding
MPOs	Metropolitan Planning Organizations
MTCO2e/year	CO2 equivalent emissions per year
MPO	Metropolitan Planning Organization
MSERC	Mobile Source Emission Reduction Credits
MRFs	Material Recovery Facilities
MS4s	municipal separate storm sewer systems
MTBE	methyl tertiary butyl ether
MW	megawatts
Metropolitan	Metropolitan Water District of Southern California
MWD	Metropolitan Water District
M85	Methanol
M&I	Municipal and Industrial
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NaOH	sodium hydroxide
Na_2CO_3	sodium carbonate
NCA	nickel-cobalt- aluminum
NCEP	National Centers for Environmental Prediction
NCM	nickel-cobalt-manganese
NCP	National Contingency Plan
NECPA	National Energy Conservation Policy Act
NEC	National Electric Code
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NEV	Neighborhood Electric Vehicles
NPDES	National Pollutant Discharge Elimination System
NFC	National Fire Codes

NFPA	National Fire Protection Association
NHTSA	National Highway Traffic Safety Administration
NH_4NO_3	ammonium nitrate
NH_4HSO_4	ammonium bisulfate
$(NH_4)_2SO_4$	ammonium sulfate
NiMH	nickel-metal hydride
NIOSH	National Institute of Occupational Safety and Health
NMFS	National Fisheries Service
N_2	Nitrogen
N_2O	Nitrous Oxide
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
NOP/IS	Notice of Preparation/Initial Study
NOx	Nitrogen Oxide
NS	No significant impacts
NSR	New Source Review
O_2	Oxygen
O_3	Ozone
OCHCA	Orange County Health Care Agency
OCSD	Orange County Sanitation District
OCTA	Orange County Transportation Authority
OCWD	Orange County Water District
ODS	Ozone Depleting Substances
ODSSH	Officially Designated State Scenic Highway
OEHHA	Office of Environmental Health Hazards Assessment
OEM	Original Engine Manufacturer
OHMS	Office of Hazardous Materials Safety
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PAHs	Polynuclear Aromatic Hydrocarbons
Pb	lead
PCB	Polychlorinated biphenyls
PEIR	Program Environmental Impact Report
PELs	Permissible Exposure Limits
PFCs	Perfluorocarbons
PG&E	Pacific Gas & Electric
PHMSA	Pipeline and Hazardous Materials Safety Administration
PM	Particulate Matter
PM2.5	particulate matter less than 2.5 microns equivalent aerodynamic diameter
PM10	particulate matter less than 10 microns equivalent aerodynamic diameter
POTW	Publicly Owned Treatment Works
POUs	publicly owned utilities

ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
Program EIR	Program Environmental Impact Report
PRC	Public Resources Code
psi	pounds per square inch
PSM	Process Safety Management
PTFE	Polytetrafluoroethylene
PUC	Public Utilities Commission
PURPA	Public Utility Regulatory Policies Act
PV	Photovoltaic
PVC	Polyvinyl Chloride
PZEV	Partial Zero Emission Vehicles
Qfs	qualifying facilities
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RCRA	Resource Conservation and Recovery Act
RCTC	Riverside County Transportation Commission
RECLAIM	Regional Clean Air Incentives Market
RELOOC	Regional Landfill Options for Orange County
RELs	Reference Exposure Levels
RFS	Renewable Fuel Standard
RHNA	Regional Housing Needs Assessment
RIN	Renewable Identification Number
RMP	Risk Management Program
RMS	Root Mean Squared
ROG	Reactive Organic Gases
RPS	Renewable Portfolio Standard
RQs	Reportable Quantities
RSPA	Research and Special Programs Administration
RTC	RECLAIM Trading Credits
RTIP	Regional Transportation Implementation Plan
RTP	Regional Transportation Plan
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RUWMP	Regional Urban Water Management Plan
RWQCB	Regional Water Quality Control Board
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SANBAG	San Bernardino Associated Governments
SB	Senate Bill
SBVMWD	San Bernardino Valley Municipal Water District
SBS	sodium bisulfate
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison

SCR	Selective Catalytic Reduction
SCRRA	Southern California Regional Rail Authority
SCS	Sustainable Communities Strategy
SCHR	South Coast Hydrologic Region
SCPPA	Southern California Public Power Authority
SCHWMA	Southern California Hazardous Waste Management Authority
SDG&E	San Diego Gas & Electric
SDCWA	San Diego County Water Authority
SDS	Safety Data Sheet
SEL	Sound Exposure Level
SF_6	Sulfur Hexafluoride
SGVEWP	San Gabriel Valley Energy Wise Program
SIP	State Implementation Plan
SNCR	selective non-catalytic reduction
SO_2	sulfur dioxide
SO_3	Sulfur Trioxide
SoCalGas	Southern California Gas Company
SOF	Solar Occultation Flux
SOON	Surplus Off-Road Option for NOx
SOx	sulfur oxide
SORE	Small Off-Road Equipment
SPCC	Spill Prevention, Control and Countermeasure
SRP	Scientific Review Panel
SRRE	Source Reduction and Recycling Element
SRU	Sulfur Recovery Unit
SSAB	Salton Sea Air Basin
SSM	Startups, Shutdowns, and Malfunctions
STEL	short-term exposure limits
SULEV	super ultra-low emission vehicle
SWFPs	Solid Waste Facility Permits
SWP	State Water Project
SWMD	Solid Waste Management Division
SWIS	Solid Waste Information System
SWMP	Storm Water Management Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TAF	Thousand Acre-Feet
TAO	Technology Advancement Office
TAZ	transportation analysis zone
TBA	tert-butyl alcohol
T-BAc	tertiary butyl acetate
TCM	Transportation Control Measure
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TEUs	twenty-foot Equivalent Units

TGUs	Tail Gas Units
TIP	Transportation Improvement Program
TiO_2	titanium dioxide
TLVs	Threshold Limit Values
TMDLS	Total Maximum Daily Loads
TOC	Total Organic Carbon
tpd	tons per day
tpy	tons per year
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSA	Transportation Security Administration
TSM	Transportation Systems Management
TSS	Total Suspended Solids
TWA	time-weighted average
TXM	Toxic Air Contaminant Control Measure
UARG	Unity Air Regulatory Group
UEL	upper explosive limit
UFC	Uniform Fire Code
Union Pacific	Union Pacific Railroad
Unified Program	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program
UltraCat DGS	catalyst impregnated filters with a Dry Gas Scrubber
U.S.	United States
USBR	United States Bureau of Reclamation
U.S. DOE	United States Department of Energy
U.S. DOT	United States Department of Transportation
U.S. EPA	United States Environmental Protection Agency
U.S.FWS	United States Fish and Wildlife Service
U.S. FS	United States Forest Service
UP	Union Pacific Railroad
USDA	U.S. Department of Agriculture
UST	Underground Storage Tank
UWA	Unified Watershed Assessment
VCTC	Ventura County Transportation Commission
VdB	vibration decibels
VHD	Vehicle Hours of Delay
VHT	Vehicle Hours of Travel
VMT	Vehicle Miles Traveled
VOC	volatile organic compounds
VRM	Vehicle Revenue Miles
V_2O_5	vanadium pentoxide
WDR	Waste Discharge Requirements
WGS	Wet Gas Scrubber
WO_3	tungsten trioxide
WRCOG	Western Riverside Council of Governments
WRD	Water Replenishment District

WRF	Weather Research and Forecasting Model
ZEV	Zero Emissions Vehicles
ug/l	micrograms per liter
ug/m^3	micrograms per cubic meter

APPENDIX A

NOTICE OF PREPARATION AND INITIAL STUDY

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South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

SUBJECT: **NOTICE OF PREPARATION OF A DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT**

PROJECT TITLE: 2016 AIR QUALITY MANAGEMENT PLAN (AQMP)

In accordance with the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (SCAQMD) will be the Lead Agency for the project identified above. This Notice of Preparation (NOP) and Initial Study (IS) serve two purposes: 1) to solicit information on the scope of the environmental analysis for the 2016 AQMP (proposed project); and 2) to notify the public that the SCAQMD will prepare a Draft Program Environmental Impact Report (Program EIR) to further assess potential adverse environmental impacts that may result from implementing the proposed project.

This cover letter, NOP and the attached IS are not SCAQMD applications or forms requiring a response from you. Their purpose is simply to provide information to you on the proposed project. If the proposed project has no bearing on you or your organization, no action on your part is necessary.

Comments focusing on your area of expertise, your agency's area of jurisdiction, or other issues relative to the environmental document will be accepted during the 30-day public review period beginning Tuesday, July 5, 2016, and ending at 5 p.m. on Thursday, August 4, 2016. Please send comments to Jillian Wong (c/o PRDAS/CEQA at the above address). Comments may also be faxed to (909) 396-3324 or emailed to jwong1@aqmd.gov. Please include the name and phone number of the contact person for your organization. Questions on the proposed 2016 AQMP should be directed to Mr. Michael Krause at (909) 396-2706 or by email to mkrause@aqmd.gov.

Six public workshops/CEQA scoping meetings will be held for the proposed project at the following locations and times.

Workshop Date	Time	Locations	Address	County
July 14, 2016	10:00 am	Coachella Valley Assn. of Governments	72-710 Fred Waring Dr., Palm Desert, CA	Riverside
July 14, 2016	6:00 pm	SCAQMD Headquarters	21865 Copley Dr. Diamond Bar, CA	Los Angeles
July 20, 2016	9:30 am	Buena Park Community Center	6688 Beach Blvd., Buena Park, CA	Orange
July 20, 2016	2:00 pm	Carson Center	801 East Carson Street, Carson, CA	Los Angeles
July 21, 2016	9:30 am	Norton Regional Events Center	1601 E. 3rd St., San Bernardino, CA	San Bernardino
July 21, 2016	2:00 pm	Hyatt Place Riverside	3500 Market Street, Riverside	Riverside

The Public Hearing is scheduled for December 2, 2016 at 9:00 am at the SCAQMD headquarters, at which time the Governing Board will consider certifying the Program EIR and approving the 2016 AQMP. Please note, the Public Hearing date is subject to change.

Date: June 30, 2016 **Signature:** Jillian Wong

Jillian Wong, Ph.D.
Program Supervisor, CEQA
Planning, Rule Development, and Area Sources

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Drive, Diamond Bar, CA 91765-4182
NOTICE OF PREPARATION OF A
DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT

Project Title:
Draft Program Environmental Impact Report: 2016 Air Quality Management Plan (AQMP)

Project Location:
The SCAQMD has jurisdiction over the four-county South Coast Air Basin (all of Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties), and the Riverside County portions of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB). The SCAQMD's jurisdiction includes the federal nonattainment area known as the Coachella Valley Planning Area, which is a sub-region of Riverside County and the SSAB.

Description of Nature, Purpose, and Beneficiaries of Project:
The 2016 AQMP identifies control measures and strategies to bring the region into attainment with the revoked 1997 8-hour National Ambient Air Quality Standard (NAAQS or standard) (80 ppb) for ozone by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual PM2.5 standard (12ug/m^3) by 2025; the 2006 24-hour PM2.5 standard (35 ug/m^3) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023. The 2016 AQMP consists of three components: 1) the SCAQMD's Stationary, Area, and Mobile Source Control Measures; 2) State and Federal Control Measures provided by the California Air Resources Board; and 3) Regional Transportation Strategy and Control Measures provided by the Southern California Association of Governments. The 2016 AQMP includes emission inventories and control measures for stationary, area and mobile sources, the most current air quality setting, updated growth projections, new modeling techniques, demonstrations of compliance with state and federal Clean Air Act requirements, and an implementation schedule for adoption of the proposed control strategy.

Lead Agency:
South Coast Air Quality Management District

Division:
Planning, Rule Development and Area Sources

Initial Study and all supporting documentation are available at:
SCAQMD Headquarters
21865 Copley Drive
Diamond Bar, CA 91765

or by calling:
(909) 396-2039

Initial Study is also available by accessing the SCAQMD's website at:
http://www.aqmd.gov/ceqa/aqmd.html

The Public Notice of Preparation is provided through the following:

☑ Los Angeles Times (July 5, 2016)
☑ Orange County Register (July 5, 2016)
☑ AQMD Website
☑ AQMD Public Information Center
☑ Riverside Press Enterprise (July 5, 2016)
☑ AQMD Mailing List & Interested Parties
☑ Desert Sun (July 6, 2016)

Notice of Preparation / Initial Study Review Period (30-day):
July 5, 2016 – August 4, 2016

Scheduled Public Workshops/CEQA Scoping Meeting Dates:

Workshop Date	Time	Location	Address	County
July 14, 2016	10:00 am	Coachella Valley Assn. of Governments	72-710 Fred Waring Dr., Palm Desert, CA	Riverside
July 14, 2016	6:00 pm	SCAQMD Headquarters	21865 Copley Dr. Diamond Bar, CA	Los Angeles
July 20, 2016	9:30 am	Buena Park Community Center	6688 Beach Blvd., Buena Park, CA	Orange
July 20, 2016	2:00 pm	Carson Center	801 East Carson Street, Carson, CA	Los Angeles
July 21, 2016	9:30 am	Norton Regional Events Center	1601 E. 3rd St., San Bernardino, CA	San Bernardino
July 21, 2016	2:00 pm	Hyatt Place Riverside	3500 Market Street, Riverside	Riverside

Scheduled Public Hearing Date: December 2, 2016, 9:00 a.m.; SCAQMD Headquarters
(Date subject to change)

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Initial Study for the Draft Program Environmental Impact Report for: 2016 Air Quality Management Plan (AQMP)

June 30, 2016

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CHAPTER 1 – PROJECT DESCRIPTION

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1.1 INTRODUCTION

The South Coast Air Quality Management District (SCAQMD) was created by the California legislature in 1977[1] as the public agency responsible for developing and enforcing air pollution control regulations in the South Coast Air Basin (Basin) and portions of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB), referred to herein as the SCAQMD or District. The Lewis Air Quality Act (now known as the Lewis-Presley Air Quality Management Act) requires the SCAQMD to prepare and adopt an Air Quality Management Plan (AQMP) consistent with federal planning requirements. In 1977, amendments to the federal Clean Air Act (CAA) included requirements for submitting State Implementation Plans (SIPs) for nonattainment areas that fail to meet all federal ambient air quality standards (CAA § 172) and similar requirements exist in state law (Health & Safety Code §40462). The federal CAA was amended in 1990 to specify attainment dates and SIP requirements for ozone, carbon monoxide (CO), nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 microns (PM10). In 1997, the United States Environmental Protection Agency (U.S. EPA) promulgated ambient air quality standards for particulate matter with an aerodynamic diameter less than 2.5 microns (PM2.5). The California Clean Air Act (CCAA), adopted in 1988, requires the SCAQMD to achieve and maintain state ambient air quality standards for ozone, CO, sulfur dioxide (SO_2), and NO_2 by the earliest practicable date (Health & Safety Code §40910). The CCAA also requires a three-year plan review, and, if necessary, an update to the AQMP. The U.S. EPA is required to periodically update the national ambient air quality standards (NAAQS).

The 2016 AQMP identifies control measures and strategies to demonstrate that the region will attain the revoked 1997 8-hour ozone NAAQS (80 ppb) by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual PM2.5 standard (12 ug/m^3) by 2025; the 2006 24-hour PM2.5 standard (35 ug/m^3) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023.

The Basin, which includes all of Orange County and the non-desert portions of Los Angeles, San Bernardino and Riverside counties, has one of the worst air quality problems in the nation. Though there have been significant improvements in air quality in the Basin over the last two decades, some ambient air quality standards are still exceeded relatively frequently and by a wide margin. The 2012 AQMP, submitted to the California Air Resources Board (CARB) for SIP inclusion in December 2012, concluded that further reductions in PM2.5 and oxides of nitrogen (NOx) emissions would be necessary to attain the air quality standards for 24-hour PM2.5 and 8-hour ozone by the dates mandated by federal law. Less emphasis was placed on emission reductions from volatile organic compounds (VOCs) because of the greater emphasis on NOx emission reductions, which is a precursor to both ozone and PM10 and PM2.5. Ozone, a criteria pollutant, is formed when VOCs react with NOx in the atmosphere. Ozone has been shown to adversely affect human health. NOx also contributes to the formation of PM10 and PM2.5.

[1] The Lewis-Presley Air Quality Management Act, 1976 Cal. State. ch. 324 (codified at H & S Code, Sections 40400 - 40540).

1.2 BACKGROUND

The first AQMP was prepared and approved by the SCAQMD in 1979. The 2016 AQMP will be the eleventh plan, not including certain SIPs for specific pollutants, e.g., PM10 for the Coachella Valley and for the Basin, CO, and lead for Los Angeles County, prepared by the SCAQMD. The following bullets summarize the main components of the past AQMP updates and revisions:

- The 1982 AQMP was revised to reflect better data and modeling tools.
- In 1987, a federal court ordered the U.S. EPA to disapprove the 1982 AQMP because it did not demonstrate attainment of all NAAQS by 1987 as required by the CAA. This, in part, led to the preparation of the 1989 AQMP.
- The 1989 AQMP was adopted on March 17, 1989 and was specifically designed to attain all NAAQS. This plan called for three "tiers" of measures as needed to attain all standards and relied on significant future technology advancement to attain these standards.
- In 1991, the SCAQMD prepared and adopted the 1991 AQMP to comply with the CCAA.
- In 1992, the 1991 AQMP was amended to add a control measure containing market incentive programs (subsequently SCAQMD's Regional Clean Air Incentives Market (RECLAIM)).
- In 1994, the SCAQMD prepared and adopted the 1994 AQMP to comply with the CCAA three-year update requirement and to meet the federal CAA requirement for an ozone SIP. The AQMP, as adopted in 1994, included the following:
    - All geographical areas under the jurisdiction of the SCAQMD, compared to just the South Coast Air Basin;
    - The basic control strategies remained the same although the three-tiered structure of control measures was replaced and measures previously referred to as Tier I, II or III were replaced with short-/intermediate-term or long-term control measures;
    - Updated and refined control measures carried over from 1991;
    - Best Available Control Measure PM10 Plan;
    - The ozone attainment demonstration plan;
    - Amendments to the federal Reactive Organic Compound Rate-of-Progress Plan (also referred to as the VOC Rate-of-Progress Plan; and
    - Attainment Demonstration Plans for the federal PM10, NO_2, and CO air quality standards; etc.
- The 1997 AQMP was designed to comply with the three-year update requirements specified in the CCAA as well as to include an attainment demonstration for PM10 as required by the federal CAA. Relative to ozone, the 1997 AQMP contained the following changes to the control strategies compared to the 1994 AQMP:
    - Less reliance on transportation control measures (TCMs);
    - Less reliance on long-term control measures that rely on future technologies as allowed under §182(e)(5) of the CAA; and
    - Removal of other infeasible control measures and indirect source measures that had been substantially impacted by the State legislature in enacting new provisions in the Health and Safety Code.

- In 1999, the ozone plan portion of the 1997 AQMP was amended to address partial disapproval of the 1997 AQMP by the U.S. EPA and a settlement of litigation by environmental groups challenging the 1997 AQMP to provide the following:
    - Greater emission reductions in the near-term than would occur under the 1997 AQMP;
    - Early adoption of the measures that would otherwise be contained in the next three-year update of the AQMP; and
    - Additional flexibility relative to substituting new measures for infeasible measures and recognition of the relevance of cost effectiveness in determining feasibility.
- In April 2000, U.S. EPA approved the 1999 ozone SIP to the 1997 plan. The 1999 Amendment in part addressed the State's requirements for a triennial plan update.
- The 2003 AQMP was approved and adopted by the SCAQMD in August 2003. The 2003 AQMP was never fully approved by the U.S. EPA as part of the SIP. The 2003 AQMP addressed the following control strategies:
    - Attaining the federal PM10 ambient air quality standard for the Basin and Coachella Valley - these portions were approved by the U.S. EPA; in both areas, the attainment demonstration was disapproved after CARB withdrew its measures;
    - Attaining the federal 1-hour ozone standard;
    - 1997/1999 control measures not yet implemented;
    - Revisions to the Post 1996 VOC Rate-of-Progress Plan and SIP for CO; and
    - Initial analysis of emission reductions necessary to attain the PM2.5 and 8-hour ozone standards.
    - The 2003 AQMP was partially approved and partially disapproved by U.S. EPA, based on CARB's withdrawal of mobile source measures after the 1-hour ozone standard was revoked.
- The SCAQMD Governing Board approved the 2007 AQMP for both ozone and PM10 on June 1, 2007. On September 27, 2007, CARB adopted the State Strategy for the 2007 SIP and the 2007 AQMP as part of the SIP. The 2007 SIP was then forwarded to U.S. EPA for approval. The following summarizes the major components of the 2007 AQMP:
    - The most current air quality setting at the time (i.e., 2005 data);
    - Updated emission inventories using 2002 as the base year, which also incorporate measures adopted since adopting the 2003 AQMP;
    - Updated emission inventories of stationary and mobile on-road and off-road sources;
    - 2003 AQMP control measures not yet implemented (eight of the control measures originally contained in the 2003 AQMP have been updated or revised for inclusion into the 2007 AQMP;
    - 24 new measures are incorporated into the 2007 AQMP based on replacing the SCAQMD's long-term control measures from the 2003 AQMP with more defined or new control measures and control measure adoption and implementation schedules;
    - SCAQMD's recommended control measures to reduce emissions from sources that are primarily under State and federal jurisdiction, including on-road and off-road mobile sources, and consumer products;
    - SCAG's regional transportation strategy and control measures; and

  - Analysis of emission reductions necessary and attainment demonstrations to achieve the federal 8-hour ozone and PM2.5 air quality standards.
- On November 22, 2010, U.S. EPA issued a notice of proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards and the corresponding 2007 State Strategy. Specifically, U.S. EPA proposed approving the SIP's inventory and regional modeling analyses, but it also proposed disapproving the attainment demonstration because it relied too extensively on commitments to emission reductions in lieu of fully adopted, submitted, and SIP-approved rules. The notice also cited deficiencies in the SIP's contingency measures.
- In response to U.S. EPA's proposed partial disapproval of the 2007 SIP, on March 4, 2011, the SCAQMD Governing Board approved Revisions to the 2007 PM2.5 and Ozone State Implementation Plan for the Basin and Coachella Valley. The revisions to the 2007 PM2.5 and Ozone SIP consisted of the following:
  - Updated implementation status of SCAQMD control measures necessary to meet the 2015 PM2.5 attainment date;
  - Revisions to the control measure adoption schedule;
  - Changes to the emission inventory resulting from CARB's December 2010 revisions to the on-road truck and off-road equipment rules; and
  - An SCAQMD commitment to its "fair share" of additional NOx emission reductions, if needed, in the event U.S. EPA does not voluntarily accept the "federal assignment."
- In response to the July 14, 2011 U.S. EPA notice of proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards, at the October 7, 2011 public hearing, the SCAQMD Governing Board approved Further Revisions to PM2.5 and Ozone SIP for the Basin and Coachella Valley. Revisions to the PM2.5 SIP included a three-prong approach for identifying contingency measures needed to address U.S. EPA's partial disapproval:
  - Equivalent emissions reductions achieved through improvements in air quality;
  - Relying on committed emissions reductions for the 2007 ozone plan; and
  - Quantifying excess emissions reductions achieved by existing rules and programs that were not originally included in the 2007 PM2.5 SIP.
- U.S. EPA fully approved the 2007 SIP for the 8-hour ozone standard on March 1, 2012.
- The SCAQMD Governing Board approved the 2012 AQMP on December 7, 2012. The 2012 AQMP was primarily designed to meet all requirements to demonstrate attainment of the 2006 24-hour PM2.5 standard (35 ug/m3). The adopted Final 2012 AQMP was forwarded to CARB on December 20, 2012 with subsequent approval at its January 23, 2013 Board meeting. On February 1, 2013, the SCAQMD Governing Board approved Control Measure IND-01, Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities, for inclusion in the Final 2012 AQMP. The following summarizes the major components of the 2012 AQMP:
  - The most current science and analytical tools;
  - A comprehensive strategy aimed at controlling pollution from stationary (point) sources, on-road and off-road mobile sources and area sources;
  - Attainment demonstration of the federal 24-hour PM2.5 standard by 2014 in the Basin through adoption of control measures;

- Update of the U.S. EPA approved 8-hour ozone control plan with new measures designed to reduce reliance on the CAA Section 182 (e)(5) long-term measures for NOx and VOC reductions;
- Address several state and federal planning requirements, incorporating new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and new meteorological air quality models;
- Update on the air quality status of the SSAB in the Coachella Valley;
- Discussion of the emerging issues of ultrafine particles and near-roadway exposures;
- Analysis of the energy supply and demand issues that face the Basin and their relationship to air quality;
- Demonstrations of 1-hour ozone attainment and vehicle miles travelled (VMT) emissions offsets, as per U.S. EPA requirements based on the recent court case of Association of Irritated Residents (AIR) vs. U.S. EPA (2012); and
- Specific measures to further implement the ozone strategy in the 2007 AQMP.

- A Supplement to the 24-Hour PM2.5 (35 ug/m^3) SIP was approved by the SCAQMD Governing Board on February 6, 2015. The purpose of the Supplement was to demonstrate attainment of the 2006 24-hour PM2.5 NAAQS by 2015 under the CAA (Title 1, Part D, Subpart 4) which had been required based on a recent court case, which included a discussion of the effects of the drought on the attainment date. New transportation conformity budgets for 2015 were also developed.
- In January 2016, the SCAQMD requested and received from the U.S. EPA a redesignation of the 24-hour PM2.5 standard to serious non-attainment area with a new attainment deadline of 2019.
- On April 14, 2016, U.S. EPA partially approved and partially disapproved the 2012/2015 PM2.5 and 2015 Supplement Plans.

1.3 AGENCY AUTHORITY – 2016 AQMP

The 2016 AQMP sets forth an emission reduction strategy which will require the cooperation and partnership of all levels of government: local, regional, state, and federal, as well as public engagement. Each agency has authority over specific emissions sources. Accordingly, in order for the AQMP to be successful in attaining ambient air quality standards, each agency or jurisdiction implements or commits to specific planning and implementation responsibilities. Interagency commitment and cooperation are the keys to success of the 2016 AQMP. The following summarizes key responsibilities of the regulatory agencies involved in the success of the AQMP:

- At the federal level, the U.S. EPA establishes emission standards for motor vehicles, locomotives, airplanes, and ships. The U.S. EPA also develops fuel standards and regulates non-road (or off-road) engines.
- At the state level, CARB regulates on-road vehicles, motor vehicle fuel specifications, off-road emission standards (e.g., off-road equipment and marine vessels), and consumer product standards. The AQMP includes SIP strategies to reduce emissions from state and federal sources (e.g., vehicles, trucks, locomotives, air planes, and marine vessels).
- At the regional level, the SCAQMD has lead responsibility for developing stationary, some area, and indirect source control measures and coordinating the development and adoption of the 2016 AQMP. SCAQMD has limited authority over mobile sources (e.g., fleet

regulations, incentives for accelerated vehicle turnover, reduction in average vehicle ridership, etc.). Similarly, SCAG is responsible for developing the Regional Transportation Plan (RTP).

- Lastly, at the local level, county transportation commissions, as well as the cities and counties and their various departments (e.g., harbors and airports) have a dual role related to transportation and land use. Their efforts are coordinated through the regional metropolitan planning organization for the Basin, SCAG, which is responsible for preparing the TCMs in the 2016 AQMP, which are part of the RTP.

1.4 AGENCY AUTHORITY – CEQA

CEQA, Public Resources Code §21000 *et seq.*, requires that the environmental impacts of proposed projects be evaluated and that feasible methods to reduce, avoid or eliminate significant adverse impacts of these projects be identified and implemented. The lead agency is the "public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect upon the environment." (Public Resources Code Section 21067.) Since the SCAQMD has the primary responsibility for supervising or approving the proposed project as a whole, it is the most appropriate public agency to act as lead agency. (CEQA Guidelines Section 15051(b).)

A Program Environmental Impact Report (Program EIR) for the 2016 AQMP is considered to be the appropriate document pursuant to CEQA Guidelines Section 15168(a)(3), because the 2016 AQMP constitutes a series of actions that can be characterized as one large project: actions that are related to the issuance of rules, regulations, plans, or other criteria required to govern the conduct of a continuing program.

As the lead agency for the proposed project, SCAQMD has prepared this Notice of Preparation/Initial Study (NOP/IS) for the proposed 2016 AQMP Program EIR. The NOP/IS is being released for a 30-day public review and comment period.

1.5 PROJECT LOCATION

The SCAQMD has jurisdiction over an area of approximately 10,743 square miles, consisting of the four-county the Basin (all of Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties), and the Riverside County portions of the SSAB and MDAB. The Basin, which is a sub-region of the SCAQMD's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. It includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Valley Planning Area) is a sub-region of the Riverside County and the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (Figure 1-1).

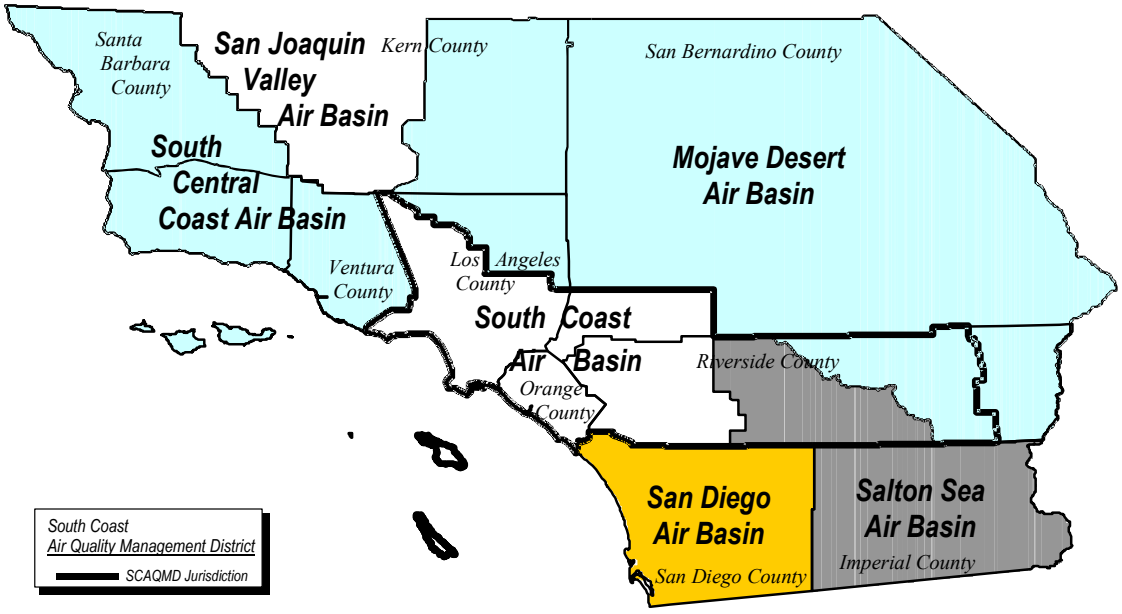

FIGURE 1-1. Southern California Air Basins

1.6 OVERALL ATTAINMENT STRATEGY

The overall control strategy for the 2016 AQMP is designed to meet applicable federal and State requirements. The 2016 AQMP includes integrated strategies and measures to meet the following federal standards in the District:

- Revoked 1997 8-hour NAAQS ozone (80 ppb) by 2024;
- 2008 8-hour ozone standard (75 ppb) by 2032;
- 2012 annual PM2.5 standard (12 µg/m^3) by 2025;
- 2006 24-hour PM2.5 standard (35 µg/m3) by 2019; and
- Revoked 1979 1-hour ozone standard (120 ppb) by 2023.

In addition to the above, the 2016 AQMP strategies have been developed to meet the revoked 1997 8-hour ozone federal standard (80 ppb) and the 2008 8-hour ozone federal standard (75 ppb) in the SSAB.

The 2016 AQMP also discusses the recently adopted federal 8-hour ozone standard (70 ppb), as well as incorporate energy, transportation, goods movement, infrastructure and other planning efforts that affect future air quality.

The California State ambient air quality standard is identical to the federal standard for annual PM2.5 and there is no State 24-hour PM2.5 standard. The State has very stringent PM10 standards (annual PM10 of 20 ug/m3 and 24-hour PM10 of 50 ug/m3). While there is no effective attainment date for the State PM standards, the State standards must be achieved as soon as practicable to protect the public and welfare. Progress towards achieving the federal

PM2.5 standards would be the most expeditious approach for attaining both the federal and State PM standards.

The proposed attainment strategy focuses on reduction of ozone precursors (NOx and VOC), direct PM2.5, and PM2.5 precursors (NOx). NOx emissions lead to the formation of both ozone and PM2.5. Therefore, the most significant air quality challenge faced by the SCAQMD is to reduce NOx emissions sufficiently to meet the upcoming ozone and PM2.5 federal standard deadlines. Preliminary analyses indicate that to achieve the upcoming ozone and PM2.5 federal standards, as well as to demonstrate attainment with other standards not yet met, approximately 65 percent further reduction in NOx emissions, above and beyond currently adopted measures are needed by 2031.

To this end, the 2016 AQMP includes both NOx and PM2.5 emission control strategies for all categories of emission sources: stationary sources (including area sources), and mobile sources. The majority of NOx emission reductions will come from mobile sources. Mobile sources consist of two main categories: on-road mobile sources, which typically include automobiles, trucks, buses, and other vehicles that operate on public roadways; and off-road mobile sources, which include aircraft, ships, trains, and construction equipment that operate off public roadways. The authority to regulate mobile emission sources is divided between the CARB and the U.S. EPA.

The magnitude of emission reductions needed for the attainment of these NAAQS requires an aggressive mobile source control strategy supplemented with focused, strategic stationary source control measures and close collaboration with federal, state, and regional governments, local agencies, businesses, and the public. The 2016 AQMP uses a variety of implementation approaches such as accelerated deployment of available cleaner technologies (e.g., zero and near-zero emission technologies), best management practices, co-benefits from existing programs (e.g., greenhouse gas), and incentive measures. Further demonstration and commercialization projects will be crucial to help deploy zero and near-zero emission technologies. Another key element to the AQMP implementation will be private and public funding to help further the development and deployment of advanced technology. Many of the same technologies will address both air quality and climate needs, such as increase energy efficiency. Without an adequate and fair-share level of reductions from all sources, the emissions reduction burden would be shifted to stationary sources, which collectively account for less than 20 percent of NOx emissions in the attainment demonstration. The SCAQMD will continue to work closely with CARB to further control mobile source emissions where federal or State actions do not meet regional needs.

1.7 PURPOSE OF THE 2016 AQMP

The 2016 AQMP will provide an updated air pollution control strategy to attain federal ambient air quality standards and has been developed as an integrated Plan taking into consideration: air quality improvement needs, climate change, transportation, and energy reliability. The proposed AQMP focuses on NOx reductions to attain the federal 2008 8-hour ozone standard (75 ppb) by 2032, NOx and PM reductions to attain the federal 2012 annual PM2.5 standard (12 ug/m^3) by 2025, and 2006 24-hour PM2.5 standard (35 ug/m3) by 2019. The 2016 AQMP also includes ozone reduction strategies to make expeditious progress in attaining the federal and state standards not yet met (identified in Section 1.6). The 2016 AQMP relies upon the most recent planning assumptions and the best available information such as CARB's latest EMFAC2014 for

the on-road mobile source emissions inventory, CARB's 2014 in-use fleet inventory for the off-road mobile source emission inventory, the latest point source and improved area source inventories as well as the use of new episodes and air quality modeling analysis, and SCAG's forecast assumptions based on the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (SCAG, 2016).

It is expected that implementing the proposed 2016 AQMP control measures will provide substantial benefits of improved air quality. From a public health standpoint, air pollution has been linked to long-term health problems affecting the lungs, heart, blood, brain and immune and nervous systems. Therefore, improving air quality is expected to result in improvements to public health. Additional benefits include improved visibility, reduced destruction of materials and buildings, reduced damage to agricultural crops and habitat for wildlife and, more efficient land use patterns and transportation systems. The proposed 2016 AQMP control measures also have the potential to reduce reliance on traditional petroleum fuels, thus, providing reductions in greenhouse gas (GHG) emissions. The following sections summarize the overall components of the 2016 AQMP and the specific control measures that comprise the 2016 AQMP.

1.8 PROJECT OBJECTIVES

CEQA Guidelines §15124(b) requires an EIR to include a statement of objectives, which describes the underlying purpose of the proposed project. The purpose of the statement of objectives is to aid the lead agency in identifying alternatives and the decision-makers in preparing a statement of findings and a statement of overriding considerations, if necessary. The objectives of the proposed 2016 AQMP are summarized below. These objectives may be refined or modified as part of the Program EIR preparation process.

- Reduce ozone, PM2.5, and their precursors on an expeditious implementation schedule;
- Demonstrate attainment of the 2008 8-hour ozone standard (75 ppb) by 2032;
- Demonstrate attainment of the 2006 24-hour PM2.5 standard (35 ug/m^3) by 2019;
- Demonstrate attainment of the 2012 annual PM2.5 standard by 2025;
- Continue making expeditious progress towards attaining the following NAAQS (although these standards were revoked, they still need to be met to avoid certain consequences, e.g., require contingency measures):
    - 1979 1-hour ozone standard (120 ppb) by 2023;
    - 1997 8-hour ozone standard (80 ppb) by 2024;
- Reduce population exposure to nonattainment pollutants (i.e., ozone and PM2.5 for the Basin) according to a prescribed schedule;
- Rank control measures by cost-effectiveness and implementation priority;
- Update planning assumptions and the best available information such as CARB's latest EMFAC2014 for the on-road mobile source emissions inventory, CARB's latest off-road emission inventory;
- Update emission inventories using 2012 as the base year, which also incorporates measures adopted since adopting the 2012 AQMP; and
- Update any remaining control measures from the 2012 AQMP.

1.9 PROJECT DESCRIPTION

The 2016 AQMP control measures consists of three components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) State and Federal Mobile Source Control Measures; and 3) Regional Transportation Strategy and Control Measures provided by SCAG. These measures primarily rely on the traditional command-and-control approach, the acceleration of zero and near-zero emission technologies, incentive programs, and advanced technologies. A summary of the proposed control measures is provided in the following subsections. The following bullet points summarize the major components of the proposed 2016 AQMP:

- The air quality baseline (i.e., 2012 data);
- Updated emission inventories using 2012 as the base year and measures implemented since adopting the 2012 AQMP;
- New District measures for stationary, area, and mobile sources to be incorporated into the 2016 AQMP;
- SCAG's 2016-2040 RTP/SCS and related transportation control measures;
- CARB's 2016 SIP Strategy;
- Analysis of emission reductions necessary to achieve the federal 8-hour ozone, the 24-hour annual PM2.5 air quality standards, and the (revoked) 1-hour ozone standard;
- Overview of state and federal planning requirements; and
- Implementation schedule for adoption of the proposed control measures.

1.9.1 Stationary Source Control Measures (SCAQMD)

Proposed stationary source control measures, under the SCAQMD's jurisdiction, would reduce emissions from both point sources and area sources.

The following basic principles were used to develop the SCAQMD's stationary source control measures: (1) identify opportunities of co-benefit emission reductions from multiple air pollutants; (2) initiate incentive-based programs or rule making activities for further NOx control strategies aimed at maximum emission reductions by the 2023-2032 timeframe to further implement the ozone plan for the 1997 and 2008 8-hour ozone standards; (3) identify limited, strategic VOC reduction opportunities to maximize reductions by the earliest possible and feasible attainment years; and (4) identify PM2.5 emission reduction opportunities, as needed, to ensure or advance attainment per federal CAA requirements. In addition, to foster further technology advancement, measures are also included to achieve additional reductions from stationary sources based on implementation and accelerated penetration of advanced technologies. For each control measure, the SCAQMD will seek to achieve the maximum reduction potential that is technically feasible and cost-effective. The stationary control measures to be implemented by the SCAQMD are listed in Table 1.9-1 and summarized in the text following Table 1.9-1.

TABLE 1.9-1

Stationary Source Control Measures (SCAQMD) Categorized by Source Type

Number	Title	Control Measure Type
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies and Incentives	All Pollutants
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures	NOx, VOC
ECC-03	Additional Enhancement in Building Energy Efficiency and Smart Grid Technology	NOx, VOC
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	All Pollutants
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources	NOx, VOC
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating	NOx
CMB-03	Emission Reductions from Non-Refinery Flares	NOx
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking	NOx
CMB-05	Further NOx Reductions from RECLAIM Assessment	NOx
FUG-01	Improved Leak Detection and Repair	VOC
CTS-01	Further Emission Reduction from Coatings, Solvents, Adhesives, and Sealants	VOC
MCS-01	Improved Breakdown Procedures and Process Re-design	All Pollutants
MCS-02	Application of All Feasible Measures	All Pollutants
FLX-01	Improved Education and Public Outreach	All Pollutants
FLX-02	Stationary Source VOC Incentives	VOC
BCM-01	Further Emission Reductions from Commercial Cooking	PM
BCM-02	Emission Reductions from Cooling Towers	PM
BCM-03	Further Emission Reductions from Paved Road Dust Sources	PM
BCM-04	Emission Reductions from Manure Management Strategies	NH_3

Number	Title	Control Measure Type
BCM-05	Ammonia Emission Reductions from NOx Controls	NH_3
BCM-06	Emission Reductions from Abrasive Blasting Operations	PM
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations	PM
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning	PM
BCM-09	Further Emission Reductions from Wood Burning Fireplaces and Wood Stoves	PM
BCM-10	Emission Reductions from Greenwaste Composting	VOC, NH_3

Notes:
BCM means Best Available Control measures for fugitive PM sources
CMB means combustion exhaust control measures
CTS means coating and solvents control measures
ECC means energy and climate change control measures
FLX means compliance flexibility programs
FUG means fugitive VOC emission control measures
MCS means multiple component sources control measures

Stationary Source Control Measures Summaries (SCAQMD)

ECC-01 - Co-Benefit Emission Reductions from GHG Programs, Policies and Incentives [All Pollutants]: Combustion sources that emit GHGs are typically sources of criteria pollutants. Significant efforts are currently being undertaken and planned to reduce GHG emissions under the State's 2020, 2030 and 2050 targets. As these GHG reduction efforts are undertaken across multiple sectors, the reductions of criteria pollutants should be considered along with any additional enhancements needed to achieve further criteria pollutant reductions under the GHG programs. Existing and further GHG emission reductions mechanisms, including market programs, renewable energy targets, incentive and rebate programs, and promoting implementation and development of new technologies, would be evaluated for reduction of emissions of both GHGs and criteria pollutants.

ECC-02 - Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]: This control measure would seek criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and SB 350 (Clean Energy Pollution Reduction Act). The 2020 target for Title 24 will be to achieve zero energy consumption from new residential buildings utilizing new building materials and more efficient appliances. SB 350 doubles the energy efficient savings in electricity and natural gas energy uses of retail customers and increase renewable energy sources from 33 to 50 percent by 2030. This control measure will take advantage of the co-benefit emission reductions from implementation of these state regulations.

ECC-03 - Additional Enhancements in Building Energy Efficiency and Smart Grid Technology [NOx, VOC]: This control measure would seek to provide financial incentives to

go beyond the goals achieved under ECC-02 and CMB-02. Incentive programs would be developed for existing residences that includes weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. Incorporating newer efficient appliance technologies, and weatherization measures along with renewables such as solar thermal and solar photovoltaics provides emission reductions within the residential sector above current SCAQMD regulations along with reduced energy costs.

ECC-04 - Reduced Ozone Formation and Emission Reductions from Cool Roof Technology [All Pollutants]: Cool roofs reflect a higher fraction of incident sunlight than traditional roofing materials. Widespread adoption of cool roofs can mitigate the urban heat island effect and can lower daytime ambient temperatures, thus slowing the rate of ozone formation. In addition, buildings equipped with cool roofs require less electricity for cooling, leading to reductions in emissions from the power generation sector. This control measure has the potential to reduce ambient ozone concentrations directly along with NOx, CO, PM, and CO2 emissions from the power generation sector. Evaporative VOC emissions will be reduced due to lower ambient temperatures in the urban areas of the Basin. Three possible aspects of cool roof technology, including solar reflectance, radiative properties, and roof replacements will be incorporated into a technical modeling analysis to quantify the impact of this control measure on air quality.

CMB-01 - Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]: This proposed control measure would seek emission reductions of NOx from traditional combustion sources by replacement with zero and near-zero emission technologies including low NOx emitting equipment, electrification, alternative process changes, efficiency measures, or fuel cells for combined heating and power (CHP). Replacing older higher-emitting equipment with newer lower or zero-emitting equipment can apply to a single source or an entire facility. These sources include engines, turbines, microturbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production. New businesses can be required or incentivized to install and operate zero emission equipment, technology and processes beyond the current BACT requirements. Fuel cells are also an alternative to traditional combustion methods, resulting in a reduction of NOx emissions with co-benefit of reducing other criteria air pollutants and GHGs. This control measure would also seek energy storage systems and smart grid control technologies that provide a flexible and dispatchable resource with zero emissions. Grid based storage systems can replace the need for new peaking generation, be coupled with renewable energy generation, and reduce need for additional energy infrastructure. Mechanisms will be explored to incentivize residences and businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these zero and near-zero emission technologies sooner.

CMB-02 – Emission Reductions From Commercial And Residential Space And Water Heating [NOx]: This control measure seeks annual average NOx emission reductions from unregulated commercial space heating furnaces and from incentive programs to replace existing older boilers, water heaters, and space heating furnaces. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial boilers, water heaters and furnaces used for heating. The control measure has two components. The first component is to continue to implement the Rule 1111 emission limit of NOx for residential space heaters which is 14 ng/J (20 ppm) starting in 2014. The second component is to incentivize the

replacement of older boilers, water heaters and space heaters with newer and more efficient low NOx boilers, water heaters and space heaters. The new boilers and water heaters would comply with SCAQMD rule emission limits and new space heaters would meet a specified emission limit. If required, the SCAQMD will consider amending Rules 1121 and 1111 to put in place a heat input based emission limit which will result in lower NOx emissions for high efficiency units compared with standard efficiency units. Because of the rules' heat output based limits, high efficiency water heaters and furnaces emit the same amount of NOx per day as standard efficiency units, so a heat-input-based standard is needed to reduce NOx emissions. In addition, the SCAQMD will also consider developing a rule to limit NOx emissions from commercial and multi-unit residential heating furnaces which are currently unregulated.

CMB-03 - Emission Reductions from Non-Refinery Flares [NOx]: Flare NOx emissions are regulated through new source review and BACT, but there are currently no source-specific rules regulating NOx emissions from flares at non-refinery sources, such as organic liquid loading stations, tank farms, and oil and gas production. This control measure proposes that, consistent with the all feasible control measures, all non-refinery flares meet current BACT for NOx emissions and thermal oxidation of VOCs. The proposed method of control would be capturing the gas that would typically be flared and converting it into a renewable energy source (e.g., transportation fuel, fuel cells), and installation of newer flares implementing BACT.

CMB-04 - Emission Reductions from Restaurant Burners and Residential Cooking [NOx]: This control measure applies to retail restaurants and quick service establishments utilizing commercial cooking ovens, ranges and charbroilers by funding development of, promoting and incentivizing the use and installation of low-NOx burner technologies. In addition, the SCAQMD would consider developing a manufacturer based rule to establish emission limits for cooking appliances used by restaurants and residential applications.

CMB-05 – Further NOx Reductions from RECLAIM Assessment [NOx]: The California Health and Safety Code requires the SCAQMD to monitor the advancement in BARCT, and if BARCT advances, the SCAQMD is required to periodically re-assess the overall facility caps, and reduce the RECLAIM Trading Credit (RTC) holdings to a level equivalent to command-and-control BARCT levels. The emission reductions resulting from the programmatic RTC reductions will help the Basin attain the NAAQS for ozone and PM2.5 as expeditiously as practicable.

When considering future emissions reductions for AQMP purposes, the NOx RECLAIM program works differently than traditional command-and-control regulations. When projecting future emissions for SIP purposes, all RECLAIM holdings must be assumed to be emitted in the air. Under command-and-control regulations, future year emissions estimates are based on actual emissions in a base year which are then projected into the future using the best available estimates of economic growth for a particular industry. The RECLAIM program has traditionally, and perhaps necessarily, included more RTCs than actual emissions. This margin may be needed for market liquidity, but also precludes taking future year SIP credit for these unused credits. For attainment demonstration purposes, these emissions reductions would then need to be achieved from non-RECLAIM sources. This control measure would identify a series of approaches that can be explored to make the program more effective in ensuring equivalency with command and control regulations implementing BARCT, and to potentially generate further NOx emission reductions at RECLAIM facilities.

FUG-01 - Improved Leak Detection and Repair [VOC]: This control measure seeks to reduce emissions from a variety of VOC emission sources including, but not limited to, oil and gas production facilities, petroleum refining and chemical products processing, storage and transfer facilities, marine terminals, and other sources, where VOC emissions occur from fugitive leaks in piping components, wastewater system components, and process and storage equipment leaks. Most of these facilities are required under SCAQMD and federal rules to maintain a leak detection and repair (LDAR) program that involves individual screening of all of their piping components and periodic inspection programs of equipment to control and minimize VOC emissions. This measure would utilize advanced remote sensing techniques (Smart LDAR), such as Fourier transform infrared spectroscopy (FTIR), Ultraviolet Differential Optical Absorption Spectroscopy (UV-DOAS), Solar Occultation Flux (SOF), and infrared cameras, that can identify, quantify, and locate VOC leaks in real time allowing for faster repair in a manner that is less time consuming and labor intensive than traditional LDAR.

This control measure would pursue two goals. The first is to upgrade a series of SCAQMD's inspection/maintenance rules (Rules 462, 1142, 1148.1, 463, 1178, 1173, and 1176) to require, at a minimum, a self-inspection program, or utilization of an optical gas imaging-assisted LDAR program where feasible. The second is to explore the use of new technologies to detect and verify VOC fugitive emissions in order to supplement existing programs and achieve additional emission reductions.

CTS-01 - Further Emission Reduction from Coatings, Solvents, Adhesives, and Sealants [VOC]: This control measure seeks VOC emission reductions by focusing on select coating, adhesive, solvent and sealant categories by further limiting the allowable VOC content in formulations or incentivizing the use of super-compliant technologies. Examples of the categories to be considered include, but are not limited to, coatings used in aerospace applications; adhesives used in a variety of sealing applications; and solvents for graffiti abatement activities. Reductions would be achieved by lowering the VOC content of a few categories within SCAQMD source-specific Rules 1113, 1124, 1168, and 1171 where possible. For solvents, reductions could be achieved by promoting the use of alternative low-VOC products or non-VOC product/equipment at industrial facilities. Enhanced enforcement and the tightening of regulatory exemptions that may be used as loopholes in lieu of compliant technologies can also lead to reduced emissions.

MCS-01 - Improved Breakdown Procedures and Process Re-Design [All Pollutants]: SCAQMD Rule 430 applies to breakdowns that result in a violation of any rule or permit condition, with some exceptions. U.S. EPA's May 2015 final action on startups, shutdowns, and malfunctions (SSM) stipulates that exemptions from emissions limits during periods of breakdown are not allowed. This control measure would introduce improved breakdown procedures and a process re-design that would apply to breakdowns from all emission sources, providing pollutant concentration and/or incidence limits to comply with U.S. EPA's SSM policy.

MCS-02 - Application of All Feasible Measures [All Pollutants]: This control measure is to address the State law requirement for all feasible measures for ozone. Existing rules and regulations for pollutants such as VOC, NOx, SOx and PM reflect current BARCT. However, BARCT continually evolves as new technology becomes available that is feasible and cost-effective. The SCAQMD staff will continue to review new emission limits or controls introduced through federal, State or local regulations to determine if SCAQMD regulations

remain equivalent or more stringent than rules in other regions. If not, a rulemaking process will be initiated to perform a BARCT analysis with potential rule amendments if deemed feasible. In addition, the SCAQMD will consider adopting and implementing new retrofit technology control standards, based on research and development and other information, that are feasible and cost-effective.

FLX-01 - Improved Education and Public Outreach [All Pollutants]: This proposed control measure seeks to provide education, outreach, and incentives for consumers to contribute to clean air efforts. Examples include consumer choices such as the use of energy efficient products, new lighting technology, "super-compliant" coatings, tree planting, and the use of lighter colored roofing and paving materials which reduce energy usage by lowering the ambient temperature. In addition, this proposed measure intends to increase the effectiveness of energy conservation programs through public education and awareness as to the environmental and economic benefits of conservation. Educational and incentive tools to be used include social comparison applications (comparing your personal environmental impacts with other individuals), social media, and public/private partnerships. Further improvement of outreach allows the public to alert staff of any environmental problems that can be corrected sooner.

This control measure is a voluntary program that provides education and outreach to consumers, business owners, and residences regarding the benefits of making clean air choices in purchases, conducting efficiency upgrades, installing clean energy sources, and approaches to conservation. These efforts will be complemented with helping implement currently available incentive programs and developing additional incentive programs. Lastly, the SCAQMD staff may develop an economic incentive program (EIP) to offer technical and financial assistance to help implement efficiency measures and other low emission technologies.

FLX-02 - Stationary Source VOC Incentives [VOC]: This control measure seeks to incentivize VOC emission reductions from various stationary sources through incentive programs for the use of clean, low emission technologies. Facilities would be able to qualify for incentive funding if they utilize equipment or accept permit conditions which result in cost-effective emission reductions that are beyond existing requirements. The program would establish procedures for quantifying emission benefits from clean technology implementation and develop cost-effectiveness thresholds for funding eligibility. Mechanisms will be explored to incentivize residences and businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these technologies sooner. For stationary sources, the SCAQMD staff has compiled an initial list of potential incentives to encourage businesses to use zero- or near-zero technologies or enhancements to the SCAQMD's existing programs to reduce or eliminate barriers to implement state of the art technologies. Potential incentive concepts include incentive funding, permitting and fee incentives and enhancements, New Source Review (NSR) incentives and enhancements, CEQA incentives, branding incentives, and recordkeeping and reporting incentives. The SCAQMD staff is committed to further investigating these concepts.

Predicting VOC emission reductions from these voluntary activities is challenging, however, when providing incentives, the modernization of facilities could take place in the both the short- and long-term. The availability and amount of incentives would directly affect the level of VOC emission reductions achieved. Emission benefits from incentives can be quantified based on program participation, technology/material penetration, and other assessment and inventory

methods. Implementing additional incentive programs will provide a means to quantify these benefits as they are developed.

BCM-01 - Further Emission Reductions from Commercial Cooking [PM]: Commercial cooking activities are the largest source of directly emitted PM2.5 emissions in the Basin, and under-fired charbroilers are responsible for the majority of emissions from this source category. To date, a variety of control device technologies have been tested by CE-CERT, and SCAQMD staff and the inter-agency working group are reviewing draft test results. This control measure seeks to establish a tiered program targeting higher efficiency controls for under-fired charbroilers at large volume restaurants, with more affordable lower efficiency controls at smaller restaurants. As with existing Rule 1138 requirements, a potential future control program for under-fired charbroilers could establish control device efficiency requirements based on restaurant throughput. Efforts could also be taken to develop a control device registration program as an alternative to the SCAQMD permit process. Small business incentive programs funded by mitigation fees or other sources could also be explored to help offset initial purchase and installation costs for restaurants.

BCM-02 - Emission Reductions from Cooling Towers [PM]: This control measure seeks reductions of PM emissions from industrial cooling towers through the use of the latest drift eliminator technologies. This control measure will seek to phase-in the use of drift eliminators with 0.001 percent drift rate for existing cooling towers. This can be achieved by retrofitting older cooling towers with modification to the cooling fans to accompany the drift eliminators, which will also result in water conservation. Newly constructed cooling towers have demonstrated ultra-low drift rates down to 0.00005 percent. This drift rate has been achieved in practice and could be considered BACT for new construction.

BCM-03 - Further Emission Reductions from Paved Road Dust Sources [PM]: Although fugitive dust emissions from agriculture and construction are primarily in the coarse size fraction (PM10-2.5), entrained road dust is still one of the major direct PM2.5 sources due to the large number of roadways and high traffic volumes in the region. Existing SCAQMD Rules 1157 and 403 requirements to reduce track out from stationary sources are based on a list of options. Further emission reductions could be achieved by specifying the most effective track out prevention measures, such as use of a wheel washing system, for sites with high vehicular activity exiting the site, or those with repeated track-out violations. Existing SCAQMD Rule 1186 requires that certified equipment be used on public roads currently subject to routine street sweeping but does not specify frequency. Further paved road dust PM2.5 emission reductions could be sought through specifying the frequency of street sweeping. Street sweeping is a portion of some local jurisdiction's National Pollutant Discharge Elimination System (NPDES) permits to reduce debris from entering the storm drain system. A review of existing NPDES mandates would be conducted in conjunction with any potential future rulemaking efforts. As part of efforts to reduce paved road dust silt loadings and the corresponding PM emissions, an evaluation of existing SCAQMD fugitive dust rules will be conducted to determine if additional PM2.5 emissions can be achieved.

BCM-04 - Emission Reductions from Manure Management Strategies [NH_3]: This control measure seeks to use manure management systems to reduce ammonia, a PM precursor, from fresh manure. Examples include acidifier application, dietary manipulation, feed additives, and other manure control strategies which can be applied on a year-around basis. To minimize costs, some control technologies can be seasonally or episodically applied during times when high

ambient PM2.5 levels are of concern. Dietary manipulation such as lowering the protein content and including high-fiber ingredients is an effective method to decrease ammonia emission from monogastric animals and ruminants manure. Feed additives can be considered as a seasonal or episodic control strategy when ambient PM2.5 concentrations are highest. New approaches to reduce ammonia emissions from manure can be considered that include manure slurry injection, microbial manure additives, manure belt cleaning in laying hen houses, cage-free egg laying manure removal, and poultry manure thermal gasification.

BCM-05 - Ammonia Emission Reductions from NOx Controls [NH_3]: This control measure seeks to reduce ammonia from NOx controls such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR). These systems are capable of reducing NOx emissions from combustion sources very effectively. However, the use of systems also results in potential emissions of ammonia that "slip" past the control equipment and into the atmosphere. Ammonia is a precursor gas for secondary PM formation. Recent advances in catalyst technology have resulted in the development of ammonia slip catalysts that selectively convert ammonia into nitrogen gas. These catalysts could be installed post-SCR and would result in less ammonia slip.

BCM-06 - Emission Reductions from Abrasive Blasting Operations [PM]: Existing SCAQMD Rule 1140 regulates opacity requirements for confined and unconfined abrasive blasting operations using various abrasives. Rule 1140 and the California Code of Regulations Title 17, Subchapter 6 – Abrasive Blasting, establish both operating requirements and abrasive materials requirements, including prohibition against visible emissions from confined or unconfined abrasive blasting operations. Current permit conditions for abrasive blasting require venting to a PM air pollution control (APC) equipment when in full use. Baghouses or dry filters are the most frequently used APC equipment. This control measure would seek amendments to existing Rule 1140 to address dry abrasive blasting operations conducted in open areas using portable blasting equipment with or without a written SCAQMD permit.

BCM-07 - Emission Reductions from Stone Grinding, Cutting, and Polishing Operations [PM]: Stone fabricating operations, including, but not limited to, grinding, cutting, and polishing generate airborne dust emissions containing PM10, some PM2.5, and silica particles that are known to cause lung diseases. Many of these operations are done at confined or unconfined worksites by construction workers, remodeling contractors and individuals, and may not be sufficiently controlled for dust emissions. This control measure seeks wet/dry methods of control, local exhaust emissions control, no visible emissions, and financial incentives as a regulatory alternative for exchanging existing wet/dry equipment with new equipment that includes integrated add-on controls.

BCM-08 - Further Emission Reductions from Agricultural, Prescribed, and Training Burning [PM]: This control measure proposes to further reduce PM emissions from open burning sources. Further PM emission reductions could be achieved through use of a fee schedule and/or an incentive program to limit agricultural burning and promote burning alternatives (e.g., chipping/grinding or composting). One approach to reduce emissions could involve establishing a fee as part of the burn permit program based on acreage or amount of material burned. Fees would not be charged to producers using burning alternatives. Another approach could involve providing incentives to agricultural producers, especially in peak PM2.5 areas, to implement alternatives to burning. A demonstration project could also be

established where a SCAQMD contractor could conduct chipping/grinding and removal activities in peak PM2.5 areas at no, or reduced, cost to producers.

BCM-09: Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]: This control measure seeks additional emission reductions from residential wood burning activities. Residential wood burning results in directly emitted PM2.5 and curtailment programs can be very cost-effective relative to other source categories. Based on a review of U.S. EPA guidance documents and other air district wood smoke control programs, the existing SCAQMD curtailment program (Rule 445) threshold could be lowered. A lower curtailment criteria (e.g., 20 or 25 μg/m3) could be established which would increase the number of no burn days but not completely prohibit wood burning during the winter. Based on historical data (2013-2015) for the November through February winter season, it is estimated there would be 11 and 28 additional curtailment days, on average, at the 25 and 20 μg/m3 thresholds, respectively, above the estimate of 24 days at the current threshold. The Check Before You Burn program could also be extended to include the months of October and/or March as high PM2.5 levels can occur during these periods. All of these potential control options would increase the number of no burn days which could lower the contribution of wood smoke to ambient PM2.5 levels in the winter months. Although these episodic reductions are designed to address 24-hour PM2.5 concentration, a consistent reduction in wintertime PM2.5 from reduced wood burning could have an impact on annual average PM2.5 concentrations. Further analysis will be conducted to determine the appropriate approach to achieve the emission reductions necessary to demonstrate attainment of both the 24-hour and annual average federal PM2.5 standards. The current SCAQMD program encourages households within high PM2.5 areas to upgrade wood-burning devices through SCAQMD incentives of up to $1,600 to offset purchase and installation costs. Although this program has been effective, additional reductions may be achieved through the use of higher incentives or expansion of the eligible geographic area. Experience has shown that education and outreach to targeted households is vital to ensure program participation, and an additional element of this control measure would focus on expanding the effectiveness of incentive programs.

BCM-10 - Emission Reductions from Greenwaste Composting [NH_3, VOC]: VOCs and ammonia, which are PM precursor gases, are emitted from composting of organic waste materials including greenwaste and foodwaste and are currently regulated by existing SCAQMD Rule 1133.3. Although Rule 1133.3 covers foodwaste composting, the level of emissions from foodwaste composting has not been fully characterized, mainly due to the lack of related emissions test data. This control measure proposes potential emission minimization through emerging organic waste processing technology and potential emission reductions through restrictions on the direct land application of chipped and ground uncomposted greenwaste. This proposed control measure seeks a 15-day pathogen reduction process of chipped and ground uncomposted greenwaste with composting best management practices (BMPs) to reduce potential VOC and ammonia emissions from land applied greenwaste.

1.9.2 Mobile Source Control Measures (SCAQMD)

The 2016 AQMP includes mobile source control measures that are being formulated by the SCAQMD. Mobile sources emit over 80 percent of regional NOx emissions and therefore must be the largest part of the solution. Attainment of the ozone standards will require broad deployment of zero and near-zero emission technologies in the 2023 to 2031 timeframe. The

mobile source control measures to be implemented by the SCAQMD are listed in Table 1.9-2 and summarized in the paragraphs following Table 1.9-2.

TABLE 1.9-2

Mobile Source Control Measures (SCAQMD) Categorized by Source Type

Number	Title	Control Measure Type
Facility-Based Control Measures		
MOB-01	Emission Reductions at Commercial Marine Ports	NOx, SOx, PM
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities	NOx, PM
MOB-03	Emission Reductions at Warehouse Distribution Centers	All Pollutants
MOB-04	Emission Reductions at Commercial Airports	All Pollutants
On-Road Mobile Source Control Measures		
MOB-05	Accelerated Penetration of Partial-Zero Emission and Zero Emission Vehicles	VOC, NOx, CO
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles	VOC, NOx, CO
MOB-07	Accelerated Penetration of Partial-Zero Emission and Zero Emission Light-Heavy and Medium-Heavy-Duty Vehicles	NOx, PM
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles	NOx, PM
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program	NOx, PM
Off-Road Mobile Source Control Measures		
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment	NOx
MOB-11	Extended Exchange Program	VOC, NOx, CO
MOB-12	Further Emission Reductions from Passenger Locomotives	NOx, PM
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program	NOx, SOx, PM

Number	Title	Control Measure Type
MOB-14	Emission Reductions from Incentive Programs	NOx, PM
Emission Growth Management Measures		
EGM-01	Emission Reductions from New Development and Redevelopment Projects	All pollutants

Notes:
MOB means facility-based mobile source control measures.
EGM means emissions growth management control measures.

Mobile Source Control Measures Summaries (SCAQMD)

MOB-01 - Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]: The Ports of Los Angeles and Long Beach (Ports) have been implementing the San Pedro Bay Ports Clean Air Action Plan (CAAP) since 2006 and is currently in the process of updating the CAAP. The Ports have been successful for the most part in implementing the CAAP and have exceeded emission reduction goals set in the CAAP. The CAAP Update have the potential in assisting the region attain air quality standards in a timely manner. Many of the actions that have been implemented in the CAAP are voluntary in nature since these reductions are not committed in the SIP. Over time, these actions have been subsumed through regulatory actions by CARB, U.S. EPA, or international entities such as the International Maritime Organization. Regardless, the actions have led to early emission reductions. The Ports have a unique position to work with the tenants (terminal and railroad operators) to develop strategies to further reduce emissions. This measure seeks to quantify the emission reductions realized from the CAAP and credit the reductions into the SIP. Emission reductions that occurred through the identified actions as reported by the Ports on an annual basis will be incorporated in the revised baseline emissions as part of the SIP revision process (either as part of the Rate-of-Progress reporting requirements of the Clean Air Act or reflected in new baseline emissions inventory for future AQMP/SIP revisions). Since many of these actions are voluntary in nature, any emission reductions credited towards attainment of the federal air quality standards must contain an enforceable commitment that the emission reductions remain real and permanent (as defined by U.S. EPA) if for some reason the emission reductions are not maintained after they are reported into the SIP. This measure may be implemented in the form of a regulation by the SCAQMD within its existing legal authority, or by the state or federal government, or other enforceable mechanisms. The proposed measure will replace control measures MOB-03 in the 2007 AQMP and IND-01 in the 2012 AQMP.

MOB-02 - Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]: SCAQMD Rules 3501 and 3502 were submitted to U.S. EPA for approval into the SIP. This measure seeks to implement the two SCAQMD rules if approved by U.S. EPA or correct deficiencies identified by U.S. EPA such that the rules will be approvable by U.S. EPA. In addition, this measure will assess and identify potential actions to further reduce emissions at rail and intermodal yards. The SCAQMD staff will reconvene the stakeholder working group from the original rulemaking to discuss and identify actions or approaches that can be implemented to further reduce emissions at rail yards and intermodal facilities. The identified actions can be in

the form of a regulation adopted by the SCAQMD within its legal authority, regulations adopted by CARB, or other enforceable mechanisms.

MOB-03 – Emission Reductions at Warehouse Distribution Centers [All Pollutants]: The SCAQMD is currently working with industry stakeholders on conducting in-use truck trip and obtaining emissions information from various warehouse distribution types. This information along with emissions occurring in and around individual warehouse distribution centers will serve as the basis for seeking opportunities to reduce emissions beyond existing standards. A stakeholders working group will be convened to discuss warehouse emissions related issues and provide input in the development of mechanisms to implement this measure. This measure could be implemented in the form of a regulation developed by the SCAQMD within its legal authority or other enforceable mechanisms.

MOB-04 – Emission Reductions at Commercial Airports [All Pollutants]: Due to projected increases in airline passenger transportation and expansion of operations at various commercial airports, potential increases in emissions may result unless the increased emissions are fully mitigated. Several airport authorities are implementing emissions mitigation measures, while other airports have initiated actions that can lead to additional emission reductions. This measure seeks to quantify such actions and identify additional actions that can lead to additional emission reductions to assist in attainment of federal air quality standards and reduce local exposure to air toxic emissions. Quantified emission reductions that are real, surplus, permanent, and enforceable will be reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or in baseline emission inventories as part of future AQMP/SIP development. In addition, such emission reductions can be used for general conformity purposes. A working group will be convened with affected stakeholders to discussion airport emissions related issues and provide input in the development of mechanisms to implement this measure. This measure could be implemented as a regulation developed by the SCAQMD within its legal authority or other enforceable mechanism.

MOB-05 – Accelerated Penetration of Partial-Zero Emission and Zero Emission Vehicles [VOC, NOx, CO]: This measure proposes to continue incentives for the purchase of zero emission vehicles and hybrid vehicles with a portion of their operation in an "all-electric range" mode. The state Clean Vehicle Rebate Pilot (CVRP) program is proposed to continue from 2016 to 2030 with proposed funding up to $5,000 per vehicle and for low-income eligible residents, additional funding of up to $1,500 for a total of $6,500 per vehicle. CARB has proposed an allocation of $160 million statewide for the CVRP in Fiscal Year 2015-16. The proposed measure seeks to provide funding rebates for at least 15,000 zero emission or partial-zero emission vehicles per year.

MOB-06 – Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]: This proposed measure calls for promoting the permanent retirement of older eligible vehicles through financial incentives currently offered through local funding incentive programs and the AB 118 Enhanced Fleet Modernization Program (EFMP). The proposed measure seeks to retire up to 2,000 older light- and medium-duty vehicles (up to 8,500 pounds GVW) per year. Funding incentives of up to $4,500 per vehicle are available to low- and moderate-income residents for the scrapping of the vehicle, which includes a replacement voucher for a newer cleaner conventional powered vehicle, plug-in hybrid electric or dedicated zero emission vehicle. For low- and moderate-income residents living in a disadvantaged community, additional funding of up to $5,000 is available for a fuel efficient conventional

powered vehicle, plug-in hybrid electric vehicle or dedicated zero emission vehicle. The proposed measure seeks to provide funding assistance for at least 2,000 replacement vehicles per year.

MOB-07 – Accelerated Penetration of Partial-Zero Emission and Zero Emission Light-Heavy and Medium-Heavy-Duty Vehicles [NOx, PM]: The objective of the proposed action is to accelerate the introduction of advanced hybrid and zero emission technologies for Class 4 through 6 heavy-duty vehicles. The state is currently implementing a Hybrid Vehicle Incentives Project (HVIP) program to promote zero emission and hybrid heavy-duty vehicles and CARB allocated $12 million to the program. The proposed measure seeks to continue the program from 2016 to 2030 to deploy up to 120 zero and partial-zero emission vehicles per year with up to $50,000 funding assistance per vehicle based on the current allocated funding. Zero emission vehicles and hybrid vehicles with a portion of their operation in an "all-electric range" mode would be given the highest priority.

MOB-08 – Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]: This proposed measure seeks to replace up to 2,000 heavy-duty vehicles per year with newer or new vehicles that meet one of the optional NOx standards adopted by CARB. The funding assistance will be prorated to offer the most funding for heavy-duty engines meeting the optional NOx exhaust emissions standard of 0.02 g/bhp-hr or cleaner. Funding assistance of up to $25,000 per vehicle is proposed and the level of funding will depend upon the NOx emissions certification level of the replacement vehicle meeting one of the optional NOx emission standards. In addition, the SCAQMD may within its authority, adopt a regulation to require purchase of the cleanest commercially available engine, which may include a provision similar to the Surplus Off-Road Opt-In for NOx (SOON) provision of the statewide In-Use Off-Road Fleet Vehicle Regulation will be sought to ensure that additional NOx emission reduction benefits are achieved. Other enforceable mechanisms may be considered providing that such mechanisms can be approved into the SIP.

MOB-09 – On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]: This proposed measure seeks to accelerate deployment of near-zero and zero emission on-road heavy-duty trucks through the generation of mobile source emission reduction credits (MSERCs) that can be used for stationary source purposes as allowed in SCAQMD Regulations XIII, XX, or any other rule or regulation that allows the use of MSERCs. The SCAQMD staff will develop amendments to SCAQMD Rules 1612 and 1612.1 to reflect the latest advanced near-zero and zero emission technologies and revise the quantification methodologies in Rules 1612 and 1612.1. MSERCs generated will be discounted to provide additional benefits to the environment and to help meet air quality standards.

MOB-10 – Extension of the SOON Provision for Construction/Industrial Equipment [NOx]: To promote turnover (i.e., retire, replace, retrofit, or repower) of older in-use construction and industrial diesel engines, this proposed measure seeks to continue the SOON provision of the statewide In-Use Off-Road Fleet Vehicle Regulation beyond 2023 through the 2031 timeframe. Historically, the SCAQMD Governing Board has allocated up to $30 million per year for the program. However, more recently, the Governing Board has allocated up to $10 million per year. This measure proposes to extend the current SOON Program beyond 2023 to 2031 with a minimum allocation of $10 million and potentially higher levels upon the Governing Board's approval. In order to implement the SOON program in this timeframe, funding of up to

$30 million per year would be sought to help fund the repower or replacement of older Tier 0 and Tier 1 equipment, with approximately 2 tons per day (tpd) of NOx reductions.

MOB-11 – Extended Exchange Program [VOC, NOx, CO]: This measure seeks to continue the successful lawnmower and leaf blower exchange programs in order to increase the penetration of electric equipment or new low emission gasoline-powered equipment used in the region. The lawnmower exchange program has resulted in over 55,000 gasoline lawnmowers replaced with zero emission lawnmowers and over 12,000 older, dirtier gasoline-powered commercial leaf blowers replaced with newer, cleaner leaf blowers. The SCAQMD is currently conducting a lawn and garden equipment loan program with various public entities to demonstrate the feasibility of zero emission lawn and garden equipment in various public and commercial settings. Such demonstrations will provide valuable information to lawn and garden equipment manufacturers to produce zero emission products for the commercial environment. A segment of the lawn and garden equipment population comprised of diesel powered equipment represents a significant fraction of the total NOx emissions associated with this category. As such, the proposed extended exchange program will focus on incentives to accelerate the replacement of older equipment with new Tier 4 or cleaner equipment or zero emission equipment where applicable. In addition, other small off-road equipment (SORE) equipment may also be considered for exchange programs for accelerating the turnover of existing engines.

MOB-12 - Further Emission Reductions from Passenger Locomotives [NOx, PM]: This measure recognizes recent actions by the SCRRA to replace their existing passenger locomotives with Tier 4 locomotives. The SCRRA is in the process of procuring 40 Tier 4 passenger locomotives to replace their older existing Tier 0 and Tier 2 passenger locomotives by 2020. The SCRRA Board has indicated a desire to work with the SCAQMD and other stakeholders to evaluate technologies that will further reduce NOx emissions beyond Tier 4 emissions level.

MOB-13 – Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]: This measure seeks to accelerate the early deployment of near-zero and zero emission off-road equipment through the generation of MSERCs that can be used for stationary source purposes as allowed in SCAQMD Regulations XIII, XX, or any other rule or regulation that allows for the use of MSERCs. The SCAQMD staff will develop amendments to SCAQMD Rule 1620 to reflect the latest advanced near-zero and zero emission technologies and revise the quantification methodologies in Rule 1620. In addition to Rule 1620, the SCAQMD staff has been working on two additional off-road mobile source emission reduction credit generation rules to incentivize the early deployment of the cleanest ocean-going vessels that are not subject to the state Vessels At-Berth Regulation or vessel calls that are considered surplus to the statewide regulation and locomotives that have lower NOx emissions than the current Tier 4 locomotive engine standards. The two rules will be further developed under this measure. MSERCs generated may be discounted to provide additional benefits to the environment and to help meet air quality standards.

MOB-14 – Emission Reductions from Incentive Programs [NOx, PM]: This measure seeks to develop a rule similar to the San Joaquin Valley Air Pollution Control District Rule 9610 to recognize emission reduction benefits associated with incentive programs. The proposed rule would recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B such that the emission reduction can be accounted in the SIP. The U.S. EPA indicated that there are six

general elements that need to be incorporated in a proposed rule in order for the reductions to be placed in the SIP.

EGM-01 - Emission Reductions from New Development and Redevelopment Projects [All Pollutants]: Since San Joaquin Valley Air Pollution Control District Rule 9510 has been approved by U.S. EPA to be included in the SIP for the San Joaquin Valley, the SCAQMD must consider Rule 9510 under the "all feasible measures" requirement of the state law. The proposed measure seeks to capture emission reduction opportunities during project development phase and opportunities to enable greater deployment of zero and near-zero emission technologies. Under the proposed measure, SCAQMD staff will evaluate the applicability of a rule similar to Rule 9510 that would apply to new or redevelopment projects. The SCAQMD will reconvene the working group made up of stakeholders from industry, local governments, and community representatives as part of the rulemaking process. The working group will provide input and comments during the development of a potential proposed rule or other enforceable mechanisms.

1.9.3 Air Toxic Control Measures (SCAQMD)

In addition to the criteria pollutant control measures, the SCAQMD is proposing additional measures to control toxic air contaminants (TACs) from stationary sources in the SCAQMD. To the extent feasible, the 2016 AQMP is capturing co-benefit opportunities in achieving multi-pollutant reductions to meet ambient air quality standards having multiple deadlines. For example, some criteria pollutant control measures will concurrently reduce air toxics and some air toxics control measures will reduce criteria pollutants. The proposed control measures, their objectives, and expected control approaches are summarized in Table 1.9-3.

TABLE 1.9-3

Proposed Air Toxic Control Measures

Number	Measure	Objective	Potential TAC	Control Approach
TXM-01	Control of Metal Particulate from Metal Grinding Operations	Reduce metal particulate emissions from metal grinding activities at forging facilities, metal foundries, and plating operations	• Cadmium • Hexavalent Chromium • Cobalt • Nickel • Particulate (metal)	• Enclosures • Pollution controls • Housekeeping measures
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations	Further reduce fugitive metal particulate emissions from electroplating and chromic acid anodizing processes	• Hexavalent Chromium • Nickel • Cadmium • Copper • Lead • Particulate (metal)	• Enclosures • Pollution controls • Enhanced housekeeping measures • Physical modifications to increase capture efficiency and reduce fugitive emissions
TXM-03	Control of Hexavalent Chrome from Chrome Spraying Operations	Further control hexavalent chromium emissions from spraying of paints and coatings containing hexavalent chromium	• Hexavalent Chromium • Particulate (metal)	• Increased housekeeping and best management practices

Number	Measure	Objective	Potential TAC	Control Approach
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminant Soil	Control toxic metal particulates during soil cleanup/remediation activities.	• Lead • Hexavalent Chromium • Cadmium • Nickel • Arsenic • Possibly Other Metal TACs • Particulate (metal)	• Soil covering • Chemical treatment • Barriers • Wheel knockout and cleaning stations • Other suppression techniques
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting	Control toxic metal particulates from laser and plasma cutting operations	• Nickel • Cadmium • Hexavalent chromium • Possibly Other Metal TACs)	• Filter technology including HEPA filters • Alternative technologies such as flame and water jet cutting
TXM-06	Control of Toxic Emissions from Metal Melting Facilities	Further reduce metal toxic emissions from melting, pouring, casting, degating, heat treating, surface cleaning, and finishing operations at foundries	• Arsenic • Cadmium • Nickel • Other toxic metals • Particulate (metal)	• Particulate filter technologies for furnaces • Enclosures • Increased housekeeping and best management practices • Possibly ambient air monitoring
TXM-07	Control of Lead Emissions from Stationary Sources	Further control of lead emissions from non-vehicular sources	• Lead • Particulate (metal)	• Reduce ambient lead concentration • Increased housekeeping and best management practices
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings	Reduce methylene chloride emissions from furniture chemical stripping operations	• Methylene Chloride	• Reformulation • Activated carbon
TXM-09	Control of Emissions from Oil and Gas Well Activities	Reduce toxic emissions during well drilling, maintenance, and stimulation activities at oil and gas production sites	• Benzene • Toluene • Ethylbenzene • Xylene • Diesel particulate matter • Particulate Matter	• Pollution control and best management practices to minimize emissions from portable storage tanks, circulation tanks, and portable totes with particulates • Use of the cleanest diesel equipment available for off-road engines • Housekeeping provision

TXM means toxic air contaminant control measure.

TXM-01 - Metal Grinding Operations: The objective of this control measure is to control fugitive toxic metal particulate emissions at forging facilities, metal foundries, and plating operations. In general, there are no current SCAQMD regulatory requirements for metal grinding operations, and this activity is exempt from permitting. Metal grinding is a material

removal and surface preparation process used to shape and finish metal parts. Grinding employs an abrasive product, usually a rotating wheel brought into controlled contact with the metal surface that removes tiny pieces of metal from the part generating metallic chips and dust. This activity is common in both heavy and light industrial processes such as metal foundries and forging and plating operations that commonly produce parts for the aerospace, automotive, and oil and gas industries. Potential metal particulate emission control approaches include conducting grinding within permanent enclosures, capture and control through add-on controls, and housekeeping measures. Examples of add-on controls include, cyclones, baghouses, scrubbers and high efficiency particulate arrestors (HEPA) filters. Effective housekeeping measures may include routine wet washing or vacuuming, proper material storage and disposal, and routine maintenance of emission control devices. This measure will be implemented as individual source-specific rules are adopted or amended.

TXM-02 – Plating and Anodizing Operations: The purpose of this control measure is to further control metal (hexavalent chrome, nickel, cadmium, copper, arsenic and lead) emissions from plating and anodizing operations. Hexavalent chromium electroplating and chromic acid anodizing are processes currently regulated under SCAQMD Rule 1469 – Hexavalent Chromium Emissions from Chromium Electroplating and Chromic Acid and Anodizing Operations. Other non-hexavalent chromium plating operations are regulated under SCAQMD Rule 1426 – Emissions from Metal Finishing Operations. Electroplating processes involve the creation of desired metal surfaces or substrates. Both nickel and copper plating are commonly performed prior to chrome plating in order to provide a substrate for the chrome to adhere to or to add additional properties such as strength. In many cases, nickel plating is performed as the only or final stage of plating where appearance is the primary desired quality of the end product. Other sources of fugitives can come from air sparging, openings or cross-draft conditions within buildings or enclosures, poor housekeeping, improper handling of waste, and improper handling of raw products. Hexavalent chromium electroplating and chromic acid anodizing processes are used in various industries including aerospace, automotive, computer electronics, machinery, and industrial equipment, and defense government. Current point source control approaches include chemical or mechanical methods to control surface tension of the baths in the tank, or capture of emissions using add-on air pollution controls such as scrubbers, mesh pads, and HEPA filters. Fume suppressants are extremely effective at minimizing process fugitive emissions from the tank, especially in situations where facilities have cross draft conditions in buildings where tanks are located, or conduct operations around tanks that may affect the release or behavior of the emissions. When used in combination with add-on air pollution control equipment, fume suppressants serve as the primary control of both point source and fugitive emissions prior to collection by the control device, and optimizes the overall emission reduction potential of the system. Facilities also can utilize best housekeeping and best management practices to mitigate fugitive emissions. In some cases, facilities may use alternative materials or plating processes. Additionally, alternative methods of applying a metal coating may be used such as aluminum ion vapor deposition, physical vapor deposition, or metal spray coating. This measure would be implemented through amendments to SCAQMD Rules 1426 and 1469.

TXM-03 – Chrome Spraying Operations: The objective of this control measure is to further control hexavalent chromium emissions from spraying of paints and coatings. Spraying of paints and coatings containing chromium or hexavalent chromium is currently regulated under SCAQMD Rule 1469.1 - Spraying Operations Using Coatings Containing Chromium. During the uncontrolled application of coatings, hexavalent chromium emissions are generated by the

inefficient transfer of paint to the part or from overspray. Spraying operations are typically conducted within a paint spray booth and emissions are exhausted through a wall of filter media or stack, assuming a properly designed booth and ventilation system. However, there is also a potential for fugitive emissions to occur from an open booth face, if capture into the ventilation system is not complete. Additionally, fugitive hexavalent chromium emissions can be generated by poor housekeeping, improper use of control equipment, and improper handling of waste or painted products. SCAQMD Rule 1469.1 currently includes requirements for spray enclosures, transfer efficiency, and housekeeping practices within spray enclosures. Paints and coatings containing hexavalent chromium occur in a variety of industries including aerospace, electroplating, and coating facilities. Current housekeeping requirements of SCAQMD Rule 1469.1 include general measures and best management practices for the clean-up, handling, storage, and disposal of waste generated within spray booth enclosures. The existing provisions for enclosures can be enhanced by requiring routine and periodic housekeeping inspections, in addition to new housekeeping and work practice requirements outside of spray enclosures in order to comprehensively reduce fugitive emissions from the facility. This measure would be implemented through amendments to SCAQMD Rule 1469.1.

TXM-04 – Toxic Air Contaminant Emissions from Decontamination of Soil: Currently the SCAQMD has a rule regulating VOC emissions from contaminated soil that establishes requirements to ensure the release of VOC emissions are minimized. There is currently no rule to address metal particulate emissions that can become airborne during the handling and disturbance of soils contaminated with toxic metals. Examples of metal toxic air contaminants that can be in contaminated soil include, but are not limited to, hexavalent chromium, lead, nickel, cadmium, and arsenic. This control strategy would establish specific requirements to ensure that fugitive toxic air contaminant emissions from soils contaminated with toxic metals are minimized during the excavation, storage, and/or transportation. This control strategy would include soil covering, watering, chemical treatment, barriers, tire and wheel knockout and cleaning stations, and other dust suppression techniques. Air monitoring of the site may also be a part of the control strategy. This measure would be implemented as a new SCAQMD Rule.

TXM-05 – Laser and Plasma Cutting: The control measure would control metal particulate emissions from laser and plasma cutting operations. Laser and plasma cutting technologies are used for cutting and fabricating large sheets of metal goods. Laser cutting directs a laser onto most metals (except reflective metals including aluminum, brass and copper) which melts or vaporizes the metal. Plasma cutting uses electrically conductive gas to transfer energy from an electrical power source through the plasma to the metal being cut. The high temperature of the plasma melts the metal. The intense energy of both the laser and plasma cutting process creates fumes and smoke from vaporizing the molten material from the bottom of the cut (kerf). Uncontrolled vaporized metals such as cadmium and nickel present environmental and health concerns. Additionally, high energy processes, such as laser and plasma cutting, can oxidize the elemental chrome in stainless steel into hexavalent chrome. Control approaches under this measure would include filter technologies such as HEPA filters or possibly other pollution controls. Alternative processes are available including flame cutting, water jet cutting, welding, and conventional machining. This measure would be implemented as a new SCAQMD Rule.

TXM-06 – Control of Toxic Emissions from Metal Melting Facilities: This control measure seeks to further reduce metal toxic emissions such as arsenic, cadmium, and nickel from foundries and other metal melting facilities (smelting, tinning, galvanizing and other

miscellaneous processes where metals are processed in molten form). Other metal melting operations include smelting, tinning, galvanizing, and other miscellaneous processes where metals are processed in molten form. Metal foundries are facilities which produce metal castings. The process involves melting metal into a liquid, pouring the liquid metal into a mold or casting, allowing the metal to cool and solidify, removing the mold or casting, degating, heat treating, surface cleaning, and finishing. Possible emission sources from such operations include, but are not limited to, fume, particulate, or dust from the melting, pouring, casting, degating, heat treating, coating, brazing, finishing, or surface cleaning processes, leftover metal or slag, and housekeeping. Emissions can potentially be reduced through venting operations to an emission collection system or improvements to existing collection systems, such as the addition of high efficiency filters. Fugitive emissions can be reduced through housekeeping measures which may include, but are not limited to, sweeping, mopping or filtered vacuuming and enclosed material storage. Equipment may require new or updated source testing and potentially new or updated permits. Additionally, an ambient air monitoring requirement is under consideration. This measure would be implemented through amendments to SCAQMD Rule 1407 and possibly a new SCAQMD Rule.

TXM-07 – Control of Lead Emissions from Stationary Sources: The objective of this control measure is to further control lead emissions from non-vehicular sources. Lead and arsenic emissions from large lead-acid battery recycling facilities are regulated by SCAQMD Rule 1420.1. Emissions of lead from large (>100 ton per year) metal melting facilities are regulated by SCAQMD Rule 1420.2. All other non-vehicular sources of lead are regulated by SCAQMD Rule 1420. Lead is found in metals and aggregate processed either as an alloy or as a contaminant. Facilities process lead in aggregate processing, metal melting, metal finishing, metal machining operations, and also use lead solder for electronic circuit boards. Possible emission sources from such operations include, but are not limited to, fume, particulate, or dust from the mining, melting, finishing, or surface cleaning processes, leftover metal or slag, and poor housekeeping. Control of lead emissions often occurs concurrently with the control of other toxic metals. Emissions can be controlled through improved housekeeping requirements and best management practices similar to those included in SCAQMD Rule 1420.1, including provisions for general cleaning, rooftop cleaning, and handling, storage, and disposal of waste generated to comprehensively reduce fugitive lead emissions. This measure would be implemented through amendments to SCAQMD Rule 1420.

TXM-08 – Chemical Stripping of Cured Coatings: This proposed control measure would restrict the use of methylene chloride during chemical stripping operations. Methylene chloride is a suspect carcinogen and is classified as a Hazardous Air Pollutant by U.S. EPA and as a TAC by the state of California. A typical chemical stripping product contains between 70 and 85 percent methylene chloride by weight. Methylene chloride is the active ingredient that penetrates the coating film and lifts the coating off the surface. Most chemical stripper usage is done without any equipment or controls. The chemical stripper is applied by brush and then rinsed off afterwards. Larger users of chemical strippers are usually furniture stripping shops which sometimes utilize tanks and flow trays to use the chemical stripper. Other uses include automobile rim coating operations and residential furniture restoration. Reformulation is the preferred method for reducing methylene chloride emissions. The use of control equipment may also be a consideration. This measure would be implemented through a new SCAQMD Rule.

TXM-09 – Oil and Gas Production: Existing oil and gas field production facilities are required to notify the SCAQMD of a planned well maintenance or stimulation event under SCAQMD Rule 1148.2 – Notification and Reporting Requirements for Oil and Gas wells and Chemical Suppliers. In addition to the notification requirements, SCAQMD Rule 1148.2 also requires operators to report chemical usage during each operation, although trade secret chemicals are not revealed to the public. Oil and gas field production well maintenance and stimulation activities release emissions such as diesel particulate matter (DPM), fugitive dust, and other air toxic emissions such as benzene, toluene, ethylbenzene, and xylene (BTEX) compounds. This control measure seeks to develop a series of BMPs to reduce the emission impact from the well maintenance and stimulation activities. The implementation of the BMPs specified may be contingent upon the proximity to sensitive receptors. The BMPs may include: (1) reduction of BTEX compounds from return fluids during gravel packing and hydraulic fracturing events by the use of carbon absorbers to control emissions venting from portable storage tanks, covering circulation tanks, and closing access hatches on portable storage tanks; (2) reduction of BTEX compounds from drilling mud return processing equipment by covering areas open to atmosphere; (3) reduction of fugitive silica dust from the use of portable plastic totes; (4) reduction of DPM from the use of Tier 3 and 4 off-road engines, or engines equipped with a CARB certified Level 3 diesel particulate filter (DPF); and (5) work area plastic ground coverings to collect spills and reduce fugitive dust. The implementation of this control measure would be through an amendment to SCAQMD Rule 1148.2.

1.9.4 Mobile Source Control Measures (Federal and State)

CARB has development a State Implementation Plan (SIP) Strategy that reflects a combination of State and federal actions, as well as actions that outline a pathway for achieving further deployment of the cleanest technologies in each sector. These measures, in conjunction with the existing control program, identify the reductions needed to achieve a 70 percent reduction in NOx emissions from mobile sources by 2023, and an 80 percent reduction by 2031 in the South Coast. Current control programs will reduce NOx emissions from today's levels by 209 tpd by 2031. The NOx and ROG emission reductions from the proposed new SIP measures in 2023 and 2031 are summarized in 1.9-4. As part of the proposed State SIP Strategy, CARB will provide an enforceable commitment to achieve in aggregate 107 tpd of NOx reductions by 2023, and 97 tpd by 2031. The State SIP Strategy will also provide 48 and 60 tpd respectively of ROG reductions in 2023 and 2031, which provide supplemental benefits in reducing ozone in some portions of the air basin.

Regulatory actions comprise the core of the overall attainment strategy. For on-road sectors, implementation of the current control program, coupled with new regulatory measures to require introduction of even cleaner technologies for cars and trucks, provides the 80 percent reduction in NOx emissions necessary by 2031. However, recognizing the benefits and opportunities for enhancing the penetration of these cleaner on-road technologies, the Strategy includes a commitment for additional reductions as part of the further deployment measures. Other actions that could enhance these reductions include further regulatory development, efficiency improvements, and emerging autonomous and connected vehicle technologies. Combined, actions for on-road sources will reduce NOx emissions over 85 percent by 2031 from today's levels.

TABLE 1.9-4
CARB Mobile Source Control Measures

CM Number	Title	Action	Implementation Begins	2023 Reduction (tpd)	2031 Reduction (tpd)
On-Road Light-Duty					
ORLD-01	Advanced Clean Cars 2	2020	2026	-	0.6 (NOx) 0.3 (ROG)
ORLD-02	Lower In-Use Emission Performance Assessment	NA	ongoing	nyq	nyq
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles	Ongoing	2016	7 (NOx) 16 (ROG)	5 (NOx) 16 (ROG)
On-Road Heavy-Duty					
ORHD-01	Lower In-Use Emission Performance Level for Heavy-Duty Vehicles	2016	2017	nyq	nyq
ORHD-02	Low-NOx Engine Standard	2017-2019	CA Implementation: 2023 Federal Implementation: 2024	-	5 (NOx – CA action), 7 (NOx – Federal action)
ORHD-03	Medium and Heavy-Duty GHG Phase 2	2016 – 2019	2018	nyq	nyq
ORHD-04	Advanced Clean Transit	2017	2018	<0.1 (NOx) <0.1 (ROG)	0.1 (NOx) <0.1 (ROG)
ORHD-05	Last Mile Delivery	2018	2020	<0.1 (NOx) <0.1 (ROG)	0.4 (NOx) <0.1 (ROG)
ORHD-06	Innovative Technology Certification Flexibility	2016	2016	nyq	nyq
ORHD-07	Zero Emission Airport Shuttle Buses	2018	2023	nyq	nyq
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles	on-going	2016	3 (NOx) 0.4 (ROG)	3 (NOx) 0.4 (ROG)
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles	ongoing	2016	34 (NOx) 4 (ROG)	11 (NOx) 1 (ROG)
Marine, Rail, and Aircraft Off-Road					
ORFIS-01	More Stringent National Locomotive Emission Standards	2016	2023	0.7 <0.1 (ROG)	8 (NOx) 0.3 ROG

CM Number	Title	Action	Implementation Begins	2023 Reduction (tpd)	2031 Reduction (tpd)
ORFIS-02	Tier 4 Vessel Standards	2015-2018	2025	-	4 (NOx)
ORFIS-03	Incentivize Low Emission Efficient Ship Visits	2017-2018	2018	nyq	nyq
ORFIS-04	At-Berth Regulation Amendments	2017-2018	2022	0.3 (NOx) <0.1 (ROG)	1 (NOx) <0.1 (ROG)
ORFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources	ongoing	2016	13 (NOx) nyq (ROG)	10 (NOx) nyq (ROG)
Other Off-Road					
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	2020	2023	-	1 (NOx) 0.1 (ROG)
OFFS-02	Zero Emission Off-Road Emission Reduction Assessment	2025	-	nyq	nyq
OFFS-03	Zero Emission Off-Road Worksite Emission Reduction Assessment	tbd	-	nyq	nyq
OFFS-04	Zero Emission Airport Ground Support Equipment	2018	2023	<0.1 (NOx) <0.1 (ROG)	<0.1 (NOx) <0.1 (ROG)
OFFS-05	Small Off-Road Engines	2018	2022	0.7 (NOx) 7 (ROG)	2 (NOx) 16 (ROG)
OFFS-06	Transport Refrigeration Units Used for Cold Storage	2017-2018	2020	nyq	nyq
OFFS-07	Low-Emission Diesel Requirement	By 2020	2023	0.6 (NOx)	2 (NOx)
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment	Ongoing	2016	21 (NOx) 21 (ROG)	17 (NOx) 20 (ROG)
Consumer Products					
CPP-01	Consumer Products Program	2019-2021	2020	-	5 (ROG)

Notes: The control measure numbers have been removed by CARB in their latest SIP Strategy document. However, they will continue to be used in the Initial Study for ease in referring to the CARB control measures.
tpd is tons per day
tbd is to be determined
nyq is not yet quantified

Achieving reductions in the off-road sectors remains a greater challenge due to the diverse nature of these sources, regulatory authority that rests outside of CARB in many cases, and the length of time sources such as locomotives, marine vessels, and aircraft remain in the fleet. Emissions from aircraft are a particular challenge, as unlike other off-road sources, their emissions are

projected to increase through 2031. Nevertheless, the Strategy includes key regulatory actions to establish the next tier of cleaner combustion for locomotives and marine vessels, and introduction of zero emission vehicle technologies for smaller off- road equipment. These actions, when coupled with current regulatory programs will reduce NOx emissions from off-road federal and international sources by approximately 45 percent by 2031. The further deployment measures in these categories provide the mechanism for additional reductions, which in combination with regulatory actions will reduce NOx emissions from off-road sectors 75 percent by 2031. These further deployment measures will rely on expanded incentive funding programs to accelerate deployment, as well as additional actions at the federal and international level, and efforts to increase system efficiencies. The Clean Air Act includes a provision for approval under Section 182(e)(5) to allow these types of actions for Extreme areas such as the South Coast needing additional reductions to meet the ozone standard.

Mobile Source Control Measure Summaries – On-Road

By 2023, it is estimated that about 12 million vehicles will be operating in the Basin. To address emissions from these vehicles, CARB would implement twelve on-road mobile source control measures. The first three measures focus on on-road light- and medium-duty vehicles, while the remaining measures focus on heavy-duty vehicles.

ORLD-01 - Advanced Clean Cars 2: This proposed measure is designed to ensure that zero and near-zero emission technology options continue to be commercially available, with range improvements to address consumer preferences for greater ease of use, and maximize electric vehicle miles travelled. The regulation may include lowering fleet emissions further beyond the super ultra-low-emission vehicle standard for the entire light-duty fleet through at least the 2030 model year, and look at ways to improve real world emissions through implementation programs. Additionally, new standards would be considered to further increase the sales of zero emission vehicles and plug-in hybrid electric vehicles beyond the levels required in 2025.

ORLD-02 - Lower In-Use Emission Performance Assessment: This proposed measure is designed to ensure that vehicles continue to operate at their cleanest possible level by evaluating California's in-use performance-focused inspection procedures and, if necessary, make improvements to further the program's effectiveness. Results from the assessment could be used to improve inspection test procedures, address program fraud, improve the effectiveness and durability of emission-related repair work, and to improve the regulations governing the design of in-use performance systems on motor vehicles to the extent necessary.

ORLD-03 - Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles: This proposed measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with increased transportation efficiencies, as well as the potential for autonomous vehicles and advanced transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

ORHD-01 - Lower In-Use Emission Performance Level for Heavy Duty Vehicles: This proposed measure is designed to ensure that heavy-duty vehicles continue to operate at the cleanest possible level. CARB would develop new, supplemental actions, in the form of regulatory amendments or new regulations, to address in-use compliance and to decrease engine deterioration. This suite of actions includes: revising the warranty requirements to better reflect

the operation of these vehicles; revising the current opacity limit in CARB's existing roadside and fleet inspection programs to better reflect the capability of current technology; revising the not to exceed supplemental test procedures for heavy-duty diesel engines; revising the durability demonstration provisions within the certification requirements; and developing a comprehensive inspection and maintenance program for heavy-duty trucks to test for excessive emissions of multiple pollutants.

ORHD-02 - Low-NOx Engine Standard: This proposed measure is designed to require near-zero emission engine technologies that will substantially lower NOx emissions from on-road heavy-duty vehicles. CARB will begin development of a new heavy-duty low-NOx emission standard in California in 2017, with Board action expected in 2019. A California-only low NOx standard would apply to all vehicles with new heavy-duty engines sold in California starting in 2023. In order to achieve the maximum emission reductions from this proposed measure, CARB may also petition U.S. EPA to establish a new federal heavy-duty engine emission standard. If U.S. EPA fails to initiate the rule development process by 2017, CARB would continue with its development and implementation efforts to establish a California-only low-NOx standard. If U.S. EPA begins the regulatory development process for new federal heavy-duty emission standards by 2017, CARB will coordinate its regulatory development efforts with the federal regulation.

ORHD-03 - Medium and Heavy-Duty GHG Phase 2: This proposed measure is designed to advance fuel efficiency improvements and achieve greater GHG emission reductions through the introduction of the next generation of integrated engine, powertrain, vehicle and trailer technologies designed to reduce climate emissions and fuel use. U.S. EPA is expected to finalize new federal Phase 2 standards for GHG emissions from medium- and heavy-duty vehicles in summer 2016. These new standards will build upon the Phase 1 standards and will push technology improvements beyond what is currently in widespread commercial use. CARB staff plans to present a California Phase 2 proposal for the Board's consideration in 2017. In addition to harmonizing with the federal Phase 2 standards where applicable, staff's proposal may include some more stringent, California-only provisions that are necessary to meet California's unique air quality challenges.

ORHD-04 - Advanced Clean Transit (ACT): This measure is designed to continue the transition of transit fleets to cleaner technologies to support NOx and GHG emission reduction goals. The measure will consider a variety of approaches to enhance the deployment of advanced clean technology and increase the penetration of the first wave of zero emission heavy-duty technology into transit applications that are well suited to its use. CARB staff will develop and propose an Advanced Clean Transit measure with a combination with incentives, and/or other methods that would result in transit fleets purchasing advanced technology buses during normal replacement and using renewable fuels when contracts are renewed.

ORHD-05 - Last Mile Delivery: This measure is designed to increase the penetration of the first wave of zero emission heavy-duty technology into applications that are well suited to its use. This proposed measure will require the use of low-NOx engines and the purchase of zero emission trucks for certain class 3-7 last mile delivery trucks in California starting in 2020, with a low fraction initially and gradually ramping up to a higher percentage of the fleet at time of normal replacement through 2030.

ORHD-06 - Innovative Technology Certification Flexibility: This proposed measure is designed to encourage early deployment of the next generation of truck and bus technologies through defined, near-term CARB certification and on-board diagnostic compliance flexibility for medium-and heavy-duty vehicles. This regulation is intended to balance the need to provide key, promising technologies with a predictable and practical CARB-certification pathway, while ensuring the expected emission benefits of advanced truck and bus technologies are achieved in-use. This regulation would provide flexibility for potentially transformational engine and vehicle technologies, such as robust hybrids and heavy-duty engines meeting the optional low-NOx standard.

ORHD-07 - Zero Emission Airport Shuttle Buses: This proposed measure is designed to achieve NOx and GHG emission reductions goals through advanced clean technology, and to increase the penetration of the first wave of zero emission heavy-duty technology into applications that are well suited to its use. Like transit buses, the inclusion of zero emission airport shuttles would serve as a stepping stone to encourage broader deployment of zero emission technologies in the on-road sector. CARB would develop and propose a regulation or other measures to deploy zero emission airport shuttles in order to further support market development of zero emission technologies in the heavy-duty sector.

ORHD-08 – Incentive Funding to Achieve Further Reductions from On-Road Heavy Duty Vehicles: This proposed measure would use existing CARB and SCAQMD incentive and other innovative funding programs for on-road, heavy-duty vehicles to increase the penetration of zero and near-zero vehicles. Funding mechanisms would target technologies that meet CARB's current optional low-NOx standard through 2023, consistent with the current round of Moyer funding.

ORHD-09 – Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles: This proposed measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, emission benefits associated with increased operational efficiency strategies, and the potential for new driver assist and intelligent transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

Mobile Source Control Measure Summaries – Off-Road

The CARB SIP Strategy includes fourteen control measures that seek further emission reductions from off-road mobile sources and industrial equipment. Off-road mobile sources such as aircraft, locomotives, and marine vessels are principally regulated by federal and state agencies. Other off-road sources encompass transport refrigeration units, vehicles and equipment used in construction and mining, forklifts, cargo handling equipment, and other industrial equipment.

ORFIS-01 – More Stringent National Locomotive Emissions Standards: This proposed measure is designed to reduce emissions from new and remanufactured locomotives. CARB would petition U.S. EPA for both new Tier 5 national locomotive emission standards for new locomotives, and for more stringent national requirements for remanufactured locomotives. CARB staff estimates that the U.S. EPA could require manufacturers to implement the new locomotive emission regulations as early as 2023 for remanufactured locomotives, and 2025 for newly manufactured locomotives. A new federal standard could also facilitate development and

deployment of zero emission track mile locomotives and zero emission locomotives by building incentives for those technologies into the regulatory structure.

ORFIS-02 - Tier 4 Vessel Standards: This measure is designed to reduce emissions from ocean going vessels. CARB would advocate with U.S. EPA, the U.S. Coast Guard, and international partners for the International Maritime Organization to adopt more stringent emission standards. Specifically, CARB would advocate for new Tier 4 NOx and PM standards, plus efficiency targets for existing vessels, and new vessel categories not covered by IMO efficiency standards.

ORFIS-03 - Incentivize Low Emission Efficient Ship Visits: This measure is designed to achieve early implementation of clean vessel technologies (e.g., liquefied natural gas, Tier 3 standards or better), and to incentivize vessels with those technologies in California service. CARB staff would work with California seaports, ocean carriers, and other stakeholders to develop the criteria and to identify the best way to incentivize introduction of Low Emission Efficient Ships into the existing fleet of vessels that visit California seaports.

ORFIS-04 - At-Berth Regulation Amendments: The goal of this proposed control measure is to further reduce emissions from ships at berth and to advance the commercialization of near-zero and zero emission technologies. CARB would develop and propose amendments to the current At-Berth Regulation to include other vessel fleets and types. This measure calls for an implementation schedule 2022-2032, assuming CARB regulatory amendment in 2016.

ORFIS-05 - Further Deployment of Cleaner Technology: Off-Road Federal and International Sources: This measure is designed to achieve further emission reductions for the Basin's attainment needs. This proposed measure outlines a series of actions that would be taken at the State and local level to achieve further reductions among the three categories off-road federal and international sources: ocean-going vessels, aircraft, and locomotives. These actions include: expanding and enhancing incentive programs to increase the deployment of cleaner technologies; incentivizing cleaner ships and aircraft to come to California; partnering with engine manufacturers to encourage production of cleaner, more efficient engines; continuing to support demonstration projects; and encouraging efficiency improvements. Achieving the magnitude of emission reductions necessary from this category will require strong action at the federal and international level, coupled with State and local advocacy and action to facilitate these efforts.

OFFS-01 - Zero Emission Off-Road Forklift Regulation Phase 1: This measure is designed to increase penetration of zero emission vehicles in off-road applications, advance zero emission vehicles commercialization, and to set a market signal to technology manufacturers and investors. CARB staff would develop and propose a regulation with specific focus on forklifts with lift capacities equal to or less than 8,000 pounds for which zero emission technologies have already gained appreciable customer acceptance and market penetration.

OFFS-02 - Zero Emission Off-Road Emission Reduction Assessment: This measure is designed to transfer zero and near-zero emission technologies in non-freight, off-road applications to heavier equipment, such as high lift-capacity forklifts or other equipment in the construction, industrial, and mining sectors. Through this assessment, CARB would provide the Board with an informational update regarding the status of zero emission vehicles in off-road applications once the Phase 1 forklift regulation is in place in 2025 or later, which would focus primarily on the scalability and transferability of zero emission technologies to larger, higher

power-demand equipment types, and would be used to inform the development of the Phase 2 regulation.

OFFS-03 - Zero Emission Off-Road Worksite Emission Reduction Assessment: This measure is designed to foster the development of a robust worksite efficiency program and to facilitate the deployment of technologies and/or strategies that increase worksite efficiency, such as connected vehicles, automation, and fleet management technologies in off-road sectors. Through this assessment, CARB would identify opportunities to further expand the use of the aforementioned strategies and/or zero and near-zero emission technologies, and would provide the Board with an informational update regarding the status of the aforementioned technologies and/or strategies, with a focus on business return on investment, scalability and sustainability of the system. CARB would also encourage deployment via incentives or by providing credit in the off-road rule.

OFFS-04 - Zero Emission Airport Ground Support Equipment: This measure is designed to increase the penetration of the first wave of zero emission heavy-duty technology in applications that are well suited to its use, and to facilitate further technology development and infrastructure expansion. CARB would develop and propose a regulation to accelerate the transition of diesel and large spark ignition airport ground support equipment to zero emission technology.

OFFS-05 - Small Off-Road Engines: This measure is designed to reduce emissions from Small Off-Road Engines, and to increase the penetration of zero emission technology. Small off-road engines that are subject to CARB regulations are used in residential and commercial lawn and garden equipment, and other utility applications. CARB will develop and propose tighter exhaust and evaporative emission standards, encourage increased use of zero emission equipment, and enhance enforcement of current emission standards for small off-road engines.

OFFS-06 - Transport Refrigeration Units Used for Cold Storage: This measure is designed to advance zero and near-zero emission technology commercialization by increasing the early penetration of hybrid electric and electric standby equipped transport refrigeration units used for cold storage, and supporting the needed infrastructure developments. CARB would develop a regulation to limit stationary operating times of internal, combustion engines in phases.

OFFS-07 – Low Emission Diesel Fuel: This measure is designed to reduce emissions from the portion of the heavy-duty fleet that will continue to operate on internal combustion engines. The proposed measure would put into place standards for Low Emission Diesel and require that diesel fuel providers sell steadily increasing volumes of Low Emission Diesel until it comprises 50 percent of total diesel sales by 2031. Due to the magnitude of needed NOx reductions in the Basin and the large volumes of Low Emission Diesel needed for full statewide implementation, the proposed measure would be phased-in with an implementation strategy that starts in the Basin, and subsequently expands statewide.

OFFS-08 - Further Deployment of Cleaner Technologies: Off-Road Equipment: This measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle technologies. These emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

Consumer Products Program

The CARB SIP Strategy also includes measures to further reduce emissions of ROG from consumer products. CARB staff propose to evaluate the 2013-2015 data reported to the Consumer Products Program to identify strategies to achieve emission reductions from consumer products. The proposed measure may involve establishing new ROG limits for categories currently unregulated and/or lowering ROG limits for categories already regulated. Staff may investigate opportunities to establish alternative compliance options to provide flexibility to industry to comply with regulations, such as an emission cap to reduce ROG emissions from consumer products. This measure calls for an implementation schedule between 2020 and 2023.

1.9.5 Transportation Control Measures from the Southern California Association of Governments 2016 Regional Transportation Plan and Sustainable Communities Strategy

The SCAG, the Metropolitan Planning Organization (MPO) for Southern California, is mandated to comply with federal and state transportation and air quality regulations. Further, pursuant to California Health and Safety Code (HSC) §40460, SCAG has the responsibility of preparing and approving the portions of the AQMP related to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. The SCAQMD combines its portion of the AQMP with those portions prepared by SCAG as required by HSC §40460.

Transportation conformity is required under CAA Section 176(c) to ensure that federally supported highway and transit project activities "conform to" the purpose of the SIP. Conformity currently applies to areas that are designated non-attainment, and those re-designated to attainment after 1990 ("maintenance areas" with plans developed under CAA Section 175[A]) for the specific transportation-related criteria pollutants. Conformity for the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. The transportation conformity regulation is found in 40 CFR Part 93.

The transportation strategy and TCMs included as part of the 2016 AQMP and SIP for the Basin, as defined in the HSC, are based on SCAG's 2016 RTP/SCS, which has been developed in consultation with federal, state, and local transportation and air quality planning agencies and other stakeholders.

The Regional Transportation Strategy and TCM portion of the 2016 AQMP/SIP consists of the following four related sections.

- Section I. Introduction: As required by federal and state laws, SCAG is responsible for ensuring that the regional transportation plan, program, and projects are supportive of the goals and objectives of AQMPs/SIPs. SCAG is also required by state law to develop demographic projections and regional transportation strategy and control measures for the AQMPs/SIPs. SCAG prepares the RTP/SCS, which is updated every four years, and the Federal Transportation Improvement Plan biennially. The RTP/SCS also integrates land use and transportation planning to achieve regional GHG reduction targets set by CARB pursuant to SB375.
- Section II. Regional Transportation Program/Sustainable Communities Strategy and TCMs: The 2012-2035 RTP/SCS was formally adopted by the SCAG Regional Council

on April 4, 2012. The 2016 RTP/SCS was adopted by the SCAG Regional Council on April 7, 2016 and contains a host of improvements to the region's transportation system including:

- Focus new growth around transit/high quality transit areas (HQTAs)
- Plan for growth around livable corridors
- Provide more options for short trips/neighborhood mobility areas
- Support zero emission vehicles and expand electric vehicle charging stations
- Support local sustainability planning
- Protect natural and farm lands
- Balance growth distribution between 500-foot buffer areas and HQTAs
- Preserve the existing transportation system
- Manage congestion through Transportation Demand Management (TDM) and Transportation System Management (TSM)
- Expand regional transit system
- Expand passenger rail and maintain high-speed rail commitments
- Promote active transportation
- Improve highway and arterial capacity
- Strengthen regional transportation network for goods movement
- Improve airport ground access

Included within these transportation system improvements are projects that reduce vehicle use or change traffic flow or congestion conditions ("TCMs"). TCMs include the following three main categories of transportation improvement projects and programs:

- Transit, intermodal transfer, and active transportation measures,
- High occupancy vehicle (HOV) lanes, high occupancy toll (HOT) lanes, and their pricing alternatives, and
- Information-based transportation strategies.

- Section III. Reasonably Available Control Measure Analysis (RACM): As required by the CAA, a RACM analysis must be included as part of the overall control strategy in the AQMP/SIP to ensure that all potential control measures are evaluated for implementation and that justification is provided for those measures that are not implemented. The AQMP contains the RACM TCM component for the Basin's ozone and PM2.5 control strategy. In accordance with U.S. EPA procedures, this analysis considers TCMS in the Final 2016 RTP/SCS, measures identified by the CAA, and relevant measures adopted in other ozone and PM2.5 nonattainment areas of the country. Based on this comprehensive review, it is determined that the TCMs being implemented in the Basin are inclusive of all TCM RACM.

- Section IV. TCM Best Available Control Measures (BACM) Analysis for 2006 PM2.5 NAAQS: The Basin has been reclassified as a serious nonattainment area under the 2006 PM2.5 NAAQS effective February 12, 2016. As a result, the Basin is required to implement BACMs including TCMs for the control of direct PM2.5 and PM2.5 precursors from on-road mobile sources. The TCM BACM analysis consists of a review of on-going implementation of TCMS in the Basin, a review of TCM measures implemented in other moderate and serious PM2.5 nonattainment areas, as well as serious PM10 nonattainment areas throughout the country, and a review of TCMS not

implemented in the SCAG region. The analysis demonstrates that the TCM projects being implemented in the Basin constitute TCM BACM. The emission benefits associated with the Final 2016 RTP/SCS are reflected in the 2016 AQMP projected baseline emissions. The amount of emission reductions from the RTP/SCS are largely affected by the change in vehicle fleet mix and vehicle emission factors.

SCAG is required to prepare a RTP/SCS, which contains TCMs, pursuant to California Health & Safety Code §65080. SCAG is responsible for preparing and approving the portions of the plan relating to regional demographic projections and integrated regional land use, housing, employment and transportation programs, measures and strategies, and is required to analyze and provide emissions data related to its planning responsibilities to appropriate local agencies such as SCAQMD, pursuant to California Health & Safety Code §40460(b). On April 7, 2016, the 2016 RTP/SCS was adopted and the Final PEIR was certified (SCAG, 2016). Thus, SCAG's 2016 RTP/SCS and associated TCMs will be implemented regardless of the 2016 AQMP. Since the environmental impacts from the 2016 RTP/SCS and associated TCMs were analyzed in the Final PEIR, the Draft 2016 AQMP Program EIR will only evaluate potential cumulative impacts from implementing the 2016 AQMP and the TCMs evaluated in SCAG's Program EIR for the 2016 RTP/SCS.

1.9.6 Coordination with the State's Greenhouse Gas Reduction Efforts

The Basin faces several ozone and PM attainment challenges, as strategies for significant emission reductions become harder to identify and the federal standards continue to become more stringent. California's GHG reductions targets under AB32 add new challenges and timelines that affect many of the same sources that emit criteria pollutants. In finding the most cost-effective and efficient path to meet multiple deadlines for multiple air quality and climate objectives, it is essential that an integrated planning approach is developed. Responsibilities for achieving these goals span all levels of government, and coordinated and consistent planning efforts among multiple government agencies are a key component of an integrated approach.

California's success in reducing smog has largely relied on technology and fuel advances, and as health-based air quality standards are tightened, the introduction of cleaner technologies must keep pace. More broadly, a transition to zero and near-zero emission technologies is necessary to meet 2023 and 2032 air quality standards and 2050 climate goals. Many of the same technologies will address air quality, climate and energy goals. As such, strategies developed for air quality and climate change planning should be coordinated to make the most efficient use of limited resources and the time needed to develop cleaner technologies. The 2016 AQMP includes control measures that would take advantage of emission reductions generated by other programs such as the GHG emission reductions under AB32.

CHAPTER 2 - ENVIRONMENTAL CHECKLIST

Introduction

General Information

Potentially Significant Impact Areas

Determination

Environmental Checklist and Discussion

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2.1 INTRODUCTION

This environmental checklist serves as an initial evaluation tool to identify the proposed project's potential adverse environmental impacts. Responses to checklist questions illustrate the types of AQMP control measures that may create potentially significant adverse impacts to environmental impact areas identified in Section 2.5. Table A-1 in Appendix A provides a comprehensive list of all 2016 AQMP proposed control measures and identifies each environmental impact area that could be adversely affected by those measures. Environmental impact areas which could be adversely affected will be evaluated further in the Draft Program EIR.

2.2 GENERAL INFORMATION

Project Title:	2016 Air Quality Management Plan
Lead Agency Name:	South Coast Air Quality Management District
Lead Agency Address:	21865 Copley Drive, Diamond Bar, CA 91765
CEQA Contact Person:	Jillian Wong, (909) 396-3176
2016 AQMP Contact Person:	Mike Krause (909) 396-2706
Project Sponsor's Name:	South Coast Air Quality Management District
Project Sponsor's Address:	21865 Copley Drive, Diamond Bar, CA 91765
General Plan Designation:	Not applicable
Zoning:	Not applicable
Description of Project:	The 2016 AQMP identifies control measures and strategies to bring the region into attainment with the revoked 1997 8-hour National Ambient Air Quality Standard (NAAQS or standard) (80 ppb) for ozone by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual PM2.5 standard (12ug/m^3) by 2025; the 2006 24-hour PM2.5 standard (35 ug/m^3) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023. The 2016 AQMP consists of three components: 1) the SCAQMD's Stationary, Area, and Mobile Source Control Measures; 2) State and Federal Control Measures provided by the California Air Resources Board; and 3) Regional Transportation Strategy and Control Measures provided by the Southern California Association of Governments. The 2016 AQMP includes emission inventories and control measures for stationary, area and mobile sources, the most current air quality setting, updated growth projections, new modeling techniques, demonstrations of compliance with state and federal Clean Air Act requirements, and an implementation schedule for adoption of the proposed control strategy.
Surrounding Land Uses and Setting:	Industrial, commercial, and potentially residential
Other Public Agencies Whose Approval is Required:	California Air Resources Board U.S. Environmental Protection Agency

2.3 POTENTIALLY SIGNIFICANT IMPACT AREAS

The following environmental impact areas have been assessed to determine their potential to be affected by the proposed project. Any checked items represent areas that may be adversely affected by the proposed project. An explanation relative to the determination of impacts can be found following the checklist for each area in Section 2.5.

☐ Aesthetics	☐ Geology and Soils	☐ Population and Housing
☐ Agriculture and Forestry Resources	☑ Hazards and Hazardous Materials	☐ Public Services
☑ Air Quality and Greenhouse Gas Emissions	☑ Hydrology and Water Quality	☐ Recreation
☐ Biological Resources	☐ Land Use and Planning	☑ Solid and Hazardous Waste
☐ Cultural Resources	☐ Mineral Resources	☑ Transportation and Traffic
☑ Energy	☑ Noise	☑ Mandatory Findings

2.4 DETERMINATION

On the basis of this initial evaluation:

☐ I find that although the proposed project could have a significant effect on the environment, there will NOT be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. A NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will NOT be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☑ I find that the proposed project MAY have a significant effect(s) on the environment, and a PROGRAM ENVIRONMENTAL IMPACT REPORT will be prepared.

☐ I find that the proposed project MAY have a "potentially significant impact" on the environment, but at least one effect: 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects: (a) have been analyzed adequately in an earlier NEGATIVE DECLARATION or ENVIRONMENTAL IMPACT REPORT pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier NEGATIVE DECLARATION or ENVIRONMENTAL IMPACT REPORT, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Date: June 30, 2016

Signature:

Jillian Wong, Ph.D
Program Supervisor, CEQA
Planning, Rule Development and Area Sources

2.5 ENVIRONMENTAL CHECKLIST AND DISCUSSION

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
I.	**AESTHETICS.** Would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☑	☐
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☑	☐
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☑	☐
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☑	☐

Introduction

Evaluation of the proposed 2016 AQMP control measures identified several control measures with the potential to generate significant adverse impacts to aesthetic resources. Table A-1 in Appendix A lists all 2016 AQMP control measures and identifies those control measures that have the potential to generate significant adverse impacts. The proposed project will implement control measures to lower emissions, thus improving air quality and visibility in the long term in order to meet the project's objectives. The discussion in this section identifies the net effect on aesthetic resources from implementing the proposed project.

Significance Criteria

The proposed project impacts on aesthetics will be considered significant if:

- The project will block views from a scenic highway or corridor.
- The project will adversely affect the visual continuity of the surrounding area.
- The impacts on light and glare will be considered significant if the project adds lighting which would add glare to residential areas or sensitive receptors.

Impacts deemed potentially significant will be considered further in the Draft Program EIR.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach.

I. a), b), and c): Less than Significant. Implementation of most proposed control measures is not expected to adversely affect scenic vistas in the District; damage scenic resources, including but not limited to trees, rock outcroppings, or historic buildings within a scenic highway; or substantially degrade the visual character of a site or its surroundings. On the contrary, the Plan will improve air quality and visibility, thus improve scenic vistas and visual character.

Control measures under SCAQMD's jurisdiction would typically affect industrial, institutional, or commercial facilities located in appropriately zoned areas (e.g., industrial and commercial areas) that are not usually associated with scenic resources. Construction activities are expected to be limited to industrial and commercial areas. Further, modifications would typically occur inside the buildings at the affected facilities, or because of the nature of the business (e.g., commercial or industrial) can easily blend with the facilities with little or no noticeable effect on adjacent areas. Finally, because the purpose of implementing 2016 AQMP control measures is to reduce emissions and improve air quality to attain state and federal ambient air quality standards, improved air quality would provide benefits to scenic vistas and resources in the District.

Mobile source control measures under the CARB's and U.S. EPA's jurisdiction would accelerate replacement of high emitting on-road and off-road mobile sources with lower emitting mobile sources. Accelerating the penetration of lower emitting mobile sources would not be expected to adversely affect scenic resources because these strategies do not require construction or disturbance to such resources. Control measures ORHD-05, ORHD-06, ORHD-08, and ORHD-09 could potentially use electric power built into roadway infrastructure.

The areas affected by the proposed Zero- and Near-Zero Emissions control measures that could result in the installation of catenary lines (overhead power lines) are expected to be located in commercial, industrial areas, and along existing high activity transportation corridors, e.g., in areas within and adjacent to the Port of Los Angles and Port of Long Beach, around container transfer facilities (truck/train) near the Terminal Island Freeway and East Sepulveda Boulevard intersection, along the Alameda Corridor, as well as the railyards near downtown Los Angeles (East Washington Boulevard in the City of Commerce, which are located within three miles of the northern terminus of the Alameda Corridor and east of I-710). The nearest scenic highway to either of the Ports, the cargo transfer facilities serving the Ports, along the Alameda Corridor, or the cargo transfer facilities in the City of Commerce, would be Route 2 (Angeles Crest Scenic Byway) near La Canada/Flintridge, in the northeastern portion of Los Angeles County. It is approximately 14 miles from the northern terminus of the Alameda Corridor and the cargo transfer railyards in the City of Commerce to the most southern portion of Route 2. The port area, Alameda Corridor or downtown railyards are not visible from Route 2 due to the distance, presence of numerous large buildings of downtown Los Angeles, and the intervening topography (hills and mountains) between downtown Los Angeles and the beginning of Route 2 near La Canada/Flintridge. The nearest roadway eligible for State scenic highway designation, to either of the Ports, the cargo transfer facilities serving the ports, along the Alameda Corridor, or the cargo transfer facilities in the City of Commerce, would be Route 1 (Pacific Coast Highway at State Route 19 – Lakewood Boulevard, in Long Beach) in the southernmost portion of Los Angeles County. It is approximately five miles from the cargo transfer facilities serving the Ports to the intersection of State Route 19 and Route 1 where it becomes eligible to become a State scenic highway. The potential locations for catenary overhead power lines (near Port

facilities, transportation corridors and railyards) would not be visible to Route 1 at State Route 19 due to the numerous structures and topography between the two locations.

There are no officially designated scenic highways or highways eligible for State scenic highway designation in areas affected by construction of Zero or Near-Zero Emissions equipment associated with the 2016 AQMP, therefore construction impacts on aesthetic impacts are considered to be less than significant.

Off-road control measures under the CARB's and U.S. EPA's jurisdiction would promote greater use of equipment at port facilities to control ship emissions from ships at berth. Such control devices may include hoods or bonnets on ship exhaust stacks to capture emissions and are expected to be as high as the height of ship stacks. While these control devices would be visible to surrounding areas, they would be similar to other structures used within the heavily industrialized portions of the ports, which contain terminals, tanks, ship-loading structures (including conveyors and cranes), and other similar structures. These activities would be consistent with activities already being undertaken as part of the San Pedro Bay Ports Clean Air Action Plan 2010 update.

I. d): Less than Significant. Implementation of proposed 2016 control measures is not expected to create additional demand for new lighting or exposed combustion sources (e.g., flares) that could create glare, adversely affecting day or nighttime views in any areas. Compliance with control measures may affect operations at industrial or commercial facilities, but is not expected to affect hours of operation. Further, many types of industrial or commercial facilities are already lighted at night for safety and security reasons. As noted in item I. a) – c) above, facilities affected by the proposed control measures typically make modifications in the interior of an affected facility so any new light sources would typically be inside a building or not noticeable because of the presence of existing outdoor light sources. Some of the control measures may create incentives for the use of solar panels to generate renewable energy. These solar panels are expected to be located on existing buildings or included in the construction of new buildings. Potential glare impacts from solar panels would be evaluated in compliance with local city and county view ordinance and requirements, which is expected to minimize impacts to less than significance.

Conclusion

Based upon the above considerations, potentially significant adverse project-specific aesthetic impacts are not expected to occur due to implementation of proposed 2016 AQMP control measures and, therefore, will not be evaluated in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
II.	**AGRICULTURE AND FOREST RESOURCES.** Would the project:				
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☑
c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code §12220(g)), timberland (as defined by Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code §51104 (g))?	☐	☐	☐	☑
d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified no control measures with the potential to generate significant adverse impacts to agricultural and forest resources.

Significance Criteria

The proposed project impacts will be considered significant if:

- The proposed project conflicts with existing zoning or agricultural use or Williamson Act contracts.
- The proposed project will convert prime farmland, unique farmland or farmland of statewide importance as shown on the maps prepared pursuant to the farmland mapping and monitoring program of the California Resources Agency, to non-agricultural use.
- The proposed project conflicts with existing zoning for, or causes rezoning of, forest land (as defined in Public Resources Code §12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code § 51104 (g)).
- The proposed project would involve changes in the existing environment, which due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

II. a), b), c) and d): No Impact. Implementation of proposed 2016 AQMP control measures is not expected to generate any new construction of buildings or other structures that would require conversion of farmland to non-agricultural use or conflict with zoning for agricultural uses or a Williamson Act contract. Further, proposed control measures would typically affect existing facilities that are located in appropriately zoned areas. Any new facilities that may be affected by AQMP control measures would be constructed and operated for reasons other than complying with the control measures. Therefore, it is not expected that implementing AQMP control measures would conflict with any forest land zoning codes or convert forest land to non-forest uses.

One control measure, BCM-04 Emission Reduction from Manure Management, would call for the application of ammonia reducing agents to manure, to control ammonia emissions at livestock operations. While this control measure could increase costs, it is not expected that it would cause costs high enough to result in conversion of farmland to other uses. In addition, some control measures could encourage the use of solar panels. The control measures are expected to encourage the use of solar panels on existing or new residential or commercial buildings, i.e., already developed property, therefore, the control measures are not expected to convert agriculture or forest-related uses to other land uses.

Finally, land use, including agriculture- and forest-related uses, and other planning considerations are determined by local governments and no agricultural land use or planning requirements would be altered by the proposed project, except as noted above. AQMP control measures, including control measures related to mobile sources, would have no direct or indirect effects on agricultural or forest land resources because these types of control measures would typically reduce combustion and fugitive VOC emissions, establish emission exhaust requirements and increase the penetration of zero-emitting mobile sources. The 2016 AQMP could provide benefits to agricultural and forest land resources by improving air quality in the region, thus, reducing the adverse oxidation impacts of ozone on plants and animals.

Conclusion

Based upon the above considerations, significant adverse project-specific impacts to agricultural resources or forest land resources are not expected to occur due to implementation of the 2016 AQMP control measures and, therefore, will not be further analyzed in the Draft Program EIR.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
III. AIR QUALITY AND GREENHOUSE GAS EMISSIONS. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☑
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	☑	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☑	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☑	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☑	☐
f) Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	☐	☐	☐	☑
g) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☑	☐	☐	☐
h) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☑	☐

Introduction

Evaluation of the proposed 2016 AQMP control measures identified several control measures with the potential to generate significant adverse air quality and GHG impacts. Table A-1 in Appendix A lists all 2016 AQMP control measures and identifies those control measures that have the potential to generate significant adverse impacts.

Significance Criteria

The proposed project impacts will be considered significant if they exceed the significance criteria in Table 2.5-1. Impacts deemed potentially significant will be considered further in the Draft Program EIR.

TABLE 2.5-1

SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Construction [b]**	**Operation [c]**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs), Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Hazard Index ≥ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000 MT/yr CO_2eq for industrial facilities	
Ambient Air Quality Standards for Criteria Pollutants [d]		
NO2 1-hour average annual arithmetic mean	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)	
PM10 24-hour average annual average	10.4 µg/m^3 (construction)[e] and 2.5 µg/m^3 (operation) 1.0 µg/m^3	
PM2.5 24-hour average	10.4 µg/m^3 (construction)[e] and 2.5 µg/m^3 (operation)	
SO2 **1-hour average** **24-hour average**	0.25 ppm (state) and 0.075 ppm (federal – 99th percentile) 0.04 ppm (state)	
Sulfate 24-hour average	25 µg/m^3 (state)	
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
Lead 30-day average Rolling 3-month average	1.5 µg/m^3 (state) 0.15 µg/m^3 (federal)	

[a] SCAQMD CEQA Handbook (SCAQMD, 1993).[b] Construction thresholds apply to both the Basin and Coachella Valley.
[c] For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
[d] Ambient air quality thresholds for criteria pollutant based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[e] Ambient air quality threshold based on SCAQMD Rule 403.
Source: SCAQMD CEQA Thresholds, Revised March, 2015.
KEY: lbs/day = pounds per day; ppm = parts per million; µg/m^3 = microgram per cubic meter; ≥ = greater than or equal to; and MT/yr CO_2eq = metric tons per year of CO_2 equivalents.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

III. a): No Impact. Pursuant to the provisions of both the CAA and CCAA, the SCAQMD is required to attain the NAAQS and CAAQS for all criteria pollutants. To this end, the SCAQMD is required by law to prepare a comprehensive AQMP which includes strategies (e.g., control measures) to reduce emission levels to achieve and maintain state and federal ambient air quality standards, to ensure that new sources of emissions are planned and operated to be consistent with the SCAQMD's air quality goals, and to protect sensitive receptors and the public in general from the adverse effects of pollutants which are known to have adverse human health effects. The AQMP's air pollution reduction strategies include control measures for stationary, mobile and indirect sources. These control measures are based on feasible methods of attaining the AAQS.

The proposed project would update the SCAQMD's 2007 and 2012 AQMPs as well as provide attainment demonstrations for new standards, as required pursuant to state and federal law. By revising and updating emission inventories and control strategies, the SCAQMD is complying with state law, which is expected to reduce emissions and make progress towards attaining and maintaining NAAQS and CAAQS in the District. The 2016 AQMP update is required by law and would not conflict or obstruct the implementation of the local air quality plan. Therefore, this impact will not be evaluated further in the Draft Program EIR.

III. b) and d): Potentially Significant Impact. The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. AQMP control measures would apply to stationary, area, and mobile sources. Although the proposed control measures are designed to improve overall air quality, implementation of some control measures may have the potential of generating secondary air quality impacts. These secondary impacts will be analyzed in the EIR. The following are examples of potential secondary impacts:

- Impacts Associated with Construction - AQMP control measures that may involve retrofitting, replacing, or installing enclosures or new air pollution control equipment, may require physical modifications at affected facilities (CMB-01, CMB-03, CMB-05, FLX-02, BCM-01, BCM-02, BCM-05, BCM-06, BCM-07, BCM-09, TXM-01, TXM-02, TXM-04 through TXM-09). Physical modifications may involve the use of construction equipment for demolition, site preparation, site grading, and construction. Exhaust emissions from on-road and off-road equipment during construction activities may be substantial depending on the number, types, and activity levels of the construction equipment used. Similarly, if large areas need to be graded to install equipment foundations or construct buildings, fugitive dust emissions may also be substantial.
- Impacts Associated with Use of Control Equipment - Implementing AQMP control measures may require the use of additional air pollution control equipment (BCM-01,

BCM-05, BCM-06, BCM-07, BCM-10, TXM-01, TXM-02, TXM-04 through TXM-09, ORFIS-03, and ORFIS-04). Although the primary purpose of air pollution control equipment is to reduce emissions of a particular pollutant, some control equipment may have the potential to create secondary adverse air quality impacts. For example, control measures intended to reduce NOx emissions from stationary or mobile sources, such as selective catalytic reduction, may use ammonia as part of the control process. Ammonia use may result in increased ammonia emissions and, since ammonia is a precursor to particulate formation, increased particulate emissions. In addition, in the event of an accidental release of ammonia, sensitive receptors in the vicinity of the release may be exposed to harmful concentrations of ammonia vapor.

- Impacts Associated with Electrification - Some control measures (FLX-02, TXM-01, TXM-02, TXM-04 through TXM-08, MOB-02 through MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, ORHD-04 through ORHD-09, ORFIS-03 through ORFIS-05, OFFS-01, and OFFS-04 through OFFS-07), although expected to improve overall air quality, may serve to increase electricity demand and potentially result in the construction and operation of new electrical power plants and increased emissions from power plants.
- Impacts Associated with Product Reformulation and Alternative Fuels - Some control measures may potentially increase air toxic emissions due to reformulation of coatings or solvents (CTS-01, TXM-08, and CPP-01). Low-VOC coating and solvent formulations may contain toxic compounds, such as formaldehyde or glycol ethers, or compounds that have a higher flammability rating. As a result, material replacement or reformulation to reduce the use of high-VOC materials has the potential to result in health risks associated with exposure to both carcinogenic and non-carcinogenic toxic air contaminants. Similarly, alternative or reformulated fuels may also contain additives with toxic characteristics (EGM-01, BCM-08, MOB-01 through MOB-05, MOB-07, MOB-10, MOB-13, ORLD-01, ORLD-03, ORHD-02, ORHD-04 through ORHD-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-07, and OFFS-08).

III. c): Potentially Significant Impact. Secondary air quality impacts associated with some control measures may generate increased emissions, as described in III. b) and d). Because the proposed control measures may result in significant adverse secondary air quality effects, the project's incremental contribution to a cumulative effect may also be cumulatively considerable. Cumulative air quality impacts will be evaluated in the Draft Program EIR.

III. e): Less than Significant. Some AQMP control measures may require construction activities at affected facilities. Odors are sometimes associated with the exhaust from diesel-fueled equipment. However, odor impacts from construction equipment are not expected to be significant because most diesel-fueled equipment are mobile and do not remain in one location that could continuously affect offsite receptors. As a result, odor impacts from construction activities to implement AQMP control measures are not expect to be significant and will not be further discussed in the EIR.

Past projects evaluating promulgation of AQMP control measures into rules or regulations, especially control measures that involve reformulated coatings or solvents, have included assessments of potential odor impacts. Although in some cases reformulated products have noticeable odors, it is typically the case that reformulated products have less noticeable odors than the products they are replacing. Reformulated products tend to have reduced VOC content

and reduced emissions and, therefore, lower potential for creating odor impacts. As a result, significant adverse odor impacts have not been associated with reformulated products, especially those relying on water-based formulations, compared to conventional high-VOC products. Modifications to industrial facilities to produce reformulated products (e.g., refineries) also have the potential to create odor impacts. However, owners/operators of industries affected by control measures in the proposed 2016 AQMP would be subject to existing air quality rules and regulations, including SCAQMD's Rule 402 - Nuisance, which prohibits creating odor nuisances. For these reasons, implementing the 2016 AQMP is not expected to create significant adverse odor impacts and, therefore, will not be further addressed in the Draft Program EIR.

III. f): No Impact. Promulgating AQMP control measures, such as control requirements for stationary sources, mobile sources, incentive programs, etc., into rules or regulations typically would serve to strengthen an existing rule or regulation. Similarly, an AQMP control measure may be promulgated as a new rule or regulation, which would serve to control emissions from an unregulated or minimally regulated source. As a result, since the proposed project would not diminish any existing air quality rule, this impact will not be analyzed further in the Draft Program EIR.

III. g): Potentially Significant Impact. The 2016 AQMP contains incentive and educational control measures that target GHG emissions and includes other control measures, not targeted at GHGs, that provided GHG co-benefits. The 2016 AQMP includes control measures that specifically address GHG emissions (ECC-01, ECC-04, EGM-01, and ORHD-03).

Although some 2016 control measures are designed to take advantage of existing programs to reduce GHG impacts, other measures may have the potential to generate combustion emissions that could increase GHG emissions. For example, implementation of control measures that accelerate zero emission technologies, rely on electricity; an increase in electrical demand may result in increased electricity generation and subsequently increased GHG emissions associated with combustion and power plants. Potential GHG emission impacts will be analyzed in the Draft Program EIR.

III. h): Less than Significant Impact. The SCS portion of the 2016 RTP/SCS is expected to focus on GHG reduction efforts through modifying traditional land use development patterns to include more mixed use projects, which eliminates or substantially shortens commute trip lengths compared to traditional land use planning where residential land uses are separate from and potentially long distances from jobs and other commercial land uses. In general, neither SCAQMD nor CARB has authority over land use decisions, so implementing AQMP control measures would not affect land use decisions envisioned in the SCS. Further, SCAG is providing TCMs to the SCAQMD for incorporation into the 2016 AQMP so that the 2016 AQMP will complement the 2016 RTP/SCS.

Conclusion

Based upon the above considerations, potentially significant adverse project-specific air quality and GHG impacts may occur due to implementation of proposed 2016 AQMP control measures and, therefore, will be evaluated in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
IV.	**BIOLOGICAL RESOURCES.** Would the project:				
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☑
c)	Have a substantial adverse effect on federally protected wetlands as defined by §404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☑
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☑
e)	Conflicting with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f)	Conflict with the provisions of an adopted Habitat Conservation plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified no control measures with the potential to generate significant adverse impacts to biological resources.

Significance Criteria

The proposed project impacts on biological resources will be considered significant if:

- The project results in a loss of plant communities or animal habitat considered to be rare, threatened or endangered by federal, state or local agencies.
- The project interferes substantially with the movement of any resident or migratory wildlife species.
- The project adversely affects aquatic communities through construction or operation of the project.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

IV. a), b), and d): No Impact. Implementation of the proposed 2016 AQMP control measures is not expected to result in habitat modification, adversely affect any riparian habitat or interfere with the movement of any native resident or migratory fish or wildlife species. Any existing or modifications to existing commercial or industrial facilities, affected by the proposed control measures, would generally be located in appropriately zoned commercial or industrial areas, which typically do not support candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service; existing industrial or commercial facilities are already devoid of plant life or plant life supporting wildlife species for fire safety reasons. Construction projects that impact affected species are not reasonably foreseeable as part of implementation of the 2016 AQMP. Any new development potentially affecting biological resources would not be as a result of the 2016 AQMP control measures and approval of those projects including evaluation of their environmental impacts would occur regardless of the 2016 AQMP.

Furthermore, AQMP control measures would not include provisions that would allow affected facility operators to violate existing zoning ordinances or regional plans, policies, or regulations. Finally, improving air quality is expected to provide health benefits to plant and animal species in the District.

IV. c): No Impact. Implementation of some AQMP control measures (CTS-01, BCM-01, BCM-04, BCM-07, BCM-08, BCM-10, TXM-01 through TXM-07) may change or increase a facility's potential to generate wastewater. Industrial or commercial facilities are generally considered "point sources" and must release wastewater into publicly owned treatment works (POTWs), under the National Pollutant Discharge Elimination System (NPDES) permit program, administered by the Regional Water Quality Control Board (RWQCB). Direct discharge into federally protected wetlands as defined by §404 of the Clean Water Act is prohibited under the federal Clean Water Act and the state Porter-Cologne Act.

Some 2016 AQMP control measures (ORFIS-03 and ORFIS-04) would promote the installation and use of air pollution controls at port facilities, located on the coast. The control measures are

not expected to have wastewater impacts. Port facilities are considered to be heavy industrial facilities (point sources) and the installation of additional controls would be consistent with this land use. Further, any facilities that release wastewater into California's ocean waters are subject to water quality standards established in the California Ocean Plan and are also subject to NPDES requirements, enforced by the local RWQCBs. For the above reasons, the proposed project will not adversely affect protected wetlands as defined by §404 of the Clean Water Act, including, but not limited to marshes, vernal pools, coastal wetlands, etc., through direct removal, filling, hydrological interruption or other means.

IV. e) and f): No Impact. Implementation of the proposed control measures is not expected to affect land use plans, local policies or ordinances, or regulations protecting biological resources such as a tree preservation policy or ordinance. Control measures promulgated as rules or regulations would primarily affect existing commercial and industrial facilities through installation of air pollution control equipment, which are typically located in appropriately zoned areas, and acceleration of zero emission vehicles into the regional vehicle fleet. Land use and other planning considerations are determined by local governments and no land use or planning requirements will be altered by the proposed project. Nor will the 2016 AQMP be the cause for new development that would affect biological resources. Such development could take place regardless of the 2016 AQMP. Neither SCAQMD nor CARB has legal authority over land use decisions except to impose certain air pollution control requirements, which do not drive the land use approval process, and, therefore, cannot alter or interfere with land use zoning ordinance or designations and cannot approve new land use projects or modifications to existing land use projects. Similarly, the proposed 2016 AQMP is not expected to affect habitat conservation or natural community conservation plans, agricultural resources or operations, and would not create divisions in any existing communities for the reasons given in discussion IV. a), b), and d).

Conclusion

Based upon the above considerations, significant adverse project-specific impacts to biological resources are not expect to occur due to implementation of the 2016 AQMP control measures and, therefore, will not be further evaluated in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
V.	**CULTURAL RESOURCES.** Would the project:				
a)	Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☑
b)	Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☐	☐	☐	☑
c)	Directly or indirectly destroy a unique paleontological resource, site, or feature?	☐	☐	☐	☑
d)	Disturb any human remains, including those interred outside formal cemeteries?	☐	☐	☐	☑
e)	Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code §21074?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified no control measures with the potential to generate significant adverse impacts to cultural resources.

Significance Criteria

The proposed project impacts to cultural resources will be considered significant if:

- The project results in the disturbance of a significant prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group.
- Unique paleontological resources or objects with cultural value to a California Native American tribe are present that could be disturbed by construction of the proposed project.
- The project would disturb human remains.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

V. a), b), c), d), and e): No Impact. All control measures in the 2016 AQMP were evaluated to identify those control measures with potential cultural resources impacts. No control measures were identified that could generate significant adverse cultural resources impacts. CEQA Guidelines §15064.5(a)(3) states in part, "Generally, a resource shall be considered 'historically significant' if the resource meets the criteria for listing in the California Register of Historical Resources including the following:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values;
- Has yielded or may be likely to yield information important in prehistory or history."

The California Register eligibility criteria are modeled on those of the eligibility criteria of the National Register of Historic Places. Resources (buildings, structures, equipment) that are less than 50 years old are excluded from listing in the National Register of Historic Places unless they can be shown to be exceptionally important. Even resources that are 50 years or older, are not necessarily considered to be historically significant if they do not represent any of the above four criteria.

Implementing the proposed 2016 AQMP control measures is primarily expected to result in controlling stationary source emissions at existing commercial or industrial facilities or accelerate the penetration of low-emission vehicles into the regional on- and off-road vehicle fleet. Facilities potentially affected by the proposed control measures, where physical modifications may occur, are typically located in appropriately zoned commercial or industrial areas that have previously been disturbed and are not typically considered to be historically significant. It is unlikely that construction activities, including heavy construction activities, such as cut-and-fill activities or excavation, at potentially affected existing facilities would uncover cultural resources as these existing facilities are located in previously disturbed areas. Some affected facilities, e.g., refineries, may have equipment older than 50 years that may need to be modified to comply with 2016 AQMP control measures. However, such equipment does not typically meet the criteria identified in CEQA Guidelines §15064.5(a)(3). New development that could affect cultural resources would not be the result of the 2016 AQMP and could take place regardless of the Plan. Any potential environmental impacts would be evaluated by the local government agency with land use authority at the time of approval. Therefore, it is unlikely that implementing 2016 AQMP control measures would adversely affect historical or archaeological resources as defined in CEQA Guidelines §15064.5, destroy unique paleontological resources or unique geologic features or disturb human remains interred outside formal cemeteries.

Although most facilities affected by 2016 AQMP control measures would be located on previously disturbed sites where there is little likelihood of remaining identifiable artifacts, it is possible, that cultural or archaeological resources may nevertheless be discovered. While the likelihood of encountering cultural resources is low, there is still a potential that additional buried archaeological resources may exist. Any such impact would be eliminated by using

standard construction practices and complying with state law including Public Resources Code § 21083.2 and CEQA Guidelines § 15064.5, which require the following, in the event that unexpected sub-surface resources were encountered:

- Conduct a cultural resources orientation for construction workers involved in excavation activities. This orientation will show the workers how to identify the kinds of cultural resources that might be encountered, and what steps to take if this occurred;

- Monitoring of subsurface earth disturbance by a professional archaeologist and a representative of the tribe with tribal cultural resources in the area, if cultural resources are exposed during construction;

- Provide the archaeological monitor with the authority to temporarily halt or redirect earth disturbance work in the vicinity of cultural resources exposed during construction, so the find can be evaluated and mitigated as appropriate; and,

- As required by State law in Public Resources Code §§ 5097.94 and 5097.98, prevent further disturbance if human remains are unearthed, until the County Coroner has made the necessary findings with respect to origin and disposition, and the Native American Heritage Commission has been notified if the remains are determined to be of Native American descent.

Conclusion

Based upon the above considerations, significant adverse project-specific impacts to cultural resources are not expect to occur due to implementation of the 2016 AQMP control measures and, therefore, will not be further evaluated in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
VI.	**ENERGY.** Would the project:				
a)	Conflict with adopted energy conservation plans?	☐	☐	☐	☑
b)	Result in the need for new or substantially altered power or natural gas utility systems?	☑	☐	☐	☐
c)	Create any significant effects on local or regional energy supplies and on requirements for additional energy?	☑	☐	☐	☐
d)	Create any significant effects on peak and base period demands for electricity and other forms of energy?	☑	☐	☐	☐
e)	Comply with existing energy standards?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified several control measures with the potential to generate significant adverse impacts to energy resources. Table A-1 in Appendix A lists all 2016 AQMP control measures and identifies those control measures that have the potential to generate significant adverse impacts.

Significance Criteria

The proposed project impacts to energy resources will be considered significant if:

- The project conflicts with adopted energy conservation plans or standards.
- The project results in substantial depletion of existing energy resource supplies.
- An increase in demand for utilities impacts the current capacities of the electric and natural gas utilities.
- The project uses non-renewable resources in a wasteful and/or inefficient manner.

Impacts deemed potentially significant will be considered further in the Draft Program EIR.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

VI. a) and e): No Impact. The 2016 AQMP includes control measures that would promote energy efficiency and conservation, thereby providing potential energy conservation benefits and not in conflict with existing energy plans or goals. Implementation of other 2016 AQMP control

measures is not anticipated to result in conflicts with adopted energy conservation plans or violations of any energy conservation standards by affected facilities. It is expected that owners/operators of affected facilities would comply with any applicable energy conservation standards in effect at the time of installation. These topics, therefore, will not be further evaluated in the Draft Program EIR.

VI. b), c), and d): Potentially Significant Impact. Implementation of some proposed control measures may potentially increase energy demand in the region, as follows:

- Control measures that promote stationary source controls may increase electrical demand (CMB-01, CMB-05, FLX-02, BCM-01, BCM-05, BCM-06, BCM-07, and BCM-09). These control measures may promote the use of electrically-powered ventilation systems, ultraviolet/electron-beam, replacement of combustion equipment with electrical equipment, and installation of electrically-powered control equipment.
- The toxics control measures (TXM-01, TXM-02, TXM-04 through TXM-08) may increase electrical demand. These control measures may increase the air flow to new and existing emission control devices, (e.g., air blowers to create negative pressure in enclosures), increasing energy demand.
- Control measures that require the addition of heat to a process (BCM-04 and BCM-10) may promote the additional use of natural gas for thermal gasification of manure and anaerobic digestion.
- Control measures that accelerate the penetration of zero and near-zero emission vehicles may result in increased electrical and natural gas demand (MOB-02 through MOB-05, MOB-09, MOB-10, MOB-13, ORLD-04 through ORHD-09, ORFIS-03 through ORFIS-05, OFFS-01, and OFFS-04 through OFFS-07), including an incentive to promote usage of an overhead powerline along existing freeway corridors to accommodate electric heavy duty vehicles.
- Control measures that promote the use of alternative fuels may result in increased natural gas demand (BCM-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-04, and OFFS-05). BCM-09 would promote the replacement of wood-burning hearths with natural gas hearths. Other control measures could promote the use of alternative fuels (EGM-01, MOB-01 through MOB-05, MOB-07, MOB-10, MOB-13, ORLD-01, ORLD-03, ORHD-02, ORHD-04 through ORHD-09, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-07, and OFFS-08) and promote the use of LNG-fueled locomotives (ORFIS-01).
- Control measures associated with increased use of shore-side power may result in increased electricity demand (MOB-01, ORFIS-04 and ORFIS-05).

If the net effect of implementing AQMP control measures would be an increase in regional energy demand, in spite of implementing energy efficiency and energy conservation measures, the proposed 2016 AQMP may result in the need for new or substantially altered power or natural gas utility systems, create significant effects on peak and base period demands for electricity and other forms of energy, and create significant effects on peak and base period demands for electricity and other forms of energy.

Conclusion

Based upon the above considerations, potentially significant adverse project-specific impacts on the energy resource may occur due to implementation of proposed 2016 AQMP control measures and, therefore will be evaluated in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
VII.	**GEOLOGY AND SOILS.** Would the project:				
a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	☑
	i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	☐	☑
	ii. Strong seismic ground shaking?	☐	☐	☐	☑
	iii. Seismic–related ground failure, including liquefaction?	☐	☐	☐	☑
	iv. Landslides?	☐	☐	☐	☑
b)	Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☑
c)	Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☑
d)	Be located on expansive soil, as defined in Table 18-1-B of the California Building Code (1994) (formerly referred to as the Uniform Building Code), creating substantial risks to life or property?	☐	☐	☐	☑
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified no control measures with the potential to generate significant adverse impacts to geology and soil resources.

Significance Criteria

The proposed project impacts on the geological environment will be considered significant if:

- Topographic alterations would result in significant changes, disruptions, displacement, excavation, compaction or over covering of large amounts of soil.
- Unique geological resources (paleontological resources or unique outcrops) are present that could be disturbed by the construction of the proposed project.
- Exposure of people or structures to major geologic hazards such as earthquake surface rupture, ground shaking, liquefaction or landslides.
- Secondary seismic effects could occur which could damage facility structures, e.g., liquefaction.
- Other geological hazards exist which could adversely affect the facility, e.g., landslides, mudslides.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

VII. a), c), and d): No Impact. The proposed 2016 AQMP control measures would not directly or indirectly expose people or structures to earthquake faults, seismic shaking, seismic-related ground failure including liquefaction, landslides, mudslides or substantial soil erosion. AQMP control measures affecting mobile sources, such as those that would accelerate the penetration of zero or low emission vehicles into fleets in the District, would not affect geology or soils because on-road vehicles would continue to operate on existing roadways. Although some AQMP control measures would accelerate the penetration of zero or low emission off-road equipment, replacing one type of off-road engine with a lower emitting off-road engine would not be expected to affect construction activities as construction activities would occur for reasons other than complying with AQMP control measures.

Proposed control measures that promote implementation of rules or regulations for stationary sources would not directly or indirectly promote new land use projects that could be located on earthquake faults, seismic zones, etc. Seismic-related activities, in areas where facilities affected by AQMP control measures are located, would be part of the existing setting. Some minor structural modifications, however, at existing affected facilities may occur as a result of installing control equipment or making process modifications. Such modifications would not likely require large heavy-duty construction equipment or substantial site modifications. In addition, affected facilities or modifications to affected facilities would be required to comply with relevant California Building Code (formerly referred to as the Uniform Building Code) requirements in effect at the time of initial construction or modification of a structure.

Southern California is an area of known seismic activity. Structures must be designed to comply with the California Building Code requirements if they are located in a seismically active area. The local city or county is responsible for ensuring that a proposed project complies with current

California Building Code requirements as part of the issuance of the building permits and can conduct inspections to ensure compliance at the time of project approval and afterwards. The California Building Code is considered to be a standard safeguard against major structural failures and loss of life. The code requires structures that will: 1) resist minor earthquakes without damage; 2) resist moderate earthquakes without structural damage but with some non-structural damage; and 3) resist major earthquakes without collapse but with some structural and non-structural damage.

The California Building Code bases seismic design on minimum lateral seismic forces ("ground shaking"). The California Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes. The basic formulas used for the California Building Code seismic design require determination of the seismic zone and site coefficient, which represent the foundation conditions at the site. Accordingly, buildings and equipment at existing affected facilities would conform to the California Building Code and other applicable state codes in effect at the time they were constructed.

Any potentially affected facilities that are located in areas where there has been historic occurrence of liquefaction, e.g., coastal zones, or existing conditions indicate a potential for liquefaction, including expansive or unconsolidated granular soils and a high water table, may have the potential for liquefaction-induced impacts at the project sites. The California Building Code requirements consider liquefaction potential and establish more stringent requirements for building foundations in areas potentially subject to liquefaction. Compliance with the California Building Code requirements is expected to minimize the potential impacts associated with liquefaction. The issuance of building permits from the local cities or counties will assure compliance with the California Building Code requirements. Finally, no AQMP control measures would require the location of new, or relocation of existing facilities in areas prone to liquefaction. Land use decisions are under the authority of the local jurisdictions, typically cities or counties. Neither the SCAQMD nor CARB has authority over land use decisions except to impose specific air pollution control requirements, which do not drive the land use approval process, and CEQA does not grant an agency new powers independent of the powers granted to the agency by other laws (CEQA Guidelines §15040(b)). Therefore, no significant impacts from liquefaction are expected and this potential impact will not be considered further.

Because facilities affected by any AQMP control measures would typically be located in appropriately zoned areas such as industrial or commercial areas, which are not typically located near known geological hazards (e.g., landslide, mudflow, seiche, tsunami or volcanic hazards), no significant adverse geological impacts are expected. Even if potentially affected facilities are located near such geological hazards, the hazards are part of the existing setting and are not made worse by installing control equipment or other activities to comply with emission control rules and regulations. AQMP control measures would not increase potential exposures to geologic hazaards. Therefore, these topics will not be further evaluated in the Draft Program EIR.

VII. b): No Impact. Although the proposed 2016 AQMP control measures may require minor modifications at existing industrial or commercial facilities, such modifications are not expected to require substantial grading or construction activities. Typically, existing facilities have already been graded and soil stabilization is already in place, e.g., through the placement of buildings, paving, or other soil stabilization measures currently required pursuant to SCAQMD Rule 403 – Fugitive Dust. In other cases, potentially affected areas may have already been

graded or displaced in some way for other reasons, e.g., leveling the site, stabilization of slopes, etc. Accelerating the penetration of low emission vehicles into the regional vehicle fleet would not require modifications requiring construction activities at existing facilities, as explained in discussion VII. a), c), and d). Therefore, significant adverse soil erosion impacts are not anticipated from implementing the 2016 AQMP and will not be further analyzed in the Draft Program EIR.

VII. e): No Impact. Septic tanks or other similar alternative waste water disposal systems are typically associated with small residential projects in remote areas. The proposed 2016 AQMP does not contain control measures that would promote the construction of residential or other types of land use projects in remote areas. As explained in discussion VII. a), c), and d), neither the SCAQMD nor CARB has land use approval authority. Consequently, construction of small residential land uses with septic systems would occur for reasons other than complying with AQMP control measures. Furthermore, AQMP control measures typically affect existing industrial or commercial facilities that already have appropriate sewerage facility connections and are subject to wastewater control requirements, typically through NPDES permits. Based on these considerations, the use of septic tanks or other alternative waste water disposal systems will not be further evaluated in the Draft Program EIR.

Conclusion

Based upon the above considerations, significant adverse project-specific impacts to geology and soil resources are not expect to occur due to implementation of the 2016 AQMP control measures and, therefore, will not be further evaluated in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
VIII.	**HAZARDS AND HAZARDOUS MATERIALS.** Would the project:				
a)	Create a significant hazard to the public or the environment through the routine transport, use, and disposal of hazardous materials?	☑	☐	☐	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset conditions involving the release of hazardous materials into the environment?	☑	☐	☐	☐
c)	Emit hazardous emissions, or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☑	☐	☐	☐
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment?	☐	☐	☐	☑
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public use airport or a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
f)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☑
g)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑
h)	Significantly increased fire hazard in areas with flammable materials?	☑	☐	☐	☐

Introduction

Evaluation of the proposed 2016 AQMP control measures identified several control measures with the potential to generate significant adverse hazards or hazardous material impacts. Table A-1 in Appendix A lists all 2016 AQMP control measures and identifies those control measures that have the potential to generate significant adverse impacts.

Significance Criteria

The proposed project impacts associated with hazards will be considered significant if any of the following occur:

- Non-compliance with any applicable design code or regulation.
- Non-conformance to National Fire Protection Association standards.
- Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.
- Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.

Impacts deemed potentially significant will be considered further in the Draft Program EIR.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

VIII. a), b), and c): Potentially Significant Impact. The proposed 2016 AQMP has the potential to create direct or indirect hazard impacts as follows:

- Control measures that promote the reformulation of coatings with lower-VOC content (CTS-01, FLX-02, TXM-08, and CPP-01) may result in reformulated products with hazardous physical or chemical properties (e.g., highly flammable or acutely hazardous), which could create hazard impacts through the routine transport or disposal of these materials or through upset conditions involving the accidental release of these materials into the environment.
- Control measures that promote the use of SCR control equipment (CMB-05, MOB-01, ORFIS-01, ORFIS-02, and ORFIS-03) may result in the increased use of ammonia and related hazards associated with ammonia use.
- Control measures that accelerate the use of alternative clean transportation fuels may create hazard impacts in the event of an accident release of these materials into the environment (EGM-01, BCM-08, MOB-01 through MOB-05, MOB-07, MOB-10, MOB-13, ORLD-01, ORLD-03, ORHD-02, ORHD-04 through ORHD-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-07, and OFFS-08).
- Catalysts associated with ships at berth (MOB-01, ORHIS-01, ORFIS-02 and ORFIS-03).

These potential hazard impacts will be further evaluated in the Draft Program EIR.

VIII. d): No Impact. Government Code §65962.5 typically refers to a list of facilities that may be subject to Resource Conservation and Recovery Act (RCRA) permits or site cleanup activities. RCRA facilities affected by the proposed control measures would be required to continue managing hazardous materials in accordance with federal, state and local regulations. Implementation of proposed control measures is not expected to interfere with site cleanup activities or create additional site contamination. Therefore, this topic will not be further evaluated in the Draft Program EIR.

VIII. e): No Impact. The proposed project is not expected to adversely affect any airport land use plan or result in any safety hazards for people residing or working in the District. Federal Aviation Administration, 14 CFR Part 77 – Safe, Efficient Use and Preservation of the Navigable Airspace[1], defines the types of projects that may affect navigable airspace. Projects that involve construction or alteration of structures greater than 200 feet above ground level within a specified distance from the nearest runway; objects within 20,000 feet of an airport or seaplane base with at least one runway more than 3,200 feet in length and the object would exceed a slope of 100:1 horizontally (100 feet horizontally for each one foot vertically from the nearest point of the runway); etc., may adversely affect navigable airspace. No control measures in the proposed 2016 AQMP were identified that could result in construction of tall structures, especially structures 200 feet tall, near airports. Therefore, potential impacts to airport land use plans or safety hazards to people residing or working in the vicinity of local airports are not anticipated. This topic will not be further addressed in the Draft Program EIR.

VIII. f): No Impact. The proposed project would not impair implementation of, or physically interfere with adopted emergency response plan or emergency evacuation plan. Operators of existing commercial or industrial facilities affected by proposed 2016 AQMP control measures are already required to have approved emergency response plans for their facilities in place. Emergency response plans are typically prepared in coordination with the local city or county emergency plans to ensure the safety to the public and to facility employees.

Health and Safety Code §25506 specifically requires all businesses handling reportable quantities of hazardous materials to submit a business emergency response plan to assist local administering agencies in the emergency release or threatened release of a hazardous material. Business emergency response plans generally require the following:

- Identification of individuals who are responsible for various actions, including reporting, assisting emergency response personnel and establishing an emergency response team;
- Procedures to notify the administering agency, the appropriate local emergency rescue personnel, and the California Office of Emergency Services;
- Procedures to mitigate a release or threatened release to minimize any potential harm or damage to persons, property or the environment;
- Procedures to notify the necessary persons who can respond to an emergency within the facility;

[1] DEPARTMENT OF TRANSPORTATION. Federal Aviation Administration, 14 CFR Part 77 [Docket No. FAA–2006–25002; Amendment No. 77–13] RIN 2120–AH31. *Safe, Efficient Use and Preservation of the Navigable Airspace*. 42296 Federal Register / Vol. 75, No. 139 / Wednesday, July 21, 2010 / Rules and Regulations. http://www.gpo.gov/fdsys/pkg/FR-2010-07-21/pdf/2010-17767.pdf.

- Details of evacuation plans and procedures;
- Descriptions of the emergency equipment available in the facility;
- Identification of local emergency medical assistance; and,
- Training (initial and refresher) programs for employees in:
    - The safe handling of hazardous materials used by the business;
    - Methods of working with the local public emergency response agencies;
    - The use of emergency response resources under control of the handler;
    - Other procedures and resources that will increase public safety and prevent or mitigate a release of hazardous materials.

Implementing certain control measures may result in the need for additional storage of hazardous materials (e.g., ammonia). Such modifications may require revisions to emergency response plans if new hazardous are introduced to a facility. However, these modifications would not be expected to interfere with emergency response procedures. Adopting the proposed 2016 AQMP is not expected to interfere with emergency response procedures or evacuation plans and, therefore, will not be further evaluated in the Draft Program EIR.

VIII. g): No Impact. The proposed 2016 AQMP would typically affect existing commercial or industrial facilities in appropriately zoned areas. Since commercial and industrial areas are not typically located near wildland or forested areas, implementing AQMP control measures would not have the potential to increase the risk of wildland fires. Further, site preparation of industrial facilities often includes the removal of vegetation for fire safety. Therefore affected industrial facilities would be devoid of plant life, especially undisturbed wildland areas. The primary focus of the 2016 AQMP is control of mobile sources, such as the accelerated penetration of zero or low emission vehicles into District fleets. These types of control measures would not impact wildfires. This topic will not be further evaluated in the Draft Program EIR.

VIII. h): Potentially Significant Impact. Implementation of proposed control measures may result in increased transport, handling, or use of flammable materials, such as alternative clean fuels (MOB-01 through MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, EGM-01, ORLD-01, ORLD-03, ORHD-02, and ORHD-04 through ORHD-09) or coatings reformulated with potentially flammable materials that may increase potential fire hazards in areas with flammable materials (CTS-01, TXM-08, and CPP-01). On the other hand, FLX-02 promotes alternatives to traditional VOC reductions from stationary sources through incentivizing methods such as ultraviolet light and electron beam. The potential for increased probability of explosion, fire, or other hazards will be addressed in the Draft Program EIR. Impacts related to public exposure to toxic air contaminants will be addressed in the "Air Quality" section of the Draft Program EIR.

Conclusion

Based upon the above considerations, the potentially adverse significant project-specific hazard impacts due to the increased probability of explosion, fire, or other risk of upset occurrences may occur due to implementation of 2016 AQMP control measures and will, therefore be addressed in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
IX.	**HYDROLOGY AND WATER QUALITY.** Would the project:				
a)	Violate any water quality standards, waste discharge requirements, exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board, or otherwise substantially degrade water quality?	☑	☐	☐	☐
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☑	☐	☐	☐
c)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in substantial erosion or siltation on- or off-site or flooding on- or off-site?	☐	☐	☐	☑
d)	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☑
e)	Place housing or other structures within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, which would impede or redirect flood flows?	☐	☐	☐	☑
f)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, or inundation by seiche, tsunami,	☐	☐	☐	☑

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
	or mudflow?				
g)	Require or result in the construction of new water or wastewater treatment facilities or new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	☑	☐	☐	☐
h)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☑	☐	☐	☐
i)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☑	☐	☐	☐

Introduction

Evaluation of the proposed 2016 AQMP control measures identified several control measures with the potential to generate significant adverse impacts to the hydrology and water quality resources. Table A-1 in Appendix A lists all proposed 2016 AQMP control measures and identifies those control measures that have the potential to generate significant adverse impacts.

Significance Criteria

The proposed project impacts hydrology and water quality will be considered significant if:

- Water Demand:
    - The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use more than 262,820 gallons per day of potable water.
    - The project increases demand for total water by more than five million gallons per day.
- Water Quality:
    - The project will cause degradation or depletion of ground water resources substantially affecting current or future uses.
    - The project will cause the degradation of surface water substantially affecting current or future uses.
    - The project will result in a violation of National Pollutant Discharge Elimination System (NPDES) permit requirements.

- The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.
- The project results in substantial increases in the area of impervious surfaces, such that interference with groundwater recharge efforts occurs.
- The project results in alterations to the course or flow of floodwaters.

Impacts deemed potentially significant will be considered further in the Draft Program EIR.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

IX. a), g), and i): Potentially Significant Impact. Implementation of proposed control measures may result in increased or altered wastewater streams, as follows:

- Control measures that promote reformulation of coatings or solvents (CTS-01, TXM-08, and CPP-01). It is not expected that there would be a substantial increase in the volume of wastewater generated by facilities affected by the control measures, but there may be a change in the nature and toxicity of wastewater effluent.
- Control measures that result in installation of control technologies (BCM-01, BCM-03, BCM-07, TXM-01, TXM-02, and TXM-04 through TXM-08).
- Control measures that promote dust control (BCM-03, BCM-07, EGM-01, TXM-01, TXM-02, TXM-04 through TXM-07, TXM-09, and ORFIS-03).
- Control measures that promote the use of alternative fuels (EGM-01, BCM-08, MOB-01 through MOB-05, MOB-07, MOB-10, MOB-13, ORLD-01, ORLD-03, ORHD-02, ORHD-04 through ORHD-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-07, and OFFS-08). These control measures may have the potential to create water quality or groundwater quality impacts in the event of accidental releases of alternative fuels during transport, storage, or handling.

Implementation of the proposed control measures may result in the generation of increased volumes of wastewater that could adversely affect water quality standards or waste discharge requirements resulting in the need for new or increased wastewater treatment capacity. Therefore, these topics will be evaluated further in the Draft Program EIR.

IX. b) and h): Potentially Significant Impact. Implementation of proposed control measures may result in increased demand for water, as follows:

- Control measures that result in installation of control technologies (BCM-01, BCM-03, BCM-07, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, and TXM-08).
- Control measures that promote dust control or could require water for control (BCM-03, BCM-07, EGM-01, TXM-01, TXM-02, and TXM-04 through TXM-08).

These control measures may require additional water from existing ground water supply, may require expansion of existing water supply facilities or require new water supply facilities. This topic is potentially significant and will be evaluated further in the Draft Program EIR.

IX. c) & d): No Impact. Implementation of proposed control measures would not be expected to generate construction of new structures that could alter existing drainage patterns by altering the course of a river or stream that would result in substantial erosion, siltation, or flooding on or offsite, increase the rate or amount of surface runoff that would exceed the capacity of existing or planned stormwater drainage systems, etc. Construction of new structures would occur for reasons other than complying with AQMP control and could occur regardless of the 2016 AQMP. Although minor modifications might occur at commercial or industrial facilities affected by the proposed control measures, these facilities have, typically, already been graded and the areas surrounding them have likely already been paved over or landscaped. As a result, further minor modifications at affected facilities that may occur as a result of implementing the proposed control measures are not expect to alter existing drainage patterns or stormwater runoff. Since this potential adverse impact is not considered to be significant, it will not be further evaluated in the Draft Program EIR.

IX. e) and f): No Impact. Implementation of proposed control measures would not include the construction of new or relocation of existing housing or other types of facilities and, as such, would not require the placement of housing or other structures within a 100-year flood hazard area. Construction of new structures would occur for reasons other than complying with AQMP control. (See also XIII "Population and Housing"). Consequently, this topic will not be evaluated further in the Draft Program EIR.

Conclusion

Based upon the above considerations, implementing several of the proposed 2016 AQMP control measures could result in increased water demand and wastewater generation that could result in potentially significant adverse project-specific hydrology and water quality impacts and, will therefore be evaluated in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
X.	**LAND USE AND PLANNING.** Would the project:				
a)	Physically divide an established community?	☐	☐	☑	☐
b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☑	☐

Introduction

Evaluation of the proposed 2016 AQMP control measures identified no control measures with the potential to generate significant adverse impacts to land use and planning resources.

Significance Criteria

The proposed project impacts will be considered significant on land use and planning if the project conflicts with the land use and zoning designations established by local jurisdictions.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

X. a and b): Less Than Significant Impact. Implementation of proposed control measures that promote the installation of stationary source control equipment, at existing commercial or institutional facilities would not create land use impacts because construction of new structures affecting land use planning would occur for reasons other than implementation of the proposed control measures and could occur regardless of the 2016 AQMP. Furthermore, neither the SCAQMD nor CARB has land use approval authority except to impose air pollution control requirements, which do not drive the land use approval process; this authority lies within the jurisdiction of public agencies with general government authority such as cities or counties. Since the proposed 2016 AQMP does not require construction of structures or new land use developments in any areas of the District, it is not expected to physically divide any established communities within the District.

EGM-01 would affect new or redevelopment projects but would not affect the land use or zoning aspects of projects. EGM-01 would minimize air quality impacts but would not impact planning decisions made by local jurisdiction so no impacts on land use would be expected.

Implementation of proposed control measures that accelerate the use of alternative clean fuels (EGM-01, BCM-08, MOB-01 through MOB-05, MOB-07, MOB-10, MOB-13, ORLD-01, ORLD-03, ORHD-02, ORHD-04 through ORHD-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-07, and OFFS-08), would not create land use impacts because on-road vehicles would continue to operate on existing roadways and would not require construction of new roadways that could physically divide communities.

Potential land use impacts associated with the 2016 AQMP are associated primarily with the construction of support systems (e.g., catenary overhead electrical lines or magnetic infrastructure related to operation of zero- and near-zero transport systems). For purposes of evaluating potential land use impacts, it has been assumed herein that no new rail or truck traffic routes would be constructed, but rather that existing truck and rail routes/corridors would be modified. The truck and rail corridors likely to be involved with the 2016 AQMP modifications are located primarily in commercial and industrial zones within the Southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles (e.g., Navy Way) Port of Long Beach, and industrial areas in and around container transfer facilities (railway and truck routes) near the Terminal Island Freeway, along the Alameda Corridor, as well as inland railyards near downtown Los Angeles. Since only existing transportation routes would be modified (e.g., electric lines installed) and no new transportation routes are anticipated as part of the 2016 AQMP, no land use conflicts, or inconsistencies with any general plan, specific plan, local coastal program, or zoning ordinance are expected.

Implementation of 2016 AQMP control measures that could result in the construction of electric or magnetic infrastructure include MOB-02, ORHD-05, ORHD-06, ORHD-08, and ORHD-09. Construction activities would be required to install these systems and would require the use of heavy equipment to install the electric or magnetic systems. Heavy construction equipment such as backhoes, cranes, aerial lifts, front end loaders, and other types of equipment would be required for installation. The electrical or magnetic systems would be installed within or adjacent to existing roadways. These construction activities are expected to occur along heavily travelled roadways (e.g., roads near the ports, such as Sepulveda Boulevard, Terminal Island Freeway, and Alameda Street). While these projects would require local approvals, they are not expected to result in significant land use impacts as they would occur within or adjacent to existing transportation corridors.

It is possible that construction activities could temporarily disrupt or divide a community. However, because construction of new traffic routes/corridors or widening of existing routes/corridors are not required as part of the proposed project, once construction activities are finished and the physical barriers removed, no long-term land use impacts are anticipated. Therefore, from a land use perspective, none of the above construction impacts are considered to be significant. The installation of electric and/or magnetic infrastructure is only expected to occur along existing roadways/freeways and transportation corridors (e.g., Sepulveda Boulevard, Terminal Island Freeway, and Alameda Street). These roads and freeways are already heavily traveled and in many cases already divide existing communities.

For example, through portions of Carson and Los Angeles, the Alameda Corridor separate communities and there are a limited number of streets available to cross the Alameda Corridor in an east/west direction. The same is true with respect to Sepulveda Boulevard and the Terminal Island Freeways – both are heavy transportation corridors with limited opportunities to cross these roadways. Installation of electric and/or magnetic infrastructure along these corridors

would not change the existing condition (i.e., there will be limited opportunities to cross these major transportation corridors); however, the installation of the electric and/or magnetic infrastructure is not expected to create any new barriers or further physically divide an established community. Further, the electric and/or magnetic infrastructure would be expected to be constructed within or adjacent to the existing rights-of-way of existing streets and freeways, so no conflict with existing land uses, general plans, specific plans, local coastal program, zoning ordinance, or other policies would be expected. Any proposed modification to an existing rail or truck traffic route/corridor will require a separate CEQA evaluation. No significant land use impacts were identified because the proposed control measures would be expected to comply with, and not interfere with, applicable land use plans, policies, or regulations of an agency with jurisdiction over the project (including, but not limited to the general plans, specific plans, local coastal programs or zoning ordinances).

No provisions of the proposed project would directly affect applicable land use plans, policies or regulations. The SCAQMD is specifically excluded from infringing on existing city or county land use authority (California Health and Safety Code §40414). Land use and other planning considerations are determined by local governments and no present or planned land uses in the region or planning requirements will be altered by the proposed project. There are existing links between population growth, land development, housing, traffic and air quality. SCAG's 2016 RTP/SCS accounts for these links when designing ways to improve air quality, transportation systems, land use, compatibility and housing opportunities in the region. Land use planning is handled at the local level and contributes to development of the AQMP growth projections. The AQMP does not affect local government land use planning decisions; instead the AQMP incorporates local land use planning decisions and population growth. The proposed 2016 AQMP complements SCAG's Regional Comprehensive Plan.

Conclusion

Based upon the above considerations, significant adverse project-specific land use and planning impacts are not expected to occur due to implementation of the 2016 AQMP control measures and will therefore not be further analyzed in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XI.	**MINERAL RESOURCES.** Would the project:				
a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☑
b)	Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified no control measures with the potential to generate significant adverse impacts to mineral resources.

Significance Criteria

The proposed project impacts on mineral resources will be considered significant if:

- The project would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- The proposed project results in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

XI. a) and b): There are no provisions in the 2016 AQMP that would result in the loss of availability of a known mineral resource of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Some examples of mineral resources are gravel, asphalt, bauxite, and gypsum, which are commonly used for construction activities or industrial processes. The 2016 AQMP provides incentives for the penetration of zero and near-zero emission technologies which are not expected to result in an increase in the use of mineral resources. The proposed project is not expected to require substantial construction activities and would not have any significant effects on the use of important minerals, such as those described above (with the exception of the use of a minimal amount of gravel and asphalt for limited paving activities), nor

would the project result in covering over or otherwise making mineral resources unrecoverable. Therefore, no new demand for mineral resources is expected to occur and no significant adverse mineral resources impacts from implementing the proposed project are anticipated.

Conclusion

Based upon the above considerations, significant adverse project-specific impacts to mineral resources are not expected to occur due to implementation of the 2016 AQMP control measures and will, therefore, not be further evaluated in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XII.	**NOISE.** Would the project result in:				
a)	Exposure of persons to or generation of permanent noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☑	☐	☐	☐
b)	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☑	☐	☐	☐
c)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☑	☐	☐	☐
d)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public use airport or private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified several control measures with the potential to generate significant adverse noise impacts. Table A-1 in Appendix A lists all 2016 AQMP control measures and identifies those control measures that have the potential to generate significant adverse impacts.

Significance Criteria

The proposed project impacts on noise will be considered significant if:

- Construction noise levels exceed the local noise ordinances or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three decibels (dBA) at the site boundary. Construction noise levels will be considered significant if they exceed federal Occupational Safety and Health Administration (OSHA) noise standards for workers.
- The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the

replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

XII. a), b, and c): Potentially Significant Impact. Implementation of proposed control measures would promote installation of control equipment or modification of operational practices at existing commercial or industrial facilities, typically located in appropriately zoned industrial or commercial areas. Although installation of some control equipment may generate noise impacts, control equipment would typically be installed within the boundaries of industrial and commercial facilities. However, once construction is complete, air pollution control equipment does not typically generate high noise levels.

Ambient noise levels associated with commercial and industrial areas are typically driven by noise from freeway and/or highway traffic in the area and heavy-duty equipment used for materials manufacturing or processing at nearby facilities. It is not expected that installation of air pollution control equipment would substantially increase ambient [operational] noise levels in an area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. Commercial and industrial facilities are typically located in areas with high levels of local ambient noise, building walls promote noise dampening, and noise levels attenuate with separation distance. Affected facilities would be required to comply with local noise ordinances, which may require construction of noise barriers or other noise control devices. Therefore, it is not expected that noise standards established in local general plans, noise elements, or noise ordinances currently in effect would be exceeded.

Implementation of 2016 AQMP control measures that could result in the construction of electric or magnetic infrastructure that could increase noise include MOB-02, ORHD-05, ORHD-06, ORHD-08, and ORHD-09. Construction activities would be required to install these systems and would require the use of heavy equipment to install the electric or magnetic systems. Heavy construction equipment such as backhoes, cranes, aerial lifts, front end loaders, and other types of equipment would be required for installation. The electrical or magnetic systems would be installed within or adjacent to existing roadways. These construction activities are expected to occur along heavily travelled roadways (e.g., roads near the ports, such as Sepulveda Boulevard, Terminal Island Freeway, and Alameda Street). Construction activities are expected to generate noise due to the presence of heavy construction equipment. Some of the construction activities could occur near residential areas, e.g., communities adjacent to the Alameda Corridor. Therefore, noise and groundborne vibration impacts associated with the construction activities are potentially significant and will be evaluated in the Draft Program EIR.

Implementation of proposed control measures that promote the acceleration of zero emission electric vehicle technologies would result in noise reductions. Electric vehicles generate less noise than diesel or gasoline engines because the electric engines have substantially fewer moving parts than conventional engines. Therefore, increasing the fleet of electric vehicles while removing diesel or gasoline engines from the fleet is expected to result in a reduction in noise from on-road vehicles.

Implementation of proposed control measures would not result in an increase in groundborne vibration levels because air pollution control equipment is not typically vibration intensive equipment. As noted above, early penetration of zero emission electric vehicles would also not

generate groundborne vibration impacts because such vehicles have fewer moving parts that could generate vibrations compared to gasoline or diesel vehicles. Consequently, the proposed control measures would not cause substantial noise or excessive groundborne vibration impacts. Operational noise impacts, therefore, will not be further evaluated in the Draft Program EIR.

XII. d): No Impact. Although some of the facilities affected by the proposed project may be located at sites within an airport land use plan, or within two miles of a public airport, the addition of new or modification of existing control equipment would not expose people residing or working in the project area to appreciably greater noise levels. All noise producing equipment must comply with local noise ordinances and applicable OSHA or Cal/OSHA workplace noise reduction requirements. Therefore, less than significant noise impacts are expected to occur at sites located within an airport land use plan, or within two miles of a public airport.

Conclusion

Based upon the above considerations, significant adverse project-specific noise impacts could occur during construction activities associated with implementation of the 2016 AQMP control measures and, therefore, will be further evaluated in the Draft Program EIR. Operational noise impacts are expected to be less than significant.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XIII.	**POPULATION AND HOUSING.** Would the project:				
a)	Induce substantial growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?	☐	☐	☐	☑
b)	Displace substantial numbers of people or existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified no control measures with the potential to generate significant adverse impacts to population and housing resources.

Significance Criteria

The proposed project impacts on population and housing will be considered significant if:

- The demand for temporary or permanent housing exceeds the existing supply.
- The proposed project produces additional population, housing or employment inconsistent with adopted plans either in terms of overall amount or location.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

XIII. a): No Impact. According to SCAG (2016), current population in the SCAG region (which includes all of the District, the non-District portions of Los Angeles and San Bernardino counties, and all of Ventura and Imperial counties) is expected to increase by another 3.8 million people by 2040. The proposed 2016 AQMP would affect existing commercial or industrial facilities located in predominantly industrial or commercial urbanized areas throughout the District and, as such, is not anticipated to generate any significant effects, either directly or indirectly, on the District's population or population distribution as explained in the following paragraphs.

Consistent with past experience, it is expected that the existing labor pool within the southern California area would accommodate the labor requirements for any modifications requiring construction at affected facilities.

It is expected that few or no new employees would need to be hired at affected facilities to operate and maintain new control equipment on site because air pollution control equipment is typically not labor intensive equipment. In the event that new employees are hired, it is expected that the existing local labor pool in the District can accommodate the increase in worker demand that might occur as a result of adopting the proposed 2016 AQMP. Based on the above, it is not expected that the 2016 AQMP would induce population growth resulting in the need for new housing, roads or other infrastructure. As such, adopting the proposed 2016 AQMP is not expected to result in changes in population densities or induce significant growth in population. The population is expected to grow regardless of the 2016 AQMD.

Implementation of proposed mobile source control measures, such as those that would accelerate the penetration of zero or low emission vehicles into District fleets, would not induce population growth because there is a finite number of drivers in the region at any one time; drivers who purchase low or zero emission vehicles would not be driving the old high emitting vehicles at the same time they are driving the new low emitting vehicles. Although projected increases in population in the region may result in the continued use of the replaced high emitting vehicles, as already noted, future population growth in the region would occur for reasons other than complying with AQMP control measures.

XIII. b): No Impact. The 2016 AQMP contains no provisions that would cause displacement of substantial numbers of people or housing necessitating construction of replacement housing elsewhere. As noted in the discussions under "Land Use and Planning," the proposed 2016 AQMP contains control measures that may result in installing control equipment on stationary sources at existing commercial or institutional facilities and establishing emission exhaust specifications for mobile sources. Construction of new structures affecting land use planning would occur for reasons other than complying with AQMP control. The installation of electric and/or magnetic infrastructure is only expected to occur along existing roadways/freeways and transportation corridors (e.g., Sepulveda Boulevard, Terminal Island Freeway, and Alameda Street). These roads and freeways already exist and are heavily traveled. The installation of electric and/or magnetic infrastructure is not expected to displace existing housing. As a result, the proposed 2016 AQMP would not be expected to affect the location of people or housing in any areas of the District.

Conclusion

Based upon the above considerations, significant adverse project-specific population and housing impacts are not expected to occur due to implementation of the 2016 AQMP and, therefore, will not be further evaluated in the Draft Program EIR.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XIV. PUBLIC SERVICES. Would the proposal result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:				
a) Fire protection?	☐	☐	☐	☑
b) Police protection?	☐	☐	☐	☑
c) Schools?	☐	☐	☐	☑
d) Other public facilities?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified no control measures with the potential to generate significant adverse impacts to public services.

Significance Criteria

The proposed project impacts on public services will be considered significant if the project results in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or the need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response time or other performance objectives.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

XIV. a) and b): No Impact. Implementation of proposed control measures is not expected to result in significant adverse public service impacts. Although implementing 2016 AQMP control measures may increase the use of alternative clean fuels, for example, there would be a commensurate reduction in currently used petroleum fuels. As first responders to emergency situations, police and fire departments may assist local hazmat teams with containing hazardous materials, putting out fires, and crowd control to reduce public exposures to hazardous materials

releases. In many situations, implementing AQMP control measures may reduce hazardous materials use, e.g., formulating coatings with less hazardous formulations.

Although some AQMP control measures may increase the use of air pollution control equipment that uses hazardous materials (such as ammonia), no component of the proposed control measures would result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times or other performance objectives. Further, most large industrial facilities have on-site security that controls public access to facilities so no increase in the need for police services are expected. Many large industrial facilities also have on-site fire protection personnel and/or have agreements for fire protection services with local fire departments. Even in the absence of onsite police or fire protection services, implementing AQMP control measures would not hinder service ratios or response times and is not expected to require physical modifications to existing government facilities to a greater extent than is currently the case.

Finally, pursuant to the Health and Safety Code, emergency or rescue vehicles operated by local, state, and federal law enforcement agencies, police and sheriff departments, fire department, hospital, medical or paramedic facility, and used for responding to situations where potential threats to life or property exist, including, but not limited to fire, ambulance calls, or life-saving calls are specifically exempt from regulations requiring alternative clean fueled vehicles. For these reasons, implementation of the 2016 AQMP is not expected to require additional fire protection services to an extent that it would cause a need for construction of new facilities, which could cause potentially significant environmental impacts.

XIV. c): No Impact. As noted in the discussions under topic "XIII. Population and Housing," implementation of the proposed 2016 AQMP is not expected to induce population growth. Thus, implementing the proposed control measures would not increase or otherwise alter the demand for schools in the District. No significant adverse impacts to schools, such as the need for new or physically altered facilities, are foreseen as a result of the proposed 2016 AQMP.

XIV. d): No Impact. As indicated in the discussions under item "XIII. Population and Housing," implementation of proposed 2016 AQMP is not anticipated to affect population growth in the District and would not adversely affect existing public services or facilities or physically alter or require new public service facilities. Anticipated development to accommodate future population growth would occur for reasons other than complying with AQMP control measures. To address future growth, it is the responsibility of local land public agencies with general land use authority, typically cities or counties, over fire departments, police departments and other public services to address potential impacts to public services that may require new or physically altered facilities or affect service ratios, response times, or other performance objectives. Consequently, no significant adverse impacts to schools or parks are foreseen as a result of the proposed 2016 AQMP.

Conclusion

Based upon the above considerations, significant adverse project-specific public services impacts are not expected to occur due to implementation of the 2016 AQMP and will, therefore, not be further evaluated in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XV.	**RECREATION.**				
a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☑
b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment or recreational services?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified no control measures with the potential to generate significant adverse impacts to recreation resources.

Significance Criteria

The proposed project impacts on recreation will be considered significant if:

- The project results in an increased demand for neighborhood or regional parks or other recreational facilities.
- The project adversely affects existing recreational opportunities.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

XV. a) and b): No Impact. The proposed 2016 AQMP contains no provisions that would affect land use plans, policies, ordinances, regulations, or population growth, as discussed under "Land Use and Planning" and "Population and Housing." Land use and other planning considerations are determined by local governments. No land use or planning requirements, including those related to recreational facilities, will be altered by the proposed AQMP. The proposed project does not have the potential to directly or indirectly induce population growth or redistribution that could adversely affect recreational resources. As a result, the proposed project would not increase the use of, or demand for, existing neighborhood and/or regional parks or other recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

In addition, a major portion of the 2016 AQMP control measures provides incentives to increase the penetration of zero and near-zero emission mobile source technologies into the Basin. Additional control measures may also require the installation of control equipment at existing industrial/commercial facilities. These types of control measures would not impact recreational facilities as they would occur within industrial/commercial areas or would not impact land uses, including recreation facilities at all (e.g., zero and near-zero emission mobile sources). Therefore, the proposed project is not expected to result in a significant impact on recreational facilities in the Basin.

Conclusion

Based upon the above considerations, no significant adverse project-specific impacts to recreation are expected to occur due to implementation of the 2016 AQMP and, therefore, will not be further evaluated in the Draft Program EIR.

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XVI. SOLID AND HAZARDOUS WASTE. Would the project:				
a) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☑	☐	☐	☐
b) Comply with federal, state, and local statutes and regulations related to solid and hazardous waste?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified several control measures with the potential to generate significant adverse solid or hazardous waste impacts. Table A-1 in Appendix A lists all 2016 AQMP control measures and identifies those control measures that have the potential to generate significant adverse impacts.

Significance Criteria

The proposed project impacts on solid and hazardous waste will be considered significant if generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

Impacts deemed potentially significant will be considered further in the Draft Program EIR.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

XVI. a): Potentially Significant Impact. Implementation of proposed 2016 AQMP control measures would promote installation of air pollution control equipment for stationary sources (CMB-03, CMB-04, CMB-05, FLX-02, BCM-01, BCM-02, BCM-06, BCM-07, and BCM-09, BCM-10. ORFIS-03 and ORFIS-04 could result in the use of air pollution control equipment to control mobile sources (locomotive and marine vessels). These control measures could result in disposal of old equipment, scrubbers, filters and general waste. The air toxics control measures (TXM-01 through TXM-09) could also result in the disposal of old equipment, disposal of filters, or the increased generation of spent carbon. Implementation of proposed 2016 AQMP control measures would also promote the acceleration of zero emission vehicles (FLX-02, MOB-02 through MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, ORHD-04 through ORHD-09, ORFIS-03 through ORFIS-05, OFFS-01, and OFFS-04 through OFFS-07). Several control measures would accelerate the retirement of older on-road and off-road equipment (MOB-06 and

MOB-08). These control measures could result in disposal of vehicles, batteries, filters and catalysts. Implementation of proposed 2016 AQMP control measures (CTS-01, FLX-02, BCM-04, and CPP-01) could also result in disposal of old coatings and manure removal. Potential solid/hazardous waste impacts will be analyzed in the Draft Program EIR.

XVI. b): No Impact. Implementation of proposed 2016 AQMP control measures is not expected to interfere with facilities' abilities to comply with federal, state, or local statutes and regulations related to solid and hazardous waste handling or disposal. Health and Safety Code Section 40727 requires that prior to adopting or amending AQMP control measures into rules or regulations or when repealing rules, the AQMD Governing Board shall make certain findings. One of these findings is consistency, which requires that SCAQMD rules are in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or federal or state regulations. This specific topic will not be further evaluated in the Draft Program EIR.

Conclusion

Based upon the above considerations, potentially significant adverse project-specific solid/hazardous waste impacts from implementation of proposed 2016 control measures, identified in XVI. a), may occur and will, therefore, be analyzed in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XVII.	**TRANSPORTATION AND TRAFFIC.** Would the project:				
a)	Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☑
b)	Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☑	☐	☐	☐
c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d)	Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☐	☑
e)	Result in inadequate emergency access?	☐	☐	☐	☑
f)	Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☑

Introduction

Evaluation of the proposed 2016 AQMP control measures identified several control measures with the potential to generate significant adverse transportation or traffic impacts. Table A-1 in Appendix A lists all 2016 AQMP control measures and identifies those control measures that have the potential to generate significant adverse impacts.

Significance Criteria

The proposed project impacts on transportation and traffic will be considered significant if:

- A major roadway is closed to all through traffic, and no alternate route is available.
- The project conflicts with applicable policies, plans or programs establishing measures of effectiveness, thereby decreasing the performance or safety of any mode of transportation.
- There is an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.
- The demand for parking facilities is substantially increased.
- Water borne, rail car or air traffic is substantially altered.
- Traffic hazards to motor vehicles, bicyclists or pedestrians are substantially increased.
- The need for more than 350 employees.
- An increase in heavy-duty transport truck traffic to and/or from the facility by more than 350 truck round trips per day.
- Increase customer traffic by more than 700 visits per day.

Impacts deemed potentially significant will be considered further in the Draft Program EIR.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

XVII. a): No Impact. Implementation of the proposed 2016 AQMP is not expected to substantially increase vehicle trips or vehicle miles traveled in the District. The 2016 AQMP relies on transportation and related control measures developed by SCAG and included in the SCAG RTP/SCS and, thus would not conflict with the RTP. These TCMs include strategies to enhance mobility by reducing congestion through transportation infrastructure improvements, mass transit improvements, increasing telecommunications products and services, enhanced bicycle and pedestrian facilities, etc. Specific strategies that serve to reduce vehicle trips and vehicle miles traveled, such as strategies resulting in greater reliance on mass transit, ridesharing, telecommunications, etc., are expected to result in reducing traffic congestion. Although population in the District is expected to continue to increase, implementing the TCMs, in conjunction with the 2016 RTP/SCS, would ultimately result in greater percentages of the population using transportation modes other than single occupancy vehicles. As a result, relative to population growth, existing traffic loads and the level of service designation for intersections District-wide would not be expected to decline at current rates, but could possibly improve to a certain extent. Even if congestion in the region increases compared to the baseline, this would occur for reasons other than complying with 2016 AQMP control measures. Therefore, it is expected implementing the AQMP, including the TCMs could ultimately provide transportation improvements and congestion reduction benefits and would not conflict with applicable transportation plans, ordinances, or policies.

The 2016 AQMP would revise the previous motor vehicle emissions budgets with new emission calculations using the latest motor vehicle emission factors and planning assumptions. The U.S. EPA's Transportation Conformity Rule requires that transportation plans and projects must not exceed SIP motor vehicle emission budgets for attaining and maintaining health-based air quality standards or a conformity lapse would occur (preventing further funding of transportation projects). By avoiding a conformity lapse, the region would continue to receive federal funding for future transportation projects, which would generally improve traffic flow, thus, providing a beneficial traffic impact.

XVII. b): Potentially Significant Impact. Implementation of proposed 2016 AQMP control measures that accelerate the penetration of zero or low emission vehicles into District fleets would not induce congestion because there is a finite number of drivers in the region at any one time; drivers who purchase low or zero emission vehicles would not be driving the old high emitting vehicles at the same time they are driving the new low emitting vehicles. In addition, new public transit opportunities are expected to be available in the future reducing or offsetting vehicle growth.

Implementation of the 2016 AQMP control measures could result in the construction of new air pollution control equipment and new equipment at industrial facilities (e.g., new units at refineries). Construction traffic impacts may be significant, depending on the location of facilities and the amount of construction traffic generated. In addition, increased truck trips would be associated with delivery of materials (e.g., ammonia) or transport of waste generated by some of the control measures.

Implementation of 2016 AQMP control measures that could result in the construction of electric or magnetic infrastructure include ORHD-05, ORHD-06, ORHD-08, and ORHD-09. Construction activities would be required to install these systems and would require the use of heavy equipment to install the electric or magnetic systems. The existing rail and truck routes/corridors likely to be modified are expected to be located primarily in commercial and industrial zones within the Southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well as inland facilities. Since only existing transportation routes would be modified, no new roadways or railways are anticipated as part of the proposed project.

Therefore, construction activities are expected to occur along heavily travelled roadways (e.g., roads near the ports, such as Sepulveda Boulevard, Terminal Island Freeway, on Navy Way at the Port of Los Angeles, and Alameda Street). Construction traffic could potentially result in increased traffic volumes on heavily traveled streets and require temporary lane closures. Construction activities may result in the following impacts: (1) Temporary reduction in the level of service on major arterials; (2) temporary closure of a roadway or major arterial; (3) temporary closure of a railroad line; (3) temporary impact on businesses or residents within the construction area; (4) removal of on-street parking; and (5) conflicts with public transportation system (e.g., temporary removal of bus stops). However, the above listed construction traffic impacts, although temporary in nature, could be significant and will be evaluated in the Draft Program EIR.

XVII. c): No Impact. Implementation of proposed 2016 AQMP control measures would not affect air traffic or air traffic patterns. As discussed in item VIII. e), the proposed project is not

expected to adversely affect any airport land use plan or result in any safety hazards for people residing or working in the District because no AQMP control measures would result in construction or alteration of structures greater than 200 feet above ground level within the maximum 20,000-foot navigable space boundaries. In addition, it is not expected that implementing 2016 control measures would require transporting goods and materials by plane. Finally, although the 2016 AQMP includes control measure OFIS-05 and OFFS-04, it is expected that these measures would incentivize cleaner airplane engines, but would not result in a reasonably forseeable change in air traffic patterns, including either increases in traffic levels or changes in locations that result in substantial safety risks.

XVII. d): No Impact. Implementation of proposed 2016 AQMP control measures would not increase roadway design hazards or incompatible risks. Most AQMP control measures would not involve roadway construction or modifications. However, to the extent that implementing components of some of the TCMs and related measures to further develop roadway infrastructure to improve traffic flow may implicate construction, it is expected that there would ultimately be reductions in roadway hazards or incompatible risks as part of any roadway infrastructure improvements and reduced congestion.

XVII. e): No Impact. Implementation of proposed 2016 AQMP control measures would not affect emergency access routes at affected facilities. Control measures that would promote installation of air control equipment would not require major construction of any structures that might obstruct emergency access routes at any affected facilities. Control measures that would promote the acceleration of low or zero emission vehicles into the regional fleet would not change travel patterns on regional roadways compared to the baseline. Although some mobile source control measures may result in installing battery charging stations, most jurisdictions have ordinances pertaining to maintaining at existing, or constructing adequate emergency access to many existing facilities and new land use projects.

XVII. f): No Impact. Implementation of proposed 2016 AQMP control measures would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. The 2016 RTP/SCS states that the safety of people and goods is an important consideration in developing, maintaining, and operating the region's multimodal transportation system. The 2016 RTP/SCS provides TCMs aimed at reducing the per capita VMT over the next 25 years, however, total demand to move people and goods will continue to grow due to the region's population increase. A strategic expansion of the regional transportation system is needed in order to provide the region with the mobility it needs. The RTP/SCS targets this expansion around transportation systems that have room to grow, including transit, high-speed rail, active transportation, express/high occupancy transit lanes, and goods movement.

The 2016 RTP/SCS calls for expansion of transit facilities and services over the next 25 years. The local county sales tax programs, most recently Measure R in Los Angeles County, are providing funding for most of this expansion in facilities and services. The transportation and related control measures would specifically encourage and provide incentives for implementing alternative transportation programs and strategies. See also Section XVI. b) regarding consistency with other regulations.

Conclusion

Based upon the above considerations, potentially significant adverse project-specific impacts to transportation and traffic systems associated with implementation of proposed 2016 AQMP traffic control measures could result in significant adverse traffic impacts during construction activities on existing roadways. Therefore, this topic will be analyzed in the Draft Program EIR.

		Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.					
a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	☑
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	☑	☐	☐	☐
c)	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☑	☐	☐	☐

Introduction

Table A-1 in Appendix A lists all 2016 AQMP control measures and identifies those control measures that have the potential to generate significant adverse impacts.

Significance Criteria

Please see the Significance Criteria section for each environmental resource for the applicable significance criteria.

Discussion

The 2016 AQMP is designed to reduce emissions from existing emission sources and promote the lowest achievable emission rates from new emissions sources. Proposed AQMP control measures would affect existing commercial/industrial facilities and residential developments; establish specifications for coatings, fuels and mobile source exhaust emissions; accelerate the replacement of high-emitting mobile sources with zero or near-zero emitting mobile sources; establish greater control of industrial stationary sources; establish greater control of fugitive dust; improve leak detection and repair procedures; and establish educational and outreach programs.

XVIII. a): No Impact. The proposed 2016 AQMP is not expected to significantly adversely affect any biological resources including wildlife and the resources on which it relies (see the discussions under item IV, Biological Resources). Overall improvements in air quality are, ultimately, expected to provide substantial benefits to local biological resources in the District. Therefore, this topic will not be evaluated further in the Draft Program EIR.

XVIII. b): Potentially Significant Impact. The proposed 2016 AQMP may have the potential to generate significant adverse project-specific environmental impacts in several environmental areas. If project-specific impacts are deemed cumulatively considerable, the 2016 AQMP may have the potential to create significant adverse cumulative impacts. Significant adverse impacts will be further analyzed in the Draft Program EIR if impacts to any of the following project-specific environmental topic areas are deemed significant: air quality, energy, hazards and hazardous materials impacts, hydrology and water resources, noise, solid and hazardous waste, and transportation and traffic.

SCAG is required to prepare a RTP/SCS, which contains TCMs, pursuant to California Health & Safety Code §65080. SCAG is responsible for preparing and approving the portions of the plan relating to regional demographic projections and integrated regional land use, housing, employment and transportation programs, measures and strategies, and is required to analyze and provide emissions data related to its planning responsibilities to appropriate local agencies such as SCAQMD, pursuant to California Health & Safety Code §40460(b). On April 7, 2016, the 2016 RTP/SCS was adopted and the Final PEIR was certified (SCAG, 2016). Thus, SCAG's 2016 RTP/SCS and associated TCMs will be implemented regardless of the 2016 AQMP. However, the TCMs will become part of the SIP. Since the environmental impacts from the 2016 RTP/SCS and associated TCMs were analyzed in the Final PEIR, the Draft 2016 AQMP Program EIR will only evaluate potential cumulative impacts from implementing the 2016 AQMP and the TCMs evaluated in SCAG's Program EIR for the 2016 RTP/SCS.

XVIII. c): Potentially Significant Impact. The proposed 2016 AQMP may have the potential to create significant adverse impacts to human beings because it may create potentially significant adverse impacts in the following areas: air quality, energy, hazards and hazardous materials impacts, hydrology and water resources, noise, solid and hazardous waste, and transportation and traffic. Significant adverse impacts to any of these areas may have the potential to adversely affect public health. Potentially significant adverse environmental impacts that could cause substantial adverse effects on human beings, either directly or indirectly will be evaluated in the Draft Program EIR. If any impacts are concluded to be significant, evaluation of feasible mitigation measures and alternatives to the project will be included in the Draft Program EIR.

2.6 REFERENCES

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2.7 ACRONYMS

ACT	Advanced Clean Transit
AQMP	Air Quality Management Plan
AQUIP	Air Quality Improvement Program
BAR	Bureau of Automotive Repair
BARCT	Best Available Retrofit Control Technology
Basin	The South Coast Air Basin
BCM	Best Available Control Measure for Fugitive PM Sources
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standard
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CMB	Combustion Exhaust Control Measure
CO	Carbon Monoxide
CTS	Coatings and Solvents Control Measure
ECC	Energy and Climate Change Control Measure
FLX	Flexibility Programs Control Measure
FUG	Fugitive Control Measure
GHG	Greenhouse Gas
GSE	Ground Support Equipment
HDV	Heavy Duty Vehicle
HEPA Filter	High Efficiency Particulate Air Filter
HOV	High Occupancy Vehicle
HSC	Health and Safety Code
IMO	International Maritime Organization
IS	Impact Statement
ITR	Innovative Technology Regulation
LDAR	Leak Detection and Repair
LDV	Light Duty Vehicle
MCS	Multiple Component Control Measure
MDAB	Mojave Desert Air Basin
NAAQS	National Ambient Air Quality Standard
NH3	Ammonia
NO2	Nitrogen Dioxide
NOP	Notice of Preparation
NOx	Nitrogen Oxides

OandM	Operation and Maintenance
OBD	On-Board Diagnostics
PM10	Particulate matter with an aerodynamic diameter of less than 10 microns
PM2.5	Particulate matter with an aerodynamic diameter of less than 2.5 microns
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO2	Sulfur Dioxide
SSAB	Salton Sea Air Basin
SSM	Startups, Shutdowns, and Malfunctions
TCM	Transportation Control Measure
TRU	Transport Refrigeration Unit
U.S. EPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
ZEV	Zero Emission Vehicle

APPENDIX A

2016 AQMP Control Measure Environmental Analysis

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
SCAQMD Ozone Measures											
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies and Incentives	All Pollutants	Measure consists of evaluation of incentives, partnerships and promoting existing programs that would reduce criteria and GHG emissions. May encourage use of electric or low emission vehicles.			X					
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures	NOx, VOC	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions. Potential air, noise, traffic and waste impacts due to construction activities.		X				X	X	X
ECC-03	Additional Enhancement in Building Energy Efficiency and Smart Grid Technology	NOx, VOC	Measure consists of incentives to implement additional energy efficiency including smart grid systems and energy storage that would reduce criteria and GHG emissions. Potential air, noise and traffic impacts due to construction activities.		X				X	X	X
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	All Pollutants	Impacts are speculative. Measure consists of incentives and promoting cool roof technologies that would reduce energy use, and criteria and GHG emissions.	X							
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources	NOx, VOC	Energy impacts associated with the potential increase in electricity and natural gas demand. Waste impacts associated with disposal of old equipment. Potential air, noise and traffic impacts due to minor construction activities.		X	X			X	X	X
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating	NOx	Solid waste impacts associated with replacing old with new low NOx burner technologies.								X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
CMB-03	Emission Reductions from Non-Refinery Flares	NOx	Air, noise, and traffic impacts associated with construction activities. Solid waste impacts associated with replacing old with new flares.		X				X	X	X
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking	NOx	Solid waste impacts associated with replacing old with new low NOx burner technologies.								X
CMB-05	Further NOx Reductions from RECLAIM Assessment	NOx	Could require additional NOx pollution control equipment resulting in air, noise, traffic, and GHG impacts during construction. Use of SCR equipment could generate ammonia emissions and create hazards associated with the use of additional ammonia. Additional energy may be required to operate new equipment and may generate additional GHG emissions. Solid waste impacts due to burner replacement and SCR catalyst disposal.		X	X	X		X	X	X
FUG-01	Improved Leak Detection and Repair	VOC	No impacts identified. Measure consists of changes in operating practices, testing, inspection, and enforcement procedures.	X							
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants	VOC	Air and hazard impacts associated with reformulated coatings potentially containing more toxic or flammable solvents; potential increased use of water based formulations.		X		X	X			
MCS-01	Improved Breakdown Procedures and Process Re-design	All Pollutants	No impacts identified. Measure consists of changes in operating practices, testing, inspection, and enforcement procedures.	X							

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
MCS-02	Application of All Feasible Measures	All Pollutants	Impacts are speculative as it would depend on future BARCT, which evolves as new technology becomes available.	X							
FLX-01	Improved Education and Public Outreach	All Pollutants	Impacts are speculative. Measure consists of education and public outreach to guide consumer behavior.	X							
FLX-02	Stationary Source VOC Incentives	VOC	Air, hazard and water impacts associated with replacement coatings, such as UV cured resins and coatings, and super-compliant/ultra-low emission technologies. Air construction and energy impacts associated with electrification in lieu of combustion-based equipment. Waste impacts associated with disposal of combustion-based equipment.		X	X	X	X			X
SCAQMD PM2.5 Measures											
BCM-01	Further Emission Reductions from Commercial Cooking	PM	Air, water and waste impacts associated with installation and operation of control equipment, such as ESPs, filters, centrifugal separators, and misters. Energy impacts associated with electricity used to operate equipment.		X	X		X			X
BCM-02	Emission Reductions from Cooling Towers	PM	Air impacts associated with installation of drift elimination technologies. Waste impacts associated with disposal of deconstructed equipment and replacement. Water savings.		X						X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
BCM-03	Further Emission Reductions from Paved Road Dust Sources	PM	Water impacts associated with required wheel washing systems. Potential noise, traffic, and waste impacts associated with minimum street sweeping frequencies and enhanced street cleaning or enhanced best management practices.					X	X	X	X
BCM-04	Emission Reductions from Manure Management Strategies	NH3	Hazard, water and waste impacts associated with acidifier application, manure removal, and manure slurry injection. Air and energy impacts associated with poultry manure thermal gasification. No impacts associated with dietary manipulation/feed additives.		X	X	X	X			X
BCM-05	Ammonia Emission Reduction from NOx Controls	NH3	Air, energy, hazard, and waste impacts associated with the use SCR control equipment. Air, noise, and traffic impacts associated with construction activities.		X	X	X		X	X	X
BCM-06	Emission Reductions from Abrasive Blasting Operations	PM	Air, noise and traffic impacts associated with construction of exhaust ventilation to a fabric filter for permanent in-building abrasive blasting activities. Energy and waste impacts associated with the use of additional portable control equipment, such as negative air machines, portable fume extractors and portable dust collectors with HEPA filters.		X	X			X	X	X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations	PM	Air, noise, and traffic impacts associated with construction of engineering controls, such as exhaust ventilation with dust collectors. Energy impacts associated with the use of engineering controls. Water impacts associated with wet methods to prevent dust release. Waste impacts associated with housekeeping measures, such as vacuuming with HEPA filter, wet-wiping, or wet sweeping.		X	X		X	X	X	X
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning	PM	Air and waste impacts associated with the use of chipping/grinding or composting as alternatives to agricultural burning. Air, hazard, water and waste impacts associated with the increased utilization of clean fuels for training burns.		X		X	X		X	X
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves	PM	Air and waste impacts associated with the construction/upgrading of wood-burning hearths to cleaner hearths. Energy impacts associated with cleaner hearths, such as natural gas or electric hearths. No impacts associated with increasing the stringency of the curtailment program or with education.		X	X				X	X
BCM-10	Emission Reductions from Greenwaste Composting	NH3, VOC	Air, energy, water and waste impacts associated with controls such as anaerobic digestion and organic processing technology. No impacts associated with improved emissions characterization or restrictions for direct applications of un-composted waste to public lands.		X	X		X			X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
SCAQMD Mobile Source Measures											
MOB-01	Emission Reductions at Commercial Marine Ports	NOx, SOx, CO	Financial incentives for cleaner vessels, vehicles and equipment can result in air (construction, combustion of alternative fuels) and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Potential air, noise and traffic impacts associated with construction activities. Waste impacts can result from battery disposal and turnover of older equipment.		X	X	X	X	X	X	X
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities	NOx, PM	Accelerating the penetration of zero and near–zero emission locomotives can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal and turnover of older equipment.		X	X	X	X			X
MOB-03	Emission Reductions at Warehouse Distribution Centers	All Pollutants	Potential air, energy, hazards, water and waste impacts associated with zero and near-zero technologies, dust control; alternative fuels; diesel PM filters; low-emitting engines; and low VOC materials.		X	X	X	X			X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
MOB-04	Emission Reductions at Commercial Airports	All Pollutants	Potential air, energy, hazards, water and waste impacts associated with zero and near-zero technologies, alternative fuels; diesel PM filters; low-emitting engines; low VOC materials; energy conservation; and mitigation fees.		X	X	X	X			X
MOB-05	Accelerated Penetration of Partial-Zero Emissions and Zero Emissions Vehicles	VOC, NOx, CO	Accelerating the penetration of zero and near–zero emission vehicles can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additives. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-duty Vehicles	VOC, NOx, CO	Retirement of older vehicles could result in increased waste associated with vehicle scrapping.								X
MOB-07	Accelerated Penetration of Partial-Zero and Zero Emission Light-Heavy and Medium- Heavy-Duty Vehicles	NOx, PM	Accelerating the penetration of zero and near–zero emission heavy duty vehicles can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additives. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X
MOB-08	Accelerated Retirement of Older On-Road Heavy-duty Vehicles	NOx, PM	Retirement of older heavy-duty vehicles could result in increased waste associated with vehicle scrapping.								X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program	NOx, PM	Emission reductions could include zero emission technologies which could result in air (construction, combustion of alternative fuels) and energy (electrical/natural gas demand) impacts. Air, noise and traffic impacts potentially generated from construction of electric or magnetic power built into roadway infrastructure. Waste impacts can result from battery disposal.		X	X	X	X	X	X	X
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment	NOx	Technologies to reduce emissions from heavy-duty equipment can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additives. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X
MOB-11	Extended Exchange Program	VOC, NOx, CO	Retirement of older off-road engines could result in increased waste associated with engine replacement and scrapping.								X
MOB-12	Further Emission Reductions from Passenger Locomotives	NOx, PM	Replacement of Tier 0 locomotives with Tier 4 locomotives could result in increased waste associated with engine replacement.								X
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program	NOx, SOx, PM	Accelerating the penetration of zero and near–zero emission off-road mobile sources can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
MOB-14	Emission Reductions from Incentive Programs.	NOx, PM	This is an administrative measure that allows the SCAQMD to take credit for emission reductions for SIP purposes achieved through past and future projects. No environmental impacts expected.	X							
EGM- 01	Emission Reductions from New Development or Redevelopment Projects	All Pollutants	Accelerating the penetration of zero and near-zero emission technologies can result in air and energy demand impacts. Potential air, energy, hazard, water, and waste impacts associated with dust control; alternative fuels; diesel PM filter, low-emitting engines; low VOC materials, energy conservation; mitigation fees.		X	X	X	X			X
SCAQMD Air Toxic Control Measures											
TXM-01	Control of Metal Particulate from Metal Grinding Operations	TACs, PM	Air, noise, and traffic impacts associated with construction of enclosures and control equipment, such as exhaust ventilation with dust collectors. Energy impacts associated with the use of control equipment. Water impacts associated with wet methods to prevent dust release. Waste impacts associated with housekeeping measures, such as vacuuming with HEPA filter, wet-wiping, or wet sweeping.		X	X		X	X	X	X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations	TACs, PM	Air, noise, and traffic impacts associated with equipment modifications, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors. Energy impacts associated with the use of control equipment. Water impacts associated with wet methods to prevent dust release. Waste impacts associated with housekeeping measures, such as vacuuming with HEPA filter, wet-wiping, or wet sweeping.		X	X		X	X	X	X
TXM-03	Control of Hexavalent Chromium from Chrome Spraying Operations	TACs, PM	Waste impacts associated with housekeeping and best management practices.								X
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soil	TACs, PM	Air, noise, and traffic impacts associated with construction of enclosures and control equipment, such as HEPA filters. Energy impacts associated with the use of control equipment. Water impacts associated with wet methods to prevent dust release. Waste impacts associated with housekeeping measures.		X	X		X	X	X	X
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting	TACs, PM	Air, noise, and traffic impacts associated with construction of enclosures and control equipment, such as HEPA filters. Energy impacts associated with the use of control equipment. Potential water impacts associated with alternative technologies		X	X		X	X	X	X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
TXM-06	Control of Toxic Emissions from Metal Melting Facilities	TACs, PM	Air, noise, and traffic impacts associated with construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses. Energy impacts associated with the use of control equipment. Waste and water impacts associated with housekeeping measures, such as vacuuming with HEPA filter, wet-wiping, or wet sweeping.		X	X		X	X	X	X
TXM-07	Control of Lead Emissions from Stationary Sources	TACs, PM	Air, noise, and traffic impacts associated with construction of new equipment. Air and energy impacts associated with the use of control equipment. Waste and water impacts associated with housekeeping and best management practices.		X	X		X	X	X	X
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings	Methylene Chloride	Air and hazard impacts associated with reformulated solvents potentially containing more toxic or flammable solvents; potential increased use of water based formulations. Use of activated carbon which can increase energy use and solid waste disposal.		X	X	X	X			X
TXM-09	Control of Toxic Emissions from Oil and Gas Well Activities	TACs, PM	Air, noise, and traffic impacts associated with construction of enclosures and control equipment. Energy impacts associated with the use of control equipment. Waste impacts associated with housekeeping measures, such as vacuuming with HEPA filter, wet-wiping, or wet sweeping.		X	X			X	X	X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
CARB Mobile Control Measures (NOTE: In the latest CARB SIP Strategy document the control measure numbers have been eliminated. They are continued to be used herein for ease in reference and discussion of environmental impacts.)											
On-Road Light-Duty											
ORLD-01	Advanced Clean Cars 2	NOx, ROG	Expanded/new standards can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X
ORLD-02	Lower In-Use Emission Performance Assessment	Tbd	No impacts associated with a study to further evaluate the ongoing Smog Check Inspection program.	X							
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles	NOx, ROG	Accelerating the penetration of zero and near–zero emission vehicles can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X
On-Road Heavy-Duty											
ORHD-01	Lower In-Use Emission Performance Level for Heavy Duty Vehicles	Tbd	No impacts are associated with changes in operating practices, testing, inspection, or enforcement procedures.	X							

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
ORHD-02	Low-NOx Engine Standards	NOx	Technologies to reduce emissions from heavy-duty engines can result in air and energy (electrical/natural gas demand) impacts.. Hazard impacts can result from the use of alternative fuels and fuel additives. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X
ORHD-03	Medium and Heavy-Duty GHG Phase 2	All pollutants	Potential impacts are considered to be speculative because the measure does not identify specific control technologies but is aiming at energy efficient improvements in car design.	X							
ORHD-04	Advanced Clean Transit	NOx, ROG	Accelerating the penetration of zero and near–zero emission buses can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X		X	X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
ORHD-05	Last Mile Delivery	NOx, ROG	Accelerating the penetration of zero and near–zero emission last mile delivery trucks can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Air, noise and traffic impacts potentially generated from construction of electric or magnetic power built into roadway infrastructure. Waste impacts can result from battery disposal.		X	X	X	X	X	X	X
ORHD-06	Innovative Technology Certification Flexibility	NOx	The penetration of zero and near–zero emission heavy duty vehicles can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Air, noise and traffic impacts potentially generated from construction of electric or magnetic power built into roadway infrastructure. Waste impacts can result from battery disposal.		X	X	X	X	X	X	X
ORHD-07	Zero Emission Airport Shuttle Buses	NOx, ROG, PM2.5	Accelerating the penetration of zero and near–zero emission airport shuttle buses can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles	NOx, ROG, PM2.5	Accelerating the penetration of zero and near–zero emission heavy duty vehicle engines can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Air, noise and traffic impacts potentially generated from construction of electric or magnetic power built into roadway infrastructure. Waste impacts can result from battery disposal.		X	X	X	X	X	X	X
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles	NOx, ROG, PM2.5	Accelerating the penetration of zero and near–zero emission engines can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Air, noise and traffic impacts potentially generated from construction of electric or magnetic power built into roadway infrastructure. Waste impacts can result from battery disposal.		X	X	X	X	X	X	X
Marine, Rail, and Aircraft Off-Road											
ORFIS-01	More Stringent National Locomotive Standards	NOx, ROG	Air and hazard impacts associated with the use of Tier 5 control equipment, such as SCRs, alternative fuels and fuel additives. Energy impacts can result from the use of alternative fuels. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from catalyst, DPM filters and electric batteries.		X	X	X	X			X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
ORFIS-02	Tier 4 Vessel Standards	NOx	No impacts are associated with the petition that new vessels meet Tier 4 IMO standards by 2025.	X							
ORFIS-03	Incentivize Low Emission Efficient Ship Visits	NOx, PM	Air and hazard impacts associated with the use of control equipment, such as SCRs. Energy impacts can result from the use of electricity. Waste impacts from ships associated with disposal of catalysts while in the ports.		X	X	X				X
ORFIS-04	At-Berth Regulation Amendments	NOx, ROG	Air impacts associated with increased energy generation. Energy impacts associated with increased use of shore-side power. Hazard, water, and waste impacts from ships associated with disposal of catalysts while in the ports. Air, noise and traffic impacts associated with construction activities		X	X	X	X	X	X	X
OFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources	NOx, ROG	This measure would accelerate deployment of cleaner marine, rail, and aircraft off-road technology by increasing incentive programs. Accelerating the penetration of zero and near–zero emission technologies can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
Other Off-Road											
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	NOx, ROG	Accelerating the penetration of zero emission technologies can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X
OFFS-02	Zero Emission Off-Road Emission Reduction Assessment	Tbd	Potential impacts are considered to be speculative because the measure does not identify specific control technologies and relies on development of future technologies.	X							
OFFS-03	Zero Emission Off-Road Worksite Emission Reduction Assessment	Tbd	Potential impacts are considered to be speculative because the measure does not identify specific control technologies and relies on development of future technologies.	X							
OFFS-04	Zero Emission Airport Ground Support Equipment	NOx, ROG, PM2.5	Accelerating the penetration of zero emission technologies can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Waste impacts can result from battery disposal.		X	X	X				X
OFFS-05	Small Off-Road Engines	NOx, ROG	Accelerating the penetration of zero emission technologies can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X

2016 AQMP PROPOSED CONTROL MEASURES											
				Potential Impact							
Control Measure Number	**Title**	**Pollutant**	**Source of Impact**	**Not Significant**	**Air**	**Energy**	**Hazard**	**Water**	**Noise**	**Traffic**	**Waste**
OFFS-06	Transport Refrigeration Units Used for Cold Storage	NOx, PM, GHG	Accelerating the penetration of zero emission technologies can result in air and energy (electrical demand) impacts.		X	X					
OFFS-07	Low Emission Diesel Requirement	NOx, PM	Reformulated diesel fuel can result in air (construction impacts at refineries), and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additives. Water (surface and ground) impacts can result from accidental spills. Potential air, noise and traffic impacts associated with construction activities. Waste impacts can result from increased use of catalyst.		X	X	X	X	X	X	X
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment	NOx, ROG, PM2.5	Accelerating the penetration of zero emission technologies can result in air and energy (electrical/natural gas demand) impacts. Hazard impacts can result from the use of alternative fuels and fuel additive. Water (surface and ground) impacts can result from accidental spills. Waste impacts can result from battery disposal.		X	X	X	X			X
Consumer Products											
CPP-01	Consumer Products Program	ROG	Air and hazard impacts associated with reformulated consumer products could potentially contain more toxic or flammable solvents; potential increased use of water based formulations.		X		X	X			

APPENDIX B

COMMENT LETTERS RECEIVED ON THE NOTICE OF PREPARATION / INITIAL STUDY (NOP/IS) AND RESPONSES TO COMMENTS

APPENDIX B

COMMENT LETTERS RECEIVED ON THE NOP/IS AND RESPONSES TO COMMENTS

INTRODUCTION

The following responds to comments received on the NOP/IS for the 2016 Air Quality Management Plan. The NOP/IS was circulated for a 30-day public review and comment period starting Tuesday, July 5, 2016 and ending Thursday, August 4, 2016. Six public workshops/CEQA scoping meetings were held for the proposed project at the following locations and times.

Workshop Date	Time	Locations	Address	County
July 14, 2016	10:00 am	Coachella Valley Assn. of Governments	72-710 Fred Waring Dr., Palm Desert, CA	Riverside
July 14, 2016	6:00 pm	SCAQMD Headquarters	21865 Copley Dr. Diamond Bar, CA	Los Angeles
July 20, 2016	9:30 am	Buena Park Community Center	6688 Beach Blvd., Buena Park, CA	Orange
July 20, 2016	2:00 pm	Carson Center	801 East Carson Street, Carson, CA	Los Angeles
July 21, 2016	9:30 am	Norton Regional Events Center	1601 E. 3rd St., San Bernardino, CA	San Bernardino
July 21, 2016	2:00 pm	Hyatt Place Riverside	3500 Market Street, Riverside	Riverside

The SCAQMD received nine comment letters on the NOP/IS during the public review period. The comment letters and individual responses to all comments related to potential environmental impacts from the proposed project are provided in this appendix. The individual comments are bracketed and numbered. The related responses are identified with the corresponding number and are included following each comment letter.

All comments received have been reviewed by SCAQMD staff and incorporated where appropriate in the analysis conducted for the Draft Program EIR. However, the comment letters received do not change any of the SCAQMD's significance determinations for any of the environmental topic areas analyzed in the NOP/IS.

TABLE A-1

List of Comment Letters Received on the 2016 Air Quality Management Plan NOP/IS

Comment Letter	Commenter
A-1	Native American Heritage Commission (NAHC)
A-2	Western States Petroleum Association (WSPA)
A-3	Gregory Nord
A-4	RadTech
A-5	Southern California Association of Governments (SCAG)
A-6	Port of Los Angeles
A-7	Port of Long Beach
A-8	Gatzke Dillon & Balance LLP
A-9	Yvonne Watson
A-10	Harvey Eder

Comment Letter A-1

STATE OF CALIFORNIA
NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Fax (916) 373-5471
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

Edmund G. Brown Jr., Governor

July 6, 2016

Jillian Wong
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765

Sent via e-mail:
jwong1@aqmd.gov

RE: SCH# 2016071006; SCAQMD 2016 Air Quality Management Plan Project, draft Environmental Impact Report, Orange, Los Angeles, Riverside and San Bernardino Counties, California

Dear Ms. Wong:

The Native American Heritage Commission has received the Notice of Preparation (NOP) for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), specifically Public Resources Code section 21084.1, states that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, § 15064.5 (b) (CEQA Guidelines Section 15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an environmental impact report (EIR) shall be prepared. (Pub. Resources Code § 21080 (d); Cal. Code Regs., tit. 14, § 15064 subd.(a)(1) (CEQA Guidelines § 15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources with the area of project effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a **separate category of cultural resources**, "tribal cultural resources" (Pub. Resources Code § 21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code § 21084.3 (a)). **AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. § 800 et seq.) may also apply. A-1.1

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments. **Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.**

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
    a. A brief description of the project.
    b. The lead agency contact information.
    c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code § 21080.3.1 (d)).
    d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code § 21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code § 21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or environmental impact report. (Pub. Resources Code § 21080.3.1(b)).
    a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code § 65352.4 (SB 18). (Pub. Resources Code § 21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
    a. Alternatives to the project.
    b. Recommended mitigation measures.
    c. Significant effects. (Pub. Resources Code § 21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
    a. Type of environmental review necessary.
    b. Significance of the tribal cultural resources.
    c. Significance of the project's impacts on tribal cultural resources.
    d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code § 21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code sections 6254 (r) and 6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code § 21082.3 (c)(1)).

A-1.1 Cont.

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
    a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
    b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code section 21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code § 21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code § 21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code section 21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code section 21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code § 21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code section 21084.3 (b). (Pub. Resources Code § 21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
   i. Protecting the cultural character and integrity of the resource.
   ii. Protecting the traditional use of the resource.
   iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code § 21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a nonfederally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code § 815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code § 5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An environmental impact report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code sections 21080.3.1 and 21080.3.2 and concluded pursuant to Public Resources Code section 21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code section 21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code § 21082.3 (d)).

    This process should be documented in the Cultural Resources section of your environmental document.

A-1.1 Cont.

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code § 65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code § 65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code section 65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code sections 5097.9 and 5097.993 that are within the city's or county's jurisdiction. (Gov. Code § 65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

3

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
   a. If part or all of the APE has been previously surveyed for cultural resources.
   b. If any known cultural resources have been already been recorded on or adjacent to the APE.
   c. If the probability is low, moderate, or high that cultural resources are located in the APE.
   d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
   a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
   b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, section 15064.5(f) (CEQA Guidelines section 15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code section 7050.5, Public Resources Code section 5097.98, and Cal. Code Regs., tit. 14, section 15064.5, subdivisions (d) and (e) (CEQA Guidelines section 15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

Please contact me if you need any additional information at gayle.totton@nahc.ca.gov.

Sincerely,



Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst

cc: State Clearinghouse

4

A-1.2

Response to Comment Letter A-1

Response A-1.1 and A-1.2

SCAQMD appreciates the cited excerpts and provisions of AB 52 and SB 18. The NAHC, as well as a contact list of tribes affiliated with the Basin (which was provided by the NAHC), were properly notified at the time of the release of the NOP/IS. No specific comments on the analysis in the NOP/IS was provided. Therefore, no response is necessary.

Comment Letter A-2

WSPA

Western States Petroleum Association

Credible Solutions • Responsive Service • Since 1907

Sue Gornick
Manager, SoCal Technical

VIA ELECTRONIC MAIL

July 21, 2016

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comments on the Notice of Preparation (NOP) and Initial Study for the Draft Program Environmental Impact Report (PEIR) for the 2016 Air Quality Management Plan (AQMP)

Dear Dr. Fine:

Western States Petroleum Association (WSPA) is a non-profit trade association representing twenty-five companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California, Arizona, Nevada, Oregon, and Washington. WSPA has been an active participant in air quality planning issues for over 30 years. WSPA-member companies operate petroleum refineries and other facilities in the South Coast Air Basin and thus have a major stake in the Air Quality Management Plan (AQMP) being prepared by the South Coast Air Quality Management District (SCAQMD or District), and any rule developments that might stem from the final AQMP as adopted by the District's Governing Board. A-2.1

WSPA appreciates the opportunity to submit these comments on the Notice of Preparation (NOP) and Initial Study (IS) for the Draft Program Environmental Impact Report (PEIR) for the 2016 Air Quality Management Plan (AQMP). Our comments are as follows:

1. **The NOP/IS fails to discuss the alternatives analysis required under the California Environmental Quality Act (CEQA) Guidelines, and so does not provide the public with any information concerning the range of alternatives which will be considered in the PEIR.** A-2.2

Under the CEQA Guidelines (§15126.6), the Draft PEIR is required to discuss and compare alternatives to the proposed project which could feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project,

and evaluate the comparative merits of the alternatives.[1] The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives.[2] The alternatives considered should avoid or substantially lessen any of the significant effects of the project, and the range of feasible alternatives must be selected and discussed in a manner to foster meaningful public participation and informed decision making.[3]

The 2016 AQMP will be a regionally significant "program" and AQMD staff has already acknowledged that it may have potential adverse environmental effects in a number of areas including air quality, greenhouse gases, energy, hazards & hazardous materials, hydrology and water quality, noise, solid and hazardous waste, and transportation and traffic.[4] Additionally, the strategy outlined in the initial Draft AQMP would involve significant costs to both public and private stakeholders. Yet the NOP/IS released for the 2016 AQMP does not even mention that an alternatives analysis will be conducted in the PEIR, or describe the range of alternatives to be considered. The subject of the alternatives analysis was also not addressed during the Staff presentation made at the recent Public Scoping Meeting.[5]

A-2.2 Cont.

The CEQA Guidelines require that alternatives "must be selected and discussed in a manner to foster meaningful public participation and informed decision making."[6] We recommend that a separate public meeting should be conducted specifically to allow public participation in the selection of the alternatives which might be considered in the PEIR.

2. The Draft PEIR schedule does not allow for reasonable consideration of public comments received in response to the Notice of Preparation (NOP).

While AQMD may have provided a minimum 30-day requirement period for public comments after the NOP release date, the anticipated August release for the Draft PEIR does not allow for reasonable consideration of those comments, some of which could be delivered as late as August 4th (i.e., the close of the public comment period). The schedule for the Draft PEIR should be relaxed to ensure that all public input can be meaningfully considered. This is especially necessary for the alternatives analysis since, as noted above, the public has so far been given no information concerning the project alternatives to be considered or opportunity for comment on same.

A-2.3

[1] CEQA Guidelines §15126.6 (a).
[2] CEQA Guidelines §15126.6 (a).
[3] CEQA Guidelines §15126.6 (f).
[4] SCAQMD, NOP/IS for the Draft Program Environmental Impact Report (EIR) for the 2016 AQMP, 30 June 2016.
[5] SCAQMD, Public Scoping Meeting for the NOP/IS for the Draft Program Environmental Impact Report (EIR) for the 2016 AQMP, 14 July 2016. See Item #3.
[6] CEQA Guidelines §15126.6 (f).

3. **The alternatives analysis should include a "Reduced Measures" alternative. That alternative would focus the AQMP control strategy around the 2016 State Strategy for the State Implementation Plan, and exclude all measures not needed to minimally achieve the region's carrying capacity targets for attainment of the National Ambient Air Quality Standards (NAAQS).**

As presented in the draft AQMP,[7] the Staff's proposal appears to include a large number of control measures which are actually not necessary for meeting the AQMP objectives. This situation is possible due to the significant emission reductions projected under the 2016 State Strategy. However, the draft AQMP includes dozens of other measures which have not been shown to be necessary for reaching the region's so-called "carrying capacity." These "extra" measures, some of which have no quantified emission benefit, would impose considerable costs on the Southern California economy.

A-2.4

The CEQA Guidelines demand the consideration of alternatives which could avoid or substantially lessen any of the significant effects of this AQMP.[8] Therefore, the alternatives analysis should include a Reduced Measures Alternative. The strategy for this Alternative would be limited to the 2016 State Strategy and only those measures needed to minimally achieve the region's carrying capacity targets for attainment of the ozone and particulate matter NAAQS as outlined in the program objectives.

WSPA appreciates the opportunity to submit these comments and we reserve the right to supplement them as this process moves forward. Please contact me with any questions at (310) 808-2146 or sgornick@wspa.org.

A-2.5

Sincerely,

Suzanne E. Gornick

cc: Jillian Wong, SCAQMD

[7] SCAQMD, Draft 2016 AQMP, Table ES-2 (June 2016).
[8] CEQA Guidelines §15126.6 (f).

Response to Comment Letter A-2

Comment A-2.1

Western States Petroleum Association (WSPA) is a non-profit trade association representing twenty-five companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California, Arizona, Nevada, Oregon, and Washington. WSPA has been an active participant in air quality planning issues for over 30 years. WSPA-member companies operate petroleum refineries and other facilities in the South Coast Air Basin and thus have a major stake in the Air Quality Management Plan (AQMP) being prepared by the South Coast Air Quality Management District (SCAQMD or District), and any rule developments that might stem from the final AQMP as adopted by the District's Governing Board.

WSPA appreciates the opportunity to submit these comments on the Notice of Preparation (NOP) and Initial Study (IS) for the Draft Program Environmental Impact Report (PEIR) for the 2016 Air Quality Management Plan (AQMP). Our comments are as follows:

A-2.1

Response A-2.1

Thank you for the comment. Since no issues were raised regarding the NOP/IS, no response is necessary.

Comment A-2.2

1. **The NOP/IS fails to discuss the alternatives analysis required under the California Environmental Quality Act (CEQA) Guidelines, and so does not provide the public with any information concerning the range of alternatives which will be considered in the PEIR.**

Under the CEQA Guidelines (§15126.6), the Draft PEIR is required to discuss and compare alternatives to the proposed project which could feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project,

A-2.2

and evaluate the comparative merits of the alternatives.[1] The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives.[2] The alternatives considered should avoid or substantially lessen any of the significant effects of the project, and the range of feasible alternatives must be selected and discussed in a manner to foster meaningful public participation and informed decision making.[3]

The 2016 AQMP will be a regionally significant "program" and AQMD staff has already acknowledged that it may have potential adverse environmental effects in a number of areas including air quality, greenhouse gases, energy, hazards & hazardous materials, hydrology and water quality, noise, solid and hazardous waste, and transportation and traffic.[4] Additionally, the strategy outlined in the initial Draft AQMP would involve significant costs to both public and private stakeholders. Yet the NOP/IS released for the 2016 AQMP does not even mention that an alternatives analysis will be conducted in the PEIR, or describe the range of alternatives to be considered. The subject of the alternatives analysis was also not addressed during the Staff presentation made at the recent Public Scoping Meeting.[5]

The CEQA Guidelines require that alternatives "must be selected and discussed in a manner to foster meaningful public participation and informed decision making."[6] We recommend that a separate public meeting should be conducted specifically to allow public participation in the selection of the alternatives which might be considered in the PEIR.

A-2.2 Cont.

[1] CEQA Guidelines §15126.6 (a).
[2] CEQA Guidelines §15126.6 (a).
[3] CEQA Guidelines §15126.6 (f).
[4] SCAQMD, NOP/IS for the Draft Program Environmental Impact Report (EIR) for the 2016 AQMP, 30 June 2016.
[5] SCAQMD, Public Scoping Meeting for the NOP/IS for the Draft Program Environmental Impact Report (EIR) for the 2016 AQMP, 14 July 2016. See Item #3.
[6] CEQA Guidelines §15126.6 (f).

Response A-2.2

Project alternatives are included and evaluated in Chapter 6 of the Draft Program EIR. Alternatives are not required to be discussed in the NOP/IS pursuant to CEQA Guidelines §15082(a)(1). Six public workshops/CEQA scoping meetings were held for the proposed project at the following locations and times in order to solicit public participation.

Workshop Date	Time	Locations	Address	County
July 14, 2016	10:00 am	Coachella Valley Assn. of Governments	72-710 Fred Waring Dr., Palm Desert, CA	Riverside
July 14, 2016	6:00 pm	SCAQMD Headquarters	21865 Copley Dr. Diamond Bar, CA	Los Angeles
July 20, 2016	9:30 am	Buena Park Community Center	6688 Beach Blvd., Buena Park, CA	Orange
July 20, 2016	2:00 pm	Carson Center	801 East Carson Street, Carson, CA	Los Angeles
July 21, 2016	9:30 am	Norton Regional Events Center	1601 E. 3rd St., San Bernardino, CA	San Bernardino
July 21, 2016	2:00 pm	Hyatt Place Riverside	3500 Market Street, Riverside	Riverside

The Draft Program EIR, including the discussion and evaluation of project alternatives in Chapter 6 will be released for a 60-day public review and comment period from September 16 to November 15, 2016. Additionally, a second round of public meetings in the form of regional public hearings will be held to allow additional public participation and input.

Comment A-2.3

2. The Draft PEIR schedule does not allow for reasonable consideration of public comments received in response to the Notice of Preparation (NOP).

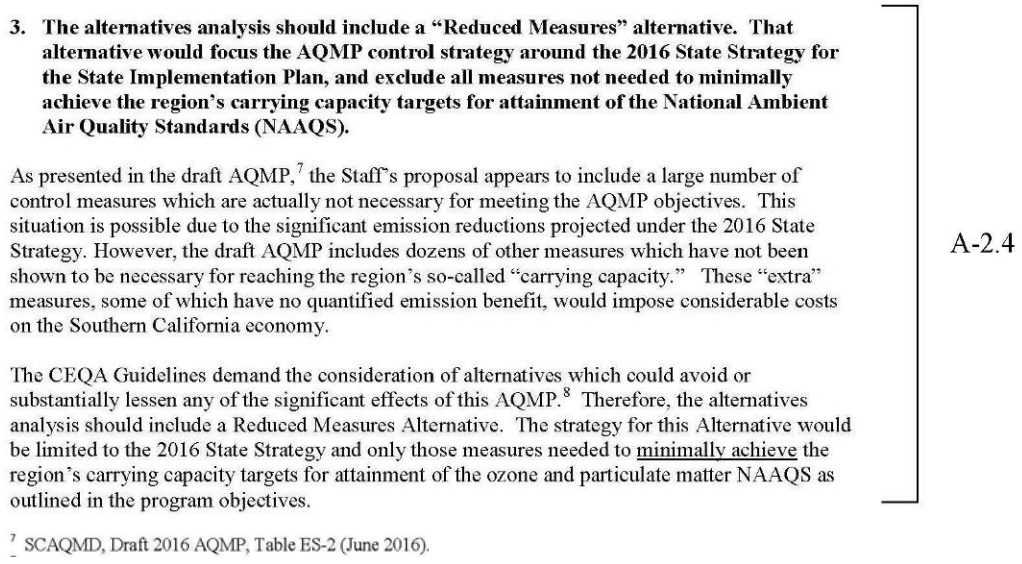
While AQMD may have provided a minimum 30-day requirement period for public comments after the NOP release date, the anticipated August release for the Draft PEIR does not allow for reasonable consideration of those comments, some of which could be delivered as late as August 4th (i.e., the close of the public comment period). The schedule for the Draft PEIR should be relaxed to ensure that all public input can be meaningfully considered. This is especially necessary for the alternatives analysis since, as noted above, the public has so far been given no information concerning the project alternatives to be considered or opportunity for comment on same.

A-2.3

Response A-2.3

The Draft Program EIR has considered all comments received on the NOP/IS and responses to those comments are included. The Draft Program EIR and the alternatives analysis will be released for a 60-day public review and comment period from September 16 to November 15, 2016.

Comment A-2.4



3. The alternatives analysis should include a "Reduced Measures" alternative. That alternative would focus the AQMP control strategy around the 2016 State Strategy for the State Implementation Plan, and exclude all measures not needed to minimally achieve the region's carrying capacity targets for attainment of the National Ambient Air Quality Standards (NAAQS).

As presented in the draft AQMP,[7] the Staff's proposal appears to include a large number of control measures which are actually not necessary for meeting the AQMP objectives. This situation is possible due to the significant emission reductions projected under the 2016 State Strategy. However, the draft AQMP includes dozens of other measures which have not been shown to be necessary for reaching the region's so-called "carrying capacity." These "extra" measures, some of which have no quantified emission benefit, would impose considerable costs on the Southern California economy.

The CEQA Guidelines demand the consideration of alternatives which could avoid or substantially lessen any of the significant effects of this AQMP.[8] Therefore, the alternatives analysis should include a Reduced Measures Alternative. The strategy for this Alternative would be limited to the 2016 State Strategy and only those measures needed to minimally achieve the region's carrying capacity targets for attainment of the ozone and particulate matter NAAQS as outlined in the program objectives.

[7] SCAQMD, Draft 2016 AQMP, Table ES-2 (June 2016).

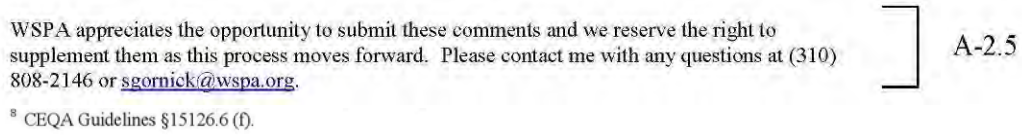
A-2.4

Response A-2.4

The Draft Program EIR will have an alternative that focuses only on mobile sources and not implement stationary source measures. SCAQMD staff's goal for the 2016 AQMP was to propose a comprehensive plan with all feasible measures. The "extra measures" referred to in the comment are not needed in the attainment demonstration and would need additional technical assessment in order to be quantified. Additionally, there may be the possible need for contingency measures and shortfall reductions.

The Draft Program EIR alternatives analysis presented in Chapter 6 includes an alternative that only proposes a regulatory control approach.

Comment A-2.5



WSPA appreciates the opportunity to submit these comments and we reserve the right to supplement them as this process moves forward. Please contact me with any questions at (310) 808-2146 or sgornick@wspa.org.

[8] CEQA Guidelines §15126.6 (f).

A-2.5

Response A-2.5

Thank you for the comment. No response is necessary.

Comment Letter A-3

From: Gregory Nord [mailto:gnord@octa.net]
Sent: Friday, July 29, 2016 4:27 PM
To: Jillian Wong <jwong1@aqmd.gov>
Subject: 2016 AQMP EIR NOP

Good afternoon Ms. Wong:

The purpose of this email is to provide comment on the Notice of Preparation of a Draft Program Environmental Impact Report for the 2016 Air Quality Management Plan. Please ensure that specific analysis is included regarding the potential for impacts to transit dependent populations due to costs associated with implementing the Advanced Clean Transit measure. Depending on how the measure is implemented, significant costs from purchasing and operating new bus technologies may place a burden on transit operators that could result in the need to reduce service. A-3.1

Thank you for your consideration of this concern. Please contact me with any questions you may have.

Sincerely,

Gregory Nord
Principal Transportation Analyst
Strategic Planning, OCTA
714.560.5885
gnord@octa.net

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Response to Comment Letter A-3

Comment A-3.1

The purpose of this email is to provide comment on the Notice of Preparation of a Draft Program Environmental Impact Report for the 2016 Air Quality Management Plan. Please ensure that specific analysis is included regarding the potential for impacts to transit dependent populations due to costs associated with implementing the Advanced Clean Transit measure. Depending on how the measure is implemented, significant costs from purchasing and operating new bus technologies may place a burden on transit operators that could result in the need to reduce service.

Thank you for your consideration of this concern. Please contact me with any questions you may have.

A-3.1

Response A-3.1

The purpose of the proposed incentive measures that are part of the State SIP Strategy is to enhance the development of advanced clean technologies such as transit buses that will achieve benefits to disadvantaged communities. Clearly, the measure would not want to result in burdens that would limit these services, but the program is in the initial phases and will still need to be fully developed and vetted. SCAQMD staff has made CARB aware of the commenter's concerns.

Comment Letter A-4

August 3rd, 2016

Jillian Wong, Ph.D.
Program Supervisor, SCAQMD
21865 Copley Drive
Diamond Bar, CA 91765
jwong1@aqmd.gov

Re: Public Comments on the Initial Study for the Draft Program Environmental Impact Report for 2016 Air Quality Management Plan

Dear Ms. Wong:

RadTech is please to submit public comments on behalf of our over 800 members, regarding the Initial Study for the Draft Program Environmental Impact Report for 2016 Air Quality Management Plan. RadTech has been selected to serve on the Air Quality Management Plan (AQMP) advisory committee and in that capacity have commented on many of the proposals brought forth by staff. We believe that UV/EB/LED technology can help the district achieve its air quality goals without sacrificing the economy. A-4.1

Section 1.9.1 Stationary Source Control Measures (SCAQMD) Page 1-10

The document states: "In addition, to foster further technology advancement, measures are also included to achieve additional reductions from stationary sources based on implementation and accelerated penetration of advanced technologies." We would urge the district to seek the additional reductions through voluntary means rather than mandates. These voluntary reductions could be obtained from stationary sources, if the proper incentives were being provided. One such example would be a permit exemption for UV/EB/LED technology which RadTech has long advocated for. A-4.2

FLX-01 Improved Education and Public Outreach

We appreciate the inclusion of "super-compliant" coatings, which would include UV/EB/LED products, in this section. A-4.3

FLX-02 Stationary Source VOC Incentives

We are supportive of the incentives concept for facilities who utilize equipment which result in cost effective emission reductions that are beyond existing requirements. However, instead of imposing permit conditions, relaxing permitting requirements, in the form of 219 exemptions, would be a better r incentive for facilities to voluntarily convert to lower emitting processes. A-4.4

ECC-01 - Co-Benefit Emission Reductions from GHG Programs, Policies and Incentives [All Pollutants]

Add-on controls which are combustion sources that emit Green House Gases (GHGS) and are typically sources of criteria pollutants, UV/EB/LED technology does not generate GHGs. We support the concept of "promoting implementation and development of new technologies" and evaluating them for "reduction of emissions of both GHGs and criteria pollutants." A-4.5

ECC-03 - Additional Enhancements in Building Energy Efficiency and Smart Grid Technology [NOx, VOC]:

This control measure appears to be limited to incentive programs for existing residences that includes weatherization, upgrading older appliances with highly efficient technologies and renewable energy A-4.6

sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. We urge the district to extend the incentives to commercial buildings where stationary sources may be operating.

A-4.6 Cont.

"Impacts Associated with Use of Control Equipment" , Page 2-12

The document identifies various negative impacts associated with the use of control equipment such as: "the potential to create secondary adverse air quality impacts".....increased ammonia emissions" and, since ammonia is a precursor to particulate formation, increased particulate emissions. The document further states that "in the event of an accidental release of ammonia, sensitive receptors in the vicinity of the release may be exposed to harmful concentrations of ammonia vapor." These statements further validate the environmental viability of reformulation to UV/EB/LED technology and make a case for the district to encourage the use of said technology.

A-4.7

FLX-02, Row titled "Stationary Source VOC Incentives Air", Page A-3

RadTech disagrees with the document's assumption that there are "hazard and water impacts associated with replacement coatings, such as UV cured resins and coatings, and supercompliant/ultra-low emission technologies". The statement implies that the environmental hazards would increase with reformulation to UV coatings. UV/EB coatings generally have less hazard and air impacts than conventional coatings. The assumption that they would present a greater hazard is erroneous and the report contains no data to support said assumption. Furthermore, the report's conclusions on the negative impacts of associated with the use of control equipment on conventional systems (see Page 2-12), make a case that conversion to UV would reduce hazards as there are no secondary adverse air quality impacts such as GHG or ammonia emissions. We would be happy to review any specific data the district relied on for this section.

A-4.8

We appreciate the opportunity to work with you and your staff. Please do not hesitate to contact me at 909-240-0866 or via email: rita@radtech.org.

Regards,

Rita M. Loof

Director Regional Environmental Affairs

Response to Comment Letter A-4

Comment A-4.1

RadTech is please to submit public comments on behalf of our over 800 members, regarding the Initial Study for the Draft Program Environmental Impact Report for 2016 Air Quality Management Plan. RadTech has been selected to serve on the Air Quality Management Plan (AQMP) advisory committee and in that capacity have commented on many of the proposals brought forth by staff. We believe that UV/EB/LED technology can help the district achieve its air quality goals without sacrificing the economy. A-4.1

Response A-4.1

Thank you for the comment. Since no issues were raised regarding the NOP/IS, no response is necessary.

Comment A-4.2

Section 1.9.1 Stationary Source Control Measures (SCAQMD) Page 1-10

The document states: "In addition, to foster further technology advancement, measures are also included to achieve additional reductions from stationary sources based on implementation and accelerated penetration of advanced technologies." We would urge the district to seek the additional reductions through voluntary means rather than mandates. These voluntary reductions could be obtained from stationary sources, if the proper incentives were being provided. One such example would be a permit exemption for UV/EB/LED technology which RadTech has long advocated for. A-4.2

Response A-4.2

The Draft Program EIR evaluated all proposed measures, whether they are considered voluntary, regulatory, or incentive-based.

Comment A-4.3

FLX-01 Improved Education and Public Outreach

We appreciate the inclusion of "super-compliant" coatings, which would include UV/EB/LED products, in this section. A-4.3

Response A-4.3

No response is necessary.

Comment A-4.4

FLX-02 Stationary Source VOC Incentives

We are supportive of the incentives concept for facilities who utilize equipment which result in cost effective emission reductions that are beyond existing requirements. However, instead of imposing permit conditions, relaxing permitting requirements, in the form of 219 exemptions, would be a better r incentive for facilities to voluntarily convert to lower emitting processes.

A-4.4

Response A-4.4

The Draft Program EIR evaluated all proposed measures, whether they are considered voluntary, regulatory, or incentive-based.

Comment A-4.5

ECC-01 - Co-Benefit Emission Reductions from GHG Programs, Policies and Incentives [All Pollutants]

Add-on controls which are combustion sources that emit Green House Gases (GHGS) and are typically sources of criteria pollutants, UV/EB/LED technology does not generate GHGs. We support the concept of "promoting implementation and development of new technologies" and evaluating them for "reduction of emissions of both GHGs and criteria pollutants."

A-4.5

Response A-4.5

Thank you for the comment. Since no issues were raised regarding the NOP/IS, no response is necessary.

Comment A-4.6

ECC-03 - Additional Enhancements in Building Energy Efficiency and Smart Grid Technology [NOx, VOC]:

This control measure appears to be limited to incentive programs for existing residences that includes weatherization, upgrading older appliances with highly efficient technologies and renewable energy

A-4.6

sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. We urge the district to extend the incentives to commercial buildings where stationary sources may be operating.

A-4.6 Cont.

Response A-4.6

Control measure ECC-03 is intended to target only residential buildings at this time. However, commercial buildings are being targeted for incentive opportunities under CMB-02 (water heating), a mix of regulatory and incentives under CMB-04 (commercial cooking burners), and co-benefit reductions from existing programs under ECC-02 (commercial lighting).

Comment A-4.7

"Impacts Associated with Use of Control Equipment" , Page 2-12

The document identifies various negative impacts associated with the use of control equipment such as: "the potential to create secondary adverse air quality impacts".....increased ammonia emissions" and, since ammonia is a precursor to particulate formation, increased particulate emissions. The document further states that "in the event of an accidental release of ammonia, sensitive receptors in the vicinity of the release may be exposed to harmful concentrations of ammonia vapor." These statements further validate the environmental viability of reformulation to UV/EB/LED technology and make a case for the district to encourage the use of said technology.

A-4.7

Response A-4.7

Thank you for the comment. Since no issues were raised regarding the NOP/IS, no response is necessary.

Comment A-4.8

FLX-02, Row titled "Stationary Source VOC Incentives Air", Page A-3

RadTech disagrees with the document's assumption that there are "hazard and water impacts associated with replacement coatings, such as UV cured resins and coatings, and supercompliant/ultra-low emission technologies". The statement implies that the environmental hazards would increase with reformulation to UV coatings. UV/EB coatings generally have less hazard and air impacts than conventional coatings. The assumption that they would present a greater hazard is erroneous and the report contains no data to support said assumption. Furthermore, the report's conclusions on the negative impacts of associated with the use of control equipment on conventional systems (see Page 2-12), make a case that conversion to UV would reduce hazards as there are no secondary adverse air quality impacts such as GHG or ammonia emissions. We would be happy to review any specific data the district relied on for this section.

A-4.8

Response A-4.8

Impacts associated with replacement coatings are discussed in the Hazards and Hazardous Materials section and Hydrology and Water Quality section of Chapter 4 of the Draft Program EIR.

Comment Letter A-5

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

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Energy & Environment
Carmen Ramirez, Oxnard

Transportation
Barbara Messina, Alhambra

August 4, 2016

Ms. Jillian Wong
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765
Phone: (909) 396-3176
E-mail: jwong1@aqmd.gov

RE: SCAG Comments on the Notice of Preparation of a Draft Program Environmental Impact Report for the 2016 Air Quality Management Plan (AQMP) [SCAG NO. IGR8918]

Dear Ms. Wong,

Thank you for submitting the Notice of Preparation of a Draft Program Environmental Impact Report for the 2016 AQMP ("proposed project") to the Southern California Association of Governments (SCAG) for review and comment. SCAG is the authorized regional agency for Inter-Governmental Review (IGR) of programs proposed for Federal financial assistance and direct Federal development activities, pursuant to Presidential Executive Order 12372. Additionally, SCAG reviews the Environmental Impact Reports of projects of regional significance for consistency with regional plans pursuant to the California Environmental Quality Act (CEQA) and CEQA Guidelines.

SCAG is also the designated Regional Transportation Planning Agency under state law, and is responsible for preparation of the Regional Transportation Plan (RTP) including the Sustainable Communities Strategy (SCS) pursuant to Senate Bill (SB) 375. As the clearinghouse for regionally significant projects per Executive Order 12372, SCAG reviews the consistency of local plans, projects, and programs with regional plans.[1] Guidance provided by these reviews is intended to assist local agencies such as local jurisdictions and project proponents to take actions that help contribute to the attainment of the regional goals and policies in the RTP/SCS. A-5.1

SCAG staff has reviewed the Notice of Preparation of a Draft Program Environmental Impact Report for the 2016 AQMP. The proposed project consists of a plan that identifies control measures and strategies to bring the region into attainment with the revoked 1997 8-hour National Ambient Air Quality Standard (NAAQS or standard) for ozone by 2024, the 2008 8-hour ozone standard by 2032, the 2012 annual PM2.5 standard by 2025, the 2006 24-our PM2.5 standard by 2019, and the revoked 1979 1-hour ozone standard by 2023. The 2016 AQMP consists of three components: 1) the SCAQMD's Stationary, Area, and Mobile Source Control Measures, 2) State and Federal Control Measures provided by ARB, and 3) Regional Transportation Strategy and Control Measures provided by SCAG.

When available, please send environmental documentation to SCAG's *office in Los Angeles or by email to sunl@scag.ca.gov* providing, at a minimum, the full public comment period for review. If you have any questions regarding the attached comments, please contact the Inter-Governmental Review (IGR) Program, attn.: Lijin Sun, Senior Regional Planner, at (213) 236-1882 or sunl@scag.ca.gov. Thank you.

Sincerely,

Ping Chang

Ping Chang
Acting Manager, Compliance and Performance Monitoring

[1] Lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency with the 2016 RTP/SCS for the purpose of determining consistency for CEQA. Any "consistency" finding by SCAG pursuant to the IGR process should not be construed as a determination of consistency with the 2016 RTP/SCS for CEQA.

The Regional Council consists of 86 elected officials representing 191 cities, six counties, six County Transportation Commissions, one representative from the Transportation Corridor Agencies, one Tribal Government representative and one representative for the Air Districts within Southern California.

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COMMENTS ON THE NOTICE OF PREPARATION OF A DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT FOR THE 2016 AQMP [SCAG NO. IGR8918]

CONSISTENCY WITH RTP/SCS

SCAG reviews environmental documents for regionally significant projects for their consistency with the adopted RTP/SCS. For the purpose of determining consistency with CEQA, lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency with the RTP/SCS.

2016 RTP/SCS GOALS

The SCAG Regional Council adopted the 2016 RTP/SCS in April 2016. The 2016 RTP/SCS seeks to improve mobility, promote sustainability, facilitate economic development and preserve the quality of life for the residents in the region. The long-range visioning plan balances future mobility and housing needs with goals for the environment, the regional economy, social equity and environmental justice, and public health (see http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx). The goals included in the 2016 RTP/SCS may be pertinent to the proposed project. These goals are meant to provide guidance for considering the proposed project within the context of regional goals and policies. Among the relevant goals of the 2016 RTP/SCS are the following:

SCAG 2016 RTP/SCS GOALS	
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness*
RTP/SCS G2:	*Maximize mobility and accessibility for all people and goods in the region*
RTP/SCS G3:	*Ensure travel safety and reliability for all people and goods in the region*
RTP/SCS G4:	*Preserve and ensure a sustainable regional transportation system*
RTP/SCS G5:	*Maximize the productivity of our transportation system*
RTP/SCS G6:	*Protect the environment and health for our residents by improving air quality and encouraging active transportation (e.g., bicycling and walking)*
RTP/SCS G7:	*Actively encourage and create incentives for energy efficiency, where possible*
RTP/SCS G8:	*Encourage land use and growth patterns that facilitate transit and active transportation*
RTP/SCS G9:	*Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies** **SCAG does not yet have an agreed-upon security performance measure.*

A-5.2

For ease of review, we encourage the use of a side-by-side comparison of SCAG goals with discussions of the consistency, non-consistency or non-applicability of the goals and supportive analysis in a table format. Suggested format is as follows:

SCAG 2016 RTP/SCS GOALS		
Goal		Analysis
RTP/SCS G1:	*Align the plan investments and policies with improving regional economic development and competitiveness*	*Consistent: Statement as to why; Not-Consistent: Statement as to why; Or Not Applicable: Statement as to why; DEIR page number reference*
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2016 RTP/SCS STRATEGIES

To achieve the goals of the 2016 RTP/SCS, a wide range of land use and transportation strategies are included in the 2016 RTP/SCS. Technical appendances of the 2016 RTP/SCS provide additional supporting information in detail. To view the 2016 RTP/SCS, please visit: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx. The 2016 RTP/SCS builds upon the progress from the 2012 RTP/SCS and continues to focus on integrated, coordinated, and balanced planning for land use and transportation that the SCAG region strives toward a more sustainable region, while the region meets and exceeds in meeting all of applicable statutory requirements pertinent to the 2016 RTP/SCS. These strategies within the regional context are provided as guidance for lead agencies such as local jurisdictions when the proposed project is under consideration.

DEMOGRAPHICS AND GROWTH FORECASTS

Local input plays an important role in developing a reasonable growth forecast for the 2016 RTP/SCS. SCAG used a bottom-up local review and input process and engaged local jurisdictions in establishing the base geographic and socioeconomic projections including population, household and employment. At the time of this letter, the most recently adopted SCAG jurisdictional-level growth forecasts that were developed in accordance with the bottom-up local review and input process consist of the 2020, 2035, and 2040 population, households and employment forecasts. To view them, please visit http://www.scag.ca.gov/Documents/2016GrowthForecastByJurisdiction.pdf. The growth forecasts for the region and applicable jurisdictions are below.

A-5.2 Cont.

	Adopted SCAG Region Wide Forecasts			Adopted Orange County Forecasts		
	Year 2020	Year 2035	Year 2040	Year 2020	Year 2035	Year 2040
Population	19,663,000	22,091,000	22,138,800	3,271,100	3,431,200	3,461,500
Households	6,458,000	7,325,000	7,412,300	1,074,700	1,135,300	1,152,300
Employment	8,414,000	9,441,000	9,871,500	1,730,400	1,870,500	1,898,900

	Adopted Los Angeles County Forecasts			Adopted Riverside County Forecasts		
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Population	10,326,200	11,145,100	11,514,800	2,479,800	3,055,100	3,183,700
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Population	2,197,400	2,637,400	2,731,300
Households	687,100	824,600	854,300
Employment	789,500	998,000	1,028,100

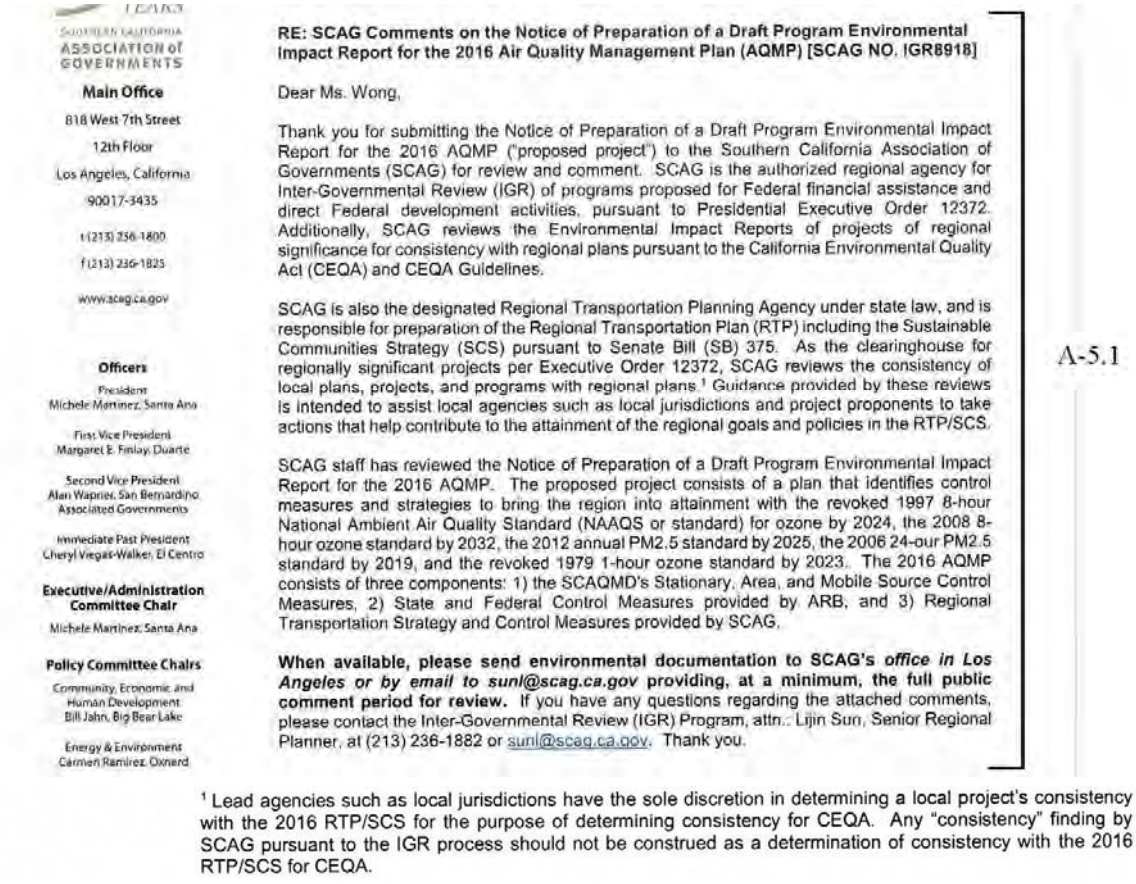
MITIGATION MEASURES

SCAG staff recommends that you review the Final Program Environmental Impact Report (Final PEIR) for the 2016 RTP/SCS for guidance, as appropriate. SCAG's Regional Council certified the Final PEIR and adopted the associated Findings of Fact and a Statement of Overriding Considerations (FOF/SOC) and Mitigation Monitoring and Reporting Program (MMRP) on April 7, 2016 (please see: http://scagrtpscs.net/Pages/FINAL2016PEIR.aspx). The Final PEIR includes a list of project-level performance standards-based mitigation measures that may be considered for adoption and implementation by lead, responsible, or trustee agencies in the region, as applicable and feasible. Project-level mitigation measures are within responsibility, authority, and/or jurisdiction of project-implementing agency or other public agency serving as lead agency under CEQA in subsequent project- and site- specific design, CEQA review, and decision-making processes, to meet the performance standards for each of the CEQA resource categories.

A-5.3

Response to Comment Letter A-5

Comment A-5.1



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Comment A-5.2

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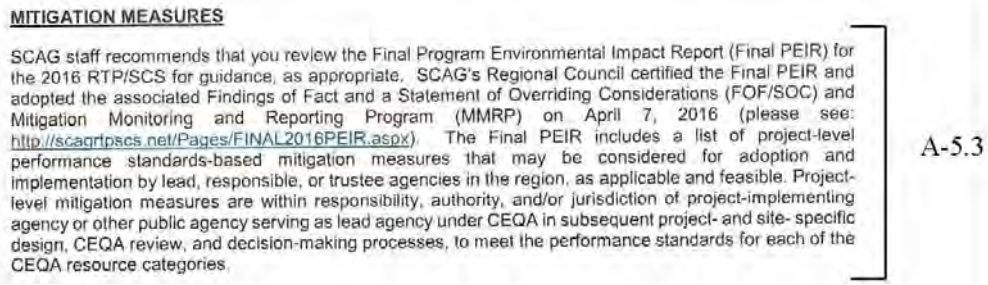
A-5.2 Cont.

Response A-5.2

The 2016 AQMP includes SCAG's TCMs, and therefore, does not conflict with SCAG's 2016 RTP/SCS Goals, as outlined in the comment above.

Comment A-5.3



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A-5.3

Response A-5.3

SCAQMD staff has reviewed the mitigation measures presented in the Final PEIR for the 2016 RTP/SCS and have included them as necessary and where appropriate.

Comment Letter A-6

THE PORT OF LOS ANGELES
425 S. Palos Verdes Street Post Office Box 151 San Pedro, CA 90733-0151 TEL/TDD 310 SEA-PORT www.portoflosangeles.org

Eric Garcetti | Mayor, City of Los Angeles
Board of Harbor Commissioners | Ambassador Vilma S. Martinez, President | David Arian, Vice President | Patricia Castellanos | Anthony Pirozzi, Jr. | Edward R. Renwick
Eugene D. Seroka | Executive Director

August 4, 2016

Jillian Wong
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765
Via Electronic Mail

Dear Ms. Wong:

SUBJECT: INITIAL COMMENTS ON THE NOTICE OF PREPARATION FOR THE 2016 AIR QUALITY MANAGEMENT PLAN DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT (PEIR)

The City of Los Angeles Harbor Department (Harbor Department) appreciates the opportunity to participate in the 2016 Air Quality Management Plan (AQMP) Advisory Committee. We support the Air Quality Management District's (AQMD) clean air goals and have worked aggressively with the port industry to reduce our fair share of air quality impacts to the region from port-related operations as outlined in the San Pedro Bay Ports Clean Air Action Plan (CAAP) and the associated San Pedro Bay Standards. A-6.1

We will continue to remain a committed partner in the effort to improve air quality in the region. As such, we have reviewed the Notice of Preparation (NOP) for the 2016 Draft PEIR (DPEIR) and would like to offer the following comments for your consideration:

AIR QUALITY/GREENHOUSE GASES

- The Initial Study (IS) indicates that the air quality baseline uses 2012 data. This data is out of date and may overly inflate baseline emissions. A newer baseline inventory should be used to accurately reflect air quality in the South Coast Air Basin. A-6.2

- The NOP does not indicate that MOB-01, MOB-02, ORFIS-04 or ORFIS-05 will create any potential secondary air quality impacts from construction. These measures should be evaluated for construction-related air quality impacts under Sections III (b) and (d). A-6.3

AN EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION EMPLOYER
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- Odors related to the use of add-on control equipment that requires the storage and usage of ammonia should be considered, quantified and evaluated in the DPEIR. A-6.4

- While concluding that the Project may have a potentially significant impact with respect to greenhouse gas emissions, the IS must still demonstrate whether the project is consistent with applicable plans, policies and regulations and demonstrate that it is doing its fair share of reducing greenhouse gas emissions. A-6.5

BIOLOGICAL RESOURCES

- The NOP identifies no significant adverse impacts from Biological Resources. Proposed measures ORFIS-03 and ORFIS-04 should be evaluated for potential wastewater impacts as they would promote the installation and use of air pollution controls at port facilities. A-6.6

HAZARDS AND HAZARDOUS MATERIALS

- The DPEIR should evaluate the implication of work being conducted on a site identified under Government Code Section 65962.5. Government Code Section 65962.5 requires the disclosure of any work conducted on a Cortese Site and precludes the project from being exempt under the California Environmental Quality Act even if only minor work is being conducted at the site. The Harbor Department has many parcels subject to this Government Code and requests further analysis for how these parcels will be evaluated in the DPEIR. A-6.7

Thank you for the opportunity to comment on the NOP. We look forward to continuing to work with the AQMD toward the successful completion of the AQMP and its associated documentation. Please contact Lisa Wunder, Marine Environmental Manager at (310) 732-7688 or via email at lwunder@portla.org, if you have any questions regarding these comments. A-6.8

Sincerely,

CHRISTOPHER CANNON
Director of Environmental Management

CC:LW:TT:mlx
APP No.: 061024-605

Response to Comment Letter A-6

Comment A-6.1

The City of Los Angeles Harbor Department (Harbor Department) appreciates the opportunity to participate in the 2016 Air Quality Management Plan (AQMP) Advisory Committee. We support the Air Quality Management District's (AQMD) clean air goals and have worked aggressively with the port industry to reduce our fair share of air quality impacts to the region from port-related operations as outlined in the San Pedro Bay Ports Clean Air Action Plan (CAAP) and the associated San Pedro Bay Standards.

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A-6.1

Response A-6.1

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Comment A-6.2

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- The Initial Study (IS) indicates that the air quality baseline uses 2012 data. This data is out of date and may overly inflate baseline emissions. A newer baseline inventory should be used to accurately reflect air quality in the South Coast Air Basin.

A-6.2

Response A-6.2

2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions in the 2016 AQMP. The latest verifiable air quality data (from approved air quality monitoring sites) is from 2015, which can be found in Chapter 2 of the 2016 AQMP and Chapter 3 (Existing Setting) of the Draft Program EIR. The most recent environmental topic data from 2016 was used for the CEQA baseline in determining environmental impacts because 2016 is the time of the release of the NOP/IS.

Comment A-6.3

- The NOP does not indicate that MOB-01, MOB-02, ORFIS-04 or ORFIS-05 will create any potential secondary air quality impacts from construction. These measures should be evaluated for construction-related air quality impacts under Sections III (b) and (d).

A-6.3

Response A-6.3

Control measures MOB-01, MOB-02, ORFIS-04 and ORFIS-05 are evaluated for construction-related impacts in Chapter 4 of the Draft Program EIR.

Comment A-6.4

- Odors related to the use of add-on control equipment that requires the storage and usage of ammonia should be considered, quantified and evaluated in the DPEIR. A-6.4

Response A-6.4

Typically, add-on control equipment that requires the usage of ammonia is used in a "closed" system, and therefore, do not typically generate associated odors beyond any possible "slips." However, it should be noted that NH3 related control equipment is not new to the region and is currently operating throughout the SCAQMD jurisdiction. The owners/operators of industries affected by control measures in the proposed 2016 AQMP would be subject to existing air quality rules and regulations, including SCAQMD's Rule 402 - Nuisance, which prohibits creating odor nuisances. For these reasons, implementing the 2016 AQMP is not expected to create significant new adverse odor impacts and, therefore, odor impacts as related to control equipment were not needed to be addressed in the Draft Program EIR.

Comment A-6.5

- While concluding that the Project may have a potentially significant impact with respect to greenhouse gas emissions, the IS must still demonstrate whether the project is consistent with applicable plans, policies and regulations and demonstrate that it is doing its fair share of reducing greenhouse gas emissions. A-6.5

Response A-6.5

The proposed project's consistency with applicable plans, policies and regulations for reducing GHGs was evaluated in Subchapter 4.2 of the Draft Program EIR.

Comment A-6.6

BIOLOGICAL RESOURCES

- The NOP identifies no significant adverse impacts from Biological Resources. Proposed measures ORFIS-03 and ORFIS-04 should be evaluated for potential wastewater impacts as they would promote the installation and use of air pollution controls at port facilities.

A-6.6

Response A-6.6

Proposed control measures ORFIS-04 and ORFIS-05 were evaluated for potential wastewater impacts in Subchapter 4.4 of the Draft Program EIR.

Comment A-6.7

HAZARDS AND HAZARDOUS MATERIALS

- The DPEIR should evaluate the implication of work being conducted on a site identified under Government Code Section 65962.5. Government Code Section 65962.5 requires the disclosure of any work conducted on a Cortese Site and precludes the project from being exempt under the California Environmental Quality Act even if only minor work is being conducted at the site. The Harbor Department has many parcels subject to this Government Code and requests further analysis for how these parcels will be evaluated in the DPEIR.

A-6.7

Response A-6.7

Potential impacts, including those that could occur on sites identified under Government Code Section 65962.5, were evaluated in Subchapter 4.3 of the Draft Program EIR.

Comment A-6.8

Thank you for the opportunity to comment on the NOP. We look forward to continuing to work with the AQMD toward the successful completion of the AQMP and its associated documentation. Please contact Lisa Wunder, Marine Environmental Manager at (310) 732-7688 or via email at lwunder@portla.org, if you have any questions regarding these comments.

A-6.8

Response A-6.8

Thank you for the comment. No response is necessary.

Comment Letter A-7

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Port of LONG BEACH
The Green Port

August 4, 2016

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Re: Comments on the Notice of Preparation, Initial Study, and Scope of Proposed Draft Program EIR for the 2016 Air Quality Management Plan

Dear Ms. Wong and Staff of the South Coast Air Quality Management District:

We appreciate this opportunity to submit comments on the Notice of Preparation ("NOP") and the accompanying Initial Study ("IS") prepared in connection with the South Coast Air Quality Management District's ("District" or "SCAQMD") consideration of the proposed 2016 Air Quality Management Plan (the "Project" or "Proposed Plan") on behalf of the City of Long Beach acting by and through its Harbor Department (collectively referred to herein as "Port of Long Beach" or "POLB").

A-7.1

As you know, the POLB along with the Port of Los Angeles (collectively the "Ports") have achieved tremendous success in obtaining substantial emissions reductions through their joint San Pedro Bay Ports Clean Air Action Plan ("CAAP") and other air quality measures implemented under the Ports' initiatives. POLB continues to be supportive of projects and programs that are intended to contribute to improvement of air quality and promote other environmental values. However, POLB fundamentally disagrees with the District's proposal to again attempt to unnecessarily convert an effective voluntary plan, built on multi-agency and industry cooperation, into potentially punitive regulations imposed unlawfully on the Ports. The Ports have previously sought to make the District aware of the serious concerns and objections to this approach.[1]

[1] (*See* letters dated January 31, 2014; January 15, 2014; October 2, 2013; August 21, 2013; November 27, 2012; November 19, 2012; November 8, 2012; October 31, 2012; October 22, 2012; August 30, 2012 (which includes letter dated May 4, 2010); July 10, 2012; July 27, 2012 from POLB and/or Port of Los Angeles to SCAQMD.)

We are also mindful that the California Environmental Quality Act ("CEQA") calls for public review, critical evaluation, and comment on the scope of the environmental review to be conducted prior to approval of proposed projects. Such review and critique is particularly important where, as here, it is anticipated that the proposed Project will have substantial impacts on and conflict with the authorities of other public agencies. Thorough identification of the proposed Project, and candid disclosure of all phases of the Project and its potential impacts, is essential to assure that the proposed Project will be planned and implemented in conformity with established community plans and policies, and that environmental review is conducted with full consideration of all potentially significant environmental impacts as well as mitigation measures and alternatives designed to address those impacts. In addition, it will be important to consider the impacts of the proposed Project on the POLB's community, mission, facilities, and operations. The District must therefore provide a meaningful opportunity for informed public review of and comment on a well-defined "project."

A-7.1 Cont.

In that context, we respectfully submit the following comments regarding the NOP for the Project as well as questions, concerns, and objections related to the omissions of critical information, unsupported assumptions, or analytical deficiencies in the IS, and comments as to the scope of the proposed Draft Program Environmental Impact Report ("DPEIR") as contemplated and invited by the District's NOP. As set forth in more detail below, we believe that: (1) the Project needs to be more thoroughly and accurately described, (2) all potentially significant environmental impacts related to all Project control measures must be thoroughly analyzed, and (3) mitigation measures and alternatives must be provided to address all potentially significant environmental impacts.

A. General Comments on the Initial Study

While we recognize the effort that has gone into preparation of the current NOP/IS, it is apparent that the IS does not provide the information, evidence, or analysis required under CEQA. The IS thus fails to fulfill its critical role as mandated by CEQA in educating the public generally, other affected regulatory agencies and governments, or the officials and Board of the District, as to the potential environmental significance and impacts of the proposed Project.

A-7.2

The necessary contents for an adequate initial study are described in CEQA Guidelines § 15063(d). An initial study must "contain in brief form:

(1) A description of the Project including the location of the Project;

(2) An identification of the environmental setting;

(3) An identification of environmental effects by use of a checklist, matrix, or other method, provided that entries on a checklist or other form are briefly explained to indicate that there is some evidence to support the entries . . . ;

(4) A discussion of ways to mitigate the significant effects identified, if any;

(5) An examination of whether the Project would be consistent with existing zoning, plans, and other applicable land use controls;

(6) The name of the person or persons who prepared or participated in the initial study."

A-7.2 Cont.

An initial study that fails to provide all of the information, analysis, and evidence called for by CEQA may be deemed to be inadequate and not a valid basis for CEQA review or project approval. (*See*, *e.g.*, *City of Redlands v. County of San Bernardino* (2002) 96 Cal.App.4th 398, 407–408, [invalidating the County's proposed general plan amendments because of a deficient initial study: "[T]he initial threshold study is inadequate because it fails to provide sufficient evidence or analysis of the potential environmental effects of the amendments."].)

As set forth in more detail below, the IS fails to: contain an adequate project description, properly identify the environmental setting, and adequately assess the Project's potentially significant environmental effects. It contains no discussion whatsoever of mitigation measures or consistency with existing zoning, plans, and other applicable land use controls, as required. It is therefore respectfully urged that the IS (and the related NOP) be revised, corrected, and recirculated for public review and comment before the District proceeds with any further action, including release of a DPEIR for the proposed Project.

The CEQA Guidelines contemplate that an initial study is to be used in defining the scope of environmental review. (CEQA Guidelines §§ 15006(d), 15063(a), 15143). However, as a result of the omissions, open questions, and deficiencies in the IS as noted below, it appears to have unduly narrowed the District's proposed scope of environmental assessment, and to have caused the NOP to erroneously exclude critical issues and topics from the proposed scope of the DPEIR.

The comments on the current IS included in this letter are organized in the same format used by the IS, i.e., comments on "Chapter 1 – Project Description" followed by comments on "Chapter 2 – Environmental Checklist." The comments are limited to those matters that appear in the current version of the IS, and we reserve the right to provide further comments in the event that additional or different information concerning the proposed Project becomes available, or the District provides a revised and CEQA-compliant initial study.

B. Request for Revision of NOP and Re-Circulation of Revised NOP/IS to Include a Legally-Adequate "Project" Description

As a preliminary matter, we note that the 30 day review period is insufficient time to review the IS and the over 1,000 page Proposed Plan and available appendices. It is also important to note that Appendix V (Modeling & Attainment Demonstrations) and Appendix VI (Compliance With Other Clean Air Act Requirements) of the Proposed Plan has not yet been posted to the District's website. A-7.3

Further, it is essential that the NOP and the IS be revised to include an adequate "project description" including *all* of the Proposed Plan's pertinent control measures and strategies that is the "project" before the public and agencies can be expected to provide comments and input.

It is only through reviewing the lengthy appendices to the Proposed Plan, can the reader understand the proposed Project control measures. The appendices also make clear that several of the proposed Project measures have not even been developed yet by the District and thus cannot be the subject of any meaningful environmental review or analysis. (*See*, *e.g.*, proposed Control Measures MOB-02, MOB-03, MOB-04, MOB-08, MOB-12, MOB-13, and MOB-14.) The details of the proposed Project must be accurately developed and described before the proposed methods and precise impacts anticipated by the Project may be analyzed or the subject of comment. Accordingly, it is still not possible for the District to proceed with appropriate project-level CEQA review or to issue an accurate NOP/IS at this stage as the details of the Proposed Plan are still under development. A-7.4

It is necessary that the current NOP and IS be revised to include a revised Project description, to incorporate the text of the Proposed Plan in detail, and to recirculate the revised documents for public review. A new set of public meetings, including a new "scoping meeting" should be scheduled to provide the public with sufficient time and opportunity to comment on the scope and adequacy of the revised notice of preparation/initial study. The comment period on any such revised documents should be at least 60 days in total.

The DPEIR schedule too is very aggressive, with the scoping comment period ending on August 4, 2016, followed immediately by the release of the DPEIR also in August 2016, and final approval planed for December 2, 2016. This schedule provides insufficient time for meaningful input on the scope and content of the DPEIR by members of the public and affected agencies. Further, the POLB is concerned that given the quick turnaround between closure of the scoping period and the scheduled release of the DPEIR, insufficient time will be allowed for thorough review of the scoping comments by the District and inclusion of such comments into the DPEIR. A-7.5

C. Comments on the Initial Study

1. Chapter 1 of the Initial Study – Inadequate "Project" Description

(a) Deficient "Project" Description – In General

The failure of the IS and NOP to provide an accurate, complete, and coherent description of the "Project" is a fundamental deficiency, which permeates the entire document. The absence of such a clear description of the proposed Project inherently prevents the IS from facilitating meaningful review and analysis of the proposed Project, and violates the requirements of CEQA. (*See*, *e.g.*, CEQA Guidelines § 15124 and *Laurel Heights Improvement Ass'n v. Regents of the University of California* (1988) 47 Cal.3d 376.)

The importance of providing an accurate and informative project description in an initial study was re-emphasized in *Nelson v. County of Kern* (2010) 190 Cal.App.4th 252, 267:

> ***The initial study must include a description of the project***. Where an agency fails to provide an accurate project description, or fails to gather information and undertake an adequate environmental analysis in its initial study, a negative declaration is inappropriate. An accurate and complete project description is necessary to fully evaluate the project's potential environmental effects.
>
> The scope of the environmental review conducted for the initial study must include the entire project. Thus, a correct determination of the nature and scope of the project is a critical step in complying with the mandates of CEQA.[2]

A-7.6

In *City of Redlands, supra*, the Court of Appeal likewise observed that:

> An accurate and complete project description is necessary for an intelligent evaluation of the potential environmental impacts of the agency's action. Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal . . . and weigh other alternatives in the balance.

[2] Unless otherwise noted, emphasis in quotations herein is supplied and citations are omitted.

(96 Cal.App.4th at 406, 408; *accord*, *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 192-193 (an accurate, complete and consistent project description is the sine qua non of informative, legally adequate CEQA review).

CEQA Guidelines § 15063(a)(1) further makes clear that an initial study must take a comprehensive view of the proposed project *as a whole*. "All phases of project planning, implementation, and operation must be considered in the initial study of the project." This requirement reflects CEQA's definition of a "project" as the "whole of an action" that may result in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change. (Public Resources Code § 21065; CEQA Guidelines § 15378.)

A-7.6 Cont.

The IS currently falls far short of these requirements in describing the proposed Project, and thus falls equally short of serving the "public awareness" purposes described above and mandated by CEQA. The IS does not include or even describe the text of several control measures supposed to comprise the "Project." The section of the IS that purports to "describe" the Project, includes nothing more than summaries of certain control measures. At least some of the summaries do not accurately match the details described in the appendices to the Proposed Plan. In any event, the summaries are insufficient to describe the Project itself, and prevent effective public review and comment. The IS also fails to describe reasonably foreseeable activities or actions in response to or associated with the proposed Project control measures.

A-7.7

As to certain control measures, the IS appears to imply that any informed public discussion and environmental review on this course of action be *deferred* until some point in the future. Such an approach, however, is inconsistent with, and in violation of, many fundamental rules and policies required by CEQA (e.g., failure to identify and analyze the whole of the project, improper project "segmentation," improper deferral of impact analysis and mitigation, failure to identify and evaluate project alternatives, etc.). (*See*, *e.g.*, Public Resources Code § 21003.1; CEQA Guidelines §§ 15126.2, 15126.4, 12126.6, 15378; *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296.)

The Proposed Plan refers to the future development of "contingency measures" if the area fails to meet certain milestones. (Proposed Plan, pp. 4-44 to 4-45, 6-13.) Yet, no such contingency measures are identified or described in the Proposed Plan or analyzed in the IS.

The Proposed Plan refers to "an action plan [that] will be developed as part of the AQMP public adoption process" to identify strategies to secure new sources of funding in order to implement the Proposed Plan. (Proposed Plan, p. 4-66.) However, the Proposed Plan provides insufficient details on what would be contained in this action plan and what environmental impacts might occur from its adoption. This action plan is part of the Project and must be analyzed in the IS and the resulting DPEIR.

A-7.8

In brief, the NOP/IS erroneously limits the scope of the analysis and inherently calls for impermissible speculation or impossible prescience on the part of public agencies or other members of the concerned public to undertake effective analysis of the proposed Project, or to provide meaningful comments as to the scope of review of the Project. No effective CEQA review can be undertaken unless and until the District provides an adequate description of the "Project." A-7.8 Cont.

(b) Specific Comments and Questions Regarding "Project Description" and Text

The following comments and questions refer to specific portions or pages of Chapter 1 of the IS:

Pp. 1-5 to 1-6 – Agency Authority-2016 AQMP

The IS correctly acknowledges that the regulation of air quality emissions from mobile sources is primarily done at the federal and state level. By comparison, the District "has lead responsibility for developing stationary, some area, and indirect source control measures . . .." (IS, p. 1-5.)[3] Despite this acknowledged limit on its regulatory jurisdiction, the AQMP nonetheless purports to contain several measures related to mobile source emissions. A-7.9

Pp. 1-7 to 1-8 – Overall Attainment Strategy

The IS indicates that the Proposed Plan "includes integrated strategies and measures" to meet the following federal standards:

- Revoked 1997 8-hour NAAQS ozone (80 ppb) by 2024;
- 2008 8-hour ozone standard (75 ppb) by 2032;
- 2012 annual PM2.5 standard (12 ug/m^3) by 2025;
- 2006 24-hour PM2.5 standard (35 ug/m^3) by 2019; and
- Revoked 1979 1-hour ozone standard (120 ppb) by 2023."

A-7.10

[3] *Accord*, Proposed Plan, p. ES-5 ("With limited SCAQMD authority over the mobile sources that contribute the most to our air quality problems, attainment cannot be achieved without state and federal actions.") and Proposed Plan, p. 3-11 ("U.S. EPA and CARB have primary authority to regulate emissions from mobile sources. U.S. EPA's authority applies to aircraft, locomotives, ocean going vessels, and some categories of on- and off-road mobile equipment. CARB has authority over the remainder of the mobile sources, and consumer products. SCAQMD has authority over most area sources and all point sources.").

In addition to developing strategies and measures to meet the above acknowledged revoked standards, the text indicates that a new 8-hour ozone standard has been adopted (70 parts per billion ["ppb"]) ostensibly replacing the 2008 standard analyzed. (IS, p. 1-7.) The text does not explain why a plan is being developed to attain standards that have been revoked or rescinded.

The IS states that the majority of nitrogen oxide ("NOx") emission reductions will need to come from mobile sources and acknowledges again that the District lacks authority to regulate such emissions. As such, why is the District developing an "aggressive mobile source control strategy" to control emissions over which it admittedly lacks regulatory jurisdiction? (IS, p. 1-8.)[4]

A-7.10 Cont.

P. 1.9 – Project Objectives

The IS notes the objective of achieving the various ozone and particulate matter ("PM2.5") standards by the specified attainment dates. However, as the appendices to the Proposed Plan make clear, several of the emissions reductions are listed as "TBD" with a note that "Emission reductions will be determined after projects are identified and implemented." (Proposed Plan, Appendix IV-A, pp. IV-A-4, IV-A-5, IV-A-96, and IV-A-172.) Because the emission reductions associated with several control measures have not yet been quantified, there is no guarantee or assurance that the emission reductions will actually be attained. Thus, contrary to the NOP, the Proposed Plan does not "identif[y] control measures and strategies to bring the region into attainment" with the specified standards nor does it demonstrate "compliance with state and federal Clean Air Act requirements." For this same reason, the Proposed Plan fails to attain its statutorily prescribed purpose.[5]

A-7.11

Pp. 1-10 – Project Description

The Project description indicates that the Project "control measures" consist of three components: (1) the SCAQMD Stationary and Mobile Source Control Measures, (2) State and Federal Mobile Source Control Measures, and (3) Regional Transportation Strategy and Control Measures provided by the Southern California Association of Governments ("SCAG").

A-7.12

[4] The Proposed Plan at page ES-7 states that mobile sources currently contribute about 88 percent of the region's total NOx emissions. It then states that "[s]ince the SCAQMD has limited authority to regulate mobile sources, staff worked closely with CARB and U.S. EPA, which have primary authority over mobile sources, to ensure mobile sources perform their fair share of pollution reduction responsibilities." (Proposed Plan, p. ES-7.)

[5] (42 U.S.C. § 7410; California Health & Safety Code § 40440; *American Coatings Ass'n v. South Coast Air Quality Management District* (2012) 54 Cal.4th 446, 453.)

The text indicates that the air quality baseline is comprised of 2012 data.[6] Yet, there is no clear explanation or rationale for the use of baseline data that is nearly 5 years old. The scope of the proposed DPEIR and Proposed Plan must be expanded to include a detailed explanation, supported by substantial evidence, that the 2012 air quality baseline is appropriate. (CEQA Guidelines § 15125; *Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 48 Cal.4th 310.) The analysis must also clearly specify the baseline used for other resource topics, and to the extent that they deviate from the normal "existing conditions" scenario, like air quality, provide a clear and cogent explanation as to why this is appropriate.

A-7.12 Cont.

Pp. 1-10 to 1-21 – Stationary Source Control Measures (SCAQMD)

The stationary control measures to be implemented by the District are listed in Table 1.9-1 and summarized in the text following that table.

The IS fails to acknowledge let alone analyze all potentially significant environmental impacts of the stationary source control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*Muzzy Ranch Co. v. Solano County Airport Land Use Comm'n* (2007) 41 Cal.4th 372, 383.)

A-7.13

Measure ECC-03 would "seek to provide financial incentives" to go beyond the Title 24 standards and existing local regulations pertaining to NOx emissions. (IS, pp. 1-12 to 1-13.) "Incentive programs *would be developed* for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources." The measure also references providing "solar thermal and solar photovoltaics" to provide emission reductions within the residential sector. The measure lacks any specificity about the programs that the District acknowledges would still be developed. There is no information on the amount of funding and the number of residents that may take advantage of this program. Based on the examples provided, this measure may result in significant environmental impacts in the areas of aesthetics, air quality, land use, solid waste, and others that are not analyzed in the IS nor proposed for analysis in the DPEIR.

A-7.14

[6] The IS later inconsistently states that the emission benefits associated with SCAG's Final 2016 Regional Transportation Plan/Sustainable Communities Strategy ("RTP/SCS") are reflected in the Project baseline emissions. (IS, p. 1-40.)

Measure ECC-04 similarly includes a vague reference to widespread adoption of cool roofs. This measure may result in significant environmental impacts in the areas of aesthetics, biological resources, and land use/planning. Neither this measure nor these impacts are analyzed in the IS nor proposed for analysis in the DPEIR and should be. A-7.15

Measure CMB-01 would seek emission reductions of NOx from traditional combustion engines by replacing them with zero and near-zero emission technologies through, among other methods, electrification and fuel cells. This measure would also seek energy storage systems and smart grid control technologies coupled with renewable energy generation. This measure has the potential to result in significant environmental impacts with respect to, among others, the construction of additional energy infrastructure. Per a more detailed description of this measure in the Appendix to the Proposed Plan, it also seeks to "[e]ncourage new businesses that use and/or manufacture near-zero and zero emission technologies to site in the Basin." (Proposed Plan, Appendix IV-A, p. IV-A-47.)[7] The IS contains, at best, an incomplete analysis of this measure as evidenced by its omission of any discussion of its potential growth inducing impacts. (CEQA Guidelines § 15126.2(d); *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 367 [EIR must discuss growth-inducing effects even though those effects will result only indirectly from a project.].) A-7.16

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be analyzed and is not. (*See* Control Measures ECC-04, CMB-01, CMB-02, CMB-03, CMB-04, MCS-02, FLX-01, FLX-02, BCM-01, BCM-02, BCM-04,[8] BCM-06, BCM-07, BCM-10.) A-7.17

Measure CMB-03 proposes to reduce emissions from non-refinery flares by "capturing the gas that would typically be flared and converting it into an energy source (e.g., transportation fuel, fuel cells) . . .." A similar measure appears to be proposed for nitrogen gas and biogas. (*See* Measures BCM-05 and BCM-10.) Yet, there is no discussion or consideration of associated pipelines or other infrastructure that would be needed to implement these measures nor of the traffic, air quality, noise, and other impacts associated with increased truck traffic to facilities containing such refined materials. There is similarly no analysis of the proposed alternative of reinjecting the gas into the ground or combusting it through flares. (Proposed Plan, Appendix IV-A, p. IV-A-70.) A-7.18

[7] A similar provision is included as part of FLX-02. (Proposed Plan, Appendix IV-A, p. IV-A-105.)

[8] This measure, which calls for revised manure management strategies, requires more analysis than is provided in the IS. (*See, e.g., County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1597 [EIR required to examine impacts of alternative sewage sludge disposal].)

Measure CTS-01 seeks to lower the content of volatile organic compounds ("VOCs") in coatings, solvents, and adhesives. Such measures may result in additional applications of lower quality products which could result in a net increase in air emissions. (*Dunn-Edwards Corp. v. Bay Area Air Quality Management District* (1992) 9 Cal.App.4th 644.) A-7.19

Measure BCM-03 calls for an unspecified increase in the watering of roads to control fugitive dust.[9] The measure also proposes to evaluate existing fugitive dust rules to see if unknown and unspecified additional PM2.5 emission reductions can be achieved. The potential air quality, noise, traffic, and water supply impacts of such a proposal must be thoroughly vetted and analyzed in the IS and the resulting DPEIR. A-7.20

The noise, air quality, geology and other impacts of Measure BCM-08, which seeks to limit agricultural burning through promoting burning alternatives (e.g., chipping/grinding or composting) must be fully analyzed. A-7.21

Pp. 1-19 to 1-25 – Mobile Source Control Measures (SCAQMD)

Notwithstanding its complete lack of regulatory jurisdiction over mobile sources, the District's Proposed Plan nonetheless contains a detailed list of mobile source control measures. The mobile source control measures "to be implemented" by the District are listed in Table 1.9-2 and summarized in the text following that table.

The IS fails to acknowledge let alone analyze all potentially significant environmental impacts of the mobile source control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*See, e.g. Muzzy Ranch, supra.*) A-7.22

Of particular concern for the POLB is MOB-01. Stemming from a desire to take ongoing credit for the voluntary emission reductions undertaken by the Ports through the CAAP Program, Measure MOB-01 would make the voluntary emission reductions a mandatory enforceable commitment in the form of a regulation enacted by the District "within its legal authority, or by the state or federal government, or other enforceable mechanism." (IS, p. 1-21.) In a separate comment letter to the District on the Proposed Plan, we will explain why the District lacks the legal authority to adopt or enforce any such regulation. Due to its lack of legal authority, this measure is not feasible and thus cannot serve as any valid form of mitigation. (Public Resources Code §§ 21004 and 21081(a)(3); CEQA Guidelines §§ 15040 and 15364; *Sierra Club v.*

[9] Measure BCM-07 likewise calls for increased watering of rotating cutting discs to reduce dust emissions. "Emissions are expected to be minimal, provided the waste material is disposed of properly." (Appendix, p. IV-A-201.) Yet, no analysis of the potentially significant air, noise, hazards, traffic, solid waste, or water supply impacts are provided such that any mitigation could be imposed to ensure that waste material is, in fact, disposed of properly.

California Coastal Comm'n (2005) 35 Cal.4th 839; and *Tracy First v. City of Tracy* (2009) 177 Cal.App.4th 912.) A-7.22 Cont.

From a CEQA standpoint, the emission reductions from the CAAP Program are already reflected in the baseline/setting. Further, the No Project Alternative is not defined in the NOP/IS. In accordance with CEQA Guidelines § 15126.6(e)(3)(A), when the "project" is the revision of an existing land use or regulatory plan, policy or ongoing operation, the "no project" alternative will be the continuation of the existing plan, policy or operation into the future. Therefore, the DPEIR should consider the impacts that would occur under the existing 2012 Air Quality Management Plan, which contains Measure IND-01. A-7.23

MOB-02 appears intended to correct two District rules pertaining to rail yards and intermodal facilities rejected by the U.S. Environmental Protection Agency ("EPA") presumably because they are beyond the scope of the District's regulatory jurisdiction. Per this vague and amorphous measure, the District will reconvene a stakeholder working group "to discuss and identify actions or approaches that can be implemented to further reduce emissions at rail yards and intermodal facilities." At most, this is a proposal to develop a measure that cannot be adequately analyzed at present in the DPEIR and should be removed from consideration.[10] Any such contemplated implementation strategies must be included in the "Project description" and better identified in a more complete NOP/IS, so that they may be evaluated along with the rest of the Project. A-7.24

Measure MOB-05 proposes to provide funding rebates for at least 15,000 zero emission or partial-emission vehicles per year. Measure MOB-07 similarly seeks to deploy up to 120 zero and partial-zero emission heavy-duty vehicles per year. The IS and resulting DPEIR must contain an analysis of the traffic, noise, air quality, and other impacts associated with such programs. A-7.25

Measure MOB-06 seeks to retire 2,000 older light and medium-duty vehicles per year. Measure MOB-08 similarly seeks to retire 2,000 heavy-duty vehicles per year. There needs to be an analysis of the solid waste and other impacts associated with such measures.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure A-7.26

[10] Similar deficiencies apply to Measures MOB-03 (Emission Reductions at Warehouse Distribution Centers), MOB-04 (Emission Reductions at Commercial Airports), MOB-08 (Accelerated Retirement of Older On-Road Heavy-Duty Vehicles), MOB-12 (Further Emission Reductions from Passenger Locomotives), MOB-13 (Off-Road Mobile Source Emission Reduction Credit Generation Program), MOB-14 (Emission Reductions from Incentive Programs), and EGM-01 (Emission Reductions from New Development and Redevelopment Projects).

must be analyzed and is not. (*See* Control Measures MOB-08, MOB-10, MOB-11, MOB-12, MOB-13, and MOB-14.)

A-7.26 Cont.

Pp. 1-25 to 1-30 – Air Toxic Control Measures (SCAQMD)

In addition to the criteria pollutant control measures, the Proposed Plan also contains a detailed list of measures to control toxic air contaminants ("TAC") from stationary sources. The TAC control measures are listed in Table 1.9-3 and summarized in the text following that table.

The IS fails to acknowledge let alone analyze all potentially significant environmental impacts of the air toxic control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*See*, *e.g. Muzzy Ranch*, *supra*.)

A-7.27

Measure TXM-01 contains a list of potential emission control approaches for metal grinding operations. Because there is no specific proposal, the IS and resulting DPEIR cannot meaningfully analyze this measure.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be analyzed and is not. (*See* Control Measures TXM-04, TXM-05, TXM-06, TXM-08, and TXM-09.)

Pp. 1-30 to 1-38 – Mobile Source Control Measures (Federal and State)

The IS's project description contains a detailed list of federal and state mobile source control measures. Although the District admittedly lacks regulatory jurisdiction over mobile sources, because the federal and state mobile source control measures are described as part of the Project, the IS, and resulting DPEIR, must contain a thorough analysis of the potentially significant environmental effects associated with these measures.

For instance, ORLD-01 proposes to increase the sales of zero emission vehicles and plug-in electric vehicles beyond the levels required in 2025. Measure ORLD-03 calls for "greater penetration of zero and near-zero technologies" as well as the "potential for autonomous vehicles and advanced transportation systems." Measure ORHD-05 requires the use of low-NOx engines and the purchase of zero emission trucks for certain class 3-7 last mile delivery trucks starting in 2020 and ramping up to a higher percentage of the fleet at time of normal replacement through 2030. Measure ORHD-09 calls for "greater penetration of zero and near-zero technologies through incentive programs, emission benefits associated with increased operation efficiency strategies, and the potential for new driver assist and intelligent transportation systems." Measure OFFS-08 likewise calls for "greater penetration of zero and near-zero technologies

A-7.28

through incentive programs, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle technologies." These measures could result in significant air quality, noise, traffic, and other impacts that are not currently or adequately described in the IS nor proposed for consideration in the DPEIR.

Further, as noted above, the Proposed Plan identifies nearly $15 billion in incentive funding needed to facilitate the transition to zero and near-zero emissions equipment. The Proposed Plan indicates that SCAQMD will develop an action plan to identify "the necessary actions by the District" and other stakeholders "to ensure the requisite levels of funding are secured." (Proposed Plan, p. 4-66.) Although the Proposed Plan discusses the possibility of a federal "superfund" program, state bond measures, and local ballot measures to obtain this funding, it does not define the specific "necessary actions." Without more detail, it is impossible to evaluate whether this incentive action plan and the necessary $15 billion in government funding have significant environmental impacts.

A-7.28 Cont.

Pp. 1-38 to 1-40 – Transportation Control Measures from the Southern California Association of Governments 2016 Regional Transportation Plan and Sustainable Communities Strategy

The IS notes that the SCAG has the responsibility for preparing and approving the portions of the Proposed Plan related to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. (IS, p. 1-38.) The IS further indicates that the District "combines its portions of the AQMP with those portions prepared by SCAG" per Health & Safety Code § 40460. (*Id.*) In particular the Project contains the Regional Transportation Strategy ("RTS"), including Transportation Control Measures ("TCM"), from SCAG's 2016 RTP/SCS.

Although those measures are only generally described in the IS, they include several measures that may result in significant environmental impacts. (*See*, IS, p. 1-39 [RTS/TCM measures include, among others, expanding regional transit, passenger rail, highway capacity, and high occupancy lanes].) Yet, none of these measures are analyzed in the IS. The IS states that because the environmental impacts were analyzed in SCAG's EIR for the RTP/SCS, the DPEIR will only evaluate potential cumulative impacts associated with implementing the Project and the TCMs.

A-7.29

This statement suggests that the DPEIR is relying on SCAG's EIR through tiering or incorporation by reference, but the IS does not explain which method or demonstrate conformance with pertinent CEQA and other related provisions. More fundamentally, there must be an explanation of the impacts analyzed in SCAG's EIR, the significance criteria and methodologies used, and mitigation measures or alternatives imposed. There must also be an explanation of the discrepancies, if any, between the two environmental documents and how

those discrepancies are proposed to be reconciled. Further, the analysis must consider not only the TCMs, but the RTS as well.

A-7.29 Cont.

2. Chapter 2 of the Initial Study – The "Environmental Checklist"

(a) General Comments and Questions on the Environmental Checklist

The NOP/IS apparently relied on a standard CEQA environmental checklist to identify those "impact areas" it recognizes to be potentially affected by the Project. In several respects, however, the IS appears to merely assume the absence of potentially significant impacts, rather than factually demonstrating that significant impacts will not occur if the (inadequately-described) Project is adopted and implemented. This is insufficient under CEQA, and under the District's own rules. (SCAQMD Rule 110; *City of Redlands* and *Sundstrom,* both *supra*).

While the CEQA Guidelines call for emphasis and "focus" on the significant environmental impacts of a project, the authority to use such focus is misapplied in the IS. For example, CEQA Guideline § 15143 explains that such focus may be used to limit the analysis in an EIR ***only*** as to such impacts that the initial study properly shows to be ***clearly insignificant and unlikely to occur*** (i.e., "effects dismissed in an Initial Study as clearly insignificant and unlikely to occur need not be discussed further in the EIR . . .."). The NOP/IS here, by contrast, appears to exclude from consideration in the DPEIR numerous effects that it has not shown to be "clearly insignificant and unlikely to occur."

A-7.30

The NOP/IS currently indicates that the scope of the proposed DPEIR for the "Project" will be limited to the eight topics listed at page 2-2 of the IS. Compliance with CEQA, however, would require not only a new and corrected IS, providing an adequate "Project description" but also a more comprehensive DPEIR that addressed additional areas of potentially significant impact, including (without limitation): (1) Aesthetics, (2) Biological Resources, (3) Cultural Resources, (4) Geology and Soils, (5) Land Use and Planning, (6) Population and Housing, (7) Public Services, and (8) *broadened evaluation* of potential impacts and issues in the areas of Air Quality and Greenhouse Gas Emissions, Energy, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Solid and Hazardous Waste, and Transportation and Traffic. Unless and until those areas are more fully addressed, the NOP/IS appears to improperly limit the scope of the proposed DPEIR based on an inaccurate and incomplete Project description, and to thus erroneously exclude areas requiring further assessment.

In addition, there is no indication what criteria were used to develop the significance criteria or that they are supported by substantial evidence, as is required. (Public Resources Code § 21082; CEQA Guidelines § 15064.7; and *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th 1099, 1111.) In the categories examined by the

A-7.31

IS, the significance criteria are inconsistent with the questions asked to elicit whether the Project would have potentially significant impacts. A-7.31 Cont.

(b) Specific Comments and Questions on the Environmental Checklist

Aesthetics – Pp. 2-4 to 2-6

The IS suggests that because the Proposed Plan is intended to "improve air quality and visibility," the District may simply assume that this Project would not be expected to generate significant adverse aesthetics impacts. However, given that several of the measures that would be used to implement the Project are not identified, the IS does not provide evidence, let alone substantial evidence as is required,[11] to demonstrate that the proposed Project would result in less than significant aesthetic impacts. A-7.32

The IS fails to describe the environmental setting and include any evidence or analysis to support its assumption that implementation of Project control measures would "typically occur inside the buildings" or could "easily blend" with existing facilities "with little or no noticeable effect on adjacent areas." (IS, p. 2-5.) Without a clearly defined project, project location, or description of the environmental setting, it is not possible to conclude that any modifications will have little or no noticeable effect on adjacent areas and would blend in with the visual setting.

The IS further contends that the installation of catenary lines (overhead power lines) in existing high activity transportation corridors, such as the areas within and adjacent to the Ports is not expected to result in any significant aesthetic impacts because the nearest scenic highways would be Routes 1 and 2, located at sufficient distances so as not to be visible from the Ports. (IS, pp. 2-5, 2-6.) In this regard, the IS fails to identify or even describe known visual resources such as John S. Gibson Boulevard, Harbor Boulevard, and the Vincent Thomas Bridge, all of which are designated as local scenic highways in the San Pedro and Wilmington-Harbor City Community Plans. Ocean Boulevard is likewise identified as a scenic route in the Scenic Element of Long Beach's General Plan. Indeed, there are many historic and cultural resources, both listed and found eligible for listing through surveys, that contribute to the visual setting and character of the Ports and if modified, through obstruction, alteration, or demolition could have a negative aesthetic impact. A-7.33

The IS does not even attempt to analyze the potentially significant aesthetic impacts from the proposed control measures which require and/or provide incentives for facility modifications, increased electrical usage (which may require new substations, powers plants and related

[11] (*See* Public Resources Code § 21080(e) [CEQA defines substantial evidence as "fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact" and excluding, among others, "speculation" and "unsubstantiated opinion."].)

infrastructure), and cool roofs and solar panels. It likewise improperly defers analysis of certain glare impacts to the local review process, which, in the case of solar panels, may not require discretionary approvals such that this topic will evade CEQA review altogether.

A-7.33 Cont.

The IS indicates that off-road control measures "may include hoods or bonnets on ship exhaust stacks to capture emissions and are expected to be as high as the height of ship stacks," and concludes that these control devices "would be similar to other structures used within the heavily industrialized portions of the ports . . .." (IS, p. 2-6.) It is speculative and erroneous to assume that control devices as high as 100 feet would have a less than significant visual impact without knowing the location, dimensions, color scheme, and/or critical viewpoints. No such analysis has been considered here and the impact is dismissed with no evidence to support the conclusion.

The IS further errs by dispensing with environmental analysis or evidence, simply because of the (assumed) beneficial air quality goals of the Project. The law is clear that environmentally "benign" aspects of a project do not excuse non-compliance with CEQA and do not justify reliance on assumptions in lieu of evidence to demonstrate the absence of potential impacts. For instance, in *California Farm Bureau Federation v. California Wildlife Conservation Board* (2006) 143 Cal.App.4th 173, 196, the Court of Appeal ruled that a State environmental agency violated CEQA by exempting an environmentally beneficial habitat project from review. In reaching its conclusion, the court reasoned that "it cannot be assumed that activities intended to protect or preserve the environment are immune from environmental review," specifically noting that "***[t]here may be environmental costs to an environmentally beneficial project, which must be considered and assessed.***"

A-7.34

Given the nature of proposed Project, it cannot be determined that its implementation would have no significant impact to aesthetics. The DPEIR therefore should include "Aesthetics" as a potentially impacted area of study.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant aesthetic impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Air Quality – Pp. 2-9 to 2-13

The IS indicates that the Project will not conflict with or obstruct implementation of the applicable air quality plan. Along those lines, the IS notes that the Proposed Plan includes control measures for stationary, mobile, and indirect sources and that these measures are based on "feasible methods of attaining the [ambient air quality standards]." (IS, p. 2-11.) There is no evidence, let alone substantial evidence to support this statement. Control measures related to mobile sources are beyond the District's regulatory jurisdiction and thus infeasible for legal and other grounds.

Given the total lack of information regarding what control measures the Project would entail and whether their implementation is feasible, it is premature to assess impacts related to violation of air quality standards, either on a project or cumulative basis, as well as exposure of sensitive receptors to substantial pollutant concentrations. These details must be provided and these topics should also be identified and assessed in a revised IS and the DPEIR. At minimum, the analysis should be expanded to include the potential air quality impacts referenced above.

A-7.35

Certain control measures could involve significant construction retrofits for compliance. (*See*, *e.g.*, MOB-01, MOB-02, OFRIS-04, and ORFIS-05.) This may result in significant construction-related air quality impacts. Further, these measures and others like it could result in additional electrification and/or the use of additional add-on control equipment, all of which needs to be addressed in the IS and resulting DPEIR.

There is no factual basis in the IS upon which to conclude that implementation of the Project would not create any odor issues and therefore need not be studied. It is premature to dismiss this area of analysis given the lack of information currently available regarding the Project. Furthermore, the IS analysis only applies to construction odors and ignores any potential odors that may occur due to Project operations.

A-7.36

As noted above, several of the proposed control measures have not yet been developed by the District. Thus, the District lacks the requisite basis to conclude that the Project would not diminish any existing air quality rule and to exclude further analysis of this topic.

While concluding that the Project may have a potentially significant impact with respect to greenhouse gas emissions, the IS inconsistently finds a less than significant impact with respect to the Project's impacts in regard to conflicts with applicable plans, policies, and regulations adopted for the purpose of reducing greenhouse gas emissions. The DPEIR must likewise study this issue and all applicable state (e.g., AB 32, Scoping Plan, Executive Orders S-3-05 and B-30-15) as well as climate action plans.

A-7.37

At minimum, the additional areas of potential impacts on air quality referenced above should be identified and assessed in the DPEIR.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant air quality impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

A-7.37 Cont.

Biological Resources – Pp. 2-14 to 2-16

The IS fails to adequately describe, and improperly minimizes, possible impacts to biological resources. The scope of the proposed DPEIR should be expanded to include environmental analysis of the Project's potentially significant impacts to biological resources.

The IS indicates that "the proposed project will not adversely affect protected wetlands as defined by § 404 of the Clean Water Act, including, but not limited to marshes, vernal pools, coastal wetlands, etc., through direct removal, filling, hydrological interruption or other means." (IS, p. 2-16.) But, the IS fails to analyze, through detailed quantification and hydrodynamic modeling, potential wastewater impacts, including impacts to designated wetlands.

A-7.38

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to biological resources, as well as feasible mitigation measures and alternatives designed to address those impacts.

Cultural Resources – Pp. 2-17 to 2-19

The IS fails to adequately describe, and improperly minimizes, possible impacts to cultural resources. For instance, not all areas within the Ports are devoid of cultural resources or have been previously disturbed, as concluded in the IS on page 2-18. There are known recorded historic and prehistoric sites throughout the Ports alone[12] and there are undoubtedly other historic and prehistoric sites in the Basin that would be affected by the Project. Without knowing the location and extent of ground disturbance from possible construction activities associated with the Project, it is speculative to assume that no significant adverse cultural resources impacts are expected as a result of its implementation. The conclusion in the IS that the Project will result in "no impact" to cultural resources is unsupported and lacks evidence or facts to support the finding.

A-7.39

Further, the IS includes language reflecting the typical mitigation measure to be imposed on unknown cultural sources to justify its "no impact" conclusion. (IS, p. 2-19). This fact alone demonstrates that there are potentially significant cultural resource impacts requiring analysis and mitigation in the DPEIR.

[12] For example, *see* City of Los Angeles's website at http://www.portoflosangeles.org/idx_history.asp.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to cultural resources as well as feasible mitigation measures and alternatives designed to address those impacts.

A-7.39 Cont.

Energy – Pp. 2-18 to 2-19

If the net effect of implementing the Project is an increase in regional energy demand, as the IS indicates is likely, potential conflicts with adopted energy conservation plans and existing energy standards (Items VI.a and IV.e) should not be dismissed as "no impact." The IS must be expanded to also consider and analyze the shift from fossil fuels to alternative fuels or electrical powered technologies and increased reliance on such alternative fuels or electricity such that sufficient supply and emergency storage would be required in the event of a major disaster. Also, some types of emissions control measures, facilities, or technologies contemplated by the Project could increase or shift demand for different types of energy or fuel usage. Although "risk of upset" is not considered in the IS Checklist, it should be cross-referenced here and addressed in the Hazards section of the IS and the DPEIR.

A-7.40

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant energy impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Geology and Soils – Pp. 2-23 to 2-19

Because details concerning several Project control measures are not yet known, the IS improperly concludes that the Project has no potential to generate significant adverse impacts to geology and soil resources. In particular, the IS wrongly assumes that only "minor" modifications at existing industrial or commercial facilities would be needed due to Project control measures and that "no AQMP control measures would require the location of new, or relocation of existing facilities in areas prone to liquefaction." (IS, p. 2-23 and 2-24.) At minimum, the potentially significant geology-related impacts associated with the control measures identified above must be analyzed in the DPEIR.

A-7.41

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant geology and soils impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Hazards and Hazardous Materials – Pp. 2-26 to 2-29

In addition to the measures described herein, the potentially significant hazards-related impacts associated with the control measures identified above must also be analyzed in the DPEIR.

Section VIII.d of the IS states that the Project would not be located on a site which is included in a list of hazardous materials sites compiled pursuant to Government Code § 65962.5, also known as the "Cortese list." As such, the IS concludes that "implementation of the proposed control measures is not expected to interfere with site cleanup activities or create additional site contamination" and that this topic "will not be further evaluated" in the DPEIR. (IS, p. 2-28.) This section must be expanded to also consider that Government Code § 65962.5 requires the disclosure of any work conducted on a site on the Cortese list and precludes a project from being exempt under CEQA even if only minor work is being conducted on such sites. There are several parcels on the Cortese list located within the POLB alone.[13] A-7.42

In addition, Item VIII.f must be expanded to also consider and analyze the increased reliance on alternative fuels or electrical powered technologies that would require sufficient supply and emergency storage in the event of a major disaster. Although interference with emergency response plans was marginally addressed in this section, "risk of upset" is not considered in the IS checklist.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to hazards and hazardous materials as well as feasible mitigation measures and alternatives designed to address those impacts.

Hydrology and Water Quality Pp. 2-30 to 2-33

The analysis does not cover all of the control measures that may result in adverse impacts to hydrology impacts. A thorough analysis of all proposed measures must be included in the DPEIR. The IS purports to exclude runoff-related impacts (Items IX.c and d) reasoning that only "minor modifications" would be needed to commercial or industrial facilities affected by the proposed control measures. (IS, p. 2-33.) This is not supported by any evidence in the record. Moreover, as noted above, several of the proposed control measures have not yet been developed by the District. Thus, the District lacks the requisite basis to conclude that the Project would not result in any adverse impacts related to stormwater runoff impacts. A-7.43

[13] (*See* California Department of Toxic Substances Control. Hazardous Waste and Substances Site List – Site Clean (Cortese List) *www.dtsc.ca.gov/Site Cleanup/Cortese_List.cfm*. City of Long Beach zip code 90802.)

Because details concerning several Project control measures are not yet known, the IS improperly concludes that the Project has no potential to generate significant adverse impacts to geology and soil resources. In particular, the IS wrongly assumes that only "minor" modifications would be needed at existing industrial or commercial facilities due to Project control measures and that "no AQMP control measures would require the location of new, or relocation of existing facilities in areas prone to liquefaction." (IS, pp. 2-23 and 2-24.) At minimum, the potentially significant geology-related impacts associated with the control measures identified above must be analyzed in the DPEIR.

A-7.43 Cont.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to hydrology and water quality as well as feasible mitigation measures and alternatives designed to address those impacts.

Land Use and Planning – Pp. 2-34 to 2-36

The IS fails to adequately describe, and improperly minimizes, possible inconsistencies between the proposed Project and the existing and applicable land use plans and policies.

The significance criteria asks whether the Project would conflict with the land use and zoning designations established by local jurisdictions. But, CEQA requires an analysis of whether the Project would conflict with any applicable plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. (CEQA Guidelines § 15125(d); CEQA Guidelines, Appendix G, Item X.b; and *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903.) No such question is asked by the IS nor does the resulting analysis provide the District the basis on which to exclude further consideration of land use and planning impacts.

A-7.44

In addition to local plans, there are numerous federal and state plans that contain pertinent policies that must be considered and evaluated in light of the Project control measures. For instance, the proposed Project would seemingly create conflicts with the Ports' existing policies implementing the State Tidelands Trust principles, the California Coastal Act planning and permitting requirements, and the existing Master Plan for each Port, as are detailed in the previous Port letters. In addition, the proposed Project would create inconsistencies with the CAAP. The numerous inconsistencies between the Project as proposed and the existing plans and policies require identification in the IS and inclusion in the proposed DPEIR. (CEQA Guidelines § 15125(d).) The fact that the District does not have authority over local land use matters (*see* IS, p. 2-34) does not justify or excuse its need to study this issue consistent with CEQA. (Public Resources Code § 21081(a)(2); *Neighbors for Smart Rail v. Exposition Metro Line Const. Auth.* (2013) 57 Cal.4th 439.)

The IS assumes that no new rail or truck traffic routes would be constructed and that instead existing transportation lines near the Ports would be modified to add electrical lines. (IS, p. 2-35.) There is no evidence to support this statement, let alone substantial evidence, as is required. Even if it were true this does not mean that the Project would not result in any conflicts with plan policies adopted for the purpose of avoiding or mitigating environmental effects. Increased electrical use would increase electrical demand. As noted above, this could conflict with adopted energy conservation plans. Installation of electric infrastructure could raise significant conflicts with aesthetic policies especially since these lines are proposed to be located above-ground. A-7.45

Additionally, fueling infrastructure to support zero and near-zero emissions vehicles, such as those powered by hydrogen fuel cells or natural gas, could have a significant impact on local land use and may conflict with existing plans. Such Project components could likewise contribute to the physical division of an established community. The IS admits as much in noting that to the extent such infrastructure requires modification to an existing rail or truck traffic route/corridor, this "will require a separate CEQA evaluation." (IS, p. 2-36.) The District cannot legally defer analysis of Project impacts to some future, speculative CEQA review process. The analysis must take place now in order to inform the District's decision on the Proposed Plan. A-7.46

The IS states that it incorporates "local land use planning decisions and population growth." (IS, p. 2-36.) There is no explanation or evidentiary support for this statement, and even if there were, it is irrelevant. The pertinent questions are whether the Project may conflict with plan policies pertaining to environmental issues and/or physically divide an established community. A-7.47

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant land use and planning impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Noise – Pp. 2-39 to 2-41

The IS acknowledges that approval of the Project could result in the construction or installation of new control equipment that may result in significant noise impacts. Even so, the IS only analyzes the construction-related noise impacts associated with some, but not all, of the proposed control measures. A-7.48

Further, there is no evidence cited in the IS to support its assumption that additional permanent noise impacts anticipated from the operations of new control equipment would not "cause substantial noise or excessive groundborne vibration impacts" and its conclusion that "[o]perational noise impacts are expected to be less than significant." (IS, p. 2-41.)

This section of the IS is littered with mere "expectations" unsupported by any evidence regarding the magnitude of new noise impacts, even though such new impacts are anticipated by the IS. Nor is there any analysis of the potential for significant adverse impacts from new noise generators related to the Project.

A-7.48 Cont.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant noise impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Population and Housing – Pp. 2-42 to 2-43

The analysis assumes that "few or no new employees would need to be hired at affected facilities to operate and maintain new control equipment on site because air pollution control equipment is typically not labor intensive equipment." (IS, p. 2-43.) There is no evidence to support this statement, let alone substantial evidence, as is required.

Further, the IS neglects to discuss or assess the potentially significant growth inducing impacts associated with several control measures. (*See*, *e.g.*, Control Measures CMB-01 and FLX-02).

A-7.49

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant population and housing impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Public Services – Pp. 2-44 to 2-45

The IS assumes that the Project would not generate any increased need for public services. However, the IS does not provide any substantial evidence to support its assumptions regarding the absence of impact on additional public services or facilities. New fueling infrastructure to support zero and near-zero emissions vehicles, including hydrogen and natural gas, could impact Fire Department resources and require additional public services.

A-7.50

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant public services impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Transportation and Traffic – Pp. 2-50 to 2-54

The IS erroneously considers only vehicular traffic impacts to local roadways. As such, it fails to adequately describe and analyze potentially significant impacts to rail and marine vessel traffic, ignoring the specific significance criterion related to this topic (*see* IS, P. 2-51). In fact, ORFIS-04 (At-Berth Regulation Amendments) could have a significant impact on marine vessel traffic as the only approved technologies to address non-regulated vessels are barge-based, and thus, would increase vessel traffic within harbor waters. An expansion of the at-berth regulation as contemplated in ORFIS-04 would likely require additional barge-based units, further exacerbating vessel traffic and posing safety hazards, all of which must be analyzed in the DPEIR. A-7.51

The IS does not contain any analysis of the potentially significant traffic impacts associated with increased zero or low emission vehicles. Instead of analyzing the impacts caused by additional vehicles, the analysis assumes that "drivers who purchase low or zero emission vehicles would not be driving the old high emitting vehicles at the same time they are driving the low emitting vehicles." (IS, p. 2-52.) However, other drivers will now be able to drive these vehicles and the analysis should assume both the old and new vehicles will be used at the same time.[14] Further, construction and operation of potential zero emission control measures related to on-road heavy-duty vehicles, such as the use of overhead catenary power lines, could result in significant traffic impacts through closure of lanes and other alternations of traffic flow patterns. Thus, operational traffic impacts should not be dismissed from the DPEIR. A-7.52

The potential road hazards associated with TCMs are assumed to not exist. (IS, p. 2-53.) However, the analysis of this topic was presumably done by SCAG in the EIR for the RTP/SCS. The IS and resulting DPEIR proposes to rely on this document but does not refer to any of its analysis or explain how the IS analysis conforms to it. The same is true for the IS's analysis of other TCM measures. Indeed, the District's own overhead catenary project has been required to install additional traffic safety measures to compensate for infrastructure design changes that include larger base foundations and wider medians, which have necessitated safety barriers to reduce traffic hazards. A-7.53

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant transportation and traffic impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

[14] This same assumption should be reflected in all the analyses, including but not limited to, air quality, greenhouse gas emissions, and noise.

Mandatory Findings of Significance – Pp. 2-55 to 2-56

As discussed above, the Project's potentially significant impacts to biological resources must be analyzed in the DPEIR and should not be considered beyond the scope of review. Further, all potentially significant impacts to all resource topics should be evaluated in the DPEIR and not just the select list of resource topics identified for consideration. The IS claims that the TCMs are part of the Project (IS, p. 1-10) but then purports to exclude them from its analysis of anything other than cumulative impacts (IS, p. 2-56). Both project and cumulative impacts must be analyzed for all Project components, including (without limitation) the RTS and TCMs.

A-7.54

D. Conclusion

The current version of the NOP/IS fails to adequately describe the "Project" thereby thwarting effective public review and comment on the Proposed Plan. The IS must therefore be revised, corrected, and re-circulated with all of the descriptions and other content required by CEQA.

Even this inadequate NOP/IS makes it clear that the scope of the proposed DPEIR has been unduly narrowed, and that environmental review will be limited in a way that erroneously fails to provide the relevant decision-makers, affected public agencies, residents and the public generally with sufficient evidence and analysis of all anticipated and potential impacts from the Project as a whole, or of all potentially feasible mitigation measures or appropriate Project alternatives as required by CEQA.

A-7.55

While it is clear that an initial study is needed in connection with this proposed Project, it is also clear that the IS should be more complete than the version that was provided for public review and comment. More fundamentally, its scope must be determined by a legally-adequate revised NOP/IS. The IS for the Project must, of course, be supported by credible and substantial evidence, including independent professional analysis.

We respectfully request that these comments and questions be considered before the District embarks on preparation of the DPEIR and all of the other required independent studies in connection with the CEQA review of the proposed Project.

The NOP requests that we provide you with a contact person for each responding agency. For the POLB, the contact persons are as follows:

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Sincerely,



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Director of Environmental Planning
Port of Long Beach

cc: Wayne Nastri, Acting Executive Officer, South Coast Air Quality Management District
Barbara Baird, Chief Deputy Counsel, South Coast Air Quality Management District
Jon Slangerup, Chief Executive, Port of Long Beach
Rick Cameron, Managing Director, Port of Long Beach

Response to Comment Letter A-7

Comment A-7.1

Re: Comments on the Notice of Preparation, Initial Study, and Scope of Proposed Draft Program EIR for the 2016 Air Quality Management Plan

Dear Ms. Wong and Staff of the South Coast Air Quality Management District:

We appreciate this opportunity to submit comments on the Notice of Preparation ("NOP") and the accompanying Initial Study ("IS") prepared in connection with the South Coast Air Quality Management District's ("District" or "SCAQMD") consideration of the proposed 2016 Air Quality Management Plan (the "Project" or "Proposed Plan") on behalf of the City of Long Beach acting by and through its Harbor Department (collectively referred to herein as "Port of Long Beach" or "POLB"). A-7.1

As you know, the POLB along with the Port of Los Angeles (collectively the "Ports") have achieved tremendous success in obtaining substantial emissions reductions through their joint San Pedro Bay Ports Clean Air Action Plan ("CAAP") and other air quality measures implemented under the Ports' initiatives. POLB continues to be supportive of projects and programs that are intended to contribute to improvement of air quality and promote other environmental values. However, POLB fundamentally disagrees with the District's proposal to again attempt to unnecessarily convert an effective voluntary plan, built on multi-agency and industry cooperation, into potentially punitive regulations imposed unlawfully on the Ports. The Ports have previously sought to make the District aware of the serious concerns and objections to this approach.[1]

We are also mindful that the California Environmental Quality Act ("CEQA") calls for public review, critical evaluation, and comment on the scope of the environmental review to be conducted prior to approval of proposed projects. Such review and critique is particularly important where, as here, it is anticipated that the proposed Project will have substantial impacts on and conflict with the authorities of other public agencies. Thorough identification of the proposed Project, and candid disclosure of all phases of the Project and its potential impacts, is essential to assure that the proposed Project will be planned and implemented in conformity with established community plans and policies, and that environmental review is conducted with full consideration of all potentially significant environmental impacts as well as mitigation measures and alternatives designed to address those impacts. In addition, it will be important to consider the impacts of the proposed Project on the POLB's community, mission, facilities, and operations. The District must therefore provide a meaningful opportunity for informed public review of and comment on a well-defined "project." A-7.1 Cont.

In that context, we respectfully submit the following comments regarding the NOP for the Project as well as questions, concerns, and objections related to the omissions of critical information, unsupported assumptions, or analytical deficiencies in the IS, and comments as to the scope of the proposed Draft Program Environmental Impact Report ("DPEIR") as contemplated and invited by the District's NOP. As set forth in more detail below, we believe that: (1) the Project needs to be more thoroughly and accurately described, (2) all potentially significant environmental impacts related to all Project control measures must be thoroughly analyzed, and (3) mitigation measures and alternatives must be provided to address all potentially significant environmental impacts.

[1] (*See* letters dated January 31, 2014; January 15, 2014; October 2, 2013; August 21, 2013; November 27, 2012; November 19, 2012; November 8, 2012; October 31, 2012; October 22, 2012; August 30, 2012 (which includes letter dated May 4, 2010); July 10, 2012; July 27, 2012 from POLB and/or Port of Los Angeles to SCAQMD.)

Response A-7.1

This is an introductory comment which alludes to specific comments presented later in the comment letter. Therefore, responses are provided to the specific comments later.

Comment A-7.2

A. General Comments on the Initial Study

While we recognize the effort that has gone into preparation of the current NOP/IS, it is apparent that the IS does not provide the information, evidence, or analysis required under CEQA. The IS thus fails to fulfill its critical role as mandated by CEQA in educating the public generally, other affected regulatory agencies and governments, or the officials and Board of the District, as to the potential environmental significance and impacts of the proposed Project.

The necessary contents for an adequate initial study are described in CEQA Guidelines § 15063(d). An initial study must "contain in brief form:

(1) A description of the Project including the location of the Project;

(2) An identification of the environmental setting;

(3) An identification of environmental effects by use of a checklist, matrix, or other method, provided that entries on a checklist or other form are briefly explained to indicate that there is some evidence to support the entries . . . ;

(4) A discussion of ways to mitigate the significant effects identified, if any;

(5) An examination of whether the Project would be consistent with existing zoning, plans, and other applicable land use controls;

(6) The name of the person or persons who prepared or participated in the initial study."

An initial study that fails to provide all of the information, analysis, and evidence called for by CEQA may be deemed to be inadequate and not a valid basis for CEQA review or project approval. (*See, e.g., City of Redlands v. County of San Bernardino* (2002) 96 Cal.App.4th 398, 407–408, [invalidating the County's proposed general plan amendments because of a deficient initial study: "[T]he initial threshold study is inadequate because it fails to provide sufficient evidence or analysis of the potential environmental effects of the amendments."].)

As set forth in more detail below, the IS fails to: contain an adequate project description, properly identify the environmental setting, and adequately assess the Project's potentially significant environmental effects. It contains no discussion whatsoever of mitigation measures or consistency with existing zoning, plans, and other applicable land use controls, as required. It is therefore respectfully urged that the IS (and the related NOP) be revised, corrected, and recirculated for public review and comment before the District proceeds with any further action, including release of a DPEIR for the proposed Project.

The CEQA Guidelines contemplate that an initial study is to be used in defining the scope of environmental review. (CEQA Guidelines §§ 15006(d), 15063(a), 15143). However, as a result of the omissions, open questions, and deficiencies in the IS as noted below, it appears to have unduly narrowed the District's proposed scope of environmental assessment, and to have caused the NOP to erroneously exclude critical issues and topics from the proposed scope of the DPEIR.

The comments on the current IS included in this letter are organized in the same format used by the IS, i.e., comments on "Chapter 1 – Project Description" followed by comments on "Chapter 2 – Environmental Checklist." The comments are limited to those matters that appear in the current version of the IS, and we reserve the right to provide further comments in the event that additional or different information concerning the proposed Project becomes available, or the District provides a revised and CEQA-compliant initial study.

A-7.2

A-7.2 Cont.

Response A-7.2

This is an introductory comment which alludes to specific comments presented later in the comment letter. Therefore, responses are provided to the specific comments later.

Comment A-7.3

B. Request for Revision of NOP and Re-Circulation of Revised NOP/IS to Include a Legally-Adequate "Project" Description

As a preliminary matter, we note that the 30 day review period is insufficient time to review the IS and the over 1,000 page Proposed Plan and available appendices. It is also important to note that Appendix V (Modeling & Attainment Demonstrations) and Appendix VI (Compliance With Other Clean Air Act Requirements) of the Proposed Plan has not yet been posted to the District's website.

A-7.3

Response A-7.3

The SCAQMD complied with the standard required CEQA public period timing requirements, including a 30-day public review and comment period for an NOP/IS (CEQA Guidelines §15082(b)(2)). Additionally, six public workshops/CEQA scoping meetings were held for the proposed project at the following locations and times.

Workshop Date	Time	Locations	Address	County
July 14, 2016	10:00 am	Coachella Valley Assn. of Governments	72-710 Fred Waring Dr., Palm Desert, CA	Riverside
July 14, 2016	6:00 pm	SCAQMD Headquarters	21865 Copley Dr. Diamond Bar, CA	Los Angeles
July 20, 2016	9:30 am	Buena Park Community Center	6688 Beach Blvd., Buena Park, CA	Orange
July 20, 2016	2:00 pm	Carson Center	801 East Carson Street, Carson, CA	Los Angeles
July 21, 2016	9:30 am	Norton Regional Events Center	1601 E. 3rd St., San Bernardino, CA	San Bernardino
July 21, 2016	2:00 pm	Hyatt Place Riverside	3500 Market Street, Riverside	Riverside

Appendix V and Appendix VI will be available when the Draft Program EIR is released for public review.

Comment A-7.4

Further, it is essential that the NOP and the IS be revised to include an adequate "project description" including *all* of the Proposed Plan's pertinent control measures and strategies that is the "project" before the public and agencies can be expected to provide comments and input.

It is only through reviewing the lengthy appendices to the Proposed Plan, can the reader understand the proposed Project control measures. The appendices also make clear that several of the proposed Project measures have not even been developed yet by the District and thus cannot be the subject of any meaningful environmental review or analysis. (*See*, *e.g.*, proposed Control Measures MOB-02, MOB-03, MOB-04, MOB-08, MOB-12, MOB-13, and MOB-14.) The details of the proposed Project must be accurately developed and described before the proposed methods and precise impacts anticipated by the Project may be analyzed or the subject of comment. Accordingly, it is still not possible for the District to proceed with appropriate project-level CEQA review or to issue an accurate NOP/IS at this stage as the details of the Proposed Plan are still under development. A-7.4

It is necessary that the current NOP and IS be revised to include a revised Project description, to incorporate the text of the Proposed Plan in detail, and to recirculate the revised documents for public review. A new set of public meetings, including a new "scoping meeting" should be scheduled to provide the public with sufficient time and opportunity to comment on the scope and adequacy of the revised notice of preparation/initial study. The comment period on any such revised documents should be at least 60 days in total.

Response A-7.4

When the NOP/IS was released for public review and comment, the Draft 2016 AQMP was available for review. Therefore, details of all of the proposed project's control measures (in Appendix IV-A, IV-B, and IV-C) were available to the public for a meaningful review.

Although some of the specific control measures are provided in broad language, known reductions and costs are provided. Regardless, potential associated impacts can still be analyzed based on known information or supported assumptions, as was done in the Draft Program EIR, to determine foreseeable effects. It should be noted that the CEQA analysis for the 2016 AQMP is not project-level, but rather program level. Each of the projects, including rule development borne out of the control measures, will undergo project level CEQA analysis in the future.

Chapter 1 of the NOP/IS includes a description of the control strategies and their anticipated environmental impacts. Although the specifics of the implementation of each control measure have not yet been defined due to the process of developing control measures, the known information is used to form the basis of the analysis of environmental impacts.

Comment A-7.5

The DPEIR schedule too is very aggressive, with the scoping comment period ending on August 4, 2016, followed immediately by the release of the DPEIR also in August 2016, and final approval planed for December 2, 2016. This schedule provides insufficient time for meaningful input on the scope and content of the DPEIR by members of the public and affected agencies. Further, the POLB is concerned that given the quick turnaround between closure of the scoping period and the scheduled release of the DPEIR, insufficient time will be allowed for thorough review of the scoping comments by the District and inclusion of such comments into the DPEIR. A-7.5

Response A-7.5

Six public workshops/CEQA scoping meetings were held for the proposed project at the following locations and times in order to solicit public participation.

Workshop Date	Time	Locations	Address	County
July 14, 2016	10:00 am	Coachella Valley Assn. of Governments	72-710 Fred Waring Dr., Palm Desert, CA	Riverside
July 14, 2016	6:00 pm	SCAQMD Headquarters	21865 Copley Dr. Diamond Bar, CA	Los Angeles
July 20, 2016	9:30 am	Buena Park Community Center	6688 Beach Blvd., Buena Park, CA	Orange
July 20, 2016	2:00 pm	Carson Center	801 East Carson Street, Carson, CA	Los Angeles
July 21, 2016	9:30 am	Norton Regional Events Center	1601 E. 3rd St., San Bernardino, CA	San Bernardino
July 21, 2016	2:00 pm	Hyatt Place Riverside	3500 Market Street, Riverside	Riverside

The Draft Program EIR will be released for a 60-day public review and comment period from September 16 to November 15, 2016. Additionally, a second round of public meetings in the form of regional public hearings will be held to allow additional public participation and input.

Comment A-7.6

C. Comments on the Initial Study

1. Chapter 1 of the Initial Study – Inadequate "Project" Description

(a) Deficient "Project" Description – In General

The failure of the IS and NOP to provide an accurate, complete, and coherent description of the "Project" is a fundamental deficiency, which permeates the entire document. The absence of such a clear description of the proposed Project inherently prevents the IS from facilitating meaningful review and analysis of the proposed Project, and violates the requirements of CEQA. (*See, e.g.*, CEQA Guidelines § 15124 and *Laurel Heights Improvement Ass'n v. Regents of the University of California* (1988) 47 Cal.3d 376.)

The importance of providing an accurate and informative project description in an initial study was re-emphasized in *Nelson v. County of Kern* (2010) 190 Cal.App.4th 252, 267:

> ***The initial study must include a description of the project***. Where an agency fails to provide an accurate project description, or fails to gather information and undertake an adequate environmental analysis in its initial study, a negative declaration is inappropriate. An accurate and complete project description is necessary to fully evaluate the project's potential environmental effects.
>
> The scope of the environmental review conducted for the initial study must include the entire project. Thus, a correct determination of the nature and scope of the project is a critical step in complying with the mandates of CEQA.[2]

A-7.6

In *City of Redlands, supra*, the Court of Appeal likewise observed that:

> An accurate and complete project description is necessary for an intelligent evaluation of the potential environmental impacts of the agency's action. Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal . . . and weigh other alternatives in the balance.

(96 Cal.App.4th at 406, 408; *accord*, *County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 192-193 (an accurate, complete and consistent project description is the sine qua non of informative, legally adequate CEQA review).

CEQA Guidelines § 15063(a)(1) further makes clear that an initial study must take a comprehensive view of the proposed project *as a whole*. "All phases of project planning, implementation, and operation must be considered in the initial study of the project." This requirement reflects CEQA's definition of a "project" as the "whole of an action" that may result in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change. (Public Resources Code § 21065; CEQA Guidelines § 15378.)

A-7.6 Cont.

[2] Unless otherwise noted, emphasis in quotations herein is supplied and citations are omitted.

Response A-7.6

A detailed and comprehensive project description was included in Chapter 1 of the NOP/IS and the Draft 2016 AQMP was available to provide meaningful review. This comment does not provide specific examples to support the claim that the project description in the NOP/IS is deficient. No further response is necessary.

Comment A-7.7

The IS currently falls far short of these requirements in describing the proposed Project, and thus falls equally short of serving the "public awareness" purposes described above and mandated by CEQA. The IS does not include or even describe the text of several control measures supposed to comprise the "Project." The section of the IS that purports to "describe" the Project, includes nothing more than summaries of certain control measures. At least some of the summaries do not accurately match the details described in the appendices to the Proposed Plan. In any event, the summaries are insufficient to describe the Project itself, and prevent effective public review and comment. The IS also fails to describe reasonably foreseeable activities or actions in response to or associated with the proposed Project control measures.

As to certain control measures, the IS appears to imply that any informed public discussion and environmental review on this course of action be *deferred* until some point in the future. Such an approach, however, is inconsistent with, and in violation of, many fundamental rules and policies required by CEQA (e.g., failure to identify and analyze the whole of the project, improper project "segmentation," improper deferral of impact analysis and mitigation, failure to identify and evaluate project alternatives, etc.). (*See*, *e.g.*, Public Resources Code § 21003.1; CEQA Guidelines §§ 15126.2, 15126.4, 12126.6, 15378; *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296.)

A-7.7

Response A-7.7

Summaries of control measures provided in the NOP/IS were specifically used to aid in the understanding of the proposed project for the general public. More extensive discussion of the control measures was available in the Draft 2016 AQMP in both Chapter 4 and Appendices IV-A, IV-B, and IV-C. The comment does not provide any specific examples to support the claim that the summaries do not accurately match the details described in the appendices of the proposed plan.

The NOP/IS discloses impacts of the proposed project. Some environmental topics were found to have potentially significant impacts and are fully analyzed in the Draft Program EIR, not deferred, as the comment suggests. The specific control measures of concern and the basis for the implication that concerns the commenter is not provided to allow a more proper detailed response.

Comment A-7.8

The Proposed Plan refers to the future development of "contingency measures" if the area fails to meet certain milestones. (Proposed Plan, pp. 4-44 to 4-45, 6-13.) Yet, no such contingency measures are identified or described in the Proposed Plan or analyzed in the IS.

The Proposed Plan refers to "an action plan [that] will be developed as part of the AQMP public adoption process" to identify strategies to secure new sources of funding in order to implement the Proposed Plan. (Proposed Plan, p. 4-66.) However, the Proposed Plan provides insufficient details on what would be contained in this action plan and what environmental

A-7.8

In brief, the NOP/IS erroneously limits the scope of the analysis and inherently calls for impermissible speculation or impossible prescience on the part of public agencies or other members of the concerned public to undertake effective analysis of the proposed Project, or to provide meaningful comments as to the scope of review of the Project. No effective CEQA review can be undertaken unless and until the District provides an adequate description of the "Project."

A-7.8 Cont.

Response A-7.8

Chapter 4 of the 2016 AQMP has a detailed discussion as to what is being defined as a contingency measure to comply with Clean Air Act (CAA) requirements. These measures are analyzed in the Draft Program EIR regardless of how the measure is classified to comply with CAA requirements.

The reference in the comment to an action plan is a plan for future funding opportunities. The NOP/IS and the Draft Program EIR analyzed environmental impacts from implementation of the 2016 AQMP, regardless of how the measure are to be implemented (through incentives or regulation). The funding action plan is a document separate to the 2016 AQMP and has no legal requirement for its development.

The detailed, comprehensive project description in the NOP/IS is adequate and provides sufficient detail for analysis of potential environmental impacts. The comment does not provide specific evidence to support the claims.

Comment A-7.9

(b) Specific Comments and Questions Regarding "Project Description" and Text

The following comments and questions refer to specific portions or pages of Chapter 1 of the IS:

Pp. 1-5 to 1-6 – Agency Authority-2016 AQMP

The IS correctly acknowledges that the regulation of air quality emissions from mobile sources is primarily done at the federal and state level. By comparison, the District "has lead responsibility for developing stationary, some area, and indirect source control measures . . .." (IS, p. 1-5.)[3] Despite this acknowledged limit on its regulatory jurisdiction, the AQMP nonetheless purports to contain several measures related to mobile source emissions.

A-7.9

[3] *Accord*, Proposed Plan, p. ES-5 ("With limited SCAQMD authority over the mobile sources that contribute the most to our air quality problems, attainment cannot be achieved without state and federal actions.") and Proposed Plan, p. 3-11 ("U.S. EPA and CARB have primary authority to regulate emissions from mobile sources. U.S. EPA's authority applies to aircraft, locomotives, ocean going vessels, and some categories of on- and off-road mobile equipment. CARB has authority over the remainder of the mobile sources, and consumer products. SCAQMD has authority over most area sources and all point sources.").

Response A-7.9

The SCAQMD has limited regulatory authority over mobile sources (e.g., fleet rules) and thus, a suite of SCAQMD mobile source measures are being proposed. Most of these mobile source measures will work in concert with CARB's SIP strategy being developed locally.

Comment A-7.10

Pp. 1-7 to 1-8 – Overall Attainment Strategy

The IS indicates that the Proposed Plan "includes integrated strategies and measures" to meet the following federal standards:

- Revoked 1997 8-hour NAAQS ozone (80 ppb) by 2024;
- 2008 8-hour ozone standard (75 ppb) by 2032;
- 2012 annual PM2.5 standard (12 ug/m^3) by 2025;
- 2006 24-hour PM2.5 standard (35 ug/m^3) by 2019; and
- Revoked 1979 1-hour ozone standard (120 ppb) by 2023."

A-7.10

In addition to developing strategies and measures to meet the above acknowledged revoked standards, the text indicates that a new 8-hour ozone standard has been adopted (70 parts per billion ["ppb"]) ostensibly replacing the 2008 standard analyzed. (IS, p. 1-7.) The text does not explain why a plan is being developed to attain standards that have been revoked or rescinded.

The IS states that the majority of nitrogen oxide ("NOx") emission reductions will need to come from mobile sources and acknowledges again that the District lacks authority to regulate such emissions. As such, why is the District developing an "aggressive mobile source control strategy" to control emissions over which it admittedly lacks regulatory jurisdiction? (IS, p. 1-8.)[4]

A-7.10 Cont.

[4] The Proposed Plan at page ES-7 states that mobile sources currently contribute about 88 percent of the region's total NOx emissions. It then states that "[s]ince the SCAQMD has limited authority to regulate mobile sources, staff worked closely with CARB and U.S. EPA, which have primary authority over mobile sources, to ensure mobile sources perform their fair share of pollution reduction responsibilities." (Proposed Plan, p. ES-7.)

Response A-7.10

The 2008 standard has not yet been revoked, so the obligation to demonstrate attainment still remains. Sanctions and consequences to our region will be imposed if a plan is not submitted. That being said, once a standard is revoked, there are still anti-backsliding requirements to be complied with. See Chapter 6 of the 2016 AQMP for those requirements. This was explained in Chapter 6 of the Draft 2016 AQMP.

The SCAQMD does not lack authority, but rather has limited authority. The overall strategy, that includes state and federal sources, is an aggressive mobile source strategy.

Comment A-7.11

P. 1.9 – Project Objectives

The IS notes the objective of achieving the various ozone and particulate matter ("PM2.5") standards by the specified attainment dates. However, as the appendices to the Proposed Plan make clear, several of the emissions reductions are listed as "TBD" with a note that "Emission reductions will be determined after projects are identified and implemented." (Proposed Plan, Appendix IV-A, pp. IV-A-4, IV-A-5, IV-A-96, and IV-A-172.) Because the emission reductions associated with several control measures have not yet been quantified, there is no guarantee or assurance that the emission reductions will actually be attained. Thus, contrary to the NOP, the Proposed Plan does not "identif[y] control measures and strategies to bring the region into attainment" with the specified standards nor does it demonstrate "compliance with state and federal Clean Air Act requirements." For this same reason, the Proposed Plan fails to attain its statutorily prescribed purpose.[5]

A-7.11

[5] (42 U.S.C. § 7410; California Health & Safety Code § 40440; *American Coatings Ass'n v. South Coast Air Quality Management District* (2012) 54 Cal.4th 446, 453.)

Response A-7.11

SCAQMD staff's goal for the Draft 2016 AQMP was to propose a comprehensive plan with all feasible measures. The emission reductions listed as TBD referred to in the comment are not needed in the attainment demonstration and would need additional technical assessment in order to be quantified. However, there may be the possible need in the near future for contingency measures and shortfall reductions in which case the TBD measures could be explored further to assist in those needs.

Comment A-7.12

Pp. 1-10 – Project Description

The Project description indicates that the Project "control measures" consist of three components: (1) the SCAQMD Stationary and Mobile Source Control Measures, (2) State and Federal Mobile Source Control Measures, and (3) Regional Transportation Strategy and Control Measures provided by the Southern California Association of Governments ("SCAG"). A-7.12

The text indicates that the air quality baseline is comprised of 2012 data.[6] Yet, there is no clear explanation or rationale for the use of baseline data that is nearly 5 years old. The scope of the proposed DPEIR and Proposed Plan must be expanded to include a detailed explanation, supported by substantial evidence, that the 2012 air quality baseline is appropriate. (CEQA Guidelines § 15125; *Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 48 Cal.4th 310.) The analysis must also clearly specify the baseline used for other resource topics, and to the extent that they deviate from the normal "existing conditions" scenario, like air quality, provide a clear and cogent explanation as to why this is appropriate. A-7.12 Cont.

[6] The IS later inconsistently states that the emission benefits associated with SCAG's Final 2016 Regional Transportation Plan/Sustainable Communities Strategy ("RTP/SCS") are reflected in the Project baseline emissions. (IS, p. 1-40.)

Response A-7.12

2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions for the 2016 AQMP. The latest verifiable air quality data (from approved air quality monitoring sites) is from 2015, which can be found in Chapter 2 of the 2016 AQMP and Subchapter 3.2 of the Draft Program EIR. The most recent environmental topic data from 2016 was used for the CEQA baseline in determining environmental impacts because that was the time of the release of the NOP/IS.

Comment A-7.13

Pp. 1-10 to 1-21 – Stationary Source Control Measures (SCAQMD)

The stationary control measures to be implemented by the District are listed in Table 1.9-1 and summarized in the text following that table.

The IS fails to acknowledge let alone analyze all potentially significant environmental impacts of the stationary source control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*Muzzy Ranch Co. v. Solano County Airport Land Use Comm'n* (2007) 41 Cal.4th 372, 383.) A-7.13

Response A-7.13

The Draft Program EIR contains a comprehensive analysis of the reasonably foreseeable direct and indirect impacts of the proposed project. Currently, no supportive evidence is available, nor is it foreseeable that industries or other regulated entities would need to relocate elsewhere due to implementation of the proposed project. Therefore this impact was not analyzed.

Comment A-7.14

Measure ECC-03 would "seek to provide financial incentives" to go beyond the Title 24 standards and existing local regulations pertaining to NOx emissions. (IS, pp. 1-12 to 1-13.) "Incentive programs *would be developed* for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources." The measure also references providing "solar thermal and solar photovoltaics" to provide emission reductions within the residential sector. The measure lacks any specificity about the programs that the District acknowledges would still be developed. There is no information on the amount of funding and the number of residents that may take advantage of this program. Based on the examples provided, this measure may result in significant environmental impacts in the areas of aesthetics, air quality, land use, solid waste, and others that are not analyzed in the IS nor proposed for analysis in the DPEIR. A-7.14

Response A-7.14

ECC-03 is an incentive-based measure. The specific details of implementation will be established in a working group process to take place once the plan has been approved to proceed in the development. However, this control measure is included in the analysis for the topic areas of aesthetics, air quality, and solid waste. Since the control measure is directed towards existing residences, environmental impacts in the area of land use are not expected and therefore were not specifically discussed in the Draft Program EIR.

Comment A-7.15

Measure ECC-04 similarly includes a vague reference to widespread adoption of cool roofs. This measure may result in significant environmental impacts in the areas of aesthetics, biological resources, and land use/planning. Neither this measure nor these impacts are analyzed in the IS nor proposed for analysis in the DPEIR and should be. A-7.15

Response A-7.15

Control measure ECC-04 is intended for commercial building roofs and high-rise residential roofs with low slopes, however, the aesthetic impacts from ECC-04 are analyzed in the Draft Program EIR. It should be noted that these types of structures are typically located in either highly industrialized or highly developed settings. Therefore, no significant impacts to biological resources are anticipated. Lan use decisions are made on a local level and it would be speculative to assume adverse decisions would be made based on roof product and color.

Comment A-7.16

Measure CMB-01 would seek emission reductions of NOx from traditional combustion engines by replacing them with zero and near-zero emission technologies through, among other methods, electrification and fuel cells. This measure would also seek energy storage systems and smart grid control technologies coupled with renewable energy generation. This measure has the potential to result in significant environmental impacts with respect to, among others, the construction of additional energy infrastructure. Per a more detailed description of this measure in the Appendix to the Proposed Plan, it also seeks to "[e]ncourage new businesses that use and/or manufacture near-zero and zero emission technologies to site in the Basin." (Proposed Plan, Appendix IV-A, p. IV-A-47.)[7] The IS contains, at best, an incomplete analysis of this measure as evidenced by its omission of any discussion of its potential growth inducing impacts. (CEQA Guidelines § 15126.2(d); *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 367 [EIR must discuss growth-inducing effects even though those effects will result only indirectly from a project.].) A-7.16

Response A-7.16

CEQA does define growth-inducing impacts from projects that "foster economic or population growth or construction of additional housing." Since CMB-01 projects seek to advance deployment of engines, ovens and boilers, they are not constructing housing and nor will the population grow as a result of new industry when this region has a robust available labor force. The aspect of fostering economy is when that facility could significantly affect the environment.

[8] This measure, which calls for revised manure management strategies, requires more analysis than is provided in the IS. (*See, e.g., County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1597 [EIR required to examine impacts of alternative sewage sludge disposal].)

Comment A-7.17

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be analyzed and is not. (*See* Control Measures ECC-04, CMB-01, CMB-02, CMB-03, CMB-04, MCS-02, FLX-01, FLX-02, BCM-01, BCM-02, BCM-04,[8] BCM-06, BCM-07, BCM-10.) A-7.17

Response A-7.17

The role of the NOP/IS is a preliminary review of the project to determine potential significant environmental topic areas that can be fully analyzed in the Draft Program EIR. As such, the potential environmental impacts associated with the measures (ECC-04, CMB-01, CMB-03, CMB-04, MCS-02, FLX-01, FLX-02, BCM-01, BCM-02, BCM-04, BCM-06, BCM-07, BCM-10) that involve replacing equipment, operations, and/or infrastructure referred to in the comment

[7] A similar provision is included as part of FLX-02. (Proposed Plan, Appendix IV-A, p. IV-A-105.)

Comment A-7.18

Measure CMB-03 proposes to reduce emissions from non-refinery flares by "capturing the gas that would typically be flared and converting it into an energy source (e.g., transportation fuel, fuel cells) . . .." A similar measure appears to be proposed for nitrogen gas and biogas. (*See* Measures BCM-05 and BCM-10.) Yet, there is no discussion or consideration of associated pipelines or other infrastructure that would be needed to implement these measures nor of the traffic, air quality, noise, and other impacts associated with increased truck traffic to facilities containing such refined materials. There is similarly no analysis of the proposed alternative of reinjecting the gas into the ground or combusting it through flares. (Proposed Plan, Appendix IV-A, p. IV-A-70.) A-7.18

Response A-7.18

The potential environmental impacts from traffic, air quality, and noise associated with increased truck traffic referred to in the comment are analyzed in Chapter 4 of the Draft Program EIR. It is speculative at this time to assume the options an operator will choose to take in handling gas, such

as microturbines, fuel cells, sell back to gas companies, reinjection, or low-emitting burners. Having said that, the Draft Program EIR does account, programmatically, that extensive construction will take place and determines significant adverse impacts. These impacts are due to a variety of construction processes, but could include pipeline installation, infrastructure, or reinjection into the ground due to CMB-03, BCM-05, and BCM-10.

Comment A-7.19

Measure CTS-01 seeks to lower the content of volatile organic compounds ("VOCs") in coatings, solvents, and adhesives. Such measures may result in additional applications of lower quality products which could result in a net increase in air emissions. (*Dunn-Edwards Corp. v. Bay Area Air Quality Management District* (1992) 9 Cal.App.4th 644.) A-7.19

Response A-7.19

The potential air quality impacts referred to in the comment are analyzed in Subchapter 4.1 of the Draft Program EIR. Specific issue areas associated with reformulation of coatings including increased viscosity, illegal thinning, the need for more priming, more topcoats, more touch-ups and repair work, more frequent recoating, substitution, and reactivity, are discussed.

Comment A-7.20

[9] Measure BCM-07 likewise calls for increased watering of rotating cutting discs to reduce dust emissions. "Emissions are expected to be minimal, provided the waste material is disposed of properly." (Appendix, p. IV-A-201.) Yet, no analysis of the potentially significant air, noise, hazards, traffic, solid waste, or water supply impacts are provided such that any mitigation could be imposed to ensure that waste material is, in fact, disposed of properly.

and analyzed in the IS and the resulting DPEIR.

Response A-7.20

The potential noise, traffic, and hydrological impacts referred to in the comment are analyzed in Subchapters 4.5, 4.7, and 4.4 of the Draft Program EIR, respectively. BCM-03 is intended to reduce emissions through reduction of track out from stationary sources by specifying street sweeping methods and frequency. Therefore, an air quality benefit is anticipated from this control measure.

Comment A-7.21

The noise, air quality, geology and other impacts of Measure BCM-08, which seeks to limit agricultural burning through promoting burning alternatives (e.g., chipping/grinding or composting) must be fully analyzed. A-7.21

Response A-7.21

The potential air quality impacts referred to in the comment are analyzed in Subchapter 4.1 of the Draft Program EIR. BCM-08 is intended to incentivize chipping/grinding or composting in the place of agricultural burning as well as the increased utilization of clean fuels for training burns. The chipping/grinding activities conducted in place of agricultural burning are expected to take place in rural locations. Therefore, no significant noise impacts are anticipated. No geological impacts are reasonably foreseeable from BCM-08.

Comment A-7.22

Pp. 1-19 to 1-25 – Mobile Source Control Measures (SCAQMD)

Notwithstanding its complete lack of regulatory jurisdiction over mobile sources, the District's Proposed Plan nonetheless contains a detailed list of mobile source control measures. The mobile source control measures "to be implemented" by the District are listed in Table 1.9-2 and summarized in the text following that table.

The IS fails to acknowledge let alone analyze all potentially significant environmental impacts of the mobile source control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*See, e.g. Muzzy Ranch, supra.*) A-7.22

Of particular concern for the POLB is MOB-01. Stemming from a desire to take ongoing credit for the voluntary emission reductions undertaken by the Ports through the CAAP Program, Measure MOB-01 would make the voluntary emission reductions a mandatory enforceable commitment in the form of a regulation enacted by the District "within its legal authority, or by the state or federal government, or other enforceable mechanism." (IS, p. 1-21.) In a separate comment letter to the District on the Proposed Plan, we will explain why the District lacks the legal authority to adopt or enforce any such regulation. Due to its lack of legal authority, this measure is not feasible and thus cannot serve as any valid form of mitigation. (Public Resources Code §§ 21004 and 21081(a)(3); CEQA Guidelines §§ 15040 and 15364; *Sierra Club v. California Coastal Comm'n* (2005) 35 Cal.4th 839; and *Tracy First v. City of Tracy* (2009) 177 Cal.App.4th 912.) A-7.22 Cont.

Response A-7.22

The SCAQMD has limited regulatory authority over mobile sources (e.g., fleet rules) and thus, a suite of SCAQMD mobile source measures are being proposed. Most of these mobile source measures will work in concert with CARB's SIP strategy being developed locally.

The commenter's claim that the mobile source control measures will cause regulated entities to relocate elsewhere is speculative and unfounded by evidence.

Emission reductions from the ports are included in the baseline emissions inventory. The approach agreed upon in the future regarding how to implement MOB-01 will dictate the exact direct and indirect impacts. However, MOB-01 is analyzed programmatically in the Draft Program EIR.

Comment A-7.23

> From a CEQA standpoint, the emission reductions from the CAAP Program are already reflected in the baseline/setting. Further, the No Project Alternative is not defined in the NOP/IS. In accordance with CEQA Guidelines § 15126.6(e)(3)(A), when the "project" is the revision of an existing land use or regulatory plan, policy or ongoing operation, the "no project" alternative will be the continuation of the existing plan, policy or operation into the future. Therefore, the DPEIR should consider the impacts that would occur under the existing 2012 Air Quality Management Plan, which contains Measure IND-01.

A-7.23

Response A-7.23

The Draft Program EIR analyzes the impacts of the 2016 AQMP. The Draft Program EIR contains a No Project Alternative which looks at the continued implementation of the 2012 AQMP.

Comment A-7.24

> MOB-02 appears intended to correct two District rules pertaining to rail yards and intermodal facilities rejected by the U.S. Environmental Protection Agency ("EPA") presumably because they are beyond the scope of the District's regulatory jurisdiction. Per this vague and amorphous measure, the District will reconvene a stakeholder working group "to discuss and identify actions or approaches that can be implemented to further reduce emissions at rail yards and intermodal facilities." At most, this is a proposal to develop a measure that cannot be adequately analyzed at present in the DPEIR and should be removed from consideration.[10] Any such contemplated implementation strategies must be included in the "Project description" and better identified in a more complete NOP/IS, so that they may be evaluated along with the rest of the Project.

A-7.24

[10] Similar deficiencies apply to Measures MOB-03 (Emission Reductions at Warehouse Distribution Centers), MOB-04 (Emission Reductions at Commercial Airports), MOB-08 (Accelerated Retirement of Older On-Road Heavy-Duty Vehicles), MOB-12 (Further Emission Reductions from Passenger Locomotives), MOB-13 (Off-Road Mobile Source Emission Reduction Credit Generation Program), MOB-14 (Emission Reductions from Incentive Programs), and EGM-01 (Emission Reductions from New Development and Redevelopment Projects).

Response A-7.24

MOB-02 is intended to aid in the acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives. MOB-02 is intended to be part of future rulemaking activities, which will need further CEQA evaluation at that time. However, MOB-02 is analyzed programmatically in the Draft Program EIR.

Comment A-7.25

Measure MOB-05 proposes to provide funding rebates for at least 15,000 zero emission or partial-emission vehicles per year. Measure MOB-07 similarly seeks to deploy up to 120 zero and partial-zero emission heavy-duty vehicles per year. The IS and resulting DPEIR must contain an analysis of the traffic, noise, air quality, and other impacts associated with such programs. A-7.25

Response A-7.25

The potential impacts to traffic, noise, and air quality referred to in the comment are analyzed in Chapter 4 of the Draft Program EIR.

Comment A-7.26

Measure MOB-06 seeks to retire 2,000 older light and medium-duty vehicles per year. Measure MOB-08 similarly seeks to retire 2,000 heavy-duty vehicles per year. There needs to be an analysis of the solid waste and other impacts associated with such measures. A-7.26

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be analyzed and is not. (*See* Control Measures MOB-08, MOB-10, MOB-11, MOB-12, MOB-13, and MOB-14.) A-7.26 Cont.

Response A-7.26

The potential impacts from mobile source control measures, including solid waste, referred to in the comment, are analyzed in Chapter 4 of the Draft Program EIR.

Comment A-7.27

Pp. 1-25 to 1-30 – Air Toxic Control Measures (SCAQMD)

In addition to the criteria pollutant control measures, the Proposed Plan also contains a detailed list of measures to control toxic air contaminants ("TAC") from stationary sources. The TAC control measures are listed in Table 1.9-3 and summarized in the text following that table.

The IS fails to acknowledge let alone analyze all potentially significant environmental impacts of the air toxic control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*See, e.g. Muzzy Ranch, supra.*) A-7.27

Measure TXM-01 contains a list of potential emission control approaches for metal grinding operations. Because there is no specific proposal, the IS and resulting DPEIR cannot meaningfully analyze this measure.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be analyzed and is not. (*See* Control Measures TXM-04, TXM-05, TXM-06, TXM-08, and TXM-09.)

Response A-7.27

The Draft Program EIR contains a comprehensive analysis of the reasonably foreseeable direct and indirect impacts of the proposed project. The commenter's claim that the measures will cause regulated entities to relocate elsewhere is speculative.

TXM-01 is intended to be part of future rulemaking activities, which will need further CEQA evaluation at that time. However, TXM-01 is analyzed programmatically in the Draft Program EIR. The potential impacts from air toxic control measures referred to in the comment are analyzed in Chapter 4 of the Draft Program EIR.

Comment A-7.28

Pp. 1-30 to 1-38 – Mobile Source Control Measures (Federal and State)

The IS's project description contains a detailed list of federal and state mobile source control measures. Although the District admittedly lacks regulatory jurisdiction over mobile sources, because the federal and state mobile source control measures are described as part of the Project, the IS, and resulting DPEIR, must contain a thorough analysis of the potentially significant environmental effects associated with these measures.

For instance, ORLD-01 proposes to increase the sales of zero emission vehicles and plug-in electric vehicles beyond the levels required in 2025. Measure ORLD-03 calls for "greater penetration of zero and near-zero technologies" as well as the "potential for autonomous vehicles and advanced transportation systems." Measure ORHD-05 requires the use of low-NOx engines and the purchase of zero emission trucks for certain class 3-7 last mile delivery trucks starting in 2020 and ramping up to a higher percentage of the fleet at time of normal replacement through 2030. Measure ORHD-09 calls for "greater penetration of zero and near-zero technologies through incentive programs, emission benefits associated with increased operation efficiency strategies, and the potential for new driver assist and intelligent transportation systems." Measure OFFS-08 likewise calls for "greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle technologies." These measures could result in significant air quality, noise, traffic, and other impacts that are not currently or adequately described in the IS nor proposed for consideration in the DPEIR. A-7.28

Further, as noted above, the Proposed Plan identifies nearly $15 billion in incentive funding needed to facilitate the transition to zero and near-zero emissions equipment. The Proposed Plan indicates that SCAQMD will develop an action plan to identify "the necessary actions by the District" and other stakeholders "to ensure the requisite levels of funding are secured." (Proposed Plan, p. 4-66.) Although the Proposed Plan discusses the possibility of a federal "superfund" program, state bond measures, and local ballot measures to obtain this funding, it does not define the specific "necessary actions." Without more detail, it is impossible to evaluate whether this incentive action plan and the necessary $15 billion in government funding have significant environmental impacts. A-7.28 Cont.

Response A-7.28

The SCAQMD has limited regulatory authority over mobile sources (e.g., fleet rules) and thus, a suite of SCAQMD mobile source measures are being proposed. Most of these mobile source measures will work in concert with CARB's SIP strategy being developed locally.

The potential air quality impacts from ORLD-01, ORLD-03, ORHD-05, ORHD-09, and OFFS-08 are analyzed in Subchapter 4.1 of the Draft Program EIR. The potential noise and traffic impacts from ORHD-05 and ORHD-09 are analyzed in Subchapters 4.5 and 4.7, respectively, of the Draft Program EIR.

The funding mechanism of the incentive funding needed is not relevant to environmental impacts. The Draft Program EIR analyzed environmental impacts regardless of how the control measures are implemented (incentive-based or regulatory).

Comment A-7.29

Pp. 1-38 to 1-40 – Transportation Control Measures from the Southern California Association of Governments 2016 Regional Transportation Plan and Sustainable Communities Strategy

The IS notes that the SCAG has the responsibility for preparing and approving the portions of the Proposed Plan related to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. (IS, p. 1-38.) The IS further indicates that the District "combines its portions of the AQMP with those portions prepared by SCAG" per Health & Safety Code § 40460. (*Id.*) In particular the Project contains the Regional Transportation Strategy ("RTS"), including Transportation Control Measures ("TCM"), from SCAG's 2016 RTP/SCS.

Although those measures are only generally described in the IS, they include several measures that may result in significant environmental impacts. (*See*, IS, p. 1-39 [RTS/TCM measures include, among others, expanding regional transit, passenger rail, highway capacity, and high occupancy lanes].) Yet, none of these measures are analyzed in the IS. The IS states that because the environmental impacts were analyzed in SCAG's EIR for the RTP/SCS, the DPEIR will only evaluate potential cumulative impacts associated with implementing the Project and the TCMs. A-7.29

This statement suggests that the DPEIR is relying on SCAG's EIR through tiering or incorporation by reference, but the IS does not explain which method or demonstrate conformance with pertinent CEQA and other related provisions. More fundamentally, there must be an explanation of the impacts analyzed in SCAG's EIR, the significance criteria and methodologies used, and mitigation measures or alternatives imposed. There must also be an explanation of the discrepancies, if any, between the two environmental documents and how those discrepancies are proposed to be reconciled. Further, the analysis must consider not only the TCMs, but the RTS as well. A-7.29 Cont.

Response A-7.29

SCAG's 2016 RTP/SCS Program EIR already analyzed potential environmental impacts associated with the TCMs in the 2016 RTP/SCS. The SCAG Program EIR was approved by the SCAG Regional Council and implementation will proceed regardless of the 2016 AQMP. However, due to state law, the SCAG TCMs are included in the 2016 AQMP. Thus, they are included appropriately in the cumulative analysis in the Draft Program EIR.

Comment A-7.30

2. Chapter 2 of the Initial Study – The "Environmental Checklist"

(a) General Comments and Questions on the Environmental Checklist

The NOP/IS apparently relied on a standard CEQA environmental checklist to identify those "impact areas" it recognizes to be potentially affected by the Project. In several respects, however, the IS appears to merely assume the absence of potentially significant impacts, rather than factually demonstrating that significant impacts will not occur if the (inadequately-described) Project is adopted and implemented. This is insufficient under CEQA, and under the District's own rules. (SCAQMD Rule 110; *City of Redlands* and *Sundstrom,* both *supra*).

While the CEQA Guidelines call for emphasis and "focus" on the significant environmental impacts of a project, the authority to use such focus is misapplied in the IS. For example, CEQA Guideline § 15143 explains that such focus may be used to limit the analysis in an EIR ***only*** as to such impacts that the initial study properly shows to be ***clearly insignificant and unlikely to occur*** (i.e., "effects dismissed in an Initial Study as clearly insignificant and unlikely to occur need not be discussed further in the EIR . . .."). The NOP/IS here, by contrast, appears to exclude from consideration in the DPEIR numerous effects that it has not shown to be "clearly insignificant and unlikely to occur." A-7.30

The NOP/IS currently indicates that the scope of the proposed DPEIR for the "Project" will be limited to the eight topics listed at page 2-2 of the IS. Compliance with CEQA, however, would require not only a new and corrected IS, providing an adequate "Project description" but also a more comprehensive DPEIR that addressed additional areas of potentially significant impact, including (without limitation): (1) Aesthetics, (2) Biological Resources, (3) Cultural Resources, (4) Geology and Soils, (5) Land Use and Planning, (6) Population and Housing, (7) Public Services, and (8) *broadened evaluation* of potential impacts and issues in the areas of Air Quality and Greenhouse Gas Emissions, Energy, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Solid and Hazardous Waste, and Transportation and Traffic. Unless and until those areas are more fully addressed, the NOP/IS appears to improperly limit the scope of the proposed DPEIR based on an inaccurate and incomplete Project description, and to thus erroneously exclude areas requiring further assessment.

Response A-7.30

The general comment refers to the NOP/IS as being deficient and improperly limiting the scope of the Draft Program EIR. However, no specifics on the deficiencies of the NOP/IS are provided. Therefore, no further response is necessary.

Comment A-7.31

In addition, there is no indication what criteria were used to develop the significance criteria or that they are supported by substantial evidence, as is required. (Public Resources Code § 21082; CEQA Guidelines § 15064.7; and *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th 1099, 1111.) In the categories examined by the A-7.31

IS, the significance criteria are inconsistent with the questions asked to elicit whether the Project would have potentially significant impacts. A-7.31 Cont.

Response A-7.31

As with any other project in which the SCAQMD is the lead agency, SCAQMD's significance criteria was utilized to determine if the proposed project would have potentially significant impacts. The significance criteria was listed under each environmental topic in the NOP/IS.

Comment A-7.32

(b) Specific Comments and Questions on the Environmental Checklist

Aesthetics – Pp. 2-4 to 2-6

The IS suggests that because the Proposed Plan is intended to "improve air quality and visibility," the District may simply assume that this Project would not be expected to generate significant adverse aesthetics impacts. However, given that several of the measures that would be used to implement the Project are not identified, the IS does not provide evidence, let alone substantial evidence as is required,[11] to demonstrate that the proposed Project would result in less than significant aesthetic impacts.

The IS fails to describe the environmental setting and include any evidence or analysis to support its assumption that implementation of Project control measures would "typically occur inside the buildings" or could "easily blend" with existing facilities "with little or no noticeable effect on adjacent areas." (IS, p. 2-5.) Without a clearly defined project, project location, or description of the environmental setting, it is not possible to conclude that any modifications will have little or no noticeable effect on adjacent areas and would blend in with the visual setting.

A-7.32

[11] (*See* Public Resources Code § 21080(e) [CEQA defines substantial evidence as "fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact" and excluding, among others, "speculation" and "unsubstantiated opinion."].)

Response A-7.32

Aesthetics was added as a potential adverse impact and analyzed in the Draft Program EIR.

The project is clearly and comprehensively defined in Chapter 1 of the NOP/IS. The project description and location are fully described in Chapter 2 of the Draft Program EIR. The environmental setting is described in Chapter 3- Existing Setting.

Comment A-7.33

The IS further contends that the installation of catenary lines (overhead power lines) in existing high activity transportation corridors, such as the areas within and adjacent to the Ports is not expected to result in any significant aesthetic impacts because the nearest scenic highways would be Routes 1 and 2, located at sufficient distances so as not to be visible from the Ports. (IS, pp. 2-5, 2-6.) In this regard, the IS fails to identify or even describe known visual resources such as John S. Gibson Boulevard, Harbor Boulevard, and the Vincent Thomas Bridge, all of which are designated as local scenic highways in the San Pedro and Wilmington-Harbor City Community Plans. Ocean Boulevard is likewise identified as a scenic route in the Scenic Element of Long Beach's General Plan. Indeed, there are many historic and cultural resources, both listed and found eligible for listing through surveys, that contribute to the visual setting and character of the Ports and if modified, through obstruction, alteration, or demolition could have a negative aesthetic impact.

The IS does not even attempt to analyze the potentially significant aesthetic impacts from the proposed control measures which require and/or provide incentives for facility modifications, increased electrical usage (which may require new substations, powers plants and related

A-7.33

infrastructure), and cool roofs and solar panels. It likewise improperly defers analysis of certain glare impacts to the local review process, which, in the case of solar panels, may not require discretionary approvals such that this topic will evade CEQA review altogether. A-7.33 Cont.

Response A-7.33

Potential aesthetic impacts from the implementation of control measures ORHD-05, ORHD-06, and ORHD-08 and ORHD-09 which could include the installation of catenary lines were included and analyzed in Subchapter 4.8 of the Draft Program EIR.

The 2016 AQMP does not envision modification of historic or cultural resources at the Port. But if the ports choose to impact any historical or cultural resources, it would be expected to be evaluated through the CEQA process for that specific project.

Potential impacts due to increased electrical usage from the implementation of the 2016 AQMP control measures are analyzed in Subchapter 4.2 of the Draft Program EIR.

Potential aesthetic impacts (glare) from cool roofs and solar panels were included and analyzed in Subchapter 4.8 of the Draft Program EIR.

Comment A-7.34

The IS indicates that off-road control measures "may include hoods or bonnets on ship exhaust stacks to capture emissions and are expected to be as high as the height of ship stacks," and concludes that these control devices "would be similar to other structures used within the heavily industrialized portions of the ports . . .." (IS, p. 2-6.) It is speculative and erroneous to assume that control devices as high as 100 feet would have a less than significant visual impact without knowing the location, dimensions, color scheme, and/or critical viewpoints. No such analysis has been considered here and the impact is dismissed with no evidence to support the conclusion.

The IS further errs by dispensing with environmental analysis or evidence, simply because of the (assumed) beneficial air quality goals of the Project. The law is clear that environmentally "benign" aspects of a project do not excuse non-compliance with CEQA and do not justify reliance on assumptions in lieu of evidence to demonstrate the absence of potential impacts. For instance, in *California Farm Bureau Federation v. California Wildlife Conservation Board* (2006) 143 Cal.App.4th 173, 196, the Court of Appeal ruled that a State environmental agency violated CEQA by exempting an environmentally beneficial habitat project from review. In reaching its conclusion, the court reasoned that "it cannot be assumed that activities intended to protect or preserve the environment are immune from environmental review," specifically noting that "***[t]here may be environmental costs to an environmentally beneficial project, which must be considered and assessed.***" A-7.34

Given the nature of proposed Project, it cannot be determined that its implementation would have no significant impact to aesthetics. The DPEIR therefore should include "Aesthetics" as a potentially impacted area of study.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant aesthetic impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Response A-7.34

Aesthetic impacts associated with 2016 AQMP control measures, including the use of hoods or bonnets to capture ship emissions, are analyzed in Subchapter 4.8 of the Draft Program EIR.

Comment A-7.35

Air Quality – Pp. 2-9 to 2-13

The IS indicates that the Project will not conflict with or obstruct implementation of the applicable air quality plan. Along those lines, the IS notes that the Proposed Plan includes control measures for stationary, mobile, and indirect sources and that these measures are based on "feasible methods of attaining the [ambient air quality standards]." (IS, p. 2-11.) There is no evidence, let alone substantial evidence to support this statement. Control measures related to mobile sources are beyond the District's regulatory jurisdiction and thus infeasible for legal and other grounds.

Given the total lack of information regarding what control measures the Project would entail and whether their implementation is feasible, it is premature to assess impacts related to violation of air quality standards, either on a project or cumulative basis, as well as exposure of sensitive receptors to substantial pollutant concentrations. These details must be provided and these topics should also be identified and assessed in a revised IS and the DPEIR. At minimum, the analysis should be expanded to include the potential air quality impacts referenced above. A-7.35

Certain control measures could involve significant construction retrofits for compliance. (*See*, *e.g.*, MOB-01, MOB-02, OFRIS-04, and ORFIS-05.) This may result in significant construction-related air quality impacts. Further, these measures and others like it could result in additional electrification and/or the use of additional add-on control equipment, all of which needs to be addressed in the IS and resulting DPEIR.

Response A-7.35

The 2016 AQMP utilizes air quality modeling to demonstrate that the proposed control measures are feasible methods of attaining the ambient air quality standards. For measures where the SCAQMD currently has no regulatory authority, and incentive-based approach is being utilized.

Information related to the feasibility of control measures is included in the specific control measure write-up located in Appendix IV of the 2016 AQMP.

Construction-related air quality impacts from control measures MOB-01, MOB-02, ORFIS-04, and ORFIS-05 are analyzed in Subchapter 4.1 of the Draft Program EIR.

Comment A-7.36

There is no factual basis in the IS upon which to conclude that implementation of the Project would not create any odor issues and therefore need not be studied. It is premature to dismiss this area of analysis given the lack of information currently available regarding the Project. Furthermore, the IS analysis only applies to construction odors and ignores any potential odors that may occur due to Project operations. A-7.36

As noted above, several of the proposed control measures have not yet been developed by the District. Thus, the District lacks the requisite basis to conclude that the Project would not diminish any existing air quality rule and to exclude further analysis of this topic.

Response A-7.36

As stated in the NOP/IS, odor impacts from construction equipment are not expected to be significant because most diesel-fueled equipment are mobile and do not remain in one location that could continuously affect offsite receptors. As a result, odor impacts from construction activities to implement AQMP control measures are not expect to be significant.

The NOP/IS discussed potential operational odors from the use of reformulated products and from modifications to industrial facilities to produce reformulated products. Reformulated products tend to have reduced VOC content and reduced emissions and, therefore, lower potential for creating odor impacts. As a result, significant adverse odor impacts have not been associated with reformulated products, especially those relying on water-based formulations, compared to conventional high-VOC products. Modifications to industrial facilities to produce reformulated products (e.g., refineries) also have the potential to create odor impacts. However, owners/operators of industries affected by control measures in the proposed 2016 AQMP would be subject to existing air quality rules and regulations, including SCAQMD's Rule 402 - Nuisance, which prohibits creating odor nuisances. For these reasons, implementing the 2016 AQMP is not expected to create significant adverse odor impacts and, therefore, was not further addressed in the Draft Program EIR.

The 2016 AQMP is a long-range document with targeted emission reductions. Therefore, analysis of the proposed control measures that have not been fully developed is conducted on a programmatic level. No further response is necessary.

Comment A-7.37

While concluding that the Project may have a potentially significant impact with respect to greenhouse gas emissions, the IS inconsistently finds a less than significant impact with respect to the Project's impacts in regard to conflicts with applicable plans, policies, and regulations adopted for the purpose of reducing greenhouse gas emissions. The DPEIR must likewise study this issue and all applicable state (e.g., AB 32, Scoping Plan, Executive Orders S-3-05 and B-30-15) as well as climate action plans. A-7.37

At minimum, the additional areas of potential impacts on air quality referenced above should be identified and assessed in the DPEIR.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant air quality impacts as well as feasible mitigation measures and alternatives designed to address those impacts. A-7.37 Cont.

Response A-7.37

The 2016 AQMP includes measures such as ECC-01 and ECC-02 that target reductions of GHGs and energy efficiency. ECC-03 further exceeds those goals through incentives. Therefore, instead of conflicting with GHG plans, the 2016 AQMP compliments and further supports these policies and goals. In addition, the 2016 AQMP builds upon SCAG's 2016 RTP/SCS and CARB's SIP strategy, which are in part, based on greenhouse gas reduction plans. Therefore, the 2016 AQMP does not conflict with other applicable plans, policies, or regulations.

Comment A-7.38

Biological Resources – Pp. 2-14 to 2-16

The IS fails to adequately describe, and improperly minimizes, possible impacts to biological resources. The scope of the proposed DPEIR should be expanded to include environmental analysis of the Project's potentially significant impacts to biological resources.

The IS indicates that "the proposed project will not adversely affect protected wetlands as defined by § 404 of the Clean Water Act, including, but not limited to marshes, vernal pools, coastal wetlands, etc., through direct removal, filling, hydrological interruption or other means." (IS, p. 2-16.) But, the IS fails to analyze, through detailed quantification and hydrodynamic modeling, potential wastewater impacts, including impacts to designated wetlands.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to biological resources, as well as feasible mitigation measures and alternatives designed to address those impacts.

A-7.38

Response A-7.38

The proposed control measures in the 2016 AQMP affect existing sources at developed, established facilities that have already affected biological resources, so no new adverse impacts are anticipated. Any new sources impacted would be voluntary through incentives.

As stated in the NOP/IS, implementation of some AQMP control measures (CTS-01, BCM-01, BCM-04, BCM-07, BCM-08, BCM-10, TXM-01 through TXM-07) may change or increase a facility's potential to generate wastewater. Industrial or commercial facilities are generally considered "point sources" and must release wastewater into publicly owned treatment works (POTWs), under the National Pollutant Discharge Elimination System (NPDES) permit program, administered by the Regional Water Quality Control Board (RWQCB). Direct discharge into federally protected wetlands as defined by §404 of the Clean Water Act is prohibited under the federal Clean Water Act and the state Porter-Cologne Act.

Additionally, some 2016 AQMP control measures (ORFIS-03 and ORFIS-04) would promote the installation and use of air pollution controls at port facilities, located on the coast. The control measures are not expected to have wastewater impacts. Port facilities are considered to be heavy industrial facilities (point sources) and the installation of additional controls would be consistent with this land use. Further, any facilities that release wastewater into California's ocean waters are subject to water quality standards established in the California Ocean Plan and are also subject to NPDES requirements, enforced by the local RWQCBs. For the above reasons, the proposed project will not adversely affect protected wetlands as defined by §404 of the Clean Water Act, including, but not limited to marshes, vernal pools, coastal wetlands, etc., through direct removal, filling, hydrological interruption or other means.

Therefore, the comment does not change any conclusions and further analysis on biological resources was not included in the Draft Program EIR.

Comment A-7.39

Cultural Resources – Pp. 2-17 to 2-19

The IS fails to adequately describe, and improperly minimizes, possible impacts to cultural resources. For instance, not all areas within the Ports are devoid of cultural resources or have been previously disturbed, as concluded in the IS on page 2-18. There are known recorded historic and prehistoric sites throughout the Ports alone[12] and there are undoubtedly other historic and prehistoric sites in the Basin that would be affected by the Project. Without knowing the location and extent of ground disturbance from possible construction activities associated with the Project, it is speculative to assume that no significant adverse cultural resources impacts are expected as a result of its implementation. The conclusion in the IS that the Project will result in "no impact" to cultural resources is unsupported and lacks evidence or facts to support the finding. A-7.39

Further, the IS includes language reflecting the typical mitigation measure to be imposed on unknown cultural sources to justify its "no impact" conclusion. (IS, p. 2-19). This fact alone demonstrates that there are potentially significant cultural resource impacts requiring analysis and mitigation in the DPEIR.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to cultural resources as well as feasible mitigation measures and alternatives designed to address those impacts. A-7.39 Cont.

Response A-7.39

The proposed control measures would affect existing, developed facilities, and therefore, potential impacts to cultural resources are not likely to occur. Furthermore, compliance with state law, including Public Resources Code §21083.2 and CEQA Guidelines § 15064.5, is not a "typical mitigation measure", as the comment states. The comment does not change any conclusions and further analysis on cultural resources was not included in the Draft Program EIR.

Comment A-7.40

Energy – Pp. 2-18 to 2-19

If the net effect of implementing the Project is an increase in regional energy demand, as the IS indicates is likely, potential conflicts with adopted energy conservation plans and existing energy standards (Items VI.a and IV.e) should not be dismissed as "no impact." The IS must be expanded to also consider and analyze the shift from fossil fuels to alternative fuels or electrical powered technologies and increased reliance on such alternative fuels or electricity such that sufficient supply and emergency storage would be required in the event of a major disaster. Also, some types of emissions control measures, facilities, or technologies contemplated by the Project could increase or shift demand for different types of energy or fuel usage. Although "risk of upset" is not considered in the IS Checklist, it should be cross-referenced here and addressed in the Hazards section of the IS and the DPEIR. A-7.40

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant energy impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

[12] For example, *see* City of Los Angeles's website at http://www.portoflosangeles.org/idx_history.asp.

Response A-7.40

The 2016 AQMP would promote and incentivize meeting and exceeding energy goals and standards. Increases or shifts in demand for different types of energy or fuel usage, including future electricity supply and demand, is evaluated in Subchapter 4.2 for energy of the Draft Program EIR. Risk of upset is analyzed in Subchapter 4.3 for hazards as a result of the usage of alternative fuels. Emergency storage due to a major disaster is not evaluated as an energy impact. The comment does not change any conclusions.

Comment A-7.41

Geology and Soils – Pp. 2-23 to 2-19

Because details concerning several Project control measures are not yet known, the IS improperly concludes that the Project has no potential to generate significant adverse impacts to geology and soil resources. In particular, the IS wrongly assumes that only "minor" modifications at existing industrial or commercial facilities would be needed due to Project control measures and that "no AQMP control measures would require the location of new, or relocation of existing facilities in areas prone to liquefaction." (IS, p. 2-23 and 2-24.) At minimum, the potentially significant geology-related impacts associated with the control measures identified above must be analyzed in the DPEIR. A-7.41

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant geology and soils impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Response A-7.41

Details concerning several of the control measures will be fully developed when the measure is approved to be developed when a working group of stakeholders is convened. In the meantime, for the Draft Program EIR, potential impacts can be estimated using the control measure descriptions in the Draft 2016 AQMP. The proposed control measures, such as equipment replacement and fleet turnover, would affect existing, developed facilities. Therefore, impacts to geology and soils were not reasonably foreseeable and further analysis on geology and soils was not included in the Draft Program EIR.

Comment A-7.42

Hazards and Hazardous Materials – Pp. 2-26 to 2-29

In addition to the measures described herein, the potentially significant hazards-related impacts associated with the control measures identified above must also be analyzed in the DPEIR.

Section VIII.d of the IS states that the Project would not be located on a site which is included in a list of hazardous materials sites compiled pursuant to Government Code § 65962.5, also known as the "Cortese list." As such, the IS concludes that "implementation of the proposed control measures is not expected to interfere with site cleanup activities or create additional site contamination" and that this topic "will not be further evaluated" in the DPEIR. (IS, p. 2-28.) This section must be expanded to also consider that Government Code § 65962.5 requires the disclosure of any work conducted on a site on the Cortese list and precludes a project from being exempt under CEQA even if only minor work is being conducted on such sites. There are several parcels on the Cortese list located within the POLB alone.[13] A-7.42

In addition, Item VIII.f must be expanded to also consider and analyze the increased reliance on alternative fuels or electrical powered technologies that would require sufficient supply and emergency storage in the event of a major disaster. Although interference with emergency response plans was marginally addressed in this section, "risk of upset" is not considered in the IS checklist.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to hazards and hazardous materials as well as feasible mitigation measures and alternatives designed to address those impacts.

[13] (*See* California Department of Toxic Substances Control. Hazardous Waste and Substances Site List – Site Clean (Cortese List) *www.dtsc.ca.gov/Site Cleanup/Cortese_List.cfm*. City of Long Beach zip code 90802.)

Response A-7.42

Potential hazards and hazardous materials impacts are analyzed in Subchapter 4.3 of the Draft Program EIR.

The 2016 AQMP does not directly cause these facilities to contaminate the soil, but rather could indirectly cause the facility to expose contamination upon breaking ground. The issue addressed in the NOP/IS assumed those on the Cortese list were conducting due diligence in cleaning up and protecting the neighborhood and was not assuming inaction. There are various federal, state, and local laws that apply to activities sites on the Cortese list, such as the Response Conservation, and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act and the Hazardous Materials Release and Clean-Up Act. Furthermore, SCAQMD Rule 1166 regulates the emissions of VOCs from contaminated soils, Rule 1403 regulates the presence of asbestos during construction, and the 2016 AQMP contains TXM-04, which seeks to develop control measures that would control the toxic metal particulates generated during soil cleanup or remediation activities at these sites. Near-surface contaminated soil may be encountered during demolition and/or construction activities associated with implementation of the 2016 AQMP. Based on the location of the nearest sensitive receptor, it is possible that construction activities would create a significant hazard to the public or environment. Furthermore, without knowing the types of contamination (i.e. VOCs, TACs, etc) it is not possible to know which regulations would apply. This is discussed in further detail in Subchapter 4.3.4.8 of the Draft Program EIR.

Increases or shifts in demand for different types of energy or fuel usage, including future electricity supply and demand, is evaluated in Subchapter 4.2 for energy of the Draft Program EIR. Risk of upset is analyzed in Subchapter 4.3 for hazards as a result of the usage of alternative fuels. Emergency storage due to a major disaster is not evaluated as an energy impact. The comment does not change any conclusions.

Comment A-7.43

Hydrology and Water Quality – Pp. 2-30 to 2-33

The analysis does not cover all of the control measures that may result in adverse impacts to hydrology impacts. A thorough analysis of all proposed measures must be included in the DPEIR. The IS purports to exclude runoff-related impacts (Items IX.c and d) reasoning that only "minor modifications" would be needed to commercial or industrial facilities affected by the proposed control measures. (IS, p. 2-33.) This is not supported by any evidence in the record. Moreover, as noted above, several of the proposed control measures have not yet been developed by the District. Thus, the District lacks the requisite basis to conclude that the Project would not result in any adverse impacts related to stormwater runoff impacts. A-7.43

Because details concerning several Project control measures are not yet known, the IS improperly concludes that the Project has no potential to generate significant adverse impacts to geology and soil resources. In particular, the IS wrongly assumes that only "minor" modifications would be needed at existing industrial or commercial facilities due to Project control measures and that "no AQMP control measures would require the location of new, or relocation of existing facilities in areas prone to liquefaction." (IS, pp. 2-23 and 2-24.) At minimum, the potentially significant geology-related impacts associated with the control measures identified above must be analyzed in the DPEIR. A-7.43 Cont.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to hydrology and water quality as well as feasible mitigation measures and alternatives designed to address those impacts.

Response A-7.43

The Draft Program EIR analyzes potential impacts to hydrology and water quality associated with the control measures. The proposed control measures is not anticipating nor requires the construction of new facilities. Based on the descriptions of the control measures, only minor modifications would be needed to affected facilities. The comment referring to runoff related impacts and other impacts to geology and soils is speculative. The NOP/IS evaluated potential geology-related impacts associated with the control measures.

Details concerning several of the control measures will be developed at a later time with stakeholders and interested parties. In the meantime, potential impacts can be estimated using the control measure descriptions in the Draft 2016 AQMP. These control measures are analyzed programmatically in the Draft Program EIR.

Potentially significant impacts to hydrology and water quality and feasible mitigation measures are evaluated in Subchapter 4.4 for hydrology of the Draft Program EIR. Project alternatives analysis is provided in Chapter 6 of the Draft Program EIR.

Comment A-7.44

Land Use and Planning – Pp. 2-34 to 2-36

The IS fails to adequately describe, and improperly minimizes, possible inconsistencies between the proposed Project and the existing and applicable land use plans and policies.

The significance criteria asks whether the Project would conflict with the land use and zoning designations established by local jurisdictions. But, CEQA requires an analysis of whether the Project would conflict with any applicable plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. (CEQA Guidelines § 15125(d); CEQA Guidelines, Appendix G, Item X.b; and *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903.) No such question is asked by the IS nor does the resulting analysis provide the District the basis on which to exclude further consideration of land use and planning impacts.

In addition to local plans, there are numerous federal and state plans that contain pertinent policies that must be considered and evaluated in light of the Project control measures. For instance, the proposed Project would seemingly create conflicts with the Ports' existing policies implementing the State Tidelands Trust principles, the California Coastal Act planning and permitting requirements, and the existing Master Plan for each Port, as are detailed in the previous Port letters. In addition, the proposed Project would create inconsistencies with the CAAP. The numerous inconsistencies between the Project as proposed and the existing plans and policies require identification in the IS and inclusion in the proposed DPEIR. (CEQA Guidelines § 15125(d).) The fact that the District does not have authority over local land use matters (*see* IS, p. 2-34) does not justify or excuse its need to study this issue consistent with CEQA. (Public Resources Code § 21081(a)(2); *Neighbors for Smart Rail v. Exposition Metro Line Const. Auth.* (2013) 57 Cal.4th 439.)

A-7.44

Response A-7.44

The comment provides no specific evidence or example of how the proposed project is inconsistent with land use policies or conflicts with any applicable plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. The 2016 AQMP does not conflict with any applicable plan, policy, or regulation. Additionally, the comment does not specify inconsistencies caused by the proposed project. No further response is necessary.

Comment A-7.45

The IS assumes that no new rail or truck traffic routes would be constructed and that instead existing transportation lines near the Ports would be modified to add electrical lines. (IS, p. 2-35.) There is no evidence to support this statement, let alone substantial evidence, as is required. Even if it were true this does not mean that the Project would not result in any conflicts with plan policies adopted for the purpose of avoiding or mitigating environmental effects. Increased electrical use would increase electrical demand. As noted above, this could conflict with adopted energy conservation plans. Installation of electric infrastructure could raise significant conflicts with aesthetic policies especially since these lines are proposed to be located above-ground.

A-7.45

Response A-7.45

Any potential adverse impacts referred to in the comment are analyzed and discussed in the Energy Subchapter 4.2 in the Draft Program EIR.

Comment A-7.46

Additionally, fueling infrastructure to support zero and near-zero emissions vehicles, such as those powered by hydrogen fuel cells or natural gas, could have a significant impact on local land use and may conflict with existing plans. Such Project components could likewise contribute to the physical division of an established community. The IS admits as much in noting that to the extent such infrastructure requires modification to an existing rail or truck traffic route/corridor, this "will require a separate CEQA evaluation." (IS, p. 2-36.) The District cannot legally defer analysis of Project impacts to some future, speculative CEQA review process. The analysis must take place now in order to inform the District's decision on the Proposed Plan.

A-7.46

Response A-7.46

The claim that fueling infrastructure to support zero and near-zero emission vehicles could have a significant impact on local land use and conflict with existing plans is speculative. Fueling stations are increasingly being installed throughout the region and are required to get local land use approval. Any conflict with local plans would not garner approval. The 2016 AQMP does not say where fueling stations should be located. Future CEQA review for specific fueling infrastructure projects is necessary and warranted.

Comment A-7.47

The IS states that it incorporates "local land use planning decisions and population growth." (IS, p. 2-36.) There is no explanation or evidentiary support for this statement, and even if there were, it is irrelevant. The pertinent questions are whether the Project may conflict with plan policies pertaining to environmental issues and/or physically divide an established community.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant land use and planning impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

A-7.47

Response A-7.47

The NOP/IS incorporates local land use planning decisions and population growth through the incorporation of population growth forecast estimates provided by SCAG and used in the modeling of the 2016 AQMP.

Comment A-7.48

Noise – Pp. 2-39 to 2-41

The IS acknowledges that approval of the Project could result in the construction or installation of new control equipment that may result in significant noise impacts. Even so, the IS only analyzes the construction-related noise impacts associated with some, but not all, of the proposed control measures.

Further, there is no evidence cited in the IS to support its assumption that additional permanent noise impacts anticipated from the operations of new control equipment would not "cause substantial noise or excessive groundborne vibration impacts" and its conclusion that "[o]perational noise impacts are expected to be less than significant." (IS, p. 2-41.)

A-7.48

This section of the IS is littered with mere "expectations" unsupported by any evidence regarding the magnitude of new noise impacts, even though such new impacts are anticipated by the IS. Nor is there any analysis of the potential for significant adverse impacts from new noise generators related to the Project.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant noise impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

A-7.48 Cont.

Response A-7.48

An evaluation and analysis of potential noise impacts is included in Chapter 4 of the Draft Program EIR.

Comment A-7.49

Population and Housing – Pp. 2-42 to 2-43

The analysis assumes that "few or no new employees would need to be hired at affected facilities to operate and maintain new control equipment on site because air pollution control equipment is typically not labor intensive equipment." (IS, p. 2-43.) There is no evidence to support this statement, let alone substantial evidence, as is required.

Further, the IS neglects to discuss or assess the potentially significant growth inducing impacts associated with several control measures. (*See*, *e.g.*, Control Measures CMB-01 and FLX-02).

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant population and housing impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

A-7.49

Response A-7.49

The assumption that few or no new employees would be needed to install or operate air pollution control equipment is based on experience from previous rulemaking history implemented by the SCAQMD (e.g. Rule 1110.2, Rule 1402, Rule 1420, etc.)

Control measure CMB-01 is an incentive-based measure to advance the development of cleaner NOx combustion equipment for stationary sources (e.g. internal combustion engines), replacing old existing equipment. Therefore, no growth inducing impacts are expected as a result of implementation of this control measure. CEQA does define growth-inducing impacts from projects that "foster economic or population growth or construction of additional housing." Since CMB-01 projects seek to advance deployment of engines, ovens and boilers, they are not constructing housing and nor will the population grow as a result of new industry when this region has a robust available labor force. The aspect of fostering economy is when that facility could significantly affect the environment. The statement to site new facilities using near-zero and zero emission technologies is clearly not significantly affecting the environment. Therefore, the growth-inducing impacts are less than significant.

Similarly, control measure FLX-02 incentivizes the replacement of existing, older, higher emitting equipment with new lower emitting equipment. These measures are focused on existing

equipment or replacements requiring the same amount of workers and would not require additional employees to operate. The measures are not intended to grow business, but if that does happen, the region has a robust labor force to do the work.

Comment A-7.50

Public Services – Pp. 2-44 to 2-45

The IS assumes that the Project would not generate any increased need for public services. However, the IS does not provide any substantial evidence to support its assumptions regarding the absence of impact on additional public services or facilities. New fueling infrastructure to support zero and near-zero emissions vehicles, including hydrogen and natural gas, could impact Fire Department resources and require additional public services.

The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant public services impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

A-7.50

Response A-7.50

Fueling facilities, storage tanks, etc., do require the inspections and occasionally the approval of the local fire department. The need for additional public services is triggered by population growth. Since the 2016 AQMP is not expected to cause population growth, there is no expectation that additional public services will be needed. Fueling facilities, storage tanks, etc., do require the inspections and occasionally the approval of the local fire department. However, the increasing need of local services is an ongoing evaluation of resources that local jurisdictions adjust and budget. While more public service could be needed, the impact would not be considered significant.

Comment A-7.51

Transportation and Traffic – Pp. 2-50 to 2-54

The IS erroneously considers only vehicular traffic impacts to local roadways. As such, it fails to adequately describe and analyze potentially significant impacts to rail and marine vessel traffic, ignoring the specific significance criterion related to this topic (*see* IS, P. 2-51). In fact, ORFIS-04 (At-Berth Regulation Amendments) could have a significant impact on marine vessel traffic as the only approved technologies to address non-regulated vessels are barge-based, and thus, would increase vessel traffic within harbor waters. An expansion of the at-berth regulation as contemplated in ORFIS-04 would likely require additional barge-based units, further exacerbating vessel traffic and posing safety hazards, all of which must be analyzed in the DPEIR.

A-7.51

Response A-7.51

The primary compliance option for ORFIS-04 requires the use of shore power, and therefore, would not affect marine vessel traffic. Another compliance option would be utilizing emissions capture and control systems that are typically installed on barges. However, the number of barges needed to comply with ORFIS-04 is unknown at this time. CARB's SIP analysis does determine

traffic and transportation impacts from the 2016 State Strategy to be significant. Additionally, the Draft Program EIR also determined that traffic and transportation impacts would be significant.

Comment A-7.52

> The IS does not contain any analysis of the potentially significant traffic impacts associated with increased zero or low emission vehicles. Instead of analyzing the impacts caused by additional vehicles, the analysis assumes that "drivers who purchase low or zero emission vehicles would not be driving the old high emitting vehicles at the same time they are driving the low emitting vehicles." (IS, p. 2-52.) However, other drivers will now be able to drive these vehicles and the analysis should assume both the old and new vehicles will be used at the same time.[14] Further, construction and operation of potential zero emission control measures related to on-road heavy-duty vehicles, such as the use of overhead catenary power lines, could result in significant traffic impacts through closure of lanes and other alternations of traffic flow patterns. Thus, operational traffic impacts should not be dismissed from the DPEIR.

A-7.52

[14] This same assumption should be reflected in all the analyses, including but not limited to, air quality, greenhouse gas emissions, and noise.

Response A-7.52

The potential impacts referred to in the comment are analyzed in the transportation/traffic section of Chapter 4 of the Draft Program EIR.

Comment A-7.53

> The potential road hazards associated with TCMs are assumed to not exist. (IS, p. 2-53.) However, the analysis of this topic was presumably done by SCAG in the EIR for the RTP/SCS. The IS and resulting DPEIR proposes to rely on this document but does not refer to any of its analysis or explain how the IS analysis conforms to it. The same is true for the IS's analysis of other TCM measures. Indeed, the District's own overhead catenary project has been required to install additional traffic safety measures to compensate for infrastructure design changes that include larger base foundations and wider medians, which have necessitated safety barriers to reduce traffic hazards.
>
> The NOP/IS must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant transportation and traffic impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

A-7.53

Response A-7.53

The potential road hazards associated with TCMs were already analyzed in SCAG's approved EIR for the RTP/SCS. It is not necessary or warranted to re-analyze these potential impacts in the Draft Program EIR.

Comment A-7.54

Mandatory Findings of Significance – Pp. 2-55 to 2-56

As discussed above, the Project's potentially significant impacts to biological resources must be analyzed in the DPEIR and should not be considered beyond the scope of review. Further, all potentially significant impacts to all resource topics should be evaluated in the DPEIR and not just the select list of resource topics identified for consideration. The IS claims that the TCMs are part of the Project (IS, p. 1-10) but then purports to exclude them from its analysis of anything other than cumulative impacts (IS, p. 2-56). Both project and cumulative impacts must be analyzed for all Project components, including (without limitation) the RTS and TCMs.

A-7.54

Response A-7.54

As stated previously, there are no foreseeable impacts to biological resources, and therefore, will not be further analyzed in the Draft Program EIR. Please see response A-7.38. The TCMs referred to have already been analyzed under CEQA.

Comment A-7.55

D. Conclusion

The current version of the NOP/IS fails to adequately describe the "Project" thereby thwarting effective public review and comment on the Proposed Plan. The IS must therefore be revised, corrected, and re-circulated with all of the descriptions and other content required by CEQA.

Even this inadequate NOP/IS makes it clear that the scope of the proposed DPEIR has been unduly narrowed, and that environmental review will be limited in a way that erroneously fails to provide the relevant decision-makers, affected public agencies, residents and the public generally with sufficient evidence and analysis of all anticipated and potential impacts from the Project as a whole, or of all potentially feasible mitigation measures or appropriate Project alternatives as required by CEQA. A-7.55

While it is clear that an initial study is needed in connection with this proposed Project, it is also clear that the IS should be more complete than the version that was provided for public review and comment. More fundamentally, its scope must be determined by a legally-adequate revised NOP/IS. The IS for the Project must, of course, be supported by credible and substantial evidence, including independent professional analysis.

We respectfully request that these comments and questions be considered before the District embarks on preparation of the DPEIR and all of the other required independent studies in connection with the CEQA review of the proposed Project.

The NOP requests that we provide you with a contact person for each responding agency. For the POLB, the contact persons are as follows:

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A-7.55 Cont.

With a copy to:

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Response A-7.55

The comment is a conclusory statement and all of the claims were previously stated in specific comments in the letter, and therefore, responded to in the corresponding specific response. No further response is necessary.

Comment Letter A-8

G | D | B Gatzke Dillon & Ballance LLP
LAWYERS

August 4, 2016 *By Electronic Mail*

Jillian Wong (c/o PRDAS/CEQA)
South Coast Air Quality Management District
21865 Copley Drive
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Re: *Notice of Preparation of a Draft Program Environmental Impact Report for the 2016 Air Quality Management Plan*

Dear Ms. Jillian Wong:

This letter is submitted on behalf of John Wayne Airport, Orange County (Airport or JWA). This letter contains the Airport's written comments on the Notice of Preparation (NOP) and Initial Study (IS) (collectively NOP/IS) for the proposed 2016 Air Quality Management Plan (2016 AQMP), issued by the South Coast Air Quality Management District (SCAQMD or District) on June 30, 2016.

The Airport's comments on the NOP/IS are intended to serve the following principal objectives: A-8.1

1. First, we appreciate the opportunity to continue to work constructively and cooperatively with the SCAQMD in evaluating and developing realistic airport emission reduction strategies for the proposed 2016 AQMP and analyzing the potential environmental impacts of the proposed measures. We hope that our past comments, our comments in this letter, and our continued cooperation in this process will allow us to make meaningful contributions toward resolving and addressing the complex airport regulatory issues associated with air quality in the Basin.

2. Second, a key concern relating to the use of a baseline to measure emissions reductions is the apparent failure of this method to provide some type of "credit" to the Airport for the significant emission reduction measures that have already been implemented and are currently being implemented to reduce air quality impacts associated with Airport operations. These measures already provide: (i) more efficient fuel operations and consumption; (ii) the ability to manage aircraft operations in a more efficient manner; (iii) a reduction in the fugitive dust generated by aircraft activity at JWA; (iv) improvement in traffic circulation within the vicinity of JWA; and (v) the possibility for use of alternative fuels. In order to maintain equity and to avoid inadvertently "penalizing" those who voluntarily implement significant air quality reduction measures, the 2016 AQMP should provide some type of "credit" to "sources" for these efforts rather than A-8.2

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reflect these emission reductions into future emissions inventories and/or in baseline emissions inventories.

3. Third, and finally, we have a number of specific comments relating to the NOP/IS discussion and analysis, including comments relating to the emissions inventories, potential transportation and traffic impacts of proposed control measures, potential inconsistencies between existing and proposed new control measures, mitigation fees, SCAQMD's ability to implement measures as regulations, and the cost effectiveness of any regulatory strategy. In many instances, these comments may require the NOP/IS to be revised and supplemented with additional discussions and analysis.

A-8.2 Cont.

COMMENTS

A. EMISSION INVENTORY

Over the past several years, JWA has provided information to SCAQMD staff relating to its baseline emissions inventory as well as its projections for future aircraft activity (both general aviation and commercial aircraft) at the Airport. As this information indicates, and as the District knows, the Airport is under certain legal and operational constraints with respect to existing and future operations. We appreciate SCAQMD's recognition of the uniqueness of the legal and regulatory constraints as well as the available infrastructure (existing and planned) at each of the airports in the Basin and the necessity of taking into account both the unique characteristics and available infrastructure at each of the airports in the context of the continued development and approval of any regulatory strategies, including proposed measure MOB-04.

That said, one key and continuing concern relating to the use of a baseline to measure emissions reductions is the current failure of this method to provide some type of "credit" to the Airport for the significant emission reduction measures that have already been implemented and are currently being implemented to reduce air quality impacts associated with airport operations. As indicated above, in order to maintain equity and to avoid inadvertently "penalizing" those who voluntarily implement significant air quality reduction measures, the 2016 AQMP should provide some type of "credit" to "sources" for these efforts and not simply "bake" into the baseline these significant emission reduction measures.

A-8.3

According to the NOP/IS, "[q]uantified emission reductions that are real, surplus, permanent, and enforceable will be reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or *in the baseline emissions inventories* as part of future AQMP/SIP development." (NOP/IS, page 1-22.) It is unclear from this statement what data SCAQMD will rely upon for the baseline emissions inventories and what data it will use for the estimated projected reductions in airport generated trips that could occur through implementation of the

proposed control measures. In addition, if the baseline emissions inventories in the 2016 AQMP will not be used by the District as the performance standards for proposed measures, the NOP/IS must be revised to accurately indicate what performance standards or objectives the District will adopt for the air transportation industry. The NOP/IS should also be revised to include a discussion of some type of "credit system" that will be provided for airports that have already implemented significant emission reduction measures.

A-8.3 Cont.

B. TRAFFIC AND AIR QUALITY IMPACTS

The NOP/IS concludes that there will be no significant impacts to transportation and traffic. (*See, e.g.,* Appendix A, A-7.) Specifically, the NOP/IS concludes that "[i]mplementation of the 2016 AQMP is not expected to substantially increase vehicle trips or vehicle miles traveled in the District." (NOP/IS at page 2-51.)

In the case of airports, this conclusion may not be true. As we have previously discussed with the District, any regulation by the District which may affect the operational capacity of one or more of the airports in the Basin might be perceived as providing air quality impact reductions at the constrained airport, but this does not mean that there has been a net air quality benefit in the Basin generally. If passenger traffic is reduced at one airport in the Basin because of regulatory constraints, then that traffic may be served at another airport in the Basin, or the displaced passengers may choose to drive to their ultimate destination. For environmental purposes, the significant repercussion from either alternative (i.e., reliance on a different airport or road travel) is that the displaced passengers will have to incur an additional number of regional vehicle miles traveled (VMT). This will worsen traffic congestion, and the concomitant negative impacts on air quality associated with higher VMT. The NOP/IS does not identify these potentially significant transportation and traffic issues or the associated air quality impacts. The NOP/IS must be revised to include a discussion of these potential impacts.

A-8.4

In addition, one of the significance criteria identified for transportation and traffic impacts is whether air traffic will be substantially altered. (NOP/IS at page 2-50.) Implementation of the control measures that continue to be pursued by both the SCAQMD and the California Air Resources Board (ARB) (in the context of its SIP strategies) to reduce emissions from state and federal sources, including aircraft, may have a significant impact on the ability of air carriers to provide service in the Southern California Basin. This potential substantial alteration of air traffic should be addressed in the NOP/IS and the NOP/IS should be revised to discuss and analyze this potentially significant impact.

A-8.5

C. POTENTIAL INCONSISTENCIES BETWEEN EXISTING AND PROPOSED NEW CONTROL MEASURES

The long term control measures identified by the 2016 AQMP to be considered by ARB for implementation continue to: (1) pursue approaches to reduce emissions from ground support equipment (GSE) (OFFS-04); (2) require zero emission airport shuttle buses (ORHD-07); and (3) require fleet and facility modernization. We continue to be concerned about these long term control measures because, as you know, the SCAQMD already has a number of regulatory rules governing vehicle fleets. Any future regulatory measures should be consistent with these existing regulations. In addition, airports should not be required to regulate or administer emission reduction programs for vehicle fleets or GSE that they do not own or operate. A-8.6

D. MITIGATION FEES

There is a troubling reference in the Initial Study, Appendix A, page A-7, to mitigation fees in the context of the source of impact for MOB-04, Emission Reductions at Commercial Airports. We are very concerned about this reference primarily because, in the past, SCAQMD has provided as one of the suggested control measures for airports the use of a mitigation fee program. We have discussed at length, with both the District and the U.S. EPA over the years, our concern regarding any proposed mitigation fee program and the role of the airport proprietor with respect to the administration of air quality emission strategies at airports in the Basin. We have expressed strong opposition to the measures previously proposed by the District. The airports are not in favor of becoming the air quality "enforcers" for all airport users. In addition to our concern regarding the airport proprietor's exact role and obligations under any "mitigation fee program" that may be considered, we are concerned as to what, if any, penalties airport proprietors might be subjected to if one of their airport users fails to provide the required mitigation fee in connection with their operation(s). A-8.7

We have serious doubt, particularly after adoption of the Airport Noise and Capacity Act of 1990 (49 USCA §2151, et seq.) (ANCA), as to whether airport proprietors generally have sufficient residual regulatory authority to act effectively as the agencies implementing and enforcing any "mitigation fee program" imposed by the District.

We also continue to have a fundamental disagreement with the District regarding the extent of the District's authority to regulate airports. Specifically, we continue to believe that, to the extent the District attempts to regulate aircraft related emissions, directly or indirectly (as is the case with the mitigation fee program or the reference in ARB's SIP measures to partner with airports to incentivize cleaner aircraft to come to California airports); any such indirect source regulation would constitute a constitutionally impermissible local intrusion into a federally preempted field of regulation. (People of State of Cal. v. Dept. of Navy (1977) 431 F. Supp. 1271, 1281; Washington v. General Motors Corp. (1972) 405 U.S. 109.) The District's A-8.8

attempted indirect regulation of airport related emissions through a fee program or other type of indirect source rule would be an impermissible and unconstitutional intrusion into an area which is pervasively and exclusively controlled by federal law and federal authority. (City of Burbank v. Lockheed Air Terminal, Inc. (1973) 411 U.S. 624, 633.)

Irrespective of these legal constraints regarding this type of control measure, the 2016 AQMP has not defined the proposed "mitigation fee" control measure in a manner that allows the NOP/IS and Programmatic EIR to discuss this measure and its potential environmental consequences consistent with the requirements of CEQA. The NOP/IS should therefore be revised to delete reference to mitigation fees in the context of MOB-04 or provide additional discussion and analysis of this proposed control measure.

A-8.8 Cont.

E. SOCIOECONOMIC ANALYSIS

Although we understand that the AQMP includes a preliminary assessment of the cost effectiveness of available and proposed measures, it is imperative that before any further environmental analysis is conducted regarding any of the measures provided in the 2016 AQMP directed toward airports and airlines, that the District prepare appropriate and complete analyses of the cost effectiveness of all of the proposed measures as mandated by California law in order to provide the airports in the Basin with information which measures the full costs of any and all possible regulatory programs in terms of the increase in emission reduction costs versus program and improvement costs. This is particularly important with those measures that have been defined, such as zero emission airport shuttle buses and zero emission GSE.

A-8.9

F. EMISSION REDUCTIONSAND PERFORMANCE STANDARDS

The NOP/IS indicates that a program EIR will be prepared for the 2016 AQMP because it examines the environmental effects of the proposed control measures that will ultimately be issued as rules or regulations and promulgated as part of a continuing ongoing regulatory strategy. (NOP/IS, page 1-6.) Although a program EIR may properly focus on "broad policy alternatives and program wide mitigation measures," as well as "regional influences, secondary effects, cumulative impacts, broad alternatives, and other factors that apply to the program as a whole" (Cal. Code Regs. §§15168(b)(4), (d)(2)), the agency should adopt performance standards or objectives that can then be translated into site specific measures or regulations when site-specific CEQA analysis is prepared. The NOP/IS fails to comply with this requirement.

A-8.10

Although the 2016 AQMP and NOP/IS have identified a number of control measures for the airport and airline industry, the NOP/IS fails to discuss any performance standards and objectives for these measures despite ongoing discussion that indicates that the District could quickly pivot to regulation, if necessary, and that such regulations are within the District's legal authority. Have performance targets been established for these control measures? The NOP/IS

A-8.11

must address any performance targets that have been established so that they can be translated into specific control measures for the airport and airline industry.

A-8.11 Cont.

In addition, although we understand that the rule development process will provide additional opportunity for public and stakeholder input as well as ongoing technical review, assessment of costs and environmental impacts, it is difficult to assess measure MOB-04 or the proposed State SIP strategy measures included in the NOP/IS, including ORHD-07 (zero emission airport shuttle buses) and OFFS-04 (zero emission GSE), without further information on their proposed parameters; we look forward to better understanding the District's proposals. That being said, and as the District has recognized, in many instances, controlling emissions at airports in the Basin is constrained by legal, operational, technological, and economic limitations. Therefore, we encourage the District to continue to be sensitive to and informed of such constraints when designing or implementing any regulations developed by SCAQMD and predicting associated emission reductions.

A-8.12

In closing, thank you again for this opportunity to comment on the NOP/IS for the 2016 AQMP. We look forward to continuing to engage in an open, thorough and responsive public process on the 2016 AQMP, and assisting the District with its efforts to improve air quality in the South Coast Air Basin. If you have any questions regarding the comments set forth in this letter, please do not hesitate to contact me at your convenience.

Very truly yours,



Lori D. Ballance
of
Gatzke Dillon & Ballance LLP

LDB/rlf

cc: Frank Kim, County Executive Officer
Mark Denny, County Operations Officer
Barry Rondinella, Airport Director
Melinda McCoy, Airport Environmental Engineer
Carol Sutkus, Manager, South Coast Air Quality Planning Section, California Air Resources Board

Response to Comment Letter A-8

Comment A-8.1

Dear Ms. Jillian Wong:

This letter is submitted on behalf of John Wayne Airport, Orange County (Airport or JWA). This letter contains the Airport's written comments on the Notice of Preparation (NOP) and Initial Study (IS) (collectively NOP/IS) for the proposed 2016 Air Quality Management Plan (2016 AQMP), issued by the South Coast Air Quality Management District (SCAQMD or District) on June 30, 2016.

The Airport's comments on the NOP/IS are intended to serve the following principal objectives: A-8.1

1. First, we appreciate the opportunity to continue to work constructively and cooperatively with the SCAQMD in evaluating and developing realistic airport emission reduction strategies for the proposed 2016 AQMP and analyzing the potential environmental impacts of the proposed measures. We hope that our past comments, our comments in this letter, and our continued cooperation in this process will allow us to make meaningful contributions toward resolving and addressing the complex airport regulatory issues associated with air quality in the Basin.

Response A-8.1

Thank you for the comment. No further response is necessary.

Comment A-8.2

2. Second, a key concern relating to the use of a baseline to measure emissions reductions is the apparent failure of this method to provide some type of "credit" to the Airport for the significant emission reduction measures that have already been implemented and are currently being implemented to reduce air quality impacts associated with Airport operations. These measures already provide: (i) more efficient fuel operations and consumption; (ii) the ability to manage aircraft operations in a more efficient manner; (iii) a reduction in the fugitive dust generated by aircraft activity at JWA; (iv) improvement in traffic circulation within the vicinity of JWA; and (v) the possibility for use of alternative fuels. In order to maintain equity and to avoid inadvertently "penalizing" those who voluntarily implement significant air quality reduction measures, the 2016 AQMP should provide some type of "credit" to "sources" for these efforts rather than A-8.2

   reflect these emission reductions into future emissions inventories and/or in baseline emissions inventories.

3. Third, and finally, we have a number of specific comments relating to the NOP/IS discussion and analysis, including comments relating to the emissions inventories, potential transportation and traffic impacts of proposed control measures, potential inconsistencies between existing and proposed new control measures, mitigation fees, SCAQMD's ability to implement measures as regulations, and the cost effectiveness of any regulatory strategy. In many instances, these comments may require the NOP/IS to be revised and supplemented with additional discussions and analysis. A-8.2 Cont.

Response A-8.2

SCAQMD staff works with airport staff to ensure that correct emissions are included in baseline inventories. CEQA analysis does not take credit for the airport's voluntary efforts in reducing emissions.

The comment under number 3 above is an introductory comment which alludes to specific comments presented later in the comment letter. Therefore, responses are provided to the specific comments later.

Comment A-8.3

COMMENTS

A. EMISSION INVENTORY

Over the past several years, JWA has provided information to SCAQMD staff relating to its baseline emissions inventory as well as its projections for future aircraft activity (both general aviation and commercial aircraft) at the Airport. As this information indicates, and as the District knows, the Airport is under certain legal and operational constraints with respect to existing and future operations. We appreciate SCAQMD's recognition of the uniqueness of the legal and regulatory constraints as well as the available infrastructure (existing and planned) at each of the airports in the Basin and the necessity of taking into account both the unique characteristics and available infrastructure at each of the airports in the context of the continued development and approval of any regulatory strategies, including proposed measure MOB-04.

That said, one key and continuing concern relating to the use of a baseline to measure emissions reductions is the current failure of this method to provide some type of "credit" to the Airport for the significant emission reduction measures that have already been implemented and are currently being implemented to reduce air quality impacts associated with airport operations. As indicated above, in order to maintain equity and to avoid inadvertently "penalizing" those who voluntarily implement significant air quality reduction measures, the 2016 AQMP should provide some type of "credit" to "sources" for these efforts and not simply "bake" into the baseline these significant emission reduction measures.

A-8.3

According to the NOP/IS, "[q]uantified emission reductions that are real, surplus, permanent, and enforceable will be reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or *in the baseline emissions inventories* as part of future AQMP/SIP development." (NOP/IS, page 1-22.) It is unclear from this statement what data SCAQMD will rely upon for the baseline emissions inventories and what data it will use for the estimated projected reductions in airport generated trips that could occur through implementation of the

Response A-8.3

The aircraft emission inventory is currently being updated and will be included in the upcoming Revised Draft 2016 AQMP.

Comment A-8.4

B. TRAFFIC AND AIR QUALITY IMPACTS

The NOP/IS concludes that there will be no significant impacts to transportation and traffic. (*See, e.g.,* Appendix A, A-7.) Specifically, the NOP/IS concludes that "[i]mplementation of the 2016 AQMP is not expected to substantially increase vehicle trips or vehicle miles traveled in the District." (NOP/IS at page 2-51.)

In the case of airports, this conclusion may not be true. As we have previously discussed with the District, any regulation by the District which may affect the operational capacity of one or more of the airports in the Basin might be perceived as providing air quality impact reductions at the constrained airport, but this does not mean that there has been a net air quality benefit in the Basin generally. If passenger traffic is reduced at one airport in the Basin because of regulatory constraints, then that traffic may be served at another airport in the Basin, or the displaced passengers may choose to drive to their ultimate destination. For environmental purposes, the significant repercussion from either alternative (i.e., reliance on a different airport or road travel) is that the displaced passengers will have to incur an additional number of regional vehicle miles traveled (VMT). This will worsen traffic congestion, and the concomitant negative impacts on air quality associated with higher VMT. The NOP/IS does not identify these potentially significant transportation and traffic issues or the associated air quality impacts. The NOP/IS must be revised to include a discussion of these potential impacts.

A-8.4

Response A-8.4

Reliance on a different airport and associated additional road travel is not envisioned in the 2016 AQMP, thus potential impacts were not further analyzed.

Comment A-8.5

In addition, one of the significance criteria identified for transportation and traffic impacts is whether air traffic will be substantially altered. (NOP/IS at page 2-50.) Implementation of the control measures that continue to be pursued by both the SCAQMD and the California Air Resources Board (ARB) (in the context of its SIP strategies) to reduce emissions from state and federal sources, including aircraft, may have a significant impact on the ability of air carriers to provide service in the Southern California Basin. This potential substantial alteration of air traffic should be addressed in the NOP/IS and the NOP/IS should be revised to discuss and analyze this potentially significant impact.

A-8.5

Response A-8.5

The proposed control measures of the 2016 AQMP are not expected to substantially alter air traffic in any way. The conclusion above is considered speculative.

Comment A-8.6

C. POTENTIAL INCONSISTENCIES BETWEEN EXISTING AND PROPOSED NEW CONTROL MEASURES

The long term control measures identified by the 2016 AQMP to be considered by ARB for implementation continue to: (1) pursue approaches to reduce emissions from ground support equipment (GSE) (OFFS-04); (2) require zero emission airport shuttle buses (ORHD-07); and (3) require fleet and facility modernization. We continue to be concerned about these long term control measures because, as you know, the SCAQMD already has a number of regulatory rules governing vehicle fleets. Any future regulatory measures should be consistent with these existing regulations. In addition, airports should not be required to regulate or administer emission reduction programs for vehicle fleets or GSE that they do not own or operate.

A-8.6

Response A-8.6

We appreciate your continued concern with these measures, but the long term control measures are intended to be harmonious wit CARB control strategies. No further response is necessary.

Comment A-8.7

D. MITIGATION FEES

There is a troubling reference in the Initial Study, Appendix A, page A-7, to mitigation fees in the context of the source of impact for MOB-04, Emission Reductions at Commercial Airports. We are very concerned about this reference primarily because, in the past, SCAQMD has provided as one of the suggested control measures for airports the use of a mitigation fee program. We have discussed at length, with both the District and the U.S. EPA over the years, our concern regarding any proposed mitigation fee program and the role of the airport proprietor with respect to the administration of air quality emission strategies at airports in the Basin. We have expressed strong opposition to the measures previously proposed by the District. The airports are not in favor of becoming the air quality "enforcers" for all airport users. In addition to our concern regarding the airport proprietor's exact role and obligations under any "mitigation fee program" that may be considered, we are concerned as to what, if any, penalties airport proprietors might be subjected to if one of their airport users fails to provide the required mitigation fee in connection with their operation(s). A-8.7

We have serious doubt, particularly after adoption of the Airport Noise and Capacity Act of 1990 (49 USCA §2151, et seq.) (ANCA), as to whether airport proprietors generally have sufficient residual regulatory authority to act effectively as the agencies implementing and enforcing any "mitigation fee program" imposed by the District.

Response A-8.7

Comment noted.

Comment A-8.8

We also continue to have a fundamental disagreement with the District regarding the extent of the District's authority to regulate airports. Specifically, we continue to believe that, to the extent the District attempts to regulate aircraft related emissions, directly or indirectly (as is the case with the mitigation fee program or the reference in ARB's SIP measures to partner with airports to incentivize cleaner aircraft to come to California airports); any such indirect source regulation would constitute a constitutionally impermissible local intrusion into a federally preempted field of regulation. (People of State of Cal. v. Dept. of Navy (1977) 431 F. Supp. 1271, 1281; Washington v. General Motors Corp. (1972) 405 U.S. 109.) The District's A-8.8

attempted indirect regulation of airport related emissions through a fee program or other type of indirect source rule would be an impermissible and unconstitutional intrusion into an area which is pervasively and exclusively controlled by federal law and federal authority. (City of Burbank v. Lockheed Air Terminal, Inc. (1973) 411 U.S. 624, 633.)

Irrespective of these legal constraints regarding this type of control measure, the 2016 AQMP has not defined the proposed "mitigation fee" control measure in a manner that allows the NOP/IS and Programmatic EIR to discuss this measure and its potential environmental consequences consistent with the requirements of CEQA. The NOP/IS should therefore be revised to delete reference to mitigation fees in the context of MOB-04 or provide additional discussion and analysis of this proposed control measure. A-8.8 Cont.

Response A-8.8

This comment is not pertinent to the NOP/IS analysis. Therefore, no further response is necessary.

Comment A-8.9

E. SOCIOECONOMIC ANALYSIS

Although we understand that the AQMP includes a preliminary assessment of the cost effectiveness of available and proposed measures, it is imperative that before any further environmental analysis is conducted regarding any of the measures provided in the 2016 AQMP directed toward airports and airlines, that the District prepare appropriate and complete analyses of the cost effectiveness of all of the proposed measures as mandated by California law in order to provide the airports in the Basin with information which measures the full costs of any and all possible regulatory programs in terms of the increase in emission reduction costs versus program and improvement costs. This is particularly important with those measures that have been defined, such as zero emission airport shuttle buses and zero emission GSE. A-8.9

Response A-8.9

A socioeconomic analysis for the 2016 AQMP is currently being prepared.

Comment A-8.10

F. EMISSION REDUCTIONSAND PERFORMANCE STANDARDS

The NOP/IS indicates that a program EIR will be prepared for the 2016 AQMP because it examines the environmental effects of the proposed control measures that will ultimately be issued as rules or regulations and promulgated as part of a continuing ongoing regulatory strategy. (NOP/IS, page 1-6.) Although a program EIR may properly focus on "broad policy alternatives and program wide mitigation measures," as well as "regional influences, secondary effects, cumulative impacts, broad alternatives, and other factors that apply to the program as a whole" (Cal. Code Regs. §§15168(b)(4), (d)(2)), the agency should adopt performance standards or objectives that can then be translated into site specific measures or regulations when site-specific CEQA analysis is prepared. The NOP/IS fails to comply with this requirement. A-8.10

Response A-8.10

Commented noted but, performance standards that can be translated into site specific measures for site-specific CEQA analysis are not a requirement for an NOP/IS.

Comment A-8.11

Although the 2016 AQMP and NOP/IS have identified a number of control measures for the airport and airline industry, the NOP/IS fails to discuss any performance standards and objectives for these measures despite ongoing discussion that indicates that the District could quickly pivot to regulation, if necessary, and that such regulations are within the District's legal authority. Have performance targets been established for these control measures? The NOP/IS A-8.11

must address any performance targets that have been established so that they can be translated into specific control measures for the airport and airline industry. A-8.11 Cont.

Response A-8.11

As stated above, performance standards are not a requirement for CEQA or an NOP/IS. The analysis is conducted on the proposal as presented in the project description in Chapter 2.

Comment A-8.12

In addition, although we understand that the rule development process will provide additional opportunity for public and stakeholder input as well as ongoing technical review, assessment of costs and environmental impacts, it is difficult to assess measure MOB-04 or the proposed State SIP strategy measures included in the NOP/IS, including ORHD-07 (zero emission airport shuttle buses) and OFFS-04 (zero emission GSE), without further information on their proposed parameters; we look forward to better understanding the District's proposals. That being said, and as the District has recognized, in many instances, controlling emissions at airports in the Basin is constrained by legal, operational, technological, and economic limitations. Therefore, we encourage the District to continue to be sensitive to and informed of such constraints when designing or implementing any regulations developed by SCAQMD and predicting associated emission reductions. A-8.12

In closing, thank you again for this opportunity to comment on the NOP/IS for the 2016 AQMP. We look forward to continuing to engage in an open, thorough and responsive public process on the 2016 AQMP, and assisting the District with its efforts to improve air quality in the South Coast Air Basin. If you have any questions regarding the comments set forth in this letter, please do not hesitate to contact me at your convenience.

Response A-8.12

SCAQMD staff will continue to work with airport representatives during future rulemaking activities.

Comment Letter A-9

Yvonne Watson
201 W. Madison Avenue
Montebello, CA 90640
August 4, 2016

TO: JILLIAN WONG, SCAQMD

PROJECT TITLE: DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT 2016 AIR QUALITY MANAGEMENT PLAN (AQMP)

INITIAL STUDY COMMENTS

Ms. Wong,

Below are my brief comments on the Initial Study for the 2016 Air Quality Management Plan.

ACRONYMS

Please move the list to the beginning of the NOP/IS and add the following items:

BACM = Best Available Control Measures
BACT = (Page 1-13. Please correct if this is a typo.)
BMPs = Best Management Practices
BTEX – Benzene, Toluene, Ethylbenzene, and Xylene
CAAP = San Pedro Bay Ports Clean Air Action Plan
CE-Cert = ? (Page 1-17)
CFR = ?(Page 1-38)
CHP = Combined Heating and Power
CVRP = Clean Vehicle Rebate Pilot Program
dBA = Decibels
DPF = Diesel Particulate Filter
DPM – Diesel Particulate matter
EFMP = Enhanced Fleet Modernization Program
EIP = Economic Incentive Program
EMFAC2014 = ? (Page 1-8)
ERPG = Emergency Response Planning Guideline
FTIR = Fourier transform infrared spectroscopy
g/bhp-hr = (Found in text as well as in table.)
GVW = ? (Page 1-22)
HOT = High Occupancy Toll
HQTA = High Quality Transit Area
HVIP - Hybrid heavy-duty vehicles
HVIP = Hybrid Vehicle Incentives Project

A-9.1

MPO = Metropolitan Planning Organization
MSERCs = Mobile Source Emission Reduction Credits
NPDES = National Pollutant Discharge Elimination System
NSR = New Source Review
OSHA = Occupational Safety and Health Administration
PEIR = Programmed Environmental Impact Report
PM = Particulate matter
POTW = Publicly Owned Treatment Work
Ppb = Parts per billion
RACM = Reasonably Available Control Measure Analysis
RCRA = Resource Conservation and Recovery Act
RECLAIM = Regional Clean Air Incentives Market
ROG = ? (Page 1-30)
RTP = Regional Transportation Plan
RWQCB = Regional Water Quality Control Board
SOF = Solar Occultation Flux
SOON = Surplus Off-Road Opt-In
SORE – Small Off-Road Equipment
SOx = ? (Page 1-20.)
TACs = Toxic Air Contaminants
TDM = Transportation Demand Management
Tpd = ? (Page 1-24)
TSM = Transportation System Management
TXM = Toxic Air Contaminant Control Measure
SCRRA = ? (Page1-23)

A-9.1 Cont.

Please include the date for the "recently adopted" federal 8-hour ozone standard (70 ppb) cited on page 1-7.

A-9.2

Thank you for the opportunity to comment on this document.

Yvonne Watson
Sierra Club Angeles Chapter

Response to Comment Letter A-9

Comment A-9.1

ACRONYMS

Please move the list to the beginning of the NOP/IS and add the following items:

BACM = Best Available Control Measures
BACT = (Page 1-13. Please correct if this is a typo.)
BMPs = Best Management Practices
BTEX – Benzene, Toluene, Ethylbenzene, and Xylene
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A-9.1

MPO = Metropolitan Planning Organization
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TDM = Transportation Demand Management
Tpd = ? (Page 1-24)
TSM = Transportation System Management
TXM = Toxic Air Contaminant Control Measure
SCRRA = ? (Page1-23)

A-9.1 Cont.

Response A-9.1

The list of acronyms provided will be added to the Draft Program EIR.

Comment A-9.2

Please include the date for the "recently adopted" federal 8-hour ozone standard (70 ppb) cited on page 1-7. A-9.2

Response A-9.2

The 2015 date for the recently adopted federal 8-hour ozone standard will be added to the Draft Program EIR.

Comment Letter A-10

-----Original Message-----
From: Harvey Eder [mailto:harveyederpspc@yahoo.com]
Sent: Friday, August 12, 2016 5:29 PM
To: Jillian Wong <jwong1@aqmd.gov>; pfine@aqmp.gov; harveyederpspc@yahoo.com
Cc: harveyederpspc@yahoo.com; Jillian Wong <jwong1@aqmd.gov>
Subject: comments on nop ceqa aqmp 2016 by Harvey Eder for self & PSPC Public Solar Power Coalition 8/12/16 per MKrause phone 8/4/16 ITSC

Hello AQMP 2016 folks ie. Jillian Wong (Dr.) , Phil Fine (Dr.) and Mike Krause, 8/12/16

This document is copyrighted by Harvey Mark Eder all rights reserved. August 12,2016 2:30 pm

Due to the cite in 10 2 and 10-3 in the June 30,2016 Draft Plan that says there has been a 30% increase
in ch4/methane over the last 10 years and the new 84, 86 gwp used by IPCC AR5 2013 I brought this up with Dr. Arron Katsenstein who chap 10 and is staff lead in Climate Change and GHG etc, the current number using radiative
forcing for 1800 (2016 is 1841ppb ch4) ppb is 274 ppm co2equivilent ch4 emissions in the atmosphere +- 10%
ch4 gwp over 20 yrs is 84,or 86 gwp compared to co2, plus ~100 ppm N2O co2 equilivent (using 300gwp for N2O)
pous 406 ppm co2 Totals to at least

co2 406 ppm
ch4 274 ppm co2e (+- 10%)
n2o ~100 ppm co2e (calcs needed)

Equals at least 780 ppm co2 now

A-10.1

Therefor what is needed is ITSC Immediate Total Solar Conversion the corredt best science numbers on co2e at over 2 times preindustrial co2 280 ppm co2 times 2 is 560 ppm co2e and 3 times 280 ppm co2 is 840
which is apx where we are now ! These numbers were not supposted to be fact until 2050 to 2100' Its on now folks.

The entire record of my and PSPC record in and out of litigation is incorporated into the record herein in the CEQIA nop etc and the Draft 2016 AQMP. Also incorporated into the record herein as cited here by reference is the 2014 Jacobson et. al. Plan For Converting California to 80-85% solar renewables by 2030 or more and 100% by 2050 or sooner,,,,,California is the World lead in Solar Renewables not Germany anymore with its nucs (which is being phased
out after fukashema in Japan) and the coal plants /mines. The Federal CAA and Ca caa require solar cost effective
energy be implemented ie Deployed as cited inar5 chapt 8 "solar renewable energy " is cost effective now and has been
and is being "deployed". We must lead the usa and the world. I/We submitted the 8 reports to the Dist Advisory

Group with the US DOE May 18,2016 SunShot Documents including PV and CSP (Concentrated Solar Power) as well as Health benefits from solar etc and Fianceing Solar which can reduce solar by "30-60%", The origional PV andf CSP 2012 were in the State law wuit filed in January of 2013 etc the origional suit s were filed in 1992...

This is submission number 1 or many

Also since the Dist has ignored solar conversion and not covering ITSC Ithe alternative project in the CEQA Document EIR must be ITSC II as "expediously as practiable" like our Father and Mothers did in WW2 against
the Naziesw/Facists/ and Japan etc. we can and must to this now...

Either there has been a conspirancy or at best gross neglience to ignore solar most likely criminal"'' It's now or never.....

A-10.1 Cont.

Solarly,

Harvey Eder for self and for the PSPC Public Solar Coalition.
August 12,2016 as per K w/ Mr. Mike Krausde

The sun makes the wind blow , the water flow and the plants grow It's the engine of our ecosystem The Way The World Works.....

1223 Wilshire Blvd. #667
Santa Monica, CA. 90403
(310) 3932589

PS The little ditti is from cited in responce yo Dist Demur in lit 2013 . I was the first registerurd Environmental Studies Student at the University of California in the Fall of 1970 at UCSC with my Professor Dr. Richard Cooley who told me that its Solar Energy not appropriate or alernative energy or "clean energy " cause thats what you Dist call your Dirty Gas a Fossil Fuel which is against Ca Hand SC to Import into the state 88% of DG is imporated in Ca.breaking state law etc

Response to Comment Letter A-10

Response A-10.1

Thank you for your comments. A solar power alternative was evaluated in the alternatives in Chapter 6 of the Draft Program EIR.

APPENDIX C

ASSUMPTIONS AND CALCULATIONS

TABLE C-1

Summary of Construction Emissions

Total On-Site for One Facility

	CO, lb/day	NOx, lb/day	PM10, lb/day	PM2.5, lb/day	VOC, lb/day	SOx, lb/day	CO2e, ton/year	Total GHG Amortized over 30 years for One facility (CO2e/yr)
Grading/Site Preparation	11	25	**3.9**	**1.6**	2.7	0.0	16	
Paving	8	12	0.7	0.7	0.2	0.01	2	
Equipment Installation	**15**	**30**	1.4	1.3	**3.4**	**0.0**	**414**	
								14
Significance Threshold	550	100	150	55	75	150	10,000	
Exceed Significance?	NO	NO	NO	NO	NO	NO	NO	

TABLE C-2

Grade/Site Summary

Grading/Site Preparation -	for One Facility								
Construction Schedule	**10**	**days**[a]							
Equipment Type[a,b]	**No. of Equipment**	**hr/day**	**Crew Size per facility**						
Rubber Tired Dozers	1	7.0	4						
Tractors/Loaders/Backhoes	1	7.0							
Construction Equipment Emission Factors									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
Equipment Type[c]	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
Rubber Tired Dozers	1.101	2.381	0.099	0.091	0.284	0.002	238	0.026	0.099
Tractors/Loaders/Backhoes	0.374	0.498	0.034	0.031	0.073	0.001	67	0.007	0.021
Fugitive Dust Bulldozer Parameters									
Vehicle Speed (mph)[d]	**Vehicle Miles Traveled**[e]								
3	21								
Fugitive Dust Material Handling									
Aerodynamic Particle Size Multiplier[f]	**Mean Wind Speed**[g]	**Moisture Content**[h]	**Dirt Handled**[i]		**Conversion**			**Dirt Handled**[j]	
	mph		cy					lb/day	
0.35	10	7.9	2,730		136513			6,825,625	
Construction Vehicle (Mobile Source) Emission Factors[k]									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Automobile	4.12E-03	3.41E-04	1.04E-04	4.41E-05	4.50E-04	8.22E-06	0.73	2.01E-05	4.83E-06
Medium-Duty Truck	3.98E-03	1.81E-02	5.40E-04	3.85E-04	7.84E-04	3.64E-05	3.76	3.64E-05	2.56E-04
Number of Trips and Trip Length									
Vehicle	**No. of One-Way Trips/Day**	**One-Way Trip Length (miles)**							
Automobile	4	20							
Medium-duty Truck[l]	3	20							

TABLE C-2

Grade/Site Summary (continued)

Incremental Increase in Combustion Emissions from Construction Equipment

Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Construction Emissions (lb/day)

	CO	NOx	PM10	PM2.5	VOC	SOx	CO2	CH4	NO2
Equipment Type	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Rubber Tired Dozers	7.71	16.67	0.69	0.64	1.99	0.02	1,665	0.18	0.69
Tractors/Loaders/Backhoes	2.62	3.48	0.24	0.22	0.51	0.01	467	0.05	0.14
Total	**10.3**	**20.2**	**0.9**	**0.9**	**2.5**	**0.0**	**2,132**	**0.2**	**0.8**

Incremental Increase in Fugitive Dust Emissions from Construction Operations

Equations:

Grading[m]: PM10 Emissions (lb/day) = 0.60 x 0.051 x mean vehicle speed$^{2.0}$ x VMT x (1 - control efficiency)

Material Handling[n] PM10 Emissions (lb/day) = (0.0032 x aerodynamic particle size multiplier x (wind speed (mph)/5)$^{1.3}$/(moisture content/2)$^{1.4}$ x dirt handled (lb/day)/2,000 (lb/ton) (1 - control efficiency)

	Control Efficiency	Unmitigated PM10	Mitigated PM2.5[o]
Description	%	lb/day	lb/day
Earthmoving	61	2.3	0.475
Material Handling	61	0.54	0.113
Total		**2.8**	**0.588**

Incremental Increase in Combustion Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

	CO	NOx	PM10	PM2.5	VOC	SOx	CO2	CH4	NO2
Vehicle	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Automobiles	0.6371	2.8971	0.0865	0.0615	0.1255	0.0058	601	0.0058	0.0410
Medium Duty Trucks	0.4779	2.1728	0.0648	0.0462	0.0941	0.0044	451	0.0044	0.0308
	1.115	**5.070**	**0.151**	**0.108**	**0.220**	**0.010**	**1,051**	**0.010**	**0.072**

Total Incremental Emissions from Construction Activities

	CO	NOx	PM10	PM2.5	VOC	SOx	CO2
Sources	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	metric ton/year
Emissions	**11**	**25**	**3.9**	**1.6**	**2.7**	**0.033**	**16**
Significance Threshold[p]	***550***	***100***	***150***	***55***	***75***	***150***	
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	

Notes:

Project specific data may be entered into shaded cells. Changing the values in the shaded cells will not affect the integrity of the worksheets. Verify that units of values entered match units for cell.

Adding lines or entering values with units different than those associated with the shaded cells may alter the integrity of the sheets or produce incorrect results.

a) Based on assumption that each bulldozer can move 35 cubic yards of soil per hour and one acre of area with a depth of 20 feet.

b) Estimated construction equipment assumed to operate one eight-hour shift per day.

c) Emission factors estimated using OFFROAD2011

d) Caterpillar Performance Handbook, Edition 33, October 2003 Operating Speeds, p 2-3.

e) Two bulldozers traveling three miles per hour for seven hours per day.

f) USEPA, AP-42, Jan 1995, Section 13.2.4 Aggregate Handling and Storage Piles, p 13.2.4-3 Aerodynamic particle size multiplier for < 10 µm

g) Mean wind speed - maximum of daily average wind speeds reported in 1981 meteorological data.

i) Assuming 2730.25 cubic yards of dirt handled (4840 ft2 x 20 ft) x yd3/27 ft3)/ days)

j) Dirt handled, lb/day = (2730.25 yd3 x 2,500 lb/yd3)

k) Emission factors estimated using EMFAC2011 for the 2014 fleet year.

l) Assumed 30 cubic yd truck capacity for 2730.25 cy of dirt [(2730.25 cy x truck/30 cy) = 3 one-way truck trips/day].

m) USEPA, AP-42, July 1998, Table 11.9-1, Equation for Site Grading ≤ 10 µm

n) USEPA, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, Sept 1992, EPA-450/2-92-004, Equation 2-12

o) Includes watering at least three times a day per Rule 403 (61% control efficiency)

p) SCAQMD CEQA significance thresholds

TABLE C-3

Paving Summary

Asphalt Paving of Foundation	**for One Facility**								
Construction Schedule	**8**	**days**[a]							
Equipment Type[a]	**No. of Equipment**	**hr/day**	**Crew Size per facility**						
Pavers	1	7.0	4						
Cement and Mortar Mixers	1	6.0							
Rollers	1	7.0							
Construction Equipment Combustion Emission Factors									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
Equipment Type[b]	lb/hr	lb/hr	lb/hr		lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
Pavers	0.526	0.810	0.056	0.052	0.143	0.001	78	0.013	0.000
Cement and Mortar Mixers	0.042	0.055	0.002	0.002	0.009	0.000	7	0.001	0.000
Rollers	0.401	0.616	0.042	0.039	0.091	0.001	67	0.008	0.000
Construction Vehicle (Mobile Source) Emission Factors[c]									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Automobile	4.12E-03	3.41E-04	1.04E-04	4.41E-05	4.50E-04	8.22E-06	0.73	2.01E-05	4.83E-06
Medium-Duty Truck	3.98E-03	1.81E-02	5.40E-04	3.85E-04	7.84E-04	3.64E-05	3.76	3.64E-05	2.56E-04
Number of Trips and Trip Length									
Vehicle	**No. of One-Way Trips/Day**	**One-Way Trip Length (miles)**							
Worker	4	20							
Delivery/Disposal Truck[d]	3	20							
Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Construction Emissions (lb/day)									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
Equipment Type	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Pavers	3.68	5.67	0.39	0.36	0.1	0.00	51	0.01	0.00
Cement and Mortar Mixers	2.41	3.70	0.25	0.23	0.0	0.00	0	0.00	0.00
Rollers	0.29	0.39	0.02	0.02	0.0	0.00	0	0.00	0.00
Total	**6**	**10**	**0.66**	**0.61**	**0.06**	**0.00**	**51**	**0.01**	**0.00**
Incremental Increase in Combustion Emissions from Onroad Mobile Vehicles									
Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
Vehicle	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Worker	0.659	0.055	0.0166	0.0071	0.0720	0.0013	116.5368	0.0032	0.0008
Delivery	0.478	2.173	0.0648	0.0462	0.0941	0.0044	450.6386	0.0044	0.0308
Total	**1.137**	**2.227**	**0.0814**	**0.0532**	**0.1661**	**0.0057**	**567.1755**	**0.0076**	**0.0315**
Total Incremental Combustion Emissions from Construction Activities									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2eq**		
Sources	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	metric ton/year		
Emissions	**8**	**12**	**0.7**	**0.7**	**0.2**	**0.0**	**2.3**		
Significance Threshold[e]	***550***	***100***	***150***	***55***	***75***	***150***			
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**			

Notes:

Project specific data may be entered into shaded cells. Changing the values in the shaded cells will not affect the integrity of the worksheets. Verify that units of values entered match units for cell. Adding lines or entering values with units different than those associated with the shaded cells may alter the integrity of the sheets or produce incorrect results.

a) Estimated construction equipment assumed to operate one eight-hour shift per day.

b) Emission factors estimated using OFFROAD2011

c) Emission factors estimated using EMFAC2011 for the 2014 fleet year.

d) Assumed three deliver truck trips per day.

Table C-4

Installation Summary

APCD Installation	**for One Facility**								
Construction Schedule	30 days								
Equipment Type[a]	**No. of Equipment**	**hr/day**	**Crew Size per facility**						
Cranes	3	4.0	4						
Forklifts	2	6.0							
Tractors/Loaders/Backhoes	2	8.0							
Construction Equipment Combustion Emission Factors									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
Equipment Type[b]	lb/hr	lb/hr	lb/hr		lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
Cranes	0.431	1.028	0.044	0.041	0.120	0.001	121	0.011	0.043
Forklifts	0.221	0.355	0.018	0.016	0.050	0.001	54	0.004	0.015
Tractors/Loaders/Backhoes	0.374	0.498	0.034	0.031	0.073	0.001	67	0.007	0.021
Construction Vehicle (Mobile Source) Emission Factors[c]									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Automobile	4.12E-03	3.41E-04	1.04E-04	4.41E-05	4.50E-04	8.22E-06	0.73	2.01E-05	4.83E-06
Medium-Duty Truck	3.98E-03	1.81E-02	5.40E-04	3.85E-04	7.84E-04	3.64E-05	3.76	3.64E-05	2.56E-04
Number of Trips and Trip Length									
Vehicle	**No. of One-Way Trips/Day**	**One-Way Trip Length (miles)**							
Worker	4	20							
Medium-duty Truck[d]	3	20							
Incremental Increase in Combustion Emissions from Construction (Off Road) Equipment									
Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Construction Emissions (lb/day)									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
Equipment Type	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Cranes	5.2	12.3	0.53	0.49	1.4	0.02	1,451	0.13	0.51
Forklifts	2.7	4.3	0.21	0.20	0.60	0.01	652	0.05	0.18
Tractors/Loaders/Backhoes	6.0	8.0	0.54	0.50	1.17	0.01	1,068	0.10	0.33
Total	**13.8**	**24.6**	**1.3**	**1.2**	**3.2**	**0.04**	**3,171**	**0.29**	**1.02**
Incremental Increase in Combustion Emissions from Onroad Mobile Vehicles									
Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2**	**CH4**	**NO2**
Vehicle	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Worker	0.64	2.9	0.087	0.062	0.126	5.80E-03	601	0.0058	0.0410
Medium-Duty Truck	0.48	2.2	0.07	0.046	0.09	4.00E-03	451	0.004	0.031
Total	**1.1**	**5.1**	**0.15**	**0.11**	**0.22**	**9.80E-03**	**1,051**	**0.010**	**0.072**
Total Incremental Combustion Emissions from Construction Activities									
	CO	**NOx**	**PM10**	**PM2.5**	**VOC**	**SOx**	**CO2eq**		
Sources	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	metric ton/year		
Emissions	**15**	**30**	**1.4**	**1.3**	**3.4**	**0.0**	**414**		
Significance Threshold[e]	***550***	***100***	***150***	***55***	***75***	***150***			
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**			

Notes:

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a) Estimated construction equipment assumed to operate one eight-hour shift per day.

b) Emission factors estimated using OFFROAD2011

c) Emission factors estimated using EMFAC2011 for the 2014 fleet year.

d) Assumed three deliver truck trips per day.

e) SCAQMD CEQA significance thresholds

APPENDIX D

SCOPING MEETINGS

SCOPING MEETINGS

July 14, 2016, 10:00 AM
Coachella Valley Association of Governments
73-710 Fred Waring Drive
Palm Desert, CA 92260

No CEQA comments were made.

July 14, 2016, 6:00 PM
SCAQMD Auditorium
21865 Copley Drive
Diamond Bar, CA 91765

No CEQA comments were made.

July 20, 2016, 9:30 AM
Buena Park Community Center
6688 Beach Blvd.
Buena Park, CA 90622

No CEQA comments were made.

July 20, 2016, 2:00 PM
Carson Center
801 E. Carson Street
Carson, CA 90745

No CEQA comments were made.

July 21, 2016, 9:30 AM
Norton Regional Events Center
1601 E. 3rd Street
San Bernardino, CA 92408

No CEQA comments were made.

July 21, 2016, 2:00 PM
Hyatt Place Riverside
3500 Market Street
Riverside, CA 92501

No CEQA comments were made.

APPENDIX E

COMMENT LETTERS RECEIVED ON THE DRAFT PROGRAM EIR AND RESPONSES TO COMMENTS

APPENDIX E

COMMENT LETTERS RECEIVED ON THE DRAFT PROGRAM EIR AND RESPONSES TO COMMENTS

INTRODUCTION

The following comments were received on the Draft Program EIR for the 2016 Air Quality Management Plan (AQMP). The Draft Program EIR was circulated for a 60-day public review and comment period starting September 16, 2016 and ending November 15, 2016.

The SCAQMD received eleven comment letters on the Draft Program EIR during the public review period. The comment letters and individual responses to all comments related to potential environmental impacts from the 2016 AQMP are provided in this appendix. The individual comments are bracketed and numbered. The related responses are identified with the corresponding number and are included following each comment letter.

Comment Letter	Submitted By
1	Pala Band of Mission Indians
2	City of Yucaipa
3	Port of Long Beach
4	GDB c/o John Wayne Airport
5	Southern California Edison
6	Port of Los Angeles
7	Airlines for America
8	Long Beach Unified School District
9	Santa Ana Regional Water Quality Control Board
10	Orange County Transportation Authority
11	Harvey Eder

All comments received have been reviewed by SCAQMD staff and incorporated where appropriate. However, the comment letters received do not change any of the SCAQMD's significance determinations for any of the environmental topic areas analyzed in the Draft Program EIR.

PALA ENVIRONMENTAL DEPARTMENT
PALA BAND OF MISSION INDIANS
PMB 50, 35008 Pala Temecula Road | Pala, CA 92059
Phone 760-891-3510 | Fax 760-742-3189

September 16, 2016

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178
Attention: Jeff Inabinet

Re: Notice of Renewed/Proposed Permits – 2016 Air Quality Management Plan (AQMP)

Dear Mr. Inabinet,

Thank you for the notice referenced above. This letter constitutes our response on behalf of Robert Smith, Chairman of the Pala Band of Mission Indians.

At this time, the Pala Band has no objection to the action outlined in the notice as proposed. We reserve the right to comment in the future should there be modifications or if new information becomes available. 1-1

If you have any questions or comments, please contact Darold Wallick, Air Technician for the Pala Environmental Department, at dwallick@palatribe.com or 760-891-3540.

Sincerely,

Shasta C. Gaughen, PhD
Environmental Director

Responses to Comment Letter #1 – Pala Band of Mission Indians

Response 1-1
Thank you for the comment. Since no issues were raised regarding the Draft Program EIR, no response is necessary under CEQA.

CITY OF Yucaipa

November 1, 2016

Jeffrey Inabinet
Office of Planning/CEQA
21865 Copley Drive
Diamond Bar, CA 91765

Regarding: 2016 Air Quality Management Plan; Notice of Availability of a Draft Environmental Impact Report

Thank you for the opportunity to respond to the Draft Environmental Impact Report (DEIR) for the above-referenced project. In reviewing the methodology used for growth projections for the Air Quality Management Plan (AQMP), which serves as the basis of the DEIR, the City of Yucaipa notes that the 2040 growth figure for the City is outdated and therefore inaccurate. To better reflect the 2040 conditions, the City requests that the analysis for the AQMP and EIR be updated to reflect the City's current 2040 projection. This includes the figures from the City's comprehensive General Plan update, which was adopted in April, 2016, and the City's Mobilehome Park Conversion Ordinance. The corrected assumptions should include the following totals for 2040:

2-1

Population	# of Residential Units	Nonresidential Square Feet
79,723	30,903	9,826,104

The changes are notable for the AQMP and its associated EIR to ensure that the analysis accurately and effectively accounts for future growth, and incorporation of the revised figures would more accurately disclose Project-related impacts for decision makers.

If you have any questions, please feel free to contact me at 909-797-2489 x.247 or ptoomey@yucaipa.org.

Sincerely,

CITY OF YUCAIPA

Paul Toomey
Director of Community Development

cc: City Council
Ray Casey, City Manager

Responses to Comment Letter #2 – City of Yucaipa

Response 2-1

The California Health and Safety Code section 40460(b) requires the Southern California Association of Governments (SCAG) to prepare and approve the portions of the Air Quality Management Plan (AQMP) relating to regional demographics projections and integrated regional land use, housing, employment and transportation programs, measures and strategies. Part of this effort is to provide the projected growth mentioned in the comment letter. SCAG approved their 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) and provided all the finalized data including the growth projections in the region. These forecasts were provided with the assistance of cities and counties, but are updated periodically. SCAQMD staff encourages the City of Yucaipa to contact SCAG and provide the updated values to ensure those are used in the next RTP/SCS and corresponding AQMP.

4801 Airport Plaza Drive, Long Beach, CA 90815 Tel 562.283.7000 www.polb.com

Port of LONG BEACH
The Green Port

November 14, 2016

Michael Krause
Planning and Rules Manager
Planning, Rule Development, and Area Sources
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4182

Electronic Submittal via E-mail: aqmp@aqmd.gov and mkrause@aqmd.gov

Re: Comments on the 2016 Draft Program EIR

Dear Mr. Krause:

We appreciate this opportunity to submit comments on the Draft Program Environmental Impact Report ("DPEIR") prepared in connection with the South Coast Air Quality Management District's ("District" or "SCAQMD") consideration of the proposed 2016 Air Quality Management Plan (the "Project" or "Proposed Plan")[1] on behalf of the City of Long Beach acting by and through its Harbor Department (collectively referred to herein as "Port of Long Beach" or "POLB").

As you know, the POLB along with the Port of Los Angeles (collectively the "Ports") have achieved tremendous success in obtaining substantial emissions reductions through their joint San Pedro Bay Ports Clean Air Action Plan ("CAAP") and other air quality measures implemented under the Ports' initiatives. POLB continues to be supportive of projects and programs that are intended to contribute to improvement of air quality and promote other environmental values. However, POLB fundamentally disagrees with the District's proposal to again attempt to unnecessarily convert an effective voluntary plan, built on multi-agency and industry cooperation, into potentially punitive regulations imposed unlawfully on the Ports. The Ports have previously sought to make the District aware of the serious concerns and objections to this approach.[2]

3-1

[1] This letter refers to the June 2016 version of the Proposed Plan and the June 2016 version of Appendix IV-A to the Proposed Plan as those versions were the ones made available to the public prior to the release of the September 2016 DPEIR.

[2] (*See* letters dated November 7, 2016; August 19, 2016; August 4, 2016; January 31, 2014; January 15, 2014; October 2, 2013; August 21, 2013; November 27, 2012; November 19, 2012; November 8, 2012; October 31, 2012; October 22, 2012; August 30, 2012 (which includes letter

We are also mindful that the California Environmental Quality Act ("CEQA") calls for a thorough analysis of a project's potentially significant environmental impacts as well as feasible means to avoid or substantially lessen such impacts. In order to serve its important public purposes of informing the public and decision-makers of the consequences of its action, such review must occur *prior* to approval of a project. Such review is particularly important where, as here, it is anticipated that the proposed Project will have substantial impacts on and conflict with the authorities of other public agencies.

As such, thorough identification of the proposed Project, and candid disclosure of all phases of the Project and its potential impacts, is essential to ensure that the proposed Project will be planned and implemented in conformity with established community plans and policies, and that environmental review is conducted with full consideration of all potentially significant environmental impacts as well as mitigation measures and alternatives designed to address those impacts. In addition, it will be important to consider the impacts of the proposed Project on the POLB's community, mission, facilities, and operations. The District must therefore provide a meaningful opportunity for informed public review of and comment on a well-defined "project." 3-2

In that context, we respectfully submit the following comments regarding the DPEIR for the Project as well as questions, concerns, and objections related to the omissions of critical information, unsupported assumptions, or analytical deficiencies. As set forth in more detail below, we believe that: (1) the Project needs to be more thoroughly and accurately described, (2) all potentially significant environmental impacts related to all Project control measures must be thoroughly analyzed, and (3) adequate mitigation measures and alternatives must be provided to address all potentially significant environmental impacts.

Accordingly, the DPEIR needs to be thoroughly revised and recirculated for public review before the District can legally take action on the Project.

I. INTRODUCTION

While we recognize the effort that has gone into preparation of the current DPEIR, it is apparent that the document does not provide the information, evidence, or analysis required under CEQA. The DPEIR thus fails to fulfill its critical role as mandated by CEQA in educating the public generally, other affected regulatory agencies and governments, or the officials and Board of the District, as to the potential environmental significance and impacts of the proposed Project. 3-3

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dated May 4, 2010); July 10, 2012; July 27, 2012 from POLB and/or Port of Los Angeles to SCAQMD.) The August 4, 2016 letter contains POLB's comments on the Notice of Preparation/Initial Study ("NOP/IS") for the Project. We incorporate by reference herein our comments on the NOP/IS, as well as the other letters referenced above to the extent that they are germane to the environmental impacts associated with the Project.

The necessary contents for an adequate Draft EIR are described in Public Resources Code § 21000. A Draft EIR must include "a detailed statement setting forth all of the following:

(1) All significant effects on the environment of the proposed project.

(2) In a separate section:

(A) Any significant effects on the environment that cannot be avoided if the project is implemented.

(B) Any significant effect on the environment that would be irreversible if the project is implemented.

(3) Mitigation measures proposed to minimize the significant effects on the environment, including, but not limited to, measures to reduce the wasteful, inefficient, and unnecessary consumption of energy.

(4) Alternatives to the proposed project.

(5) The growth-inducing impacts of the proposed project."

Article 9 of the CEQA Guidelines further expands on the contents of Draft EIRs. Specifically, a Draft EIR must contain the information required by CEQA Guidelines sections 15122 through 15131. (CEQA Guidelines § 15120.) Those sections require, among others, adequate consideration and discussion of (1) the Project Description, (2) the Environmental Setting, (3) Significant Environmental Impacts, (4) Mitigation Measures, (5) Alternatives, and (6) Cumulative Impacts.

3-3 cont.

As set forth in more detail below, the DPEIR fails to, among others: contain an adequate project description; properly identify the environmental setting; adequately assess the Project's potentially significant environmental effects, including those that cannot be avoided; and identify feasible mitigation measures and alternatives to avoid or substantially lessen the Project's significant environmental effects. It is therefore respectfully urged that the DPEIR be revised, corrected, and recirculated for public review and comment before the District proceeds with any further action, on the proposed Project.

3-4

II. THE DPEIR FAILS TO COMPLY WITH CEQA.

A. The DPEIR Does Not Provide A Full And Accurate Description Of The Project.

1. Deficient Project Description—In General

The DPEIR does not provide a full and accurate description of the "Project" as required by CEQA. (*See*, *e.g.*, CEQA Guidelines § 15124; *Laurel Heights Improvement Ass'n v. Regents of the University of California* (1988) 47 Cal.3d 376.) In particular, the Proposed Plan released in June 2016 was incomplete as evidenced by the fact that large portions of it were revised and released for public review ***after*** the DPEIR was circulated for review.

An accurate and complete project description is necessary for an intelligent evaluation of the potentially significant environmental impacts of the agency's action. (*Silveira v. Las Gallinas Valley Sanitary Dist.* (1997) 54 Cal.App.4th 980, 990.) "Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal . . . and weigh other alternatives in the balance." (*County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 192-193 [court further observes that an accurate, complete and consistent project description is the sine qua non of informative, legally adequate CEQA review].)

3-5

CEQA Guidelines § 15126 further makes clear that an EIR must take a comprehensive review of the proposed project *as a whole*. "All phases of a project must be considered when evaluating its impact on the environment: planning, acquisition, development, and operation." (CEQA Guidelines § 15126.) This requirement reflects CEQA's definition of a "project" as the "***whole of an action***" that may result in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change. (Public Resources Code § 21065; CEQA Guidelines § 15378.)[3]

The DPEIR falls far short of the above requirements in describing the proposed Project, and thus fails to serve the "public awareness" purposes mandated by CEQA. The DPEIR does not include or even describe the text of several control measures supposed to comprise the "Project." The section of the DPEIR that purports to "describe" the Project, includes nothing more than summaries of certain control measures. In any event, the summaries are insufficient to describe the Project itself, and prevent effective public review and comment. The DPEIR also fails to describe reasonably foreseeable actions that will be taken in response to the proposed Project control measures.

3-6

[3] Unless otherwise noted, emphasis in quotations herein is supplied and citations are omitted.

As to certain control measures, the DPEIR implies that any informed public discussion and environmental review be *deferred* until some point in the future, as detailed below. Such an approach, however, is inconsistent with, and in violation of, many fundamental rules and policies required by CEQA (*e.g.*, failure to identify and analyze the whole of the project, improper project "segmentation," improper deferral of impact analysis and mitigation, failure to identify and evaluate project alternatives, etc.). (*See*, *e.g.*, Public Resources Code § 21003.1; CEQA Guidelines §§ 15126.2, 15126.4, 12126.6, 15378; *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296.)

3-6 cont.

The Proposed Plan refers to the future development of "contingency measures" if the area fails to meet certain milestones. (Proposed Plan, pp. 4-44 to 4-45, 6-13.) Yet, no such contingency measures are identified or described in the Proposed Plan or analyzed in the DPEIR.

3-7

It is only through reviewing the lengthy appendices to the Proposed Plan, can the reader understand the proposed Project control measures. The appendices also make clear that several of the proposed Project measures have not even been developed yet by the District and thus cannot be the subject of any meaningful environmental review or analysis. (*See*, *e.g.*, proposed Control Measures EGM-01, MOB-02, MOB-03, MOB-04, MOB-08, MOB-12, MOB-13, MOB-14, and BCM-01.) The details of the proposed Project must be accurately developed and described ***before*** the proposed methods and precise impacts anticipated by the Project may be analyzed or the subject of comment.

3-8

In addition to being accurate and complete, a project description must be stable. (CEQA Guidelines § 15124; *County of Inyo*, *supra*, 71 Cal.App.3d at 197.) Yet, the District released a Revised Draft 2016 AQMP ("Revised Plan") on October 7, 2016, ***after*** the DPEIR was released for public review. The Revised Draft Plan includes several substantive additions to the Proposed Plan from that which was analyzed in the DPEIR. Control measures related to mobile source emissions over which the District lacks regulatory jurisdiction, including MOB-01 to MOB-04, were revised in an attempt to make the emissions reductions associated with these measures "enforceable commitments." A new regulatory measures section was added discussing how the Revised Plan proposes "robust" NOx reduction regulations and other measures. Certain measures were revised to highlight the need for an analysis of life-cycle in-Basin emissions related to energy/fuel production and transmission under future energy pricing and electricity generation scenarios. Further, major revisions were made to the text of control measures, such as MOB-01, MOB-02, MOB-03, MOB-04, CMB-01, CMB-02, CMB-05.

3-9

A discussion of Environmental Justice was also added to the Revised Plan, with a note that this topic will be discussed in a Socio-Economic Report, the complete version of which is still outstanding. In addition, several substantive additions were made to the appendices, such as Appendix II (Current Air Quality), Appendix III (Base & Future Year Emission Inventory), Appendix IV-A (SCAQMD's Stationary & Mobile Source Control Measures), Appendix IV-B (CARB's Mobile Source Strategy), and Appendix IV-C (Regional Transportation Strategy &

3-10

Control). Other appendices, including Appendix V (Modeling & Attainment Demonstrations) and Appendix VI (Compliance With Other Clean Air Act Requirements) are "draft versions" which are "still out for review." As the details of the Proposed Plan are still under development, it is not possible for the District to proceed with CEQA review at this stage.

3-10 cont.

In brief, the DPEIR erroneously limits the scope of the analysis and inherently calls for impermissible speculation or impossible prescience on the part of public agencies or other members of the concerned public to undertake effective analysis of the proposed Project, or to provide meaningful comments on the DPEIR. No effective CEQA review can be undertaken unless and until the District provides an adequate description of the "Project." It is essential that the DPEIR be revised to include an adequate "project description" including *all* of the Proposed Plan's pertinent control measures and strategies that make up the "project" ***before*** the public and agencies can be expected to provide meaningful comments and input.

3-11

2. Specific Comments on "Project Description" Text

The following comments and questions refer to specific portions or pages of Chapter 2 of the DPEIR:

P. 2-7 – Agency Authority-2016 AQMP

The DPEIR correctly acknowledges that the regulation of air quality emissions from mobile sources is primarily done at the federal and state level. By comparison, the District "has lead responsibility for developing stationary, some area, and indirect source control measures . . .." (DPEIR, p. 2-7.)[4] Despite this acknowledged limit on its regulatory jurisdiction, the Proposed Plan nonetheless purports to contain several measures related to mobile source emissions.

3-12

Pp. 2-9 to 2-11 – Overall Attainment Strategy

The DPEIR indicates that the Proposed Plan is designed to meet the following federal standards:

- Revoked 1979 1-hour ozone standard (120 parts per billion ["ppb"]) by 2023;

3-13

[4] *Accord*, Proposed Plan, p. ES-5 ("With limited SCAQMD authority over the mobile sources that contribute the most to our air quality problems, attainment cannot be achieved without state and federal actions.") and Proposed Plan, p. 3-11 ("U.S. EPA and CARB have primary authority to regulate emissions from mobile sources. U.S. EPA's authority applies to aircraft, locomotives, ocean going vessels, and some categories of on- and off-road mobile equipment. CARB has authority over the remainder of the mobile sources, and consumer products. SCAQMD has authority over most area sources and all point sources.").

- Revoked 1997 8-hour federal ozone standard (80 ppb) by 2024;
- 2006 24-hour PM2.5 standard (35 ug/m^3) by 2019;
- 2008 8-hour ozone standard (75 ppb) by 2032; and
- 2012 annual federal and state PM2.5 standards (12 ug/m^3) by 2025.

In addition to developing strategies and measures to meet the above acknowledged revoked standards, the text indicates that a new federal 8-hour ozone standard has been adopted (70 ppb) ostensibly replacing the 2008 standard analyzed. (DPEIR, p. 2-9.) The text does not explain why a plan is being developed to attain standards that have been revoked or superseded.

According to the DPEIR, the "most significant air quality challenge faced by the SCAQMD is to reduce [nitrogen oxide or "NOx"] emissions sufficiently to meet the upcoming ozone and federal PM2.5 federal standard deadlines." (DPEIR, p. 2-9) Specifically, an additional 43 percent NOx emission reduction is needed in 2023 and 55 percent is needed in 2031 to attain the 8-hour ozone standard. (DPEIR, pp. 2-9 to 2-10.) Mobile sources account for 80 percent of the NOx emissions, and the DPEIR accordingly states that the "majority of NOx emission reductions" will need to come from mobile sources. (*Id.*) The DPEIR acknowledges again that the District lacks authority to regulate such emissions which are "divided between" the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA"). (DPEIR, p. 2-10.) The control measures are supposed to be based on, among others, enforceability and legal authority. (DPEIR, p. 2-11.) Yet, through the Proposed Plan, the District is purporting to adopt an "aggressive mobile source control strategy" to control emissions over which it admittedly lacks regulatory jurisdiction. (DPEIR, p. 2-10.)[5]

3-13 cont.

The lack of authority is further reflected by the DPEIR's admission that the Proposed Plan places "heavy reliance on voluntary incentive measures to achieve attainment of the federal air quality standards" such that the District "must design programs such that the emission reductions from these incentive measures are proven to be real, quantifiable, surplus, enforceable, and permanent in order for U.S. EPA to approve the emission reduction as part of the Plan." (DPEIR, pp. 2-17 to 2-18.)

[5] The Proposed Plan at page ES-7 states that mobile sources currently contribute about 88 percent of the region's total NOx emissions. It then states that "[s]ince the SCAQMD has limited authority to regulate mobile sources, staff worked closely with CARB and U.S. EPA, which have primary authority over mobile sources, to ensure mobile sources perform their fair share of pollution reduction responsibilities." (Proposed Plan, p. ES-7.)

Pp. 2-11 to 2-12 – Project Objectives

The DPEIR notes the objective of achieving the various ozone and particulate matter standards by the specified attainment dates. However, as the Tables in the Project Description make clear, most of the emissions reductions are listed as "TBD" with a note that emission reductions "will be determined after projects are identified and implemented" or "once the technical assessment is complete, and inventory and cost-effective control approach[es] are identified." (DPEIR, pp. 2-15, 2-26, 2-36.) Because the emission reductions associated with several control measures have not yet been quantified, there is no guarantee or assurance that the emission reductions will actually be attained. Thus, contrary to the NOP for the DPEIR, the Proposed Plan does not "identif[y] control measures and strategies to bring the region into attainment" with the specified standards nor does it demonstrate "compliance with state and federal Clean Air Act requirements." For this same reason, the Proposed Plan fails to attain its statutorily prescribed purpose.[6]

3-14

P. 2-13 – Project Description

The Project description indicates that the Project "control measures" consist of three main components: (1) the SCAQMD Stationary and Mobile Source Control Measures, (2) State and Suggested Federal Mobile Source Control Measures, and (3) Regional Transportation Plan/Sustainable Communities Strategy ("RTP/SCS") provided by the Southern California Association of Governments ("SCAG").

3-15

The text indicates that the air quality baseline is comprised of 2012 data. (DPEIR, p. 2-13.) Yet, there is no clear explanation or rationale for the use of baseline data that is nearly 5 years old. The scope of the proposed DPEIR and Proposed Plan must be expanded to include a detailed explanation, supported by substantial evidence,[7] that the 2012 air quality baseline is appropriate. (CEQA Guidelines § 15125; *Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 48 Cal.4th 310.) The analysis must also clearly specify the baseline used for other resource topics, and to the extent that they deviate from the normal "existing conditions" scenario, like air quality, provide a clear and cogent explanation as to why this is appropriate.

[6] (42 U.S.C. § 7410; California Health & Safety Code § 40440; *American Coatings Ass'n v. South Coast Air Quality Management District* (2012) 54 Cal.4th 446, 453.)

[7] (*See* Public Resources Code § 21080(e) [CEQA defines substantial evidence as "fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact" and excluding, among others, "speculation" and "unsubstantiated opinion."].)

Pp. 2-13 to 2-23 – Stationary Source Control Measures (SCAQMD)

The stationary control measures to be implemented by the District are listed in Table 2.8-1 and summarized in the text following that table.

The DPEIR fails to acknowledge, let alone analyze, all potentially significant environmental impacts of the stationary source control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*Muzzy Ranch Co. v. Solano County Airport Land Use Comm'n* (2007) 41 Cal.4th 372, 383.) 3-16

Measure CMB-03 proposes to reduce emissions from non-refinery flares by "capturing the gas that would typically be flared and converting it into an energy source (*e.g.*, transportation fuel, fuel cells) . . .." (DPEIR, p. 2-16.) A similar measure appears to be proposed for nitrogen gas and biogas. (*See* Measures BCM-05 and BCM-10.) Yet, there is no discussion or consideration of the potentially significant impacts associated with pipelines or other infrastructure that would be needed to implement these measures nor of the traffic, air quality, noise, and other impacts associated with increased truck traffic to facilities containing such refined materials. There is similarly no analysis of the proposed alternative of reinjecting the gas into the ground or combusting it through flares. (Proposed Plan, Appendix IV-A, p. IV-A-70.)

Measure ECC-04 includes a vague reference to widespread adoption of cool roofs. This measure may result in significant environmental impacts in the areas of aesthetics, biological resources, and land use/planning. 3-17

Measure ECC-03 would "seek to provide incentives" to go beyond the Title 24 standards and existing local regulations pertaining to NOx emissions. (DPEIR, p. 2-18.) "Incentive programs ***would be developed*** for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources." (*Id.*) The measure also references providing "solar thermal and solar photovoltaics" to provide emission reductions within the residential sector. (*Id.*) The measure lacks any specificity about the programs that the District acknowledges would still be developed. There is no information on the amount of funding and the number of residents that may take advantage of this program. Based on the examples provided, this measure may result in significant environmental impacts in the areas of aesthetics, air quality, land use, solid waste, and other resource topics.

Measure CMB-01 would seek emission reductions of NOx from traditional combustion engines by replacing them with zero and near-zero emission technologies through, among other methods, electrification and fuel cells. This measure would also seek energy storage systems and smart grid control technologies coupled with renewable energy generation. This measure has the 3-18

potential to result in significant environmental impacts with respect to, among others, the construction of additional energy infrastructure. Per a more detailed description of this measure in the Appendix to the Proposed Plan, it also seeks to "[e]ncourage new businesses that use and/or manufacture near-zero and zero emission technologies to site in the Basin." (Proposed Plan, Appendix IV-A, p. IV-A-47.)[8] The DPEIR contains, at best, an incomplete analysis of this measure as evidenced by its omission of any discussion of its potential growth inducing impacts.[9]

3-18 cont.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be analyzed and are not. (*See* Control Measures ECC-04, CMB-01, CMB-02, CMB-03, CMB-04, MCS-02, FLX-01, FLX-02, and BCM-10.) For instance, the impacts of most measures is described by a single sentence in tables set forth in the DPEIR. Table 4.0-1 of the DPEIR wrongly concludes that Control Measures MCS-02 and FLX-01 will result in no impacts, asserting without any substantial evidence that "[i]mpacts are speculative" due to unknown future technologies and the unknown effectiveness of education and outreach.

3-19

Measure CTS-01 seeks to lower the content of VOCs in coatings, solvents, and adhesives. Such measures may result in additional applications of lower quality products which could result in a net increase in air emissions. (*Dunn-Edwards Corp. v. Bay Area Air Quality Management District* (1992) 9 Cal.App.4th 644.)

3-20

Pp. 2-23 to 2-33 – Mobile Source Control Measures (SCAQMD)

Notwithstanding its lack of regulatory jurisdiction over mobile sources, the District's Proposed Plan nonetheless contains a detailed list of mobile source control measures. The mobile source control measures are listed in Table 2.8-2 and summarized in the text following that table.

The DPEIR fails to acknowledge let alone analyze all potentially significant environmental impacts of the mobile source control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*See*, *e.g. Muzzy Ranch*, *supra*.)

3-21

[8] A similar provision is included as part of FLX-02. (Proposed Plan, Appendix IV-A, p. IV-A-105.)

[9] (CEQA Guidelines § 15126.2(d); *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 367 [EIR must discuss growth-inducing effects even though those effects will result only indirectly from a project.].)

Of particular concern for the POLB is MOB-01. Stemming from a desire to take ongoing credit for the voluntary emission reductions undertaken by the Ports through the CAAP Program, Control Measure MOB-01 could make the voluntary emission reductions a mandatory enforceable commitment in the form of a regulation enacted by the District "within its existing legal authority" or some yet-to-be granted authority that the District will "seek" to regulate mobile source emissions. (DPEIR, p. 2-24.)[10] In a separate comment letter to the District on the Proposed Plan dated August 19, 2016, the Ports explain why the District lacks the legal authority to adopt or enforce any such regulation.[11] Due to its lack of legal authority, this measure is not feasible and thus cannot serve as any valid form of mitigation. (Public Resources Code §§ 21004 and 21081(a)(3); CEQA Guidelines §§ 15040 and 15364; *Sierra Club v. California Coastal Comm'n* (2005) 35 Cal.4th 839; and *Tracy First v. City of Tracy* (2009) 177 Cal.App.4th 912.) Moreover, from a CEQA standpoint, the emission reductions from the CAAP Program are already reflected in the baseline/setting as well as in the discussion of the No Project Alternative.[12]

3-21 cont.

MOB-02 appears intended to correct two District rules pertaining to rail yards and intermodal facilities rejected by the U.S. EPA presumably because they are beyond the scope of the District's regulatory jurisdiction. Per this vague and amorphous measure, the District will reconvene a stakeholder working group "to discuss and identify actions or approaches that can be implemented to further reduce emissions at rail yards and intermodal facilities." (DPEIR, p. 2-28.) At most, this is a proposal to develop a measure that cannot be adequately analyzed at present in the DPEIR and should be removed from consideration.[13] Any such contemplated implementation strategies must be included in the "Project Description" so that they may be evaluated in the DPEIR along with the other control measures.

3-22

Measure MOB-05 proposes to provide funding rebates for at least 15,000 zero emission or partial-emission vehicles per year. Measure MOB-07 similarly seeks to deploy up to 120 zero

3-23

[10] Specifically Measure MOB-01 "seeks to quantify the emission reductions realized from the CAAP and credit the reductions into the [State Implementation Plan ("SIP")] to the extent that these actions are real and surplus to the SIP." (DPEIR, p. 2-28.)

[11] The Ports supplemented its August 19, 2016 letter on the Proposed Plan with a November 7, 2016 comment letter on the Revised Plan and the partially-released Socio-Economic Report.

[12] (*See*, *e.g.*, CEQA Guidelines § 15126.6(e)(3)(A) [when the "project" is the revision of an existing land use or regulatory plan, policy or ongoing operation, the "no project" alternative will be the continuation of the existing plan, policy or operation into the future."].)

[13] Similar deficiencies apply to Measures MOB-03 (Emission Reductions at Warehouse Distribution Centers), MOB-04 (Emission Reductions at Commercial Airports), MOB-12 (Further Emission Reductions from Passenger Locomotives), MOB-13 (Off-Road Mobile Source Emission Reduction Credit Generation Program), MOB-14 (Emission Reductions from Incentive Programs), and EGM-01 (Emission Reductions from New Development and Redevelopment Projects).

and partial-zero emission heavy-duty vehicles per year. The DPEIR needs to contain an analysis of the traffic, noise, air quality, and other impacts associated with such programs, which could result in additional vehicles being added to already congested roadways.

Measure MOB-06 seeks to retire 2,000 older light and medium-duty vehicles per year. Measure MOB-08 similarly seeks to retire 2,000 heavy-duty vehicles per year. The DPEIR needs to contain an analysis of the traffic, noise, air quality, and other impacts associated with such programs, which could result in additional vehicles being added to already congested roadways.

3-23 cont.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be thoroughly analyzed and mitigated. (*See* Control Measures MOB-06, MOB-07, MOB-08, MOB-10, MOB-11, MOB-12, MOB-13, and MOB-14.)

Pp. 2-33 to 2-39 – SCAQMD Proposed PM2.5 Strategy

Measure BCM-03 calls for an unspecified increase in the watering of roads to control fugitive dust. The measure also proposes to evaluate existing fugitive dust rules to see if unknown and unspecified additional PM2.5 emission reductions can be achieved. The potentially significant air quality, noise, traffic, and water supply impacts of such a proposal must be thoroughly analyzed and mitigated in the DPEIR.

Measure BCM-04, which calls for revised manure management strategies, requires more analysis than is provided in the DPEIR. (*See*, *e.g.*, *County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1597 [EIR required to examine impacts of alternative sewage sludge disposal].)

Measure BCM-07 calls for increased watering of rotating cutting discs to reduce dust emissions. "Emissions are expected to be minimal, provided the waste material is disposed of properly." (Proposed Plan, Appendix IV-A, p. IV-A-201.) Yet, no analysis of the potentially significant air, noise, hazards, traffic, solid waste, or water supply impacts are provided such that any mitigation could be imposed to ensure that waste material is, in fact, disposed of properly.

3-24

The noise, air quality, geology and other impacts of Measure BCM-08, which seeks to limit agricultural burning through promoting burning alternatives (*e.g.*, chipping/grinding or composting) must be fully analyzed and mitigated.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be thoroughly analyzed and mitigated. (*See*, *e.g.*, Control Measures BCM-01, BCM-02, BCM-04, BCM-06, BCM-07, and BCM-10.)

Pp. 2-39 to 2-45 – SCAQMD Air Toxic Control Measures

In addition to the criteria pollutant control measures, the Proposed Plan also contains a detailed list of measures to control toxic air contaminants ("TAC") from stationary sources. The TAC control measures are listed in Table 2.8-5 and summarized in the text following that table.

The DPEIR fails to acknowledge, let alone analyze, all potentially significant environmental impacts of the air toxic control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*See*, *e.g. Muzzy Ranch*, *supra*.)

3-25

Measure TXM-01 contains a list of potential emission control approaches for metal grinding operations. Because there is no specific proposal, the DPEIR cannot meaningfully analyze this measure.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be thoroughly analyzed and mitigated. (*See* Control Measures TXM-04, TXM-05, TXM-06, TXM-08, and TXM-09.)

Pp. 2-45 to 2-53 – State and Federal Control Measures

The DPEIR's project description contains a detailed list of federal and state mobile source control measures. Although the District admittedly lacks regulatory jurisdiction over mobile sources, because the federal and state mobile source control measures are described as part of the Project, the DPEIR must contain a thorough analysis of the potentially significant environmental effects associated with these measures. Yet, Table 4.0-1 of the DPEIR wrongly concludes that several of these measures will result in no impacts. Instead, it claims without any evidentiary support that "[i]mpacts are speculative" due to unknown future technologies and the design of future cars.

3-26

Control Measure ORLD-01 proposes to increase the sales of zero emission vehicles and plug-in electric vehicles beyond the levels required in 2025. Measure ORLD-03 calls for "greater penetration of zero and near-zero technologies" as well as the "potential for autonomous vehicles and advanced transportation systems." (DPEIR, p. 2-48.) Measure ORHD-05 requires the use of low-NOx engines and the purchase of zero emission trucks "for certain class 3-7 last mile delivery trucks" starting in 2020 and "ramping up to a higher percentage of the fleet at time of normal replacement through 2030." (DPEIR, p. 2-49.) Measure ORHD-09 calls for "greater penetration of zero and near-zero technologies through incentive programs, emission benefits associated with increased operation efficiency strategies, and the potential for new driver assist and intelligent transportation systems." (DPEIR, p. 2-50.) Measure OFFS-08 likewise calls for

"greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle technologies." (DPEIR, p. 2-52.) The potentially significant air quality, noise, traffic, and other impacts associated with such measures must be thoroughly analyzed and mitigated in the DPEIR.

Further, the Proposed Plan identifies nearly $15 billion in incentive funding needed to facilitate the transition to zero and near-zero emissions equipment. The Proposed Plan indicates that SCAQMD will develop an action plan to identify "the necessary actions by the District" and other stakeholders "to ensure the requisite levels of funding are secured." (Proposed Plan, p. 4-66.) Although the Proposed Plan discusses the possibility of a federal "superfund" program, state bond measures, and local ballot measures to obtain this funding, it does not define the specific "necessary actions." Without more detail, it is impossible to evaluate whether this incentive action plan and the necessary $15 billion in government funding have significant environmental impacts. The DPEIR states that such a measure could result in significant secondary impacts in the areas of aesthetics, energy, hazards, water, noise, waste, and traffic. (DPEIR, pp. 6-40 to 6-41.) But no thorough analysis nor mitigation is provided as required by CEQA. Instead, the impacts of such a proposal are only cursorily examined as a Project "alternative." 3-26 cont.

Pp. 2-53 to 2-55 – SCAG's Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures

SCAG has the responsibility for preparing and approving the portions of the Proposed Plan related to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. (DPEIR, p. 2-53.) The DPEIR further indicates that the District "combines its portions of the AQMP with those portions prepared by SCAG" per Health & Safety Code § 40460. (*Id.*) In particular the Project contains Transportation Control Measures ("TCM"), from SCAG's RTP/SCS. 3-27

Although those measures are only generally described in the DPEIR, they include several measures that may result in significant environmental impacts. (*See* DPEIR, p. 2-54 [measures include, among others, expanding regional transit, passenger rail, highway capacity, and high occupancy lanes].) Yet, none of these measures are analyzed in the DPEIR. As noted in Section II.D below, the DPEIR only evaluates the TCMs in the cumulative impact analysis and ignores completely the land use and transportation strategies. This results in a failure of the DPEIR to consider the "whole of the action" and associated improper segmentation of project impacts. (CEQA Guidelines § 15378; *Bozung v. Local Agency Formation Comm'n* (1975) 13 Cal.3d 263, 283-284.)

B. The DPEIR Fails To Acknowledge And Address Numerous Significant Environmental Impacts.[14]

1. Introduction

We provide below comments that are common to all resource topics.

Given the total lack of information regarding what control measures the Project would entail and whether their implementation is feasible, it is premature to assess impacts related to any environmental resource topic, either on a project or cumulative basis. The "whole" of the Project must be analyzed in an EIR. As such, these details must be provided before these topics can be properly analyzed and mitigated in a revised and recirculated DPEIR.

In general, there is no indication what criteria were used to develop the significance thresholds or that they are supported by substantial evidence, as required. (Public Resources Code § 21082; CEQA Guidelines § 15064.7; and *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th 1099, 1111.) In the categories examined by the DPEIR, the significance criteria are inconsistent with the recommended questions designed to elicit whether the Project would have potentially significant impacts per Appendix G of the CEQA Guidelines.

3-28

Other than in tables with a one-sentence description of potential impacts, the vast majority of control measures are not mentioned at all in the Environmental Impact "Analysis." (*See* Tables 4.1-1, 4.1-4, 4.2-1, 4.3-1, 4.4-1, 4.5-1, 4.6-1, 4.7-1, and 4.8-1.) ***A one-sentence description of potential impacts does not constitute an adequate good faith effort at full disclosure***. (CEQA Guidelines § 15151 ["An EIR should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences" and that in reviewing an agency's efforts in regard to preparing an EIR courts look for "adequacy, completeness, and a good faith effort at full disclosure"]; *accord*, CEQA Guidelines § 15204(a) [requiring that a "good faith effort at full disclosure [be] made in the EIR."].)

In several instances, the DPEIR fails to identify significant unavoidable impacts as required by CEQA. It also relies on future CEQA documents by local agencies to correct any shortcomings in its analysis. Not only is such deferral of analysis improper under CEQA, it fails to recognize that given the likely ministerial nature of permits needed from local agencies, no further CEQA review may occur. (Public Resources Code § 21080(b)(1); CEQA Guidelines § 15268.) Even if such measures did require discretionary approvals, as the DPEIR repeatedly notes, the measures would be implemented at existing facilities and thus would likely be

[14] This Section provides comments on both the Existing Environmental Setting (Chapter 3) and Environmental Impacts and Mitigation Measures (Chapter 4) of the DPEIR.

determined by local agencies to be exempt from CEQA pursuant to the existing facilities exemption. (*See*, *e.g.*, CEQA Guidelines § 15301.)

The DPEIR must be revised and recirculated to contain a thorough analysis of all potentially significant impacts associated with all of the proposed Project's control measures as well as feasible mitigation measures and alternatives designed to avoid or substantially lessen those impacts.

3-28 cont.

2. Air Quality and Greenhouse Gas Emissions

a. Scope of Analysis

Several air quality topics were scoped out of the analysis pursuant to the IS. (DPEIR, p. 4.1-10.) Yet, the District's conclusion that the Project will not result in any potentially significant impacts to those topic areas is not supported by substantial evidence, as required.

For instance, the IS concluded that the Project would not conflict with or obstruct implementation of the applicable air quality plan. Along those lines, the IS notes that the Proposed Plan includes control measures for stationary, mobile, and indirect sources and that these measures are based on "feasible methods of attaining the [ambient air quality standards]." (IS, p. 2-11.) There is no evidence, let alone substantial evidence, as required, to support this statement. As noted above, control measures related to mobile sources are beyond the District's regulatory jurisdiction and thus infeasible for legal and other grounds.

There is also no factual basis to conclude that implementation of the Project would not create any odor issues and therefore need not be studied. It is premature to dismiss this area of analysis given the lack of information currently available regarding the Project. Furthermore, the IS analysis only applies to construction odors and ignores any potential odors that may occur due to Project operations.

3-29

Several of the proposed control measures have not yet been developed by the District. Further, the emissions reductions from numerous control measures are listed as "TBD" in the Proposed Plan and DPEIR. Thus, the District lacks the requisite evidentiary basis to conclude that the Project would not diminish any existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s).

The DPEIR must be revised, and the scope of the proposed DPEIR expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant air quality impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

b. Environmental Setting

The discussion of environmental setting or baseline is confusing and fails to comport with CEQA Guidelines § 15125. That section requires that the impacts of a project be evaluated compared to the existing environmental setting as of the time of the notice of preparation. The NOP here was issued on July 5, 2016. Yet, the DPEIR states that "2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions in the 2016 AQMP." (DPEIR, p. 4.1-12.) The DPEIR goes on to inconsistently say that the latest verifiable air quality data are from 2015 and the most recent environmental topic data is from 2016. (*Id.*) It is unclear whether data from 2012 was used as the baseline for analysis of air quality impacts, or data from 2015 or 2016. An EIR that relied on shifting baselines, like the DPEIR purports to do here, was struck down by the Court of Appeal in *Save Our Peninsula Comm. v. Monterey County Bd. of Supervisors* (2001) 87 Cal.App.4th 99. If 2016 was used as the baseline, where is the verified air quality data to support it? The DPEIR refers to the use of a future baseline (DPEIR, p. 4.1-12), which was also struck down by the California Supreme Court in *Neighbors for Smart Rail v. Exposition Metro Line Constr. Auth.* (2013) 57 Cal.4th 439.

3-30

c. Impact Analysis

In order to determine whether or not the air quality impacts from the proposed Project are significant, impacts are compared to the significance criteria in Table 4.1-2. (DPEIR, p. 4.1-10.) That table lists the numerical thresholds for criteria and other pollutants. There is no qualitative analysis of any air quality impacts nor consideration of several topics referenced in Section III of the Appendix G Checklist.

The DPEIR acknowledges that "[t]he exact scope of the construction activities necessary to implement the proposed control measures is not known at this time." (DPEIR, p. 4.1-19.) It nonetheless states that the measures are similar to the measures which have been implemented at facilities due to SCAQMD rulemaking. (*Id.*) No evidence is provided to support this statement.

3-31

More fundamentally, the actual "analysis" of peak construction emissions from the approximately 80 control measures is predicated on construction of only four facilities or control devices on any given day. (DPEIR, pp. 4.1-19 and Table 4.1-3.) No explanation is provided as to how this number was derived or why it is a reasonable assumption given that the Proposed Plan applies to a nearly 11,000 square mile area consisting of numerous cities and unincorporated communities in the counties of Los Angeles, Orange, San Bernardino, and Riverside. (DPEIR, pp. 1-6, 2-8, 3.9-2.) As a result of this artificial and flawed assumption, the resulting air quality impacts are grossly underreported. For instance, only NOx emissions are reported as significant impacts, requiring mitigation. Emissions of other key pollutants (*e.g.*, VOC, CO, SOx, PM10 and PM2.5) are reported as less than significant and no mitigation is proposed.

3-32

The analysis also omits any consideration of grading activities "because modifications or installation of new equipment would occur at existing industrial/commercial facilities and, therefore, would not be expected to require earthmoving, grading, etc." (DPEIR, p. 4.1-19.) Even assuming that most upgrades would be made to existing facilities, some grading is likely to occur. By omitting such activity from the analysis, the DPEIR underreports the Project's air quality impacts. 3-33

Although the District has developed localized significance thresholds for criteria pollutant emissions, which are commonly employed for air quality impact analysis in the region, the DPEIR omits any localized air quality impact analysis claiming that "the details of the individual projects to implement [the AQMP] and their locations are not known at this time." (DPEIR, p. 4.1-20.) If the details of the project is not known, then no analysis can be undertaken at all. Moreover, there is no reason why the DPEIR could not have employed reasoned estimates of air quality emissions to provide analysis of likely impacts compared to the localized significance criteria. 3-34

Control Measure BCM-04 is intended to reduce ammonia emissions from livestock waste through a process known as thermal gasification. The DPEIR states that because such systems are in the testing stage, it is not likely that this technology will become widespread until further testing is done and that "any air quality impacts will be minimal." (DPEIR, p. 4.1-30.) The measure, among others, is intended to be implemented to attain federal and state air quality standards. The DPEIR thus must assume the measures will be implemented and analyze their impacts. 3-35

The Proposed Plan contains a number of measures designed to reduce emissions from mobile sources by accelerating the penetration of partial zero-emission and zero emission vehicles. (*See*, *e.g.*, Control Measures MOB-05, MOB-06, MOB-08, MOB-09, ORLD-03, ORHD-05, and ORHD-08.) The air quality analysis presumes that all older vehicles would be eliminated and discarded and thus only considers the air quality impacts associated with scrapping old vehicles. (DPEIR, Section 4.1.6.2.4; *see also*, DPEIR, pp. 4.1-43 to 4.1-44.)[15] There is no evidence to support this assumption. The air quality analysis should have conservatively assumed operation of both the new and old vehicles simultaneously at least for the estimated remaining operational life of the old vehicles. Indeed, the DPEIR acknowledges that "it is not conclusive that equipment will be put out of service and that the high number of vehicles or equipment will be scrapped as solid/hazardous waste." (DPEIR, p. 6-33.) Similarly, the DPEIR should have assumed *increased* levels of petroleum fuel production and 3-36

[15] Even so, the scrapping analysis is based on an "internet search" of auto recycling facilities in the Basin. (DPEIR, p. 4.1-39.) This is hardly a scientific basis on which to conduct a robust analysis of potential air quality impacts. Indeed, there are other auto recycling facilities located outside the Basin and there are likely additional facilities inside the Basin as well.

transportation of crude oil, as opposed to vastly reduced levels. (DPEIR, pp. 4.1-41, 4.1-51 to 4.1.52.)

3-36 cont.

Control Measure BCM-08 is intended to provide alternatives to agricultural burns. Yet, no alternatives are specified. Thus, the conclusion that BCM-08 would reduce emissions from agricultural burn operations is not supported and does not inform the analysis of air quality impacts. (DPEIR, p. 4.1-42.)

3-37

The DPEIR claims that due to the qualitative nature of the analysis of greenhouse gas ("GHG") emissions, "it is not possible to show the magnitude of GHG emission effects from implementing 2016 AQMP control measures." (DPEIR, p. 4.1-50.) The DPEIR nonetheless asserts that the Proposed Plan "is expected to reduce GHG emissions consistent with the AB 32 Scoping Plan," resulting in less than significant GHG impacts. It reaches this conclusion by amortizing already depressed construction emissions over a 30-year period and claiming that increased GHG emissions from energy demand will be offset by substantial reductions in the amount of petroleum fuel use (*e.g.*, 530 million gallons by 2023 and 870 million gallons by 2031). (DPEIR, pp. 4.1-51 to 4.1-53.) As noted above, those assumptions are artificial and unfounded.

There is no analysis of recently enacted SB 32. This measure requires the State to reduce GHG emissions by 40 percent below 1990 levels by 2030. There is likewise no acknowledgment or analysis of the Project's consistency with State policy of reducing GHG emissions by 80 percent below 1990 levels by 2050. (Executive Order S-3-05.) The California Supreme Court has acknowledged the need to consider the evolving GHG targets and standards. (*Center for Biological Diversity v. California Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204.)

3-38

While concluding that the Project may have a potentially significant impact with respect to GHG emissions, the DPEIR inconsistently finds a less than significant impact with respect to the Project's impacts in regard to conflicts with applicable plans, policies, and regulations adopted for the purpose of reducing greenhouse gas emissions. The DPEIR must likewise study this issue and all applicable federal, state, and local GHG reduction plans and policies.

Finally, the DPEIR only analyzes the air quality and GHG impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential air quality and GHG impacts associated with, among others, Control Measures CMB-01, CMB-02, CMB-03, ECC-03, MOB-05, MOB-06, MOB-07, MOB-08, MOB-13, BCM-03, BCM-06, BCM-07, BCM-08, BCM-10, CTS-01, TXM-01, TXM-05, TXM-06, TXM-09, ORLD-01, ORLD-03, ORHD-05, ORHD-09, and OFFS-08.

3-39

d. Mitigation

As noted above, the air quality analysis was artificially constrained by focusing only on a theoretical maximum of four facilities undertaking construction activities per day in response to the control measures. As such, and contrary to CEQA, the disclosure of potentially significant air quality impacts, and the imposition of feasible mitigation measures to address them, is largely ignored by the DPEIR.

The DPEIR does acknowledge a significant impact in regard to NOx emissions. However, Section 4.1.7 of the DPEIR states that various measures "*should* be implemented, where applicable and *if feasible*."[16] This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *Sierra Club v. County of San Diego* (2014) 231 Cal.App.4th 1152, 1168 [no evidence that recommendations for reducing GHG emissions would function as enforceable or effective mitigation measures]; and *Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 95 [list of potential mitigation measures rejected as "nonexclusive, undefined, untested and of unknown efficacy."].)

3-40

Several of the mitigation measures appear to have nothing at all to do with NOx emissions. Moreover, no effort is made to quantify the reduction in NOx emissions as a result of the measures, as is commonly done. Thus, it is impossible to determine whether impacts have been avoided or substantially lessened, as required. Instead, the DPEIR concludes that while implementation of these measures would reduce construction emissions, "the overall construction air quality and GHG impacts after mitigation would likely remain significant." (DPEIR, p. 4.1-57.)

The DPEIR also fails to acknowledge that because the District lacks controls over implementation of these measures, the impact is significant and unavoidable. Instead, the DPEIR contains a vague reference to reliance on "subsequent CEQA analyses." (DPEIR, p. 4.1-57.)

3-41

3. Energy

a. Scope of Analysis

Several energy topics were scoped out of the analysis pursuant to the IS. (DPEIR, p. 4.2-7.) However, the District's conclusion that the Project will not potentially result in significant impacts to those areas is not supported by substantial evidence.

3-42

[16] Mitigation Measure AQ-2 similarly "encourage[s]" contractors to apply for SCAQMD funding incentives.

For instance, the IS determined that the Project would not conflict with an adopted energy conservation plan or existing energy standards. (IS, p. A-76.) The District reached this conclusion by assuming that any owners or operators of affected facilities would comply with applicable standards at the time of future installation. However, there is no substantial evidence supporting the conclusion that owners or operators would comply with future standards. If the net effect of implementing the Project is an increase in regional energy demand, as the DPEIR indicates is likely, potential conflicts with adopted energy conservation plans and existing energy standards cannot be dismissed as "no impact." The shift from fossil fuels to alternative fuels or electrical- powered technologies and increased reliance on such alternative fuels or electricity such that sufficient supply and emergency storage would be available in the event of a major disaster must also be considered. 3-42 cont.

Additionally, the IS reached the conclusion that the Project would not conflict with an adopted energy conservation plan by assuming that the Project control measures would promote, rather than interfere with, energy efficiency and conservation. However, the IS does not analyze the potential for the control measures to frustrate adopted energy conservation plans by implementing conflicting measures. In fact, the IS does not even disclose any adopted energy conservation plans or energy standards. As such, there is no substantial evidence to support the conclusion that the Project will not conflict with adopted energy conservation plans or existing energy standards. 3-43

The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant energy impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts. 3-44

b. Impact Analysis

The DPEIR specifically states that the "actual potential increase in the amount of electricity use due to the implementation of the 2016 AQMP is unclear at this time because specific information regarding the number and size of the air pollution control devices that may be installed are currently unknown." (DPEIR, p. 4.2-11.) Yet, estimates of increased energy use must be provided based on substantial evidence. The DPEIR must accordingly be revised to include the potential operational energy use, including pollution control equipment that would be added pursuant to Control Measure CMB-05. 3-45

The Energy Section improperly relies on a 2015 Final Program Environmental Assessment ("PEA"), which analyzed potential increases in electricity demand associated with SCAQMD's Regional Clean Air Incentives Market ("RECLAIM") program to conclude that Control Measure CMB-05, which would seek further NOx reductions under the RECLAIM program, would not increase electricity demand. However, the DPEIR states that Measure CMB-05 may encourage different types of control devices, including "SCR, SNCRs, a proprietary Low Temperature Oxidation technology . . . and catalyst impregnates filters." 3-46

(DPEIR, p. 4.2-8.) The DPEIR does not disclose how these different types of control devices would affect the conclusions in the 2015 PEA, but presumably, different types of control devices would alter the analysis and should be considered. More importantly, any further NOx reductions under the RECLAIM program should be quantified and analyzed. The District cannot simply assume that CMB-05 would not substantially increase electricity demand by relying on a 2015 EA for an existing program.

3-46 cont.

Similarly, the analysis of impacts from Control Measures MOB-09, ORHD-08, ORHD-06, and ORHD-09 is based on a Draft EIR/EIS prepared by Caltrans in 2012 for the Interstate 710 Corridor Project. (DPEIR, p. 4.2-12.) The District states that Caltrans is in the process of revising the I-710 Corridor Project EIR/EIS and that the associated estimates used in the DPEIR, thus, are preliminary.

The EIR/EIS for the I-710 Corridor Project is in the process of being revised and recirculated and the particulars of that project are still unknown. A Draft EIR/EIS for the I-710 Corridor Project was released in 2012. In 2013, the I-710 Corridor Project lead agencies announced that they would be pursuing a Recirculated CEQA document with updated alternatives. This Recirculated EIR/EIS is not anticipated to be released until Spring 2017 at the earliest. As such, the alternatives being considered for the I-710 Corridor Project are currently unknown, and it is speculative to make any statements about the environmental impacts of the alternatives or rely on the underlying analysis that is a basis for environmental impacts of the alternatives.

3-47

It is not permissible to simply state that an impact analysis was based on preliminary data in lieu of preparing data supported by substantial evidence. The District should calculate an estimate of electricity demand for electric or magnetic power for anticipated new roadway infrastructure instead of relying on a four year old Caltrans document that is in the process of being substantially revised.

The DPEIR notes that construction activities necessary to implement control measures would increase gasoline and diesel demand. (DPEIR, p. 4.2-19.) The DPEIR then states that larger construction projects will likely require project-specific CEQA analysis and that the Project is anticipated to reduce petroleum fuels and alternative fuels overall. A deferral of environmental analysis until after a project is approved is not allowed by CEQA. (Public Resources Code §§ 21002, 21151; CEQA Guidelines § 15004.) The conclusion that the Project will not have a significant impact with regard to the use of gasoline, diesel, and alternative fuels is also not based on sufficient evidence. The DPEIR must be revised to include estimates of petroleum fuels and alternative fuels based on substantial evidence.

3-48

The DPEIR states that the Project will result in a shift from petroleum-based fuels to alternative fuels, including hydrogen. (DPEIR, p. 4.2-21.) The DPEIR then states that hydrogen fueling capacity will be insufficient by 2020. Nonetheless, the DPEIR does not include any

3-49

analysis or mitigation to address impacts associated with this deficiency in hydrogen fueling capacity, such as through development of additional hydrogen fueling facilities and/or reliance on alternative fuels. As such, the DPEIR should be revised to include analysis of this potentially significant impact.

3-49 cont.

There is no substantial evidence to support the DPEIR's conclusion that impacts related to the increased demand of alternative fuels, alternative energy, renewable energy, petroleum fuels, and natural gas would be less than significant. (DPEIR, p. 4.2-24.) In the Energy Section itself, the DPEIR cites potential indirect impacts of the control measures, including the increased use of electricity and potentially increased need to generate additional renewable energy sources. (DPEIR, p. 4.2-23.) These indirect impacts would increase demand for alternative fuels, alternative energy, and renewable energy and are not quantified in the energy section. Thus, impacts cannot be deemed less than significant.

3-50

Appendix F of the CEQA Guidelines contains several requirements, which have recently been held by the court to be critical to include in EIR energy sections. (*Ukiah Citizens for Safety First v. City of Ukiah* (2016) 248 Cal.App.4th 256; *California Clean Energy Committee v. City of Woodland* (2014) 225 Cal.App.4th 173.) One of the requirements is for total energy demand to be quantified, which is absent from the DPEIR. Other requirements mandate consideration of construction processes and specify that total daily vehicle trips be included. This information is also omitted from the Energy Section. Mitigation Measure E-4 purports to improperly defer the requisite energy analysis until after approval of the Project. The District must revise the Energy Section to include all components of Appendix F.

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Finally, the energy analysis fails to analyze the impacts associated with all of the proposed control measures. For instance, there is no substantive discussion or analysis of, among others, the potential energy impacts associated with, among others, Control Measures CMB-01, CMB-03, CMB-03, ECC-04, ECC-02, ECC-03, MOB-01, MOB-02, MOB-04, TXM-01, ORHD-04, ORFIS-01, and ORFIS-03.

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c. Mitigation

Section 4.2.5 of the DPEIR states that various measures "*should*" be implemented "where feasible." Other measures are likewise vague and indefinite. This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *see also*, *Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.)

For instance, Mitigation Measure E-1 states that project sponsors should "pursue incentives" to encourage the use of energy efficient equipment and vehicles and promote energy conservation. It is unclear specifically what incentives should be pursued and the number of energy efficient equipment and vehicles needed to mitigate Project impacts. Mitigation

3-53

Measures E-5, E-6, and E-7 likewise call for "evaluat[ing] the potential for reducing peak energy demand" through various means. Studying or considering the potential for reducing energy demand is not the same as imposing a binding commitment to reduce energy demand.

3-53 cont.

4. Hazards and Hazardous Materials

a. Scope of Analysis

The IS stated that the Project would not be located on a site which is included in a list of hazardous materials sites compiled pursuant to Government Code § 65962.5, also known as the "Cortese list." As such, the IS concluded that "implementation of the proposed control measures is not expected to interfere with site cleanup activities or create additional site contamination" and that this topic "will not be further evaluated" in the DPEIR. (IS, p. 2-28.)

In our comment letter on the IS, we pointed out that Government Code § 65962.5 must be considered and that there are several parcels on the Cortese list located within the POLB alone.[17] The DPEIR includes a brief section on this issue and states that some facilities are included on lists of hazardous materials sites or near listed sites and that construction on these sites could pose risks to the public and environment. But, the DPEIR states that without knowing the sites and contaminants present, "it is not possible to know in advance which regulations would apply." (DPEIR, p. 4.3-40.) This is a critical issue that must be considered for the DPEIR to be adequate pursuant to CEQA. As such, the DPEIR must be revised and recirculated to adequately address this issue.

3-54

b. Impact Analysis

The DPEIR concludes that hazards associated with increased ethanol from mobile sources are equivalent or reduced compared to diesel fuel and gasoline. However, the DPEIR itself lists certain characteristics of ethanol that would pose a greater hazard risk than diesel and gasoline, such as ethanol's higher auto ignition temperature and the fact that ethanol can ignite in enclosed spaces, unlike gasoline. (DPEIR, p. 4.3-18.) It is unclear based on the limited information provided in the DPEIR whether, on balance, ethanol is more or less hazardous than diesel fuel and gasoline. The DPEIR should be revised to include further details about the specific differences between ethanol, diesel fuel, and gasoline, prior to making a conclusion that hazards associated with ethanol are generally equivalent or less than conventional fuel hazards.

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The DPEIR reaches a similar unsupported conclusion regarding the hazards associated with the use of compressed natural gas. The DPEIR needs to explain specifically why

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[17] (*See* California Department of Toxic Substances Control. Hazardous Waste and Substances Site List—Site Clean (Cortese List) *www.dtsc.ca.gov/Site Cleanup/Cortese_List.cfm*. City of Long Beach zip code 90802.)

compressed natural gas poses the same or fewer hazards compared to conventional fuels, and such explanation must be supported by substantial evidence. 3-56 cont.

Regarding the use of liquefied natural gas, the DPEIR cites a methodology for estimating the potential risk of a vapor explosion; however, the Project's potential vapor explosion risk is never quantified. In addition, the discussion states that exposure of liquefied natural gas concentrations that would cause adverse health effects is unlikely because the lower explosive limit ("LEL"), or concentration at which a given gas ignites or explodes, is five percent. However, the discussion never explains what percentage would cause a LEL to result in adverse health effects nor does it compare a five percent LEL to any adopted threshold of significance. 3-57

Section 4.3.4.2.5 of the Hazards Section discusses biodiesel's characteristics and then concludes that biodiesel and renewable diesel are safer than conventional diesel. However, there is no analysis, much less substantial evidence, to support this conclusion. This section must be revised to compare the hazardous characteristics of biodiesel to conventional diesel in order to conclude that biodiesel is the safer of the two. 3-58

The DPEIR analyzes the difference between hydrogen and conventional fuels and concludes that hydrogen is equivalent or safer than conventional fuels. However, the discussion notes that a hydrogen flame has few warning properties and that hydrogen has an unusually large flammability range. It is difficult to determine, on balance, based on the discussion in the DPEIR, why hydrogen's impacts are the same or less than conventional fuels. As such, the DPEIR should be revised to include a more detailed and quantitative analysis of the comparison of hydrogen and conventional fuels to support its less than significant conclusion. 3-59

In all of the sections of the DPEIR discussed above that balance the risks of alternative fuels compared to conventional fuels, the DPEIR fails to disclose whether the quantity of each chemical is the same quantity that is required for conventional fuels. This information is critical to the determination of whether hazardous impacts would increase compared to conventional fuels and therefore should be included in Section 4.3. 3-60

We noted in our comment letter on the IS that "risk of upset" was improperly omitted from the IS checklist. While risk of upset is included in Section 4.3 of the DPEIR, the analysis fails to adequately describe and improperly minimizes impacts that could potentially result from hazardous materials spills or accidents. For example, Section 4.3 includes an ammonia tank rupture scenario but simply states that major industrial facilities are typically large enough and far enough away from sensitive receptors to minimize impacts associated with new tanks by siting new tanks at least 528 feet from sensitive receptors. However, the section then notes that there are a number of industrial facilities in the Basin with sensitive receptors located within 528 feet of industrial facilities. Thus, the conclusion that any future new tank would be far enough away from sensitive receptors to minimize impacts is illogical since there are sensitive receptors currently located within 528 feet of industrial facilities that could be impacted by such an 3-61

incident. The analysis goes on to state that "information on specific projects potentially affected by these control measures are unknown at this time" and "to identify any impacts at this time without knowing the specific design features would be speculative." (DPEIR, p. 4.3-33.) This is an inadequate conclusion under CEQA. The DPEIR must seek to disclose as much information as it reasonable can so as to reflect a good faith effort at full disclosure. 3-61 cont.

Finally, the DPEIR improperly analyzes the hazardous materials impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential hazards impacts associated with, among others, Control Measures BCM-07, TXM-01, TXM-05, TXM-06, TXM-08, and TXM-09. 3-62

c. Mitigation

Section 4.3.5 of the DPEIR contains various measures that "*should*" be implemented. Other measures are likewise vague and indefinite. This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *see also*, *Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.) 3-63

Several of the mitigation measures in the Hazards Section are insufficient to mitigate the Project's impacts. For example, Mitigation Measure HZ-1 calls for consumer warning requirements on all products that are flammable and extremely flammable, but does not indicate what those warnings must contain. Mitigation Measure HZ-2 similarly calls for a public education and outreach program with local fire departments as to such measures, without providing any performance standard or metric to ensure impacts are mitigated. Mitigation Measure HZ-3 requires fire departments to install secondary containment, but does not specify the level of containment required and does not require the containment to be inspected or approved by the fire department. Similarly, HZ-10 requires the use of best management practices to avoid soil and groundwater hazards, but does not identify specific practices or give an agency authority to review and approve the practices. HZ-17 requires transportation of hazardous materials within one-quarter mile of schools to be avoided "wherever feasible." 3-64

Formulation of mitigation measures cannot be deferred until a later time. (CEQA Guidelines § 15126.4(a)(1)(B); *Sundstrom*, *supra*.) However, several mitigation measures in the Hazards Section constitute improper deferral of mitigation. For example, Mitigation Measure HZ-3 simply recommends that future projects "[i]nstall secondary containment (e.g., berms)" and Mitigation Measure HZ-4 recommends that future projects "[i]nstall valves that fail shut." Mitigation Measure HZ-6 requires performance integrity testing of LNG storage tanks to prevent structural failure problems; however, this measure does not include an explanation of how to prevent physical damage if the integrity testing shows that the storage tanks will fail. Mitigation Measure HZ-7 requires future facilities to conduct Phase 1 Environmental Site Assessments ("ESA") prior to construction. If known contamination is discovered, Mitigation Measure HZ-7 requires a Phase II ESA to be conducted and the recommendations of the Phase II ESA to be 3-65

implemented. This is improper deferral of mitigation and requires recirculation of the DPEIR with legally adequate mitigation measures. 3-65 cont.

CEQA requires a lead agency to present feasible mitigation measures to avoid or substantially lessen significant environmental impacts. (Public Resources Code §§ 21002, 21002.1, 21100.) Despite concluding that the Project will result in significant hazards impacts with respect to the transportation of ammonia, the DPEIR does not contain a single mitigation measure to address this impact. The DPEIR must be revised to provide feasible mitigation measures to address the Project's acknowledged significant hazards impacts. 3-66

5. Hydrology and Water Quality

a. Scope of Analysis

Runoff-related impacts were scoped out of the DPEIR pursuant to the IS, with the District reasoning that only "minor modifications" would be needed to commercial or industrial facilities affected by the proposed control measures. (DPEIR, p. A-86.) Drainage pattern impacts were similarly scoped out of the analysis in the DPEIR. Excluding these topics is not supported by substantial evidence in the record. 3-67

The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant hydrology and water quality impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts.

b. Impact Analysis

The water quality impacts related to wastewater treatment capacity rely on estimated affecting coating usage data from the Program EIR ("PEIR") for the 2012 AQMP. (DPEIR, p. 4.4-9.) The discussion states that the 2012 data provides a conservative estimate of wastewater use because some of the materials may have already been reformulated. However, this explanation does not constitute a reasoned explanation why the 2012 data is appropriate to rely upon without supporting documentation proving that the estimate is, in fact, conservative. The discussion does not provide any details about why data from the 2012 AQMP PEIR is appropriate or relevant to analyze the significant water quality impacts of the particular 2016 control measures. As shown in Table 4.4-2, in addition to the total wastewater generated from reformulated materials, Control Measures CTS-01, FLX-02, TXM-08, CMB-05, BCM-01, and CPP-01 generate wastewater flow. The DPEIR should include a current estimate of how these control measures would affect projected wastewater flow. 3-68

The wastewater treatment capacity section asserts that a 2.1 million gallon per day increase in wastewater flow would be within the capacity of existing wastewater treatment 3-69

plants, but fails to list the wastewater treatment plants that would accept this capacity. If all of the new wastewater flow is sent to one wastewater treatment plant, for example, flow generated by the Project could exceed the capacity of that plant. This data should be provided in the DPEIR and the conclusion should be supported by substantial evidence.

3-69 cont.

The analysis for wastewater discharge impacts is flawed because it relies on the 2015 PEA for the District's NOx RECLAIM program, which analyzed wastewater impacts for refinery facilities that would potentially install Wet Gas Scrubbers ("WGS") or Wet Electrostatic Precipitators ("ESP") technologies. The analysis concludes that since the RECLAIM PEA showed peak percentage increases from baseline levels to be less than 25 percent and thus under the need to obtain a wastewater discharge permit, any increased wastewater generated from WGS or Wet ESP technologies under the Project would not exceed 25 percent of existing capacity. The analogy to the 2015 PEA is insufficient evidence to support the conclusion that the Project control measures would not trigger a 25 percent or more increase above existing capacity at any facility, much less that the impacts from the Project control measures would be "similar or fewer" than impacts analyzed in the 2015 PEA. Control Measure CMB-05 itself requires further NOx reductions from the RECLAIM Assessment and requires a re-examination of the RECLAIM program, including voluntary opt-out of the program and implementation of additional control and SCR equipment. The DPEIR must specifically analyze potentially affected refineries and include capacity limits to properly analyze the impacts of the Proposed Plan. The DPEIR cannot simply rely on the analysis completed for a different project to conclude that the Project's wastewater discharge impacts are less than significant.

3-70

The DPEIR's discussion of water demand concludes that new water conveyance infrastructure is not expected because the anticipated increased water demand associated with the Project, *e.g.*, five million gallons per day, is expected to be associated with existing sources within the Basin which already have water conveyance infrastructure. This conclusion is completely unsupported. An increase of water demand of five million gallons per day is extremely unlikely to be able to be accommodated by existing infrastructure. This impact must be adequately studied and impacts must be disclosed in order for the DPEIR to be legally adequate under CEQA.

3-71

The DPEIR identifies potential new or increased sources of water pollution, such as biodiesel fuels, compressed natural gas, liquefied natural gas, and hydrogen. The DPEIR states that alternative fuels are expected to be less toxic compared to conventional fuels. However, the DPEIR fails to provide substantial evidence to support the conclusion that alternative fuels would be less toxic than conventional fuels. Further, even if alternative fuels are less toxic, they may cause or contribute to exceedances of storm water permit requirements because they present different pollutants into the storm drain system compared to conventional fuel byproducts. For example, as noted in the DPEIR, electric vehicles contain lead-acid and nickel-cadmium batteries. Although, as noted in the DPEIR, these batteries are being recycled at an increasing rate, they remain a source of storm water pollution which could exceed "numeric action limits"

3-72

in various storm water permits issued to agencies in SCAQMD's jurisdiction. Thus, the conclusion that alternative fuel vehicles will not pose water quality impacts is unsupported by substantial evidence.

3-72 cont.

Lastly, the DPEIR only analyzes the hydrology impacts associated with some, but not all, of the proposed control measures. For instance, the potential water quality impacts (both water demand and water quality impacts) associated with cleaning solar panels during routine maintenance (Control Measure ECC-03) are not analyzed. In addition, there is no substantive discussion or analysis of the potential hydrological impacts associated with, among others, Control Measures BCM-03, BCM-07, ECC-04, BCM-04, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, and CCP-01.

3-73

c. Mitigation

Section 4.4.6 of the DPEIR states that various measures "*should*" be implemented "where feasible." Other measures are likewise vague and indefinite. This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *see also*, *Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.)

For example, Mitigation Measure WQ-1 states that local water agencies should continue to evaluate future water demand. Mitigation Measure WQ-2 provides that project sponsors should coordinate with local water providers to make sure there are adequate water supplies. Mitigation Measure WQ-3 encourages project sponsors to implement water conservation measures and prioritize recycled water "whenever available and appropriate." Finally, Mitigation Measure WQ-4 states that project sponsors should consult with local water providers to identify "feasible and reasonable" measures to reduce water consumption.

3-74

Most of these measures, which rely on future study and action, also constitute improper deferred mitigation under CEQA. (CEQA Guidelines §15126.4(a)(1)(B); *Sundstrom*, *supra*.)

6. Noise

a. Scope of Analysis

We appreciate the District adding operational noise impacts to the scope of the DPEIR in response to our comments on the NOP/IS. However, the DPEIR still neglects to address the qualitative noise impacts that Appendix G of the CEQA Guidelines specifically recommends be addressed. For instance, there is no discussion of whether the Project would result in a substantial temporary or permanent increase in ambient noise levels above levels existing without the Project.

3-75

The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant noise impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts. 3-75 cont.

b. Impact Analysis

In order to determine whether or not the noise impacts from the proposed Project are significant, impacts are compared to the significance criteria in Section 4.5.3. (DPEIR, p. 4.5-5.) That section indicates that construction noise levels are significant if they: (a) "exceed the local noise ordinances," (b) increase ambient noise levels by more than three decibels if the noise threshold is currently exceeded, or (c) exceed federal Occupational Safety and Health Administration noise levels. For operational noise, thresholds similar to (a) and (b) above are used.

Despite the stated use of these thresholds, no analysis is performed of the Project's impacts compared to these thresholds. Instead, the DPEIR simply states based on the noise from a typical construction site, that construction noise impacts would be significant. There is no analysis of whether Project construction activities would exceed local noise ordinances. There is also no analysis of existing ambient noise levels, whether those noise levels are currently exceeded, and, if so, whether the Project would increase those levels by more than three decibels. The DPEIR employs a vibration significance threshold that is not included in its significance criteria and provides no explanation whatsoever to justify its use or reliance thereon. 3-76

Moreover, there is no *qualitative* analysis of any noise impacts nor consideration of several topics referenced in Section XII of the Appendix G Checklist. (*Berkeley Keep Jets Over the Bay Comm. v. Board of Port Commissioners* (2001) 91 Cal.App.4th 1344 [lead agency did not comply with CEQA by relying solely on specified noise standard without undertaking analysis of potential impacts pursuant to Appendix G of the CEQA Guidelines].) 3-77

Further, the DPEIR only analyzes the construction-related noise impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential noise impacts associated with, among others, Control Measures MOB-05, MOB-08, MOB-13, BCM-08, and ORLD-01, ORLD-03, ORHD-05, ORHD-09, and OFFS-08. Other measures that may result in significant impacts, such as Control Measures CMB-03, MOB-06, BCM-03, and BCM-07, are given cursory, at best, treatment. Further, the DPEIR assumes that "no new industrial facilities or corridors will be constructed," but provides no evidence, let alone substantial evidence, as required, to support this statement. (DPEIR, p. 4.5-5.) 3-78

The analysis of operational noise impacts suffers from the same flaws as the analysis of construction noise impacts. The stated noise thresholds are ignored and no reasoned analysis or 3-79

substantial evidence supports the DPEIR's claim that "operational noise and vibration impacts associated with the Proposed Plan are expected to less than significant." (DPEIR, p. 4.5-10.)

3-79 cont.

c. Mitigation

The DPEIR acknowledges a significant impact in regard to construction noise and vibration impacts. Section 4.5.5 of the DPEIR states that various measures "*should* be implemented." This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *see also*, *Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.) Moreover, as noted previously, *none* of these measures may be implemented given the ministerial nature of the subsequent local permitting process. Indeed, the DPEIR states that the District "cannot predict" how local agencies "might choose to mitigate a significant construction noise and vibration impacts for a future project." (DPEIR, p. 4.5-13.)

3-80

The DPEIR acknowledges that the identified measures are not sufficient to mitigate the significant noise impacts to a less than significant level. No effort or attempt is made to explain what noise levels would be with or without mitigation. Thus, it is impossible to determine whether impacts have been avoided or substantially lessened, as required.

Mitigation Measure NS-1 requires the installation of temporary noise barriers during construction. It is not clear whether such barriers must be installed during all construction periods, as implied.

Mitigation Measure NS-2 specifies that noise barriers shall be used to protect sensitive noise receptors from excessive noise levels during construction. Again, the measure does not specify whether such barriers must be installed during all construction periods, as implied. Further, the measure does not specify what constitutes "excessive" noise levels.

3-81

Mitigation Measure NS-3 indicates that if construction activities are allowed outside the hours allowed by local ordinances, the impacted individual should seek "temporary relocation or use of hearing protective devices." Placing the onus of mitigating noise impacts on the impacted sensitive receptor is anathema to the District's mitigation obligations under CEQA.

7. Solid and Hazardous Waste

a. Scope of Analysis

The IS prepared for the Project scoped out compliance with federal, state, and local statutes and regulations related to solid and hazardous waste from the DPEIR on the basis that the District's Board would be required to make consistency findings with current regulations prior to adopting or amending the proposed control measures. There is no substantial evidence

3-82

to support the statement that the control measures would be consistent with regulations simply because the District will make consistency findings.

The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant solid and hazardous waste impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts.

3-82 cont.

b. Impact Analysis

Section 4.6.4.2.2 states that the permitted capacity of landfills in Los Angeles, Orange, Riverside, and San Bernardino counties is 112,592 tons per day and that the increase in solid waste from the Project control measures would only result in a minor increase in solid waste that would not exceed permitted capacity. There are several issues with this analysis. First, the discussion omits an estimate of the quantity of solid waste anticipated to be generated by the Project, which is a critical component to making a significance determination of solid waste impacts. Second, the discussion does not state which landfills will accept solid waste from the Project. Third, the analysis does not consider when applicable landfills will reach capacity, which is vital to understanding whether there will be capacity to accept future waste, particularly for an EIR that analyzes impacts of a program that will be implemented over many years.

3-83

Similarly, the DPEIR states that the permitted capacity at the Buttonwillow Landfill, which would likely accept hazardous waste generated as a result of the Project, is in excess of 10 million cubic yards and will therefore have "sufficient capacity to handle any small amounts of hazardous waste that could be collected by the filters, baghouses, or [electrostatic precipitators]." (DPEIR, p. 4.6-14.) This conclusion is not supported by substantial evidence because it does not quantify the "small amount" of hazardous waste generated by the Project and relies on permitted capacity rather than presenting data on current capacity.

3-84

Regarding construction waste, the DPEIR does not even attempt to quantify the solid waste that would be generated by the Proposed Plan's measures. Rather, the DPEIR states that "at this time, it is speculative to estimate the amount of construction waste that may be generated as the 2016 AQMP is implemented, since the extent and timing of individual projects is not known." (DPEIR, p. 4.6-17.) This conclusion is unsupported by any evidence, much less substantial evidence, as required. Construction waste estimates must be quantified and presented in the DPEIR along with feasible mitigation measures to avoid or substantially lessen any associated impacts.

3-85

The Solid and Hazardous Waste Section only analyzes impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential solid and hazardous waste impacts associated with, among others, Control Measures ECC-03, ECC-04, BCM-01, BCM-02, BCM-07, CMB-01, CMB-02, CMB-

3-86

04, FLX-02, MOB-05, MOB-06, MOB-07, MOB-08, MOB-10, MOB-11, MOB-12, and MOB-13.

3-86 cont.

c. Mitigation

CEQA requires a lead agency to present feasible mitigation measures to avoid or substantially lessen significant environmental impacts. (Public Resources Code §§ 21002, 21002.1, 21100.) Despite concluding that the Project will result in significant solid and hazardous waste impacts, the DPEIR does not contain a single mitigation measure to address this impact. The DPEIR must be revised to provide feasible mitigation measures to address the Project's acknowledged significant waste impacts.

3-87

8. Transportation and Traffic

a. Scope of Analysis

Per the conclusions of the IS, the DPEIR does not contain any analysis of whether the Project would conflict with an applicable transportation plan, ordinance, or policy; substantially increase hazards due to a design feature or incompatible use; or conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities. (DPEIR, p. 4.7-6.) These highly relevant topics from Section XVI of the Appendix G Checklist should be addressed in the DPEIR. As noted in our comment letter on the NOP/IS, the DPEIR's conclusion that the Project will not result in significant impacts to any of these categories is not supported by substantial evidence.

3-88

The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant traffic and transportation impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts.

b. Impact Analysis

In order to determine whether or not the traffic impacts from the proposed Project are significant, impacts are compared to the significance criteria in Section 4.7.3. (DPEIR, p. 4.7-6.) Per that section, the Project would result in significant traffic impacts if it would, among others: (a) cause peak period levels on major arterials to degrade to Level of Service ("LOS") D, E, or F for more than a month, (b) substantially alter water borne, rail car, or air traffic, (c) result in the need for 350 employees, or (d) increase customer traffic by more than 700 visits. There is no explanation for how these artificial thresholds, which do not appear to represent any local thresholds, were derived.

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More fundamentally, the DPEIR never applies the thresholds it purports to use. For instance, as to construction traffic impacts, the DPEIR simply concludes without any reasoned

3-90

analysis or supporting data that construction traffic impacts could be significant. The reader is assured that such impacts will be studied later since "Project specific impacts would require a separate CEQA evaluation." (DPEIR, p. 4.7-7.) As noted previously, any further CEQA review would only be required if implementation of the Project control measures required discretionary approvals. Even if such measures did require discretionary approvals, as the DPEIR repeatedly notes, the measures would be implemented at existing facilities and thus would likely be determined by local agencies to be exempt from CEQA. (*See*, *e.g.*, CEQA Guidelines § 15301.) This underscores the important point that by law the time for CEQA review is now before the Project is approved.

3-90 cont.

As to operational traffic impacts, the DPEIR claims that "it is not known what control strategies may be applied, which facilities may require additional trips, or how often these trips may be necessary." (DPEIR, p. 4.7-9.) As such, the DPEIR claims that "no traffic estimates can be prepared at this time." Consistent with its treatment of other topics, the DPEIR summarily concludes without any analysis of Project impacts compared to its stated significance thresholds that the impacts of the proposed Project on traffic and transportation are expected to be significant prior to mitigation.

In particular, the DPEIR does not contain any analysis of the potentially significant traffic impacts associated with an estimated increase of over 700,000 partial-zero and zero emission vehicles, 11,000 partial-zero and zero emission buses, and 245,000 partial-zero and zero heavy emission trucks[18] by 2031. (DPEIR, p. 4.7-8.) Instead of analyzing the impacts caused by additional vehicles, the analysis assumes that these vehicles will replace older vehicles "upon retirement." (*Id.*) However, other drivers will now be able to drive these vehicles and the analysis should have assumed that both the old and new vehicles will be used at the same time.[19] Indeed, the DPEIR itself acknowledges that "it is not conclusive that equipment will be put out of service and that the high number of vehicles or equipment will be scrapped as solid/hazardous waste." (DPEIR, p. 6-33.)

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The DPEIR fails to meaningfully describe and analyze potentially significant impacts to rail and marine vessel traffic, ignoring the specific significance criterion related to this topic. Any attempt to quantify and analyze the impacts of increased marine vessel and rail traffic are dismissed by the DPEIR are "speculative." (DPEIR, pp. 4.7-8 to 4.7-9.)

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The DPEIR likewise fails to meaningfully describe and analyze potentially significant impacts associated with the use of overhead catenary electrical lines. Instead, the reader is told that the use of such lines could result in significant traffic impacts due to closure of lane(s) to

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[18] The DPEIR text wrongly cites this figure as 115,000 light, medium, and heavy duty trucks, whereas Table 4.7-2 lists this figure as 245,000 vehicles.

[19] This same assumption should be reflected in all the analyses, including but not limited to, air quality, GHG emissions, and noise.

vehicular traffic and alteration of traffic patterns and congestion. (DPEIR, p. 4.7-10.) Such analysis and mitigation is improperly deferred to an unspecified, later "CEQA evaluation." (DPEIR, p. 4.7-9 to 4.7-10.)

3-93 cont.

Finally, the DPEIR only analyzes the traffic impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential traffic impacts associated with, among other others, Control Measures CMB-03, MOB-05, MOB-06, MOB-08, MOB-13, BCM-03, BCM-07, ORLD-01, ORLD-03, ORHD-05, ORHD-09, and OFFS-08.

3-94

c. Mitigation

As to mitigation of identified significant construction traffic impacts, the DPEIR claims that it cannot impose mitigation measures for all such impacts because it failed to study them. (DPEIR, p. 4.7-10.) This plainly violates CEQA. (Public Resources Code §§ 21002, 21002.1., 21100.) As to the lone traffic mitigation measure the DPEIR does identify for significant construction traffic impacts (Mitigation Measure TR-1), this measure constitutes impermissible deferral of mitigation.

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Formulation of mitigation measures should not be deferred until a later time. (CEQA Guidelines § 15126.4(a)(1)(B); *Sundstrom*, *supra*.) Deferral is permitted only in limited circumstance where a lead agency can show: (1) practical considerations prohibit devising such measures earlier in the planning process and (2) the EIR specifies the specific performance standards capable of mitigating the project's impact(s) to a less than significant level. (*Sacramento Old City Ass'n*, *supra*, 229 Cal.App.3d at 1028-1029; *Clover Valley Foundation v. City of Rocklin* (2011) 197 Cal.App.4th 200, 237.)

3-96

Mitigation Measure TR-1 calls for the preparation of a future Construction Management Plan. No commitment to mitigation is provided by the measure. Instead, the specified items need only be included "if determined to be feasible by the Lead Agency." In addition, no clear, specific performance standards are specified by this measure. Moreover, as noted previously, this measure may well never be implemented given the ministerial nature of the subsequent local permitting process.

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No mitigation measures are provided for the identified significant operational traffic impacts. This clearly and unequivocally violates CEQA, which requires agencies to not only identify potentially significant impacts but also mitigation measures and alternatives designed to avoid or substantially lessen such impacts. (Public Resources Code §§ 21002, 21002.1, 21100.) An agency cannot simply conclude an impact is significant without identifying all feasible mitigation to address that impact. (*Id.*) The DPEIR must be revised to provide feasible mitigation measures to address the Project's acknowledged significant traffic impacts.

3-98

9. Aesthetics

a. Scope of Analysis

We appreciate the District adding Aesthetics to the scope of the DPEIR in response to our comments on the NOP/IS. 3-99

b. Impact Analysis

Implementation of Control Measures ORHD-05, ORHD-06, ORHD-08, and ORHD-09 would result in the installation of catenary overhead electrical lines and fixed guideway systems, battery charging stations, and fueling infrastructure within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. The DPEIR contends that the installation of catenary lines in industrialized areas near the Ports, is not expected to result in any significant aesthetic impacts to scenic highways because such areas "are not near an officially designated Scenic Highway or a roadway eligible for State Scenic Highway Designation." (DPEIR, p. 4.8-4.) However, the DPEIR fails to identify or even describe known visual resources such as John S. Gibson Boulevard, Harbor Boulevard, and the Vincent Thomas Bridge, all of which are designated as local scenic highways in the San Pedro and Wilmington-Harbor City Community Plans. Ocean Boulevard is likewise identified as a scenic route in the Scenic Element of Long Beach's General Plan. Indeed, there are many historic and cultural resources, both listed and found eligible for listing through surveys, that contribute to the visual setting and character of the Ports and if modified, through obstruction, alteration, or demolition would have a negative aesthetic impact. 3-100

Implementation of Control Measures MOB-01 and ORFIS-04 would lead to the use of bonnet technology, which could be either land-based or barge-based, to reduce emissions from marine terminals. The DPEIR claims that while the use of bonnet technology could degrade the existing visual character or quality in the immediate surrounding area, it is unlikely that the use of bonnet technology would be visible from sensitive vantage points due to the presence of intervening structures at the ports. There is no substantial evidence, such as visual simulations, maps, or comparable data to support such statements. 3-101

Implementation of Control Measures ECC-03 and ECC-04 would require the installation of solar panels and cool roof technology. The DPEIR acknowledges that there would be a significant construction-related impact due to degradation of the existing visual character of each affected site as a result of equipment staging and laydown areas. The DPEIR likewise acknowledges that these technologies could increase a significant source of glare as a result of the Proposed Plan. 3-102

Further, the DPEIR only analyzes the aesthetic impacts associated with some, but not all, of the proposed control measures. The DPEIR does not even attempt to analyze the potentially 3-103

significant aesthetic impacts from the proposed control measures which require and/or provide incentives for facility modifications, increased electrical usage (which may require new substations, powers plants and related infrastructure), and cool roofs and solar panels. In addition, there is no substantive discussion or analysis of, among others, the potential aesthetic impacts associated with Control Measures ECC-03, ECC-04, ECC-02, CMB-01, EGM-01, MOB-02, MOB-03, and MOB-04. 3-103 cont.

c. Mitigation

Section 4.8.5 proposes various measures to address the above aesthetics impacts. Most of the measures are qualified by the phrase "where feasible" providing no assurances that the measures will, in fact, be implemented. This does not constitute adequate or effective mitigation under CEQA. (CEQA Guidelines § 15126.4(a)(2); *see also*, *Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.)

For instance, Mitigation Measures AE-1 specifies that to "the extent feasible" construction staging areas should be located in areas that are already disturbed and sited to take advantage of natural screening opportunities provided by existing structures, topography, and/or vegetation. Mitigation Measure AE-2 requires construction areas to be screened from view "where feasible." Mitigation Measure AE-3 siting projects next to important scenic resources "should be avoided to the greatest extent possible." Finally, to reduce glare, Mitigation Measure AE-5 states that structural and/or vegetative screening from light-sensitive uses are to be provided "where feasible." 3-104

10. Other CEQA Topics

The DPEIR neglects to discuss or assess the potentially significant growth inducing impacts associated with several control measures. (*See*, *e.g.*, Control Measures CMB-01 and FLX-02). The DPEIR concludes that the Project would not directly increase economic or population growth or result in the need for new housing in the Basin. (DPEIR, p. 4.10-1.) However, there is no substantial evidence to support this statement, as required by CEQA. 3-105

The DPEIR relies on the fact that the District does not have land use authority to conclude that the Proposed Plan would not generate new residential development or alter land use policies. (DPEIR, p. 4.10-2.) The fact that the District does not have authority over local land use matters does not justify or excuse its need to study this issue consistent with CEQA. (Public Resources Code § 21081(a)(2); *Neighbors for Smart Rail*, *supra*.) 3-106

The DPEIR acknowledges that the Proposed Plan would result in construction activities associated with implementation of control measures, such as activities from installation of control equipment at existing stationary sources and electrification of existing roadways. The DPEIR then purports to justify its conclusion that few or no workers would relocate to the 3-107

region, with statements that there is currently a workforce in the region and the Proposed Plan would be implemented over several years. These two facts alone do not constitute substantial evidence to support the conclusion that no additional workers would be needed to complete construction resulting from the Proposed Plan. Potential growth inducing impacts must be quantified and mitigated in the DPEIR.

3-107 cont.

The DPEIR assumes that no new roadway access would be constructed as a result of the Project and therefore the Proposed Plan would not induce growth. (DPEIR, p. 4.10-2.) However, there is no evidence to support the statement that no new roadway access would be constructed, let alone substantial evidence, as required. Even if it were true, this does not mean that the Project would not result in new growth because there are other factors that induce growth besides new roadways and infrastructure.

3-108

The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant growth inducing impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

C. <u>The Project May Result In Numerous Significant Impacts That Were Scoped Out Of, And Not Analyzed By, The DPEIR</u>.

The scope of the proposed DPEIR improperly excludes potentially significant impacts to (1) Biological Resources, (2) Cultural Resources, (3) Geology and Soils, (4) Land Use and Planning, (5) Population and Housing, and (6) Public Services. Unless and until those areas are more fully addressed, the scope of the DPEIR is improperly limited and erroneously excludes areas requiring further assessment. In several respects, the DPEIR merely ***assumes*** the absence of potentially significant impacts, rather than factually demonstrating that significant impacts will not occur if the (inadequately-described) Project is adopted and implemented. This is insufficient under CEQA, and under the District's own rules. (SCAQMD Rule 110; *City of Redlands v. County of San Bernardino* (2002) 96 Cal.App.4th 398; and *Sundstrom, supra*.)

3-109

While the CEQA Guidelines call for emphasis and "focus" on the significant environmental impacts of a project, the authority to use such focus is misapplied in the DPEIR. For example, CEQA Guideline § 15143 explains that such focus may be used to limit the analysis in an EIR ***only*** as to such impacts that the initial study properly shows to be ***clearly insignificant and unlikely to occur*** (*i.e.*, "effects dismissed in an Initial Study as clearly insignificant and unlikely to occur need not be discussed further in the EIR . . .."). The DPEIR, by contrast, excludes from consideration numerous effects that it has not shown to be "clearly insignificant and unlikely to occur."

1. Biological Resources

The DPEIR dismisses potentially significant impacts to biological resources because the DPEIR states that these impacts are not reasonably foreseeable. (DPEIR, pp. 4.9-1 to 4.9-2.) But, construction of new and/or expanded facilities is a reasonably foreseeable indirect impact of implementation of the Proposed Plan. For instance, the Project will result in the likely construction of transportation support systems, installation of control equipment at existing stationary sources, and electrification of existing roadways. (DPEIR, p. 4.10-2.) Any of these and other related Project construction activities could result in potentially significant biological impacts. As such, impacts to biological resources must be analyzed and cannot simply be dismissed for being unforeseeable. 3-110

The DPEIR also dismisses impacts on land use plans, local policies, ordinances, and regulations protecting biological resources. (DPEIR, p. 4.9-2.) The rationale behind this conclusion is that development would take place with or without the Project and that SCAQMD does not have legal authority over land use decisions. These arguments are improper considerations under CEQA. CEQA does not permit a lead agency to dismiss potential direct or indirect impacts to the environment simply because development will occur with or without a project or because the lead agency does not have authority over certain land use decisions that will be affected by the Project. (Public Resources Code § 21081(a)(2); *Neighbors for Smart Rail*, *supra*.) CEQA requires lead agencies to analyze the direct and indirect environmental impacts of a Project, regardless of those considerations. The Project control measures will certainly conflict with some land use plans, local policies, ordinances, and resolutions protecting biological resources. As such, any impacts should be fully analyzed and mitigated as appropriate in a recirculated DPEIR. 3-111

The DPEIR fails to analyze, through detailed quantification and hydrodynamic modeling, potential wastewater impacts to designated wetlands. Section 4.9 of the DPEIR states that Project control measures promoting the installation of air pollution control equipment at Port facilities is not anticipated to have wastewater impacts because the facilities would be required to comply with applicable water quality standards. (DPEIR, p. 4.9-2.) This explanation remains insufficient to conclude that potential impacts on protected wetlands would be less than significant. 3-112

The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to biological resources, as well as feasible mitigation measures and alternatives designed to address those impacts. 3-113

2. Cultural Resources

The DPEIR fails to adequately describe, and improperly minimizes, possible impacts to cultural resources. (DPEIR, p. 4.9-2.) The DPEIR dismisses impacts to cultural resources because it states that any physical modifications would likely be located in a previously disturbed location. (*Id.*) Even if it is likely that physical environmental changes will occur in areas that are currently developed, the Project's potentially significant cultural resources impacts must be analyzed and mitigated in the event that development occurs on an undeveloped site or one with known or unknown cultural resources.

3-114

For instance, not all areas within the Ports are devoid of cultural resources or have been previously disturbed, as concluded on Page 4.9-2 of the DPEIR. There are known recorded historic and prehistoric sites throughout the Ports alone,[20] and there are undoubtedly other historic and prehistoric sites in the Basin that would be affected by the Project. Without knowing the location and extent of ground disturbance from possible construction activities associated with the Project, it is speculative to assume that no significant adverse cultural resources impacts are expected as a result of its implementation. The conclusion in the DPEIR that the Project will result in "no impact" to cultural resources is unsupported by substantial evidence, as required.

Further, the DPEIR includes language reflecting the typical mitigation measure to be imposed on unknown cultural resources to justify its "no impact" conclusion. (DPEIR, p. 4.9-2). This fact alone demonstrates that there are potentially significant cultural resource impacts requiring analysis and mitigation in the DPEIR.

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The DPEIR must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to cultural resources as well as feasible mitigation measures and alternatives designed to address those impacts.

3-116

3. Geology and Soils

Because details concerning several Project control measures are not yet known, the DPEIR improperly concludes that the Project has no potential to generate significant adverse impacts to geology and soil resources. In particular, the DPEIR wrongly assumes that only "minor" modifications at existing industrial or commercial facilities would be needed due to Project control measures and that "no control measures would require the location of new or relocation of existing facilities in areas prone to liquefaction." (DPEIR, p. 4.9-3.) At minimum,

3-117

[20] For example, *see* City of Los Angeles's website at http://www.portoflosangeles.org/idx_history.asp.

the potentially significant geology-related impacts associated with the control measures identified above must be analyzed in the DPEIR. 3-117 cont.

The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant geology and soils impacts as well as feasible mitigation measures and alternatives designed to address those impacts. 3-118

4. Land Use and Planning

CEQA requires an analysis of whether the Project would conflict with any applicable plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. (CEQA Guidelines § 15125(d); CEQA Guidelines, Appendix G, Item X.b; and *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903.) However, the DPEIR does not include an analysis of potential conflicts between the Proposed Plan and applicable plans, policies, and regulations adopted to avoid or mitigate environmental effects.

The DPEIR states that there would be no land use conflicts because construction would occur with or without implementation of the Project and because modified rail or truck traffic routes would not conflict with land use documents. (DPEIR, p. 4.9-3.) As discussed above, CEQA requires an analysis of direct and indirect impacts on the environment from an action and does not allow a lead agency to conclude that impacts would not occur simply because an action would occur with or without the project. The fact that the District does not have authority over local land use matters (DPEIR, p. 4.9-3) does not justify or excuse its need to study this issue consistent with CEQA. (Public Resources Code § 21081(a)(2); *Neighbors for Smart Rail*, *supra*.) Further, it is impossible to determine whether land use conflicts would occur without conducting any analysis of the applicable land use documents and the Project control measures. There is no evidence to support the conclusion that the Project would not conflict with applicable land use documents. 3-119

In addition to local plans, there are numerous federal and state plans that contain pertinent policies that must be considered and evaluated in light of the Project control measures. For instance, the proposed Project would seemingly create conflicts with the Ports' existing policies implementing the State Tidelands Trust principles, the California Coastal Act planning and permitting requirements, and the existing Master Plan for each Port, as detailed in the previous Port letters. In addition, the proposed Project would create inconsistencies with the CAAP. The numerous ***inconsistencies*** between the Project, as proposed, and the existing plans and policies require inclusion in the DPEIR. (CEQA Guidelines § 15125(d).)

The DPEIR assumes that no new rail or truck traffic routes would be constructed and that instead existing transportation lines near the Ports would be modified to add electrical lines. (DPEIR, p. 4.9-3.) There is no evidence to support this statement, let alone substantial evidence, as required. Even if it were true this does not mean that the Project would not result in any 3-120

conflicts with plan policies adopted for the purpose of avoiding or mitigating environmental effects. Increased electrical use would increase electrical demand. As noted above, this could conflict with adopted energy conservation plans. Installation of electric infrastructure could raise significant conflicts with aesthetics/visual policies especially since these lines are proposed to be located overhead.

3-120 cont.

Additionally, fueling infrastructure to support zero and near-zero emissions vehicles, such as those powered by hydrogen fuel cells or natural gas, could have a significant impact on local land use and may conflict with existing plans. Such Project components could likewise contribute to the physical division of an established community. The DPEIR admits as much in noting that to the extent such infrastructure requires modification to an existing rail or truck traffic route/corridor, this "will require a separate CEQA evaluation." (DPEIR, p. 4.9-3.) The District cannot legally defer analysis of Project impacts to some future, speculative CEQA review process. The analysis must take place now in order to inform the District's decision on the Proposed Plan.

3-121

The DPEIR states that it incorporates "local land use planning decisions and population growth." (DPEIR, p. 4.9-4.) However, there is no explanation or evidentiary support for this statement, and even if there were, it is irrelevant. The pertinent questions are whether the Project may conflict with plan policies pertaining to environmental issues and/or physical division of an established community.

3-122

The DPEIR admits that it is possible construction activities would divide an existing community, but reasons that because the Project would only result in modification of existing traffic routes, the Project would not divide an existing community in the long-run. (DPEIR, p. 4.9-3.) As discussed above, however, there is no basis to support the conclusion that the Project would not result in construction of new traffic routes or corridors. As such, the conclusion that the Project would not divide an existing community is not supported by substantial evidence.

3-123

The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant land use and planning impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

3-124

5. Population and Housing

The analysis assumes that "few or no new employees would need to be hired at affected facilities as the new control equipment is typically not labor intensive to operate or maintain." (DPEIR, p. 4.9-4.) The DPEIR concludes that no control measures would induce population growth because "there are a finite number of drivers in the region at any given time." (*Id.*) There is no evidence to support either statement, let alone substantial evidence, as required.

3-125

The DPEIR states that there would be no displacement of people or housing without providing any analysis to support the conclusion. (DPEIR, p. 4.9-4.) Several of the control measures, including new or expanded transportation corridors, could result in displacement of people or housing. 3-125 cont.

The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant population and housing impacts as well as feasible mitigation measures and alternatives designed to address those impacts. 3-126

6. Public Services

The DPEIR assumes that the Project would not generate any increased need for public services. (DPEIR, p. 4.9-4.) However, the DPEIR does not provide any substantial evidence to support its *assumptions* regarding the absence of impact on additional public services or facilities. New fueling infrastructure to support zero and near-zero emissions vehicles, including hydrogen and natural gas, could impact Fire Department resources and require additional public services. 3-127

The DPEIR relies on the lack of future population increase assumed in the Population and Housing Section to conclude that no new school facilities or public facilities would be required. This conclusion is not supported by substantial evidence and is therefore improper.

The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant public services impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

D. <u>The DPEIR Fails To Consider And Discuss Cumulative Impacts</u>.

The cumulative impact analysis includes the project-specific analyses of the SCAQMD's stationary and mobile source control measures and CARB's mobile source control measures, as well as the TCMs that were developed and adopted by SCAG as part of the 2016 RTP/SCS. (DPEIR, pp. 1-22, 5-1.) In general, TCMs are control measures that provide emission reductions from on-road mobile sources, based on changes in the patterns and modes by which the regional transportation system is used. (DPEIR, p. 5-2.) The DPEIR claims that the TCMs "are appropriately part of the cumulative impact analysis because they include regulatory activities associated with measures that could also generate related environmental impacts within the Basin." (DPEIR, p. 5-1.) 3-128

A cumulative impact analysis is supposed to evaluate the impacts of a project along with *other* projects producing *related effects*. (CEQA Guidelines § 15130(b).) The Project Description states that the Project is comprised of: (1) the SCAQMD's Stationary and Mobile

Source Control Measures, (2) stated and suggested Federal Source Control Measures, and (3) RTP/SCS Control Measures provided by SCAG. (DPEIR, p. 2-13.) The TCMs are part of the RTP/SCS. (DPEIR, pp. 2-53 to 2-55.) The DPEIR thus improperly segmented the Project analysis by removing a portion of it, the TCMs, from the project-level analysis and treating it as a separate project for purposes of the cumulative impact analysis. The whole of an action must be considered when evaluating an activity, both on a project-level and on a cumulative basis.[21] 3-128 cont.

There is also no explanation as to why other past, present, and probable future projects producing related effects were not considered. The DPEIR reaches this conclusion apparently because it mistakenly focused on whether the projects themselves were "related," instead of whether the impacts were related. (DPEIR, p. 5-4.) The DPEIR thus errs in failing to consider other projects that along with the Project result in potentially significant impacts. 3-129

As noted above, the DPEIR did not analyze several resource topics on the ground that the Project would not result in any significant impacts in those areas. These topics include biological resources, cultural resources, geology and soils, land use, mineral resources, and public services. Yet, the cumulative impact analysis acknowledges that the Project would result in potential impacts in these areas albeit in a form "different" than the impacts of the TCMs. (DPEIR, pp. 5-10 to 5-12, 5-14, 5-18, 5-20, 5-23.) 3-130

The cumulative noise analysis wrongly states that the Project's significant construction impacts were limited to the construction of the overhead catenary lines. Section 4.5.4.1 of the DPEIR identified significant noise impacts associated with other construction activities as well. (*See also*, Table 4.5-1.) 3-131

The cumulative traffic analysis focuses exclusively on construction traffic impacts. (DPEIR, Section 5.18.) It neglects to reference or analyze the Project's significant unavoidable operational traffic impacts. These include significant congestion and hazard traffic impacts associated with the use of the catenary lines and barge-based bonnet technology. (DPEIR, p. 4-7-10.) 3-132

E. <u>The EIR Fails To Analyze A Reasonable Range Of Alternatives To The Project</u>. 3-133

CEQA requires that an EIR include a reasonable range of alternatives to the project that would feasibly meet most of the basic project objectives while avoiding or significantly reducing the project's significant impacts. (CEQA Guidelines § 15126.6.) The EIR's alternatives analysis does not comply with CEQA because it includes legally infeasible alternatives as well as

[21] The DPEIR also improperly omits any discussion of the RTP/SCS's land use and transportation strategies as well as the federal mobile source control measures, which are also part of the Project (*see* Section 2.8), from the cumulative impact analysis.

alternatives that would not meet most of the basic project objectives and/or avoid or substantially lessen significant environmental impacts.

The DPEIR considers four alternatives. These include: (1) No Project Alternative (2012 AQMP), (2) Mobile Source Reduction Only, (3) CARB or SCAQMD Regulation Only, and (4) Expanded Incentive Funding. None of the alternatives, other than the Expanded Incentive Funding alternative would meet most of the basic project objectives. (DPEIR, p. 6-41.) The DPEIR claims that that the Expanded Incentive Funding alternative has the potential to be the environmental superior alternative even though it would result in increased impacts to aesthetics, energy, hazards, water, noise, waste, and traffic. (DPEIR, pp. 6-40 to 6-41.) Only one of these alternatives, the No Project Alternative, would substantially reduce impacts compared to the Project. The Mobile Source Reduction Only Alternative is not legally feasible as the District lacks regulatory jurisdiction over mobile source emissions.

3-133 cont.

In several resource topics (*e.g.*, air quality, energy, hazards and hazardous materials, hydrology and water quality, noise, transportation and traffic), the DPEIR acknowledges that the No Project Alternative would result in significant impacts. But, it calls the impact less than significant because this alternative is "requiring what has already been adopted and analyzed to be implemented." (DPEIR, pp. 6-19, 6-20, 6-22, 6-25, 6-28, 6-34.)[22] This is akin to an impermissible plan-to-plan comparison of impacts. (*Environmental Planning & Information Council v. County of El Dorado* (1982) 131 Cal.App.3d 350.) If continued implementation of the 2012 AQMP would result in significant impacts, this should have been acknowledged in a simple and straight-forward manner. The failure to do so skews the entire alternatives analysis since impacts that are in fact significant are deemed insignificant merely because of the bureaucratic reason that the plan has been approved.

3-134

The discussion of construction noise impacts (Section 6.4.5.1) wrongly states that the Project does not result in significant construction noise impacts. As set forth in Section 4.5.4.1, the Project results in significant and unavoidable construction noise impacts.

3-135

III. CONCLUSION

While it is plain that an EIR is needed in connection with this proposed Project, it is also clear that the DPEIR should be more complete than the version that was provided for public review and comment. The current version of the DPEIR fails to adequately describe the "Project" thereby thwarting effective public review and comment on the Proposed Plan. In several key areas, it fails to thoroughly and adequately identify the Project's significant environmental impacts and propose feasible mitigation measures and alternatives to avoid or

3-136

[22] As to traffic, the DPEIR then inconsistently claims that "the traffic and transportation impacts will not change the traffic and transportation impacts identified in the 2012 AQMP, and therefore, remain significant." (DPEIR, p. 6-34.)

substantially lessen such impacts. As such, the DPEIR fails to comply with CEQA, and the DPEIR must therefore be revised, corrected, and re-circulated with all of the analysis and other content required by CEQA before the District may lawfully take action on the Project.

3-136 cont.

Thank you for your consideration of POLB's comments on the DPEIR. Please do not hesitate to contact the undersigned or Dawn McIntosh with any questions concerning this correspondence. Our contact information is as follows:

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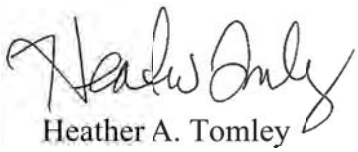
Sincerely,



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cc: Wayne Nastri, Acting Executive Officer, South Coast Air Quality Management District
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Responses to Comment Letter #3 – Port of Long Beach

Comment 3-1

We appreciate this opportunity to submit comments on the Draft Program Environmental Impact Report ("DPEIR") prepared in connection with the South Coast Air Quality Management District's ("District" or "SCAQMD") consideration of the proposed 2016 Air Quality Management Plan (the "Project" or "Proposed Plan")[1] on behalf of the City of Long Beach acting by and through its Harbor Department (collectively referred to herein as "Port of Long Beach" or "POLB").

As you know, the POLB along with the Port of Los Angeles (collectively the "Ports") have achieved tremendous success in obtaining substantial emissions reductions through their joint San Pedro Bay Ports Clean Air Action Plan ("CAAP") and other air quality measures implemented under the Ports' initiatives. POLB continues to be supportive of projects and programs that are intended to contribute to improvement of air quality and promote other environmental values. However, POLB fundamentally disagrees with the District's proposal to again attempt to unnecessarily convert an effective voluntary plan, built on multi-agency and industry cooperation, into potentially punitive regulations imposed unlawfully on the Ports. The Ports have previously sought to make the District aware of the serious concerns and objections to this approach.[2]

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[1] This letter refers to the June 2016 version of the Proposed Plan and the June 2016 version of Appendix IV-A to the Proposed Plan as those versions were the ones made available to the public prior to the release of the September 2016 DPEIR.

[2] (*See* letters dated November 7, 2016; August 19, 2016; August 4, 2016; January 31, 2014; January 15, 2014; October 2, 2013; August 21, 2013; November 27, 2012; November 19, 2012; November 8, 2012; October 31, 2012; October 22, 2012; August 30, 2012 (which includes letter dated May 4, 2010); July 10, 2012; July 27, 2012 from POLB and/or Port of Los Angeles to SCAQMD.) The August 4, 2016 letter contains POLB's comments on the Notice of Preparation/Initial Study ("NOP/IS") for the Project. We incorporate by reference herein our comments on the NOP/IS, as well as the other letters referenced above to the extent that they are germane to the environmental impacts associated with the Project.

Response 3-1

This is an introductory comment which states disagreement with the approach in the 2016 AQMP but does not raise specific comments regarding the Draft Program EIR. The August 4, 2016 comment letter on the NOP/IS and the responses to those comments were included in Appendix B of the Draft Program EIR as Comment Letter A-7. The August 19, 2016 comment letter on the Draft 2016 AQMP is referred to as Comment Letter #50 and the responses to those comments are available on the internet here: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/response-to-comments/2016-aqmp-rtc-3-of-4.pdf. The November 7, 2016 comment letter on the Revised Draft 2016 AQMP is referred to as Comment Letter #96 and the responses to those comments are available on the internet here: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/response-to-comments/2016-aqmp-rtc-4-of-4.pdf. Therefore, no further response is necessary under CEQA.

Comment 3-2

We are also mindful that the California Environmental Quality Act ("CEQA") calls for a thorough analysis of a project's potentially significant environmental impacts as well as feasible means to avoid or substantially lessen such impacts. In order to serve its important public purposes of informing the public and decision-makers of the consequences of its action, such review must occur *prior* to approval of a project. Such review is particularly important where, as here, it is anticipated that the proposed Project will have substantial impacts on and conflict with the authorities of other public agencies.

As such, thorough identification of the proposed Project, and candid disclosure of all phases of the Project and its potential impacts, is essential to ensure that the proposed Project will be planned and implemented in conformity with established community plans and policies, and that environmental review is conducted with full consideration of all potentially significant environmental impacts as well as mitigation measures and alternatives designed to address those impacts. In addition, it will be important to consider the impacts of the proposed Project on the POLB's community, mission, facilities, and operations. The District must therefore provide a meaningful opportunity for informed public review of and comment on a well-defined "project."

In that context, we respectfully submit the following comments regarding the DPEIR for the Project as well as questions, concerns, and objections related to the omissions of critical information, unsupported assumptions, or analytical deficiencies. As set forth in more detail below, we believe that: (1) the Project needs to be more thoroughly and accurately described, (2) all potentially significant environmental impacts related to all Project control measures must be thoroughly analyzed, and (3) adequate mitigation measures and alternatives must be provided to address all potentially significant environmental impacts.

Accordingly, the DPEIR needs to be thoroughly revised and recirculated for public review before the District can legally take action on the Project.

Response 3-2

SCAQMD staff agrees that a CEQA document should include a thorough and well-defined project description and allow the public to review and provide comments. The project description was included in Chapter 2 of the Draft Program EIR. The Notice of Preparation/Initial Study (NOP/IS) was released on July 5, 2016 for a 30-day public review and comment period ending on August 4, 2016. The Draft Program EIR was released on September 16, 2016 for a 60-day public review and comment period ending on November 15, 2016. The first paragraph of this comment does not provide specific comments on the Draft Program EIR and no further response is necessary under CEQA.

The second paragraph of this comment provides a summary of specific comments presented later in the comment letter. Responses to those specific comments are provided to the specific comments later.

Since the Draft 2016 AQMP was released on June 30, 2016, SCAQMD staff has released the Revised Draft 2016 AQMP on October 7, 2016 and the Draft Final 2016 AQMP on December 2, 2016. SCAQMD staff reviewed the changes in each of those documents and found that, pursuant to CEQA Guidelines Section 15088.5, any changes to the project description did not constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring

mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The third paragraph of this comment does not raise any issues which would trigger the need for recirculation. Therefore, no further response is necessary under CEQA.

Comment 3-3

I. INTRODUCTION

While we recognize the effort that has gone into preparation of the current DPEIR, it is apparent that the document does not provide the information, evidence, or analysis required under CEQA. The DPEIR thus fails to fulfill its critical role as mandated by CEQA in educating the public generally, other affected regulatory agencies and governments, or the officials and Board of the District, as to the potential environmental significance and impacts of the proposed Project.

The necessary contents for an adequate Draft EIR are described in Public Resources Code § 21000. A Draft EIR must include "a detailed statement setting forth all of the following:

(1) All significant effects on the environment of the proposed project.

(2) In a separate section:

(A) Any significant effects on the environment that cannot be avoided if the project is implemented.

(B) Any significant effect on the environment that would be irreversible if the project is implemented.

(3) Mitigation measures proposed to minimize the significant effects on the environment, including, but not limited to, measures to reduce the wasteful, inefficient, and unnecessary consumption of energy.

(4) Alternatives to the proposed project.

(5) The growth-inducing impacts of the proposed project."

Article 9 of the CEQA Guidelines further expands on the contents of Draft EIRs. Specifically, a Draft EIR must contain the information required by CEQA Guidelines sections 15122 through 15131. (CEQA Guidelines § 15120.) Those sections require, among others, adequate consideration and discussion of (1) the Project Description, (2) the Environmental Setting, (3) Significant Environmental Impacts, (4) Mitigation Measures, (5) Alternatives, and (6) Cumulative Impacts.

Response 3-3

The comment claims that the Draft Program EIR does not provide information, evidence, or analysis required under CEQA without providing specifics or evidence as to where this is lacking in the Draft Program EIR. The Draft Program EIR released for public review included a discussion of all significant effects on the environment in Chapter 4, significant effects that cannot be avoided or would be irreversible in Chapter 4.10, mitigation measures proposed to reduce potentially significant impacts in Chapter 4, alternatives to the proposed project in Chapter 6, growth-inducing impacts in Chapter 4.10, a detailed project description in Chapter 2, the environmental setting in Chapter 3, and cumulative impacts in Chapter 5. This comment does not provide specific

comments on the Draft Program EIR. Therefore, no further response is necessary under CEQA.

Comment 3-4

> As set forth in more detail below, the DPEIR fails to, among others: contain an adequate project description; properly identify the environmental setting; adequately assess the Project's potentially significant environmental effects, including those that cannot be avoided; and identify feasible mitigation measures and alternatives to avoid or substantially lessen the Project's significant environmental effects. It is therefore respectfully urged that the DPEIR be revised, corrected, and recirculated for public review and comment before the District proceeds with any further action, on the proposed Project.

Response 3-4

The comment summarizes comments made later in the comment letter. Responses to those specific comments are included later in the letter. Since the Draft 2016 AQMP was released on June 30, 2016, SCAQMD staff has released the Revised Draft 2016 AQMP on October 7, 2016 and the Draft Final 2016 AQMP on December 2, 2016. SCAQMD staff reviewed the changes in each of those documents and found that, pursuant to CEQA Guidelines Section 15088.5, any changes to the project description did not constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation. Therefore, no further response is necessary under CEQA.

Comment 3-5

II. THE DPEIR FAILS TO COMPLY WITH CEQA.

A. The DPEIR Does Not Provide A Full And Accurate Description Of The Project.

1. Deficient Project Description—In General

The DPEIR does not provide a full and accurate description of the "Project" as required by CEQA. (*See, e.g.*, CEQA Guidelines § 15124; *Laurel Heights Improvement Ass'n v. Regents of the University of California* (1988) 47 Cal.3d 376.) In particular, the Proposed Plan released in June 2016 was incomplete as evidenced by the fact that large portions of it were revised and released for public review *after* the DPEIR was circulated for review.

An accurate and complete project description is necessary for an intelligent evaluation of the potentially significant environmental impacts of the agency's action. (*Silveira v. Las Gallinas Valley Sanitary Dist.* (1997) 54 Cal.App.4th 980, 990.) "Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal . . . and weigh other alternatives in the balance." (*County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 192-193 [court further observes that an accurate, complete and consistent project description is the sine qua non of informative, legally adequate CEQA review].)

CEQA Guidelines § 15126 further makes clear that an EIR must take a comprehensive review of the proposed project *as a whole*. "All phases of a project must be considered when evaluating its impact on the environment: planning, acquisition, development, and operation." (CEQA Guidelines § 15126.) This requirement reflects CEQA's definition of a "project" as the "*whole of an action*" that may result in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change. (Public Resources Code § 21065; CEQA Guidelines § 15378.)[3]

[3] Unless otherwise noted, emphasis in quotations herein is supplied and citations are omitted.

Response 3-5

A detailed and comprehensive project description was included in Chapter 2 of the Draft Program EIR and the Draft 2016 AQMP was available during the public comment period to provide meaningful review. This comment does not provide specific examples to support the claim that the project description in the Draft Program EIR is deficient under CEQA. A project description is open to revision and agency modification during the CEQA process. (*Concerned Citizens of Costa Mesa, Inc. v. 32nd Dist. Agric. Ass'n* (Cal. 1986) 42 Cal.3d 929, 936.) The CEQA process "is not designed to freeze the ultimate proposal for a proposed project in the precise mold of the initial project [; indeed, n]ew and unforeseen insights may emerge during the investigation and evoke a revision of the original proposal." *Kings County Farm Bureau v. City of Hanford* (5th Dist. 1990) 221 Cal. App. 3d 692, 738. Changes to the project during that process do not necessarily invalidate that description (*Concerned Citizens*, 42 Cal.3d at 936) or require recirculation (*Laurel Heights Improvement Ass'n v. Regents of the Univ. of Cal.* (Cal. 1993) 6 Cal 4th 1112, 1130 ("Laurel Heights II")). As further discussed in Response 3-2, the changes to the Draft Program EIR do not require recirculation.

Moreover, as discussed further in Response 3-6, the Draft Program EIR is a programmatic-level document and the project description contained therein is appropriate under CEQA.

Comment 3-6

> The DPEIR falls far short of the above requirements in describing the proposed Project, and thus fails to serve the "public awareness" purposes mandated by CEQA. The DPEIR does not include or even describe the text of several control measures supposed to comprise the "Project." The section of the DPEIR that purports to "describe" the Project, includes nothing more than summaries of certain control measures. In any event, the summaries are insufficient to describe the Project itself, and prevent effective public review and comment. The DPEIR also fails to describe reasonably foreseeable actions that will be taken in response to the proposed Project control measures.
>
> As to certain control measures, the DPEIR implies that any informed public discussion and environmental review be *deferred* until some point in the future, as detailed below. Such an approach, however, is inconsistent with, and in violation of, many fundamental rules and policies required by CEQA (*e.g.*, failure to identify and analyze the whole of the project, improper project "segmentation," improper deferral of impact analysis and mitigation, failure to identify and evaluate project alternatives, etc.). (*See, e.g.*, Public Resources Code § 21003.1; CEQA Guidelines §§ 15126.2, 15126.4, 12126.6, 15378; *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296.)

Response 3-6

The Draft 2016 AQMP was released to the public on June 30, 2016 and the Revised Draft 2016 AQMP was released to the public on October 7, 2016. All key comments on the Draft 2016 AQMP and modifications to the Draft 2016 AQMP were disclosed to the public during the public comment period of the Draft Program EIR, which was from September 16, 2016 to November 15, 2016. Summaries of control measures provided in the Draft Program EIR were used to aid in the understanding of the Draft 2016 AQMP for the general public. A more extensive discussion of the control measures was available in the Draft 2016 AQMP in both Chapter 4 and Appendices IV-A, IV-B, and IV-C and appropriate references were included in the Draft Program EIR to allow easy referencing for the reader. Modifications made between the releases of the Draft, Revised Draft and Draft Final 2016 AQMP are described in the preface of the Final Program EIR. None of the modifications made caused additional significant adverse environmental impacts from the proposed project not already analyzed in the Draft Program EIR.

In general, the 2016 AQMP provides a framework of control measures for attaining National Ambient Air Quality Standards (NAAQS). It must be noted that the CEQA analysis for the 2016 AQMP is not project-level, but rather program level. All environmental topics were analyzed in the Initial Study and those found to have potentially significant impacts were fully analyzed in the Draft Program EIR on a programmatic level, not deferred, as the comment claims. This is the proper use of a programmatic EIR. (*See Rio Vista Farm Bureau Ctr. v. Cnty. of Solano* (1st Dist. 1992) 5 Cal. App. 4th 351, 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be appropriate at that time. *See Town of Atherton v. California High Speed Rail Authority* (3d Dist. 2014) 228 Cal. App. 4th 314, 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that

requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. The comment does not provide specifics to support the claim that the summaries are insufficient to describe the project.

Comment 3-7

> The Proposed Plan refers to the future development of "contingency measures" if the area fails to meet certain milestones. (Proposed Plan, pp. 4-44 to 4-45, 6-13.) Yet, no such contingency measures are identified or described in the Proposed Plan or analyzed in the DPEIR.

Response 3-7
Chapter 4 of the 2016 AQMP has a detailed discussion as to what is being defined as a contingency measure to comply with the Clean Air Act (CAA) requirements. Contingency measures are those measures whose emissions reductions were not used to demonstrate attainment of the NAAQS. The contingency measures were analyzed along with the other proposed control measures in environmental impacts subchapters of Chapter 4 of the Draft Program EIR regardless of how the control measure is classified to comply with CAA requirements.

Comment 3-8

> It is only through reviewing the lengthy appendices to the Proposed Plan, can the reader understand the proposed Project control measures. The appendices also make clear that several of the proposed Project measures have not even been developed yet by the District and thus cannot be the subject of any meaningful environmental review or analysis. (*See, e.g.*, proposed Control Measures EGM-01, MOB-02, MOB-03, MOB-04, MOB-08, MOB-12, MOB-13, MOB-14, and BCM-01.) The details of the proposed Project must be accurately developed and described ***before*** the proposed methods and precise impacts anticipated by the Project may be analyzed or the subject of comment.

Response 3-8
Details of all of the proposed project's control measures (in Appendix IV-A, IV-B, and IV-C of the 2016 AQMP) were available to the public during the public comment period of the Draft Program EIR.

Regardless of the level of specificity of the control measures, potential environmental impacts associated with those measures can still be analyzed on a programmatic level to the extent they are based on known information and supported assumptions, as was done in the Draft Program EIR, to determine foreseeable environmental effects. Further attempts to analyze the environmental impacts would have been speculative. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373.) Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be appropriate at that time. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-9

> In addition to being accurate and complete, a project description must be stable. (CEQA Guidelines § 15124; *County of Inyo*, *supra*, 71 Cal.App.3d at 197.) Yet, the District released a Revised Draft 2016 AQMP ("Revised Plan") on October 7, 2016, *after* the DPEIR was released for public review. The Revised Draft Plan includes several substantive additions to the Proposed Plan from that which was analyzed in the DPEIR. Control measures related to mobile source emissions over which the District lacks regulatory jurisdiction, including MOB-01 to MOB-04, were revised in an attempt to make the emissions reductions associated with these measures "enforceable commitments." A new regulatory measures section was added discussing how the Revised Plan proposes "robust" NOx reduction regulations and other measures. Certain measures were revised to highlight the need for an analysis of life-cycle in-Basin emissions related to energy/fuel production and transmission under future energy pricing and electricity generation scenarios. Further, major revisions were made to the text of control measures, such as MOB-01, MOB-02, MOB-03, MOB-04, CMB-01, CMB-02, CMB-05.

Response 3-9

The goal of the 2016 AQMP is to provide a framework of measures for attaining the NAAQS. Control measures were identified and analyzed in the Draft Program EIR on a programmatic level to determine foreseeable environmental effects. Regardless of the level of specificity of the control measures, potential environmental impacts associated with those measures can still be analyzed on a programmatic level to the extent they are based on known information and supported assumptions, as was done in the Draft Program EIR, to determine foreseeable environmental effects. Additionally, the environmental impacts associated with control measures are not dependent on how they are achieved (i.e. based on incentives or regulations). Therefore, a change in approach in this manner does not result in a substantive change to the project description. In response to a comment received, the possibility of performing a life-cycle analysis in order to determine the cost-effectiveness of control measures or how funds from incentives could be distributed was added to the Revised Draft 2016 AQMP. This change does not have environmental impacts associated with it. Similarly, the addition of a new regulatory measures section added to Chapter 4 of the Revised Draft 2016 AQMP was for clarification purposes. Since the Draft 2016 AQMP was released on June 30, 2016, SCAQMD staff has released the Revised Draft 2016 AQMP on October 7, 2016 and the Draft Final 2016 AQMP on December 2, 2016. SCAQMD staff reviewed the changes in each of those documents and found that, pursuant to CEQA Guidelines Section 15088.5, any changes to the project description did not constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be appropriate at that time. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-10

> A discussion of Environmental Justice was also added to the Revised Plan, with a note that this topic will be discussed in a Socio-Economic Report, the complete version of which is still outstanding. In addition, several substantive additions were made to the appendices, such as Appendix II (Current Air Quality), Appendix III (Base & Future Year Emission Inventory), Appendix IV-A (SCAQMD's Stationary & Mobile Source Control Measures), Appendix IV-B (CARB's Mobile Source Strategy), and Appendix IV-C (Regional Transportation Strategy & Control). Other appendices, including Appendix V (Modeling & Attainment Demonstrations) and Appendix VI (Compliance With Other Clean Air Act Requirements) are "draft versions" which are "still out for review." As the details of the Proposed Plan are still under development, it is not possible for the District to proceed with CEQA review at this stage.

Response 3-10

The Socioeconomic Report provides an analysis of the socioeconomic impacts of the 2016 AQMP in order to further inform public discussions and the decision-making process associated with the adoption of the 2016 AQMP. The Draft Program EIR is independent of the Socioeconomic Report, which was not used in the analysis of environmental impacts. At the time of release of the Draft Program EIR for public review, all documents which were relied upon for the analysis of environmental impacts, such as the Draft 2016 AQMP and corresponding appendices, were also available for public review. Since the Draft 2016 AQMP was released on June 30, 2016, SCAQMD staff has released the Revised Draft 2016 AQMP on October 7, 2016 and the Draft Final 2016 AQMP on December 2, 2016. SCAQMD staff reviewed the changes in each of those documents and found that, pursuant to CEQA Guidelines Section 15088.5, any changes to the project description did not constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. *See also* Responses 3-5 and 3-6.

Comment 3-11

> In brief, the DPEIR erroneously limits the scope of the analysis and inherently calls for impermissible speculation or impossible prescience on the part of public agencies or other members of the concerned public to undertake effective analysis of the proposed Project, or to provide meaningful comments on the DPEIR. No effective CEQA review can be undertaken unless and until the District provides an adequate description of the "Project." It is essential that the DPEIR be revised to include an adequate "project description" including *all* of the Proposed Plan's pertinent control measures and strategies that make up the "project" ***before*** the public and agencies can be expected to provide meaningful comments and input.

Response 3-11
A detailed and comprehensive project description was included in Chapter 2 of the Draft Program EIR and the Draft 2016 AQMP was available during the public comment period to provide meaningful review. The adverse environmental impacts associated with the Draft 2016 AQMP were analyzed on a programmatic level. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373.) Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be appropriate at that time. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. *See also* Responses 3-5 and 3-6.

Comment 3-12

2. Specific Comments on "Project Description" Text

The following comments and questions refer to specific portions or pages of Chapter 2 of the DPEIR:

P. 2-7 – Agency Authority-2016 AQMP

The DPEIR correctly acknowledges that the regulation of air quality emissions from mobile sources is primarily done at the federal and state level. By comparison, the District "has lead responsibility for developing stationary, some area, and indirect source control measures . . .." (DPEIR, p. 2-7.)[4] Despite this acknowledged limit on its regulatory jurisdiction, the Proposed Plan nonetheless purports to contain several measures related to mobile source emissions.

[4] *Accord*, Proposed Plan, p. ES-5 ("With limited SCAQMD authority over the mobile sources that contribute the most to our air quality problems, attainment cannot be achieved without state and federal actions.") and Proposed Plan, p. 3-11 ("U.S. EPA and CARB have primary authority to regulate emissions from mobile sources. U.S. EPA's authority applies to aircraft, locomotives, ocean going vessels, and some categories of on- and off-road mobile equipment. CARB has authority over the remainder of the mobile sources, and consumer products. SCAQMD has authority over most area sources and all point sources.").

Response 3-12
The SCAQMD has limited regulatory authority over mobile sources (e.g., fleet rules) and thus, a suite of SCAQMD facility-based mobile source measures are being proposed. Most of these mobile source measures will work in concert with CARB's State SIP Strategy being developed locally. Incentives are one way to gain emission reductions sooner than natural turnover of vehicles and equipment. Accelerating the deployment of cleaner technologies before future rulemaking is established allows the new technology to be commercially available, achieved in practice, feasible in more applications, cost effective, as well as publicly acceptable. The specific sources of funding have yet to be finalized, but staff has developed the Financial Incentive Funding Action Plan that maps out the possible opportunities to ensure the proposals have secured funding. Such funding is being sought on a federal, state and local level. To ensure the reductions are

creditable in the SIP, the U.S. EPA does require these reductions to be quantifiable, surplus (beyond regulations), permanent and enforceable. With such integrity elements in place, the incentive actions can be effective and provide lasting improvements.

The mobile source control measures, including the measures that CARB has identified, were analyzed for potential environmental impacts in Chapter 4 of the Draft Program EIR. Potential air quality impacts from mobile source control measures are analyzed in Subchapter 4.1.6.2.4.

Comment 3-13

Pp. 2-9 to 2-11 – Overall Attainment Strategy

The DPEIR indicates that the Proposed Plan is designed to meet the following federal standards:

- Revoked 1979 1-hour ozone standard (120 parts per billion ["ppb"]) by 2023;
- Revoked 1997 8-hour federal ozone standard (80 ppb) by 2024;
- 2006 24-hour PM2.5 standard (35 ug/m^3) by 2019;
- 2008 8-hour ozone standard (75 ppb) by 2032; and
- 2012 annual federal and state PM2.5 standards (12 ug/m^3) by 2025.

In addition to developing strategies and measures to meet the above acknowledged revoked standards, the text indicates that a new federal 8-hour ozone standard has been adopted (70 ppb) ostensibly replacing the 2008 standard analyzed. (DPEIR, p. 2-9.) The text does not explain why a plan is being developed to attain standards that have been revoked or superseded.

According to the DPEIR, the "most significant air quality challenge faced by the SCAQMD is to reduce [nitrogen oxide or "NOx"] emissions sufficiently to meet the upcoming ozone and federal PM2.5 federal standard deadlines." (DPEIR, p. 2-9) Specifically, an additional 43 percent NOx emission reduction is needed in 2023 and 55 percent is needed in 2031 to attain the 8-hour ozone standard. (DPEIR, pp. 2-9 to 2-10.) Mobile sources account for 80 percent of the NOx emissions, and the DPEIR accordingly states that the "majority of NOx emission reductions" will need to come from mobile sources. (*Id.*) The DPEIR acknowledges again that the District lacks authority to regulate such emissions which are "divided between" the California Air Resources Board ("CARB") and the U.S. Environmental Protection Agency ("EPA"). (DPEIR, p. 2-10.) The control measures are supposed to be based on, among others, enforceability and legal authority. (DPEIR, p. 2-11.) Yet, through the Proposed Plan, the District is purporting to adopt an "aggressive mobile source control strategy" to control emissions over which it admittedly lacks regulatory jurisdiction. (DPEIR, p. 2-10.)[5]

The lack of authority is further reflected by the DPEIR's admission that the Proposed Plan places "heavy reliance on voluntary incentive measures to achieve attainment of the federal air quality standards" such that the District "must design programs such that the emission reductions from these incentive measures are proven to be real, quantifiable, surplus, enforceable, and permanent in order for U.S. EPA to approve the emission reduction as part of the Plan." (DPEIR, pp. 2-17 to 2-18.)

[5] The Proposed Plan at page ES-7 states that mobile sources currently contribute about 88 percent of the region's total NOx emissions. It then states that "[s]ince the SCAQMD has limited authority to regulate mobile sources, staff worked closely with CARB and U.S. EPA, which have primary authority over mobile sources, to ensure mobile sources perform their fair share of pollution reduction responsibilities." (Proposed Plan, p. ES-7.)

Response 3-13

The 2008 ozone standard has not yet been revoked, so the obligation to demonstrate attainment still remains. Sanctions and consequences to our region will be imposed if a plan is not submitted. However, once a standard is revoked, there are still anti-backsliding requirements that need to be complied with. Please see Chapter 6 of the 2016 AQMP for more information. CARB has authority to propose a State SIP Strategy. The State SIP Strategy includes reductions from federal sources including aircraft, locomotives and ocean-going vessels, as well as reductions from on-road vehicles and off-road equipment under the authority of CARB. SCAQMD proposes reductions from stationary and mobile sources under the SCAQMD's control for the 2016 AQMP in the form of regulatory, incentive and co-benefit approaches.

The SCAQMD does not lack authority, but rather has limited authority. The overall strategy, that includes state and federal sources, is an aggressive mobile source strategy.

Comment 3-14

Pp. 2-11 to 2-12 – Project Objectives

The DPEIR notes the objective of achieving the various ozone and particulate matter standards by the specified attainment dates. However, as the Tables in the Project Description make clear, most of the emissions reductions are listed as "TBD" with a note that emission reductions "will be determined after projects are identified and implemented" or "once the technical assessment is complete, and inventory and cost-effective control approach[es] are identified." (DPEIR, pp. 2-15, 2-26, 2-36.) Because the emission reductions associated with several control measures have not yet been quantified, there is no guarantee or assurance that the emission reductions will actually be attained. Thus, contrary to the NOP for the DPEIR, the Proposed Plan does not "identif[y] control measures and strategies to bring the region into attainment" with the specified standards nor does it demonstrate "compliance with state and federal Clean Air Act requirements." For this same reason, the Proposed Plan fails to attain its statutorily prescribed purpose.[6]

[6] (42 U.S.C. § 7410; California Health & Safety Code § 40440; *American Coatings Ass'n v. South Coast Air Quality Management District* (2012) 54 Cal.4th 446, 453.)

Response 3-14

SCAQMD staff's goal for the Draft 2016 AQMP was to propose a comprehensive plan with all feasible measures. The emission reductions listed as TBD referred to in the comment were not relied upon in the attainment demonstration and would need additional technical assessment in order to be quantified. However, many of these measures would help implement state mobile source strategies. There may also be the possible need in the near future for measures to help make up any shortfall in reductions in which case the TBD measures could be explored further to assist

in those needs.

Comment 3-15

P. 2-13 – Project Description

The Project description indicates that the Project "control measures" consist of three main components: (1) the SCAQMD Stationary and Mobile Source Control Measures, (2) State and Suggested Federal Mobile Source Control Measures, and (3) Regional Transportation Plan/Sustainable Communities Strategy ("RTP/SCS") provided by the Southern California Association of Governments ("SCAG").

The text indicates that the air quality baseline is comprised of 2012 data. (DPEIR, p. 2-13.) Yet, there is no clear explanation or rationale for the use of baseline data that is nearly 5 years old. The scope of the proposed DPEIR and Proposed Plan must be expanded to include a detailed explanation, supported by substantial evidence,[7] that the 2012 air quality baseline is appropriate. (CEQA Guidelines § 15125; *Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 48 Cal.4th 310.) The analysis must also clearly specify the baseline used for other resource topics, and to the extent that they deviate from the normal "existing conditions" scenario, like air quality, provide a clear and cogent explanation as to why this is appropriate.

[7] (*See* Public Resources Code § 21080(e) [CEQA defines substantial evidence as "fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact" and excluding, among others, "speculation" and "unsubstantiated opinion."].)

Response 3-15

The environmental setting and baseline that was used to evaluate proposed project impacts is explained in detail in Subchapter 3.2 of the Draft Program EIR. 2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions for the 2016 AQMP. The latest verifiable air quality data (from approved air quality monitoring sites) is from 2015, which can be found in Chapter 2 of the 2016 AQMP and Subchapter 3.2 of the Draft Program EIR. The verified 2015 air quality data was used as the baseline for evaluating air quality impacts associated with the proposed project. The most recent environmental topic data from 2016 was used for the CEQA baseline in determining environmental impacts from other environmental topic areas because that was the time of the release of the NOP/IS.

Comment 3-16

Pp. 2-13 to 2-23 – Stationary Source Control Measures (SCAQMD)

The stationary control measures to be implemented by the District are listed in Table 2.8-1 and summarized in the text following that table.

The DPEIR fails to acknowledge, let alone analyze, all potentially significant environmental impacts of the stationary source control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*Muzzy Ranch Co. v. Solano County Airport Land Use Comm'n* (2007) 41 Cal.4th 372, 383.)

Response 3-16
The Draft Program EIR contains a comprehensive analysis of the reasonably foreseeable direct and indirect impacts of the 2016 AQMP. Currently, SCAQMD staff does not have evidence to support nor is it foreseeable that industries or other regulated entities would need to relocate elsewhere due to implementation of the 2016 AQMP. The comment does not provide any evidence to support its claims. No further response is necessary under CEQA.

Comment 3-17

> Measure CMB-03 proposes to reduce emissions from non-refinery flares by "capturing the gas that would typically be flared and converting it into an energy source (*e.g.*, transportation fuel, fuel cells) . . .." (DPEIR, p. 2-16.) A similar measure appears to be proposed for nitrogen gas and biogas. (*See* Measures BCM-05 and BCM-10.) Yet, there is no discussion or consideration of the potentially significant impacts associated with pipelines or other infrastructure that would be needed to implement these measures nor of the traffic, air quality, noise, and other impacts associated with increased truck traffic to facilities containing such refined materials. There is similarly no analysis of the proposed alternative of reinjecting the gas into the ground or combusting it through flares. (Proposed Plan, Appendix IV-A, p. IV-A-70.)
>
> Measure ECC-04 includes a vague reference to widespread adoption of cool roofs. This measure may result in significant environmental impacts in the areas of aesthetics, biological resources, and land use/planning.
>
> Measure ECC-03 would "seek to provide incentives" to go beyond the Title 24 standards and existing local regulations pertaining to NOx emissions. (DPEIR, p. 2-18.) "Incentive programs ***would be developed*** for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources." (*Id.*) The measure also references providing "solar thermal and solar photovoltaics" to provide emission reductions within the residential sector. (*Id.*) The measure lacks any specificity about the programs that the District acknowledges would still be developed. There is no information on the amount of funding and the number of residents that may take advantage of this program. Based on the examples provided, this measure may result in significant environmental impacts in the areas of aesthetics, air quality, land use, solid waste, and other resource topics.

Response 3-17
Potential environmental impacts associated with the measures that involve replacing equipment, operations, and/or infrastructure referred to in the comment, including CMB-03, are analyzed in Chapter 4 of the Draft Program EIR. The potential environmental impacts from traffic, air quality, and noise associated with increased truck traffic referred to in the comment are also analyzed in Chapter 4 of the Draft Program EIR. It is speculative at this time to assume the options an operator will choose to take in handling gas, such as microturbines, fuel cells, sell back to gas companies, reinjection, or low-emitting burners. The Draft Program EIR takes into account, programmatically, that extensive construction will take place and found significant adverse impacts. These impacts are due to a variety of construction processes, but could include pipeline installation, infrastructure, or reinjection into the ground due to CMB-03, BCM-05, and BCM-10.

ECC-03 is an incentive-based measure to take credit for emission reductions from the existing residential sector. The specific details of implementation will be established in a working group process to take place once the 2016 AQMP has been approved to proceed in the development

phase. However, this control measure was analyzed in the Draft Program EIR for the topic areas of aesthetics, air quality, and solid waste. The comment refers to "other resource topics" potentially being impacted, but does not provide any specific information. Staff is not aware of potential significant impacts to other topic areas. Therefore, it is speculative to determine potential impacts from other resource topic areas at this time. Since ECC-03 is directed towards existing residences, land use impacts are not expected and, therefore, were not analyzed in the Draft Program EIR.

Control measure ECC-04 is intended for commercial building roofs and high-rise residential roofs with low slopes and the aesthetic impacts from ECC-04 were analyzed in the Draft Program EIR. It should be noted that these types of structures are typically located in either highly industrialized or highly developed settings. Therefore, no significant impacts to biological resources are anticipated since ECC-04 would affect existing structures. Land use decisions are made on a local level and it would be speculative to assume adverse decisions would be made based on roof product and color.

The Draft Program EIR analyzed the environmental impacts from the Draft 2016 AQMP on a programmatic level. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373.) Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be appropriate at that time. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. *See also* Responses 3-5 and 3-6.

Comment 3-18

> Measure CMB-01 would seek emission reductions of NOx from traditional combustion engines by replacing them with zero and near-zero emission technologies through, among other methods, electrification and fuel cells. This measure would also seek energy storage systems and smart grid control technologies coupled with renewable energy generation. This measure has the potential to result in significant environmental impacts with respect to, among others, the construction of additional energy infrastructure. Per a more detailed description of this measure in the Appendix to the Proposed Plan, it also seeks to "[e]ncourage new businesses that use and/or manufacture near-zero and zero emission technologies to site in the Basin." (Proposed Plan, Appendix IV-A, p. IV-A-47.)[8] The DPEIR contains, at best, an incomplete analysis of this measure as evidenced by its omission of any discussion of its potential growth inducing impacts.[9]
>
> [8] A similar provision is included as part of FLX-02. (Proposed Plan, Appendix IV-A, p. IV-A-105.)
>
> [9] (CEQA Guidelines § 15126.2(d); *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 367 [EIR must discuss growth-inducing effects even though those effects will result only indirectly from a project.].)

Response 3-18
CEQA defines growth-inducing impacts as those that "foster economic or population growth or construction of additional housing." CMB-01 seeks to advance the deployment of engines, ovens and boilers, which are not anticipated to result in the direct or indirect construction of housing. Additionally, any new businesses that site within the District as a result of CMB-01 will undergo project-level CEQA analysis at that time.

The Draft Program EIR analyzed the adverse environmental impacts from the Draft 2016 AQMP on a programmatic level. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373.) Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be appropriate at that time. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. *See also* Responses 3-5 and 3-6.

Comment 3-19

> All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be analyzed and are not. (*See* Control Measures ECC-04, CMB-01, CMB-02, CMB-03, CMB-04, MCS-02, FLX-01, FLX-02, and BCM-10.) For instance, the impacts of most measures is described by a single sentence in tables set forth in the DPEIR. Table 4.0-1 of the DPEIR wrongly concludes that Control Measures MCS-02 and FLX-01 will result in no impacts, asserting without any substantial evidence that "[i]mpacts are speculative" due to unknown future technologies and the unknown effectiveness of education and outreach.

Response 3-19
The potential environmental impacts associated with the measures (ECC-04, CMB-01, CMB-03, CMB-04, MCS-02, FLX-01, FLX-02, BCM-01, BCM-02, BCM-04, BCM-06, BCM-07, BCM-10) that involve replacing equipment, operations, and/or infrastructure referred to in the comment were analyzed in Chapter 4 of the Draft Program EIR. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

As described in Table 4.0-1, MCS-02 – Application of All Feasible Measures refers to implementation of rulemaking to establish emission limits for future BARCT analysis, and FLX-01 – Improved Education and Public Outreach refers to increased and public outreach to guide consumer behavior. Both these measures will be developed in the future and their environmental impacts are considered speculative at this time since the specifics on implementation have not been developed. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA.].) As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically. Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be appropriate at that time. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that

requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-20

> Measure CTS-01 seeks to lower the content of VOCs in coatings, solvents, and adhesives. Such measures may result in additional applications of lower quality products which could result in a net increase in air emissions. (*Dunn-Edwards Corp. v. Bay Area Air Quality Management District* (1992) 9 Cal.App.4th 644.)

Response 3-20

Subchapter 4.1 of the Draft Program EIR includes a discussion of the specific issues associated with reformulation of coatings including increased viscosity, illegal thinning, the need for more priming, more topcoats, more touch-ups and repair work, more frequent recoating, substitution, and reactivity. The comment does not raise any new issues not already discussed in the Draft Program EIR. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373.) Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be appropriate at that time. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. *See also* Responses 3-5 and 3-6.

Comment 3-21

> Pp. 2-23 to 2-33 – Mobile Source Control Measures (SCAQMD)
>
> Notwithstanding its lack of regulatory jurisdiction over mobile sources, the District's Proposed Plan nonetheless contains a detailed list of mobile source control measures. The mobile source control measures are listed in Table 2.8-2 and summarized in the text following that table.
>
> The DPEIR fails to acknowledge let alone analyze all potentially significant environmental impacts of the mobile source control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*See, e.g. Muzzy Ranch, supra.*)

Of particular concern for the POLB is MOB-01. Stemming from a desire to take ongoing credit for the voluntary emission reductions undertaken by the Ports through the CAAP Program, Control Measure MOB-01 could make the voluntary emission reductions a mandatory enforceable commitment in the form of a regulation enacted by the District "within its existing legal authority" or some yet-to-be granted authority that the District will "seek" to regulate mobile source emissions. (DPEIR, p. 2-24.)[10] In a separate comment letter to the District on the Proposed Plan dated August 19, 2016, the Ports explain why the District lacks the legal authority to adopt or enforce any such regulation.[11] Due to its lack of legal authority, this measure is not feasible and thus cannot serve as any valid form of mitigation. (Public Resources Code §§ 21004 and 21081(a)(3); CEQA Guidelines §§ 15040 and 15364; *Sierra Club v. California Coastal Comm'n* (2005) 35 Cal.4th 839; and *Tracy First v. City of Tracy* (2009) 177 Cal.App.4th 912.) Moreover, from a CEQA standpoint, the emission reductions from the CAAP Program are already reflected in the baseline/setting as well as in the discussion of the No Project Alternative.[12]

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[10] Specifically Measure MOB-01 "seeks to quantify the emission reductions realized from the CAAP and credit the reductions into the [State Implementation Plan ("SIP")] to the extent that these actions are real and surplus to the SIP." (DPEIR, p. 2-28.)

[11] The Ports supplemented its August 19, 2016 letter on the Proposed Plan with a November 7, 2016 comment letter on the Revised Plan and the partially-released Socio-Economic Report.

[12] (*See, e.g.*, CEQA Guidelines § 15126.6(e)(3)(A) [when the "project" is the revision of an existing land use or regulatory plan, policy or ongoing operation, the "no project" alternative will be the continuation of the existing plan, policy or operation into the future."].)

Response 3-21

The SCAQMD has limited regulatory authority over mobile sources (e.g., fleet rules) and thus, a suite of SCAQMD facility-based mobile source measures are being proposed. Most of these mobile source measures will work in concert with CARB's State SIP Strategy being developed locally. Incentives are one way to gain emission reductions sooner than natural turnover of vehicles and equipment. Accelerating the deployment of cleaner technologies before future rulemaking is established allows the new technology to be commercially available, achieved in practice, feasible in more applications, cost effective, as well as publicly acceptable. The specific sources of funding have yet to be finalized, but staff has developed the Financial Incentive Funding Action Plan that maps out the possible opportunities to ensure the proposals have secured funding. Such funding is being sought on a federal, state and local level. To ensure the reductions are creditable in the SIP, the U.S. EPA does require these reductions to be quantifiable, surplus (beyond regulations), permanent and enforceable. With such integrity elements in place, the incentive actions can be effective and provide lasting improvements.

Currently, SCAQMD staff has no evidence that the control measures will cause industries and other regulated entities to relocate elsewhere and this is considered speculative. This comment does not provide evidence to support its claim.

Emission reductions from the ports (through the Clean Air Action Plan - CAAP Program) are included in the baseline emissions inventory. Staff believes that a constructive approach to achieving additional emission reductions in the near-term is through the actions the Ports are taking in the development of the CAAP update. If such actions are voluntary in nature and the associated emission reductions are proposed to be included in the SIP, enforceable commitments must be made to ensure the reductions are surplus and permanent. The enforceable commitment may be

in the form of a rule or other enforceable mechanisms. The approach agreed upon in the future regarding how to implement MOB-01 will dictate the exact direct and indirect impacts. However, MOB-01 is analyzed programmatically in the Draft Program EIR.

The August 19, 2016 comment letter on the Draft 2016 AQMP is referred to as Comment Letter #50 and the responses to those comments are available on the internet here: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/response-to-comments/2016-aqmp-rtc-3-of-4.pdf.

The Draft Program EIR analyzed the environmental impacts associated with the mobile source control measures, as applicable, and as summarized in Table 3-1 below. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Table 3-1 – Summary of Environmental Topics Analyzed in the Draft Program EIR for Mobile Source Control Measures

Mobile Source Control Measure	Air Quality and GHG	Energy	Hazards and Hazardous Materials	Hydrology and Water Quality	Noise	Solid and Hazardous Waste	Transportation and Traffic	Aesthetics
MOB-01	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MOB-02	Yes	Yes	Yes	Yes	No	Yes	No	No
MOB-03	Yes	Yes	Yes	Yes	No	Yes	No	No
MOB-04	Yes	Yes	Yes	Yes	No	Yes	No	No
MOB-05	Yes	Yes	Yes	Yes	No	Yes	No	No
MOB-06	No	No	No	No	No	Yes	No	No
MOB-07	Yes	Yes	Yes	Yes	No	Yes	No	No
MOB-08	No	No	No	No	No	Yes	No	No
MOB-09	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
MOB-10	Yes	Yes	Yes	Yes	No	Yes	No	No
MOB-11	No	No	No	No	No	Yes	No	No
MOB-12	No	No	No	No	No	Yes	No	No
MOB-13	Yes	Yes	Yes	Yes	No	Yes	No	No
MOB-14	Yes	Yes	Yes	No	No	Yes	No	No

Comment 3-22

MOB-02 appears intended to correct two District rules pertaining to rail yards and intermodal facilities rejected by the U.S. EPA presumably because they are beyond the scope of the District's regulatory jurisdiction. Per this vague and amorphous measure, the District will reconvene a stakeholder working group "to discuss and identify actions or approaches that can be implemented to further reduce emissions at rail yards and intermodal facilities." (DPEIR, p. 2-28.) At most, this is a proposal to develop a measure that cannot be adequately analyzed at present in the DPEIR and should be removed from consideration.[13] Any such contemplated implementation strategies must be included in the "Project Description" so that they may be evaluated in the DPEIR along with the other control measures.

[13] Similar deficiencies apply to Measures MOB-03 (Emission Reductions at Warehouse Distribution Centers), MOB-04 (Emission Reductions at Commercial Airports), MOB-12 (Further Emission Reductions from Passenger Locomotives), MOB-13 (Off-Road Mobile Source Emission Reduction Credit Generation Program), MOB-14 (Emission Reductions from Incentive Programs), and EGM-01 (Emission Reductions from New Development and Redevelopment Projects).

Response 3-22

MOB-02 is intended to aid in the acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP (including MOB-02, MOB-03, MOB-04, MOB-14, and EGM-01) were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) MOB-12 was determined to not have any potential air quality impacts. Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-23

Measure MOB-05 proposes to provide funding rebates for at least 15,000 zero emission or partial-emission vehicles per year. Measure MOB-07 similarly seeks to deploy up to 120 zero and partial-zero emission heavy-duty vehicles per year. The DPEIR needs to contain an analysis of the traffic, noise, air quality, and other impacts associated with such programs, which could result in additional vehicles being added to already congested roadways.

Measure MOB-06 seeks to retire 2,000 older light and medium-duty vehicles per year. Measure MOB-08 similarly seeks to retire 2,000 heavy-duty vehicles per year. The DPEIR needs to contain an analysis of the traffic, noise, air quality, and other impacts associated with such programs, which could result in additional vehicles being added to already congested roadways.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be thoroughly analyzed and mitigated. (*See* Control Measures MOB-06, MOB-07, MOB-08, MOB-10, MOB-11, MOB-12, MOB-13, and MOB-14.)

Response 3-23

Chapter 4 of the Draft Program EIR included an analysis of the air quality impacts from all applicable control measures, including MOB-05, MOB-07, MOB-09, MOB-10, MOB-13 and MOB-14, which are detailed in Subchapter 4.1. As explained in Subchapter 4.7, control measures MOB-05, MOB-06, MOB-07, MOB-09, MOB-10, MOB-13 and MOB-14 are expected to replace already existing, older high emitting vehicles with cleaner vehicles, and will not result in additional cars added to the roadways. The only mobile source control measures with potential noise impacts were MOB-01 and MOB-09, which are analyzed in Subchapter 4.5.

Comment 3-24

Pp. 2-33 to 2-39 – SCAQMD Proposed PM2.5 Strategy

Measure BCM-03 calls for an unspecified increase in the watering of roads to control fugitive dust. The measure also proposes to evaluate existing fugitive dust rules to see if unknown and unspecified additional PM2.5 emission reductions can be achieved. The potentially significant air quality, noise, traffic, and water supply impacts of such a proposal must be thoroughly analyzed and mitigated in the DPEIR.

Measure BCM-04, which calls for revised manure management strategies, requires more analysis than is provided in the DPEIR. (*See, e.g., County Sanitation Dist. No. 2 v. County of Kern* (2005) 127 Cal.App.4th 1544, 1597 [EIR required to examine impacts of alternative sewage sludge disposal].)

Measure BCM-07 calls for increased watering of rotating cutting discs to reduce dust emissions. "Emissions are expected to be minimal, provided the waste material is disposed of properly." (Proposed Plan, Appendix IV-A, p. IV-A-201.) Yet, no analysis of the potentially significant air, noise, hazards, traffic, solid waste, or water supply impacts are provided such that any mitigation could be imposed to ensure that waste material is, in fact, disposed of properly.

The noise, air quality, geology and other impacts of Measure BCM-08, which seeks to limit agricultural burning through promoting burning alternatives (*e.g.*, chipping/grinding or composting) must be fully analyzed and mitigated.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be thoroughly analyzed and mitigated. (*See, e.g.*, Control Measures BCM-01, BCM-02, BCM-04, BCM-06, BCM-07, and BCM-10.)

Response 3-24

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

For BCM-03, the air quality, noise, traffic, and water supply impacts were analyzed in Chapters 4.1, 4.5, 4.7, and 4.4, respectively. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

For BMC-04, the air quality, energy, hazards, hydrology, solid waste, and transportation impacts were analyzed in Chapters 4.1, 4.2, 4.3, 4.4, and 4.7, respectively. The comment does not include specifics as to the additional analysis required and does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

For BCM-07, the air quality, energy, hydrology, noise, solid waste, and transportation impacts were analyzed in Chapters 4.1, 4.2, 4.4, 4.5, 4.6, and 4.7, respectively. The comment does not

raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

For BCM-08, the air quality, hazards, solid waste, and transportation impacts were analyzed in Chapters 4.1, 4.3, 4.6, and 4.7, respectively. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 3-25

Pp. 2-39 to 2-45 – SCAQMD Air Toxic Control Measures

In addition to the criteria pollutant control measures, the Proposed Plan also contains a detailed list of measures to control toxic air contaminants ("TAC") from stationary sources. The TAC control measures are listed in Table 2.8-5 and summarized in the text following that table.

The DPEIR fails to acknowledge, let alone analyze, all potentially significant environmental impacts of the air toxic control measures. The DPEIR must contain a complete and comprehensive analysis of the direct and reasonably foreseeable indirect impacts of all such measures. The potential for these measures to cause industries and other regulated entities to relocate elsewhere must also be considered. (*See, e.g. Muzzy Ranch, supra.*)

Measure TXM-01 contains a list of potential emission control approaches for metal grinding operations. Because there is no specific proposal, the DPEIR cannot meaningfully analyze this measure.

All potentially significant environmental impacts associated with replacing equipment, operations, and/or infrastructure with new or altered equipment, operations, and/or infrastructure must be thoroughly analyzed and mitigated. (*See* Control Measures TXM-04, TXM-05, TXM-06, TXM-08, and TXM-09.)

Response 3-25

The Draft Program EIR analyzed the environmental impacts associated with the toxic air contaminant (TAC) control measures, as applicable, and as summarized in Table 3-2 below. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Table 3-2 – Summary of Environmental Topics Analyzed in the Draft Program EIR for TAC Control Measures

TAC Control Measure	Air Quality and GHG	Energy	Hazards and Hazardous Materials	Hydrology and Water Quality	Noise	Solid and Hazardous Waste	Transportation and Traffic	Aesthetics
TXM-01	Yes	Yes	No	Yes	Yes	Yes	Yes	No
TXM-02	Yes	Yes	No	Yes	Yes	Yes	Yes	No
TXM-03	No	No	No	No	No	Yes	No	No
TXM-04	Yes	Yes	No	Yes	Yes	Yes	Yes	No
TXM-05	Yes	Yes	No	Yes	Yes	Yes	Yes	No
TXM-06	Yes	Yes	No	Yes	Yes	Yes	Yes	No
TXM-07	Yes	Yes	No	Yes	Yes	Yes	Yes	No
TXM-08	Yes	Yes	Yes	Yes	No	Yes	No	No
TXM-09	Yes	Yes	No	No	Yes	Yes	Yes	No

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

For example, Proposed Rule (PR) 1430 – Control of Emissions from Grinding Operations at Metal Forging Facilities is currently being proposed, which is consistent with the intent of TXM-01. As part of the rulemaking process, an environmental assessment was prepared for PR 1430 and was released for a 30-day public review and comment period from January 11, 2017 to February 10, 2017.

Comment 3-26

Pp. 2-45 to 2-53 – State and Federal Control Measures

The DPEIR's project description contains a detailed list of federal and state mobile source control measures. Although the District admittedly lacks regulatory jurisdiction over mobile sources, because the federal and state mobile source control measures are described as part of the Project, the DPEIR must contain a thorough analysis of the potentially significant environmental effects associated with these measures. Yet, Table 4.0-1 of the DPEIR wrongly concludes that several of these measures will result in no impacts. Instead, it claims without any evidentiary support that "[i]mpacts are speculative" due to unknown future technologies and the design of future cars.

Control Measure ORLD-01 proposes to increase the sales of zero emission vehicles and plug-in electric vehicles beyond the levels required in 2025. Measure ORLD-03 calls for "greater penetration of zero and near-zero technologies" as well as the "potential for autonomous vehicles and advanced transportation systems." (DPEIR, p. 2-48.) Measure ORHD-05 requires the use of low-NOx engines and the purchase of zero emission trucks "for certain class 3-7 last mile delivery trucks" starting in 2020 and "ramping up to a higher percentage of the fleet at time of normal replacement through 2030." (DPEIR, p. 2-49.) Measure ORHD-09 calls for "greater penetration of zero and near-zero technologies through incentive programs, emission benefits associated with increased operation efficiency strategies, and the potential for new driver assist and intelligent transportation systems." (DPEIR, p. 2-50.) Measure OFFS-08 likewise calls for

"greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle technologies." (DPEIR, p. 2-52.) The potentially significant air quality, noise, traffic, and other impacts associated with such measures must be thoroughly analyzed and mitigated in the DPEIR.

Further, the Proposed Plan identifies nearly $15 billion in incentive funding needed to facilitate the transition to zero and near-zero emissions equipment. The Proposed Plan indicates that SCAQMD will develop an action plan to identify "the necessary actions by the District" and other stakeholders "to ensure the requisite levels of funding are secured." (Proposed Plan, p. 4-66.) Although the Proposed Plan discusses the possibility of a federal "superfund" program, state bond measures, and local ballot measures to obtain this funding, it does not define the specific "necessary actions." Without more detail, it is impossible to evaluate whether this incentive action plan and the necessary $15 billion in government funding have significant environmental impacts. The DPEIR states that such a measure could result in significant secondary impacts in the areas of aesthetics, energy, hazards, water, noise, waste, and traffic. (DPEIR, pp. 6-40 to 6-41.) But no thorough analysis nor mitigation is provided as required by CEQA. Instead, the impacts of such a proposal are only cursorily examined as a Project "alternative."

Response 3-26

The SCAQMD has limited regulatory authority over mobile sources (e.g., fleet rules) and thus, a suite of SCAQMD facility-based mobile source measures are being proposed. Most of these mobile source measures will work in concert with CARB's State SIP Strategy being developed locally. Incentives are one way to gain emission reductions sooner than natural turnover of vehicles and equipment. Accelerating the deployment of cleaner technologies before future rulemaking is established allows the new technology to be commercially available, achieved in practice, feasible in more applications, cost effective, as well as publicly acceptable. The specific sources of funding have yet to be finalized, but staff has developed the Financial Incentive Funding Action Plan that maps out the possible opportunities to ensure the proposals have secured funding. Such funding is being sought on a federal, state and local level. To ensure the reductions are creditable in the SIP, the U.S. EPA does require these reductions to be quantifiable, surplus (beyond regulations), permanent and enforceable. With such integrity elements in place, the incentive actions can be effective and provide lasting improvements.

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

The Draft Program EIR analyzed the environmental impacts associated with the state and federal control measures, as applicable, and as summarized in Table 3-3 below. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further

response is necessary under CEQA.

Table 3-3 – Summary of Environmental Topics Analyzed in the Draft Program EIR for State and Federal Control Measures

TAC Control Measure	Air Quality and GHG	Energy	Hazards and Hazardous Materials	Hydrology and Water Quality	Noise	Solid and Hazardous Waste	Transportation and Traffic	Aesthetics
ORLD-01	Yes	Yes	Yes	Yes	No	Yes	No	No
ORLD-02	No	No	No	No	No	No	No	No
ORLD-03	Yes	Yes	Yes	Yes	No	Yes	No	No
ORHD-01	No	No	No	No	No	No	No	No
ORHD-02	Yes	Yes	Yes	Yes	No	Yes	No	No
ORHD-03	No	No	No	No	No	No	No	No
ORHD-04	Yes	Yes	Yes	Yes	No	Yes	No	No
ORHD-05	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ORHD-06	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ORHD-07	Yes	Yes	Yes	Yes	No	Yes	No	No
ORHD-08	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ORHD-09	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ORFIS-01	Yes	Yes	Yes	Yes	No	Yes	Yes	No
ORFIS-02	No	No	No	No	No	No	No	No
ORFIS-03	Yes	Yes	Yes	No	No	Yes	Yes	No
ORFIS-04	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ORFIS-05	Yes	Yes	Yes	Yes	No	Yes	No	No
OFFS-01	Yes	Yes	Yes	Yes	No	Yes	No	No
OFFS-02	No	No	No	No	No	No	No	No
OFFS-03	No	No	No	No	No	No	No	No
OFFS-04	Yes	Yes	Yes	No	No	Yes	No	No
OFFS-05	Yes	Yes	Yes	Yes	No	Yes	No	No
OFFS-06	Yes	Yes	No	No	No	No	No	No
OFFS-07	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
OFFS-08	Yes	Yes	Yes	Yes	No	Yes	No	No
CPP-01	Yes	No	Yes	Yes	No	No	No	No

The Draft Program EIR analyzed the environmental impacts regardless of how the control measures are implemented (incentive-based or regulatory). SCAQMD staff reviewed the Draft Financial Incentives Funding Action Plan (released in December 2016) and did not find any associated environmental impacts. Therefore, no further analysis is needed.

Comment 3-27

> Pp. 2-53 to 2-55 – SCAG's Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures
>
> SCAG has the responsibility for preparing and approving the portions of the Proposed Plan related to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. (DPEIR, p. 2-53.) The DPEIR further indicates that the District "combines its portions of the AQMP with those portions prepared by SCAG" per Health & Safety Code § 40460. (*Id.*) In particular the Project contains Transportation Control Measures ("TCM"), from SCAG's RTP/SCS.
>
> Although those measures are only generally described in the DPEIR, they include several measures that may result in significant environmental impacts. (*See* DPEIR, p. 2-54 [measures include, among others, expanding regional transit, passenger rail, highway capacity, and high occupancy lanes].) Yet, none of these measures are analyzed in the DPEIR. As noted in Section II.D below, the DPEIR only evaluates the TCMs in the cumulative impact analysis and ignores completely the land use and transportation strategies. This results in a failure of the DPEIR to consider the "whole of the action" and associated improper segmentation of project impacts. (CEQA Guidelines § 15378; *Bozung v. Local Agency Formation Comm'n* (1975) 13 Cal.3d 263, 283-284.)

Response 3-27

The 2016 AQMP relies on the regional demographic projections and transportation programs, measures, and strategies from SCAG's 2016 RTP/SCS. The RTP TCMs are required by Health and Safety Code 40460 to be combined with the SCAQMD's portion of the AQMP; however, the 2016 RTP/SCS is considered a separate project under CEQA because the land use and transportation strategies program are within SCAG's jurisdictional authority and the 2016 RTP/SCS will move forward with or without adoption of the 2016 AQMP. The environmental impacts from the 2016 RTP/SCS were analyzed and disclosed in the Draft Program EIR released by SCAG on December 4, 2015 for a 60-day public review and comment period ending on February 1, 2016. On April 7, 2016, the SCAG Regional Council adopted the 2016 RTP/SCS and certified the Final Program EIR. Since SCAQMD will not be adopting rules or regulations to implement the TCMs and the two projects are not dependent on each other, the environmental impacts from the 2016 RTP/SCS were only analyzed as part of the cumulative analysis.

Comment 3-28

B. The DPEIR Fails To Acknowledge And Address Numerous Significant Environmental Impacts.[14]

1. Introduction

We provide below comments that are common to all resource topics.

Given the total lack of information regarding what control measures the Project would entail and whether their implementation is feasible, it is premature to assess impacts related to any environmental resource topic, either on a project or cumulative basis. The "whole" of the Project must be analyzed in an EIR. As such, these details must be provided before these topics can be properly analyzed and mitigated in a revised and recirculated DPEIR.

In general, there is no indication what criteria were used to develop the significance thresholds or that they are supported by substantial evidence, as required. (Public Resources Code § 21082; CEQA Guidelines § 15064.7; and *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th 1099, 1111.) In the categories examined by the DPEIR, the significance criteria are inconsistent with the recommended questions designed to elicit whether the Project would have potentially significant impacts per Appendix G of the CEQA Guidelines.

Other than in tables with a one-sentence description of potential impacts, the vast majority of control measures are not mentioned at all in the Environmental Impact "Analysis." (*See* Tables 4.1-1, 4.1-4, 4.2-1, 4.3-1, 4.4-1, 4.5-1, 4.6-1, 4.7-1, and 4.8-1.) ***A one-sentence description of potential impacts does not constitute an adequate good faith effort at full disclosure***. (CEQA Guidelines § 15151 ["An EIR should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences" and that in reviewing an agency's efforts in regard to preparing an EIR courts look for "adequacy, completeness, and a good faith effort at full disclosure"]; *accord*, CEQA Guidelines § 15204(a) [requiring that a "good faith effort at full disclosure [be] made in the EIR."].)

In several instances, the DPEIR fails to identify significant unavoidable impacts as required by CEQA. It also relies on future CEQA documents by local agencies to correct any shortcomings in its analysis. Not only is such deferral of analysis improper under CEQA, it fails to recognize that given the likely ministerial nature of permits needed from local agencies, no further CEQA review may occur. (Public Resources Code § 21080(b)(1); CEQA Guidelines § 15268.) Even if such measures did require discretionary approvals, as the DPEIR repeatedly notes, the measures would be implemented at existing facilities and thus would likely be determined by local agencies to be exempt from CEQA pursuant to the existing facilities exemption. (*See, e.g.*, CEQA Guidelines § 15301.)

The DPEIR must be revised and recirculated to contain a thorough analysis of all potentially significant impacts associated with all of the proposed Project's control measures as well as feasible mitigation measures and alternatives designed to avoid or substantially lessen those impacts.

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[14] This Section provides comments on both the Existing Environmental Setting (Chapter 3) and Environmental Impacts and Mitigation Measures (Chapter 4) of the DPEIR.

Response 3-28
A detailed project description was included in Chapter 2 of the Draft Program EIR. The one sentence description of potential impacts in the tables referenced in the comment is intended to be a summary of the potential impacts, with further details and a more thorough discussion following later in the respective subchapters. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR.

The SCAQMD's CEQA Significance Thresholds were utilized for analyzing impacts in the Draft Program EIR. Those thresholds were clearly stated in the Initial Study and the Draft Program EIR.

The comment does not provide specifics as to which significant and unavoidable impacts were omitted or provide evidence of significant environmental impacts which would occur at existing facilities, not already analyzed in the Draft Program EIR, therefore, no revisions to the Draft Program EIR are necessary.

Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation. Therefore, no further response is necessary under CEQA.

Comment 3-29

2. Air Quality and Greenhouse Gas Emissions

a. Scope of Analysis

Several air quality topics were scoped out of the analysis pursuant to the IS. (DPEIR, p. 4.1-10.) Yet, the District's conclusion that the Project will not result in any potentially significant impacts to those topic areas is not supported by substantial evidence, as required.

For instance, the IS concluded that the Project would not conflict with or obstruct implementation of the applicable air quality plan. Along those lines, the IS notes that the Proposed Plan includes control measures for stationary, mobile, and indirect sources and that these measures are based on "feasible methods of attaining the [ambient air quality standards]." (IS, p. 2-11.) There is no evidence, let alone substantial evidence, as required, to support this statement. As noted above, control measures related to mobile sources are beyond the District's regulatory jurisdiction and thus infeasible for legal and other grounds.

There is also no factual basis to conclude that implementation of the Project would not create any odor issues and therefore need not be studied. It is premature to dismiss this area of analysis given the lack of information currently available regarding the Project. Furthermore, the IS analysis only applies to construction odors and ignores any potential odors that may occur due to Project operations.

Several of the proposed control measures have not yet been developed by the District. Further, the emissions reductions from numerous control measures are listed as "TBD" in the Proposed Plan and DPEIR. Thus, the District lacks the requisite evidentiary basis to conclude that the Project would not diminish any existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s).

The DPEIR must be revised, and the scope of the proposed DPEIR expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant air quality impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Response 3-29

As explained in the IS, the 2016 AQMP "would update the SCAQMD's 2007 and 2012 AQMPs as well as provide attainment demonstrations for new standards, as required pursuant to state and federal law." By building upon the previous adopted and approved AQMPs, which are regional air quality plans, the 2016 AQMP would not conflict with or obstruct implementation of the 2007 and 2012 AQMPs. Information related to the feasibility of control measures is included in the specific control measure write-up located in Appendix IV of the 2016 AQMP.

As noted in the comment, the SCAQMD has limited regulatory authority over mobile sources (e.g., fleet rules) and thus, a suite of SCAQMD facility-based mobile source measures are being proposed. Most of these mobile source measures will work in concert with CARB's State SIP Strategy being developed locally. Incentives are one way to gain emission reductions sooner than natural turnover of vehicles and equipment. Accelerating the deployment of cleaner technologies before future rulemaking is established allows the new technology to be commercially available, achieved in practice, feasible in more applications, cost effective, as well as publicly acceptable. The specific sources of funding have yet to be finalized, but staff has developed the Financial

Incentive Funding Action Plan that maps out the possible opportunities to ensure the proposals have secured funding. Such funding is being sought on a federal, state and local level. To ensure the reductions are creditable in the SIP, the U.S. EPA does require these reductions to be quantifiable, surplus (beyond regulations), permanent and enforceable. With such integrity elements in place, the incentive actions can be effective and provide lasting improvements.

As discussed in the IS, odor impacts from construction equipment are not expected to be significant because most diesel-fueled equipment are mobile and do not remain in one location that could continuously affect offsite receptors. As a result, odor impacts from construction activities to implement the 2016 AQMP control measures are not expect to be significant.

The IS discussed potential operational odors from the use of reformulated products and from modifications to industrial facilities to produce reformulated products. Reformulated products tend to have reduced VOC content and reduced emissions and, therefore, lower potential for creating odor impacts. As a result, significant adverse odor impacts have not been associated with reformulated products, especially those relying on water-based formulations, compared to conventional high-VOC products. Modifications to industrial facilities to produce reformulated products (e.g., refineries) also have the potential to create odor impacts. However, owners/operators of industries affected by control measures in the proposed 2016 AQMP would be subject to existing air quality rules and regulations, including SCAQMD's Rule 402 - Nuisance, which prohibits creating odor nuisances. For these reasons, implementing the 2016 AQMP is not expected to create significant adverse odor impacts and, therefore, was not further addressed in the Draft Program EIR. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR.

SCAQMD staff's goal for the Draft 2016 AQMP was to propose a comprehensive plan with all feasible measures. The emission reductions listed as TBD referred to in the comment are not relied upon in the attainment demonstration and would need additional technical assessment in order to be quantified. However, some of these measures would help implement CARB's Further Deployment of Cleaner Technologies measures (Further Deployment Measures). There may be the possible need in the near future for measures to meet shortfall reductions, in which case the TBD measures could be explored further to assist in those needs. As discussed in the IS, promulgating control measures in the 2016 AQMP, such as control requirements for stationary sources, mobile sources, incentive programs, etc., into rules or regulations typically would serve to strengthen an existing rule or regulation. Similarly, an AQMP control measure may be promulgated as a new rule or regulation, which would serve to control emissions from an unregulated or minimally regulated source. Therefore, the 2016 AQMP is not expected to diminish any existing air quality rule or future compliance requirement resulting in a significant increase in air pollutants. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Pursuant to CEQA Guidelines Section15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation. Therefore, no revisions to the Draft Program EIR are necessary and no further response is necessary under CEQA.

Comment 3-30

b. Environmental Setting

The discussion of environmental setting or baseline is confusing and fails to comport with CEQA Guidelines § 15125. That section requires that the impacts of a project be evaluated compared to the existing environmental setting as of the time of the notice of preparation. The NOP here was issued on July 5, 2016. Yet, the DPEIR states that "2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions in the 2016 AQMP." (DPEIR, p. 4.1-12.) The DPEIR goes on to inconsistently say that the latest verifiable air quality data are from 2015 and the most recent environmental topic data is from 2016. (*Id.*) It is unclear whether data from 2012 was used as the baseline for analysis of air quality impacts, or data from 2015 or 2016. An EIR that relied on shifting baselines, like the DPEIR purports to do here, was struck down by the Court of Appeal in *Save Our Peninsula Comm. v. Monterey County Bd. of Supervisors* (2001) 87 Cal.App.4th 99. If 2016 was used as the baseline, where is the verified air quality data to support it? The DPEIR refers to the use of a future baseline (DPEIR, p. 4.1-12), which was also struck down by the California Supreme Court in *Neighbors for Smart Rail v. Exposition Metro Line Constr. Auth.* (2013) 57 Cal.4th 439.

Response 3-30

The environmental setting and baseline that was used to evaluate proposed project impacts is explained in detail in Subchapter 3.2 of the Draft Program EIR. 2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions for the 2016 AQMP. The latest verifiable air quality data (from approved air quality monitoring sites) is from 2015, which can be found in Chapter 2 of the 2016 AQMP and Subchapter 3.2 of the Draft Program EIR. The verified 2015 air quality data was used as the baseline for evaluating air quality impacts associated with the proposed project. The most recent environmental topic data from 2016 was used for the CEQA baseline in determining environmental impacts from other environmental topic areas because that was the time of the release of the NOP/IS. The Draft Program EIR used the appropriate baseline, which was disclosed.

Comment 3-31

> **c. Impact Analysis**
>
> In order to determine whether or not the air quality impacts from the proposed Project are significant, impacts are compared to the significance criteria in Table 4.1-2. (DPEIR, p. 4.1-10.) That table lists the numerical thresholds for criteria and other pollutants. There is no qualitative analysis of any air quality impacts nor consideration of several topics referenced in Section III of the Appendix G Checklist.
>
> The DPEIR acknowledges that "[t]he exact scope of the construction activities necessary to implement the proposed control measures is not known at this time." (DPEIR, p. 4.1-19.) It nonetheless states that the measures are similar to the measures which have been implemented at facilities due to SCAQMD rulemaking. (*Id.*) No evidence is provided to support this statement.

Response 3-31

The Draft Program EIR focused on the checklist topics which were identified as having a potentially significant impact, as disclosed in the NOP/IS (Appendix A). As some of the checklist topics in the Air Quality and GHG area were identified as having either a less than significant or no impact from the proposed 2016 AQMP, those checklist topics were not further analyzed in the Draft Program EIR.

As discussed earlier, the 2016 AQMP updates and builds upon the 2007 and 2012 AQMPs. Some of the control measures are expanding or continuing the measures which have already been implemented as part of previous AQMPs. Therefore, in those cases, SCAQMD staff assumed that the impacts would be similar to those of previously implemented measures. Additionally, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-32

> More fundamentally, the actual "analysis" of peak construction emissions from the approximately 80 control measures is predicated on construction of only four facilities or control devices on any given day. (DPEIR, pp. 4.1-19 and Table 4.1-3.) No explanation is provided as to how this number was derived or why it is a reasonable assumption given that the Proposed Plan applies to a nearly 11,000 square mile area consisting of numerous cities and unincorporated communities in the counties of Los Angeles, Orange, San Bernardino, and Riverside. (DPEIR, pp. 1-6, 2-8, 3.9-2.) As a result of this artificial and flawed assumption, the resulting air quality impacts are grossly underreported. For instance, only NOx emissions are reported as significant impacts, requiring mitigation. Emissions of other key pollutants (*e.g.*, VOC, CO, SOx, PM10 and PM2.5) are reported as less than significant and no mitigation is proposed.

Response 3-32
Chapter 4.1, Page 4.1-19 of the Draft Program EIR states that, "although the construction emissions at each individual facility might not exceed the SCAQMD's CEQA significance thresholds, it is foreseeable and likely that on any given day, construction of one or more control devices in order to comply with the 2016 AQMP could occur at more than one facility. Based on the results in Table 4.1-3, if more than four facilities or more than four control devices were concurrently constructed on any given day, the emissions would exceed the SCAQMD's air quality significance thresholds. Therefore, construction emissions are considered significant." Installation of control devices at four facilities was used as an example. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Mitigation measures AQ-1 through AQ-23 were included which would reduce construction related emissions of all criteria pollutants, not only for NOx. Implementation of the construction mitigation measures would reduce construction emissions, but the overall construction air quality and GHG impacts after mitigation would remain significant and unavoidable.

Comment 3-33

> The analysis also omits any consideration of grading activities "because modifications or installation of new equipment would occur at existing industrial/commercial facilities and, therefore, would not be expected to require earthmoving, grading, etc." (DPEIR, p. 4.1-19.) Even assuming that most upgrades would be made to existing facilities, some grading is likely to occur. By omitting such activity from the analysis, the DPEIR underreports the Project's air quality impacts.

Response 3-33
As shown in Chapter 4.1, pages 4.1-18 and 4.1-19, and in Table 4.1-3 of the Draft Program EIR, construction emissions from grading/site preparation activities were estimated for the various construction phases associated with the installation of air pollution control devices. In addition, criteria pollutant emissions were calculated for all on-road vehicles transporting workers, vendors, and material removal and delivery. The purpose of the footnote the comment is referring to is to clarify that grading/site preparation/earth moving activities are not anticipated to be necessary because modifications or installation of new equipment would occur at existing commercial/industrial facilities. However, the air quality impact analysis included emissions from grading/site preparation activities in order to ensure a worst-case analysis. Therefore, the Draft Program EIR did not underreport the air quality impacts, as claimed in the comment.

Comment 3-34

> Although the District has developed localized significance thresholds for criteria pollutant emissions, which are commonly employed for air quality impact analysis in the region, the DPEIR omits any localized air quality impact analysis claiming that "the details of the individual projects to implement [the AQMP] and their locations are not known at this time." (DPEIR, p. 4.1-20.) If the details of the project is not known, then no analysis can be undertaken at all. Moreover, there is no reason why the DPEIR could not have employed reasoned estimates of air quality emissions to provide analysis of likely impacts compared to the localized significance criteria.

Response 3-34

As explained in the Draft Program EIR and consistent with SCAQMD's LST Guidance, "An analysis of localized air quality impacts for criteria pollutant emissions is not applicable to regional projects such as local general plans, specific plans, or AQMPs (SCAQMD, 2008) because the details of the individual projects to implement these types of plans and their locations are not known at this time." (See Page 4.1-20) Furthermore, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-35

> Control Measure BCM-04 is intended to reduce ammonia emissions from livestock waste through a process known as thermal gasification. The DPEIR states that because such systems are in the testing stage, it is not likely that this technology will become widespread until further testing is done and that "any air quality impacts will be minimal." (DPEIR, p. 4.1-30.) The measure, among others, is intended to be implemented to attain federal and state air quality standards. The DPEIR thus must assume the measures will be implemented and analyze their impacts.

Response 3-35

Since the release of the Draft Program EIR, emission reductions were quantified for control measure BCM-04 in the Revised Draft 2016 AQMP. These reductions were estimated based on lowering the livestock thresholds in existing SCAQMD Rule 223 - Emission Reduction Permits for Large Confined Animal Facilities, as part of a Reasonably Available Control Measure (RACM) analysis of the Federal CAA requirements. At this time, analysis of the technology that would be used to achieve these estimated reductions would be speculative. As explained previously, the adverse environmental impacts from BCM-04 were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program

EIR.

Comment 3-36

> The Proposed Plan contains a number of measures designed to reduce emissions from mobile sources by accelerating the penetration of partial zero-emission and zero emission vehicles. (*See, e.g.*, Control Measures MOB-05, MOB-06, MOB-08, MOB-09, ORLD-03, ORHD-05, and ORHD-08.) The air quality analysis presumes that all older vehicles would be eliminated and discarded and thus only considers the air quality impacts associated with scrapping old vehicles. (DPEIR, Section 4.1.6.2.4; *see also*, DPEIR, pp. 4.1-43 to 4.1-44.)[15] There is no evidence to support this assumption. The air quality analysis should have conservatively assumed operation of both the new and old vehicles simultaneously at least for the estimated remaining operational life of the old vehicles. Indeed, the DPEIR acknowledges that "it is not conclusive that equipment will be put out of service and that the high number of vehicles or equipment will be scrapped as solid/hazardous waste." (DPEIR, p. 6-33.) Similarly, the DPEIR should have assumed *increased* levels of petroleum fuel production and transportation of crude oil, as opposed to vastly reduced levels. (DPEIR, pp. 4.1-41, 4.1-51 to 4.1.52.)
>
> [15] Even so, the scrapping analysis is based on an "internet search" of auto recycling facilities in the Basin. (DPEIR, p. 4.1-39.) This is hardly a scientific basis on which to conduct a robust analysis of potential air quality impacts. Indeed, there are other auto recycling facilities located outside the Basin and there are likely additional facilities inside the Basin as well.

Response 3-36

There is no evidence to support the claim that the proposed mobile source control measures would increase the number of vehicles in operation due to both old and new vehicles operating concurrently. Implementation of control measures from previous AQMPs which included vehicle replacements have led to the removal and replacement of older, higher emitting vehicles within the District. Additionally, SCAG's Final 2016 RTP/SCS projects a decrease in vehicle miles travelled. The intent of the mobile source control measures listed in the comment is to replace already existing, older high emitting vehicles with cleaner vehicles, not add additional cars. Furthermore, the aim of these measures is to move away from fossil fuel usage. Therefore, analysis of increased levels of petroleum fuel production and transportation of crude oil in the Draft Program EIR is not necessary or warranted.

Comment 3-37

> Control Measure BCM-08 is intended to provide alternatives to agricultural burns. Yet, no alternatives are specified. Thus, the conclusion that BCM-08 would reduce emissions from agricultural burn operations is not supported and does not inform the analysis of air quality impacts. (DPEIR, p. 4.1-42.)

Response 3-37

BCM-08 is considered a contingency measure in the 2016 AQMP. Chapter 4 of the 2016 AQMP has a detailed discussion as to what is being defined as a contingency measure to comply with CAA requirements. These contingency measures are analyzed in the Draft Program EIR regardless of how the measure is classified to comply with CAA requirements. As explained previously, the adverse environmental impacts from BCM-08 were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later

activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-38

> The DPEIR claims that due to the qualitative nature of the analysis of greenhouse gas ("GHG") emissions, "it is not possible to show the magnitude of GHG emission effects from implementing 2016 AQMP control measures." (DPEIR, p. 4.1-50.) The DPEIR nonetheless asserts that the Proposed Plan "is expected to reduce GHG emissions consistent with the AB 32 Scoping Plan," resulting in less than significant GHG impacts. It reaches this conclusion by amortizing already depressed construction emissions over a 30-year period and claiming that increased GHG emissions from energy demand will be offset by substantial reductions in the amount of petroleum fuel use (*e.g.*, 530 million gallons by 2023 and 870 million gallons by 2031). (DPEIR, pp. 4.1-51 to 4.1-53.) As noted above, those assumptions are artificial and unfounded.
>
> There is no analysis of recently enacted SB 32. This measure requires the State to reduce GHG emissions by 40 percent below 1990 levels by 2030. There is likewise no acknowledgment or analysis of the Project's consistency with State policy of reducing GHG emissions by 80 percent below 1990 levels by 2050. (Executive Order S-3-05.) The California Supreme Court has acknowledged the need to consider the evolving GHG targets and standards. (*Center for Biological Diversity v. California Dept. of Fish & Wildlife* (2015) 62 Cal.4th 204.)
>
> While concluding that the Project may have a potentially significant impact with respect to GHG emissions, the DPEIR inconsistently finds a less than significant impact with respect to the Project's impacts in regard to conflicts with applicable plans, policies, and regulations adopted for the purpose of reducing greenhouse gas emissions. The DPEIR must likewise study this issue and all applicable federal, state, and local GHG reduction plans and policies.

Response 3-38

As discussed in Chapter 4.1.6.4, "compared to the 2014 baseline, energy demand from 2016 AQMP control measures is expected to increase by 10,227 GWh, a 7.8 percent increase, by the year 2023 and produce 3.4907 million metric tons (MMT) of GHG emissions. Similarly, compared to the 2014 baseline, energy demand from 2016 AQMP control measures is expected to increase by 18,029 GWh, a 12.7 percent increase, by the year 2031 and produce 6.1496 MMT of GHG emissions. Concurrent with projected increases in electricity demand and associated emissions from implementing 2016 AQMP mobile source control measures is a reduction in the use of petroleum fuels and their associated emissions." Contrary to the claim in the comment, the analysis in the Draft Program EIR does not rely on amortizing already depressed construction emissions to reach the conclusion that the proposed 2016 AQMP will not conflict with the AB32 Scoping Plan, but instead relies on conservative, worst-case construction scenario impacts that could occur as a result of the implementation of the control measures. ECC-03 further exceeds the AB32 goals through incentives. Additionally, there will be the co-benefit of GHG reductions through other control measures targeted at criteria pollutant emissions, which would support the reductions required by SB32. Therefore, instead of conflicting with GHG plans, the 2016 AQMP compliments and further supports these policies and goals. Furthermore, the 2016 AQMP builds

upon SCAG's 2016 RTP/SCS and CARB's State SIP Strategy, which are in part, based on greenhouse gas reduction plans. Therefore, the 2016 AQMP does not conflict with other applicable plans, policies, or regulations and the comment does not provide evidence to the contrary.

Comment 3-39

> Finally, the DPEIR only analyzes the air quality and GHG impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential air quality and GHG impacts associated with, among others, Control Measures CMB-01, CMB-02, CMB-03, ECC-03, MOB-05, MOB-06, MOB-07, MOB-08, MOB-13, BCM-03, BCM-06, BCM-07, BCM-08, BCM-10, CTS-01, TXM-01, TXM-05, TXM-06, TXM-09, ORLD-01, ORLD-03, ORHD-05, ORHD-09, and OFFS-08.

Response 3-39

Subchapter 4.1 of the Draft Program EIR examines potential direct and indirect air quality and GHG impacts associated with the implementation of the control measures in the proposed 2016 AQMP. Table 4.1-1 on page 4.1-17 of the Draft Program EIR identifies the control measures that have the potential to generate air quality impacts and the types of air quality impacts for each control measure, including CMB-01, CMB-02, CMB-03, ECC-03, MOB-05, MOB-07, MOB-13, BCM-06, BCM-07, BCM-08, BCM-10, CTS-01, TXM-01, TXM-05, TXM-06, TXM-09, ORLD-01, ORLD-03, ORHD-05, ORHD-09, and OFFS-08. There are no specific issues raised as to the analysis contained in the Draft Program EIR.

MOB-06 involves the accelerated retirement of older light-duty and medium-duty vehicles and MOB-08 involves the accelerated penetration of partial zero-emission and zero-emission light-heavy- and medium-heavy-duty vehicles, which would result in emissions reductions of NOx and PM. Since it is speculative to assume the amount of reductions which would result from MOB-06 and MOB-08, the Draft Program EIR took a conservative approach and did not take credit for those emission reductions. BCM-03 involves the emission reductions from paved road dust sources. Since it is speculative to assume the amount of reductions which would result from BCM-03, the Draft Program EIR took a conservative approach and did not take credit for those PM emission reductions. Therefore, no air quality and GHG impacts are anticipated from these measures and the comment does not provide evidence of impacts not analyzed in the Draft Program EIR.

Comment 3-40

d. Mitigation

As noted above, the air quality analysis was artificially constrained by focusing only on a theoretical maximum of four facilities undertaking construction activities per day in response to the control measures. As such, and contrary to CEQA, the disclosure of potentially significant air quality impacts, and the imposition of feasible mitigation measures to address them, is largely ignored by the DPEIR.

The DPEIR does acknowledge a significant impact in regard to NOx emissions. However, Section 4.1.7 of the DPEIR states that various measures "*should* be implemented, where applicable and *if feasible*."[16] This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *Sierra Club v. County of San Diego* (2014) 231 Cal.App.4th 1152, 1168 [no evidence that recommendations for reducing GHG emissions would function as enforceable or effective mitigation measures]; and *Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 95 [list of potential mitigation measures rejected as "nonexclusive, undefined, untested and of unknown efficacy."].)

[16] Mitigation Measure AQ-2 similarly "encourage[s]" contractors to apply for SCAQMD funding incentives.

Response 3-40

The Draft Program EIR states, "although the construction emissions at each individual facility might not exceed the SCAQMD's CEQA significance thresholds, it is foreseeable and likely that on any given day, construction of one or more control devices in order to comply with the 2016 AQMP could occur at more than one facility. Based on the results in Table 4.1-3, if more than four facilities or more than four control devices were concurrently constructed on any given day, the emissions would exceed the SCAQMD's air quality significance thresholds. Therefore, construction emissions are considered significant." (Draft Program EIR, p.4.1-19) Installation of control devices at four facilities was used as an example of a theoretical minimum to exceed the significance threshold, not maximum of concurrent construction sites as the comment claims. The maximum of concurrent construction sites is unknown.

Enforceable mitigation measures (AQ-1 through AQ-23) that would reduce construction related emissions of all criteria pollutants were included in the Draft Program EIR and can be found beginning on page 4.1-55. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, it is expected that mitigation measures AQ-1 through AQ-23 would be applied to future projects, if the impacts from those projects would result in significant air quality impacts. This framework for applying mitigation measures to future projects is appropriate for a program-level document. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of

mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) The Draft Program EIR concluded that implementation of the construction mitigation measures would reduce construction emissions, but the overall construction air quality and GHG impacts after mitigation would likely remain significant.

Comment 3-41

> Several of the mitigation measures appear to have nothing at all to do with NOx emissions. Moreover, no effort is made to quantify the reduction in NOx emissions as a result of the measures, as is commonly done. Thus, it is impossible to determine whether impacts have been avoided or substantially lessened, as required. Instead, the DPEIR concludes that while implementation of these measures would reduce construction emissions, "the overall construction air quality and GHG impacts after mitigation would likely remain significant." (DPEIR, p. 4.1-57.)
>
> The DPEIR also fails to acknowledge that because the District lacks controls over implementation of these measures, the impact is significant and unavoidable. Instead, the DPEIR contains a vague reference to reliance on "subsequent CEQA analyses." (DPEIR, p. 4.1-57.)

Response 3-41

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. The Draft Program EIR clearly identifies significant adverse construction air quality, for all criteria pollutants, not just NOx, and GHG impacts would be caused by the proposed 2016 AQMP. Implementation of the construction mitigation measures would reduce construction emissions of all criteria pollutants, but the overall construction air quality and GHG impacts after mitigation would remain significant and unavoidable. As a program level document, it would be speculative to determine the amount of reduction achieved by the mitigation measures. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) Therefore, the Draft Program EIR concluded that construction air quality and GHG impacts would remain significant and unavoidable.

Comment 3-42

> **3. Energy**
>
> **a. Scope of Analysis**
>
> Several energy topics were scoped out of the analysis pursuant to the IS. (DPEIR, p. 4.2-7.) However, the District's conclusion that the Project will not potentially result in significant impacts to those areas is not supported by substantial evidence.
>
> For instance, the IS determined that the Project would not conflict with an adopted energy conservation plan or existing energy standards. (IS, p. A-76.) The District reached this conclusion by assuming that any owners or operators of affected facilities would comply with applicable standards at the time of future installation. However, there is no substantial evidence supporting the conclusion that owners or operators would comply with future standards. If the net effect of implementing the Project is an increase in regional energy demand, as the DPEIR indicates is likely, potential conflicts with adopted energy conservation plans and existing energy standards cannot be dismissed as "no impact." The shift from fossil fuels to alternative fuels or electrical- powered technologies and increased reliance on such alternative fuels or electricity such that sufficient supply and emergency storage would be available in the event of a major disaster must also be considered.

Response 3-42

The 2016 AQMP would promote and incentivize meeting and exceeding energy goals and standards. Increases or shifts in demand for different types of energy or fuel usage, including future electricity supply and demand, is evaluated in Subchapter 4.2 for energy of the Draft Program EIR. Risk of upset is analyzed in Subchapter 4.3 for hazards as a result of the usage of alternative fuels. Emergency storage due to a major disaster is not evaluated as an energy impact since the proposed 2016 AQMP would not result in an earthquake or any foreseeable major disasters. Additionally, it is appropriate to assume compliance with existing and future laws and regulations in analyzing impacts under CEQA. (*See Rominger v. Cnty. of Colusa* (3d Dist. 2014) 229 Cal. App. 4th 690, 728 [holding that a CEQA analysis was proper in assuming compliance with regulatory measures, even without a project condition required such compliance].)

Comment 3-43

> Additionally, the IS reached the conclusion that the Project would not conflict with an adopted energy conservation plan by assuming that the Project control measures would promote, rather than interfere with, energy efficiency and conservation. However, the IS does not analyze the potential for the control measures to frustrate adopted energy conservation plans by implementing conflicting measures. In fact, the IS does not even disclose any adopted energy conservation plans or energy standards. As such, there is no substantial evidence to support the conclusion that the Project will not conflict with adopted energy conservation plans or existing energy standards.

Response 3-43

By promoting control measures that would increase energy efficiency and conservation, the 2016 AQMP would not interfere or conflict with any adopted energy conservation plans. In fact, there would likely be an energy co-benefit from the proposed control measures to complement applicable energy conservation plans and energy standards. The comment does not identify any specific conflicts or provide evidence to support the claim that the proposed control measures

would conflict with adopted energy plans. No further response is necessary under CEQA.

Comment 3-44

> The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant energy impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts.

Response 3-44

The potential adverse energy impacts were analyzed in Chapter 4.2 of the Draft Program EIR. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation. Therefore, no revisions to the Draft Program EIR are necessary and no further response is necessary under CEQA.

Comment 3-45

> **b. Impact Analysis**
>
> The DPEIR specifically states that the "actual potential increase in the amount of electricity use due to the implementation of the 2016 AQMP is unclear at this time because specific information regarding the number and size of the air pollution control devices that may be installed are currently unknown." (DPEIR, p. 4.2-11.) Yet, estimates of increased energy use must be provided based on substantial evidence. The DPEIR must accordingly be revised to include the potential operational energy use, including pollution control equipment that would be added pursuant to Control Measure CMB-05.

Response 3-45

The Draft Program EIR clearly states that the 2016 AQMP strategy would increase the demand for electricity through the incentivization and penetration of partial-zero and zero emission technologies and through the operation of some types of control equipment. Each control measure proposed in the 2016 AQMP was evaluated, including CMB-05, and 47 control measures were identified as having potential adverse energy impacts. Evaluation of the control measures was based on conducting an examination of the potential impacts for each control measure and the technologies that may be involved in light of current energy trends. All control measures were analyzed to identify both beneficial effects (energy conserving) and adverse impacts (energy consuming). Table 4.2-1 beginning on page 4.2-2 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that in turn, could generate significant energy impacts. Actual estimates of energy use are speculative at this time due to the unknown number and size of control devices that may be installed. Therefore, potential energy impacts from the control measures were analyzed in the Draft Program EIR on a programmatic level. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373.) Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be

appropriate at that time. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. *See also* Responses 3-5 and 3-6. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 3-46

> The Energy Section improperly relies on a 2015 Final Program Environmental Assessment ("PEA"), which analyzed potential increases in electricity demand associated with SCAQMD's Regional Clean Air Incentives Market ("RECLAIM") program to conclude that Control Measure CMB-05, which would seek further NOx reductions under the RECLAIM program, would not increase electricity demand. However, the DPEIR states that Measure CMB-05 may encourage different types of control devices, including "SCR, SNCRs, a proprietary Low Temperature Oxidation technology . . . and catalyst impregnates filters." (DPEIR, p. 4.2-8.) The DPEIR does not disclose how these different types of control devices would affect the conclusions in the 2015 PEA, but presumably, different types of control devices would alter the analysis and should be considered. More importantly, any further NOx reductions under the RECLAIM program should be quantified and analyzed. The District cannot simply assume that CMB-05 would not substantially increase electricity demand by relying on a 2015 EA for an existing program.

Response 3-46

CMB-05 would seek further NOx reductions under the RECLAIM program which may cause related energy impacts. Therefore, the Draft Program EIR appropriately utilized assumptions from the environmental analysis from the 2015 Final PEA for the RECLAIM amendment. Table 4.2-1 on page 4.2-9 summarized the estimated number of NOx emission control devices that were estimated in the December 2015 Final PEA prepared for NOx RECLAIM per sector and per equipment/source category. The December 2015 Final PEA for NOx RECLAIM estimated that the following new NOx air pollution control equipment could be installed: up to 117 SCRs, eight LoTOx^{TM} with WGSs, one LoTOx^{TM} without WGS, and three UltraCat DGSs. As stated in the Draft Program EIR, control measure CMB-05 would be expected to result in similar, but fewer impacts, because CMB-05 would require the approximately five tons per day of NOx emission reduction by 2031, while the analysis in the December 2015 Final PEA was based on achieving 14 tons per day of NOx reductions by 2022, which is more conservative.

Comment 3-47

Similarly, the analysis of impacts from Control Measures MOB-09, ORHD-08, ORHD-06, and ORHD-09 is based on a Draft EIR/EIS prepared by Caltrans in 2012 for the Interstate 710 Corridor Project. (DPEIR, p. 4.2-12.) The District states that Caltrans is in the process of revising the I-710 Corridor Project EIR/EIS and that the associated estimates used in the DPEIR, thus, are preliminary.

The EIR/EIS for the I-710 Corridor Project is in the process of being revised and recirculated and the particulars of that project are still unknown. A Draft EIR/EIS for the I-710 Corridor Project was released in 2012. In 2013, the I-710 Corridor Project lead agencies announced that they would be pursuing a Recirculated CEQA document with updated alternatives. This Recirculated EIR/EIS is not anticipated to be released until Spring 2017 at the earliest. As such, the alternatives being considered for the I-710 Corridor Project are currently unknown, and it is speculative to make any statements about the environmental impacts of the alternatives or rely on the underlying analysis that is a basis for environmental impacts of the alternatives.

It is not permissible to simply state that an impact analysis was based on preliminary data in lieu of preparing data supported by substantial evidence. The District should calculate an estimate of electricity demand for electric or magnetic power for anticipated new roadway infrastructure instead of relying on a four year old Caltrans document that is in the process of being substantially revised.

Response 3-47

The Draft Program EIR estimated electricity demand from electric or magnetic power built into roadway infrastructures to boost the pulling capacity or range of the heavy-duty vehicles. Data was used from the Draft EIR/EIS prepared for the Interstate 710 Corridor Project because that was the most recent data available for such an infrastructure project. Additionally, the Draft Program EIR estimated the potential electrical demand for electric roadway infrastructure along the State Route 60 Freeway. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-48

The DPEIR notes that construction activities necessary to implement control measures would increase gasoline and diesel demand. (DPEIR, p. 4.2-19.) The DPEIR then states that larger construction projects will likely require project-specific CEQA analysis and that the Project is anticipated to reduce petroleum fuels and alternative fuels overall. A deferral of environmental analysis until after a project is approved is not allowed by CEQA. (Public Resources Code §§ 21002, 21151; CEQA Guidelines § 15004.) The conclusion that the Project will not have a significant impact with regard to the use of gasoline, diesel, and alternative fuels is also not based on sufficient evidence. The DPEIR must be revised to include estimates of petroleum fuels and alternative fuels based on substantial evidence.

Response 3-48

Construction activities that may be necessary in order to implement control measures in the 2016 AQMP would increase the use of gasoline and diesel. Construction activities may be necessary for a variety of control measures in order to develop and build a transportation infrastructure, install air pollution control equipment, and further develop and build an electricity infrastructure to support the electrification of sources. The amount of petroleum fuels needed for construction would depend on the extent of the specific construction activities employed. For example, larger construction projects typically use the most fuels and are likely to require project specific CEQA review to evaluate the specific energy needs. Therefore, fuel usage is analyzed programmatically in the Draft Program EIR, not deferred, as the comment claims. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and not improperly deferred as the comment alleges. (*See Rio Vista Farm Bureau Ctr. v. Cnty. of Solano* (1st Dist. 1992) 5 Cal. App. 4th 351, 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) Pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities, and detailed, project-level CEQA analysis will be appropriate at that time. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 (holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR). Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-49

> The DPEIR states that the Project will result in a shift from petroleum-based fuels to alternative fuels, including hydrogen. (DPEIR, p. 4.2-21.) The DPEIR then states that hydrogen fueling capacity will be insufficient by 2020. Nonetheless, the DPEIR does not include any analysis or mitigation to address impacts associated with this deficiency in hydrogen fueling capacity, such as through development of additional hydrogen fueling facilities and/or reliance on alternative fuels. As such, the DPEIR should be revised to include analysis of this potentially significant impact.

Response 3-49

The Draft Program EIR adequately addresses the potential shift from petroleum-based fuels to alternative fuels, including hydrogen. On page 4.2-20, the Draft Program EIR states that "As of June 2016, 20 hydrogen fueling stations are located in the southern California region plus an additional 18 stations are expected to be opened by the end of 2016, although station development has progressed at a slower pace than projected in 2015 (CARB, 2016b)." Additionally, the Draft Program EIR states that, "California has been developing the infrastructure of a hydrogen highway to assure that hydrogen fueling stations are in place to meet the demands of fuel cell and other hydrogen vehicle technologies. CARB is focusing on putting additional emphasis on creating clusters of hydrogen fueling stations in key urban areas such as Los Angeles and Orange counties, Sacramento, and the San Francisco Bay area (CARB, 2016b)."

The intent of the mobile source control measures is not to shift from the use of petroleum-based fuels to one alternative fuel (such as hydrogen), but rather to reduce emissions, which will likely result in the use of a mix of alternative fuels. Therefore, the potential deficiency in the

infrastructure associated with one particular alternative fuel (such as hydrogen fueling capacity) will be lessened by the use and availability of other alternative fuels. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, no revisions to the Draft Program EIR are necessary.

Comment 3-50

> There is no substantial evidence to support the DPEIR's conclusion that impacts related to the increased demand of alternative fuels, alternative energy, renewable energy, petroleum fuels, and natural gas would be less than significant. (DPEIR, p. 4.2-24.) In the Energy Section itself, the DPEIR cites potential indirect impacts of the control measures, including the increased use of electricity and potentially increased need to generate additional renewable energy sources. (DPEIR, p. 4.2-23.) These indirect impacts would increase demand for alternative fuels, alternative energy, and renewable energy and are not quantified in the energy section. Thus, impacts cannot be deemed less than significant.

Response 3-50

Potential indirect impacts related to the increased demand of alternative fuels, alternative energy, renewable energy, petroleum fuels, and natural gas are fully analyzed on a programmatic level, and therefore, were not quantified at this time as that would be speculative. (*See Rio Vista Farm Bureau Ctr. v. Cnty. of Solano* (1st Dist. 1992) 5 Cal. App. 4th 351, 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) These potential indirect impacts (e.g. increased electricity usage) are discussed throughout Subchapter 4.2.4 of the Draft Program EIR. This comment does not provide specific examples to support the claim that the potential indirect impacts referred to were not adequately analyzed. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-51

> Appendix F of the CEQA Guidelines contains several requirements, which have recently been held by the court to be critical to include in EIR energy sections. (*Ukiah Citizens for Safety First v. City of Ukiah* (2016) 248 Cal.App.4th 256; *California Clean Energy Committee v. City of Woodland* (2014) 225 Cal.App.4th 173.) One of the requirements is for total energy demand to be quantified, which is absent from the DPEIR. Other requirements mandate consideration of construction processes and specify that total daily vehicle trips be included. This information is also omitted from the Energy Section. Mitigation Measure E-4 purports to improperly defer the requisite energy analysis until after approval of the Project. The District must revise the Energy Section to include all components of Appendix F.

Response 3-51

SCAQMD's CEQA significance thresholds, as discussed on page 4.2-7 of the Draft Program EIR, do not conflict with the EIR content requirements or goals of Appendix F of the CEQA Guidelines. Appendix F of the CEQA Guidelines is also specifically discussed on page 4.2-15 of the Draft Program EIR. Potential energy impacts were estimated using the control measure descriptions in the Draft 2016 AQMP. Construction processes were fully analyzed and are discussed in Subchapter 4.2.4 – Impact Analysis. The intent of Mitigation Measure E-4 is to require that future projects evaluate potential energy impacts once specific details of the project are known, which is proper for a programmatic-level document. (*See Rio Vista Farm Bureau Ctr. v. Cnty. of Solano* (1st Dist. 1992) 5 Cal. App. 4th 351, 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-52

> Finally, the energy analysis fails to analyze the impacts associated with all of the proposed control measures. For instance, there is no substantive discussion or analysis of, among others, the potential energy impacts associated with, among others, Control Measures CMB-01, CMB-03, CMB-03, ECC-04, ECC-02, ECC-03, MOB-01, MOB-02, MOB-04, TXM-01, ORHD-04, ORFIS-01, and ORFIS-03.

Response 3-52

All proposed control measures were evaluated for potential energy impacts. The control measures which may result in the use of compliance options that in turn, could generate significant energy impacts are listed in Table 4.2-2 and they include MOB-01, MOB-02, MOB-04, TXM-01, ORHD-04, ORFIS-01, and ORFIS-03. CMB-01 and CMB-03 involves the transition to cleaner, lower emitting technologies for existing stationary sources as they replace equipment and upgrade facilities, therefore, CMB-01 and CMB-03 would not increase the energy use or needs because new equipment would likely be more energy efficient. Likewise, ECC-02, ECC-03, and ECC-04 would not increase energy demand as those measures seek to take credit for emissions reductions

associated with GHG reductions already required, increasing energy efficiency, and using cool roof technology to reduce emissions, respectively. It is likely that these control measures would lead to reduced energy needs and use for consumers, but the Draft Program EIR took a conservative approach and did not take credit for these reductions. Therefore, no energy impacts are anticipated from these measures and the comment does not provide evidence of impacts not analyzed in the Draft Program EIR.

Comment 3-53

> **c. Mitigation**
>
> Section 4.2.5 of the DPEIR states that various measures "*should*" be implemented "where feasible." Other measures are likewise vague and indefinite. This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *see also, Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.)
>
> For instance, Mitigation Measure E-1 states that project sponsors should "pursue incentives" to encourage the use of energy efficient equipment and vehicles and promote energy conservation. It is unclear specifically what incentives should be pursued and the number of energy efficient equipment and vehicles needed to mitigate Project impacts. Mitigation Measures E-5, E-6, and E-7 likewise call for "evaluat[ing] the potential for reducing peak energy demand" through various means. Studying or considering the potential for reducing energy demand is not the same as imposing a binding commitment to reduce energy demand.

Response 3-53

Enforceable mitigation measures (E-1 through E-7) that would reduce energy related impacts were included in the Draft Program EIR and can be found in Subchapter 4.2.5 on page 4.2-24. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, it is expected that mitigation measures E-1 through E-7 would be applied to future projects, if the impacts from those projects would result in significant energy impacts. This framework for applying mitigation measures to future projects is appropriate for a program-level document. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) The Draft Program EIR concluded that even with implementation of the energy mitigation measures, electricity consumption impacts would remain significant and unavoidable.

Comment 3-54

4. Hazards and Hazardous Materials

a. Scope of Analysis

The IS stated that the Project would not be located on a site which is included in a list of hazardous materials sites compiled pursuant to Government Code § 65962.5, also known as the "Cortese list." As such, the IS concluded that "implementation of the proposed control measures is not expected to interfere with site cleanup activities or create additional site contamination" and that this topic "will not be further evaluated" in the DPEIR. (IS, p. 2-28.)

In our comment letter on the IS, we pointed out that Government Code § 65962.5 must be considered and that there are several parcels on the Cortese list located within the POLB alone.[17] The DPEIR includes a brief section on this issue and states that some facilities are included on lists of hazardous materials sites or near listed sites and that construction on these sites could pose risks to the public and environment. But, the DPEIR states that without knowing the sites and contaminants present, "it is not possible to know in advance which regulations would apply." (DPEIR, p. 4.3-40.) This is a critical issue that must be considered for the DPEIR to be adequate pursuant to CEQA. As such, the DPEIR must be revised and recirculated to adequately address this issue.

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[17] (*See* California Department of Toxic Substances Control. Hazardous Waste and Substances Site List—Site Clean (Cortese List) *www.dtsc.ca.gov/Site Cleanup/Cortese_List.cfm*. City of Long Beach zip code 90802.)

Response 3-54

Potential hazards and hazardous materials impacts were analyzed in Subchapter 4.3 of the Draft Program EIR.

The 2016 AQMP does not directly cause these facilities to contaminate the soil, but rather could indirectly cause the facility to expose contaminated areas during ground disturbance activities. The issue addressed in the IS assumed those on the Cortese list were conducting due diligence in cleaning up and protecting the neighborhood and was not assuming inaction. There are various federal, state, and local laws that apply to activities occurring on sites on the Cortese list, such as the Response Conservation, and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act and the Hazardous Materials Release and Clean-Up Act. Furthermore, SCAQMD Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil regulates the emissions of VOCs from contaminated soils, Rule 1403 regulates the presence of asbestos during construction, and the 2016 AQMP contains TXM-04, which seeks to develop control measures that would control the toxic metal particulates generated during soil cleanup or remediation activities at these sites. Near-surface contaminated soil may be encountered during demolition and/or construction activities associated with implementation of the 2016 AQMP. Based on the location of the nearest sensitive receptor, it is possible that construction activities would create a significant hazard to the public or environment. Furthermore, without knowing the types of contamination (i.e. VOCs, TACs, etc.) it is not possible to know which regulations would apply. This is discussed in further detail in Subchapter 4.3.4.8 of the Draft Program EIR.

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were

analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, no revisions to the Draft Program EIR are necessary.

Comment 3-55

b. Impact Analysis

The DPEIR concludes that hazards associated with increased ethanol from mobile sources are equivalent or reduced compared to diesel fuel and gasoline. However, the DPEIR itself lists certain characteristics of ethanol that would pose a greater hazard risk than diesel and gasoline, such as ethanol's higher auto ignition temperature and the fact that ethanol can ignite in enclosed spaces, unlike gasoline. (DPEIR, p. 4.3-18.) It is unclear based on the limited information provided in the DPEIR whether, on balance, ethanol is more or less hazardous than diesel fuel and gasoline. The DPEIR should be revised to include further details about the specific differences between ethanol, diesel fuel, and gasoline, prior to making a conclusion that hazards associated with ethanol are generally equivalent or less than conventional fuel hazards.

Response 3-55

Potential hazards and hazardous materials impacts associated with ethanol were evaluated and discussed in Subchapter 4.3.4.2.1 of the Draft Program EIR. Comparative information and discussion regarding the differences between ethanol, diesel fuel, and gasoline was provided on pages 4.3-17 and 4.3-18 of the Draft Program EIR. Despite ethanol having a higher auto ignition temperature than gasoline and diesel, the Draft Program EIR states, "Ethanol is more difficult to ignite since it has a larger lower flammability limit (3.3 percent) than gasoline (approximately one percent) or diesel fuel (0.5 percent)". Additionally, the Draft Program EIR continues that "Ethanol blended fuel vapors are primarily composed of gasoline, and thus, the fire hazard associated with the transfer and storage of ethanol should be relatively the same as gasoline (DOT, 1999)." Therefore, the Draft Program EIR determined that health hazards associated with ethanol are approximately equivalent or less when compared to conventional fuels. The comment does not provide any evidence to the contrary and no revisions to the Draft Program EIR are necessary or warranted.

Comment 3-56

> The DPEIR reaches a similar unsupported conclusion regarding the hazards associated with the use of compressed natural gas. The DPEIR needs to explain specifically why compressed natural gas poses the same or fewer hazards compared to conventional fuels, and such explanation must be supported by substantial evidence.

Response 3-56

Potential hazards and hazardous materials impacts associated with compressed natural gas (CNG) were evaluated and discussed in Subchapter 4.3.4.2.2 of the Draft Program EIR. Comparative information and discussion regarding the differences between CNG, diesel fuel, and gasoline was provided on pages 4.3-19 and 4.3-20 of the Draft Program EIR. Despite CNG having a higher auto ignition temperature than gasoline and diesel, the Draft Program EIR states, "CNG is more difficult to ignite since it has a larger lower flammability limit (5.3 percent) than gasoline (one percent) or diesel fuel (0.5 percent)". Additionally, the Draft Program EIR continues that "Diesel fuel and gasoline are toxic to the skin and lungs while CNG is not", and "Natural gas can be directly shipped via pipelines to the compressor station, rather than by on-road delivery trucks, and thus, has less delivery accident risk than vehicle shipments associated with gasoline or diesel fuel." Therefore, the Draft Program EIR determined that health hazards associated with CNG are approximately equivalent or less when compared to conventional fuels. The comment does not provide any evidence to the contrary and no revisions to the Draft Program EIR are necessary or warranted.

Comment 3-57

> Regarding the use of liquefied natural gas, the DPEIR cites a methodology for estimating the potential risk of a vapor explosion; however, the Project's potential vapor explosion risk is never quantified. In addition, the discussion states that exposure of liquefied natural gas concentrations that would cause adverse health effects is unlikely because the lower explosive limit ("LEL"), or concentration at which a given gas ignites or explodes, is five percent. However, the discussion never explains what percentage would cause a LEL to result in adverse health effects nor does it compare a five percent LEL to any adopted threshold of significance.

Response 3-57

Potential hazards and hazardous materials impacts associated with liquefied natural gas (LNG) were evaluated and discussed in Subchapter 4.3.4.2.3 of the Draft Program EIR. Comparative information and discussion regarding the differences between LNG, diesel fuel, and gasoline was provided on pages 4.3-21 and 4.3-22 of the Draft Program EIR. Despite LNG having a higher auto ignition temperature than gasoline and diesel, the Draft Program EIR states, "LNG is more difficult to ignite since it has a larger lower flammability limit (5.3 percent) than gasoline (one percent) or diesel fuel (0.5 percent)". Additionally, the Draft Program EIR continues that "Diesel fuel and gasoline are toxic to the skin and lungs while LNG is not."

The safety issues associated with LNG are similar to CNG, and were discussed on page 4.3-20. As described in the Draft Program EIR, "Hazards associated with LNG are that, under certain conditions, it may explode or catch on fire. LNG is only explosive when confined and vapor concentrations are between five and 15 percent[1]." The vapor explosion risk was not quantified

[1] Included as CEC, 2015i in Chapter 7

because the amount of additional LNG usage due to implementation of the proposed control measures is speculative at this time. The Draft Program EIR concluded that "it is unlikely that off-site receptors would be exposed to LNG concentrations that would generate adverse health effects, because the LEL for methane is five percent (50,000 ppm)." This is a very high concentration, and it expected that releases of this magnitude would not occur if users/mobile sources were in compliance with any applicable design codes or regulations, in conformance to National Fire Protection Association standards, and in conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection. Therefore, it was determined that increased usage of LNG with a concurrent decline in usage of conventional fuels will not significantly alter existing health hazards associated with mobile source fuels. The comment does not provide any evidence to the contrary and no revisions to the Draft Program EIR are necessary or warranted.

Comment 3-58

> Section 4.3.4.2.5 of the Hazards Section discusses biodiesel's characteristics and then concludes that biodiesel and renewable diesel are safer than conventional diesel. However, there is no analysis, much less substantial evidence, to support this conclusion. This section must be revised to compare the hazardous characteristics of biodiesel to conventional diesel in order to conclude that biodiesel is the safer of the two.

Response 3-58

Potential hazards and hazardous materials impacts associated with biodiesel and renewable diesel were evaluated and discussed in Subchapter 4.3.4.2.5 of the Draft Program EIR. Biodiesel is significantly safer to store, handle and transport compared with petroleum diesel due to its low volatility, high flashpoint (266ºF), and low toxicity[2]. The National Fire Protection Agency classifies biodiesel as a non-flammable liquid. This additional information on biodiesel has been added to Subchapter 4.3.4.2.5 of the Draft Program EIR. The Draft Program EIR determined that increased usage of biodiesel will not significantly alter existing hazards associated with mobile source fuels. The comment does not provide any evidence to the contrary and no revisions to the Draft Program EIR are necessary or warranted.

Comment 3-59

> The DPEIR analyzes the difference between hydrogen and conventional fuels and concludes that hydrogen is equivalent or safer than conventional fuels. However, the discussion notes that a hydrogen flame has few warning properties and that hydrogen has an unusually large flammability range. It is difficult to determine, on balance, based on the discussion in the DPEIR, why hydrogen's impacts are the same or less than conventional fuels. As such, the DPEIR should be revised to include a more detailed and quantitative analysis of the comparison of hydrogen and conventional fuels to support its less than significant conclusion.

Response 3-59

Potential hazards and hazardous materials impacts associated with hydrogen were evaluated and discussed in Subchapter 4.3.4.2.6 of the Draft Program EIR. Comparative information and discussion regarding the differences between hydrogen, diesel fuel, and gasoline was provided on

[2] U.S. Department of Energy; Available on the internet: http://www.afdc.energy.gov/fuels/biodiesel_benefits.html, Accessed on January 20, 2017

pages 4.3-24 and 4.3-25 of the Draft Program EIR. The Draft Program EIR states, "Diesel fuel and gasoline are toxic to the skin and lungs and hydrogen is non-toxic and non-reactive, so if released, it does not present a health hazard to humans." However, hydrogen does have a large flammability range and low energy requirement for ignition. To account for the higher range of flammability and low ignition energy requirement, hydrogen tanks are built to more rigorous standards than conventional fuel tanks, which reduces the likelihood of spills or leaks. Additionally, users/mobile sources using hydrogen are expected to be in compliance with any applicable design codes or regulations, in conformance to National Fire Protection Association standards, and in conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection. Therefore, the Draft Program EIR determined that health hazards associated with hydrogen are approximately equivalent or less when compared to conventional fuels. The comment does not provide any evidence to the contrary and no revisions to the Draft Program EIR are necessary or warranted.

Comment 3-60

> In all of the sections of the DPEIR discussed above that balance the risks of alternative fuels compared to conventional fuels, the DPEIR fails to disclose whether the quantity of each chemical is the same quantity that is required for conventional fuels. This information is critical to the determination of whether hazardous impacts would increase compared to conventional fuels and therefore should be included in Section 4.3.

Response 3-60

The quantity of each of the alternative fuels evaluated that would be necessary as a result of the 2016 AQMP cannot be accurately quantified at this time due to the unknown details of future projects, and therefore, are evaluated programmatically in the Draft Program EIR. (*See Rio Vista Farm Bureau Ctr. v. Cnty. of Solano* (1st Dist. 1992) 5 Cal. App. 4th 351, 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-61

> We noted in our comment letter on the IS that "risk of upset" was improperly omitted from the IS checklist. While risk of upset is included in Section 4.3 of the DPEIR, the analysis fails to adequately describe and improperly minimizes impacts that could potentially result from hazardous materials spills or accidents. For example, Section 4.3 includes an ammonia tank rupture scenario but simply states that major industrial facilities are typically large enough and far enough away from sensitive receptors to minimize impacts associated with new tanks by siting new tanks at least 528 feet from sensitive receptors. However, the section then notes that there are a number of industrial facilities in the Basin with sensitive receptors located within 528 feet of industrial facilities. Thus, the conclusion that any future new tank would be far enough away from sensitive receptors to minimize impacts is illogical since there are sensitive receptors currently located within 528 feet of industrial facilities that could be impacted by such an incident. The analysis goes on to state that "information on specific projects potentially affected by these control measures are unknown at this time" and "to identify any impacts at this time without knowing the specific design features would be speculative." (DPEIR, p. 4.3-33.) This is an inadequate conclusion under CEQA. The DPEIR must seek to disclose as much information as it reasonable can so as to reflect a good faith effort at full disclosure.

Response 3-61

The potential risk of upset was analyzed in Subchapter 4.3 for hazards as a result of the usage of alternative fuels. The ammonia tank rupture scenario that the comment refers to was analyzed in in detail in the Draft Program EIR beginning on page 4.3-32. Because a hazard analysis is dependent on knowing the exact location of the hazard within the site (e.g., location of the ammonia storage tank(s)), meteorological conditions, location of the receptor, etc., a site-specific hazard analysis is difficult to conduct without this information. As such, to identify any impacts at this time without knowing the specific design features would be speculative. Further attempts to qualitatively analyze the environmental impacts would have been speculative. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA.].) As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, the Draft Program EIR concluded that the hazards impacts from an ammonia tank rupture at a facility in the non-refinery sector would remain significant and unavoidable. The comment does not provide any evidence to the contrary and no revisions to the Draft Program EIR are necessary or warranted.

Comment 3-62

> Finally, the DPEIR improperly analyzes the hazardous materials impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential hazards impacts associated with, among others, Control Measures BCM-07, TXM-01, TXM-05, TXM-06, TXM-08, and TXM-09.

Response 3-62

All proposed control measures were evaluated for potential hazards and hazardous materials impacts. The control measures which may result in the use of compliance options that in turn, could generate significant hazards and hazardous materials impacts are listed in Table 4.3-1, including TXM-08. BCM-07 involves PM emission reductions from stone grinding, TXM-01 involves toxic metal PM reductions from metal grinding operations, TXM-05 involves reducing toxic metal PM reductions from laser plasma cutting, TXM-06 involves reducing toxic emissions from metal melting facilities, and TXM-09 involves the control of emissions from oil and gas well activities. Therefore, no hazards and hazardous materials impacts are anticipated from these measures since they control emissions from existing facilities and the comment does not provide evidence of impacts not analyzed in the Draft Program EIR.

Comment 3-63

> **c. Mitigation**
>
> Section 4.3.5 of the DPEIR contains various measures that "*should*" be implemented. Other measures are likewise vague and indefinite. This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *see also*, *Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.)

Response 3-63

Enforceable mitigation measures (HZ-1 through HZ-18) that would reduce hazards or hazardous materials related impacts were included in the Draft Program EIR and can be found in Subchapter 4.3.5 on page 4.3-40. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, it is expected that mitigation measures HZ-1 through HZ-18 would be applied to future projects, if the impacts from those projects would result in significant hazards or hazardous material impacts. This framework for applying mitigation measures to future projects is appropriate for a program-level document. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) The Draft Program EIR concluded that even with implementation of the mitigation measures, hazards and hazardous materials related impacts would remain significant and unavoidable.

Comment 3-64

Several of the mitigation measures in the Hazards Section are insufficient to mitigate the Project's impacts. For example, Mitigation Measure HZ-1 calls for consumer warning requirements on all products that are flammable and extremely flammable, but does not indicate what those warnings must contain. Mitigation Measure HZ-2 similarly calls for a public education and outreach program with local fire departments as to such measures, without providing any performance standard or metric to ensure impacts are mitigated. Mitigation Measure HZ-3 requires fire departments to install secondary containment, but does not specify the level of containment required and does not require the containment to be inspected or approved by the fire department. Similarly, HZ-10 requires the use of best management practices to avoid soil and groundwater hazards, but does not identify specific practices or give an agency authority to review and approve the practices. HZ-17 requires transportation of hazardous materials within one-quarter mile of schools to be avoided "wherever feasible."

Response 3-64

The Draft Program EIR clearly indicates that hazards and hazardous materials related impacts would remain significant even after the implementation of mitigation measures HZ-1, HZ-2 and HZ-3. HZ-3 does not require fire departments to install secondary containment but it does require projects which will need ammonia tanks to install berms around the tanks, which is the current practice. Further, it is anticipated that the secondary containment/berms installed around the tanks would comply with the applicable rules and regulations enforced by the local fire department. (*See Rominger*, 229 Cal. App. 4th at 728 [CEQA analysis that assumed compliance with regulatory measures proper].) However, in addition to the federal, state, and local regulations that facilities and sites must comply with pursuant to Government Code Section 65962.5, the Draft Program EIR concluded that implementation of mitigation measures HZ-7 to HZ-15 (including HZ-10- use of best management practices to avoid soil and groundwater hazards and HZ-17- avoid transport of hazardous materials within one-quarter mile of schools) will reduce the impacts to less than significant. The comment does not provide any evidence to the contrary and no revisions to the Draft Program EIR are necessary or warranted.

Comment 3-65

> Formulation of mitigation measures cannot be deferred until a later time. (CEQA Guidelines § 15126.4(a)(1)(B); *Sundstrom, supra*.) However, several mitigation measures in the Hazards Section constitute improper deferral of mitigation. For example, Mitigation Measure HZ-3 simply recommends that future projects "[i]nstall secondary containment (e.g., berms)" and Mitigation Measure HZ-4 recommends that future projects "[i]nstall valves that fail shut." Mitigation Measure HZ-6 requires performance integrity testing of LNG storage tanks to prevent structural failure problems; however, this measure does not include an explanation of how to prevent physical damage if the integrity testing shows that the storage tanks will fail. Mitigation Measure HZ-7 requires future facilities to conduct Phase 1 Environmental Site Assessments ("ESA") prior to construction. If known contamination is discovered, Mitigation Measure HZ-7 requires a Phase II ESA to be conducted and the recommendations of the Phase II ESA to be implemented. This is improper deferral of mitigation and requires recirculation of the DPEIR with legally adequate mitigation measures.

Response 3-65

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Mitigation measures were included for air quality, energy, hazards, hydrology, noise, transportation, and aesthetic impacts. Therefore, it is expected that mitigation measures contained in the Draft Program EIR would be applied to future projects, if the impacts from those projects would result in significant impacts for those environmental topics areas. This framework for applying mitigation measures to future projects is appropriate for a program-level document. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) The comment does not provide any evidence to the contrary and no revisions to or recirculation of the Draft Program EIR is warranted.

Comment 3-66

> CEQA requires a lead agency to present feasible mitigation measures to avoid or substantially lessen significant environmental impacts. (Public Resources Code §§ 21002, 21002.1, 21100.) Despite concluding that the Project will result in significant hazards impacts with respect to the transportation of ammonia, the DPEIR does not contain a single mitigation measure to address this impact. The DPEIR must be revised to provide feasible mitigation measures to address the Project's acknowledged significant hazards impacts.

Response 3-66

SCAQMD staff was unable to identify any feasible mitigation measures beyond existing legal requirements to reduce the significant impacts from ammonia transport and impacts were found to remain significant and unavoidable. Therefore, no revisions to the Draft Program EIR are

necessary or warranted.

Comment 3-67

5. Hydrology and Water Quality

a. Scope of Analysis

Runoff-related impacts were scoped out of the DPEIR pursuant to the IS, with the District reasoning that only "minor modifications" would be needed to commercial or industrial facilities affected by the proposed control measures. (DPEIR, p. A-86.) Drainage pattern impacts were similarly scoped out of the analysis in the DPEIR. Excluding these topics is not supported by substantial evidence in the record.

The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant hydrology and water quality impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts.

Response 3-67

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. The proposed control measures do not require the construction of new facilities. Based on the descriptions of the control measures, only minor modifications would be needed at affected facilities. Thus, the Draft Program EIR concluded that no reasonably foreseeable impacts would occur with regard to run-off or drainage related impacts. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 3-68

b. Impact Analysis

The water quality impacts related to wastewater treatment capacity rely on estimated affecting coating usage data from the Program EIR ("PEIR") for the 2012 AQMP. (DPEIR, p. 4.4-9.) The discussion states that the 2012 data provides a conservative estimate of wastewater use because some of the materials may have already been reformulated. However, this explanation does not constitute a reasoned explanation why the 2012 data is appropriate to rely upon without supporting documentation proving that the estimate is, in fact, conservative. The discussion does not provide any details about why data from the 2012 AQMP PEIR is appropriate or relevant to analyze the significant water quality impacts of the particular 2016 control measures. As shown in Table 4.4-2, in addition to the total wastewater generated from reformulated materials, Control Measures CTS-01, FLX-02, TXM-08, CMB-05, BCM-01, and CPP-01 generate wastewater flow. The DPEIR should include a current estimate of how these control measures would affect projected wastewater flow.

Response 3-68

The 2012 AQMP Program EIR data was used to estimate the affected coating usage to project wastewater impacts from 2016 AQMP control measures. This is considered a conservative estimate because it assumes the same volume of materials impacted under the 2012 AQMP Program EIR will be impacted by the control measures of the 2016 AQMP, when it is likely that some of these materials may have already been reformulated. If some materials have already been reformulated, these projected wastewater totals would be less for the 2016 AQMP control measures. Based on the above information, the projected wastewater flow totals shown in Table 4.4-2 for control measures CTS-01, FLX-02, TXM-08, CMB-05, BCM-01, and CPP-01 are a conservative estimate of wastewater impacts due to the 2016 AQMP. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-69

> The wastewater treatment capacity section asserts that a 2.1 million gallon per day increase in wastewater flow would be within the capacity of existing wastewater treatment plants, but fails to list the wastewater treatment plants that would accept this capacity. If all of the new wastewater flow is sent to one wastewater treatment plant, for example, flow generated by the Project could exceed the capacity of that plant. This data should be provided in the DPEIR and the conclusion should be supported by substantial evidence.

Response 3-69

It is highly unlikely that the projected new wastewater flow would be sent to one single wastewater treatment plant. Rather, the wastewater impacts would likely be spread throughout the District. Nonetheless, a list of wastewater treatment plants that could accept additional capacity has been added to Subchapter 4.4.4.1.

Comment 3-70

The analysis for wastewater discharge impacts is flawed because it relies on the 2015 PEA for the District's NOx RECLAIM program, which analyzed wastewater impacts for refinery facilities that would potentially install Wet Gas Scrubbers ("WGS") or Wet Electrostatic Precipitators ("ESP") technologies. The analysis concludes that since the RECLAIM PEA showed peak percentage increases from baseline levels to be less than 25 percent and thus under the need to obtain a wastewater discharge permit, any increased wastewater generated from WGS or Wet ESP technologies under the Project would not exceed 25 percent of existing capacity. The analogy to the 2015 PEA is insufficient evidence to support the conclusion that the Project control measures would not trigger a 25 percent or more increase above existing capacity at any facility, much less that the impacts from the Project control measures would be "similar or fewer" than impacts analyzed in the 2015 PEA. Control Measure CMB-05 itself requires further NOx reductions from the RECLAIM Assessment and requires a re-examination of the RECLAIM program, including voluntary opt-out of the program and implementation of additional control and SCR equipment. The DPEIR must specifically analyze potentially affected refineries and include capacity limits to properly analyze the impacts of the Proposed Plan. The DPEIR cannot simply rely on the analysis completed for a different project to conclude that the Project's wastewater discharge impacts are less than significant.

Response 3-70

To assess potential wastewater impacts from the installation and operation of wet gas scrubbers (WSGs) or wet electrostatic precipitators (ESPs) at refinery facilities, the Draft Program EIR included analysis from the December 2015 Final PEA for NOx RECLAIM. Each affected refinery provided their wastewater discharge limits and these limits were compared to each refinery's estimated potential increase in wastewater that may result from installing WGS or wet ESP technologies. The peak percentage increase from baseline levels was approximately nine percent. Since all of the affected facilities were shown to have a potential wastewater increases well below 25 percent, no modifications to any existing wastewater discharge permits are were anticipated at that time. Similarly, for the analysis in the Draft Program EIR, any facility operator that has increased wastewater generation due to the installation of WGS or wet ESP technology would be expected to have similar or fewer impacts than what was previously analyzed in the December 2015 Final PEA. Further, operators of affected facilities that install and operate WGS or wet ESP technology would continue to comply with existing wastewater treatment requirements of the applicable Regional Water Quality Control Board or sanitation district. Therefore, wastewater generated from industrial facilities as a result of implementing control measures in the 2016 AQMP was not expected to result in significant water quality impacts.

Comment 3-71

> The DPEIR's discussion of water demand concludes that new water conveyance infrastructure is not expected because the anticipated increased water demand associated with the Project, *e.g.*, five million gallons per day, is expected to be associated with existing sources within the Basin which already have water conveyance infrastructure. This conclusion is completely unsupported. An increase of water demand of five million gallons per day is extremely unlikely to be able to be accommodated by existing infrastructure. This impact must be adequately studied and impacts must be disclosed in order for the DPEIR to be legally adequate under CEQA.

Response 3-71

The 2016 AQMP control measures will primarily affect already existing facilities that already have developed water conveyance infrastructure. The water demand associated with certain air pollution control technologies would also likely be spread throughout the District. The source of water to meet the projected demand will vary from jurisdiction to jurisdiction, but can include additional use of ground water and recycled water resources, which is becoming more prevalent. As detailed in Subchapter 4.4 of the Draft Program EIR, overall water demand from implementing the 2016 AQMP is concluded to have significant hydrology impacts. Any new facilities that would be affected by the 2016 AQMP control measures would be required to go through the proper permitting processes, which would require a specific assessment of the available water resources at that time. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-72

> The DPEIR identifies potential new or increased sources of water pollution, such as biodiesel fuels, compressed natural gas, liquefied natural gas, and hydrogen. The DPEIR states that alternative fuels are expected to be less toxic compared to conventional fuels. However, the DPEIR fails to provide substantial evidence to support the conclusion that alternative fuels would be less toxic than conventional fuels. Further, even if alternative fuels are less toxic, they may cause or contribute to exceedances of storm water permit requirements because they present different pollutants into the storm drain system compared to conventional fuel byproducts. For example, as noted in the DPEIR, electric vehicles contain lead-acid and nickel-cadmium batteries. Although, as noted in the DPEIR, these batteries are being recycled at an increasing rate, they remain a source of storm water pollution which could exceed "numeric action limits" in various storm water permits issued to agencies in SCAQMD's jurisdiction. Thus, the conclusion that alternative fuel vehicles will not pose water quality impacts is unsupported by substantial evidence.

Response 3-72

In general, alternative fuels are expected to be less toxic than conventional fuels. Please see Subchapter 4.4.4.2.3 for the discussion to support this conclusion. The comment does not provide any specific evidence to dispute this conclusion. Industrial or commercial facilities are generally

considered "point sources" and must release wastewater into publicly owned treatment works (POTWs), under the National Pollutant Discharge Elimination System (NPDES) permit program, administered by the Regional Water Quality Control Board (RWQCB). Any facilities using alternative fuels are not expected to contribute to exceedances of storm water permit requirements because they must still comply with their applicable discharge requirements. (*See Rominger v. Cnty. of Colusa* (3d Dist. 2014) 229 Cal. App. 4th 690, 728 [holding that a CEQA analysis was proper in assuming compliance with regulatory measures, even without a project condition required such compliance].)

As noted in the comment, the switch to electric batteries has the potential to create water quality impacts from improper disposal. However, as described in the Draft Program EIR in Subchapter 4.4.4.2.4, the recycling of lead-acid and nickel-cadmium batteries is already a well-established activity. Further some manufacturers offer incentives to prevent illegal disposal of the batteries. Most car manufacturers offer a program to take back used or damaged battery packs, including Toyota and Nissan (Green Car Reports, 2016). The Draft Program EIR concluded that because battery recycling is required by law and because they have value, the illegal or improper disposal of batteries is expected to be uncommon, thereby reducing the potential water quality impacts caused by illegal disposal. (*See Rominger v. Cnty. of Colusa* (3d Dist. 2014) 229 Cal. App. 4th 690, 728 [holding that a CEQA analysis was proper in assuming compliance with regulatory measures, even without a project condition required such compliance].)

Comment 3-73

> Lastly, the DPEIR only analyzes the hydrology impacts associated with some, but not all, of the proposed control measures. For instance, the potential water quality impacts (both water demand and water quality impacts) associated with cleaning solar panels during routine maintenance (Control Measure ECC-03) are not analyzed. In addition, there is no substantive discussion or analysis of the potential hydrological impacts associated with, among others, Control Measures BCM-03, BCM-07, ECC-04, BCM-04, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, and CCP-01.

Response 3-73

The control measures which may result in the use of compliance options that in turn, could generate significant hydrology and water quality impacts are listed in Table 4.4-1, including the comment's referenced control measures ECC-03, ECC-04, BCM-03, BCM-04, BCM-07, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07 and CCP-01. Potential hydrological impacts as result of the implementation of these control measures are discussed and analyzed in Subchapter 4.4. Footnote h of Table 4.4-4 stated that it would be too speculative at this time to estimate the water needed to wash solar panels and roofs. Further attempts to qualitatively analyze the environmental impacts would have been speculative. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA.].) As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the

program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-74

c. Mitigation

Section 4.4.6 of the DPEIR states that various measures "*should*" be implemented "where feasible." Other measures are likewise vague and indefinite. This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *see also*, *Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.)

For example, Mitigation Measure WQ-1 states that local water agencies should continue to evaluate future water demand. Mitigation Measure WQ-2 provides that project sponsors should coordinate with local water providers to make sure there are adequate water supplies. Mitigation Measure WQ-3 encourages project sponsors to implement water conservation measures and prioritize recycled water "whenever available and appropriate." Finally, Mitigation Measure WQ-4 states that project sponsors should consult with local water providers to identify "feasible and reasonable" measures to reduce water consumption.

Most of these measures, which rely on future study and action, also constitute improper deferred mitigation under CEQA. (CEQA Guidelines §15126.4(a)(1)(B); *Sundstrom*, *supra*.)

Response 3-74

Enforceable mitigation measures (WQ-1 through WQ-4) that would reduce hydrology and water quality related impacts were included in the Draft Program EIR and can be found in Subchapter 4.4.6 on page 4.4-20. However, the mitigation measures are not expected to fully eliminate the significant water demand impacts. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, it is expected that mitigation measures WQ-1 through WQ-4 would be applied to future projects, if the impacts from those projects would result in significant hydrology and water quality impacts. This framework for applying mitigation measures to future projects is appropriate for a program-level document. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) The Draft Program EIR concluded that even with implementation of the mitigation measures, hydrology and water quality impacts are expected to remain significant and unavoidable.

Comment 3-75

6. Noise

a. Scope of Analysis

We appreciate the District adding operational noise impacts to the scope of the DPEIR in response to our comments on the NOP/IS. However, the DPEIR still neglects to address the qualitative noise impacts that Appendix G of the CEQA Guidelines specifically recommends be addressed. For instance, there is no discussion of whether the Project would result in a substantial temporary or permanent increase in ambient noise levels above levels existing without the Project.

The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant noise impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts.

Response 3-75

Operational noise impacts are analyzed in Subchapter 4.5.4.2 of the Draft Program EIR. The significance criteria used to evaluate potential noise impacts are presented in Subchapter 4.5.3. The operational noise and vibration impacts from implementation of the 2016 AQMP were concluded to be less than significant. The impact of the proposed project on local noise levels and vibration during construction, although temporary in nature, are considered significant. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-76

b. Impact Analysis

In order to determine whether or not the noise impacts from the proposed Project are significant, impacts are compared to the significance criteria in Section 4.5.3. (DPEIR, p. 4.5-5.) That section indicates that construction noise levels are significant if they: (a) "exceed the local noise ordinances," (b) increase ambient noise levels by more than three decibels if the noise threshold is currently exceeded, or (c) exceed federal Occupational Safety and Health Administration noise levels. For operational noise, thresholds similar to (a) and (b) above are used.

Despite the stated use of these thresholds, no analysis is performed of the Project's impacts compared to these thresholds. Instead, the DPEIR simply states based on the noise from a typical construction site, that construction noise impacts would be significant. There is no analysis of whether Project construction activities would exceed local noise ordinances. There is also no analysis of existing ambient noise levels, whether those noise levels are currently exceeded, and, if so, whether the Project would increase those levels by more than three decibels. The DPEIR employs a vibration significance threshold that is not included in its significance criteria and provides no explanation whatsoever to justify its use or reliance thereon.

Response 3-76
As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

The significance threshold used for vibration is based on the Federal Transit Administration (FTA) published standard vibration levels and peak particle velocities for construction equipment operations (FTA, 2006), and is explained on pages 4.5-8 and 4.5-9 of the Draft Program EIR.

Comment 3-77

> Moreover, there is no *qualitative* analysis of any noise impacts nor consideration of several topics referenced in Section XII of the Appendix G Checklist. (*Berkeley Keep Jets Over the Bay Comm. v. Board of Port Commissioners* (2001) 91 Cal.App.4th 1344 [lead agency did not comply with CEQA by relying solely on specified noise standard without undertaking analysis of potential impacts pursuant to Appendix G of the CEQA Guidelines].)

Response 3-77
Although some of the specific control measures are provided in broad language, potential associated noise impacts can still be analyzed based on known information or supported assumptions, as was done in the Draft Program EIR, to determine foreseeable effects. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Further attempts to qualitatively analyze the environmental impacts would have been speculative. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA.].)

Comment 3-78

> Further, the DPEIR only analyzes the construction-related noise impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential noise impacts associated with, among others, Control Measures MOB-05, MOB-08, MOB-13, BCM-08, and ORLD-01, ORLD-03, ORHD-05, ORHD-09, and OFFS-08. Other measures that may result in significant impacts, such as Control Measures CMB-03, MOB-06, BCM-03, and BCM-07, are given cursory, at best, treatment. Further, the DPEIR assumes that "no new industrial facilities or corridors will be constructed," but provides no evidence, let alone substantial evidence, as required, to support this statement. (DPEIR, p. 4.5-5.)

Response 3-78

All proposed control measures were evaluated for potential noise impacts, including construction related noise impacts. The control measures which may result in construction or the use of compliance options that in turn, could generate significant noise impacts are listed in Table 4.5-1, including CMB-03, BCM-03, and BCM-07. MOB-05, MOB-06, and MOB-08 involve the replacement of older equipment with newer, lower emitting equipment. MOB-13 involves the off-road mobile source emission reduction credit generation program. BCM-08 involves emissions reductions from agricultural, prescribed and training burning. ORLD-01, ORLD-03, ORHD-05, ORHD-09, and OFFS-08 involve the deployment of cleaner vehicles and equipment. Therefore, no noise impacts are anticipated from these measures and the comment does not provide evidence of impacts not analyzed in the Draft Program EIR.

The control measures proposed in the 2016 AQMP would result in reduction of emissions and would not result in the construction of new industrial facilities or corridors, but rather some of the existing facilities and corridors would be modified to include installation of new equipment and roadway infrastructure due to the highly developed setting of the District. The existing rail and truck routes/corridors likely to be modified are located primarily in commercial and industrial zones within the southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well inland railyards near downtown Los Angeles.

Comment 3-79

> The analysis of operational noise impacts suffers from the same flaws as the analysis of construction noise impacts. The stated noise thresholds are ignored and no reasoned analysis or substantial evidence supports the DPEIR's claim that "operational noise and vibration impacts associated with the Proposed Plan are expected to less than significant." (DPEIR, p. 4.5-10.)

Response 3-79

Contrary to the comment, the operational noise thresholds stated in Subchapter 4.5.3 are not ignored. Noise requirements and noise ordinances of the city or county would continue to apply to future projects, so that noise impacts on sensitive receptors are expected to be less than significant. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that

requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-80

> **c. Mitigation**
>
> The DPEIR acknowledges a significant impact in regard to construction noise and vibration impacts. Section 4.5.5 of the DPEIR states that various measures "*should* be implemented." This does not constitute "fully enforceable" mitigation, as required. (CEQA Guidelines § 15126.4(a)(2); *see also*, *Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.) Moreover, as noted previously, *none* of these measures may be implemented given the ministerial nature of the subsequent local permitting process. Indeed, the DPEIR states that the District "cannot predict" how local agencies "might choose to mitigate a significant construction noise and vibration impacts for a future project." (DPEIR, p. 4.5-13.)

Response 3-80

Enforceable mitigation measures (NS-1 through NS-17) that would reduce noise related impacts were included in the Draft Program EIR and can be found in Subchapter 4.5.5 on page 4.5-11. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, it is expected that mitigation measures NS-1 through NS-17 would be applied to future projects, if the impacts from those projects would result in significant noise impacts. This framework for applying mitigation measures to future projects is appropriate for a program-level document. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) While mitigation measures NS-1 to NS-17 would minimize some of the noise and vibration impacts from construction, the SCAQMD cannot predict how a lead agency or responsible agency might choose to mitigate significant construction noise and vibration impacts for a future project. Therefore, noise and vibration impacts from construction of implementing the 2016 AQMP are expected to remain significant.

Comment 3-81

The DPEIR acknowledges that the identified measures are not sufficient to mitigate the significant noise impacts to a less than significant level. No effort or attempt is made to explain what noise levels would be with or without mitigation. Thus, it is impossible to determine whether impacts have been avoided or substantially lessened, as required.

Mitigation Measure NS-1 requires the installation of temporary noise barriers during construction. It is not clear whether such barriers must be installed during all construction periods, as implied.

Mitigation Measure NS-2 specifies that noise barriers shall be used to protect sensitive noise receptors from excessive noise levels during construction. Again, the measure does not specify whether such barriers must be installed during all construction periods, as implied. Further, the measure does not specify what constitutes "excessive" noise levels.

Mitigation Measure NS-3 indicates that if construction activities are allowed outside the hours allowed by local ordinances, the impacted individual should seek "temporary relocation or use of hearing protective devices." Placing the onus of mitigating noise impacts on the impacted sensitive receptor is anathema to the District's mitigation obligations under CEQA.

Response 3-81

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. As stated above, mitigation measures NS-1 to NS-17 would minimize some of the noise and vibration impacts from construction. However, the SCAQMD cannot predict how a lead agency or responsible agency might choose to mitigate significant construction noise and vibration impacts for a future project. Therefore, it is expected that mitigation measures NS-1 through NS-17 would be applied to future projects, if the impacts from those projects would result in significant noise impacts

The intent of NS-1 is to install temporary noise barriers during all construction activities that could generate excessive noise. However, the requirements of this mitigation measure would be clarified in the CEQA document for future projects.

The intent of NS-2 is to install temporary noise barriers to protect sensitive receptors during all construction activities that could generate excessive noise. However, the requirements of this mitigation measure (including what constitutes excessive noise levels) would be clarified in the CEQA document for future projects.

The comment regarding NS-3 misstates the intent of the mitigation measure. The intent of NS-3 is to schedule construction activities consistent with the allowable hours pursuant to the applicable general plan noise element or noise ordinance and to ensure noise-generating construction activities (including truck deliveries, pile driving, and blasting) are limited to the least noise-

sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors. The portion of the mitigation measure that refers to "temporary relocation or use of hearing protective devices" is intended to only be an option if the lead agency authorizes construction activities outside the limits established by the noise element of the general plan or local noise ordinance. The details of this mitigation measure would be clarified in the CEQA document for future projects.

Comment 3-82

> **7. Solid and Hazardous Waste**
>
> **a. Scope of Analysis**
>
> The IS prepared for the Project scoped out compliance with federal, state, and local statutes and regulations related to solid and hazardous waste from the DPEIR on the basis that the District's Board would be required to make consistency findings with current regulations prior to adopting or amending the proposed control measures. There is no substantial evidence to support the statement that the control measures would be consistent with regulations simply because the District will make consistency findings.
>
> The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant solid and hazardous waste impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts.

Response 3-82

Control measures that are applied to future projects (e.g. through rulemaking activities) would be required to be consistent with federal, state, and local statutes and regulations related to solid and hazardous waste. It is appropriate to assume compliance with existing and future laws and regulations in analyzing impacts under CEQA. (*See Rominger v. Cnty. of Colusa* (3d Dist. 2014) 229 Cal. App. 4th 690, 728 [holding that a CEQA analysis was proper in assuming compliance with regulatory measures, even without a project condition required such compliance].) The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 3-83

> **b. Impact Analysis**
>
> Section 4.6.4.2.2 states that the permitted capacity of landfills in Los Angeles, Orange, Riverside, and San Bernardino counties is 112,592 tons per day and that the increase in solid waste from the Project control measures would only result in a minor increase in solid waste that would not exceed permitted capacity. There are several issues with this analysis. First, the discussion omits an estimate of the quantity of solid waste anticipated to be generated by the Project, which is a critical component to making a significance determination of solid waste impacts. Second, the discussion does not state which landfills will accept solid waste from the Project. Third, the analysis does not consider when applicable landfills will reach capacity, which is vital to understanding whether there will be capacity to accept future waste, particularly for an EIR that analyzes impacts of a program that will be implemented over many years.

Response 3-83

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. It is speculative at this time to quantify a specific amount of solid waste that will be generated since future project details are unknown at this time. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA.].) The non-hazardous waste that would potentially be generated would be accepted at numerous landfills throughout southern California, including Prima Deshecha, Badlands, Colton, El Sobrante, Frank R. Bowerman, Lamb Canyon, Mid-Valley, Olinda Alpha, San Timoteo, Agua Mansa, Sunshine Canyon, Calabasas and Chiquita Canyon Landfills. It is outside of the scope of the Draft Program EIR to analyze when applicable landfills will reach capacity.

Comment 3-84

> Similarly, the DPEIR states that the permitted capacity at the Buttonwillow Landfill, which would likely accept hazardous waste generated as a result of the Project, is in excess of 10 million cubic yards and will therefore have "sufficient capacity to handle any small amounts of hazardous waste that could be collected by the filters, baghouses, or [electrostatic precipitators]." (DPEIR, p. 4.6-14.) This conclusion is not supported by substantial evidence because it does not quantify the "small amount" of hazardous waste generated by the Project and relies on permitted capacity rather than presenting data on current capacity.

Response 3-84

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. It is speculative at this time to quantify a specific amount of hazardous waste that will be generated since future project details are unknown at this time. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA.].) The Clean Harbors hazardous waste landfill located in Buttonwillow, California is discussed in Subchapter 4.6.4.2.2 of the Draft Program EIR.

Comment 3-85

> Regarding construction waste, the DPEIR does not even attempt to quantify the solid waste that would be generated by the Proposed Plan's measures. Rather, the DPEIR states that "at this time, it is speculative to estimate the amount of construction waste that may be generated as the 2016 AQMP is implemented, since the extent and timing of individual projects is not known." (DPEIR, p. 4.6-17.) This conclusion is unsupported by any evidence, much less substantial evidence, as required. Construction waste estimates must be quantified and presented in the DPEIR along with feasible mitigation measures to avoid or substantially lessen any associated impacts.

Response 3-85

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. It is speculative at this time to quantify a specific amount of construction waste that will be generated since future project details are unknown at this time. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) Thus, the Draft Program EIR concluded that solid waste impacts from construction would remain significant and unavoidable.

Comment 3-86

> The Solid and Hazardous Waste Section only analyzes impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential solid and hazardous waste impacts associated with, among others, Control Measures ECC-03, ECC-04, BCM-01, BCM-02, BCM-07, CMB-01, CMB-02, CMB-04, FLX-02, MOB-05, MOB-06, MOB-07, MOB-08, MOB-10, MOB-11, MOB-12, and MOB-13.

Response 3-86

All proposed control measures were evaluated for potential solid and hazardous waste impacts. The control measures which may result in construction or the use of compliance options that in turn, could generate significant solid or hazardous impacts are listed in Table 4.6-1, including ECC-03, BCM-01, BCM-02, BCM-07, CMB-01, CMB-02, CMB-04, FLX-02, MOB-05, MOB-06, MOB-07, MOB-08, MOB-10, MOB-11, MOB-12, and MOB-13. ECC-04 involves the use of cool roof technology to reduce energy needs and would not result in the generation of waste as new technology would be placed on existing structures. Therefore, no solid and hazardous waste impacts are anticipated from these measures and the comment does not provide evidence of impacts not analyzed in the Draft Program EIR.

Comment 3-87

c. Mitigation

CEQA requires a lead agency to present feasible mitigation measures to avoid or substantially lessen significant environmental impacts. (Public Resources Code §§ 21002, 21002.1, 21100.) Despite concluding that the Project will result in significant solid and hazardous waste impacts, the DPEIR does not contain a single mitigation measure to address this impact. The DPEIR must be revised to provide feasible mitigation measures to address the Project's acknowledged significant waste impacts.

Response 3-87

Although the monetary value of scrapped engines, vehicles, and equipment would likely lead to recycling of these items, no mitigation measures have been identified to reduce the impacts to landfills and the impacts remain significant. Short-term impacts from construction also remain significant. No feasible mitigation measures have been identified. However, feasible mitigation may be determined during the project-level CEQA evaluation. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77.)

Comment 3-88

8. Transportation and Traffic

a. Scope of Analysis

Per the conclusions of the IS, the DPEIR does not contain any analysis of whether the Project would conflict with an applicable transportation plan, ordinance, or policy; substantially increase hazards due to a design feature or incompatible use; or conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities. (DPEIR, p. 4.7-6.) These highly relevant topics from Section XVI of the Appendix G Checklist should be addressed in the DPEIR. As noted in our comment letter on the NOP/IS, the DPEIR's conclusion that the Project will not result in significant impacts to any of these categories is not supported by substantial evidence.

The DPEIR must be revised and the scope of the DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding all potentially significant traffic and transportation impacts as well as all feasible mitigation measures and alternatives to alleviate those impacts.

Response 3-88

The 2016 AQMP contains proposed control measures to reduce emissions from both stationary and mobile sources within the District. The transportation and traffic analysis which is requested in the comment was performed in the IS (see Appendix A). The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no revisions to the Draft Program EIR are necessary and no further response is necessary under CEQA.

Comment 3-89

> **b. Impact Analysis**
>
> In order to determine whether or not the traffic impacts from the proposed Project are significant, impacts are compared to the significance criteria in Section 4.7.3. (DPEIR, p. 4.7-6.) Per that section, the Project would result in significant traffic impacts if it would, among others: (a) cause peak period levels on major arterials to degrade to Level of Service ("LOS") D, E, or F for more than a month, (b) substantially alter water borne, rail car, or air traffic, (c) result in the need for 350 employees, or (d) increase customer traffic by more than 700 visits. There is no explanation for how these artificial thresholds, which do not appear to represent any local thresholds, were derived.

Response 3-89

The significance thresholds identified in the Draft Program EIR were developed pursuant to the CEQA Guidelines. Section 15064.7(a) encourages "[e]ach public agency [] to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects."

Comment 3-90

> More fundamentally, the DPEIR never applies the thresholds it purports to use. For instance, as to construction traffic impacts, the DPEIR simply concludes without any reasoned analysis or supporting data that construction traffic impacts could be significant. The reader is assured that such impacts will be studied later since "Project specific impacts would require a separate CEQA evaluation." (DPEIR, p. 4.7-7.) As noted previously, any further CEQA review would only be required if implementation of the Project control measures required discretionary approvals. Even if such measures did require discretionary approvals, as the DPEIR repeatedly notes, the measures would be implemented at existing facilities and thus would likely be determined by local agencies to be exempt from CEQA. (*See, e.g.*, CEQA Guidelines § 15301.) This underscores the important point that by law the time for CEQA review is now before the Project is approved.

Response 3-90

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. The comment provides no evidence to support the claim that projects would likely be exempted from CEQA requirements by local agencies. Therefore, no further response is necessary.

Comment 3-91

As to operational traffic impacts, the DPEIR claims that "it is not known what control strategies may be applied, which facilities may require additional trips, or how often these trips may be necessary." (DPEIR, p. 4.7-9.) As such, the DPEIR claims that "no traffic estimates can be prepared at this time." Consistent with its treatment of other topics, the DPEIR summarily concludes without any analysis of Project impacts compared to its stated significance thresholds that the impacts of the proposed Project on traffic and transportation are expected to be significant prior to mitigation.

In particular, the DPEIR does not contain any analysis of the potentially significant traffic impacts associated with an estimated increase of over 700,000 partial-zero and zero emission vehicles, 11,000 partial-zero and zero emission buses, and 245,000 partial-zero and zero heavy emission trucks[18] by 2031. (DPEIR, p. 4.7-8.) Instead of analyzing the impacts caused by additional vehicles, the analysis assumes that these vehicles will replace older vehicles "upon retirement." (*Id.*) However, other drivers will now be able to drive these vehicles and the analysis should have assumed that both the old and new vehicles will be used at the same time.[19] Indeed, the DPEIR itself acknowledges that "it is not conclusive that equipment will be put out of service and that the high number of vehicles or equipment will be scrapped as solid/hazardous waste." (DPEIR, p. 6-33.)

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[18] The DPEIR text wrongly cites this figure as 115,000 light, medium, and heavy duty trucks, whereas Table 4.7-2 lists this figure as 245,000 vehicles.

[19] This same assumption should be reflected in all the analyses, including but not limited to, air quality, GHG emissions, and noise.

Response 3-91

It would be speculative to quantify specific traffic estimates at this time based on the fact that it is not known what control strategies may be applied and exactly where the future projects would be located. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) Therefore, operational traffic impacts from the implementation of the 2016 AQMP are analyzed on a programmatic level in the Draft Program EIR.

The 2016 AQMP relies on the regional demographic projections and transportation programs, measures, and strategies from SCAG's 2016 RTP/SCS. The RTP TCMs are required by Health and Safety Code 40460 to be combined with the SCAQMD's portion of the AQMP; however, the 2016 RTP/SCS is considered a separate project under CEQA because the land use and transportation strategies program are within SCAG's jurisdictional authority and the 2016 RTP/SCS will move forward with or without adoption of the 2016 AQMP. The environmental impacts from the 2016 RTP/SCS were analyzed and disclosed in the Draft Program EIR released by SCAG on December 4, 2015 for a 60-day public review and comment period ending on February 1, 2016. On April 7, 2016, the SCAG Regional Council adopted the 2016 RTP/SCS and certified the Final Program EIR. Since SCAQMD will not be adopting rules or regulations to implement the TCMs and the two projects are not dependent on each other, the environmental impacts from the 2016 RTP/SCS were only analyzed as part of the cumulative analysis.

Implementation of control measures from previous AQMPs which included vehicle replacements

have led to the removal and replacement of older, higher emitting vehicles within the District. The intent of control measures that incentivize the use of partial-zero and zero emission vehicles is to replace already existing, older high emitting vehicles with cleaner vehicles to assure that the intended environmental and air quality benefits of the program are achieved. Therefore, no increase in the number of mobile sources would be expected and no related traffic and circulation impacts would be generated. Consistent with SCAG's 2016 RTP/SCS, the vehicle miles travelled are anticipated to decrease, which further supports SCAQMD staff's assumption that the new vehicles would simply replace the older vehicles and not add to the older vehicles.

Comment 3-92

> The DPEIR fails to meaningfully describe and analyze potentially significant impacts to rail and marine vessel traffic, ignoring the specific significance criterion related to this topic. Any attempt to quantify and analyze the impacts of increased marine vessel and rail traffic are dismissed by the DPEIR are "speculative." (DPEIR, pp. 4.7-8 to 4.7-9.)

Response 3-92

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. *See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. It would be speculative to quantify specific rail and marine vessel traffic impacts at this time because it is not known how the control strategies would be applied to future projects. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].)

Comment 3-93

> The DPEIR likewise fails to meaningfully describe and analyze potentially significant impacts associated with the use of overhead catenary electrical lines. Instead, the reader is told that the use of such lines could result in significant traffic impacts due to closure of lane(s) to vehicular traffic and alteration of traffic patterns and congestion. (DPEIR, p. 4.7-10.) Such analysis and mitigation is improperly deferred to an unspecified, later "CEQA evaluation." (DPEIR, p. 4.7-9 to 4.7-10.)

Response 3-93

As stated in the Draft Program EIR, specific design features associated with the future projects that will implement the use of overhead catenary electrical lines are unknown at this time. However, as part of a conservative analysis, the Draft Program EIR concluded that installation of catenary lines, bonnet technology, and solar panels could create significant aesthetic impacts. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such

analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-94

> Finally, the DPEIR only analyzes the traffic impacts associated with some, but not all, of the proposed control measures. For instance, there is no substantive discussion or analysis of the potential traffic impacts associated with, among other others, Control Measures CMB-03, MOB-05, MOB-06, MOB-08, MOB-13, BCM-03, BCM-07, ORLD-01, ORLD-03, ORHD-05, ORHD-09, and OFFS-08.

Response 3-94

All proposed control measures were evaluated for potential traffic and transportation impacts. The 30 control measures that may result in the use of compliance options that could generate significant transportation and traffic impacts are listed in Table 4.7-1, including CMB-03, BCM-03, BCM-07, ORHD-05, and ORHD-09. MOB-05, MOB-06, MOB-08, ORLD-01, ORLD-03, and OFFS-08 involve the replacement of older vehicles with newer, lower emitting vehicles or further deployment of cleaner technologies and would not result in transportation impacts since no new vehicles will be added to the roadways because of these control measures. MOB-13 involves the off-road mobile source emission reduction credit generation program, which does not result in additional vehicles on roadways. Therefore, no transportation and traffic impacts are anticipated from these measures and the comment does not provide evidence of impacts not analyzed in the Draft Program EIR.

Comment 3-95

> **c. Mitigation**
>
> As to mitigation of identified significant construction traffic impacts, the DPEIR claims that it cannot impose mitigation measures for all such impacts because it failed to study them. (DPEIR, p. 4.7-10.) This plainly violates CEQA. (Public Resources Code §§ 21002, 21002.1., 21100.) As to the lone traffic mitigation measure the DPEIR does identify for significant construction traffic impacts (Mitigation Measure TR-1), this measure constitutes impermissible deferral of mitigation.

Response 3-95

The comment's claim that the Draft Program EIR cannot impose mitigation measures because it failed to study them is inaccurate. Staff did not identify any adverse environmental impacts from the traffic mitigation measures. Mitigation measure TR-1 was identified to reduce construction traffic impacts and is discussed in Subchapter 4.7.5. The intent of mitigation measure TR-1 is to develop a construction management plan that includes a list of traffic and transportation controls that can be utilized if they are determined to be feasible by the Lead Agency once future project specific details are known. This framework for applying mitigation measures to future projects is appropriate for a program-level document. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) Although

mitigation measure TR-1 would reduce transportation and traffic impacts during construction, those impacts would still remain significant. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, it is expected that mitigation measure TR-1 would be applied to future projects, if the impacts from those projects would result in significant transportation and traffic impacts.

Comment 3-96

> Formulation of mitigation measures should not be deferred until a later time. (CEQA Guidelines § 15126.4(a)(1)(B); *Sundstrom, supra*.) Deferral is permitted only in limited circumstance where a lead agency can show: (1) practical considerations prohibit devising such measures earlier in the planning process and (2) the EIR specifies the specific performance standards capable of mitigating the project's impact(s) to a less than significant level. (*Sacramento Old City Ass'n, supra*, 229 Cal.App.3d at 1028-1029; *Clover Valley Foundation v. City of Rocklin* (2011) 197 Cal.App.4th 200, 237.)

Response 3-96

As a programmatic-level document, it is appropriate under CEQA to provide a framework for developing appropriate mitigation measures during future project-level review. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) Attempts to formulate specific mitigation measures at this time would be speculative. (See id. 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].)

Comment 3-97

> Mitigation Measure TR-1 calls for the preparation of a future Construction Management Plan. No commitment to mitigation is provided by the measure. Instead, the specified items need only be included "if determined to be feasible by the Lead Agency." In addition, no clear, specific performance standards are specified by this measure. Moreover, as noted previously, this measure may well never be implemented given the ministerial nature of the subsequent local permitting process.

Response 3-97

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in

the future, in the light of the Program EIR. Therefore, it is expected that mitigation measure TR-1 would be applied to future projects, if the impacts from those projects would result in significant transportation and traffic impacts. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) The comment provides no evidence to support the claim of the ministerial nature of future projects. However, if future projects are ministerial, the lead agency may not be able to require mitigation.

Comment 3-98

No mitigation measures are provided for the identified significant operational traffic impacts. This clearly and unequivocally violates CEQA, which requires agencies to not only identify potentially significant impacts but also mitigation measures and alternatives designed to avoid or substantially lessen such impacts. (Public Resources Code §§ 21002, 21002.1, 21100.) An agency cannot simply conclude an impact is significant without identifying all feasible mitigation to address that impact. (*Id.*) The DPEIR must be revised to provide feasible mitigation measures to address the Project's acknowledged significant traffic impacts.

Response 3-98

As stated in Subchapter 4.7.6, no mitigation measures were identified to reduce the significant impacts from the exclusive dedication of existing lanes of vehicle traffic travel as a truck lane for vehicles using the overhead catenary electrical lines or fixed guideway systems because traffic patterns and congestion may be altered or for the significant impacts associated with the increase in vessels in the harbor should the barge-based bonnet technology be used. Therefore, the operational impacts remain significant and unavoidable. No feasible mitigation measures were identified in the Draft Program EIR, and the comment does not propose any feasible mitigation measures. CEQA only requires that feasible mitigation be included in the EIR. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376 ["CEQA does not require analysis of every imaginable alternative or mitigation measure; its concern is with feasible means of reducing environmental effects."] (emphasis in original); *Concerned Citizens of S. Cent. L.A. v. Los Angeles Unified Sch. Dist.* (2d Dist. 1994) 24 Cal. App. 4th 826, 841 [same]; Pub. Res. Code §§ 21002, 21002.1, 21100; Guidelines § 15126.4(a).) No revisions to the Draft Program EIR are necessary.

Comment 3-99

9. Aesthetics

a. Scope of Analysis

We appreciate the District adding Aesthetics to the scope of the DPEIR in response to our comments on the NOP/IS.

Response 3-99

No response is necessary under CEQA.

Comment 3-100

b. Impact Analysis

Implementation of Control Measures ORHD-05, ORHD-06, ORHD-08, and ORHD-09 would result in the installation of catenary overhead electrical lines and fixed guideway systems, battery charging stations, and fueling infrastructure within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. The DPEIR contends that the installation of catenary lines in industrialized areas near the Ports, is not expected to result in any significant aesthetic impacts to scenic highways because such areas "are not near an officially designated Scenic Highway or a roadway eligible for State Scenic Highway Designation." (DPEIR, p. 4.8-4.) However, the DPEIR fails to identify or even describe known visual resources such as John S. Gibson Boulevard, Harbor Boulevard, and the Vincent Thomas Bridge, all of which are designated as local scenic highways in the San Pedro and Wilmington-Harbor City Community Plans. Ocean Boulevard is likewise identified as a scenic route in the Scenic Element of Long Beach's General Plan. Indeed, there are many historic and cultural resources, both listed and found eligible for listing through surveys, that contribute to the visual setting and character of the Ports and if modified, through obstruction, alteration, or demolition would have a negative aesthetic impact.

Response 3-100

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

As stated in Subchapter 4.8.3, implementation of the 2016 AQMP would be considered to have significant aesthetics impacts if any of the following criteria apply: substantial adverse effect on scenic vistas; substantial damage to scenic resources, including but not limited to trees, rock outcroppings, and historic building within a state scenic highway; and creation of a new source of substantial light or glare which would adversely affect day or nighttime views in the area. The Draft Program EIR also states that "the potential locations for catenary overhead power lines (near Port facilities, transportation corridors, and railyards) would not be visible to Route 1 at State Route 19 due to the numerous structures and topography between the two locations. There are no officially designated Scenic Highways or highways eligible for State Scenic Highway Designation in areas affected by construction of zero or near-zero emission equipment associated with the 2016 AQMP." Most of the areas within the Basin where such equipment is being considered are primarily heavily industrialized areas and major transportation corridors. However, the Draft Program EIR did conservatively conclude that there could be significant aesthetics impacts as a result of the development of catenary lines. The potential impacts to the local visual resources and scenic highways will be evaluated during rulemaking for the proposed control measures. If future projects are planned in the immediate vicinity of the roadways referenced in the comment (John S. Gibson Blvd., Harbor Blvd., the Vincent Thomas Bridge, or Ocean Blvd., it would be necessary to conduct a site specific CEQA analysis where aesthetic impacts could be evaluated and appropriate mitigation could be applied.

Comment 3-101

> Implementation of Control Measures MOB-01 and ORFIS-04 would lead to the use of bonnet technology, which could be either land-based or barge-based, to reduce emissions from marine terminals. The DPEIR claims that while the use of bonnet technology could degrade the existing visual character or quality in the immediate surrounding area, it is unlikely that the use of bonnet technology would be visible from sensitive vantage points due to the presence of intervening structures at the ports. There is no substantial evidence, such as visual simulations, maps, or comparable data to support such statements.

Response 3-101

As discussed on page 4.8-4 of the Draft Program EIR, "while the use of bonnet technology could degrade the existing visual character or quality in the immediate surrounding area, it is unlikely that the use of bonnet technology would be visible from sensitive public vantage points due to the presence of intervening structures at the ports. One example of the use of the bonnet technology referred to in the comment is the installation of a dockside catalytic control system (DoCCS) at the Mitsubishi Cement Facility Modification Project at the Port of Long Beach." The NOP/IS[3] for the project concluded that aesthetic impacts from the DoCCS would be less than significant.

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR.

Comment 3-102

> Implementation of Control Measures ECC-03 and ECC-04 would require the installation of solar panels and cool roof technology. The DPEIR acknowledges that there would be a significant construction-related impact due to degradation of the existing visual character of each affected site as a result of equipment staging and laydown areas. The DPEIR likewise acknowledges that these technologies could increase a significant source of glare as a result of the Proposed Plan.

Response 3-102

The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

[3] The NOP/IS can be found online at: http://www.polb.com/civica/filebank/blobdload.asp?BlobID=8645, accessed on January 21, 2017.

Comment 3-103

> Further, the DPEIR only analyzes the aesthetic impacts associated with some, but not all, of the proposed control measures. The DPEIR does not even attempt to analyze the potentially significant aesthetic impacts from the proposed control measures which require and/or provide incentives for facility modifications, increased electrical usage (which may require new substations, powers plants and related infrastructure), and cool roofs and solar panels. In addition, there is no substantive discussion or analysis of, among others, the potential aesthetic impacts associated with Control Measures ECC-03, ECC-04, ECC-02, CMB-01, EGM-01, MOB-02, MOB-03, and MOB-04.

Response 3-103

All proposed control measures were evaluated for potential aesthetic impacts. The eight control measures that may result in the use of compliance options that could generate significant aesthetic impacts are listed in Table 4.8-1, including ECC-03 and ECC-04. ECC-02 involves taking credit for co-benefits from existing residential and commercial building energy efficiency measures, CMB-01 involves the transition to zero and near-zero emission technologies for stationary sources, EGM-01 involves emission reductions from new development and redevelopment projects, MOB-02, MOB-03, and MOB-04 involve emission reductions at various facilities. Therefore, no aesthetics impacts are anticipated from these measures and the comment does not provide evidence of impacts not analyzed in the Draft Program EIR.

Comment 3-104

> **c. Mitigation**
>
> Section 4.8.5 proposes various measures to address the above aesthetics impacts. Most of the measures are qualified by the phrase "where feasible" providing no assurances that the measures will, in fact, be implemented. This does not constitute adequate or effective mitigation under CEQA. (CEQA Guidelines § 15126.4(a)(2); *see also*, *Sierra Club v. County of San Diego* and *Communities for a Better Environment v. City of Richmond*, both *supra*.)
>
> For instance, Mitigation Measures AE-1 specifies that to "the extent feasible" construction staging areas should be located in areas that are already disturbed and sited to take advantage of natural screening opportunities provided by existing structures, topography, and/or vegetation. Mitigation Measure AE-2 requires construction areas to be screened from view "where feasible." Mitigation Measure AE-3 siting projects next to important scenic resources "should be avoided to the greatest extent possible." Finally, to reduce glare, Mitigation Measure AE-5 states that structural and/or vegetative screening from light-sensitive uses are to be provided "where feasible."

Response 3-104

Enforceable mitigation measures (AE-1 through AE-5) that would minimize aesthetic impacts were included in the Draft Program EIR and can be found in Subchapter 4.8.5. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment

derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. Therefore, it is expected that mitigation measures AE-1 through AE-5 would be applied to future projects, if the impacts from those projects would result in significant aesthetics impacts. This framework for applying mitigation measures to future projects is appropriate for a program-level document. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 376-77 ["The general statement of mitigation measures in the FEIR is consistent with the general nature of the Plan. Any further and more detailed statement of mitigation measures at this formative stage . . . would have been neither reasonably feasible nor particularly illuminating."].) While the identified mitigation measures could minimize some of the aesthetics impacts, the SCAQMD cannot predict how a lead agency might choose to mitigate a particular significant aesthetics impact for future project(s) located in areas with project-specific features and issues. Thus, the potential exists for impacts for future projects to be significant even after feasible mitigation measures are identified and imposed. Therefore, aesthetics impacts that may occur as a result of implementing the 2016 AQMP are expected to remain significant after mitigation.

Comment 3-105

> **10. Other CEQA Topics**
>
> The DPEIR neglects to discuss or assess the potentially significant growth inducing impacts associated with several control measures. (*See, e.g.*, Control Measures CMB-01 and FLX-02). The DPEIR concludes that the Project would not directly increase economic or population growth or result in the need for new housing in the Basin. (DPEIR, p. 4.10-1.) However, there is no substantial evidence to support this statement, as required by CEQA.

Response 3-105

CEQA defines growth-inducing impacts as those that "foster economic or population growth or construction of additional housing." CMB-01 seeks to advance the deployment of engines, ovens and boilers, which is not anticipated to result in the direct or indirect construction of housing. FLX-02 seeks to incentivize the use of low VOC technologies at stationary sources, which is not anticipated to construct housing, nor will the population grow as a result of new industry when this region has a robust available labor force. Therefore, the growth-inducing impacts are less than significant.

Comment 3-106

> The DPEIR relies on the fact that the District does not have land use authority to conclude that the Proposed Plan would not generate new residential development or alter land use policies. (DPEIR, p. 4.10-2.) The fact that the District does not have authority over local land use matters does not justify or excuse its need to study this issue consistent with CEQA. (Public Resources Code § 21081(a)(2); *Neighbors for Smart Rail, supra.*)

Response 3-106

Contrary to the comment's claim, the conclusion that the 2016 AQMP would not generate new residential development or alter land use policies was based on a review of the control measures proposed in the 2016 AQMP which found that "the 2016 AQMP does not include policies that would encourage the development of new housing or population-generating uses or infrastructure that would directly encourage such uses. The 2016 AQMP does not change jurisdictional authority

or responsibility concerning land use or property issues." (Page 4.10-1) The comment does not provide evidence to the contrary and no revisions to the Draft Program EIR are necessary or warranted.

Comment 3-107

> The DPEIR acknowledges that the Proposed Plan would result in construction activities associated with implementation of control measures, such as activities from installation of control equipment at existing stationary sources and electrification of existing roadways. The DPEIR then purports to justify its conclusion that few or no workers would relocate to the region, with statements that there is currently a workforce in the region and the Proposed Plan would be implemented over several years. These two facts alone do not constitute substantial evidence to support the conclusion that no additional workers would be needed to complete construction resulting from the Proposed Plan. Potential growth inducing impacts must be quantified and mitigated in the DPEIR.

Response 3-107

The 2016 AQMP would mainly affect existing commercial or industrial facilities in appropriately zoned industrial or commercial areas and, as such, is not anticipated to generate any significant effects on the Basin's population or population distribution. It is expected that the existing labor pool within southern California would accommodate labor requirements for any modifications required and that few or no new employees would need to be hired at affected facilities as the new control equipment is typically not labor intensive to operate or maintain. If any additional workers are needed for construction activities, they would only be needed temporarily and would not likely permanently relocate to the area. Implementation of control measures from previous AQMPs did not result in the need for additional permanent workers. Since the 2016 AQMP proposes control measures which are similar to those of previously adopted AQMPs, there is no evidence that the existing pool of construction workers would be insufficient to meet those needs and the comment does not provide evidence to support its claim.

Comment 3-108

> The DPEIR assumes that no new roadway access would be constructed as a result of the Project and therefore the Proposed Plan would not induce growth. (DPEIR, p. 4.10-2.) However, there is no evidence to support the statement that no new roadway access would be constructed, let alone substantial evidence, as required. Even if it were true, this does not mean that the Project would not result in new growth because there are other factors that induce growth besides new roadways and infrastructure.
>
> The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant growth inducing impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Response 3-108

In Subchapter 4.10.1.2, the removal of obstacles to growth from the 2016 AQMP were discussed. Contrary to the comment's claim, this discussion included other factors such as infrastructure, the use of fuels and electricity, and energy conservation. The discussion also concludes that the 2016 AQMP would not result in "the development of new infrastructure (e.g. new roadways access) that would directly or indirectly cause the growth of new populations, communities, or currently undeveloped areas." In Subchapter 4.10.1, the growth inducing impacts are discussed in detail.

Additionally, growth-inducing impacts from the TCMs were evaluated in the Program EIR for SCAG's 2016 RTP/SCS. Therefore, no revisions to the Draft Program EIR are necessary or warranted.

Comment 3-109

> **C. The Project May Result In Numerous Significant Impacts That Were Scoped Out Of, And Not Analyzed By, The DPEIR.**
>
> The scope of the proposed DPEIR improperly excludes potentially significant impacts to (1) Biological Resources, (2) Cultural Resources, (3) Geology and Soils, (4) Land Use and Planning, (5) Population and Housing, and (6) Public Services. Unless and until those areas are more fully addressed, the scope of the DPEIR is improperly limited and erroneously excludes areas requiring further assessment. In several respects, the DPEIR merely *assumes* the absence of potentially significant impacts, rather than factually demonstrating that significant impacts will not occur if the (inadequately-described) Project is adopted and implemented. This is insufficient under CEQA, and under the District's own rules. (SCAQMD Rule 110; *City of Redlands v. County of San Bernardino* (2002) 96 Cal.App.4th 398; and *Sundstrom, supra*.)
>
> While the CEQA Guidelines call for emphasis and "focus" on the significant environmental impacts of a project, the authority to use such focus is misapplied in the DPEIR. For example, CEQA Guideline § 15143 explains that such focus may be used to limit the analysis in an EIR *only* as to such impacts that the initial study properly shows to be *clearly insignificant and unlikely to occur* (*i.e.*, "effects dismissed in an Initial Study as clearly insignificant and unlikely to occur need not be discussed further in the EIR . . .."). The DPEIR, by contrast, excludes from consideration numerous effects that it has not shown to be "clearly insignificant and unlikely to occur."

Response 3-109

Pursuant to CEQA Guidelines Section 15063(c)(3), the SCAQMD prepared an IS, which provided an analysis of the potential impacts of the 2016 AQMP in all the CEQA topic areas. That analysis was supported with substantial evidence, such as implementation of control measures from previously approved AQMPs. The NOP/IS was circulated for a 30-day public review and comment period starting on July 5, 2016 and ending on August 4, 2016. Comments were received on the NOP/IS and where applicable, additional information was included in the Draft Program EIR in response to those comments. A formal response to comments section was also included in Appendix B of the Draft Program EIR. According to CEQA Guidelines Section 15143, "[e]ffects dismissed in an Initial Study as clearly insignificant and unlikely to occur need not be discussed further in the EIR unless the Lead Agency subsequently receives information inconsistent with the finding in the Initial Study." The comment does not provide evidence to support its claims and no revisions to the Draft Program EIR are necessary.

Comment 3-110

> **1. Biological Resources**
>
> The DPEIR dismisses potentially significant impacts to biological resources because the DPEIR states that these impacts are not reasonably foreseeable. (DPEIR, pp. 4.9-1 to 4.9-2.) But, construction of new and/or expanded facilities is a reasonably foreseeable indirect impact of implementation of the Proposed Plan. For instance, the Project will result in the likely construction of transportation support systems, installation of control equipment at existing stationary sources, and electrification of existing roadways. (DPEIR, p. 4.10-2.) Any of these and other related Project construction activities could result in potentially significant biological impacts. As such, impacts to biological resources must be analyzed and cannot simply be dismissed for being unforeseeable.

Response 3-110

Construction related impacts from the implementation of the 2016 AQMP were fully analyzed in the Draft Program EIR. The comment accurately notes that "the Project will result in the likely construction of transportation support systems, installation of control equipment at existing stationary sources, and electrification of existing roadways." Existing facilities affected by modifications from the proposed control measures generally occur in areas zoned as commercial or industrial which typically do not support candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Furthermore, existing industrial or commercial facilities typically have little to no plant life or plant life supporting wildlife species for fire safety reasons. The 2016 AQMP will not cause new development that would affect biological resources and the comment does not provide evidence to support its claim.

Comment 3-111

> The DPEIR also dismisses impacts on land use plans, local policies, ordinances, and regulations protecting biological resources. (DPEIR, p. 4.9-2.) The rationale behind this conclusion is that development would take place with or without the Project and that SCAQMD does not have legal authority over land use decisions. These arguments are improper considerations under CEQA. CEQA does not permit a lead agency to dismiss potential direct or indirect impacts to the environment simply because development will occur with or without a project or because the lead agency does not have authority over certain land use decisions that will be affected by the Project. (Public Resources Code § 21081(a)(2); *Neighbors for Smart Rail, supra.*) CEQA requires lead agencies to analyze the direct and indirect environmental impacts of a Project, regardless of those considerations. The Project control measures will certainly conflict with some land use plans, local policies, ordinances, and resolutions protecting biological resources. As such, any impacts should be fully analyzed and mitigated as appropriate in a recirculated DPEIR.

Response 3-111

Contrary to the comment, the 2016 AQMP's impacts on land use plans, local policies, ordinances, and regulations protecting biological resources are based on the fact that "land use plans, local polices, or ordinances, or regulations protecting biological resources are not expected to be affected by the proposed control measures as they primarily affect existing commercial and industrial facilities located in appropriately zones areas. The 2016 AQMP will not cause new development that would affect biological resources" (page 4.9-2). Based on implementing control

measures from previously approved AQMPs, the proposed control measures would not drive the land use approval process, and therefore, cannot alter or interfere with land use zoning ordinances or designations and cannot approve new land use projects. The 2016 AQMP relies on the regional demographic projections and transportation programs, measures, and strategies from SCAG's 2016 RTP/SCS. Land use and transportation strategies program are within SCAG's jurisdictional authority. The environmental impacts from the 2016 RTP/SCS were analyzed and disclosed in the Draft Program EIR released by SCAG on December 4, 2015 for a 60-day public review and comment period ending on February 1, 2016. On April 7, 2016, the SCAG Regional Council adopted the 2016 RTP/SCS and certified the Final Program EIR. Since SCAQMD will not be adopting rules or regulations to implement the TCMs and the two projects are not dependent on each other, the environmental impacts from the 2016 RTP/SCS were only analyzed as part of the cumulative analysis. Future projects will undergo additional CEQA analysis that will address whether the future proposed projects conflict with land use plans, local policies, ordinances, and resolutions protecting biological resources.

Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation. Therefore, no further response is necessary under CEQA.

Comment 3-112

> The DPEIR fails to analyze, through detailed quantification and hydrodynamic modeling, potential wastewater impacts to designated wetlands. Section 4.9 of the DPEIR states that Project control measures promoting the installation of air pollution control equipment at Port facilities is not anticipated to have wastewater impacts because the facilities would be required to comply with applicable water quality standards. (DPEIR, p. 4.9-2.) This explanation remains insufficient to conclude that potential impacts on protected wetlands would be less than significant.

Response 3-112

No wetlands were identified which would be affected by implementation of the control measures proposed in the 2016 AQMP and the comment does not provide evidence to support its claims. Affected industrial or commercial facilities are generally considered "point sources" and as such must release wastewater into POTWs under the NPDES permit program, administered by the RWQCB. Under CWA §404, direct discharge into federally protected wetlands is prohibited. Port facilities are considered to be heavy industrial facilities consistent with this land use and are subject to water quality standards established in the California Ocean Plan for any wastewater released into California's ocean waters. For this reason, control measures promoting the installation of air pollution control at port facilities are not expected to have wastewater impacts. Therefore, the 2016 AQMP will not adversely affect protected wetlands as defined by CWA §404.

Comment 3-113

> The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to biological resources, as well as feasible mitigation measures and alternatives designed to address those impacts.

Response 3-113

The comment does not provide any evidence to support the claim that biological resources were not properly evaluated. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation and no revisions to the Draft Program EIR are necessary.

Comment 3-114

> **2. Cultural Resources**
>
> The DPEIR fails to adequately describe, and improperly minimizes, possible impacts to cultural resources. (DPEIR, p. 4.9-2.) The DPEIR dismisses impacts to cultural resources because it states that any physical modifications would likely be located in a previously disturbed location. (*Id.*) Even if it is likely that physical environmental changes will occur in areas that are currently developed, the Project's potentially significant cultural resources impacts must be analyzed and mitigated in the event that development occurs on an undeveloped site or one with known or unknown cultural resources.
>
> For instance, not all areas within the Ports are devoid of cultural resources or have been previously disturbed, as concluded on Page 4.9-2 of the DPEIR. There are known recorded historic and prehistoric sites throughout the Ports alone,[20] and there are undoubtedly other historic and prehistoric sites in the Basin that would be affected by the Project. Without knowing the location and extent of ground disturbance from possible construction activities associated with the Project, it is speculative to assume that no significant adverse cultural resources impacts are expected as a result of its implementation. The conclusion in the DPEIR that the Project will result in "no impact" to cultural resources is unsupported by substantial evidence, as required.
>
> [20] For example, *see* City of Los Angeles's website at http://www.portoflosangeles.org/idx_history.asp.

Response 3-114

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development

and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. Without identification of specific locations affected by the 2016 AQMP, an analysis of the cultural impacts is speculative. (*See Rio Vista Farm Bureau*, 5 Cal. App. 4th at 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) The Draft Program EIR states that while the likelihood of encountering cultural or archaeological resources is low, there is still a potential that additional buried archaeological resources may exist. Any such impact from unexpected sub-surface resources would be eliminated by using standard construction practices and complying with state law including Public Resource Code Section21083.2 and CEQA Guidelines Section 15064.5.

Comment 3-115

> Further, the DPEIR includes language reflecting the typical mitigation measure to be imposed on unknown cultural resources to justify its "no impact" conclusion. (DPEIR, p. 4.9-2). This fact alone demonstrates that there are potentially significant cultural resource impacts requiring analysis and mitigation in the DPEIR.

Response 3-115

The mitigation referred to in the comment is actually state law, including Public Resource Code Section 21083.2 and CEQA Guidelines Section 15064.5. Since this is a law that projects are required to comply with, it is not considered mitigation and does not demonstrate that there are potentially significant impacts that need to get mitigated.

Comment 3-116

> The DPEIR must be revised, and the scope of the proposed DPEIR expanded to include a detailed analysis, supported by substantial evidence, regarding potentially significant impacts to cultural resources as well as feasible mitigation measures and alternatives designed to address those impacts.

Response 3-116

The comment does not provide any evidence to support the claim that cultural resources were not properly evaluated. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation and no revisions to the Draft Program EIR are necessary.

Comment 3-117

> **3. Geology and Soils**
>
> Because details concerning several Project control measures are not yet known, the DPEIR improperly concludes that the Project has no potential to generate significant adverse impacts to geology and soil resources. In particular, the DPEIR wrongly assumes that only "minor" modifications at existing industrial or commercial facilities would be needed due to Project control measures and that "no control measures would require the location of new or relocation of existing facilities in areas prone to liquefaction." (DPEIR, p. 4.9-3.) At minimum, the potentially significant geology-related impacts associated with the control measures identified above must be analyzed in the DPEIR.

Response 3-117

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. SCAQMD staff believes that only minor modifications at existing industrial or commercial facilities would be needed due to the proposed control measures. No relocation of facilities is anticipated. The comment does not provide evidence to support its claims.

Comment 3-118

> The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant geology and soils impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Response 3-118

The comment does not provide any evidence to support the claim that geology related impacts were not properly evaluated. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation and no revisions to the Draft Program EIR are necessary.

Comment 3-119

4. Land Use and Planning

CEQA requires an analysis of whether the Project would conflict with any applicable plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. (CEQA Guidelines § 15125(d); CEQA Guidelines, Appendix G, Item X.b; and *Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903.) However, the DPEIR does not include an analysis of potential conflicts between the Proposed Plan and applicable plans, policies, and regulations adopted to avoid or mitigate environmental effects.

The DPEIR states that there would be no land use conflicts because construction would occur with or without implementation of the Project and because modified rail or truck traffic routes would not conflict with land use documents. (DPEIR, p. 4.9-3.) As discussed above, CEQA requires an analysis of direct and indirect impacts on the environment from an action and does not allow a lead agency to conclude that impacts would not occur simply because an action would occur with or without the project. The fact that the District does not have authority over local land use matters (DPEIR, p. 4.9-3) does not justify or excuse its need to study this issue consistent with CEQA. (Public Resources Code § 21081(a)(2); *Neighbors for Smart Rail, supra*.) Further, it is impossible to determine whether land use conflicts would occur without conducting any analysis of the applicable land use documents and the Project control measures. There is no evidence to support the conclusion that the Project would not conflict with applicable land use documents.

In addition to local plans, there are numerous federal and state plans that contain pertinent policies that must be considered and evaluated in light of the Project control measures. For instance, the proposed Project would seemingly create conflicts with the Ports' existing policies implementing the State Tidelands Trust principles, the California Coastal Act planning and permitting requirements, and the existing Master Plan for each Port, as detailed in the previous Port letters. In addition, the proposed Project would create inconsistencies with the CAAP. The numerous ***inconsistencies*** between the Project, as proposed, and the existing plans and policies require inclusion in the DPEIR. (CEQA Guidelines § 15125(d).)

Response 3-119

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. . Based on analysis of the proposed control measures in the 2016 AQMP, none of the control measures would result in new development of facilities which would conflict with land use plans. The comment does not provide any evidence of how the proposed control measures would conflict with land use documents. No final decisions have been made on how to implement control measures, such as MOB-01, that could affect the CAAP. Therefore, inconsistencies with the CAAP cannot be determined at this time. The Further Deployment Measures emission reductions associated with port-related sources will be used as a starting point for discussion on what level of emission reductions could be achieved through voluntary actions. Staff will strive to be consistent with existing policies and plans, including the

CAAP, when implementing control measures. The Ports are encouraged to participate in the stakeholder working group meetings when these decisions will be made.

Comment 3-120

> The DPEIR assumes that no new rail or truck traffic routes would be constructed and that instead existing transportation lines near the Ports would be modified to add electrical lines. (DPEIR, p. 4.9-3.) There is no evidence to support this statement, let alone substantial evidence, as required. Even if it were true this does not mean that the Project would not result in any conflicts with plan policies adopted for the purpose of avoiding or mitigating environmental effects. Increased electrical use would increase electrical demand. As noted above, this could conflict with adopted energy conservation plans. Installation of electric infrastructure could raise significant conflicts with aesthetics/visual policies especially since these lines are proposed to be located overhead.

Response 3-120

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. By promoting control measures that would increase energy efficiency and conservation, the 2016 AQMP would not interfere or conflict with any adopted energy conservation plans. In fact, there would likely be an energy co-benefit from the proposed control measures to complement applicable energy conservation plans and energy standards. The comment does not provide any evidence that the proposed control measures in the 2016 AQMP would conflict with plan policies in place to avoid or mitigate environmental effects or adopted energy conservation plans. Aesthetic impacts from overhead lines are fully evaluated in Subchapter 4.8 of the Draft Program EIR.

Comment 3-121

> Additionally, fueling infrastructure to support zero and near-zero emissions vehicles, such as those powered by hydrogen fuel cells or natural gas, could have a significant impact on local land use and may conflict with existing plans. Such Project components could likewise contribute to the physical division of an established community. The DPEIR admits as much in noting that to the extent such infrastructure requires modification to an existing rail or truck traffic route/corridor, this "will require a separate CEQA evaluation." (DPEIR, p. 4.9-3.) The District cannot legally defer analysis of Project impacts to some future, speculative CEQA review process. The analysis must take place now in order to inform the District's decision on the Proposed Plan.

Response 3-121

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome

level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo a project-level CEQA analysis in the future, in the light of the Program EIR. As discussed on page 4.9-3, "no land use conflicts, or inconsistencies with any general plan, or zoning ordinance are expected since only existing transportation routes would be modified. It is possible that construction activities to modify transportation routes could temporarily disrupt or divide the community. However, because construction of new traffic routes/corridors is not required, once construction activities are finished and physical barriers removed, no long term land use impacts are anticipated." The comment does not provide any evidence that additional fueling infrastructure as a result of the proposed 2016 AQMP control measures was not adequately evaluated and addressed in the Draft Program EIR.

Comment 3-122

> The DPEIR states that it incorporates "local land use planning decisions and population growth." (DPEIR, p. 4.9-4.) However, there is no explanation or evidentiary support for this statement, and even if there were, it is irrelevant. The pertinent questions are whether the Project may conflict with plan policies pertaining to environmental issues and/or physical division of an established community.

Response 3-122

The 2016 AQMP relies on the regional demographic projections and transportation programs, measures, and strategies from SCAG's 2016 RTP/SCS. The RTP TCMs are required by Health and Safety Code 40460 to be combined with the SCAQMD's portion of the AQMP; however, the 2016 RTP/SCS is considered a separate project under CEQA because the land use and transportation strategies program are within SCAG's jurisdictional authority and the 2016 RTP/SCS will move forward with or without adoption of the 2016 AQMP. The environmental impacts from the 2016 RTP/SCS were analyzed and disclosed in the Draft Program EIR released by SCAG on December 4, 2015 for a 60-day public review and comment period ending on February 1, 2016. On April 7, 2016, the SCAG Regional Council adopted the 2016 RTP/SCS and certified the Final Program EIR. Since SCAQMD will not be adopting rules or regulations to implement the TCMs and the two projects are not dependent on each other, the environmental impacts from the 2016 RTP/SCS were only analyzed as part of the cumulative analysis. The analysis of impacts from the physical division of an established community were discussed on page 4.9-3 and also responded to in Response 3-121.

Comment 3-123

> The DPEIR admits that it is possible construction activities would divide an existing community, but reasons that because the Project would only result in modification of existing traffic routes, the Project would not divide an existing community in the long-run. (DPEIR, p. 4.9-3.) As discussed above, however, there is no basis to support the conclusion that the Project would not result in construction of new traffic routes or corridors. As such, the conclusion that the Project would not divide an existing community is not supported by substantial evidence.

Response 3-123

The 2016 AQMP relies on the regional demographic projections and transportation programs, measures, and strategies from SCAG's 2016 RTP/SCS. The RTP TCMs are required by Health and Safety Code 40460 to be combined with the SCAQMD's portion of the AQMP; however, the

2016 RTP/SCS is considered a separate project under CEQA because the land use and transportation strategies program are within SCAG's jurisdictional authority and the 2016 RTP/SCS will move forward with or without adoption of the 2016 AQMP. The environmental impacts from the 2016 RTP/SCS were analyzed and disclosed in the Draft Program EIR released by SCAG on December 4, 2015 for a 60-day public review and comment period ending on February 1, 2016. On April 7, 2016, the SCAG Regional Council adopted the 2016 RTP/SCS and certified the Final Program EIR. Since SCAQMD will not be adopting rules or regulations to implement the TCMs and the two projects are not dependent on each other, the environmental impacts from the 2016 RTP/SCS were only analyzed as part of the cumulative analysis. As discussed on page 4.9-3, "potential land use impacts associated with the 2016 AQMP are associated primarily with the construction of support system (e.g. magnetic infrastructure related to the operation of zero and near-zero transport systems). In evaluating potential impacts, it has been assumed herein that no new rail or truck traffic routes would be constructed, but rather that existing ones would be modified. No land use conflicts, or inconsistencies with any general plan, or zoning ordinance are expected since only existing transportation routes would be modified. It is possible that construction activities to modify transportation routes could temporarily disrupt or divide the community. However, because construction of new traffic routes/corridors is not required, once construction activities are finished and physical barriers removed, no long term land use impacts are anticipated." The comment does not provide evidence to support its claims.

Comment 3-124

> The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant land use and planning impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Response 3-124

The comment does not provide any evidence to support the claim that land use and planning impacts were not properly evaluated. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation and no revisions to the Draft Program EIR are necessary.

Comment 3-125

> **5. Population and Housing**
>
> The analysis assumes that "few or no new employees would need to be hired at affected facilities as the new control equipment is typically not labor intensive to operate or maintain." (DPEIR, p. 4.9-4.) The DPEIR concludes that no control measures would induce population growth because "there are a finite number of drivers in the region at any given time." (*Id.*) There is no evidence to support either statement, let alone substantial evidence, as required.

The DPEIR states that there would be no displacement of people or housing without providing any analysis to support the conclusion. (DPEIR, p. 4.9-4.) Several of the control measures, including new or expanded transportation corridors, could result in displacement of people or housing.

Response 3-125

As discussed on page 4.9-4, "the 2016 AQMP would mainly affect existing commercial or industrial facilities in appropriately zones industrial or commercial areas and, as such, is not anticipated to generate any significant effects on the Basin's population or population distribution. It is expected that the existing labor pool within Southern California would accommodate labor requirements for any modifications required and that few or no new employees would need to be hired at affected facilities as the new control equipment is typically not labor intensive to operate or maintain. Implementing the mobile source control measures, like those that would accelerate the penetration of zero or low emission vehicles, would not induce population growth because there are a finite number of drivers in the region at any given time. Future population growth would occur in the region for reasons other than complying with the 2016 AQMP control measures and adopting the control measures is not expected to result in changes to population densities or induce significant growth in the population. The 2016 AQMP contains no provisions that would lead to displacement of a substantial number of people of existing housing nor necessitate the construction of replacement housing elsewhere." The comment does not provide evidence to support its claims.

Comment 3-126

The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant population and housing impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Response 3-126

The comment does not provide any evidence to support the claim that population and housing impacts were not properly evaluated. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation and no revisions to the Draft Program EIR are necessary.

Comment 3-127

6. Public Services

The DPEIR assumes that the Project would not generate any increased need for public services. (DPEIR, p. 4.9-4.) However, the DPEIR does not provide any substantial evidence to support its *assumptions* regarding the absence of impact on additional public services or facilities. New fueling infrastructure to support zero and near-zero emissions vehicles, including hydrogen and natural gas, could impact Fire Department resources and require additional public services.

The DPEIR relies on the lack of future population increase assumed in the Population and Housing Section to conclude that no new school facilities or public facilities would be required. This conclusion is not supported by substantial evidence and is therefore improper.

The DPEIR must be revised, and the scope expanded, to include a detailed analysis, supported by substantial evidence, regarding potentially significant public services impacts as well as feasible mitigation measures and alternatives designed to address those impacts.

Response 3-127

No adverse public service impacts are expected as a result of adopting the 2016 AQMP, as it would not result in the need for new physically altered government facilities to maintain acceptable service ratios, response times, or other performance objectives. As discussed in the Draft Program EIR, the 2016 AQMP is not anticipated to result in population growth, but includes control measures to reduce emissions in spite of population growth projected by SCAG in their 2016 RTP/SCS; therefore, the Draft Program EIR properly concluded that no impacts to schools or public facilities is anticipated. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation and no revisions to the Draft Program EIR are necessary.

Comment 3-128

D. The DPEIR Fails To Consider And Discuss Cumulative Impacts.

The cumulative impact analysis includes the project-specific analyses of the SCAQMD's stationary and mobile source control measures and CARB's mobile source control measures, as well as the TCMs that were developed and adopted by SCAG as part of the 2016 RTP/SCS. (DPEIR, pp. 1-22, 5-1.) In general, TCMs are control measures that provide emission reductions from on-road mobile sources, based on changes in the patterns and modes by which the regional transportation system is used. (DPEIR, p. 5-2.) The DPEIR claims that the TCMs "are appropriately part of the cumulative impact analysis because they include regulatory activities associated with measures that could also generate related environmental impacts within the Basin." (DPEIR, p. 5-1.)

A cumulative impact analysis is supposed to evaluate the impacts of a project along with *other* projects producing *related effects*. (CEQA Guidelines § 15130(b).) The Project Description states that the Project is comprised of: (1) the SCAQMD's Stationary and Mobile

Source Control Measures, (2) stated and suggested Federal Source Control Measures, and (3) RTP/SCS Control Measures provided by SCAG. (DPEIR, p. 2-13.) The TCMs are part of the RTP/SCS. (DPEIR, pp. 2-53 to 2-55.) The DPEIR thus improperly segmented the Project analysis by removing a portion of it, the TCMs, from the project-level analysis and treating it as a separate project for purposes of the cumulative impact analysis. The whole of an action must be considered when evaluating an activity, both on a project-level and on a cumulative basis.[21]

[21] The DPEIR also improperly omits any discussion of the RTP/SCS's land use and transportation strategies as well as the federal mobile source control measures, which are also part of the Project (*see* Section 2.8), from the cumulative impact analysis.

Response 3-128

The comment provides no substantial evidence that cumulative impacts were not considered in the Draft Program EIR. The 2016 AQMP relies on the regional demographic projections and transportation programs, measures, and strategies from SCAG's 2016 RTP/SCS. The RTP TCMs are required by Health and Safety Code 40460 to be combined with the SCAQMD's portion of the AQMP; however, the 2016 RTP/SCS is considered a separate project under CEQA because the land use and transportation strategies program are within SCAG's jurisdictional authority and the 2016 RTP/SCS will move forward with or without adoption of the 2016 AQMP. The environmental impacts from the 2016 RTP/SCS were analyzed and disclosed in the Draft Program EIR released by SCAG on December 4, 2015 for a 60-day public review and comment period ending on February 1, 2016. On April 7, 2016, the SCAG Regional Council adopted the 2016 RTP/SCS and certified the Final Program EIR. Since SCAQMD will not be adopting rules or regulations to implement the TCMs and the two projects are not dependent on each other, the environmental impacts from the 2016 RTP/SCS were only analyzed as part of the cumulative analysis.

The project-specific environmental impacts from implementing CARB's mobile source control measures were analyzed herein as SCAQMD is expected to enter into rulemaking to implement CARB's strategies within the District. Furthermore, at the time of release of the Draft Program EIR, the environmental impacts associated with CARB's SIP strategy were not fully evaluated under CEQA.

Comment 3-129

There is also no explanation as to why other past, present, and probable future projects producing related effects were not considered. The DPEIR reaches this conclusion apparently because it mistakenly focused on whether the projects themselves were "related," instead of whether the impacts were related. (DPEIR, p. 5-4.) The DPEIR thus errs in failing to consider other projects that along with the Project result in potentially significant impacts.

Response 3-129

The goal of the 2016 AQMP is to provide a framework of measures for attaining the NAAQS. Control measures were identified and analyzed in the Draft Program EIR on a programmatic level to determine foreseeable environmental effects. A cumulative analysis of proposed project impacts was presented in Subchapter 5.0 of the Draft Program EIR. The related projects for the cumulative analysis (SCAG's 2016 RTP/SCS) were discussed beginning in Subchapter 5.1.3 on page 5-4. The comment does not provide evidence of cumulative projects which should have been

considered but were not.

Comment 3-130

> As noted above, the DPEIR did not analyze several resource topics on the ground that the Project would not result in any significant impacts in those areas. These topics include biological resources, cultural resources, geology and soils, land use, mineral resources, and public services. Yet, the cumulative impact analysis acknowledges that the Project would result in potential impacts in these areas albeit in a form "different" than the impacts of the TCMs. (DPEIR, pp. 5-10 to 5-12, 5-14, 5-18, 5-20, 5-23.)

Response 3-130
The Draft Program EIR analyzed all topics that were found to be potentially significant from the NOP/IS. The topics referred to in the comment were found to be not significant. Chapter 5 of the Draft Program EIR analyzed the cumulative impacts from the 2016 AQMP, which included CARB's State SIP Strategy, and SCAG's 2016 RTP/SCS. Chapter 5 summarized the conclusion of the impacts analysis performed for each of those plans. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 3-131

> The cumulative noise analysis wrongly states that the Project's significant construction impacts were limited to the construction of the overhead catenary lines. Section 4.5.4.1 of the DPEIR identified significant noise impacts associated with other construction activities as well. (*See also*, Table 4.5-1.)

Response 3-131
The Final Program EIR has been revised to reflect the conclusions stated in Subchapter 4.5.4.1 regarding noise. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation.

Comment 3-132

> The cumulative traffic analysis focuses exclusively on construction traffic impacts. (DPEIR, Section 5.18.) It neglects to reference or analyze the Project's significant unavoidable operational traffic impacts. These include significant congestion and hazard traffic impacts associated with the use of the catenary lines and barge-based bonnet technology. (DPEIR, p. 4-7-10.)

Response 3-132
Contrary to the comment's claim, the discussion in Subchapter 5.18.1 on page 5-26 (see second paragraph) includes a discussion of the 2016 AQMP's significant operational impacts on transportation and traffic, specifically from the use of catenary lines and barge based bonnet

technology.

Comment 3-133

> **E. The EIR Fails To Analyze A Reasonable Range Of Alternatives To The Project.**
>
> CEQA requires that an EIR include a reasonable range of alternatives to the project that would feasibly meet most of the basic project objectives while avoiding or significantly reducing the project's significant impacts. (CEQA Guidelines § 15126.6.) The EIR's alternatives analysis does not comply with CEQA because it includes legally infeasible alternatives as well as alternatives that would not meet most of the basic project objectives and/or avoid or substantially lessen significant environmental impacts.
>
> The DPEIR considers four alternatives. These include: (1) No Project Alternative (2012 AQMP), (2) Mobile Source Reduction Only, (3) CARB or SCAQMD Regulation Only, and (4) Expanded Incentive Funding. None of the alternatives, other than the Expanded Incentive Funding alternative would meet most of the basic project objectives. (DPEIR, p. 6-41.) The DPEIR claims that that the Expanded Incentive Funding alternative has the potential to be the environmental superior alternative even though it would result in increased impacts to aesthetics, energy, hazards, water, noise, waste, and traffic. (DPEIR, pp. 6-40 to 6-41.) Only one of these alternatives, the No Project Alternative, would substantially reduce impacts compared to the Project. The Mobile Source Reduction Only Alternative is not legally feasible as the District lacks regulatory jurisdiction over mobile source emissions.

Response 3-133

A full range of legally feasible alternatives to the proposed project are presented in Chapter 6 of the Draft Program EIR. The possible alternatives to the proposed 2016 AQMP are limited by the nature of the proposed project. For example, the SCAQMD is required to prepare a PM2.5 and ozone AQMP that demonstrates attainment of the federal ambient air quality standards by applicable dates. The magnitude of emission reductions needed for the attainment of these NAAQS requires an aggressive mobile source control strategy supplemented with focused, strategic stationary source control measures and close collaboration with federal, state, and regional governments, local agencies, businesses, and the public. Because the 2016 AQMP includes all feasible control measures identified as part of the AQMP development process and control measures reflect the maximum emission reduction potential, it is difficult to develop alternatives that would still achieve the project objectives, including attaining the federal ozone and PM2.5 standard, but are substantially different than the 2016 AQMP.

In spite of the limitations identified above with regard to developing project alternatives, similar to previous AQMP Program EIRs, alternatives to the 2016 AQMP focus on emphasizing different pollutant control strategies. For example, alternatives could rely more only on regulation only versus greater reliance on incentive funding and mobile source control measures. Ultimately, all project alternatives must demonstrate attainment of the federal ozone and PM2.5 standards.

The rationale for developing the alternatives for the proposed project is fully explained in Subchapter 6.1. The alternatives rejected as infeasible are discussed in Subchapter 6.2. The four proposed project alternatives are discussed and analyzed in Subchapters 6.3 and 6.4.

Under Alternative 2 – Mobile Source Reduction Only, CARB's mobile source and consumer

product control measures would be implemented. Although SCAQMD has limited regulatory authority over mobile sources, CARB has the primary regulatory authority and, in the case of local mobile sources (e.g., fleet rules), SCAQMD would implement those control measures that are within SCAQMD's authority.

Comment 3-134

> In several resource topics (*e.g.*, air quality, energy, hazards and hazardous materials, hydrology and water quality, noise, transportation and traffic), the DPEIR acknowledges that the No Project Alternative would result in significant impacts. But, it calls the impact less than significant because this alternative is "requiring what has already been adopted and analyzed to be implemented." (DPEIR, pp. 6-19, 6-20, 6-22, 6-25, 6-28, 6-34.)[22] This is akin to an impermissible plan-to-plan comparison of impacts. (*Environmental Planning & Information Council v. County of El Dorado* (1982) 131 Cal.App.3d 350.) If continued implementation of the 2012 AQMP would result in significant impacts, this should have been acknowledged in a simple and straight-forward manner. The failure to do so skews the entire alternatives analysis since impacts that are in fact significant are deemed insignificant merely because of the bureaucratic reason that the plan has been approved.
>
> [22] As to traffic, the DPEIR then inconsistently claims that "the traffic and transportation impacts will not change the traffic and transportation impacts identified in the 2012 AQMP, and therefore, remain significant." (DPEIR, p. 6-34.)

Response 3-134

CEQA requires the evaluation of the No Project Alternative, which consists of what would occur if the proposed project was not approved; in this case, not adopting the 2016 AQMP. The net effect of not adopting the 2016 AQMP would be a continuation of the 2012 AQMP and the 2007 AQMP. This approach is consistent with CEQA Guidelines Section 15126.6 (e)(3)(A), which states: "When the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the 'no project' alternative will be the continuation of the existing plan, policy, or operation into the future. Typically this is a situation where other projects initiated under the existing plan will continue while the new plan is developed. Thus, the projected impacts of the proposed plan or alternative plans would be compared to the impacts that would occur under the existing plan."

The 2012 AQMP was fully analyzed for potential environmental impacts. The Final Program Environmental Impact Report[4] for the 2012 Air Quality Management Plan, which was certified on December 7, 2012. The comment refers to part of the discussion of the no project alternative and takes it out of context. For example, in Subchapter 6.4.1.2, the Draft Program EIR clearly states: "Under Alternative 1, the black box measures from the 2007 AQMP and the yet-to-be implemented control measures from the 2012 AQMP would continue to be identified, adopted and implemented (see Table 6.3-1). The continuing implementation of these measures would generate construction impacts but not as many adverse impacts from the 2016 AQMP since there are less to implement. The one variable is what will constitute long-term measures in the future. Since the future technologies have not been identified or defined, it would be speculative to assume the

[4] Available online at: http://www.aqmd.gov/home/library/documents-support-material/lead-agency-scaqmd-projects/aqmd-projects---year-2012/aqmp-2012.

construction air quality impacts from the long-term measures at this time. The construction air quality impacts from the 2012 AQMP were determined to be significant; however, the No Project Alternative is requiring what has already been adopted and analyzed to be implemented. Thus, the construction air quality impacts from not taking new action or proposing new control measures will not change the existing construction air quality baseline and thus, the construction air quality impacts from Alternative 1 are less than significant." The comment does not provide substantial evidence to support its claims.

Comment 3-135

> The discussion of construction noise impacts (Section 6.4.5.1) wrongly states that the Project does not result in significant construction noise impacts. As set forth in Section 4.5.4.1, the Project results in significant and unavoidable construction noise impacts.

Response 3-135

Subchapter 6.4.5.1 has been revised in the Final Program EIR to reflect that, while temporary in nature, construction noise impacts are significant and unavoidable, consistent with the analysis in Subchapter 4.5.4.1. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation.

Comment 3-136

> **III. CONCLUSION**
>
> While it is plain that an EIR is needed in connection with this proposed Project, it is also clear that the DPEIR should be more complete than the version that was provided for public review and comment. The current version of the DPEIR fails to adequately describe the "Project" thereby thwarting effective public review and comment on the Proposed Plan. In several key areas, it fails to thoroughly and adequately identify the Project's significant environmental impacts and propose feasible mitigation measures and alternatives to avoid or substantially lessen such impacts. As such, the DPEIR fails to comply with CEQA, and the DPEIR must therefore be revised, corrected, and re-circulated with all of the analysis and other content required by CEQA before the District may lawfully take action on the Project.
>
> Thank you for your consideration of POLB's comments on the DPEIR. Please do not hesitate to contact the undersigned or Dawn McIntosh with any questions concerning this correspondence. Our contact information is as follows:

Response 3-136

This comment is a summary of previous comments made throughout the letter and those comments have been responded to in detail. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-

level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. Since the Draft 2016 AQMP was released on June 30, 2016, SCAQMD staff has released the Revised Draft 2016 AQMP on October 7, 2016 and the Draft Final 2016 AQMP on December 2, 2016. SCAQMD staff reviewed the changes in each of those documents and found that, pursuant to CEQA Guidelines Section 15088.5, any changes to the project description did not constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation.

G | D | B Gatzke Dillon & Ballance LLP
LAWYERS

November 15, 2016 *By Electronic Mail*

Jeff Inabinet
AQ Specialist: CEQA
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765-4182
jinabinet@aqmd.gov

Re: *Draft Program Environmental Impact Report for the 2016 Air Quality Management Plan*

Dear Mr. Jeff Inabinet:

This letter is submitted on behalf of John Wayne Airport, Orange County (Airport or JWA) and contains the Airport's written comments on the Draft Program Environmental Impact Report (Draft EIR) for the proposed 2016 Air Quality Management Plan (2016 AQMP), issued by the South Coast Air Quality Management District (SCAQMD or District) in September 2016. The Airport appreciates the opportunity to continue to work constructively and cooperatively with the SCAQMD in evaluating and developing realistic airport emission reduction strategies for the proposed 2016 AQMP and analyzing the potential environmental impacts of the proposed measures. 4-1

The Airport has achieved success in obtaining substantial emission reductions from their air quality measures implemented over the past decade and the Airport continues to be supportive of projects and programs that are intended to contribute to improvement of air quality and promote other environmental values. However, the Airport must fundamentally disagree with any proposal by the District to convert these measures into a possible regulatory indirect source rule and must reiterate its concerns relating to AQMP Control Measure MOB-04 (Emission Reductions at Commercial Airports). As the District knows from prior comment letters submitted by the Airport on the 2016 AQMP, which are incorporated by this reference, the Airport believes that the possible conversion of Measure MOB-04 into an indirect source rule would exceed the SCAQMD's legal authority for the reasons set forth in the referenced letters.[1] Proposed Measure MOB-04 also contains various flaws which contribute to the inadequacy of 4-2

[1] The comment letters submitted to the SCAQMD regarding the 2016 AQMP include, but are not limited to the following: (i) letter dated October 8, 2014 from John Wayne Airport to Mr. Randall Pasek regarding 2016 AQMP LTO data; (ii) letter dated July 28, 2015 from Burbank-Glendale-Pasadena Airport Authority, John Wayne Airport, Long Beach Airport and Los Angeles World Airports to Mr. Henry Hogo regarding the 2016 AQMP White Papers; (iii) letter dated August 4, 2016 from Ms. Lori Ballance, Gatzke Dillon & Ballance LLP to Ms. Jillian Wong regarding the Notice of Preparation of a Draft Program EIR; (iv) letter dated August 19, 2016 from Ms. Lori Ballance, Gatzke Dillon & Ballance LLP to Mr. Michael Krause regarding the Draft 2016 AQMP; and (v) letter dated November 7, 2016 from Ms. Lori Ballance, Gatzke Dillon & Ballance LLP to Mr. Michael Krause regarding the Revised Draft 2016 AQMP.

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the Draft EIR and failure to comply with the requirements of the California Environmental Quality Act (CEQA). 4-2 cont.

First, proposed Measure MOB-04, as described in the project description of the Draft EIR and in the AQMP itself, is unconstitutionally vague and lacks sufficient description making it impossible for the SCAQMD, the Airport, or the public to assess its potential environmental impacts. An EIR must describe the whole of the action, or the entirety of a project, including reasonably foreseeable actions that are part of a project, and must analyze the impacts of those reasonably foreseeable actions. Although the District continues to indicate that the exact impacts resulting from the particular methods that will be used under MOB-04 can only be determined in the future as the measure is developed into a rule or regulation and adopted, it is clear that the District has already commenced the rule development process and will continue this process with an "MOB-04 working group." The Draft EIR does not provide a description of how the proposed measure would work. It fails to describe reasonably foreseeable activities or action of other agencies in response to or associated with the proposed measure. The Draft EIR instead suggests that the intent of the proposed measure would be to delegate the District's responsibilities for regulating or reducing emissions to other agencies, specifically the public officials governing airports in the Basin, and appears to imply that any informed public discussion and environmental review on this course of action be deferred until those other agencies attempt to "comply" with the District's proposed, but unarticulated, new MOB-04 measure at some point in the future. Such an approach, however, is inconsistent with, and in violation of, many fundamental rules and policies required by CEQA (*e.g.,* failure to identify and analyze the whole of the project, improper project "segmentation," improper deferral of impact analysis and mitigation, failure to identify and evaluate project alternatives). 4-3

Because of the current structure of MOB-04, it is clear that the approaches and concepts considered for MOB-04 may be changed based on comments from the working group. In light of the District's initiative in forming an "airport working group" to help formulate the proposed measure, and thereby provide an actual "project description," it would be more appropriate to undertake CEQA analysis and compliance after any actual measure is developed and to delete the measure from current consideration in the AQMP. This is particularly important, because of the importance and consequences of the AQMP to the State of California's State Implementation Plan (SIP) if adopted by the California Air Resources Board (ARB), and to the Federal Clean Air Act enforcement, if approved by the U.S. Environmental Protection Agency (EPA). The SCAQMD is required to fully disclose the details of Measure MOB-04 before adoption, and CEQA requires a full disclosure and discussion, which SCAQMD has failed to do in the Draft EIR. 4-4

Second, although the Draft EIR does not provide emissions targets for proposed MOB-04 (which omission itself is a defect), it appears that regulation will be triggered by failure to meet 4-5

set emission targets for future years. The Airport is concerned about, among others, what these emission targets will be and how the District set the emissions inventory. These examples are provided to illustrate that the Draft EIR's description of the proposed measure is not only flawed but missing altogether.

4-5 cont.

Third, to the extent the SCAQMD intends to approve the Draft EIR and AQMP containing the vague current version of MOB-04, and later, as a part of future rulemaking, provide details regarding its proposed actions against airports including an environmental analysis, that would be segmentation or piecemealing of its CEQA analysis. More specifically, it appears that proposed MOB-04 is intended to require actions by the airports in the Basin to adopt and implement strategies to address emission reductions. The Draft EIR improperly fails to address or to provide any information and analysis relating to the environmental impacts of the anticipated subsequent approvals, discretionary actions, and possible future regulations that appear to be proposed as parts of MOB-04, or the physical environmental effects of social or economic impacts that may result [CEQA Guidelines Section 15063]. Such anticipated and intended actions by other governmental agencies therefore appear to be part of this project and must be identified and evaluated in the Draft EIR, along with the potential impacts. The District has failed to fully disclose the details of Measure MOB-04 and as a result is segmenting or piecemealing its CEQA analysis.

4-6

Fourth, it is critical under CEQA that any level of environmental review makes clear the "baseline" being used as the basis for analysis of the significance of potential project impacts [CEQA Guidelines 15125(a)]. The Draft EIR fails to make it clear as to what "baseline" is being used and what data it will use for the estimated projected reductions that may occur through implementation of control measures. In many places the Draft EIR compares the anticipated impacts to the permitted emissions levels anticipated in the future under the 2016 AQMP, rather than to the existing environmental conditions. The Draft EIR must be revised to accurately and consistently describe the baseline being used.

4-7

Fifth, Measure MOB-04 has serious problems of infeasibility which the Draft EIR has failed to analyze. Measure MOB-04 in effect arguably attempts to convert the various goals of airports in the Basin into enforceable regulation against the airports. However, because the airports are not air regulators and they do not themselves own, operate, or control much of the emissions equipment operated by the airport industry, there are legal feasibility questions that must be discussed in the Draft EIR. In addition, the District does not have the legal authority to compel the airports in the Basin to exercise their discretion in particular ways, such as to impose clean fleet rules, to achieve District objectives.

4-8

At a minimum, the Draft EIR must address the issue of whether the proposed MOB-04 is being proposed in order to accomplish something indirectly that SCAQMD cannot do directly. *See*

4-9

e.g., Perry v. Brown (2011) 52 Cal.4th 1116, 1126 (public officials are not permitted to do indirectly that which they are prohibited from doing directly); *Graber v. City of Upland* (2002) 99 Cal.App.4th 424, 434. These issues of infeasibility and legality have been addressed at length in previous Airport comment letters to the District. The Draft EIR must be revised to cite to any authority the District is relying on for its processing of the proposed measure so that the public can comment on whatever legal authority may be invoked by the District. Until the legal authority is identified and shown to be legally authorized, how can the CEQA analysis for measure MOB-04 be undertaken? The Draft EIR is flawed and legally inadequate in its failure to discuss these infeasibility issues.

Further, to the extent the Draft EIR relies on vague disclaimers to the effect that proposed MOB-04 would not require any measure that lacks legal authority or feasibility, such disclaimers raise more questions than they answer. Whatever types of emission reduction plans may be anticipated by MOB-04 should be identified by the District in the Draft EIR so that the feasibility and legality of such approaches can be evaluated as part of the environmental assessment for the Project.

4-9 cont.

Sixth, the draft AQMP refers to some emission reduction strategies, such as fleet and facility modernization, reductions in emissions from ground support equipment, zero emission airport shuttle buses, and possible mitigation fees and clean fleet rules, but the Draft EIR does not explain how these may relate to proposed MOB-04, or whether they should be considered part of the Project. Such measures may themselves be considered as "projects" subject to CEQA review and may have impacts on the activities of the Airport users that themselves would require analysis or mitigation. Any such contemplated implementation strategies should be included in the project description and better identified in a more complete Draft EIR, so that they may be evaluated along with the rest of the project.

4-10

Seventh, and finally, the Draft EIR should be revised to include a broad-based analysis of the socioeconomic effects of the proposed measure MOB-04, including the potential for job loss, business closures, and diversion of passenger and cargo demand to other airports due to the potential loss of regional competitiveness. The socioeconomic analysis needs to consider both the existence of the measure, even if future regulatory action is not taken, and the possible future enforcement of the measure. Because these conditions have the potential to physically change the environment in and around the airports, these impacts should be identified and assessed in the Draft EIR. [CEQA Guidelines 15064(e) and 15131.] This assessment should not be limited to businesses and operations at the airports in the Basin, but should extend to those facilities, businesses, and operations that while located outside of the airport are dependent upon the flow of passenger and cargo service at the airports.

4-11

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LAWYERS

In closing, we believe that the Draft EIR has provided a narrow and legally inadequate environmental analysis that is not in conformance with the requirements of CEQA, or with the District's own policies and rules for environmental analysis thereby thwarting effective public review and comment. The Draft EIR must therefore be revised, corrected, and re-circulated to provide the relevant decision-makers, affected public agencies, and the public generally with sufficient analysis as required by CEQA. 4-12

If you have any questions regarding the comments set forth in this letter, please do not hesitate to contact me at your convenience.

Very truly yours,

Lori D. Ballance
of
Gatzke Dillon & Ballance LLP

LDB/rlf

cc: David Salardino, California Air Resources Board
Rhonda Runyon, California Air Resources Board
Jessica Witt, Deputy Chief Operating Officer
Barry Rondinella, Airport Director
Melinda McCoy, Airport Environmental Engineer

Responses to Comment Letter #4 – GDB- John Wayne Airport

Comment 4-1

This letter is submitted on behalf of John Wayne Airport, Orange County (Airport or JWA) and contains the Airport's written comments on the Draft Program Environmental Impact Report (Draft EIR) for the proposed 2016 Air Quality Management Plan (2016 AQMP), issued by the South Coast Air Quality Management District (SCAQMD or District) in September 2016. The Airport appreciates the opportunity to continue to work constructively and cooperatively with the SCAQMD in evaluating and developing realistic airport emission reduction strategies for the proposed 2016 AQMP and analyzing the potential environmental impacts of the proposed measures.

Response 4-1

This is an introductory comment, which does not raise any issues regarding the Draft Program EIR.

Comment 4-2

The Airport has achieved success in obtaining substantial emission reductions from their air quality measures implemented over the past decade and the Airport continues to be supportive of projects and programs that are intended to contribute to improvement of air quality and promote other environmental values. However, the Airport must fundamentally disagree with any proposal by the District to convert these measures into a possible regulatory indirect source rule and must reiterate its concerns relating to AQMP Control Measure MOB-04 (Emission Reductions at Commercial Airports). As the District knows from prior comment letters submitted by the Airport on the 2016 AQMP, which are incorporated by this reference, the Airport believes that the possible conversion of Measure MOB-04 into an indirect source rule would exceed the SCAQMD's legal authority for the reasons set forth in the referenced letters.[1] Proposed Measure MOB-04 also contains various flaws which contribute to the inadequacy of the Draft EIR and failure to comply with the requirements of the California Environmental Quality Act (CEQA).

[1] The comment letters submitted to the SCAQMD regarding the 2016 AQMP include, but are not limited to the following: (i) letter dated October 8, 2014 from John Wayne Airport to Mr. Randall Pasek regarding 2016 AQMP LTO data; (ii) letter dated July 28, 2015 from Burbank-Glendale-Pasadena Airport Authority, John Wayne Airport, Long Beach Airport and Los Angeles World Airports to Mr. Henry Hogo regarding the 2016 AQMP White Papers; (iii) letter dated August 4, 2016 from Ms. Lori Ballance, Gatzke Dillon & Ballance LLP to Ms. Jillian Wong regarding the Notice of Preparation of a Draft Program EIR; (iv) letter dated August 19, 2016 from Ms. Lori Ballance, Gatzke Dillon & Ballance LLP to Mr. Michael Krause regarding the Draft 2016 AQMP; and (v) letter dated November 7, 2016 from Ms. Lori Ballance, Gatzke Dillon & Ballance LLP to Mr. Michael Krause regarding the Revised Draft 2016 AQMP.

Response 4-2

The comment raises concern with MOB-04 – Emission Reductions at Commercial Airports. As explained in Subchapter 2.8.2.2 of the Draft Program EIR, "Due to projected increases in airline passenger transportation and expansion of operations at various commercial airports, potential increases in emissions may result unless the increased emissions are fully mitigated. Several airport authorities are implementing emissions mitigation measures, while other airports have initiated actions that can lead to additional emission reductions. This measure seeks to quantify such actions and identify additional actions that can lead to additional emission reductions to assist in attainment of federal air quality standards and reduce local exposure to air toxic emissions.

Quantified emission reductions that are real, surplus, permanent, and enforceable will be reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or in baseline emission inventories as part of future AQMP/SIP development. In addition, such emission reductions can be used for general conformity purposes. A working group will be convened with affected stakeholders to discuss airport emissions related issues and provide input to identify actions and develop mechanisms to implement this measure. To the extent that the identified actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms." The comment also refers to the comment letter submitted previously on the NOP/IS. That letter is identified as Letter A-8 and responses to those comments were contained in Appendix B of the Draft Program EIR.

Comment 4-3

> First, proposed Measure MOB-04, as described in the project description of the Draft EIR and in the AQMP itself, is unconstitutionally vague and lacks sufficient description making it impossible for the SCAQMD, the Airport, or the public to assess its potential environmental impacts. An EIR must describe the whole of the action, or the entirety of a project, including reasonably foreseeable actions that are part of a project, and must analyze the impacts of those reasonably foreseeable actions. Although the District continues to indicate that the exact impacts resulting from the particular methods that will be used under MOB-04 can only be determined in the future as the measure is developed into a rule or regulation and adopted, it is clear that the District has already commenced the rule development process and will continue this process with an "MOB-04 working group." The Draft EIR does not provide a description of how the proposed measure would work. It fails to describe reasonably foreseeable activities or action of other agencies in response to or associated with the proposed measure. The Draft EIR instead suggests that the intent of the proposed measure would be to delegate the District's responsibilities for regulating or reducing emissions to other agencies, specifically the public officials governing airports in the Basin, and appears to imply that any informed public discussion and environmental review on this course of action be deferred until those other agencies attempt to "comply" with the District's proposed, but unarticulated, new MOB-04 measure at some point in the future. Such an approach, however, is inconsistent with, and in violation of, many fundamental rules and policies required by CEQA (*e.g.*, failure to identify and analyze the whole of the project, improper project "segmentation," improper deferral of impact analysis and mitigation, failure to identify and evaluate project alternatives).

Response 4-3

The adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. This comment does not provide evidence to support the claim that the project description in the Draft Program EIR does not describe reasonably foreseeable activities associated with the control measure. The comment does not provide evidence that SCAQMD has commenced

the rule development process. As noted by the comment, the formation of a working group is one of the first steps to rulemaking, when the interested stakeholders and the public are invited to join the working group, which would be involved in providing SCAQMD staff with feedback during rulemaking. Therefore, contrary to the comment, the identification of a MOB-04 working group does not imply that the rulemaking process for MOB-04 has begun and that the Draft Program EIR has failed to properly include reasonably foreseeable actions related to MOB-04. Potential impacts were estimated using the control measure descriptions in the Draft 2016 AQMP. These control measures, including MOB-04, were analyzed on a programmatic level, not deferred, as the comment suggests. As stated previously, any future regulatory action by the SCAQMD would require further CEQA evaluation at that time.

Comment 4-4

Because of the current structure of MOB-04, it is clear that the approaches and concepts considered for MOB-04 may be changed based on comments from the working group. In light of the District's initiative in forming an "airport working group" to help formulate the proposed measure, and thereby provide an actual "project description," it would be more appropriate to undertake CEQA analysis and compliance after any actual measure is developed and to delete the measure from current consideration in the AQMP. This is particularly important, because of the importance and consequences of the AQMP to the State of California's State Implementation Plan (SIP) if adopted by the California Air Resources Board (ARB), and to the Federal Clean Air Act enforcement, if approved by the U.S. Environmental Protection Agency (EPA). The SCAQMD is required to fully disclose the details of Measure MOB-04 before adoption, and CEQA requires a full disclosure and discussion, which SCAQMD has failed to do in the Draft EIR.

Response 4-4

As noted above in Response 4-3, MOB-04 is analyzed programmatically in the Draft Program EIR. SCAQMD staff agrees with the comment that specific control measures such as MOB-04 may need to go through a rulemaking process in the future and environmental impacts associated with the proposed rulemaking will be further evaluated at that time, in the light of the Program EIR. SCAQMD staff will work with affected parties to develop enforceable mechanisms to ensure that the resulting emission reductions remain permanent if the reductions are proposed to be included in the SIP.

Comment 4-5

Second, although the Draft EIR does not provide emissions targets for proposed MOB-04 (which omission itself is a defect), it appears that regulation will be triggered by failure to meet set emission targets for future years. The Airport is concerned about, among others, what these emission targets will be and how the District set the emissions inventory. These examples are provided to illustrate that the Draft EIR's description of the proposed measure is not only flawed but missing altogether.

Response 4-5

Emission reduction targets are not specified for MOB-04 because staff is seeking to identify additional actions through a public process to help meet the State SIP Strategy emission reduction commitment.

The emissions inventory relied upon in the Draft Program EIR is based on the most recent information from CARB. For example, after the release of the Draft 2016 AQMP in June, SCAQMD staff revised aircraft emissions, as newer data reflecting SCAG's newest growth forecast was received. Staff continually seeks to improve the emissions inventory so the most accurate data is included in the Final 2016 AQMP and submitted to U.S. EPA as part of the 2016 AQMP in compliance with CAA requirements.

Additionally, there was a typo on the CARB 2016 SIP Strategy document. The 2023 emission reductions associated with aircraft category is 11 TPD, not 17 TPD. This is reflected in the Draft Final 2016 AQMP.

Comment 4-6

Third, to the extent the SCAQMD intends to approve the Draft EIR and AQMP containing the vague current version of MOB-04, and later, as a part of future rulemaking, provide details regarding its proposed actions against airports including an environmental analysis, that would be segmentation or piecemealing of its CEQA analysis. More specifically, it appears that proposed MOB-04 is intended to require actions by the airports in the Basin to adopt and implement strategies to address emission reductions. The Draft EIR improperly fails to address or to provide any information and analysis relating to the environmental impacts of the anticipated subsequent approvals, discretionary actions, and possible future regulations that appear to be proposed as parts of MOB-04, or the physical environmental effects of social or economic impacts that may result [CEQA Guidelines Section 15063]. Such anticipated and intended actions by other governmental agencies therefore appear to be part of this project and must be identified and evaluated in the Draft EIR, along with the potential impacts. The District has failed to fully disclose the details of Measure MOB-04 and as a result is segmenting or piecemealing its CEQA analysis.

Response 4-6

As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development

and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. This is the proper use of a programmatic EIR. (*See Rio Vista Farm Bureau Ctr. v. Cnty. of Solano* (1st Dist. 1992) 5 Cal. App. 4th 351, 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) This is not considered "segmenting" or "piecemealing" the CEQA analysis and the comment provides no evidence to support its claim.

Comment 4-7

Fourth, it is critical under CEQA that any level of environmental review makes clear the "baseline" being used as the basis for analysis of the significance of potential project impacts [CEQA Guidelines 15125(a)]. The Draft EIR fails to make it clear as to what "baseline" is being used and what data it will use for the estimated projected reductions that may occur through implementation of control measures. In many places the Draft EIR compares the anticipated impacts to the permitted emissions levels anticipated in the future under the 2016 AQMP, rather than to the existing environmental conditions. The Draft EIR must be revised to accurately and consistently describe the baseline being used.

Response 4-7

2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions for the 2016 AQMP. The latest verifiable air quality data (from approved air quality monitoring sites) is from 2015, which can be found in Chapter 2 of the 2016 AQMP and Subchapter 3.2 of the Draft Program EIR. The most recent environmental topic data from 2016 was used for the CEQA baseline in determining environmental impacts in other environmental topic areas because that was the time of the release of the NOP/IS. The baseline used was described in Subchapter 3.2.1 of the Draft Program EIR and no revisions are necessary.

Comment 4-8

Fifth, Measure MOB-04 has serious problems of infeasibility which the Draft EIR has failed to analyze. Measure MOB-04 in effect arguably attempts to convert the various goals of airports in the Basin into enforceable regulation against the airports. However, because the airports are not air regulators and they do not themselves own, operate, or control much of the emissions equipment operated by the airport industry, there are legal feasibility questions that must be discussed in the Draft EIR. In addition, the District does not have the legal authority to compel the airports in the Basin to exercise their discretion in particular ways, such as to impose clean fleet rules, to achieve District objectives.

Response 4-8

The Draft Program EIR evaluated the environmental impacts of implementing the control measures proposed in the 2016 AQMP, regardless of how the emissions reductions would be achieved (regulatory, incentive and co-benefit approaches). The comment does not provide evidence of the infeasibility which was not analyzed. Control measure MOB-04 is proposed to help meet the State SIP Strategy "Further Deployment of Cleaner Technologies" measures emission reductions. The measures seek to work collaboratively with affected stakeholders and the public to identify actions that could help achieve the State SIP Strategy emission reductions. A working group will be created to help implement the measures. SCAQMD staff welcomes John Wayne Airport's participation on the working group. Any future proposed regulatory action by the SCAQMD will be within its legal authority.

Comment 4-9

At a minimum, the Draft EIR must address the issue of whether the proposed MOB-04 is being proposed in order to accomplish something indirectly that SCAQMD cannot do directly. *See e.g., Perry v. Brown* (2011) 52 Cal.4th 1116, 1126 (public officials are not permitted to do indirectly that which they are prohibited from doing directly); *Graber v. City of Upland* (2002) 99 Cal.App.4th 424, 434. These issues of infeasibility and legality have been addressed at length in previous Airport comment letters to the District. The Draft EIR must be revised to cite to any authority the District is relying on for its processing of the proposed measure so that the public can comment on whatever legal authority may be invoked by the District. Until the legal authority is identified and shown to be legally authorized, how can the CEQA analysis for measure MOB-04 be undertaken? The Draft EIR is flawed and legally inadequate in its failure to discuss these infeasibility issues.

Further, to the extent the Draft EIR relies on vague disclaimers to the effect that proposed MOB-04 would not require any measure that lacks legal authority or feasibility, such disclaimers raise more questions than they answer. Whatever types of emission reduction plans may be anticipated by MOB-04 should be identified by the District in the Draft EIR so that the feasibility and legality of such approaches can be evaluated as part of the environmental assessment for the Project.

Response 4-9

Staff believes that SCAQMD has the legal authority to regulate indirect sources as recognized by *Nat. Ass'n. of Home Builders v. San Joaquin Valley Unif. APCD*, 627 F. 3d 730 (9th Cir. 2009). Moreover, EPA's former indirect source regulation specifically identified airports as a type of indirect source. *See* "Indirect Source Controls: An Intersection of Air Quality Management and Land Use Regulation," Loyola of Los Angeles Law Review, 6-1-91, p. 1133. The 9th Circuit Court of Appeals rejected the contention that indirect source controls were preempted by the CAA's provisions regarding mobile sources. With regard to any other potentially preemptive federal statute, we note that once the measure is approved into the SIP, it would be entitled to be harmonized with the provisions of that federal statute and upheld wherever possible. *Ass'n of Am. Railroads v. S. Coast AQMD*, 622 F. 3d 1094 (9th Cir. 2010). With regard to the airport's authority as a proprietor, this issue will be discussed further during the working group process to the extent there is a desire to rely on such authority. This comment raises no specific comments on the adequacy of the environmental analysis under CEQA.

Comment 4-10

Sixth, the draft AQMP refers to some emission reduction strategies, such as fleet and facility modernization, reductions in emissions from ground support equipment, zero emission airport shuttle buses, and possible mitigation fees and clean fleet rules, but the Draft EIR does not explain how these may relate to proposed MOB-04, or whether they should be considered part of the Project. Such measures may themselves be considered as "projects" subject to CEQA review and may have impacts on the activities of the Airport users that themselves would require analysis or mitigation. Any such contemplated implementation strategies should be included in the project description and better identified in a more complete Draft EIR, so that they may be evaluated along with the rest of the project.

Response 4-10

The Draft Program EIR analyzed the environmental impacts from all proposed control measures in the 2016 AQMP on a programmatic level. (*See Rio Vista Farm Bureau Ctr. v. Cnty. of Solano* (1st Dist. 1992) 5 Cal. App. 4th 351, 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) The comment does not provide specific examples of which emission reduction strategies in the 2016 AQMP were not analyzed in the Draft Program EIR. Therefore, no further response is necessary under CEQA.

Comment 4-11

Seventh, and finally, the Draft EIR should be revised to include a broad-based analysis of the socioeconomic effects of the proposed measure MOB-04, including the potential for job loss, business closures, and diversion of passenger and cargo demand to other airports due to the potential loss of regional competitiveness. The socioeconomic analysis needs to consider both the existence of the measure, even if future regulatory action is not taken, and the possible future enforcement of the measure. Because these conditions have the potential to physically change the environment in and around the airports, these impacts should be identified and assessed in the Draft EIR. [CEQA Guidelines 15064(e) and 15131.] This assessment should not be limited to businesses and operations at the airports in the Basin, but should extend to those facilities, businesses, and operations that while located outside of the airport are dependent upon the flow of passenger and cargo service at the airports.

Response 4-11

A socioeconomic analysis is not within the CEQA scope of analysis. However, in an effort to provide information to the public, a socioeconomic analysis was conducted for the 2016 AQMP and is available here: http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/socioeconomic-analysis. The socioeconomic analysis evaluated the regional impacts of the entire 2016 AQMP and does not provide a breakdown of effects by control measure. During future rulemaking, SCAQMD staff will conduct both a CEQA and Socioeconomic analysis of the proposed rules, where applicable and as suggested by the comment.

Comment 4-12

In closing, we believe that the Draft EIR has provided a narrow and legally inadequate environmental analysis that is not in conformance with the requirements of CEQA, or with the District's own policies and rules for environmental analysis thereby thwarting effective public review and comment. The Draft EIR must therefore be revised, corrected, and re-circulated to provide the relevant decision-makers, affected public agencies, and the public generally with sufficient analysis as required by CEQA.

If you have any questions regarding the comments set forth in this letter, please do not hesitate to contact me at your convenience.

Response 4-12

This comment is a summary of previous comments made throughout the letter, which have been responded to. As explained previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a

Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. Since the Draft 2016 AQMP was released on June 30, 2016, SCAQMD staff has released the Revised Draft 2016 AQMP on October 7, 2016 and the Draft Final 2016 AQMP on December 2, 2016. SCAQMD staff reviewed the changes in each of those documents and found that, pursuant to CEQA Guidelines Section 15088.5, any changes to the project description did not constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation. Therefore, no further response is necessary under CEQA.

SOUTHERN CALIFORNIA EDISON®
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Kelly Henderson
Senior Attorney
Environmental and Licensing
Kelly.Henderson@sce.com

November 15, 2016

VIA ELECTRONIC DELIVERY (mkrause@aqmd.gov)

Michael Krause
Program Supervisor
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comments on Draft Program Environmental Impact Report for the 2016 Air Quality Management Plan

Dear Mr. Krause:

Southern California Edison (SCE) is hereby providing additional comments pertaining to one particular aspect of the Draft Environmental Impact Report ("Draft EIR") for the 2016 Air Quality Management Plan ("2016 AQMP") for the South Coast Air Quality Management District ("SCAQMD"). These comments are in addition to other comments provided by SCE pertaining to other aspects of the Draft EIR. 5-1

The Draft EIR correctly points out that certain control measures contained in the 2016 AQMP will result in installation of additional selective catalytic reduction ("SCR") emissions-control systems utilizing ammonia injection. As a result, the Draft EIR analyzes the potential impacts associated with increased use and transport of ammonia within the SCAQMD. The Draft EIR states that the typical concentration of ammonia used in SCR is 19% (see, e.g., pp. 3.4-21 and 3.4-30). While this is generally true, certain existing and proposed enhanced emissions-control systems may utilize a higher concentration of ammonia (up to 29%). The Draft EIR should acknowledge and analyze the potential impacts associated with the use and transport of higher-concentration ammonia. 5-2

An example of such use is in enhanced emission control systems currently planned for multiple "peaking" electrical generating facilities located throughout the SCAQMD. This advanced SCR improves the deliverability of ammonia to the catalyst through changes to the ammonia injection grid and use of 29% aqueous ammonia. These enhancements increase the emissions-control efficiency of the SCR. 5-3

One of the advantages of these enhanced emission control systems is that they improve grid reliability and integration of renewable energy resources. This is accomplished by improving the ability of the emission control systems to control NOx emissions from the combustor, allowing the turbines to operate over a wider operating range, including lower operating levels, with faster ramping capability throughout the operating range. This provides the California grid operator with

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more options for dispatching the facilities to meet very specific needs related to grid stability and the integration of intermittent renewable energy resources (solar and wind). This means that facilities need not be dispatched at load levels higher than needed to maintain grid reliability in order to maintain compliance with emission limits that typically can only be achieved at higher operating levels. This, in turn, means less fuel consumption and lower emissions.

Another advantage of these enhancements is reduced water consumption in emission control systems that rely on water injection in the combustor to control NOx emissions. The enhancements involve reconfiguring the emissions-control system to increase the catalyst surface area and improve ammonia distribution in order to enhance control of NOx emissions. As a result, the NOx concentration from the combustor can increase while still maintaining controlled emissions within required limits. Thus, the enhanced configuration does not require as much water injection for the initial control of NOx from the combustor. The lower water-injection rate in the emissions-control systems will mean that less water is consumed – which supports California's goal to reduce water usage.

5-3 cont.

While use of higher-concentration ammonia is not expected to be widespread, it can offer significant advantages in certain applications, and its use and transport should be addressed in the Draft EIR. This does not significant modifications to the Draft EIR's analysis. The Draft EIR concludes that storage of ammonia is not anticipated to result in significant adverse impacts after implementation of appropriate project design features and mitigation measures (see, Draft EIR, Section 4.3.4.3). Construction of the vessels and foundations in accordance with the California Building Code requirements helps structures to resist major earthquakes without collapse. As required by U.S. EPA's spill prevention control and countermeasure regulations, all facilities are required to have emergency spill containment equipment and implement spill control measures if necessary. Storage tanks typically have secondary containment such as a berm, which would be capable of containing 110 percent of the contents of the storage tanks. Therefore, should a rupture occur, the contents of the tank would be collected within the containment system and pumped to an appropriate storage tank. This is true for 29% ammonia as much as it is for 19% ammonia.

With respect to transport of ammonia to facilities, the Draft EIR correctly points out the extensive regulations applied to the shipment of hazardous materials on California highways on both the federal and state level to ensure the safe transport of ammonia, including the Hazardous Material Transportation Act (HMTA), adopted in 1975 (*see* 49 U.S.C. §§5101 – 5127), and regulations promulgated by the United States Department of Transportation (U.S. DOT) (*see* 49 CFR Parts 171-180) which oversees the movement of hazardous materials at the federal level. U.S. DOT regulations require all tanker truck trailers carrying aqueous ammonia to meet strict requirements for collision and accident prevention. The ammonia tanker trucks are designed to withstand violent accidents without breach of the primary containment. The Draft EIR concludes that notwithstanding these measures, the impacts associated with a potential release as a result of an accident are significant and cannot be fully mitigated (see, Draft EIR, pp. 4.3-39 and 4.3-41). While SCE does not necessarily agree with the conclusion that transport of ammonia presents a significant impact, including consideration of 29% ammonia in the analysis will not alter the conclusion in the Draft EIR with respect to this issue.

5-4

SCE appreciates the opportunity to comment on this important aspect of the Draft EIR. Should you have additional questions, we would be happy to meet with you at your earliest convenience. Please contact me at (626) 302-4411 with any questions.

5-5

Sincerely,

Kelly Henderson

Kelly Henderson

KO:ig

Responses to Comment Letter #5 – Southern California Edison

Comment 5-1

> Southern California Edison (SCE) is hereby providing additional comments pertaining to one particular aspect of the Draft Environmental Impact Report ("Draft EIR") for the 2016 Air Quality Management Plan ("2016 AQMP") for the South Coast Air Quality Management District ("SCAQMD"). These comments are in addition to other comments provided by SCE pertaining to other aspects of the Draft EIR.

Response 5-1

This is an introductory comment, which does not raise any issues regarding the Draft Program EIR.

Comment 5-2

> The Draft EIR correctly points out that certain control measures contained in the 2016 AQMP will result in installation of additional selective catalytic reduction ("SCR") emissions-control systems utilizing ammonia injection. As a result, the Draft EIR analyzes the potential impacts associated with increased use and transport of ammonia within the SCAQMD. The Draft EIR states that the typical concentration of ammonia used in SCR is 19% (see, e.g., pp. 3.4-21 and 3.4-30). While this is generally true, certain existing and proposed enhanced emissions-control systems may utilize a higher concentration of ammonia (up to 29%). The Draft EIR should acknowledge and analyze the potential impacts associated with the use and transport of higher-concentration ammonia.

Response 5-2

Based on a review of permits issued for SCRs, the typical concentration of ammonia used in SCRs is 19 percent. However, as the comment notes, there are certain situations where the use of a higher concentration of ammonia could be used. For those specific projects, additional CEQA review would be necessary to fully evaluate the potentially significant impacts prior to issuance of any SCAQMD permits. The Draft Program EIR concludes that there could be significant impacts associated with a potential release of ammonia as a result of an accident which cannot be fully mitigated. This would certainly remain true for projects using higher concentrations of ammonia, and therefore, would not alter any conclusions reached in the Draft Program EIR. Since it is not foreseeable that typical SCRs would use a higher concentration of ammonia, the Draft Program EIR appropriately analyzed the potential impacts from the use of 19 percent ammonia.

Comment 5-3

An example of such use is in enhanced emission control systems currently planned for multiple "peaking" electrical generating facilities located throughout the SCAQMD. This advanced SCR improves the deliverability of ammonia to the catalyst through changes to the ammonia injection grid and use of 29% aqueous ammonia. These enhancements increase the emissions-control efficiency of the SCR.

One of the advantages of these enhanced emission control systems is that they improve grid reliability and integration of renewable energy resources. This is accomplished by improving the ability of the emission control systems to control NOx emissions from the combustor, allowing the turbines to operate over a wider operating range, including lower operating levels, with faster ramping capability throughout the operating range. This provides the California grid operator with more options for dispatching the facilities to meet very specific needs related to grid stability and the integration of intermittent renewable energy resources (solar and wind). This means that facilities need not be dispatched at load levels higher than needed to maintain grid reliability in order to maintain compliance with emission limits that typically can only be achieved at higher operating levels. This, in turn, means less fuel consumption and lower emissions.

Another advantage of these enhancements is reduced water consumption in emission control systems that rely on water injection in the combustor to control NOx emissions. The enhancements involve reconfiguring the emissions-control system to increase the catalyst surface area and improve ammonia distribution in order to enhance control of NOx emissions. As a result, the NOx concentration from the combustor can increase while still maintaining controlled emissions within required limits. Thus, the enhanced configuration does not require as much water injection for the initial control of NOx from the combustor. The lower water-injection rate in the emissions-control systems will mean that less water is consumed – which supports California's goal to reduce water usage.

Response 5-3

The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 5-4

While use of higher-concentration ammonia is not expected to be widespread, it can offer significant advantages in certain applications, and its use and transport should be addressed in the Draft EIR. This does not significant modifications to the Draft EIR's analysis. The Draft EIR concludes that storage of ammonia is not anticipated to result in significant adverse impacts after implementation of appropriate project design features and mitigation measures (see, Draft EIR, Section 4.3.4.3). Construction of the vessels and foundations in accordance with the California Building Code requirements helps structures to resist major earthquakes without collapse. As required by U.S. EPA's spill prevention control and countermeasure regulations, all facilities are required to have emergency spill containment equipment and implement spill control measures if necessary. Storage tanks typically have secondary containment such as a berm, which would be capable of containing 110 percent of the contents of the storage tanks. Therefore, should a rupture occur, the contents of the tank would be collected within the containment system and pumped to an appropriate storage tank. This is true for 29% ammonia as much as it is for 19% ammonia.

With respect to transport of ammonia to facilities, the Draft EIR correctly points out the extensive regulations applied to the shipment of hazardous materials on California highways on both the federal and state level to ensure the safe transport of ammonia, including the Hazardous Material Transportation Act (HMTA), adopted in 1975 (*see* 49 U.S.C. §§5101 – 5127), and regulations promulgated by the United States Department of Transportation (U.S. DOT) (*see* 49 CFR Parts 171-180) which oversees the movement of hazardous materials at the federal level. U.S. DOT regulations require all tanker truck trailers carrying aqueous ammonia to meet strict requirements for collision and accident prevention. The ammonia tanker trucks are designed to withstand violent accidents without breach of the primary containment. The Draft EIR concludes that notwithstanding these measures, the impacts associated with a potential release as a result of an accident are significant and cannot be fully mitigated (see, Draft EIR, pp. 4.3-39 and 4.3-41). While SCE does not necessarily agree with the conclusion that transport of ammonia presents a significant impact, including consideration of 29% ammonia in the analysis will not alter the conclusion in the Draft EIR with respect to this issue.

Response 5-4

Based on a review of permits issued for SCRs, the typical concentration of ammonia used in SCRs is 19 percent. However, as the comment notes, there are certain situations where the use of a higher concentration of ammonia could be used. For those specific projects, additional CEQA review would be necessary to fully evaluate the potentially significant impacts prior to issuance of any SCAQMD permits. The Draft Program EIR concludes that there could be significant impacts associated with a potential release of ammonia as a result of an accident which cannot be fully mitigated. This would certainly remain true for projects using higher concentrations of ammonia, and therefore, would not alter any conclusions reached in the Draft Program EIR. Since it is not foreseeable that typical SCRs would use a higher concentration of ammonia, the Draft Program EIR appropriately analyzed the potential impacts from the use of 19 percent ammonia.

Comment 5-5

SCE appreciates the opportunity to comment on this important aspect of the Draft EIR. Should you have additional questions, we would be happy to meet with you at your earliest convenience. Please contact me at (626) 302-4411 with any questions.

Response 5-5
This comment does not raise any issues regarding the Draft Program EIR and no response is necessary under CEQA.

THE PORT OF LOS ANGELES 425 S. Palos Verdes Street Post Office Box 151 San Pedro, CA 90733-0151 TEL/TDD 310 SEA-PORT www.portoflosangeles.org

Eric Garcetti *Mayor, City of Los Angeles*

Board of Harbor Commissioners: Ambassador Vilma S. Martinez *President*; David Arian *Vice President*; Patricia Castellanos; Anthony Pirozzi, Jr.; Edward R. Renwick

Eugene D. Seroka *Executive Director*

November 15, 2016

Jillian Wong
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Dear Ms. Wong:

SUBJECT: DRAFT 2016 AIR QUALITY MANAGEMENT PLAN PROGRAM ENVIRONMENTAL IMPACT REPORT (PEIR)

The City of Los Angeles Harbor Department (Harbor Department) appreciates the opportunity to participate in the 2016 Air Quality Management Plan (AQMP) Advisory Committee and to provide these comments regarding the Draft Program Environmental Impact Report (PEIR).

A PEIR by definition is broad and often unable to quantify impacts to a refined level of detail. The Harbor Department recognizes this and requests and assumes that further California Environmental Quality Act (CEQA) review will be conducted by the Lead Agency when project-specific analyses are tiered off of this document for individual development. As you know, CEQA requires that the direct or indirect effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited to, the resources involved; physical changes; alterations of ecological systems; health and safety impacts caused by physical changes; and other aspects of the resource base, including water quality, public services, etc. 6-1

The following are our comments related to the specific resources areas found in the Draft PEIR:

AIR QUALITY IMPACTS

Construction Impacts

Section 4.1 of the Draft PEIR evaluates potential air quality impacts from the 2016 AQMP. Construction-related impacts were identified for several port-related measures including MOB-01, MOB-02, ORFIS-01, ORFIS-04, ORFIS-05 as well as TXM-04 related to the construction of control equipment at stationary sources. 6-2

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Table 4.1-3 highlights the peak daily construction emissions for the installation of one single control device in the South Coast Air Basin (Basin). However, there appears to be no quantification of overall construction for infrastructure changes necessary to provide support for cleaner equipment or vehicles. Please provide more detail on Table 4.1-3 and what constitutes a control device in the analysis. Please further provide an estimate of construction-related emissions from significant infrastructure improvements; particularly as they pertain to the San Pedro Bay Complex. 6-2 cont.

Operational Impacts

The Draft PEIR states the following:

Control measures MOB-01, MOB-02, MOB-04, MOB-05, MOB-06, MOB-07, MOB-09, MOB-10, MOB-13, MOB-14, EGM-01, ORLD-01, ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-05, OFFS-04, OFFS-07, and OFFS-08 have the potential to increase the use of alternative fuels such as biodiesel, LNG, CNG, ethanol, and hydrogen. The availability of the producers of alternative fuels to meet the increase in demand has the potential for an increase in emissions associated with the increased production.[1]

This section then concludes with the statement that "in general, the 2016 AQMP mobile source control measures are expected to result in emission reductions."[2] There appears to be no quantification or substantiation of this statement. An estimate of the production increases and associated emissions should have been provided rather than a qualitative comparison between gasoline and diesel fuel. 6-3

Similar to the use of alternative fuels, the Draft PEIR discusses the conversion to electric vehicles and the use of electricity for control technology and infrastructure changes and improvements. The document states that "the associated emissions from the increased electricity generation needed to meet this projected energy demand have been included in the emissions inventory of the 2016 AQMP."[3] These emission estimates should be provided in the PEIR so that a thorough evaluation can occur.

GREENHOUSE GAS EMISSIONS (GHGS)

The analysis shows a qualitative reduction in GHGs from implementation of the control measures contained in the PEIR including several that pertain to the San Pedro Bay Complex. It is important that the PEIR show how compliance with these measures would be consistent with applicable local, regional and state plans and policies that set goals for reduction of GHGs. 6-4

[1] SCAQMD, Draft PEIR, page 4.1-40.
[2] SCAQMD, Draft PEIR, page 4.1-40.
[3] SCAQMD, Draft PEIR, page 4.1-24.

While it is difficult for quantification to occur at this programmatic level of analysis, the Harbor Department requests that this quantification be provided during each measure's individual rule development and associated CEQA process. Further, a reduction in petroleum fuel usage was estimated and provided for several measures but it is unclear where these estimates were derived. Further, please clarify what the Estimated Increase in Vehicles is referring to in Table 4.1-5 and how this estimate was derived along with the associated fuel usage. The table appears to assume that all source categories are utilizing significant quantities of petroleum fuel rather than any alternative fuel options. It also assumes that there will be a significant increase in "vehicles" under such categories as truck refrigeration units (TRU), forklifts, and ground support equipment. Please provide the estimate of how this increase was derived.

6-4 cont.

ENERGY IMPACTS

The Draft PEIR indicates that the AQMP may increase the usage of electricity or alternative fuels such as natural gas as part of implementation of several proposed control measures. As commented above under Air Quality Impacts, more details need to be provided during the rule development process for specific control measures. If additional power plants or the increased production of alternative fuels is necessary, the construction-related and operational emissions associated with the increased production should be quantified and included in the individual rule assessments and associated CEQA documentation for the individual control measures.

6-5

HAZARD IMPACTS

The Draft PEIR estimates that ammonia storage will be needed to implement those control measures that require the use of Selective Catalytic Reduction, Non-Selective Catalytic Reduction and Dry Gas Scrubbers. Port-related measures ORFIS-01 and ORFIS-03 were both identified as measures that would require the use (and storage) of ammonia. Because ammonia is not something traditionally stored in large quantities at the Port of Los Angeles (Port), we respectfully request additional information as to how the tank sizes were estimated, how much ammonia is assumed to be utilized at the Port Complex and estimation of the necessary truck trips transporting this hazardous material. Additional information on the transport, storage and use of this hazardous material is necessary to make a thorough evaluation and conclusion. As background, the Port Master Plan contains the Methodology for the Identification of Hazards as well as the probability of a hazardous release. The Port's Methodology for the Identification of Hazards is as follows:

6-6

The identification of hazards to be assessed in the Risk Management Plan utilizes the National Fire Protection Association (NFPA) Hazard Identification System. The NFPA system numerically grades all materials in three separate hazard dimensions: health, flammability, and reactivity (tendency to react with water or other common materials). There are five numerical grades (0-4) with four being the most severe hazard or danger and zero being no hazard at all. More detailed information on this system is available in the "Standard System for the Identification of the Hazards of Materials for Emergency

Response", NFPA No. 704. Commodities with a rating of two or more in any dimension, and transferred or stored in bulk (quantities greater than 10,000 gallons) within the Port are considered hazardous and subject to the goals and policies of the Risk Management Plan. The exception is for a commodity's flammability. In addition to the NFPA flammability rating of two (2) or greater, a commodity must have a flashpoint (the lowest temperature where a liquid generates sufficient vapors to form a flammable gas vapor) of below 140° Fahrenheit (F).[4]

Please provide an explanation for the assumption that ammonia would be stored in 5,000 gallon tanks on site and how the Harbor Department would assess this potential impact as these tanks may be required at multiple sites within the Port Complex.

6-6 cont.

The San Pedro Bay Complex contains many sites listed as hazardous materials sites pursuant to Government Code Section 65962.5. As a result, near-surface contaminated soil is often encountered during demolition and/or construction activities; including those associated with implementation of the 2016 AQMP. This creates the possibility that a significant hazard could be created to the public or the environment. Please clarify what, if any, mitigation measures the South Coast Air Quality Management District (SCAQMD) is proposing to reduce this potential risk and whether the SCAQMD will be the Lead Agency for any necessary CEQA analysis as it pertains to measure TXM-04 and Government Code Section 65962.5. Please further clarify whether the Phase I Environmental Site Assessment and possible Phase II Environmental Site Assessment identified in Mitigation Measure HZ-7 will be required for every site; regardless of whether it has been identified under Government Code Section 65962.5. The cost and timing associated with this measure needs to be quantified and considered and the Lead Agency responsible for this testing needs to be identified.[5]

6-7

BIOLOGY AND WATER QUALITY IMPACTS

Please provide the quantification for water consumption assumed for TXM-04. Table 4.4-4 highlights water demand from AQMP control measures but does not have a measure-by-measure breakdown so it is difficult to ascertain whether this measure (and others) would cause a significant water demand impact at the San Pedro Bay Complex. While water demand impacts are identified as significant and unavoidable after mitigation, quantification by measure is necessary to assess project-level demand.

6-8

NOISE

Several measures pertaining to the San Pedro Bay Complex have been identified as needing construction due to infrastructure improvements or the installation of air pollution control technology. These measures include but are not limited to the following: MOB-01, TXM-04 and ORFIS-04. The Draft PEIR states the following:

6-9

[4] Port of Los Angeles Port Master Plan, page 64, 2014.
[5] SCAQMD, Draft PEIR, page 4.3-41.

The existing rail and truck routes/corridors likely to be modified are located primarily in commercial and industrial zones within the Southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well inland railyards near downtown Los Angeles.[6]

The San Pedro Bay Complex is already a heavy-duty industrial area where significant noise levels can occur from both construction improvements and the daily operation of the facilities. Any increase in noise to the terminals as a result of the AQMP needs to be quantified and addressed to ensure that a new significant adverse noise impact is not triggered as a result of the implementation of control measures that include significant associated construction.

6-9 cont.

SOLID AND HAZARDOUS WASTE

Table 4.6-2 of the Draft PEIR indicates that the acceleration of the penetration of zero emission TRUs, forklifts and ground support equipment (among other things) could result in increased solid/hazardous waste from the disposal of spent batteries. A quantification or explanation for the estimate from the source category should be provided that includes the basis for assuming that this equipment doubles in inventory between 2023 and 2031.[7] The early retirement of equipment such as burners, on-road trucks, off-road vehicles, gasoline-fueled engines, and locomotive and aircraft engines is also expected to occur as part of the 2016 AQMP. Although it is expected that approximately 80% of a vehicle can be recycled and reused in another capacity, there still remains a potentially significant amount of landfill materials that need to be quantified and assessed for disposal capacity in the Basin.

6-10

Please provide further justification for why the significant conversion of the abovementioned source categories will not exceed or adversely impact the physical landfill capacity constraints of approximately 112,000 tons per day in the Basin. The finding of no significant impacts needs further substantiation and quantification.

TRAFFIC AND TRANSPORTATION

The Draft PEIR states the following:

MOB-01 might result in an increase of harbor traffic, if the ports decide to use the barge-based bonnet system to capture emissions from ocean-going vessels. The additional number of vessels is speculative at this time, but could potentially result in significant impacts to transportation and traffic by creating congestion and causing an increase in traffic hazards in the harbors.[8]

6-11

[6] SCAQMD, Draft PEIR, page 4.5-6.
[7] SCAQMD, Draft PEIR, Table 4.6-2, page 4.6-9.
[8] SCAQMD Draft PEIR, page 4.7-8.

Although this potential impact is found to be speculative, the Draft PEIR concludes that operational traffic impacts remain significant for both the increased use of the barge-based bonnet as well as the potential dedication of existing vehicular traffic lanes for vehicles using the overhead catenary system. These impact areas need further quantification and clarification. In addition, if an analysis is too speculative at this time, please indicate how this conclusion was derived and what type of analysis will be conducted in the future. Please indicate whether these measures will be the jurisdiction of the SCAQMD or California Air Resources Board as Lead Agency. 6-11 cont.

AESTHETICS

The Draft PEIR states the following:

Similarly, while the use of bonnet technology could degrade the existing visual character or quality in the immediate surrounding area, it is unlikely that the use of bonnet technology would be visible from sensitive public vantage points due to the presence of intervening structures at the ports.[9] 6-12

Please provide substantiation for this statement as to what intervening structures are being assumed. Projects traditionally completed in the San Pedro Bay Complex undergo extensive aesthetics analyses when additional cranes or other large equipment is being installed. This same analysis would be required for any required bonnet technology. Although the chapter's finding is that aesthetic impacts would remain significant after mitigation, it is unclear if this component of MOB-01 is also considered significant and unavoidable.

Thank you for the opportunity to comment on the Draft PEIR. We look forward to continuing to work with the SCAQMD toward the successful completion of the 2016 AQMP and its associated documentation. We further look forward to receiving written responses to the comments included herein. Please contact Lisa Wunder, Marine Environmental Manager, at (310) 732-7688 or via email at lwunder@portla.org if you have any questions regarding these comments. 6-13

Sincerely,

CHRISTOPHER CANNON
Director of Environmental Management

CC:LW:LO:TT:mrx
APP No.: 061024-605

[9] SCAQMD, Draft PEIR, page 4.8-4.

Responses to Comment Letter #6 – Port of Los Angeles

Comment 6-1

The City of Los Angeles Harbor Department (Harbor Department) appreciates the opportunity to participate in the 2016 Air Quality Management Plan (AQMP) Advisory Committee and to provide these comments regarding the Draft Program Environmental Impact Report (PEIR).

A PEIR by definition is broad and often unable to quantify impacts to a refined level of detail. The Harbor Department recognizes this and requests and assumes that further California Environmental Quality Act (CEQA) review will be conducted by the Lead Agency when project-specific analyses are tiered off of this document for individual development. As you know, CEQA requires that the direct or indirect effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited to, the resources involved; physical changes; alterations of ecological systems; health and safety impacts caused by physical changes; and other aspects of the resource base, including water quality, public services, etc.

The following are our comments related to the specific resources areas found in the Draft PEIR:

Response 6-1

This is an introductory comment. The comment accurately notes that the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. Specific control measures will need to go through a rulemaking process in the future and environmental impacts associated with the proposed rules or proposed rule amendments will be further evaluated at that time, in the light of the Program EIR.

Comment 6-2

AIR QUALITY IMPACTS

Construction Impacts

Section 4.1 of the Draft PEIR evaluates potential air quality impacts from the 2016 AQMP. Construction-related impacts were identified for several port-related measures including MOB-01, MOB-02, ORFIS-01, ORFIS-04, ORFIS-05 as well as TXM-04 related to the construction of control equipment at stationary sources.

Table 4.1-3 highlights the peak daily construction emissions for the installation of one single control device in the South Coast Air Basin (Basin). However, there appears to be no quantification of overall construction for infrastructure changes necessary to provide support for cleaner equipment or vehicles. Please provide more detail on Table 4.1-3 and what constitutes a control device in the analysis. Please further provide an estimate of construction-related emissions from significant infrastructure improvements; particularly as they pertain to the San Pedro Bay Complex.

Response 6-2

The assumptions for potential air quality impacts from construction activities associated with the 2016 AQMP control measures are discussed in Subchapter 4.1.6.1 beginning on page 4.1-18. Examples of what constitutes a control device is provided in the first paragraph: "3) the construction of control equipment at stationary sources (e.g., SCRs, SNCRs particulate controls, and vapor recovery systems)." The commenter correctly states that Table 4.1-3 summarizes the construction emissions that would be expected to occur as a result of installing one air pollution control device at one facility (see Appendix C of the Draft Program EIR for detailed assumptions and calculations). Although the construction emissions at each individual facility might not exceed the SCAQMD's CEQA significance thresholds, it is foreseeable and likely that on any given day, in order to comply with the 2016 AQMP, construction of one or more control devices could occur at more than one facility. Based on the results in Table 4.1-3, if more than four facilities or more than four control devices were concurrently constructed on any given day, the emissions would exceed the SCAQMD's air quality significance thresholds. Therefore, construction emissions were considered significant.

Since project specific details of future infrastructure development projects are unknown at this time, construction impacts for these types of projects cannot be accurately quantified, thus were evaluated on a programmatic level in the Draft Program EIR. (*See Rio Vista Farm Bureau Ctr. v. Cnty. of Solano* (1st Dist. 1992) 5 Cal. App. 4th 351, 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) It will be necessary for future infrastructure projects to undergo a project-specific CEQA evaluation once project-specific details are known.

Comment 6-3

Operational Impacts

The Draft PEIR states the following:

Control measures MOB-01, MOB-02, MOB-04, MOB-05, MOB-06, MOB-07, MOB-09, MOB-10, MOB-13, MOB-14, EGM-01, ORLD-01, ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-05, OFFS-04, OFFS-07, and OFFS-08 have the potential to increase the use of alternative fuels such as biodiesel, LNG, CNG, ethanol, and hydrogen. The availability of the producers of alternative fuels to meet the increase in demand has the potential for an increase in emissions associated with the increased production.[1]

This section then concludes with the statement that "in general, the 2016 AQMP mobile source control measures are expected to result in emission reductions."[2] There appears to be no quantification or substantiation of this statement. An estimate of the production increases and associated emissions should have been provided rather than a qualitative comparison between gasoline and diesel fuel.

Similar to the use of alternative fuels, the Draft PEIR discusses the conversion to electric vehicles and the use of electricity for control technology and infrastructure changes and improvements. The document states that "the associated emissions from the increased electricity generation needed to meet this projected energy demand have been included in the emissions inventory of the 2016 AQMP."[3] These emission estimates should be provided in the PEIR so that a thorough evaluation can occur.

[1] SCAQMD, Draft PEIR, page 4.1-40.
[2] SCAQMD, Draft PEIR, page 4.1-40.
[3] SCAQMD, Draft PEIR, page 4.1-24.

Response 6-3

It is speculative to quantify any potential increases in emissions associated with the potential increase in production of alternative fuels (from current production levels) because there are a number of unknown factors at the present time, and therefore, this impact was analyzed qualitatively. As detailed in Subchapter 4.1.6.2.4, production of alternative fuels such as LNG and CNG require little processing with less emissions than the production of refined petroleum products such as gasoline, diesel, and jet fuel. While biodiesel and ethanol production do require more processing than LNG and CNG, the production processes are less complicated than petroleum refining. Therefore, the production of alternative fuels, especially biofuels, typically generates less air emissions than a petroleum refinery would when producing similar gasoline or gasoline equivalent amounts. Any increase in emissions attributable to an increased production of alternative fuels would be offset by reduced levels of petroleum fuel production and transportation of crude oil primarily from overseas and possibly by rail, as diesel and gasoline demand decreases.

Potential impacts from increased electricity demand associated with the 2016 AQMP control measures are thoroughly discussed in Subchapter 4.1.6.2.1. Please refer to this section of the Draft Program EIR for the detailed discussion.

Comment 6-4

GREENHOUSE GAS EMISSIONS (GHGS)

The analysis shows a qualitative reduction in GHGs from implementation of the control measures contained in the PEIR including several that pertain to the San Pedro Bay Complex. It is important that the PEIR show how compliance with these measures would be consistent with applicable local, regional and state plans and policies that set goals for reduction of GHGs.

While it is difficult for quantification to occur at this programmatic level of analysis, the Harbor Department requests that this quantification be provided during each measure's individual rule development and associated CEQA process. Further, a reduction in petroleum fuel usage was estimated and provided for several measures but it is unclear where these estimates were derived. Further, please clarify what the Estimated Increase in Vehicles is referring to in Table 4.1-5 and how this estimate was derived along with the associated fuel usage. The table appears to assume that all source categories are utilizing significant quantities of petroleum fuel rather than any alternative fuel options. It also assumes that there will be a significant increase in "vehicles" under such categories as truck refrigeration units (TRU), forklifts, and ground support equipment. Please provide the estimate of how this increase was derived.

Response 6-4

As stated in Subchapter 4.1.3 of the Draft Program EIR, the NOP/IS concluded that the 2016 AQMP would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases. SCAG's 2016 RTP/SCS focuses on the GHG reduction efforts through modifying traditional land use development patterns to include more mixed use projects, which eliminates or substantially shortens commute trip lengths compared to traditional land use planning where residential land uses are separate from and potentially long distances from jobs and other commercial land uses. The 2016 AQMP utilizes vehicle and population projections from the 2016 RTP/SCS and none of the proposed control measures would conflict with GHG reduction plans, but would instead seek to quantify and take credit for criteria pollutant emission reductions resulting in compliance with GHG regulations. Therefore, this topic was not analyzed in the Draft Program EIR.

The comment accurately notes that as part of the future rulemaking process, SCAQMD staff will provide specific quantification of emissions and environmental impacts.

The reduction in petroleum fuel usage shown in Table 4.1-5 was estimated based on the mobile source emissions model EMFAC2014 emissions for 2023 and 2031 and mobile source emissions model OFFROAD emissions for 2023 and 2029. As stated in Subchapter 4.1.5, vehicle population data and transportation analysis zone (TAZ) data was provided by SCAG.

Comment 6-5

ENERGY IMPACTS

The Draft PEIR indicates that the AQMP may increase the usage of electricity or alternative fuels such as natural gas as part of implementation of several proposed control measures. As commented above under Air Quality Impacts, more details need to be provided during the rule development process for specific control measures. If additional power plants or the increased production of alternative fuels is necessary, the construction-related and operational emissions associated with the increased production should be quantified and included in the individual rule assessments and associated CEQA documentation for the individual control measures.

Response 6-5

The comment accurately notes that as part of the future rulemaking process, SCAQMD staff will provide specific quantification of emissions and environmental impacts.

Comment 6-6

HAZARD IMPACTS

The Draft PEIR estimates that ammonia storage will be needed to implement those control measures that require the use of Selective Catalytic Reduction, Non-Selective Catalytic Reduction and Dry Gas Scrubbers. Port-related measures ORFIS-01 and ORFIS-03 were both identified as measures that would require the use (and storage) of ammonia. Because ammonia is not something traditionally stored in large quantities at the Port of Los Angeles (Port), we respectfully request additional information as to how the tank sizes were estimated, how much ammonia is assumed to be utilized at the Port Complex and estimation of the necessary truck trips transporting this hazardous material. Additional information on the transport, storage and use of this hazardous material is necessary to make a thorough evaluation and conclusion. As background, the Port Master Plan contains the Methodology for the Identification of Hazards as well as the probability of a hazardous release. The Port's Methodology for the Identification of Hazards is as follows:

The identification of hazards to be assessed in the Risk Management Plan utilizes the National Fire Protection Association (NFPA) Hazard Identification System. The NFPA system numerically grades all materials in three separate hazard dimensions: health, flammability, and reactivity (tendency to react with water or other common materials). There are five numerical grades (0-4) with four being the most severe hazard or danger and zero being no hazard at all. More detailed information on this system is available in the "Standard System for the Identification of the Hazards of Materials for Emergency

Response", NFPA No. 704. Commodities with a rating of two or more in any dimension, and transferred or stored in bulk (quantities greater than 10,000 gallons) within the Port are considered hazardous and subject to the goals and policies of the Risk Management Plan. The exception is for a commodity's flammability. In addition to the NFPA flammability rating of two (2) or greater, a commodity must have a flashpoint (the lowest temperature where a liquid generates sufficient vapors to form a flammable gas vapor) of below 140° Fahrenheit (F).[4]

Please provide an explanation for the assumption that ammonia would be stored in 5,000 gallon tanks on site and how the Harbor Department would assess this potential impact as these tanks may be required at multiple sites within the Port Complex.

[4] Port of Los Angeles Port Master Plan, page 64, 2014.

Response 6-6

The tank sizes, ammonia usage, and estimations of necessary truck trips for transporting ammonia were based on general assumptions from previous projects in the non-refinery sector. SCAQMD staff will work with Port staff to ensure that all environmental impacts, such as hazards impacts, associated with control measures affecting the Ports will be analyzed as part of future rulemaking activities. Detailed project-specific information will be researched and used in any rulemaking efforts that involve the Port-related control measures.

Comment 6-7

The San Pedro Bay Complex contains many sites listed as hazardous materials sites pursuant to Government Code Section 65962.5. As a result, near-surface contaminated soil is often encountered during demolition and/or construction activities; including those associated with implementation of the 2016 AQMP. This creates the possibility that a significant hazard could be created to the public or the environment. Please clarify what, if any, mitigation measures the South Coast Air Quality Management District (SCAQMD) is proposing to reduce this potential risk and whether the SCAQMD will be the Lead Agency for any necessary CEQA analysis as it pertains to measure TXM-04 and Government Code Section 65962.5. Please further clarify whether the Phase I Environmental Site Assessment and possible Phase II Environmental Site Assessment identified in Mitigation Measure HZ-7 will be required for every site; regardless of whether it has been identified under Government Code Section 65962.5. The cost and timing associated with this measure needs to be quantified and considered and the Lead Agency responsible for this testing needs to be identified.[5]

[5] SCAQMD, Draft PEIR, page 4.3-41.

Response 6-7

Potential hazards and hazardous materials impacts, including near-surface contaminated soil at sites, were analyzed in Subchapter 4.3 of the Draft Program EIR. As the comment notes, the San Pedro Bay Complex contains many sites listed as hazardous materials sites pursuant to Government Code Section 65962.5 The 2016 AQMP does not directly cause these facilities to contaminate the soil, but rather could indirectly cause the facility to expose contamination upon ground disturbance activities. The NOP/IS assumed that sites identified as hazardous materials sites, such as those on the Cortese list, were conducting due diligence in cleaning up and protecting the neighborhood and was not assuming inaction. There are various federal, state, and local laws that apply to activities occurring on sites on the Cortese list, such as the Response Conservation, and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act and the Hazardous Materials Release and Clean-Up Act. Furthermore, SCAQMD Rule 1166 - Volatile Organic Compound Emissions from Decontamination of Soil regulates the emissions of VOCs from contaminated soils, Rule 1403 - Asbestos Emissions from Demolition/Renovation Activities regulates the presence of asbestos during construction, and the 2016 AQMP contains TXM-04, which seeks to develop control measures that would control the toxic metal particulates generated during soil cleanup or remediation activities at these sites. Near-surface contaminated soil may be encountered during demolition and/or construction activities associated with implementation of the 2016 AQMP. Based on the location of the nearest sensitive receptor, it is possible that construction activities would create a significant hazard to the public or environment. Furthermore, without knowing the types of contamination (i.e. VOCs, TACs, etc) it is not possible to know which regulations would apply. Without the knowledge of site-specific information, it is speculative to identify what investigative or remedial activities would be required and to identify the Lead Agency responsible for oversight at these sites. SCAQMD staff will work with Port staff to ensure that all environmental impacts associated with control measures affecting the Ports will be analyzed as part of future rulemaking activities.

Comment 6-8

BIOLOGY AND WATER QUALITY IMPACTS

Please provide the quantification for water consumption assumed for TXM-04. Table 4.4-4 highlights water demand from AQMP control measures but does not have a measure-by-measure breakdown so it is difficult to ascertain whether this measure (and others) would cause a significant water demand impact at the San Pedro Bay Complex. While water demand impacts are identified as significant and unavoidable after mitigation, quantification by measure is necessary to assess project-level demand.

Response 6-8

Control measures, such as TXM-04, were identified and analyzed in the Draft Program EIR on a programmatic level to determine foreseeable adverse effects. As noted previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. SCAQMD staff will work with Port staff to ensure that all environmental impacts, such as water quality, associated with control measures affecting the Ports will be analyzed as part of future rulemaking activities.

Comment 6-9

NOISE

Several measures pertaining to the San Pedro Bay Complex have been identified as needing construction due to infrastructure improvements or the installation of air pollution control technology. These measures include but are not limited to the following: MOB-01, TXM-04 and ORFIS-04. The Draft PEIR states the following:

The existing rail and truck routes/corridors likely to be modified are located primarily in commercial and industrial zones within the Southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well inland railyards near downtown Los Angeles.[6]

The San Pedro Bay Complex is already a heavy-duty industrial area where significant noise levels can occur from both construction improvements and the daily operation of the facilities. Any increase in noise to the terminals as a result of the AQMP needs to be quantified and addressed to ensure that a new significant adverse noise impact is not triggered as a result of the implementation of control measures that include significant associated construction.

[6] SCAQMD, Draft PEIR, page 4.5-6..

Response 6-9
As noted previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. SCAQMD staff will work with Port staff to ensure that all environmental impacts, such as noise impacts, associated with control measures affecting the Ports will be analyzed as part of future rulemaking activities.

Comment 6-10

SOLID AND HAZARDOUS WASTE

Table 4.6-2 of the Draft PEIR indicates that the acceleration of the penetration of zero emission TRUs, forklifts and ground support equipment (among other things) could result in increased solid/hazardous waste from the disposal of spent batteries. A quantification or explanation for the estimate from the source category should be provided that includes the basis for assuming that this equipment doubles in inventory between 2023 and 2031.[7] The early retirement of equipment such as burners, on-road trucks, off-road vehicles, gasoline-fueled engines, and locomotive and aircraft engines is also expected to occur as part of the 2016 AQMP. Although it is expected that approximately 80% of a vehicle can be recycled and reused in another capacity, there still remains a potentially significant amount of landfill materials that need to be quantified and assessed for disposal capacity in the Basin.

Please provide further justification for why the significant conversion of the abovementioned source categories will not exceed or adversely impact the physical landfill capacity constraints of approximately 112,000 tons per day in the Basin. The finding of no significant impacts needs further substantiation and quantification.

[7] SCAQMD, Draft PEIR, Table 4.6-2, page 4.6-9.

Response 6-10
As noted in the comment, the switch to electric batteries has the potential to create solid waste impacts from the improper disposal of spent batteries. However, as described in Subchapter 4.6.4.1 the Draft Program EIR, the recycling of lead-acid and nickel-cadmium batteries is already a well-established activity. Further some manufacturers offer incentives to prevent illegal disposal of the batteries. Most car manufacturers offer a program to take back used or damaged battery packs, including Toyota and Nissan. The Draft Program EIR concluded that because battery recycling is required by law and because they have value, the illegal or improper disposal of batteries is expected to be uncommon, thereby reducing the solid waste impacts caused by illegal disposal. The comment does not provide any evidence contrary to the conclusions made in the Draft Program EIR.

Vehicle population data and transportation analysis zone (TAZ) data was provided by SCAG. Retirement of equipment was discussed in Subchapter 4.6.4.3. Based on a programmatic-level review of potential solid waste impacts, scrap metals from vehicle and engine replacements are

expected to be recycled and not disposed of in landfills. Any small increase of disposal in landfills that may occur from miscellaneous parts is expected to be within the permitted capacity of over 112,000 tons per day. However, as stated on page 4.6-17 of the Draft Program EIR, the high volume of vehicle and equipment to retire in a short timeframe and the uncertainty of their outcome would result in potential significant solid and hazardous waste impacts due to implementation of the 2016 AQMP. Additionally, it is too speculative to estimate the amount of waste that could be generated at this time. (*See Rio Vista Farm Bureau Ctr. v. Cnty. of Solano* (1st Dist. 1992) 5 Cal. App. 4th 351, 373 ["Where, as here, an EIR cannot provide meaningful information about a speculative future project, deferral of an environmental assessment does not violate CEQA."].) Project-specific potential solid waste impacts will be evaluated as part of future rulemaking activities, which will need further CEQA evaluation at that time.

Comment 6-11

TRAFFIC AND TRANSPORTATION

The Draft PEIR states the following:

MOB-01 might result in an increase of harbor traffic, if the ports decide to use the barge-based bonnet system to capture emissions from ocean-going vessels. The additional number of vessels is speculative at this time, but could potentially result in significant impacts to transportation and traffic by creating congestion and causing an increase in traffic hazards in the harbors.[8]

Although this potential impact is found to be speculative, the Draft PEIR concludes that operational traffic impacts remain significant for both the increased use of the barge-based bonnet as well as the potential dedication of existing vehicular traffic lanes for vehicles using the overhead catenary system. These impact areas need further quantification and clarification. In addition, if an analysis is too speculative at this time, please indicate how this conclusion was derived and what type of analysis will be conducted in the future. Please indicate whether these measures will be the jurisdiction of the SCAQMD or California Air Resources Board as Lead Agency.

[8] SCAQMD Draft PEIR, page 4.7-8.

Response 6-11

The Draft Program EIR conservatively concluded that the operational traffic impacts would remain significant for the increased use of the barge-based bonnet technology as well as the potential dedication of existing vehicular traffic lanes for vehicles using overhead catenary systems. As noted previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in the light of the Program EIR. SCAQMD staff will work with Port staff to ensure that all environmental impacts, such as traffic and transportation impacts, associated with control measures affecting the

Ports will be analyzed as part of future rulemaking activities. Jurisdiction and Lead Agency determination would also be clarified during future rulemaking activities.

Comment 6-12

AESTHETICS

The Draft PEIR states the following:

Similarly, while the use of bonnet technology could degrade the existing visual character or quality in the immediate surrounding area, it is unlikely that the use of bonnet technology would be visible from sensitive public vantage points due to the presence of intervening structures at the ports.[9]

Please provide substantiation for this statement as to what intervening structures are being assumed. Projects traditionally completed in the San Pedro Bay Complex undergo extensive aesthetics analyses when additional cranes or other large equipment is being installed. This same analysis would be required for any required bonnet technology. Although the chapter's finding is that aesthetic impacts would remain significant after mitigation, it is unclear if this component of MOB-01 is also considered significant and unavoidable.

[9] SCAQMD, Draft PEIR, page 4.8-4.

Response 6-12

The intervening structures refer to storage buildings, unloaders, ships, lighting, fencing, and signage, as noted in the example provided on page 4.8-5 of the Draft Program EIR. As stated previously, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in light of the Program EIR. SCAQMD staff will work with Port staff to ensure that all environmental impacts, such as aesthetics impacts, associated with control measures affecting the Ports will be analyzed as part of future rulemaking activities. While the identified aesthetic mitigation measures could minimize some of the aesthetics impacts, the SCAQMD cannot predict how a lead agency might choose to mitigate a particular significant aesthetics impact for future project(s) located in areas with project-specific features and issues. Thus, the potential exists for impacts for future projects to be significant even after feasible mitigation measures are identified and imposed. Therefore, aesthetics impacts that may occur as a result of implementing the 2016 AQMP, including MOB-01, are expected to remain significant after mitigation.

Comment 6-13

> Thank you for the opportunity to comment on the Draft PEIR. We look forward to continuing to work with the SCAQMD toward the successful completion of the 2016 AQMP and its associated documentation. We further look forward to receiving written responses to the comments included herein. Please contact Lisa Wunder, Marine Environmental Manager, at (310) 732-7688 or via email at lwunder@portla.org if you have any questions regarding these comments.

Response 6-13

SCAQMD staff looks forward to working with Port staff. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.



November 15, 2016

South Coast Air Quality Management District
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submitted electronically at: https://onbase-pub.aqmd.gov/sAppNet/UnityForm.aspx?key=UFSessionIDKey
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Re: Comments on Draft Program Environmental Impact Report - 2016 Air Quality Management Plan

To Whom It May Concern:

On behalf of our members, Airlines for America® ("A4A")[1] thanks the South Coast Air Quality Management District ("SCAQMD" or "District") for providing this opportunity to comment on its Draft Program Environmental Impact Report - 2016 Air Quality Management Plan ("Draft EIR"). We note that we provided extensive comments on the Draft 2016 Air Quality Management Plan released in June 2016 ("Draft 2016 AQMP") and will provide further comment on the Revised Draft 2016 Air Quality Management Plan (the "Draft Final AQMP") as appropriate.

7-1

As we emphasized in our comments on the Draft 2016 AQMP, A4A and its member airlines have a very strong record of continually improving environmental performance while increasing our considerable contributions to the national and California economies. We also emphasized that we fully support the District's effort to develop its 2016 AQMP to attain compliance with National Ambient Air Quality Standards ("NAAQS") and its overall objective "[t]o ensure air quality goals will be met while maximizing benefits and minimizing adverse impacts to the regional economy."[2] We continue to support this effort and will look forward to working with District staff as they work to finalize and implement the AQMP.

However, we identified a number of concerns about the Draft 2016 AQMP, many of which do not appear to have been addressed in the latest revision, the Draft Final AQMP. In this context, we remain particularly concerned about the accuracy and transparency of the emissions inventory and the estimates of emission reductions expected to result from measures identified in the various documents supporting the AQMP, including the Draft EIR. The most recent estimates from both the California Air Resources Board ("CARB") and the District state that

7-2

[1] A4A is the principal trade and service organization of the U.S. airline industry. A4A's members are: Alaska Airlines, Inc.; American Airlines Group; Atlas Air, Inc.; Federal Express Corporation; Hawaiian Airlines; JetBlue Airways Corp.; Southwest Airlines Co.; United Continental Holdings, Inc.; and United Parcel Service Co.; Air Canada, Inc. is an associate member.
[2] Draft 2016 AQMP at ES-4; Draft Final AQMP at ES-4.

total reductions in emissions of oxides of nitrogen ("NOx") in the South Coast resulting from the "Further Deployment of Cleaner Technologies" measures applied to Off-Road Federal and International Sources will be 40 tons per day ("tpd) in 2023 and 30tpd in 2031. *See* Draft Final AQMP, Table 4-5 and the "Proposed New SIP Measures Handout" provided at CARB's September 1, 2016 public workshop on the Proposed 2016 State Strategy for the State Implementation Plan (available here: https://www.arb.ca.gov/planning/sip/2016sip/090116wkshp_handout.pdf). Both of these documents indicate that the Further Deployment of Cleaner Technologies measure will result in NOx reductions of 17tpd from aircraft, 10tpd from locomotives and 13tpd from ocean-going vessels (a total of 40tpd) in 2023 and of 13tpd from aircraft, 7tpd from locomotives and 10tpd from ocean-going vessels (a total of 30tpd) in 2031. This is not consistent with the estimate of emissions reductions identified in the Draft EIR. The Draft EIR identifies ORFIS-05, "Further Deployment of Cleaner Technology: Off-Road Federal and International Sources," as one of the measures in the State SIP Strategy. The Draft EIR describes this measure as "outlin[ing] a series of actions that would be taken at state and local level to achieve further reductions among three categories of off-road federal and international sources: ocean-going vessels, aircraft, and locomotives." Draft EIR at 2-51. Table 2.8-6 in the Draft EIR indicates that "expected emissions reductions" from this measure will be 13tpd NOx on 2023 and 10tpd NOx in 2031. *See also* Draft EIR, Appendix A, Table 1.9-4. There is thus a clear discrepancy between the estimates of NOx emissions reductions expected to result from Further Deployment of Cleaner Technologies by these federal sources provided in the Draft EIR and the State SIP Strategy and between the estimates provided in the Draft EIR and the Draft Final AQMP it is intended to support.

7-2 cont.

We pointed out in our comments on the Draft 2016 AQMP that while the State SIP Strategy indicates that CARB estimated Further Deployment of Cleaner Technologies could reduce NOx emissions from aircraft in the District by 17tpd in 2023,[3] this value exceeded the total NOx emissions the District projected would be emitted by aircraft in 2023. As pointed out above, the District adopts this estimate in the Draft Final AQMP (as reflected in Table 4-4). However, the inventory accompanying the Draft Final AQMP now projects NOx emissions from aircraft in the District in 2023 will be 17.31tpd. *See* Draft Final AQMP, Attachment A. In other words, the Draft Final AQMP implies (as did the State SIP Strategy) that this measure will result in the virtual elimination of NOx emissions from aircraft in 2023. This is not possible. The Draft EIR provides no basis for assessing the actual impact this measure may have; in fact, it only muddles the issue as it provides an estimate of emissions reductions that differs from the estimate in the AQMP it is intended to support.

7-3

In short, these discrepancies render it impossible to provide meaningful comment on this aspect of the Draft EIR. In addition, the discrepancies indicate a more general lack of definition regarding the effect this measure may have on aircraft, raising doubts regarding the District's ability to properly assess potential impacts related to the measure.

7-4

In our comments on the Draft 2016 AQMP, we emphasized that it is absolutely essential that the State and its political subdivisions respect that they lack authority to regulate aircraft, aircraft engines and aviation fuels and face strict limitations on their authority to regulate the aviation sector generally. In this context, the reference to "mitigation fees" in the description of MOB-04

7-5

[3] State SIP Strategy, Table 4.

("Emissions Reductions at Airports") contained in Appendix A at A-125 is of concern. We will not repeat the comments presented on this subject in our comments on the Draft 2016 AQMP.[4] It is important to note, however, that the District makes no reference to "mitigation fees" in any other description of MOB-04 in either the Draft 2016 AQMP, Draft Final AQMP or Draft EIR and the District has not provided any discussion of the "mitigation fees" concept or any basis for evaluating their potential impact(s). As such, no adequate notice and opportunity for comment has been provided to support adoption of this concept and this Draft EIR cannot provide support for any future action to pursue such a concept. Indeed, MOB-04 is not sufficiently defined to enable a meaningful evaluation of its potential impacts, much less comments on such an evaluation. The Draft Final AQMP makes clear that any specific measures that may be generated through MOB-04 will only emerge after a future process to consider alternatives. The evaluation of the need for such alternatives could well depend on the effectiveness of other measures identified in the AQMP, including the Further Deployment of Cleaner Technologies measures discussed above, which themselves are ill-defined and speculative. In short, at present the MOB-04 measure is too ill-defined to support development of an EIR that adequately discloses potential impacts and this Draft EIR has not done so.

7-5 cont.

Finally, we note that the "Regulatory Setting" section of Chapter 3.6 addressing noise impacts fails to reference statutory and regulatory provisions strictly prohibiting state and local governments from adopting airport noise or access restrictions without approval by the Federal Aviation Administration ("FAA"), specifically the Airport Noise & Capacity Act of 1990 and Federal Code of Regulations, Title 14, Part 161 – Notice and Approval of Noise and Access Restrictions. This section also fails to identify Part 150 – Airport Noise Compatibility Planning and the role the FAA plays in approving airport noise analyses and associated noise compatibility programs. Any sufficient analysis would need to take these regulatory constraints on California and its local governments into account.

7-6

CONCLUSION

We appreciate the opportunity to comment on this Draft EIR. We continue to strive to improve on our strong environmental performance and contribute to the prosperity of California and its residents and, in that spirit, look forward to conferring with the District as it refines and finalizes the 2016 AQMP.

7-7

Sincerely yours,



Timothy A. Pohle
Senior Managing Director, Environmental Affairs

[4] We do incorporate our comments on the Draft 2016 AQMP by reference.

Responses to Comment Letter #7 – Airlines for America

Comment 7-1

On behalf of our members, Airlines for America® ("A4A")[1] thanks the South Coast Air Quality Management District ("SCAQMD" or "District") for providing this opportunity to comment on its Draft Program Environmental Impact Report - 2016 Air Quality Management Plan ("Draft EIR"). We note that we provided extensive comments on the Draft 2016 Air Quality Management Plan released in June 2016 ("Draft 2016 AQMP") and will provide further comment on the Revised Draft 2016 Air Quality Management Plan (the "Draft Final AQMP") as appropriate.

As we emphasized in our comments on the Draft 2016 AQMP, A4A and its member airlines have a very strong record of continually improving environmental performance while increasing our considerable contributions to the national and California economies. We also emphasized that we fully support the District's effort to develop its 2016 AQMP to attain compliance with National Ambient Air Quality Standards ("NAAQS") and its overall objective "[t]o ensure air quality goals will be met while maximizing benefits and minimizing adverse impacts to the regional economy."[2] We continue to support this effort and will look forward to working with District staff as they work to finalize and implement the AQMP.

Response 7-1

This is an introductory comment, which does not raise any issues regarding the Draft Program EIR and no response is necessary under CEQA.

Comment 7-2

However, we identified a number of concerns about the Draft 2016 AQMP, many of which do not appear to have been addressed in the latest revision, the Draft Final AQMP. In this context, we remain particularly concerned about the accuracy and transparency of the emissions inventory and the estimates of emission reductions expected to result from measures identified in the various documents supporting the AQMP, including the Draft EIR. The most recent estimates from both the California Air Resources Board ("CARB") and the District state that total reductions in emissions of oxides of nitrogen ("NOx") in the South Coast resulting from the "Further Deployment of Cleaner Technologies" measures applied to Off-Road Federal and International Sources will be 40 tons per day ("tpd) in 2023 and 30tpd in 2031. *See* Draft Final AQMP, Table 4-5 and the "Proposed New SIP Measures Handout" provided at CARB's September 1, 2016 public workshop on the Proposed 2016 State Strategy for the State Implementation Plan (available here: https://www.arb.ca.gov/planning/sip/2016sip/090116wkshp_handout.pdf). Both of these documents indicate that the Further Deployment of Cleaner Technologies measure will result in NOx reductions of 17tpd from aircraft, 10tpd from locomotives and 13tpd from ocean-going vessels (a total of 40tpd) in 2023 and of 13tpd from aircraft, 7tpd from locomotives and 10tpd from ocean-going vessels (a total of 30tpd) in 2031. This is not consistent with the estimate of emissions reductions identified in the Draft EIR. The Draft EIR identifies ORFIS-05, "Further Deployment of Cleaner Technology: Off-Road Federal and International Sources," as one of the measures in the State SIP Strategy. The Draft EIR describes this measure as "outlin[ing] a series of actions that would be taken at state and local level to achieve further reductions among three categories of off-road federal and international sources: ocean-going vessels, aircraft, and locomotives." Draft EIR at 2-51. Table 2.8-6 in the Draft EIR indicates that "expected emissions reductions" from this measure will be 13tpd NOx on 2023 and 10tpd NOx in 2031. *See also* Draft EIR, Appendix A, Table 1.9-4. There is thus a clear discrepancy between the estimates of NOx emissions reductions expected to result from Further Deployment of Cleaner Technologies by these federal sources provided in the Draft EIR and the State SIP Strategy and between the estimates provided in the Draft EIR and the Draft Final AQMP it is intended to support.

Response 7-2

The emissions inventory is updated as the AQMP is developed and new information is provided. For example, after the release of the Draft 2016 AQMP in June, aircraft emissions were revised, as SCAQMD staff received newer data reflecting SCAG's newest growth forecast. SCAQMD staff works to improve the emissions inventory so the most accurate data is included in the Final 2016 AQMP and submitted to U.S. EPA as part of the 2016 AQMP in compliance with CAA requirements.

The total NOx emission reductions of 40 TPD in 2023 and 30 TPD in 2031 the comment refers to are correct for the May version of CARB's State SIP Strategy. The emission reductions modelled for the attainment demonstration are taken from CARB's State SIP Strategy. However, the discrepancy between the expected emission reductions for ORFIS-05 in Table 2.8-6 and CARB's State SIP Strategy is because ORFIS-05 only includes the further deployment of cleaner technology from ocean-going vessels. The exclusion of further deployment of cleaner technology from aircraft and locomotives from the Table 2.8-6 does not change the conclusions in the 2016 AQMP or the Draft Program EIR. The further deployment of cleaner technology from aircraft and locomotives has not specifically been defined beyond what is described in CARB's State SIP Strategy.

There was a typo in CARB's State SIP Strategy document. The 2023 emission reductions associated with aircraft category is 11 TPD, not 17 TPD. This is reflected in the Draft Final 2016

AQMP and is reflected in the Final Program EIR. This revision does not worsen the potential air quality impacts, but would reduce the air quality benefit of the 2016 AQMP. The Draft Program EIR did not take credit for the emissions reductions which would occur as a result of implementation of the 2016 AQMP, therefore, this revision would not affect the conclusions and CEQA determination. Pursuant to CEQA Guidelines Section 15088.5, the comment does not raise any issues which would constitute "significant new information" because no new significant environmental impacts would result, there would be no substantial increase in the severity of an environmental impact requiring mitigation, no feasible new or different project alternatives or mitigation measures have been identified, and the public was not deprived of an opportunity for meaningful review and comment. The comment does not raise any issues which would trigger the need for recirculation.

Comment 7-3

> We pointed out in our comments on the Draft 2016 AQMP that while the State SIP Strategy indicates that CARB estimated Further Deployment of Cleaner Technologies could reduce NOx emissions from aircraft in the District by 17tpd in 2023,[3] this value exceeded the total NOx emissions the District projected would be emitted by aircraft in 2023. As pointed out above, the District adopts this estimate in the Draft Final AQMP (as reflected in Table 4-4). However, the inventory accompanying the Draft Final AQMP now projects NOx emissions from aircraft in the District in 2023 will be 17.31tpd. *See* Draft Final AQMP, Attachment A. In other words, the Draft Final AQMP implies (as did the State SIP Strategy) that this measure will result in the virtual elimination of NOx emissions from aircraft in 2023. This is not possible. The Draft EIR provides no basis for assessing the actual impact this measure may have; in fact, it only muddles the issue as it provides an estimate of emissions reductions that differs from the estimate in the AQMP it is intended to support.

Response 7-3

Please refer to Response 7-2 above.

Comment 7-4

> In short, these discrepancies render it impossible to provide meaningful comment on this aspect of the Draft EIR. In addition, the discrepancies indicate a more general lack of definition regarding the effect this measure may have on aircraft, raising doubts regarding the District's ability to properly assess potential impacts related to the measure.

Response 7-4

Please refer to Response 7-2 above.

Comment 7-5

> In our comments on the Draft 2016 AQMP, we emphasized that it is absolutely essential that the State and its political subdivisions respect that they lack authority to regulate aircraft, aircraft engines and aviation fuels and face strict limitations on their authority to regulate the aviation sector generally. In this context, the reference to "mitigation fees" in the description of MOB-04 ("Emissions Reductions at Airports") contained in Appendix A at A-125 is of concern. We will not repeat the comments presented on this subject in our comments on the Draft 2016 AQMP.[4] It is important to note, however, that the District makes no reference to "mitigation fees" in any other description of MOB-04 in either the Draft 2016 AQMP, Draft Final AQMP or Draft EIR and the District has not provided any discussion of the "mitigation fees" concept or any basis for evaluating their potential impact(s). As such, no adequate notice and opportunity for comment has been provided to support adoption of this concept and this Draft EIR cannot provide support for any future action to pursue such a concept. Indeed, MOB-04 is not sufficiently defined to enable a meaningful evaluation of its potential impacts, much less comments on such an evaluation. The Draft Final AQMP makes clear that any specific measures that may be generated through MOB-04 will only emerge after a future process to consider alternatives. The evaluation of the need for such alternatives could well depend on the effectiveness of other measures identified in the AQMP, including the Further Deployment of Cleaner Technologies measures discussed above, which themselves are ill-defined and speculative. In short, at present the MOB-04 measure is too ill-defined to support development of an EIR that adequately discloses potential impacts and this Draft EIR has not done so.
>
> [4] We do incorporate our comments on the Draft 2016 AQMP by reference.

Response 7-5

SCAQMD staff believes that working with the commenter and airport authorities, we can identify and quantify additional emission reductions from existing actions and future actions that are being implemented to improve operational efficiencies in aircraft operations (being taken by individual airlines) and by airport authorities. SCAQMD staff does not have any preconceived concepts for incentives and such concepts will be identified and developed through a public process. SCAQMD staff welcomes the commenter's participation in the process. The comment letter submitted on the 2016 AQMP referenced in the comment was responded to within the Response to Comments[1] document.

Proposed measure MOB-04 is seeking to identify actions to help achieve the emission reductions associated with the State Mobile Source Strategy "Further Deployment of Cleaner Technologies" measures for light-duty vehicles, off-road equipment, and federal and international sources. MOB-04 is proposing that the overall AQMP emission reductions to attain federal air quality standard be used as an initial goal to help identify additional emission reductions. SCAQMD staff will consider comments and input through the public process on identifying actions that result in additional emission reductions. The actions may be voluntary or regulatory in nature. Any future proposed regulatory action by the SCAQMD will be within its legal authority. The adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].)

[1] The referenced comment letter with responses is listed as Comment Letter Number 30 and is available on the internet at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/response-to-comments/2016-aqmp-rtc-2-of-4.pdf.

Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in light of the Program EIR. However, the implementation mechanism of the control measures (i.e. regulation or incentive or fee approach) does not affect the environmental analysis contained in the Draft Program EIR and the comment does not provide evidence to the contrary.

Comment 7-6

> Finally, we note that the "Regulatory Setting" section of Chapter 3.6 addressing noise impacts fails to reference statutory and regulatory provisions strictly prohibiting state and local governments from adopting airport noise or access restrictions without approval by the Federal Aviation Administration ("FAA"), specifically the Airport Noise & Capacity Act of 1990 and Federal Code of Regulations, Title 14, Part 161 – Notice and Approval of Noise and Access Restrictions. This section also fails to identify Part 150 – Airport Noise Compatibility Planning and the role the FAA plays in approving airport noise analyses and associated noise compatibility programs. Any sufficient analysis would need to take these regulatory constraints on California and its local governments into account.

Response 7-6

References to FAA regulations and authority were made throughout Subchapter 3.6, including Subchapters 3.6.2.1.3, 3.6.2.3, and 3.6.3.4.1 of the Draft Program EIR. SCAQMD staff will ensure that any future proposed regulatory action by the SCAQMD will be within its legal authority and will be in compliance with all FAA regulations.

Comment 7-7

> **CONCLUSION**
>
> We appreciate the opportunity to comment on this Draft EIR. We continue to strive to improve on our strong environmental performance and contribute to the prosperity of California and its residents and, in that spirit, look forward to conferring with the District as it refines and finalizes the 2016 AQMP.

Response 7-7

The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

long beach unified school district

BUSINESS DEPARTMENT – Facilities Development & Planning
2425 Webster Avenue, Long Beach, CA 90810
(562) 997-7550 Fax (562) 595-8644

November 07, 2016

Mr. Jeff Inabinet
Program Supervisor, CEQA
Planning, Rule Development, and Area Sources
21865 Coplay Drive
Diamond Bar, California 91765-4182
Transmitted via email: jinabinet@aqmd.gov

Re: Comments on the Draft Environmental Impact Report for the 2016 Air Quality Management Plan, SCAQMD, California

Dear Mr. Inabinet:

The Long Beach Unified School District (LBUSD) appreciates the opportunity to comment on the Draft Environmental Impact Report (DEIR) for the 2016 Air Quality Management Plan (2016 AQMP or Plan). We understand the Plan is a regional blueprint for achieving the federal air quality standards and healthful air, and that the South Coast Air Quality Management District (SCAQMD) is Lead Agency for the Project under the California Environmental Quality Act (CEQA).

BACKGROUND

The 2016 AQMP includes both stationary and mobile source strategies to ensure that rapidly approaching attainment deadlines are met, that public health is protected to the maximum extent feasible, and that the region is not faced with burdensome sanctions if the Plan is not approved or if the National Ambient Air Quality Standards (NAAQS) are not met on time. As noted in the draft Plan, the most significant air quality challenge in the Basin is to reduce nitrogen oxide (NOx) emissions sufficiently to meet the upcoming ozone standard deadlines. Since NOx emissions also lead to the formation of $PM_{2.5}$, the NOx reductions needed to meet the ozone standards will likewise lead to improvement of $PM_{2.5}$ levels and attainment of $PM_{2.5}$ standards.

8-1

GENERAL COMMENT

In addition to establishing high standards of academic excellence for its students, LBUSD is committed to providing a safe environment and school facilities for its students and employees. Thus, our primary concern in reviewing the DEIR – and the Plan -- is to ensure that potential environmental impacts to schools are appropriately identified, evaluated and mitigated.

SPECIFIC COMMENTS

Facility-Based Mobile Sources

Three "facility-based" mobile source control measures in the Plan seek to identify actions that will result in additional emission reductions at commercial marine ports, rail yards and intermodal facilities, and warehouse distribution centers to help meet the emission reductions associated with the State Mobile Source State Implementation Plan (SIP) Strategy "Further Deployment"

8-2

measures for on-road heavy-duty vehicles, off-road equipment, and federal and international sources:

- MOB-01 Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]
- MOB-02 Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]
- MOB-03 Emission Reductions at Warehouse Distribution Centers [All Pollutants].

We note that the recently revised draft Plan (dated October 7, 2016) includes revisions to proposed implementation start dates for these measures to 2019 from 2018). The implementation period is now identified as 2019 – 2031 for each measure.

Comment: A number of District school facilities are adjacent to and adversely affected by emissions from commercial marine ports, rail yards and intermodal facilities, and warehouse distribution centers. As such, the District encourages implementation of these proposed measures (MOB-01, MOB-02, and MOB-03) as expeditiously as possible.

8-2 cont.

On-Road Mobile Sources

The Plan identifies a range of "on-road" mobile source control measures, including the following:

- MOB-05 Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]
- MOB-06 Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]
- MOB-07 Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]
- MOB-08 Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]

Comment: District school facilities can be adversely affected by emissions from mobile sources of emissions, including Goods Movement sources. As such, the District encourages continuing and expeditious implementation of these proposed measures.

Air Pollution Impacts to Schools

The DEIR states (pp.1-18 and 1-27) "[I]mplementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites." The DEIR further states (p. 3.2-40) "[E]levated ozone levels are also associated with increased school absences." In addition, (p. 3.2-44) "[D]aily fluctuations in fine particulate matter concentration levels have also been related to hospital admissions for acute respiratory conditions, to school and kindergarten absences, to a decrease in respiratory function in normal children and to increased medication use in children and adults with asthma. Studies have also shown lung function growth in children is reduced with long-term exposure to particulate matter. In

8-3

addition to children, the elderly, and people with preexisting respiratory and/or cardiovascular disease appear to be more susceptible to the effects of PM_{10} and $PM_{2.5}$."

New and modified sources of toxic air contaminants in the SCAQMD are subject to Rule 1401 - New Source Review of Toxic Air Contaminants, and Rule 212 - Standards for Approving Permits. Rule 1401.1 – Requirements for New and Relocated Facilities Near Schools -- sets risk thresholds for new and relocated facilities near schools. The requirements are more stringent than those for other air toxics rules in order to provide additional protection to school children. In addition, Rule 212 requires notification of SCAQMD's intent to grant a permit to construct a significant project, defined as a new or modified permit unit located within 1000 feet of a school (a state law requirement under AB 3205), a new or modified permit unit posing a maximum individual cancer risk of one in one million (1×10^6) or greater, or a new or modified facility with criteria pollutant emissions exceeding specified daily maximums.

8-3 cont.

Comment: District school facilities can be adversely affected by emissions from stationary sources, including new and modified permitted sources of toxic air contaminants. As such, the District encourages continuing and expeditious implementation of the existing rules regarding risk thresholds for new or relocated facilities near schools and notification regarding SCAQMDs intent to permit projects within close proximity of new schools. The District agrees with the intent of the above rules but recommends that the rule(s) be modified to require risk thresholds and notifications be required for projects within 1,320 feet (1/4 mile), rather than 1,000 feet, of SCAQMD permitted uses, to be consistent with the State's school safety criteria as established in Education Code 17213(b) and California Code of Regulations, Title 5, 14010(q).

CONCLUSION

The District appreciates the opportunity to participate in the environmental review process. We look forward to working with the SCAQMD in a continuing review and assessment of impacts from implementation of the Project (Plan), and the development and implementation of effective measures to mitigate air pollution impacts to schools.

8-4

If you have any questions, please contact Dori Arbour at LBUSD at (714) 598-5456 or darbour@lbschools.net.

Sincerely,



Alan Reising – Executive Director, Facilities Development & Planning
Long Beach Unified School District
areising@lbschools.net

cc: Dori Arbour, Facilities Consultant Environmental Manager
PlaceWorks

Responses to Comment Letter #8 – Long Beach Unified School District

Comment 8-1

The Long Beach Unified School District (LBUSD) appreciates the opportunity to comment on the Draft Environmental Impact Report (DEIR) for the 2016 Air Quality Management Plan (2016 AQMP or Plan). We understand the Plan is a regional blueprint for achieving the federal air quality standards and healthful air, and that the South Coast Air Quality Management District (SCAQMD) is Lead Agency for the Project under the California Environmental Quality Act (CEQA).

BACKGROUND

The 2016 AQMP includes both stationary and mobile source strategies to ensure that rapidly approaching attainment deadlines are met, that public health is protected to the maximum extent feasible, and that the region is not faced with burdensome sanctions if the Plan is not approved or if the National Ambient Air Quality Standards (NAAQS) are not met on time. As noted in the draft Plan, the most significant air quality challenge in the Basin is to reduce nitrogen oxide (NOx) emissions sufficiently to meet the upcoming ozone standard deadlines. Since NOx emissions also lead to the formation of $PM_{2.5}$, the NOx reductions needed to meet the ozone standards will likewise lead to improvement of $PM_{2.5}$ levels and attainment of $PM_{2.5}$ standards.

GENERAL COMMENT

In addition to establishing high standards of academic excellence for its students, LBUSD is committed to providing a safe environment and school facilities for its students and employees. Thus, our primary concern in reviewing the DEIR – and the Plan – is to ensure that potential environmental impacts to schools are appropriately identified, evaluated and mitigated.

Response 8-1

This is an introductory comment, which does not raise any issues regarding the Draft Program EIR, therefore, no response is necessary under CEQA.

Comment 8-2

SPECIFIC COMMENTS

Facility-Based Mobile Sources

Three "facility-based" mobile source control measures in the Plan seek to identify actions that will result in additional emission reductions at commercial marine ports, rail yards and intermodal facilities, and warehouse distribution centers to help meet the emission reductions associated with the State Mobile Source State Implementation Plan (SIP) Strategy "Further Deployment" measures for on-road heavy-duty vehicles, off-road equipment, and federal and international sources:

- MOB-01 Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]
- MOB-02 Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]
- MOB-03 Emission Reductions at Warehouse Distribution Centers [All Pollutants].

We note that the recently revised draft Plan (dated October 7, 2016) includes revisions to proposed implementation start dates for these measures to 2019 from 2018). The implementation period is now identified as 2019 – 2031 for each measure.

Comment: A number of District school facilities are adjacent to and adversely affected by emissions from commercial marine ports, rail yards and intermodal facilities, and warehouse distribution centers. As such, the District encourages implementation of these proposed measures (MOB-01, MOB-02, and MOB-03) as expeditiously as possible.

On-Road Mobile Sources

The Plan identifies a range of "on-road" mobile source control measures, including the following:

- MOB-05 Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]
- MOB-06 Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]
- MOB-07 Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]
- MOB-08 Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]

Comment: District school facilities can be adversely affected by emissions from mobile sources of emissions, including Goods Movement sources. As such, the District encourages continuing and expeditious implementation of these proposed measures.

Response 8-2

SCAQMD staff will work expeditiously to implement the proposed control measures referenced in the comment. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 8-3

Air Pollution Impacts to Schools

The DEIR states (pp.1-18 and 1-27) "[I]mplementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites." The DEIR further states (p. 3.2-40) "[E]levated ozone levels are also associated with increased school absences." In addition, (p. 3.2-44) "[D]aily fluctuations in fine particulate matter concentration levels have also been related to hospital admissions for acute respiratory conditions, to school and kindergarten absences, to a decrease in respiratory function in normal children and to increased medication use in children and adults with asthma. Studies have also shown lung function growth in children is reduced with long-term exposure to particulate matter. In addition to children, the elderly, and people with preexisting respiratory and/or cardiovascular disease appear to be more susceptible to the effects of PM_{10} and $PM_{2.5}$."

New and modified sources of toxic air contaminants in the SCAQMD are subject to Rule 1401 - New Source Review of Toxic Air Contaminants, and Rule 212 - Standards for Approving Permits. Rule 1401.1 – Requirements for New and Relocated Facilities Near Schools -- sets risk thresholds for new and relocated facilities near schools. The requirements are more stringent than those for other air toxics rules in order to provide additional protection to school children. In addition, Rule 212 requires notification of SCAQMD's intent to grant a permit to construct a significant project, defined as a new or modified permit unit located within 1000 feet of a school (a state law requirement under AB 3205), a new or modified permit unit posing a maximum individual cancer risk of one in one million (1×10^6) or greater, or a new or modified facility with criteria pollutant emissions exceeding specified daily maximums.

Comment: District school facilities can be adversely affected by emissions from stationary sources, including new and modified permitted sources of toxic air contaminants. As such, the District encourages continuing and expeditious implementation of the existing rules regarding risk thresholds for new or relocated facilities near schools and notification regarding SCAQMDs intent to permit projects within close proximity of new schools. The District agrees with the intent of the above rules but recommends that the rule(s) be modified to require risk thresholds and notifications be required for projects within 1,320 feet (1/4 mile), rather than 1,000 feet, of SCAQMD permitted uses, to be consistent with the State's school safety criteria as established in Education Code 17213(b) and California Code of Regulations, Title 5, 14010(q).

Response 8-3

SCAQMD staff will work expeditiously and appreciates the recommendation in the comment. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 8-4

CONCLUSION

The District appreciates the opportunity to participate in the environmental review process. We look forward to working with the SCAQMD in a continuing review and assessment of impacts from implementation of the Project (Plan), and the development and implementation of effective measures to mitigate air pollution impacts to schools.

If you have any questions, please contact Dori Arbour at LBUSD at (714) 598-5456 or darbour@lbschools.net.

Response 8-4

SCAQMD staff looks forward to working with Long Beach Unified School District staff. The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

OCTA

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November 15, 2016

Ms. Jillian Wong
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: **Draft 2016 Air Quality Management Plan Program Environmental Impact Report**

Dear Ms. Wong:

The Orange County Transportation Authority (OCTA) appreciates the opportunity to provide comments on the Draft 2016 Air Quality Management Plan (AQMP) Program Environmental Impact Report. In addition, OCTA appreciates your diligent efforts to include a wide variety of stakeholders in your process as the 2016 AQMP is developed. In reviewing the Draft Program Environmental Impact Report (PEIR), OCTA identified several environmental impact areas that would benefit from additional clarification or further analysis prior to the certification of the Final AQMP Environmental Impact Report (EIR). These concerns are outlined in the discussion below.

9-1

As you know, the direct or indirect effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited to, the resources involved; physical changes; alterations of ecological systems; health and safety impacts caused by physical changes; and other aspects of the resource base, including water quality, public services, etc. Because the environmental analysis accompanying the AQMP is a Draft PEIR, the analysis is broad and often cannot calculate and quantify environmental impacts to the detail needed to make findings. Therefore, OCTA requests that further Califoria Environmental Quality Act (CEQA) analysis be conducted (whether by the Southern California Air Quality Management District {SCAQMD} or the California Air Resources Board {CARB}) related to the individual control measures as they undergo the rulemaking process. We specifically request a subsequent analysis of ORHD-04 – Advanced Clean Transit and EGM-01 – Emission Reductions from New Development and Redevelopment Projects.

9-2

Orange County Transportation Authority
600 South Main Street / P.O. Box 14184 / Orange / California 92863-1584 / (714) 560-OCTA (6282)

ORHD-04 - Advanced Clean Transit

The CARB's Advanced Clean Transit Regulation is included in the AQMP. This regulation is intended to ensure that nearly every heavy-duty vehicle operated in California in 2023 will meet the 2010 heavy-duty engine emission standard. However, even a highly aggressive full-fleet penetration of 2010-compliant engines would not provide sufficient nitrous oxide (NOx) reductions to attain the federal ozone standard in the timeframe required.

This proposed rulemaking also requires transit operators to replace their entire bus fleets with zero-emission technologies between 2018 and 2040. There is a significant investment required as a result of this measures for very little emission reductions (less than 200 pounds of NOx per day). The emission reduction calculations for this measure need to be provided along with the fleet inventory assumed and fleet turnover projected. Without critical inputs, OCTA is unable to replicate the emission reductions associated with this measure.

It appears that the Draft 2016 AQMP assumed that the South Coast region's fleet is comprised of 11,000 buses, each traveling approximately 16,000 miles per year. However, CARB's Mobile Source Strategy appears to assume the same 11,000 buses operating for the entire state. Please verify the fleet assumption for the draft AQMP. The documentation for this inventory, along with the assumed fleet mix, should also be provided and shown in the Final PEIR. Further, please clarify that SCAQMD or CARB intend on conducting a subsequent and more detailed CEQA analysis as part of this rulemaking process in the future.

Finally, please note that implementation of ORHD-04 may result in significant expenses to transit providers that could necessitate fare increase and/or reduced service. This could negatively impact low-income and environmental justice communities. These potential impacts should be addressed in the PEIR.

9-3

EGM-01 – Emission Reductions from New Development and Redevelopment Projects

This measure appears to be under the jurisdiction of the SCAQMD and has a tentative adoption date of 2017. Implementation would occur between the years 2018-2031. AQMD states that this measure "seeks to capture emission reduction opportunities during the project development phase and opportunities to enable greater deployment of zero and near-zero emission

9-4

technologies."[1] This language is vague, and the measure does not identify emission reductions, cost-effectiveness, affected entities, or legal authority. However, although lacking detail or specificity, the Draft PEIR has identified the following potential environmental impacts: Air quality, energy, hazards, water quality and solid waste.

OCTA requests more information on this measure, so that a thoughtful analysis can occur and comments can be submitted. Specifically, please describe what assumptions were used to make the impact determinations. If a working group is convened for this measure, OCTA respectfully requests inclusion to assist with the rule development process.

Emission reductions with this measure, and many others, are identified as "To Be Determined" (TBD), which makes it difficult to assess benefits and potential adverse environmental impacts. Given the lack of specificity with these TBD measures, please explain whether it is necessary to include them in the PEIR, or if it would be more appropriate to analyze them separately once they are more refined.

9-4 cont.

Air Quality Impacts

Potential air quality and greenhouse gas emissions were projected from the use of additional electricity and alternative fuels. As stated previously, the emissions analysis should be clearly quantified so that this information can be more easily reviewed and verified. OCTA is particularly interested in the details regarding the emissions calculated for ORHD-04 to better understand potential adverse impacts related to increased demand for electricity and alternative fuels.[2]

A significant decrease in fuel usage was accounted for based on the implementation of ORHD-04. Specifically, this decrease was estimated at 88,902,832 gallons per year by 2023 and 77,251,722 by 2031. Please explain or provide the assumptions and calculations that went into these figures. Further, the estimated increase in clean transit vehicles is listed at 11,000 by 2023 and 11,000 by 2031. If the inventory for the four-county Basin is actually estimated to be 11,000 transit buses, it is unclear why the turnover appears to be estimated at exactly double this figure. Please provide the assumptions and calculations that went into Table 4.1-5.[3]

9-5

[1] Draft Program EIR for the 2016 AQMP, page 2-27, October 2016.
[2] Draft Program EIR, Table 4.1-4, page 4.1-48, October 2016.
[3] Draft Program EIR, Table 4.1-5, page 4.1-52, October 2016.

Energy Impacts

Table 4.2-5 in the Draft PEIR evaluates potential energy impacts from the 2016 AQMP. ORHD-04 is shown as having a fleet of 11,000 buses within the South Coast region, each averaging 16,600 miles per year. It further assumes that this sector will need an additional 183 gigawatts (GW)/hour in 2023 and 183 GW/hour in 2031. Please, again, verify the fleet assumption and provide details for the energy consumption calculation. Also, please explain why this energy usage number is identical in 2023 and 2032. It seems unlikely that the fleet turnover and energy usage would be exactly the same for both years.[4] 9-6

ORHD-04 is included in an additional line item in Table 4.2-5. It indicates that ORHD-03, ORHD-04, ORHD-05, ORHD-06 and ORHD-08 will have a combined electricity usage of 1,909 GW/hour in 2023 and 4,067 GW/hour in 2031. Please clarify why ORHD-04 is being counted twice and what the difference is between the two line items for ORHD-04. 9-7

The natural gas sector under the Energy Impacts analysis has also identified ORHD-04 as creating an increase in demand. When explaining the fleet mix and assumptions, it would be helpful to know if a certain percentage of buses were assumed to turnover to electric engines versus natural gas. 9-8

Thank you once again for the opportunity to provide input on the Draft 2016 AQMP PEIR. Should you have any questions regarding the comments above, please contact Greg Nord, Principal Transportation Analyst, at 714-569-5885, or gnord@octa.net. 9-9

Sincerely,

Kia Mortazavi
Executive Director, Planning

KM:gn

[4] Draft Program EIR, Table 4.2-5, page 4.2-13, October 2016.

Responses to Comment Letter #9 – Orange County Transportation Authority

Comment 9-1

The Orange County Transportation Authority (OCTA) appreciates the opportunity to provide comments on the Draft 2016 Air Quality Management Plan (AQMP) Program Environmental Impact Report. In addition, OCTA appreciates your diligent efforts to include a wide variety of stakeholders in your process as the 2016 AQMP is developed. In reviewing the Draft Program Environmental Impact Report (PEIR), OCTA identified several environmental impact areas that would benefit from additional clarification or further analysis prior to the certification of the Final AQMP Environmental Impact Report (EIR). These concerns are outlined in the discussion below.

Response 9-1

This is an introductory comment, which does not raise any issues regarding the Draft Program EIR, therefore, no response is necessary under CEQA.

Comment 9-2

As you know, the direct or indirect effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited to, the resources involved; physical changes; alterations of ecological systems; health and safety impacts caused by physical changes; and other aspects of the resource base, including water quality, public services, etc. Because the environmental analysis accompanying the AQMP is a Draft PEIR, the analysis is broad and often cannot calculate and quantify environmental impacts to the detail needed to make findings. Therefore, OCTA requests that further Califoria Environmental Quality Act (CEQA) analysis be conducted (whether by the Southern California Air Quality Management District {SCAQMD} or the California Air Resources Board {CARB}) related to the individual control measures as they undergo the rulemaking process. We specifically request a subsequent analysis of ORHD-04 – Advanced Clean Transit and EGM-01 – Emission Reductions from New Development and Redevelopment Projects.

Response 9-2

As accurately noted in the comment, the adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Each of the projects, including rule development and amendment derived from the control measures, will undergo project-level CEQA analysis in the future, in light of the Program EIR.

Comment 9-3

ORHD-04 - Advanced Clean Transit

The CARB's Advanced Clean Transit Regulation is included in the AQMP. This regulation is intended to ensure that nearly every heavy-duty vehicle operated in California in 2023 will meet the 2010 heavy-duty engine emission standard. However, even a highly aggressive full-fleet penetration of 2010-compliant engines would not provide sufficient nitrous oxide (NOx) reductions to attain the federal ozone standard in the timeframe required.

This proposed rulemaking also requires transit operators to replace their entire bus fleets with zero-emission technologies between 2018 and 2040. There is a significant investment required as a result of this measures for very little emission reductions (less than 200 pounds of NOx per day). The emission reduction calculations for this measure need to be provided along with the fleet inventory assumed and fleet turnover projected. Without critical inputs, OCTA is unable to replicate the emission reductions associated with this measure.

It appears that the Draft 2016 AQMP assumed that the South Coast region's fleet is comprised of 11,000 buses, each traveling approximately 16,000 miles per year. However, CARB's Mobile Source Strategy appears to assume the same 11,000 buses operating for the entire state. Please verify the fleet assumption for the draft AQMP. The documentation for this inventory, along with the assumed fleet mix, should also be provided and shown in the Final PEIR. Further, please clarify that SCAQMD or CARB intend on conducting a subsequent and more detailed CEQA analysis as part of this rulemaking process in the future.

Finally, please note that implementation of ORHD-04 may result in significant expenses to transit providers that could necessitate fare increase and/or reduced service. This could negatively impact low-income and environmental justice communities. These potential impacts should be addressed in the PEIR.

Response 9-3
Comments regarding the Advanced Clean Transit regulation have been provided to CARB since the measure is part of the State Mobile Source Strategy. It is not the intent of the control measure to result in reduced service levels, but CARB has not released specific proposals for the rule amendment at this time. However, CARB has discussed concepts for a proposed regulation, which includes consideration of near-zero emission buses as a transition to zero-emission buses.

CARB's Mobile Source Strategy uses an 11,000 bus fleet for the entire state. Accordingly, the buses operating within the District would be a subset of this fleet. However, SCAQMD did not have an accurate subset to use at the time of the development of the 2016 AQMP, so therefore, the entire fleet was conservatively included. The fleet assumption in the Draft 2016 AQMP was not relied upon for the programmatic level analysis conducted in the Draft Program EIR. ORHD-04 is intended to be part of future rulemaking activities and the environmental impacts associated with the proposed rules or proposed rule amendments will be further evaluated at that time, in light of the Program EIR.

Comment 9-4

EGM-01 – Emission Reductions from New Development and Redevelopment Projects

This measure appears to be under the jurisdiction of the SCAQMD and has a tentative adoption date of 2017. Implementation would occur between the years 2018-2031. AQMD states that this measure "seeks to capture emission reduction opportunities during the project development phase and opportunities to enable greater deployment of zero and near-zero emission technologies."[1] This language is vague, and the measure does not identify emission reductions, cost-effectiveness, affected entities, or legal authority. However, although lacking detail or specificity, the Draft PEIR has identified the following potential environmental impacts: Air quality, energy, hazards, water quality and solid waste.

OCTA requests more information on this measure, so that a thoughtful analysis can occur and comments can be submitted. Specifically, please describe what assumptions were used to make the impact determinations. If a working group is convened for this measure, OCTA respectfully requests inclusion to assist with the rule development process.

Emission reductions with this measure, and many others, are identified as "To Be Determined" (TBD), which makes it difficult to assess benefits and potential adverse environmental impacts. Given the lack of specificity with these TBD measures, please explain whether it is necessary to include them in the PEIR, or if it would be more appropriate to analyze them separately once they are more refined.

[1] Draft Program EIR for the 2016 AQMP, page 2-27, October 2016.

Response 9-4
EGM-01 is intended to be part of future rulemaking activities and the environmental impacts associated with the proposed rules or proposed rule amendments will be further evaluated at that time, in light of the Program EIR. All assumptions used to make these determinations are discussed in Draft Program EIR Subchapters 4.1, 4.2, 4.3, 4.4, and 4.6, respectively.

The "TBD" (to be determined) measures require further technical and feasibility evaluations and the attainment demonstration is not dependent on these measures. However, they are included in the 2016 AQMP as part of a comprehensive plan with all feasible measures in case there is a possible need for additional measures and a shortfall in reductions. As emission reductions are realized and to the extent that the reductions can be SIP creditable, the reductions will be taken as part of future rate-of-progress reporting or as part of future AQMP revisions. For the SCAQMD TBD mobile source measures, emission reductions are accounted for under CARB's State SIP Strategy so emission reductions are not listed to avoid overlap. These emission reductions will take place locally and will be determined when the programs, such as facility-based measures, are implemented.

Comment 9-5

Air Quality Impacts

Potential air quality and greenhouse gas emissions were projected from the use of additional electricity and alternative fuels. As stated previously, the emissions analysis should be clearly quantified so that this information can be more easily reviewed and verified. OCTA is particularly interested in the details regarding the emissions calculated for ORHD-04 to better understand potential adverse impacts related to increased demand for electricity and alternative fuels.[2]

A significant decrease in fuel usage was accounted for based on the implementation of ORHD-04. Specifically, this decrease was estimated at 88,902,832 gallons per year by 2023 and 77,251,722 by 2031. Please explain or provide the assumptions and calculations that went into these figures. Further, the estimated increase in clean transit vehicles is listed at 11,000 by 2023 and 11,000 by 2031. If the inventory for the four-county Basin is actually estimated to be 11,000 transit buses, it is unclear why the turnover appears to be estimated at exactly double this figure. Please provide the assumptions and calculations that went into Table 4.1-5.[3]

[2] Draft Program EIR, Table 4.1-4, page 4.1-48, October 2016.
[3] Draft Program EIR, Table 4.1-5, page 4.1-52, October 2016.

Response 9-5

The potential emissions increases that could occur as a result of the additional use of electricity and alternative fuels from the mobile source control measures were not quantified because project-specific information is not known at this time. Therefore, they are analyzed programmatically in the Draft Program EIR. ORHD-04 is intended to be part of future rulemaking activities and environmental impacts associated with the proposed rules or proposed rule amendments will be further evaluated at that time, in light of the Program EIR. However, any increase in emissions attributable to an increased production of alternative fuels would be offset by reduced levels of petroleum fuel production and transportation of crude oil primarily from overseas and possibly by rail, as diesel and gasoline demand decreases. Similarly, the net effect of removing gasoline and diesel mobile sources is expected to have greater overall emission reduction benefits because emissions from electricity generation needed to power one electric vehicle are much less than the

combustion emissions from one gasoline or diesel vehicle, including for GHGs. In general, the 2016 AQMP mobile source control measures are expected to result in emission reductions.

The reduction in petroleum fuel usage shown in Table 4.1-5 was estimated based on the mobile source emissions model EMFAC2014 emissions for 2023 and 2031 and mobile source emissions model OFFROAD emissions for 2023 and 2029. The estimated increase of 11,000 clean transit vehicles by 2023 was estimated based on the funding estimates needed for the mobile source sector to attain the ozone NAAQS provided in Table 4-19 on page 4-68 of the Revised Draft 2016 AQMP. The addition of 11,000 clean transit vehicles in 2031 is a typographical error which has been corrected in the Draft Final 2016 AQMP and the Final Program EIR.

Comment 9-6

Energy Impacts

Table 4.2-5 in the Draft PEIR evaluates potential energy impacts from the 2016 AQMP. ORHD-04 is shown as having a fleet of 11,000 buses within the South Coast region, each averaging 16,600 miles per year. It further assumes that this sector will need an additional 183 gigawatts (GW)/hour in 2023 and 183 GW/hour in 2031. Please, again, verify the fleet assumption and provide details for the energy consumption calculation. Also, please explain why this energy usage number is identical in 2023 and 2032. It seems unlikely that the fleet turnover and energy usage would be exactly the same for both years.[4]

[4] Draft Program EIR, Table 4.2-5, page 4.2-13, October 2016.

Response 9-6

As stated in Response 9-5 above, the estimated increase of 11,000 clean transit vehicles by 2023 was estimated based on the funding estimates needed for the mobile source sector to attain the ozone NAAQS provided in Table 4-19 on page 4-68 of the Revised Draft 2016 AQMP. Footnote c to Table 4.2-5 describes the assumptions used to estimate the electricity impacts. The 183 GW-h estimate in 2031 is simply a carryover from the additional electricity demand from 2023, since the entire 11,000 busses estimate is accounted for in the 2023 figure.

Comment 9-7

ORHD-04 is included in an additional line item in Table 4.2-5. It indicates that ORHD-03, ORHD-04, ORHD-05, ORHD-06 and ORHD-08 will have a combined electricity usage of 1,909 GW/hour in 2023 and 4,067 GW/hour in 2031. Please clarify why ORHD-04 is being counted twice and what the difference is between the two line items for ORHD-04.

Response 9-7

The second reference to ORHD-04 was a typographical error. This has been corrected in the Final Program EIR.

Comment 9-8

> The natural gas sector under the Energy Impacts analysis has also identified ORHD-04 as creating an increase in demand. When explaining the fleet mix and assumptions, it would be helpful to know if a certain percentage of buses were assumed to turnover to electric engines versus natural gas.

Response 9-8

The potential energy impacts that could occur as a result of ORHD-04 was not quantified because project-specific information is not known at this time. Therefore, the energy impacts were analyzed programmatically in the Draft Program EIR and based on natural gas demand projections from the CEC as shown in Table 4.2-6 in the Draft Program EIR. ORHD-04 is intended to be part of future rulemaking activities and environmental impacts associated with the proposed rules or proposed rule amendments will be further evaluated at that time, in light of the Program EIR.

Comment 9-9

> Thank you once again for the opportunity to provide input on the Draft 2016 AQMP PEIR. Should you have any questions regarding the comments above, please contact Greg Nord, Principal Transportation Analyst, at 714-569-5885, or gnord@octa.net.

Response 9-9

The comment does not raise any issues specific to the analysis contained in the Draft Program EIR, therefore, no further response is necessary under CEQA.

CALIFORNIA Water Boards

EDMUND G. BROWN JR. GOVERNOR

MATTHEW RODRIQUEZ SECRETARY FOR ENVIRONMENTAL PROTECTION

Santa Ana Regional Water Quality Control Board

November 18, 2016

Mr. Jeff Inabinet
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

jinabinet@aqmd.gov

DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT, 2016 AIR QUALITY MANAGEMENT PLAN – SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT, DIAMOND BAR

Dear Mr. Inabinet:

Staff of the Santa Ana Regional Water Quality Control Board (Regional Board) has reviewed the Draft Program Environmental Impact Report (DPEIR) for the 2016 Air Quality Management Plan (AQMP) prepared by the South Coast Air Quality Management District (AQMD). This AQMP is the eleventh such regional plan to be issued since 1979, consistent with requirements of the 1976 Lewis Air Quality Act (which created the AQMD) and the federal Clean Air Act to incorporate updates of air quality standards and implementation measures to attain them. 10-1

The DPEIR provides an extensive, accurate review of the Regional Water Board goals and programs in its discussion of supply and water quality protection. The DPEIR evaluated the proposed comprehensive Project (the AQMP), and considered various components of several alternatives. However, because the DPEIR focuses only on certain air pollution control measures[1] that potentially affect water supply and quality, the document is insufficient in detailing whether or how the AQMP will address the topic of the potential for anthropogenic activities (some are listed below) to release air-borne pollutant particles that can adversely impact water bodies. The primary mechanism is dispersion of those particles, which are then absorbed or adsorbed into water at varying distances from the emission source. The distance over which different contaminants disperse would have 10-2

[1] Section 1.5.4, Hydrology and Water Quality, Subchapter 4.4 identified that implementing the control measures in the 2016 AQMP could potentially increase water demand and consequent wastewater discharges from an increase of treated wastewater at treatment plants, use of more waterborne coatings, and accidental releases from catalytic or non-catalytic reduction.

WILLIAM RUH, CHAIR | KURT V. BERCHTOLD, EXECUTIVE OFFICER

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RECYCLED PAPER

value in the regulation of boatyards, metal plating, and other industries. The addition of this information would greatly enhance the Water Boards' knowledge of these little-known impacts, and also more completely address water quality concerns in the DPEIR. 10-2 cont.

Water Quality Section 3.5.6 discusses point and nonpoint source pollution, but only mentions atmospheric deposition of metals (DPEIR p.3.5-33). Section 4.4, Hydrology and Water Quality mitigation measures (p.4.4.6), addresses contaminant spills to water bodies (reservoirs, channel beds, wetlands, nearshore environments, etc.) but again, the contaminant-water pollution link should be discussed for these situations. We recommend the DPEIR and AQMP address these data and information gaps, including the potential dispersal distances of air contaminants from the following likely sources to a water body: 10-3

- Applications or stripping of coatings for boats and other surfaces, including reformulated coatings, solvents, adhesives, and sealants containing VOCs;
- Metal emissions from plating, anodizing, and painting operations (p.2-42), with fugitive emissions to the air from nickel and copper plating prior to hexavalent chromium plating;
- Metal particulate emissions that can become airborne during the disturbance of soils contaminated with hexavalent chromium, lead, nickel, cadmium, and arsenic;
- Fumes from plasma/laser cutting of metals;
- Emissions from smelting, galvanizing, soldering, and other processing of molten metal;
- Lead and arsenic emissions from lead-acid battery recycling;
- Oil and gas field production well maintenance/stimulation;
- Return fluids from hydraulic fracturing;
- Fugitive silica dust from a variety of industrial actions;
- Heavy-duty vehicle engine emissions (primary diesel);
- Ammonia from greenwaste composting;
- Emissions from locomotives, ships and pleasure craft;
- Perchloroethylene emissions from dry cleaning operations;
- Spent batteries and disposed activated carbon; and we add,
- Atmospheric deposition from wind-borne air pollution from other countries (China, etc.).

If you have any questions, please contact Glenn Robertson at (951) 782-3259 or Glenn.Robertson@waterboards.ca.gov

10-4

Sincerely,

Wanda M Cross

Wanda M. Cross, Chief
Regional Planning Programs Section

Cc: State Clearinghouse
State Water Resources Control Board, Clean Water Programs Unit - Bill Orme

Responses to Comment Letter #10 – Santa Ana Regional Water Quality Control Board

Comment 10-1

Staff of the Santa Ana Regional Water Quality Control Board (Regional Board) has reviewed the Draft Program Environmental Impact Report (DPEIR) for the 2016 Air Quality Management Plan (AQMP) prepared by the South Coast Air Quality Management District (AQMD). This AQMP is the eleventh such regional plan to be issued since 1979, consistent with requirements of the 1976 Lewis Air Quality Act (which created the AQMD) and the federal Clean Air Act to incorporate updates of air quality standards and implementation measures to attain them.

Response 10-1

This is an introductory comment, which does not raise any issues regarding the Draft Program EIR, therefore, no response is necessary under CEQA.

Comment 10-2

The DPEIR provides an extensive, accurate review of the Regional Water Board goals and programs in its discussion of supply and water quality protection. The DPEIR evaluated the proposed comprehensive Project (the AQMP), and considered various components of several alternatives. However, because the DPEIR focuses only on certain air pollution control measures[1] that potentially affect water supply and quality, the document is insufficient in detailing whether or how the AQMP will address the topic of the potential for anthropogenic activities (some are listed below) to release air-borne pollutant particles that can adversely impact water bodies. The primary mechanism is dispersion of those particles, which are then absorbed or adsorbed into water at varying distances from the emission source. The distance over which different contaminants disperse would have value in the regulation of boatyards, metal plating, and other industries. The addition of this information would greatly enhance the Water Boards' knowledge of these little-known impacts, and also more completely address water quality concerns in the DPEIR.

[1] Section 1.5.4, Hydrology and Water Quality, Subchapter 4.4 identified that implementing the control measures in the 2016 AQMP could potentially increase water demand and consequent wastewater discharges from an increase of treated wastewater at treatment plants, use of more waterborne coatings, and accidental releases from catalytic or non-catalytic reduction.

Response 10-2

The adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Specific control measures will need to go through a rulemaking process in the future and environmental impacts associated with the proposed rules or proposed rule amendments will be further evaluated at that time, in light of the Program EIR.

SCAQMD staff is unaware of methodologies which would estimate the absorption or adsorption of air-borne PM into water at varying distances from the emission source. SCAQMD staff looks forward to working with Santa Ana RWQCB staff during the future rulemaking process to more completely address water quality concerns.

Comment 10-3

Water Quality Section 3.5.6 discusses point and nonpoint source pollution, but only mentions atmospheric deposition of metals (DPEIR p.3.5-33). Section 4.4, Hydrology and Water Quality mitigation measures (p.4.4.6), addresses contaminant spills to water bodies (reservoirs, channel beds, wetlands, nearshore environments, etc.) but again, the contaminant-water pollution link should be discussed for these situations. We recommend the DPEIR and AQMP address these data and information gaps, including the potential dispersal distances of air contaminants from the following likely sources to a water body:

- Applications or stripping of coatings for boats and other surfaces, including reformulatec coatings, solvents, adhesives, and sealants containing VOCs;
- Metal emissions from plating, anodizing, and painting operations (p.2-42), with fugitive emissions to the air from nickel and copper plating prior to hexavalent chromium platingı
- Metal particulate emissions that can become airborne during the disturbance of soils contaminated with hexavalent chromium, lead, nickel, cadmium, and arsenic;
- Fumes from plasma/laser cutting of metals;
- Emissions from smelting, galvanizing, soldering, and other processing of molten metal;
- Lead and arsenic emissions from lead-acid battery recycling;
- Oil and gas field production well maintenance/stimulation;
- Return fluids from hydraulic fracturing;
- Fugitive silica dust from a variety of industrial actions;
- Heavy-duty vehicle engine emissions (primary diesel);
- Ammonia from greenwaste composting;
- Emissions from locomotives, ships and pleasure craft;
- Perchloroethylene emissions from dry cleaning operations;
- Spent batteries and disposed activated carbon; and we add,
- Atmospheric deposition from wind-borne air pollution from other countries (China, etc.).

Response 10-3

The Draft Program EIR evaluates and addresses potential hydrology and water quality impacts that may be caused by the proposed control measures on a programmatic level. The 2016 AQMP proposes control measures which would reduce the emissions from the sources listed below. Therefore, it is anticipated that by reducing the emissions from these sources, there would be a corresponding reduction in the associated water quality impact from the existing baseline. The adverse environmental impacts from the Draft 2016 AQMP were analyzed programmatically and pursuant to CEQA Guidelines Section 15168(c), a Program EIR can be used with later activities. (*See Town of Atherton*, 228 Cal. App. 4th at 346-47 [holding that site-specific analysis must be examined in detail in a project-level EIR and that requiring such analysis at the program level would undermine the purpose of tiering and create a burdensome level of detail in the larger-scale program EIR].) Specific control measures will need to go through a rulemaking process in the future and environmental impacts associated with the proposed rules or proposed rule amendments will be further evaluated at that time, in light of the Program EIR. The sources listed in the comment are addressed below:

- Applications of stripping of coatings for boats and other surfaces, including reformulated coatings, solvent, adhesives, and sealants containing VOCs are currently regulated by a number of Rules under SCAQMD Regulation XI – Source Specific Standards, including but not limited to Rules 1104, 1106, 1106.1, 1107, 1113, 1115, 1122, 1124, 1125, 1126, 1128, 1129, 1132, 1136, 1141, 1141.1, 1141.2, 1143, 1144, 1145, 1151, 1162, 1163, 1164, 1168, and 1171. Details of these VOC-related Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts will undergo a project-level CEQA analysis at that time.

- Metal emissions from plating, anodizing, and painting operations are currently regulated by a number of Rules under SCAQMD Regulation XI – Source Specific Standards, including but not limited to Rules 1107 and 1144, and SCAQMD Regulation XIV – Toxics and Other Non-Criteria Pollutants, including but not limited to Rules 1426, 1469, and 1469.1. Details of Regulation XI Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi, and details of Regulation XIV Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xiv. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from metal emissions will undergo a project-level CEQA analysis at that time.

- Plasma/laser cutting is currently regulated in Rule 219 under Regulation II – Permits. Details of Regulation II Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-ii. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from plasma/laser cutting will undergo a project-level CEQA analysis at that time.

- Emissions from metal melting operations are currently regulated by several Rules under SCAQMD Regulation XIV – Toxics and Other Non-Criteria Pollutants, including but not limited to Rules 1407 and 1420.2. Details of Regulation XIV Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xiv. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from metal melting operations will undergo a project-level CEQA analysis at that time.

- Emissions from lead and arsenic emissions from lead-acid battery recycling operations are currently regulated under SCAQMD Regulation XIV – Toxics and Other Non-Criteria Pollutants, Rule 1420.1. Details of Rule 1420.1 can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xiv. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from lead-acid battery recycling operations will undergo a project-level CEQA analysis at that time.

- Emissions from oil and gas field production well maintenance/stimulation, as well as hydraulic fracturing fluids are currently regulated by several Rules under SCAQMD Regulation XI – Source Specific Standards, including but not limited to Rules 1148, 1148.1 and 1148.2. Details of Regulation XI Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from oil and gas field production well maintenance/stimulation, as well as hydraulic fracturing fluids, will undergo a project-level CEQA analysis at that time.

- Emissions from fugitive silica dust (from abrasive blasting) are currently regulated by Rule 1140 under SCAQMD Regulation XI – Source Specific Standards. Details of Regulation XI Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from fugitive silica dust will undergo a project-level CEQA analysis at that time.

- Emissions from heavy-duty vehicle engine emissions are currently regulated by Rules 1192, 1193, 1194, 1195, and 1196 under SCAQMD Regulation XI – Source Specific Standards. Details of Regulation XI Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from heavy-duty vehicle engine emissions (within SCAQMD authority) will undergo a project-level CEQA analysis at that time.

- Emissions from greenwaste composting are currently regulated by Rule 1133.3 under SCAQMD Regulation XI – Source Specific Standards. Details of Regulation XI Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from greenwaste composting will undergo a project-level CEQA analysis at that time.

- Emissions from locomotives are currently regulated by Rules 3501, 3502, and 3503 under SCAQMD Regulation XXXV – Railroads and Railroad Operations. Details of Regulation XXXV Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xxxv. The SCAQMD is currently in development of several rules that would apply to commercial marine ports that include proposed Rules 4001, 4010, and 4020. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from railroad, ship, or pleasure craft operations will undergo a project-level CEQA analysis at that time.

- Perchloroethylene emissions from dry cleaning operations are currently regulated by Rule 1102.1 under SCAQMD Regulation XI – Source Specific Standards. Details of Regulation XI Rules can be found online at the following location: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi. Any future rule development derived from the control measures that could potentially create hydrology/water quality impacts from dry cleaning operations will undergo a project-level CEQA analysis at that time.

- Please refer to Response 6-10 regarding a discussion on battery disposal. Please refer to Subchapter 4.6.4.2.1 of the Draft Program EIR for a full discussion on the disposal of activated carbon from control technologies.

- Wind-borne air pollution from other countries is out of the CEQA scope of analysis for the 2016 AQMP Draft Program EIR. No further response is necessary.

Comment 10-4

If you have any questions, please contact Glenn Robertson at (951) 782-3259 or Glenn.Robertson@waterboards.ca.gov

Response 10-4

This comment does not raise any issues regarding the Draft Program EIR, therefore, no response is necessary under CEQA.

From: Harvey Eder <harveyederpspc@yahoo.com>
Sent: Wednesday, November 16, 2016 12:00 AM
To: harveyederpspc@yahoo.com
Cc: harveyederpspc@yahoo.com
Subject: comments for all documents ref.ceqa ,aqmp 2016 and socio economics.Solar Now

lFrom Harvey Eder Ex. Dir. for self and PSPC Public Solar Power Coalition Nov. 15, 2016

More time is needed to work on commenting on the above

incorporated by reference is the entire record in 2013 SC116941 EDER et.a and the a[[eeelate case as well and everything said on the record etc

solar includes wind and water, This pro[osal includes floating solar and wind since some of this is con

Combined solar power pv and thermal with large tamks heat engine w.o combustion water tanks can be used after a big earthquake with seasonal storage in the ground as well as stratas in aquifers and earth due to confidental business inffformation.
the hox emissions will come down by 43 and 55 per cent by 23 and 31 respectfully this includes district heating and cooling systems these can all be done the new infrastructure program trump has thaked about water and sewerz etc,
solar thermal is 2 to 3 times more efficent, also this and all submittalsare in ther dealings with the comision and the Segs 11-1
solar energy generation about 400mw capacity
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there will be 20 million zev with lithum and other batteries that via tesla l battrtord thast were 500 dollars per kw capacoty kwh are now 400 dokkars per kwh that will soon be 300 dokkars a kwh and are estimated to go 50 percent by 2019 or 100 to150 dollars oe [er kwh

and IEA and IREn have info on solarrnargy and district solar heating and cooling sustems. so

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

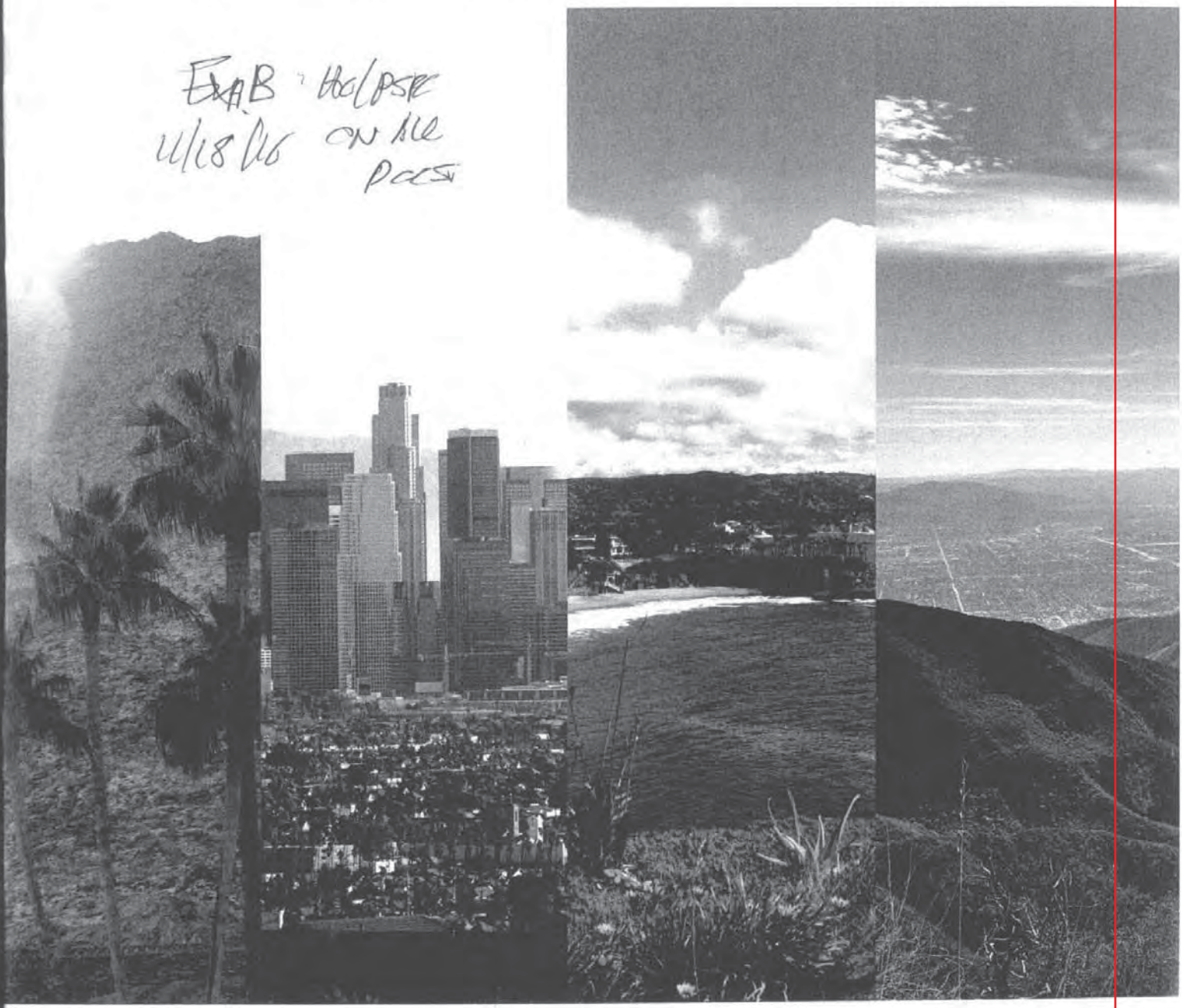
South Coast AQMD

Draft Program Environmental Impact Report

11-2

2016 AIR QUALITY MANAGEMENT PLAN

EXAB 11/18/16 HG/PSR ON ALL POCS



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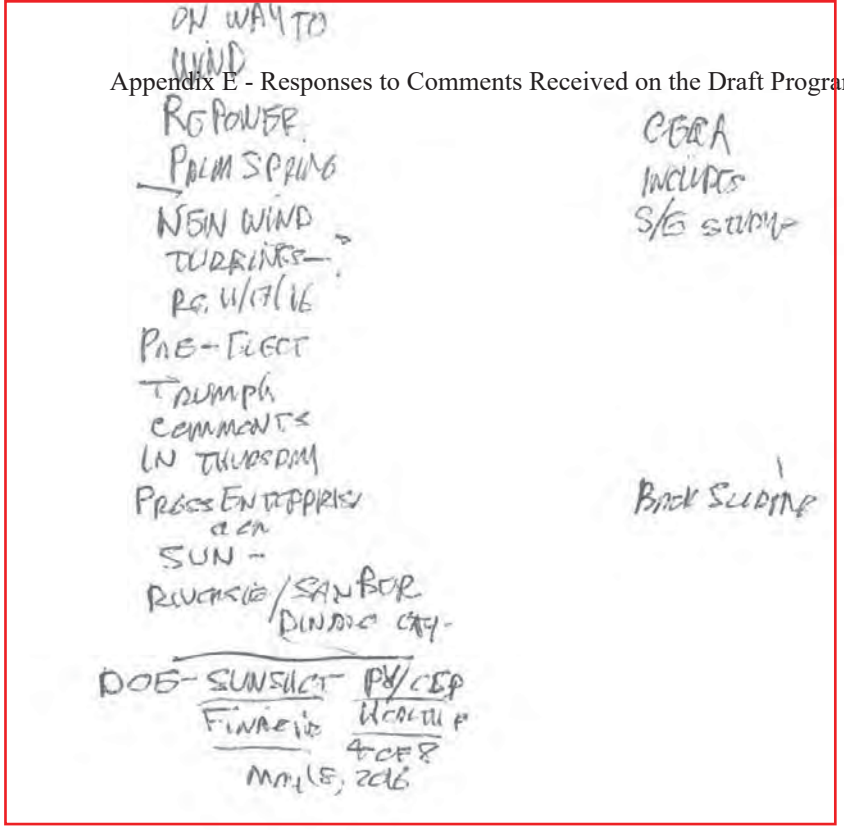

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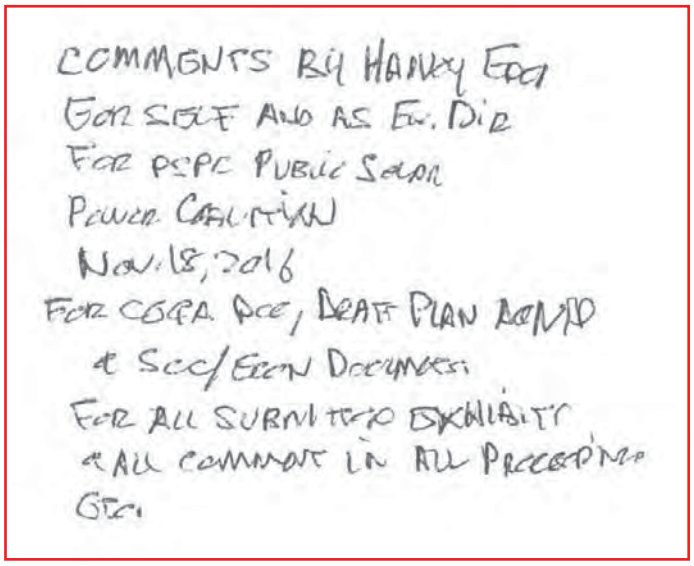
S/E STUDY

BACK SLIDING

DOE — SUNSHOT PV/CSP
FINANCIAL HEALTH
4 OF 8
MAY 18, 2016

11-3

COMMENTS BY HANCY EDO
FOR SELF AND AS EX. DIR
FOR PSPC PUBLIC SOLAR
POWER COALITION
NOV. 18, 2016
FOR CEQA DOC, DRAFT PLAN AQMD
& SCC/ECON DOCUMENTS
FOR ALL SUBMITTED EXHIBITS
& ALL COMMENT IN ALL PROCEEDINGS
ETC.



11-4

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NORM INGRAHAM
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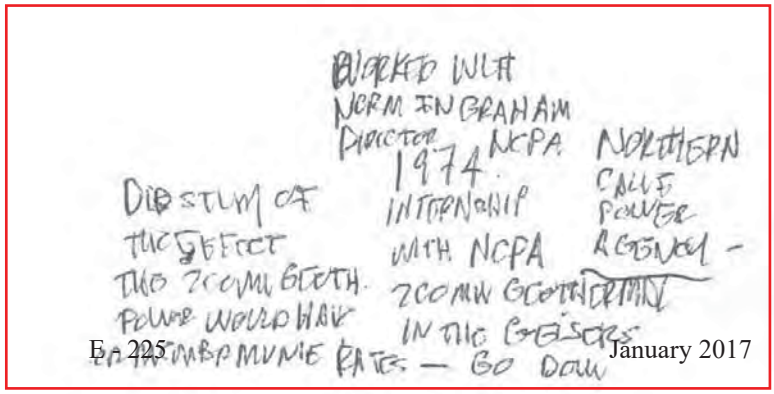


11-5

6.0 INTRODUCTION

This Program EIR provides a discussion of alternatives to the proposed project as required by CEQA. Pursuant to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project but would avoid or substantially lessen any of the significant effects of the project, and provide means for evaluating the comparative merits of each alternative (CEQA, Guidelines, §15126.6(a)). In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines, §15126.6(f)(3).

6.1 METHODOLOGY FOR DEVELOPING PROJECT ALTERNATIVES

The alternatives typically included in CEQA documents for proposed SCAQMD rules, regulations, or plans are developed by breaking down the project into distinct components (e.g., emission limits, compliance dates, applicability, exemptions, pollutant control strategies, etc.) and varying the specifics of one or more of the components. Different compliance approaches that generally achieve the objectives of the project may also be considered as project alternatives.

11-6

The 2016 AQMP identifies control measures and strategies to demonstrate that the region will: (1) attain the revoked 1997 8-hour ozone standard (80 ppb) by 2023; (2) attain the 2008 8-hour ozone standard (75 ppb) by 2032; (3) attain the 2012 annual PM2.5 standard (12 ug/m3) by 2025; (4) attain the 2006 24-hour PM2.5 standard (35 ug/m3) by 2019; and (5) attain the revoked 1979 1-hour ozone standard (120 ppb) by 2022. The 2016 AQMP also discusses the recently adopted new federal 8-hour ozone standard (70 ppb), as well as incorporates toxics, climate change, energy, transportation, goods movement, infrastructure and other planning efforts that affect future air quality.

The proposed attainment strategy focuses on reduction of ozone precursors (NOx and VOC), direct PM2.5, and PM2.5 precursors (NOx). NOx emissions lead to the formation of both ozone and PM2.5. Therefore, the most significant air quality challenge faced by the SCAQMD is to reduce NOx emissions sufficiently to meet the upcoming ozone and PM2.5 federal standard deadlines. The 2016 AQMP analyses indicate that an additional 43 percent NOx emission reduction is needed by 2023 and 55 percent is needed by 2031 to attain the 8-hour ozone standard. The majority of NOx emission reductions are expected to come from mobile sources.

The possible alternatives to the proposed 2016 AQMP are limited by the nature of the project. For example, the SCAQMD is required to prepare a PM2.5 and ozone AQMP that demonstrates attainment of the federal ambient air quality standards by applicable dates. The magnitude of emission reductions needed for the attainment of these NAAQS requires an aggressive mobile source control strategy supplemented with focused, strategic stationary source control measures and close collaboration with federal, state, and regional governments, local agencies, businesses, and the public.

Further, 2016 AQMP control measures are developed to achieve the maximum emission reduction potential that is technically feasible and cost-effective. Because, the 2016 AQMP includes all feasible control measures identified as part of the AQMP development process and control measures reflect the maximum emission reduction potential, it is difficult to develop alternatives that would still achieve the project objectives, including attaining the federal ozone and PM2.5 standard, but are substantially different than the 2016 AQMP.

11-7

In spite of the limitations identified above with regard to developing project alternatives, similar to previous AQMP Program EIRs, alternatives to the 2016 AQMP focus on emphasizing different pollutant control strategies. For example, alternatives could rely more only on regulation only versus greater reliance on incentive funding and mobile source control measures. Ultimately, all project alternatives must demonstrate attainment of the federal ozone and PM2.5 standards.

11-8

Development of the ozone and PM2.5 attainment control strategy relies on baseline emissions specified by the emissions inventory of all emissions sources in the Basin. The federal CAA §172(c)(3) requires all plan [AQMP] submittals to include a comprehensive, accurate, and current inventory of actual emissions from all sources of the relevant pollutant(s). To fulfill the intent of this requirement, the year 2012 was selected as the baseline year for analyzing the effectiveness of 2016 AQMP control measures in attaining the ozone and PM2.5 standard. Typically, the existing setting is established at the time the NOP/IS is circulated for public review, which was July 2016. This baseline is used for all environmental topics analyzed in this Program EIR.

6.2 ALTERNATIVES REJECTED AS INFEASIBLE

In accordance with CEQA Guidelines §15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Section 15126.6(c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives; (2) infeasibility; or (3) inability to avoid significant environmental impacts.

11-9

As noted in Section 6.2, the range of feasible alternatives to the 2016 AQMP is limited by the nature of the proposed project and associated legal requirements. Similarly, the range of alternatives considered, but rejected as infeasible is also relatively limited. The following subchapters identify six potential alternatives to the 2016 AQMP that were rejected for the reasons explained in each subchapter.

6.2.1 NO PROJECT ALTERNATIVE – NO FURTHER ACTION

CEQA documents typically assume that the adoption of a no project alternative would result in no further action on the part of the project proponent or Lead Agency. For example, in the case of a proposed land use project such as a housing development, adopting the No Project Alternative terminates further consideration of that housing development or any housing development alternative identified in the associated CEQA document. In that case, the existing setting would typically remain unchanged.

11-10

The concept of taking no further action (and thereby leaving the existing setting intact) by adopting a No Project Alternative does not readily apply to an update of an already adopted and legally mandated plan such as the AQMP. Adopting a no project alternative for an update to the AQMP does not imply that no further action will be taken (i.e., halting implementation of the existing AQMP). The federal and state Clean Air Acts require the SCAQMD to revise and implement the AQMP in order to attain all applicable ozone and PM2.5 state and national ambient air quality standards. A no further action No Project Alternative in the case of the AQMP is not a legally viable alternative. Consequently, the No Project Alternative presented in this Program EIR is the continued implementation of the 2012 AQMP. Continued implementation of the 2012 AQMP without additional reduction measures would not be a feasible alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates, as explained above. However, continued implementation of the 2012 AQMP as the No Project Alternative (see Section 6.3.1 below) is consistent with CEQA guidelines §15126.6(e)(2) (italics added):

11-11

"The 'no project' analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, *as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services…*"

It should be noted that, except for air quality, there would be no further incremental impacts on the existing environment if no further action is taken. Although there are existing rules that may have future compliance dates, potential adverse impacts from these rules have already been evaluated in the Final Program EIR for the 2012 AQMP and subsequent rule-specific CEQA documents. Air quality would continue to improve to a certain extent, but it is unlikely that all state or federal ozone standards would be achieved as required by the federal and California CAAs.

6.2.2 FULL SOLAR CONVERSION ONLY

11-12

Under this alternative, all electricity would be generated by solar power. Public comments provided on the 2016 AQMP and NOP/IS (Appendix B) have requested that the alternative of complete solar power be evaluated.

11-13

Under this alternative, electricity would be generated by the construction and operation of additional solar generating systems. Some of these would be expected to be on existing housing, structures, and buildings. However, the amount of electricity that would need to be generated would require new large solar installations, which have generally been placed in the desert areas of California (CEC, 2016g), due to the large demand for land that is required. In 2015, solar thermal facilities generated a total of 14,953 gigawatt-hours or about 7.64 percent of the state's total electricity production (CEC, 2016g). Therefore, the state would need a significant increase in the construction and operation of additional solar generating systems.

While the solar technology has made great advances in recent years, there are still a number of existing concerns regarding the reliability and transmission of solar power. Large solar installations have been located in the desert portions of the state. As such, transmission lines that connect solar installations to the more populated portions of the state are not currently available.

Further, electricity would only be generated when the sun was out. While this is common in California, there are times when it is cloudy, rainy or night time when electricity would not be produced. So some type of electricity storage system may be required. The technology for large battery backup systems has not yet been developed which would mean that there would still be a requirement for natural gas-generated electricity. Therefore, full solar conversion is not feasible at this time.

A full solar alternative would result in a number of additional potentially significant environmental impacts than the current proposed AQMP strategy. This alternative would require the conversion of large portion of presumably desert habitat to industrial facilities, resulting in potentially significant impacts to aesthetics (impacts to visual character and glare), biological impacts (destruction of native habitats for rare and endangered species such as the desert tortoise), cultural impacts, land use impacts (conversion of native habitat to industrial land uses), additional air, noise, and traffic impacts associated with construction activities, and other similar impacts.

Finally, converting to full solar is an ambitious goal that has future possibilities. A full solar alternative to the 2016 AQMP would not result in sufficient emission reductions to assure attainment of the federal or state ozone standards. As discussed in Chapter 4.1.5, the carrying capacities (the maximum allowable NOx emissions to meet ozone standards) are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Elimination of natural gas-fired electricity power plants would not result in sufficient emission reductions to comply with ozone standards. Therefore, a full solar alternative would not achieve the primary objective of the proposed project to demonstrate attainment of the federal or state standards for ozone. For this reason, the alternative is considered to be infeasible at this time.

6.2.3 HEAVY VOC REDUCTION STRATEGY

The Heavy VOC Reductions Alternative scenario would aim to implement more VOC emission reductions to achieve ozone attainment, as opposed to the current 2016 AQMP strategy which focuses on NOx emission reductions. NOx levels would be held at or nearly constant and attainment would be dependent upon the reduction of VOC emissions, primarily in the areas of cleaner mobile sources, consumer products and lower VOC solvents. The VOC heavy approach is technically more uncertain, because it would require technology breakthrough in formulations of solvents or consumer products, which are not currently available. One result of the strategy may be the development of potentially new toxic formulations; however, replacement of solvents with low VOC formulations tends to be less toxic than conventional solvents.

Table 6.2-1 shows the limited feasible VOC control measures that have been identified as part of the 2016 AQMP. The VOC emission reductions currently total about 7-10 tons per day. Under this alternative, significant additional VOC emissions reductions would be required. Sufficient feasible VOC emission reductions are not available to demonstrate compliance with the ozone ambient air quality standards because there is a limited number of VOC sources and limited number of feasible VOC emission reductions. As a matter of fact, the ozone isopleths[1] for the two

[1] April 2016 AQMP Advisory Group Meeting #9 – http://www.aqmd.gov/docs/default-source/Agendas/aqmp/advisory9-item2.pdf (Slides 7-8)

Public Solar Power Coalition – Harvey Eder

The commentator provided printed copies of the following series of published papers. Since these papers are copyrighted materials (e.g. published papers or books), these copyrighted materials are not reprinted here, and instead, we are providing a list of the papers received, and links to websites where such materials may be available for viewing and download.

- ≠ Power to the People (William Bradley, December 2001)
- ≠ Home Investment Partnerships Program (U.S. Department of Urban Housing and Development, 2016)
- ≠ The California Energy Crisis, (Los Angeles Times, February 2001)
- ≠ Taken for a Ride (New Day Films, 1996)
- ≠ General Motors Streetcar Conspiracy (Wikipedia)
- ≠ Incorporating Emerging and Voluntary Measures in a State Implementation Plan (SIP) (U.S. Environmental Protection Agency, September 2004)
- ≠ Guidance on State Implementation Plan (SIP) Credits for Emissions Reductions from Electric-Sector Energy Efficiency and Renewable Energy Measures (U.S. EPA, August 2004)
- ≠ Control Techniques for Nitrogen Oxides Emissions from Stationary Sources – Second Edition (U.S. EPA, January 1978 - Cover to page 25 was provided)

Responses to Comment Letter #11 – Harvey Eder
(Note that this is also listed as Comment Letter #98[1] on the 2016 AQMP)

Comment 11-1

lFrom Harvey Eder Ex. Dir. for self and PSPC Public Solar Power Coalition Nov. 15, 2016

More time is needed to work on commenting on the above

incorporated by reference is the entire record in 2013 SC116941 EDER et.a and the a[[eeelate case as well and everything said on the record etc

solar includes wind and water, This pro[osal includes floating solar and wind since some of this is con

Combined solar power pv and thermal with large tamks heat engine w.o combustion water tanks can be used after a big earthquake with seasonal storage in the ground as well as stratas in aquifers and earth due to confidental business infffformation.
the hox emissions will come down by 43 and 55 per cent by 23 and 31 respectfully this includes district heating and cooling systems these can all be done the new infrastructure program trump has thaked about water and sewerz etc,
solar thermal is 2 to 3 times more efficent, also this and all submittalsare in ther dealings with the comision and the Segs
solar energy generation about 400mw capacity
the 8 may 18 this yr are in the record there will be 10 million solar zev were in the here and above all is incirperateeeeeeeeeeeeeeeeeeeeeeeed
by reference tkhere is ahistiry of lit going back Materials on drug resistant ie super bugs 77770 per cent of anti biotice are used for farm animmmmals
there has been a series of articles on this on the record s10s 100000 deaths per yr to the mbte of the thousands od deaths
in deceptoively called renewabke natlural gas Al baeq working on BACT the hand scode says the district nust work ion BACT ASBAET BACRT deadky gas iv=boit 19 yrs ago
there will be 20 million zev with lithum and other batteries that via tesla l battrtord thast were 500 dollars per kw capacoty kwh are now 400 dokkars per kwh that will soon be 300 dokkars a kwh and are estimated to go 50 percent by 2019 or 100 to150 dollars oe [er kwh

and IEA and IREn have info on solarrnargy and district solar heating and cooling sustems. so

Response 11-1

The foreseeable environmental impacts associated with the 2016 AQMP control measures were fully analyzed in the Draft Program EIR. The use of renewable energy, such as solar, wind, and water has been committed to by the state and the 2016 AQMP seeks to compliment those efforts by accelerating the deployment of cleaner vehicles, such as electric, which would reduce emissions.

This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

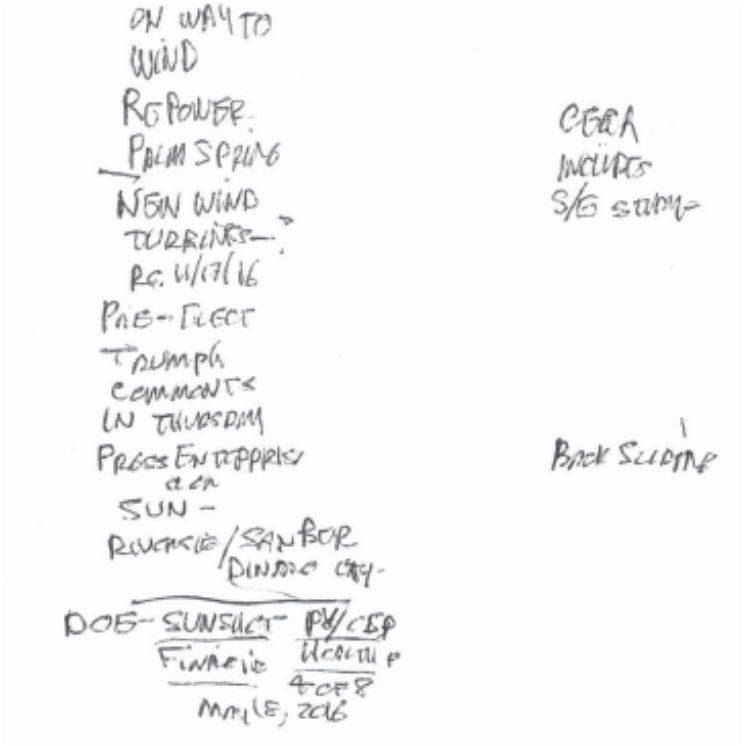
Comment 11-2

This comment is a reproduction of the cover page of the Draft Program EIR.

[1] Available on the internet at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/response-to-comments/2016-aqmp-rtc-4-of-4.pdf.

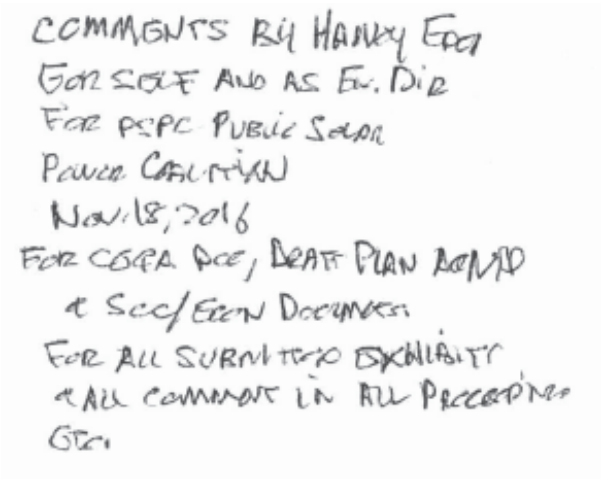
Response 11-2
The comment includes the commenters name and the date. This comment does not provide specifics regarding the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 11-3



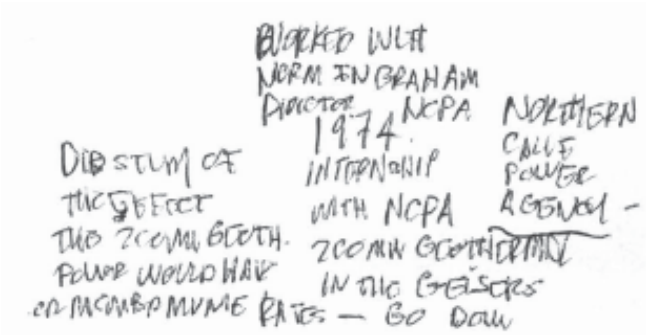
Response 11-3
This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-4



Response 11-4
This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-5



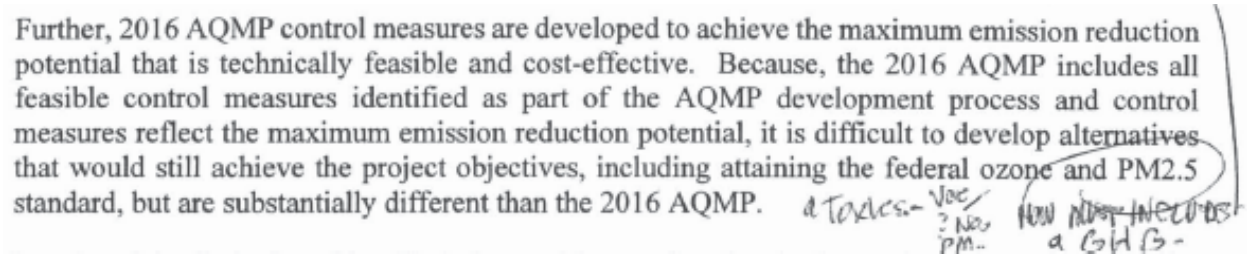
Response 11-5
This comment does not provide specifics regarding the Draft Program EIR, therefore, no further response is necessary under CEQA.

Comment 11-6

This comment is a reproduction of Page 6-1 of the Draft Program EIR.

Response 11-6
This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-7



Response 11-7
The environmental impacts regarding air toxics and GHG emissions was included in Subchapter 4.1 of the Draft Program EIR. This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-8

In spite of the limitations identified above with regard to developing project alternatives, similar to previous AQMP Program EIRs, alternatives to the 2016 AQMP focus on emphasizing different pollutant control strategies. For example, alternatives could rely more only on regulation only versus greater reliance on incentive funding and mobile source control measures. Ultimately, all project alternatives must demonstrate attainment of the federal ozone and PM2.5 standards.

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Response 11-8

The environmental impacts regarding PM2.5 emissions was included in Subchapter 4.1 of the Draft Program EIR. This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-9

6.2 ALTERNATIVES REJECTED AS INFEASIBLE

In accordance with CEQA Guidelines §15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Section 15126.6(c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives; (2) infeasibility; or (3) inability to avoid significant environmental impacts.

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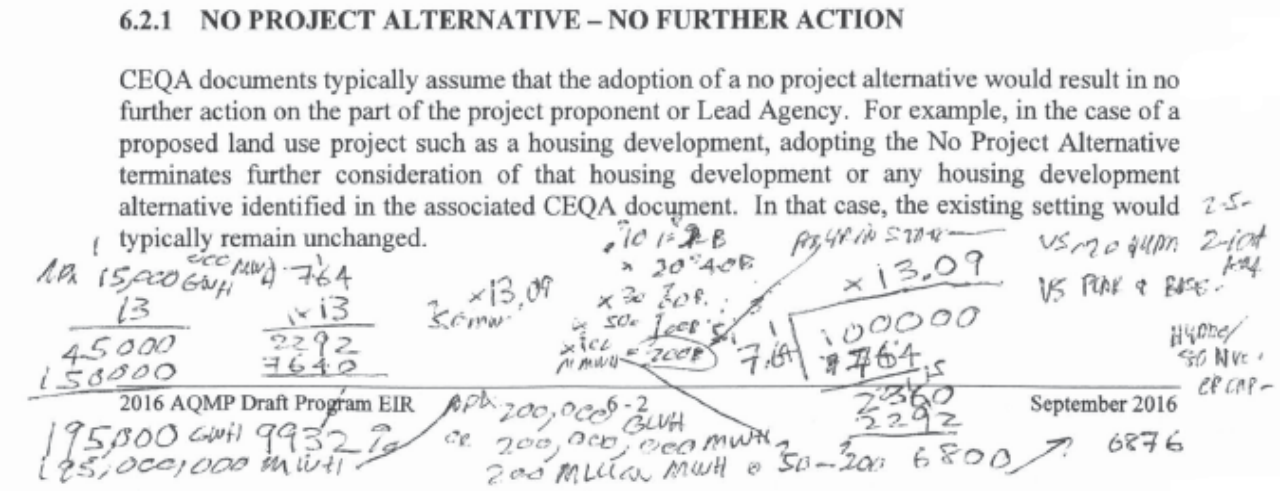
Response 11-9

This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-10



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2016 AQMP Draft Program EIR September 2016

Response 11-10

This comment includes numbers and calculations. However, no specifics regarding the analysis in the Draft Program EIR are provided. Therefore, no further response is necessary under CEQA.

Comment 11-11

The concept of taking no further action (and thereby leaving the existing setting intact) by adopting a No Project Alternative does not readily apply to an update of an already adopted and legally mandated plan such as the AQMP. Adopting a no project alternative for an update to the AQMP does not imply that no further action will be taken (i.e., halting implementation of the existing AQMP). The federal and state Clean Air Acts require the SCAQMD to revise and implement the AQMP in order to attain all applicable ozone and PM2.5 state and national ambient air quality standards. A no further action No Project Alternative in the case of the AQMP is not a legally viable alternative. Consequently, the No Project Alternative presented in this Program EIR is the continued implementation of the 2012 AQMP. Continued implementation of the 2012 AQMP without additional reduction measures would not be a feasible alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates, as explained above. However, continued implementation of the 2012 AQMP as the No Project Alternative (see Section 6.3.1 below) is consistent with CEQA guidelines §15126.6(e)(2) (italics added):

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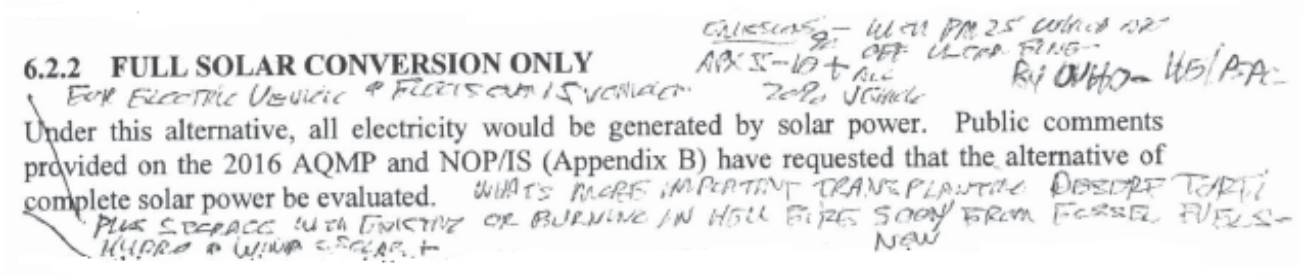
Response 11-11
This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-12

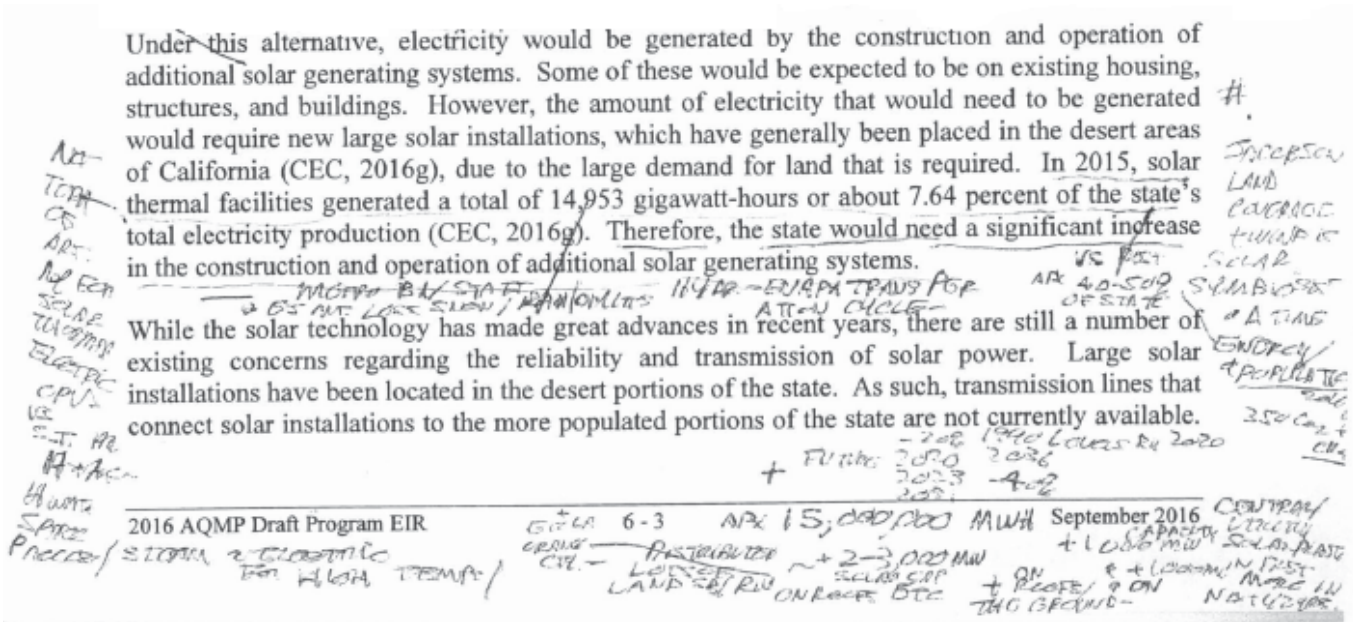


6.2.2 FULL SOLAR CONVERSION ONLY

Under this alternative, all electricity would be generated by solar power. Public comments provided on the 2016 AQMP and NOP/IS (Appendix B) have requested that the alternative of complete solar power be evaluated.

Response 11-12
The biological impacts from implementation of the 2016 AQMP were discussed in the NOP/IS (Appendix A), with a finding that no impacts would result; therefore, this topic area was not further analyzed in the Draft Program EIR. The air quality impacts were analyzed in Subchapter 4.1 of the Draft Program EIR and the energy impacts were analyzed in Subchapter 4.2 of the Draft Program EIR. This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-13

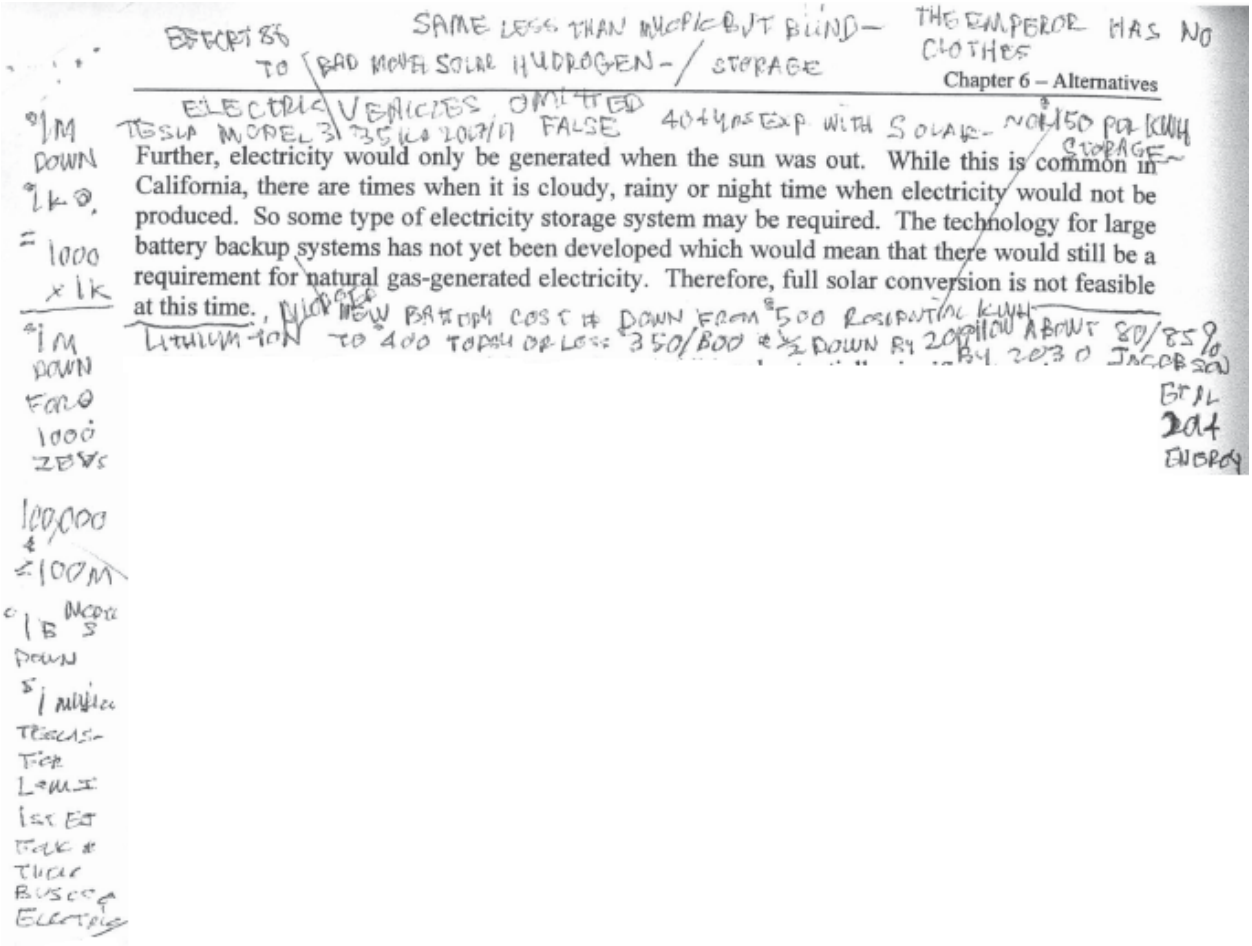


Under this alternative, electricity would be generated by the construction and operation of additional solar generating systems. Some of these would be expected to be on existing housing, structures, and buildings. However, the amount of electricity that would need to be generated would require new large solar installations, which have generally been placed in the desert areas of California (CEC, 2016g), due to the large demand for land that is required. In 2015, solar thermal facilities generated a total of 14,953 gigawatt-hours or about 7.64 percent of the state's total electricity production (CEC, 2016g). Therefore, the state would need a significant increase in the construction and operation of additional solar generating systems.

While the solar technology has made great advances in recent years, there are still a number of existing concerns regarding the reliability and transmission of solar power. Large solar installations have been located in the desert portions of the state. As such, transmission lines that connect solar installations to the more populated portions of the state are not currently available.

Response 11-13
The air quality impacts were analyzed in Subchapter 4.1 of the Draft Program EIR, and the energy impacts were analyzed in Subchapter 4.2 of the Draft Program EIR. This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-14

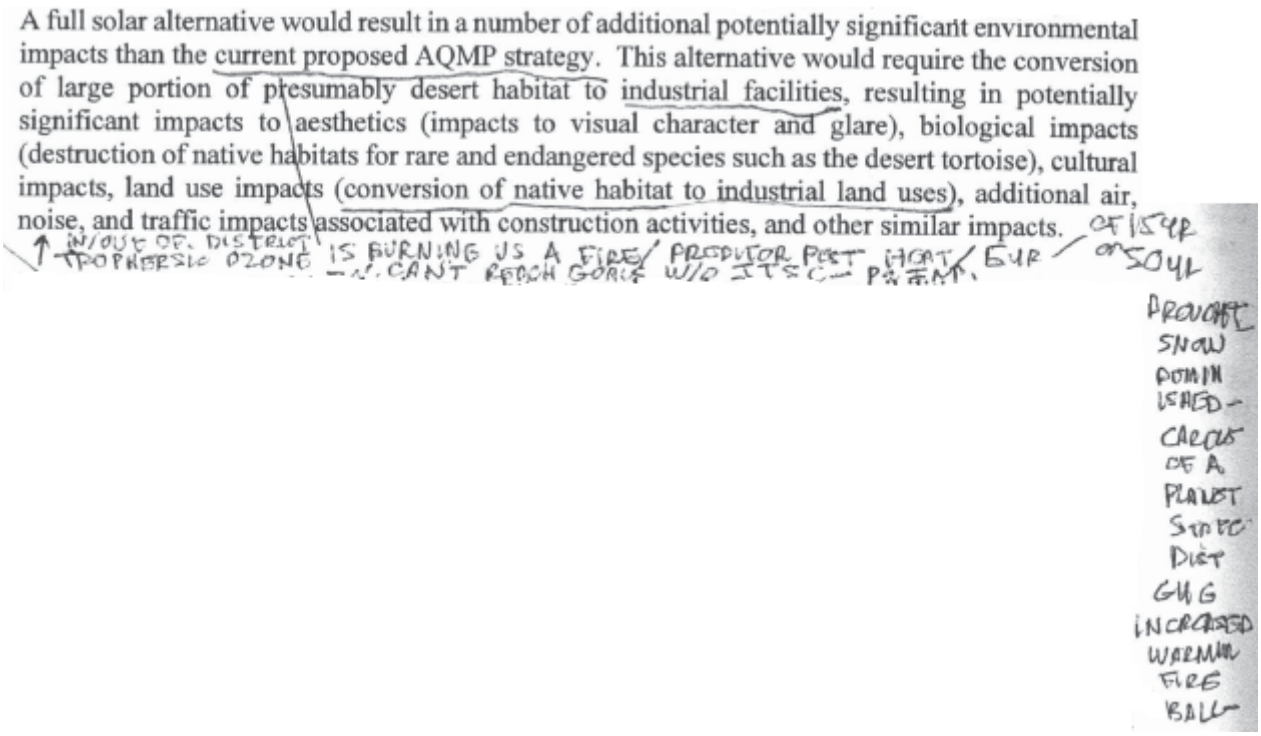

Chapter 6 – Alternatives

Further, electricity would only be generated when the sun was out. While this is common in California, there are times when it is cloudy, rainy or night time when electricity would not be produced. So some type of electricity storage system may be required. The technology for large battery backup systems has not yet been developed which would mean that there would still be a requirement for natural gas-generated electricity. Therefore, full solar conversion is not feasible at this time.

Response 11-14
The air quality impacts were analyzed in Subchapter 4.1 of the Draft Program EIR, and the energy impacts were analyzed in Subchapter 4.2 of the Draft Program EIR. The costs associated with the control measures are not a consideration when analyzing the environmental impacts of the 2016 AQMP. However, the Socioeconomic Report[2], which was prepared for the 2016 AQMP, discloses the costs and health benefits. This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

[2] Available on the internet at: http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/socioeconomic-analysis

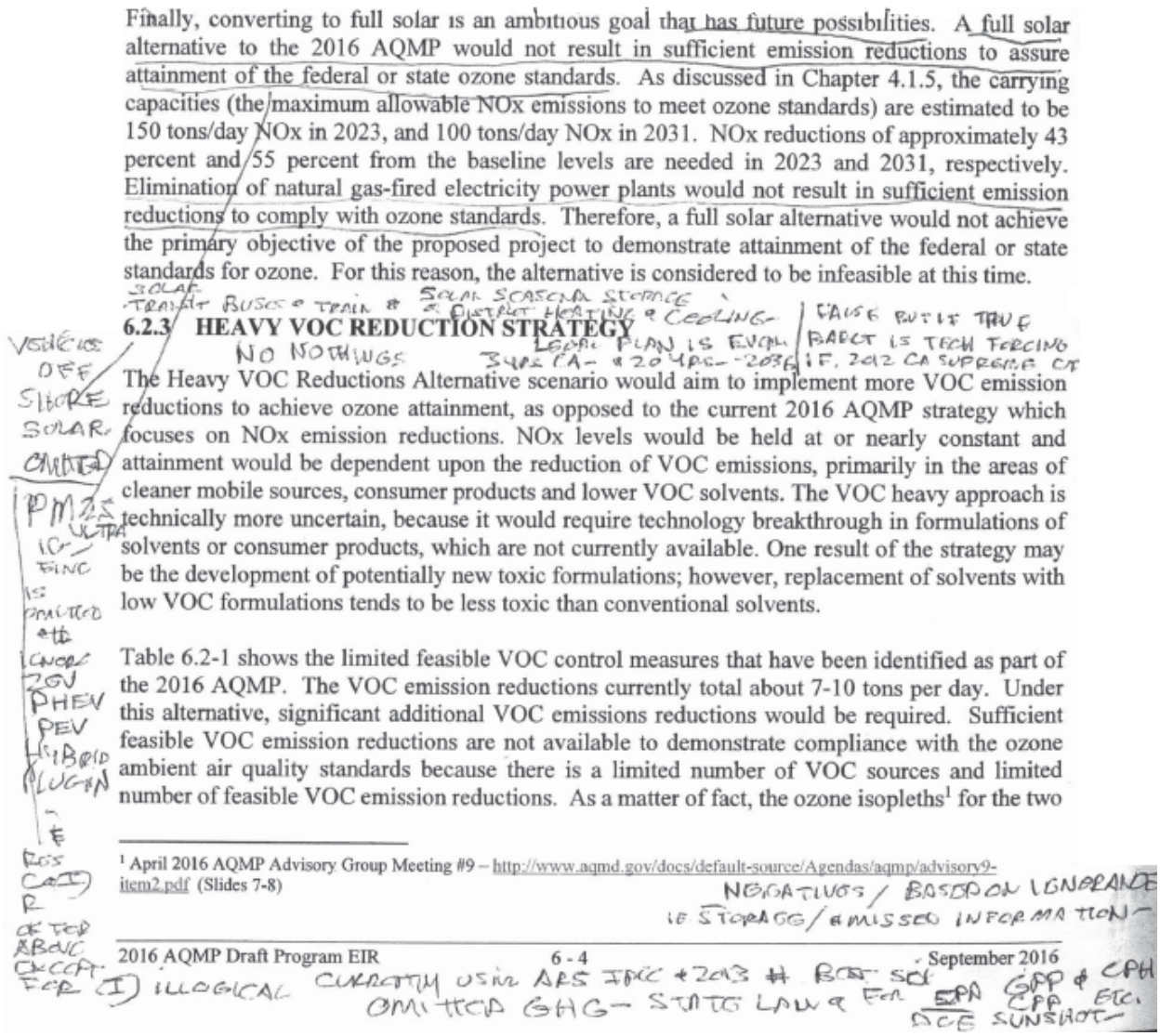
Comment 11-15


A full solar alternative would result in a number of additional potentially significant environmental impacts than the current proposed AQMP strategy. This alternative would require the conversion of large portion of presumably desert habitat to industrial facilities, resulting in potentially significant impacts to aesthetics (impacts to visual character and glare), biological impacts (destruction of native habitats for rare and endangered species such as the desert tortoise), cultural impacts, land use impacts (conversion of native habitat to industrial land uses), additional air, noise, and traffic impacts associated with construction activities, and other similar impacts.

Response 11-15

The foreseeable environmental impacts associated with the 2016 AQMP control measures were fully analyzed in the Draft Program EIR. The hazards and hazardous materials impacts were discussed in Subchapter 4.3 of the Draft Program EIR. This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

Comment 11-16



Finally, converting to full solar is an ambitious goal that has future possibilities. A full solar alternative to the 2016 AQMP would not result in sufficient emission reductions to assure attainment of the federal or state ozone standards. As discussed in Chapter 4.1.5, the carrying capacities (the maximum allowable NOx emissions to meet ozone standards) are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Elimination of natural gas-fired electricity power plants would not result in sufficient emission reductions to comply with ozone standards. Therefore, a full solar alternative would not achieve the primary objective of the proposed project to demonstrate attainment of the federal or state standards for ozone. For this reason, the alternative is considered to be infeasible at this time.

6.2.3 HEAVY VOC REDUCTION STRATEGY

The Heavy VOC Reductions Alternative scenario would aim to implement more VOC emission reductions to achieve ozone attainment, as opposed to the current 2016 AQMP strategy which focuses on NOx emission reductions. NOx levels would be held at or nearly constant and attainment would be dependent upon the reduction of VOC emissions, primarily in the areas of cleaner mobile sources, consumer products and lower VOC solvents. The VOC heavy approach is technically more uncertain, because it would require technology breakthrough in formulations of solvents or consumer products, which are not currently available. One result of the strategy may be the development of potentially new toxic formulations; however, replacement of solvents with low VOC formulations tends to be less toxic than conventional solvents.

Table 6.2-1 shows the limited feasible VOC control measures that have been identified as part of the 2016 AQMP. The VOC emission reductions currently total about 7-10 tons per day. Under this alternative, significant additional VOC emissions reductions would be required. Sufficient feasible VOC emission reductions are not available to demonstrate compliance with the ozone ambient air quality standards because there is a limited number of VOC sources and limited number of feasible VOC emission reductions. As a matter of fact, the ozone isopleths[1] for the two

[1] April 2016 AQMP Advisory Group Meeting #9 – http://www.aqmd.gov/docs/default-source/Agendas/aqmp/advisory9-item2.pdf (Slides 7-8)

Response 11-16

The SCAQMD fully supports solar powered technologies and the 2016 AQMP includes a number of control measures that promote and integrate solar. Control Measures ECC-01 recognizes criteria pollutant co-benefits from federal, state, and local mandates and programs to reduce greenhouse gas (GHG) emissions including renewable portfolio standards and widely incentivized solar programs; ECC-02 seeks criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and SB 350 Clean Energy and Pollution Reduction Act; and ECC-03 seeks to provide financial incentives that go beyond the state-wide goals achieved under ECC-02. Solar PV and hot water heating are integral to these measures and will facilitate the penetration of zero-emission technologies in both stationary and mobile applications. Further, control measure CMB-01 anticipates future rulemaking in combination with financial incentives for the replacement of older equipment with zero and near-zero emission technologies. Equipment electrification, solar power, use of fuel cells, battery storage, and/or combined heating and power are all possible alternatives. Additionally, an

extensive discussion of energy and climate change can be found in Chapter 10 of the 2016 AQMP and the CEQA document considers the feasibility of full solar conversion as an alternative to the project. While full solar conversion cannot achieve AQMP's attainment goals by attainment deadlines, it can serve to make zero-emission technologies more cost-effective and feasible.

Solar panels are becoming more efficient, well established, and prices are declining rapidly making them cost-effective, but there are still a number of concerns regarding the reliability, transmission, demand spikes, and intermittency associated with renewable generation. Due to these issues, technologies that provide ancillary services and grid support, such as energy storage and improved demand side management, need to be further developed and integrated into the grid. Without incorporating these technologies as higher levels of renewables are incorporated, the stability of the electrical grid can be compromised and emissions could increase as peaking generating units are increasingly used.

To meet the federal ozone standards, the region will need to reduce 117 tpd NOx emission by 2023. Elimination of natural gas-fired electricity power plants, if feasible, will only result in 3 tpd NOx reductions. However, great progress in solar deployment is being made in California, which is leading the nation with over half a million solar projects along with commitments towards using 50% renewables in California by 2030. Incorporating and combining newer technologies such as solar collectors, smart grid, and energy storage with better power system management at the transmission, distribution, and behind the meter applications can reduce the need for redundant infrastructure and emissions from fossil-based generation. In addition, by combining with other technologies, conversions to full solar power become more cost effective and subsequently decrease the need for traditional based fossil generation. Staff will continue to promote and encourage the use of solar energy systems and technology in applications where it can be shown to be cost-effective and result in emission reductions. These efforts include incorporating renewable resources towards powering alternative transportation technologies.

The use of solar transit busses and trains, although not currently commercially available, is envisioned in the mobile source control measures in the 2016 AQMP. At the time of rulemaking, SCAQMD staff will consider all feasible technologies and options available for near-zero and zero emission vehicles. The use of battery storage to supplement solar was discussed in Chapter 10 of the 2016 AQMP as well as in control measures BCM-02 and ECC-03. This comment does not provide specifics regarding the Draft Program EIR; therefore, no further response is necessary under CEQA.

As part of this comment letter, copies of published materials were submitted. Since those papers are copyrighted materials, a list of the items submitted is included at the end of the comment letter.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Final Socioeconomic Report

2016 AIR QUALITY MANAGEMENT PLAN



January 2017

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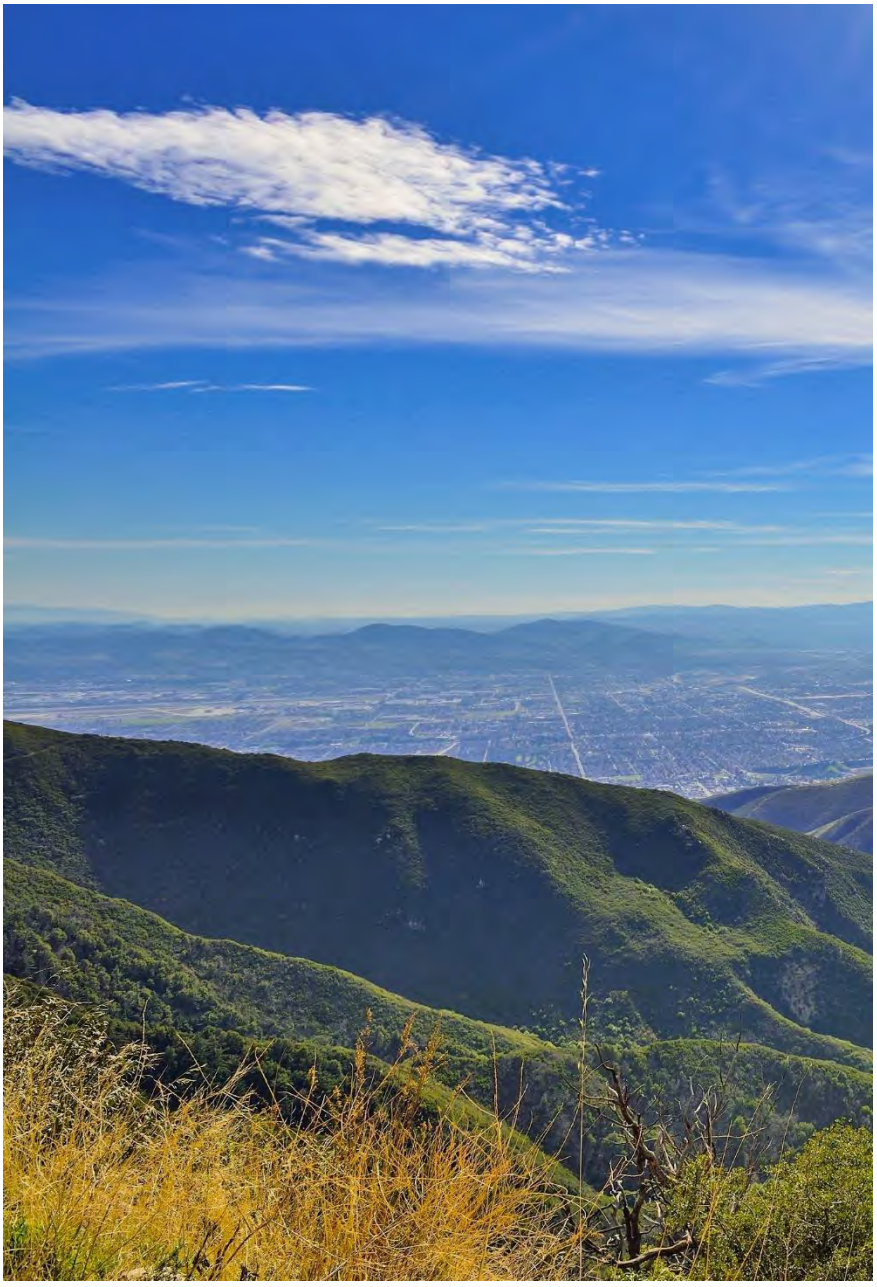
Executive Summary



While air quality has improved over the years, the South Coast Air Basin (Basin) still has some of the most polluted air in the nation, exceeding federal public health standards for both ozone and fine particulate matter (PM2.5). The Coachella Valley also exceeds current ozone standards.[1,2] The Basin and Coachella Valley will also be required to meet increasingly more stringent federal and state air quality standards to better protect public health.[3] The Draft Final 2016 Air Quality Management Plan (AQMP) is a regional blueprint designed to achieve federal air quality standards in the Basin and Coachella Valley by seeking emission reductions from stationary and mobile sources through regulations and incentives[4] to help accelerate the deployment of zero and near-zero emission technologies.

The estimated costs and benefits of the proposed measures in the Draft Final 2016 AQMP[5] are expected to alter, to various degrees, the economic decisions made by households, businesses, and other economic actors. Some businesses would see production costs go up while other businesses would benefit from a greater demand for their services and technologies. For consumers who consider purchasing or replacing vehicles or certain household appliances, the proposed control strategies would also change or widen the range of product choices that differ in fuel types, energy efficiencies, effective unit prices, and thus potential payback periods.

In order to inform decision-makers and stakeholders about the potential costs and benefits of the Draft Final 2016 AQMP and how the associated socioeconomic impacts would affect communities within the region, a Draft Final Socioeconomic Report has been prepared. Based on recommendations made by Abt Associates in 2014 to improve the socioeconomic assessment, a concerted effort among SCAQMD staff, scientific advisors, sister agencies, and the public was made to conduct an enhanced analysis that not only utilizes state-of-the-art methods, but is more accessible and transparent to the general public. While many of Abt Associates' recommendations have been implemented, staff will continue to update and refine its methodologies for subsequent AQMPs and socioeconomic assessments for clean air rules and programs.[6]

The key findings in the Draft Final Socioeconomic Report are based on analyses conducted using two major modeling tools: the Regional Economic Models, Inc. (REMI)'s Policy Insight Plus, a policy simulation

[1] The Basin is an over 10,000 square mile area comprised of Orange County and the urban portions of Los Angeles, Riverside, and San Bernardino Counties. The Coachella Valley is a sub-region of Riverside County in the Salton Sea Air Basin that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east.

[2] The Basin is required to meet the following standards: 2008 8-hour ozone standard of 75 parts per billion (ppb) in 2031; 2012 annual PM2.5 standard of 12.0 micrograms per cubic meter ($\mu g/m^3$) in 2021 or 2025 depending on nonattainment classification; 2006 24-hour PM2.5 standard of 35 $\mu g/m^3$ in 2019; 1997 8-hour ozone standard of 80 ppb in 2023; 1979 1-hour ozone standard of 120 ppb in 2022.

[3] In 2015, U.S. EPA revised the 8-hour ozone standard to 70 ppb. If the Basin retains the classification as an extreme nonattainment area, the attainment deadline for this latest standard would be 2037.

[4] The Draft Financial Incentives Funding Action Plan for the 2016 AQMP provides more information regarding how incentive programs are expected to be implemented as well as potential funding sources and opportunities. The document can be found at http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draftfinancialincentivefunddec2016.pdf.

[5] The Draft Final 2016 AQMP was released on December 2, 2016 and can be found here: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draft-final-aqmp/clean/2016finaldraftaqmpdec2016(clean).pdf.

[6] See Chapter 8 for more details regarding the implementation of Abt Associates' recommendations for enhancing the report and future enhancements to be made.

environmental Benefits Mapping and Analysis program (BenMAP). Total incremental costs, inclusive of the cost of incentives, were compiled for proposed control measures with quantified emission reductions. Modeled air quality data for the Basin, together with mathematical functions and parameters based on the most updated epidemiological and economic studies, were used in BenMAP to quantify public health benefits due to reduced exposure to air pollution. Public health benefits were combined with incremental costs to estimate a range of regional jobs and other macroeconomic impacts from implementing the Draft Final 2016 AQMP. Projected changes in health risk and monetized public health benefits were also used to analyze how implementation of the Draft Final 2016 AQMP may affect environmental justice (EJ) in the Basin, as evaluated by a number of alternative metrics.

Key Findings in the Draft Final Socioeconomic Report

- ***Two-thirds of the Draft Final 2016 AQMP's nearly $16 billion[7] total incremental cost is associated with control strategies seeking reductions from mobile source emissions, the principal contributor to the Basin's air quality challenges.***

Living in a region with over 20,000 miles of highways and major surface streets, 450 miles of passenger rail, six commercial airports, and the two largest marine ports in the nation, Basin residents are exposed to emissions from a multitude of mobile sources each day. Reducing emissions from mobile sources is generally the most cost-effective way to reduce regional and local air pollution health impacts. Two-thirds or about $10 billion of the Draft Final 2016 AQMP's total incremental cost is related to mobile source control strategies, and these strategies are expected to lead to more than 80 percent of the emission reductions needed to attain the 8-hour ozone standard by 2031.[8] The remaining $5.7 billion is associated with reducing stationary source emissions in the Basin.

TABLE ES-1: COST SUMMARY OF THE DRAFT FINAL 2016 AQMP[9]

Measures	Present Worth Value (Billions of 2015 dollars)					Percent of Total Incremental Cost
	Remaining Incremental Cost		Incentives		Total Incremental Cost	
Stationary Source	$4.3	+	$1.4	=	$5.7	36%
Mobile Source	-$3.3	+	$13.2	=	$10.0	64%
All Sources	**$1.1**	**+**	**$14.6**	**=**	**$15.7**	**100%**

Note: Numbers may not sum up due to rounding.

[7] Expressed in 2015 dollars for present worth value, with a discount rate of four percent.

[8] Since nitrogen oxide (NOx) emissions also lead to the formation of PM2.5, the NOx reductions needed to meet the ozone standards will likewise lead to improvement of PM2.5 levels and attainment of PM2.5 standards.

[9] Costs are characterized as incremental costs, not as the total cost of a particular control equipment or program. Specifically, they represent the cost difference between a "business as usual" path and an alternative path as proposed by the Draft Final 2016 AQMP. See Table 2-1 in Chapter 2 for more cost details for each measure.

Over 90 percent or $14.6 billion of the Draft Final 2016 AQMP's total incremental cost is attributed to publicly funded incentive programs that eligible industries and consumers can use to offset the cost of purchasing cleaner technologies. Due to incentives and expected fuel savings, consumers are expected to see total cost savings of $2.3 billion. While some industries would similarly benefit from incentives and long-term cost-savings, private industries as a whole are expected to incur $3.4 billion in incremental costs.

- ***By implementing the Draft Final 2016 AQMP, the risk of premature deaths among Basin residents and numerous other health risks associated with air pollution would be reduced. As a result, the four-county region is expected to gain a total public health benefit of $173 billion.***

Air pollution continues to be linked to increases in death rates (mortality) and increases in illness and other health effects (morbidity). Implementing the Draft Final 2016 AQMP would lower many health risks associated with exposure to air pollution. These decreases in health risk are estimated to result in an average of 1,600 premature deaths avoided per year. Reductions in numerous other non-fatal health conditions were also estimated annually, including about 2,500 fewer asthma-related emergency department visits, about 700 fewer hospital admissions related to asthma, cardiovascular, or respiratory conditions, and more than 200,000 fewer person-days of work and school absences. These public health benefits have an estimated value of $173 billion, cumulatively from 2017 to 2031.[10]

TABLE ES-2: MONETIZED PUBLIC HEALTH BENEFITS OF THE DRAFT FINAL 2016 AQMP

	Present Worth Value (Billions of 2015 dollars)
Mortality-related benefits	$170.8
Short-Term Ozone Exposure	$6.1
Long-Term PM2.5 Exposure	$164.7
Morbidity-related benefits	$2.4
Grand Total	**$173.2**

Over 95 percent of the estimated public health benefits are associated with a lower risk of premature deaths due to reduced long-term exposure to PM2.5, and the rest are associated with ozone mortality and avoided incidence of various respiratory and cardiovascular symptoms and of work and school absences. Although not quantified in the Draft Final Socioeconomic Report, additional public welfare benefits exist relating to how clean air promotes visibility and prevents damage to agriculture, local ecology, buildings, and other materials.

[10] It should be emphasized that, as with all scientific studies and evaluations, there are various sources of uncertainty surrounding the estimated public health benefits, including the uncertainty embedded in data inputs, uncertainty of the magnitude of various health effects of exposure to air pollutants, and uncertainty of valuation. Given the significant contribution of mortality-related benefits, several sensitivity analyses were conducted, including one regarding the valuation parameters used. See Chapter 3 for more details as well as other sensitivity analyses.

- ***Projected job change from implementing the Draft Final 2016 AQMP are expected to have a minimal impact on regional job growth.***

The four-county regional economy currently generates more than a trillion dollars in GDP and supplies more than 10 million jobs.[11] Without implementing the Draft Final 2016 AQMP, baseline jobs in the region are expected to grow at an annualized rate of 1.02 percent from 2016 to 2031.[12] Based on the four different scenarios analyzed, total jobs in the region are projected to grow between 1.01 and 1.04 percent annually over the same period, a small variation from the expected baseline growth in an economy with over 10 million jobs. Scenarios are based on a combination of two important factors: 1) whether public health benefits are taken into account and 2) whether incentive funding is assumed to be financed from existing state revenues allocated for the region or from existing unallocated federal funds.

TABLE ES-3: FOUR JOB SCENARIOS OF DRAFT FINAL 2016 AQMP IMPLEMENTATION

	Health Benefits Included	**No Health Benefits Included**
Federal Revenues	**Best-Case Scenario:** • **1.04%** Annualized Job Growth between 2016 and 2031 • An additional **29,000 jobs gained** annually to an economy with over 10 million jobs	• **1.02%** Annualized Job Growth between 2016 and 2031 • An additional **6,000 jobs gained** annually to an economy with over 10 million jobs
State Revenues	**Primary Scenario:** • **1.04%** Annualized Job Growth between 2016 and 2031 • An additional **14,000 jobs gained** annually to an economy with over 10 million jobs	**Worst-Case Scenario:** • **1.01%** Annualized Job Growth between 2016 and 2031 • **9,000 jobs foregone** annually from an economy with over 10 million jobs

As seen in Table ES-3, when health benefits are included with incremental costs, an average of 12,000 jobs are expected to be gained annually under the state-funded primary scenario; whereas, more jobs, or an annual average of 29,000, are expected to be gained under the federally-funded best-case scenario.

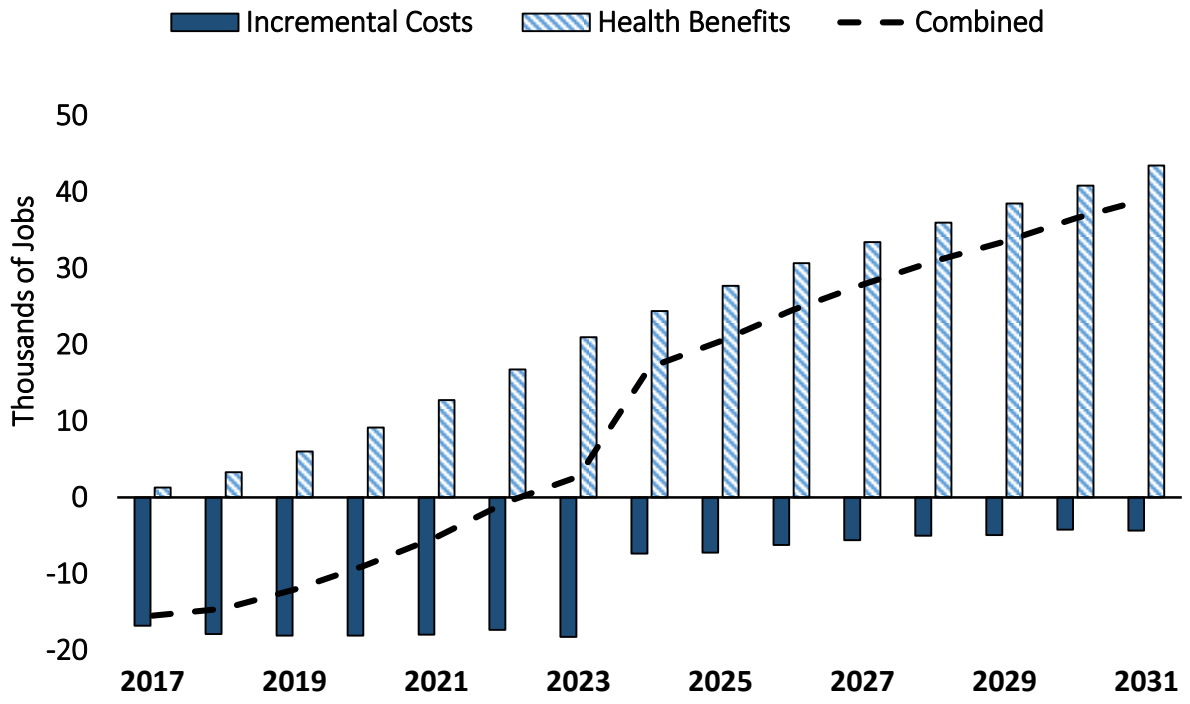
[11] U.S. Bureau of Economic Analysis, 2015 GDP and 2014 total job estimates (including payroll jobs and self-employment) for Los Angeles-Long Beach-Anaheim and Riverside-San Bernardino-Ontario metropolitan areas.

[12] The baseline scenario analyzed in this report is derived from the 2016 Growth Forecast, which is a long-term demographic and job forecast developed by the Southern California Association of Governments (SCAG 2016). SCAG's growth forecast was used to guide the development of its 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), and it was also used by SCAQMD to develop the baseline emissions inventory for the Draft Final 2016 AQMP and thus for air quality model projections. This growth forecast assumes that the four-county region would continue receiving federal highway funding to make the necessary infrastructure investments for implementing the 2016 RTP/SCS.

Job gains are smaller under the primary scenario because needing to use large amounts of existing state-funding allocated for the region for incentives implementation would divert funds away from local spending on other programs. As a result, this would dampen the positive job impact. In an economy with over 10 million jobs, however, a gain of 14,000 or 29,000 jobs a year would not have lasting effects on the region's long-term job outlook. Under either scenario, the annualized job growth rate between 2016 and 2031 would increase to 1.04 percent, which represents a 0.02 percentage point uptick in expected job growth of 1.02 percent without implementation of proposed control measures.

In the beginning years under the primary scenario, state government jobs would be most adversely impacted, followed by construction, retail trade, and the healthcare and social assistance sectors. Over time, as the proposed strategies are implemented and public health benefits are realized, healthcare related spending would be reduced, worker productivity would increase, and the region would become a more attractive place to live and work. As more economic migrants are enticed to the region, the labor supply would increase, creating more local demand for goods and services in the region. As the regional economy grows larger, more job opportunities would become available, as seen in Figure ES-1.

FIGURE ES-1: NET JOB IMPACTS OF THE DRAFT FINAL 2016 AQMP IMPLEMENTATION PRIMARY SCENARIO



Of the 14,000 jobs expected to be gained on average each year under the primary scenario, they are expected to distribute differently among the 21 sub-county regions analyzed. The Central sub-region of Los Angeles County is expected to see the largest gain of jobs. An additional 2,100 jobs would be added each year to its projected average baseline of 1,239,000 jobs. The sub-region of Riverside Other in Riverside County would see 40 jobs foregone on average each year during the same period from its projected average baseline of about 413,000 jobs.

Even in the worst-case scenario where existing state funds for local spending must be used to finance incentives and no public health benefits are accounted for, the projected 9,000 jobs foregone annually would correspond to a 0.01 percentage point slowdown for the region's annualized job growth, from 1.02 percent to 1.01 percent, between 2016 and 2031.

Four CEQA alternatives were analyzed as alternative pathways to achieving attainment goals, and they were projected to have a similarly small job growth impact.[13]

- ***Overall inequality of health risks are expected to decrease in the Basin, with greater per-capita public health benefits accrued in Environmental Justice (EJ) communities versus non-EJ communities.***

Many Basin residents live, work, and play in areas with poorer air quality than others, and are often more economically disadvantaged. The EJ analysis was significantly enhanced in the Draft Final Socioeconomic Report to assess the impacts of implementing the Draft Final 2016 AQMP by answering these two important questions:

1. How does implementing the Draft Final 2016 AQMP impact the inequality of health risks that already exist in the Basin?
2. Do more health benefits accrue in EJ versus non-EJ communities as a result of implementation of the Draft Final 2016 AQMP?

Our analysis found that the overall health risk inequality in the region decreases, whether in terms of the risk of dying prematurely among adults or the risk of children having to go to emergency room for asthma exacerbations. Furthermore, while the entire Basin is expected to benefit from health risk reductions due to clean air, EJ communities are expected to gain greater per capita public health benefits versus non-EJ communities. Monetized benefits range between $1,900 and $2,000 per capita in EJ communities, approximately $300 to $400 higher than for non-EJ communities. These results are consistent across all alternative EJ definitions tested.[14]

Concluding Remarks

Overall, the implementation of the Draft Final 2016 AQMP is expected to result in nearly $16 billion of incremental cost, while generating public health benefits of $173 billion. Even when uncertainties in health benefits valuation are taken into account, the range of public health benefits—$66 billion to $273 billion, cumulatively from 2017 to 2031—is still well above the estimated total cost. Moreover, over 90 percent of the anticipated incremental costs, mostly related to capital expenditures, would be financed by publicly funded incentive programs. In an economy with more than a trillion dollars in regional GDP and more than 10 million jobs across the four counties, these costs and benefits were projected to result in relatively minor job impacts and would not alter the region's long-term job growth. Additionally, overall health risk inequality is expected to decrease in the Basin. While all residents would benefit from reductions in air pollution-related health risk, a higher per capita benefit is anticipated to accrue in EJ communities, as a result of implementing the Draft Final 2016 AQMP.

[13] See Chapter 4 for more information of job impacts under the four scenarios discussed. Sub-regional distribution of job impacts is discussed in Chapter 5. Chapter 7 discusses CEQA alternatives.

[14] See Chapter 6 for more information of the Environmental Justice Analysis.

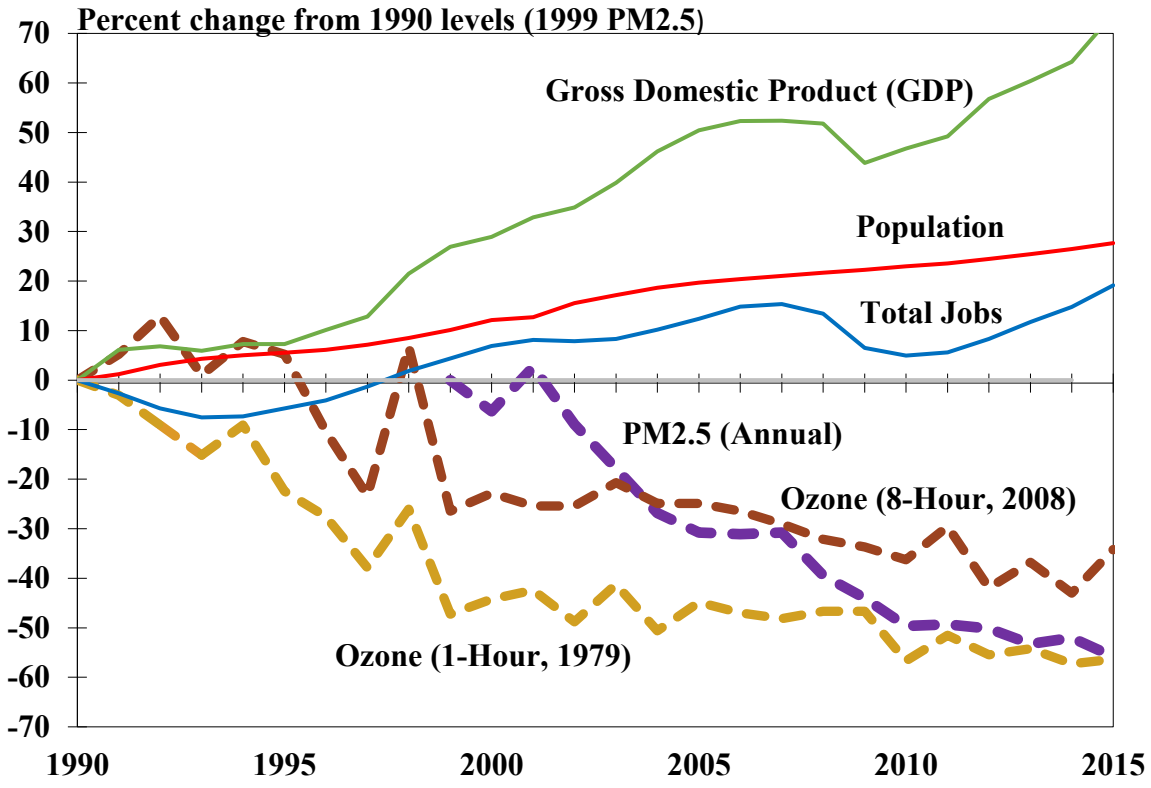
Chapter 1: Introduction



Air quality in the South Coast Air Basin (Basin) has improved significantly over the years, and air quality control programs at the local, state and federal levels have played an important role. These improvements are demonstrated in Figure 1-1, which shows the air quality trends since 1990, including percent changes in the 8-hour ozone concentrations, the 1-hour ozone concentrations, and the annual average concentrations of fine particulate matter (PM2.5) since measurements began in 1999.

Concurrent economic trends, including percent changes in regional gross domestic product, total jobs and population, are also depicted in Figure 1-1. The 2007-2009 economic recession, precipitated by the housing market collapse and ensuing worldwide financial crisis, dealt a severe blow to the regional economy and employment. Since then, the slow pace of economic recovery in the nation amid global headwinds continues to cast uncertainties on the sustainability of this recovery. Despite these issues, California has been one of the nation's silver linings in recent years, and the economy of the four-county region—Los Angeles, Orange, Riverside and San Bernardino—is expanding again, with clearly rebounding jobs and output numbers that have exceeded pre-recession peaks.

FIGURE 1-1: AIR QUALITY HAS IMPROVED AMID POPULATION INCREASES AND RISE IN ECONOMIC ACTIVITY (SCAQMD FOUR-COUNTY REGION, 1990-2015)



Economic growth and other human activities generally result in increased air pollutant emissions (i.e., anthropogenic emissions). However, the increased utilization of low-emitting and more energy efficient technologies have nonetheless resulted in decreased ozone and PM levels. Thus, advances in technology demonstrate that it is possible to maintain a healthy economy while improving public health through air quality improvements. This reality has been demonstrated in the past, and with concerted efforts by all stakeholders, can continue into the future.

Challenges to Attaining Air Quality Standards

While substantial progress and improvements in air quality have been made, the region still does not meet all federal and state air quality standards set to protect public health. The Draft Final 2016 Air Quality Management Plan (AQMP) is designed to provide a path to clean air goals and address federal Clean Air Act (CAA) requirements for ozone and PM2.5 standards.

The CAA requires areas not attaining the national ambient air quality standards (NAAQS) to develop and implement an emission reduction strategy that will bring the area into attainment in a timely manner. For ozone and PM2.5, the area is given a classification that describes the degree of nonattainment. This classification dictates specific planning requirements under the CAA, including the time provided to attain the standard. The CAA requires attainment of the standard to be achieved as "expeditiously as practicable," but no later than the attainment years listed in Table 1-1 below.

TABLE 1-1: AIR QUALITY STANDARDS AND LATEST ATTAINMENT YEAR

Standard	Concentration	Classification	Latest Attainment Year
2008 8-Hour Ozone	75 ppb	Extreme	2031
2012 Annual PM2.5	12.0 µg/m^3	Moderate	2021
		Serious	2025
2006 24-Hour PM2.5	35 µg/m^3	Serious	2019
1997 8-Hour Ozone	80 ppb	Extreme	2023
1979 1-Hour Ozone	120 ppb	Extreme	2022

Note: "ppb" stands for parts per billion and "µg/m^3" stands for microgram per cubic meter.

The most significant air quality challenge in the Basin is to reduce nitrogen oxide (NOx) emissions[1] sufficiently to meet the upcoming ozone standard deadlines. Although the existing air regulations and programs will continue to lower NOx emissions in the region, an additional 43 percent of NOx emission reductions in the year 2023 and an additional 55 percent in the year 2031 are necessary to attain the 8-hour ozone standards.[2] Since NOx emissions also lead to the formation of PM2.5, the NOx reductions

[1] NOx emissions are a precursor to the formation of both ozone and secondary PM2.5.

[2] Estimates are based on the inventory and modeling results and are relative to the baseline emission levels for each attainment year (see Draft Final 2016 AQMP for detailed discussion).

needed to meet the ozone standards will likewise lead to significant improvement of PM2.5 levels and attainment of PM2.5 standards.

Latest Scientific Evidence Relating Ozone and PM2.5 Exposure to Public Health

Ambient air pollution is a major public health concern. Ozone and PM2.5 are the two pollutants being targeted to meet federal air quality standards in the Draft Final 2016 AQMP and they continue to be linked to increases in illness (morbidity) and increases in death rates (mortality).[3]

In 2013, the U.S. Environmental Protection Agency (U.S. EPA) released the latest Integrated Scientific Assessment (ISA) of ozone and related photochemical oxidants (U.S. EPA 2013). It was concluded in the assessment that there was a causal relationship between short-term ozone exposure and respiratory effects, and a likely causal relationship between long-term ozone exposure and respiratory effects. Short-term ozone exposure was also determined to have likely causal relationships with mortality and cardiovascular effects. U.S. EPA additionally identified groups with increased risk from ozone exposure such as outdoor workers, individuals with asthma, children, elderly adults, and people with certain vitamin deficiencies. As a result of these findings, in 2015, the U.S. EPA revised the 8-hour ozone standard to 70 ppb from 75 ppb. While the Basin needs to attain the 2008 standard of 75 ppb in 2031, the attainment deadline of the 2015 standard of 70 ppb is anticipated to be 2037 if the Basin retains the classification as an extreme nonattainment area.

With regard to particulate matter, the 2009 ISA[4] released by the U.S. EPA concluded that both mortality and cardiovascular effects had a causal relationship with both short- and long-term PM2.5 exposures (U.S. EPA 2009). Respiratory effects were also likely to have a causal relationship with short- and long-term exposure to PM2.5. Numerous studies showing the causal relationship between PM2.5 and negative health effects have been closely scrutinized with the data being reanalyzed by additional investigators. The re-analyses confirmed original findings, and there were additional studies reviewed in the 2009 ISA that confirmed and extended the range of the adverse health effects of PM2.5 exposures. As a result, in 2012, the U.S. EPA revised the PM2.5 annual average standard to 12.0 $\mu g/m^3$, which the Basin needs to attain in 2025 as a serious nonattainment area.

In a systematic literature review commissioned by the South Coast Air Quality Management District (SCAQMD), Industrial Economics, Inc. (IEc) found 27 studies published since 2012 that assessed the relationship between mortality and PM2.5 exposure that were conducted in the U.S. or Canada. Four studies focused on effects of PM2.5 exposures on populations within California or within the Los Angeles metropolitan area specifically. Collectively, these newer studies provided additional evidence to support the U.S. EPA's determination of a causal association between PM2.5 exposure and mortality due to both short- and long-term exposure (Industrial Economics, Inc. 2016a).

[3] See Appendix I of the Draft Final 2016 AQMP for a discussion of these studies.

[4] The 2009 PM ISA is currently being updated, with draft materials being circulated for public input.

Legal Requirements for Socioeconomic Analysis

Both the SCAQMD Governing Board and the California Health & Safety Code require preparation of a socioeconomic analysis whenever the SCAQMD adopts or amends emission reduction rules or regulations. Although these requirements do not apply to preparation of the AQMP, the SCAQMD nonetheless elects to perform a separate socioeconomic analysis of the AQMP in order to further inform public discussions and the decision-making process associated with adoption of the Plan.

In so doing, SCAQMD staff is guided by a Governing Board Resolution adopted in 1989. That resolution directed staff to prepare an economic analysis of all emissions reduction rules proposed for adoption or amendment. The analysis was to include the following elements: identification of affected industries, cost effectiveness of control, and public health benefits in any such analysis.

Staff is additionally guided by the California Health & Safety Code requirements for socioeconomic analyses prepared during the rulemaking process. In particular, Health and Safety Code Section 40440.8 lists relevant impacts to be considered in a socioeconomic analysis. These impacts include:

1. The type of industries affected by the rule or regulation.
2. The impact of the rule or regulation on employment and the economy in the Basin.
3. The range of probable costs, including costs to industry, of the rule or regulation.
4. The availability and cost-effectiveness of alternatives to the rule or regulation.
5. The emission reduction potential of the rule or regulation.
6. The necessity of adopting, amending, or repealing the rule or regulation in order to attain state and federal ambient air standards.

Health and Safety Code Section 40728.5 identifies similar impacts to be discussed in a socioeconomic analysis and additionally states that efforts shall be made to minimize any adverse impacts.

Finally, staff may also consider Health and Safety Code Sections 39616 and 40920.6 during its preparation of the socioeconomic analysis. Section 39616 requires the SCAQMD to ensure that any market-based incentive strategy it adopts results in equivalent or greater emission reductions at equivalent or less cost and overall job impacts – i.e., no greater job losses or significant shifts from high-paying to low-paying jobs – when compared to command-and-control regulations. Section 40920.6, requires that incremental cost effectiveness – i.e., the difference in costs divided by difference in emission reductions – be performed whenever more than one control option is feasible to meet control requirements.

Economic Outlook for Industries Potentially Affected by the Draft Final 2016 AQMP

Nearly 18 million people currently reside in the counties of Los Angeles, Orange, Riverside and San Bernardino. The four-county regional economy generates over one trillion dollars of gross domestic product and employs more than 8 million workers, with a four to six percent unemployment rate among

the four counties.[5,6,7] The region currently supplies about 7.5 million payroll jobs.[8] Between July 2012 and July 2016, total payroll jobs in the region have increased at an annualized rate of nearly 2.5 percent.[9] In the long-term, based on projections by the Southern California Association of Governments (SCAG), total jobs in the region are forecasted to grow at an annualized rate of one percent between 2016 and 2031.[10]

The Draft Final 2016 AQMP includes control strategies for emission reductions from both stationary and mobile sources to attain upcoming NAAQS. Stationary source control measures are proposed by SCAQMD whereas the braoder mobile source control measures are proposed by the California Air Resources Board (CARB), with SCAQMD's local mobile source measures proposed mainly to facilitate local implementation of CARB's mobile source control strategy. These strategies are comprised of both command-and-control regulations and incentive programs[11], as well as further deployment of advanced clean technologies. These proposed control strategies could potentially affect both public and private sectors, but are expected to mainly impact the nine private sector industries as listed below:

- Oil & Gas Extraction
- Utilities
- Construction
- Manufacturing
- Nurseries, Wholesale Garden
- Transportation & Warehousing
- Equipment Leasing and Rental
- Waste Management
- Restaurants

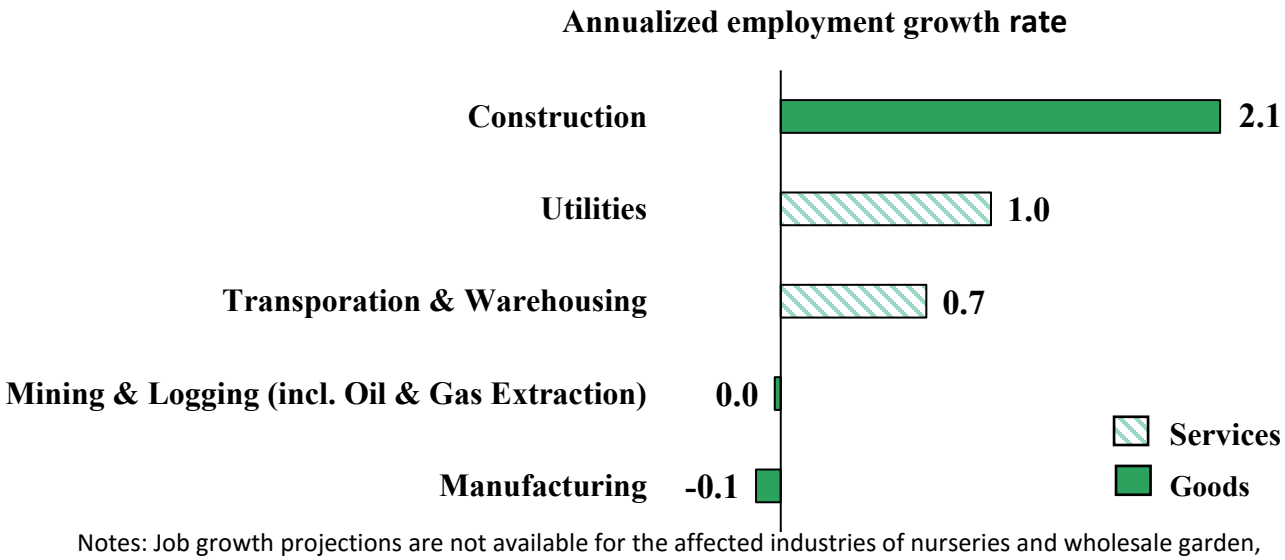
Figure 1-2 shows the regional job outlook between 2016 and 2031 for the potentially affected industries, based on SCAG projections.

Both SCAQMD and CARB's mobile source strategies would primarily affect passenger transportation and the "goods movement" sector, the core of which constitutes freight transportation and warehousing. The goods movement sector plays a pivotal part in the regional economy. It provides the critical service of

[5] California Department of Finance, State/County Population Estimates as of January 1, 2016.
[6] U.S. Bureau of Economic Analysis, 2015 GDP estimates for Los Angeles-Long Beach-Anaheim and Riverside-San Bernardino-Ontario metros.
[7] California Economic Development Department (EDD), preliminary estimates as of October 2016, civilian employment only. A five-percent unemployment rate is generally considered as "full employment" by the Federal Reserve.
[8] EDD Current Employment Survey (CES) estimates as of November 2016 for Anaheim-Santa Ana-Irvine, Los Angeles-Long Beach-Glendale metro divisions, and Riverside-San Bernardino-Ontario MSA. Does not include self-employed, family workers, and private household employees.
[9] Edd, current employment statistics (CES), July 2012 and July 2016.
[10] Based on SCAG's Growth Forecast in the 2016 Final Regional Transportation Plan/Sustainable Communities Strategy.
[11] The Draft Financial Incentives Funding Action Plan for the 2016 AQMP provides more information regarding how incentive programs are expected to be implemented as well as potential funding sources and opportunities. The document can be found at http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draftfinancialincentivefunddec2016.pdf

delivering goods between the region's seaports and airports and businesses across the nation. It also serves the fast-growing consumer demand for retail products purchased online.[12] The strong dollar and demand for imports, coupled with increases in e-commerce and the competition among the retailers to shorten delivery time, especially to large urban markets, puts a growing number of high-cube distribution centers in the Inland Empire at a strategic economic advantage. The transportation and warehousing sector currently provides 291,300 payroll jobs or 4 percent of all payroll jobs in the region.[13] Over the next 15 years, the sector as a whole is expected to grow at an annualized rate of 0.7 percent. Much of this job growth will be concentrated in the Inland Empire. Currently, average pay in this sector ranges from $38,000 in Riverside County to $56,000 in Los Angeles County, which are respectively seven percent below the average wage in Riverside County and about the average wage in Los Angeles County.[14]

FIGURE 1-2: CONSTRUCTION LEADS PROJECTED JOB GROWTH WHILE MANUFACTURING DECLINES



Notes: Job growth projections are not available for the affected industries of nurseries and wholesale garden, equipment leasing and rental, and waste management, and restaurants.
Source: Staff analysis of SCAG's growth forecast in the 2016 Final RTP/SCS Plan.

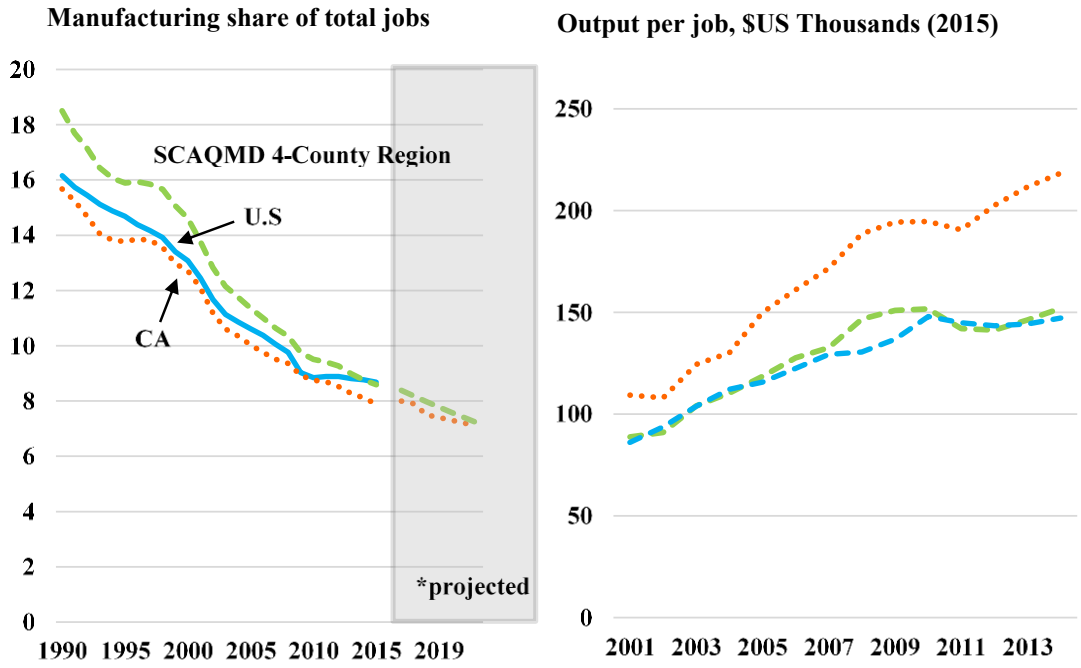
[12] According to the 2013 market research by eMarketer, online retail in the U.S. grew by 16.4 percent from 2012 to 2013 and totaled $262.3 billion in sales; by 2017, it was expected to reach $440 billion (Jones 2013).

[13] Based on EDD's CES for November 2016. All current job numbers listed below are from this source unless otherwise noted and unlike the BEA total jobs estimate that includes self-employment, CES estimates represent "payroll" jobs only

[14] Historical wage data from California Employment Development Department's Quarter Census of Employment and Wage (QCEW) database for 2015 Q3 wages. All the wage data in this section is from this source unless otherwise noted and is reported for the county with the lowest average annual wage in a specific industry and the county with the highest. The average wage represents the average of all industries covered by QCEW in both private and public sectors. According to EDD, the average annual pay is affected by the ratio of full-time to part-time workers; the number of workers who worked for the full year; and the number of individuals in high-paying and low-paying occupations. When comparing average pay levels between geographic areas and industries, these factors should be taken into consideration. For example, industries characterized by high proportions of part-time workers will show average wage levels appreciably less than the pay levels of regular full-time employees in these industries. The opposite effect characterizes industries with low proportions of part-time workers, or industries that typically schedule heavy weekend and overtime work. Average wage data also may be influenced by work stoppages, labor turnover, retroactive payments, seasonal factors, bonus payments, and so on.

The manufacturing sector would be affected by stationary source measures targeting NOx and Volatile Organic Compound (VOC) emissions, which include both command-and-control regulations and incentive programs to accelerate facility modernization. In the meantime, transportation equipment manufacturers in the region and nationwide would benefit from the incentive programs proposed to accelerate the deployment of zero and near-zero emission technologies, as part of the mobile source control strategies. The manufacturing sector in the region currently provides 608,100 payroll jobs or about 8 percent of all payroll jobs in the region; however, the sector's total job count is expected to mirror the nationwide trend and continue its long-term decline (see Figure 1-3). Manufacturing jobs are projected to decrease by an annualized rate of 0.1 percent over the next 15 years. More than half of the projected manufacturing job losses would occur in Los Angeles County where the industry is concentrated.

FIGURE 1-3: OUTPUT PER JOB INCREASES DESPITE STEADY DECLINE IN MANUFACTURING JOBS



Data Sources: SCAG, U.S. Bureau of Labor Statistics and U.S. Bureau of Economic Analysis.

Despite the industry's shrinking workforce, its output per worker has increased over time, rising from $89,000 to $152,000 (in 2015 dollars) over the 2001 to 2014 time period (see Figure 1-3).[15] Currently, the average pay in the sector ranges from $50,000 in Riverside County to $69,000 in Orange County, paying about a quarter more than the average wages in these counties. Both chemical manufacturers and refineries are expected to be impacted by stationary source measures. Chemical manufacturing pays slightly higher with average pay ranging from $58,000 in Riverside County to $70,000 in Orange County. Petroleum manufacturing pays substantially higher, ranging from $75,000 in Riverside County to $117,000 in Los Angeles County.

[15] Output from the U.S Bureau of Economic Analysis and employment data from the U.S. Bureau of Labor Statistics.

Transportation equipment manufacturing and its related industries will be key partners in the joint effort to reduce mobile source emissions, as it plays a pivotal role in the research, development and deployment (RD&D) of advanced clean transportation technologies, whether they apply to light-duty passenger cars or heavy-duty commercial trucks. Funding programs can help lower the upfront financial barriers for deploying cleaner technologies and realize long-term benefits such as fuel-savings. Long-term cost-savings can potentially become greater over time as the sector shifts towards producing not only the hardware but the software that will be needed to help increase fuel efficiency. Past funding programs have incentivized several truck engine manufacturers to develop and demonstrate that ultra-low NOx technologies (0.02 g/bhp-hr) are technically feasible. These technologies have provided the basis for CARB's Low-NOx Engine Standard control measure for heavy-duty vehicles, proposed as part of the State Implementation Plan (SIP). Currently, the transportation equipment manufacturing industry in coastal counties provides 61,400 payroll jobs or nearly one percent of payroll jobs in the region and is projected to decline by 0.1 percent annually from 2016 to 2031. The average wage in this sector ranges from $41,000 Riverside County to $88,000 in Los Angeles County, which is about the overall average wage in Riverside County and nearly 60 percent higher than the average wage in Los Angeles County.

Restaurants would be affected by a NOx measure that proposes the installation of cleaner cooking equipment. Restaurants are one of the region's major small business employers with nearly all establishments employing fewer than 100 people.[16] It currently provides 594,000 payroll jobs and accounts for about eight percent of payroll jobs in the region. However, restaurants typically offer lower paying jobs—the recent annual compensation is on average about $17,000 in Riverside County to $20,000 in Los Angeles County, more than 60 percent below the average wages in these counties.

Energy producers, who are broadly considered to include the oil and gas extraction industry and the utilities sector, would also be affected by the proposed control measures. Oil and gas extraction is a highly capital intensive industry. While the industry's total output was as high as $1.4 billion in 2012,[17] it provides only a few thousand payroll jobs[18] in the region and pays on average six-figure wages that are similar to or higher than in the petroleum manufacturing industry. The industry sector of utilities currently provides 21,000 payroll jobs in the region. It offers high paying jobs in all counties with average pay ranging from $90,000 in San Bernardino to $101,000 in Orange County, which is 130 and 80 percent higher than the average wage in the respective counties. Job growth for energy producers is projected to remain relatively flat between 2016 and 2031.

Additionally, the industry of waste management and remediation service would be impacted by a VOC/PM2.5 measure. The industry currently provides 18,000 payroll jobs[19] and average pay ranges from $54,000 in San Bernardino County to $61,000 in Orange County, which is about 30 and eight percent more than the average wage in their respective counties. Construction, the fastest growing industry in the Basin, is expected to be directly affected by mobile source strategies incentivizing the conversion to cleaner equipment and a stationary source strategy regulating the VOC content of coatings, solvents, adhesives,

[16] Based on the establishment-by-size data for the four counties from the U.S. Census Bureau's 2014 County Business Patterns Database.

[17] Bureau of Economic Analysis.

[18] CES data do not provide job estimates for the oil and gas extraction industry; however, this industry belongs to the broader sector of mining and logging, with current number of jobs estimated at about 5,100. Moreover, the QCEW data indicated that, in Los Angeles County alone, the oil and gas extraction industry supplied approximately 2,000 jobs in the third quarter of 2015.

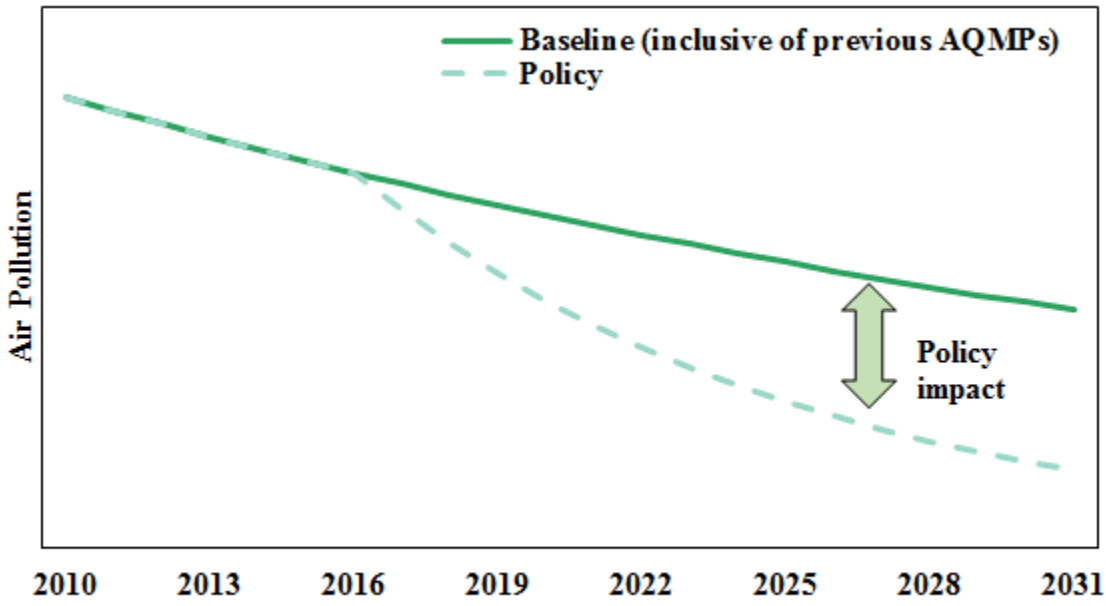
[19] Unlike other current job estimates, this figure is based on the QCEW 2015 third quarter data.

and sealants. In the meantime, however, construction could potentially benefit from additional revenues from installing control equipment. Currently, the construction industry provides 317,800 payroll jobs or about four percent of payroll jobs in the region. The industry is expected to grow at an average annualized rate of about two percent from 2016 to 2031. The average pay in the sector ranges from $50,000 in Riverside to $63,000 in Orange County, about 25 and 15 percent higher than the average job in the respective counties. Finally, the proposed control measures would also affect segments of the retail and wholesale trades (e.g., nurseries and wholesale garden suppliers), as well as commercial and industrial machinery and equipment rental and leasing.

Baseline Definition for Socioeconomic Assessment

A fundamental component in the practice of socioeconomic analysis is the definition of the baseline for analysis. The "baseline" is often referred to as the expected path (of pollution concentrations, the regional economy, etc.) without the implementation of a plan i.e. "policy". The difference between the baseline and policy scenario is the policy impact (an example of this is illustrated in Figure 1-4).

FIGURE 1-4: ILLUSTRATIVE EXAMPLE OF BASELINE AND POLICY SCENARIOS



For the purpose of this socioeconomic analysis, the impacts of the Draft Final 2016 AQMP, which is implemented in the policy scenario,[20] are evaluated with respect to the baseline scenario, which is a projection of the regional economy *without* the implementation of the control measures described in

[20] "Policy scenario" is used interchangeably with "control scenario" throughout the report, particularly in the discussion of regional air quality modeling as an input to the quantification of public health benefits.

Draft Final 2016 AQMP.[21] The baseline scenario is inclusive of any effects that have not yet occurred but are projected to occur as a result of all existing plans, regulations, and policies, including those adopted and implemented pursuant to previous AQMPs. Specifically, all SCAQMD rules adopted as of December 2015 and all CARB rules adopted by November 2015, are incorporated into the baseline, while rules after these dates are not (for more information see Draft Final 2016 AQMP Appendix III-B).[22]

The baseline scenario analyzed in this report is derived from the 2016 Growth Forecast, which is a long-term demographic and job forecast developed by SCAG (SCAG 2016). SCAG's growth forecast was used to guide the development of its 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), and it was also used by the SCAQMD to develop the baseline emissions inventory for the Draft Final 2016 AQMP and thus for air quality model projections. This growth forecast assumes that the four-county region would continue receiving federal highway funding to make the necessary infrastructure investments for implementing the 2016 RTP/SCS. For this reason, the baseline scenario for both emission inventory and socioeconomic analysis purposes includes implementation of the 2016 RTP/SCS.

The socioeconomic analysis herein attempts to address any deviations from the baseline as the Draft Final 2016 AQMP is fully implemented in terms of benefits of cleaner air, incremental costs of control strategies, and spillover impacts of direct benefits and costs. These deviations represent the socioeconomic impact of the Draft Final 2016 AQMP, and they do not overlap with any cost, benefit, and macroeconomic impacts analyzed for the 2016 RTP/SCS. The impacts of the 2016 RTP/SCS are separately summarized and discussed in Appendix IV-C of the Draft Final 2016 AQMP. Similarly, the air quality improvements projected in the Draft Final 2016 AQMP do not overlap with any emission reductions attributable to the 2016 RTP/SCS or any of its components such as the Transportation Control Measures (TCMs). TCMs are included in the Draft Final 2016 AQMP for air quality conformity purposes (for more information see Chapter 4 and Appendix IV-C of the Draft Final 2016 AQMP).

This baseline definition is employed consistently throughout the socioeconomic analysis both for quantifying costs and benefits, and for determining regional macroeconomic impacts from implementation of the Draft Final 2016 AQMP control strategies. The costs evaluated in this socioeconomic analysis are the total incremental cost expected to be incurred due to Draft Final 2016 AQMP control strategies. Any costs associated with TCMs and TCM-type projects included in SCAG's 2016 RTP/SCS are excluded from this analysis. Public health benefits reflect air quality improvements attributable to the Draft Final 2016 AQMP control measures. Any benefits associated with TCMs and TCM-type projects included in SCAG's 2016 RTP/SCS are excluded from this analysis. The regional macroeconomic impact model, REMI PI+ v1.7, baseline forecast is updated with the job and population forecasts from SCAG (2016), ensuring that the baseline used for costs and benefits analyses is consistent with that used for macroeconomic modeling (for more information see Appendix 4 of this report).

The socioeconomic analysis horizon is from 2017 to 2031, where 2017 is expected to be the year when the Draft Final 2016 AQMP is adopted and 2031 is the last year of the planning horizon, at which time the federal 8-hour ozone standard will need to be attained (see the Draft Final 2016 AQMP for the attainment demonstration). SCAG forecasts jobs and population in the four-county region to grow by 16 percent and 11 percent, respectively, from 2016 (base year for job growth) to 2031. The County of Riverside is

[21] These "without" (baseline) and "with" (policy) scenarios are different than "before" and "after" scenarios, because they control for changes over time.

[22] This includes the reduction in RECLAIM trading credits (RTCs) by 12 tpd by year 2022, which was adopted by the SCAQMD Governing Board in December 2015.

projected to grow at the fastest pace: jobs are projected to increase by 36 percent and population by 22 percent over the period of 2016 to 2031.

It should be noted that the receipt of federal highway funding for transportation investment in the region hinges on adopting an appropriate plan to achieve the federal air quality standards (i.e., the highway sanction clause in the CAA). Ultimately, failure to attain these standards could have undesirable economic consequences for the region if it results in the inability to have an approvable plan or results in a failure to implement the plan. However, this outcome is not incorporated into the baseline as the purpose of this socioeconomic analysis is to evaluate the impact of the Draft Final 2016 AQMP, not the impacts of a scenario where the region is penalized for failure to attain NAAQSs.

Current Socioeconomic Analysis Program

SCAQMD staff continually seeks to improve its analysis of socioeconomic impacts by expanding the scope of analysis, as well as the methods and tools utilized. Over the years, the SCAQMD socioeconomic analyses have evolved as shown in Figure 1-5. The evolution has been informed by two major reviews of the socioeconomic assessment procedures and guided by the Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group members, who are economists from academia, other government agencies (SCAG, CARB, and U.S. EPA), the Center for Continuing Study of California Economy (CCSCE), and other economic research and consulting firms. The first comprehensive review was conducted by the Massachusetts Institute of Technology (MIT) in 1992 (Polenske, et. al 1992). This review found that the SCAQMD surpassed most other agencies in analytical methods and recommended further enhancements, which included using alternative approaches in certain areas and working with the regulated community and socioeconomic experts to refine its socioeconomic assessment.

In 2014, Abt Associates, Inc. (Abt) conducted the second comprehensive review of the SCAQMD's socioeconomic assessments (Abt Associates 2014). This review found that the SCAQMD socioeconomic assessment is more comprehensive in both breadth and depth relative to those conducted by the majority of other agencies considered in Abt's evaluation effort. Abt also found that SCAQMD staff uses sound methodologies to analyze costs, health benefits, and economic impacts. For further enhancements, Abt provided a list of major and minor recommendations.

The key recommendations concerned multiple areas. First, Abt recommended that SCAQMD clearly define the baseline and policy scenarios, specifically, whether SCAG's TCMs and their associated benefits and costs are considered as part of the AQMP policy scenario. Second, while Abt supported the continued use of REMI for economic impact analysis, it recommended that SCAQMD staff: 1) use other modeling tools and analysis for small industry sectors and small businesses; 2) improve the REMI amenity inputs; and 3) keep abreast of the U.S. EPA's development of methods for applying benefits in economy-wide models. In addition, Abt advised that SCAQMD improve the uncertainty analyses, expand the environmental justice (EJ) analysis, and institute a systematic process to review and update recent literature in specific areas. Finally, in the interest of transparency, Abt recommended that the SCAQMD: 1) involve the scientific advisory group; 2) increase public outreach; 3) make the peer review process clearer; and 4) enhance documentation and clarity to consider different types of audiences.

Between the two reviews, there have been a number of major enhancements to the SCAQMD socioeconomic assessment. In 2000, towards the goal of expanding its analysis tools, SCAQMD staff commissioned BBC Research and Consulting to examine approaches to assess impacts of proposed regulations on a spectrum of facilities and to evaluate impacts of rules after their adoption. The study

results indicated the need to employ a variety of external data sources, construct internal time series data, and explore data sharing opportunities with other governmental agencies.

Beginning in 2000, published economic statistics at the industry level have moved away from the Standard Industrial Classification (SIC) system to the North American Industrial Classification System (NAICS) to include new and emerging industries such as information technologies, among others. In 2006, all the potentially affected point source facilities in the 2002 emission inventory were re-designated with appropriate NAICS codes. The American Community Survey (ACS) continuously samples population to provide up-to-date demographic statistics to supplement information not provided by decennial censuses. There are ACS one-year, three-year, and five-year estimates for various purposes. The 2006 to 2008 estimate was used to expand the four-county geography to 21 sub-regions from the previous 19 regions.

Since 2007, SCAQMD staff has used the Environmental Benefits Mapping and Analysis Program (BenMAP) to assess health benefits associated with reductions in exposure to criteria pollutants. BenMAP is currently maintained and used by the U.S. EPA to assess health benefits of federal rules. It is a geographic information system (GIS) application which integrates epidemiological studies with air quality and demographic data, as well as economic valuation methodologies to quantify health effects associated with pollutant concentration and economic values associated with these effects.

In preparation for development of the socioeconomic assessment of the Draft Final 2016 AQMP, SCAQMD staff has consulted with the AQMP Advisory Group, the STMPR Advisory Group, SCAG, CARB, California Department of Finance, and U.S. EPA staff, as well as independent consultants to discuss possible and future refinements to data collection, modeling, and other aspects of socioeconomic of analyses. In 2015, SCAQMD staff continued to refine its socioeconomic analysis as recommended by Abt. During 2015, staff held multiple study sessions with SCAG staff and consultants and came to consensus on the most suitable approach to define the baseline for the socioeconomic analyses. Three Requests for Proposals were issued relative to analysis of health benefits, environmental justice, and small scale economic impacts. A contract was issued for a third-party evaluation of macroeconomic modeling of public health and other non-market benefits. Based on a stakeholder request that was documented in the Abt report, but not recommended in the Abt report, another contract was issued for analysis of the health impacts of unemployment in the SCAQMD region. The findings of the latter two contracts were published and made available to the public (Lahr 2016; Tekin 2015).[23]

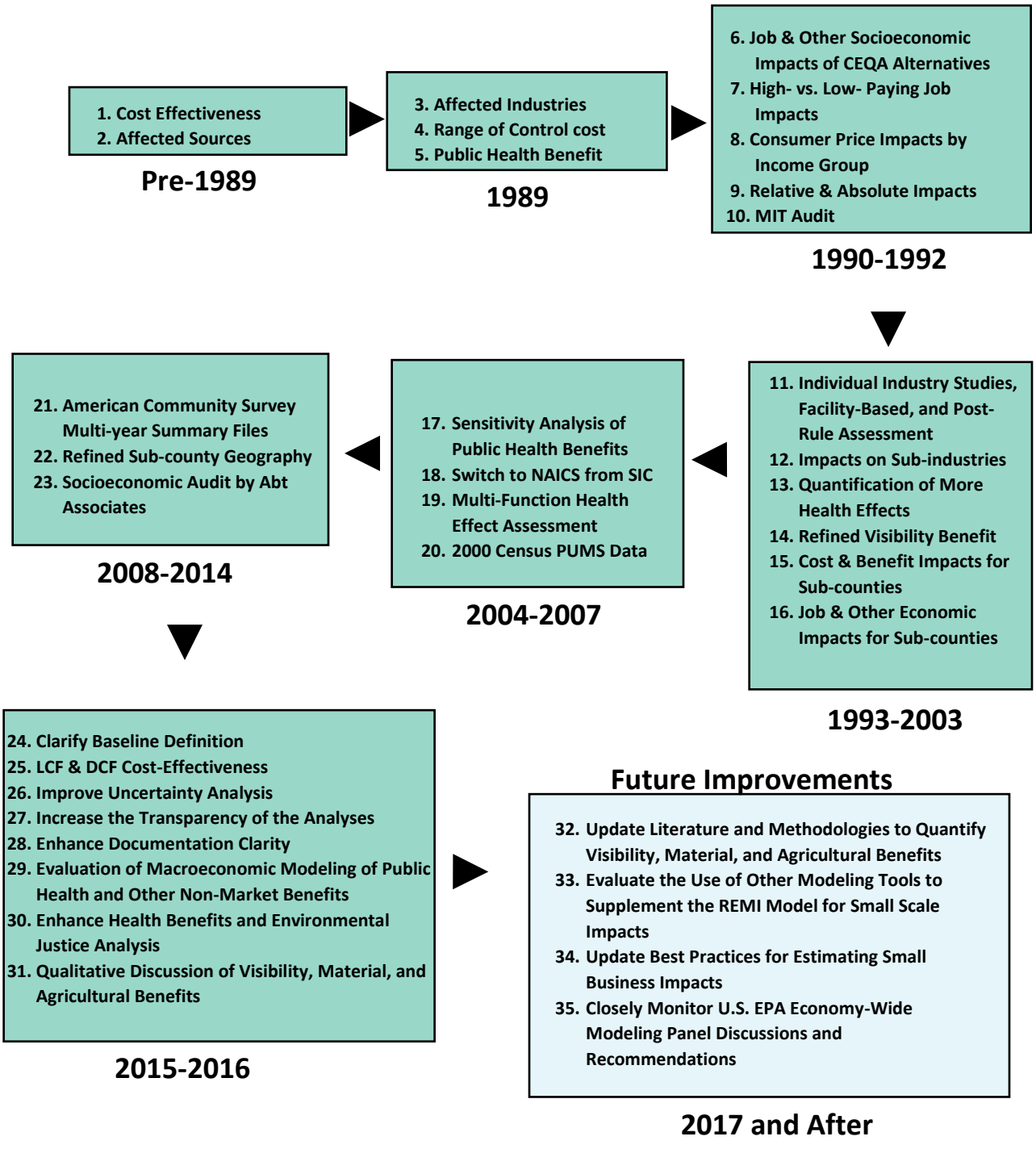
In addition, an Ad Hoc Governing Board Committee on Large Compliance Investments and Regulatory Uncertainty was formed in 2015 to evaluate recent concerns raised by the business community regarding investing in pollution control technologies only to have them become stranded assets as a result of later rule amendments. In 2016, the 2016 AQMP--Socioeconomic Assessment EJ Working Group was formed to further engage stakeholders to help staff enhance the impact analyses on EJ communities.

In addition to enhancements made to the costs, benefits, macroeconomic impact, and EJ analyses, other Abt recommendations are also implemented throughout this report. They include improving the

[23] The Evaluation of Macroeconomic Impacts of Non-Market Benefits can be found here: http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/lahr_evalmacroeconimpacts_041716.pdf
The Final Report on Unemployment and Health can be found here: http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/unemploymentandhealth_dec2015_012616.pdf

uncertainty analyses, increasing the transparency of the analyses, increasing public outreach, making the peer review process more transparent, and enhancing documentation and clarity to consider different types of audiences. The implementation of the Abt recommendations will be discussed in detail in the ensuing chapters and summarized in the closing chapter.

FIGURE 1-5: EVOLUTION OF SOCIOECONOMIC ANALYSIS



Chapter 2: Incremental Costs



The Draft Final 2016 AQMP control strategies will seek emission reductions from stationary and mobile sources through command-and-control regulations and incentives to help accelerate the deployment of cleaner equipment. The cost analysis herein quantifies the incremental cost associated with the additional actions needed to achieve sufficient emission reductions for attaining the federal ozone and PM2.5 standards.

What is Quantified in the Estimated Costs of Draft Final 2016 AQMP Measures?

Estimated costs associated with the Draft Final 2016 AQMP are characterized as incremental costs, not as the total cost of a particular control equipment or program. Specifically, they represent the cost difference between the baseline path and an alternative path as proposed by the Draft Final 2016 AQMP to reach the attainment targets. As an illustrative example, if a piece of low-emission replacement equipment costs $5,000, and without the proposed actions identified in the control strategies, it can be reasonably expected that an affected facility would normally purchase a conventional model as a replacement for $2,000, then the *total incremental cost* associated with purchasing the low-emission model would be $3,000 ($5,000-$2,000=$3,000). Suppose a $1,500 cash rebate is available, then the affected facility will not incur the total incremental costs, but the *remaining incremental cost* of $1,500 ($3,000 price difference between models - $1,500 rebate= $1,500).[1]

Present Value (PV) of Total Incremental Costs
= PV of Remaining Incremental Costs + PV of Incentives

Note that only the remaining incremental costs will be directly incurred by the affected entities, including businesses and consumers. The incentive funds may be financed by different levels of government from their existing revenue sources, or by introducing additional sources of revenue through new or increased taxes and fees. In the Draft Final Socioeconomic Report, it is assumed for modeling purposes that the federal or state government will be responsible for financing the entire incentive amount from their existing funds (see Chapter 4). Total incremental costs are calculated as the sum of incremental capital costs (e.g., equipment purchases and installation costs) and future incremental recurring costs over the equipment's expected lifetime that are associated with operation and maintenance (e.g., filter replacement and fuel costs/savings).[2] The present value, or interchangeably present worth value (PWV), of incremental capital costs is calculated by multiplying the unit cost of equipment by the number of affected units and discounting them from the year of capital spending back to 2017, or when a number of control strategies are expected to begin implementation.[3] The present value of incremental recurring costs are calculated by multiplying recurring costs or savings over the lifetime of the equipment by the number of affected units and discounting back to 2017. The present value of incentives are also

[1] These do not represent market prices and are for illustrative purposes only.

[2] CTS-01 (Coatings, Solvents, Adhesives, and Lubricants) has a reformulation cost associated with Rule 1168—Adhesive and Sealant Applications and is calculated by multiplying the price difference between compliant/non-compliant products and the annual sales of the product (in tons).

[3] A discount rate of four percent is used in the Draft Final Socioeconomic Report. See Appendix 2-A for more discussion on the discount rate.

discounted back from the year of capital spending to 2017. All present worth values are expressed in 2015 dollars. More details about the assumptions of cost estimates for each control measure can be found in Appendix 2-A.

Similar to previous AQMPs, the Draft Final 2016 AQMP contains control strategies with quantified emission reductions, as well as control measures with to-be-determined (TBD) emission reductions. It is important to note that NAAQS are expected to be attained with the quantified emission reductions alone. For the cost analysis in this report, incremental costs are estimated for the control strategies with quantified emission reductions only. Some of the control strategies with TBD emission reductions may serve as contingency measures to make up for any unexpected emission reductions shortfall. However, many of these control strategies include emergent technologies. Therefore, their emission-reducing potential may still need to be evaluated and their cost-effectiveness, and in some cases their costs too, remain highly uncertain or unknown at this time. Nonetheless, the inclusion of these TBD control strategies can provide strategic flexibility in the future. For example, as cleaner technologies develop, they can potentially become more cost-effective than the proposed control strategies with quantified emission reductions. As a result, SCAQMD may consider the more cost-effective option at the time of rule or program implementation. Appendix 2-A includes a discussion of each TBD control measure proposed by SCAQMD.

In addition, control measures that recognize co-benefit ozone and/or VOC emission reductions from other programs will not have incremental costs. Specifically, ECC-01, ECC-02, and ECC-04 recognize co-benefit credits from other *existing* programs that aim to promote energy efficiencies and greenhouse gas reductions. Similarly, CARB's "Further Deployment of Cleaner Technologies: On-Road Light Duty Vehicles" measure is primarily designed to reduce greenhouse gas emissions and therefore it is recognized as providing the co-benefit of NOx and VOC reductions that are expected to be implemented even if the Draft Final 2016 AQMP is not adopted. Finally, the costs associated with the *existing* Carl Moyer projects (part of MOB-14) will not be considered as part of the incremental cost of Draft Final 2016 AQMP. These existing Carl Moyer projects are included for the purpose of recognizing their associated emission reductions for the SIP submittal. These emission reductions are included in the baseline emission inventory. Therefore, they do not count toward the quantified public health benefits that will be discussed in Chapter 3.

Cost Summary of Draft Final 2016 AQMP Measures

As seen in Table 2-1, the total present worth value was estimated to be $15.7 billion for the total incremental costs associated with the Draft Final 2016 AQMP control measures, and the amortized amount was close to an average of $850 million per year between 2017 and 2031. The estimated annual cost of the Draft Final 2016 AQMP is less than one tenth of a percent (0.07 percent) of the $1.3 trillion worth of annual gross domestic output in the region.

The discount rate used in this analysis for discounting and amortization corresponds to a real interest rate of four percent. As a sensitivity test, a real interest rate of one percent—which is closer to the prevailing real interest rate—was used. Assuming a real interest rate of one percent, the amortized cost of the Draft Final 2016 AQMP was estimated at $628 million per year between 2017 and 2031. It should be noted that the amortization was performed for the upfront costs, mainly for expenditures related to capital outlay, over the equipment lifetime. However, many categories of equipment have an expected lifetime that will extend well beyond 2031. Therefore, the amortized annual average between 2017 and 2031 does not

reflect the entire present worth value of the total incremental costs. The amortized annual average can be considered as the expected spending per year between 2017 and 2031, if the affected entities would be able to finance their upfront costs and pay off the loan over the equipment lifetime with an equal amount of annual installments.

TABLE 2-1: ESTIMATED COSTS OF DRAFT FINAL 2016 AQMP MEASURES

Control Measures	Implementation Period for Cost Analysis	Present Value of Remaining Incremental Cost ($Million)		Present Value of Incentives ($Million)		Present Worth Value of Total Incremental Cost ($Million)	Amortized Annual Average 2017-2031 ($Million)
SCAQMD Stationary Source							
ECC-03 (Residential Building Energy Efficiency)	2018-2031	$246.6	+	$406.9	=	$653.5	$37.8
CMB-01 (Transition to Zero & Near-Zero Emission Technologies)	2018-2031	$1,883.0	+	$275.5	=	$2,158.6	$89.8
CMB-02 (Zero and Near-Zero Appliances)	2018-2031	$699.0	+	$503.5	=	$1,202.4	$51.6
CMB-03 (Emission Reductions from Non-Refinery Flares)	2020	$113.4	+	$0.0	=	$113.4	$6.3
CMB-04 (Restaurant Burners and Residential Cooking)	2018-2031	$320.6	+	$192.4	=	$512.9	$30.7
CMB-05 (NOx Reductions from RECLAIM Assessment)	2026-2031	$856.4	+	$0.0	=	$856.4	$19.3
CTS-01 (Coatings, Solvents, Adhesives, and Lubricants)	2018-2031	$31.6	+	$0.0	=	$31.6	$3.0
FUG-01 (Improved Leak Detection and Repair)	2022	$26.5	+	$0.0	=	$26.5	$2.5
BCM-10 (Emission Reductions from Greenwaste Composting)	2020-2031	$7.0	+	$0.0	=	$7.0	$0.6
BCM-01 (Further Emission Reductions from Commercial Cooking)	2025	$143.1	+	$0.0	=	$143.1	$10.8
BCM-04 (Manure Management Strategies)	2020-2031	$16.4	+	$0.0	=	$16.4	$2.0
Total for SCAQMD Stationary Sources		**$4,343.5**	+	**$1,378.2**	=	**$5,721.7**	**$254.6**
SCAQMD Mobile Source Measures							
MOB-10 (SOON Provision for Construction/Industrial Equipment)	2017-2022	$7.2	+	$63.4	=	$70.6	$4.6
MOB-11 (Extended Exchange Program)	2018-2022	$0.0	+	$66.2	=	$66.2	$6.7

Control Measures	Implementation Period for Cost Analysis	Present Value of Remaining Incremental Cost ($Million)		Present Value of Incentives ($Million)		Present Worth Value of Total Incremental Cost ($Million)	Amortized Annual Average 2017-2031 ($Million)
MOB-14 (Emission Reductions from Incentive Programs)	2017-2023	$26.7	+	$460.1	=	$486.7	$43.1
Total for SCAQMD Mobile Sources		**$33.9**	+	**$589.7**	=	**$623.5**	**$54.4**
CARB Mobile Source Measures Affecting South Coast							
On-Road Light-Duty							
Advanced Clean Cars 2	2026-2031	($2,648.0)	+	$0.0	=	($2,648.0)	($90.8)
On-Road Heavy-Duty							
Low NOx Engine Standard - California Action	2023-2027	$154.3	+	$0.0	=	$154.3	$11.7
Low NOx Engine Standard - Federal Action	2024-2031	$281.9	+	$0.0	=	$281.9	$15.1
Advanced Clean Transit	2018-2031	($521.5)	+	$312.2	=	($209.2)	($6.6)
Last Mile Delivery	2020-2031	$411.5	+	$0.0	=	$411.5	$29.2
Further Deployment of Cleaner Technologies: On-Road Heavy Duty*	2017-2031	$0.0	+	$4,191.5	=	$4,191.5	$269.8
Off-Road Federal & International							
More Stringent National Locomotive Emission Standards	2024-2031	$308.2	+	$0.0	=	$308.2	$12.0
Tier 4 Vessel Standard	2025-2031	$133.7	+	$0.0	=	$133.7	$3.9
At-Berth Regulation Amendments	2022	$90.4	+	$0.0	=	$90.4	$5.2
Further Deployment of Cleaner Technologies: Federal and International*	2017-2031	$120.3	+	$3,707.0	=	$3,827.2	$221.0
Off-Road Equipment							
Zero-Emission Off-Road Forklift Regulation Phase I	2023-2030	($134.8)	+	$0.0	=	($134.8)	($8.5)
Zero-Emission Ground Support Equipment	2023-2031	$3.3	+	$0.0	=	$3.3	$0.2
Small Off-Road Engines	2022-2031	$20.4	+	$0.0	=	$20.4	$2.1
Low-Emission Diesel Fuel Requirement	2023-2031	$867.7	+	$0.0	=	$867.7	$86.9

Control Measures	Implementation Period for Cost Analysis	Present Value of Remaining Incremental Cost ($Million)		Present Value of Incentives ($Million)		Present Worth Value of Total Incremental Cost ($Million)	Amortized Annual Average 2017-2031 ($Million)
Further Deployment of Cleaner Technologies: Off-road Equipment*	2017-2031	($2,453.2)	+	$4,435.5	=	$1,982.2	($18.8)
Other CARB SIP Measure Affecting South Coast							
Consumer Products Program	2023-2031	$70.1	+	$0.0	=	$70.1	$7.0
Total for CARB Measures Affecting South Coast		**($3,295.7)**	+	**$12,646.2**	=	**$9,350.5**	**$539.3**
Grand Total for All Quantified Costs		**$1,081.7**	+	**$14,614.0**	=	**$15,695.7**	**$848.3**

* Based on Table 4-20 of the Draft Final 2016 AQMP. Other CARB measures are based on data provided by CARB staff.
Note: 1) Numbers are expressed in 2015 dollars and may not sum up due to rounding.
2) A discount rate of four percent was used for both discounting and amortization.
3) Numbers in parentheses indicate cost-savings, mainly associated with fuel-savings

More than $9 billion, of the Draft Final 2016 AQMP's total incremental cost can be attributed to CARB's mobile source measures, which target on-road light and heavy-duty sources like cars, trucks, and buses as well as off-road sources like trains, ocean-going vessels, planes, and construction equipment.[4] This amount represents the net total of costs estimated for most of the CARB control measures and cost-savings anticipated from the remaining CARB measures, which include Advanced Clean Cars 2, Advanced Clean Transit, and Forklift Regulations. CARB's mobile source control strategies, while contributing to 60 percent of total cost, are expected to be generally more cost-effective and would lead to more than 80 percent of the emission reductions needed to attain the 8-hour ozone standard by 2031. This large share reflects the large amount of NOx emissions generated from mobile sources, which contributed about 88 percent of the region's total NOx emissions in 2012 and would continue to be the single largest category of emission sources if no further controls are implemented.

The SCAQMD's local mobile source measures are proposed mainly to facilitate local implementation of CARB's "Further Deployment" measures. The total incremental cost of three local mobile source measures, for which additional NOx emission reduction potentials were identified, was estimated to be $624 million in present worth value, with an amortized annual average of $54 million between 2017 and 2031. Two of these three measures focus on turning over older in-use construction and industrial diesel engines (MOB-10) and increasing market penetration of electric or low-emission gas powered lawn and

[4] The incentive amount and incremental costs for CARB's "Further Deployment" measures were based on Table 4-20 of the Draft Final 2016 AQMP. Cost estimates for the remaining CARB control measures were derived from data provided by CARB staff. In CARB's Mobile Source Strategy, Appendix A: Economic Impact Analysis (2016a), incremental costs are not presented in present worth values. Costs from CARB that apply to the four-county region have been converted to present worth values in this analysis.

garden equipment (MOB-11). The third measure (MOB-14) recognizes the expected emission reduction credits from existing and future projects enabled by Carl Moyer funds.

The SCAQMD's stationary source measures were estimated to cost $5.7 billion, with an amortized annual average of $255 million between 2017 and 2031. About 24 percent of these costs are associated with incentive programs that are built into a number of control strategies, including those for cleaner space and water heaters (CMB-02), restaurant burners (CMB-04), as well as enhancements in building efficiency (ECC-03) and the transition to zero and near-zero technologies at industrial facilities (CMB-01). Traditional command-and-control regulations focus on reducing NOx and/or VOC emissions from composting (BCM-10), non-refinery flares (CMB-03), fugitive leaks (FUG-01), and coatings, solvents, lubricants, and adhesives (CTS-01). The proposed NOx-reducing measures also include further amendments to the market incentive program RECLAIM (CMB-05). BCM-01 and BCM-04, which specifically target PM2.5 emission controls for under-fired charbroilers and from manure management respectively, are included as contingency measures in the event that the NOx and VOC control measures fail to produce sufficient PM2.5 co-benefits.

Among the $15.7 billion of total incremental cost, over 90 percent or $14.6 billion is associated with incentive-based measures or measures that include an incentive component for the purposes of accelerating further deployment of zero and near-zero emission technologies. The majority of incentive funds—about $10 billion—will be used to accelerate further deployment of cleaner transit systems, trucks, cars, as well as various types of off-road equipment, in order to achieve the large amount of NOx emission reductions needed from mobile sources. The $10 billion of incentives associated with the "Further Deployment" measures is an upper limit of the most likely funding necessary if no other actions are taken to achieve the associated emission reductions. There are other implementation approaches for the "Further Deployment" measures in addition to incentives programs. For example, operational efficiency improvements and deployment of connected vehicles, autonomous vehicles, and intelligent transportation systems could lead to emission reduction benefits and reduce the amount of incentives needed to achieve these emission reductions.

While production costs may rise initially for industries deploying cleaner technologies, incentive programs can help by offsetting a portion of the initial capital spending to shorten the payback period. This would further accelerate market penetration and promote wider adoption of low-emission technologies across industries. This is critical to lowering costs in the long-run as demand ramps up and local supply chains are developed. Accelerating the deployment of cleaner technologies may also increase benefits over time. For example, three measures focusing on advanced clean cars, advanced public transit, and zero-emission forklifts are expected to result in cost savings, mainly due to fuel savings.

Distribution of Draft Final 2016 AQMP Costs Across Economic Sectors

The total incremental cost of the Draft Final 2016 AQMP is expected to affect various parts of the regional economy. Many private industries and the public sector are expected to incur costs, although the amount borne by each party would vary. Table 2-2 shows the sectoral distribution of the Draft Final 2016 AQMP's total incremental cost. As mentioned above, over 90 percent of the total cost is associated with publicly funded incentive programs that eligible industries and consumers can use to offset the cost of purchasing cleaner technologies. Due to incentives and expected fuel savings, such as increased energy efficiency and

the use of renewable energies for residential buildings, consumers are expected to see total cost-savings of $2.3 billion.

TABLE 2-2: INCREMENTAL COSTS OF THE DRAFT FINAL 2016 AQMP BY SECTOR

Sector	Present Value of Incremental Cost ($Millions)	Share (Percent)
Agriculture, Forestry, Fishing, and Related Activities	$16	0
Oil and Gas Extraction	$131	1
Utilities	$664	4
Construction	$39	0
Manufacturing	$558	4
Nurseries, Wholesale Garden	-$32	(0)
Other Wholesale and Retail Trades	$1	0
Transportation & Warehousing	$791	5
Equipment Leasing and Rental	-$34	(0)
Administrative and Waste Management Services	$390	(2)
Health Care and Social Assistance	$1	0
Restaurants	$464	3
All Industries	$1,181	8
Subtotal of Private Industries	**$3,392**	22
Consumers	-$2,311	(15)
Government Spending	$14,615	93
Total	**$15,696**	**100**

Note: 1) Numbers are expressed in 2015 dollars and may not add up due to rounding.
2) Numbers in parentheses indicate cost-savings, mainly associated with fuel-savings.
3) An 'All Industries' category is included for measures with across-the-board cost impacts (i.e., CMB-01 & CMB-02).
4) Government spending captures mainly incentive funds, but it also includes expected control costs incurred by public agencies.

While some industries will benefit from incentives and long-term cost-savings, private industries as a whole are expected to incur $3.4 billion in incremental costs. Some control measures are expected to affect all industries, because widely used emission source equipment is being targeted. For example, all industries using traditional combustion for the production of facility power, heating, and steam production will be affected by a NOx control measure (CMB-01) incentivizing the transition to cleaner equipment. CMB-02 also seeks broad base NOx emission reductions from and commercial space and water heating.

Energy producers, who are broadly considered to include the utilities sector and the oil and gas extraction industry, are expected to incur a total incremental cost estimated at about $0.8 billion in combination, with $0.7 billion incurred by the utilities sector alone. The $0.8 billion total cost includes the cost associated with CMB-05 which would seek further NOx emission reductions from all RECLAIM sources,

including energy producers.[5] It also includes the cost associated with CMB-01 affecting facilities belonging to a wide variety of industries including energy producers. CMB-03 would also affect energy producers because it would require non-refinery facilities to install newer flares or to capture flare gas for beneficial uses, such as renewable energy generation.[6] In addition, this sector would incur additional costs from FUG-01 which seeks installation of advanced leak detection devices. While energy producers are expected to incur more than half of the cost estimated of all private industries. The cost-related job impact is expected to be proportionally small because, this sector is more capital intensive.

Both SCAQMD and CARB's mobile source strategies will primarily affect passenger transportation and the "goods movement" sector, the core of which constitutes freight transportation and warehousing. As shown in Table 2-2, transportation and warehousing, among all private industries, is expected to incur an estimated incremental cost of $791 million. The relatively moderate cost impact, as compared to the large amount of emission reductions from mobile sources, is mainly due to the incentive funds that will be used to lessen the financial impact to this industry sector.

SCAQMD and CARB recognize the importance of the goods movement sector to the regional economy, as well as the financial constraints faced by many small business operators that make up the majority of this sector.[7] Situated among the world's largest seaports and airports, the region's goods movement sector provides the critical service of delivering goods securely and promptly to and from businesses across the nation. In 2015, the U.S. waterborne trade totaled $1.6 trillion in value, of which nearly a quarter moved through the Ports of Los Angeles and Long Beach; in the same year, about one tenth of the $1 billion worth of total U.S. airborne trade traveled through the airports in the Basin.[8] Over the next 15 years, jobs in the transportation and warehousing sector are expected to grow at an annualized rate of 0.7 percent.[9] Much of this job growth will be concentrated in the Inland Empire region. The SCAQMD and CARB will work closely with industry stakeholders during the implementation stage to further fine-tune the mobile source strategies and explore and identify the most affordable and cost-effective pathway to reducing mobile source emissions.

The manufacturing sector is expected to incur an estimated incremental cost of $558 million. Some measures will impact this sector more broadly as in the case of CMB-01 which incentivizes the transition to zero and near-zero technology at industrial facilities. Other measures may potentially affect only a small number of manufacturing industries. For example, FUG-01 (leak detection and repair) and CMB-05 (RECLAIM) are expected to affect the petroleum and coal products manufacturers, including refineries, in addition to energy producers. As mentioned in Chapter 1, the number of total manufacturing jobs is

[5] Note that, due to data limitations for the time being, the incremental cost estimated for CMB-05 was based on the 2014 NOx RECLAIM amendments. The cost distribution among the industries reflect the estimated distribution as a result of the 2014 amendments and may not reflect the actual distribution of any future amendments to NOx RECLAIM.

[6] The potential economic benefits of energy conversion are not taken into account.

[7] For example, according to data presented by the California Trucking Association at the October 31, 2014 meeting of the 2016 AQMP White Paper Working Group "A Business Case for Clean Air Strategies," In 2006, more than half of California registered trucks belonged to fleets with five or fewer trucks, including one third being solo operators. The data source cited was the California Department of Motor Vehicles' 2006 data.

[8] Staff analysis based on data compiled by the U.S. Census Bureau (U.S. Merchandise Trade, Selected Highlights: Report FT 920).

[9] Based on SCAG's Growth Forecast for its 2016 RTP/SCS.

expected to mirror the nationwide trend and continue its long-term decline. This long-term decline is not expected to be affected by any potential effect from the proposed control strategies

The restaurant industry is expected to incur up to $464 million in estimated incremental costs. Restaurants will be mainly impacted by a NOx measure (CMB-04) which would require the installation of low-NOx burners in retail and quick service establishments utilizing commercial cooking ranges, ovens, and fryers. As mentioned earlier, BCM-01 is a PM2.5 contingency measure to control emissions from under-fired charbroilers, and its associated cost of $143 million may be potentially incurred by both small and large restaurants; currently, however, this cost is not expected to occur if ozone measures are implemented.

Restaurants are one of the major small business employers in the region. While currently providing 594,000 payroll jobs in the region, nearly all restaurants employ fewer than 100 people.[10] Moreover, restaurants typically offer lower paying jobs and many of their employees subsist on minimum wage.[11] Therefore, affordability for small businesses and the job impact on economically disadvantaged workers will need to be carefully taken into consideration during the implementation stage of these control strategies.

Unlike other industries, the administrative and waste management sector is expected to experience a total cost-savings of about $390 million. This sector is expected to incur gross incremental costs mainly due to a VOC/PM2.5 measure (BCM-10) which would require the use of emerging organic waste processing technology while restricting the direct land application of chipped and ground uncomposted greenwaste. Landscapers, who also work in this industry and primarily for small operations, may incur incremental costs associated with voluntarily upgrading to cleaner gardening equipment (MOB-11). However, this sector will also experience significant fuel savings from diesel industrial engines and commercial lawnmowers and turf equipment proposed by the CARB control "Further Deployment of Cleaner Technologies: Off-Road Equipment measure."[12] As a result, this sector will experience net cost-savings. Cost-savings estimated for the sectors of nurseries, wholesale garden and equipment leasing and rental are also due to fuel savings and building energy efficiencies.

Lastly, the construction industry is expected to incur an estimated incremental cost of up to $39 million for converting to cleaner equipment through SCAQMD's SOON program (MOB-10) and a VOC measure (CTS-01) to reduce emissions from chemical products like architectural adhesives and sealants used in construction. In the meantime, however, construction could potentially benefit from additional revenues that stem from installing control equipment and other activities that are expected to occur in other industries due to the proposed control strategies.

[10] Based on establishment by size data for 4-County region from the U.S. Census 2014 County Business Patterns Database.

[11] Recent annual compensation ranged from an average about $17,000 in San Bernardino to about $20,000 in Los Angeles (source: EDD QCEW database for 2015 Q3).

[12] Based on Table 4-20 of Draft Final 2016 AQMP.

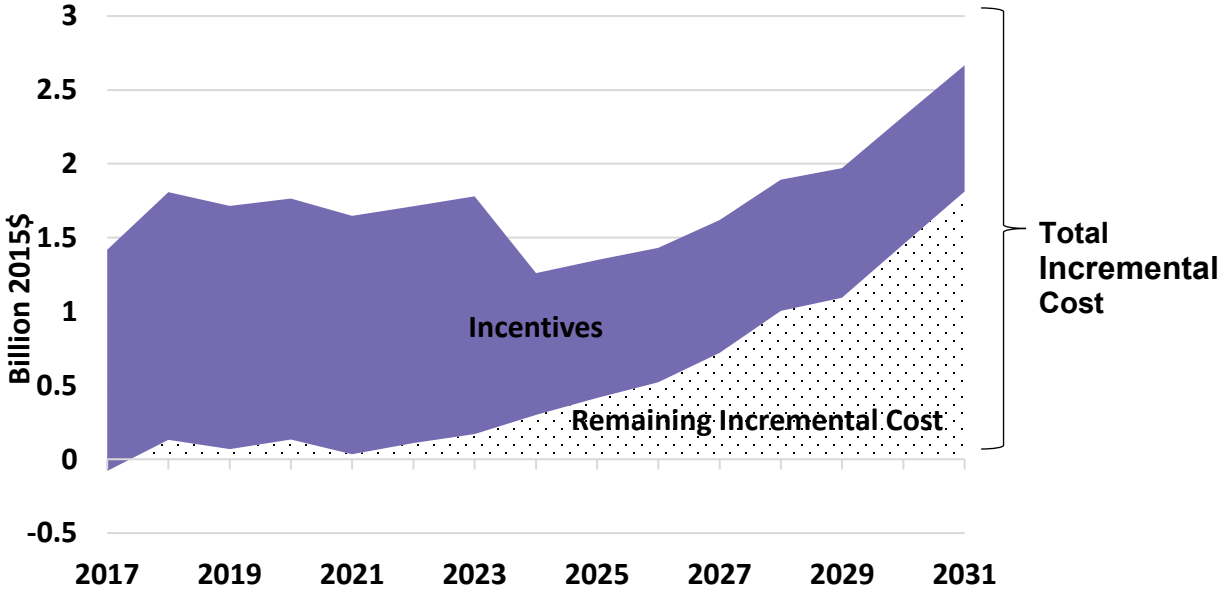
Incremental Costs over Time

Figure 2-1 illustrates the incremental costs of control measure equipment and programs attributable to each implementation year. Unlike the costs reported previously, these costs are not discounted to their present worth values, nor are they amortized over the equipment life.

The total incremental cost increases over time, due to each successive year of the Draft Final 2016 AQMP which will require a greater amount of more costly equipment and activities in order to achieve attainment of the NAAQS. The cost per year remains approximately constant from 2018 through 2022, as most of the incentive funding is expected to be available and similar equipment and programs are assumed to phase in over that time period to attain the 1997 8-hour ozone standard in 2023. The largest amount of incremental cost occurs towards the end of the analysis horizon, with the greatest cost year being the last year of attainment demonstration (2031), or the year when the 2008 8-hour ozone standard needs to be attained.

The total incremental cost increases from about $1.4 billion in 2017 to about $2.7 billion in 2031. The total incremental cost in 2017 consists of about $1.5 billion in incentives and $0.08 billion of fuel savings from more efficient equipment. In 2031, the total incremental cost consists of about $0.9 billion in incentives and $1.8 billion remaining incremental cost. It should be noted that the $850 million annual cost discussed earlier came from amortized costs over the life of the equipment and represents an annual average of the amortized costs between 2017 and 2031. In Figure 2-1, capital costs were reported in the expected year of capital spending instead of being amortized over the equipment life.

FIGURE 2-1: INCREMENTAL COSTS OVER TIME



Small Business Analysis

The SCAQMD defines a "small business" in Rule 102 for purposes of fees as one which employs 10 or fewer persons and which earns less than $500,000 in gross annual receipts. The SCAQMD also defines "small business" for the purpose of qualifying access to services from SCAQMD's Small Business Assistance Office (SBAO) as a business with annual receipts of $5 million or less or with 100 or fewer employees.

In addition to SCAQMD's definition of a small business, the federal Small Business Administration (SBA) and the Federal Clean Air Act Amendments (CAAA) of 1990 also provide definitions of a small business. The CAAA classifies a business as a "small business stationary source" if it: (1) employs 100 or fewer employees, (2) does not emit more than 10 tons per year of either VOC or NOx, and (3) is a small business as defined by the SBA. The SBA definitions of small businesses vary by six-digit NAICS codes. In general terms, a small business must have no more than 500 employees for most manufacturing and mining industries, and no more than $7 million in average annual receipts for most non-manufacturing industries.

Table 2-3 provides information on the share of small businesses in each industry potentially impacted by the Draft Final 2016 AQMP.[13] Small business impacts will be assessed in further detail during the rulemaking process, when more facility-specific data will be available. Furthermore, as part of Abt's 2014 recommendations, staff will evaluate the use of other modeling tools such as partial equilibrium modeling to supplement the REMI analysis when assessing for small scale impacts.

TABLE 2-3: SMALL BUSINESS SHARE OF AFFECTED INDUSTRIES, 2014

Industry Sector	Number of Establishments	Size of Employment		
		Less than 10 Employees	Less than 100 Employees	Less than 500 Employees
Oil and Gas Extraction	222	64%	95%	99%
Utilities	493	48%	87%	99%
Construction	26,678	79%	99%	100%
Manufacturing	20,403	58%	94%	99%
Nurseries, Wholesale Garden	314	71%	100%	100%
Transportation & Warehousing	10,994	71%	96%	99%
Equipment Leasing & Rental	1,002	67%	99%	100%
Waste Management	744	57%	94%	100%
Restaurants	33,249	47%	99%	100%
All Private Industries	**418,463**	**75%**	**98%**	**100%**

[13] Employment by establishment-size data from the U.S. Census Bureau's County Business Patterns for the Los Angeles-Long Beach-Anaheim and Riverside-San Bernardino metros.

Cost-Effectiveness Analysis

Based on the estimated total incremental costs for each measure and the projected emission reductions throughout the associated project life, cost-effectiveness was calculated for each control measure proposed in the Draft Final 2016 AQMP.[14] Following the 2014 Abt recommendations, cost-effectiveness based on both discounted cash flow (DCF) and levelized cash flow (LCF) methods were reported in Table 2-4 to facilitate comparisons with cost-effectiveness reported by other agencies and organizations.[15] It should be noted that, each cost-effectiveness value listed in Table 2-4 was calculated based on emission reductions of the primary target pollutant for attaining the ozone and PM2.5 NAAQS. However, many control measures also achieve reductions of other air pollutants. For example, many of the mobile source NOx control measures would additionally result in VOC and greenhouse gas emission reductions which are not reflected in the cost-effectiveness calculated in this section.

It is observed that, the stationary source measures for NOx are expected to cost between $10,000 and $50,000 per ton of emissions reduced, as calculated using the DCF method ($15,000 to $77,000 using LCF). Most of the mobile source measures would cost between $4,000 and $50,000 per ton of NOx reduced (using DCF, and between $6,000 to $69,000 using LCF), with many of them under $10,000 per ton. Additionally, a few mobile source measures proposed by CARB are expected to lead to long-term cost-savings due to lower fuel costs and operation and maintenance expenditures. However, two of CARB's mobile source measures are expected to incur a high cost per ton of NOx emission reduction. Under the "Last Mile Delivery" measure, a mix of battery electric and fuel cell trucks were assumed, and the latter technology carries a high per unit cost and a high cost to build up the infrastructure. Under the "Low-Emission Diesel Fuel Requirement" measure, the portion of the heavy-duty fleet that chooses to continue operating on internal combustion engines, instead of adopting the expectedly more cost-effective zero and near-zero emission technologies, is anticipated to incur additional costs due to the proposed requirement to utilize low-emission diesel fuel.

The limited and strategic use of VOC controls has cost-effectiveness values well below $10,000 per ton, regardless of the method used. These values are consistent with estimations for previous VOC regulations. Finally, cost-effectiveness of the contingent PM2.5 control measures were estimated to be $12,000 per ton of PM2.5 reduced and $19,000 per ton of NH3 reduced, respectively, as calculated using the DCF method ($14,000 and $23,000 respectively when calculated using LCF).

[14] Consistent with the estimation of total incremental cost, which accounts for capital cost of equipment and operation and maintenance costs throughout the equipment life, the project life of a control measure is calculated from the year the first pieces of equipment are expected to be installed to the year the last pieces of installed equipment are expected to be retired. The expected emission reductions were calculated based on the average emission reductions per unit of equipment over the equipment life or provided by CARB staff based on the Vision model. However, most of the expected emission reductions throughout the project life relied on linear interpolation based on the projected emission reductions in 2023 and 2031, as the equipment was generally assumed to be evenly phased in over the implementation period. If the project life would extend beyond 2031, the post-2031 emission reductions were assumed to stay constant as in 2031, except in the case where the estimated emission reductions per unit were used for year-by-year projections.

[15] A comparison of DCF and LCF methods, as well as more information for the methodology used, can be found in Appendix 2-B.

As mentioned in the 2014 Abt Report, the main difference between the DCF and LCF methods lies in how the costs are expressed. DCF utilizes the present value, or a stream of all present and future costs discounted to and summed up in the same initial year. In comparison, LCF amortizes all costs, incurred at present or in the future, into a yearly expenditure of equal amount over the project life. As the same amount of money is usually considered to be more valuable now than in the future (i.e., the financial concept "time value of money"), the same amount of cost is therefore lower when discounted to its present value than when amortized to the present and each future period of the project life. This is why a cost-effectiveness value as calculated using DCF is always lower than that calculated using LCF. In other words, the methodological choice is to some degree analogous to the choice of measurement units: the same length can be expressed as one inch or 2.54 centimeters, and the smaller (or greater) number should not be taken to indicate a shorter (or longer) length. Similarly, a cost-effectiveness value calculated using the DCF method should not be compared with another cost-effectiveness value calculated using the LCF method. In the interest of transparency and comparability and based on Abt's recommendation, staff had begun providing both values since the rulemaking process that led to the 2015 NOx RECLAIM amendments.

TABLE 2-4: COST-EFFECTIVENESS OF DRAFT FINAL 2016 AQMP MEASURES

Control Measures	Primary Target Pollutant	DCF (2015$/ton)	LCF (2015$/ton)
SCAQMD Stationary Source Measures			
ECC-03 (Residential Building Energy Efficiency)	NOx	$49,000	$77,000
CMB-01 (Transition to Zero & Near-Zero Emission	NOx	$39,000	$73,000
CMB-02 (Zero and Near-Zero Appliances)	NOx	$26,000	$49,000
CMB-03 (Emission Reductions from Non-Refinery Flares)	NOx	$10,000	$15,000
CMB-04 (Restaurant Burners and Residential Cooking)	NOx	$42,000	$68,000
CMB-05 (NOx Reductions from RECLAIM Assessment)	NOx	$17,000	$28,000
CTS-01 (Coatings, Solvents, Adhesives, and Lubricants)	VOC	$5,000	$6,000
FUG-01 (Improved Leak Detection and Repair)	VOC	$4,000	$4,000
BCM-10 (Emission Reductions from Greenwaste Composting)	VOC	$1,000	$1,000
BCM-01 (Further Emission Reductions from Commercial	PM2.5	$12,000	$14,000
BCM-04 (Manure Management Strategies)	NH3	$19,000	$23,000
SCAQMD Mobile Source Measures			
MOB-10 (SOON Provision for Construction/Industrial	NOx	$5,000	$8,000
MOB-11 (Extended Exchange Program)	NOx	$6,000	$8,000
MOB-14 (Emission Reductions from Incentive Programs)	NOx	$19,000	$31,000
CARB Mobile Source Measures Affecting South Coast			
On-Road Light-Duty			
Advanced Clean Cars 2	NOx	($771,000)	($1,072,000)
On-Road Heavy-Duty			
Low Nox Engine Standard - California Action	NOx	$8,000	$10,000
Low Nox Engine Standard - Federal Action	NOx	$8,000	$11,000
Advanced Clean Transit	NOx	($431,000)	($663,000)
Last Mile Delivery	NOx	$206,000	$296,000
Further Deployment: On-Road Heavy Duty	NOx	$12,000	$19,000
Off-Road Federal & International			
More Stringent National Locomotive Emission Standards	NOx	$6,000	$9,000
Tier 4 Vessel Standard	NOx	$4,000	$6,000
At-Berth Regulation Amendments	NOx	$15,000	$22,000
Further Deployment: Federal and International	NOx	$5,000	$11,000
Off-Road Equipment			
Zero-Emission Off-Road Forklift Regulation Phase I	NOx	($26,000)	($34,000)
Zero-Emission Ground Support Equipment	NOx	$50,000	$69,000
Small Off-Road Engines	NOx	$2,000	$3,000
Low-Emission Diesel Fuel Requirement	NOx	$203,000	$236,000
Further Deployment: Off-road Equipment	NOx	$6,000	$12,000
Other CARB SIP Measure Affecting South Coast			
Consumer Products Program	VOC	$5,000	$5,000

Note: All numbers are rounded to thousands. Negative values (in parentheses) indicate cost-savings. Each cost-effectiveness value was calculated for the primary target pollutant only and does not take into account additional emission reductions of other pollutants that would be simultaneously achieved.

Chapter 3: Public Health and Other Benefits



The Draft Final 2016 AQMP contains a suite of control strategies that are designed to attain the 80 ppb 8-hour ozone standard in 2023 and the 75 ppb 8-hour ozone standard in 2031. They are devised to also attain the 12.0 µg/m^3 annual PM2.5 standard and the 35 µg/m^3 24-hour PM2.5 standard. Attaining the ozone and PM2.5 standards will result in various benefits including better public health, improved visibility, and avoided damage to animals, crops, vegetation, and buildings.

One of the major recommendations of the 2014 Abt independent review of past socioeconomic analyses was to update the literature and methodology for benefits analysis (Abt Associates 2014). This report prioritizes the implementation of this recommendation in the area of public health benefits for two reasons. First, public health benefits usually account for the majority of quantified benefits associated with improved air quality.[1] Second, the primary ambient air quality standards were set to provide public health protection, whereas the secondary standards, in some cases less stringent than the corresponding primary standard,[2] were set to provide public welfare protection in other areas mentioned above. Moreover, Abt recommended that these analyses be updated with more current methodologies, which cannot be done in time for this report.

SCAQMD staff has worked closely with Industrial Economics, Inc. and its scientific advisors to provide an updated health benefits literature review and fine-tune the methodology used to quantify public health benefits and address the associated uncertainties in estimates. Despite these efforts, a full assessment of public health benefits in dollar terms is not possible until further advances occur in human health sciences, physical science, and economic disciplines that will allow monetary estimates to be made for currently unquantifiable areas. Public welfare benefits of the Draft Final 2016 AQMP are not quantified as explained above; however, these benefits are scientifically documented and are qualitatively discussed towards the end of this chapter.

Projected Emission Reductions and Changes in Pollutant Concentrations

Regional air quality modeling indicates that significant NOx reductions with additional strategic, limited VOC reductions will lead to the attainment of ozone standards. As shown in Table 3-1, the proposed control strategies were projected to significantly reduce NOx emissions by 124 and 128 tons per day (tpd) and strategically reduce VOC emissions by 64 and 72 tpd, in 2023 and 2031 respectively. These control strategies were also projected to generate sufficient PM2.5 co-benefits that will lead to attainment of the annual PM2.5 standard by 2025.

[1] For example, quantified public health benefits of the 2007 AQMP amounted to $16 billion for year 2023, compared to other quantified public welfare benefits of about $6 billion (in 2000 dollars). Similarly, quantified public health benefits of the 2012 AQMP amounted to $1.7 billion for year 2023, compared to other quantified public welfare benefits of $0.66 billion (in 2005 dollars).

[2] For annual PM2.5 standards, the secondary standard is 15.0 µg/m^3 whereas the primary standard is 12.0 µg/m^3.

TABLE 3-1: PROJECTED EMISSION REDUCTIONS BY POLLUTANT

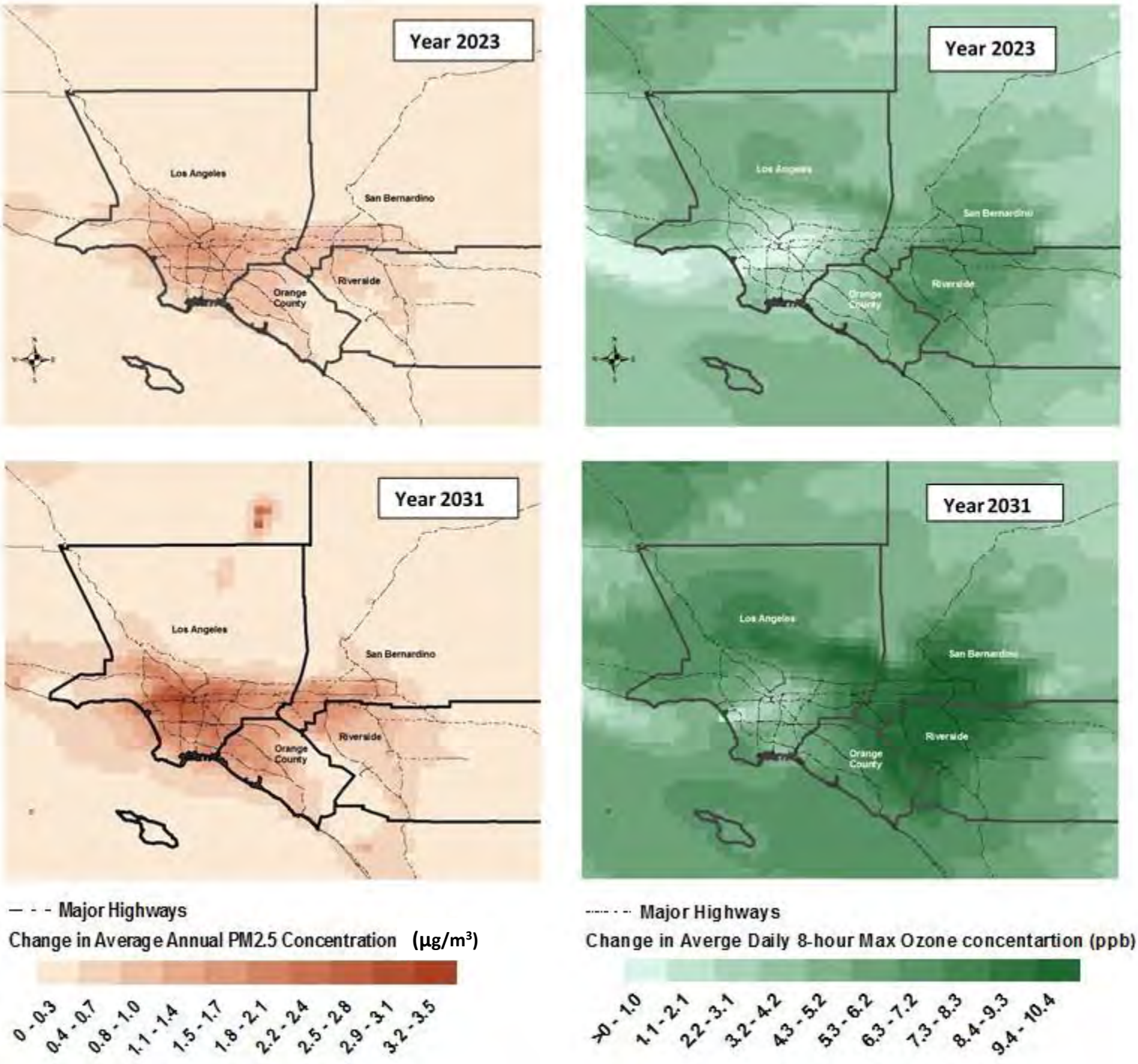
NOx Emissions (tpd)	**Year 2023**	**Year 2031**
Baseline Inventory	262	223
Reductions from Draft Final Control Strategies	124	128
Remaining Emissions	138	95
VOC Emissions (tpd)	**Year 2023**	**Year 2031**
Baseline Inventory	379	362
Reductions from Draft Final Control Strategies	64	72
Remaining Emissions	314	290

Note: Projected emission reductions are the average of the summer planning period (May 1 to September 30). The NOx emission reductions reported in this table reflect the latest regional air quality modeling results.

Although each attainment demonstration is performed with respect to the worst air quality site, the benefit assessment herein analyzed the changes in the projected air pollutant concentrations between the baseline scenario (without Draft Final 2016 AQMP) and the control or policy scenario (with Draft Final 2016 AQMP) in each air quality modeling grid of four kilometer by four kilometer. Thus, the quantified public health benefits discussed in this report are based on where projected air quality changes are expected to occur. Figure 3-1 shows the modeled changes in ozone and PM2.5 concentrations based on control measures proposed in the Draft Final 2016 AQMP, which will move beyond the already adopted regulations and already implemented programs to the level needed to attain the federal ozone and PM2.5 standards. Air quality modeling methods account for background concentrations of pollutants and thus concentrations projected in the control scenarios are above backgound concentration levels.[3]

[3] Background concentrations of chemical species are calculated with a global chemistry transport model (Model for Ozone and Related chemical Tracers, MOZART). Species concentrations from this model are fed into the modeling domain along the model boundaries. Temporally- and spatially-dependent MOZART data are used to capture the variability in background concentrations throughout the entire modelling year. Biogenic and Anthropogenic emissions from within the modeling domain are simulated with the MOZART-derived boundary conditions to estimate pollutant concentrations within the Basin. Therefore, the PM concentrations modeled for future years in this analysis are above the background levels.

FIGURE 3-1: MODELED CHANGES IN PM2.5 AND OZONE CONCENTRATIONS, 2023 AND 2031



Note: Ozone concentarations are the summer planning period average of daily 8-hour maxima, whereas PM2.5 concentrations are the annual average of 24-hour means.

Quantified Public Health Benefits

Numerous epidemiological as well as controlled laboratory studies have demonstrated a positive association between ambient air pollution exposure and increases in illness and other health effects (morbidity endpoints) and increases in death rates from various causes (mortality endpoints) (U.S. EPA 2009; U.S. EPA 2013). Groups that are most sensitive to the effects of air pollution are children, elderly persons, and people with certain respiratory and heart conditions.

Table 3-2 summarizes the causal determinations documented in the U.S. EPA Integrated Science Assessments (ISAs), based on the current weight of evidence regarding ozone and PM2.5 exposure (U.S. EPA 2009; U.S. EPA 2013).[4] Exposure to other pollutants, such as NO2 and SO2, has also been found to cause adverse respiratory effects.[5] However, based on the recommendation by Industrial Economics, Inc., this analysis does not quantify these effects to avoid potentially double counting benefits with reduced PM2.5 exposure (Industrial Economics and Thurston 2016b). Similarly, due to concerns of potentially double counting over the same health endpoint, not all causal or likely causal relationships listed in Table 3-2 are quantified in this report.

TABLE 3-2: SUMMARY OF U.S. EPA'S CAUSAL DETERMINATIONS FOR OZONE AND PM2.5 EXPOSURE

Health Category	Causal Determination	Quantified?
Short-Term Exposure to Ozone		
Mortality	**Likely to be a causal relationship**	**Y**
Cardiovascular Effects	**Likely to be a causal relationship**	N
Respiratory Effects	**Causal relationship**	**Y**
Central Nervous System Effects	*Suggestive of a causal relationship*	N
Effects on Liver and Xenobiotic Metabolism	*Inadequate to infer a causal relationship*	N
Effects on Cutaneous and Ocular Tissues	*Inadequate to infer a causal relationship*	N
Long-Term Exposure to Ozone		
Mortality	*Suggestive of a causal relationship*	N
Cardiovascular Effects	*Suggestive of a causal relationship*	N
Respiratory Effects	**Likely to be a causal relationship**	N
Reproductive and Developmental Effects	*Suggestive of a causal relationship*	N
Central Nervous System Effects	*Suggestive of a causal relationship*	N
Cancer	*Inadequate to infer a causal relationship*	N

[4] Descriptions for Weight of Evidence for Causal Determinations are provided in Appendix 3-A.

[5] See the Draft Final 2016 AQMP Appendix I for a discussion of health effects of ambient air pollution.

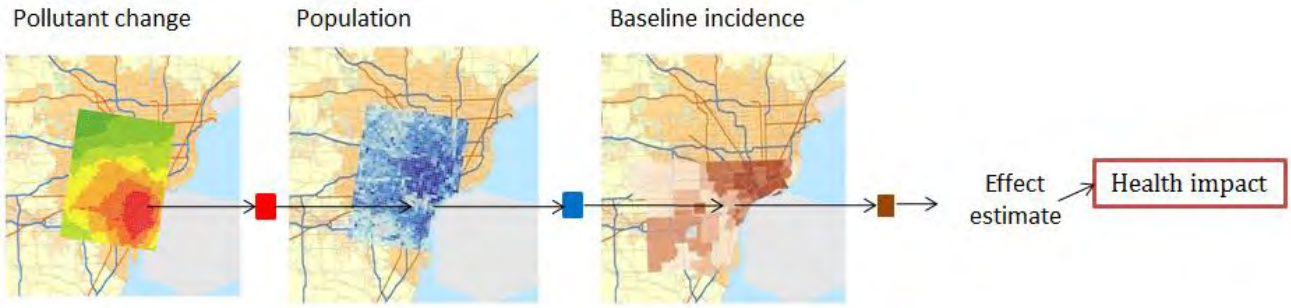
TABLE 3-2: SUMMARY OF U.S. EPA'S CAUSAL DETERMINATIONS FOR OZONE AND PM2.5 EXPOSURE (CONT'D)

Health Category	Causal Determination	Quantified?
Short-Term Exposure to PM2.5		
Mortality	**Causal relationship**	**Y[1]**
Cardiovascular Effects	**Causal relationship**	**Y**
Respiratory Effects	**Likely to be a causal relationship**	**Y[2]**
Central Nervous System Effects	*Inadequate information to assess*	
Long-Term Exposure to PM2.5		
Mortality	**Causal relationship**	**Y**
Cardiovascular Effects	**Causal relationship**	N
Respiratory Effects	**Likely to be a causal relationship**	**Y**
Reproductive and Developmental Effects	*Suggestive of a causal relationship*	N
Cancer, Mutagenicity, Genotoxicity	*Suggestive of a causal relationship*	N

[1] Health effects of short-term PM2.5 exposure on all-cause mortality is quantified and discussed separately due to concerns for potential double-counting with mortality effects due to long-term exposure.
[2] Effects of PM2.5 exposure on new onset of wheeze among adult populations are quantified but not monetized, due to lack of valuation method.
Source: U.S. EPA ISAs (2009; 2013)

The first step of a public health benefits analysis is the health effects quantification. Appropriate concentration-response (C-R) functions need to be selected, which numerically characterize the causal and likely causal relationships between exposure to a pollutant and various health endpoints. Specifically, the C-R function used in this analysis relates changes in ambient air pollution concentration with changes in mortality or morbidity incidence, the magnitude of which also depends on the baseline incidence rate and the population exposed to a specific health risk being analyzed (see Figure 3-2 for a graphic illustration).

FIGURE 3-2: HEALTH EFFECTS QUANTIFICATION



Source: U.S. EPA BenMAP Community Edition User's Manual.

C-R functions were determined based on a systematic review of the epidemiological literature, where studies were evaluated for quality and applicability according to numerous criteria (Industrial Economics and Thurston 2016a; Industrial Economics and Thurston 2016b). These criteria included: peer-review, date of the study, geography and population characteristics, and study design. Thus, the C-R functions applied in this analysis were found from recent, peer-reviewed articles, derived from local studies of the Basin or studies that report separate estimates using sub-samples pertaining to the Basin, where feasible. The 2016 RTP/SCS population forecast was provided by SCAG for each air quality modeling grid. When feasible, local health data based on public administrative records were utilized to obtain baseline incidence rates. Appendix 3-B describes in detail the input data and methodology used, as well as analytical assumptions such as cessation lags for mortality effects associated with long-term PM2.5 exposure that will have implications for monetizing health benefits. The public health benefit analysis is implemented using U.S. EPA's Environmental Mapping and Analysis Program – Community Edition (BenMAP-CE).[6]

Table 3-3 reports the health effect estimates for each health endpoint by pollutant. In total, it was estimated that more than 1,400 premature deaths will be avoided in 2023, and more than 2,700 in 2031, or an average of about 1,500 avoided premature deaths per year due to improved air quality as a result of implementing the Draft Final 2016 AQMP control measures. Figure 3-3 shows that mortality risks will be reduced in each of the four counties, with the largest number of avoided premature deaths concentrated in the densely-populated Los Angeles County area. Morbidity incidence is also reduced as a result of the Plan. It is estimated that reductions in ozone and PM2.5 concentrations will results in about 2,500 fewer asthma-related emergency department visits. In addition, the number of hospital admissions from all endpoints considered (asthma, cardiovascular, respiratory, and ischemic stroke) are estimated to decrease by about 700 per year on average.

[6] The operations of the BenMAP-CE by SCAQMD staff for estimating public health benefits in this report were reviewed by Dr. Jin Huang, a former project manager for the 2014 Abt review and the STMPR expert on BenMAP analysis. The operations were found to be appropriate as described in Appendix 3-C.

TABLE 3-3: HEALTH EFFECT ESTIMATES

	2023	2031	Average Annual
Premature Deaths Avoided, All Cause			
Short-Term Ozone Exposure[1]	45	89	49
Long-Term PM2.5 Exposure	1,394	2,716	1,512
Short-Term PM2.5 Exposure[2]	100	194	108
Reduced Morbidity Incidence			
Short-Term Ozone Exposure[1]			
Emergency Room Visits, Asthma	2,209	4,154	2,350
Hospital Admissions (HA), All Respiratory	68	148	78
Hospital Admissions (HA), Asthma	64	119	68
Minor Restricted Activity Days[4]	327,312	610,075	346,679
School Loss Days, All Cause[4]	100,034	184,781	105,451
Long-Term PM2.5 Exposure			
Acute Bronchitis	1,039	1,890	1,087
Short-Term PM2.5 Exposure			
Acute Myocardial Infarction, Nonfatal	33	71	38
Asthma Exacerbation (Wheeze, Cough, Shortness of Breath)	23,321	42,780	24,495
Asthma, New Onset (Wheeze)	2,956	5,577	3,151
HA, All Cardiovascular (less Myocardial Infarctions)	164	337	183
HA, All Respiratory (less Asthma)[3]	136	290	155
HA, Ischemic Stroke	79	171	91
HA and ED Visits, Asthma	142	260	149
Lower Respiratory Symptoms	12,268	22,387	12,850
Upper Respiratory Symptoms	24,342	44,720	25,587
Minor Restricted Activity Days[4]	528,869	961,248	552,809
Work Loss Days[4]	91,689	166,826	95,892

* Each health effect represents the point estimate of a statistical distribution of potential outcomes. Please see Appendix 3-B where the 95-percent confidence intervals are reported. Health effects for other years during the period 2017 to 2031 were based on interpolated, as opposed to modeled, air quality changes. The study population of each C-R function utilized can be found in Appendix 3-B.

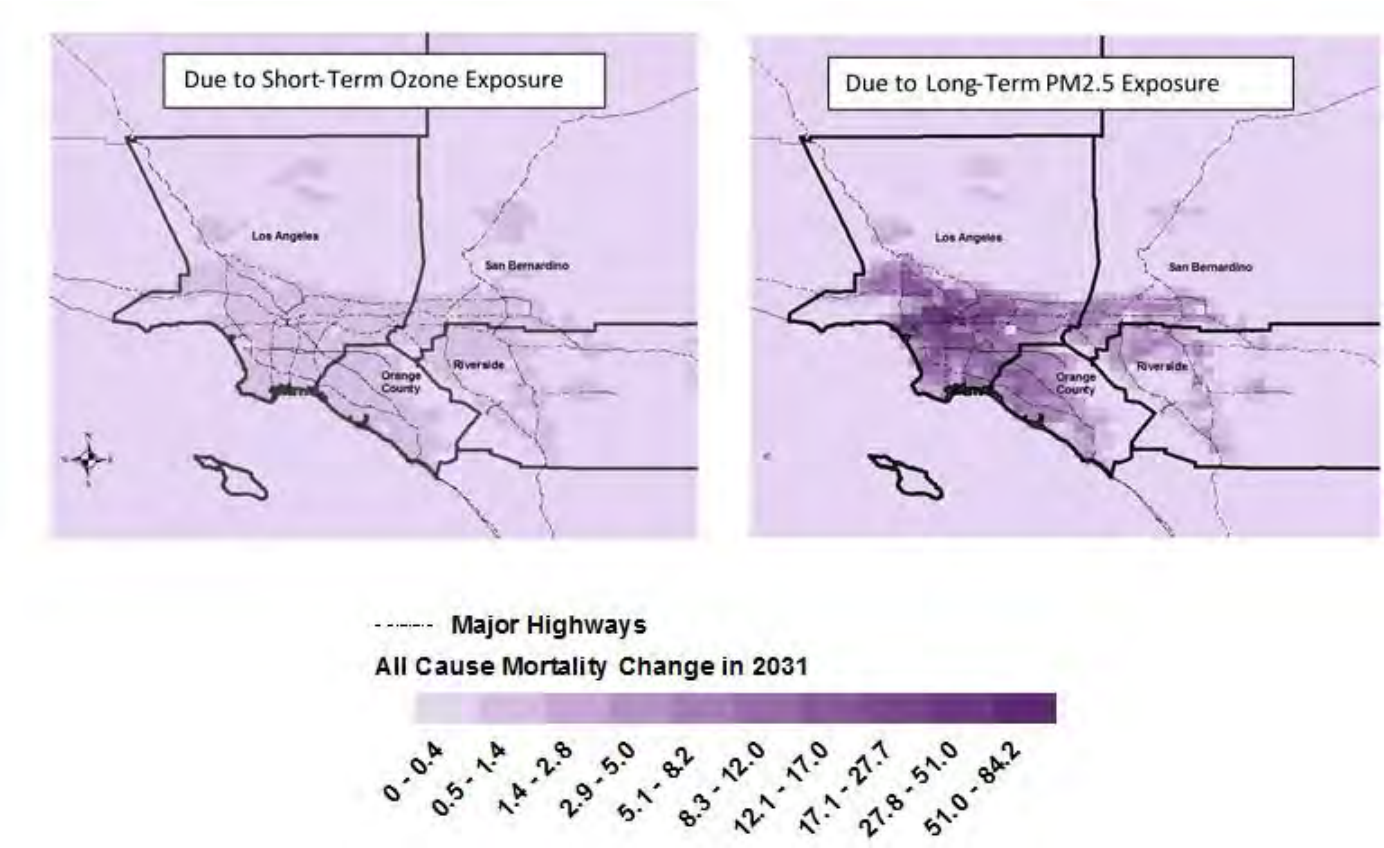
[1] Health effects of ozone exposure are quantified for the summer planning period only (i.e., May 1 to September 30). There are potentially more premature mortalities and morbidity conditions avoided outside the ozone peak season.

[2] Premature deaths avoided due to short-term exposure to PM2.5 are likely to partially overlap with those due to long-term PM2.5 exposure. Therefore, the total premature deaths associated with PM2.5 will be lower than simply summing across mortality effects from both short-term and long-term exposure (Industrial Economics and Thurston 2016a; Kunzli et al. 2001).

[3] This is the pooled estimate of two health endpoints: HA, Chronic Lung Disease (less Asthma) (18-64 years old) and HA, All Respiratory (65 or older).

[4] Expressed in person-days. Minor Restricted Activity Days (MRAD) refer to days when some normal activities are avoided due to illness.

FIGURE 3-3: SPATIAL DISTRIBUTION OF ESTIMATED PREMATURE DEATHS AVOIDED (YEAR 2031)



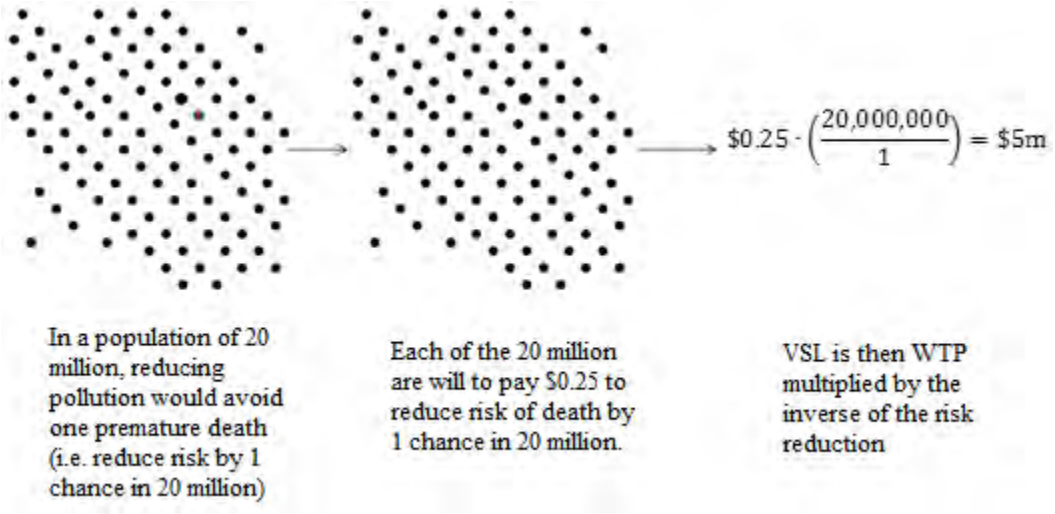
Basin residents are also expected to benefit from the avoidance of large numbers of hospital admissions, emergency room visits, school and work loss days, as well as various respiratory and cardiovascular symptoms. The all-cause mortality effects related to short-term ozone exposure were estimated based on pooling two LA city-specific C-R functions from Bell et al. (2005), and the all-cause mortality effects associated with long-term PM2.5 exposure were estimated based on pooling C-R functions estimated in Jerrett et al. (2005), Jerrett et al. (2013), and the kriging and land use regression results from Krewski et al. (2009). Details of these selected functions and the C-R functions used for morbidity effect estimates can be found in Appendix 3-B.

It should be noted that the health effect estimation does not use a concentration threshold below which the affected population would stop benefiting from further reduced exposure to ambient air pollution. In the analysis, health benefits will continue to accrue due to reduced exposure at all levels of pollutant concentration, even at levels below the current NAAQS.[7] This practice was recommended by Industrial

[7] Note that the control scenario being analyzed here is based on the Draft Final 2016 AQMP control strategies which are designed to bring the Basin into attainment of the federal ozone and PM2.5 standards. Due to the nature of emissions and air quality dynamics, there are spatial variations of pollutant concentrations across the Basin (see Chapter 5 of the Draft Final 2016 AQMP for detailed discussions). In the baseline scenario (without Draft Final 2016 AQMP), there are certain areas in the Basin where the modeled pollutant concentrations are already below the federal standards; however, there are also many other areas with modeled pollutant concentrations still exceeding the standards by attainment deadlines. In the control scenario, pollutant concentrations in all areas are expected to fall below the standards, with some falling slightly below and others significantly below. By not employing a

Economics, Inc. and based on the latest scientific evidence, including those summarized in the ISAs (U.S. EPA 2009; U.S. EPA 2013). It is also consistent with the current analytical approach adopted by the U.S. EPA in its regulatory impact analyses (U.S. EPA 2012; U.S. EPA 2015b).[8] It should also be noted that health effects related to ozone exposure are quantified only for the summer planning period of May 1 to September 30. There are potentially more premature mortalities and morbidity conditions avoided outside the peak ozone season.

FIGURE 3-4: ILLUSTRATIVE EXAMPLE OF VALUE OF STATISTICAL LIFE



Source: U.S. EPA, modified by Industrial Economics, Inc. and SCAQMD staff

After health effects are quantified, they are then translated into dollar values using two types of valuation methodologies.[9] Monetized benefits associated with avoided premature deaths are monetized based on a population's willingness-to-pay (WTP) for a small reduction of mortality risk in a year and generally expressed as the "value of statistical life (VSL)." As illustrated in Figure 3-4, the concept of VSL does not place a monetary value on saving a life with certainty; instead, it is an aggregate WTP of a population so

threshold in the analysis, public health benefits are being quantified for all reductions in pollutant concentrations between the baseline and the control scenarios that are attributable to the Draft Final 2016 AQMP.

[8] There was no threshold used in quantifying public health benefits of reduced ozone exposure in the 2015 Regulatory Impact Analysis (RIA) of the Final Revisions to the NAAQS for Ground-Level Ozone. In the same document and in the 2012 RIA for the Final Revisions to the NAAQS for Particulate Matter, the estimated total premature deaths avoided due to long-term exposure to PM2.5 was reported as the sum of two numbers: one represents the number of premature deaths avoided estimated at or above the lowest measured level (LML) of PM2.5 concentration, and the other represents the number of premature deaths avoided estimated below the same LML. This was done as one of the concentration benchmark analyses to address uncertainty. Meanwhile, the mortality-related benefits associated with reduced PM2.5 exposure was monetized for the total premature deaths avoided. More discussion can be found in Appendix 3-B.

[9] Health effects quantification and valuation in this analysis rely on existing high quality studies whose results are applicable and suitable for a benefits analysis of the Draft Final 2016 AQMP. This "benefit transfer" from existing studies to the analysis herein is necessary as it is not feasible for staff to conduct original research for all necessary inputs.

that the associated risk reductions are statistically equivalent to one case of premature death avoided.[10] The total monetized benefits of avoided premature deaths were derived by multiplying the number of premature mortalities reduced by the VSL. For morbidity effects, WTP was the preferred valuation method, but in many cases when such estimates are not yet available or reliable, cost of illness (COI) avoided were used to monetize morbidity risk reductions. Avoided COI is conceptually regarded as a conservative estimate of monetized health benefits, as it only accounts for avoided resource costs including direct medical costs and indirect productivity losses, but generally cannot fully account for the benefits of preventing pain and suffering associated with health-related issues.

As shown in Table 3-4, the overall quantifiable and monetized annual public health benefits are estimated to be $14.4 billion in 2023 and $30.9 billion in 2031 with an average annual of $16.5 billion. About 99 percent of these benefits are attributable to mortality-related benefits, among which the avoided premature deaths due to reduced long-term exposure to PM2.5 were estimated to account for over 95 percent of total monetized public health benefits. The estimates were based on the VSL of $9.0 million[11] and the assumption that the WTP for mortality risk reductions will increase as per-capita income grows; specifically, a one percent increase in income was assumed to raise VSL by 1.1 percent (i.e., an income elasticity of 1.1) (Industrial Economics and Robinson 2016a). These values correspond to a present value of quantified benefits of $173.2 billion at a four percent discount rate or $246.1 billion at a one percent discount rate, cumulatively from 2017 to 2031.

TABLE 3-4: MONETIZED PUBLIC HEALTH BENEFITS (BILLIONS OF 2015 DOLLARS)

	Year 2023	Year 2031	Average Annual (2017-2031)	Present Value (2017-2031)
Mortality-related benefits	**$14.2**	**$30.5**	**$16.2**	**$170.8**
Short-Term Ozone Exposure	$0.5	$1.1	$0.6	$6.1
Long-Term PM2.5 Exposure	$13.7	$29.4	$15.7	$164.7
Morbidity-related benefits	$0.2	$0.4	$0.2	$2.4
Grand Total	**$14.4**	**$30.9**	**$16.5**	**$173.2**

Note:
1) Numbers may not sum up due to rounding, and the present value was calculated using a four-percent discount rate.
2) Premature deaths avoided due to short-term exposure to PM2.5 are monetized separately due to potentially double counting concerns with benefits associated with long-term exposure.
3) Health effects of the endpoint "Asthma, New Onset (Wheeze)" are not monetized, due to lack of a valuation method.
4) The monetized public health benefits reported in this table were estimated for the four-county region, which includes areas that are located outside the Basin. However, staff estimated that mortality-related benefits accrued to the areas within the Basin would account for 99 percent of the total. In other words, the difference is minimal between quantifying public health benefits for the Basin and for the four-county region.
5) See Appendix 3-B for a detailed discussion regarding morbidity-related public health benefits.

[10] For more details, please see Industrial Economics and Robinson (2016a) and Robinson and Hammitt (2016).

[11] All VSL values presented here are in 2013 dollars and income levels, health benefits results estimated from them are converted to 2015 dollars using published U.S. GDP deflators for consistency with this report.

As noted for Table 3-3, the effects of reduced short-term PM2.5 exposure on mortality incidence likely overlap to some extent with those from long-term PM2.5 exposure. Thus, for the purposes of this analysis, we exclude the monetized value of these benefits from the total quantified public health benefits to avoid issues of double-counting. Here we provide the monetized value of avoided premature deaths from short-term PM2.5 exposure separately for informational purposes. Based on the estimated avoided premature deaths of 100 and 194 on average in 2023 and 2031, respectively, the corresponding monetized benefits are $1.0 billion and $2.1 billion per year using the mid-point estimate of VSL.[12]

Sensitivity and Uncertainty Analyses

It should be emphasized that, as with all scientific studies and evaluations, there are various sources of uncertainty surrounding the estimated public health benefits, including the uncertainty embedded in data inputs, uncertainty of the C-R functions chosen, and uncertainty of valuation. Given the significant contribution of mortality-related benefits, staff conducted several sensitivity and uncertainty analyses regarding three major sources of uncertainties in public health benefits estimations.

Sensitivity Analysis using Different Sets of VSL and Income Elasticity

The first sensitivity analysis considers alternative VSL and income elasticities. The base VSL of $9.0 million represents the mid-point of the recommended VSL range of $4.2 million to $13.7 million (Industrial Economics and Robinson 2016a). This VSL range is based on a review of recent, peer-reviewed studies on the value of mortality risk reductions and considered as reasonable for regulatory analysis (Robinson and Hammitt 2016). In addition, a lower income elasticity of 0 (i.e., VSL does not change with income level) and a higher income elasticity of 1.4 (i.e., a one percent income growth increases VSL by 1.4 percent) were also recommended to be used in the sensitivity analysis, based on a study by Viscusi (2015). Table 3-5 shows the range of monetized public health benefits, where the lower bound assumes a VSL of $4.2 million and an income elasticity of 0 while the upper bound assumes a VSL of $13.7 million and an income elasticity of 1.4. In 2023, the range of benefits is from $5.6 to $22.7 billion, and for 2031, the range is from $10.9 to $49.9 billion. The lower bound is ranges from about 35 to 40 percent of the mid-point benefits for 2023 and 2031, while the upper bound is about 160 percent of the mid-point estimate. Applying the same sensitivity analysis to the present value of quantified public health benefits, the range will be $64 billion to $271 billion, cumulatively from 2017 to 2031, with a mid-point estimate of $258.4 billion.

[12] Further information on this analysis can be found in Appendix 3-B.

TABLE 3-5: SENSITIVITY ANALYSIS OF MORTALITY EFFECTS VALUATION

Monetized Public Health Benefits (Billions of 2015 dollars)						
	2023			2031		
	Lower Bound	Mid-point	Upper Bound	Lower Bound	Mid-point	Upper Bound
Base VSL*	$4.2	$9	$13.7	$4.2	$9	$13.7
Income Elasticity	0	1.1	1.4	0	1.1	1.4
Mortality-related benefits	**$5.6**	**$14.2**	**$22.7**	**$10.9**	**$30.5**	**$49.9**

* The base VSL is expressed in millions of 2013 dollars and based on 2013 income levels.

Sensitivity Analysis using C-R Functions from Different Study Locations and Endpoints

To test the sensitivity of mortality-related health benefits to the recommended C-R functions for long-term exposure to PM2.5, three alternative sets of C-R functions estimated for different geographies and incidence data were used, as recommended by Industrial Economics (2016a). The sets of pooled C-R functions include those estimated from California data, those estimated from national data, and those estimated based on cardiovascular disease (CVD) related mortality incidence rather than all-cause mortality incidence. The first two sets of C-R functions consider studies conducted at progressively larger geographic scales, usually with larger sample sizes. The third set focuses on the impact of long-term PM2.5 exposure on cardiovascular mortality risk, based on studies of affected populations in Los Angeles and California. In addition to the consistent evidence of a causal relationship, the biological mechanism of how exposure to PM2.5 affects cardiovascular mortality risk was also extensively evaluated.

Table 3-6 shows the results of the sensitivity analysis for both health impacts and monetized benefits in milestone years 2023 and 2031. It can be seen that the quantified public health benefits appear to be lower under all three alternative sets of C-R functions, ranging from about 65 percent for the national estimates to 19 percent for the California estimates. However, it should be noted that only the national estimates are directly comparable to the main estimates because of similar study populations. The key difference between the main estimates and the national estimates stem from the estimated magnitude of how mortality risk responds to a change in PM2.5 concentration, which is lower in the national studies used. The other two sensitivity tests also have different magnitudes of concentration-response relationship, but there are additional differences. The sensitivity test based on California estimates consists of the pooling of two studies which have a large variance in their estimated C-R relationships. The pooling method based on IEc's recommendation weighs the study with the smaller magnitude of mid-point estimate (Thurston et al. 2016) much more than the other study with a larger magnitude mid-point estimate (Jerrett et al. 2013); if an equal weighting pooling method would have been applied to these two studies, it would result in greater health impact estimates which are closer to those found for the CVD studies. The CVD-only mortality impacts did not account for impacts associated with other causes of mortality and are thus likely underestimated the magnitude of total mortality-related benefits due to reduced long-term exposure to PM2.5 (Industrial Economics and Thurston 2016a).

TABLE 3-6: SENSITIVITY ANALYSIS OF PREMATURE DEATHS AVOIDED AND MONETIZED BENEFITS ASSOCIATED WITH REDUCED LONG-TERM EXPOSURE TO PM2.5

Scenarios	Premature Deaths Avoided (Annual Impacts)		Monetized Benefit (Billions of 2015$ per Year)	
	2023	2031	2023	2031
Main Scenario (L.A. Studies)	1,394	2,716	$13.7	$29.4
California Studies	258	509	$2.5	$5.5
National Studies	918	1,790	$9.0	$19.4
CVD (L.A. and CA Studies)	339	663	$3.3	$7.2

Distribution of PM2.5 Mortality-related Health Impacts by Lowest Measured Level

While the U.S. EPA concluded that, for both ozone and PM2.5, the current scientific evidence does not support the existence of a threshold concentration level below which no health impacts occur (U.S. EPA 2009; U.S. EPA 2013), various different health impact analysis have included a threshold, particularly for PM2.5, for the purpose of addressing the issue of statistical uncertainty at very low concentration levels (U.S. EPA 2012; U.S. EPA 2015b; CARB 2010). In these analyses, a threshold was determined by the lowest measured level (LML) of PM2.5 concentration in the study where the selected C-R function was estimated.

To address the uncertainty associated with this topic, a sensitivity analysis was conducted on the public health benefits of the Draft Final 2016 AQMP, using a threshold of 5.8 μg/m^3 based on the LML for national data and 9.5 μg/m^3 based on the LML for Los Angeles data, both from Krewski et al. (2009). It was found that 94 percent and 68 percent of the premature deaths avoided reported in Table 3-3 for 2031 are associated with PM2.5 concentrations that were reduced to 5.8 μg/m^3 and 9.5 μg/m^3, respectively (see Table 3-7). Therefore, at least 68 percent of the avoided premature deaths associated with reduced long-term exposure to PM2.5 can be regarded with sufficient confidence, as it accounts for concentration levels observed in at least one the studies from which the C-R functions were derived. Conversely, at most 30 percent of the health benefits are accompanied by a greater degree of statistical uncertainty, as they relied on extrapolation of study results.

The results of various sensitivity and uncertainty analyses conducted were consistent with the initial analysis. While it is important to recognize the uncertainties regarding valuation parameters, which specific function is most appropriate to use, and the extrapolation of concentration-response results to very low levels of pollution concentration, the sensitivity analyses continued to demonstrate the significant contribution of cleaner air to public health improvements, specifically from avoided premature deaths due to lower air pollution-related health risk.

TABLE 3-7: DISTRIBUTION OF MORTALITY-RELATED HEALTH IMPACTS BY LML SCENARIO IN 2031

	Avoided Premature Deaths		
LML scenario	**Above LML threshold**	**Below LML threshold**	**Percent above threshold**
5.8 µg/m^3	2,552	164	94%
9.5 µg/m^3	1,836	880	68%

Moreover, the quantifiable public health benefits associated with improved air quality were assessed relative to reduced morbidity conditions and premature mortalities from exposure to ozone and PM2.5, respectively. To avoid potentially double counting health effects, this analysis uses C-R functions that do not have overlapping health endpoints for the same age group, whether the overlap may be large or small. It also does not add to the overall quantified public health benefits the monetized value of avoided premature deaths due to short-term exposure to PM2.5, due to concerns over potentially double counting benefits with those associated with long-term exposure to PM2.5. Moreover, the present state of knowledge allows a quantitative assessment of the relationship between ozone and PM2.5 and the health effects as noted in Table 3-2. However, not enough information is currently available in scientific literature to allow for all adverse health effects identified to be measured and valued in dollars, mainly because sufficient data are not available to establish a quantitative relationship between these pollutant levels and some of these health effects. Hence, the quantified public health benefits may be underestimated.

It should also be emphasized that improved public health can generate direct economic benefits other than increased productivity and fewer lost work days in the short-term. As an example of other health benefits that can occur, but are not quantified here, a recent study (Isen et al. forthcoming) showed that improvement in early-childhood health has long-term economic benefits as well. Reductions of in-utero and early-infancy exposure to air pollution were found to increase labor participation among the affected individuals 30 years later; that is, working-age adults are more likely to hold a job when they were less exposed to air pollution as an infant.

Public Welfare Benefits

NAAQSs for criteria pollutants, set pursuant to the CAA, include both primary standards designed to protect public health and secondary standards to protect public welfare, including preventing damage to agriculture, ecology, visibility, buildings, and materials. In the previous section, the public health benefits associated with the Draft Final 2016 AQMP, which is designed to attain the federal ozone and PM2.5 standards, were quantified. The Draft Final 2016 AQMP is additionally expected to provide benefits protective of public welfare. Although these additional benefits are not specifically quantified for this AQMP, we provide a qualitative description of these public welfare benefits. We additionally include a discussion of the benefits estimated in these categories from the Socioeconomic Reports of previous AQMPs and the scientific literature that provided the methodological basis for quantification. The 2014 report by Abt Associates recommended that the literature and methodologies be updated to reflect the latest advancement in scientific knowledge and that the sufficiency of data and information should also be evaluated. Implementation of these recommendations will be conducted for future AQMPs.

Agricultural Benefit

Agriculture is an integral part of the economy in the Basin. Riverside and San Bernardino counties are ranked in the top 25 counties in California in value of agricultural commodity production. The total value of agricultural production in the four-county region was $2.3 billion, comprised of $1.36 billion from Riverside, $527 million from San Bernardino, $230 million from Los Angeles, and $132 million from Orange (CDFA 2015). Some of the leading commodities produced in these counties include: milk, nursery, grapes (table), hay (alfalfa), eggs, and cattle (milk cows).

Ozone damages vegetation and many crops more than all other pollutants combined. Since the early 1970s, numerous studies have shown that ozone inhibits crop productivity in California, resulting in reductions in crop yield (Larsen and Heck 1976; Oshima et al. 1976; CARB 1987). Improvements in air quality, in particular reductions in ozone concentrations, can improve the productivity of crops. The benefits to agriculture from improved air quality have been quantified in the Socioeconomic Report of previous AQMPs. Using results from more recent studies on the effects of ozone on crop yield (Olszyk and Thompson 1989; Randall and Soret 1998), combined with land-use and economic data, the cash value of increased crop yields that would result from implementation of the 2007 AQMP was estimated. It was projected that the 2007 AQMP would result in a cash value of $23.2 million (in 2000 dollars) for the year 2023. Since the 2012 AQMP was a PM2.5 plan, ozone concentrations were not modeled to derive agricultural benefits. In addition to the benefits to crops from reducing ozone, air contaminants can also damage livestock as they do humans. This livestock benefit was not quantified in previous AQMPs and is also not quantified here.

Implementation of the Draft Final 2016 AQMP will result in agricultural benefits such as increased productivity of agricultural crops in the four counties. However, updating the economic methods used for quantifying these benefits was suggested by Abt Associates (2014). These updates cannot be implemented at this time but are planned for socioeconomic assessments in future AQMPs.

Material Benefit

Material benefit is the benefit accrued by the reduction of damage to materials from air pollution. Studies have identified the types of damage that can occur from air pollution and estimated their monetary value. For total suspended particulate matter (TSP) in particular, it causes accelerated wear and breakdown of painted wood and stucco surfaces of residential and commercial properties (Murray et al. 1985). In addition, TSP leads to additional household cleaning costs due to soiling damages (Cummings et al. 1985). Using the results from these studies, the benefits of air pollution controls under previous AQMPs were estimated. The monetary benefit, as a result of implementing the 2007 AQMP, from decreases in cost for repainting stucco and wood surfaces, and cleaning and replacing damaged materials was projected to be $308 million (in 2000 dollars) for the year 2023. Material benefits due to the 2012 AQMP was projected to be about $13 million (in 2005 dollars) for the year 2023. The large difference between the benefits estimated from these two previous AQMPs is due to the 2007 AQMP being an ozone attainment plan with more PM2.5 co-benefits, whereas the 2012 AQMP was a PM2.5 attainment plan with fewer PM2.5 reductions.

In addition to the these damages, a link exists between several pollutants (ozone, sulfur dioxide, PM2.5, and nitrogen oxides) and ferrous metal corrosion; erosion of cement, marble, brick, tile, and glass; and the fading of fabric and coated surfaces (Cummings et al. 1985; Murray et al. 1985). The damage and conversely the potential benefits from reducing the exposure to these items currently cannot be

quantified and valued in dollars.

There will also be benefits of reduced damage to materials as a result of the Draft Final 2016 AQMP, which will reduce PM2.5 and correspondingly TSP. However, the studies used previously to quantify these benefits are outdated, and the Abt report (2014) recommended not quantifying these benefits until a systematic literature review of current research on this topic could be conducted and the sufficiency of data and information could be reevaluated. This literature review is planned for socioeconomic assessments in future AQMPs.

Visibility Benefit

Visibility benefits are the benefits individuals place on the ability to see distant vistas, in places where they live, work, and travel. In qualitative terms, an example of this for the Basin is the value people place on being able to see the San Gabriel Mountains, which were designated a National Monument, from much greater distances, more often. Studies have found that individuals place a monetary value on being able to see distant vistas (Smith and Osborne 1996). A local study by Beron et al. (2001), which estimated parameters that could quantify the value of these visibility benefits,[13] was applied to valuation of the visibility improvements of previous AQMPs. The visibility benefit of the 2007 AQMP was projected to be $5.2 billion (in 2000 dollars) for the year of 2020, and $649 million (in 2005 dollars) as a result of the 2012 AQMP for the year of 2023. The larger benefit from the 2007 AQMP is due to a greater reduction of PM2.5 concentrations than those achieved in the 2012 AQMP.

There will also be benefits to visibility as a result of the air quality improvements achieved from implementing the Draft Final 2016 AQMP. However, quantification of these benefits was not performed in this analysis based on a recommendation from Abt Associates (2014). The Abt report argued that the local study used to monetize the visibility benefits in previous AQMPs had shortcomings and was dated;[14] therefore, an updated methodology is needed to accurately estimate these benefits. This methodology update is planned for socioeconomic assessments in future AQMPs.

[13] This study used a method called hedonic price analysis, which uses property values along with a diverse set of attributes to estimate the implicit prices of attributes that are associated with a good exchanged in the market.

[14] The methodological improvements since Beron et al. (2001) was published would address issues such as endogeneity in spatial sorting of communities, choice of functional form for the econometric model, and the difficulty of measuring amenities from available data that are likely present in that research.

Chapter 4: Macroeconomic Job Impacts



Chapters 2 and 3 of this report estimated the incremental costs and quantified the public health benefits associated with the proposed Draft Final 2016 AQMP control measures, respectively. The control measures are designed to provide a path to clean air targets and address federal CAA requirements for ozone and PM2.5 standards. The costs and benefits of the Draft Final 2016 AQMP are expected to alter, to various degrees, the economic decisions made by households, businesses, and other economic actors. Some businesses would see production costs go up while other businesses would benefit from a greater demand for their services and technologies. For consumers who consider purchasing or replacing vehicles or certain household appliances, the proposed control strategies would also change or widen the range of product choices that differ in fuel types, energy efficiencies, effective unit prices, and thus potential payback periods. In the meantime, improved public health would contribute to higher labor productivity and reduce healthcare-related expenditures. All these direct effects would then cascade through the regional economy and produce indirect and induced macroeconomic impacts. The immediate and subsequent effects may not just occur in the short-term, but some of them may also have lasting impacts that would subside only after a long period of time.

These direct, indirect, and induced macroeconomic impacts were assessed through a multi-year, multi-sector, and multi-region economic model customized by REMI for the SCAQMD.[1] This model contains 21 sub-county regions within the four-county area of Los Angeles, Orange, Riverside, and San Bernardino, and the rest of the world. The production of the model economy is comprised of 70 public and private sectors. The regionalized input-output framework used in the REMI model depicts the inter-industry relationships and interactions between different sectors of the model economy. The structure of each sub-county region's economy is represented through production, sales, and purchases between sectors; demand and supply of products in each sector; expenditures made by consumers, businesses, and governments; and trades of goods and services which occur between one sub-county region, the rest of the sub-county regions, and the rest of the world. REMI is a dynamic model which simulates the difference in jobs and other macroeconomic variables annually. REMI simulates annual job impacts, resulting in a projection of either jobs gained or foregone. Jobs foregone consists two conceptually distinctive components: jobs losses and jobs not created, but they cannot be numerically separated.

The macroeconomic impacts associated with the Draft Final 2016 AQMP were simulated and projected relative to the baseline forecast for the regional economy, which excludes the implementation of the proposed control strategies in the Draft Final 2016 AQMP. Consistent with the baseline air quality modeling and emission inventory analysis in the Draft Final 2016 AQMP, the baseline economic forecast utilizes the 2016 SCAG Growth Forecast (SCAG 2016), specifically its population and job projections.[2] The regional job impacts were simulated for incremental costs only, public health benefits only, and a combined scenario. The REMI model provides policy variables through which the incremental costs and public health benefits can be entered as changes to the economic variables or parameters in the model equations. In addition to job impacts, potential impacts on regional competitiveness are simulated as part of this analysis and included in Appendix 4-C.

It should be emphasized that the REMI model is designed and used mainly to assess the potential macroeconomic impacts on the overall regional economy and the various sectors within the economy. It is not designed to predict potential impacts on an individual business or facility. Moreover, due to both model and data constraints, the analysis does not take into account the air quality management plans being proposed

[1] REMI Policy Insight Plus (PI+) South Coast Sub County Model v1.7.3 (Build 3967). For a full description of the REMI methodology, please refer to the REMI documentation available at http://www.remi.com/products/pi.

[2] Appendix 4-A describes the 2016 SCAG projections of population and jobs, as well as the procedures taken by staff to adjust and update the default REMI baseline forecasts based on SCAG projections and the modeling implications of this update.

by other air districts, such as the 2016 ozone and PM2.5 plans by the San Joaquin Valley Air Pollution Control District. It is possible that the macroeconomic impacts of these other plans can potentially spillover to the South Coast region, therefore attenuating in some cases and reinforcing in other cases the macroeconomic impacts projected in this chapter. Further, the state and federal actions proposed by CARB would concurrently affect the four-county region and other regions in the state or in the nation, and these effects may change relative prices and other relative conditions between the regional economy and the rest of the world. However, these concurrent effects in other regions are not incorporated in the macroeconomic impact analysis because the customized REMI for the SCAQMD's socioeconomic assessment does not explicitly model regions outside the four counties. While these effects may also attenuate or reinforce the projected impacts, the magnitudes are expected to be sufficiently small.

Projected Job Impacts Due to Estimated Incremental Costs

As discussed in Chapter 2, the total present worth value (PWV) of incremental costs associated with the Draft Final 2016 AQMP control strategies was estimated to be $15.7 billion, and the amortized annual average amounted to $850 million per year between 2017 and 2031. Consumers would see net cost savings of $2.3 billion, mainly due to fuel savings from zero and near-zero emissions light-duty vehicles and also from using residential appliances with higher energy efficiency. In the REMI model, these cost savings would then allow consumers to spend more on other goods and services, whether locally supplied or imported from outside the four-county area.[3]

Almost all private industry sectors in the regional economy are expected to incur varying amounts of cost increases as a direct result of implementing the proposed control strategies (see Table 2-2 in Chapter 2). The additional cost is modeled as a higher cost of doing business, along with a projected decrease in industry output which is seen as a direct effect of the increased costs. Even so, it should be noted that there are also cases where the proposed control strategies generate significant fuel or operation and maintenance cost-savings such that the cost of doing business may be partially offset or actually decrease, especially when coupled with incentives. These decreases in costs would enable regional businesses to increase their output.

These direct changes in the cost of doing business are accompanied by an increased demand for air pollution control equipment or zero and near-zero emission technologies (e.g. low-NOx trucks, burners and heaters), as intended by the proposed control strategies in the Draft Final 2016 AQMP. This would result in increased output and sales for the suppliers of this equipment which would additionally benefit the upstream suppliers who provide intermediate inputs to manufacture such equipment. These potential beneficial impacts flowing from the increased demand on suppliers would highly depend on the location(s) of the potential suppliers. Due to lack of such information in many cases, staff largely relied on REMI's embedded assumption regarding the share of increased local demand met by local *versus* outside suppliers.

The government sector is expected to incur the largest share of the total estimated incremental cost: about 93 percent, or $14.6 billion in PWV. The vast majority of this cost would be expended on the proposed incentive programs, which are devised to accelerate the deployment of zero and near-zero emission technologies. In the event where no additional revenues are raised, the estimated government spending to provide clean air incentives would need to be appropriated from unallocated and non-earmarked funds or from funds for discretionary programs that are supported by existing revenue sources. To be conservative

[3] See Appendix 4-B for the policy variables used in the REMI analysis associated with incremental costs.

about the prospect of securing additional public revenue from new sources and also to be consistent with CARB's modeling approach for the state's mobile source strategy (CARB 2016), the primary scenario of the REMI analysis assumed that all incentive programs would be funded by existing revenue sources for the state budget. This scenario would require a state government budget reallocation and affects the provision of public services in the REMI model. Moreover, this scenario conservatively assumes that the modeling approach adopted in this primary scenario considers that the budget reallocation only affects state funding for the four-county region and does not directly affect other regions within the state.

All of these different cost and demand changes are entered into the appropriate REMI policy variables. Overall, the incremental costs from implementation of the Draft Final 2016 AQMP are projected to result in, on average, slightly more than 9,000 jobs foregone per year during the period from 2017 to 2031. The number of jobs foregone includes both potential job losses and forecasted jobs not created, and 9,000 jobs foregone would represent a 0.08 percent decrease from the baseline total of jobs in the four-county region. This represents an annualized job growth rate of 1.01 percent from 2016 to 2031, which implies a less than 0.01 percentage point slowdown from the baseline job growth forecast. Table 4-1 shows the job impacts by industry sector for the initial implementation year of the Draft Final 2016 AQMP (2017), the milestone years for ozone attainment demonstration (2023 and 2031), as well as the annual average between 2017 and 2031.

All sectors, except manufacturing (NAICS 33) and management of companies and enterprises (NAICS 55), are expected to provide fewer jobs relative to the baseline forecast. The jobs forgone projected for each of these sectors represent a decrease of less than one percent from each sector's baseline job counts. The average annual job impacts show that the state and local governments together would account for more than half of overall jobs foregone in the region. Most of this projected decrease from the baseline forecast would occur to state jobs within the four-county region, largely due to the modeling assumptions that the proposed incentive programs would be funded by existing sources of state government revenues and that this would only affect state budget spending within the four-county region.

In the REMI model, the reallocation of public funds to the proposed clean air incentive programs would directly result in funds diverted from local spending and thus jobs foregone in many sectors of the regional economy. For example, the construction sector would see jobs foregone mainly due to reduced government spending on local projects such as infrastructure improvements. Despite these projected decreases in the number of jobs from the baseline forecast, the proposed incentive programs would create indirect benefits for the suppliers of zero and near-zero emission vehicles and equipment. However, the four-county region is not expected to reap much of these benefits since most of the equipment targeted by the proposed incentive programs was assumed to be manufactured outside the region, based on the current industry structure of the regional economy that is summarized in the simplified model economy. Whether this model assumption holds true throughout the analysis horizon will significantly impact both the direction and the magnitude of the REMI analysis results.

TABLE 4-1: ANNUAL REGIONAL JOB IMPACTS OF INCREMENTAL COSTS BY SECTOR

Assuming Incentive Programs Funded by Existing Sources of *State Government Revenues*
(Relative to Baseline)

Sector	NAICS	Jobs			Average Annual (2017-2031)		
		2017	2023	2031	Jobs	Baseline Jobs	% Change
Agriculture, Forestry, Fishing, and Related Activities	11	-9	-7	1	-4	28,747	-0.01%
Mining, Oil and Gas Extraction	21	-59	-157	-233	-141	26,073	-0.54%
Utilities	22	-24	-112	-948	-254	25,739	-0.99%
Construction	23	-2,093	-2,205	-1,272	-1,475	591,549	-0.25%
Manufacturing	33	874	1,431	1,411	1,277	662,486	0.19%
Wholesale Trade	42	-275	-153	494	40	489,248	0.01%
Retail Trade	44-45	-1,132	-856	955	-385	1,038,587	-0.04%
Transportation and Warehousing	48-49	-260	305	739	315	383,908	0.08%
Information	51	-147	-82	13	-38	316,884	-0.01%
Finance and Insurance	52	-475	-259	140	-99	567,305	-0.02%
Real Estate and Rental and Leasing	53	-420	-446	-137	-275	683,422	-0.04%
Professional, Scientific, and Technical Services	54	-791	-771	-384	-493	899,580	-0.05%
Management of Companies and Enterprises	55	8	69	133	82	118,815	0.07%
Administrative and Waste Management Services	56	-959	-424	566	-22	865,447	0.00%
Educational Services	61	-199	-179	4	-95	250,443	-0.04%
Health Care and Social Assistance	62	-1,206	-1,110	-58	-617	1,363,990	-0.05%
Arts, Entertainment, and Recreation	71	-192	-105	52	-44	347,599	-0.01%
Accommodation and Food Services	72	-684	-903	-602	-672	751,627	-0.09%
Other Services, except Public Administration	81	-858	-521	360	-122	726,486	-0.02%
State and Local Government	92	-7,735	-9,259	-3,991	-6,274	1,030,886	-0.61%
Total		**-16,635**	**-15,741**	**-2,760**	**-9,299**	**11,168,820**	**-0.08%**

Another important assumption is the funding source of incentive programs. Table 4-2 presents the results of a sensitivity analysis where the funding for the proposed incentive programs comes from outside the four-county region and is considered as "free" money in the sense that it has minimal impacts on local public spending and the disposable income of the region's residents. This could arguably be the case when the proposed incentive programs are financed by existing federal funds. In this alternative scenario,

implementation of the Draft Final 2016 AQMP would result in an addition of average 6,300 jobs per year from 2017 to 2031, or a 0.06 percent increase from the overall baseline number of jobs in the region. This job impact would barely change the forecast 1.02-percent annualized job growth at the baseline.

Table 4-2: Sensitivity Analysis of Annual Regional Job Impacts of Incremental Costs by Sector

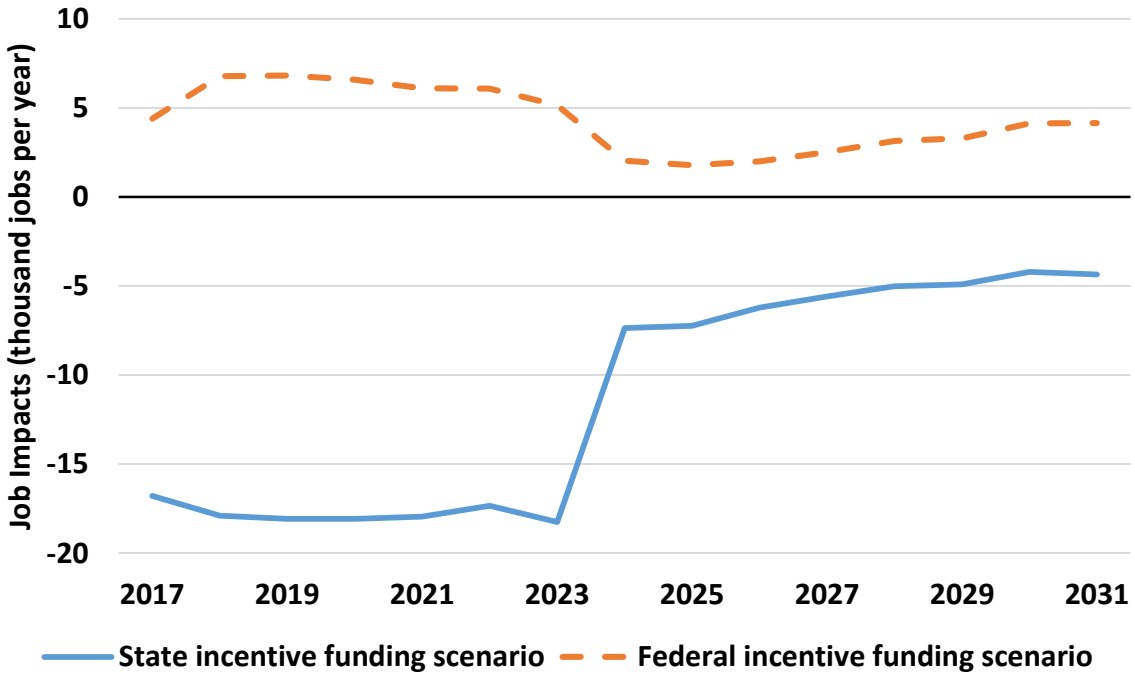
Assuming Incentive Programs Funded by Existing Sources of *Federal Government Revenues*
(Relative to Baseline)

Sector	NAICS	Jobs			Average Annual (2017-2031)		
		2017	2023	2031	Jobs	Baseline Jobs	% Change
Agriculture, Forestry, Fishing, and Related Activities	11	1	2	3	2	28,747	0.01%
Mining, Oil and Gas Extraction	21	-3	-113	-226	-114	26,073	-0.44%
Utilities	22	11	-72	-932	-227	25,739	-0.88%
Construction	23	307	376	-864	130	591,549	0.02%
Manufacturing	33	1,394	1,555	1,360	1,362	662,486	0.21%
Wholesale Trade	42	224	336	660	368	489,248	0.08%
Retail Trade	44-45	329	772	1,617	717	1,038,587	0.07%
Transportation and Warehousing	48-49	156	672	835	550	383,908	0.14%
Information	51	47	79	52	64	316,884	0.02%
Finance and Insurance	52	218	314	302	278	567,305	0.05%
Real Estate and Rental and Leasing	53	119	206	156	170	683,422	0.02%
Professional, Scientific, and Technical Services	54	285	433	29	304	899,580	0.03%
Management of Companies and Enterprises	55	99	127	138	117	118,815	0.10%
Administrative and Waste Management Services	56	327	1,010	1,076	922	865,447	0.11%
Educational Services	61	55	91	105	84	250,443	0.03%
Health Care and Social Assistance	62	316	563	679	524	1,363,990	0.04%
Arts, Entertainment, and Recreation	71	65	95	114	87	347,599	0.03%
Accommodation and Food Services	72	181	200	-97	86	751,627	0.01%
Other Services, except Public Administration	81	291	530	735	586	726,486	0.08%
State and Local Government	92	141	497	2	311	1,030,886	0.03%
Total		**4,559**	**7,673**	**5,745**	**6,321**	**11,168,820**	**0.06%**

These two scenarios analyze the job impacts from full funding from state only and federal only. In reality, the incentives will likely be funded from a combination of state and federal sources and hence the projected job impacts would likely fall in between these two scenarios (see Figure 4-1).

FIGURE 4-1: REGIONAL JOB IMPACTS OF INCREMENTAL COSTS, 2017-2031

(SCAQMD Four-County Region, 1990-2016)



Projected Job Impacts of Quantified Public Health Benefits

Similar to the job impacts of incremental costs, the job impacts due to public health improvements were also simulated annually for the period of 2017 to 2031. Public health improvements consist of two components: avoided premature deaths and reduced morbidity incidence. These improvements were quantified and monetized as described in Chapter 3.[4] The largest amount of public health benefits comes from the aggregated

[4] In the Draft Socioeconomic Report released on November 19, 2016, only the portion of mortality-related public health benefits that would accrue to the working age population (age 25-65) were inputted into the REMI model to simulate job impacts. This portion represented 17 percent of the previous estimate of total mortality-related benefits. REMI staff commented at the November 3rd, 2016 STMPR meeting that they would recommend inputting 100 percent of the estimated total public health benefits and considered staff's approach to be very conservative. In the Draft Final Socioeconomic Report, the estimated total of mortality-related public health benefits was revised downward using the updated air quality modeling results. However, staff did not revise the amount of mortality-related public health benefits when evaluating job impacts. The amount of public health benefits inputted into the REMI model now accounts for 25 percent of the revised total morality-related benefits, and therefore, still represents a conservative estimate of positive

willingness-to-pay for a lower risk of premature deaths as a result of decreased exposure to PM2.5 and ozone, based on Value of Statistical Life (VSL). These monetized benefits, while not occurring in the market economy through direct transactions of goods and services, were considered to enhance the quality of life or amenity in the region. In the modeled economy, an increase in a region's amenity, which includes but is not limited to better environmental quality such as cleaner air, acts to attract more economic migrants into the region. Therefore, it directly increases local labor supply as well as local demand for housing, which in turn produces ripple effects throughout the regional economy.

The other component of the public health benefits is derived from reduced morbidity incidence, such as fewer hospital admissions and visits to emergency departments, fewer absences from work and school, and fewer episodes of experiencing cardiovascular and respiratory symptoms. The monetized morbidity-related benefits are estimated based on the willingness-to-pay for a lower morbidity risk, and where those estimates are not available, the avoided cost of illness was used.[5] The portion of morbidity-related benefits associated with avoided work loss days and school loss days was valued based on the market price of a worker's productivity (i.e., hourly earnings) that results from less work absences due to fewer illnesses for adult workers and their children. These benefits were modeled in REMI as an increase in labor productivity for all industries in the region. Other morbidity-related benefits were considered to result in less spending on healthcare and related services, thus allowing households to reallocate their budget and increase spending on other goods and services. The change in healthcare-related expenditures was modeled as a decrease in consumer spending for six categories in the REMI model, including spending on hospitals, health insurance, nursing homes, paramedical services, pharmaceutical and other medical products, and physician services.

Table 4-3 shows the annual regional job impacts of quantified public health benefits for the initial implementation year of the Draft Final 2016 AQMP (2017), the milestone years for ozone attainment demonstration (2023 and 2031), as well as the annual average between 2017 and 2031. Under the primary scenario, the public health benefits are projected to increase the number of jobs in the region by about 21,000 in 2023 and 43,500 in 2031 relative to the baseline. The annual job impacts for the analysis horizon of 2017-2031 correspond with an average annual increase of 23,000 jobs, which is about 0.2 percent above the baseline regional total jobs. The mortality-related benefits contribute the largest share to the number of jobs gained, at about 22,900 on average per year, while morbidity-related benefits (increased labor productivity and reduced healthcare costs) contribute fewer than 200 jobs per year on average.

job impacts according to REMI staff. Additionally, as shown below, staff also conducted a sensitivity analysis to demonstrate the relationship between the amount of mortality-related public health benefits inputted into REMI and the corresponding job impacts generated by REMI. See Appendix 4-B for more discussion and also for the policy variables used in the REMI analysis associated with public health benefits.

[5] This specific methodology was recommended by IEc (Industrial Economics and Robinson 2016).

TABLE 4-3: ANNUAL REGIONAL JOB IMPACTS OF QUANTIFIED PUBLIC HEALTH BENEFITS

(Relative to Baseline)

	Jobs			Average Annual (2017-2031)	
Primary Scenario	**2017**	**2023**	**2031**	**Jobs**	**% Change**
Quantified Public Health Benefits	1,294	21,017	43,481	23,036	0.20%
Mortality-Related Benefits	1,284	20,851	43,282	22,894	0.20%
Morbidity-Related Benefits	10	166	192	144	0.00%
Sensitivity Analysis					
Quantified Public Health Benefits (with Discounted Mortality-Related Benefits)	652	10,591	21,792	11,576	0.10%
Mortality-Related Benefits Discounted by 50%	642	10,425	21,582	11,431	0.10%

Note: REMI model results are not additive, so the total job impact can not necessarily be found from adding the individual components.

The mortality-related public health benefits were derived from the willingness-to-pay to lower mortality risk with certainty, which is a non-market good. Due to remaining uncertainties surrounding the macroeconomic modeling of non-market benefits and whether the amount of the benefits should be adjusted before being entered into REMI to enact regional amenity improvements (Abt Associates 2014; Lahr 2016), a sensitivity analysis was performed where the monetized benefits associated with avoided premature deaths were discounted by half as REMI amenity inputs. The sensitivity test was performed based on recommendations in the 2014 Abt Report and a separate third-party evaluation (Lahr, 2016).[6] The purpose was to examine how sensitive job impacts are to the inputs of REMI policy variable "Non-pecuniary (Amenity) Aspects."

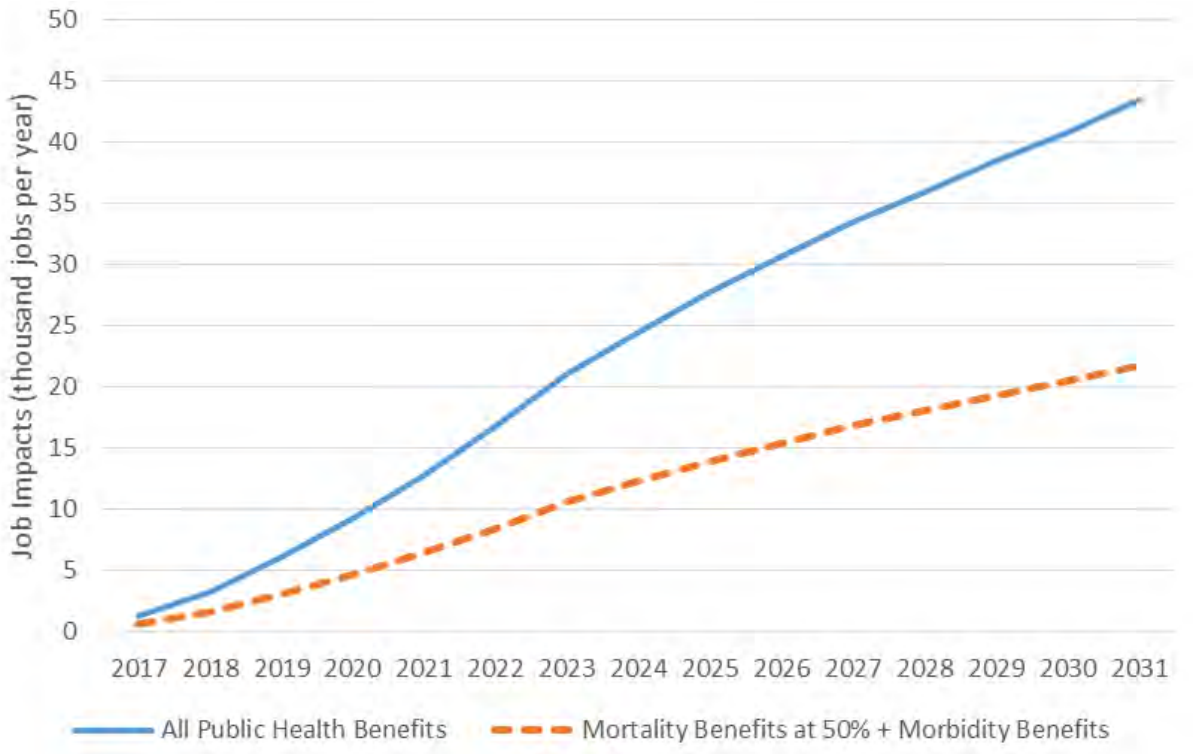
In order to have comparable results, the sensitivity analysis scenario was conducted for both components of public health benefits combined and for the mortality-related portion separately. The results of the sensitivity analysis reported in Table 4-3, show that the job impacts of the total quantified public health benefits are reduced by half when the value of amenity inputs is reduced by the same magnitude. This approximately one-to-one correlation (correspondence of reduction in job impacts) is due to the fact that mortality benefits account for over 99 percent of total quantified public health benefits. Overall, the sensitivity test results suggest that, if any scaling or weighting is necessary for the non-market clean air benefits to enter into REMI as regional amenity improvement, the job impacts as projected by REMI would be reduced by approximately the same factor.

Figure 4-2 shows how the job impacts change over the course of the analysis horizon. Under both the primary scenario and sensitivity test, the job impacts grow at a relatively faster rate between 2017 and 2023 and

[6] The 2014 Abt report recommended that the SCAQMD "initiate a research task to consider the weighting of estimates of air quality benefits to reflect the relative importance of air quality changes compared to other area specific amenities" and "keep abreast of the USEPA's development of methods for applying benefits in economy-wide models." The sensitivity test is staff's initial effort to implement the former recommendation, and the latter recommendation was also being implemented concurrently. The Abt report further recommended an evaluation of REMI's logic for incorporating amenities in its model; however, REMI contested the reasoning behind this recommendation.

relatively slower rate from 2024 to 2031, mirroring the year-to-year change of quantified public health benefits.

FIGURE 4-2: REGIONAL JOB IMPACTS OF QUANTIFIED PUBLIC HEALTH BENEFITS, 2017-2031



As discussed above, the regional job impacts of quantified public health benefits are driven by three forces at work. First, increased economic migration into the region, due to improved regional amenities (or "quality of life"), would result in a larger labor supply and also higher demand for goods and services, thus creating ripple effects throughout the regional economy. Second, the benefits related to avoided morbidity incidence would decrease healthcare-related consumer spending, thus directly resulting in reduced jobs and output in healthcare industries; these healthcare savings can then be spent on other goods and services, which would result in positive job impacts when these goods and services are supplied by local businesses and industries. Third, increased labor productivity due to fewer absences from work would make the region more competitive, thus driving up output and jobs in all sectors.

Table 4-4 shows the distribution of job impacts across all major sectors under the primary scenario. All sectors are projected to experience job gains relative to the baseline. The largest job gain, in both absolute and percentage terms, is expected in the state and local government sector. This is mainly due to increases in public services and infrastructure investments in the region to accommodate a larger population because of increased migration into the area. For the same reason, the construction sector and the accommodation and food services sector are also projected to see large gains in jobs. Some of the least impacted sectors are the agriculture, forestry, fishing, and related activities sector; the mining sector; and the information sector.

TABLE 4-4: ANNUAL REGIONAL JOB IMPACTS OF QUANTIFIED PUBLIC HEALTH BENEFITS BY SECTOR

(Relative to Baseline)

Sector	NAICS	Jobs			Average Annual (2017-2031)		
		2017	2023	2031	Jobs	Baseline Jobs	% Change
Agriculture, Forestry, Fishing, and Related Activities	11	0	6	13	7	28,747	0.02%
Mining, Oil and Gas Extraction	21	3	19	20	15	26,073	0.06%
Utilities	22	4	66	138	73	25,739	0.28%
Construction	23	152	2,188	3,179	2,049	591,549	0.35%
Manufacturing	33	46	679	1,375	740	662,486	0.11%
Wholesale Trade	42	37	572	1,274	652	489,248	0.13%
Retail Trade	44-45	139	2,136	4,570	2,384	1,038,587	0.23%
Transportation and Warehousing	48-49	23	318	756	371	383,908	0.10%
Information	51	12	160	405	192	316,884	0.06%
Finance and Insurance	52	33	320	887	401	567,305	0.07%
Real Estate and Rental and Leasing	53	85	1,436	3,268	1,655	683,422	0.24%
Professional, Scientific, and Technical Services	54	63	1,033	2,075	1,117	899,580	0.12%
Management of Companies and Enterprises	55	8	120	262	135	118,815	0.11%
Administrative and Waste Management Services	56	72	1,202	2,561	1,335	865,447	0.15%
Educational Services	61	33	538	1,098	583	250,443	0.23%
Health Care and Social Assistance	62	127	2,444	6,129	2,941	1,363,990	0.22%
Arts, Entertainment, and Recreation	71	14	155	500	210	347,599	0.06%
Accommodation and Food Services	72	143	2,627	5,396	2,888	751,627	0.38%
Other Services, except Public Administration	81	63	660	1,740	805	726,486	0.11%
State and Local Government	92	238	4,337	7,833	4,486	1,030,886	0.44%
Total		**1,294**	**21,017**	**43,481**	**23,036**	**11,168,820**	**0.21%**

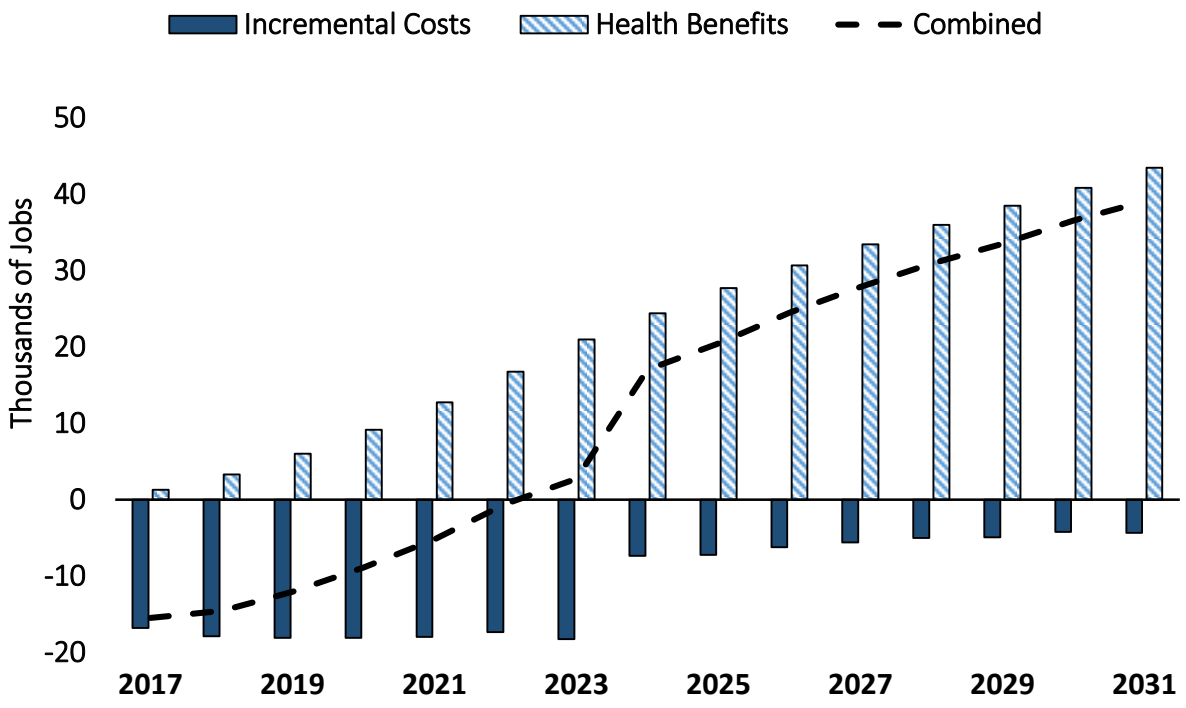
Projected Job Impacts of the Draft Final 2016 AQMP

The simulation of the regional economy with all of the incremental cost and benefit-related policy variables combined together represents the regional economic impact of the Draft Final 2016 AQMP. Figure 4-3 illustrates how the net job impacts of the Draft Final 2016 AQMP change over time, along with the job impacts attributable separately to incremental costs and public health benefits under their respective primary scenarios as described in the previous sections (i.e., incentives funded by existing state revenue sources and

full air-related public health benefits for regional amenity adjustments). Overall, the regional economy is projected to experience jobs forgone in the first years because the negative effects, mainly associated with the incremental costs of proposed control measures, would dominate the positive effect that largely stems from public health benefits. Over time, however, as public health benefits continue to increase, net job gains are projected for most of the industries.

On an annual average, the combined effects of public health benefits and incremental costs associated with the Draft Final 2016 AQMP are expected to result in a gain of 14,000 jobs per year from 2017 to 2031, relative to the baseline job forecast. This represents an annualized job growth rate of 1.04 percent, or a 0.02 percentage point acceleration from the baseline job growth during the same period. Table 4-5 reports the average annual net job impacts by sector. It is projected that the initial negative job impacts would spread among most of the public and private sectors. However, almost half of the 15,300 jobs foregone projected for year 2017 are concentrated in the state and local government sector. Construction, and healthcare and social assistance sectors would also have more than 1,000 jobs foregone in that year. However, by 2023, most sectors would see job increases from their baseline forecast. In 2031, only mining and utilities sectors would still experience jobs foregone; however, on an annual average, the net negative job impact for these two sectors are expected to be less than one percent lower than their baseline number of jobs. All of these changes are relatively small when compared with the overall size of the four-county economy.

FIGURE 4-3: REGIONAL JOB IMPACTS OF THE DRAFT FINAL 2016 AQMP, 2017-2031



Under the alternative scenario where incentives are financed by existing federal funds, the projected combined job impact becomes an average gain of 29,000 jobs per year, relative to the baseline job forecast. The corresponding annualized job growth rate will increase very slightly and remain at around 1.04 percent from 2017 to 2031.

TABLE 4-5: ANNUAL NET JOB IMPACTS BY SECTOR

(Relative to Baseline)

Sector	NAICS	Jobs				Average Annual (2017-2031)	
		2017	2023	2031	Jobs	Baseline Jobs	% Change
Agriculture, Forestry, Fishing, and Related Activities	11	-8	-1	13	2	28,747	0.01%
Mining, Oil and Gas Extraction	21	-56	-137	-213	-126	26,073	-0.48%
Utilities	22	-20	-47	-810	-182	25,739	-0.71%
Construction	23	-1,940	-16	1,907	573	591,549	0.10%
Manufacturing	33	920	2,110	2,785	2,017	662,486	0.30%
Wholesale Trade	42	-238	420	1,767	691	489,248	0.14%
Retail Trade	44-45	-993	1,281	5,521	1,995	1,038,587	0.19%
Transportation and Warehousing	48-49	-237	624	1,496	685	383,908	0.18%
Information	51	-135	78	418	154	316,884	0.05%
Finance and Insurance	52	-442	62	1,026	301	567,305	0.05%
Real Estate and Rental and Leasing	53	-335	989	3,127	1,378	683,422	0.20%
Professional, Scientific, and Technical Services	54	-728	262	1,690	623	899,580	0.07%
Management of Companies and Enterprises	55	16	189	395	216	118,815	0.18%
Administrative and Waste Management Services	56	-888	779	3,125	1,312	865,447	0.15%
Educational Services	61	-167	359	1,101	487	250,443	0.19%
Health Care and Social Assistance	62	-1,079	1,334	6,065	2,323	1,363,990	0.17%
Arts, Entertainment, and Recreation	71	-178	51	551	166	347,599	0.05%
Accommodation and Food Services	72	-541	1,723	4,786	2,212	751,627	0.29%
Other Services, except Public Administration	81	-794	141	2,098	683	726,486	0.09%
State and Local Government	92	-7,497	-4,925	3,836	-1,791	1,030,886	-0.17%
Total		**-15,340**	**5,274**	**40,681**	**13,720**	**11,168,820**	**0.12%**

Table 4-6 shows the distribution of net job impacts in 2017, 2023, and 2031 among five groups categorized by occupational earnings. In general, the job impacts are distributed rather evenly across all five groups, with no positive or negative job impacts overwhelmingly borne by any particular group. All groups are projected to see small numbers of jobs foregone in 2017 which mirrors the initial negative job impacts among various sectors. In 2031, all groups are projected to experience small job gains of 0.3 to 0.5 percent, relative to the baseline forecast.

TABLE 4-6: NET JOB IMPACTS BY OCCUPATIONAL EARNINGS GROUP

Group	2015 Median Weekly Earnings*	% Impact from Baseline			No. of Occupations
		2017	2023	2031	
1	$236 - $480	-0.13%	0.11%	0.46%	19
2	$481 - $619	-0.11%	0.08%	0.36%	19
3	$620 - $767	-0.12%	0.08%	0.40%	19
4	$768 - $980	-0.27%	-0.10%	0.26%	19
5	$990 - $1738	-0.12%	0.03%	0.26%	19

*Source: REMI. For the list of occupations by earning group, see Appendix 4-B

Preliminary Discussion of Health Effects of Unemployment

The results of the impact analysis reported above show that implementation of the Draft Final 2016 AQMP would lead to very small job impacts (positive or negative) relative to the baseline and would have minimal effects on the region's long-term job growth. Of the four different scenarios analyzed, the annualized long-term job growth rate between 2016 and 2031 in the region would remain similar to the baseline rate, at slightly above one percent. Although this is the case, SCAQMD staff has explored the possibility of incorporating possible health effects that may occur from unemployment into this quantitative macroeconomic job impact analysis. The following section describes the current state of knowledge on this topic.

Recent economics literature has shown that job displacement, particularly due to plant closings and layoffs, could lead to adverse health effects on the individuals who experience job losses (see Tekin (2015) for a thorough review). In a groundbreaking study by Sullivan and von Wachter (2009), displaced workers were found to experience increased mortality risk immediately following their job loss. The heightened risk, although subsiding over time, was still present to some extent 20 years after the initial episode of job displacement. On these grounds, some of the SCAQMD's stakeholders have requested further investigation and analysis on whether air regulations and programs, while aimed to protect public health, may have actually resulted in job losses and thus produced undesirable health outcomes. These concerns were expressed during the stakeholder interviews conducted by Abt Associates as part of their review of SCAQMD socioeconomic assessment, and Abt recommended that staff keep abreast of the findings from U.S. EPA's ongoing efforts to review methodology for employment effects of regulation (Abt Associates 2014).

There are two major analytical difficulties in conducting a formal analysis on this topic. First, a macroeconomic impact assessment—including the policy simulations conducted using the Regional Economic Models, Inc. (REMI)'s Policy Insight Plus model—generates job impacts in terms of the projected number of jobs foregone. This number consists of two conceptually distinctive components: job losses and forecasted jobs not created, but they cannot be numerically separated. At the same time, while job losses are associated with higher health risks, the linkage between a job that never existed and public health is not well understood, let alone quantified. Furthermore, while a number of empirical studies, based on observed or surveyed data, have identified negative job impacts of past environmental regulations in the heavy polluting industries (e.g., Greenstone (2002)), the overall impact on economy-wide employment has been found to be largely muted, due to various factors including employment shifts from heavy polluting to less polluting industries (see Morgenstern (2002)for a literature review). There is also empirical evidence suggesting that the negative job impact observed among the more polluting industries was, in large part, a result of slower or decreased hiring and had minimal impacts on the incumbent workers (Curtis 2014).[7]

Another major analytical difficulty is how to account for public health effects of unemployment, regardless of whether they are related to environmental regulations. Rhum (2000) and a series of follow-up studies have reported the counterintuitive finding that, as headline unemployment rates went up, public health metrics improved (usually measured by reduced mortality rate). Interestingly, it was also found that the improvement was most pronounced among the elderly, who were unlikely to be directly impacted by labor market fluctuations.[8] The SCAQMD commissioned Dr. Erdal Tekin to conduct a literature review and examine the health effects of unemployment in the four-county region. His final report provided similar results; that is, adverse health effects were generally observed among individuals who recently became unemployed, but the overall mortality risk as a public health indicator decreased when unemployment rose (Tekin 2015).[9]

To be integrated into the quantitative analysis of public health benefits discussed in the earlier section, health effects of unemployment on both displaced workers and on other segments of the population will need to be taken into account. Furthermore, a methodology needs to be developed to project job losses, which are usually an unknown fraction of projected jobs foregone. In the October 2015 meeting of the U.S. EPA's Science Advisory Board – Economy-Wide Modeling Panel, several economists on the panel did not support the inclusion of health effects of unemployment and other second-order effects when conducting macroeconomic impact modeling or cost-benefit analysis of environmental policies and regulations. The reasons cited included the current lack of sufficient empirical evidence, the difficulty to establish causality, and the anticipated small magnitude of such effects (U.S. EPA 2015a).

Although it is not currently possible to systematically quantify the health effects of potential unemployment related to air regulations and programs, it does not mean that the consequences of facilities closing and job losses are not considered when developing the Draft Final 2016 AQMP or during rulemaking process. The SCAQMD is committed to protecting the health of residents, while remaining sensitive to businesses. These commitments are manifested through the SCAQMD's efforts at many fronts, including public processes to

[7] It is worth emphasizing, however, that these empirical studies were usually based on large samples of firm-level data and the findings were derived for the general pattern of firm behavior observed in the data. These findings cannot be taken to rule out outlying behavior of an individual firm, and they also cannot be relied upon to predict the outcome of an environmental regulation that is of a very different scale or targets very different industry sectors.

[8] Stevens et al. (2015) posited that one of the many plausible mechanisms could be the effect of labor market competition on the quality of senior healthcare. During periods of low unemployment, shortage of skilled healthcare workers could adversely impact nursing home operations and raise mortality risks for their elderly residents.

[9] Full report available here: http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/unemploymentandhealth_dec2015_012616.pdf

solicit input and comments from all interested parties and continuous outreach to the general public and affected businesses, as well as performing a socioeconomic assessment which the Governing Board must consider for rules or rule amendments significantly affecting air quality or emission limitations.

Chapter 5: Sub-Regional Distribution of Impacts



This chapter assesses the sub-regional distribution of incremental costs, public health benefits, and job impacts to provide information on how the Draft Final 2016 AQMP may affect different communities within the four-county region of Los Angeles, Orange County, Riverside and San Bernardino. As Figure 5-1 shows, there are 11 sub-county regions within Los Angeles County, four within Orange County, and three each within Riverside and San Bernardino counties. The four counties are divided into these sub-county regions based on socioeconomic characteristics found in the U.S. Census Bureau's American Community Survey (Lieu, Dabirian, and Hunter 2012). The REMI model used to simulate regional macroeconomic impacts based on the incremental costs and public health benefits of the Draft Final 2016 AQMP was customized according to these same sub-county definitions.

FIGURE 5-1: 21 SUB-COUNTY REGIONS



Description of the 21 Sub-County Regions

With six commercial airports, the nation's two largest marine ports, and over 8 million workers[1] generating more than a trillion dollars in GDP[2], the regional economy of Los Angeles, Orange, Riverside, and San Bernardino counties is one of the largest and most productive in the United States. This section provides a snapshot of how different communities within the four-county region vary according to key demographic and economic indicators. All indicators discussed below are based on the REMI baseline projections that have been adjusted according to the 2016 SCAG Growth Forecast (see Appendix 4-A).

The four-county region is home to nearly 18 million people. By 2031, the region is expected to gain an additional two million people (SCAG 2016). About 75 percent of the region's population, or about 14 million people, reside in the coastal counties of Los Angeles and Orange, while the remaining 25 percent, or about 4 million people, live further inland in Riverside and San Bernardino counties. Figure 5-2 (a) demonstrates the population distribution among 21 sub-county regions in 2016, while Figure 5-2 (b) shows widely varying population density in each of the sub-regions.

The densest populated areas in the region are the South Central and Central sub-regions in Los Angeles County. South Central is home to a little over a million people, or roughly 15,000 people per square mile. The Central sub-region in Los Angeles also has a population over a million and a density of 13,000 people per square mile. The densest populated areas in Orange County are the Central and Western sub-regions, which have a population density of 10,000 and 6,000 people per square mile respectively. In comparison, the sub-regions further inland are much less densely populated. San Bernardino City, San Bernardino Southwest, and Northwest Riverside, for example, have population densities of 3,000 people per square mile, about one fifth of the population density in South Central Los Angeles.

[1] EDD estimates as of July 2016.

[2] U.S. Bureau of Economic Analysis, 2015 GDP estimates for Los Angeles-Long Beach-Anaheim and Riverside-San Bernardino-Ontario metros.

FIGURE 5-2 (A): POPULATION BY SUB-COUNTY REGION, 2016

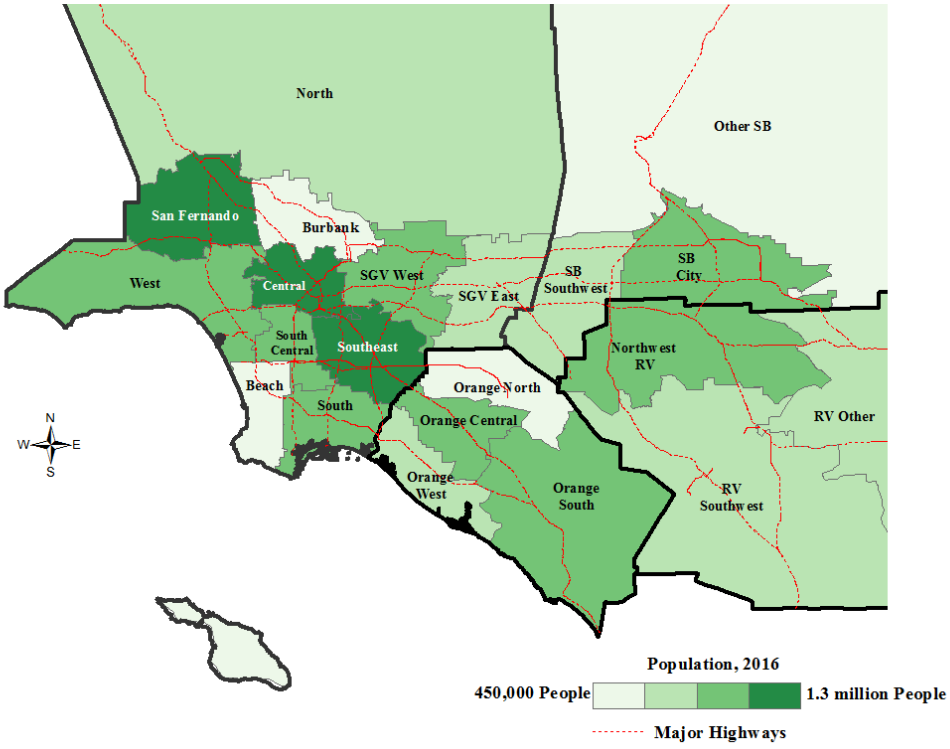
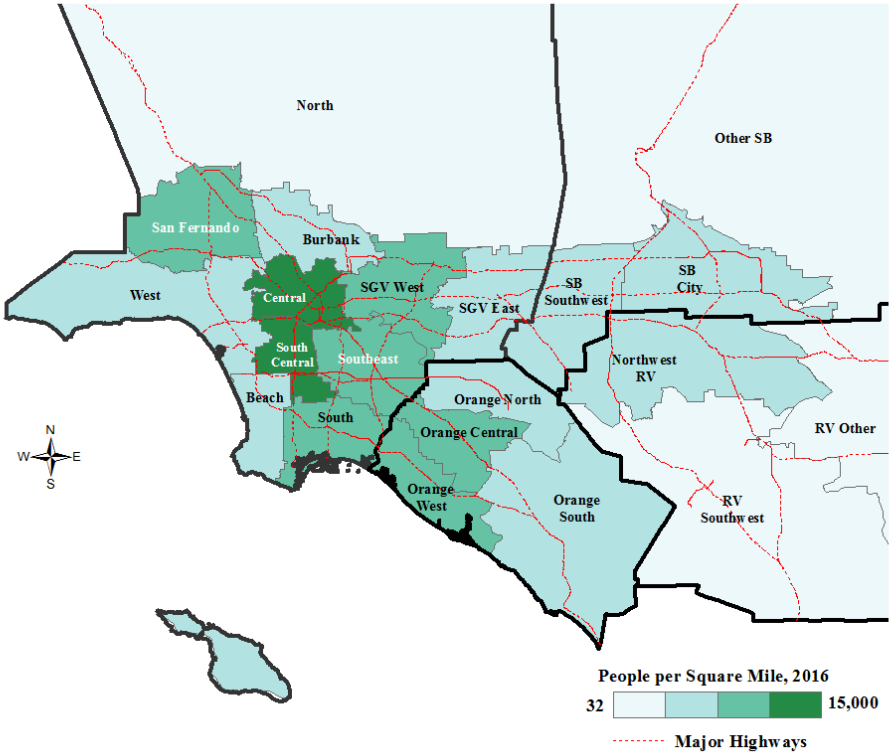


FIGURE 5-2 (B): POPULATION DENSITY BY SUB-COUNTY REGION, 2016



As seen in Figure 5-3, jobs are largely concentrated in the Central and Western sub-regions of Los Angeles, which collectively provide nearly one out of every five jobs in the region. In the Inland area, the largest concentration of jobs is found along the San Bernardino and Riverside border, yet this cluster of San Bernardino Southwest, San Bernardino City, and Northwest Riverside only supplies about one out of every ten jobs in the region.

FIGURE 5-3: JOB COUNTS BY SUB-COUNTY REGION, 2016

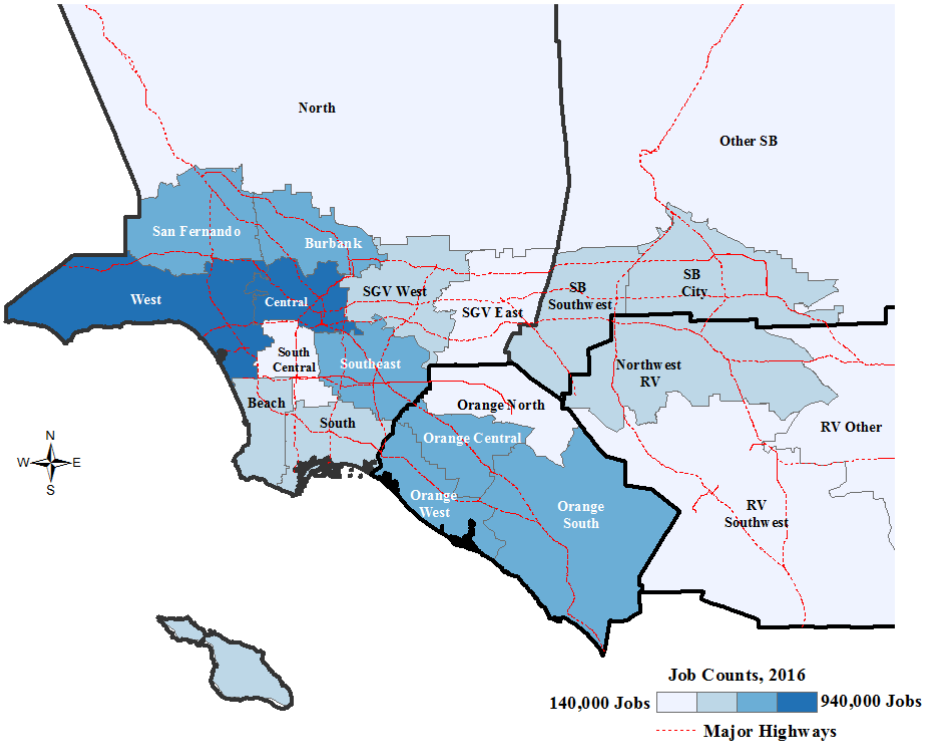


Figure 5-4 (a) shows the number of jobs per working age adult (25 to 64 years old). Most sub-county regions have about one job per working-age adult, with a few exceptions. The South Central and Other San Bernardino regions have relatively scarce employment opportunities, with less than one job per working-age adult. In comparison, residents in Burbank and the West region of Los Angeles have better employment prospects, with approximately two jobs per working-age adult. Figure 5-4 (b) illustrates the age-dependency ratio, defined as the number of those too young or elderly to work per working-age adult. The western region of Los Angeles has the lowest age-dependency ratio of 43 dependents per 100 workers; whereas, eastern Riverside has the largest at 58 dependents per 100 workers. Higher age-dependency ratios in the inland area than in Los Angeles or Orange counties is largely a result of proportionally more families with young children and more affordable family housing, but it also indicates more pressure on workers in these areas, as well as in certain areas in Los Angeles and Orange counties, to provide for those not in the workforce. Such pressure is especially high in regions such as South Central Los Angeles, where jobs are harder to come by, as indicated in Figure 5-4 (a).

FIGURE 5-4 (A): JOBS PER WORKING-AGE ADULT BY SUB-COUNTY REGION, 2016

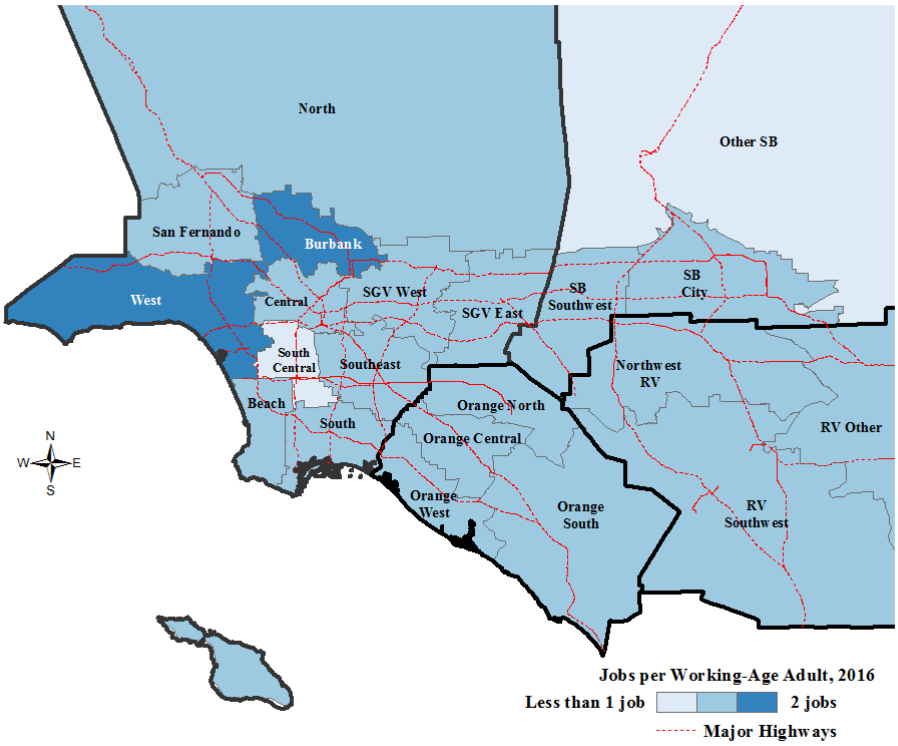
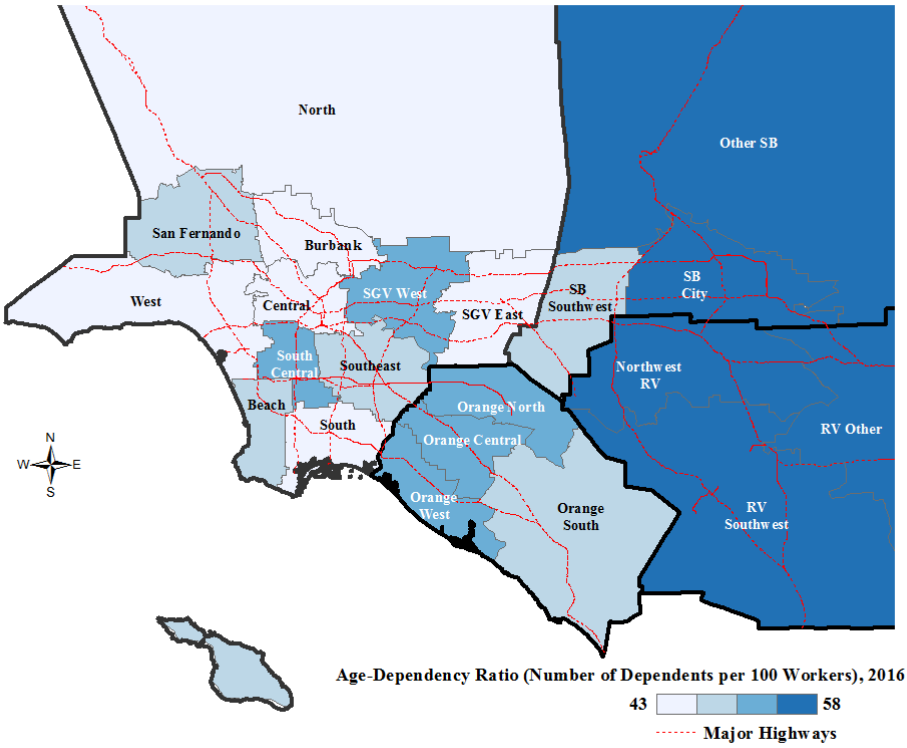


FIGURE 5-4 (B): AGE-DEPENDENCY RATIOS BY SUB-COUNTY REGION, 2016



In terms of economic output, Figure 5-5 (a) shows the distribution of industry output by sub-county region, with all dollar amounts being expressed in 2015 dollars. More than a quarter of the region's output, or about $420 billion, is generated in Central and West Los Angeles and Orange South; whereas, all sub-regions in Riverside and San Bernardino combined produced about $240 billion, or approximately 15 percent of the regional economic output. Figure 5-5 (b) illustrates different labor productivity across sub-county regions. Output per worker is highest in the beach and southern area of Los Angeles, with about $230,000 and $208,000 being generated per worker in 2016, respectively. The lowest levels of output per worker are in inland, with a range of about $130,000 being generated per worker in Other San Bernardino to about $150,000 in San Bernardino Southwest. The differences largely reflect the very different industry structures across the four-county region, with more capital-intensive industries tending to locate in the coastal counties and more labor-intensive industries in the inland area.

FIGURE 5-5 (A): ECONOMIC OUTPUT BY SUB-COUNTY REGION, 2016

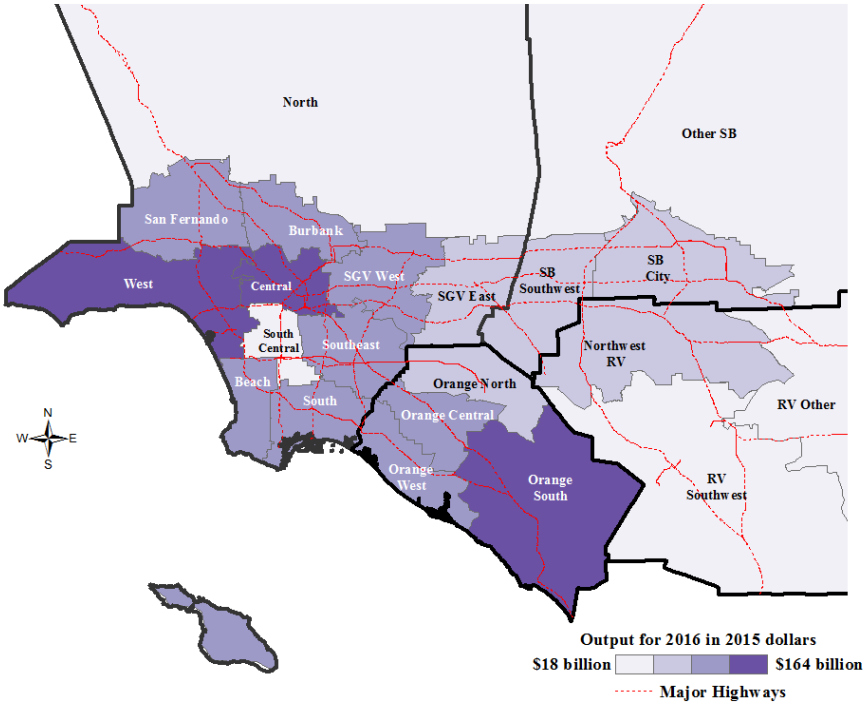
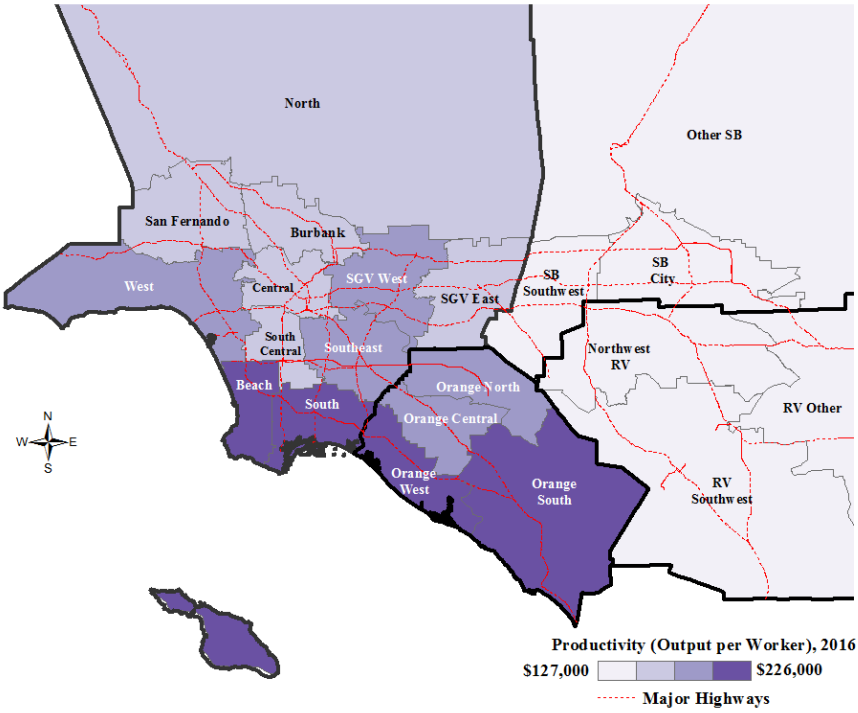


FIGURE 5-5 (B): WORKER PRODUCTIVITY BY SUB-COUNTY REGION, 2016



Sub-County Distribution of Estimated Incremental Costs

As reported in Chapter 2, the present worth value of the total incremental cost associated with the Draft Final 2016 AQMP is $15.7 billion. From 2017 to 2031, private industries, consumers, and the public sector will collectively spend an average of $848 million each year. Table 5-1 reports the average annual total incremental costs by sub-county region, which range from a high of $61 million in San Fernando Los Angeles to a low of $21 million in Orange North (also illustrated in Figure 5-6). On a per capita basis, the range of average annual incremental costs narrows to a high of $54 per person in the Beach & Catalina sub-region of Los Angeles County to a low of $43 per person in the majority of areas. This range of incremental cost is relatively small when considering the four-county region's per capita personal income of about $49,700.[3]

TABLE 5-1: TOTAL AND PER CAPITA INCREMENTAL COST BY SUB-COUNTY REGION[4]
(AVERAGE ANNUAL, 2017-2031)

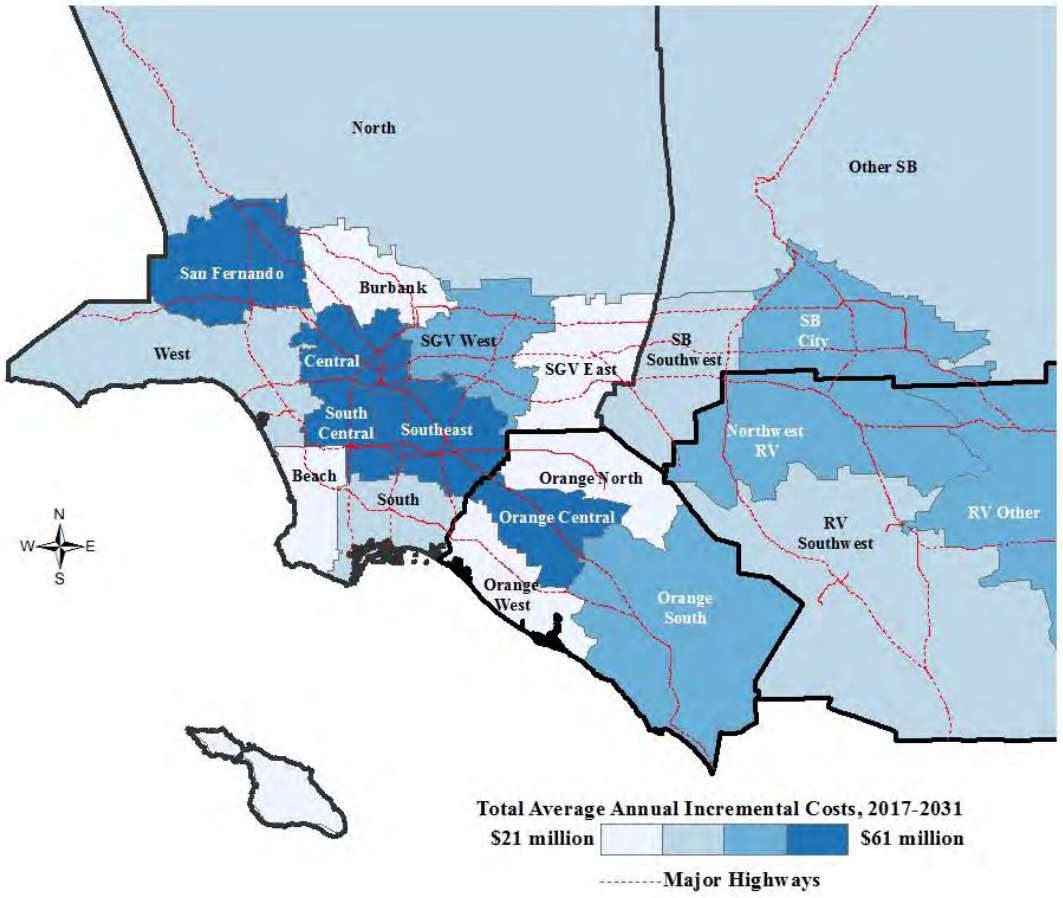
County	Sub-county Region	Average Annual Incremental Cost ($Millions)	Per Capita Average Annual Incremental Cost ($)
Los Angeles	Beach & Catalina	32	54
Los Angeles	Burbank	26	43
Los Angeles	Central	59	43
Los Angeles	North	38	47
Los Angeles	San Fernando	61	43
Los Angeles	San Gabriel Valley East	30	44
Los Angeles	San Gabriel Valley West	43	43
Los Angeles	South	45	50
Los Angeles	South Central	48	43
Los Angeles	Southeast	57	46
Los Angeles	West	41	43
Orange	Orange Central	47	43
Orange	Orange North	21	44
Orange	Orange South	47	43
Orange	Orange West	31	44
Riverside	Northwest Riverside	43	44
Riverside	Riverside Other	41	43
Riverside	Riverside Southwest	36	47
San Bernardino	San Bernardino City	41	44
San Bernardino	Other San Bernardino	31	43
San Bernardino	San Bernardino Southwest	31	43
All Sub-County Regions		**848**	**45**

Note: Total average annual incremental cost may not sum up to the total in Table 2-1 due to rounding.

[3] SCAQMD staff calculation based on U.S. BEA's personal income data for 2015 (in current dollars) and U.S. Census Bureau's 2015 population estimates for each of the four counties.

[4] It should be noted that the cost distribution presented here is for informational purposes only, and mostly reflects sub-county per capita population distribution of the incremental costs. It may not reflect the actual cost distribution under all plausible cost scenarios. Staff expects to be able to gather more detailed information during the program implementation and rulemaking process.

FIGURE 5-6: TOTAL INCREMENTAL COSTS BY SUB-COUNTY REGION (AVERAGE ANNUAL, 2017-2031)



Sub-County Distribution of Monetized Public Health Benefits

As discussed in Appendix I of the Draft Final 2016 AQMP, air pollution continues to be linked to increases in death rates (mortality) and increases in illness and other health effects (morbidity). Based on the quantification of health benefits in Chapter 3, it has been estimated that the four-county region will gain a total public health benefit of $173 billion in present worth value, which represents an average annualized benefit of $16.5 billion from 2017 to 2031 for the avoided incidence of mortality and morbidity.

Tables 5-2 and 5-3 report the total and per capita annual average public health benefits for each of the 21 sub-county regions, respectively. The per capita public health benefits will be further analyzed between EJ and non-EJ communities in Chapter 6. Mortality-related benefits associated with reduced long-term exposure to PM2.5 make up the vast majority, or over 99 percent, of total public health benefits quantified, and they range from an annual average of $2 billion in Central Los Angeles to $93 million in Other San Bernardino. As public health benefits were calculated based on reduced health risk per person, the $2 billion of public health benefits projected for Central Los Angeles does not only reflect the larger reductions in PM2.5 concentrations estimated in and around that area, but also its population size which is among the largest in the four-county region (see Chapter 3 and Figure 5-2(a)). That is why, in per capita terms, the range narrows to $1,600 per person in Central Los Angeles and $130 per person in Other San Bernardino.[5]

Mortality-related benefits associated with reduced short-term exposure to ozone range from an annual average of $49 million in Northwest Riverside to $9 million in South Central Los Angeles, reflecting the larger reductions of ozone concentration in and around Northwest Riverside. In per capita terms, this becomes $50 dollars per person in Northwest Riverside and $9 per person in South Central Los Angeles.

[5] Per capita calculation uses SCAG-adjusted REMI population projection data for 2016. Therefore, differing population growth in each sub-county region may also contribute to the differences of annual average per capita public health benefits observed across the sub-county regions.

TABLE 5-2: TOTAL PUBLIC HEALTH BENEFITS BY 21 SUB-COUNTY REGION (AVERAGE ANNUAL, 2017-2031)

County	Sub-county Region	Average Annual PM2.5 Benefits ($Millions)		Average Annual Ozone Benefits ($Millions)		Total Annual Average Benefits ($Millions)
		Mortality	Morbidity	Mortality	Morbidity	
Los Angeles	Beach & Catalina	578	5	17	2	602
Los Angeles	Burbank	477	4	16	2	499
Los Angeles	Central	2,135	20	21	3	2,179
Los Angeles	North	149	2	27	5	182
Los Angeles	San Fernando	1,031	9	48	7	1,096
Los Angeles	San Gabriel Valley East	643	6	25	4	678
Los Angeles	San Gabriel Valley West	1,323	11	21	3	1,358
Los Angeles	South	775	8	19	3	805
Los Angeles	South Central	1,138	13	9	2	1,162
Los Angeles	Southeast	1,411	15	20	3	1,450
Los Angeles	West	1,378	11	29	3	1,421
Orange	Orange Central	762	9	25	5	801
Orange	Orange North	404	4	16	2	426
Orange	Orange South	526	5	44	6	581
Orange	Orange West	708	5	27	3	743
Riverside	Northwest Riverside	635	6	49	8	698
Riverside	Riverside Other	141	1	33	4	178
Riverside	Riverside Southwest	289	2	35	5	332
San Bernardino	Other San Bernardino	93	1	25	4	122
San Bernardino	San Bernardino City	505	5	43	7	559
San Bernardino	San Bernardino Southwest	566	6	30	5	606
All Sub-County Regions		**15,668**	**146**	**580**	**84**	**16,478**

TABLE 5-3: PER CAPITA PUBLIC HEALTH BENEFITS BY 21 SUB-COUNTY REGION (AVERAGE ANNUAL, 2017-2031)

County	Sub-county Region	Per Capita Average Annual PM2.5 Benefits ($)		Per Capita Average Annual Ozone Benefits ($)		Total Annual Average Benefits Per Capita ($)
		Mortality	Morbidity	Mortality	Morbidity	
Los Angeles	Beach & Catalina	969	9	29	4	1,010
Los Angeles	Burbank	787	6	26	3	822
Los Angeles	Central	1,592	14	16	2	1,624
Los Angeles	North	190	2	34	6	232
Los Angeles	San Fernando	740	7	35	5	786
Los Angeles	San Gabriel Valley East	938	8	37	5	989
Los Angeles	San Gabriel Valley West	1,331	11	21	3	1,365
Los Angeles	South	861	9	21	3	894
Los Angeles	South Central	1,039	12	9	2	1,061
Los Angeles	Southeast	1,158	12	17	3	1,190
Los Angeles	West	1,483	11	31	3	1,528
Orange	Orange Central	702	8	23	4	737
Orange	Orange North	855	8	33	5	901
Orange	Orange South	493	4	41	6	544
Orange	Orange West	1,016	7	38	4	1,066
Riverside	Northwest Riverside	656	6	50	8	721
Riverside	Riverside Other	154	1	36	4	195
Riverside	Riverside Southwest	385	3	47	7	442
San Bernardino	Other San Bernardino	134	1	36	5	177
San Bernardino	San Bernardino City	545	5	46	7	603
San Bernardino	San Bernardino Southwest	809	8	43	7	866
All Sub-County Regions		**832**	**8**	**31**	**4**	**876**

Figures 5-7 (a) and (b) provide a visualization of how mortality-related benefits are distributed in the region. Figure 5-7 (a) shows that the largest average annual mortality-related benefits associated with decreased PM2.5 exposure are concentrated around Central Los Angeles; whereas, Figure 5-7 (b) shows that the largest average annual mortality-related benefits associated with decreased ozone exposure spread towards San Fernando Los Angeles, Orange South, and inland towards Northwest Riverside and San Bernardino City.

FIGURE 5-7 (A): DISTRIBUTION OF MORTALITY-RELATED BENEFITS FOR PM2.5 BY SUB-COUNTY REGION (AVERAGE ANNUAL, 2017-2031)

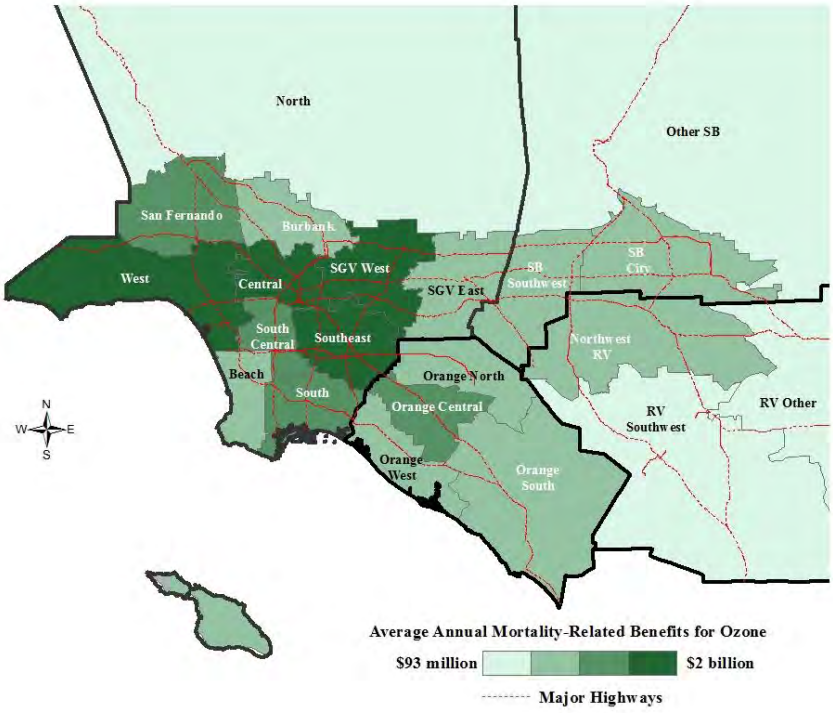
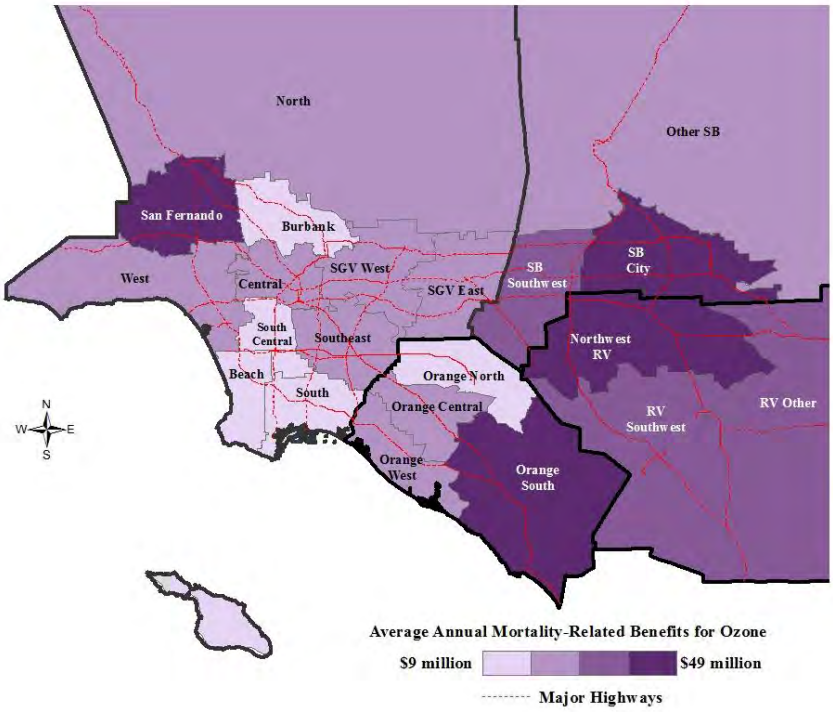


FIGURE 5-7 (B): DISTRIBUTION OF MORTALITY-RELATED BENEFITS FOR OZONE BY SUB-COUNTY REGION (AVERAGE ANNUAL, 2017-2031)



Morbidity-related benefits related to decreased PM2.5 and ozone exposure are much lower than mortality-related benefits and are similar to the spatial distributions shown in Figures 5-7(a) and (b), respectively. Together, the highest morbidity-related benefits are in Central Los Angeles, with an annual average of $23 million, and lowest in Riverside Other and Other San Bernardino with an annual average of $5 million. This translates into a $16 benefit per person and $5 to $6 benefit per person, respectively.

Sub-County Distribution of Projected Job Impacts

As discussed in Chapter 4, the costs and benefits of the 2016 AQMP are expected to alter, to various degrees, the economic decisions made by households, businesses, and other economic actors. Some businesses would see production costs go up while other businesses would benefit from a greater demand for their services and technologies. For consumers who consider purchasing or replacing vehicles or certain household appliances, the proposed control strategies would also change or widen the range of product choices that differ in fuel types, energy efficiencies, effective unit prices, and thus potential payback periods. In the meantime, improved public health would contribute to higher labor productivity and reduce healthcare-related expenditures. All these direct effects would then cascade through the regional economy and produce indirect and induced macroeconomic impacts. Given this, the region is expected to gain, on average, about 14,000 jobs per year as a result of implementing the Draft Final 2016 AQMP.

Figure 5-8 (a) shows the distribution of the annual average net job impacts by sub-county region. Central Los Angeles is expected to gain the largest number of jobs at 2,100 on average per year. Northwest Riverside is also expected to gain a relatively large amount of jobs per year at about 1,800. The largest number of jobs foregone are expected in Riverside Other at about 40 jobs foregone on average per year. Figure 5-8 (b) shows the average annual percent change in jobs compared to the baseline, which represents job impacts that would occur regardless of whether the 2016 AQMP is implemented. The largest percent increases are concentrated in the Inland Empire and South Central Los Angeles and range from a 0.02percent job increase in Burbank Los Angeles to 0.34 percent job increase in South Central Los Angeles relative to the baseline. Job decreases relative to the respective baseline forecasts is observed among several sub-county regions, with a -0.01 percent decline in jobs relative to the baseline in Riverside Other and slightly lesser declines in Orange South and Los Angeles North.

FIGURE 5-8 (A): DISTRIBUTION OF NET JOB IMPACTS BY SUB-COUNTY REGION (ANNUAL AVERAGE, 2017-2031)

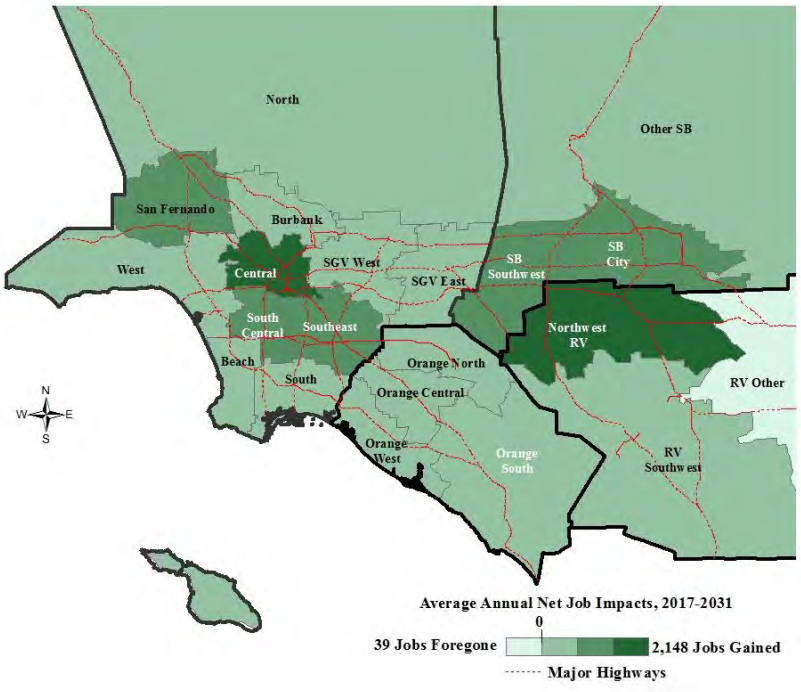
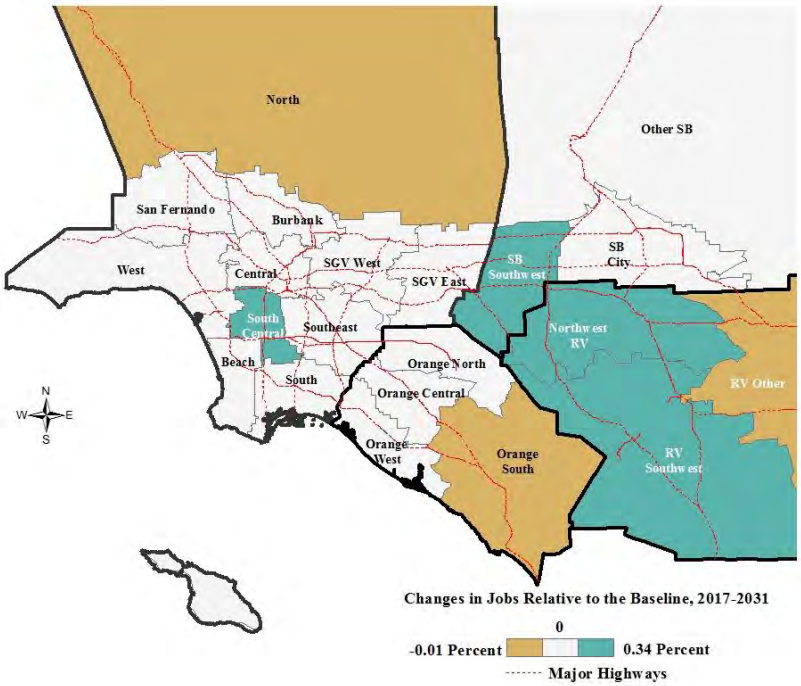


FIGURE 5-8 (B): PERCENT CHANGE RELATIVE TO THE BASELINE BY SUB-COUNTY REGION (ANNUAL AVERAGE, 2017-2031)



Chapter 6: Environmental Justice



The SCAQMD defines EJ as "equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution." It is akin to the U.S. EPA's definition: "Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[1] California state law similarly defines EJ as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies."[2]

For grant allocation purposes, the SCAQMD developed guidelines for EJ area designation. Currently, a community (geographically defined as a two-kilometer-by-two-kilometer grid cell) is designated as an EJ area if at least ten percent of the area's population falls below the federal poverty line, and if the area's PM2.5 concentration or toxic cancer risk is within the top 15th percentile among all areas within the Basin.[3] Additionally, for the allocation of the Greenhouse Gas Reduction Fund (GGRF), a local administering agency such as the SCAQMD relies upon a list of disadvantaged communities being created by the California Environmental Protection Agency (CalEPA). CalEPA created and updates the list using the California Communities Environmental Health Screening Tool (CalEnviroScreen) to "assess all census tracts in California to identify the areas disproportionately burdened by and vulnerable to multiple sources of pollution," whether air related or not.[4] Currently, the top 25 percent of most impacted census tracts are eligible for receiving grants funded by the GGRF.

The 2014 Abt report recommended that the SCAQMD expand the EJ analysis in its socioeconomic assessments with respect to its existing regulatory and policy impact analyses (Abt Associates 2014). It recommended that staff consider alternative designations of EJ areas by utilizing screening tools to identify vulnerable and susceptible populations. The report stated that a screening analysis could be used to identify geographic locations where the populations are potentially subject to disproportionate risk or exposure, based on an existing (baseline) profile of pollution emissions or releases, as well as the affected population's health conditions and socioeconomic status. The report noted that these factors have been shown to be important determinants of the degree of vulnerability and susceptibility to pollution exposure. Furthermore, the report recommended that a distributional analysis of policy impacts be included for purposes of assessing and comparing the distribution of health risk with and without the proposed policy, and evaluating whether any changes in health risk distribution represent an increase or a decrease in health risk inequality between the most vulnerable and susceptible populations and all other residents in the Basin.

SCAQMD staff has worked closely with IEc and its scientific advisors to implement Abt's recommendations as described above. Based on a thorough review and update of EJ literature, alternative screening and designation methods were identified and tailored for the purpose of preparing the socioeconomic impact analysis for the Draft Final 2016 AQMP. Moreover, two inequality indices were proposed for evaluating the

[1] See http://www3.epa.gov/environmentaljustice/.

[2] California Senate Bill 115, Solis, 1999; California Government Code § 65040.12(c).

[3] For funding allocation purposes, the SCAQMD also designates EJ areas in Coachella Valley, which is not located within the Basin. An EJ area there has at least ten percent of the area's population falling below the federal poverty line and its PM10 concentration within the top 15th percentile among all areas in Coachella Valley.

[4] California Senate Bill 535 (De León) designated CalEPA as the agency in charge of identifying disadvantaged communities for GGRF allocation. The Bill directed that a quarter of the proceeds from the GGRF must go to projects that provide a benefit to disadvantaged communities; moreover, at least ten percent of the funds must be for projects located within those communities (see http://www.calepa.ca.gov/EnvJustice/GHGInvest/).

distribution of health risk and for comparing differential policy impacts, if any, between EJ and non-EJ communities. The interim drafts of IEc's report were reviewed by the 2016 AQMP Socioeconomic Assessment EJ Working Group (Group).[5] The Group's comments and suggestions were reported back to the STMPR Advisory Group and incorporated into IEc's final report (2016).[6]

Alternative EJ Screening and Designation Methods

For purposes of the socioeconomic impact analysis, IEc recommended the use of quantitative indicators based on state-of-the-science literature guidance in designating EJ communities. Following its review of the existing EJ screening tools and methodologies, IEc recommended a list of alternative definitions in designating EJ communities based on a screening method derived from CalEnviroScreen 2.0.[7] IEc recommended multiple alternative definitions based on two considerations: first, these alternative definitions can be used as a sensitivity analysis for the current grant distribution definition of EJ; second, these alternative definitions, all with a similar structure, can also serve as sensitivity analyses for one another.

Alternative Definition 1 consists of poverty status and air quality related environmental indicators, which are most akin to those used by the SCAQMD in the current EJ designation for grant allocation purposes. Definition 2 expands the indicators by also including other demographic indicators available in CalEnviroScreen 2.0, including age, asthma, education, linguistic isolation, low birth weight, and unemployment. Definition 3 further expands the indicators by adding other non-air related environmental indicators available in CalEnviroScreen 2.0, including drinking water, pesticides, toxic releases, and traffic that are directly related to pollution exposure, as well as environmental effects such as cleanup sites, groundwater threats, hazardous waste, impaired water bodies, and solid waste that are considered to contribute less to possible pollution burden than the environmental indicators that are directly associated with pollutant exposure (CalEPA and OEHHA 2014). Definitions 2a and 3a include an additional indicator of race/ethnicity to Definitions 2 and 3, respectively. These alternative definitions are listed in Table 6-1 below.

As in CalEnviroScreen 2.0, each indicator is calculated at the level of census tract. All the individual indicators, except for toxic cancer risk and race/ethnicity, are derived from the same raw data provided on the CalEnviroScreen 2.0 website. The diesel PM concentration indicator in CalEnviroScreen 2.0 is replaced by toxic cancer risk, which is based on estimates in the SCAQMD's Multiple Air Toxics Exposure Study IV (MATES IV). While diesel PM accounted for 76.2 percent of the overall toxic cancer risk (SCAQMD 2015), the MATES IV estimates additionally account for other important contributors to toxic cancer risk. These toxic cancer risk estimates are used for the SCAQMD's current EJ area designation for grant allocation purposes.

[5] The Socioeconomic Assessment EJ Working Group met for a total of three times in April, May, and September 2016 to discuss respectively the proposed alternative EJ screening and designation methods, distributional analysis, and finally, IEc's draft final report and staff's preliminary analysis results.

[6] The final report is available on the SCAQMD website at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/scaqmdfinalejreport_113016.pdf?sfvrsn=6.

[7] IEc reviewed the current version of CalEnviroScreen (version 2.0), EJScreen and Community-Focused Exposure and Risk Screening Tool (C-FERST) both developed by the U.S. EPA, Environmental Justice Screening Method (EJSM) developed by researchers at the University of Southern California, UC Berkeley, and Occidental College, Cumulative Environmental Vulnerabilities Assessment (CEVA) developed by UC Davis, the Social Vulnerability Index (SoVI) 2006-10 developed by University of South Carolina, the 2010 Social Vulnerability Index (SVI) developed by the Agency for Toxic Substances & Disease Registry.

TABLE 6-1: ALTERNATIVE DEFINITIONS FOR EJ COMMUNITY DESIGNATION

Alternative Definition	Demographic Indicators		Environmental Indicators	
	Income	Other Demographic	Air Quality	Other Environmental
1	Poverty status[1]		PM2.5, toxic cancer risk,[2] ozone	
2	Poverty status[1]	Age, asthma, education, linguistic isolation, low birth weight, unemployment	PM2.5, toxic cancer risk,[2] ozone	
2a	Poverty status[1]	Age, asthma, education, linguistic isolation, low birth weight, unemployment, race/ethnicity[3]	PM2.5, toxic cancer risk,[2] ozone	
3	Poverty status[1]	Age, asthma, education, linguistic isolation, low birth weight, unemployment	PM2.5, toxic cancer risk,[2] ozone	Drinking water, pesticides, toxic releases, traffic, *cleanup sites, groundwater threats, hazardous waste, impaired water bodies, solid waste*[4]
3a	Poverty status[1]	Age, asthma, education, linguistic isolation, low birth weight, unemployment, race/ethnicity[3]	PM2.5, toxic cancer risk,[2] ozone	Drinking water, pesticides, toxic releases, traffic, *cleanup sites, groundwater threats, hazardous waste, impaired water bodies, solid waste*[4]

Notes:

[1] Unlike the SCAQMD's current EJ definition where poverty status is considered as at least ten percent of population below federal poverty line, the poverty status here is the share of population below twice the federal poverty line to account for the higher than average cost of living in the Basin and the conservative federal poverty level value.

[2] Toxic cancer risk is based on estimates from the SCAQMD's Multiple Air Toxics Exposure Study IV (MATES IV).

[3] Race/ethnicity is not included as an indicator in CalEnviroScreen 2.0. It is expressed as the percent of population within a census tract with minority status using the U.S. Census Bureau's American Community Survey five-year estimates for 2010-2014. Based on the federal National Environmental Policy Act (NEPA) Guideline, "minority" is defined as "[i]ndividual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic."

[4] Consistent with CalEnviroScreen 2.0, the "other environmental" indicators that are shown in *italics* are given half the weight when calculating the overall score for all environmental indicators whereas all other indicators were given the weight of one.

Source: Industrial Economics, Levy, and Harper 2016.

Race/ethnicity is not included as an indicator in CalEnviroScreen 2.0.[8] However, it is included in this analysis based on state-of-the-science literature guidance and input from the EJ Working Group. In order to facilitate potential use of an alternative EJ definition in circumstances where race and ethnicity are legally prohibited

[8] However, a post-screening analysis conducted by OEHHA showed that the more impacted communities identified by CalEnviroScreen 2.0 also have higher shares of minority population (OEHHA 2014).

from being used, race/ethnicity is included in this analysis as a sensitivity test to Alternative Definitions 2 and 3.

Similar to CalEnviroScreen 2.0, each census tract within the Basin was ranked from the most to the least impacted areas, based on a tract's overall screening score.[9] IEc recommended two potential thresholds to designate EJ communities. The first threshold option would define an EJ community as the worst impacted census tracts until the total population residing in these tracts reaches approximately 50 percent of the Basin's population. This threshold roughly reflects the same number of residents as the SCAQMD's current EJ designation, which covers about 47 percent of the Basin's population. In comparison, the second and more stringent threshold option includes the worst impacted census tracts as EJ communities until approximately 25 percent of the Basin's population are identified to live in these communities. This 25-percent population threshold reflects the current practice of setting statewide CalEnviroScreen threshold to allocate the GGRF.[10]

Table 6-2 shows the EJ population distribution across the four counties within the Basin for each EJ definition and based on the two population thresholds. Compared to the SCAQMD's current EJ definition for grant allocation purposes, the EJ population identified by Alternative Definitions 1-3 all consist of a larger share of residents in the Inland region and a smaller share of residents in the coastal counties. While this difference ranges from 4 to 12 percent, depending on the alternative definition and population threshold used, the largest differences appear when the designation threshold is set at the more restrictive population cut-off of top 25 percent and when other non-air related environmental indicators are not included.

TABLE 6-2: EJ POPULATION DISTRIBUTION BY DEFINITION AND DESIGNATION THRESHOLD

County	SCAQMD Definition (~ 50%)	Alternative Definition 1		Alternative Definition 2		Alternative Definition 3	
		Top 50%	Top 25%	Top 50%	Top 25%	Top 50%	Top 25%
Los Angeles	74.4	70.6	72.1	72.5	72.0	68.1	75.2
Orange	10.0	5.7	1.0	3.9	0.1	11.2	4.8
Riverside	5.9	10.0	7.2	9.5	7.1	8.1	6.6
San Bernardino	9.8	13.7	19.7	14.1	20.8	12.5	13.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

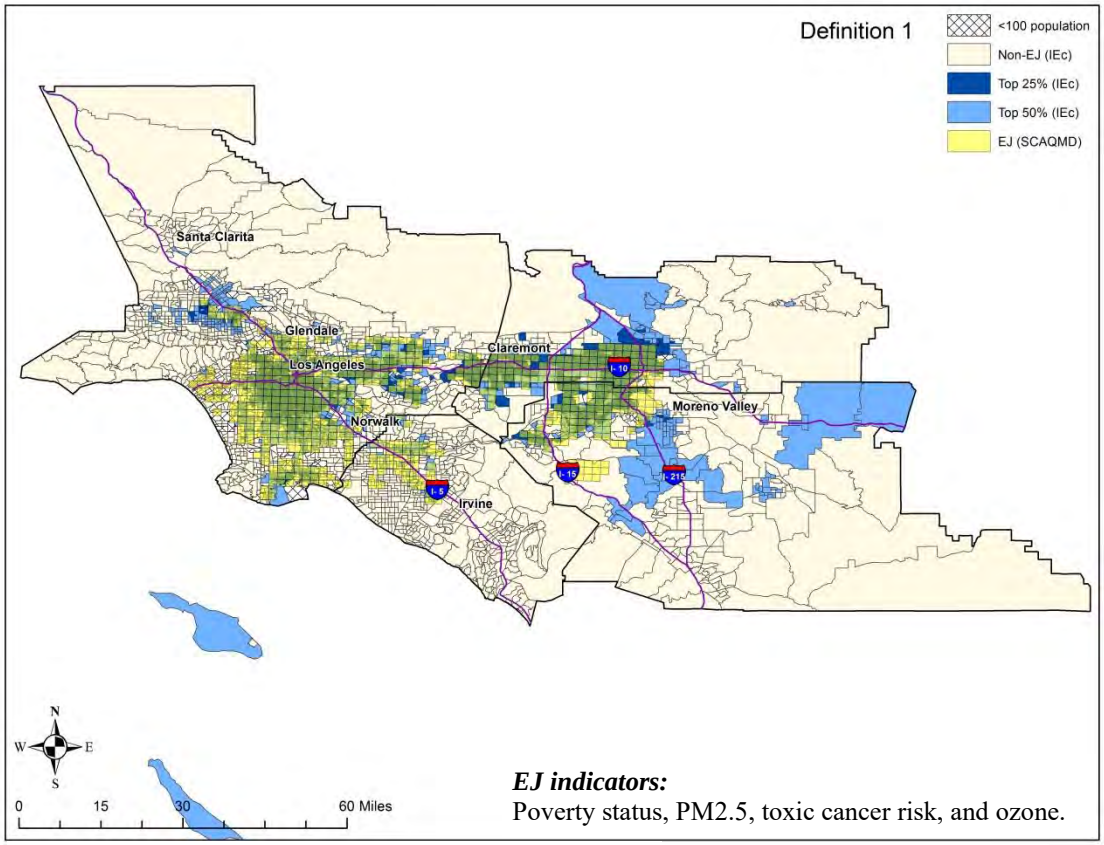
Note: County-specific values may not sum up to 100 percent due to rounding error.
Source: Industrial Economics, Levy, and Harper (2016).

Figures 6-1, 6-2, and 6-3 present the maps of EJ designation results based on Alternative Definitions 1, 2, and 3 respectively. In general, communities that have been designated as EJ communities by the SCAQMD largely overlap with those designated as EJ communities by the alternative definitions recommended by IEc. Particularly, the current SCAQMD EJ designation covers the majority of the worst impacted EJ areas, as identified by the 25-percent population threshold under any of the three alternative definitions. Consistent

[9] The calculation of screening score is identical to the CalEnviroScreen 2.0 method. See Appendix 6-A for an example.
[10] Notice, however, that the Basin has a higher concentration of EJ communities as identified for GGRF allocation purposes based on the statewide ranking using CalEnviroScreen 2.0. Therefore, the number of residents living in the Basin's EJ communities according to the GGRF designation effectively accounts for about 39 percent of the Basin's total population.

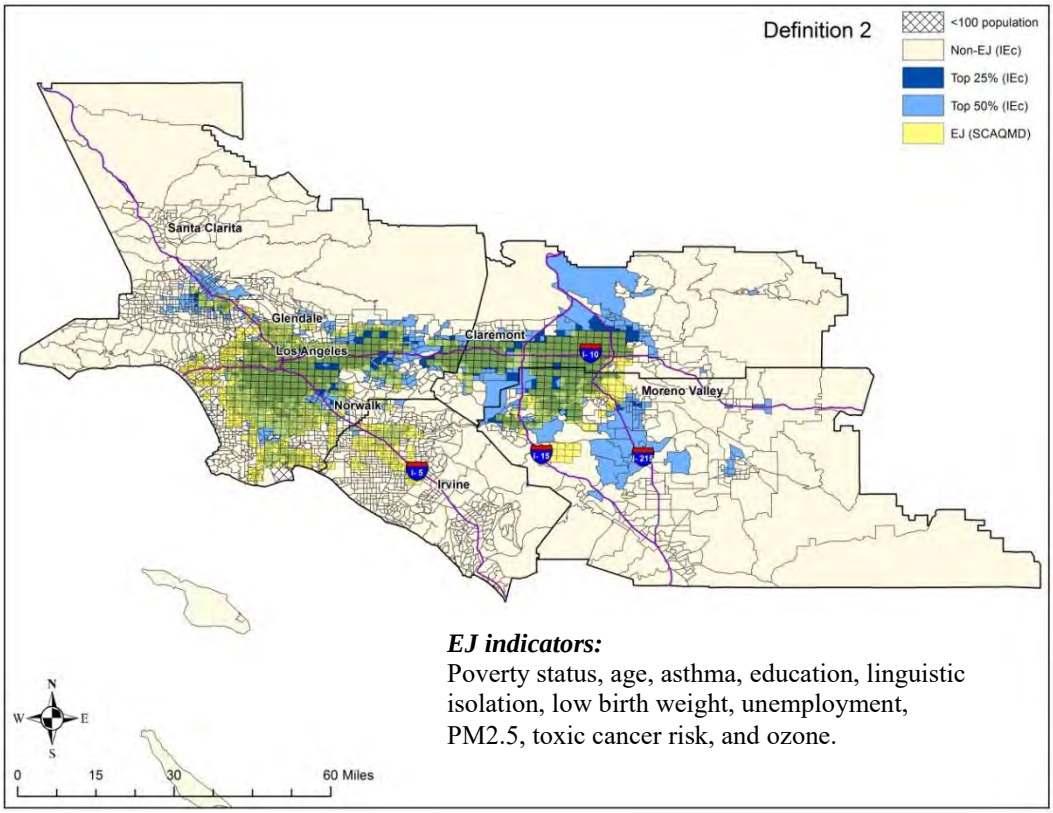
with the EJ population distribution shown in Table 6-2, however, all three maps demonstrate a slight eastward shift away from the coast and toward the inland area when the recommended alternative definitions are used instead of the current SCAQMD EJ designation. Moreover, the eastward shift is somewhat more pronounced under Alternative Definitions 1 and 2, and under these two definitions, there are also visibly fewer EJ communities located in Orange County. The map for Alternative Definition 3 shows the largest difference from the current SCAQMD EJ designation. It includes a number of large, rural, and sparsely populated census tracts at the southeastern most corner of the Basin, as well as a number of census tracts in Orange County between Interstate 405 and the Santa Ana Freeway portion of Interstate 5. Residents in these census tracts are relatively more impacted by other water- and hazardous waste-related environmental burdens, more so than air pollution-related burdens.

FIGURE 6-1: EJ COMMUNITIES DESIGNATED UNDER ALTERNATIVE DEFINITION 1 VERSUS SCAQMD'S CURRENT EJ DESIGNATION



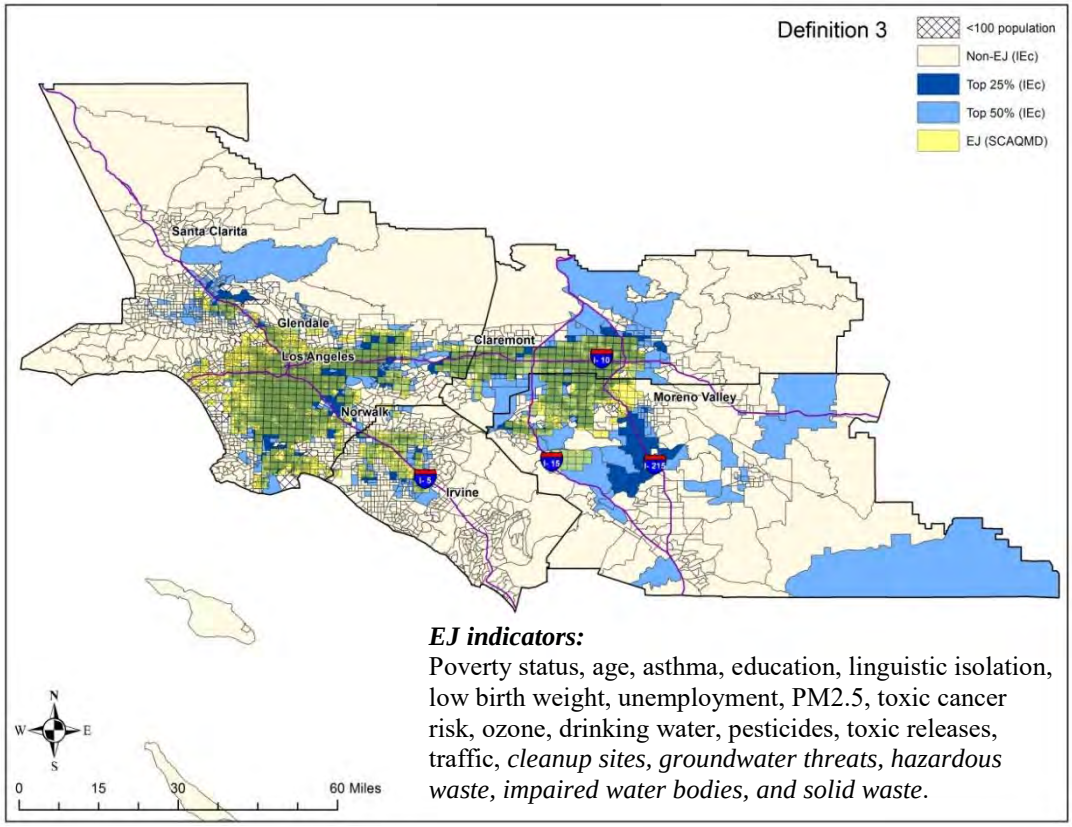
Source: Industrial Economics, Levy, and Harper 2016.

FIGURE 6-2: EJ COMMUNITIES DESIGNATED UNDER ALTERNATIVE DEFINITION 2 VERSUS SCAQMD'S CURRENT EJ DESIGNATION



Source: Industrial Economics, Levy, and Harper 2016.

FIGURE 6-3: EJ COMMUNITIES DESIGNATED UNDER ALTERNATIVE DEFINITION 3 VERSUS SCAQMD'S CURRENT EJ DESIGNATION



Source: Industrial Economics, Levy, and Harper 2016.

According to the literature survey conducted by IEc and its scientific advisors (Industrial Economics et al. 2016), race/ethnicity has been shown to be an important indicator of vulnerability to pollution exposure. Table 6-3 illustrates the impact of adding race/ethnicity to Alternative Definitions 2 and 3 on the EJ population distribution across the four counties. This additional EJ indicator is based on the percent minority population within a census tract, with the definition of minority being "[i]ndividual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic." (Council on Environmental Quality 1997) Table 6-3 allows the comparison of population distributions between EJ definitions without and with race/ethnicity (i.e., between Alternative Definitions 2 and 2a and between Alternative Definitions 3 and 3a). It can be seen that the inclusion of race/ethnicity results in very minor changes to how the EJ population is distributed.

TABLE 6-3: IMPACT OF RACE/ETHNICITY INCLUSION ON EJ POPULATION DISTRIBUTION

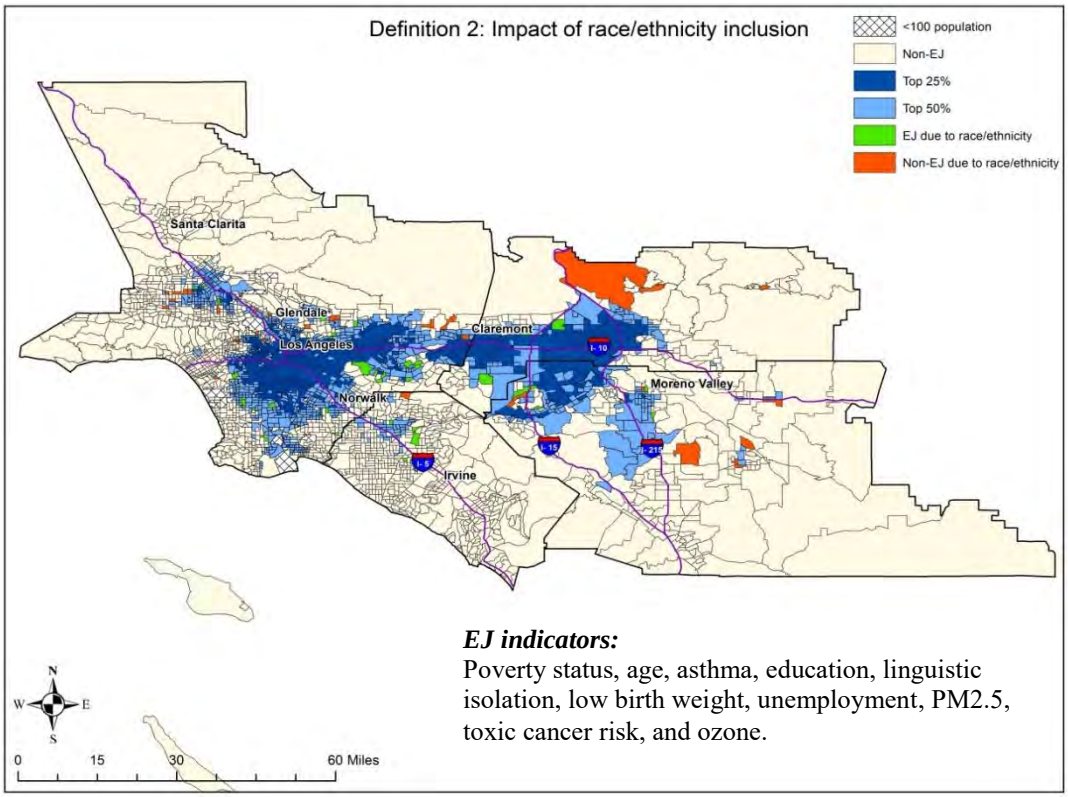
County	Top 50%		Top 25%		Top 50%		Top 25%	
	Def. 2	Def. 2a	Def. 2	Def. 2a	Def. 3	Def. 3a	Def. 3	Def. 3a
Los Angeles	72.5	72.2%	72.0	72.8%	68.1	68.6%	75.2	76.4%
Orange	3.9	4.2%	0.1	0.0%	11.2	11.1%	4.8	4.6%
Riverside	9.5	9.2%	7.1	6.4%	8.1	7.9%	6.6	6.3%
San Bernardino	14.1	14.3%	20.8	20.8%	12.5	12.4%	13.5	12.7%
Total	100.0	100%	100.0	100%	100.0	100%	100.0	100%

Note: County-specific values may not sum up to 100 percent due to rounding error.
Source: Industrial Economics, Levy, and Harper (2016).

Similarly, marginal changes in EJ designations are observed in Figures 6-4 and 6-5, where race/ethnicity was added to the existing list of demographic indicators under Alternative Definitions 2 and 3, respectively. Generally speaking, some census tracts outside of the main contiguous EJ area are now non-EJ communities, and at the same time, some census tracts within the contiguous area from central Los Angeles east along the Interstate 10 corridor are now EJ communities. For either designation threshold, these changes affect only about two percent of the Basin's population.

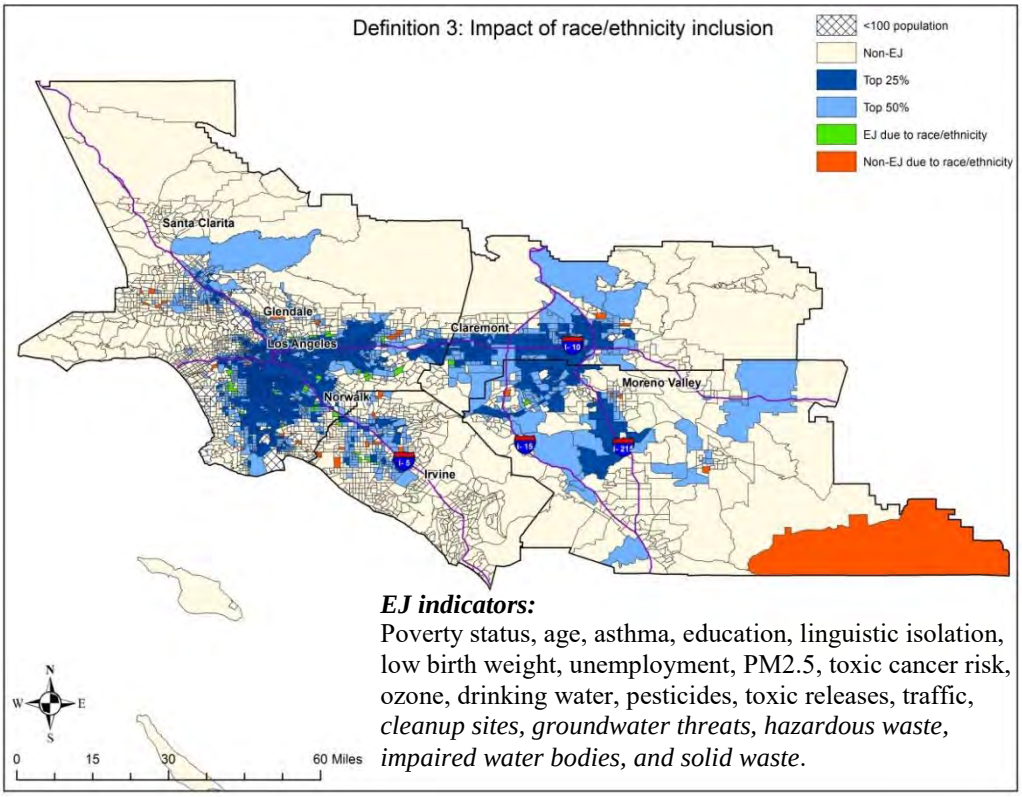
Nonetheless, it should be emphasized that the minimal changes as a result of adding race/ethnicity do not imply a lack of significance of race/ethnicity as an EJ indicator. Rather, these minimal changes suggest a likely high correlation between race/ethnicity and many, if not all, of the indicators that are already included under Alternative Definitions 2 or 3.

FIGURE 6-4: IMPACT OF RACE/ETHNICITY INCLUSION ON EJ COMMUNITY DESIGNATION UNDER ALTERNATIVE DEFINITION 2



Source: Industrial Economics, Levy, and Harper 2016.

FIGURE 6-5: IMPACT OF RACE/ETHNICITY INCLUSION ON EJ COMMUNITY DESIGNATION UNDER ALTERNATIVE DEFINITION 3



Source: Industrial Economics, Levy, and Harper 2016.

Quantified Public Health Effects and Monetized Benefits in EJ and non-EJ communities

For the purpose of analyzing the distributional impacts of the Draft Final 2016 AQMP, it was recommended by IEc that the analysis be conducted for PM2.5- and ozone-related mortality risk in adults, as well as for morbidity risk of asthma-related emergency department (ED) visits in children, as different age groups could experience varying impacts for a particular health endpoint. This section summarizes the health effects for these recommended health endpoints and the monetized overall public health benefits, as a result of implementing the Draft Final 2016 AQMP, based on the annual estimates for year 2031 within the Basin.[11] Based on the finding that the projected air quality (measured by ozone and PM2.5 concentrations at the grid-cell level) in 2023 and in 2031 are almost perfectly correlated,[12] the distribution of public health benefits for year 2023 is expected to be very similar to the results for year 2031, except that the 2023 benefits would be of a smaller magnitude due to the projected smaller changes in pollutant concentrations for the earlier milestone year.

Table 6-4 compares the projected decreases in the number of premature deaths per million residents in 2031 in EJ and non-EJ communities due to implementation of the Draft Final 2016 AQMP. Similarly, Table 6-5 compares the projected decreases in the number of asthma-related ED visits per million residents in 2031 in EJ and non-EJ communities. Table 6-4 shows that, on average, EJ communities are projected to experience greater public health benefits of avoided premature deaths among adults, as a result of implementing the Draft Final 2016 AQMP. Table 6-5 shows that, while all communities would see reductions in the risk of asthma-related ED visits in children, non-EJ communities are expected to see a greater decrease in that risk than EJ communities.

TABLE 6-4: ANNUAL AVOIDED PREMATURE DEATHS AMONG ADULTS (25 YEARS OR OLDER)* ANTICIPATED THROUGH IMPLEMENTING THE DRAFT FINAL 2016 AQMP

By EJ Designation and for Year 2031

		Decrease in Number of Premature Deaths per Million Residents 25 Years or Older		Difference
EJ Designation		**EJ Communities**	**Non-EJ Communities**	**(EJ) – (Non-EJ)**
Definition 1	Top 50%	169	140	29
	Top 25%	180	145	35
Definition 2	Top 50%	173	136	37
	Top 25%	175	144	31
Definition 3	Top 50%	167	140	27
	Top 25%	155	146	10

*Due to both long-term exposure to PM2.5 and short-term exposure to ozone
Note: Numbers may not sum up due to rounding.

[11] The health effects and monetized public health benefits are slightly less than those reported in Chapter 3. The difference of about one percent is due to the effects and benefits estimated within the four-county region but outside the Basin.

[12] The correlation coefficient of pollutant concentrations for year 2023 and for year 2031 is greater than 0.99 for both baseline and control scenarios.

TABLE 6-5: ANNUAL AVOIDED ASTHMA RELATED ED VISITS AMONG CHILDREN (YOUNGER THAN 18)* ANTICIPATED THROUGH IMPLEMENTING THE DRAFT FINAL 2016 AQMP

By EJ Designation and for Year 2031

		Decrease in Number of Asthma-Related ED Visits per Million Residents Younger than 18		Difference
EJ Designation		EJ Communities	Non-EJ Communities	(EJ) – (Non-EJ)
Definition 1	Top 50%	698	700	-2
	Top 25%	685	703	-18
Definition 2	Top 50%	701	697	3
	Top 25%	691	702	-11
Definition 3	Top 50%	683	717	-35
	Top 25%	645	720	-75

*Due to short-term exposure to ozone only
Note: Numbers may not add up due to rounding.

Finally, Table 6-6 shows the per capita monetized public health benefits in EJ and non-EJ communities, respectively. As previously discussed in Chapter 3, these monetized benefits are largely driven by projected avoided premature deaths; therefore, consistent with the comparison results shown in Table 6-4, EJ communities are projected to experience a larger per capita health benefits. In other words, proportionally more of the quantified public health improvement due to implementing the Draft Final 2016 AQMP are projected to accrue to EJ communities than non-EJ communities, regardless of the alternative definition or designation threshold chosen.

TABLE 6-6: MONETIZED ANNUAL PUBLIC HEALTH BENEFITS

By EJ Designation and for Year 2031

		Per Capita Monetized Benefits (in 2015 Dollars)		Difference in Per Capita Benefits
EJ Designation		EJ Communities	Non-EJ Communities	EJ - Non-EJ
Definition 1	Top 50%	$1,865	$1,554	$311
	Top 25%	$2,011	$1,610	$402
Definition 2	Top 50%	$1,906	$1,510	$395
	Top 25%	$2,029	$1,597	$432
Definition 3	Top 50%	$1,843	$1,546	$297
	Top 25%	$1,928	$1,615	$313

Notably, the difference in per capita health benefits is consistently larger when the designation threshold is set at the top 25-percent of population. This indicates that the most vulnerable and susceptible communities will experience proportionally more of the projected health benefits of cleaner air. It is also observed that,

regardless of the threshold used, the difference in per capita health benefits is the smallest under Alternative Definition 3, where other non-air related environmental indicators are included for EJ screening. This implies that, as clean air policy is not designed to alleviate other types of environmental risks or degradation, Alternative Definition 3 may not be the best way to designate EJ communities for the purpose of evaluating the effectiveness of air regulations and programs in reducing health risk disparity, which is used in the recent EJ literature as the barometer for environmental justice.

Evaluating Distributional Impact of the Draft Final 2016 AQMP via Health Risk Inequality Index

According to the U.S. EPA's latest *Guidelines for Preparing Economics Analyses* (2016), examining the distribution of changes in health benefits alone may not completely reflect the distributional impact since "an unequal distribution of environmental improvements may actually help alleviate existing disparities (Maguire and Sheriff 2011)" (p. 10-7). The *Guidelines* recommend the consideration of changes in distributions of health and environmental outcomes, such as health risk, between baseline and policy scenarios.

Consistent with the *Guidelines*, IEc recommended that the distributional impact of the Draft Final 2016 AQMP be analyzed by comparing the distributions of exposure-related mortality and morbidity risk between baseline and policy scenarios (Industrial Economics et al. 2016). The purpose of analyzing more than one health endpoint is two-fold: first, health risk for different health endpoints cannot easily be combined into one meaningful risk metric; second, different health endpoints may have varying impacts on different population groups, such as age cohorts. Therefore, the distribution of PM2.5 and ozone exposure related mortality risk is analyzed, as premature death is the most severe effect of air pollution among all health endpoints. However, it is more likely that a larger effect of mortality risk changes will be experienced by the older age cohort. To complement the distributional analysis of mortality risk, the exposure related morbidity risk distribution is also analyzed for asthma-related ED visits among children, whose lungs are not yet fully developed and are therefore more susceptible than adults to respiratory health impacts.

The distributional analysis consists of three main steps as described below:[13]

1. Health risk related to the exposure of a pollutant was estimated separately for the baseline and the policy (control) scenario using BenMAP-CE and accounting for exposure to all emission sources of the pollutant, whether anthropogenic or biogenic.[14]
2. Inequality index values, which summarize the distribution of exposure related health risk among all census tracts within the Basin, were calculated for the baseline and the policy scenario separately.[15]
3. The inequality index values calculated in Step 2 were decomposed into the inequality *between* the EJ and the non-EJ group of communities and the inequality *within* either group of communities.

[13] A similar methodology was used in Fann et al. (2011). See Appendix 6-B for further discussion.

[14] BenMAP-CE was also used to quantify health benefits in Chapter 3. See Appendix 3-B for a discussion of BenMAP-CE operational steps.

[15] Some studies have shown that using inequality index to summarize the distribution of a "bad" (e.g., health risk), as opposed to a "good" (e.g., income) can lead to violations of some axioms that an inequality index must satisfy. For this reason, SCAQMD staff analyzed the distributions of the complement of health risk (one minus the health risk), which is directly interpretable as a "good," i.e., the percent of population not expected to experience premature deaths or asthma-related ED visits (see Appendix 6-B for further discussion).

Based on IEc recommendations, the analysis uses both Atkinson and Kolm-Pollak Inequality Indices to show the potential changes in health risk inequality. Generally speaking, a higher inequality index value indicates greater inequality. However, it should be noted that an inequality index value is, in essence, a single number that indicates the statistical dispersion of a distribution,[16] and the directional change is much more meaningful than the precise value of an inequality index. Moreover, the index value and changes in index value cannot be compared across different indices.[17] An analogous example is stock market indices: the *directional changes* of Dow Jones Industrial Average and S&P 500 are both important financial market indicators, but the value of the indices do not carry much meaning and the values and their absolute changes also should not be compared against each other.

Additionally, it should also be noted that the Atkinson Inequality Index is based on *relative* inequality whereas the Kolm-Pollak Inequality Index is based on *absolute* inequality. As an illustrative example of the difference, let us assume that there is no within-group inequality (i.e., identical health risk at each census tract within either the EJ or non-EJ group of communities), and therefore, the overall inequality can be entirely attributed to inequality between the EJ and the non-EJ group of communities. In this example, if the ratio of health risk between EJ and non-EJ groups stays constant across the baseline and the policy scenario (e.g., health risk ratio for baseline: 0.0004/0.0002 = health risk ratio for policy: 0.0002/0.0001), then the Atkinson Index will also stay constant and show no change in inequality. In contrast, the Kolm-Pollak Index will show a decrease in inequality in this example as the absolute difference in health risk shrinks (i.e., [0.0004-0.0002 = 0.0002] > [0.0002-0.0001 = 0.0001]).[18]

Table 6-7 reports the impact of the Draft Final 2016 AQMP on the overall distribution of health risk within the Basin in 2031. The inequality in PM2.5 and ozone exposure related mortality risk among adults is projected to decrease with either inequality index. The inequality in ozone exposure related asthma ED visits among children is also projected to decrease according to either inequality index.

[16] Not all measures of statistical dispersion can qualify as an inequality index. Only those that satisfy a list of required axioms can be used as inequality indices. See Industrial Economics et al. (2016) for a discussion of the axioms.
[17] The inequality index values also cannot be compared across different inequality aversion parameters even with the same inequality index. See Industrial Economics et al. (2016) for more discussion of inequality aversion.
[18] In this analysis, the absolute and relative changes in inequality are very similar in value because the distributions of the complement of health risks average around 0.99, from which point small changes in absolute or percentage terms are similar.

TABLE 6-7: OVERALL DISTRIBUTIONAL IMPACT OF THE DRAFT FINAL 2016 AQMP IN 2031

	PM2.5 and Ozone Exposure Related Mortality Risk (Among Residents 25 Years or Older)		Ozone Exposure Related Asthma ED Visits for Asthma (Among Residents Younger than 18)	
	Atkinson Index [Relative Inequality] Inequality Aversion = 0.5	**Kolm-Pollak Index [Absolute Inequality]** Inequality Aversion = 0.5	**Atkinson Index [Relative Inequality]** Inequality Aversion = 0.5	**Kolm-Pollak Index [Absolute Inequality]** Inequality Aversion = 0.5
	(Values in 10^{-8})	(Values in 10^{-8})	(Values in 10^{-8})	(Values in 10^{-8})
Baseline	6.3	6.3	15.7	15.5
Policy	4.4	4.4	13.9	13.8
Change	↓	↓	↓	↓

Note: Inequality aversion parameters take on non-negative values only, and a higher value indicates that a society is more "inequality averse". However, the same parameter value does not imply the same degree of inequality aversion between Atkinson and Kolm-Pollak Indices.

Tables 6-8 and 6-9 decompose the overall inequality of health risk, for Atkinson and Kolm-Pollak Indices respectively, into two components: inequality *between* EJ and non-EJ groups of communities and a weighted average inequality *within* each group; moreover, the decomposition was conducted for all three alternative EJ definitions and the two population thresholds for EJ designation. In terms of *relative* inequality as measured by the Atkinson Index (see Table 6-8), it is observed that there is consistently greater within- than between-group dispersion for both mortality and morbidity risk analyzed here. Nonetheless, both between- and within-group inequalities are reduced for PM2.5 and ozone exposure related mortality risk among adults. In the meantime, the inequality between EJ and non-EJ communities is shown to increase for the health risk of ozone exposure related asthma ED visits among children, although the corresponding within-group inequality decreases. This implies that the decrease in overall inequality, as measured by the Atkinson Index for the risk of asthma-related ED visits among children as shown in Table 6-7, is due to a larger reduction in the relative within-group inequality, which dominates any increase in the relative between-group inequality.

In terms of *absolute* inequality as measured by the Kolm-Pollak Index (see Table 6-9), it also shows greater within- than between-group dispersion. Furthermore, the changes of absolute inequality corroborate the results shown for relative inequality.

The result of increased inequality of ozone-exposure related risk of asthma ED visits among children between EJ and non-EJ communities is primarily due to the chemical mechanism of ozone formation in the Basin. This mechanism and the atmospheric dispersion of precursor pollutants from the emission sources lead to greater reductions in ozone concentrations in the downwind inland areas of the Basin, and smaller reductions in the central Los Angeles areas of the Basin. In the meantime, the central Los Angeles areas have a greater proportion of census tracts designated as EJ communities than the less populous inland areas. (See Table 6-2 and note that census tracts are designed to have similar population sizes across all tracts.). As a result, while the ozone-exposure related health risk is projected to decline everywhere in the Basin, it would decline less in many of the EJ communities located around central Los Angeles.

TABLE 6-8: DECOMPOSED DISTRIBUTIONAL IMPACT OF THE DRAFT FINAL 2016 AQMP IN 2031 USING RELATIVE INEQUALITY-BASED ATKINSON INDEX *(Inequality Aversion = 0.5)*

	PM2.5 and Ozone Exposure Related Mortality Risk (Among Residents 25 Years or Older)				**Ozone Exposure Related Asthma ED Visits for Asthma (Among Residents Younger than 18)**			
	Top 50%		*Top 25%*		*Top 50%*		*Top 25%*	
	Between	Within	Between	Within	Between	Within	Between	Within
	(All values are in 10^{-8})							
Def. 1								
Baseline	0.3	6.0	0.3	6.0	1.7	14.0	1.3	14.5
Policy	0.2	4.2	0.2	4.2	2.0	12.0	1.5	12.5
Change	↓	↓	↓	↓	↑	↓	↑	↓
Def. 2								
Baseline	0.4	5.9	4.5	6.5	2.5	13.2	1.5	14.2
Policy	0.3	4.1	2.9	4.6	2.7	11.2	1.7	12.3
Change	↓	↓	↓	↓	↑	↓	↑	↓
Def. 3								
Baseline	0.4	5.9	4.0	6.7	0.9	14.8	0.6	15.1
Policy	0.3	4.1	2.8	4.6	1.1	12.8	0.8	13.1
Change	↓	↓	↓	↓	↑	↓	↑	↓

TABLE 6-9: DECOMPOSED DISTRIBUTIONAL IMPACT OF THE DRAFT FINAL 2016 AQMP IN 2031 USING ABSOLUTE INEQUALITY-BASED KOLM-POLLAK INDEX *(Inequality Aversion = 0.5)*

	PM2.5 and Ozone Exposure Related Mortality Risk (Among Residents 25 Years or Older)				**Ozone Exposure Related Asthma ED Visits for Asthma (Among Residents Younger than 18)**			
	Top 50%		*Top 25%*		*Top 50%*		*Top 25%*	
	Between	Within	Between	Within	Between	Within	Between	Within
	(All values are in 10^{-8})							
Def. 1								
Baseline	0.3	6.0	0.3	6.0	1.7	13.8	1.2	14.3
Policy	0.2	4.2	0.2	4.2	2.0	11.9	1.4	12.4
Change	↓	↓	↓	↓	↑	↓	↑	↓
Def. 2								
Baseline	0.4	5.9	0.3	6.0	2.4	13.1	1.4	14.1
Policy	0.3	4.1	0.2	4.1	2.7	11.1	1.7	12.1
Change	↓	↓	↓	↓	↑	↓	↑	↓
Def. 3								
Baseline	0.4	5.9	0.3	6.0	0.9	14.6	0.6	14.9
Policy	0.3	4.1	0.2	4.2	1.1	12.7	0.8	13.0
Change	↓	↓	↓	↓	↑	↓	↑	↓

Chapter 7: CEQA Alternatives



The California Environmental Quality Act (CEQA) requires that SCAQMD propose alternatives to the 2016 AQMP. These alternatives should include realistic measures to attain the basic objectives of the project (i.e., the obligation to adopt attainment plans to meet the PM2.5 and ozone NAAQS) and provide the means for evaluating the comparative merits of each alternative. The range of alternatives must be sufficient to permit a reasoned choice but need not include every conceivable project alternative. The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation.

The Draft Program Environmental Impact Report (PEIR) considers four CEQA Alternatives to the proposed Draft 2016 AQMP.[1] For purposes of socioeconomic impact assessment, except for Alternative 1—No Project, it is assumed that the remaining three alternatives would lead to attainment of NAAQS. Each of the four alternatives and how their socioeconomic impacts were modeled are described below.

Description of CEQA Alternatives

Alternative 1—No Project

CEQA requires the evaluation of the No Project Alternative, which consists of what would occur if the proposed project was not approved; in this case, not adopting the 2016 AQMP. The net effect of not adopting the 2016 AQMP would be a continuation of the 2012 AQMP and the 2007 AQMP. This approach is consistent with CEQA Guidelines §15126.6 (e)(3)(A), which states: "When the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the 'no project' alternative will be the continuation of the existing plan, policy, or operation into the future. Typically this is a situation where other projects initiated under the existing plan will continue while the new plan is developed. Thus, the projected impacts of the proposed plan or alternative plans would be compared to the impacts that would occur under the existing plan".

The No Project Alternative would implement any remaining control measures in the 2012 AQMP and fulfill the "black box" measure commitment in the future pursuant to the 2007 AQMP to achieve the 1997 8-hour ozone standard (80 ppb) by 2023 but would not propose enough reductions to achieve the 2008 8-hour ozone standard (75 ppb) by 2031 or the 2012 annual PM2.5 standard (12.0 μg/m^3) by 2025 as projected to be accomplished by the proposed 2016 AQMP control measures. Since no emission reductions are expected from the projected baseline inventory, there will be no emission reduction related costs or public health benefits, therefore also no resultant macroeconomic impacts under Alternative 1. However, the No Project Alternative would not be sufficient to satisfy the SCAQMD's SIP obligations. As discussed in Chapter 1, the receipt of federal highway funding for transportation investment in the region hinges on adopting an appropriate plan to attain the NAAQS; therefore, failure to do so could have undesirable economic consequences for the region. The potential macroeconomic impacts resulting from such a scenario are not quantified in this report due to a wide range of uncertainties regarding sanction implementation and impacts. For instance, the baseline economic projections used in the analysis relies on the 2016 SCAG Growth Forecast, which assumes that the region would continue receiving federal highway funding. Thus, analyzing the economic impacts of this potential funding shortfall would require new transportation and air quality model forecasts, which is beyond the scope of this analysis.

[1] Environmental Audit Inc. and Inabinet 2016; available at: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2016/2016-aqmp-draft-program-eir-combined.pdf.

Alternative 2—Mobile Source Emission Reductions Only

Alternative 2 retains all mobile source control strategies proposed by SCAQMD and CARB, along with CARB's consumer product control measure; however, the stationary source control measures as proposed by SCAQMD would not be implemented under this alternative. For the purpose of conducting a comparable socioeconomic analysis between the Draft Final 2016 AQMP and the CEQA alternatives, the amount of NOx and VOC emission reductions attributable to stationary source control measures under the proposed Draft Final 2016 AQMP — annual average of 8 tpd in 2023 and 20 tpd in 2031 for NOx; and annual average of 8 tpd in 2023 and 12 tpd in 2031 for VOC, would then be classified as achievable under CAA §182(e)(5) measures under Alternative 2, in order to still meet the ozone NAAQS.

It was further assumed that: first, most of the mobile source CAA §182(e)(5) measures would generate NOx and VOC emission reductions as a co-benefit and their associated costs would be an average of $50,000 per ton of NOx reduced;[2] and second, only limited, strategic VOC reductions of 3 tpd in 2023 and 4 tpd in 2031 will be needed from the remaining mobile source CAA §182(e)(5) measures and they would incur an additional cost per ton similar to the proposed VOC-only control measures.

Table 7-1 presents the list of ozone control measures considered for Alternative 2, for which emission reductions were quantified. Similar to the conclusion made in the Draft Final 2016 AQMP, it is assumed that the implementation of all ozone control strategies would result in attainment of the 2012 annual PM2.5 standard.[3]

[2] As calculated by the discounted cash flow method. $50,000 per ton of NOx emission reduction was considered in the 2014 NOx RECLAIM amendments as the cost-effectiveness threshold. This threshold was assumed to reflect the expectation that the not-yet-identified technologies under the CAA §182(e)(5) measures could be significantly more expensive than the average of $29,000 per ton estimated for the further deployment measures proposed by CARB.

[3] The Draft Final 2016 AQMP contains two *contingency* PM2.5 control measures with quantified emission reductions; therefore, their incremental costs have been estimated. They are BCM-01: Further Emission Reductions from Commercial Cooking and BCM-04: Emission Reductions from Manure Management Strategies. The costs associated with these two measures are retained for socioeconomic assessment for CEQA Alternatives 2-4.

TABLE 7-1: OZONE MEASURES CONSIDERED FOR SOCIOECONOMIC ASSESSMENT UNDER ALTERNATIVE 2

Measure	Title	Implementation Agency
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	SCAQMD
MOB-11	Extended Exchange Program [VOC, NOx, CO]	SCAQMD
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	SCAQMD
ORLD-01	Advanced Clean Cars 2	CARB
ORLD-03	Further Deployment of Cleaner Technologies: On-Road Light Duty Vehicles*	CARB
ORHD-02	Low-NOx Engine Standard – California and Federal Action	CARB
ORHD-04	Advanced Clean Transit	CARB
ORHD-05	Last Mile Delivery	CARB
ORHD-09	Further Deployment of Cleaner Technologies: On-Road Heavy Duty Vehicles	CARB
ORFIS-01	More Stringent National Locomotive Emission Standards	U.S. EPA
ORFIS-02	Tier 4 Vessel Standards	U.S. EPA
ORFIS-04	At-Berth Regulation Amendments	CARB
ORFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources	CARB
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	CARB
OFFS-04	Zero Emission Airport Ground Support Equipment	CARB
OFFS-05	Small Off-Road Engines	CARB
OFFS-07	Low-Emission Diesel Requirement	CARB
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment	CARB
CPP-01	Consumer Products Program	CARB
CAA §182(e)(5) Measures (to Replace Stationary Source Control Measures)		

*NOx and VOC emission reductions estimated for this measure are considered as co-benefits.

Alternative 3—CARB and SCAQMD Regulations Only

Alternative 3 is designed to implement those control strategies that are regulatory in nature only. These strategies are proposed by both SCAQMD and CARB for stationary, area, and mobile sources, and include some measures regulating federal sources. Consequently, the emission reductions projected to be generated by incentive-based control strategies would be classified as achievable under CAA §182(e)(5) measures to meet the NAAQS. For socioeconomic analysis purposes, it was assumed that the CAA §182(e)(5) measures under Alternative 3 would be similar in nature to the incentive-based control strategies proposed in the Draft Final 2016 AQMP, except that no incentives would be provided. In other words, Alternative 3 would retain all proposed control strategies under the Draft Final 2016 AQMP. However, all emission reductions quantified for each control measure would be achieved via rule-making only.

Table 7-2 presents the list of ozone control measures considered for Alternative 3, for which emission reductions were quantified.[4]

[4] See Footnote 3 for the treatment of contingency PM2.5 control measures.

TABLE 7-2: OZONE MEASURES CONSIDERED FOR SOCIOECONOMIC ASSESSMENT UNDER ALTERNATIVE 3

Measure	Title	Implementation Agency
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	SCAQMD
CMB-03	Emission Reductions from Non-Refinery Flares [NOx,VOC]	SCAQMD
CMB-02	Emission Reductions from Replacement with Zero or Near-Zero NOx Appliances in Commercial and Residential Applications	SCAQMD
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking [NOx]	SCAQMD
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	SCAQMD
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx,VOC]*	SCAQMD
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Efficiency [NOx,VOC]	SCAQMD
CMB-01	Transition to Zero & Near-Zero Emission Technologies for Stationary Sources [All Pollutants]	SCAQMD
CMB-05	Further NOx Reductions from RECLAIM Assessment [NOx]	SCAQMD
FUG-01	Improved Leak Detection and Repair [VOC]	SCAQMD
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	SCAQMD
MOB-11	Extended Exchange Program [VOC, NOx, CO]	SCAQMD
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	SCAQMD
ORLD-01	Advanced Clean Cars 2	CARB
ORHD-02	Low-NOx Engine Standard – California and Federal Action	CARB
ORLD-03	Further Deployment of Cleaner Technologies: On-Road Light Duty Vehicles*	CARB
ORHD-04	Advanced Clean Transit	CARB
ORHD-05	Last Mile Delivery	CARB
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles	CARB
ORFIS-01	More Stringent National Locomotive Emission Standards	U.S. EPA
ORFIS-02	Tier 4 Vessel Standards	U.S. EPA
ORFIS-04	At-Berth Regulation Amendments	CARB
ORFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources	CARB
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	CARB
OFFS-04	Zero Emission Airport Ground Support Equipment	CARB
OFFS-05	Small Off-Road Engines	CARB
OFFS-07	Low-Emission Diesel Requirement	CARB
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment	CARB
CPP-01	Consumer Products Program	CARB

* NOx and/or VOC emission reductions estimated for these measures are considered as co-benefits.

Alternative 4—Expanded Incentive Funding

Alternative 4 would expand the incentive funding programs to accelerate the deployment of cleaner vehicles and technologies, potentially allowing for more emission reductions and possibly earlier attainment of NAAQS. Under this alternative, it was assumed that additional incentive funding sources would be found. For socioeconomic analysis purposes, it was further assumed that additional incentive funds would be available to achieve more NOx emission reductions under ECC-03 "Additional Enhancements in Reducing Existing Residential Building Energy Use" and OFFS-08 "Further Deployment of Cleaner Technologies: Off-road Equipment," and to further accelerate the deployment of facility-based clean technologies under CMB-01 "Transition to Zero and Near-Zero Emission Technologies for Stationary Sources."

The list of Alternative 4 control measures, for which emission reductions were quantified, are the same as those listed in Table 7-2. Additional emission reductions from ECC-03 were obtained by incentivizing more units of electric water heat pumps, electric dryers, and electric pool heat pumps to be purchased and installed. Additional emission reductions from OFFS-08 were obtained by incentivizing a greater volume of turnover for off-road diesel construction equipment and large spark ignition industrial, commercial, and lawn and garden equipment than those included in the Draft Final 2016 AQMP. Accelerated emission reductions from CMB-01 were obtained by incentivizing more low-NOx Internal Combustion Engines to come online by 2023 instead of later years.

Incremental Cost and Related Job Impacts of CEQA Alternatives

Table 7-3 compares the incremental costs and job impacts between the Draft Final 2016 AQMP and the four CEQA alternatives. The annualized total incremental cost of the Draft Final 2016 AQMP was estimated to be $850 million per year between 2017 and 2031, which would result in an average of about 9,000 jobs foregone per year. As all CEQA alternatives, except the No Project Alternative, are required to be realistic and provide a viable path to attainment of NAAQS, thus achieving similar or greater public health benefits.

As discussed above, while under the No Project Alternative there will be no emission reduction-related incremental cost and job impacts, it should be recognized that there could be potential federal sanctions under CAA, which would prohibit the region from receiving federal highway funding for regional transportation investment, and inhibit new business growth through more stringent emission offset requirements. Depending on the region's ability to make up for this lack of funding from other sources, federal sanctions could produce varying impacts on the regional economy, which are not quantified in this analysis as explained above.

TABLE 7-3: AVERAGE ANNUAL INCREMENTAL COSTS AND THE ASSOCIATED JOB IMPACTS OF AQMP AND CEQA ALTERNATIVES, 2017-2031

Scenario	Average Annual Incremental Costs (Millions of 2015 Dollars)	Average Annual Job Impacts Associated with Incremental Costs	Percent Change from the Baseline Job Forecast
Draft Final 2016 AQMP	$848	-9,299	-0.08%
Alt 1—No Project	Not Quantified	Not Quantified	Not Quantified
Alt 2—Mobile Source Emission Reduction Only	$983	-8,616*	-0.08%
Alt 3—CARB and SCAQMD Regulation Only	$848	-8,282*	-0.07%
Alt 4—Expanded Incentive Funding	$1,017	-14,071*	-0.13%

* Based on proportioning job impact estimates of CEQA alternatives reported in the Draft Socioeconomic Report using the ratio of estimated job impact of Draft Final 2016 AQMP to that of Revised Draft 2016 AQMP.

Under Alternative 2—Mobile Source Emission Reduction Only, it was assumed that the stationary source control strategies would be replaced by the CAA §182(e)(5) measures. Under the aforementioned cost assumptions made for the CAA §182(e)(5) measures, Alternative 2 was estimated to be costlier than the Draft Final 2016 AQMP, with an annualized total incremental cost of nearly $1.0 billion per year between 2017 and 2031. However, it should be noted that this result depends on the cost assumptions made for the mobile source CAA §182(e)(5) measure under this alternative. Relative to the baseline job forecast, this alternative would result in an average of about 8,600 jobs foregone per year over the same period, which is, despite the higher costs, a slightly lower number than the jobs foregone associated with the incremental costs of Draft Final 2016 AQMP. This marginally lower job impact is mainly due to the distribution of costs among a different set of industry sectors in the regional economy.

Under Alternative 3—CARB and SCAQMD Regulation Only, it was assumed that all control strategies would remain the same as proposed in the Draft Final 2016 AQMP, except that all emission reductions would be achieved by rule-making and no incentives would be provided. Therefore, all incremental costs were now assumed to be incurred directly by the affected industries and consumers. As a result of this assumption, Alternative 3 was estimated to have the same total incremental cost as the Draft Final 2016 AQMP, annualized at $0.8 billion per year between 2017 and 2031. However, it would result in an average of about 1,000 fewer jobs foregone. This is mainly due to the shifting of incremental costs from the state government, who was assumed to provide all incentive funding under this scenario, to the affected industry sectors and consumers. As discussed earlier in Chapter 4, in the REMI model, the reallocation of public funds to the proposed clean air incentive programs would directly result in funds diverted from local spending and thus jobs foregone in many sectors of the regional economy. In comparison, when private industries and consumers incur the costs, they may reduce spending on other goods and services, some of which may be imported; consequently, the overall adverse effect of increased costs on the regional economy would be slightly dampened.

Under Alternative 4—Expanded Incentive Funding, it was assumed that all control strategies would remain the same as proposed in the Draft Final 2016 AQMP, except that additional or accelerated emission reductions from control measures ECC-03, OFFS-08, and CMB-01 would be achieved with expanded incentive funding. As a result of this assumption, Alternative 4 was estimated to incur an average annual cost of slightly over $1 billion between 2017 and 2031, which is higher than the cost of Draft Final 2016 AQMP. Under the assumption

that all incentives would be funded by existing state revenue sources, the higher incentive amount assumed under this alternative would result in a greater negative job impact, or an average of about 14,000 jobs foregone annually relative to the baseline job forecast for the period 2017 to 2031. As discussed earlier, in the REMI model, the reallocation of public funds to the proposed clean air incentive programs would directly result in funds diverted from local spending and thus jobs foregone in many sectors of the regional economy. However, it should be noted that this alternative would also result in greater emission reductions which would likely increase the public health benefits compared to the Draft Final 2016 AQMP.

Finally, it is worth emphasizing that the varying numbers of jobs foregone under Alternatives 2-4 would have minimal impacts on the long-term job growth. The annualized job growth rate between 2017 and 2031 (estimated to be 1.02 percent without the Draft Final 2016 AQMP) would remain between 1.01 and 1.02 percent under all alternatives examined.

Chapter 8: Summary



Summary of Socioeconomic Analyses of the Draft Final 2016 AQMP

The Draft Final 2016 AQMP control strategy will seek emission reductions from stationary and mobile sources through command-and-control regulations and incentives to help accelerate the deployment of cleaner equipment for the purpose of achieving federal and state air quality standards. The total incremental cost of the Draft Final 2016 AQMP was estimated to be $15.7 billion in present worth value (expressed in 2015 dollars) over the life of all equipment and fleets that are expected to be put into operation. Between 2017 and 2031, the amortized annual average incremental cost would be $848 million, which is less than one tenth of a percent (0.07 percent) of the $1.3 trillion worth of annual gross domestic output in the region.

About 60 percent or $9.3 billion of the total incremental cost is related to CARB mobile source control strategies affecting the Basin. About 36 percent or $5.7 billion is associated with SCAQMD control measures for stationary sources, and the remaining 4 percent or $0.6 billion represents SCAQMD's local mobile source measures. The proposed incentives, in the amount of $14.6 billion, would be distributed to eligible industries and consumers and offset more than 90 percent of the total incremental cost estimated for the Draft Final 2016 AQMP.

Importantly, the region will also experience benefits from the implementation of the Draft Final 2016 AQMP. Air pollution continues to be linked to increases in death rates (mortality) and increases in illness and other health effects (morbidity). It was estimated that, as a result of implementing the Draft Final 2016 AQMP, an average of 1,600 premature deaths would be avoided per year. Numerous other non-fatal health conditions were also estimated to be avoided annually, including about 2,500 asthma-related emergency department visits, about 700 hospital admissions related to asthma, cardiovascular, or respiratory conditions, and more than 200,000 person-days of work and school absences. Due to these lowered mortality and morbidity risks, an estimated $173 billion worth of public health benefits are expected to accrue in the four-county region, cumulatively from 2017 to 2031. This represents an average of $16.5 billion in public health benefits per year. Over 95 percent of the estimated public health benefits are associated with avoided premature deaths from reduced long-term exposure to PM2.5. Although not quantified in this report, there exist additional public welfare benefits related to clean air from preventing damage to agriculture, ecology, visibility, buildings, and materials.

The incremental costs and public health benefits of the Draft Final 2016 AQMP are expected to alter, to various degrees, the economic decisions made by households, businesses, and other economic actors. Some businesses would see production costs go up while other businesses would benefit from a greater demand for their services and technologies. For consumers who consider purchasing or replacing vehicles or certain household appliances, the proposed control strategies would also change or widen the range of product choices that differ in fuel types, energy efficiencies, effective unit prices, and thus potential payback periods. Improved public health would contribute to higher labor productivity and reduce healthcare-related expenditures, while also increasing the region's attractiveness to economic migrants. All these direct effects would then cascade through the regional economy and would produce indirect and induced macroeconomic impacts.

As a result of incremental costs and health benefits associated with the Draft Final 2016 AQMP, the overall job impact on the four-county region of Los Angeles, Orange, Riverside, and San Bernardino is projected to range from 9,000 jobs foregone to 29,000 jobs gained per year from 2017 to 2031, relative to the

baseline job forecast where the Draft Final 2016 AQMP control strategies are not implemented. In an economy with nearly 18 million people and more than 10 million jobs, the projected changes in the total number of regional jobs are expected to have a minimal impact on the region's long-term job growth. The region's projected annualized job growth rate between 2016 and 2031 will remain at slightly above one percent (1.01 to 1.04 percent) under all Draft Final 2016 AQMP scenarios examined with macroeconomic impact modeling.

Under the primary scenario (i.e., incentives funded by existing state revenue sources and full air-related public health benefits for regional amenity adjustments), the region is expected to gain an average of about 14,000 jobs per year from 2017 to 2031. The annualized job growth rate would increase slightly to 1.04 percent from the baseline rate of 1.02 percent between 2016 and 2031. In the beginning years, however, large amounts of incentives would directly result in funds diverted from local spending and thus jobs foregone in many sectors of the regional economy, among which state and local governments would be most adversely impacted, followed by construction, retail trade, and healthcare and social assistance sectors. Over time, as the proposed control strategies are implemented and public health benefits are realized, increased regional amenity is expected to attract more economic migrants and enlarge the pie of the regional economy, thereby creating more job opportunities in the four-county region.

It should be noted, however, there remains methodological uncertainties regarding macroeconomic modeling of non-market benefits and how clean air related amenities should be weighted relative to other regional amenities (Abt Associates 2014; Lahr 2016); therefore, the results should be regarded with caution. Nonetheless, it should also be noted that, even with the most conservative approach where public health benefits are considered as having no impacts on the regional economy, the projected 2017-2031 annual average job impacts associated with incremental cost only would represent one-tenth of a percent decrease from the forecasted baseline number of total jobs. The annualized job growth rate between 2016 and 2031 would slow down by less than 0.01 percentage point to 1.01 percent. Moreover, as shown in Chapter 4, this slightly negative impact could be potentially mitigated if incentive funding can be obtained from outside the region or state.

To provide stakeholders with more information about how the Draft Final 2016 AQMP would potentially impact different sub-county communities within the region, sub-regional distributions for incremental costs, public health benefits, and net job impacts were also provided. The average annualized incremental costs between 2017 and 2031, if spread among the region's population, would range from approximately $21 million in Orange North, a sub-region of Orange County to $61 million in the San Fernando sub-region of Los Angeles County. The average annual public health benefits range from $122 million in Other San Bernardino, the northern sub-region of San Bernardino County, to $2.1 billion in the Central sub-region of Los Angeles County. Of the 14,000 jobs expected to be gained on average each year during the period of 2017-2031, The Central Los Angeles sub-region of Los Angeles County is expected to see the largest gain of jobs, with nearly 2,000 jobs being added on average each year to the baseline forecast levels, while the Riverside sub-region of Riverside Other will see about 40 jobs foregone on average each year during the same period.

In addition, the EJ analysis was significantly enhanced and expanded compared to previous AQMPs by investigating the distributional impact of the Draft Final 2016 AQMP based on multiple alternative definitions of EJ communities. Specifically, staff examined whether estimated reductions in health risks associated with air pollution would reduce or exacerbate baseline inequality in the Basin. Inequality between EJ and non-EJ communities was also analyzed to identify any potential differences. First, as a result of implementing the Draft Final 2016 AQMP, greater per-capita monetized public health benefits

are anticipated to accrue in EJ communities than non-EJ communities. Next, in terms of the distribution of health risk related to air pollution exposure, inequality in mortality-related risk more likely to affect the elderly population was found to decrease overall, which is also true between the EJ and non-EJ communities. This finding is consistent for both mortality-related risk associated with long-term exposure to PM2.5 and short-term exposure to ozone. However, the inequality of morbidity risk for asthma-related ED visits among children that is associated with short-term exposure to ozone are expected to increase slightly between EJ and non-EJ communities, despite a decrease in overall inequality. These general results do not change based on the different EJ definitions analyzed.

Lastly, this report also examines the potential socioeconomic impacts of CEQA alternatives to the proposed 2016 AQMP. The Draft Program Environmental Impact Report includes four alternatives: Alternative 1—No Project; Alternative 2—Mobile Source Emission Reductions Only; Alternative 3—CARB and SCAQMD Regulations Only; and Alternative 4—Expanded Incentive Funding. All the alternatives above, except the No Project Alternative, are required to be realistic and provide a viable path to attainment of NAAQS, thus achieving similar or greater public health benefits. Therefore, for Alternatives 2, 3, and 4, only incremental costs and the associated job impacts were analyzed and compared to the corresponding impacts of the proposed 2016 AQMP. For purposes of the socioeconomic assessment, Alternatives 2 and 3 were analyzed based on the assumption that they would lead to NAAQS attainment with CAA §182(e)(5) measures (i.e., "black box" measures). Alternative 4 assumes additional or accelerated emission reductions achievable by expanded incentive funding. Incremental costs of both Alternatives 2 and 3 are projected to result in fewer jobs foregone than the proposed 2016 AQMP; whereas, incremental costs for Alternative 4 are projected to result in more jobs foregone, mainly due to higher incentive amounts assumed to be provided by existing sources of state funds for local spending. Alternative 4 would result in more emission reductions, however, which would also likely increase public health benefits above the 2016 AQMP. Caution should be exercised, however, as the projected cost estimates and job impacts are highly dependent on the assumptions made for each alternative.

Enhancements Made to the 2016 AQMP Socioeconomic Assessment

As mentioned in Chapter 1, Abt Associates conducted a review in 2014 of the SCAQMD's practices for conducting socioeconomic assessments for previous AQMPs during rulemaking. The key purpose was to evaluate whether these practices represented state-of-the-art methods for these assessments, whether the scope of the analysis undertaken was adequate, and whether the documentation assured a transparent and balanced presentation to reflect interests from different parties. As a result of the 2014 review, a concerted effort among staff, sister agencies, and the public has been made to enhance the development and documentation of the 2016 AQMP Socioeconomic Report.

First and foremost, this report is designed to be accessible and transparent to the general public. The main document presents the general picture of socioeconomic impacts while clearly defining methodologies employed and data sources utilized. Careful consideration has been given to report not only overall impacts, but to also discuss uncertainty and provide a range of estimates through sensitivity analyses.[1]

[1] This includes sensitivity analyses for health benefits in Chapter 3, macroeconomic modeling of non-market benefits in Chapter 4, macroeconomic modeling of different incentive funding scenarios in Chapter 4, and EJ community definitions and distributional analysis in Chapter 6.

When quantification of uncertainty is not feasible, a qualitative discussion about uncertainty sources, the expected magnitude, and impact of uncertainty (i.e. negative or positive effect on results) has been added. In addition, the appendices provide technical readers with more detail about the analyses, while an executive summary geared towards a more general audience condenses the analyses and results. As each component of the 2016 Socioeconomic Report has been developed, it has been presented at various meetings to the STMPR Advisory Group, the AQMP Advisory Group, and the interested parties from the public to enhance transparency and solicit feedback. Staff also presented the preliminary outline of this report and described analysis methodologies at six AQMP scoping meetings in July 2016.

To implement Abt's recommendation to clearly define the baseline for socioeconomic analysis and clarify whether the baseline should include SCAG's TCMs, staff worked closely with SCAG staff and consultants from REMI and the Center for Continuing Study of the California Economy. Following many rounds of communication and discussions, consensus was reached that TCMs, along with other components of the 2016 RTP/SCS, should be considered as baseline for the AQMP socioeconomic assessment, and that, for informational purposes, the benefits and costs associated with TCMs would be provided separately in the 2016 AQMP Appendix IV-C: Regional Transportation Plan/Sustainable Communities Strategy and Transportation Control Measures. This baseline definition is also consistent with the AQMP baseline inventory of air pollutant emissions, which considers any emission reductions associated with SCAG's 2016 RTP/SCS and all its sub-components (TCMs included) as accounted for in the baseline. Additionally, as in the past, the default baseline forecasts of population and jobs in the REMI model were adjusted in accordance with the population and job projections from SCAG's 2016 Growth Forecast, which was also largely used to project future baseline emissions of air pollutants.[2]

In order to improve the public health benefits analysis conducted in the socioeconomic assessment, SCAQMD commissioned IEc to conduct an updated literature review of epidemiological studies to quantify concentration-response functions, which quantitatively describe the relationship between exposure to air pollution and various health endpoints, and economic valuation functions, which are used to monetize quantified public health benefits. Based on the review of literature, IEc provided staff with recommendations on which health endpoints to include in the public health benefits analysis of the Draft Final 2016 AQMP and which mathematical functions should be used to evaluate and quantify benefits. IEc also provided recommendations on the use of the U.S. EPA's BenMAP tool, including choices of data input, assumptions and procedures that were appropriate for the functions used in the analysis. IEc recommendations and the analysis results were presented during each step of the process to the STMPR Advisory Group for review and guidance. In addition to IEc recommendations, the BenMAP operations were further reviewed and confirmed as appropriate by Dr. Jin Huang, a former project manager for the 2014 Abt review and the STMPR expert on BenMAP analysis.

IEc also reviewed the most updated literature of environmental justice studies and analytical tools. Based on the review, IEc recommended alternative EJ screening definitions and the most appropriate screening tools that have been developed to help identify EJ communities for socioeconomic assessment purposes. Additionally, IEc also recommended the state-of-science methodology to analyze the impacts of the proposed 2016 AQMP on health risk distributions between and within EJ and non-EJ communities. To engage the community and develop the most applicable approach in the region, the 2016 AQMP Socioeconomic Assessment Environmental Justice Working Group was formed to review and provide comments and suggestions on IEc's recommendations and staff's analysis results. The Working Group's

[2] See Appendix 4-A for more discussion.

feedback helped inform and enhance the EJ analyses in this report.

Finally, SCAQMD commissioned a third-party evaluation by Dr. Michael Lahr on REMI's modeling of non-market benefits and Abt's further recommendation to evaluate how to improve the input of these benefits into REMI. REMI models non-market benefits as an improvement to regional amenities, or quality of life; however, the 2014 Abt Report indicated that there remained methodological uncertainties as to how these benefits could be best incorporated into macroeconomic modeling and asked staff to keep abreast of developments at the U.S. EPA's Science Advisory Board Panel on Economy-Wide Modeling. While it is generally recognized that location-specific amenities such as climate, clean air, public safety, and other public service provisions, make a region more attractive to economic migrants, the 2014 Abt report also indicated that prospective economic migrants may consider air quality differently than other types of amenities when making their location choices; however, such differences, if any, were not taken into account under the prior modeling approach. As such, Abt recommended identifying methods to properly normalize the magnitude of adjustments made to the sub-region specific amenity coefficients in REMI's migration equation, which links air quality change with the relative attractiveness of one area compared to another. Based on the qualitative conclusion made in the third-party evaluation, SCAQMD staff conducted a sensitivity analysis of job impacts where the REMI input related to the non-market portion of public health benefits was discounted by half, therefore significantly lessening the magnitude of adjustments to the amenity coefficients in REMI. Staff preliminarily concluded that this adjustment is a major determinant to the non-market benefits related job impact; however, further research is needed to determine the proper scaling of the related REMI input.

Future Enhancements for Future AQMPs

SCAQMD staff will continue working to update the technical aspects of its analyses which includes updating methodologies to quantify visibility, material, and agricultural benefits, developing methods to properly normalize the magnitude of adjustment to the amenity coefficient in REMI, evaluating the use of other modeling tools such as partial equilibrium modeling to supplement REMI for small scale impacts, updating best practices for estimating small business impacts, and closely monitoring the U.S. EPA Science Advisory Board's Economy-Wide Modeling Panel discussions and recommendations, particularly on the macroeconomic modeling of non-market benefits. Retrospective studies, when feasible, will be considered as part of the implementation plan to enhance the uncertainty analysis.

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Final Socioeconomic Report

APPENDICES

2016 AIR QUALITY MANAGEMENT PLAN



January 2017

DRAFT FINAL SOCIOECONOMIC REPORT
APPENDIX 2-A

COMPILATION OF INCREMENTAL COSTS OF CONTROL MEASURES

JANUARY 2017

The Draft Final 2016 AQMP includes control strategies for emission reductions from both stationary sources and local mobile sources, as well as broader mobile source control measures proposed by CARB that will contribute to further emission reductions and help the region attain upcoming federal air quality standards.

This appendix consists of two parts. Part I presents the incremental costs of the SCAQMD control measures with quantified emission reductions to be committed into the SIP. It also includes a discussion of currently known or available cost information for the SCAQMD's stationary source control measures with TBD emission reductions. Part II presents the incremental costs of the state's SIP control strategies. These costs are based on CARB data and assumptions,[1] and they are estimated for those control strategies with quantified emission reductions in the Basin.

Part I – Incremental Costs of the SCAQMD Control Measures

(a) Incremental Costs of Control Measures with Quantified Emission Reductions

Direct costs associated with the Draft Final 2016 AQMP control measures generally include capital expenditures on control or replacement equipment or on research and development to reformulate chemical products. They also include annual operating and maintenance costs such as fuel, utilities, filter replacement and so on.

The present worth value (PWV) of incremental costs by measure was calculated based on a four-percent discount rate which discounts all future stream of costs to year 2017. Conversely, the amortized annual average cost was obtained by amortizing the PWV of the incremental costs over the average equipment life using the same discount rate. The discount rate used for discounting and amortization corresponds to a real interest rate of four percent.[2] As a sensitivity test, a real interest rate of one percent will also be used, which is closer to the prevailing real interest rate.[3]

Notice that the analysis horizon which is used in the macroeconomic impact evaluation in Chapter 4 of this report is from 2017 to 2031, or from the year of the anticipated 2016 AQMP adoption to the year when the 2008 8-hour ozone standard of 75 ppb will need to be achieved. However, many categories of equipment included in the cost analysis will continue to be in operation after year 2031, either because of their long equipment life or because they are expected to come online at a later date. The PWV reported in Table 2-1 of Chapter 2 includes all recurring costs over the entire equipment life; thus, it may

[1] See CARB's Mobile Source Strategy, Appendix A: Economic Impact Analysis (2016a).

[2] In 1987, SCAQMD staff began to calculate cost-effectiveness of control measures and rules using the Discounted Cash Flow method with a discount rate of 4 percent. Although not formally documented, the discount rate is based on the 1987 real interest rate on 10-year Treasury Notes and Bonds, which was 3.8 percent. The maturity of 10 years was chosen because a typical control equipment life is 10 years; however, a longer equipment life would not have corresponded to a much higher rate—the 1987 real interest rate on 30-year Treasury Notes and Bonds was 4.4 percent. Since 1987, the 4 percent discount rate has been used by SCAQMD staff for all cost-effectiveness calculations, including BACT analysis, for the purpose of consistency.

[3] See https://www.whitehouse.gov/omb/circulars_a094/a94_appx-c/.

include costs occurring after 2031. In that same table, the amortized annual average cost over the period 2017-2031 is also reported. This cost, in contrast, includes recurring costs up to 2031, and the amortized capital and other upfront costs beyond 2031 are not included. The amortized costs are comparable to the costs reported in the Economic Analysis for the Proposed 2016 State Strategy for the State Implementation Plan.

Cost assumptions and cost breakdown by measure are presented below (see Chapter 4 and Appendixes IV-A and IV-B of the Draft Final 2016 AQMP for the detailed description of each measure). All costs presented herein are expressed in 2015 dollars, with conversion based on the Marshall and Swift Index of equipment costs. It should be noted that the implementation period for the cost analysis may differ somewhat from the "Implementation Period" listed in the Draft Final 2016 AQMP Table 4-2 on page 4-10. The implementation period for the cost analysis herein generally refers to the year(s) when the control or replacement equipment will be purchased, installed, and begin operation. It is assumed that the purchase and installation of all equipment is evenly distributed over the implementation period unless otherwise noted.

Finally, the control measures that recognize co-benefit ozone emission reductions from other programs will not have incremental costs. They include *ECC-02 (Co-benefits from existing residential and commercial building energy efficiency measures)* which has quantified NOx emission reductions, *ECC-01 (Co-benefit emission reductions from GHG programs, policies, and incentives)* and *ECC-04 (Reduced ozone formation and emission reductions from cool roof technology)*, both with TBD NOx emission reductions. Also, the Further Development of Cleaner Technologies: On-Road Light-Duty control measure is primarily designed to reduce GHG emissions and therefore is recognized as providing NOx and VOC reductions as a co-benefit. These measures are part of federal, state, and local programs and are being implemented across multiple energy sectors and are generally mandated by law, regardless of whether the Draft Final 2016 AQMP is adopted. Therefore, their costs are not a result of the proposed control measures.

Stationary Source Measures (NOx and/or VOC Emission Reductions)

- *CMB-01 (Transition to zero, near-zero emission technologies for stationary sources)*

CMB-01 is an incentive program based control measure and seeks emission reductions of NOx from traditional combustion sources (non-power plant) through facility modernization or replacement of old higher emitting equipment. Higher emitting equipment or facilities will be modernized by replacing or putting in technologies with zero or near-zero NOx emissions such as the usage of electrification, battery storage, alternative process changes, efficiency measures, or fuel cells for combined heat and power. These combustion sources include, but are not limited to, engines, turbines, microturbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production. Another type of combustion source identified for equipment replacement includes ovens, kilns, and furnaces. New businesses can be required or incentivized to install and operate zero-emission equipment, control equipment, technology and processes beyond the current BACT requirements. Fuel cells are also an alternative to traditional combustion methods, resulting in a reduction of NOx emissions with the co-benefit of reducing other criteria air pollutants and greenhouse gases (GHGs). Incentives may be used towards alternative process changes, such as biogas cleanup, or encourage facilities to change out equipment sooner. This would help modernize a facility towards zero and near-zero technologies. This control measure would also seek energy storage systems and smart grid control technologies that provide a flexible and dispatchable resource with zero emissions. Grid based storage systems can replace the need for new peaking generation, be coupled with renewable energy

generation, and reduce the need for additional energy infrastructure. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these zero and near-zero emission technologies sooner. Over the anticipated timeline of this Plan, as emerging technologies become more widely available and costs decline, the SCAQMD will undergo rulemaking to require zero emission equipment be installed where economically feasible and near-zero emission equipment in all other applications.

SCAQMD's tool for the annual emission reporting (AER) program requires reporting emissions at permit unit/equipment/device levels. The reporting tool classifies the type of emission source (e.g., external combustion, internal combustion, coatings, tanks, etc.) and requires fuel type, throughput, pollutant and emission factors. Using this tool, staff identified the largest non-RECLAIM NOx emitting facilities. Sixty six facilities were identified consisting of municipal solid waste (MSW) incinerators, landfill gas, and wastewater treatment facilities, and together these facilities emit 2.3 tons per day of NOx. These facilities will be analyzed to determine where the greatest emissions reductions could be achieved and replaced with zero or near-zero equipment or emission technology including the diversion of waste streams to be cleaned up or processed, or biogas routed to pipelines or used for transportation fuels. Staff also used the AER program along with SCAQMD CLASS permitting system to identify categories with combustion sources that are older and higher emitting and could be replaced with zero and near-zero technologies including fuel cells, low emitting NOx equipment, equipment modification, control equipment, and/or process changes. The combustion source category with the largest amount of emissions is from internal combustion engines (ICEs), because of the volume of ICEs being used in the Basin. Other smaller categories identified include ovens and low use fuel natural gas (NG) boilers.

The cost effective analysis is only a demonstration of source categories staff identified for potential emission reductions through incentive funding and costs for replacement or control equipment currently available. Upon implementation and formation of a working group, new zero and near-zero emitting technologies could be identified as well as other sources for potential NOx reductions. Staff anticipates many facilities and stakeholders will come forth to participate in the incentive program and, once a working group is established, will determine the most cost-effective means for distribution of funds to achieve emissions reductions.

Assumptions[4] for cost estimates are listed in the table below:

[4] AER System and CLASS permitting system.

Source Categories	
Tier 2 and Lower Diesel ICE Replacement	• The average unit cost of an ICE (meeting at a minimum Tier 4 standards) is assumed to be $155,000[5] per engine (including installation). • It is assumed the replacement of these ICEs (Tier 2 and lower) will have a 96 percent reduction for NOx. • Approximately 6,300 diesel ICEs were permitted before 2010 and are expected to be higher emitting. It is expected about 40 percent will be replaced to reduce NOx emissions. • No additional operational or maintenance costs are expected with this replacement. • Equipment life is expected to be 25 years.
NG Engines to Zero and Near-Zero Replacement[6]	• NG engines being replaced must be less than 670 brake horsepower (bhp) (500 kilowatt (kW)) to use this technology. • NG engines being replaced must be used for power generation to use this technology. • This technology would replace the existing NG rich-burn engines and includes controls. It is assumed 25 percent of NG engines identified from past survey[7] responses could be replaced with this technology. • The average bhp of the engines used in the cost analysis is assumed to be 548 bhp. • It is assumed each engine operates for 6,000 hours per year. • Operation and maintenance costs are assumed at a rate of $0.013 per bhp-hour (bhp-hr). • Equipment life is expected to be 25 years.
NG Engines Retrofitted with Control equipment[3]	• This technology involves retrofitting NG engines with a catalyst to reduce NOx emissions. • The average bhp rating of the engines used in the cost analysis is 344 bhp. • It is assumed each engine operates for 6,000 hours per year. • Operation and maintenance costs are assumed at a rate of $0.013 per bhp-hr. • Equipment life is expected to be 25 years.
Replacement of ICEs to Fuel Cells (Cell Towers)[8]	• Roughly 400 permitted engines could be located at cellular communication sites. Of these, it is estimated 25 percent could be replaced with fuel cells. • Operational and maintenance costs are expected to be minimal; therefore, it is assumed to be five percent of the capital costs. • Equipment life is expected to 20 years.
Retrofitting Diesel ICEs to NG Bi-Fuel Systems[9]	• It is assumed one percent of diesel ICEs permitted before 2010 could be converted to bi-fuel systems that utilize NG to reduce NOx emissions by 30 percent. • No additional operational or maintenance costs are expected with this retrofit. • Equipment life is expected to be 25 years.

[5] Industry stakeholder cost estimates from Rule 1470 amendment and internal cost data.
[6] Email from W. Martini (Industry Stakeholder) to K. Orellana. September 1, 2016.
[7] 2008 Rule 1110.2 Amendment Survey Data.
[8] Email from C. Vita (Industry Stakeholder) to D. Thai.
[9] Email from J. Villa (Industry Stakeholder) to D. Thai. August 24, 2016.

Source Categories	
Replacement of Ovens/Furnaces/Kilns	• Approximately 1,000 unpermitted ovens, furnaces, and kilns could be replaced with low NOx equipment. • No additional operational or maintenance costs are expected with this replacement. • Equipment life is expected to be 25 years.
Replacement of Low Fuel use NG Boilers[10,11]	• 133 low fuel use NG boilers were identified ranging from five to 75 million British thermal units (MMBtu) per hr to be replaced. Six of these boilers are larger boilers. • No additional operational or maintenance costs are expected with this replacement. • Equipment life is expected to be 25 years.
Facility Modernization by Sector	
Landfills and Wastewater Treatment	• Costs are based only on biogas cleanup. • Biogas cleanup can include cleanup of siloxanes, hydrogen sulfides, oxygen, water (removal), nitrogen, and trace constituents[12]. • Cleanup cost is estimated from the total throughput (in cubic feet per minute) from all the facilities for each category (landfills or wastewater treatment) and not based on each individual facility. • Infrastructure for pipelines is expected to be the highest portion of costs for facility modernization. These are not included in the costs, because it has not been determined which facilities will be participating in the incentive program and their respective distances to pipeline access. Location distance plays a large factor in interconnection costs. • Equipment for biogas cleanup is expected to have an equipment life of 25 years.
Municipal Solid Waste	• Costs are based on using a selective catalytic reduction (SCR)[13] system for a boiler at MSW facilities to lower NOx emissions. • SCRs are expected to have an equipment life of 25 years.

Implementation period for cost analysis: 2018-2031

[10] Best Available Control Technology (BACT) – Internal Documents (2008).
[11] Final Staff Report. Proposed Amended Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters. August 2008.
[12] Black & Veatch Biogas Upgrading. April 29, 2016. Email from N. Taylor to D. Thai. September 1, 2016.
[13] NOx RECLAIM Staff Report – December 4, 2015.

Capital cost assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit/Facility Cost	Per Unit/Facility Incentive Amount	Number of Units	Years of Equipment Life
Tier 2 and Lower Diesel ICEs Replacement	All Industries	$155,000	$43,105	2,420	25
NG Engines to Zero and Near-Zero Replacement	All Industries	$3,781,200	$896,972	60	25
NG Engines Retrofitted with Control equipment[3]	All Industries	$182,320	$43,250	528	25
Replacement of ICEs to Fuel Cells (Cell Towers)	All Industries	$180,000	$44,901	95	20
Retrofitting Diesel ICEs to NG Bi-Fuel Systems	All Industries	$38,000	$13,470	63	25
Replacement of Ovens/Furnaces/Kilns	All Industries	$40,000	$33,300	1,000	25
Replacement of Low Fuel use NG Small Boilers	All Industries	$404,457	$74,749	127	25
Replacement of Low Fuel use Larger NG Boilers	All Industries	$1,178,556	$217,813	6	25
Facility Modernization (Bio Gas Clean up-Landfills)	Landfills (562)	$21,365,000	$1,862,069	29	25
Facility Modernization (Bio Gas Clean up-Waste Water Treatment)	Waste Water Treatment (221)	$6,730,000	$771,429	35	25
Facility Modernization (with SCR)	Landfills (562)	$3,732,800	$13,500,000	4	25

Additional operating and maintenance costs for the NG engines to zero and near-zero and NG engines retrofitted with control equipment were assumed to be catalyst replacements every five years at an estimated cost of $42,744 and $26,832, respectively. Additional operating and maintenance costs for facility modernization of bio gas cleanup for landfills and waste water treatment facilities were assumed to be carbon adsorption replacements at an estimated cost of $1,500,000 and $700,000, respectively. Also, an additional cost of $255,600 for ammonia usage was assumed annually for the units with new SCR.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
CMB-01	$1,883.0	+	$275.5	=	$2,158.6	$89.8

❖ *CMB-02 (Emission reductions from commercial and residential space and water heating)*

CMB-02 would incentivize replacement of older water heaters, boilers and steam generators in commercial establishments and multifamily residential buildings. Initially, incentives would accelerate replacement of older units with new units using existing technology whose NOx emissions are significantly lower than applicable rule limits (e.g., 12 ppm NOx instead of 20 ppm for Rule 1146.2 equipment). A second phase would replace units with near zero emission technologies including, but not limited to, solar thermal, electric, solar electric, heat pumps, and fuel cell technologies. The number of units that can potentially be replaced with newer low emission units or technologies is based on an equipment inventory developed for Rule 1146.2 adoption. Incentive programs are proposed to start by 2018 and potential future rules in support of these programs can have implementation dates starting in 2020.

Cost of equipment are estimated using the following sources of information:

- Prices on Type 1 and Type 2 Rule 1146.2 units based on Information in the 2006 Staff Report for Rule 1146.2[14]
- Prices of Type 1 Rule 1146.2 units were updated based on listed prices on websites of equipment supply companies including but not limited to Home Depot, Lowes, and Grainger
- Prices of heat pump water heaters are based on listed prices on websites of equipment suppliers
- Prices of solar technologies based on information from U.S. EPA, California Energy Commission and web based cost analysis and tools available from companies providing solar heating and electric systems

The price difference between a standard model and a low-NOx emitting model is the basis of the total incremental cost for this control measure. To take into account the potentially larger cost associated with early replacement instead of natural equipment turnover, it is further assumed that the cost of early replacement is equivalent to one third of the price difference. In order to obtain emission reduction credits for the early replacement, it is assumed that units are replaced at two thirds of their useful life (e.g., at 10 out of 15 years) for a commercial water heater. It is also assumed that the installation cost is identical for both models. Therefore, the total incremental cost for a particular type of equipment is assumed to be equal to 1.33 times of the estimated price difference.

Incentives are proposed to partially offset the incremental cost, and the incentives range from $1,000 to $10,000 per unit, depending on the type of equipment purchased. The SCAQMD has committed to achieving emission reductions through an approved program meeting U.S. EPA requirements that will be in place by 2020. However, the incentive programs under this control measure will begin earlier and

[14] Staff Report for SCAQMD Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters, May 5, 2006

achieve emission reductions starting in 2018.

Implementation period for cost analysis: 2018-2031[15]

Capital cost assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit Cost	Per Unit Incentive Amount	Number of Units	Years of Equipment Life
Various Categories of Water Heater/Boiler	All Industries	$1,400-$15,000	$1,000-$10,000	2,000-50,000	15-25

No additional operating and maintenance costs were assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
CMB-02	$699.0	+	$503.5	=	$1,202.4	$51.6

❖ *CMB-03 (Emission reductions from non-refinery flares)*

CMB-03 proposes to reduce NOx and VOC emissions from gas handling at non-refinery sources such as organic liquid loading stations, tank farms, oil and gas facilities, landfills, and wastewater treatment facilities. This control measure would create a source specific rule for non-refinery flares based on two potential approaches (certain applications may warrant both approaches):

1) Cleaning the gas that would typically be flared and using it as follows:
    a. Capturing the gas that would typically be flared and converting it into an energy source (e.g. transportation fuel, fuel cells, facility power generation), or if not feasible,
    b. Directing it to equipment that can be converted to power and/or heat.
2) If all other options are infeasible, requiring the installation of newer flares implementing the best available control technology.

Facilities were identified from the following source categories: oil and gas production, landfills, and wastewater treatment facilities. Using SCAQMD's permitting systems, roughly 250 flares were identified. Cost data was based on estimates for new flares with clean enclosed burners (CEB) installed at existing SCAQMD permitted facilities. Facilities can choose a number of options to reduce NOx emissions instead of flaring such as using microturbines and boilers for power generation or routing waste streams to pipelines for transportation fuel. Waste gas that would otherwise be flared can be directed to microturbines or boilers that use organic rankine cycle (ORC) technology to provide power to the facility. Newer power producing technologies, such as the ORC, have shown the ability to consume the gas that would otherwise be flared and provide a co-benefit by producing power. This technology utilizes heat

[15] Depending on the category of water heater/boilers, some are assumed to be evenly phased in between 2018 and 2023, some between 2018 and 2031, and others between 2023 and 2031.

recovery from gas combustion to operate the ORC loop to make power. Regenerative thermal oxidation with microturbine technology to produce power can be utilized at landfills with low quality, low methane content landfill gas to make power with ultra-low criteria pollutant emissions and without expensive biogas cleanup. Incorporating newer technologies such as energy storage along with biogas development, distributed energy resources, and improved efficiencies can reduce the need for redundant energy infrastructures, provide for greater grid reliability (less possibility for blackouts), and reduce the need for new fossil-based generation. Better utilization of waste streams, such as biogas, will provide sources of energy, can help supply near-zero emission transportation technologies, improve the Basin's NG infrastructure, and provide carbon neutral fuels.

The cost analysis was based on the worst-case scenario where all facilities could not implement all other options and, as a result, had to purchasing a newer lower emitting flare, as specified in Point 2) above. One of the reasons why a facility could not implement all other options may be due to economic feasibility concerns. Pipeline injection can be costly based on pipeline infrastructure and biogas cleanup. Facilities can be identified that are closer to pipelines with corresponding lower costs for pipeline injection infrastructure. Depending on the type of technology or equipment receiving biogas, biogas cleanup could mean removal of nitrogen, siloxanes, hydrogen sulfides, high levels of oxygen, and other trace constituents. Incentives for infrastructure and biogas cleanup can help these sources find beneficial uses with co-benefits for these waste streams. It is expected that advancements in technology will continue and allow zero and near-zero technology to become more cost-effective once established. Staff also anticipates technology will evolve to address waste streams for facilities that produce low levels of biogas. Facilities may qualify under other programs such as the Low Carbon Fuel Standard (LCFS) in California and the federal Renewable Fuel Standard Program. Under these programs, credits are generated for the sale of renewable transportation fuels and, depending on market prices, have provided funding for equipment and lower fuel costs. This may help offset costs.

The cost estimates presented here could be considered as an upper bound for the likely range of incremental costs associated with this measure.

Assumptions[16] for cost estimates include:

Replacement of existing flares with newer flares utilizing CEB (<15 ppm)	• A new flare with CEB for oil and gas production and landfill facilities, was estimated to cost $700,000 and $250,000, respectively (including installation). • New flares with CEB to process digester gas were estimated to cost $475,000 (the average between the high and low estimates of other categories). • Annual operation and maintenance costs are assumed to be 7.2 percent of the capital cost of the equipment. • It is assumed a facility will operate 24 hours a day and 365 days per year. • Equipment life is expected to be 25 years. • Compliance date is expected to be 2020. • The annual average emission reductions of 1.3 tons per day are expected to be achieved for all the non-refinery flares.

Implementation period for cost analysis: 2020

[16] Costs estimated on data received from Industry Stakeholders.

Capital cost assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit Cost	Incentive Amount	Number of Units	Years of Equipment Life
Clean Enclosed Burners (meeting ≤5 ppmv)	Oil and Gas (211),	$700,000	$0	43	25
	Landfills (562) Landfills, Utilities (221),	$250,000	$0	52	25
	Waste Water Treatment (221),Chemical Manufacturing (325), Transportation Equipment Manufacturing (336), Pipeline Transportation (486), Support Activities for Transportation (488),	$475,000	$0	33	25

Additional annual operating and maintenance costs were estimated at $50,000 per unit for Oil and Gas, $18,000 per unit for landfill units, and $34,000 per unit for other units.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
CMB-03	$113.4	+	$0	=	$113.4	$6.3

❖ *CMB-04 (Emission reductions from restaurant burners and residential cooking)*

CMB-04 would incentivize purchases of new lower emission commercial cooking appliances including, but not limited to, fryers, griddles, ovens and broilers. This control measure proposes to incentivize early replacement or retrofit of up to 250,000 commercial cooking appliances. This equipment number is based on an estimate of 264,000 units in the Basin assuming 47% of the equipment in the commercial cooking inventory developed for the California Energy Commission is in the Basin (population weighted). Not all of the equipment in the Basin would be retrofit or replaced because emissions vary depending upon type and size of unit. Currently, there are more units in the Basin than are proposed to be replaced. In addition, if larger units are the focus of the program, fewer units would need to be replaced.

A cost of $10,000 per unit is used as the average cost for a new commercial cooking appliance and for this analysis all units are assumed to be replaced. The cost for new equipment varies widely from less than $1,000 to much more than $10,000 per unit. This cost is in the middle of the range of costs provided by the following sources of information:

- Southern California Gas Company staff at the Gas Company Energy Resource Center
- Prices listed on websites of restaurant equipment sales companies

The cost increase for purchase of units with lower NOx emissions will also vary. Some individual units in an equipment category may already have lower emissions and there would be no increase in cost to purchase the unit. Lower NOx emissions in other categories of equipment may require a different type of burner in order to reduce emissions.[17] Based on cost increases for low NOx technologies in other

[17] California Energy Commission, "Characterizing the Energy Efficiency Potential of Gas-Fired Commercial Foodservice Equipment" [CEC-500-2014-095] (2014).

appliances used in residential and commercial settings and because of this variability, staff estimates that the average increase in cost for a low NOx unit will be about 20%, or $2,000 per unit. To take into account the potentially larger cost associated with early replacement instead of natural equipment turnover, it is further assumed that the cost of early replacement is equivalent to one third of this cost increase. Therefore, the incremental cost per unit is assumed to be equal to 1.33 times of $2,000, or $2,667 per unit.

An incentive of $1,000 per unit is proposed to partially offset the incremental cost. Incentive programs are proposed to start by 2018 and potential future rules in support of these programs can have implementation dates starting in 2020.

The SCAQMD has committed to achieve emission reductions through an approved program meeting U.S. EPA requirements that will be in place by 2020. However, the incentive programs under this control measure will begin earlier and achieve emission reductions starting 2018.

Implementation period for cost analysis: 2018-2031

Capital cost assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit Cost[18]	Per Unit Incentive Amount	Number of Units	Years of Equipment Life
Restaurant Burners	Restaurants (722)	$2,666	$1,000	250,000	15

No additional operating and maintenance costs were assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
CMB-04	$320.6	+	$192.4	=	$512.9	$30.7

❖ *CMB-05 (Further NOx reductions from RECLAIM assessment)*

CMB-05 proposes to reduce NOx emissions from RECLAIM facilities, which include a wide range of equipment such as fluid catalytic cracking units, boilers, heaters, furnaces, ovens, kilns, coke calciners, internal combustion engines, and turbines that are major sources of NOx or SOx emissions. A proposed method of control is to perform additional or more frequent BARCT assessments and adjust NOx RECLAIM Trading Credit (RTC) allocations as control technologies improve and are implemented in practice. However, another approach under serious consideration is to sunset the program and transition to a traditional command-and-control structure. This would be predicated on whether more creditable SIP reductions and/or actual emission reductions can be achieved in a command-and-control regulatory regime instead of the RECLAIM program. Since the possible sunsetting of the RECLAIM program would be

[18] Sources: Southern California Gas Company and industry representatives.

a long-term process, the cost assumptions for this control measure must be based on a subsequent BARCT assessment. That is, there would be sufficient time for control technologies to further mature. Thus, such a BARCT assessment would take into consideration equipment controls far enough out in the future that would be determined as feasible and cost-effective. The overall average cost-effectiveness for the December 4, 2015 RECLAIM amendment was $9,000 to $14,000 per ton of NOx reduced[19]. It is assumed that further reductions would be achieved from already controlled equipment, and it is expected that the cost-effectiveness for this control measure would be about 50 percent higher or $13,500–$21,000 per ton.

The cost assumptions were based on distributing the 5 tons per day of emission reductions in the same manner as the 8.77 tons per day of incremental NOx reductions were applied for the December 2015 amendments across the same source categories, which included:

- Refinery Fluid Catalytic Cracking Units (FCCU)
- Refinery Boilers and Heaters
- Refinery Gas Turbines
- Coke Calciner
- Sulfur Recovery Units/Tail Gas Incinerators
- Glass Melting Furnaces
- Sodium Silicate Furnace
- Metal Heat Treating Furnaces Above 150 MMBTU/hr
- Non-Refinery Gas Turbines
- Non-Refinery Internal Combustion Engines

The increase in costs would result from the installation of more sophisticated controls in the future for these source categories to achieve the incremental emission reductions. The cost analysis for CMB-05 assumes negligible cost impact on structural buyers, and at the same time, also omits the potential financial gain of selling surplus credits for those facilities that are assumed to install additional controls.

Implementation period for cost analysis: 2026-2031

[19] SCAQMD, 2015. Final Staff Report for Amendments to Regulation XX – NOx RECLAIM.

Cost assumptions:[20]

Equipment Name	Affected Industries (NAICS)	Capital and Installation Costs (Millions)	Total O& M Costs (Millions)	Years of Equipment Life
Fluid Catalytic Cracking Units (FCCUs)	Petroleum and Coal Products(324)	$227.01	$10.86	25
Gas Turbine	Petroleum and Coal Products(324)	$15.64	$3.67	25
Coke Calciner	Petroleum and Coal Products(324)	$50.84	$2.58	25
Boilers/Heaters	Petroleum and Coal Products(324)	$201.0	$2.42	25
Sulfur Recovery Units	Petroleum and Coal Products(324)	$114.62	$0.64	25
Glass Melting Furnaces	Nonmetallic Mineral Product Manufacturing(327)	$5.68	$0.47	25
Sodium Silicate Furnace	Chemical Manufacturing (325)	$2.0	$0.13	25
Metal Heat Treating Furnace	Primary Metal Manufacturing (331)	$2.8	$0.32	25
Non-Refinery Gas Turbines	Oil and Gas(211), Paper Manufacturing (322), and Support Activities for Transportation (488)	$17.06	$2.36	25
Non-Refinery ICEs	Utilities (221)	$36.2	$2.72	25

No additional operating and maintenance costs were assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
CMB-05	$856.4	+	$0	=	$856.4	$19.3

❖ *ECC-03 (Additional enhancements in reducing existing residential building energy use)*

ECC-03 would incentivize advanced highly efficient appliance technologies focused on existing residences. Implementation of smart grid technology and other energy efficiency weatherization measures including: heat pump water heaters and storage systems, pool heater and covers, solar thermal water heating, weatherization, and clothes dryers. The replacements will reduce end use energy consumption and

[20] Source: 2015 Amendments to the NOx RECLAIM.

provide overall emission reductions. The cost of the incentive program is dependent on the type and number of equipment replacements, available incentives, efficiency gains, and energy prices.

Assumptions

Equipment Cost and Existing Incentives – Equipment cost for proposed technologies and existing incentives currently available were gathered from various websites including: Energy Upgrade California, Energy Star, Energy Wise EPA, Lawrence Berkeley National Lab, U.S. Department of Energy, Southern California Edison, Southern California Gas, and Los Angeles Department of Water and Power.

Number of Units - California Energy Commission Residential Energy Use Summary 2009 Residential Appliance Saturation Survey was used to estimate the number of appliance units in the Basin which could participate in program.

Incentive Amounts – Incentives/reimbursement amounts range from $100 to $300 based on equipment type and cost, existing incentives already available, and cost effectiveness of technology.

Estimated Annual Cost/Savings - For estimated annual cost/savings various scenarios were analyzed including cost savings from reduced natural gas usage[21] (estimated $1.10 cents/therm), and the anticipated expense if the technology uses electricity[22] ($0.16 per kWh for electricity). It should be noted that all residences would be eligible for funding; however, homes with solar panels will have higher savings and lower cost since they have lower electricity cost[23] ($0.06 per kWh). For households with solar panels, it is assumed that a large majority of them, or about 161,000 households,[24] will participate in the program and utilize at least one type of the proposed technologies. This number may be a conservative estimate. As solar panels become more affordable, the number of participants with solar panels will likely also increase to benefit from the higher cost-savings. Other non-utility operation and maintenance costs are assumed to be equivalent to a standard equipment; therefore, no additional costs are associated.

Timeline and Equipment Life - The ECC-03 program is anticipated to begin in 2018, and for the purpose of this cost analysis, end in 2031. Equipment lifetime information was gathered from similar websites as the equipment cost.[25,26,27] It should be noted that equipment life is variable and several factors contribute to the number of years a piece of equipment is operational. Since this program will provide incentives for various types of equipment, assumptions also need to be made regarding the percent distribution of ECC-03's emission reduction targets among different equipment. The equipment life and percent distribution assumptions are listed in the table below.

Technology Type	Equipment Life Assumed	% Distribution for Emission Reduction Targets in ECC-03
Electric Heat Pump	14	40%
Pool Cover	6	16%
Electric Dryer	14	20%
Pool Heat Pump	14	24%

[21] U.S. Bureau of Labor Statistics, Los Angeles Area
[22] CEC Average Price of Electricity to Ultimate Customers by End-Use Sector
[23] U.S. Department of Energy Sunshot Initiative
[24] Based on latest figure compiled by the California Solar Statistics.
[25] Energy Star Market & Industry Scoping Report - Residential Clothes Dryers - Nov 2011
[26] http://energy.gov/eere/wipo/what-weatherization
[27] Lawrence Berkeley National Lab - National Survey Data to Estimate Lifetimes of Residential Appliances

Implementation period for cost analysis: 2018-2031

Capital cost assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit Cost	Per Unit Incentive Amount	Number of Units	Years of Equipment Life
Water Heater (Electric Heat Pump)	Consumers	$400	$200	1,690,530	14
Pool Heater (Cover)	Consumers	$500	$200	469,328	6
Dryer (Electric)	Consumers	$250	$100	1,079,936	14
Pool Heat Pump (Electric Heat Pump)	Consumers	$1,500	$200	240,586	14

Annual operating and maintenance net cost/(savings) assumptions:[28]

Equipment Name	Per Unit Cost No Solar	Per Unit Cost With Solar
Water Heater (Electric Heat Pump)	$15	$(132)
Pool Heater (Cover)	$(170)	N/A
Dryer (Electric)	$30	$(10)
Pool Heat Pump (Electric Heat Pump)	$(229)	$(238)

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
ECC-03	$246.6	+	$406.9	=	$653.5	$37.8

Stationary Source Measures (VOC and/or $PM_{2.5}$ Emission Reductions)

❖ *BCM-10 (Emission reductions from greenwaste composting)*

BCM-10 proposes composting Best Management Practices (BMPs) as a control method to reduce potential VOC and ammonia emissions from chipped and ground but uncomposted mulch that is presumably directly applied to the land after chipping and grinding (chip/grind). Specifically, the proposed control method requires for the 15 days of active phase composting during which chipped and ground mulch piles would be covered by finished compost (or compost overs) only one time and then watered

[28]$0.09 per kWh for electricity is the Federal average price in the U.S; $0.93 per therm for gas is the Federal average price in the U.S.; $1.107 cents/therm for Los Angeles area (Source: US Bureau of Labor Statistics http://www.bls.gov/regions/west/news-release/averageenergyprices_losangeles.htm.)

before turning up to five times during the 15 day period.[29] In the Basin, 21 affected (8 composting and 13 chip/grind) mulch producing facilities are proposed to be subject to this control method.

Thirteen chip/grind facilities would need to purchase cover material (finished compost or compost overs) from local composting facilities. To reduce the cover material purchasing cost, which could be highly dependent on the size of mulch throughput, it is assumed that they would purchase it only for the first year and then would produce finished compost on-site in the following years. Therefore, material cost (and pick-up trip cost) is considered a one-time cost, annualized over 15 years of a facility's lifetime. In addition to the cover material cost, watering, covering, and recordkeeping costs are also included.

Eight composting facilities would also need to do compost covering and watering. However, since the cover material is readily available on-site, the cover material will not need to be purchased. Recordkeeping is also not considered because it is already required in SCAQMD Rule 1133.3, which applies to the facilities.

Assumptions[29,30] for cost estimates include:

Compost Covering (Labor & Equipment) [a]	• A mulch windrow is 16 ft. wide, 7 ft. high, 200 ft. long, and 132 tons in mass. • Approximately 457,500 tons of chipped and ground mulch throughput. • Operating cost for labor and a front-end loader is $180 per hour. • On a per ton of throughput basis, approximately 0.0044 hours of front-end loader time is needed to apply compost cover to each mulch windrow only one time. • Front-end loader needs 5 gallons of diesel per hour at a rate of $3.50 per gallon. • On a per ton of throughput basis, 0.022 gallons of diesel is needed to operate a front-end loader.
Watering (Labor & Water) [a]	• The wage rate for watering is $20 per hour. • On a per ton of throughput basis, approximately 0.0165 hours of labor are needed to water the windrow five times. • Water costs $0.0024 per gallon (conservatively assumed affected facilities use potable water). • On per ton of throughput basis, 95 gallons of water are needed to water windrow five times.
Compost Cover (Material & Pick-up) [b]	• Approximately 176,700 tons of chipped and ground mulch throughput. • On per ton of throughput basis, approximately 0.167 tons of finished compost are needed to cover mulch windrow.[31] • Bulk finished compost costs approximately $50 per ton.[32] • A 20-ton truck travels 30 roundtrip miles to pick up bulk finished compost at a local composting facility. • Diesel fuel for a truck costs approximately $0.45 per mile.[33]
Recordkeeping [b]	• The wage rate for recordkeeping labor is $25 per hour. • Approximately 78 hours of recordkeeping time are needed per facility.

[a] Apply to 21 affected facilities; [b] Apply to 13 chip/grind facilities

[29] SCAQMD, 2011. Final Staff Report for Proposed Amended Rule 1133.1 and Proposed Rule 1133.3.
[30] SCAQMD, 2011. Socioeconomic Assessment for Proposed Amended Rule 1133.1 and Proposed Rule 1133.3.
[31] CalRecycle, 2007. Emissions Testing of VOC from Greenwaste Composting at the Modesto Compost Facility in the San Joaquin Valley.
[32] Finished Compost Sale Price: http://www.sunshinegrowersnursery.com. Accessed in May 2016.
[33] Weekly California No. 2 Diesel Retail Prices: https://www.eia.gov. Accessed in May 2016.

Implementation period for cost analysis: 2020-2031

Annual capital and operating and maintenance cost assumptions[34]:

Affected Facilities (Types of Operations)	Affected Industries (NAICS)	Annual Cost	Per Unit/Facility Incentive Amount	Number of Units
Facility A (Landscaping& Nursery)	Flower, Nursery Stock, and Florists' Supplies Merchant Wholesalers (424930)	$10,936	$0	1
Facility B (Legislative Bodies)	Refuse Services (921120)	$45,154	$0	1
Facility C (Recycle Wood Products)	Other Miscellaneous Durable Goods Merchant Wholesalers (423990)	$47,527	$0	1
Facility D (Chipping and Grinding)	Landscaping Services (561730)	$26,544	$0	1
Facility E (Green Waste Operation)	Farm Supplies Merchant Wholesalers (424910)	$18,983	$0	1
Facility F (Landscape Operations)	Landscaping Services (561730)	$2,393	$0	1
Facility G (Disposal Services)	Other Waste Collection (562119)	$52,662	$0	1
Facility H (Landscape Operations)	Other heavy and civil engineering construction (237990)	$17,483	$0	1
Facility I (Other Wood Product Manufacturing)	Cut Stock, Resawing Lumber, and Planing (321912)	$39,476	$0	1
Facility J (Solid Waste Management)	Solid waste landfill (562212)	$55,863	$0	1
Facility K (Nursery and Garden Supplies)	Nursery, Garden Center, and Farm Supply Stores (444220)	$19,133	$0	1
Facility L (Landscape Operations)	Landscaping Services (561730)	$2,446	$0	1

[34] http://www.sunshinegrowersnursery.com for compost covering and material pickups; https://www.eia.gov/ for water and gasoline retail Prices; SCAQMD, Socioeconomic Assessment for PAR 1133.1 & PR 1133.3, July 2011; SCAQMD, Final Staff Report for PAR 1133.1 & PR 1133.3, July 2011; CalRecycle, Emissions Testing of VOC from Greenwaste Composting at the Modesto Compost Facility in the San Joaquin Valley, October 2007.

Affected Facilities (Types of Operations)	Affected Industries (NAICS)	Annual Cost	Per Unit/Facility Incentive Amount	Number of Units
Facility M (Solid Waste Management)	Other Waste Collections (562119)	$67,911	$0	1
Facility N(Solid Waste Management)	Legislative Bodies (Refuse System) (921120)	$75,523	$0	1
Facility O (Nursery)	Nursery and Garden Supplies (444220)	$53,110	$0	1
Facility P (Solid Waste Management	Material Recovery Facility(562920)	$1,187	$0	1
Facility N(Farm Supplies)	Farm Supplies Wholesalers (424910)	$8,797	$0	1
Facility Q(Nursery)	Nursery, Garden Center, and Farm Supply Stores (444220	$6,935	$0	1
Facility R(Recycle Materials)	Recycle Materials Wholesalers (423930)	$20,154	$0	1
Facility S(Recycle Materials)	Recycle Materials Wholesalers (423930)	$173,662	$0	1
Facility T(Landscape Operations)	Landscaping Services (561730)	$61,342	$0	1

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
BCM-10	$7.0	+	$0	=	$7.0	$0.6

❖ *FUG-01 (Improved leak detection and repair)*

FUG-01 would utilize more efficient and effective leak detection systems known as advanced remote sensing techniques (Smart LDAR), such as Fourier transform infrared spectroscopy (FTIR), Ultraviolet Differential Optical Absorption Spectroscopy (UV-DOAS), Solar Occultation Flux (SOF) and infrared cameras, that can identify, quantify, and locate VOC leaks in real time, allowing for faster repair in a manner that is less time consuming and labor intensive than traditional LDAR.

Costs for the various types of equipment are provided below:

- Infrared cameras – state of the art IR camera with cooled detector – provides visualization of VOC

emissions, no speciation, no concertation or emission flux determination - ~$100K[35]

- Fourier transform infrared spectroscopy (FTIR) – for monitoring of alkanes, CH4, CO, CO2, some toxics, CFC's – commercial Open Path FTIR (OP-FTIR) systems range between $150 – 250K[36]
- Ultraviolet Differential Optical Absorption Spectroscopy (UV-DOAS) – for monitoring of BTEX, NO2, SO2, HCHO, O3, NO3 - between $100 - $150K [37]
- Solar Occultation Flux (SOF) – for emission flux measurements of alkanes - ~$300K[38]
- Fully equipped mobile laboratory containing SOF (for emission flux measurements of alkanes); zenith-looking DOAS (for emission flux measurements of NO2, SO2, HCHO), DOAS white cell (for ground concentration mapping and emission fluxes of BTEX and O3), extractive FTIR (for ground concentration mapping and emission fluxes of CH4, ammonia, and VOC speciation) - ~$1.1M

Staff is using the SOF technology to determine potential costs. SOF technology requires a full-time technician to operate the equipment resulting in a labor cost of $50,000 per unit per year. Each unit also requires approximately $25,000 in maintenance annually and consumes $75 dollars in electricity.[39]

Staff further estimates that 33 SOF units (with corresponding labor, maintenance and electrical annual costs) would be necessary to implement FUG-01. The number of units is based on the number of large oil and gas production facilities (27) and petroleum refining and chemical products processing (6).

Implementation period for cost analysis: 2022

Capital cost assumptions:[40]

Equipment Name	Affected Industries (NAICS)	Per Unit Cost	Incentive Amount	Number of Units	Years of Equipment Life
Advanced LDAR	Oil and Gas Production (211), Petroleum and Coal Products Manufacturing (342)	$300,000	$0	33	10

An additional annual cost of $75 for electricity and an additional annual maintenance labor cost of $50,000 of labor and $30,000 of materials were assumed for the affected facilities.

[35] https://www3.epa.gov/airquality/oilandgas/2014papers/Attachment_GG_EDF.pdf
[36] https://archive.epa.gov/nrmrl/archive-etv/web/pdf/01_vr_ail.pdf
[37] http://www.spectroscopyonline.com/minidoas-low-cost-high-performance-contactless-ammonia-measurements-0
[38] http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2015/2015-oct2-010.pdf
[39] https://www3.epa.gov/ttnemc01/guidlnd/gd-052.pdf
[40] http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2014/may-specsess-10.pdf

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
FUG-01	$26.5	+	$0.0	=	$26.5	$2.5

❖ *CTS-01 (Further emission reductions from coatings, solvents, adhesives, and sealants)*

CTS-01 would seek VOC emission reductions by limiting the allowable VOC content in formulations of coatings, adhesives, and solvents. Between 1 and 2 tons per day (tpd) (5,698 tons over 14 years) of VOC reduction are estimated as emission reductions are conservatively phased in over time. Emission reductions are projected to be 1.0 tpd in 2023 and 2.0 tpd in 2031.

Based on the 2012 survey data of adhesive products[41], between 2.5 million and 2.8 million gallons of product sold will be impacted by the proposed control measure. Due to projected growth[42] over a 19 year period (2012 to 2031), the gallons impacted are likewise expected to grow to 3.0 million to 3.3 million by 2031.

An online comparison of over 23 product categories at retail stores between currently compliant products and future compliant products[43] indicates an average price difference of $1.76 per gallon. This figure is used as the estimate of the increase in costs for end-users to purchase future compliant products and is also assumed to be the dollar amount that will be necessary for product manufacturers to recover reformulation related costs. The total annual cost increase is estimated to be proportional to the annual emission reductions projected and will grow to $5.8 million by year 2031. The product survey was not exhaustive and further surveys will be conducted during rule development to further hone cost and cost-effectiveness estimates.

Implementation period for cost analysis[44]: 2018-2031[45]

Reformulation cost assumptions:[46]

Equipment Name	Affected Industries (NAICS)	Average Cost Increase per Gallon	Incentive Amount	Volume per Year (Gallon)	Years for Cost Recovery
Certain Coating, Adhesive, Solvent and Sealant Categories	Specialty Trade Contractors (238110)	$1.76	$0	3,300,000	14

[41] Proposed Amended Rule 1168 Adhesive and Sealant 2012 Product Sales Survey (August 2013)
[42] Southern California Association of Governments Adopted 2012 RTP Growth Forecast
[43] Online cost comparison of potentially impacted products conducted December 2015
[44] Reformulation costs assumed to incur beginning in 2018
[45] It is assumed that reformulation cost spending would begin in 2018 to meet compliance requirements.
[46] Incremental cost for VOC measures and rules is typically approximated as the price difference between the existing products that have already met the proposed product standard and those that will need to undergo reformulation to comply with the new proposed standard. The overall incremental cost is then derived from multiplying the

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
CTS-01	$31.6	+	$0.0	=	$31.6	$3.0

Stationary Source Measures (PM2.5 Emission Reductions)

❖ *BCM-01(Further emission reductions from commercial cooking)*

BCM-01 is a contingency control measure which would seek PM reductions from commercial under-fired charbroilers if the PM2.5 annual average standards are not met by 2025. If necessary to meet contingency control measure requirements, a tiered program could be developed that targets higher efficiency controls for under-fired charbroilers at large volume restaurants, with more affordable, lower efficiency controls at smaller restaurants.

Assumptions for cost estimates include:

Estimated number of potentially affected facilities[47]	• 1,000 large restaurants • 7,000 average restaurants
Control Device Cost Estimates[48]	• Large restaurants - Electrostatic precipitator (ESP) $31,000 device cost, $9,500 installation and $8,000 (O&M) • Average restaurants – Vent hood cartridge and filter $2,500 device cost, $500 installation[49], and $1,200[50] (O&M)

Implementation period for cost analysis: 2025

Capital cost assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit Cost	Incentive Amount	Number of Units	Years of Equipment Life
Electrostatic Precipitator (ESP)	Restaurant Operations (722513)	$40,500	$0	1,000	10
Vent hood cartridge + filter	Restaurant Operations (722513)	$3,000	$0	7,000	10

incremental cost per unit by the number of potentially affected units. The latter is approximated by the most recent annual sales volume of the existing products that have not met the proposed new standard, multiplied by the years estimated for reformulation cost recovery.

[47] Derived from SCAQMD PAR 1138 Preliminary Draft Staff Report. August, 2009 and Pacific Environmental Services, A Detailed Survey of Restaurant Operations in the South Coast Air Basin, Contract Number 98089; February 5, 1999.

[48] Air Quest (ESP), 2015 and Streivor air systems (Vent hood cartridge and filter), 2016.

[49] SCAQMD staff estimates

For large restaurants, an additional annual maintenance cost of $8,000 per electrostatic precipitator is assumed. For smaller restaurants, an annual cost of $1,200 for vent hood cartridge maintenance, based on an assumption of 52 hours of labor at $10/hour and 72 filter replacements at $8.50/unit.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
BCM-01	$143.1	+	$0.0	=	$143.1	$10.8

❖ *BCM-04 (Emission reductions from manure management strategies)*

BCM-04 proposes manure management to reduce ammonia, a PM2.5 precursor, from livestock waste. These control strategies can be applied on a year-round basis, or seasonally or episodically to minimize costs. BCM-04 also proposes lowering the applicability thresholds of SCAQMD Rule 223 - Emission Reduction Permits for Large Confined Animal Facilities. The proposed thresholds are 500 milk cows and 400,000 birds. As a result, 36 dairy farms and no chicken farm would be impacted by the proposal. The feasibility of lowering the applicability threshold is evaluated.

The anticipated incremental costs that would be incurred by the 36 impacted dairy farms include the additional cost of disposing manure though composting compared to disposing manure by land application, and the cost of more frequent corral cleaning (4 instead of 2 times per year per farm).

The cost of corral cleaning would be approximately $204.50 per cleaning. The analysis assumes that 119,732 tons of manure is sent to fabric in-vessel (FIV) composting operations, which would cost approximately $31 per ton of manure. In the absence of the composting facilities, the base case assumes that manure will be land spread in the Basin (least costly option currently available, which is approximately $10.20 per ton of manure)[50]. The incremental compliance cost per year is estimated as below:

- *Incremental Annual Compliance Cost = ((FIV cost/ton – In-basin spreading $_{cost/ton}$) x tons manure) + extra corral cleaning costs*
  = (($31 – $10.2) x 119,732) + (204.50 x 2 x 36)
  =$2.5 million

The implementation period for cost analysis is 2020-2031.

An estimated average annual cost of $69,444 for cost of corral cleaning and sending the manure to FIV composting facilities was assumed for each dairy farm.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
BCM-04	$16.4	+	$0	=	$16.4	$2.0

[50] Unit costs are based on data from Rule 1127 Staff Report and inflated to 2016 dollars.

SCAQMD Mobile Source Measures (NOx and/or VOC, PM2.5 Emission Reductions)

❖ *MOB-10 (Extension of the SOON provision for construction/industrial equipment)*

In 2016, nearly all applications were for replacement equipment. Replacement equipment eligible for SOON funding can cost from under $100,000 to over $1,000,000. The applications were typically for rubber tire loaders, the most common type of mobile off-road equipment. Incentive funding averaged $134,380 per equipment and average equipment cost was $444,521. For replacement equipment, SOON incentives can be up to 80% of actual cost but generally are lower due to cost effectiveness limits. For 2016 applications, SOON paid approximately 30% of actual price ($134,380/$444,521 = 30.2%). Most SOON replacement projects, including those that are not funded, offer incentives between 10% and 50% of actual cost.

Equipment Life:
Most heavy duty equipment remains in operation for many years. Tier 0 equipment replaced or repowered was built before 1996 and is at least 20 years old. The equipment life used for analysis was 20 years.

Operating & Maintenance Cost:
Fuel and maintenance costs are assumed to be the same for new equipment and engines compared to the equipment they replaced. An additional cost is urea for the SCR systems which was estimated at 3% of diesel fuel usage based on engine manufacturer guidance:

200 gallons fuel/week x 52 weeks x 3% = 312 gallons urea/year

Urea cost ranges from $2 to $4 per gallon depending on source, volume and delivery charge. Most heavy construction equipment is refueled at job sites and urea would be delivered by the refueling truck. A conservative estimate for urea cost was $4/gal.

312 gallons per year x $4/gal = $1,248

Incremental Cost:
The SOON program is administered according to Carl Moyer Program guidelines which considers 80% of actual cost to be the incremental cost of replacement equipment and 85% of actual cost to be the incremental cost of engine repowers. The remainder (15% for repower and 20% for replacement) is considered the overhaul and maintenance expense that would be incurred to keep the old engine/equipment operational. For this cost analysis, an incremental cost of $155,000 was selected reflecting the highest average incentive in the SOON program.

Incentive:
The SOON incentive amount for each project in 2014-2016 was based on the difference in emissions of the old and new equipment and a cost effectiveness limit. For many projects, particularly equipment replacement, the incentive amount is less than the 80% nominal incremental value. For this cost analysis the incentive amount of $155,000 was selected reflecting the highest average incentive in the SOON program.

Implementation period for cost analysis: 2017-2022

Capital cost assumptions:[51]

Equipment Name	Affected Industries (NAICS)	Per Unit Cost	Per Unit Incentive Amount	Number of Units	Years of Equipment Life
Off-Road Construction Equipment (Repower)	Construction (283110)	$180,226	$155,000	135	20
Off-Road Construction Equipment (Replacement)	Construction (283110)	$444,521	$155,000	315	20

An additional annual cost of $1,248 for urea usage was assumed for each repower or replacement engine.[52]

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
MOB-10	$7.2	+	$63.4	=	$70.6	$4.6

❖ *MOB-11 (Extended exchange program)*

MOB-11 is an incentive based control measure similar to the Carl Moyer Program focusing on the small off-road engines (SORE) less than 25 hp. These engines are used in handheld equipment, portable equipment, recreational equipment/vehicles, and mobile off-road equipment. This measure specifically addresses commercial 5-25 hp diesel- and gasoline-fueled lawn and garden equipment including garden tractors, riding mowers, and other commercial turf equipment. Commercial diesel-fueled equipment were included because they have the highest NOx emissions per vehicle and therefore are very cost effective compared to gasoline-fueled equipment.

Since 2003, SCAQMD has sponsored lawn mower buyback programs for residential users of old lawn mowers. This program has resulted in over 55,000 high polluting gasoline-powered lawn mowers taken out of service from 2003 to today. In addition to the lawn mower exchange program, SCAQMD has recently sponsored a gasoline-powered leaf blower exchange program targeted at commercial operators. The leaf blower buyback program has resulted in over 12,000 older leaf blowers being exchanged for cleaner combustion leaf blowers.

While the residential lawnmower and commercial hand-held leaf blower exchange programs are important programs, additional emission reductions will be needed from larger commercial lawn and garden equipment such as riding lawnmowers. Zero-emission commercial lawn and garden equipment are currently commercially available from a number of vendors. The SCAQMD is currently sponsoring a

[51] Source: SOON program, 2014-2016.
[52] Urea (DEF) cost of $1,248/truck/year = 3% x 200 gal fuel/week x 52 weeks/year.

zero-emission commercial lawn and garden equipment loaner program to test and evaluate equipment performance in a various commercial applications. Many of these test units have been well received by users.

MOB-11 achieves emission reductions of NOx from diesel- and gasoline-fueled mobile lawn and garden equipment through their replacement with similar zero or near zero emission equipment. The most stringent regulations for these engines became effective before 2008 meaning that most commercial equipment already meets the most stringent emission standards.

The information for the analysis was based on the 2023 emission inventory of lawn and garden equipment, the 2023 population estimate of lawn and garden equipment from CARB's OFFROAD2007 inventory model, and a limited internet search of pricing for lawn and garden equipment.

Number of Units/Objects:
There are over 7,000,000 pieces of lawn and garden equipment, most of which are either handheld equipment or residential mowers with a total emission inventory of 6 tpd of NOx. In reviewing the population and emission estimates by equipment type and horsepower, the 5-25 hp diesel lawn tractor and 15-25 hp diesel turf equipment categories were the highest NOx categories of lawn and garden equipment. The next highest category was 5-25 hp gasoline turf equipment. These three categories represent nearly half of the lawn and garden source category and total 33,000 units. For simplicity, it was assumed that all units would be replaced by near zero hybrid or zero emission equipment. During implementation, any commercial lawn and garden equipment in these horsepower ranges would be eligible for replacement.

Fuel Type	HP range	Number[53]	NOx tpd reduction[54]	Unit Costs	Cost Used in Analysis
Diesel	15-25	14,550	1.8	$9,000 - $20,000	$12,000
Diesel	5-15	11,600	0.6	$4,000 - $12,000	$8,000
Gasoline	5-25	7,500	0.5	$2,000 - $10,000	$4,000

Equipment Life:
The OFFROAD2007 model includes age-based population distribution factors. The nominal useful life is shown as 5 or 7 years for commercial diesel tractors or turf equipment depending on equipment hp and equipment type. For gasoline tractors or turf equipment, the nominal life is 1 or 4 years. The nominal useful life represents half of the actual age distribution in the model. For diesel equipment, that is either 10 or 14 years and for gasoline equipment is either 2 or 8 years.

For this cost analysis, 10 years was assumed for 15-25 hp diesel equipment, 14 years for 5-15 hp for diesel equipment and 8 years for gasoline equipment.

Operating & Maintenance Cost:
Electrical usage, battery replacement cost, and other operating and maintenance expenses are not quantified due to lack of data. Although fuel and maintenance costs are expected to be lower, for this

[53] CARB OFFROAD2007 Inventory model – 2023
[54] 2023 AQMP Inventory dated 1/7/2016

analysis no increased operating and maintenance costs or savings were included.

Incremental Cost:
Electric equipment is estimated to have 25% incremental cost over combustion engine equipment due to lower sales volume and higher costs of the battery electrical storage, charging, and drive system compared to combustion engine designs.

Incentive:
For this cost analysis[55], the incentive amount of 25% of average cost was selected to offset the estimated incremental cost.

Manufacturer	Equipment	Model	Fuel	HP	Price	EV Premium
John Deere	Riding Mower	Z-TRACK 997	Diesel	37	$23,765	
Green Machine	Riding Mower	CRX60	EV	36	$22,799	0.96
John Deere	Utility Truck	Gator 4x2 TS	Gas	13	$6,969	
John Deere	Utility Truck	Gator 4x2 EV	EV	6	$11,379	1.63
Toro	Stand-on Mower	74518	Gas	23	$10,388	
Green Machine	Stand-on Mower	48”	EV	24	$13,299	1.28
					AVERAGE	**1.29**

For this analysis, an incremental capital cost of 25% was used. Moreover, EV versions of lawn and turf equipment are available in only a few categories, and EV and combustion engine equipment are not exactly equivalent in performance and configurations.

Internet search for gas/diesel equipment (10/14/2016):

Manufacturer	Equipment	Model	Fuel	HP	Price
Husqvarna	Utility tractor	YTH24K54	Gas	24	$2,100
John Deere	Utility truck	Gator 4x2 TS	Gas	13	$6,969
Kubota	Walk behind mower	WHF-19-52	Gas	13	$7,519
Toro	Stand-on mower	74518	Gas	23	$10,388
Kubota	Utility tractor	BX25D-1	Diesel	18	$9,971
John Deere	Utility tractor	1023E	Diesel	22	$12,002
John Deere	Utility tractor	3025E	Diesel	25	$17,325
John Deere	Riding mower	1550	Diesel	24	$18,420

[55] Internet search for EV premium 10/14/2016

Implementation period for cost analysis: 2018-2022

Capital cost assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit Incremental Cost	Per Unit Incentive Amount	Number of Units	Years of Equipment Life[56]
Replace Commercial Diesel Equipment 15-25 HP with T4 or Cleaner	Landscaping Services (561730)	$3,000	$3,000	14,550	10
Replace Commercial Diesel Tractors 5-15 HP with T4 or Cleaner	Landscaping Services (561730)	$2,000	$2,000	11,600	14
Replace Commercial Gasoline Equipment 5-25 HP with Cleanest or Zero Emission Equipment	Landscaping Services (561730)	$1,000	$1,000	7,500	8

No operating and maintenance costs were assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
MOB-11	$0.0	+	$66.2	=	$66.2	$7.6

❖ *MOB-14 (Emission reductions from incentive programs)*

MOB-14 will develop a rule so that emission reductions generated through incentive programs can be credited in State Implementation Plan (SIP) emission inventories. Such emission reductions have been accounted in the development of historic base year emissions inventories where actual quantifiable emission reductions have occurred. Future emission reductions from adopted regulations can be credited towards attainment of air quality standards. However, future emissions reductions as a result of incentive-based programs cannot be credited towards attainment without a demonstration and commitment that the reductions are real, surplus, enforceable, and permanent (for mobile sources to the extent of their useful life). The lack of a SIP-creditability mechanism is now a major constraint in developing future AQMPs since planned reductions cannot be counted in the future year emission inventories. This proposed measure would provide a new administrative mechanism to take SIP credit for future emission reductions achieved in the Basin through incentive programs administered by SCAQMD, CARB, or U.S. EPA.

SCAQMD has a long history of successful implementation of incentive programs that help fund the accelerated deployment of cleaner engines and aftertreatment technologies in on-road heavy-duty

[56] Based on CARB Offroad2007 model AgeDist table (used all years in age distribution).

vehicles and off-road mobile equipment. Such accelerated deployment not only results in early emission reductions, but also provides a signal for technology providers, engine and automobile manufacturers, and academic researchers to develop and commercialize the cleanest combustion engines possible and further the efforts to commercialize zero-emission technologies into a wider market. Major incentive programs administered by SCAQMD include:

- CARB Carl Moyer Memorial Air Quality standards Attainment Program (Carl Moyer Program)
- CARB Proposition 1-B Air Quality Improvement Fund
- CARB Lower Emission School Bus Program
- U.S. EPA Diesel Emission Reduction Act (DERA) Program
- Old vehicle scrap programs (light duty vehicles)
- Lawn and garden equipment exchange programs.

MOB-14 includes two categories of emission reductions: those from current contracts where new equipment will remain in service through 2023, and those from projects which have been approved but not contracted and funding is reasonably expected to be available. Since the vehicle replacement costs in the first category have already been incurred, they were not included in this analysis.

Number of Units/Objects:
Four project types have been included In MOB14 between 2017 and 2023:

School bus replacements:	600 based on anticipated future funding levels and typical annual school bus replacements from 2010 through 2016.
Cargo handling equipment:	68 units awarded in 2017 Carl Moyer Program funding.
Freight locomotives:	10 units awarded in 2017 Carl Moyer Program funding.
HD On-road vehicles:	7,500 vehicles based on Proposition 1B and Low Carbon Transportation and Fuels Program's funding commitments.

Unit Costs:

School bus replacements:	Based on actual cost of recent replacements projects ($197,000).
Cargo handling equipment:	Based on quote ($300,000) for electric yard trucks awarded in 2016.
Freight locomotives:	Based on quote ($3,000,000) for freight locomotives awarded in 2016.
HD On-road vehicles:	Based on estimated $125,000 for day cab on-road tractors with diesel engines.

Equipment Life:
School bus and heavy duty trucks – 15 years
Locomotives – 30 years
Electric Yard Trucks – 12 years

Operating and Maintenance Cost:

CNG school bus:	Fuel cost savings – 20% of diesel fuel cost: 10,000 gallons/year x $4/gal x20% = $8,000 savings/year/truck.
Locomotives:	No change in O&M cost.
Electric Yard Trucks:	Fuel cost savings – 80% diesel fuel cost: 2,600 gallons/year x $4/gal x 80% = $8,320 savings/year/truck.

HD On-road Trucks: Cost of urea for SCR systems - 3% diesel fuel cost:
200 gal/wk x 52 wk/yr x $4/gal x 3% = $1,248/year/truck.

Incremental Cost:

CNG school bus: The incremental cost of replacing existing diesel buses with new natural gas buses was 80% of new vehicle cost. The balance (20% of new vehicle cost) was the estimated cost of maintaining the existing vehicles in operation). Incremental cost = $175,000.

Locomotives: The incremental cost of replacing old Tier 0/1 locomotives with new Tier 4 locomotives was 85% of the new locomotive cost with the remainder considered the cost of maintaining the existing locomotives in operation. Incremental cost = $2,550,000.

Electric Yard Trucks: The incremental cost of replacing old diesel yard trucks with new electric yard trucks was the cost difference between new Tier 4 diesel yard trucks and electric yard trucks as shown in the application. Incremental cost = $100,000.

HD On-road Trucks: The incremental cost of replacing old diesel on-road trucks with new near-zero trucks was the cost difference between new Tier 4 diesel yard trucks and near-zero natural gas yard trucks. Incremental cost = $50,000 for engine/aftertreatment and natural gas fuel system.

Incentive:

For the analysis, the incentive amount was equal to the estimated incremental cost.

Implementation period for cost analysis: 2017-2023

Capital cost assumptions:

Equipment Name (Implementation Period)	Affected Industries (NAICS)	Per Unit Incremental Cost	Per Unit Incentive Amount	Number of Units	Years of Equipment Life
CNG School Buses (2017-2023)	Transit Buses (485)	$175,000	$175,000	600	15
Tier 4 Freight Locomotives (2017)	Rail Yards (482)	$2,550,000	$2,550,000	10	30
Electric Cargo Handling Equipment (2017-2019)	Ports (488)	$100,000	$100,000	68	15
0.02 g/bhp-hr On-Road Heavy-Duty Trucks (2017-2023)	Truck Transportation (484)	$50,000	$50,000	7,500	12

An annual fuel cost-savings of $8,000 were assumed for each of the 600 school buses.[57] An annual fuel

[57] Fuel cost-savings: 20% of diesel fuel cost = 10,000 gal/year x $4/gal x 20%.

cost-savings of $8,320 were assumed for each of the 68 electric cargo handling equipment.[58] An additional annual cost of $1,248 for urea usage was assumed for each of the 7,500 heavy-duty trucks.[59]

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
MOB-14	$26.7	+	$460.1	=	$486.7	$43.1

(b) SCAQMD Control Measures with TBD Emission Reductions

The control measures listed below are not part of the Draft Final 2016 AQMP's attainment demonstration. SCAQMD staff will conduct further assessments to the quantify cost and emission reductions for these measures as data becomes available. Currently available, but limited, cost information is provided below for each measure:

- *BCM-02 (Emission reductions from cooling towers)*

SCAQMD Rule 219(d) exempts cooling towers that do not contain chromium compounds from permitting requirements. As such, the universe of equipment that may benefit from the cost effectiveness of the use of high efficiency drift eliminators is currently unavailable and would be addressed during rule development, if rulemaking is determined to be necessary.

- *BCM 03 (Further emission reductions from paved road dust sources)*

A street sweeping and wheel washing system can be leased for about $3,000 per month with one-time installation/removal, including a transportation cost of about $14,000. However, the number of facilities and local jurisdictions that may participate and benefit from the use of these additional programs are unknown at this time and would be subject to a rule development effort, if rulemaking is determined to be necessary.

- *BCM-05 (Ammonia emission reductions from NOx controls)*

The purpose of this control measure is to seek reductions of ammonia from NOx controls such as SCR and Selective Non-Catalytic Reduction (SNCR). The use of these control systems can result in potential ammonia emissions that slip past the equipment and into the atmosphere. Ammonia is a precursor for PM. Recent advances in catalyst technology have resulted in the development of ammonia slip catalysts that selectively convert ammonia into nitrogen. These catalysts could be installed post-SCR and would result in less ammonia slip. Based on a recent estimate from Ammonia Slip Catalyst (ASC) vendor, an ASC equipment adder (which includes ASC catalyst and a means of loading it into the SCR reactor) is estimated to cost about 6 percent to 12 percent over the cost of SCR emission system equipment. Further cost analysis will be addressed during rule development, if rulemaking is determined to be necessary.

[58] Fuel cost-savings: 80% of diesel fuel cost = 2,600 gal/year x $4/gal x 80%.
[59] Urea (DEF) cost of $1,248/truck/year = 3% x 200 gal fuel/week x 52 weeks/year.

❖ *BCM-06 (Emission reductions from abrasive blasting operations)*

The California Health and Safety Code Section 41904 prohibits local districts from requiring emission and performance standards more or less stringent that the state regulation. SCAQMD Rule 1140 – Abrasive Blasting has been developed to conform to the 17 CCR §§92000 et seq (Abrasive Blasting). Due to this pre-emption, this control measure proposes only a voluntary application of limited possible air pollution control methods by providing incentives. The inherent uncertainty in operator preferences limits the ability to forecast resultant emission reductions and costs at this time. As a result, the cost analysis will be addressed during rule development, if rulemaking is determined to be necessary.

❖ *BCM-07 (Emission reductions from stone grinding, cutting and polishing operations)*

SCAQMD Rule 219(g) exempts from permitting requirements machining equipment exclusively used for polishing, cutting, surface grinding, etc. The universe of affected facilities under this control measure is not fully developed and needs assessment outside of the permitting arena. Due to the absence of operational data at existing facilities, the emissions, potential reductions and associated costs are not available and would be addressed during rule development, if rulemaking is determined to be necessary.

❖ *BCM-08 (Further emission reductions from agricultural, prescribed and training burning)*

Changes to prescribed burning programs are anticipated to have minimal direct costs as burning would likely be shifted to other times of the year, although training and fire suppression issues would take precedence. Incentivizing or requiring burning alternatives (e.g., chipping/grinding with land application) could increase costs to the agricultural community although 90 percent of agricultural burning occurs in the Coachella Valley portion of the Salton Sea Air Basin which, unlike the Basin, is currently classified as a PM2.5 unclassifiable/attainment area and would not be targeted as part of an attainment demonstration.

❖ *BCM 09 (Further emission reductions from wood-burning fireplaces and wood stoves)*

Increasing the number of no burn days would result in relatively few direct cost increases to the impacted community as regional residential wood burning is primarily for aesthetic purposes. Based on results of the current and former SCAQMD incentive programs, a basic gas log set can be purchased at a local retailer and installed by a contractor into a home with an existing wood burning fireplace plumbed for natural gas for approximately $400 to $500. The average cost associated with removal and replacement of conventional (uncertified) wood heaters with a U.S. EPA Phase II-certified device has been estimated at $4,000 per unit. The devices are unpermitted and the total number is market and consumer driven. Wood heater upgrades are allowed under the current targeted incentive program but participation has been low due to the small eligible geographic area, whereas, over 10,000 gas log sets have been voluntarily installed into traditional wood-burning fireplaces under various incentive programs implemented since 2008. As a result, the cost analysis will be addressed during rule development, if rulemaking is determined to be necessary.

❖ *FLX-01 (Improved education and public outreach)*

This proposed control measure seeks to provide education, outreach, and incentives for consumers to contribute to clean air efforts. Examples include consumer choices such as the use of energy efficient products, new lighting technology, “super-compliant” coatings, tree planting, transportation choices, and the use of lighter colored roofing and paving materials which reduce energy usage by lowering the ambient temperature. Potential cost of this control measure cannot be quantified at this time due to the

fact that the number of individuals, facilities, and public entities that may participate and benefit from the use of these additional programs are unknown at the present. As a result, the cost analysis will be addressed during rule development, if rulemaking is determined to be necessary.

- *FLX-02 (Stationary source VOC incentives)*

This control measure would seek to incentivize VOC emission reductions from various stationary and area sources through incentive programs for the use of clean, low emission materials or processes. Facilities would be able to qualify for incentive funding if they utilize equipment or material, or accept permit conditions which result in cost-effective emission reductions that are beyond existing requirements. The decision regarding when to replace existing equipment can vary; some facilities may replace equipment or reformulate material when it is no longer operable or outdated, while other facilities may replace equipment or material well before it reaches that point. Predicting VOC emission reductions from these voluntary activities is challenging as the availability and amount of incentives would directly affect the level of VOC emission reductions achieved. Emission benefits from incentives can be quantified based on program participation, technology/material penetration, and other assessment and inventory methods.

The cost and cost-effectiveness of this measure cannot be determined at this time, given the potential variety of programs and projects that will be developed. As a result, the cost analysis will be addressed during rule development, if rulemaking is determined to be necessary.

- *MCS-01 (Improved breakdown procedures and process re-design)*

SCAQMD Rule 430 – Breakdown Provisions, applies to breakdowns that result in a violation of any rule or permit conditions, with some exceptions, and stipulates reporting requirements. This control measure would introduce improved breakdown procedures and/or process re-designs that would apply to breakdowns from all emission sources, providing pollutant concentration, work practice, and/or incidence limits to comply with U.S. EPA's Startup, Shutdown, and Maintenance (SSM) policy. This would apply to combustion equipment that can be tested readily with a portable analyzer such as boilers, engines, and some ovens and furnaces, along with associated control equipment such as SCR. Due to the nature of this control measure, the cost-effectiveness cannot be calculated. The inherent uncertainty in operator preferences limits the ability to forecast resultant emission reductions and costs at this time. As a result, the cost analysis will be addressed during rule development, if rulemaking is determined to be necessary.

- *MCS-02 (Application of all feasible measures)*

This control measure serves as a placeholder for any future control measures that may become feasible, prior to subsequent SIP revisions, through technology advances and/or cost decreases. The SCAQMD staff continually monitors evolving control technologies, price changes, and the actions of other air quality agencies to determine the feasibility of implementing additional controls to achieve emission reductions.

For example, almost all processes in the pulp and recycled paper mills (e.g., pulping machines, press and dryers to convert waste-paper –newspaper, cardboard, etc. – back into cardboard paper) are sources of fugitive VOC emissions, yet currently very high air flow of vent gases makes it impractical and not cost-effective to vent the exhaust gas to a control device. Similarly, breweries, wineries, distillers and other similar operations that store and process grains, ferment, age, store and package the spirits (beer, wine, whiskey, etc.,) and treat the wastewater on-site generate VOC and PM emissions.

Cost and cost-effectives for this control measure cannot be determined because there is currently no

known feasible control potentially available for fugitive VOC emissions generated by these type of sources. As a result, the cost analysis will be addressed during rule development, if rulemaking is determined to be necessary.

❖ *Local mobile source TBD control measures*

SCAQMD staff analyzed the need to accelerate the penetration of cleaner engine technologies and assist in implementing CARB's proposed mobile source strategy. Specifically, there are several measures under the proposed State SIP Strategy that are titled "Further Deployment of Cleaner Technologies" (see Revised Draft 2016 AQMP Appendix IV-B), which identify SCAQMD as an implementing agency along with CARB and U.S. EPA. CARB indicated that the implementation of the "Further Deployment" measures is based on a combination of incentive funding, development of regulations, and quantification of emission reduction benefits from operational efficiency actions and deployment of autonomous vehicles, connected vehicles, and intelligent transportation systems. As such, the proposed SCAQMD mobile source measures will facilitate local implementation of the State SIP control strategy's further deployment of advanced technology measures proposed by CARB. The SCAQMD measures propose a process to also identify voluntary actions that could potentially result in additional NOx emission reductions beyond the state's emission reduction commitments. Since these actions are not specifically identified at this time and will be voluntary in nature, staff does not presume that the affected industries and businesses would voluntarily incur any costs above what has been quantified for CARB's "Further Deployment" measures.

Part II – Incremental Costs of the of the State's SIP Control Strategies

To arrive at the cost of the Mobile Source Strategy, CARB has estimated the incremental costs of zero and near-zero emission technologies compared to their conventional counterparts. These incremental costs include capital, fueling infrastructure, and annual operation and maintenance costs associated with each mobile source type. These cost differentials are used to calculate the costs over a vehicle or equipment population generated by the Vision model.

CARB proposed four categories of mobile source measures: On-road light-duty, On-road heavy-duty, Off-Road Federal and International, and Off-Road Equipment.

Vision Model

CARB staff used the Vision model, version 2.1, to estimate the emission reductions as outlined in the State Mobile Source Strategy. Vision 2.1 is an estimation tool that can analyze multiple potential technology and fuel pathways for individual emission sources while collectively considering multiple sectors, fuels, and technologies in comprehensive scenarios to study different pathways to meeting California's air quality and climate goals (CARB 2015). Vision 2.1 incorporates updated CARB inventory work including EMFAC2014, and reflects currently adopted policies.[60] In addition, Vision 2.1 scenarios illustrate the type of technology transformation that would be required to meet the kinds of deadlines and goals that California faces. In this model, a typical user can define penetration rates and technology availability and receive outputs such as greenhouse gas emissions, criteria pollutant emissions, and energy mix.

[60] Mobile Source Emissions Inventory: http://www.arb.ca.gov/msei/categories.htm

Vision is used to estimate turnover such that the emissions profile of the future fleet of light-duty vehicles, heavy-duty vehicles, locomotives, ships, and off-road vehicles will achieve the goals outlined in the Mobile Source Strategy (for more details see CARB (2016b)).

For control measures where CARB staff has provided the change in the quantity of energy expected by measure, SCAQMD staff used the energy price projections for the Pacific region from U.S. Department of Energy, Energy Information Administration's Annual Energy Outlook 2015 (2015) to calculate costs or savings.

(a) On-Road Light-Duty

- *Advanced Clean Cars* 2

This proposed measure is designed to ensure that zero and near-zero emission technology options continue to be commercially available, with range improvements to address consumer preferences for greater ease of use, and maximize electric vehicle miles travelled (eVMT). The regulation may include lowering fleet emissions further beyond the super-ultra-low-emission vehicle standard for the entire light-duty fleet through at least the 2030 model year, and options for improving real world emissions through implementation programs. Additionally, new standards would be considered to further increase the sales of zero-emission vehicles (ZEVs) and plug-in hybrid electric vehicles (PHEVs) beyond the levels required in 2025. The Advanced Clean Cars 2 program is expected to result in price increases (mainly borne by consumers) for new vehicles, while also leading to reduced operating and fuel costs (electricity and hydrogen versus gasoline).

Implementation period for cost analysis: 2026-2031

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit/Facility Cost ($)	Per Unit/Facility Incentive Amount ($)	Number of Units	Years of Equipment Life
BEV(Battery) Electric Vehicles	Consumers	$11,237	$0	176,200	14
PHEV(Plug-in-Hybrid Electric Vehicles)	Consumers	$10,676	$0	392,100	14
FCEV(Fuel Cell/Battery Electric Vehicles)	Consumers	$8,788	$0	116,600	14

Additional annual operating savings of $126 was assumed for each of the affected vehicles. Moreover, the additional savings from fuel/energy demand is presented in table below in millions of 2015 dollars:

Years	Gasoline (Billions of Gallons)	Price of Gasoline ($/ Gallon)	Diesel (Billions of Gallons)	Price of Diesel ($/Gallon)	Quantity of Electricity (MWhs)	Electricity Price ($/ MWh)	Quantity of Hydrogen (kg)	Price of Hydrogen ($/ kg)
2026	-0.022	$3.29	-0.0002	$3.54	77,000	$137.9	1250,000	$6.00
2027	-0.041	$3.34	-0.0003	$3.59	139,000	$138.0	2410,000	$6.00
2028	-0.057	$3.41	-0.0004	$3.67	189,000	$137.4	3190,000	$6.00
2029	-0.069	$3.47	-0.0005	$3.73	235,000	$136.8	3950,000	$6.00
2030	-0.079	$3.52	-0.0006	$3.78	267,000	$136.8	450,0000	$6.00
2031	-0.077	$3.58	-0.0005	$3.85	228,000	$136.7	3,900,000	$6.00

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Advanced Clean Cars 2	($2,648.0)	+	$0	=	($2,648.0)	($90.8)

(b) On-Road Heavy-Duty

❖ *Low-NOx Engine Standard-California Action*

This proposed measure is designed to require near-zero emission engine technologies that will substantially lower NOx emissions from on-road heavy-duty vehicles. CARB will begin development of a new heavy-duty low-NOx emission standard in California in 2017, with Governing Board action expected in 2019. A California-only low-NOx standard would apply to all vehicles with new heavy-duty engines sold in California starting in 2023. CARB will develop a heavy-duty low-NOx engine standard in California, and may petition U.S. EPA to establish new federal emission standards for heavy-duty engines. SCAQMD has already petitioned the U.S. EPA to establish a national new low-NOx standard.

Implementation period for cost analysis: 2023-2027

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit/Facility Cost ($)	Per Unit/Facility Incentive Amount ($) up to 20124	Number of Units 2026-2027	Years of Equipment Life
ZEVs/PHEVz	Truck Transportations (484)	$1,500	$0	140,600	10

No additional annual operating savings or fuel savings were assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Low NOx Engine Standard-California Action	$154.3	+	$0	=	$154.3	$11.7

❖ *Low-NOx Engine Standard-Federal Action*

The proposed measure includes a new-NOx standard that would be applied to all new heavy-duty engines sold nationwide starting in 2024 or later through a national standard. Conceptually, this measure would ensure that all heavy-duty vehicles traveling within California would eventually be equipped with an engine meeting the low-NOx standard. This proposed measure is necessary to achieve emission reductions from Class 7 and 8 vehicles as many are purchased outside of California. If U.S. EPA begins the regulatory development by 2017, CARB will coordinate its California feet rulemaking efforts with the federal regulation.

Implementation period for cost analysis: 2024-2031

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit/Facility Cost ($)	Per Unit/Facility Incentive Amount ($) up to 20124	Number of Units 2024-2031	Years of Equipment Life
ZEVs/PHEVz	Truck Transportations (484)	$1,500	$0	282,600	10

No additional annual operating savings or fuel savings were assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Low NOx Engine Standard-Federal Action	$281.9	+	$0	=	$281.9	$15.1

❖ *Advanced Clean Transit*

This measure is designed to continue the transition of transit fleets to cleaner technologies to support NOx and GHG emission reduction goals. The measure will consider a variety of approaches to enhance the deployment of advanced clean technology and increase the penetration of the first wave of zero-emission heavy-duty technology into transit applications that are well suited to its use. CARB staff will develop and propose an Advanced Clean Transit measure with a combination of incentives, and/or other methods that would result in transit fleets purchasing advanced technology buses during normal replacement and using renewable fuels when contracts are renewed. Based on currently available information including fuel price projections, the operating and maintenance costs and fuel savings for this measure are expected to more than offset the incremental cost of electric or CNG or fuel cell, and infrastructure buses. Transit bus fleets are well suited for introducing zero-emission buses and other advanced technologies because they operate in urban centers, have stop and go driving cycles, and are centrally maintained and fueled.

Implementation period for cost analysis: 2018-2031

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit/Facility Cost ($)	Per Unit/Facility Incentive Amount ($)	Number of Units by 2031	Years of Equipment Life
BEV(Battery) Electric Vehicles	Transit and Ground Transportation (485)	$89,445-$211,122	$89,445-$211,122	1,600	12
Low-NOx	Transit and Ground Transportation (485)	$50,000	$50,000	1,210	12
FCEV(Fuel Cell/Battery Electric Vehicles)	Transit and Ground Transportation (485)	$255,000-$605,000	$255,000-$605,000	270	12

Additional annual operating and costs/savings and additional infrastructure costs are presented in the tables below in millions of 2015 dollars:

Incremental Operating and Maintenance Costs/Savings	2018-2020	2021-2031
BEB (slow charge)	($18,000)	($18,000)
FCEB	$16,000	($7,000)

Infrastructure	Unit Cost	2018	2025
Slow charging (cost per bus)	$20,000		
H2 Station	$5,000,000	$15,000,000	$15,000,000

Additional change in energy and fuel demand are presented in the table below in millions of 2015 dollars:

Years	Gasoline (Billions of Gallons)	Diesel (Billions of Gallons)	Electricity (MWh)	Natural Gas (Bcf)	Hydrogen (kg)
2018	-0.00045	-0.00037	0.0083	-0.0225	0.00001
2019	-0.00056	-0.00016	0.0086	-0.0496	0.00002
2020	-0.00056	-0.00016	0.0087	-0.0498	0.00002
2021	-0.00056	-0.00015	0.0089	-0.0493	0.00003
2022	-0.00056	-0.00015	0.0092	-0.0493	0.00003
2023	-0.00053	-0.00014	0.0092	-0.0476	0.00003
2024	-0.00051	-0.00013	0.0091	-0.0454	0.00003
2025	-0.00076	-0.00019	0.0141	-0.0692	0.00004
2026	-0.00102	-0.00025	0.0188	-0.0945	0.00005
2027	-0.00129	-0.00031	0.0234	-0.1206	0.00007
2028	-0.00128	-0.0003	0.0229	-0.1195	0.00007
2029	-0.00125	-0.00029	0.0220	-0.1169	0.00006
2030	-0.0026	-0.0006	0.0452	-0.2453	0.00012
2031	-0.00267	-0.00049	0.0454	-0.3410	0.00002

Corresponding price forecast from the above energy categories are listed below.[61]

Years	Gasoline Price ($/ Gallon)	Diesel Price ($/Gallon)	Electricity Price ($/MWh)	Natural Gas Price ($/MMBtu)	Hydrogen Price ($/kg)
2018	$2.97	$3.39	$123.04	$9.86	$6.00
2019	$2.98	$3.44	$122.13	$10.28	$6.00
2020	$3.03	$3.50	$122.24	$10.71	$6.00
2021	$3.07	$3.56	$122.55	$11.01	$6.00
2022	$3.10	$3.63	$122.62	$11.18	$6.00
2023	$3.15	$3.70	$121.84	$11.35	$6.00
2024	$3.20	$3.76	$121.28	$11.44	$6.00
2025	$3.24	$3.82	$121.66	$11.69	$6.00
2026	$3.29	$3.89	$122.28	$11.91	$6.00
2027	$3.34	$3.95	$122.31	$11.92	$6.00
2028	$3.41	$4.03	$121.42	$11.81	$6.00
2029	$3.47	$4.10	$120.38	$11.79	$6.00
2030	$3.52	$4.15	$120.09	$11.82	$6.00
2031	$3.58	$4.23	$119.70	$11.92	$6.00

[61] U.S. DOE EIA (2015)

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Advanced Clean Transit	($521.5)	+	$312.2	=	($209.2)	($6.6)

❖ *Last Mile Delivery*

This measure is designed to increase the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. This proposed measure will require the use of low-NOx engines and the purchase of zero-emission trucks for certain Class 3-7 last mile delivery trucks in California starting in 2020, with a low fraction initially and gradually ramping up to a higher percentage of the fleet at time of normal replacement through 2030. This control measure would affect truck transportation and couriers and messengers.

Implementation period for cost analysis: 2020-2031

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit/Facility Cost ($)	Per Unit/Facility Incentive Amount ($)	Number of Units 2020-2031	Years of Equipment Life
BEV(Battery) Electric Vehicles	Truck Transportation (484)	$31,000	$0	9,800	10
Fuel Cell (FCET)	Couriers and Messengers (492)	$90,000	$0	1,100	10

Cost assumption for the infrastructure is presented below.

Truck Type/Infrastructure	Population	Incremental Capital Cost
FCEV Infrastructure	73	$2,000,000
BEV Infrastructure	980	$20,000

No additional annual operating savings or fuel savings were assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Last Mile Delivery	$411.5	+	$0	=	$411.5	$29.2

❖ *Further Deployment of Cleaner Technology On-Road Heavy-Duty Vehicles (SCAQMD Scenario)*

The control strategies targeting Light- and Medium-Heavy-Duty Trucks and Heavy-Heavy-Duty Trucks in Tables 4-20 (a) and 4-20 (b) of the Draft Final 2016 AQMP reflect incentive-based control programs to facilitate market penetration of near-zero technologies for diesel trucks with GVWR of 10,001 pounds and heavier. These control strategies represent an alternative emission control scenario for the mobile source sector with a focus on potentially achieving increased emission reductions from higher-emitting vehicles and pieces of equipment, resulting in a greater cost-effective use of funding. The purpose of the alternative scenario is to present a potentially more effective use of incentive funds compared to the use of these funds by CARB. The amount of incentive funding is assumed to be sufficient to cover the incremental capital cost of purchasing a cleaner vehicle versus a vehicle that the fleet would normally be expected to purchase considering applicable state and local rules. Table 4-20 (a) represents the 2023 attainment scenario, while Table 4-20 (b) represents the 2031 attainment scenario which is built upon the 2023 attainment scenario. The cost assumptions are consistent with the Draft Final 2016 AQMP Tables 4-20 (a) and 4-20 (b). Assumptions utilized for emissions benefit and cost estimation are detailed in the tables below.

Assumptions for Table 4-20 (a):

Source Categories	
Light and Medium Heavy-Duty Trucks	• Affected vehicle categories: - Light heavy-duty diesel trucks with a GVWR of 10,001 to 14,000 pounds - Medium heavy-duty diesel trucks with a GVWR of 14,001 to 33,000 pounds • Affected vehicle model years: the oldest through 2015 model year • Replacement vehicles are assumed to be zero or near zero emission (0.02 g/bhp-hr) • Average unit cost of replacement truck is assumed to be $90,000 per truck • No additional operational or maintenance costs are expected with this measure • Equipment life is expected to be 15 years • Average incentive funding is assumed to be $15,000 per truck
Heavy Heavy-Duty Trucks	• Affected vehicle categories: - Heavy heavy-duty diesel trucks with a GVWR of over 33,000 pounds • Affected vehicle model years: 1997 model year and newer (1997 through 2016 model years: replacement; 2017 to 2023 model years: new purchase) • Replacement / new purchase vehicles are assumed to be zero or near zero emission (0.02 g/bhp-hr) • Average unit cost of replacement/new purchase truck is assumed to be $160,000 per truck • No additional operational or maintenance costs are expected with this measure • Equipment life is expected to be 15 years • Average incentive funding is assumed to be $25,000 per truck

Assumptions for Table 4-20 (b):

Source Categories	
Light and Medium Heavy-Duty Trucks	• Affected vehicle categories: - Light heavy-duty diesel trucks with a GVWR of 10,001 to 14,000 pounds - Medium heavy-duty diesel trucks with a GVWR of 14,001 to 33,000 pounds • Affected vehicle model years: 2016 and 2017 model years • Replacement vehicles are assumed to be zero or near zero emission (0.02 g/bhp-hr) • Average unit cost of replacement truck is assumed to be $90,000 per truck • No additional operational or maintenance costs are expected with this measure • Equipment life is expected to be 15 years • Average incentive funding is assumed to be $35,000 per truck
Heavy Heavy-Duty Trucks	• Affected vehicle categories: - Heavy heavy-duty diesel trucks with a GVWR of over 33,000 pounds • Affected vehicle model years: 2024 through 2027 model year (new purchase) • New purchase vehicles are assumed to be zero or near zero emission (0.02 g/bhp-hr) • Average unit cost of new truck is assumed to be $160,000 per truck • No additional operational or maintenance costs are expected with this measure • Equipment life is expected to be 15 years • Average incentive funding is assumed to be $50,000 per truck

Implementation period for cost analysis: 2017-2031

Cost Assumptions:

Equipment Name	**Affected Industries (NAICS)**	**Per Unit/Facility Incremental Cost ($) (2023/2031)**	**Per Unit/Facility Incentive Amount ($)**	**Number of Units 2023/2031**	**Years of Equipment Life**
LHD/MHD Trucks	Truck Transportations (484)	$15,000/$35,000	$15,000	68,860/35,100	15
HHD Trucks	Truck Transportations (484)	$25,000/$50,000	$25,000	82,300/18,600	15

No annual operating savings or fuel savings were quantified for this control measure.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Further Deployment of Cleaner Technology for On-Road Heavy-Duty Vehicles	$0	+	$4191.5	=	$4,191.5	$269.8

❖ *Heavy Duty Fuel (Aggregate Fuel Changes)*

CARB has provided an overall aggregate of fuel and energy demand changes from all the on-road heavy duty control measures as listed below.

Implementation period for cost analysis: 2018-2031

Cost Assumptions:

Calendar Year	Gasoline Billion Gallons	DSL Billion Gallons	CNG (Bcf)	Electricity (MWh)	Hydrogen (Kg)
2018	N/A	-0.0007	N/A	N/A	N/A
2019	N/A	-0.0016	N/A	200	700
2020	-0.0001	-0.0035	-0.0014	5,400	17,900
2021	-0.0006	-0.0099	-0.033	11,600	38,600
2022	-0.0013	-0.0190	-0.068	27,600	91,800
2023	-0.0023	-0.0302	-0.054	48,700	162,100
2024	-0.003	-0.050	0.96	72,000	240,000
2025	-0.005	-0.075	2.33	98,100	326,800
2026	-0.006	-0.101	3.85	124,600	415,100
2027	-0.008	-0.127	5.28	150,500	501,300
2028	-0.009	-0.154	6.79	175,800	585,700
2029	-0.010	-0.183	8.34	200,600	668,400
2030	-0.012	-0.213	10.11	225,200	750,300
2031	-0.013	-0.245	12.08	248,800	828,900

Source: Vision 2.1 Model

The overall aggregate fuel cost increase or savings, including the total increase in cost of electricity and Fuel cell Hydrogen as well as other fuel savings are presented below.

Calendar Year	Gasoline (million $)	Diesel (million $)	CNG (million $)	Electricity (million $)	Hydrogen (million $)
2018	$0.00	($2.37)	$0.00	$0.00	$0.00
2019	$0.00	($3.10)	$0.00	$0.02	$0.00
2020	($0.30)	($6.65)	($0.02)	$0.64	$0.10
2021	($1.54)	($22.76)	($0.36)	$0.76	$0.12
2022	($2.17)	($33.08)	($0.40)	$1.96	$0.32
2023	($3.15)	($41.40)	$0.16	$2.57	$0.42
2024	($2.24)	($74.45)	$11.93	$2.83	$0.47
2025	($6.49)	($95.60)	$16.47	$3.18	$0.52
2026	($3.29)	($101.03)	$18.60	$3.24	$0.53
2027	($6.69)	($102.58)	$17.54	$3.17	$0.52
2028	($3.41)	($108.94)	$18.27	$3.07	$0.51
2029	($3.47)	($118.81)	$18.82	$2.99	$0.50
2030	($7.05)	($124.60)	$21.56	$2.95	$0.49
2031	($3.58)	($135.34)	$24.12	$2.82	$0.47

Source: Vision 2.1

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Heavy-Duty (aggregated fuel change)	($542.7)	+	$0.0	=	($542.7)	($55.5)

(c) Off-Road Federal & International

❖ *More Stringent National Locomotive Emission Standards*

This proposed measure is designed to reduce emissions from new and remanufactured locomotives. CARB would petition U.S. EPA for both new Tier 5 national locomotive emission standards for new locomotives and for more stringent national requirements for remanufactured locomotives. CARB staff estimates that the U.S. EPA could require manufacturers to implement the new locomotive emission regulations as early as 2023 for remanufactured locomotives, and 2025 for newly manufactured locomotives. A new federal standard could also facilitate development and deployment of zero-emission track mile locomotives and zero-emission locomotives by building incentives for those technologies into the regulatory structure. This analysis looks at the incremental costs and benefits above Tier 4 standards. Under this measure, CARB would petition U.S. EPA to begin the process of developing new Tier 5 locomotive emissions standards for newly manufactured locomotives, and more stringent national requirements for remanufactured locomotives for criteria pollutants, toxics, and GHG emissions by 2018.

It is assumed that the rail sector would bear the total capital cost for the purchases of locomotives with the compact SCR and Diesel Oxidation Catalyst (DOC) after-treatment system and on-board battery capabilities and for the construction of urea infrastructure required to transition to the Tier 5 standard. Additionally, the rail transportation industry would incur incremental costs related to the operating and maintenance, including those for urea consumption.

Implementation period for cost analysis: 2024-2031

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit/Facility Cost ($)	Per Unit/Facility Incentive Amount ($)	Number of Units 2017-2031	Years of Equipment Life
Tier 5	Rail Transportations (482)	$1,000,000	$0	4,680	15
Remanufacture		$250,000	$0	3,840	15

Annual operating costs/savings are presented below in millions of 2015 dollars:

Incremental Annual Operating and Maintenance Savings	
Tier 5	$60,000
Remanufacture	$21,600
Fuel Savings (Tier 5 only)	($135,000)

In addition, urea infrastructure for a one-time cost of $1,500,000 is assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
More Stringent National Locomotive Emission Standards	$308.2	+	$0	=	$308.2	$12.0

❖ *Tier 4 Vessel Standards*:

The goal of this measure is to reduce emissions from ocean going vessels. CARB would work with international partners and advocate for the International Maritime Organization to establish new Tier 4 NOx and PM standards, plus efficiency targets for existing vessels in Ship Energy Efficiency Management Plans for International Maritime Organization Action. The water transportation sector is expected to bear the costs of the transition to the Tier 4 technology. These costs include the incremental cost above the Tier 3 Exhaust Gas Recycling (EGR) to the Tier 4 SCR technology.

Implementation period for cost analysis: 2025-2031

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit/Facility Cost ($)	Per Unit/Facility Incentive Amount ($)	Number of Units 2015-2031	Years of Equipment Life
Tier 4 OGV	Water Transportations (483)	$467,000	$0	504	20

The additional annual cost of urea usage of is estimated to be $147,000 per each Tier 4 OGV.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Tier 4 Vessel Standards	$133.7	+	$0	=	$133.7	$3.9

❖ *At-Berth Regulation Amendments*

This measure is designed to further reduce emissions from ships auxiliary engines while at-berth. CARB would investigate expanding the current At-Berth Regulation to include smaller fleets and/or additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers) in the requirements for shore power. The proposed measure would increase costs for fleet operators and potentially for terminal operators. In addition, to the extent these costs are passed on to the businesses that own the goods shipped to and from California seaports, the added costs are expected to impact the cargo and business owners that purchase these goods.

Implementation period for cost analysis: 2022

Cost Assumptions:

Cost Incurred by Ports	Affected Industries (NAICS)	Per Unit/Facility Cost ($)	Per Unit/Facility Incentive Amount ($)	Number of Units 2018-2031	Years of Equipment Life
Aggregate Vessel Equipment (bulk, general cargo, tanker vessels)	Water Transportations (483)	$10,000,000	$0.0	11	20

No additional operating and maintenance costs were assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
At-Berth Regulation	$90.4	+	$0	=	$90.4	$5.2

❖ *Further Deployment of Cleaner Technology: Off-Road Federal and International Sources (SCAQMD Scenario)*

Off-road Federal Sources include aircraft, locomotives, and ocean going vessels (OGVs). The SCAQMD and CARB do not have authority to regulate these sources. As a result, the only control method available is an incentive program to encourage use of the lowest emission equipment available. The purpose of this measure is obtain emission reductions earlier than would otherwise occur by natural turnover of fleets through incentive programs.

The SCAQMD has a long history of successful implementation of incentive programs to fund the accelerated deployment of cleaner engines and after-treatment technologies in on-road heavy-duty vehicles and off-road mobile equipment. Such accelerated deployment not only results in early emission reductions, but also provides a signal for technology providers, engine and automobile manufacturers, academic researchers to develop and commercialize the cleanest combustion engines and zero-emission technologies. Major incentive programs administered by SCAQMD include:

- CARB Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program)
- CARB Proposition 1-B Air Quality Improvement Fund
- CARB Lower Emission School Bus Program
- U.S. EPA Diesel Emission Reduction Act (DERA) Program
- Old vehicle scrap programs (light duty vehicles)
- Lawn and garden equipment exchange programs.

Specific technologies were not evaluated in this analysis. Rather, an example of control strategies to address aircraft, locomotive, and OGV emission sources are presented. In its plan, CARB had determined an emission reduction goal of 40 tpd in 2023 and additional 8 tpd in 2031 from further deployment of cleaner technologies for all Federal and international sources. Specific NOx emission reduction targets for aircraft, locomotive, and OGV emission sources were based on SCAQMD staff's judgement as to the relative feasibility of achieving emission reductions considering the emission inventories, state of technology development, and regulatory requirements. An estimate of the cost of incentives needed to attain the target emission reductions was calculated using the Carl Moyer Program[62] methodologies as follows.

[62] Carl Moyer Program Guidelines, available at https://www.arb.ca.gov/msprog/moyer/guidelines/current.htm.

Cost of Reduction = Emission Reduction x Cost Effectiveness limit/Cost Recovery Factor
Where: NOx Emission Reduction target in tpy
Cost Effectiveness Limit = $30,000/ton NOx[63]
Cost Recovery Factor (annualized cost over program life)

The cost of the target emission reductions was then divided by the estimated cost per unit to determine the number of units affected by the measure.

Aircraft

This strategy is to encourage early use of the newest and lowest emission aircraft available by providing incentives to airlines that commit to operate aircraft built after 2010 at LAX. Commercial aircraft servicing the Southern California region range in age from essentially new to over 20 years old. The average age of aircraft using LAX has not been determined but the national commercial fleet is approximately 11 years old with the dominant airlines operating at LAX having fleets with average age up to 15 years old[64]. Aircraft engine standards were first adopted in 1992 and revised to reduce NOx emissions in 1998, 2004, and 2010. If the average aircraft is 11-15 years old, then the average emission level is equivalent to the CAEP/4 standard adopted in 1998. The CAEP/8 standard adopted in 2010 provides approximately 30% lower NOx emissions compared to the CAEP/4 standard. Further improvements resulting in additional emission reductions are anticipated in the near future. An 2016 emission reduction goal of at least 50% compared to CAEP/4 was established and has been demonstrated as achievable over a range of engine designs, but has not yet been adopted as a formal standard.[65]

Parameter	**2023**	**2031**
NOx Emission inventory:	16.0 tpd	17.0 tpd
Target Emission Reduction:	5.9 tpd	3.0 tpd
Aircraft useful life:	20 years	20 years
Incentive program life:	10 years	10 years
10 year CRF at 2% interest:	0.111	0.111
Incentive program cost effectiveness limit:	$30,000/ton	$30,000/ton
Cost of Emission Reduction:		
2023: (5.9 tpd x 365 dpy x $30,000/ton) / 0.111	$600,000,000	
2031: (3.0 tpd x 365 dpy x $30,000/ton) / 0.111	--	$289,500,000
Per aircraft incremental cost (engine/air frame improvements):	$1,500,000	$1,500,000
Number of aircraft (cost of reduction/incremental cost):	388	197
Operating and Maintenance Cost: (unquantified)	no change	no change

Locomotives

This strategy is to encourage early use of Tier 4 or cleaner freight locomotives by providing incentives to purchase and operate the locomotives in Southern California. Tier 4 locomotives are just now entering service. Locomotives have long useful lives and go through multiple overhaul cycles. As a result, locomotives operating in the Southern California region range in age and emission characteristics. On

[63] Proposed 2017 cost effectiveness limit
[64] From www.AirFleets.net
[65] N. Dickson, "Local Air Quality and ICAO Engine Emissions Standards," International Civil Aviation Organization Environmental Bureau, Workshop presentation, 2014, available at http://www.icao.int/Meetings/EnvironmentalWorkshops/Documents/2014-Kenya/4-1_LAQ-Technology_notes.pdf

average, the freight locomotive line-haul fleet is reported by ARB to have average emissions equal to Tier 2[66]. The emission reduction from Tier 2 to Tier 4 is approximately 75% per locomotive replaced.

Parameter	2023	2031
NOx Emission inventory:	22.9 tpd	3.6 tpd
Target Emission Reduction:	17.2 tpd	2.4 tpd
Locomotive useful life:	30 years	30 years
Incentive program life:	12 years	12 years
12 year CRF at 2%:	0.095	0.095
Incentive program cost effectiveness limit:	$30,000/ton	$30,000/ton
Cost of Emission Reduction:		
2023: (17.2 tpd x 365 dpy x $30,000/ton) / 0.095	$1,979,644,737	--
2031: (2.4 tpd x 365 dpy x $30,000/ton) / 0.095	--	$236,756,757
Incremental cost/locomotive (replace vs maintain old):	$3,500,000	$3,500,000
Number of locomotives (cost of reduction/incremental cost):	566	79
O&M Cost (3% increase in cost for fuel (non-SCR) or urea (SCR))		
100,000 gal/year x $4/gal x 3%	$12,000	$12,000
Incentive (equal to estimated incremental cost):	$3,500,000	$3,500,000

Ocean Going Vessels

Ocean Going Vessels (OGVs) visiting the Southern California ports range in age and emission characteristics. On average, the average vessel calling at the ports in 2013 was 10 years old (built in 2003) and was subject to Tier 1 emission standards.[67,68] Tier 3 NOx standards are approximately 80% lower than Tier 1 and became effective for vessels with keels laid in 2016. The first Tier 3 vessels will enter service in 2017. This measure is to incentivize the use of the cleanest available ships or propulsion engine retrofit technologies when calling at Southern California ports.

Parameter	2023	2031
NOx Emission inventory:	23.0 tpd	14.6 tpd
Target Emission Reduction:	17.3 tpd	3.0 tpd
Vessel useful life:	30 years	30 years
Incentive program life:	per visit	per visit
1 year CRF at 2%:	1.02	1.02
Incentive program cost effectiveness limit:	$30,000/ton	$30,000/ton
Cost of Emission Reduction:		
2023: (17.3 tpd x 365 dpy x $30,000/ton) / 1.02	$150,000,000	--
2031: (3.0 tpd x 365 dpy x $30,000/ton) / 1.02	--	32,500,000
Per visit incremental cost (technology cost):	$50,000	$50,000
Number of visits (cost of reduction/incremental cost):	3,714	644
Operating and Maintenance Cost (Unquantified):	no change	no change

[66] CARB website posting that 1998 MOU target had been met. Available at https://www.arb.ca.gov/railyard/1998agree/1998agree.htm

[67] Air Emissions Inventory – 2013, Port of Long Beach, June 2014

[68] Inventory of Air Emissions for Calendar Year 2013, Port of Los Angeles, July 2014.

Implementation period for cost analysis: 2017-2031

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit Capital Costs ($)	Per Unit/Facility Incentive Amount ($)	Number of Units 2017-2023 /2024-2031	Years of Equipment Life
Low Emission Air Craft	Air Transportation (481)	$1,500,000	$1,500,000	388/197	20
Low Emission Locomotives	Rail Transportations (482)	$3,500,000	$3,500,000	566/79	30
Low Emission OGV Credits*	Water Transportation (483)	N/A	$50,000	3,714/644	N/A

*Credits to docking fee for Tier 4 vessels

Additional operating and maintenance costs of $12,000 per Tier 4 freight locomotive for urea costs is included.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Further Deployment of Cleaner Technology: Off-Road Federal and International	$120.3	+	$3,707.0	=	$3,827.2	$221.0

(d) Off-Road Equipment

❖ *Low-Emission Diesel Fuel Requirement*

This measure is designed to reduce emissions from the portion of the heavy-duty fleet that will continue to operate on internal combustion engines. This measure would put into place standards for Low-Emission Diesel, and would require that diesel fuel providers sell steadily increasing volumes of Low-Emission Diesel until it comprises 50 percent of total diesel sales by 2031.

Additional cost of Low-Emission Diesel was distributed evenly among sectors of Rail Yards (NAICS 483) and Water Transportations (NAICS 488).

Implementation period for cost analysis: 2023-2031

Cost Assumptions:

Years	Costs in Millions
2023	$76.8
2024	$107.1
2025	$131.8
2026	$150.9
2027	$164.0
2028	$170.7
2029	$171.1
2030	$165.4
2031	$165.4

No additional operating and maintenance costs are assumed.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Low-Emission Diesel Requirement (All Off-Road)	$867.7	+	$0	=	$867.7	$86.9

❖ Zero-Emission Off-Road Forklift Regulation Phase I

This measure is designed to increase the penetration of ZEVs in off-road applications, advance ZEV commercialization, and to send a market signal to technology manufacturers and investors. CARB staff would develop and propose a regulation with specific focus on forklifts with lift capacities equal to or less than 8,000 pounds for which zero-emission technologies have already gained appreciable customer acceptance and market penetration.

Implementation period for cost analysis: 2023-2030

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit capital Costs ($)	Per Unit/Facility Incentive Amount ($)	Number of Units	Years of Equipment Life
ZEVs Forklift	Truck Transportations (484), Water Transportations (488), Production Cost - Fruit and Vegetable Preserving and Specialty Food Manufacturing (311), Wholesale (423)	$12,700	$0	3,670	10

Additional electricity cost/fuel and maintenance savings are listed below.

Incremental Annual Operating and Maintenance Costs, per unit	
Electricity	$1,253
Fuel (savings)	$(7,495)
Maintenance (Savings)	$(1,560)

Additional savings are expected to offset the incremental capital cost, resulting in an overall savings for this control measure.

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Zero-Emission Off-Road Forklift Regulation	($134.8)	+	$0	=	($134.8)	($8.5)

❖ *Zero-Emission Airport Ground Support Equipment*

This measure is designed to increase the penetration of the first wave of zero-emission heavy-duty technology in applications that are well suited to its use, and to facilitate further technology development and infrastructure expansion. CARB would develop and propose a regulation to accelerate the transition of diesel and large spark ignition airport ground support equipment to zero-emission technology. Additional costs are assumed to be incurred evenly by the air transportation and scenic and sightseeing transportation and support activities industries, respectively.

Implementation period for cost analysis: 2023-2031

Cost Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit capital Costs ($)	Per Unit/Facility Incentive Amount ($)	Number of Units	Years of Equipment Life
Zero-emission GSE Equipment	Scenic And Sightseeing Transportation And Support Activities (488), Air Transportation (481)	$7,733	$0	320	10
Electrical Infrastructure		$800	$0	320	10
Battery Replacement (every 5 years)		$7,773	$0	320	10
Engine Replacement, savings (every 5 years)		$(6,950)	$0	320	10

Additional electricity cost/fuel and maintenance savings are listed below.

Incremental Annual Operating and Maintenance Costs, per unit	
Electricity	$1,238
Fuel (savings)	$(7,409)
Annual Parts savings	$(1,538)
Maintenance (Savings)	$(1,330)

Additional savings are expected to offset the incremental capital cost, resulting in an overall savings for this control measure.[69]

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Zero-Emission Ground Support Equipment	$3.3	+	$0	=	$3.3	$0.2

❖ *Small Off-Road Engines*

This measure is designed to reduce emissions from Small Off-Road Engines (SORE), and to increase the penetration of zero-emission technology. SORE that are subject to CARB regulations are used in residential and commercial lawn and garden equipment, and other utility applications. CARB will develop and propose tighter exhaust and evaporative emission standards, encourage increased use of zero-emission equipment, and enhance enforcement of current emission standards for SORE.

[69] Fuel and O&M savings for this measure have not yet been incorporated in the calculation of PWV. They will be included in the Draft report.

Implementation period for cost analysis: 2023-2031

Costs Assumptions:

Equipment Name	Affected Industries (NAICS)	Per Unit/Facility Cost ($)	Per Unit/Facility Incentive Amount ($)	Number of Units	Years of Equipment Life
Lawn movers (incremental)	Consumers	$74	$0	24,276	10
String Trimmers (incremental)	Consumers	$41	$0	24,276	10
Exhaust emission controls 80-225 cc (incremental)	Consumers	$28	$0	24,276	10
Exhaust emission controls 225 cc+ (incremental)	Consumers	$97	$0	24,276	10

Additional electricity costs and fuel savings per unit are presented below.[70]

Incremental Annual Operating and Maintenance Costs, per unit	
Electricity	$2
Fuel (savings)	$24

The incremental cost is presented below, all in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Small Off-Road Engines	$20.4	+	$0	=	$20.4	$2.1

❖ *Further Deployment of Cleaner Technologies: Off-Road Equipment (SCAQMD Scenario)*

These off-road sources include mobile construction, industrial, portable, lawn and garden, and TRU equipment and are represented in CARB's expected emission reductions in the Basin by Further deployment of Cleaner Technologies beyond those achieved by existing and proposed regulations. New engine standards are established by U.S. EPA and CARB. In addition, CARB has established in-use fleet rules for many of these categories. Incentives are used to encourage replacement of these equipment sooner or using cleaner equipment than is required to comply with the fleet rules.

The SCAQMD has a long history of successful implementation of incentive programs to fund the accelerated deployment of cleaner engines and after-treatment technologies in on-road heavy-duty vehicles and off-road mobile equipment. Such accelerated deployment not only results in early emission reductions, but also provides a signal for technology providers, engine and automobile manufacturers,

[70] Cost estimates from CARB staff (Mallory.Albright@arb.ca.gov)

academic researchers to develop and commercialize the cleanest combustion engines and zero-emission technologies. Major incentive programs administered by SCAQMD include:

- CARB Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program)
- CARB Proposition 1-B Air Quality Improvement Fund
- CARB Lower Emission School Bus Program
- U.S. EPA Diesel Emission Reduction Act (DERA) Program
- Old vehicle scrap programs (light duty vehicles)
- Lawn and garden equipment exchange programs.

The 2023 and 2031 emission inventories were consulted to determine the largest contributors. Four strategies for obtaining emission reductions equivalent to the Off-Road were evaluated as described in the following pages. CARB emission models[71] were used to predict the NOx emission inventory and number of equipment in future years by Tier, fuel type, and HP categories. The emission reduction and number of equipment needed to be replaced with cleaner technology was determined from the inventories by assuming the oldest equipment and highest NOx emission equipment was replaced first.

Off-Road Diesel Construction Equipment Replacement

Off-road diesel construction equipment is subject to turn-over requirements according to CARB's In-Use Off-Road Diesel-Fueled Equipment Regulation[72]. The regulation requires fleet turnover (replacement, repower, or retirement) to meet a gradually decreasing fleet average emission target. This strategy is to encourage early use of Tier 4 or cleaner off-road equipment by providing incentives to fleets that commit to purchase and operate the cleaner equipment to replace all Tier 0, Tier 1, and Tier 2 equipment by 2023 and all Tier 3 and Tier 4 Interim equipment with Tier 4 Final equipment and 15% of Tier 4 Final equipment with zero emission equipment by 2031.

Parameter	2023	2031
NOx Emission inventory:	17.8 tpd	10.4 tpd
Target Emission Reduction:	9.6 tpd	2.3 tpd
Equipment useful life:	20 years	20 years
Number of Equipment:	10,100	15,100
Average Unit Cost ($444,521)[73]	$450,000	$450,000
Average Incremental cost[74]:	$155,000	$150,000
Operating and Maintenance Cost (Urea = 3% of fuel usage)[75]:	$682	$682
Incentive (equal to estimated incremental cost):	$155,000	$150,000

[71] Off-road equipment inventory models available at https://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles

[72] https://www.arb.ca.gov/msprog/ordiesel/reglanguage.htm

[73] Average unit costs from 2014/2015 SOON and 2014 Carl Moyer programs

[74] Incremental unit costs from 2014/2015 SOON and 2014 Carl Moyer programs from amounts actually paid based on cost effectiveness criteria

[75] Urea for SCR systems = 3% x 6,500 gallons fuel/year x $3.50/gal = $682/year

Industrial, Commercial (Portable), TRU, GSE

Off-road diesel-fueled mobile industrial and ground support equipment (GSE) is also subject to the turn-over requirements according to CARB's In-Use Off-Road Diesel-Fueled Equipment Regulation. Transportation Refrigeration Units (TRUs) are subject to the TRU Air Toxics Control Measure[76] which uses an equipment replacement schedule based on original equipment model year. Certain industrial equipment powered by spark ignition engines are subject to CARB's Large Spark-Ignition (LSI) Engine Requirements Regulation[77] which requires equipment turn-over to meet fleet average emission targets. Under these various fleet rules, most equipment already meets the most stringent requirements. This strategy is to incentivize fleets to replace all Tier 0 through Tier 4 Interim and 45% of Tier 4 Final diesel fueled equipment with zero emission equipment by 2023; and replace 42% of remaining Tier 4 Final equipment with zero emission equipment by 2031.

Parameter	2023	2031
NOx Emission inventory:	16.3 tpd	8.4 tpd
Target Emission Reduction:	9.7 tpd	2.7 tpd
Equipment useful life:	15 years	15 years
Number of Equipment:	90,000	42,000
Average Unit Cost[78]:	$130,000	$130,000
Average Incremental cost[79]:	$25,000	$25,000
O&M Cost (Savings)[80]:	($1,000)	($1,000)
Incentive (equal to estimated incremental cost):	$25,000	$25,000

Commercial Small Off-Road Engines (SORE)

The small off-road engine (SORE) category consists of off-road spark-ignition engines that produce 19 kilowatts gross power or less (less than 25 horsepower), including lawn and garden, industrial, logging, airport ground support, and commercial utility equipment, golf carts, and specialty vehicles. CARB's SORE category does not include compression-ignition engines, watercraft, or recreational vehicles. However, for the purpose of this analysis, remaining compression-ignition lawn and garden equipment are included in the inventory and target emission reduction. SORE engines are subject to new engine standards but there are no in-use fleet regulations. This strategy is to incentivize equipment owners to replace all diesel fueled equipment and all spark ignition commercial mowers and tractors between 2 and 50hp (270,000 units) with zero emission equipment by 2023; and replace 36,000 remaining spark-ignition engines with zero emission equipment by 2031.

[76] https://www.arb.ca.gov/diesel/tru/tru.htm

[77] https://www.arb.ca.gov/msprog/offroad/orspark/lsireglang.htm

[78] Average unit costs based on limited on-line search of lift trucks comparing similar capacity diesel and electric trucks

[79] Incremental costs based on limited on-line search of lift trucks comparing similar capacity diesel and electric trucks

[80] O&M Savings based on 80% of fuel cost representing reduced fuel cost less electric power charge – 1,080 gal/yr x $3.50/gal x 80% = $3,024/year

Parameter	2023	2031
NOx Emission inventory:	8.9 tpd	5.5 tpd
Target Emission Reduction:	3.1 tpd	0.3 tpd
Equipment useful life:	7 years	7 years
Number of Equipment:	270,000	36,000
Average Unit Cost[81]:	$2,000	$2,000
Average Incremental cost[82]:	$500	$500
O&M Cost (Savings)[83]:	($840)	($840)
Incentive (equal to estimated incremental cost):	$500	$500

Locomotives

Locomotives are regulated by EPA. However, a number of passenger locomotives operating in Southern California are old and replacing them with new Tier 4 locomotives or repowering them with Tier 4 engines would reduce NOx emissions at least 75% per locomotive (difference between Tier 2 and Tier 4). This strategy will incentivize railroads owners to replace or repower older 12 passenger locomotives with Tier 4 locomotives or engines by 2023.

Parameter	2023
NOx Emission inventory:	4.5 tpd
Target Emission Reduction:	2.0 tpd
Equipment useful life:	30 years
Number of Equipment:	12
Average Unit Cost[84]:	$6,300,000
Average Incremental cost[85]:	$2,000,000
Operating and Maintenance Cost[86]:	$10,500
Incentive (equal to estimated incremental cost):	$2,000,000

[81] Average unit costs based on limited on-line search of 10 hp equipment versus electric equipment.

[82] Incremental costs based on limited on-line search of 10 hp equipment versus electric equipment

[83] O&M Savings based on 80% of fuel cost representing reduced fuel cost less electric power charge – 300 gal/yr x $3.50/gal x 80% = $840/year

[84] Average unit costs based on prior Moyer funded project for Metrolink

[85] Incremental costs based on prior Moyer funded project for Metrolink

[86] O&M cost based on SCR urea costs if equipped with SCR or fuel penalty if based on high rate EGR: 100,000 gal/yr x $3.50/gal x 3% = $10,500/year

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Further Deployment of Cleaner Technology: Off-Road Equipment	$(2,453.2)	+	$4,435.5	=	$1,982.2	($18.8)

❖ *Consumer Products*

The proposed Consumer Products measure includes a wide variety of consumable goods including deodorants, hair spray, cleaning products and other products. The cost assumptions are based on CARB estimates[87]. The cost associated with this measure is estimated at $3.61 per pound of VOC reduced[88]. It is also assumed that half of the estimated 10 tpd of VOC emission reductions for the state in 2031 would occur in the Basin. Staff further assumed that 5 tpd of VOC emission reductions from the baseline inventory would occur annually from 2024 to 2031, after implementation begins in 2020 and becomes fully implemented by the end of 2023.

Implementation period for cost analysis: 2023-2031

The incremental cost is presented below in millions of 2015 dollars:

Control Measure	Present Value of Remaining Incremental Cost		Present Value of Incentives		Present Worth Value of Total Incremental Cost	Amortized Annual Average (2017-2031)
Consumer Products Program	$70.1	+	$0	=	$70.1	$7.0

[87] CARB. 2016. "Proposed 2016 State Strategy for the State Implementation Plan. Appendix A: Economic Analysis." Sacramento, CA: California Air Resources Board (CARB).
[88] CARB. 2016. "Proposed 2016 State Strategy for the State Implementation Plan. Appendix A: Economic Analysis." Sacramento, CA: California Air Resources Board (CARB).

DRAFT FINAL SOCIOECONOMIC REPORT
APPENDIX 2-B

COST-EFFECTIVENESS METHODOLOGIES

JANUARY 2017

As part of the 2014 independent review of SCAQMD's past socioeconomic assessments (2014), the contracted reviewer, Abt Associates examined the cost-effectiveness analysis conducted in recent years. The report concluded that the Discount Cash Flow (DCF) method used by SCAQMD is an appropriate choice for regulatory development purposes; however, it is different from the Levelized Cash Flow (LCF) method used by most other agencies and organizations. As a result, the cost-effectiveness estimates produced by SCAQMD staff cannot be directly compared to those produced by other agencies. Abt thus recommends SCAQMD continue using DCF, and at the same time, conduct a separate analysis using LCF, which could be included in an appendix or juxtaposed with DCF results.

This appendix updates SCAQMD's existing documentation regarding cost-effectiveness methodologies. It begins with a review of SCAQMD's past and current practice regarding cost-effectiveness analysis. The review is followed by a description of the two methods in question: DCF and LCF. Next, the two cost-effectiveness methodologies are compared in relation to SCAQMD's rule development process. Ensuing is a discussion on the sensitivity of cost-effectiveness to key parameters. The final section concludes with staff's recommendations for future practice.

SCAQMD's Cost-Effectiveness Analysis: Past and Current Practice

Historical Overview

The SCAQMD had previously used the LCF method for the assessment of control measures in the Air Quality Management Plan (AQMP); however, a decision was made in 1987 to switch to the DCF method for two reasons: first, it was then used extensively in major Fortune 500 companies; second, it was more versatile than the LCF method (SCAQMD 1989). In 1995, SCAQMD began to use DCF in determining compliance of the best available control technology (BACT) for minor sources. DCF has become the cost-effectiveness methodology for rulemaking since 1996.

Furthermore, in 1998, the California Air Pollution Control Officer's Association (CAPCOA) Board approved *Incremental Cost-Effectiveness Calculation Procedures for Rule Adoption* that recognized the importance of using a single cost-effectiveness assessment methodology to maintain consistency when comparing different projects. This guidance document was a collaborative effort among all the air pollution districts in California. Both the Western States Petroleum Association and the California Council for Environmental and Economic Balance participated in the process. 1998 was also the year when the Carl Moyer program began to operate. It is the only program in SCAQMD that uses the LCF method to calculate cost-effectiveness with an annually updated discount rate (instead of using a four-percent discount rate). This exception is due to the requirement to follow the statewide *Carl Moyer Program Guidelines*. And it affects mobile sources of air pollution only. Figure 2B-1 summarizes the historical timeline of how SCAQMD's cost-effectiveness analysis has evolved.

FIGURE 2B-1: HISTORICAL TIMELINE OF SCAQMD'S COST-EFFECTIVENESS (CE) ANALYSIS

Prior to 1987	Used LCF for AQMPs
1987	Switched to DCF Began using four percent real interest rate as the discount rate
1995	Began using DCF to determine BACT's maximum CE for minor sources
1996	Began using DCF for rulemaking
1998	CAPCOA guideline approved: Use single CE methodology to maintain consistency
	Carl Moyer program began: the only program in SCAQMD that uses LCF with annually updated discount rate (following the statewide Carl Moyer Program Guidelines)

Current Practice

The SCAQMD routinely conducts cost-effective analyses regarding proposed rules and regulations that result in the reduction of criteria pollutants (NOx, SOx, VOC, PM, and CO). The analysis is used as a measure of *relative effectiveness* of a proposal. It is generally used to compare and rank rules, control measures, or alternative means of emissions control relating to the cost of purchasing, installing, and operating control equipment in order to achieve the projected emission reductions. The major inputs in a cost-effectiveness analysis include capital and installation costs, operating and maintenance costs, emission reductions, and the key parameters are discount rate and equipment life.

In conducting its analysis of the costs of purchasing, installing, and operating emissions control equipment, staff utilizes, to the extent feasible, data and information provided by equipment manufacturers and also uses actual installation data, where available. In order to derive the control costs by which to examine cost-effectiveness, staff utilizes the capital and annual costs associated with implementing emission reductions. Typically, staff relies on the guidance provided in the Cost Control Manual developed by U.S. EPA's Office of Air Quality and Planning Standards (OAQPS) (U.S. EPA 2002). The EPA developed the factors used in the Cost Control Manual from vendor quotes. This guidance provides a means by which to estimate direct and indirect capital and annual costs as a ratio of the equipment costs. Indirect costs include other associated costs into the analysis, such as the cost of overhead, property taxes, insurance, shipping, and labor. These costs are all included in the cost-effectiveness equations and can generally be broken out as follows:

- Capital investment, which is usually a one-time cost that's incurred at the beginning of rule implementation. It can be further broken down into total equipment cost, including cost of control device, ancillary equipment, and taxes and freight; the retrofit factor includes installation, and indirect costs including engineering, field expenses, start-up, performance tests, and contingencies;
- Operating and maintenance (O&M) cost, which is a recurring expenditure that's incurred annually. It includes materials, utilities, labor, maintenance, overhead and administration, taxes and insurance.

For the majority of SCAQMD regulations, emission reductions are considered as constant over the lifetime

of control equipment. It is regarded as a reasonable assumption whether a rule may necessitate the installation of a single piece of control equipment or the simultaneous installation of several pieces of control equipment. However, when the compliance of a regulation is designed to phase in over a number of years, the emissions reduced can increase over this phase-in period and then level off after rule compliance is fully achieved. Therefore, non-constant emission reductions can occur for rules that specify various compliance dates for different types of control equipment or product categories.

As mentioned earlier, an important reason why SCAQMD switched from the LCF method to the DCF method back in 1987 was for the latter's versatility. More importantly for SCAQMD, the DCF method by design treats constant and non-constant emission reductions unambiguously in the same way. Below, we will discuss the cost-effectiveness methodologies in greater detail.

Cost-Effectiveness Methodologies

The SCAQMD's first documented discussion of cost-effectiveness methodologies was dated back to the 1989 AQMP. The 2005 staff report for amendments to the Regional Clean Air Incentives Market (RECLAIM) also included an extensive discussion that compared DCF and LCF methods and the corresponding cost-effectiveness results. The discussion below expands on the existing documentation.

- *Discounted Cash Flow (DCF)*

The DCF method converts all costs, including the initial capital investments and the costs that are expected in the present and all future years of equipment life, to a present value. Conceptually, it is as if calculating the amount of funds that would be needed at the beginning of the initial year to finance the initial capital investments and also to set aside to pay off the annual costs as they occur in the future. The fund that's set aside is assumed to be invested and generates a rate of return at the discount rate chosen. The final cost-effectiveness measure is derived by dividing the present value of total costs by the total emissions reduced over the equipment life. Below is the equation used for calculating cost-effectiveness with DCF:

$$CE^{DCF} = \frac{C_0 + \sum_{n=1}^{N} \frac{C_n}{(1+r)^n}}{\sum_{n=1}^{N} E_n} \quad \left(or \ \frac{Present\ Value\ of\ Total\ Costs}{Unweighted\ Sum\ of\ Emission\ Reductions\ Over\ Equipment\ Life} \right) \quad (1)$$

with C_0 denoting the total of initial capital investments; C_n and E_n denoting the costs and emission reductions, respectively, that are anticipated in a future year *n*; *r* denoting the discount rate and *N* the equipment life. As evident in Equation (1), the DCF method aggregates emission reductions over the equipment lifetime regardless of the year when reductions occur. As a result, the DCF treats constant and non-constant emission reductions unambiguously in the same way.

When annual costs and emission reductions are constant, the equation above can be simplified into:

$$CE^{DCF'} = \frac{C_0 + C_n * PVF(r,N)}{E_n * N} \quad \left(or \ \frac{Initial\ Capital\ Investments + (Annual\ O\&M\ Costs \times PVF)}{Annual\ Emission\ Reductions \times Years\ of\ Equipment\ Life} \right) \quad (1')$$

where $PVF(r,N)$ denotes the Present Value Factor, which is a function of the discount rate (r) and equipment life (N).[1]

[1] $PVF(r,N) = \frac{(1+r)^N - 1}{r*(1+r)^{(N-1)}}$

➢ *Levelized Cash Flow (LCF)*

The LCF method annualizes the present value of total costs as if all costs, including the initial capital investments, would be paid off in the future with an equal annual installment over the equipment life (similar to mortgage amortization).[2] What's less clear, however, is how to deal with non-constant emission reductions when using the LCF method. As stated in the 2014 Abt report, the LCF method is designed to compare the annualized cost with the annual emission reduction that can be potentially achieved by a project; thus implicitly, emission reductions are constant when the LCF method is applied. In van Kooten et al. (2004), however, it is mentioned that there are three main approaches in the literature to account for carbon sequestration:

- Flow summation method, which corresponds to the DCF method described previously.
- Average storage method, which annualizes the present value of all costs (as with the LCF method) and then divides the amount by the mean annual carbon sequestrated.
- Levelization/discounting method, which is similar to the DCF method, but instead of using the unweighted sum of emission reduced, it discounts future carbon sequestration to reflect the preference for earlier emission reductions.[3]

In the following, we will consider that a generalized LCF method, which can handle non-constant emission reductions, corresponds to the average storage method in the carbon sequestration literature. That is, the annualized cost is divided by the average annual emission reduction to arrive at the final cost-effectiveness measure with LCF:[4]

$$CE^{LCF} = \frac{\left(C_0 + \sum_{n=1}^{N} \frac{C_n}{(1+r)^n}\right) * CRF(r,N)}{(\sum_{n=1}^{N} E_n)/N} \quad \left(or \ \frac{Annualized\ Present\ Value\ of\ Total\ Costs}{Average\ Annual\ Emission\ Reductions}\right) \qquad (2)$$

where $CRF(r,N)$ denotes the Capital Recovery Factor, which is used to convert the present value of total costs into annualized payments. It is a reciprocal of $PVF(r,N)$ and therefore also a function of the discount rate (*r*) and equipment life (*N*).[5]

When annual costs and emission reductions are constant, the cost conversion procedure is equivalent to annualizing the initial capital investments only and adding it to the constant annual cost anticipated in any future year. Since emission reductions are constant, the average annual emission reduced is the same in any future year:

$$CE^{LCF'} = \frac{C_0 * CRF(r,N) + C_n}{E_n} \quad \left(or \ \frac{(Initial\ Capital\ Investments \times CRF) + Annual\ O\&M\ Costs}{Annual\ Emission\ Reductions}\right) \qquad (2')$$

[2] The same cost conversion procedure was documented in the 1989 AQMP. It was specifically mentioned in the case of using the LCF method with non-constant annual costs.

[3] With constant emission reductions, the cost-effectiveness calculated using the levelization/discounting method coincides with that obtained with the average storage method.

[4] The formulation can also be rewritten as *(Undiscounted Sum of Annualized Costs ÷ Unweighted Sum of Emission Reductions over Equipment Life)*. When compared to Equation (1), it is clear that emission reductions are treated identically with both the DCF and the generalized LCF method. The only difference stems from cost-conversion.

[5] $CRF(r,N) = \frac{1}{PVF(r,N)} = \frac{r*(1+r)^{(N-1)}}{(1+r)^N - 1}$

This is the formula most often seen for the LCF method.[6]

Comparison between DCF and LCF

➢ Why is the cost-effectiveness value larger with LCF than with DCF?

It's like a mortgage: the lower the down payment, the higher the mortgage costs. The DCF method considers the value of all costs as if they all could be paid off *at present*, or at the time when initial capital investments are made, whereas the LCF method considers the same set of costs as if they all could only be paid off *in future years*. However, by comparing Equations (1) and (2) (or similarly (1') and (2') for the special case of constant emission reductions), it is straightforward to show that one can easily convert, cost-effectiveness computed using the DCF method into that using the LCF method as follows:

$$CE^{LCF} = [N * CRF(r, N)] * CE^{DCF} \qquad (4)$$

Note that this conversion formula stays the same with both constant and non-constant emission reductions. Moreover, the "wedge" between the two cost-effectiveness methods (i.e., $[N * CRF(r, N)]$) is independent of any monetary cost inputs or emission reduction estimates. It depends only on two parameters: equipment life (*N*) and discount rate (*r*). As illustrated in Figure 2B-2, this wedge grows larger with a higher discount rate or a longer equipment life.

To understand better the wedge between LCF and DCF, it is useful to consider the analogous practice of home financing. A typical home buyer usually makes a down payment at the time of purchase and pays off the mortgage over the lifetime of the home loan. The cost conversion made by DCF and LCF methods corresponds to two what-if scenarios respectively when purchasing a home. The cost conversion in DCF is similar to calculating how much the house would cost at the time of purchase if no mortgage is obtained. In comparison, LCF converts costs in a similar fashion as in the scenario when no down payments is made and the purchase is financed completely through a fixed-rate mortgage that needs to be paid off in subsequent years. The wedge between DCF and LCF methods is therefore analogous to the total mortgage payments that need to be made in the latter scenario: they grow larger with a higher interest rate and a greater mortgage length.

However, it should be emphasized that it would not be appropriate to state that the cost-effectiveness derived from the DCF method underestimates the true compliance costs per ton of emission reduced, or conversely, that the cost-effectiveness derived from the LCF method is an overestimation. DCF and LCF are simply two different approaches to convert the compliance costs anticipated at various points in time to the same time frame: DCF converts all costs to the present value while LCF annualizes all costs over the equipment life. The conversions are done irrespective of how the compliance costs are actually financed

[6] Some regulations proposed by the SCAQMD, typically for VOC reductions, may entail the reformulation of chemical products. In this case, a typical cost-effectiveness analysis uses a methodology that mirrors the LCF method with constant emission reductions. First, incremental cost per unit is approximated as the price difference between the existing products that have already met the proposed product standard and those that will need to undergo reformulation to comply with the new proposed standard. The overall incremental cost is then derived from multiplying the unit cost by the number of potentially affected units, which is approximated by the most recent annual sales volume of the existing products that have not met the proposed new standard. Next, emission reductions are measured by aggregating the amount of pollutant reduced across all affected units that were sold in the most recent year. Finally, the cost-effectiveness measure is obtained by dividing the annual incremental compliance costs by the annual emissions reduced.

by each affected facility. The difference in cost conversion between DCF and LCF means that the dollar costs of compliance alternatives are expressed at different time periods; therefore, the cost-effectiveness results, albeit both in dollar per ton, are not directly comparable to each other.

FIGURE 2B-2: WEDGE BETWEEN LCF AND DCF

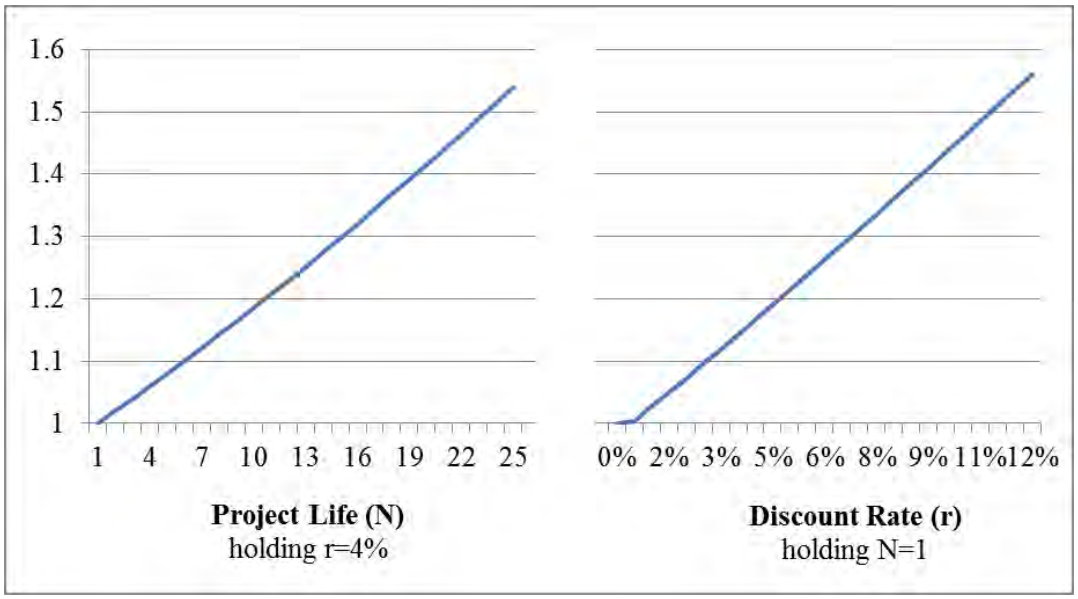


Table 2B-1 summarizes the main methodological differences between DCF and LCF in the case of a one-time capital investment cost made at the initial period and an annually recurring O&M cost, with constant annual emission reductions.

TABLE 2B-1: MAIN METHODOLOGICAL DIFFERENCES BETWEEN DCF AND LCF

Item	DCF	LCF
Time Horizon	Treats all costs (initial capital investments and annual O&M costs) as if they would be paid off *in the initial year*.	Treats the initial capital investment as if they could only be paid off *in future years*, along with the annual O&M costs.
Cost Conversion	Calculates the amount that would be needed to set aside at the initial year to fund the costs as they occur in the future. The fund that's set aside is assumed to be invested and generate a rate of return at the discount rate chosen.	Calculates the amount of annual payments in each future year as if the initial capital investment was entirely financed through a fixed-rate loan and would be paid for in equal annual installments (similar to a home mortgage). The borrowing interest rate is assumed to be the discount rate chosen.
Cost-Effectiveness	Divides the discounted total costs by the unweighted sum of emission reductions that are expected to occur over the equipment life.	Divides the annualized total costs by the amount of emissions reduced at any given year

- Can the ranking of alternatives change if LCF, instead of DCF, is used?

The short answer is no. Since the cost-effectiveness analysis is used to compare and rank rules, control measures, or alternative means of emissions control, it is of utmost importance to ascertain whether the ranking of alternatives could be different when a different cost-effectiveness method is chosen. In effect, this is never the case. Suppose there are two such alternatives A and B and that it's already known that alternative A is more cost-effective than alternative B using the DCF method:

$$CE_A^{DCF} < CE_B^{DCF}$$

It automatically implies that alternative A is also more cost-effective than alternative B using the LCF method:

$$CE_A^{LCF} = [N * CRF(r,N)] * CE_A^{DCF} \quad < \quad CE_B^{LCF} = [N * CRF(r,N)] * CE_B^{DCF}$$

This is because, to derive the cost-effectiveness values of both alternatives using the LCF method, we simply need to scale up the DCF results by the same factor, i.e., the wedge between LCF and DCF. Since this factor is always positive, the operation does not change the ordinal ranking of the alternatives.

- Will the BACT cost-effectiveness guidelines change when LCF is used instead of DCF?

The short answer is no. The minor source BACT cost-effectiveness guidelines use the DCF method to establish maximum cost-effectiveness criteria, below which a control method is considered cost-effective.[7] The criteria derived using the DCF method are not applicable to the cost-effectiveness results calculated using the LCF method; the criteria must first be converted to their LCF equivalent. As explained earlier, the difference between DCF and LCF in their cost conversion methods implies that the dollar costs of compliance alternatives are expressed in different time frames; thus, their cost-effectiveness results are not directly comparable with each other. (It's as if comparing the value of one US dollar to the value of one Australian dollar, we need to use the proper exchange rate to convert one currency to the other to have a meaningful comparison.)

The left panel of Table 2B-2 reports the current SCAQMD BACT cost-effectiveness guidelines for non-major polluting facilities, which were adopted in 1995 and inflation-adjusted to 2014 third quarter dollars. The maximum cost-effectiveness for each criteria pollutant was calculated using the DCF method, with a four-percent discount rate and a 10-year equipment life. The right panel then converted them to the LCF method, by multiplying all amounts in the left panel by a factor of 1.185 (=10*CRF(4%,10)). Again, notice that the conversion from DCF to LCF only involves two parameters: the equipment life and the discount rate that has already been assumed in the computation of cost-effectiveness using the DCF method.

[7] As mentioned earlier, the Carl Moyer program is an exception in that it uses the LCF method to calculate a project's cost-effectiveness, as required by the statewide program guidelines.

TABLE 2B-2: BACT MAXIMUM COST-EFFECTIVENESS CRITERIA FOR NON-MAJOR POLLUTING FACILITIES

	DCF			LCF	
Pollutant	Average (Maximum $ per Ton)	Incremental (Maximum $ per Ton)	Pollutant	Average (Maximum $ per Ton)	Incremental (Maximum $ per Ton)
ROG	28,600	85,800	ROG	33,905	101,715
NOx	27,000	81,000	NOx	32,008	96,025
SOx	14,300	42,900	SOx	16,953	50,858
PM10	6,400	19,000	PM10	7,587	22,524
CO	570	1,630	CO	676	1,932

Note: The cost criteria are based on those adopted by the SCAQMD Governing Board in the 2006 BACT Guidelines, adjusted for inflation to third quarter 2014 dollars using the Marshall and Swift Equipment Cost Index.

The left panel of Table 2B-3 replicates the cost-effectiveness of various types of burners that are reported in the 2008 staff report for PR 1147 – NOx Reductions from Miscellaneous Sources (SCAQMD 2008).[8] The right panel then converts the amounts to their LCF equivalent using a four-percent discount rate and a 10-year equipment life, as assumed for the DCF method used in the original staff report.[9] When compared against the BACT guidelines in Table 2B-2, none of the burners listed in Table 2B-3 exceed the maximum cost-effectiveness criteria, as long as the comparison is appropriately made using values derived with the same cost-effectiveness method. The reason for this consistency is the same as the ranking of alternatives, which as discussed above does not change when LCF is used in lieu of DCF.

TABLE 2B-3: BURNER COST-EFFECTIVENESS FOR RULE 1147

	DCF			LCF	
Burner Size (mmBtu/hr)	30 ppm ($ per ton of NOx)	60 ppm	Burner Size (mmBtu/hr)	30 ppm ($ per ton of NOx)	60 ppm
Less than 0.5	21,886	18,887	Less than 0.5	25,946	22,390
1	6,666	6,666	1	7,902	7,902
2.5	4,444	5,555	2.5	5,268	6,585
5	3,333	4,999	5	3,951	5,927
10	3,111	4,444	10	3,688	5,268
20	3,000	3,333	20	3,556	3,951

Note: The original cost-effectiveness were calculated using the 2008 dollar. All amounts in this table have been adjusted for inflation to third quarter 2014 dollars using the Marshall and Swift Equipment Cost Index.

[8] Adjusted for inflation to third quarter 2014 dollars.

[9] In the original cost-effectiveness analysis using the DCF method, no discount rate was explicitly used because it was assumed that there was only an initial capital investment cost. Moreover, in the 2011 amendments to Rule 1147, staff used equipment life different than ten years when demonstrating a few more specific examples of cost-effectiveness calculation. The 2008 staff report conducted a more aggregate level of analysis, and an equipment life of ten years was chosen to be on the conservative side.

Sensitivity to Key Parameters Chosen

The discussion so far concludes that the choice between DCF and LCF does not change the ranking of alternatives; moreover, a control method that is considered as cost-effective under the current BACT cost-effectiveness guidelines for minor sources will remain cost-effective when calculated with the LCF method. However, the cost-effectiveness analysis can be very sensitive to the key parameters chosen.

- Discount Rate

The cost-effectiveness analysis conducted by SCAQMD is based on the estimated compliance costs that are expected to be incurred privately by the affected facilities. According to the U.S. EPA's *2010 Guidelines for Preparing Economic Analyses* (2010, section 8.3.1.3), a discount rate that *reflects the industry's cost of capital* should be used. This discount rate is usually higher than that recommended by the Office of Management and Budget in its *Circular A-94 Appendix C* for cost-effectiveness analysis of Federal programs. One of the important reasons for this differential is due to the fact that private facilities generally need to pay an industry-specific risk premium in order to obtain capital. In U.S. EPA's *The Benefits and Costs of the Clean Air Act from 1990 to 2020* (2011), for example, the proprietary data—*Cost of Capital Yearbook* (by Ibbotson Associates)—was used to estimate the private discount rates for each affected industry.

To put it plainly, the most relevant discount rate to SCAQMD should be the real interest rate (i.e., borrowing interest rate net of inflation) at which the affected facilities can raise capital to pay for the compliance costs. In the perfect world, this rate should most ideally vary with individual facility, equipment life, and across time. In practice, however, SCAQMD staff has been using a real interest rate of four percent since 1987.[10] The 2014 Abt report recommended SCAQMD conduct sensitivity analysis using, for example, a higher and a lower discount rate.

To demonstrate the sensitivity of cost-effectiveness to the discount rate chosen, we will consider a hypothetical example, where there are two control methods A and B with the following profile:

Year	***0***	***1***	***2***	***…***	***15***	
	Compliance Costs ($)					**Constant Annual Emission Reductions (tons)**
	Initial Capital	**O&M**	**O&M**	**O&M**	**O&M**	
A	2,500	200	200	200	200	0.25
B	200	400	400	400	400	0.25

Figure 2B-3 below shows how cost-effectiveness varies with different discount rates, with the left panel using the DCF method and the right panel the LCF method. Given the same discount rate, it is again verified

[10] Although not formally documented, the discount rate is based on the 1987 real interest rate on 10-year Treasury Notes and Bonds, which was 3.8 percent. The maturity of 10 years was chosen because a typical control equipment life was 10 years; however, a longer equipment life would not have corresponded to a much higher rate-- the 1987 real interest rate on 30-year Treasury Notes and Bonds was 4.4 percent. Since 1987, the 4 percent discount rate has been used by SCAQMD staff for all cost-effectiveness calculations, including in BACT analysis, to maintain for the purpose of consistency.

that the cost-effectiveness ranking of alternatives has nothing to do with the choice between DCF and LCF; that is, if a control method is more cost-effective at a certain discount rate with the DCF method, it's still more cost-effective when calculated using the LCF method with the same discount rate.

More importantly, however, it is observed that the ranking of these two alternatives is very sensitive to the discount rate used. Specifically, at a discount rate of less than four percent, control method A is more cost-effective; however, when the discount rate reaches four percent or higher, control method B becomes preferable. This is because a larger share of the overall compliance costs for control method A occurs at the initial year, while for control method B, the majority of the compliance costs are spread out into the future. When the discount rate goes up, the costs that are expected to occur further into the future become relatively cheaper than the more imminent costs, thus favoring control method B. In a nutshell, a higher discount rate would generally favor the control methods with a relatively higher annual O&M cost than the initial capital cost because the present value of their total costs are decreased by a proportionally larger amount than the control methods with the opposite cost structure;[11] the converse is true for a lower discount rate.

FIGURE 2B-3: SENSITIVITY OF COST-EFFECTIVENESS RANKING TO DISCOUNT RATE

(Equipment life is taken to be 15 years)



➢ Equipment Life

The SCAQMD determines the equipment life used in its cost-effectiveness analysis through a category-by-category review during AQMP control or rule development, and with input from the stakeholders. When there is a range of estimated equipment life, SCAQMD staff usually chooses a representative value that lies on the conservative side. Despite this prudent practice, it is however true that cost-effectiveness can be very sensitive to the equipment life assumed for the analysis. To demonstrate, we will again consider

[11] Instead of thinking in terms of present value, we can also reason in terms of annualized costs: a higher discount rate would generally favor the control methods with a relatively higher annual O&M cost than the initial capital cost because the annualized value of their total costs are increased by a proportionally smaller amount than the control methods with the opposite cost structure. The major difference is that, in terms of present value, only the annual costs would be discounted; the higher the discount rate, the lower their present value is. In terms of annualized value however, only the initial capital investments are annualized into future years; the higher the discount rate, the higher the annual installment would become.

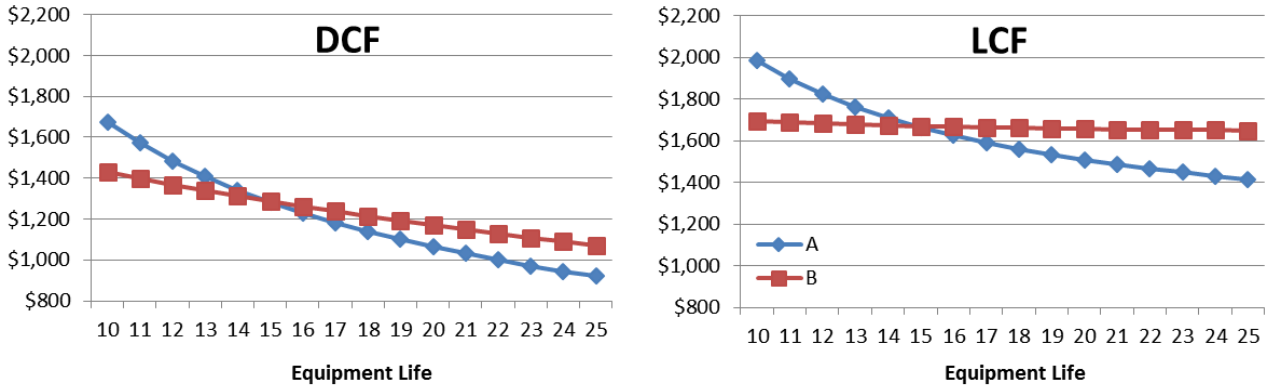
a hypothetical example that is similar to the one analyzed above:

Year	*0*	*1*	*2*	*…*	*N*	
	Compliance Costs ($)					**Constant Annual Emission Reductions (tons)**
	Initial Capital	**O&M**	**O&M**	**O&M**	**O&M**	
A	2,500	200	200	200	200	0.25
B	200	400	400	400	400	0.25

Figure 2B-4 below plots the cost-effectiveness of control methods A and B, assuming a four-percent discount rate and varying equipment life. Again, it is shown that the cost-effectiveness ranking of alternatives is consistent between DCF and LCF. However, the ranking of these two alternatives is very sensitive to the equipment life assumed. Specifically, when the equipment life is 15 years or shorter, control method B is more cost-effective, but if the equipment would be in operation for longer than 15 years, control method A becomes preferable. This is because, when the equipment life is longer, the annual O&M cost becomes a more important determinant of the total compliance costs than the initial capital investments. As a result, a longer equipment life lends more favor to the control methods with a lower annual O&M cost, and the opposite is true for a shorter equipment life.

FIGURE 2B-4: SENSITIVITY OF COST-EFFECTIVENESS RANKING TO EQUIPMENT LIFE

(Discount rate is assumed to be 4 percent)



Conclusion

The Cost-effectiveness analysis plays a critical role in SCAQMD's rule development process. It is used to compare and rank rules, control measures, or alternative means of emissions control relating to the cost of purchasing, installing, and operating control equipment in order to achieve the projected emission reductions. Regarding the cost-effective methodology, SCAQMD switched from LCF to DCF in 1987 and has been using the DCF method since then. It was first used in the 1989 AQMP, and later extended to help determine the maximum BACT cost-effectiveness values, and finally adopted for all rulemaking.

In its final recommendation report for SCAQMD's socioeconomic assessments, the independent reviewer Abt Associates suggested SCAQMD continue using DCF, but at the same time, conduct a separate analysis using LCF, which could be included in an appendix. By doing so, the cost-effectiveness of SCAQMD's control measures can then be directly compared with the cost-effectiveness of similar control measures proposed by other agencies that use the LCF method. Staff has carefully reviewed in this paper both cost-effectiveness methodologies and concludes that:

- The DCF method, by design, does not impose any constraint on a project's time profile of emission reductions. This makes it more versatile than the LCF method, which is conceptually designed to evaluate projects with constant emission reductions. As SCAQMD may elect to phase in regulation compliance to allow for reasonable time and flexibility for the regulated community to adapt to the new regulatory requirements, non-constant emission reductions can occur over the initial phase-in period. For this reason, the DCF method is preferred to the LCF method in order to maintain a conceptually consistent cost-effectiveness methodology.
- While maintaining the DCF method, staff also agrees with the 2014 Abt report's recommendation to juxtapose the LCF and DCF results so as to facilitate the comparison with similar control methods proposed by other agencies that use the LCF method. The LCF results can be obtained with the following DCF-LCF conversion formula:

$$CE^{LCF} = [Equipment\ Life * Capital\ Recovery\ Factor] * CE^{DCF}$$

The capital recovery factor is jointly determined by the discount rate (*r*) and equipment life (*N*) that are assumed in the cost-effectiveness computation using the DCF method:

$$CRF(r, N) = \frac{r * (1 + r)^{(N-1)}}{(1 + r)^N - 1}$$

The CRF value can also be obtained using the Excel function: PMT(r,N,-1, ,1).

Meanwhile, it is worth emphasizing that, although the cost-effectiveness values vary between DCF and LCF (mainly due to different cost conversion procedures), the cost-effectiveness ranking of alternatives does not change with the method used. If a control method is considered as cost-effective under the current BACT minor source guidelines, it will remain so when both the cost-effectiveness value and the BACT guidelines are converted to their LCF equivalent. (For clarity and consistency, the official BACT guidelines for minor sources will continue to be determined using the DCF method.)

However, as discussed in the 2014 Abt report, the cost-effectiveness analysis can be very sensitive to the key parameters chosen, namely the discount rate and the equipment life assumed for the analysis. This paper provides hypothetical examples to demonstrate this point, and it also offers a detailed discussion to explain the reasons behind this sensitivity. For future practice, staff recommends considering consideration of a sensitivity analyses on a case-by-case basis. A sensitivity analysis may be pursued if a reasonable deviation from either the assumed discount rate or the assumed equipment life can impact the cost-effectiveness ranking of a control method or change its cost-effectiveness designation under the BACT minor source guidelines.

DRAFT FINAL SOCIOECONOMIC REPORT
APPENDIX 3-A

WEIGHT OF EVIDENCE DESCRIPTIONS FOR CAUSAL DETERMINATION

JANUARY 2017

DETERMINATION	WEIGHT OF EVIDENCE
Causal Relationship	Evidence is sufficient to conclude that there is a causal relationship with relevant pollutant exposures. That is, the pollutant has been shown to result in health effects in studies in which chance, bias, and confounding could be ruled out with reasonable confidence. For example: (a) controlled human exposure studies that demonstrate consistent effects; or (b) observational studies that cannot be explained by plausible alternatives or are supported by other lines of evidence (e.g., animal studies or mode of action information). Evidence includes replicated and consistent high-quality studies by multiple investigators.
Likely To Be A Causal Relationship	Evidence is sufficient to conclude that a causal relationship is likely to exist with relevant pollutant exposures, but important uncertainties remain. That is, the pollutant has been shown to result in health effects in studies in which chance and bias can be ruled out with reasonable confidence but potential issues remain. For example: (a) observational studies show an association, but co-pollutant exposures are difficult to address and/or other lines of evidence (controlled human exposure, animal, or mode of action information) are limited or inconsistent; or (b) animal toxicological evidence from multiple studies from different laboratories that demonstrate effects, but limited or no human data are available. Evidence generally includes replicated and high-quality studies by multiple investigators.
Suggestive Of A Causal Relationship	Evidence is suggestive of a causal relationship with relevant pollutant exposures, but is limited because chance, bias, and confounding cannot be ruled out. For example, at least one high-quality epidemiologic study shows an association with a given health outcome but the results of other studies are inconsistent.
Inadequate To Infer A Causal Relationship	Evidence is inadequate to determine that a causal relationship exists with relevant pollutant exposures. The available studies are of insufficient quantity, quality, consistency or statistical power to permit a conclusion regarding the presence or absence of an effect.
Not Likely To Be A Causal Relationship	Evidence is suggestive of no causal relationship with relevant pollutant exposures. Several adequate studies, covering the full range of levels of exposure that human beings are known to encounter and considering susceptible populations, are mutually consistent in not showing an effect at any level of exposure.

(Adapted from U.S. EPA 2009)

DRAFT FINAL SOCIOECONOMIC REPORT
APPENDIX 3-B

QUANTIFICATION OF PUBLIC HEALTH BENEFITS

JANUARY 2017

Implementation of the Draft 2016 Air Quality Management Plan will result in improved air quality, including lower ozone and PM2.5 concentrations in the SCAQMD four-county region. Research in epidemiology and health economics has shown that reduced exposure to air pollutants reduces incidence of mortality and morbidity endpoints. The effect of these air quality improvements on the number of various health endpoints are quantified in these analyses, and valuation methods are used to monetize these quantified public health effects to arrive at the overall value of public health benefits. This appendix describes the methodology and data inputs used. More detailed results, including breakdowns by county and by each health endpoint evaluated, are provided as well.

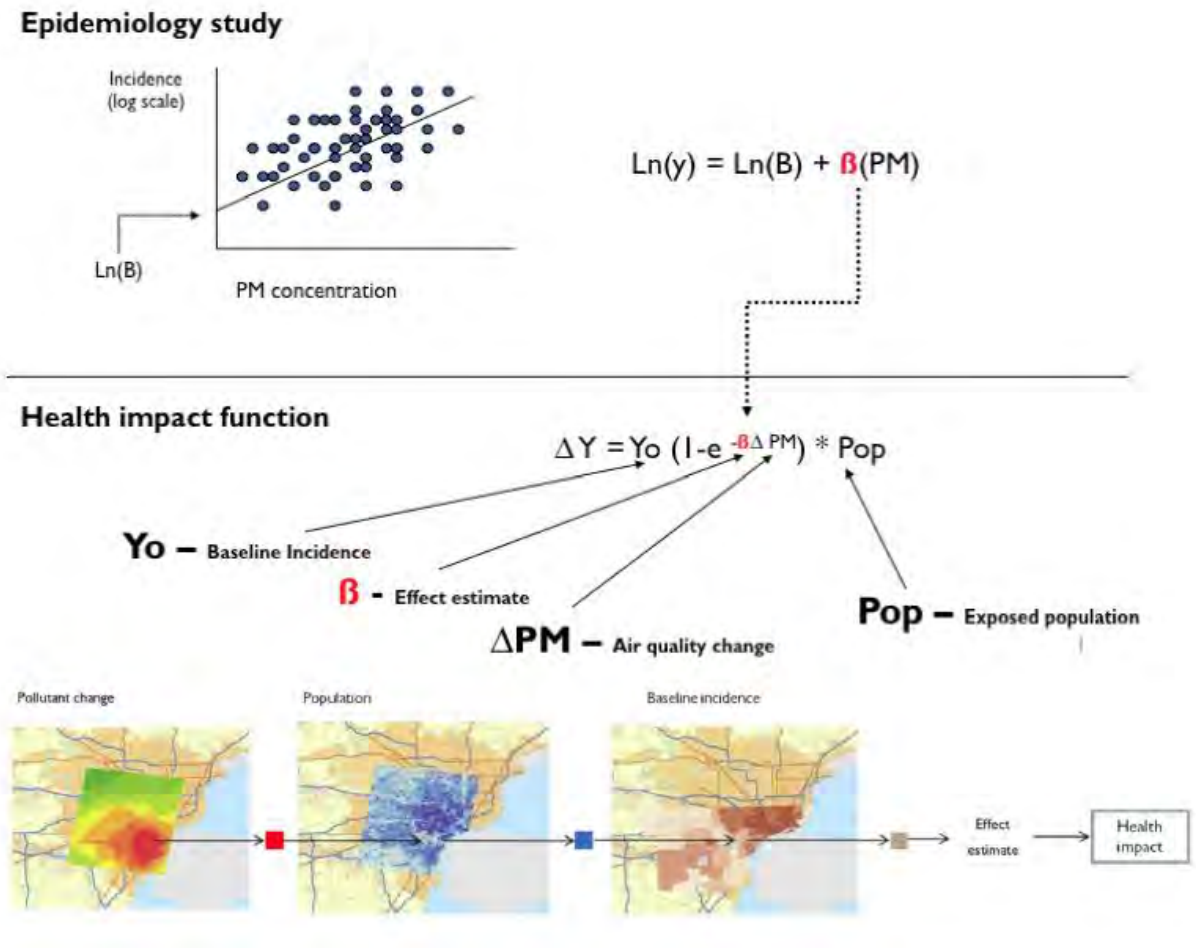
Methodology

The methodology employed to quantify public health benefits consists of several components. The first component is the health impact analysis (see Figure 3B-1). This analysis is based on the use of a health impact function to estimate the change in incidence of a particular endpoint. The variables in the analysis include: the change in air quality concentrations, baseline incidence, population exposed to the particular health risk, and an effect estimate. The effect estimate is derived from epidemiology studies, which use health and air quality data to estimate Concentration-Response (C-R) functions which relate the concentration of a particular pollutant to a mortality or morbidity endpoint. With all of these data taken together, the health impact function can be evaluated to estimate the health effect for a given geographic unit. In the case where there are multiple different C-R functions in epidemiology literature that need to be taken into account, a pooling method can be used. Pooling allows for a calculation of change in incidence of particular endpoint using multiple effect estimates from different epidemiology studies combined together. Once the health impacts have been estimated (pooled or un-pooled), a valuation function is applied, which places a monetary value on the change in incidence of a given endpoint which is either a scalar value or a distribution of values for a given type of incidence. The valuation function can also be pooled together to account for differences among valuation studies.

This methodology is implemented in the Environmental Benefits Mapping and Analysis Program - Community Edition (BenMAP-CE) application, which is used for this analysis. BenMAP-CE is a free and open-source application maintained by the U.S. EPA. Earlier editions of BenMAP were used to quantify the public health benefits of the 2007 and 2012 AQMPs, as well as for numerous other studies.[1]

[1] U.S. EPA lists examples of these studies at: https://www.epa.gov/benmap/benmap-ce-applications-articles-and-presentations

FIGURE 3B-1: HEALTH IMPACT METHODOLOGY



Source: BenMAP CE User's Manual 2015, U.S. EPA

Data

The first input into the health impact calculation is the projected changes in air quality for a particular pollutant, which are derived from the difference between the "baseline" and the "control" air quality scenarios, or the scenarios without and with the Draft Final 2016 AQMP respectively. The projected baseline and control air quality scenarios are the result of emission inventories (see Appendix III of the Draft Final 2016 AQMP) and air quality simulations based on these emission inventories and other variables (see Appendix V of the Draft Final 2016 AQMP). These air quality projections are produced at the level of a 4km x 4km grid for the Basin. The projections are hourly for each modeled year and consist of 365 days for PM2.5 and 153 days during the Summer Planning Season for ozone. These hourly data are converted into daily metrics of air quality changes for each pollutant (daily 8-hour max for ozone and daily 24-hour mean for PM2.5), then loaded into BenMAP for analysis. The average of the daily changes for each pollutant in milestone years 2023 and 2031 is illustrated in Figure 3B-2. As shown in panels (a) and (b), the control measures result in decreases in average ozone concentration levels throughout the region for both years, with the largest decreases located around the western portions of San Bernardino and Riverside Counties. Panels (c) and (d) illustrate the

changes in average PM2.5 concentration levels, which decrease throughout the region for both years, with the largest decreases concentrated in central Los Angeles County.

FIGURE 3B-2: AIR QUALITY CHANGE FROM DRAFT FINAL 2016 AQMP MEASURES, 2023 & 2031

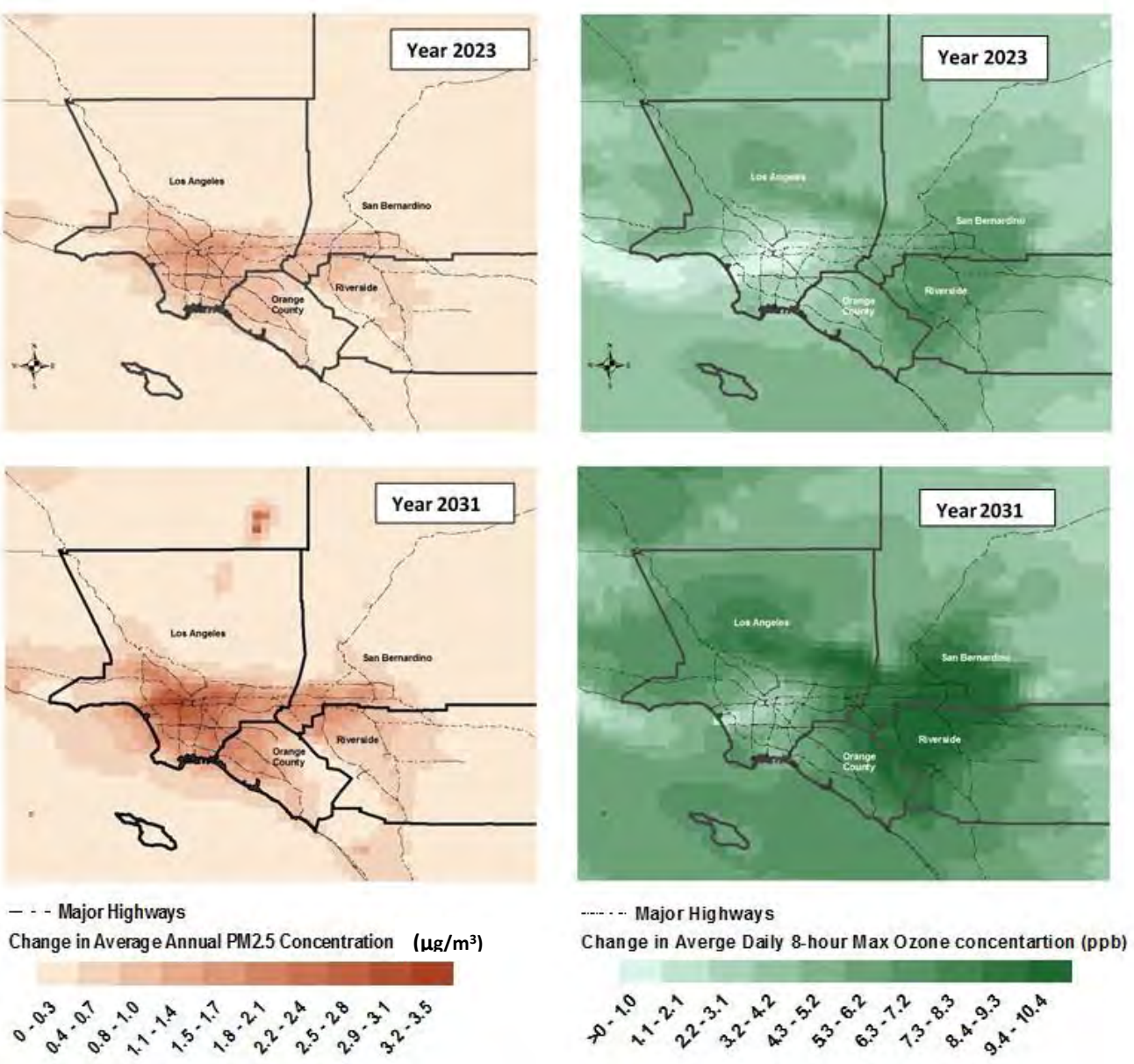
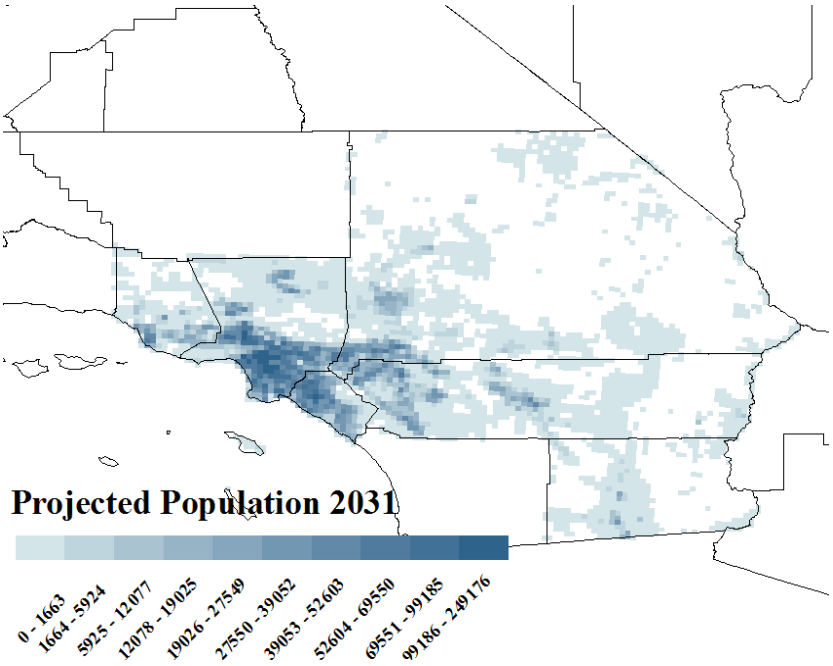


FIGURE 3B-3: PROJECTED POPULATION IN 2031



The baseline incidence rates for mortality and morbidity used are provided by Industrial Economics, Inc. (IEc), based on recommendations from their report (2016) at the county level, by five-year age group. Baseline mortality incidence rates for the base year 2012 are collected for historical years 2011-2013 from the California Department of Public Health and averaged to account for year to year variation. Projected baseline mortality rates for future years are based on the projected trend of U.S. crude death rates, which is available from the U.S. Census Bureau. This U.S. trend was applied to the base year local mortality rates, by age group, to obtain the projected mortality rates for all future years for each county.[2] Baseline incidence for hospital admissions and emergency department visits are based on the publicly accessible database from the Health Care Utilization Project (HCUP). County-level estimates of baseline incidence for nonfatal myocardial infarctions and ischemic stroke are obtained from U.S. Center for Disease Control's Interactive Atlas of Heart Disease and Stroke. Baseline incidence rates for new onset of asthma in children are provided by IEc for the Los Angeles area for 2002-2005 from the Children's Health Study cohort (McConnell et al. 2010). Baseline incidence for all other endpoints not discussed here are based on the data included with BenMAP-CE (RTI International 2015).

The effect estimates for each health impact function are from C-R functions as described in Table 3B-1. Local estimates in the SCAQMD four-county region were selected whenever available and meeting other selection criteria recommended by IEc (Industrial Economics, 2016a and 2016b). The health effect is often estimated as a relative risk (RR), which is the ratio of the probability of an incidence of a particular endpoint in an exposed group to the probability of it occurring in an unexposed group.

[2] Staff is looking into procuring more local mortality rate projections and will update the analysis based on these new data once they are obtained.

The RRs from the recommended studies for all-cause mortality from short-term ozone exposure are 1.0035 (National Morbidity and Mortality Air Pollution Study) and 1.005 (meta-analysis) from Bell et al. (2005). The RRs from the recommended studies for all-cause mortality from long-term PM2.5 exposure are: 1.14 (Jerrett et al. 2005), 1.104 (Jerrett et al. 2013), 1.17 and 1.14 from Krewski et al. (2009)'s kriging and land-use regression estimates, respectively.

TABLE 3B-1: C-R FUNCTIONS, STUDY POPULATIONS AND VALUATION FUNCTIONS BY ENDPOINT GROUP

Endpoint	C-R Function	C-R Function Study Population	Valuation Function
Short-term Exposure to Ozone			
Mortality, All Cause	Pooling of: LA-specific NMMAPS and meta-analysis (Bell, Dominici, and Samet 2005)	All ages	VSL (Robinson and Hammitt 2016). $9 million ($4.2-$13.7 million)
School Loss Days All Cause	Gilliland, et al. (2001)	5-17 years	$217/day (BLS, 2012)
Hospital Admissions (HA), All Respiratory	Katsouyanni et al. (2009)	>64 years	$21,509 (HCUP, (Chestnut et al. 2006)
Minor Restricted Activity Days	B. D. Ostro and Rothschild (1989)	18-65 years	$17-$294/day (Brandt, Vásquez Lavín, and Hanemann 2012; Dickie and Hubbell 2004)
Emergency Room Visits, Asthma	Mar and Koenig (2009)	0-19 years and >19 years	HA: $9,131 (Chestnut et al. 2006) ED: $519 (Smith et al. 1997; Stanford, McLaughlin, and Okamoto 1999; Meng et al. 2010)
Long-term Exposure to PM2.5			
Mortality, All Cause	Pooling of: LA-specific estimates (Jerrett et al. 2005; Jerrett et al. 2013), Kriging and LUR (Krewski et al. 2009)	> 30 years	VSL (Robinson and Hammitt 2016). $9 million ($4.2-$13.7 million)
Acute Bronchitis	Dockery et al. (1996)	8-12 years	$17-$294/day (Brandt, Vásquez Lavín, and Hanemann 2012; Dickie and Hubbell 2004)

TABLE 3B-1: C-R FUNCTIONS, STUDY POPULATIONS AND VALUATION FUNCTIONS BY ENDPOINT GROUP (CONT'D)

Endpoint	C-R Function	C-R Function Study Population	Valuation Function
Short-term Exposure to PM2.5			
Minor Restricted Activity Days	B. D. Ostro and Rothschild (1989)	18-64 years	$17-$294/day (Brandt, Vásquez Lavín, and Hanemann 2012; Dickie and Hubbell 2004)
Lower Respiratory Symptoms	Schwartz and Neas (2000)	7-14 years	
Upper Respiratory Symptoms	Pope et al. (2015)	9-11 years	
Asthma Exacerbation (Wheeze, Cough, Shortness of Breath)	Pooling of: Ostro et al. (2001) (cough, wheeze, shortness of breath) and Mar et al. (2004) (cough, shortness of breath)	6-18 years	
HA All Cardiovascular (less Myocardial Infarctions)	Moolgavkar (2000)	>20-64 years	$23,469 (Chestnut et al. 2006)
HA, All Respiratory	Zanobetti et al. (2009) and Moolgavkar (2000)	>64 years	$21,509 (HCUP, (Chestnut et al. 2006)
HA, Ischemic Stroke	(Shin et al. 2014)	>65 years	$61,384 (Lee et al. 2007)
HA and ED Visits, Asthma	Delfino et al. (2014)	0-18 years	HA: $9,131 (Chestnut et al. 2006) ED: $519 (Smith et al. 1997; Stanford, McLaughlin, and Okamoto 1999; Meng et al. 2010)
Asthma, New Onset (Wheeze)	Young et al. (2014)	>34 years	No valuation function applied.
Work Loss Days	Ostro (1987)	18-64 years	$217/day (BLS, 2012)
Acute Myocardial Infarction, Nonfatal	Pooling of (Pope et al. 2015; Zanobetti and Schwartz 2006; Zanobetti et al. 2009; Sullivan et al. 2005).	Adults (>18 years)	$106,293 to $223,214 depending on age (Cropper and Krupnick 1990; Russell et al. 1998; Wittels, Hay, and Gotto 1990)

The valuation functions associated with each endpoint are also described in Table 3B-1. The highest valued endpoint is premature mortality. Avoided premature deaths are valued using the concept of the Value of Statistical Life (VSL). VSL is a measure of the willingness-to-pay (WTP) of a society to

reduce the risk of a mortality, aggregated up to the amount of risk reduction required to avoid one statistical death over the population. A range of VSL is recommended by IEc (2016) from $4.2 to $13.7 million, with a midpoint of $9 million, all of which are expressed in 2013 dollars and based on 2013 income levels. This range is found in Robinson and Hammitt (2016), and falls within the range of Viscusi (2015). Avoided morbidity conditions are valued primarily based on the concept of cost of illness (COI) avoided, which includes the cost of healthcare and the cost of lost productivity, though a few endpoints do include a WTP component. The COI and WTP valuations functions for morbidity endpoints are based on recommendations from the IEc report (2016). It is also recommended that WTP valuations be adjusted for income growth, based on the concept that the income elasticity of VSL is positive. The recommended income elasticity for VSL is $\varepsilon_I = 1.1$ based on Viscusi (2015), with $\varepsilon_I = 0$ and $\varepsilon_I = 1.4$ for sensitivity analyses, while $\varepsilon_I = 0.5$ is recommended for WTP portions of morbidity endpoints.[3]

Per-capita income growth data for historical years 2013-2015 and projections for 2016-2019 are from the California Department of Finance (DOF). The DOF publishes forecasts total personal (nominal) income growth, a forecast of the consumer-product index (CPI-U)[4], and a population forecast. Using the inflation forecast to adjust the nominal income forecast and the population forecast, a forecast of real per-capita income growth to 2019 was derived. The post-2019 per-capita income growth is estimated based on the forecasted 2019 total income growth rate and the DOF's population forecast, resulting in an average annual growth rate of per-capita income of 1.1 percent.

Results

The health impacts are calculated according to the methodology and data described above. The health impacts are categorized into three different types of exposure: short-term ozone exposure, short-term PM2.5 exposure, and long-term PM2.5 exposure. Annual health impacts from short-term ozone exposure are calculated as the sum of the daily impacts for the Summer Planning season. Health impacts from off-season short-term ozone exposure are not calculated here due to data limitations. Thus, the health impacts shown can be interpreted as conservative estimates of the annual health impact, only representing daily impacts of less than half of a year. Annual health impacts from short-term PM2.5 exposure are calculated as the sum of daily impacts for 365 days of a year.[5] Annual health impacts for long-term PM2.5 exposure are calculated based on the annual average of the mean daily concentrations.

Annual health impacts for all endpoints are estimated with no threshold effects for all types of pollutant exposure. This practice is recommended by Industrial Economics, Inc. and based on the latest scientific evidence, including those summarized in the Integrated Science Assessments (U.S.

[3] The income elasticity adjustment is done according to the formula $VSL_{t+n} = VSL_t \left(\frac{income_{t+n}}{income_t}\right)^{\epsilon_I}$, where *n* is the number of years of income growth.

[4] The forecast of CPI-U All Items is used.

[5] In leap-years, February 29th is excluded from health impact calculation due to limitations of BenMAP-CE.

EPA 2009; U.S. EPA 2013).

Pooling methods are used to calculate the annual health impact from pollutant exposure for endpoints where multiple C-R functions are recommended as described in Table 3B-1. The pooling method used here for overlapping C-R functions is either Fixed Effects or Random Effects as implemented in BenMAP-CE. The choice between using Fixed Effects or Random Effects for pooling is made automatically by BenMAP-CE based on a test statistic evaluated at an alpha of 5% (RTI International, 2015).[6] The independent sum pooling method is used for C-R functions with non-overlapping age-groups.

The health impacts of mortality based on the recommended C-R functions are shown in Table 3B-2. The effect of reduced short-term ozone exposure will result in a reduction of 45 all-cause premature deaths per year in the year 2023 and 89 per year in the year 2031 (both these numbers represent point estimates of a statistical distribution of possible outcomes). The effect of ozone improvements on mortality reduction is significant at the 95% confidence level as shown by the confidence intervals (CI).[7] The effect of reduced long-term PM2.5 exposure on all-cause mortality incidence is much larger than from ozone; reduced long-term PM2.5 levels result in a reduction of 1,394 premature deaths per year in year 2023 and 2,716 per year in year 2031, both point estimates as well. The rate of change of reduced premature mortalities from year 2023 to 2031 is about 95 percent for both ozone and PM2.5 exposure.

[6] The test statistic used by BenMAP-CE is $Q_w = \sum_i \left[\left(\frac{1}{v_i}\right)\left(\beta_{fe} - \beta_i\right)^2\right]$, where v_i is the variance of study i, β_{fe} is the weighted parameter from fixed-effects estimation, β_i is the beta coefficient of study i. Q_w is chi-squared distributed with n-1 degrees of freedom.

[7] A 95% Confidence Interval (CI) is found from the 2.5 percentile and 97.5 percentile of an empirical distribution resulting from Monte Carlo simulation.

TABLE 3B-2: ANNUAL MORTALITY AND MORBIDITY HEALTH EFFECT ESTIMATES

Endpoint	2023	2031
Premature Deaths Avoided, All Cause		
Short-Term Ozone Exposure[1]	45	89
	(5; 85)	(10; 168)
Long-Term PM2.5 Exposure	1,394	2,716
	(221; 2595)	(433; 5029)
Short-Term PM2.5 Exposure[2]	100	194
	(77; 122)	(150; 239)
Reduced Morbidity Incidence		
Short-Term Ozone Exposure[1]		
Hospital Admissions, All Respiratory	68	148
	(-20; 155)	(-44; 338)
Hospital Admissions (HA), Asthma	64	119
	(33; 95)	(61; 178)
Emergency Room Visits, Asthma	2,209	4,154
	(803; 3195)	(1546; 5963)
Minor Restricted Activity Days	327,312	610,075
	(135625; 516446)	(253230; 960949)
School Loss Days, All Cause	100,034	184,781
	(-11927; 205680)	(-22255; 376275)
PM2.5 Exposure		
Acute Bronchitis	1,039	1,890
	(-247; 2281)	(-455; 4099)
Acute Myocardial Infarction, Nonfatal	33	71
	(12; 88)	(26; 190)
Asthma Exacerbation (Wheeze, Cough, Shortness of Breath)	2,956	5,577
	(-1368; 6838)	(-2631; 12680)
Asthma, New Onset (Wheeze)	23,321	42,780
	(-1440; 50795)	(-2641; 93113)
HA, All Cardiovascular (less Myocardial Infarctions)	164	337
	(110; 204)	(226; 419)
HA, All Respiratory (less Asthma)[3]	136	290
	(83; 174)	(176; 372)
HA, Ischemic Stroke	79	171
	(24; 143)	(52; 309)
HA and ED Visits, Asthma	142	260
	(-24; 377)	(-44; 687)
Lower Respiratory Symptoms	12,268	22,387
	(4713; 19614)	(8637; 35646)

TABLE 3B-2: ANNUAL MORTALITY AND MORBIDITY HEALTH EFFECT ESTIMATES (CONT'D)

Endpoint	2023	2031
Upper Respiratory Symptoms	528,869	961,248
	(431337; 625725)	(784383; 1136704)
Minor Restricted Activity Days[4]	24,342	44,720
	(4421; 44141)	(8126; 81066)
Work Loss Days[4]	91,689	166,826
	(77650; 105650)	(141320; 192177)

[1] Health effects of ozone exposure are quantified for summer planning period only (i.e., May 1 to September 30). There are potentially more premature mortalities and morbidity conditions avoided outside the ozone peak season.
[2] Premature deaths avoided due to short-term exposure to PM2.5 are likely to partially overlap with those due to long-term PM2.5 exposure. Therefore, the total premature deaths associated with PM2.5 will be lower than simply summing across mortality effects from both short-term and long-term exposure (Industrial Economics and Thurston 2016a; Kunzli et al. 2001).
[3] This is the pooled estimate of two health endpoints: HA, Chronic Lung Disease (less Asthma) (18-64 years old) and HA, All Respiratory (65 or older).
[4] Expressed in person-days. Minor Restricted Activity Days (MRAD) refer to days when some normal activities are avoided due to illness.
(Note: Parenthesis are a 95% CI.)

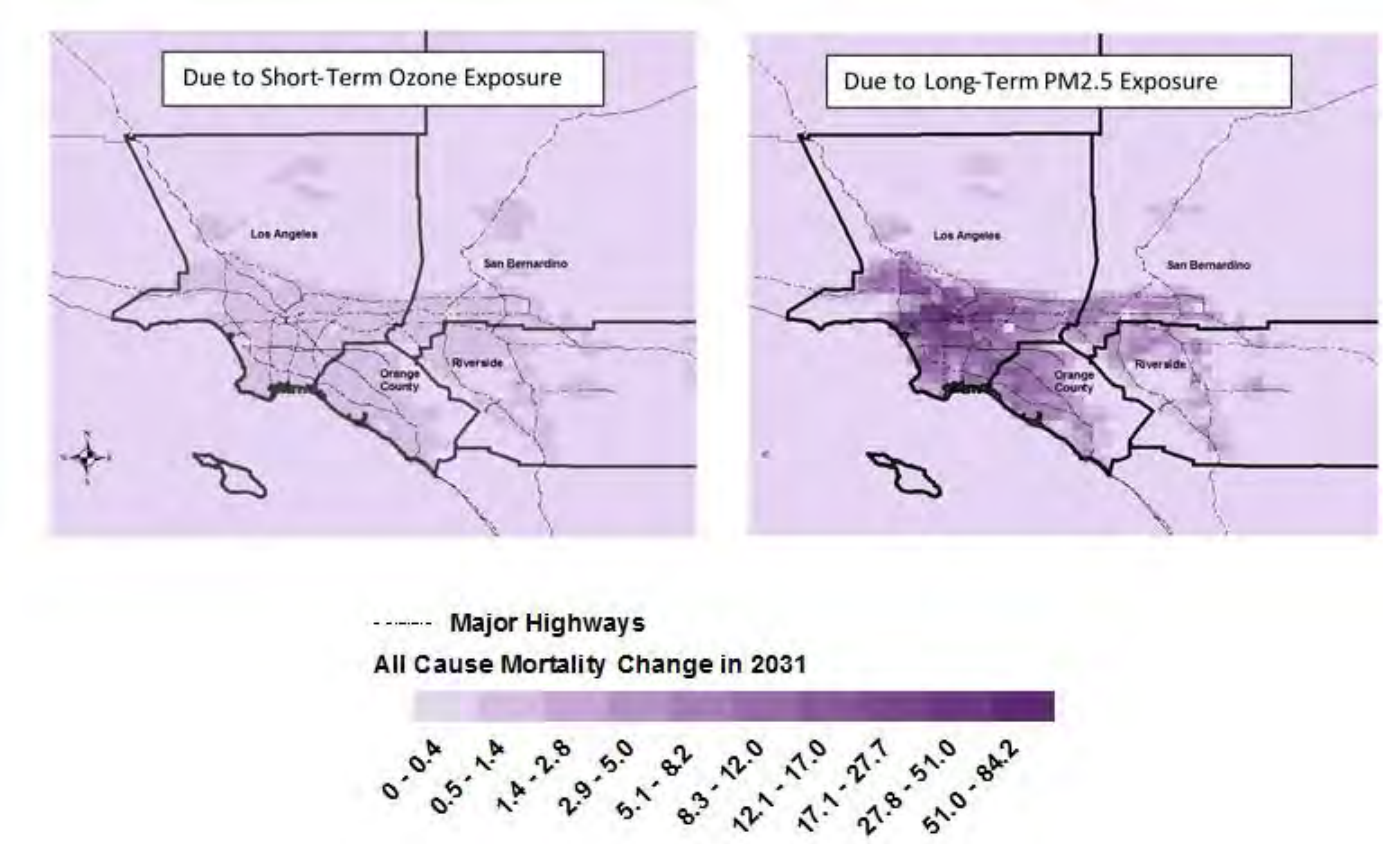
Figure 3B-4 maps the location of the avoided premature deaths by pollutant type in 2031. Ozone exposure reductions result in relatively small reductions in mortality throughout the basin, with concentrations in western Riverside and San Bernardino counties, and central Los Angeles County. The reduced PM2.5 exposure results in much more significant reductions in premature mortality, which are concentrated in central Los Angeles County.

The sensitivity of the long-term PM2.5 mortality-related health impacts shown in Table 3B-2 to the C-R functions used is examined by considering C-R functions from non-local studies. As recommended by IEc (2016), staff estimates the health impacts based on the pooling of three sets of non-local CR functions: (1) two California studies are pooled (Thurston et al. 2016; Jerrett et al. 2013) which have a RRs of 1.03 and 1.01, respectively, (2) two National study estimates are pooled (Lepeule et al. 2012; Krewski et al. 2009) which have RRs of 1.03 and 1.01, respectively, and (3) three estimates based on CVD-related mortality are considered (Jerrett et al. 2013; Thurston et al. 2016), which have RRs of 1.11, 1.11, and 1.04.

TABLE 3B-3: PM2.5-RELATED DEATHS AVOIDED ESTIMATES FROM DIFFERENT CR FUNCTIONS

Scenarios	Health Impacts (premature deaths avoided per year)	
	2023	2031
Main Scenario (L.A. Studies)	1,394	2,716
	(221; 2595)	(433; 5029)
California Studies	258	509
	(-48; 877)	(-95; 1712)
National Studies	918	1,790
	(409; 1862)	(800; 3617)
CVD (L.A. and CA Studies)	339	663
	(151; 609)	(298; 1183)

FIGURE 3B-4: CHANGE IN ALL-CAUSE MORTALITY FROM SHORT-TERM OZONE EXPOSURE AND LONG-TERM PM2.5 EXPOSURE IN 2031



The change in incidence of specific morbidity endpoints as a result of air quality improvements are also shown in Table 3B-2. There are different sets of morbidity endpoints for different pollutant exposures, but both reductions in ozone and PM2.5 exposures result in fewer school loss days, fewer hospital admissions related to all respiratory causes, and fewer asthma-related emergency room visits.

The valuation of reduced mortality and morbidity incidence, is based on the valuation functions described in Table 3B-4, along with an income elasticity and cessation lag where applicable. The valuation of avoided premature deaths is based on the recommended VSL and income elasticity as described above, along with a 20-year cessation lag for long-term PM2.5 exposure. Cessation lag describes how the avoided premature deaths from annual exposure are lagged over time. The 20-year cessation lag as recommended by IEc (2016a) assigns 30% of the reduction to the first year, 13% for years 2-5, and 1% for all following years.[8] The valuation estimates for reduced premature mortality incidence are shown in Table 3B-3, along with lower and upper bounds resulting from sensitivity analysis. The results of this analysis show that the annual public health benefits from avoided premature deaths have a midpoint estimate of $14.2 billion in 2023 and $30.5 billion in 2031 (expressed in 2015 dollars), based on a base VSL of $9 million and an income elasticity ε_I of 1.1. The lower- (upper-) bound shows the value of public health benefits if the base VSL is at $4.2 million ($13.7 million) and $\varepsilon_I = 0$ ($\varepsilon_I = 1.4$), this represents an extreme bound of the valuation of the mean health impact and shows the sensitivity of the results to the assumptions of the analysis. The annual public health benefits due to avoided premature deaths range from $5.6-$22.7 billion in 2023 and $10.9-$49.9 billion in 2031. From 2017 to 2031, the mid-point estimate of mortality-related benefits amounts to an average of $16.2 billion per year. As expected from the health impact results, the largest public health benefits are derived from the reduction in PM2.5 concentration in the basin.

[8] Consistent with the rest of the Draft Final Socioeconomic Report, a four-percent discount rate is applied to the valuation of avoided premature mortalities lagged over the 20-year period.

TABLE 3B-4: MONETIZED PUBLIC HEALTH BENEFITS

	Monetized Public Health Benefits (Billions 2015$ per year)					
	2023			2031		
	Lower Bound ($4.2M, ε_I=0)	Midpoint ($9M, ε_I=1.1)	Upper Bound ($13.7M, ε_I=1.4)	Lower Bound ($4.2M, ε_I=0)	Midpoint ($9M, ε_I=1.1)	Upper Bound ($13.7M, ε_I=1.4)
Morality, All Cause	$5.6	**$14.2**	$22.7	$10.9	**$30.5**	$49.9
Ozone	$0.2	**$0.5**	$0.8	$0.4	**$1.1**	$1.8
Los Angeles	$0.1	**$0.2**	$0.3	$0.2	**$0.5**	$0.8
Orange	$0.0	**$0.1**	$0.2	$0.1	**$0.2**	$0.3
Riverside	$0.0	**$0.1**	$0.2	$0.1	**$0.2**	$0.3
San Bernardino	$0.0	**$0.1**	$0.1	$0.1	**$0.2**	$0.3
PM	$5.4	**$13.7**	$21.9	$10.5	**$29.4**	$48.1
Los Angeles	$3.8	**$9.7**	$15.4	$7.4	**$20.7**	$33.8
Orange	$0.8	**$2.1**	$3.4	$1.6	**$4.5**	$7.3
Riverside	$0.3	**$0.9**	$1.4	$0.7	**$2.1**	$3.4
San Bernardino	$0.4	**$1.0**	$1.6	$0.8	**$2.2**	$3.6

The monetary benefits of avoided morbidity incidence are shown in Table 3B-5. The greatest benefit from short-term ozone exposure reductions is from reduced minor restricted activity days valued at $103.3 million in 2031 and avoided productivity loss from school loss days valued at $40.5 million in 2031. The greatest benefits from short-term PM2.5 exposure is from reduced minor restricted activity days valued at $175.9 million in 2031 and avoided work loss day valued at $36.6 million in 2031. From 2017 to 2031, the morbidity-related benefits amount to an average of $230 million per year.

TABLE 3B-5: MONETIZED ANNUAL MORBIDITY BENEFITS (MILLIONS OF 2015 DOLLARS)

Morbidity Endpoint by Exposure	2023	2031	Average Annual (2017-2031)
Short-term Ozone Exposure (Total)	***$78.3***	***$150.5***	***$84.3***
Emergency Room Visits, Asthma	$1.1	$2.2	$1.2
Hospital Admissions (HA), All Respiratory	$1.5	$3.4	$1.8
Hospital Admissions (HA), Asthma	$0.6	$1.2	$0.7
Minor Restricted Activity Days[4]	$53.1	$103.3	$57.5
School Loss Days, All Cause[4]	$21.9	$40.5	$23.1
Long-Term PM2.5 Exposure (Total)	**$3.3**	**$6.2**	**$3.5**
Acute Bronchitis	$3.3	$6.2	$3.5
Short-term PM2.5 Exposure (Total)	**$133.1**	**$254.4**	**$142.9**
Acute Myocardial Infarction, Nonfatal	$1.7	$3.6	$1.9
Asthma Exacerbation (Wheeze, Cough, Shortness of Breath)	$0.6	$1.1	$0.6
HA, All Cardiovascular (less Myocardial Infarctions)	$4.1	$8.4	$4.5
HA, All Respiratory (less Asthma)[3]	$3.1	$6.6	$3.5
HA, Ischemic Stroke	$5.1	$11.0	$5.9
HA and ED Visits, Asthma	$0.2	$0.4	$0.3
Lower Respiratory Symptoms	$2.0	$3.8	$2.1
Upper Respiratory Symptoms	$3.6	$6.9	$3.9
Minor Restricted Activity Days[4]	$92.7	$175.9	$99.1
Work Loss Days[4]	$20.1	$36.6	$21.0
Total Morbidity Benefits	***$214.7***	***$411.1***	***$230.7***

The total of the monetized public health benefits from avoided premature deaths and reduced morbidity conditions are the sum values from Tables 3B-4 and 3B-5. The total annual public health benefits of the emission reductions resulting from implementation of the Draft Final 2016 AQMP are $14.4 billion in 2023 and $30.9 billion in 2031. The majority of the public health benefits are derived from premature deaths avoided, with the remaining amount coming from reduced incidence of morbidity conditions.

DRAFT SOCIOECONOMIC REPORT
APPENDIX 3-C

REVIEW OF BenMAP OPERATION

JANUARY 2017

memorandum

Date September 1, 2016

To Elaine Shen/SCAQMD

From Jin Huang

Subject Review of the SCAQMD's BenMAP Operation for its Health Benefits Analysis (Final Version)

Background and Objective

The South Coast Air Quality Management District (SCAQMD) is preparing its Socioeconomic Analysis for the 2016 Air Quality Management Plan (AQMP). The District staff is using BenMAP-CE[1] for the health benefits analysis (as part of the AQMP Socioeconomic Analysis).

Under Contract #15577, I was tasked to review the SCAQMD's BenMAP operation and to make sure the District technical staff performs BenMAP tool in an appropriate manner for the health benefits analysis. Note that I did not review any raw data or data sources.

In this memorandum, I document my review process as well as my comments and recommendations.

Review process

BenMAP Audit Trail Reports

My review process started with checking BenMAP audit trail reports generated from the SCAQMD's preliminary health benefits analysis.[2] Audit Trail Reports summarize the assumptions underlying each of five types of files generated by BenMAP-CE:

- Air Quality Grids (with the ".aqgx" extension),
- Incidence Configurations (with the ".cfgx" extension),
- Incidence Configuration Results (with the ".cfgrx" extension),
- Aggregation, Pooling, and Valuation Configurations (with the ".apvx" extension), and
- Aggregation, Pooling, and Valuation Results (with the ".apvrx" extension).

I reviewed the audit trail reports provided to me (i.e., the $PM_{2.5}$ and Ozone health impact quantification and valuation in year 2031) and provided my comments back to the District staff.[3]

[1] Environmental Benefits Mapping and Analysis Program - Community Edition (BenMAP -CE)
[2] The District technical staff Anthony Oliver provided the audit trail reports to me via email attachments on August 2, 2016.
[3] My comments and notes were sent to Elaine Shen and Anthony Oliver via email on August 8 and were discussed in a face-to-face meeting with Tony on August 9.

Customized BenMAP Datasets

To further evaluate the SCAQMD's BenMAP operation in the health benefits analysis, a face-to-face meeting between District technical staff and me was held on August 9, 2016 (from 10:00AM to 5:00PM) in Mountain View, CA. Using his laptop, the District staff showed me the upload process of customized datasets used in their analysis, including air quality data, population data, health incidence data, health impact functions (HIF), inflation dataset, and income growth factors. I looked into each dataset uploaded to BenMAP, checked data format and identified potential problems with creating and loading the data (see Table 1).

BenMAP Runs

During the face-to-face meeting, the District technical staff performed two complete BenMAP runs, one for $PM_{2.5}$ health benefits and the other is for Ozone health benefits, both using projected 2031 data. I have monitored each step during the runs as well as every option chosen (e.g., health impact function pooling, valuation function pooling).

Intermediate and Final Results

Finally, I reviewed the intermediate and final results generated from the above two BenMAP runs, including

- Maps of air quality change in the study area
- Changes in health incidence
- Aggregated and pooled incidence results, and
- Pooled valuation results

Review Results

Summary

Based on the BenMAP audit trail reports and in-person demonstration of BenMAP runs provided by the SCAQMD, the BenMAP operation for the SCAQMD's health benefits analysis was generally appropriate: the data upload was conducted properly; the customized BenMAP runs were performed correctly; and the intermediate and final results both looked fine. The SCAQMD technical staff has been trained to conduct BenMAP analysis; he is familiar with technical details in BenMAP setup and runs.

Detailed Review Results

The detailed evaluation results, including specific comments and suggestions on different aspects of BenMAP datasets/operation, are listed in Table 1 below.

Table 1. Comments and Suggestions on the SCAQMD BenMAP Operation

BenMAP Operation Steps /Datasets	Comment	Suggestion
SCAG population projection data	Data upload process is correct. Since the incidence rate data is not based on SCAG population (probably based on Census population data), BenMAP would calculate *incidence_count= incidence_rate*SCAG_pop*, that is, *incidence_count/Census_pop * SCAG_pop*. If SCAG and Census	Compare the SCAG and Census population data used in the analysis.

	population data are similar, this would not be a problem; if the population data are quite different, the incidence estimate would not be accurate.	
Incidence rates	Some morbidity incidence rates are not county specific; they are equal for all the four counties.	Incidence rates should be updated to be county- specific when county-level data are available.[4]
Inflation dataset	No inflation dataset is needed for SCAQMD's analysis but a dataset was uploaded in the inflation databox in BenMAP setup. The District staff used this shortcut to adjust income growth for valuation functions that include both willingness-to-pay and cost of illness components.	Document clearly the shortcut used in an internal report to avoid confusion (it might not be necessary to describe it in the public socioeconomic report).
Discount factor	4% is historically used, and 1% will be additionally used in the 2016 AQMP Socioeconomic analysis. It is a good practice to use a low and high discount rate.	Provide sufficient rationale for using 4% and 1% discount rate.[5]
Ozone season	Standard ozone season (May 1 – September 30) is used.[6]	Consider whether extended ozone season is more appropriate for the region.[7]
Health impact function (HIF) pooling	For the "Advanced Pooling Method", the option of "Round weights to two digits" was chosen.	Use "exact weights" option rather than "round weights to two digits".
Valuation function pooling	1) In the $PM_{2.5}$ BenMAP run for respiratory hospitalization, HIF for different age groups (18-64 and 65+) were pooled, but valuation function for 18-64 was then used. 2) Similar problem in the Ozone run for asthma emergency department visits: HIF for 0-17 and 18+ age groups were pooled but valuation function for 0-17	If different age groups were pooled in the HIF pooling step (e.g., 18-64 and 65+), the valuation function for the aggregated age group (e.g., 18+) should be used.[8]

[4] I was told that the SCAQMD's contractor is working on updating the rates.
[5] Since USEPA and other federal agencies usually use 3% and 7% discount rate in their regulatory analysis (as recommended by OMB in Circular A-4, section "Discount Rates"), the District needs to provide sufficient rationale for using different discount rates.
[6] This may be due to data limitation, that is, the regional air quality modeling focused on summer season only.
[7] If an extended ozone season is more appropriate but air quality data is not currently available, this can be considered as a long-term enhancement.
[8] This suggestion is based on my past practice with BenMAP. The BenMAP user manual does not seem to have details about such pooling.

	was used in the valuation step. See screenshots in Appendix II.	
Health impact function summary		This is out of my review scope; but for District record, it would be good to keep a summary of selected C-R functions/HIFs (A sample is provided in Appendix I).

Appendix I: Sample Summary of Health Impact Studies and Functions

Hospital Admission

Effect	Author	Year	Location	Age	Co-Poll	Metric	Beta	Std. Err.	Functional Form	Notes
All Respiratory	Fung et al.	2006	Vancouver, Canada	65-99		D24Hour Mean	0.003285	0.001707	Log-linear	
Asthma	Linn et al.	2000	Metropolitan Los Angeles	0-29		D24Hour Mean	0.002400	0.000800	Log-linear	
Asthma	Liun et al.	2000	Metropolitan Los Angeles	30-99		D24Hour Mean	0.001400	0.000500	Log-linear	
All Respiratory	Luginaah et al.	2005	Windsor, Ontario	0-14		D1Hour Max	0.006747	0.003628	Log-linear	Female
All Respiratory	Luginaah et al.	2005	Windsor, Ontario	0-14		D1Hour Max	-0.002878	0.003132	Log-linear	Male
All Respiratory	Luginaah et al.	2005	Windsor, Ontario	15-64		D1Hour Max	0.007139	0.004353	Log-linear	Female
All Respiratory	Luginaah et al.	2005	Windsor, Ontario	15-64		D1Hour Max	0.000746	0.005879	Log-linear	Male
All Respiratory	Luginaah et al.	2005	Windsor, Ontario	65-99		D1Hour Max	0.001238	0.002961	Log-linear	Female
All Respiratory	Luginaah et al.	2005	Windsor, Ontario	65-99		D1Hour Max	-0.001435	0.004295	Log-linear	Male
Chronic Lung Disease	Moolgavkar S.H.	2003	Los Angeles County, CA	65-99		D24Hour Mean	0.001800	0.000188	Log-linear	
Chronic Lung Disease	Moolgavkar S.H.	2003	Cook County, CA	65-99		D24Hour Mean	0.002400	0.000803	Log-linear	
All Respiratory	Yang et al.	2003	Vancouver, Canada	65-99	SO_2, O_3, CO, COH	D24Hour Mean	0.008759	0.003069	Logistic	
Chronic Lung Disease (less Asthma)	Yang et al.	2005	Vancouver, Canada	65-99	O_3	D24Hour Mean	0.020605	0.006637	Log-linear	

1. Fung et al. (2006)

Fung et al. (2006) assessed the impact of ambient gaseous pollutants (SO_2, NO_2, CO, and O_3) and particulate matters (PM_{10}, $PM_{2.5}$, and $PM_{10-2.5}$) as well as the coefficient of haze (COH) on recurrent respiratory hospital admissions (ICD-9 codes 460-519) among the elderly in Vancouver, Canada, for the period of June 1, 1995, to March 31, 1999, using a new method proposed by Dewanji and Moolgavkar(2000; 2002). The associations were conducted at current day, 3-day, 5-day, and 7-day moving averages. The strongest association between NO_2 and hospital admissions was observed at 3-day lag (RR = 1.018, 95% CI: 1.000-1.037). For SO_2, significant associations were found between admissions and 3-day, 5-day, and 7-day moving averages of the ambient SO_2 concentrations, with the strongest association observed at the 7-day lag (RR = 1.044, 95% CI: 1.018-1.070). The authors found $PM_{10-2.5}$ for 3-day and 5-day lag to be significant, with the

strongest association at 5-day lag (RR = 1.020, 95% CI: 1.001-1.039). No significant associations with admission were found with current day exposure.

Hospital Admissions, All Respiratory (ICD-9 codes 460-519)
In a single-pollutant model the coefficient and standard error are estimated from the relative risk (1.018) and 95% confidence interval (95% CI: 1.000-1.037) for a 5.431 ppb increase in 3-day moving average of NO_2 (Fung, et al., 2006, Table 4).

Emergency Room Visits

Effect	Author	Year	Location	Age	Co-Poll	Metric	Beta	Std. Err.	Functional Form	Notes
Asthma	Ito et al.	2007	NYC	0-99		D24HourMean	0.005460	0.000933	Log-linear	
Asthma	Jaffe et al.	2003	Cincinnati and Cleveland, Ohio	5-34		D1HourMax	0.003000	0.002041	Log-linear	Asthmatics ; Warm season
Asthma	NYDOH	2006	Bronx, NYC	0-99	O_3	D24HourMean	0.002264	0.001178	Log-linear	
Asthma	Peel et al.	2005	Atlanta, GA	0-99		D1HourMax	0.002296	0.000901	Log-linear	
Asthma	Villeneuve et al.	2007	Edmonton, Canada	75-99		D24HourMean	0.013505	0.005345	Logistic	

1. Ito et al.(2007)
Ito et al.(2007) assessed associations between air pollution and asthma emergency department visits in New York City for all ages. Specifically they examined the temporal relationships among air pollution and weather variables in the context of air pollution health effects models. The authors compiled daily data for $PM_{2.5}$, O_3, NO_2, SO_2, CO, temperature, dew point, relative humidity, wind speed, and barometric pressure for New York City for the years 1999-2002.The authors evaluated the relationship between the various pollutants' risk estimates and their respective concurvities, and discuss the limitations that the results imply about the interpretability of multi-pollutant health effects models.

Emergency Room Visits, Asthma (ICD-9 code 493)
In a single-pollutant model, the coefficient and standard error are estimated from the relative risk (1.14) and 95% confidence interval (1.09-1.19) for a 24 ppb increase in the average of 0- and 1-day lag of NO_2 (Ito, et al., 2007, p. S52).

Asthma Exacerbation

Effect	Author	Year	Location	Age	Co-Poll	Metric	Beta	Std. Err.	Functional Form	Notes
One or More Symptoms	Delfino et al.	2002	Southern California	9-18		D8Hour Max	0.019939	0.011443	Logistic	
One or More Symptoms	Delfino et al.	2003	Los Angeles	10-16		D8Hour Max	0.240337	0.115256	Logistic	Hispanic asthmatics
One or More Symptoms	Mortimer et al.	2002	7 urban areas (US)	4-12	O_3, SO_2	D4Hour Mean	0.013501	0.011179	Logistic	Warm season; Adjusted age
Cough	Ostro et	2001	Central Los	4-12		D1Hour	0.000591	0.000595	Logistic	African-

Effect	Author	Year	Location	Age	Co-Poll	Metric	Beta	Std. Err.	Functional Form	Notes
	al.		Angeles, CA			Max				Americans; Adjusted age
Cough (New Cases)	Ostro et al.	2001	Central Los Angeles, CA	4-12		D1Hour Max	0.002267	0.001098	Logistic	African-Americans; Adjusted age
Shortness of Breath	Ostro et al.	2001	Central Los Angeles, CA	4-12		D1Hour Max	0.001539	0.000896	Logistic	African-Americans; Adjusted age
Shortness of Breath (New Cases)	Ostro et al.	2001	Central Los Angeles, CA	4-12		D1Hour Max	0.002621	0.001429	Logistic	African-Americans; Adjusted age
Wheeze	Ostro et al.	2001	Central Los Angeles, CA	4-12		D1Hour Max	0.001539	0.000612	Logistic	African-Americans; Adjusted age
Wheeze (New Cases)	Ostro et al.	2001	Central Los Angeles, CA	4-12		D1Hour Max	0.002444	0.000897	Logistic	African-Americans; Adjusted age
One or More Symptoms	Schildcr out et al.	2006	Eight U.S. cities	4-12		D24HourMean	0.004309	0.001406	Logistic	Adjusted age

1. Delfino et al.(2002)

Delfino et al.(2002) examined the association between air pollution and asthma symptoms among 22 asthmatic children (9-19 years of age) followed March through April 1996 (1,248 person-days) in Southern California. Air quality data for PM_{10}, NO_2, O_3, fungi and pollen were used in a logistic model with control for temperature, relative humidity, day-of-week trends and linear time trends. The odds ratio (95% confidence interval) for asthma episodes in relation to lag0 20 ppb changes in 8-hr max NO_2 is 1.49 (0.95-2.33). The authors also considered subgroups of asthmatic children who were on versus not on regularly scheduled anti-inflammatory medications and found that pollutant associations were stronger during respiratory infections in subjects not on anti-inflammatory medications.

Asthma Exacerbation, One or More Symptoms

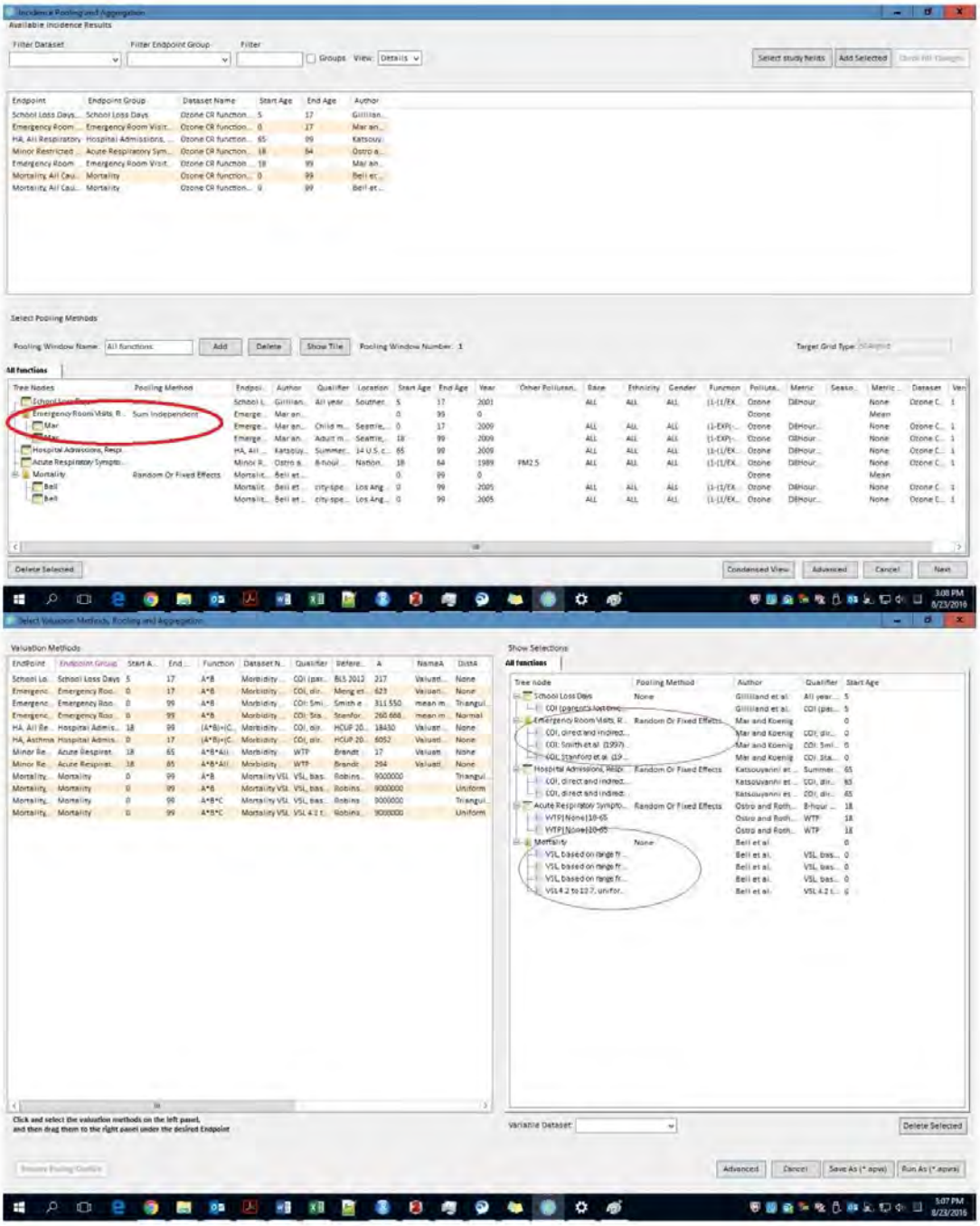
In a single-pollutant model, the coefficient and standard error are estimated from the odds ratio (1.49) and the 95% confidence interval (0.95-2.33) for a 20 ppb increase in 8-hr max NO_2 (Delfino, et al., 2002, Table 4).

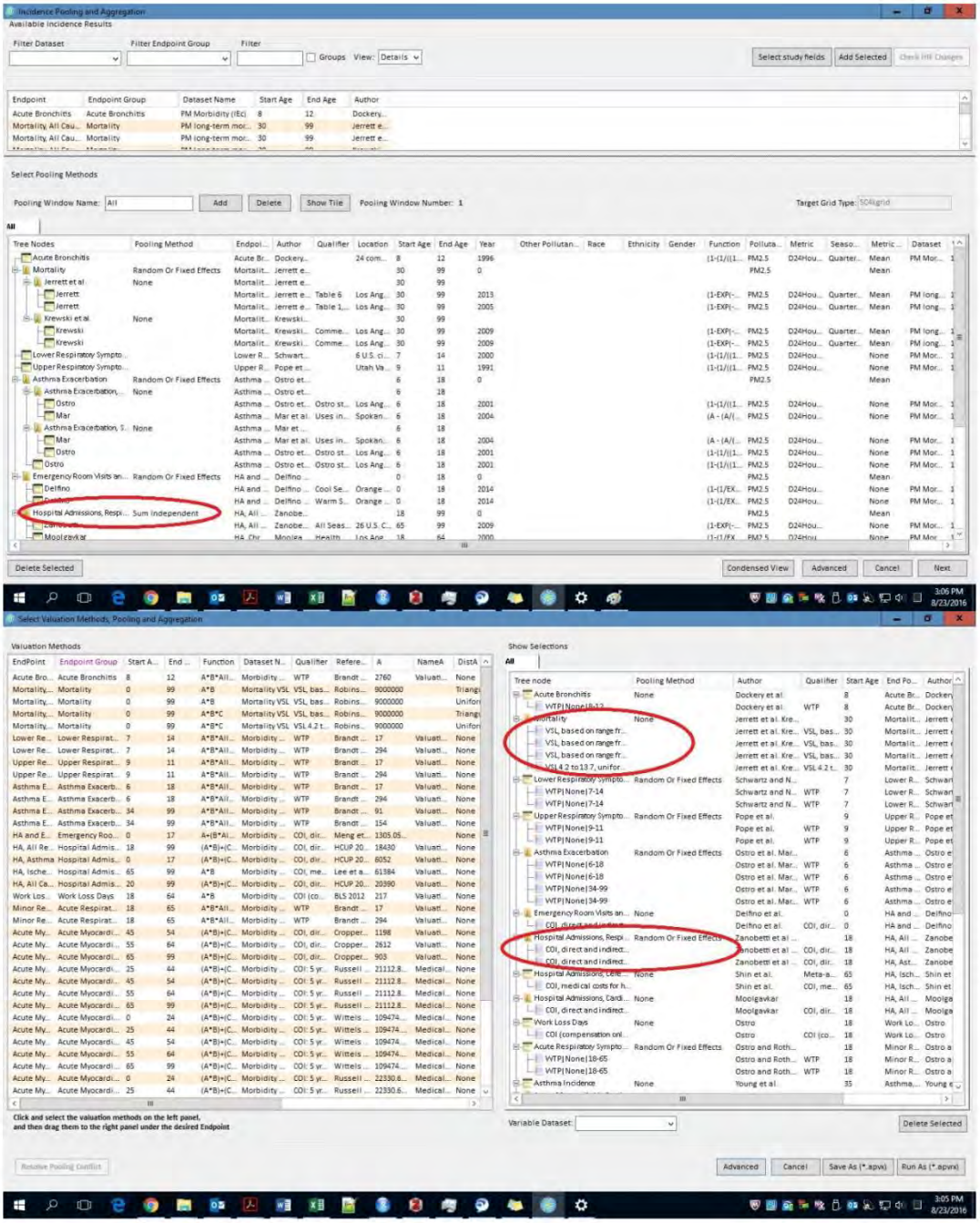
Incidence Rate: Delfino et al.(2002, Table 1) reported asthma episodes in the 22 asthmatic children. Asthma episodes are defined as having asthma symptoms that interfered with daily activities (symptom sore >2). The incidence rate is calculated as the ratio of number of person-days that symptom sore >2 and the total number of person-days, i.e., daily asthma episodes incidence rate = 196/1248=0.157

Population: The study population includes asthmatics from 9 to 18 years of age. We treat these as two groups based on the available information from American Lung Association (2002, Table 7). Asthmatic population ages 9 to 17 = 5.67% of population ages 9 to 17 and asthmatic population age 18 = 3.71% of population age 18. The American Lung Association (2002, Table 7) estimates asthma prevalence for children 5- 17 and 18-44 at 5.67% and 3.71% respectively (based on data from the 1999 National Health Interview Survey).

Reference:

Appendix II: Health Impact Function and Valuation Function Pooling




Incidence Pooling and Aggregation
Available Incidence Results
Filter Dataset
Filter Endpoint Group
Filter
Groups
View: Details
Select study fields
Add Selected
Endpoint
Endpoint Group
Dataset Name
Start Age
End Age
Author
Acute Bronchitis
Mortality, All Cau...
Select Pooling Methods
Pooling Window Name: All
Add
Delete
Show Tile
Pooling Window Number: 1
Target Grid Type: SCAIgrid
Tree Nodes
Pooling Method
Hospital Admissions, Respi...
Sum Independent
Delete Selected
Condensed View
Advanced
Cancel
Next
Select Valuation Methods, Pooling and Aggregation
Valuation Methods
Show Selections
Click and select the valuation methods on the left panel,
and then drag them to the right panel under the desired Endpoint
Variable Dataset:
Delete Selected
Advanced
Cancel
Save As (*.apvx)
Run As (*.apvx)

DRAFT FINAL SOCIOECONOMIC REPORT
APPENDIX 4-A

REMI BASELINE ADJUSTMENTS FOR THE 2016 AQMP

JANUARY 2017

Introduction

The 2016 AQMP uses SCAG's 2016 Growth Forecast of jobs, population, output, and other socioeconomic variables as inputs for baseline emissions inventories. To simulate the potential socioeconomic impacts of air pollution control policies, SCAQMD staff use the Regional Economic Models Inc. (REMI) model, which is embedded with its own demographic and economic forecasts. The REMI jobs and population projections are consistent with SCAG at the national level, but differ for the four-county region of Los Angeles, Orange, Riverside, and San Bernardino. For consistency with other AQMP analyses, the sub-county jobs and population forecasts by SCAG for the four-county region are used to adjust and update the REMI baseline forecast for the 2016 AQMP socioeconomic impact assessment. The following sections describe the data and methods used to accomplish the updates in the REMI model, as well as the updated results and any potential implications due to the updates performed.

REMI Baseline Update: Background and Assessment

A 1992 audit of the SCAQMD's socioeconomic analysis methods by Massachusetts Institute of Technology (MIT) recommended further evaluation of the inconsistency between the REMI and SCAG forecasts and the method used to resolve it (Polenske et al. 1992). The biggest source of inconsistency comes from the use of different jobs data for the forecast, where SCAG relies on the Bureau of Labor Statistics (BLS), REMI uses data from the Bureau of Economic Analysis (BEA). The MIT report observed that job impacts predicted by the model could differ significantly between the default REMI and the adjusted REMI models and that this was undesirable. The suggestions offered were: (1) use the default version of REMI model if legally permissible, (2) if SCAG data best suits SCAQMD's needs, negotiate with REMI for a model based on BLS data if feasible, and (3) if the adjusted REMI model is used, the issue of differing job impacts would need to be considered during analysis.

Following the MIT audit, SCAQMD staff chose option (3) and commissioned a study from the Center for the Continuing Study of the California Economy (CCSCE) to determine the sources of inconsistency between these forecasts (Levy 1994). A three-step process was recommended to ensure consistency between REMI and SCAG forecasts: (1) they should use the same U.S. projections for population and jobs, (2) they should use the same birth rates by age cohort; and (3) they should use similar rates of growth for jobs projections. Since the completion of the CCSCE report, REMI and SCAG forecasts have converged in the data sources used for their respective national projections: the BLS Employment Outlook was primarily used for national job projections, and the U.S. Census Bureau's national population projections was the basis for national population projections (REMI 2015a). As with the most recent AQMP socioeconomic reports (Lieu, Dabirian, and Kwon 2007; Lieu, Dabirian, and Hunter 2012), it was determined by SCAQMD staff that no further adjustment to the REMI U.S. forecast is needed.

In this report, SCAQMD staff took the recommendations by both MIT and CCSCE into consideration when conducting an update of the REMI model baseline (i.e., "Regional Control") with SCAG jobs and population forecasts. As described in detail in the following sections, staff found that the REMI employment update achieved similar job growth rates, by county and also for each of the 21 sub-county regions, to SCAG's forecast for the 2016-2031 analysis horizon. We also found that, by using the REMI Population Update function, the REMI population forecast was updated to be identical to SCAG's.

Having achieved the goals set forth by the CCSCE study, staff further investigated, based on the MIT recommendation, the effect of the update on the key parameter of labor productivity, which is the primary parameter in predicting the job impacts of a policy, as described below. Staff found that these

updates did not significantly alter labor productivity parameters from the REMI default values; the values changed by less than one percent for the majority of sectors. Based on these findings, staff concluded that the updated REMI model, which was used for the socioeconomic analysis of the 2016 AQMP, acceptably reflected the population and job growth rates forecasted by SCAG. Furthermore, the update did not result in significant changes to the key model parameter of labor productivity, and thus job impact predictions are not expected to differ significantly from what would have been predicted using the default REMI model.

Employment Baseline Adjustment

Data

The jobs forecast in the REMI model and that from SCAG differ both in their data sources and their job forecast up to 2031. The REMI model uses jobs data from BEA, supplemented by compensation data from the same source, for its historical job distribution pattern in the 21 sub-county regions contained in the model. For job projections, REMI bases its national forecast on the 2012-2022 Employment Outlook published by the BLS, along with short-term final demand forecast by the Research Seminar in Quantitative Economics (RSQE). The national forecast is then converted to regional forecasts using historical patterns (REMI 2015a). In comparison, SCAG's jobs forecast is based on data published by the California Employment Development Department (EDD) and the BLS. The base year of SCAG's forecast is 2012. The 2012 job counts is benchmarked to the corresponding historical data in the Current Employment Statistics (CES), and the forecasts for all future years were projected based on a shift-share calculation of national jobs forecasts and refined by inputs provided to SCAG by their local jurisdictions.

There are several differences between the BEA and the EDD/BLS CES data. The BEA jobs data uses additional data sources to estimate jobs in the farm sector, private households, private schools, and other sectors such as railroad operations. The BEA data also include federal military jobs and estimates of self-employment based on tax records. In contrast, the BLS data report only civilian payroll jobs. For transportation modeling purposes, SCAG arrived at its total jobs projections by adding self-employment by sector based on the American Community Survey's Public Use Microdata Samples (ACS PUMS). This method results in much lower estimates of the self-employed than reported in the BEA data, as indicated by a comparison of the 2012 data.

Method

Based on the 2016 Final RTP/SCS (SCAG 2016), SCAG staff provided forecasted job counts by sector for each of the 21 sub-county regions used within the REMI model, for 11 years between 2016 and 2031, in addition to the 2012 base year.[1] The provided data were based on a conversion from SCAG's jobs forecast, which was for 13 industry sectors by Transportation Analysis Zone (TAZ),[2] to the REMI 70-sector model by 21 sub-county regions that was customized for the SCAQMD. The conversion was performed in consultation with SCAQMD staff so that the industry sectors and geographical boundaries are aligned with

[1] The years of jobs and population data provided are 2012, 2016-2023, 2025, 2026, and 2031. The base year of 2012 was used in the analysis for both the 2016 AQMP and the 2016 RTP/SCS. Other years, except 2016, are the milestone years for air quality attainment demonstration.

[2] TAZs are generally equivalent to census block groups, and there are a total 11,267 TAZs in all of the SCAG counties except Catalina Island.

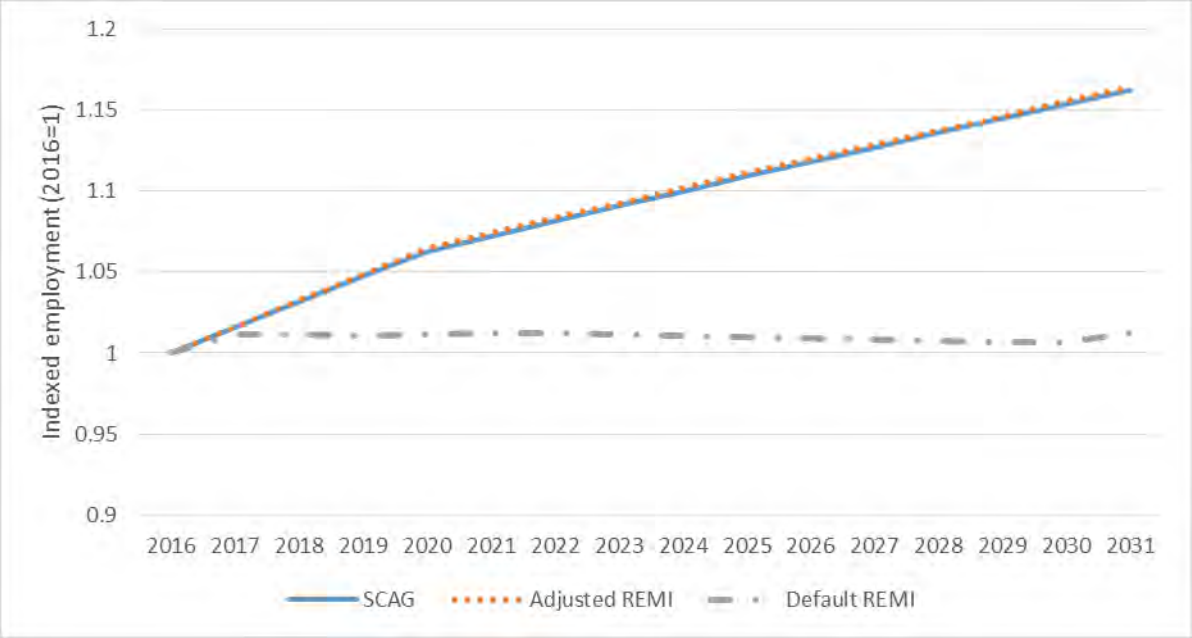
those in the REMI model. As part of this conversion, SCAG provided a forecast of the Public Administration sector (NAICS 92), which included federal civilian jobs,[3] local and state government jobs, as well as public school jobs. In the REMI model, however, this sector has two separate categories for federal civilian jobs and local and state government jobs, with public school jobs included within the latter category. In order to obtain an applicable growth rate for the REMI model, the Public Administration job counts provided by SCAG was allocated into federal civilian and state and local government categories based on the relative share of jobs annually as implied by the REMI default forecast. Military and private household jobs forecasts were not provided by SCAG; therefore, SCAQMD staff used the default forecast in REMI. Finally, for those years that are missing from the provided forecast, linear interpolation was used to estimate job counts for these in-between years.

From these jobs data, the yearly growth rate was calculated between 2013 and 2031 for each sub-county and each industry sector. These SCAG job growth rates are then multiplied by the corresponding REMI job counts in 2013, the last year of historical data in the REMI model. This results in a jobs forecast which begins with REMI's base-year job counts in 2013, and grows at the rate forecasted by SCAG. This adjusted jobs forecast is entered into the REMI model using the Employment Update function. As illustrated in Figure 4A-3, the overall growth rate is nearly identical between the SCAG and the adjusted REMI forecasts. At the same time, the SCAG, and hence the adjusted REMI, job growth is considerably more optimistic than the default REMI forecast. By 2031, the difference in the adjusted and default levels of overall job counts in REMI reaches 15 percentage points.

It should be noted that there are several technical constraints to directly applying SCAG's projected job counts in REMI's Employment Update function. First, there are large differences in estimates of self-employment between those obtained from ACS PUMS and those from BEA. Secondly, regional allocation of jobs from aggregation of SCAG's TAZs and REMI's method may differ. These resulted in significant differences in the job counts between REMI and SCAG forecasts. These large differences caused errors in the REMI model when SCAG job counts were directly used in the Employment Update function. The job growth rate method adopted here follows what was done in the previous AQMP (Lieu, Dabirian, and Hunter 2012), but is enhanced to include detailed growth rates by 21 sub-county regions and 70 industry sectors based on statistics directly projected by SCAG. Additionally, growth rates were calculated annually instead of for five-year periods.

[3] Post office workers (NAICS 491) are also included here.

FIGURE 4A-3: JOB GROWTH, FOUR-COUNTY REGION, 2016-2031



Results and Implications

The 2016-2031 job growth rates by county and by sector can be found in Tables 4A-1 and 4A-2, respectively. On average, the SCAG job growth rate is greater than that of the REMI default rate over the 2016-2031 time period. While SCAG projected the four-county region to grow at an average annual rate of 0.9 percent, the REMI defaults forecasted a mere 0.1 percent. Examining Table 4A-2, it is also observed that the REMI default jobs forecast differs from SCAG's projections by industry sector, and significantly so for a number of sectors such as telecommunications and apparel manufacturing sectors. The adjusted REMI baseline forecast of jobs more closely reflects the SCAG-projected rates of growth for most sectors.

TABLE 4A-1: AVERAGE ANNUAL JOB GROWTH RATES BY COUNTY, 2016-2031

County	Default REMI	SCAG	Adjusted REMI
Los Angeles	0.0%	0.7%	0.7%
Orange	0.1%	0.8%	0.8%
Riverside	0.3%	2.0%	2.0%
San Bernardino	0.1%	1.3%	1.5%
Four-county region	**0.1%**	**0.9%**	**1.0%**

TABLE 4A-2: AVERAGE ANNUAL JOB GROWTH RATES BY INDUSTRY FOR THE FOUR-COUNTY REGION, 2016-2031

Industry	Default REMI	SCAG	Adjusted REMI
Utilities	-2.1%	0.9%	0.8%
Construction	1.8%	1.9%	1.9%
Wholesale trade	-0.4%	0.9%	0.8%
Professional, scientific, and technical services	0.9%	1.1%	1.1%
Management of companies and enterprises	-1.2%	1.0%	1.0%
Educational services	0.2%	1.0%	1.0%
Agriculture and forestry support activities	-0.9%	0.2%	0.0%
Oil and gas extraction	0.7%	0.0%	0.0%
Mining (except oil and gas)	0.2%	0.0%	0.0%
Support activities for mining	1.5%	0.0%	-0.1%
Food manufacturing	-0.6%	0.1%	0.1%
Beverage and tobacco product manufacturing	-0.4%	0.1%	0.4%
Wood product manufacturing	0.3%	0.1%	0.1%
Paper manufacturing	-1.6%	-0.2%	-0.4%
Printing and related support activities	-1.7%	0.1%	0.1%
Petroleum and coal products manufacturing	-1.2%	-0.1%	-0.3%
Chemical manufacturing	-1.9%	-0.3%	-0.1%
Plastics and rubber product manufacturing	-1.9%	-0.2%	-0.3%
Nonmetallic mineral product manufacturing	0.8%	0.1%	0.0%
Primary metal manufacturing	-2.4%	-0.1%	0.1%
Fabricated metal product manufacturing	-0.5%	-0.2%	-0.2%
Machinery manufacturing	-2.1%	-0.1%	-0.2%
Computer and electronic product manufacturing	-1.2%	-0.3%	-0.3%
Electrical equipment and appliance manufacturing	-2.4%	-0.3%	-0.3%
Furniture and related product manufacturing	-0.4%	0.1%	0.0%
Miscellaneous manufacturing	-2.5%	-0.1%	-0.1%
Air transportation	-2.7%	0.2%	0.3%
Rail transportation	-1.4%	0.9%	1.7%
Water transportation	0.5%	0.4%	0.8%
Truck transportation	-0.4%	0.7%	0.7%
Transit and ground passenger transportation	0.0%	0.7%	0.6%
Pipeline transportation	-2.9%	0.7%	0.4%
Couriers and messengers	-2.3%	0.7%	0.9%
Warehousing and storage	0.4%	0.8%	1.5%
Publishing industries, except Internet	-0.8%	0.8%	0.7%
Motion picture and sound recording industries	-1.0%	0.5%	0.3%
Broadcasting, except Internet	-0.8%	0.4%	0.2%
Telecommunications	-2.3%	1.0%	1.2%
Securities, commodity contracts, investments	-0.1%	0.8%	0.7%

TABLE 4A-2: AVERAGE ANNUAL JOB GROWTH RATES BY INDUSTRY FOR THE FOUR-COUNTY REGION, 2016-2031 (CONT'D)

Industry	Default REMI	SCAG	Adjusted REMI
Insurance carriers and related activities	0.0%	0.6%	0.7%
Real estate	0.0%	0.6%	0.8%
Administrative and support services	0.6%	1.3%	1.3%
Waste management and remediation services	0.0%	1.6%	1.5%
Ambulatory health care services	1.1%	1.5%	1.5%
Hospitals	1.2%	0.9%	0.9%
Nursing and residential care facilities	0.7%	1.2%	1.1%
Social assistance	1.0%	1.6%	1.5%
Performing arts and spectator sports	-0.6%	0.6%	0.5%
Museums, historical sites, zoos, and parks	0.8%	0.8%	0.7%
Amusement, gambling, and recreation	0.2%	0.8%	1.3%
Accommodation	0.2%	0.7%	0.7%
Food services and drinking places	-0.1%	0.7%	0.7%
Repair and maintenance	-0.6%	1.1%	1.1%
Personal and laundry services	-0.6%	0.9%	0.9%
Membership associations and organizations	-0.3%	0.8%	0.9%
Forestry and logging; Fishing, hunting, and trapping	-0.8%	0.3%	-1.4%
Textile mills; Textile product mills	-2.8%	-0.1%	0.0%
Apparel manufacturing; Leather and allied product manufacturing	-4.1%	-0.1%	-0.1%
Motor vehicles, bodies and trailers, and parts manufacturing	-0.6%	0.2%	-0.1%
Other transportation equipment manufacturing	-1.7%	-0.4%	0.0%
Retail trade	-0.4%	0.9%	-0.6%
Scenic and sightseeing transportation; Support activities for transportation	0.1%	0.4%	0.8%
Internet publishing and broadcasting; ISPs, search portals, and data processing; Other information services	-1.6%	0.7%	0.2%
Monetary authorities - central bank; Credit intermediation and related activities; Funds, trusts, & other financial vehicles	-0.9%	0.7%	0.7%
Rental and leasing services; Lessors of nonfinancial intangible assets	0.4%	1.0%	1.1%

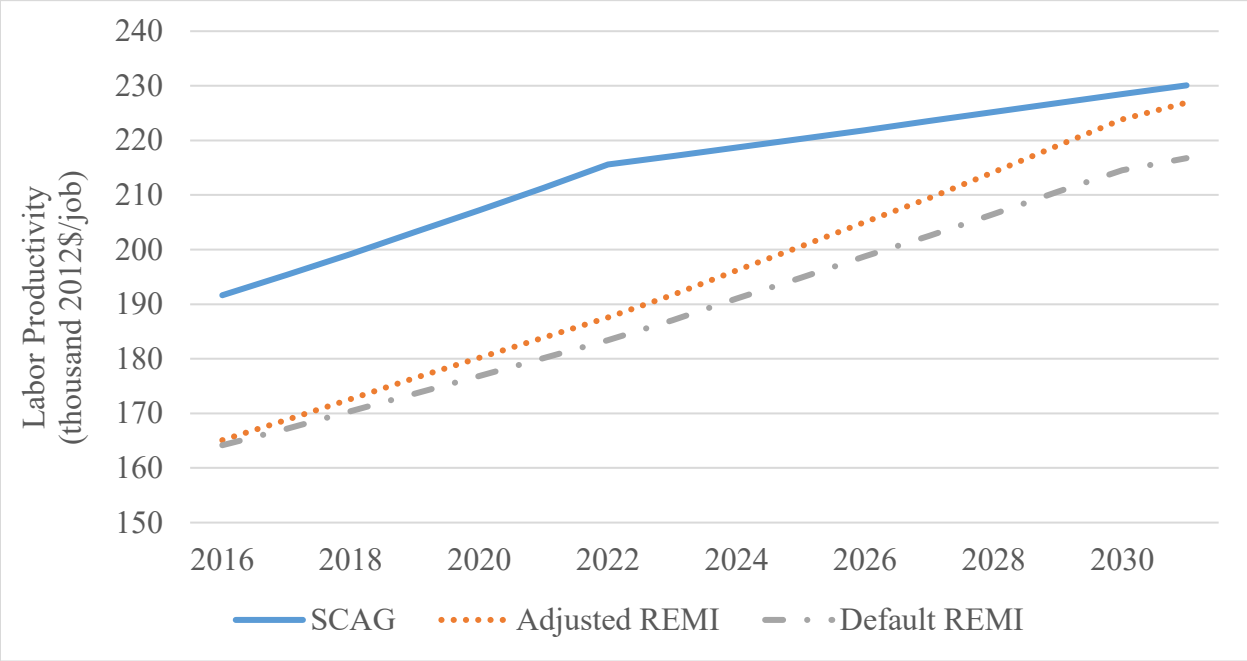
Updating the jobs forecast in REMI not only changes job counts, it may also change the output and the labor productivity (measured in $/job), the latter of which is a major parameter that affects a policy's job impact modeled in REMI. The labor productivity is determined according to the simplified production function below:[4]

$$Y = LP * E, \qquad (1)$$

[4] This is the inverse of a simplified version of equation 2-5 from PI+ v1.7 Model Equations (REMI 2015c).

where *Y* is output in dollars, *LP* is the labor productivity, and *E* is the job counts. According to REMI technical staff, the Employment Update function changes *E* from its REMI defaults to an adjusted *E'* for every time period so that the period-to-period change in *E'* would reflect SCAG's growth rate, and an algorithm concurrently changes *Y*. The percent change in *Y* is less than the percent change in *E* for some industries and more for others. Therefore, the labor productivity may increase or decrease from the default values in REMI as a result of this employment update. Any difference in labor productivity as a result of this employment update is shown in Figure 4A-4. It can be seen that the difference is the largest in years further into the future. SCAQMD staff empirically tested the correlation between jobs and output changes for year 2031 and found that, on average, the ratio of the percentage change in output and percentage change in job counts was approximately one, which indicated that, on average, the labor productivity remained close to the REMI defaults and the divergence in labor productivity in later years was driven mainly by a few outliers. The by-sector percentage changes in labor productivity from default REMI to adjusted REMI in 2031 are shown in Table 4A-3.

FIGURE 4A-4: LABOR PRODUCTIVITY, 2016-2031 FOR THE FOUR-COUNTY REGION



It is important to note that, in Figure 4A-4, the labor productivity shown as the "Adjusted REMI", while on average is close in value to "Default REMI," is generally lower than the labor productivity that SCAG uses to generate forecasted output for the purpose of the 2016 AQMP baseline emission inventory. REMI does not provide a function that allows users to update both job counts and labor productivity. Even if such function exists, however, the labor productivities used by SCAG may not be directly used to replace REMI labor productivities. This is because labor productivity is calculated as output per job, and as discussed above (Equation 1), SCAG and REMI differ greatly in their employment definitions, which result in large differences in the numerator of labor productivity calculation.

TABLE 4A-3: CHANGES IN LABOR PRODUCTIVITY FROM DEFAULT REMI TO ADJUSTED REMI IN 2031 BY INDUSTRY FOR THE FOUR-COUNTY REGION

Industry	% Change	Direction
Monetary authorities – central bank; Credit intermediation and related activities; Funds, trusts, & other financial vehicles	6.3%	(+)
Amusement, gambling, and recreation	5.5%	(+)
Nonmetallic mineral product manufacturing	5.0%	(-)
Pipeline transportation	4.4%	(-)
Publishing industries, except Internet	3.6%	(-)
Mining (except oil and gas)	3.3%	(-)
Forestry and logging; Fishing, hunting, and trapping	2.3%	(-)
Beverage and tobacco product manufacturing	1.9%	(-)
Telecommunications	1.6%	(+)
Fabricated metal product manufacturing	1.4%	(-)
Food manufacturing	1.4%	(-)
Warehousing and storage	1.3%	(+)
Utilities	1.2%	(-)
Primary metal manufacturing	1.2%	(-)
Petroleum and coal products manufacturing	1.2%	(-)
Rail transportation	1.1%	(-)
Motor vehicles, bodies and trailers, and parts manufacturing	1.1%	(-)
Chemical manufacturing	1.1%	(-)
Performing arts and spectator sports	1.0%	(-)
Repair and maintenance	1.0%	(-)
Personal and laundry services	1.0%	(-)
Transit and ground passenger transportation	0.9%	(-)
Paper manufacturing	0.8%	(-)
Air transportation	0.8%	(-)
Scenic and sightseeing transportation; Support activities for transportation	0.8%	(-)
Miscellaneous manufacturing	0.8%	(-)
Motion picture and sound recording industries	0.7%	(-)
Waste management and remediation services	0.7%	(-)
Machinery manufacturing	0.6%	(-)
Furniture and related product manufacturing	0.6%	(-)
Insurance carriers and related activities	0.6%	(-)
Rental and leasing services; Lessors of nonfinancial intangible assets	0.6%	(+)
Real estate	0.6%	(+)
Textile mills; Textile product mills	0.6%	(-)
Accommodation	0.6%	(-)
Truck transportation	0.6%	(-)
Wholesale trade	0.5%	(-)
Plastics and rubber product manufacturing	0.5%	(-)
Wood product manufacturing	0.5%	(-)

TABLE 4A-3: CHANGES IN LABOR PRODUCTIVITY FROM DEFAULT REMI TO ADJUSTED REMI IN 2031 BY INDUSTRY FOR THE FOUR-COUNTY REGION (CONT'D)

Industry	% Change	Direction
Printing and related support activities	0.5%	(-)
Oil and gas extraction	0.5%	(-)
Retail trade	0.4%	(-)
Computer and electronic product manufacturing	0.4%	(-)
Electrical equipment and appliance manufacturing	0.4%	(-)
Couriers and messengers	0.4%	(-)
Social assistance	0.4%	(-)
Apparel manufacturing; Leather and allied product manufacturing	0.4%	(-)
Other transportation equipment manufacturing	0.3%	(-)
Ambulatory health care services	0.3%	(+)
Agriculture and forestry support activities	0.3%	(-)
Museums, historical sites, zoos, and parks	0.3%	(-)
Broadcasting, except Internet	0.3%	(-)
Membership associations and organizations	0.3%	(-)
Internet publishing and broadcasting; ISPs, search portals, and data processing; Other information services	0.2%	(-)
Water transportation	0.2%	(-)
Administrative and support services	0.2%	(+)
Support activities for mining	0.2%	(+)
Educational services	0.2%	(-)
Nursing and residential care facilities	0.2%	(-)
Professional, scientific, and technical services	0.1%	(+)
Food services and drinking places	0.1%	(+)
Hospitals	0.1%	(-)
Construction	0.0%	(+)
Securities, commodity contracts, investments	0.0%	(-)
Private households	0.0%	(-)
Management of companies and enterprises	0.0%	(-)

One of the important implications of the changes in the modeled labor productivity is that it affects the magnitude of job impacts that will be simulated by the REMI model. To understand this by examining direct job effects,[5] we can rewrite $Y = LP * E$ as:

$$E = EPV * Y, \qquad (2)$$

where $EPV = LP^{-1}$ is jobs per dollar of output. Totally differentiating the equation above, we obtain:

$$dE = EPV * dY. \qquad (3)$$

[5] There are also indirect and induced effects.

Therefore, for some change in output, $dY \neq 0$, and some *EPV'>EPV,* then $|dE'| > |dE|$. In other words, a policy that directly or indirectly changes output will have an amplified jobs impact with a greater *EPV* (lower *LP*) and dampened one with a lower EPV (greater LP).

Therefore, when the REMI model with the adjusted baseline results in a lower labor productivity, job impacts will be greater than those that would be predicted by the REMI model with the default baseline. However, differentials in job impacts are minimal for most of the sectors, as labor productivity by sector is mostly very similar between the adjusted and the default REMI baselines. As an example, using the different estimates of labor productivity for the sector of apparel manufacturing and leather and allied products manufacturing in 2031, a policy that causes a $10 million decrease in output, would result in a *direct* effect of 47 predicted jobs foregone using labor productivity values in either adjusted or default REMI baselines.[6]

Population Baseline Adjustment

Data

The default population forecast embedded in the REMI model is based on the demographic assumptions used in the U.S. Census Bureau's national population projections and refined with region-specific parameters, including birth, death, and international migration rates.[7] In comparison, SCAG's sub-county population forecast is based on the projections developed for its 2016 Final RTP/SCS at the TAZ level. SCAG projections considered various data sources, including those published by the U.S. Census Bureau and the California Department of Finance, and refined with local inputs (SCAG 2016). The TAZ-level population projections by gender, race/ethnicity, and age cohort are then aggregated to the 21 sub-county regions and transmitted to the SCAQMD, specifically for the use in the REMI sub-county model which was customized for the South Coast 4-county region (REMI PI$^+$ v1.7.3). It should be noted that both the REMI and SCAG forecast methods relate population growth to job growth; higher job growth levels imply more migration into the region and vice versa.

Method

SCAG staff provided sub-county sub-population projections for 11 years between 2016 and 2031, in addition to the 2012 base year. For years that are missing from the provided forecast, linear interpolation was used to estimate population for these in-between years. The 2014-2031 data were transposed and entered into REMI using its Population Update function, concurrently with the Employment Update described above, to generate an alternative baseline scenario, or "Regional Control," that reflected SCAG's

[6] Based on labor productivities of $0.220, and $0.221 million/job, respectively. This example is based on fixed input-output relationship, which does not take into account indirect effects. As this industry's intermediate demands change, the job effects of these changes could widen, albeit how slightly, the difference in job impact across and the adjusted and the default REMI baselines.

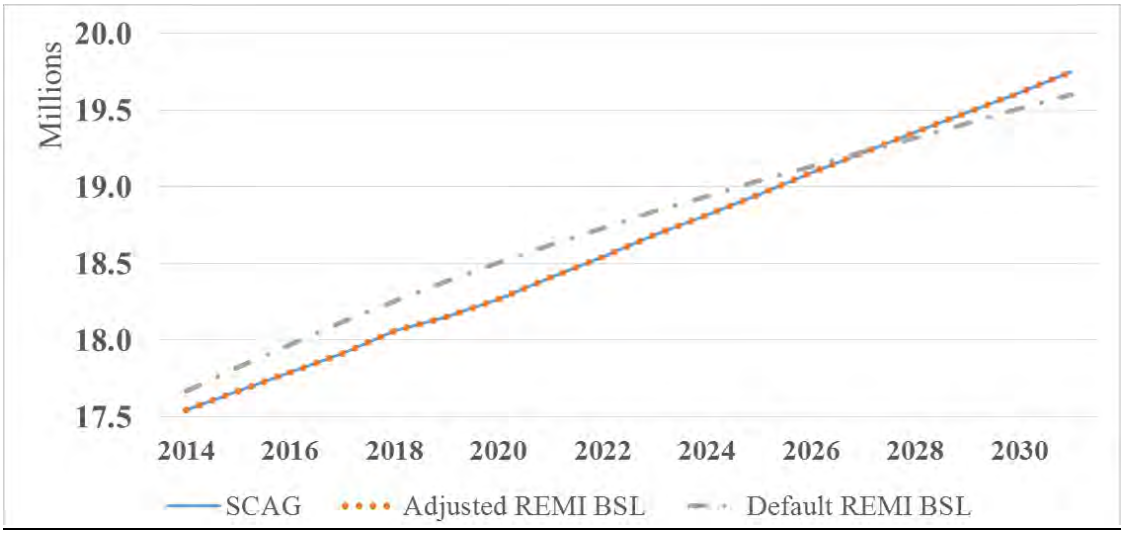
[7] REMI documentation "REMI PI$^+$ v1.7: Demographic Component of the REMI Model" (2015b) and in consultation with REMI technical staff.

projections. The 2014-2031 data were used because the Population Update function allows users to adjust population for the forecast years only, and the last historical year in REMI PI+ v1.7.3 is 2013.[8]

Results and Implications

It can be seen from Figure 4A-5 that the adjusted REMI baseline perfectly aligns with the projected total population using SCAG's projections for the 21 sub-county regions. An examination of the discrepancies among all sub-county, sub-population groups showed infinitesimal differences for all years.

FIGURE 4A-5: POPULATION FORECASTS, TOTAL OF 21 SUB-COUNTY REGIONS (2014-2031)



It should be noted that no adjustments of birth rates by age cohort was done prior to entering data into the Population Update. Such adjustments were recommended back in 1994 (Levy 1994) and implemented for earlier AQMPs, largely due to the lack of detailed sub-population data table as needed to populate the REMI forecast. Therefore, cohort birth rates were used to generate the needed table. This is now obviated as SCAG provides the necessary sub-population forecast data to fill the Population Update table in REMI. The birth rates in the adjusted REMI baseline are different than the REMI default rates. This is a result of the Population Update *per se* and may not reflect entirely the birth rates assumed by the SCAG demographic projections.

According to REMI technical staff, the REMI Population Update function treats the initial difference in 2014 between the adjusted and default REMI baselines as a decrease in the number of international migrants. Then, if the implied next-period population by the embedded demographic assumptions does not match up with that projected by SCAG, any remaining differences are again attributed to international migration. The process continues for all subsequent periods until 2031. Because economic behaviors do not differ by migrant status in the REMI model, this update procedure is not expected to cause any

[8] As REMI solves its model per time period, simulation results for years 2014-2031 will not be affected by maintaining the default REMI baseline for the historical and post-2031 years. (This is in contrast to an intertemporal forward-looking model.)

changes in key parameter values that could influence simulation results, other than a different baseline population for comparison.

DRAFT FINAL SOCIOECONOMIC REPORT
APPENDIX 4-B

REMI MODELING ASSUMPTIONS

JANUARY 2017

This appendix consists of two parts. Part I presents the REMI Model's framework and the assumptions embedded in the model. The second part covers the detailed REMI modeling assumptions used by staff for each control measure analyzed in this report.

Part I – REMI Modeling Framework and Assumptions

(a) REMI Model Framework

In an effort to expand socioeconomic impact assessments for proposed rules, rule amendments, and AQMPs, the SCAQMD has been using a computerized economic model from Regional Economic Models, Inc. (REMI) to assess the socioeconomic impacts on the four-county economy since 1990. The structure and assumptions of the model are briefly described below.

The REMI model customized for the SCAQMD's use links the economic activities in the 21 sub-counties within the four-county region of Los Angeles, Orange, Riverside, and San Bernardino. There are 11 sub-county regions in Los Angeles County, four in Orange County, three in Riverside County, and three in San Bernardino County. The division of the sub-regions were originally developed in 1996 and have been updated to reflect the 2010 Census, reflecting the politically, socially, economically, and geographically diversified structure of the Southern California economy.

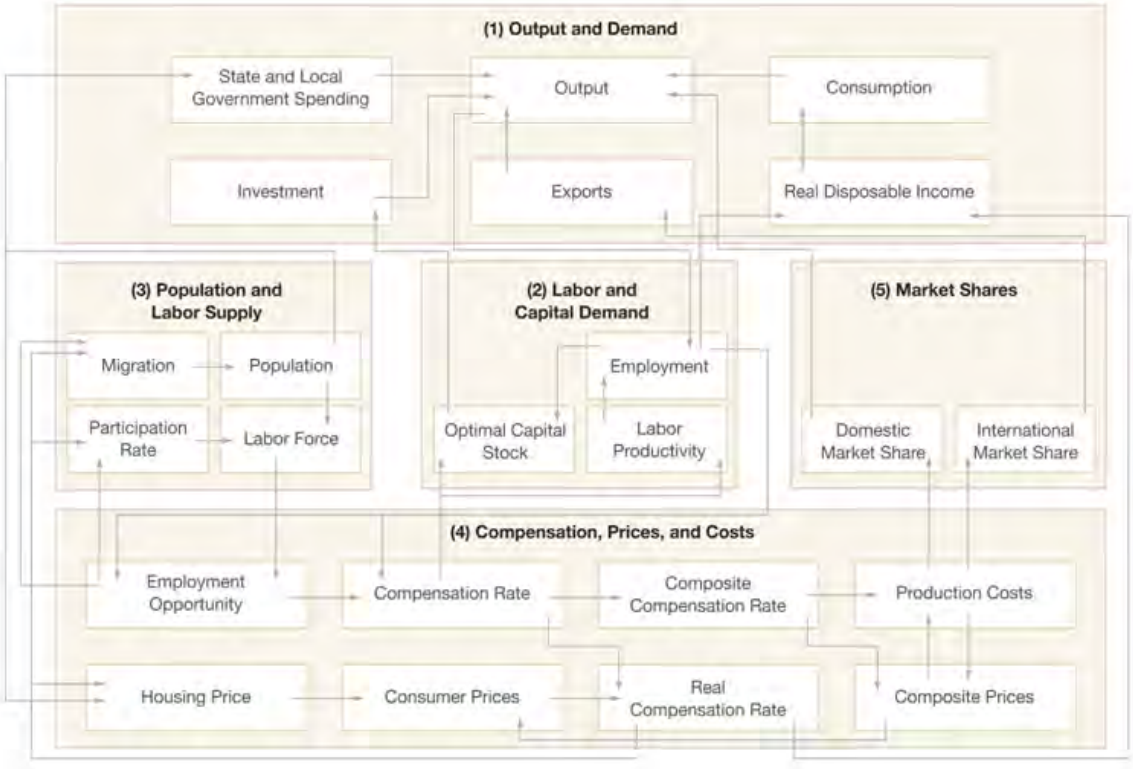
The REMI model for each sub-region is comprised of a five block structure that includes (1) output and demand, (2) labor and capital, (3) population and labor force, (4) compensation, prices and costs, and (5) market shares. These five blocks are interrelated and the linkages are shown in Figure 4B-1. Each block is built upon a two-step process. First, producers and consumers throughout all regions of the country are assumed to have similar behavioral characteristics. Because of these similarities, statistical techniques are used to estimate economic responses based on studies performed throughout the U. S. The second step of the modeling process is region specific, and involves calibration of the model based on region-specific historical data.

The standard structure has 66 private non-farm industries (3-digit NAICS), three government sectors and a farm sector, 95 occupations, and 88 final demand sectors. The demographic/migration component captures population changes due to births, deaths, migration, and changes to special population (e.g., prisoners and college students); and has 808 age/gender/race/ethnicity cohorts. The input-output module contains detailed inter-industry relationships for 403 sectors and is used to assess the detailed inter-industry effect of a policy change. Results from the input-output module are fed through population, price and economic geography equations to produce a complete economic and demographic assessment.

Figure 4B-1 depicts the framework of the REMI model.

FIGURE 4B-1

REMI Model Components



(b) Verification of the Model

The REMI model for the Southern California geography was independently evaluated by the University of Pittsburgh in 1989, MIT 1992, and Abt Associates in 2014 to determine its forecasting and simulation capabilities. The model's performance was judged to meet accepted standards of practice (Cassing and Giarratani, 1992). Abt Associates (2014) recommended that staff continue using the REMI model for macroeconomic impact assessment while evaluating other tools and models to supplement the REMI analysis, particularly when impacts are expected to be at a relatively small scale or when the proposed policies and regulations would affect mainly small businesses or very specific industries.

Part II – REMI Modeling Assumptions for the 2016 AQMP Socioeconomic Assessment

The costs and benefits of the Draft Final 2016 AQMP are expected to alter, to various degrees, the economic decisions made by households, businesses, and other economic actors. Some businesses would see production costs go up while other businesses would benefit from a greater demand for their services and technologies. For consumers who consider purchasing or replacing vehicles or certain household appliances, the proposed control strategies would also change or widen the range of product choices that differ in fuel types, energy efficiencies, effective unit prices, and thus potentially payback periods. In the

meantime, improved public health would contribute to higher labor productivity and reduce healthcare-related expenditures. All these direct effects would then cascade through the regional economy and produce indirect and induced macroeconomic impacts. The immediate and subsequent effects may not just occur in the short-term, but some of them may also have lasting impacts that would subside only after a long period of time.

These direct, indirect, and induced macroeconomic impacts were assessed through the customized REMI model.[1] The macroeconomic impacts associated with the Draft Final 2016 AQMP were simulated and projected relative to the baseline forecast of the regional economy, which is absent the Draft Final 2016 AQMP and without the implementation of the proposed control strategies. The modeling assumptions used in the analysis are discussed below.

(a) Incremental Costs and Incentives

As discussed in Chapter 2, costs associated with the Draft Final 2016 AQMP represent the cost difference between a baseline path and an alternative path as proposed by the Draft Final 2016 AQMP to reach the attainment targets. The total incremental cost includes remaining incremental cost plus incentives. The remaining incremental costs will be incurred by the affected entities, including businesses and consumers, and it is assumed that federal or state governments will be responsible for financing the entire incentive amount. Total incremental costs are calculated as the sum of incremental capital costs (e.g., equipment purchases and installation costs) and future incremental recurring costs over the equipment's expected lifetime that are associated with operation and maintenance (e.g., filter replacement and fuel costs/savings).

For the remaining incremental costs, the industry-specific "Production Cost" policy variable is used to model increased costs of doing business (and in some cases, cost-savings) for the affected industries. The associated spending on control device and low-emission equipment is modeled with the industry-specific "Exogenous Final Demand" policy variables to account for increases in sales volume for the equipment and technology suppliers. For the consumers, the "Consumer Spending" policy variable is used in conjunction with "Consumer Spending Reallocation" to model impacts resulting from changes in consumer behavior. For the government incentives, it was assumed that all incentive programs would be funded by existing revenue sources for the state budget. This is modeled using the "State Government Spending" policy variable which would result in state budget reallocation and affect provision of public services. An additional incentive funding scenario was analyzed where funds would be provided by existing funds from the federal government. For this scenario, incentives were considered as "free money" and not entered into the model.

Table 4B-1 at the end of this appendix lists the industry sectors modeled in REMI that would either incur costs or benefit from the compliance expenditures. It should be noted that, although staff was able to make reasonable assumptions about the geographical location of directly affected industries based on the review of SCAQMD permits and other existing data, the same could not be achieved for the businesses from which the affected facilities would purchase control equipment and services. As a result, staff adopted the ad-hoc assumption that only a portion of these purchases would be from local suppliers, and this portion was based on the national distribution of industry-specific statistics that REMI summarizes in

[1] REMI Policy Insight Plus (PI+) South Coast Sub County Model v1.7.3 (Build 3967). For a full description of the REMI methodology, please refer to the REMI documentation available at http://www.remi.com/products/pi.

its embedded "regional purchase coefficient" parameters.

(b) Public Health Benefits

Public Health Benefits were valued using two general types of methodologies: willingness-to-pay (WTP) to reduce health risk and avoided cost of illness (COI), based on the 2016 IEc recommendations.[2]

The morbidity-related health benefits were valued by a combination of COI and WTP. The directly avoided COI or the WTP for reduced risk of various morbidity symptoms were modeled as reduced consumer spending on healthcare-related goods and services and a corresponding reallocation of consumer spending from healthcare to other goods, services, and savings. The indirectly avoided COI, which was valued by the lost work time due to absences from work to recover or take care of ill dependents, were assumed to increase labor productivity for all industries.

The mortality-related health benefits valued based on WTP were modeled using the "Non-Pecuniary Amenity Aspects" policy variable which would result in increases in attractiveness of the region relative to the rest of the nation and would induce economic migration into the region. The basic concept of this policy variable is that prospective economic migrants consider a list of factors, including but not limited to location-specific amenities and wages, when making their location choice. An increase in the amenity of a region increases a location's attractiveness even when wages remain the same, such that an individual from outside the region would be willing to migrate to the region despite no changes in the (pre-migration) wage differential between his/her current residence and the location where the amenity is enhanced. This is because amenity, although non-pecuniary, can in concept be converted as an increase in an individual's total compensation, on top of his/her market wages.

This change in economic migration then leads to a change in the local labor supply and regional population, and subsequently the post-migration wages and housing prices, which have impacts that cascade through the regional economy. These impacts will eventually lead to a change in regional GDP and the number of jobs.

Following is a technical description of how the change in amenity values enter into the REMI model. REMI's equation for economic migration is as follows (REMI 2015):

$$ECMIG_t^l = \left[\lambda^l + \beta_1 \ln\left(REO_t^l\right) + \beta_2 \ln\left(RWR_t^l\right) + \beta_1 \ln\left(MIGPROD_t^l\right)\right] * LF_{t-1}^l,$$

where *ECMIG* is economic migration, and it is a function of a number of variables including the location-specific amenity (λ^l) and the relative real compensation rate (*RWR*). β_1 and β_2 are the econometrically estimated coefficients and, LF_{t-1}^l is the regional labor force of the previous year. According to REMI staff, an increase in amenity raises λ^l by the amount $\beta_2 \ln\left(1+\frac{a}{w}\right)$, where a is the amount REMI users would enter into REMI via the "Non-Pecuniary Amenity Aspects" policy variable and w is the total wage and salary disbursement in the location. This increase, in terms of affecting economic migration, can be shown to be equivalent to the effect of raising the relative real compensation rate (*RWR*) by a factor of $\left(1+\frac{a}{w}\right)$ so that the change in economic migration ($dECMIG_t^l$) as a result of the increased amenities is calculated

[2] Industrial Economics Memo: "Review of Mortality Risk Reduction Valuation Estimates for 2016 Socioeconomic Assessment" March, 2016.

by the following differential equation:

$$dECMIG_t^l = \frac{\beta_2 LF_{t-1}^l}{RWR_t^l} dRWR_t^l = \beta_2 \ln\left(1 + \frac{a}{w}\right) LF_{t-1}^l.$$

This change in economic migration cascades through the regional economy according to the model structure described above.

To evaluate and further understand the amenity modeling mechanism employed in the REMI model, SCAQMD commissioned a third-party study by Michael Lahr (2016). One of the recommendations of this study was to conduct a sensitivity analysis of the amenity values evaluated in REMI. This sensitivity analysis is included in Chapter 4 of this report.

TABLE 4B-1: INDUSTRIES/SECTORS INCURRING *VS.* BENEFITTING FROM COMPLIANCE COSTS/SPENDING

Control Measure	Industries Incurring Incremental Costs/Savings	Supplier Industries Benefitting from Additional/Reduced Spending
SCAQMD Stationary Source Measures		
BCM-01 (Commercial Restaurants)	Food services and drinking places	Construction
		Food services and drinking places
		Machinery manufacturing
		Wholesale trade
BCM-04 (Emission Reductions from Manure Operations)	Farm	Farm
BCM-10 (Green waste Operation)	Administrative and support services	Administrative and support services
	Retail trade	Construction
	State and Local Government	Retail trade
	Waste management and remediation services	State and Local Government
	Wholesale trade	Utilities
	Wood product manufacturing	Waste management and remediation services
		Wholesale trade
CMB-01 (Transition to zero and near-zero Technologies)	All Industries	Electrical equipment and appliance manufacturing
	Utilities	Fabricated metal product manufacturing
		Machinery manufacturing
CMB-02 (Water Heaters/Boilers)	All Industries	Construction
		Machinery manufacturing

TABLE 4B-1: INDUSTRIES/SECTORS INCURRING *VS.* BENEFITTING FROM COMPLIANCE COSTS/SPENDING (CONT'D)

Control Measure	Industries Incurring Incremental Costs/Savings	Supplier Industries Benefitting from Additional/Reduced Spending
CMB-03 (Non-Ref Flares)	Ambulatory health care services	Chemical manufacturing
	Beverage and tobacco product manufacturing	
	Food manufacturing	
	Oil and gas extraction	
	Pipeline transportation	
	Utilities	
	Waste management and remediation services	
CMB-04 (Restaurant Burners)	Food services and drinking places	Machinery manufacturing
CMB-05 (RECLAIM Refinery) CMB-05 (RECLAIM Refinery) Cont.	Petroleum and coal products manufacturing Petroleum and coal products manufacturing	Chemical manufacturing
		Construction
		Fabricated metal product manufacturing
		Machinery manufacturing
		Professional, scientific, and technical services
		Utilities
CMB-05 (RECLAIM Non-Refinery)	Chemical manufacturing	Chemical manufacturing
	Nonmetallic mineral product manufacturing	Construction
	Oil and gas extraction	Machinery manufacturing
	Paper manufacturing	Professional, scientific, and technical services
	Primary metal manufacturing	Utilities
	Scenic and sightseeing transportation; Support activities for transportation	
	Utilities	
CTS-01 (Coatings, Solvents, Adhesives, and Lubricants)	Construction	Chemical manufacturing
ECC-03 (Building Efficiency)	Consumers	Machinery manufacturing
		Utilities
FUG-01 (Leak Detections and Repairs)	Oil and gas extraction	Computer and electronic product manufacturing
	Petroleum and coal products manufacturing	Fabricated metal product manufacturing
		Support activities for mining

TABLE 4B-1: INDUSTRIES/SECTORS INCURRING *VS.* BENEFITTING FROM COMPLIANCE COSTS/SPENDING (CONT'D)

Control Measure	Industries Incurring Incremental Costs/Savings	Supplier Industries Benefitting from Additional/Reduced Spending
SCAQMD Mobile Sources		
MOB-10 (SOON Program)	Construction	Machinery manufacturing
		Wholesale trade
MOB-11 (Extended Exchange Program)	Administrative and support services	Machinery manufacturing
MOB-14 (Incentives Program)	Rail transportation	Chemical manufacturing
	Scenic and sightseeing transportation; Support activities for transportation	Machinery manufacturing
	Transit and ground passenger transportation	Motor vehicles, bodies and trailers, and parts manufacturing
	Truck transportation	Retail trade
		Wholesale trade
CARB's Measures		
ORLD-01 (Advanced Clean Cars 2)	Consumer	Motor vehicles, bodies and trailers, and parts manufacturing
		Repair and maintenance
		Utilities
ORHD-02 Low NOx Engine Standard - California Action	Truck transportation	Motor vehicles, bodies and trailers, and parts manufacturing
ORHD-02 Low NOx Engine Standard - Federal Action	Truck transportation	Motor vehicles, bodies and trailers, and parts manufacturing
ORHD-04 Advanced Clean Transit	Transit and ground passenger transportation	Chemical manufacturing
		Electrical equipment and appliance manufacturing
		Motor vehicles, bodies and trailers, and parts manufacturing
		Oil and gas extraction
		Utilities
ORHD-05 Last Mile Delivery	Couriers and messengers	Machinery manufacturing
	Truck transportation	
ORHD-09 Further Deployment: On-Road Heavy Duty	Truck transportation	Motor vehicles, bodies and trailers, and parts manufacturing

TABLE 4B-1: INDUSTRIES/SECTORS INCURRING *VS.* BENEFITTING FROM COMPLIANCE COSTS/SPENDING (CONT'D)

Control Measure	Industries Incurring Incremental Costs/Savings	Supplier Industries Benefitting from Additional/Reduced Spending
ORFIS-01 More Stringent National Locomotive Emission Standards	Rail transportation	Other transportation equipment manufacturing
		Repair and maintenance
		Retail trade
ORFIS-02 Tier 4 Vessel Standard	Water transportation	Other transportation equipment manufacturing
		Repair and maintenance
ORFIS-04 At-Berth Regulation Amendments	Water transportation	Other transportation equipment manufacturing
ORFIS-05 Further Deployment: Federal and International	Air transportation	Chemical manufacturing
	Rail transportation	Machinery manufacturing
	Water transportation	Other transportation equipment manufacturing
OFFS-01 Zero-Emission Off-Road Forklift Regulation Phase I	Food manufacturing	Machinery manufacturing
	Rental and leasing services; Lessors of nonfinancial intangible assets	Repair and maintenance
	Truck transportation Water Transportation	Retail trade
	Wholesale trade	Utilities
OFFS-04 Zero-Emission Airport Ground Support Equipment	Air transportation	Construction
	Scenic and sightseeing transportation; Support activities for transportation	Machinery manufacturing
OFFS-05 Small Off-Road Engines	Consumers	Machinery manufacturing
		Retail trade
		Utilities
OFFS-07 Low-Emission Diesel	Rail transportation	Food manufacturing
	Scenic and sightseeing transportation; Support activities for transportation	Wood product manufacturing
OFFS-08 SCAQMD Further Deployment: Off-road Equipment	Administrative and support services Rail transportation	Chemical manufacturing
		Machinery manufacturing
	Truck transportation	Motor vehicles, bodies and trailers, and parts manufacturing
	Administrative and support services	Oil and gas extraction
CPP-01 Consumer Product Program	Consumer	Chemical manufacturing

Table 4B-2 presents the nationwide median weekly wage rates for 95 occupations obtained from the 2014 Bureau of Labor Statistics (BLS) Current Population Survey (CPS), Employment and Earnings. The wage rates are ranked in ascending order, and then divided into five groups. The range of occupational wage rates are listed in Table 4-6 of Chapter 4.

TABLE 4B-2: EARNINGS BY OCCUPATIONAL WAGE GROUP BY MEDIAN WEEKLY EARNINGS

Quintile	Occupational Title	Median Weekly Earnings
1	Media and communication equipment workers	$398
1	Nursing, psychiatric, and home health aides	$457
1	Occupational therapy and physical therapist assistants and aides	$457
1	Other healthcare support occupations	$460
1	Cooks and food preparation workers	$398
1	Food and beverage serving workers	$424
1	Other food preparation and serving related workers	$385
1	Building cleaning and pest control workers	$467
1	Grounds maintenance workers	$445
1	Entertainment attendants and related workers	$361
1	Personal appearance workers	$480
1	Other personal care and service workers	$431
1	Supervisors of farming, fishing, and forestry workers	$448
1	Agricultural workers	$418
1	Fishing and hunting workers	$448
1	Forest, conservation, and logging workers	$448
1	Other construction and related workers	$461
1	Textile, apparel, and furnishings workers	$250
1	Other transportation workers	$236
2	Life, physical, and social science technicians	$571
2	Other education, training, and library occupations	$582
2	Other protective service workers	$534
2	Supervisors of food preparation and serving workers	$529
2	Animal care and service workers	$524
2	Funeral service workers	$481
2	Baggage porters, bellhops, and concierges; Tour and travel guides	$481
2	Retail sales workers	$516
2	Information and record clerks	$603
2	Other office and administrative support workers	$611
2	Helpers, construction trades	$566
2	Extraction workers	$596
2	Assemblers and fabricators	$525

TABLE 4B-2: EARNINGS BY OCCUPATIONAL WAGE GROUP BY MEDIAN WEEKLY EARNINGS (CONT'D)

Quintile	Occupational Title	Median Weekly Earnings
2	Food processing workers	$509
2	Printing workers	$583
2	Plant and system operators	$573
2	Other production occupations	$555
2	Rail transportation workers	$619
2	Material moving workers	$486
3	Social scientists and related workers	$640
3	Religious workers	$767
3	Librarians, curators, and archivists	$685
3	Entertainers and performers, sports and related workers	$763
3	Supervisors of building and grounds cleaning, maintenance workers	$684
3	Supervisors of personal care and service workers	$687
3	Other sales and related workers	$659
3	Communications equipment operators	$638
3	Financial clerks	$624
3	Material recording, scheduling, dispatching, and distributing workers	$623
3	Secretaries and administrative assistants	$681
3	Construction trades workers	$680
3	Electrical and electronic equipment mechanics, installers, and repairers	$706
3	Vehicle and mobile equipment mechanics, installers, and repairers	$737
3	Other installation, maintenance, and repair occupations	$761
3	Metal workers and plastic workers	$645
3	Woodworkers	$623
3	Motor vehicle operators	$689
3	Water transportation workers	$620
4	Drafters, engineering technicians, and mapping technicians	$909
4	Life scientists	$960
4	Counselors and Social workers	$864
4	Miscellaneous community and social service specialists	$773
4	Legal support workers	$856
4	Preschool, primary, secondary, and special education school teachers	$935
4	Other teachers and instructors	$905
4	Art and design workers	$969
4	Health technologists and technicians	$768
4	Supervisors of protective service workers	$897

TABLE 4B-2: EARNINGS BY OCCUPATIONAL WAGE GROUP BY MEDIAN WEEKLY EARNINGS (CONT'D)

Quintile	Occupational Title	Median Weekly Earnings
4	Law enforcement workers	$899
4	Supervisors of sales workers	$776
4	Sales representatives, services	$906
4	Supervisors of office and administrative support workers	$772
4	Supervisors of installation, maintenance, and repair workers	$980
4	Supervisors of production workers	$902
4	Supervisors of transportation and material moving workers	$882
4	Military	$904
5	Top executives	$1,729
5	Advertising, marketing, promotions	$1,384
5	Operations specialties managers	$1,320
5	Other management occupations	$1,141
5	Business operations specialists	$1,074
5	Financial specialists	$1,108
5	Computer occupations	$1,367
5	Mathematical science occupations	$1,244
5	Architects, surveyors, and cartographers	$1,016
5	Engineers	$1,384
5	Physical scientists	$1,261
5	Lawyers, judges, and related workers	$1,738
5	Postsecondary teachers	$1,172
5	Media and communication workers	$995
5	Health diagnosing and treating practitioners	$1,267
5	Other healthcare practitioners and technical occupations	$1,065
5	Sales representatives, wholesale and manufacturing	$1,042
5	Supervisors of construction and extraction workers	$990
5	Air transportation workers	$1,131

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COMPETITIVENESS IMPACTS

JANUARY 2017

Regional economic competitiveness depends on various interrelated factors. A primary factor is the cost of operating a business in a region, which varies from industry to industry. Some industries may rely heavily on local market demand while others export goods and services to other regions. Businesses in some industry sectors tend to physically cluster with their competitors, as well as upstream and downstream firms, to foster network effects and create economies of agglomeration. In contrast, in other industries, businesses need not locate in close proximity to competitors or upstream/downstream firms to be competitive. Besides the industry-specific factors, the health and productivity of the region's workforce is another important determinant, and both cost of living and quality of life play a role in the size and makeup of a region's labor pool. Additionally, regional economic competitiveness can be also affected by policy decisions and public investment, such as the adequacy and conditions of regional infrastructure, as well as the regulatory environment and enforcement. As discussed in previous sections, the 2016 AQMP will potentially affect regional economic competitiveness through three major channels: (1) by increasing costs or introducing cost-savings for regional businesses, consumers, and the public sector as a result of the proposed control strategies; (2) by reducing air pollution-related health risks for the workforce and their dependents; and 3) by enhancing quality of life for the region's residents via public health and other clear air-related welfare benefits.

Having analyzed the benefits of clean air to the region's population and workforce, this section discusses net competitiveness impacts from the perspective of business operations. The REMI model, used to estimate potential job impacts of the 2016 AQMP, also projects impacts on industry gross domestic product (GDP), cost of production, prices of locally manufactured goods, as well as exports and imports.

Impacts on Industry GDP

Industry GDP is the gross output of an industry less the value of its intermediate inputs. Table 4-8 shows the percent change of industry GDP from the baseline. The impacts associated with incremental costs only are mostly negative, and the impacts associated with public health benefits only are mostly positive. The overall impacts of the Revised Draft 2016 AQMP on industry GDP are largely negative in the beginning years of plan implementation, but then become positive towards the later years. However, the magnitude of these impacts are negligible, with a combined cost/benefit impact of less than one percent for the majority of industries.

TABLE 4C-1: IMPACTS ON INDUSTRY GDP

(Relative to Baseline)

Industry	Incremental Costs			Health Benefits			Combined Costs and Benefits		
	2017	2023	2031	2017	2023	2031	2017	2023	2031
Forestry, Fishing, Other	-0.07%	-0.05%	0.09%	0.01%	0.07%	0.11%	-0.06%	0.02%	0.19%
Mining, Oil and Gas Extraction	-0.25%	-0.67%	-0.99%	0.01%	0.06%	-0.08%	-0.24%	-0.60%	-1.07%
Utilities	-0.10%	-0.43%	-3.48%	0.02%	0.24%	0.41%	-0.08%	-0.19%	-3.07%
Construction	-0.42%	-0.38%	-0.20%	0.03%	0.36%	0.45%	-0.39%	-0.02%	0.24%
Manufacturing	0.12%	0.20%	0.16%	0.01%	0.08%	0.14%	0.13%	0.28%	0.29%
Wholesale Trade	-0.06%	-0.03%	0.09%	0.01%	0.11%	0.20%	-0.05%	0.08%	0.29%
Retail Trade	-0.12%	-0.08%	0.09%	0.02%	0.20%	0.37%	-0.10%	0.12%	0.46%
Transportation and Warehousing	-0.07%	0.03%	-0.04%	0.01%	0.07%	0.14%	-0.06%	0.10%	0.10%
Information	-0.08%	-0.06%	-0.01%	0.01%	0.07%	0.13%	-0.07%	0.01%	0.12%
Finance and Insurance	-0.10%	-0.06%	0.01%	0.01%	0.06%	0.12%	-0.09%	0.00%	0.13%
Real Estate, Rental, and Leasing	-0.07%	-0.06%	-0.01%	0.01%	0.18%	0.31%	-0.05%	0.12%	0.29%
Professional and Technical Services	-0.10%	-0.09%	-0.04%	0.01%	0.11%	0.19%	-0.09%	0.03%	0.15%
Management of Companies & Entr.	0.01%	0.06%	0.11%	0.01%	0.10%	0.19%	0.02%	0.16%	0.30%
Administrative and Waste Services	-0.13%	-0.02%	0.07%	0.01%	0.14%	0.26%	-0.12%	0.12%	0.33%
Educational Services	-0.09%	-0.07%	0.00%	0.02%	0.22%	0.39%	-0.07%	0.15%	0.39%
Health Care and Social Assistance	-0.11%	-0.09%	-0.01%	0.01%	0.18%	0.39%	-0.10%	0.09%	0.38%
Arts, Entertainment and Recreation	-0.06%	-0.03%	0.02%	0.01%	0.04%	0.07%	-0.05%	0.01%	0.08%
Accommodation and Food Services	-0.10%	-0.11%	-0.07%	0.02%	0.33%	0.61%	-0.08%	0.21%	0.54%
Other Services (ex. Government)	-0.14%	-0.10%	0.07%	0.01%	0.09%	0.19%	-0.13%	0.00%	0.26%

Impacts on Cost of Production

Table 4-9 shows the percent change in cost of production relative to the rest of the United States, as a result of implementing the Revised Draft 2016 AQMP. The impacts associated with incremental costs are mostly negative in 2017 and 2023 when most of government incentives are assumed to occur assisting consumers and industry in reducing the financial burden of acquiring equipment made with zero and near-zero emission technologies. In some cases, especially when large cost-savings from operation and maintenance are anticipated, the assumed incentive amounts could be significant enough to largely offset the incremental cost of capital equipment, thus resulting in an immediate lowering of production costs. Moreover, due to the modeling assumption that no additional revenues would be raised to fund the proposed incentives, the incentive payouts from government would necessitate a decrease in public spending in other function areas. These spending decreases would reduce local demand for goods and services across many industry sectors, thereby also reducing their demand for capital, labor, and other inputs. With lower demands for these inputs, their price would drop and therefore reduce the cost of production. While these incentives are being spent by consumers and industry elsewhere in the economy, much of it is on equipment manufactured outside the region, thus much of the impact occurs outside the region.

The impacts associated with public health benefits mainly increase production costs. By attracting more

economic migrants into the region via improved quality of life, the population increase would increase demand for housing and drive up land costs as well. This will eventually translate into higher capital costs, and therefore increasing production costs. It should be noted that increased economic migration would also increase labor supply and lower wage rates. However, in the REMI model built for the four-county region, the improved amenity, or quality of life, exerts more upward pressure on capital costs than downward impacts on wages, thus increasing the overall costs of production.

Overall, the utility sector is projected to experience the highest increase (0.02 percent in 2023 and 0.18 percent in 2031) as a result of the Revised Draft 2016 AQMP, due to the many proposed stationary and mobile source control measures affecting cost and output of the sector including: Advanced Clean Cars 2, Advanced Clean Transit, CMB-01, CMB-05, and ECC-03 (for more details see Appendix 4-B). All the remaining sectors will experience a smaller magnitude of production cost impacts, whether positive or negative, on their costs of production. All of these changes are relatively small when compared with the overall size of the four-county economy.

TABLE 4C-2: IMPACTS ON COST OF PRODUCTION BY INDUSTRY

(Relative to Baseline)

Industry	Incremental Costs			Health Benefits			Combined Costs and Benefits		
	2017	2023	2031	2017	2023	2031	2017	2023	2031
Forestry, Fishing, Other	-0.01%	-0.02%	0.00%	0.00%	0.00%	-0.02%	-0.01%	-0.03%	-0.01%
Mining, Oil and Gas Extraction	-0.01%	-0.02%	0.04%	0.00%	0.19%	0.38%	-0.01%	0.17%	0.42%
Utilities	-0.01%	0.02%	0.18%	0.00%	0.11%	0.23%	-0.01%	0.13%	0.41%
Construction	-0.01%	-0.04%	0.01%	0.00%	0.01%	0.00%	-0.01%	-0.03%	0.01%
Manufacturing	-0.01%	-0.02%	0.02%	0.00%	0.01%	0.01%	-0.01%	-0.01%	0.03%
Wholesale Trade	-0.01%	-0.03%	0.00%	0.00%	0.01%	0.02%	-0.01%	-0.02%	0.02%
Retail Trade	-0.01%	-0.04%	0.00%	0.00%	0.03%	0.05%	-0.01%	-0.01%	0.05%
Transportation and Warehousing	-0.03%	0.00%	0.19%	0.00%	0.01%	0.00%	-0.03%	0.00%	0.19%
Information	-0.01%	-0.04%	-0.01%	0.00%	0.03%	0.06%	-0.01%	-0.01%	0.05%
Finance and Insurance	-0.01%	-0.05%	-0.01%	0.00%	0.04%	0.07%	-0.01%	-0.01%	0.06%
Real Estate, Rental, Leasing	-0.01%	-0.06%	-0.01%	0.00%	0.15%	0.29%	-0.01%	0.09%	0.28%
Professional and Technical Services	-0.01%	-0.04%	-0.01%	0.00%	0.00%	-0.01%	-0.01%	-0.04%	-0.02%
Management of Companies and Entr.	-0.01%	-0.04%	0.00%	0.00%	-0.01%	-0.03%	-0.01%	-0.05%	-0.04%
Administrative and Waste Services	-0.07%	-0.33%	-0.22%	0.00%	0.00%	-0.01%	-0.07%	-0.33%	-0.23%
Educational Services	-0.02%	-0.07%	-0.02%	0.00%	0.01%	0.00%	-0.02%	-0.06%	-0.03%
Health Care and Social Assistance	-0.01%	-0.05%	-0.01%	0.00%	0.00%	-0.01%	-0.02%	-0.05%	-0.02%
Arts, Entertainment and Recreation	-0.01%	-0.05%	-0.01%	0.00%	0.05%	0.09%	-0.01%	0.00%	0.08%
Accommodation and Food Services	-0.01%	-0.01%	0.08%	0.00%	0.03%	0.06%	-0.01%	0.02%	0.14%
Other Services (ex. Government)	-0.01%	-0.04%	-0.01%	0.00%	0.03%	0.04%	-0.01%	-0.02%	0.04%

Impacts on Delivered Prices

Changes in production costs will affect prices of goods produced locally. The relative delivered price of a good is based on its production cost and the transportation cost of delivering the good to where it is consumed or used. Thus, the impact of implementing the Revised Draft 2016 AQMP on the delivered price mimics the cost of production. A lower cost of production translates to lower delivered prices, and *vice versa*.

TABLE 4C-3: IMPACTS ON DELIVERED PRICES BY INDUSTRY

(Relative to Baseline)

Industry	Incremental Costs			Health Benefits			Combined Costs and Benefits		
	2017	2023	2031	2017	2023	2031	2017	2023	2031
Forestry, Fishing, Other	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mining, Oil and Gas Extraction	0.00%	-0.01%	0.02%	0.00%	0.09%	0.18%	0.00%	0.08%	0.20%
Utilities	-0.01%	0.02%	0.15%	0.00%	0.09%	0.19%	-0.01%	0.11%	0.34%
Construction	-0.01%	-0.03%	0.01%	0.00%	0.01%	0.00%	-0.01%	-0.02%	0.01%
Manufacturing	-0.01%	-0.01%	0.01%	0.00%	0.01%	0.00%	-0.01%	-0.01%	0.02%
Wholesale Trade	-0.01%	-0.03%	0.00%	0.00%	0.01%	0.02%	-0.01%	-0.02%	0.01%
Retail Trade	-0.01%	-0.03%	0.00%	0.00%	0.03%	0.05%	-0.01%	-0.01%	0.05%
Transportation and Warehousing	-0.03%	-0.08%	0.00%	0.00%	0.01%	0.00%	-0.03%	-0.07%	0.00%
Information	-0.01%	-0.03%	-0.01%	0.00%	0.03%	0.06%	-0.01%	0.00%	0.05%
Finance and Insurance	-0.01%	-0.03%	-0.01%	0.00%	0.03%	0.04%	-0.01%	-0.01%	0.04%
Real Estate, Rental, and Leasing	-0.01%	-0.06%	-0.01%	0.00%	0.15%	0.29%	-0.01%	0.09%	0.28%
Professional and Technical Services	-0.01%	-0.04%	-0.01%	0.00%	0.00%	-0.01%	-0.01%	-0.04%	-0.02%
Management of Companies and Entr.	-0.01%	-0.03%	0.00%	0.00%	-0.01%	-0.03%	-0.01%	-0.04%	-0.03%
Administrative and Waste Services	-0.06%	-0.29%	-0.19%	0.00%	0.00%	-0.01%	-0.07%	-0.29%	-0.20%
Educational Services	-0.01%	-0.05%	-0.01%	0.00%	0.00%	0.00%	-0.01%	-0.04%	-0.02%
Health Care and Social Assistance	-0.01%	-0.04%	-0.01%	0.00%	0.00%	0.00%	-0.01%	-0.03%	-0.01%
Arts, Entertainment and Recreation	-0.01%	-0.04%	-0.01%	0.00%	0.04%	0.06%	-0.01%	0.00%	0.05%
Accommodation and Food Services	-0.01%	-0.01%	0.07%	0.00%	0.03%	0.05%	-0.01%	0.02%	0.12%
Other Services (ex. Government)	-0.01%	-0.04%	-0.01%	0.00%	0.03%	0.04%	-0.01%	-0.01%	0.04%

Impacts on Imports and Exports

Table 4-11 summarizes the combined impact of the incremental cost of control measures and the public health benefits on the region's exports and imports relative to the baseline projections. Changes in exports reflect the changes in relative cost of production and delivered prices, thus its impact would mimic the impacts discussed above. On the other hand, as a result of population increase in the region, imports are expected to increase. As shown in the table below, all of these changes are relatively small when compared with the overall size of the four-county economy.

TABLE 4C-4: IMPACTS ON IMPORTS AND EXPORTS

($Millions/Percent Change Relative to Baseline)

Category	2017		2023		2031	
Exports	$80	0.01%	$134	0.02%	$19	0.00%
Imports	$2,314	0.35%	$1,893	0.30%	$4,714	0.55%

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ENVIRONMENTAL JUSTICE COMMUNITY SCREENING METHOD

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The EJ community screening method used in this report was derived from the California Communities Environmental Health Screening Tool (CalEnviroScreen or CES), Version 2.0 (OEHHA 2014). The CES method produced an overall percentile ranking of census tracts within California, based on a formula that combined percentile rankings of numerous sociodemographic and environmental indicators.[1] For the EJ screening analysis included in this report, SCAQMD staff used the same structure of the CES formula, but applied it to census tracts within the Basin and considered alternative EJ definitions which included different sets of indicators as recommended by Industrial Economics, Inc., Levy, and Harper (2016). The general steps and mathematical formula used to produce the overall percentile ranking of census tracts under each alternative EJ definition is described below, which is followed by an illustrative example.

EJ Screening Methodology

The CES method builds upon two categories of indicators: sociodemographic (or "population characteristics") and environmental (or "pollution burden"). Chapter 6 describes the indicators included in each category under the five alternative EJ definitions used, which were also summarized in Table 6-1 of Chapter 6 and reproduced below.

Table 6A-1: Alternative Definitions for EJ Community Designation

Alternative Definition	Sociodemographic Indicators		Environmental Indicators	
	Income	Other Demographic	Air Quality	Other Environmental
1	Poverty status		PM2.5, toxic cancer risk, ozone	
2	Poverty status	Age, asthma, education, linguistic isolation, low birth weight, unemployment	PM2.5, toxic cancer risk, ozone	
2a	Poverty status	Age, asthma, education, linguistic isolation, low birth weight, unemployment, race/ethnicity	PM2.5, toxic cancer risk, ozone	
3	Poverty status	Age, asthma, education, linguistic isolation, low birth weight, unemployment	PM2.5, toxic cancer risk, ozone	Drinking water, pesticides, toxic releases, traffic, *cleanup sites, groundwater threats, hazardous waste, impaired water bodies, solid waste*
3a	Poverty status	Age, asthma, education, linguistic isolation, low birth weight, unemployment, race/ethnicity	PM2.5, toxic cancer risk, ozone	Drinking water, pesticides, toxic releases, traffic, *cleanup sites, groundwater threats, hazardous waste, impaired water bodies, solid waste*

Note: Indicators shown in *italics* were given half the weight. Other indicators were given a weight of one each.

[1] See the final report of CES 2.0 for more information, available at http://oehha.ca.gov/media/downloads/report/ces20finalreportupdateoct2014.pdf.

Each step of the calculation is described as follows. The calculation was repeated for each of the five alternative EJ definitions examined.

Step 1): For each individual indicator, every census tract within the Basin was percentile ranked based on the raw value of each indicator, such as pollutant concentrations, share of vulnerable populations, etc.

Step 2): For each census tract, a weighted average of its percentile rankings of all indicators was derived separately for each of the two categories: population characteristics (PC) and pollution burden (PB).

Step 3): For each census tract, its average percentile under each of the two categories was scaled, or normalized, by the highest average percentile among all census tracts. The scaled number was then multiplied by ten to arrive at an interim "component score" for each category.

Step 4): For each census tract, the two "component scores" (one for each category) were multiplied into the overall EJ screening score. Every census tract within the Basin was percentile ranked again, but now based on the overall screening score. A high score would put a census tract in the top ranks, which means a more adverse cumulative impact; therefore, the worst impacted tracts are ranked among the top one percent while the least impacted tract are ranked among the bottom 99 percent.

Step 5): Depending on the population threshold chosen, if a census tract has an overall score that is high enough to be ranked above the threshold, then it is designated as an EJ area. In this report, the population threshold was set at either top 25 percent or top 50 percent relative to the Basin's population; therefore, a census tract with an overall score ranked among the top 1st to 25th percentile is designated as an EJ area under either threshold.

The CES formula is also mathematically described below. Let the overall EJ screening score for census tract *i* be CES_i, the component score for the category of pollution burden for census tract *i* be PB_i, the component score for the category of population characteristics for census tract *i be* PC_i, and *I* the set of all census tracts within the Basin. Then the overall EJ screening score can be written as:

$$CES_i = PB_i \times PC_i,$$

where PB_i and PC_i are the ratios of the average rank of all indicators in the group to the max average rank in the Basin. Mathematically,

$$PB_i = 10 \times \frac{AvgPB_i}{\max_i\{AvgPB_i\}} \; and \; PC_i = 10 \times \frac{AvgPC_i}{\max_i\{AvgPC_i\}},$$

where

$$AvgPB_i = \frac{\sum_j^J E1rank_{i,j} + 0.5\sum_l^L E2rank_{i,l}}{J + 0.5L} \; and \; AvgPC_i = \frac{\sum_k^K Srank_{i,k}}{K},$$

with *J* denoting the set of environmental indicators that measure pollutant exposure, L is the set of environmental indicators that is recognized to contribute less to possible pollution burden than other exposure-related environmental indicators, *K* is the set of sociodemographic indicators, $E1rank_{i,j}$ is the percentile rank of exposure-related environmental indicator *j* for census tract *i*, $E2rank_{i,j}$ is the percentile rank of the half-weighted environmental indicator *j* in census tract *i*, and $Srank_{i,k}$ is the percentile rank of sociodemographic indicator *k* in census tract *i*.

From this formula, we can see that the set of pollution burden and population characteristics indicators are given equal weight in the overall EJ screening score. The addition of an indicator to either set will change the average for that group, but does not change the weighting of either group in calculating the screening score. The EJ screening score is a continuous variable that does not in itself indicate whether a census tract should be designated as an EJ area or not. Therefore, a threshold needs to be chosen to determine an EJ designation for a census tract from the screening score.

EJ Screening Example

Table 6A-1 provides an illustrative example of two census tracts to demonstrate how to use the CES method to calculate the overall EJ screening score and designate EJ area. This example uses two EJ definitions: Alternative Definition 1 that is most akin to SCAQMD's current EJ definition for grant allocation purposes, which focuses on air quality indicators for pollution burden and poverty status for socioeconomic vulnerability; Alternative Definition 3a is comprised of an expansive list of indicators that largely overlaps with the indicators included in CES 2.0.

It is worth noting that the EJ designation for a census tract can be sensitive to both the definition and designation threshold chosen. As shown in the table, under Alternative Definition 1 that includes toxic cancer risk, PM2.5 and ozone concentrations, and poverty rate, Census Tract A is designated as an EJ area because it ranks among the top 50-percent most impacted census tracts. Under the expansive Alternative Definition 3a, however, the same census tract becomes a non-EJ area as it is relatively less impacted than other census tracts according to the additional indicators, whether sociodemographic or environmental. This reduces its overall screening score so much that it falls below either designation threshold. In comparison, Census Tract B is considered more impacted under Alternative Definition 3a than under Alternative Definition 1. Specifically, it ranks among the top 25-percent most impacted census tracts under the former definition, but not so under the latter. This is because Census Tract B has relatively high percentile rankings for many of the additional environmental and sociodemographic indicators, which raise both component scores and cause the overall EJ screening score to increase from Alternative Definition 1 to 3a.

Table 6A-2: EJ Screening Example

		Census Tract A		Census Tract B	
		Def 1	**Def 3a**	**Def 1**	**Def 3a**
Step 1: Indicator Percentile					
Exposure-Related Environmental Indicators					
PM2.5		33.9	33.9	73.6	73.6
Toxic Cancer Risk		24.6	24.6	92.7	92.7
Ozone		56.9	56.9	25.3	25.3
Drinking water			46.8		70.7
Pesticide			0		0
Toxic Release			18.2		79.0
Traffic			32.5		58.6
Other Environmental Indicators (Half-Weighted)					
Cleanup Sites			0		82.8
Groundwater Threats			28.9		78.2
Hazardous Waste			29.1		75.3
Impaired Water Bodies			50.4		87.1
Solid Waste			0		70.7
Sociodemographic Indicators					
Poverty		67.6	67.6	41.6	41.6
Age			13.9		59.7
Asthma			41.0		65.7
Education			55.1		55.9
Linguistic Isolation			71.6		46.9
Low Birth Weight			47.8		4.6
Unemployment			44.2		71.2
Percent Minority			38.7		57.3
Step 2: Weighted Average Percentile					
Pollution Burden (PB)		38.5	28.1	63.9	62.8
Population Characteristics (PC)		67.6	47.5	41.6	50.4
Step 3: Component Score					
Max PB		93.0	82.9	93.0	82.9
PB Component Score = (PB/Max PB) x 10		4.1	3.4	6.9	7.6
Max PC		100.0	93.7	100.0	93.7
PC Component Score = (PC/Max PC) x 10		6.8	5.1	4.2	5.4
Step 4: Overall EJ Screening Score					
EJ Score = PB Component x PC Component		27.9	17.2	28.6	40.7
EJ Percentile		55.4	30.9	56.3	80.1
Step 5: EJ Designation					
EJ Designation	50% threshold	EJ	Non-EJ	EJ	EJ
	25% threshold	Non-EJ	Non-EJ	Non-EJ	EJ

Note: A zero value for an indicator means that there was no impact from that source in the given census tract, thus the percentile rank is 0.

DRAFT FINAL SOCIOECONOMIC REPORT
APPENDIX 6-B

DATA AND DETAILED RESULTS OF THE EJ DISTRIBUTIONAL ANALYSIS

JANUARY 2017

Health Risk Data

Data used to calculate the summary tables for the "Quantified Public Health Effects and Monetized Benefits in EJ and non-EJ Communities" section (Tables 6-4 to 6-6) were derived from the results presented in Chapter 3 of this report. A description of methodology that was used to estimate public health benefits can be found in Appendix 3-B. The data used in Chapter 6 are based on the projected public health benefits in attainment year 2031.

Data used for the "Evaluating Distributional Impact of the Draft Final 2016 AQMP via Health Risk Inequality Index" section (Tables 6-7 to 6-9) were derived based on recommendations from Industrial Economics Inc., Levy and, Harper (2016), following the method used by Fann et al. (2011). This method utilized the air quality data, population projections, baseline incidence of health endpoints, and epidemiological concentration-response functions as described in Appendix 3-B. In contrast to Chapter 3, where the changes in pollutant concentrations between the baseline and policy scenario were used to estimate the health impact and corresponding monetized public health benefits, pollution exposure related health risk was estimated and its distribution examined for the EJ analysis under baseline and policy scenarios separately. Inequality statistics characterizing the statistical dispersion of each distribution were then compared to evaluate whether inequality of health risk would be decreased or exacerbated as a result of implementing the Draft Final 2016 AQMP. The distribution of exposure related health risk was estimated using the modeled ambient air quality concentrations under each scenario using the health impact methodology as described in Appendix 3-B; however, the exposure-related health risk accounts for exposure to all emission sources of the pollutant, whether anthropogenic or biogenic, under both baseline and policy scenarios. The estimated health risk is defined as the implied health impact based on exposure to ambient air quality concentrations divided by the affected population.

The conversion of air quality, health impacts, and population data from the four kilometer by four kilometer grid cell to census tract, which can either be an aggregation of multiple grid cells, disaggregation of a grid cell, or a combination of both, was done using the geoprocessing methods of BenMAP, which applies an area-weighting approach (RTI International 2015).

The summary statistics for the health risk distributions utilized here are described in Table 6B-1. All distributions consist of data points for each of the 3447 census tracts in the Basin that are examined. The mortality risk related to PM2.5 and ozone exposure at baseline has an average of 0.168 percent, with a standard deviation of 0.05 percent, implying a coefficient of variation of 0.3. Under the policy scenario, the exposure-related mortality risk has a mean of 0.145 percent and standard deviation of 0.042 percent. At baseline, the morbidity risk of asthma related emergency department visits associated with ozone exposure has a mean of 0.473 percent, with a standard deviation of 0.079 percent. Under the policy scenario, this exposure-related morbidity risk has a mean of 0.436 percent and a standard deviation of 0.074 percent. Both the mean and standard deviation, as well as the quartile statistics, are reduced for all health risk examined as a result of implementing the Draft Final 2016 AQMP. The only statistic that is increased is the interquartile range for morbidity risk of asthma related emergency department visits associated

with ozone exposure.

TABLE 6B-1: SUMMARY STATISTICS OF HEALTH RISK DISTRIBUTIONS

Distribution	Scenario	Mean	Standard Deviation	Coefficient of Variation	Median	25th Percentile	75th Percentile	Inter-Quartile Range
PM2.5 and ozone-related mortality risk	Baseline	0.168%	0.050%	0.30	0.168%	0.132%	0.193%	0.062%
	Policy	0.145%	0.042%	0.29	0.145%	0.115%	0.168%	0.053%
PM2.5-related mortality risk	Baseline	0.161%	0.050%	0.31	0.161%	0.125%	0.187%	0.062%
	Policy	0.139%	0.042%	0.30	0.140%	0.109%	0.161%	0.052%
Ozone-related mortality risk	Baseline	0.004%	0.001%	0.26	0.004%	0.003%	0.005%	0.001%
	Policy	0.004%	0.001%	0.25	0.004%	0.003%	0.004%	0.001%
Risk of ozone related Asthma ED Visits	Baseline	0.473%	0.079%	0.17	0.483%	0.423%	0.519%	0.096%
	Policy	0.436%	0.074%	0.17	0.453%	0.378%	0.482%	0.104%

As mentioned in the EJ report by Industrial Economics (2016), there is discussion in the economic literature that it may be problematic to evaluate the inequality index using something that is considered an economic "bad" as compared to an economic "good." For this reason, staff conducted a transformation on health risk using its complement, which is one minus the health risk, and can be described as the percent of the population that is not expected to experience illnesses or premature deaths. The complement of health risk is directly interpretable as a "good," in that an increase in the value of this metric is a reduction in health risks. This metric is also a percentage, and thus on the same scale as health risk, it therefore does not violate the scale invariance of the Atkinson Index (Sheriff and Maguire 2013).

Distributional Analysis Method

The computation of the decomposed Atkinson and Kolm-Pollack Index values were accomplished through the use of statistical software. The Atkinson Index is calculated using the Stata package *ineqdeco* (Jenkins 2015). The formula for the Atkinson Index is as follows:

$$A_\epsilon = \begin{cases} 1 - \frac{1}{\mu}\left(\frac{1}{N}\sum_{i=1}^{N} y_i^{1-\epsilon}\right)^{\frac{1}{1-\epsilon}} & for\ 0 \le \epsilon \ne 1 \\ 1 - \frac{1}{\mu}\left(\prod_{i=1}^{N} y_i\right)^{\frac{1}{N}} & for\ \epsilon = 1, \end{cases}$$

where, y_i is the health risk for census tract i, μ is the average health risk, N is the number of census tracts, and ϵ is the inequality aversion parameter. The Atkinson index can be decomposed in within- and between-group components and a residual term. The between-group measure is given as:

$$A_B = 1 - \left[\frac{1}{j}\sum_{j=1}^{J}\left(\frac{\overline{y_j}}{y}\right)^{1-\epsilon}\right]^{\frac{1}{1-\epsilon}},$$

where y_j now represents the average health risk of group j (Harper and Lynch 2016). The formula for within-group inequality is somewhat more complicated as is given by Cowell (2011).

The Kolm-Pollack Index was calculated by staff using R software according to the following formula:

$$K(\alpha)_T = K(\alpha)_W + K(\alpha)_B = \left[\sum_{j=1}^{J} p_j K(\alpha)_j\right] + \left[\sum_{j=1}^{J} p_j \zeta_j - \zeta\right],$$

where $K(\alpha)$ is the Kolm-Pollack index, with an inequality aversion parameter α and subscripted by *T, W, and B* to denote the total, within-group, and between-group inequalities. J is the set of groups, and there are two groups examined in the EJ analysis: EJ and non-EJ communities based on the geographical unit of census tracts. p_j is the share of group *j* among all census tracts. ζ_j is the average health risk for group j, and ζ is the equally distributed health risk (Harper and Lynch 2016).

Distributional Analysis Results

Comprehensive results of the inequality analysis are provided. Tables 6B-2 through 6B-5 provide results based on the Atkinson and Kolm-Pollack indices (inequality aversion=0.5) for each of the alternative EJ definitions described in Chapter 6. The within-group value is a measure of the average of the inequality within the EJ and Non-EJ communities, respectively. The between-group value is a measure of average inequality between EJ and non-EJ communities. These results show the numerical values from which Table 6-9 in Chapter 6 are based.

TABLE 6B-2: INEQUALITY INDICES OF PM2.5 EXPOSURE-RELATED MORTALITY RISK

		Atkinson		Kolm-Pollack	
Definition	Scenario	Within	Between	Within	Between
Def. 1 : Top 25%	Baseline	5.97E-08	3.43E-09	5.95E-08	3.41E-09
	Control	4.13E-08	1.97E-09	4.12E-08	1.97E-09
	Change	-1.8E-08	-1.5E-09	-1.8E-08	-1.4E-09
	% Change	-31%	-42%	-31%	-42%
Def. 1: Top 50%	Baseline	6.01E-08	3.07E-09	5.99E-08	3.06E-09
	Control	4.15E-08	1.80E-09	4.14E-08	1.8E-09
	Change	-1.9E-08	-1.3E-09	-1.9E-08	-1.3E-09
	% Change	-31%	-41%	-31%	-41%
Def. 2: Top 25%	Baseline	5.96E-08	3.60E-09	5.94E-08	3.59E-09
	Control	4.12E-08	2.09E-09	4.11E-08	2.08E-09
	Change	-1.8E-08	-1.5E-09	-1.8E-08	-1.5E-09
	% Change	-31%	-42%	-31%	-42%
Def. 2: Top 50%	Baseline	5.89E-08	4.30E-09	5.87E-08	4.29E-09
	Control	4.07E-08	2.61E-09	4.06E-08	2.6E-09
	Change	-1.8E-08	-1.7E-09	-1.8E-08	-1.7E-09
	% Change	-31%	-39%	-31%	-39%
Def. 3: Top 25%	Baseline	6.01E-08	3.08E-09	5.99E-08	3.07E-09
	Control	4.13E-08	1.99E-09	4.12E-08	1.99E-09
	Change	-1.9E-08	-1.1E-09	-1.9E-08	-1.1E-09
	% Change	-31%	-35%	-31%	-35%
Def. 3: Top 50%	Baseline	5.90E-08	4.16E-09	5.88E-08	4.14E-09
	Control	4.06E-08	2.67E-09	4.05E-08	2.67E-09
	Change	-1.8E-08	-1.5E-09	-1.8E-08	-1.5E-09
	% Change	-31%	-36%	-31%	-36%

TABLE 6B-3: INEQUALITY INDICES OF OZONE EXPOSURE-RELATED MORTALITY RISK

		Atkinson		Kolm-Pollack	
Definition	Scenario	Within	Between	Within	Between
Def. 1 : Top 25%	Baseline	2.50E-11	1.78E-12	2.50E-11	1.81E-12
	Control	1.89E-11	1.11E-12	1.89E-11	1.1E-12
	Change	-6.1E-12	-6.8E-13	-6.1E-12	-7.1E-13
	% Change	-24%	-38%	-24%	-39%
Def. 1: Top 50%	Baseline	2.46E-11	2.24E-12	2.45E-11	2.21E-12
	Control	1.87E-11	1.38E-12	1.87E-11	1.32E-12
	Change	-5.9E-12	-8.6E-13	-5.9E-12	-8.9E-13
	% Change	-24%	-38%	-24%	-40%
Def. 2: Top 25%	Baseline	2.52E-11	1.59E-12	2.52E-11	1.53E-12
	Control	1.91E-11	8.99E-13	1.91E-11	8.88E-13
	Change	-6.1E-12	-6.9E-13	-6.1E-12	-6.4E-13
	% Change	-24%	-43%	-24%	-42%
Def. 2: Top 50%	Baseline	2.49E-11	1.95E-12	2.49E-11	1.86E-12
	Control	1.90E-11	9.68E-13	1.9E-11	1.03E-12
	Change	-6E-12	-9.8E-13	-5.9E-12	-8.3E-13
	% Change	-24%	-50%	-24%	-45%
Def. 3: Top 25%	Baseline	2.43E-11	2.48E-12	2.42E-11	2.52E-12
	Control	1.84E-11	1.55E-12	1.84E-11	1.56E-12
	Change	-5.8E-12	-9.3E-13	-5.8E-12	-9.6E-13
	% Change	-24%	-37%	-24%	-38%
Def. 3: Top 50%	Baseline	2.33E-11	3.47E-12	2.33E-11	3.43E-12
	Control	1.78E-11	2.13E-12	1.78E-11	2.16E-12
	Change	-5.5E-12	-1.3E-12	-5.5E-12	-1.3E-12
	% Change	-24%	-38%	-24%	-37%

TABLE 6B-4: INEQUALITY INDICES OF PM2.5 AND OZONE-RELATED MORTALITY RISK

		Atkinson		Kolm-Pollack	
Definition	Scenario	Within	Between	Within	Between
Def. 1 : Top 25%	Baseline	6.00E-08	3.32E-09	5.97E-08	3.31E-09
	Control	4.17E-08	1.92E-09	4.16E-08	1.92E-09
	Change	-1.8E-08	-1.4E-09	-1.8E-08	-1.4E-09
	% Change	-30%	-42%	-30%	-42%
Def. 1: Top 50%	Baseline	6.03E-08	2.96E-09	6.01E-08	2.95E-09
	Control	4.19E-08	1.75E-09	4.17E-08	1.74E-09
	Change	-1.8E-08	-1.2E-09	-1.8E-08	-1.2E-09
	% Change	-31%	-41%	-31%	-41%
Def. 2: Top 25%	Baseline	5.98E-08	3.51E-09	5.96E-08	3.5E-09
	Control	4.16E-08	2.05E-09	4.14E-08	2.04E-09
	Change	-1.8E-08	-1.5E-09	-1.8E-08	-1.5E-09
	% Change	-30%	-42%	-30%	-42%
Def. 2: Top 50%	Baseline	5.91E-08	4.19E-09	5.89E-08	4.17E-09
	Control	4.11E-08	2.56E-09	4.09E-08	2.55E-09
	Change	-1.8E-08	-1.6E-09	-1.8E-08	-1.6E-09
	% Change	-31%	-39%	-30%	-39%
Def. 3: Top 25%	Baseline	6.03E-08	2.93E-09	6.01E-08	2.92E-09
	Control	4.17E-08	1.91E-09	4.16E-08	1.9E-09
	Change	-1.9E-08	-1E-09	-1.9E-08	-1E-09
	% Change	-31%	-35%	-31%	-35%
Def. 3: Top 50%	Baseline	5.93E-08	3.95E-09	5.91E-08	3.94E-09
	Control	4.11E-08	2.56E-09	4.09E-08	2.55E-09
	Change	-1.8E-08	-1.4E-09	-1.8E-08	-1.4E-09
	% Change	-31%	-35%	-31%	-35%

TABLE 6B-5: INEQUALITY INDICES OF OZONE-RELATED ASTHMA EMERGENCY DEPARTMENT VISITS RISK

		Atkinson		Kolm-Pollack	
Definition	Scenario	Within	Between	Within	Between
Def. 1 : Top 25%	Baseline	1.45E-07	1.25E-08	1.43E-07	1.24E-08
	Control	1.25E-07	1.45E-08	1.24E-07	1.44E-08
	Change	-2E-08	2.03E-09	-2E-08	2.02E-09
	% Change	-14%	16%	-14%	16%
Def. 1: Top 50%	Baseline	1.40E-07	1.74E-08	1.38E-07	1.72E-08
	Control	1.20E-07	1.97E-08	1.19E-07	1.95E-08
	Change	-2E-08	2.28E-09	-2E-08	2.27E-09
	% Change	-14%	13%	-14%	13%
Def. 2: Top 25%	Baseline	1.42E-07	1.46E-08	1.41E-07	1.44E-08
	Control	1.23E-07	1.68E-08	1.21E-07	1.66E-08
	Change	-2E-08	2.18E-09	-2E-08	2.17E-09
	% Change	-14%	15%	-14%	15%
Def. 2: Top 50%	Baseline	1.32E-07	2.46E-08	1.31E-07	2.44E-08
	Control	1.12E-07	2.75E-08	1.11E-07	2.72E-08
	Change	-2.1E-08	2.86E-09	-2E-08	2.85E-09
	% Change	-16%	12%	-16%	12%
Def. 3: Top 25%	Baseline	1.51E-07	6.29E-09	1.49E-07	6.23E-09
	Control	1.31E-07	8.29E-09	1.3E-07	8.22E-09
	Change	-2E-08	2E-09	-1.9E-08	1.99E-09
	% Change	-13%	32%	-13%	32%
Def. 3: Top 50%	Baseline	1.48E-07	9.17E-09	1.46E-07	9.08E-09
	Control	1.28E-07	1.14E-08	1.27E-07	1.13E-08
	Change	-2E-08	2.24E-09	-2E-08	2.23E-09
	% Change	-14%	24%	-13%	25%

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Comments and Response to Comments

2016 AIR QUALITY MANAGEMENT PLAN SOCIOECONOMIC REPORT



January 2017

DRAFT FINAL SOCIOECONOMIC REPORT

COMMENTS AND RESPONSES TO COMMENTS ON THE DRAFT FINAL SOCIOECNOMIC REPORT

JANUARY 2017

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COMMENT LETTER #1 – INLAND EMPIRE ECONOMIC PARTNERSHIP (IEEP), DECEMBER 8, 2015

From: Erdal Tekin <tekin@american.edu>
Sent: Wednesday, December 9, 2015 5:05 AM
To: Elaine Shen
Subject: Fwd: AQMD research on Unemployment

Sent from Erdal's iPhone

Begin forwarded message:

From: "John Husing" <john@johnhusing.com>
Date: December 8, 2015 at 11:27:44 PM EST
To: tekin@american.edu, "SupervisorRutherford@sbcounty.gov" <SupervisorRutherford@sbCounty.gov>, "McCallon, Larry" <lmccallon@cityofhighland.org>, bbenoit@cityofwildomar.org, JJBenoit@mbos.org
Subject: AQMD research on Unemployment

Sir:

1-1 I have just reviewed your paper prepared for the South Coast Air Quality Management District's staff which appears to attempt to justify their belief that somehow their work does not negatively impact public health through its impact on the economy. The choice of the periodic short term fluctuations in unemployment as the appropriate variable to study looks suspiciously like a less than serious way of looking at the issue about which those of us concerned with the unintended consequences of the agency's policies have raised. To be specific, the issue is not a periodic difficulty of seeing the economy fluctuate in the short term as a result of the business cycle but rather the long term consequences of their cumulative policies that are inhibiting the ability of marginally educated workers to migrate out of poverty by suppressing growth of sectors like logistics, manufacturing, construction, oil and gas with median incomes in the $45,000 to $55,000 range. While you correctly identify that unemployment negatively affects individuals, the fact you have seemed to find that a slowing economy in the aggregate leads to cleaner air and less income for individuals to engage in nefarious activities like smoking, drinking or drug use would appear to contribute nothing to our understanding of the deeper poverty issue facing areas like the Inland Empire where the cumulative effect of the agency's short-circuiting of job growth in sector's allowing people to leave poverty behind is the true concern. As a serious researcher, I hope

1-2 that you will not allow yourself to have your work become used in the agency's propaganda to show that it has clean hands on the deeper issues that you were apparently not tasked with studying. The agency is notorious for taking the study of one thing and using it to push aside true issues they are unwilling to face.

1-2 (CONT'D)

I have cc:d the four members of the AQMD board on this email, because those of us concerned with the agency's nefarious use of research want to make sure they are aware of what you were asked to study and not asked to study.

John Husing, Ph.D.
Chief Economist
Inland Empire Economic Partnership

Responses to Comment Letter #1

Submitted by Inland Empire Economic Partnership on December 8, 2015

1-1

The comment letter contains claims and opinions without supporting evidence. Socioeconomic analyses performed by SCAQMD staff use the best available data and state-of-science methodologies that are based on recommendations by the SCAQMD's expert consultants and scientific advisors. Moreover, information and assumptions used in the Draft Final Socioeconomic Report, including data, methodology, and analytical results, were discussed at nine Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group meetings between October 2014 and November 2016, four AQMP Advisory Group meetings in 2015 and 2016, three AQMP Socioeconomic Assessment EJ Working Group meetings in 2016, eight regional public workshops and hearings in 2016, and additional presentations to various stakeholders. Public meeting notices were sent to all advisory and working group members, as well as all AQMP interested parties.

The Commenter incorrectly claimed that Dr. Erdal Tekin's report was SCAQMD staff's "attempt to justify [staff's] belief that somehow [the SCAQMD's] work does not negatively impact public health through its impact on the economy." Contrary to this claim, the SCAQMD, in response to requests by stakeholders from the business community, commissioned Dr. Tekin—Professor of Public Policy at the American University, research associate at the National Bureau of Economic Research (NBER) and research fellow at the Institute for the Study of Labor (IZA)—to independently conduct a literature review of the relationship between health and unemployment and to examine the health effects of unemployment in the four-county region. Dr. Erdal Tekin's report, entitled "Employment and Health," is available at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/unemploymentandhealth_dec2015_012616.pdf.

Furthermore, staff's modeling results of regional macroeconomic impacts due to implementation of the Draft Final 2016 AQMP does not corroborate the Commenter's claim. As shown in Chapter 4 of the Draft Final Socioeconomic Report and summarized in its Executive Summary, the projected jobs impact under each of the four impact scenarios analyzed in the report ranges from an average of 9,000 jobs foregone per year to an average of 29,000 jobs gained per year from 2017 to 2031. These are very small job impacts percentage-wise relative to a baseline regional economy of over 10 million jobs (including both payroll jobs and self-employment). Moreover, it was also shown that, under all four impact scenarios, the projected job impact does not alter the region's long-term job growth in any significant way. Similarly, Figure 1-1 of the Draft Final Socioeconomic Report demonstrates no discernible correlation between cleaner air and the macroeconomic indicators in the four-county region of Los Angeles, Orange, Riverside and San Bernardino. Observed fluctuations in the region's GDP and total employment clearly correspond to business cycles, while the regional economy and population appear to grow hand-in-hand with improved air quality.

Chapter 4 of the Draft Final Socioeconomic Report also includes a preliminary discussion on the health effects of unemployment, whether related to air quality regulations or not. Recent economics literature has shown that job displacement, particularly due to plant closings and layoffs, could lead to adverse

health effects on the individuals who experience job losses. In the meantime, as reviewed in Dr. Tekins' report, a journal article published in 2000 by economist Christopher Rhum and a series of follow-up academic studies have all reported the finding that, as headline unemployment rates went up, public health outcomes improved (usually measured by mortality rate). The finding might be counter-intuitive but the same finding was also shown in Dr. Tekin's analysis of the health effects of unemployment in the four-county region; specifically, adverse health effects were generally observed among individuals who recently became unemployed, but the overall mortality risk as a public health indicator decreased when unemployment rate in the local economy rose. It was hypothesized in various related studies that reduced air pollution due to less travel and less industrial activities during economic downturns could be one factor, and the more abundant supply of skilled labor in the healthcare industry, such as in nursing homes, could also reduce mortality incidence among the physically more fragile population.

Regardless, several economists on the U.S. EPA's Science Advisory Board – Economy-Wide Modeling Panel did not support the inclusion of health effects of unemployment and other second-order effects when conducting macroeconomic impact modeling or cost-benefit analysis of environmental policies and regulations. As documented in the October 2015 meeting minutes, the panel economists cited reasons including the current lack of sufficient empirical evidence, the difficulty to establish causality, and the anticipated small magnitude of such effects. Additionally, there is also a lack of scientific evidence indicating any linkage between environmental regulations and poverty.

With respect to the Commenter's claim that periodic short term fluctuations in unemployment were an inappropriate variable to study, Dr. Tekin's econometric analysis based on variations of monthly unemployment rate is a standard and well established technique to tease out the relationship between health outcomes and economic conditions. Similar practices can be found in many of the scientific papers reviewed in Dr. Tekin's report.

It should be emphasized that staff recognizes that the macroeconomic impact analysis may not reflect potential impacts at the individual facility level. During rule development process, staff continues to be sensitive to any potential effect on plant-level operations and employment while taking necessary steps to protect public health from exposure to air pollutants. These commitments are manifested through the SCAQMD's efforts on many fronts, including public processes to solicit input and comments from all interested parties, continuous outreach to the general public and affected businesses, as well as performing a socioeconomic assessment which the Governing Board must consider for all emission reduction rules proposed for adoption or amendment.

1-2

The Commenter's attempts to denigrate the research, efforts, and integrity of Dr. Tekin and SCAQMD staff lack merit. As set forth above, Dr. Tekin is highly qualified and conducted his study and arrived at his conclusions independently. Staff has spent thousands of hours analyzing data, meeting with stakeholders, conferring with experts, drafting its analysis, and making voluminous amounts of information available to the public, including the Commenter. Compliance with the law, transparency, and integrity are demanded by SCAQMD.

COMMENT LETTER #2 – STAN YOUNG EMAIL #1, JANUARY 29, 2016

From: Stan Young <stan.young@omicsoft.com>
Sent: Friday, January 29, 2016 9:43 AM
To: Elaine Shen
Cc: James E. Enstrom
Subject: Comment on recent Tekin report
Attachments: Income and longevity.pdf

Dear Ms. Eshen:

2-1 I was sent a short quote from a recent Tekin report that was submitted to SCAQMD. The quote implies that income has little of know effect on health. Of course, that conclusion is absurd as income is a very important enabler of many aspects of being and staying healthy.

I attach a short note including two references and a pointer to a dramatic YouTube video.

2-2 Please acknowledge that you have received this note and if possible send me a pdf of the Tekin report. If you are interested I can send you pdfs of the two references I cite.

Stan Young

ATTACHMENT TO COMMENT LETTER #2
Young, Stan: January 29, 2016

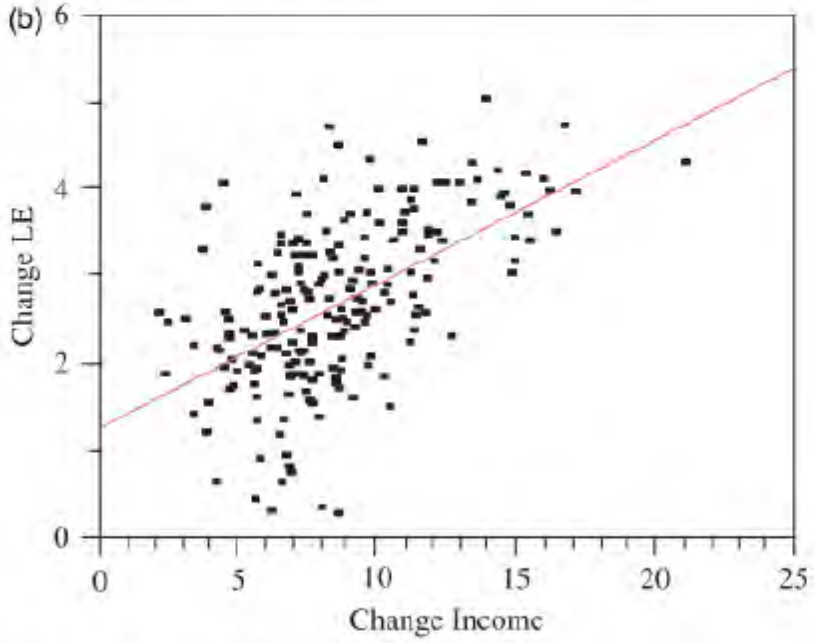
January 26, 2016 Tekin Report on Unemployment and Health for SCAQMD

"…mortality rate using data from the U.S. Vital Statistics. The results from this analysis reveal that mortality is procyclical in California and the SCAQMD counties, i.e., the **mortality rate increases as unemployment decreases**.

"Based on these findings, we conclude that fluctuations in the local unemployment rate are **unlikely to be associated** with health and health behaviors in any meaningful manner, at least for the state of California.

These statements are very counter intuitive and not supported by massive literature. Longevity increases with income. See the Hans Rosling youtube, https://www.youtube.com/watch?v=jbkSRLYSojo, which has been viewed over 7 million times.

In a publication by Young and Xia, 2013, Figure 6 (b), (Data from Pope et al. 2009) the relationship between income and longevity is dramatic and clear. As income increases, the x axis, longevity increases, the y-axis.



As income increases, Change Income, x-axis, longevity increases, Change LE, y-axis.

Pope III CA, Ezzati E, Dockery DW. (2009) Fine particulate air pollution and life expectancy in the United States. *NEJM* 360, 376–386.

Young SS, Xia JQ. (2013) Assessing geographic heterogeneity and variable importance in an air pollution data set. *Statistical analysis and data mining*. 6, 375-386.

Responses to Comment Letter #2

Submitted by Stanley Young on January 29, 2016

2-1

Dr. Erdal Tekin's report referenced by the Commenter (available at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/unemploymentandhealth_dec2015_012616.pdf) does not claim or imply that "income has little of know effect on health.[sic]" It is instead a report on the relationship between unemployment and health. The report found that, while adverse health effects were generally observed among individuals who recently became unemployed, the overall mortality risk as a public health indicator decreased when unemployment rate in the local economy rose. (For the plausible explanations of this finding and further discussion, please see staff response to Comment 1-1.) Moreover, the two short quotes from Dr. Tekin's report referenced in the Commenter's note[1] were taken out of context. The quotes refer to the econometric test results, and the econometric test conducted in the report controlled for individuals' income level to remove the confounding effect of income on health outcomes.

2-2

Acknowledgement of receipt of this comment and a hyperlink to the referenced report were sent to the Commenter on January 29, 2016.

[1] "The results from this analysis reveal that mortality is procyclical in California and in the SCAQMD counties, i.e., the mortality rate increases as unemployment decreases."
"Based on these findings, we conclude that fluctuations in the local unemployment rate are unlikely to be associated with health and health behaviors in any meaningful manner, at least for the state of California"

COMMENT LETTER #3 – STAN YOUNG EMAIL #2, JANUARY 29, 2016

From: Stan Young <stan.young@omicsoft.com>
Sent: Friday, January 29, 2016 1:59 PM
To: Elaine Shen
Cc: James E. Enstrom
Subject: Re: Comment on recent Tekin report

Elaine:

3-1 Dr Tekin cites Christopher Ruhm to the effect that when employment goes up mortality and other health problems increase. I think we can agree that this is surprising and counter intuitive. Taken to its logical conclusion the best policy would be for everyone to stop work. I'm eager to see how Dr. Tekin squares the circle. If you know the answer, please point me to it.

I'm looking through Ruhm's things now.

Stan

Responses to Comment Letter #3

Submitted by Stanley Young on January 29, 2016

3-1

Staff provided the Commenter with a response via electronic mail on January 29, 2016 that "Dr. Tekin's report discusses different possible mechanisms that may have contributed to the observed relationship reported in Ruhm (2000), among others." Please also see staff response to Comment 1-1 where it is mentioned that Ruhm (2000)'s finding that mortality rate decreases as unemployment rate increases might be counter-intuitive but the finding was corroborated in a series of follow-up studies by various researchers.

COMMENT LETTER #4—STAN YOUNG EMAIL, DECEMBER 24, 2015

From: Stan Young [mailto:stan.young@omicsoft.com]
Sent: Thursday, December 24, 2015 3:07 PM
To: Henry Roman
Cc: George.Thurston@nyumc.org; James E. Enstrom
Subject: Air quality and mortality in California

Dear Mr. Roman:

For several years I have been examining air quality, PM2.5 and ozone, and mortality in California. I have a data set that covers 2000-2012 and 8 air basins. After extensive analysis I find no association between either PM2.5 or ozone with acute mortality.

Enstrom (2005) finds no chronic association.

4 -1

There is extensive literature on air quality and mortality for California that supports my findings. So far as I know the data set that I am using is the largest California data set extant.

You might take knowledge of my findings into account as you consider the situation in California.

Stan Young

Short Bio 2015



Dr. S. Stanley Young is a retired researcher from Eli Lilly, GlaxoSmithKline and the National Institute of Statistical Sciences.
Dr. Young graduated from North Carolina State University, BS, MES and a PhD in Statistics and Genetics. He worked in the pharmaceutical industry on all phases of pre-clinical research. He has authored or co-authored over 60 papers including six "best paper" awards, and a highly cited book, Resampling-Based Multiple Testing. He has three issued patents. He is interested in all aspects of applied statistics, with special interest in chemical and biological informatics. He conducts research in the area of data mining.
Dr. Young is a Fellow of the American Statistical Association and the American Association for the Advancement of Science. He is an adjunct professor of statistics at North Carolina State University, the University of Waterloo and the University of British Columbia where he has co-directed thesis work.

Response to Comment Letter #4

Submitted by Stanley Young on December 24, 2015

4-1

Staff appreciates the Commenter's sharing of his analysis findings with the SCAQMD expert consultant Industrial Economics, Inc. Please see staff response to Comment 12-1.

COMMENT LETTER # 5—JOHN DUNN EMAIL, JANUARY 23, 2016

From: John Dunn [mailto:jddmdjd@web-access.net]
Sent: Saturday, January 23, 2016 8:51 PM
To: har@indecon.com; George.Thurston@nyumc.org
Cc: robinson@hsph.harvard.edu; er@indecon.com
Subject: South Coast Air Management proposals

Ladies and Gentlemen,

I object to your efforts to bolster the efforts of South Coast Air Management District to impose more air pollution regulations.

I attach here my objections to your your effort to support the CA South Coast 2016 air regs.

5 - 1 I hope you read the objections and you can respond to them or just, as Hillary or Leon or the bamster ordered—stand down, and withdraw the Thurston paper and any effort to cobble together science from the flawed Thurston report with the flawed wok of Michael Jarrett in support of ,pre small particle regulations on the theory it saves lives when you couldn't show me a life if your LIFE depended on it. I know you have already collected a lot of money for your efforts to makie the Thurston study into a silk purse, but ain't gonna happen, Thurston shows an overall small particle air pollution effect of ZERO. What you gonna do—change the rules?

I will provide the South Coast People with negative responses on their proposed small particle proposals, when necessary, and depending on what you do with the sorry hurston results.

5 - 2 I will provide equally negative scientific information on the South Coast ozone scare mongering when that becomes necessary, but I will relieve you of the responsibility for defending them on ozone, since your organization has nothing to do with ozone—you have your own problems. You also have a big problem with the show horse, Dr. Thurston and his now very old small particles paper that admits extremely small Hazard Risks and even Confidence Intervals that include 1.0, not a good thing for a guy who is trying to help the EPA push more regs. Does EPA have a problem with the show horse, Dr. Thurston and his prominent associates on a study that dates to 2009 or earlier? a study that fails to show a relative risk/hazard risk that is a basis for more stringent small particle regulations.

The letter is attached, accompanied by attachments. excerpts form the attachments are inserted in the letter to make life easier for those who are not inclined to pursue the links. lazy.

I wish the letter was shorter, but you and your group and South Coast provided such a target rich environment.

John Dale Dunn MD JD
Consultant Emergency Services/Peer Review
Civilian Faculty, Emergency Medicine Residency
Carl R. Darnall Army Med Center
Fort Hood, Texas
Medical Officer, Sheriff Bobby Grubbs
Brown County, Texas
325 784 6697 (h) 642 5073 (c)

John Dale Dunn MD JD
Diplomate ABEM, ABLM
Admitted but inactive, Texas and Louisiana Bars
Civilian Contract Faculty, Emergency Medicine Residency Program
Carl R. Darnall Army Medical Center, Fort Hood, TX
Medical Officer, Brown County Sheriff George Caldwell Jr.
401 Rocky Hill Road Lake Brownwood, Texas 76801
Phone 325 784-6697
E-mail jddmdjd@web-access.net

January 19, 2016

Henry A. Roman, M.S. Industrial Economics, Incorporated (IEc) har@indecon.com
To: Henry A. Roman <har@indecon.com>

CC: George D. Thurston <George.Thurston@nyumc.org>;
Lisa A. Robinson <robinson@hsph.harvard.edu>; Eric D. Ruder <er@indecon.com>

Re: The Proposed 2016 SCAQMD AQMP relies on deceptive human effects research claims and should be scrapped

Mr. Roman,

I will get to the point. Your supportive documents cite the work of George Thurston and in his paper he admits that he finds no evidence that Small Particle Air pollution is killing anyone. When the confidence interval crosses a relative risk of 1.0 all honest scientists declare a null effect.

George Thurston PhD and Co Authors can't find a small particle effect.

My position is that The September 15, 2015 *EHP* paper by Thurston, et al., found NO relationship between PM2.5 and total mortality during 2000-2009 in the publicly available NIH-AARP Diet and Health cohort (http://ehp.niehs.nih.gov/1509676/).

5 - 3

In the teased out data sets of the study Dr. Thurston tries, with his co authors, to make a silk purse out of pigs ear, because he found some subset data from carved out groups where the usual (for EPA air pollution epidemiologist could be found. But the pig's ear is still there—his findings are small non proof associations for those subgroups, the usual EPA offal, not proof and an overall result of NO EFFECT.

Here's the important section of the abstract with my comments inserted in bold parens to show why the paper does not support the South Coast project to push more small particle regs:

> **Results:** $PM_{2.5}$ exposure was significantly associated with total mortality (HR= 1.03, 95% CI =1.00, 1.05) (**overall CI includes 1.0—no effect)** and CVD mortality (HR=1.10, 95% CI=1.05, 1.15), but the association with respiratory mortality was not statistically significant (HR=1.05, 95% CI=0.98, 1.13) **Authors misused statistically significant, here because it only means**

5 – 3 (CONT'D)

they had a desired p value, not results that proved anything). A significant (**misused again)** association was found with respiratory mortality only among never smokers (HR=1.27; 95% CI: 1.03, 1.56). Associations with 10 $\mu g/m^3$ $PM_{2.5}$ exposures in yearly participant residential annual mean, or in metropolitan area-wide mean, were consistent with baseline exposure model results. Associations with $PM_{2.5}$ were similar when adjusted for ozone exposures. Analyses of California residents alone also yielded statistically significant $PM_{2.5}$ mortality HR's for total and CVD mortality

(**Not so, small associations don't prove anything, such as HR of 1.03 and 1.1 and anytime the small association is associated with a CI that includes 1.0, no effect can be asserted. And to repeat, all the findings in this study were statistically significant, the negative findings of no effect and the miniscule findings of a small positive effect—the authors intentionally deceive, but they follow a pattern in all air pollution studies of misusing the concept of statistical significance.)**

Conclusions: Long-term exposure to $PM_{2.5}$ air pollution was associated with an increased risk of total (**not true, CI included 1.0, miniscule non proof HR)** and CVD mortality **(again, not true, no proof from a small association, and other problems with parsing out a subset)** providing an independent test of the $PM_{2.5}$ – mortality relationship in a new large U.S. prospective cohort experiencing lower post-2000 $PM_{2.5}$ exposure levels. **(Again, small associations don't prove anything and CI that includes 1.0 is null effect. Not only that, but I would suggest that Thurston and colleagues fail the test when they don't advise that their study**

I also object strongly to the misuse of the words that Thurston and co-authors pick to describe their results "statistically significant," a term of art intentionally designed to put lipstick on a pig. Statistical significance is used by these EPA air pollution researchers to imply valid—however it is nothing more than a method for preventing randomness errors in data management and has nothing to do with the strength or validity of the results. For example in this case a statistically significant result of HR of 1.03 is no proof of anything in a population study, it is not even good enough to be hypothesis generating and requiring stronger or better evidence. As for a statistically significant result (by the data management test of p values) has a Confidence Interval that includes 1.0, the study is proof of nothing, it is a study with a null effect.

To parse out data to find a positive HR in CVD deaths is a deception too—in desk top death certificate tallies CVD deaths dominate but do not actually reflect a diagnosis, just a very uncertain guess. It does provide an opportunity to find a

5 – 3 (CONT'D)

small association; however, that means nothing about proof of causation.

Thurston, and colleagues, being ingenious and they are working for a regulatory entity, so they sliced and diced the data and found—voila—a way to tease out a small effect, admittedly a non proof small effect, that evaded the doom of a CI that included 1.0. It means nothing and is a trick. Shame on them. They aren't finding anything, they were just reworked the data piles to get to a HR that was enough to avoid the nullifying CI that included 1.0. Nice going, but still pseudo-science, because it requires believing in an HR of 1.1.

Since Dr. Thurston and his colleagues don't really know a mechanism for small particles at ambient levels can kill people, another data phenomenon deserves a comment—the CVD results showed a miniscule effect, but the Respiratory Deaths showed an overall no effect—BUT there was a data surprise, they found a nonsmoker HR that was positive with a relatively large (CI goes up when sample size goes down) and the CI stayed above 1.0 so they could use the magic words "statistically significant" in their deceptive way.

I will not belabor the obvious point that such a non sequitur deserves interesting and a measure of the uncertainties of population studies why the researchers are digging around in effects measures by HRs that are so small as not to deserve attention.

My conclusion is that Thurston and his co-authors were, no doubt, well paid by the NIH and had nothing to offer for the enviro agenda with their study—they are my exhibit one to prove the South Coast needs to reconsider its air pollution rags and reduce the burden on the residents.

5 – 4

I would also remind the South Coast officials that the Thurston study was a 6 state study that obviously must be considered in view of the California experience that will be outlined below—California, even Southern California where air pollution is higher than many other locations, shows no death effect when one assesses the deaths in California cohorts separately.

Michael Jarrett is one of Dr. Thurston's co-authors, and I am sure he could wax eloquent on the California null effect, since he has been running away from it for a long time. I also suspect that there is a California cohort that could be extracted pretty easily from the Thurston study (it's called zip codes) and studied and it would show the same null effect.

5 – 4
(CONT'D)

Imagine, to finish this section off—imagine the weak study Thurston and the almost dead certainty that the Thurston study would show no, nada, nunc effect in California. What's your guess, Mr. Roman?

Guess what, Mr. Roman, there is a California cohort in the Thurston Study and it shows—just what I said, no effect

In 160,000 deaths in CA here's the result provided by the Thurston et.al Table 3.

Full Baseline Model for California Only
160,209 deaths Results HR CI
All deaths--1.02 (0.99, 1.04)
CVD deaths 1.10 (1.05, 1.16)
Respiratory deaths 1.01 (0.93, 1.10)

Again, no proof where the CI doesn't include 1.0, and two parts of the cohort where CI includes 1.0.

The Thurston Study doesn't pass the smell, taste or laugh test for proof of ambient air pollution caused deaths.

EPA Research Scientist--Under Oath, Epidemiology can't prove our case—we need human exposures

To support that position and remind you, Mr. Roman, and Dr. Thurston, I provide **Appendix A,** attached to this emailed letter, a statement under oath by a Senior EPA official Robert Devlin PhD on the value of epidemiology studies in proving toxicity of air pollutants. I have highlighted for your convenience parsed out sections of his research where he admits epidemiology cannot prove causation, which is the reason the EPA funded attempts to find toxicity with human exposure experiments.

In his declaration under oath Dr. Devlin explains why he is heading up an EPA sponsored human exposure experiments project:

5 – 5

7.Epidemiological observations are the primary tool in the discovery of risks to public health such as that presented by ambient PM2.5. However, epidemiological studies do not generally provide direct evidence of causation. They indicate the existence or lack of a statistical relationship between ambient levels of PM2.5 and adverse health outcomes. Large population studies cannot assess the biological mechanisms (called biological plausibility) that could explain how inhaling ambient air pollution particles can cause illness or death in susceptible individuals. This sometimes leaves open the question of whether the observed association in the epidemiological study is causal or whether PM2.5 is merely a marker for some other unknown substance.

Controlled human exposure studies offer the opportunity to study small numbers of human subjects under carefully controlled exposure conditions and gain valuable insights

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into both the relative deposition of inhaled particles and the resulting health effects. Individuals studied can range from healthy people to individuals with cardiac or respiratory diseases of varying degrees of severity. In all cases, the specific protocols defining the subjects, the exposure conditions, and the evaluation procedures must be reviewed and approved by institutional review boards providing oversight for human experimentation. The exposure atmospheres studied vary, ranging from well-defined, single-component aerosols (such as black carbon or sulfuric acid) to atmospheres produced by recently developed particle concentrators, which concentrate the particles present in ambient air. The concentrations of particles studied are limited by ethical considerations and by concern for the range of concentrations, from the experimental setting to typical ambient concentration, over which findings need to be extrapolated.

5 – 5 (CONT'D)

Exhibit 1 at 36. Controlled human exposures studies have been conducted for decades on important pollutants such as ozone, particulate matter, nitrogen dioxide (N02), sulfur dioxide (S02), VOCs emitted in from new homes, and carbon monoxide (CO).

9. Controlled human exposure studies assess the biological plausibility of the associations observed in the large-population epidemiological studies. Controlled human exposure studies usually compare the response of an individual following exposure to clean air with their response following exposure to a pollutant that was generated or prepared under carefully controlled conditions, thus providing direct causal evidence that observed effects are related to the pollutant of interest. These studies are done under conditions that are controlled to ensure safety, with measurable, reversible physiological responses. They are not meant to cause clinically significant adverse health effects, but rather reversible physiological responses can be indicators of the potential for more serious outcomes in susceptible populations identified in epidemiology studies.

I would comment that the human exposure experiments were and are sponsored and funded by EPA in spite of the testimony by EPA officials and before the US Congress as well as public pronouncements by
By the EPA that small particles are lethal, at any level of exposure that would make the exposure experiments illegal, unethical and prohibited by federal statute and American common law as well as international accords on human experiments.

Reference Manual on Scientific Evidence explains the rules on epidemiology.

As a reminder of the rules of epidemiology that Dr. Thurston and your group as well as South Coast official should know, I attach as **Appendix B** the Chapter on Epidemiology in the *Reference Manual on Scientific Evidence* published by the National Academy of Science press and supervised by the Federal Judicial Center. The pertinent parts of the chapter on strength of association are highlighted.

As examples of the points made, from page 602:

> *B. How Strong Is the Association Between the Exposure and Disease?155*
> The relative risk is one of the cornerstones for causal inferences.156 Relative risk measures the strength of the association. The higher the relative risk, the greater the likelihood that the relationship is causal.157 For cigarette smoking, for example, the estimated relative risk for lung cancer is very high, about 10.158 That is, the risk of lung cancer in smokers is approximately 10 times the risk in nonsmokers.
> A relative risk of 10, as seen with smoking and lung cancer, is so high that it is extremely difficult to imagine any bias or confounding factor that might account for it. The higher the relative risk, the stronger the association and the lower the chance that the effect is spurious. Although lower relative risks can reflect causality, the epidemiologist will scrutinize such associations more closely because there is a greater chance that they are the result of uncontrolled con- founding or biases.

5 – 6

And from page 612:

> Some courts have reasoned that when epidemiologic studies find that expo- sure to the agent causes an incidence in the exposed group that is more than twice the incidence in the unexposed group (i.e., a relative risk greater than 2.0), the probability that exposure to the agent caused a similarly situated individual's disease is greater than 50%.191 These courts, accordingly, hold that when there is group-based evidence finding that exposure to an agent causes an incidence of dis- ease in the exposed group that is more than twice the incidence in the unexposed group, the evidence is sufficient to satisfy the plaintiff's burden of production and permit submission of specific causation to a jury. In such a case, the factfinder may find that it is more likely than not that the substance caused the particular plain- tiff's disease. Courts, thus, have permitted expert witnesses to testify to specific causation based on the logic of the effect of a doubling of the risk.192

GRADE Working Group work on strength of evidence.

5 – 6 (CONT'D)

I also attach a paper by the highly regarded international public/private scientific group studying integrity in medical research science, called the GRADE Working Group (**Appendix C**), and the paper the discuses their guidelines for strength of evidence, with specifics on how to grade evidence for reliability. In the paper 9 of the series they produced they go to those specifics and I would recommend the paper for your review, Mr. Roman and the review of Dr. Thurston. The GRADE Guidance specifies in its quality of evidence discussion the importance of Relative Risk of 2 or more and the more the better. For proof of benefit the guidance is for a RR of 0.5 or less.

At item 2 on page 2 of the 9th paper in a series of articles produced by the GRADE Working Group for the *Journal of Clinical Epidemiology* (**Appendix C1**) the Authors detail the importance of robust Relative Risk, above 2.0 or below 0.5 as they outline in an adjacent table:

Table 1. Factors that may increase the quality of evidence

1. Large magnitude of effect (direct evidence, relative risk [RR] 2.0 toe 5.0 or RR 0.5 < with no plausible confounders); very large with RR 2 to 5 or RR 0.5 or less and no serious problems with risk of bias or precision (sufficiently narrow confidence intervals); more likely to rate up if effect rapid and out of keeping with prior trajectory; usually supported by indirect evidence.

2. Dose-response gradient.

3. All plausible residual confounders or biases would reduce a demonstrated effect, or suggest a spurious effect when results show no effect.

5 – 7

Human experiments by EPA sponsored researchers have not been shown to support their claims that small particles kill—nor have EPA researchers been able to kill animals with extraordinary small particle air pollution exposures.

I not only assert that Dr. Thurston's study shows no evidence to prove deaths by small particles, but I would assert that all the portfolio of EPA sponsored studies on small particles fail to prove deaths because of the same flaws—small associations that prove nothing, no bench science to even suggest a mechanism of death and severely dishonest data torturing that I will explain hereunder.

<u>The flawed EPA research portfolio on human effects of small particles.</u>

There is a compelling listing of the California specific data on small particles pollution and death in all the major studies that are claimed to be proof of lethality. To find a segment of the population not effects is severely damaging to the EPA and CA EPA regime of regulatory efforts to control small particles.

James Enstrom, epidemiologist whom I have worked with to try to stop the research misconduct outlined above, did an analysis of the California cohorts from all the major the major studies that could be mined to separate out California cohorts. Enstrom found a stunning lack of small particle effect in California as demonstrated in the tables below and the dramatic Krewski map of the US showing a decline in small particle effects from highs in the Eastern US to lows and no effect in the West, including California, thought to have the worst air pollution in the nation. **(Appendix D)**

Shocking news, if you look at the Enstrom California cohort table below. The table of studies has stunningly negative results with the confidence interval of all but 3 of the studies crossing RR of 1.0. Game over, Mr. Roman. The Krewski Map shows no effects in California.

5 – 8

I suggest you Mr. Roman, and Dr. Thurston and his coauthors review this paper that has the null effect information, presented by Dr. Enstrom September 28, 2012 American Statistical Association 2012 JSM Proceedings Session Description and Enstrom Paper on "PM Not Killing CA" (http://www.scientificintegrityinstitute.org/ASAS092812.pdf) à find table on PM2.5 and total deaths in CA

For your convenience, Mr. Roman, I have inserted the link for Appendix D that shows the table of California cohorts from the EPAs favorite small particle air pollution studies where California cohorts could be separated. The California data pull was analyzed for RR and Confidence intervals by Dr. Enstrom and it shows a stunning pattern of NULL EFFECT of small particles on deaths.

See the tables on the next two pages and the Krewski Map on the third page. The pages are extracted from the document pages 2331-33.

Table 1. Epidemiologic Cohort Studies of PM2.5 and Total Mortality in California (http://www.scientificintegrityinstitute.org/Enstrom081512.pdf)
Relative risk of death from all causes (RR and 95% CI) associated with increase of 10 μg/m³ in PM2.5

Krewski 2000 & 2010 (N=40,408 [18,000 M + 22,408 F]; 4 MSAs; 1979-1983 PM2.5; 44 covariates)	CA CPS II Cohort	RR = 0.872 (0.805-0.944)	1982-1989
McDonnell 2000 (N~3,800 [1,347 M + 2,422 F]; SC&SD&SF AB; M RR=1.09(0.98-1.21) & F RR~0.98(0.92-1.03))	CA AHSMOG Cohort	RR ~ 1.00 (0.95 – 1.05)	1977-1992
Jerrett 2005 (N=22,905; 267 zip code areas; 1999-2000 PM2.5; 44 cov + max confounders)	CPS II Cohort in Los Angeles Basin	RR = 1.11 (0.99 - 1.25)	1982-2000
Enstrom 2005 (N=35,783 [15,573 M + 20,210 F]; 11 counties; 1979-1983 PM2.5; 25 county internal comparison)	CA CPS I Cohort	RR = 1.039 (1.010-1.069) RR = 0.997 (0.978-1.016)	1973-1982 1983-2002
Enstrom 2006 (N=35,783 [15,573 M + 20,210 F]; 11 counties; 1979-1983 & 1999-2001 PM2.5)	CA CPS I Cohort	RR = 1.061 (1.017-1.106) RR = 0.995 (0.968-1.024)	1973-1982 1983-2002
Zeger 2008 (3.1 M [1.5 M M + 1.6 M F]; Medicare enrollees in CA+OR+WA (CA=73%); 2000-2005 PM2.5)	MCAPS Cohort "West"	RR = 0.989 (0.970-1.008)	2000-2005
Jerrett 2010 (N=77,767 [34,367 M + 43,400 F]; 54 counties; 2000 PM2.5; KRG ZIP; 20 ind cov+7 eco var; Slide 12)	CA CPS II Cohort	RR ~ 0.994 (0.965-1.025)	1982-2000
Krewski 2010	CA CPS II Cohort		
(N=40,408; 4 MSAs; 1979-1983 PM2.5; 44 cov)		RR = 0.960 (0.920-1.002)	1982-2000
(N=50,930; 7 MSAs; 1999-2000 PM2.5; 44 cov)		RR = 0.968 (0.916-1.022)	1982-2000
Jerrett 2011 (N=73,609 [32,509 M + 41,100 F]; 54 counties; 2000 PM2.5; KRG ZIP Model; 20 ind cov+7 eco var; Table 28)	CA CPS II Cohort	RR = 0.994 (0.965-1.024)	1982-2000
Jerrett 2011 (N=73,609 [32,509 M + 41,100 F]; 54 counties; 2000 PM2.5; Nine Model Ave; 20 ic+7 ev; Fig 22 & Tab 27-32)	CA CPS II Cohort	RR = 1.002 (0.992-1.012)	1982-2000
Lipsett 2011 (N=73,489 [73,489 F]; 2000-2005 PM2.5)	CA Teachers Cohort	RR = 1.01 (0.95 – 1.09)	2000-2005
Ostro 2011 (N=43,220 [43,220 F]; 2002-2007 PM2.5)	CA Teachers Cohort	RR = 1.06 (0.96 – 1.16)	2002-2007
replaced Ostro 2010	Incorrect 2010 Result:	RR = 1.84 (1.66 – 2.05)	2002-2007

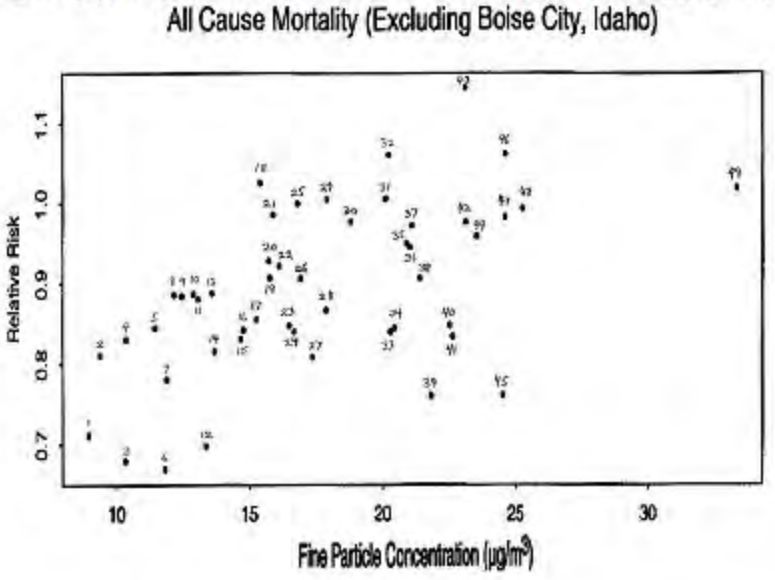
5 – 8 (CONT'D)

Figure 1. Figures 21 and 5 from HEI Reanalysis Report (Krewski 2000)

Figure 21 Spatial Overlay of PM2.5 Level and Mortality Risk by City (page 197)



Figure 5 (Upper Right) Relative Risk for PM2.5 and Total Mortality by City (page 161)



5 – 8 (CONT'D)

5 – 8 (CONT'D)

Mr. Roman, my request to you is that you reevaluate the Thurston paper and confirm what Dr. Thurston admits is no effect in his overall study. Then you must reject participation in any effort by the staff of South Coast to cobble together a case for more onerous regulations of small particles using the Thurston Paper or the Jarrett research of the last few years. You can see that Jarrett's studies in the tables show no effect.

I have written my comments to CARB on the Jarrett conurbation study and discuss it below. Under no circumstances should South Coast burden the citizens of the region based on the Thurston and Jarrett studies on small particle effects.

Since the death effects are projected by your studies from small particles, I will not address the arguments against accepting the other studies on ozone that are not in your area of activity.

5 – 9

Dr. Jarrett admits no effects at the big show in Sacramento.

Dr. Michael Jarrett, prominent air pollution researcher for CARB and EPA (UC Berkeley) had his head handed to him at the public debate/symposium on small particles, Sacramento CAL EPA offices February 26, 2010 as I narrated and told the tale here:

http://www.americanthinker.com/articles/2010/03/californias_toxic_air_scare_ma.html

The 7 hour symposium/debate on small particles is on the video here:

http://www.cal-span.org/media.php?folder[]=CARB

At the debate, Dr. Jarrett admitted that he couldn't find a death effect in his studies of recent years. He admitted he could not show a death effect and he and CARB hired experts lost the debate to an expert group including Dr. Enstrom, UCLA, Roger McClellan, former Chair of the US EPA Clean Air Scientific Advisory Committee (CASAC), Suresh Moolgavkar MD, U of Washington Cancer Center.

A year and 3 quarters of a million dollars of CARB money later, Dr. Jarrett delivered what he couldn't deliver at Sacramento by what I would describe as flagrant pseudo-science that now is becoming very stylish in junk science for government circles—he did computer models till he could find one that gave him what he wanted. He added, along the way, a prominent list of co-authors:
Principal Investigator:
Michael Jerrett, PhD
Co-Investigators:
Richard T. Burnett, PhD, Arden Pope III, PhD, Daniel Krewski, PhD
George Thurston, ScD, George Christakos, PhD, ScD
Edward Hughes, PhD, Zev Ross, MS, Yuanli Shi, MD, Michael Thun, MD

Funny thing is he admitted his methodology which makes him some kind of evolution of stupid by him and all these prominent air pollution researchers. In his paper reporting small particle effects he and his many prominent co-authors reported positive effects from a parsing of the population data on a temporal spatial template called "conurbation"

that showed a positive death effect from small particle air pollution. He also reported the other models he used did not show any effect, and there were 8. So one modeling template gave the group what they wanted and they canned the other 8:

Such scientific strategies are risible, since repeating and confirming is the normal process, but I admit it gave me a big fat target with a group of charlatans, and I took advantage of the opportunity. See **(Appendix E).**

Even with data mining and torturing, Dr. Jarrett found an association that was so small it was not proof of causation at all—just like the studies above with RR and HR of less than 1.1.

I had an easy time of it, making fun of Dr. Jarrett's and his high powered group's scientific misconduct, since he and his paper were his own worst enemies. Dr. Jarrett admitted he used multiple models to torture the data until it yielded his desired result, a small, I repeat small, association that would not, in proper application of the rules on magnitude of Relative Risk for epidemiological studies, outlined above, be considered proof of toxicity or lethality, or anything at all.

5 – 9 (CONT'D)

No matter, the CARB and US EPA and all the anxious advocates of efforts to reduce human activity would believe anything that Dr. Thurston or Dr. Jarrett claimed, even claims of thousands, even hundreds of thousands of lives saved from premature death.

Here are a few excerpts from my letter criticizing the conurbation paper—and I stand by those criticisms here:

> My goodness, the subornation gambit is just another form of the well-known researcher trick of chopping the data under multiple methodologies until one finds the result desired with the computer, the mindless computer rigged to find that good result. Changing the geographic parameters to an urban and suburban mix to get a desired effect is bad science that produces outcome based junk.
>
> The rules haven't changed. Dr. Jarrett can't tell us why or how small particles cause disease, so he's short on plausibility; he's also short on specificity because he just uses crude deaths in excess of the predicted and calls them premature. He also, even with such loose methodology, can only show effects in the range under 1.2, so he doesn't have an adequate magnitude of effect to claim proof of causation.
> Just because Dr. Jarrett is committed to eliminating pollution of any kind, doesn't mean he can claim he is eliminating a toxin, particularly when one considers the following.
> 1. The researchers have not even bothered to define the nature of the toxin satisfactorily—small particles is a size, 2.5 microns, but it could be weaponized anthrax or agricultural dust—would anyone claim the two are equally toxic?
> 2. The researchers do not have exposure information—they also use air pollution monitor information for outside air when people

5 – 9 (CONT'D)

live indoors 90 % of the time and they just average it and use it as an exposure index—when will such nonsense be stopped?
3. The decision to use crude death rates and arbitrary short lag times for endpoint of "premature" deaths ignores the nature of chronic diseases. Low level air pollution does not acutely poison people. People die after long periods of illness or disease and failed medical treatment, not some acute exposure to a few microns in a cubic meter of air. What are the researchers studying, is it a real disease or toxic effect or just variable death rates in a population?
4. Premature deaths from what disease, what toxic effect? Specificity is a surrogate in toxicology for plausibility, but it is a separate, important consideration—how can Dr. Jarrett just use premature deaths as an endpoint when we have yet no biologically or toxicologically plausible mechanism for deaths from ambient levels of air pollution. Dr. Jarrett could be counting deaths from any one of a number of confounding causes.
5. If premature deaths are to be the endpoint rather than tissue proven or test proven disease, when will Dr. Jarrett and his colleagues admit to the problem that they torture crude death rate data for short term rate increases that might correlate with air pollution increases? What proof is that? If they are wrong, a pile of studies that result from such data torturing to find associations is just another extraordinary example of a pattern of research where the principles can't differentiate the noise (death rate variability) from the signal (whatever deaths that might be attributable to air pollution). Monitor information in the range of the noise created by variability of the death rates, lack of real exposure and toxicity information, and arbitrary lag times provide great opportunities for trolling through the data for a correlation. Could it be that Dr. Jarrett was trolling with the good ship conurbation?
6. If death rates vary as much as 15 percent in populations from winter to summer and variability of death rates from day to day can easily be that much, is Dr. Jarrett, *sans* biological plausibility just reporting on the noise and claiming it is a signal. If the results are in the low range, how much noise, how much signal?
7. If the effect reported fails to meet the *Reference Manual recommendation* that effects be at least 100 percent to be adequate for proof of toxicity, is the Jarrett study just another hypothesis generating study under the rules or another supportive study for the needs of the agency and the air pollution regulatory agenda?
8. Is this conurbation model anything more than a sophisticated form of confirmation bias driven by intellectual passion and commitment with tunnel vision?
9. Is Dr. Jarrett falling for the well-established problem in the air pollution human health effects science community of intellectual passion and commitment combined with confirmation bias and the faggot fallacy? (That faggot fallacy is discussed in *Judging Science* by Huber and Foster (MIT press 1997), and it is the fallacy based on the "belief that multiple pieces of evidence, each independently

being suspect or weak, provide strong evidence when bundled together.")
10. Given the source of funding and the CARB commitment to regulating small particles, does anyone on the review panel think Dr. Jarrett would ever, ever receive funding from US EPA or CARB if he repeated his candid admission of February 26, 2010 that would shut down the CARB particle control industry and shut down the CARB and US EPA juggernaut?

And

Cargo Cult Science in the Movie Capital State
I would ask that the reader consider the old and amusing story of Cargo Cults—the mistaken notion of primitives that if they followed some of the appearances of old air fields in South East Asia after the war was over, the planes would return with the people who flew them. Cargo cult science is a fallacious conduct, the pretentious display of scientific customs and methodology that has no substance and is unreliable and unscientific.
The many PhDs arrayed in this very expensive study, even if they presented themselves solemnly and wore white coats, would be involved in a data dredging charade. Bad science cannot be hidden like a Potemkin village, because in the end it's still about the reliability and the credibility of the evidence. Dr. Jerrett's evidence is the great example of the old Texas saying often wrong but never in doubt.

5 – 9 (CONT'D)

I won't belabor the history and the previous studies that will be brought to the reader's attention about California studies that show no effect. Use of the word significantly might be over the top.
1. A major study by the Health Effects Institute shows no excess mortality from fine particles.
2. The Enstrom Study of a robust cohort of Californians studied over a significant period of time shows no death effect from small particles.
3. The US EPA 2002 report of diesel exhaust health effects showed no effect.
4. The previously mentioned Pope second half data and the Krewski map of effects shows that California residents are not suffering any adverse effects from air pollution.

A good honest study that disproves a hypothesis is controlling—it is evidence that the premise is wrong. Consensus science, a vote of the paid researchers present, or a reliance on authority offends the rules of science—a process that must first of all hold skepticism rather than acquiescence in high regard. Unfortunately hundreds of thousands of dollars from agency coffers can influence research and eliminate self-examination, skepticism and most of all humility and adherence to the rules of science even when it goes against one's personal interests. 8

5 – 9 (CONT'D)

Scientists must be committed to a careful and skeptical search for truth and reliable results and solutions; they can't become tools of political interests.
Hello—any scientists on watch at CARB or CA EPA?

5 – 10

/Economics analysis

I will not spend much time in this letter discussion the inappropriate economics risk/benefits conclusions that come from creating out of whole cloth deaths that never happened and attaching them to a value of almost 10 million per, all to prove up the value of controlling small particles. Mr. Roman, you and I both know that the benefits side of the balance sheet becomes insignificant and not enough to support burdensome regulations if the economists can't put a multimillion dollar value on the specious and unsupported claims of thousands of deaths in the South Coast catchment population.

Let us agree that if you can't prove that the research shows deaths, the economics analyses are worthless exaggerated exercises in releasing agit-prop to the accepting and supportive CA media. The claims certainly overestimate claims of injury by orders of magnitude.

5 – 11

Conclusion

Overwhelming evidence shows that the IEc documents misrepresent and exaggerate the relationship of PM2.5 and ozone to total mortality in the South Coast Air Basin (SCAB) and California. I have explained why. Your faulty claims are embedded in:
"IEc Literature Review of Air Pollution-Related Health Endpoints and Concentration-Response Functions for Particulate Matter: Results and Recommendations Draft Report December 4, 2015" (http://www.aqmd.gov/docs/default- source/Agendas/STMPR-Advisory-Group/december-2015/3a_draft_pm.pdf?sfvrsn=4)

and

the PPT "IEc Review of Health Endpoints and Economic Valuation for Socioeconomic Report on 2016 South Coast AQMP" (http://www.aqmd.gov/docs/default-source/Agendas/STMPR- Advisory-Group/december-2015/3f_stmpr_presentation_121015.pdf?sfvrsn=4).

I have been working on the problem of bad epidemiology used by CARB and its allies for many years now, trying to cultivate better scientific approaches and fewer panicky exercises in bloviating by EPA advocacy mavens. I would be happy if they would just stop publishing papers that don't prove anything.

I have been in the practice of medicine, mostly emergency medicine, for just short of 44 years now and I am yet to witness a death from small particles—how bout that? Dr. Thurston is a desk bound person, and I own a stethoscope—he counts death certificates and I fill them out when asked and I assure you that the autopsy rate and the methods displayed by EPA researchers make for epidemiology that really isn't reliable science.

The rules are still in my favor as explained above. My submission to CARB in the 2008 battle over small particle regulations covers the same ground as this letter. The scientific

misconduct of EPA CARB and South Coast sponsored researchers is the same now as many years ago. They violate basic rules of epidemiology to create unreal and unreliable, exaggerated claims of deaths to panic the people and intimidate the policy makers and politicians.

Since I have never seen a person die from American ambient air pollution I condemn and disapprove the the death certificate desk exercises of the EPA, CARB and South Coast researchers as sham science , not real investigations of causes of death. The studies are soaked in deceitful methods and data torturing that result in false assertions and scare mongering for political advantage and to promote an aggressive policy agenda that harms the citizens. **Nothing has changed in 20 years, just more deceptions and more junk science epidemiology paid for by CARB, South Coast, CA EPA and US EPA. The Rules of epidemiology haven't changed, just the number of times the rules were broken by researchers funded by the EPA**.

In 2012 James Enstrom and other doctoral-level scientists submitted detailed public comments to SCAQMD, which are shown on pages 213-254 of the 2012 AQMP Appendix I Health Effects Document (http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012- air-quality-management-plan/final-carb-epa-sip-dec2012/2012-aqmp-carb-epa-sip-submittal- appendix-i.pdf).

These comments provide overwhelming evidence as of 2012 that there is NO relationship between PM2.5 and total mortality in California.

5 – 11 (CONT'D)

James Enstrom put together an in depth study of the issue in a submission to Science that I support and agree with. The evidence that "Particulate Matter Does Not Cause Premature Deaths" is now even stronger, as summarized in my August 17, 2015 submission to *Science* (https://www.nas.org/images/documents/PM2.5.pdf).

I assure you that you, your associates and Dr. Thurston are well advised to inform South Coast officials of my letter and my assertions—more importantly Dr. Thurston and your group, Mr. Roman, have to be honest and forthcoming—you should inform the South Coast Board about the weakness of small associations in epidemiological studies, the lack of bench science to support the claims of small particle lethality, and the null effects of studies on California populations that are found in a focused analysis of the many famous studies of small particle air pollution effects that are referenced above in this letter.

You should also tell the South Coast Board that the studies are piling up to indicate that CA residents don't suffer from any effects of small particle pollution.

I would also advise you to advise South Coast officials not to try to make the Jarrett study a study that justifies the imposition of more regulations that will be a burden on the economy and welfare of the South Coast Citizens.

I hope this letter alerts you to the dangers of deceit in public policy matters and how bad science cannot justify excessive government regulatory regimes. I have previously warned CARB and CA EPA officials that the False Claims Act provides for severe penalties for those who use taxpayer money, received, for example as a grant, to perpetrate a fraud. Treble damages get your attention?

5 – 11 (CONT'D)

Thank you for your consideration of this letter and I will copy Dr. Thurston and the individuals listed above. I will not be contacting South Coast Officials and Board Members, anticipating your response to indicate you will be forthcoming and honest in your upcoming presentations to South Coast.

Do you promise to be honest, Mr. Roman, or will you continue this charade of bad science I pursuit of panicking the public and promoting more environmental power grabbing? Your choice.

Remember what I said above about treble damages from the False Claims Act—Dr. Thurston's study was funded by the NIH, which is funded by taxpayers like me.

Cordially,
s/JDunn MD/
John Dale Dunn MD JD

Attached documents

Appendix A, Dr. Robert Devlin admission under oath
Appendix B, Chapter on Epidemiology *Reference Manual on Scientific Evidence*
Appendix C GRADE Working Group website information
Appendix C 1 GRADE Working Group paper 9 of a series
Appendix D Enstrom paper with tables and US map on human death effects from Small Particles
Appendix E Letter by Dunn criticizing Jarrett's conurbation study of California air pollution effects

Responses to Comment Letter #5

Submitted by John Dunn on January 23, 2016

5-1 and 5-2

These comments are introductory, summarizing the Commenter's opinions and claims without supporting evidence.

The Commenter's attempts throughout this comment letter to denigrate the work of SCAQMD staff, its expert consultant Industrial Economics, Inc. (IEc) and their scientific advisor, Dr. George Thurston, lack merit.

The Draft Final 2016 AQMP is designed to provide a path to clean air goals and address federal Clean Air Act (CAA) requirements for both ozone and PM2.5 standards. The Commenter's objection to staff's efforts on the 2016 AQMP are noted.

5-3

See staff response to Comment 12-1. The referenced article by Thurston et al. (2015) was discussed in the IEc report on PM-related C-R functions. However, it should be clarified that this study was not included in the analysis quantifying public health impacts of the Draft Final 2016 AQMP for reasons related to "benefit transfer." Please refer to the IEc report (http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/iec_pmlitreview_092916.pdf) for detailed discussion.

5-4

Please see staff response to Comments 5-3 and 12-1. Regarding the public health benefits associated with reduced long-term exposure to PM2.5, the Draft Final Socioeconomic Report quantified the benefits based on the pooled results of four estimates from the following studies: Jerrett et al. (2005), Krewski et al. (2009), and Jerrett et al, (2013). Please see Chapter 3 and Appendix 3-B of the Draft Final Socioeconomic Report for more information.

5-5

The Commenter appears to be criticizing the validity of particulate matter human exposure studies conducted by U.S. EPA. The Commenter's suggestion that exposure studies conducted by U.S. EPA were somehow improper is offered without any detailed evidence to support the allegation. The allegation is inconsistent with standard protocols associated with human exposure studies. SCAQMD staff also notes that these studies are regulated. See, e.g., 40 C.F.R.§26.101 et seq [Basic EPA Policy for Protection of Subjects in Human Research Conducted or Supported by EPA].

Moreover, the quoted statement was taken out of context and misinterpreted by the Commenter. Staff agrees with the quoted statement that, in epidemiological research, "[l]arge population studies cannot assess the biological mechanisms (called biological plausibility) that could explain how inhaling ambient air pollution particles can cause illness or death in susceptible individuals." The purpose of carefully designed controlled human exposure studies, where the adverse physiological effects are reversible, is to help uncover the biological mechanisms underlying the correlations observed in epidemiological studies.

Both type of studies were carefully considered in U.S. EPA's causal determination of air pollution-related health effects.

For more discussion, please see Appendix I of the Draft Final 2016 AQMP which summarizes the health effects and causal determinations as assessed by U.S. EPA and other scientific agencies, discusses some recent studies published since the latest U.S. EPA reviews, gives some quantitative estimates of the health impacts of particulate matter air pollution in the South Coast Air Basin, and presents a "local perspective" by highlighting studies conducted in the South Coast Air Basin, Southern California, or California.

5-6

Staff acknowledges receipt of the excerpt from the *Reference Manual on Scientific Evidence* and the materials regarding GRADE Working Group's work. Staff rejects any insinuation that U.S. EPA, CARB, and the researchers and experts upon which they and SCAQMD have relied lack knowledge of or have acted inconsistent with applicable basic research principles.

5-7

See staff response to Comment 5-5 and Appendix 1 of the Draft Final 2016 AQMP. It should be clarified that in U.S. EPA's 2009 Integrated Science Assessment (ISA) for Particulate Matter, a large body of scientific research supported a causal determination for the relationship between PM2.5 exposure and increased mortality risk. The ISA document describes the observational (epidemiological) studies, which lend support to effects on human populations, as well as laboratory studies which help explain the underlying biological mechanisms.

5-8

Staff denies the existence of any research misconduct by SCAQMD staff and its expert consultant IEc in the application of established scientific evidence in the AQMP public health benefits analysis. Similar comments, including a table containing many of the entries in Table 1 of Comment 5-8, were submitted to CARB during its rulemaking for diesel vehicles.[1] CARB's staff responded to those comments and that response is included in the following statement:

> *In summary, the commenter presents a table of effect estimates from studies that either have insufficient statistical power to show whether or not there is an effect, that are not peer reviewed and published, or that are based on populations in which one would not expect to see an effect due to subject age. In addition, the table omits more studies than it includes. The table omits the majority of published, peer reviewed studies that have been performed in the U.S. Virtually all of the omitted studies report a statistically significant association between long-term exposure to PM2.5 and all-cause mortality, often larger than the ~5% effect estimate we have applied in our cost-benefit analyses. While the commenter's table focuses on the lowest estimates available*

[1] Final Statement of Reasons for Rulemaking: for Amendments to the Regulation to Reduce Emissions from In-Use On-Road Diesel Vehicles Made as Part of the Public Hearing to Consider Proposed Amendments to the Regulation to Reduce Emissions from In-Use On-Road Diesel-Fueled Vehicles, the Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Measure, and the Regulation to Control Emissions from In-Use On-road Diesel-Fueled Heavy-Duty Drayage Trucks at Ports and Intermodal Rail Yard Facilities. December 17, 2010. https://www.arb.ca.gov/regact/2010/truckbus10/tbfsor.pdf

(published or not), the ones left off of the table range up to several times the estimate we have used.

It is not the purpose of the Draft Final Socioeconomic Report to reevaluate the work of U.S. EPA and CARB with regard to making causal determinations for the health effects of air pollution. The U.S. EPA is tasked with assessing new and emerging air quality science, including health studies, as part of the process of setting the federal air quality standards. In other words, the U.S. EPA's role is to assess the causal relationships between the pollutants and the different types of health endpoints. It is then SCAQMD's role is to describe the public health impacts of poor air quality in our region, as well as to develop and implement an emission reduction strategy to attain the federal and state ambient air quality standards.

5-9

SCAQMD's expert consultant, IEc, conducted a thorough evaluation of what studies should be included and relied upon by SCAQMD in its socioeconomic analysis. IEc's reasoning for recommending Jerrett et al. (2013) along with two other studies for quantification of PM2.5 mortality-related effects is described in their report (available at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/iec_pmlitreview_092916.pdf) See also See page 3-6 of the Draft Final Socioeconomic Report.

5-10

Staff disagrees with Commenter's claims. The Draft Final Socioeconomic Report, which includes costs of control measures, benefits of clean air, regional and sub-regional job impacts, and an environmental justice (EJ) analysis at the community level, was prepared to further inform public discussions and the decision-making process associated with the adoption of the Draft Final 2016 AQMP. However, the SCAQMD is legally required to adopt a plan to attain the National Ambient Air Quality Standards. The legal requirements for the AQMP are described in Chapter 1 of the Draft Final 2016 AQMP. See staff response to Comment 12-1 for more discussion.

5-11

SCAQMD staff disagrees with the Commenter's analysis. The Commenter's analysis has been previously submitted to both U.S. EPA and CARB. Both agencies have rejected it. SCAQMD's expert consultant IEc reviewed the relevant literature and health effects studies and has found that the conclusions of U.S. EPA and CARB remain sound.

The SCAQMD contracted with IEc, who worked with their scientific advisor Dr. George Thurston, to perform a thorough review of air pollution-related health effects literature using study evaluation criteria presented to and reviewed by the 2016 AQMP Scientific, Technical & Modeling Peer Review (STMPR) Advisory Group, and based on the review results, make recommendations regarding methodologies and data to be used for the public health benefits of the 2016 AQMP. Additionally, IEc's draft findings and recommendations regarding both C-R and benefits valuation functions were all discussed and reviewed at multiple meetings of the STMPR Advisory Group, which were open to public participation with advanced meeting notices electronically mailed to all 2016 AQMP interested parties.

For detailed information, please see Chapter 3 and Appendix 3-B of the Draft Final Socioeconomic Report and IEc's reports regarding concentration-response functions. The IEc reports are available at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/iecmemos_november2016/evaluationcriteria_113016.pdf (selection criteria);

http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/iec_pmlitreview_092916.pdf (PM-related C-R functions); http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/iec_gasplitreview_092916.pdf (gaseous pollutant-related C-R functions).

SCAQMD staff responses to the comments submitted by Dr. James Enstrom on the 2012 AQMP can be found at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/2012-aqmp-response-to-comments/part-1-comment-letters-2012.pdf.

See also staff response to Comment 12-1.

NOTES FOR COMMENT LETTER #5

All attached materials (Appendices A through E) can be found in Comment Letter #5 in Responses to Comments for Appendix I of the Draft Final 2016 AQMP.

COMMENT LETTER # 6—JAMES ENSTROM EMAIL, DECEMBER 15, 2015

December 15, 2015

Henry A. Roman, M.S. (HSPH)
Principal Industrial Economics, Incorporated (IEc)
har@indecon.com

Dear Mr. Roman,

This email letter is a follow-up to my unanswered December 11, 2015 telephone message to you regarding your December 10, 2015 SCAQMD STMRP Socioeconomic Session Presentation "Recommendation for Health Effects C-R and Valuation Function" (http://www.aqmd.gov/home/library/meeting-agendasminutes/agenda?title=STMPR_Socio_121015). I have overwhelming evidence that your draft IEc documents misrepresent and exaggerate the relationship of PM2.5 and ozone to total mortality in the South Coast Air Basin (SCAB) and California.

I am particularly concerned about the "IEc Literature Review of Air Pollution-Related Health Endpoints and Concentration-Response Functions for Particulate Matter: Results and Recommendations Draft Report December 4, 2015" (http://www.aqmd.gov/docs/defaultsource/Agendas/STMPR-Advisory-Group/december-2015/3a_draft_pm.pdf?sfvrsn=4) and the PPT "IEc Review of Health Endpoints and Economic Valuation for Socioeconomic Report on 2016 South Coast AQMP" (http://www.aqmd.gov/docs/default-source/Agendas/STMPRAdvisory-Group/december-2015/3f_stmpr_presentation_121015.pdf?sfvrsn=4).

6 - 1

In 2012 I and other doctoral-level scientists submitted detailed public comments to SCAQMD, which are shown on pages 213-254 of the 2012 AQMP Appendix I Health Effects Document (http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012air-quality-management-plan/final-carb-epa-sip-dec2012/2012-aqmp-carb-epa-sip-submittalappendix-i.pdf). These comments provide overwhelming evidence as of 2012 that there is NO relationship between PM2.5 and total mortality in California. The evidence that "Particulate Matter Does Not Cause Premature Deaths" is now even stronger, as summarized in my August 17, 2015 submission to Science (https://www.nas.org/images/documents/PM2.5.pdf).

You cited some of this NULL evidence in the September 21, 2006 IEc EPA Expert Elicitation Report (http://www3.epa.gov/ttnecas1/regdata/Uncertainty/pm_ee_report.pdf) and Dr. George Thurston has been well aware of this NULL evidence ever since he and I attended the February 26, 2010 CARB Symposium "Estimating Premature Deaths from Long-term Exposure to PM2.5" (http://www.arb.ca.gov/research/health/pm-mort/pm-mort-ws_02-26-10.htm). Furthermore, the September 15, 2015 EHP paper by Thurston, et al., found NO relationship between PM2.5 and total mortality during 2000-2009 in the publicly available NIH-AARP Diet and Health cohort (http://ehp.niehs.nih.gov/1509676/).

Thus, I request that you and/or Dr. Thurston notify me by December 21, 2015 that all final IEc documents prepared for the 2016 SCAQMD AQMP will cite the overwhelming NULL evidence described above and will state that PM2.5 and ozone have NO relationship to total mortality in the SCAB or California. If I do not receive such a notification by December 21, 2015, I will immediately thereafter

6 - 2

6 – 2 (CONT'D)

begin explaining the deliberate misrepresentations and exaggerations contained in the draft IEc documents to SCAQMD Board Members, certain SCAQMD staff members, impacted SCAB business leaders, the U.S. House Science Committee, scientific colleagues, the press, and others who are interested in having regulatory policy in the SCAB and California based on the truth.

Thank you for your prompt attention to this important request.

Sincerely yours,

James E. Enstrom, Ph.D. (Stanford), M.P.H. (UCLA) UCLA and Scientific Integrity Institute
jenstrom@ucla.edu (310) 472-4274

cc: George D. Thurston, D.Sc. (HSPH) <George.Thurston@nyumc.org> Lisa A. Robinson, M.P.P. (Harvard) <robinson@hsph.harvard.edu> Eric D. Ruder, M.S. (HSPH) <er@indecon.com>

Responses to Comment Letter #6

Submitted by James Enstrom on December 15, 2015

6-1

Henry Roman, Principal at Industrial Economics, Inc. (IEc), provided a written response via electronic mail to the commenter letter on December 18, 2015 wherein he advised Commenter that materials would be reviewed and acknowledged the Commenter's "different interpretation of the air pollution health effects literature" (A copy of Mr. Roman's December 18, 2015 response is included as Attachment A to Comment Letter #7.) Mr. Roman also advised Commenter that he needed to direct his comments "through the systems established by SCAQMD."

With respect to the claims regarding the health effects of PM and ozone, please see staff response to Comment 12-1.

6-2

In his December 18, 2015 response, Mr. Roman declined the Commenter's request to amend the IEc draft report. The referenced draft report had already been submitted for review and discussion at the December 10, 2015 meeting of the Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group. The participating STMPR members provided many comments and suggestions, but there was no corroboration of the Commenter's claims. (The meeting minutes can be found at http://www.aqmd.gov/docs/default-source/Agendas/STMPR-Advisory-Group/december-2015/stmpr_socmins_121015.pdf.)

COMMENT LETTER #7—JAMES ENSTROM EMAIL, DECEMBER 23, 2015

December 23, 2015

Andrew M. Schwarz, M.S.T. (Antioch), M.F.S. (Yale), M.B.A. (GWU)
President Industrial Economics, Incorporated (IEc)
ams@indecon.com

Dear President Schwarz,

In his December 18, 2015 reply to me, IEc Principal Henry A. Roman refuses to properly modify draft IEc documents prepared for socioeconomic justification of the 2016 SCAQMD AQMP (http://www.scientificintegrityinstitute.org/Roman121815.pdf). My December 15, 2015 email letter requests that he properly cite the massive evidence that there are NO deaths due to PM2.5 and ozone in California (http://www.scientificintegrityinstitute.org/Roman121515.pdf). The draft IEc documents are not simply "a different interpretation of the air pollution health effects literature," but they include "deliberate misrepresentations and exaggerations." I believe the draft documents violate IEc policies (http://www.indecon.com/iecweb/AboutUsValues.aspx): "Our Values--IEc has been delivering unbiased work products for more than 30 years" and "Committed to Objective Analysis--We believe that the most intellectually honest basis for decision making is to let the evidence speak."

7-1

Thus, I request that you and the other IEc Principals immediately review the overwhelming NULL evidence described in my December 15, 2015 email letter and its eight weblinks. Then, I request that you notify me via email that all final IEc documents prepared for the 2016 SCAQMD AQMP will cite this overwhelming NULL evidence and will state that PM2.5 and ozone have NO relationship to total mortality in the SCAB or California. Until I receive such a notification from you, I will continue the efforts that I began this week to explain the deliberate misrepresentations and exaggerations contained in the draft IEc documents to SCAQMD Board Members, the U.S. House Science Committee, and others who are interested in having regulatory policy in the SCAB and California based on the truth. If the final IEc documents do not include a complete and accurate presentation of the NULL mortality evidence regarding PM2.5 and ozone, I will make the case that all 22 IEc Principals, Dr. George D. Thurston, and EPA are conspiring with SCAQMD EO Barry Russell Wallerstein, D.Env., in a deliberate effort to impose scientifically unjustified and economically destructive EPA regulations on 17 million SCAB residents.

In order to understand how the ground is shifting under EPA-support groups like IEc, please read the December 23, 2015 Wall Street Journal editorial "Brushing Back a Lawless EPA" (http://www.wsj.com/articles/brushing-back-a-lawless-epa-1450829307). I hope you take my request seriously, because it is very serious and I am a very serious scientist.

Thank you very much for your consideration.

Sincerely yours,

James E. Enstrom, Ph.D. (Stanford), M.P.H. (UCLA)
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu
(310) 472-4274

cc:

Jennifer R. Baxter, M.E.S. (Yale) jbaxter@indecon.com
Gail B. Coad, M.B.A. (Stanford) gbc@indecon.com
Mark S. Curry, M.P.A (Indiana) msc@indecon.com
Rachel DelVecchio, M.E. (MIT) rdelvecchio@indecon.com
Michael C. Donlan, M.B.A. (Stanford) mcd@indecon.com
Neal Etre, M.E.M. (Yale) netre@indecon.com
Mark D. Ewen, M.P.P. (Michigan) mde@indecon.com
Leslie Genova, M.A. (Brown) lgenova@indecon.com
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Director Chiara Trabucchi ct@indecon.com
Robert E. Unsworth, M.F.S. (Yale) reu@indecon.com

IEc

INDUSTRIAL ECONOMICS, INCORPORATED

18 December 2015

Dr. James Enstrom
UCLA Pub Hlth
BOX 951772, A1-295 CHS
Los Angeles, CA 90095-1772

Dear Dr. Enstrom:

We received your telephone message of December 11, 2015 and your email dated December 15, 2015 in which you cite papers and other information you would like us to consider as part of our work supporting the South Coast Air Quality Management District (SCAQMD). We will review the referenced materials.

We understand from both communications that you have a different interpretation of the air pollution health effects literature than the one presented in our review. As you know, there is a formal process by which the public can submit comments to SCAQMD regarding the development of the Air Quality Management Plan. I believe that is the appropriate forum for you to present your concerns for consideration by SCAQMD.

Regarding your request that IEc amend our documents to state "that PM2.5 and ozone have NO relationship to total mortality in the SCAB or California," IEc respectfully declines. IEc has a well-established reputation for conducting objective analyses. We disagree with your allegation that our work contains "deliberate misrepresentations and exaggerations."

If you choose to continue this discussion, we request that you direct your comments through the systems established by SCAQMD. Written comments may be submitted to SCAQMD's Executive Officer, Dr. Barry R. Wallerstein (BWallerstein@aqmd.gov; 909-396-3131).

Sincerely,

Henry Roman
Principal

cc:
Mr. Eric Ruder, IEc;
Dr. George Thurston, NYU Medical School

Industrial Economics, Incorporated
2067 Massachusetts Avenue
Cambridge, MA 02140 USA
617.354.0074 | 617.354.0463 fax
www.indecon.com

NOTES FOR COMMENT LETTER #7

The following attachment(s) were included with the comment letter submitted by James Enstrom on December 23, 2015 and were duplicate entries on previous comment letter(s) received:

1. Comment Letter #6

Response to Comment Letter #7

Submitted by James Enstrom on December 23, 2015

7-1

In a response letter to the Commenter dated December 18, 2015 (attached to Comment Letter #7), IEc Principal Henry Roman stated that IEc would consider the information provided by the Commenter and, after doing so, IEc ultimately decided not to include the Commenter's information in their final report. With respect to the claims regarding the health effects of PM and ozone, please see staff response to Comment 12-1.

COMMENT LETTER #8—JAMES ENSTROM EMAIL, JANUARY 4, 2016

January 4, 2016

Michael T. Huguenin, A.B. (physics, WU), M.Sc. (management, MIT)
IEc Co-Founder and Special Consultant
mikehuguenin@indecon.com

Dear IEc Co-Founder Huguenin,

I am writing you because IEc President Andrew M. Schwarz has not responded to my December 23, 2015 email letter or to my December 29, 2015 telephone message (http://scientificintegrityinstitute.org/IEcP122315.pdf) regarding my December 15, 2015 letter to IEc Principal Henry A. Roman (http://scientificintegrityinstitute.org/Roman121515.pdf). Thus, I request that you and/or Mr. Schwarz convince Mr. Roman that the final IEc documents prepared for the 2016 SCAQMD AQMP must properly summarize the overwhelming evidence since 2000 that there are NO premature deaths in the SCAB or California caused by PM2.5 or ozone and thus must base the health benefits and socioeconomic assessments on NO premature deaths. Indeed, the SCAB has an age-adjusted total death rate that is among the lowest in the United States and the entire world and does not have premature or excess deaths due to air pollution!

8-1

Please carefully read my email letters to Mr. Schwarz and Mr. Roman for detailed documentation of the NULL evidence. SCAQMD Health Effects Officer (HEO) Jean Joseph Ospital, Dr.P.H., is fully aware of this NULL evidence, which includes all the results from the 2007-2013 SCAQMD Agreement No. R06-337 project involving George D. Thurston, Sc.D. Also, HEO Ospital knows that this NULL evidence needs to be properly presented to the SCAQMD Governing Board at a 2016 hearing on "the health impacts of particulate matter air pollution in the South Coast Air Basin", as per CHSC Section 40471(b) (http://scientificintegrityinstitute.org/Ospital073115.pdf).

Until I receive an email response or telephone call from you confirming that final IEc documents will fully comply with my above request, I will continue taking the measures described in my email letters to Mr. Schwarz and Mr. Roman. Because you have basic knowledge of physics like I do, I want you to know that as of January 16, 2016, "critical mass" will be achieved on the SCAQMD Governing Board. This "critical mass" will make possible a "nuclear chain reaction" against scientifically unjustified PM2.5 and ozone regulations in the SCAB. Also, I predict that there will a "thermonuclear explosion" on November 8, 2015 that will lead to the destruction of all scientifically unjustified PM2.5 and ozone regulations in the United States.

Thank you for your consideration of my important request. Please take it very seriously!

Sincerely yours,

James E. Enstrom, B.S. (physics, HMC), M.S. (physics, Stanford),
Ph.D. (physics, Stanford), M.P.H. (epidemiology, UCLA)
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu
(310) 472-4274

cc:

IEc President Andrew M. Schwarz <ams@indecon.com>
IEc Principal Henry A. Roman <har@indecon.com>
SCAQMD HEO Jean J. Ospital <jospital@aqmd.gov>

COMMENT LETTER #8—ATTACHMENT A

Date: Fri, 31 Jul 2015 14:20:44 -0700
To: Jean J. Ospital <jospital@aqmd.gov> From: "James E. Enstrom" <jenstrom@ucla.edu> Subject: SCAQMD Health Effects Officer Will Be Held Accountable Cc: Philip M. Fine <pfine@aqmd.gov>,Mohsen Nazemi <mnazemi@aqmd.gov>, Ian MacMillan <imacmillan@aqmd.gov>,C. Arden Pope III <cap3@byu.edu>, Jane V. Hall <jhall@fullerton.edu>

July 31, 2015

Jean J. Ospital, Dr.P.H.
SCAQMD Health Effects Officer
jospital@aqmd.gov

Dear Dr. Ospital,

I understand that you are retiring from SCAQMD today. I am going to make every effort to see that the next SCAQMD Health Effects Officer is a doctoral level epidemiologist or statistician who honestly and objectively evaluates and summarizes air pollution health effects evidence, particularly the evidence that applies to the South Coast Air Basin (SCAB). I plan to continue my efforts to correct the false and out of context health effects evidence contained in the 2003, 2007, and 2012 AQMPs and the 2008 MATES III and 2015 MATES IV. You are personally responsible for the inaccurate and exaggerated health effects contained in all of these documents. This faulty evidence has been used as the basis for countless SCAQMD regulations that are not justified on a scientific, public health, or economic basis. These SCAQMD regulations have had a severe adverse impact on the Exide Battery Recycling Plant in Vernon, the Exxon Mobil Refinery in Torrance, the World Logistics Center in Moreno Valley, thousands of truckers at the Ports of Los Angeles and Long Beach, and thousands of manufacturers throughout the SCAB.

The SCAB has age-adjusted total death rates and total cancer death rates that are lower that the corresponding rates in almost all of the 50 states. Furthermore, it has been known since the 2000 HEI Reanalysis Report, particularly by PM2.5 experts like Dr. Pope, that Los Angeles area residents have a relatively low absolute PM2.5 mortality risk. You have been fully aware of my concerns at least since our April 29, 2011 and July 6, 2011 personal meetings at UCLA and SCAQMD. In spite of this, you have continued to made exaggerated claims about the health effects of PM2.5, diesel PM, and ozone in the SCAB. Furthermore, you have never complied with California Health and Safety Code Section 40471 (b), which requires that before an AQMP is finalized and approved, the SCAQMD Governing Board must hold a public hearing on “the report and the peer review” regarding “the health impacts of particulate matter air pollution in the South Coast Air Basin.”

Eventually, you and the others who have exaggerated the health effects of PM2.5, diesel PM, and ozone will be held accountable. Part of this accounting will come through the U.S. Congress, particularly by use of the Secret Science Reform Act, which has been approved by the House of Representatives and is awaiting a vote by the Senate. More details are provided in my June 11, 2015 Tenth International Conference on Climate Change Panel 8 presentation (http://www.ustream.tv/recorded/63542583).

Sincerely yours,

James E. Enstrom, Ph.D., M.P.H.
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu

cc: Philip M. Fine, Ph.D., SCAQMD Deputy Executive Officer pfine@aqmd.gov
Mohsen Nazemi, SCAQMD Deputy Executive Officer mnazemi@aqmd.gov
Ian MacMillan, SCAQMD Planning & Rules Manager imacmillan@aqmd.gov
C. Arden Pope, III, Ph.D., Leading PM2.5 Premature Deaths Expert cap3@byu.edu
Jane V. Hall, SCAQMD PM2.5 Premature Deaths Expert jhall@fullerton.edu

NOTES FOR COMMENT LETTER #8

The following attachment(s) were included with the comment letter submitted by James Enstrom on January 4, 2016 and were duplicate entries on previous comment letter(s) received:

1. Comment Letter #7 and Attachments

Response to Comment Letter #8

Submitted by James Enstrom on January 4, 2016

8-1

See staff response to Comment 7-1 and a letter sent by Industrial Economics, Inc. (IEc) in response to comment letters #7 and #8 (the IEc letter is attached to this response with IEc's permission).

This comment letter also includes an attached letter sent to former SCAQMD Health Effects Officer Jean Ospital, dated July 31, 2015. With respect to comments in that letter alleging use of false and out of context health effects evidence in prior AQMPs and MATES studies, SCAQMD unequivocally denies those claims. With respect to the claims regarding the health effects of PM and ozone, please see staff response to Comment 12-1. Finally, with respect to the claim that the SCAQMD has not complied with California Health & Safety Code section 40471(b), please see staff response to Comment 9-3.

IEc

INDUSTRIAL ECONOMICS, INCORPORATED

7 January 2016

Via Email: jenstrom@ucla.edu

Dr. James Enstrom
UCLA

Dr. Enstrom:

I am in receipt of your email dated December 23, 2015 to me in response to the prior December 18, 2015 email to you from my colleague Henry Roman. I am also in receipt of your January 4, 2016 email to Michael Huguenin, IEc Co-Founder and Special Consultant.

As indicated in the December 18th email, there is a specified process to direct any comments relating to the work we are undertaking for the South Coast Air Quality Management District (SCAQMD), namely that written comments may be submitted to SCAQMD's Executive Officer, Dr. Barry R. Wallerstein (bwallerstein@aqmd.gov; 909 396 3131).

I am informed by SCAQMD that as of January 6, 2016, the District had not received any comments from you on this matter. It appears you have chosen to disregard the specified public comment process and to repeatedly contact IEc directly. We demand that you cease and desist in this behavior.

Should you desire to submit comments on the project, please follow the specified public comment procedures. SCAQMD advised us on January 6, 2016 that comments were still being accepted. We do not know and make no representation as to when comments will cease to be accepted.

We reserve all rights and remedies in connection with this matter, and nothing contained herein shall constitute a waiver of any such rights or remedies.

Sincerely,

Andrew M. Schwarz
President, Industrial Economics, Incorporated

Industrial Economics, Incorporated
2067 Massachusetts Avenue
Cambridge, MA 02140 USA
617.354.0074 | 617.354.0463 fax
www.indecon.com

COMMENT LETTER #9—JAMES ENSTROM EMAIL, JANUARY 11, 2016

January 11, 2016

President Andrew M. Schwarz
Industrial Economics, Incorporated (IEc)
ams@indecon.com

Dear President Schwarz,

I greatly appreciate your January 7, 2016 response to my January 4, 2016 request to IEc CoFounder Michael T. Huguenin regarding my December 15, 2015 letter to IEc Principal Henry A. Roman (http://scientificintegrityinstitute.org/Roman121515.pdf). However, regarding your sentence "I am informed by SCAQMD that as of January 6, 2016, the District had not received any comments from you on this matter," you have been given DELIBERATELY FALSE information by SCAQMD. I submitted November 16, 2015 comments to Mr. Joseph C. Cassmassi (http://scientificintegrityinstitute.org/Cassmassi111615.pdf) and July 31, 2015 comments to Dr. Jean J. Ospital (http://scientificintegrityinstitute.org/Ospital073115.pdf). In addition, I have submitted relevant public comments and research findings to SCAQMD for more than a decade and they have ALL been IGNORED or DISMISSED. This is the primary reason why I have contacted IEc and I consider my contact with IEc to be quite appropriate. **9-1**

My November and July comments make substantive points on health effects, measurements, exposures, sources, and CHSC requirements that are directly relevant to the IEc documents that have been prepared for the 2016 SCAQMD AQMP Socioeconomic Analysis. I have not received an acknowledgement or response from any of the numerous SCAQMD staff members who received my comments, all of whom have been copied on this message. Thus, I request that the SCAQMD staff members below respond to you and me after reading all of my comments.

Also, I request that you obtain from George D. Thurston, D.Sc., the COMPLETE files for the 2007-2013 SCAQMD Agreement No. R06-337 Project "Spatiotemporal Analysis of Air Pollution and Mortality in California Based on the American Cancer Society Cohort" and the 2009-2015 NIH-AARP STaRs Project Number 200903-0012 "Long-Term Air Pollution Exposure and Mortality." Dr. Thurston was a key investigator on these projects and both of them found NO relationship between PM2.5 and total mortality in California or the SCAB. Dr. Thurston must reveal to you and me the underlying documents and COMPLETE results for these two projects, without FOIA requests. Please examine my November 22, 2015 Table of detailed evidence of NO relationship (RR = 1.00) between PM2.5 and total mortality in California. In spite of overwhelming NULL evidence, the SCAQMD leadership makes this alarmist, unsubstantiated, and false claim (http://scientificintegrityinstitute.org/TRTB102111.mov): "The fact is that according to the best estimates nearly five thousand Southern Californians die prematurely each year due to air pollution." **9-2**

All final IEc documents prepared for the 2016 SCAQMD AQMP must properly summarize the overwhelming evidence, which is shown in my Table, that there are NO premature deaths in the SCAB or California caused by PM2.5 or ozone. As per the stated IEc values ("the most intellectually honest basis for decision making is to let the evidence speak"), the IEc documents must base the health benefits and socioeconomic assessments in the SCAB on NO premature

9-2 (CONT'D)

deaths. Also, the IEc documents should state that there is NO established etiologic mechanism by which about one teaspoon of PM2.5 inhaled over a lifetime can cause premature deaths. Furthermore, the IEc documents should state that the SCAB has an age-adjusted total death rate that is lower than the rate in 49 states, which makes it totally implausible that the SCAB experiences premature or excess deaths caused by PM2.5 or ozone!

9-3

Finally, the IEc documents should be consistent with the findings in the 2016 AQMP that are required by CHSC Section 40471(b): "On or before December 31, 2001, and every three years thereafter [i.e., 2016], as part of the preparation of the air quality management plan revisions, the south coast district board, in conjunction with a public health organization or agency, shall prepare a report on the health impacts of particulate matter air pollution in the South Coast Air Basin. The south coast district board shall submit its report to the advisory council appointed pursuant to Section 40428 for review and comment. The advisory council shall undertake peer review concerning the report prior to its finalization and public release. The south coast district board shall hold public hearings concerning the report and the peer review, and shall append to the report any additional material or information that results from the peer review and public hearings." (http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=4000141000&file=40460-40471).

We will soon learn if either of us get a substantive response from SCAQMD staff regarding this message. I will contact you after January 15, 2016 to discuss this matter further.

Thank you very much for your professionalism and cooperation.

Sincerely yours,

James E. Enstrom, Ph.D., M.P.H.
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu
(310) 472-4274

cc:

IEc Staff:

Co-Founder Michael T. Huguenin <mikehuguenin@indecon.com>
Principal Henry A. Roman <har@indecon.com>

SCAQMD Staff:

Planning & Rules Director Joseph C. Cassmassi <jcassmassi@aqmd.gov>
Health Effects Officer Jean J. Ospital <jospital@aqmd.gov>
Health Effects Officer Jo Kay Chan Ghosh <jghosh@aqmd.gov>
Deputy Executive Officer Philip M. Fine <pfine@aqmd.gov>
Deputy Executive Officer Mohsen Nazemi <mnazemi@aqmd.gov>
Deputy Executive Officer Chung S. Liu <cliu@aqmd.gov>
Assistant Deputy Executive Officer Laki T. Tisopulos <ltisopulos@aqmd.gov>
Planning & Rules Manager Ian MacMillan <imacmillan@aqmd.gov>

Air Quality Specialist Xinqiu Zhang <xzhang@aqmd.gov>
Air Quality Specialist Kalam Cheung <kcheung@aqmd.gov>
Air Quality Specialist Jong Hoon Lee <jhlee@aqmd.gov>
Air Quality Specialist Olga Pikelnaya <opikelnaya@aqmd.gov>
Program Supervisor Sang-Mi Lee <slee@aqmd.gov>
Program Supervisor Elaine Shen <eshen@aqmd.gov>
Program Supervisor Shah Dabirian sdabirian@aqmd.gov

IEc and SCAQMD Experts on PM2.5 Premature Deaths:

NYU Professor George D. Thurston <George.Thurston@nyumc.org>
BYU Professor C. Arden Pope, III <cap3@byu.edu>
CSUF Professor Jane V. Hall <jhall@fullerton.edu>
SCAQMD Experts on SCAB Air Pollution Health Effects: UCLA Professor of Epidemiology Beate R. Ritz <britz@ucla.edu> UCLA Professor of EHS Yifang Zhu <yifang@ucla.edu>

SCAQMD Experts on SCAB Socioeconomic Health Effects:

American U Professor Erdak Tekin <tekin@american.edu>
UCLA Professor Paul M. Ong <pmong@ucla.edu>
UCR Professor Gloria Gonzalez-Rivera <gloria.gonzalez@ucr.edu>
CSULB Professor Lisa M. Grobar <lisa.grobar@csulb.edu>
CCSCE Director Stephen M. Levy <slevy@ccsce.com>

COMMENT LETTER #9—ATTACHMENT A

From: James E. Enstrom [mailto:jenstrom@ucla.edu] Sent: Monday, November 16, 2015 9:46 AM To: 'Joe Cassmassi' <jcassmassi@aqmd.gov> Cc: 'Xinqiu Zhang' <xzhang@aqmd.gov>; 'Kalam Cheung' <kcheung@aqmd.gov>; 'Sang-Mi Lee' <slee@aqmd.gov>; 'Chung Liu' <cliu@aqmd.gov>; 'Yifang Zhu' <yifang@ucla.edu> Subject: Important Request re November 17 SCAQMD STMPR AG Agenda

November 16, 2015

Joe Cassmassi

Planning and Rules Director
SCAQMD 2016 Air Quality Management Plan (AQMP)
Scientific, Technical & Modeling Peer Review (STMPR) Advisory Group
jcassmassi@aqmd.gov

Dear Mr. Cassmassi,

I am submitting these written public comments to the STMPR Advisory Group and to the SCAQMD staff members who are presenting at the November 17, 2015 Modeling Session Meeting. I make four basic points that are highly relevant to the preparation of the 2016 AQMP, although none of these points are on the Modeling Session Agenda. I request that all four of my points be addressed by the STMPR Advisory Group and SCAQMD staff as soon as possible.

1) There is overwhelming evidence that the ambient levels of 8-hour ozone and 24-hour fine particulate matter (PM2.5) throughout the South Coast Air Basin (SCAB), as measured by SCAQMD (http://www.aqmd.gov/home/library/air-quality-data-studies), are substantially below the current USEPA NAAQS of 75 ppb for 8-hour ozone and of 35 μg/m³ for 24-hour PM2.5 (http://www3.epa.gov/ttn/naaqs/criteria.html). For instance, on November 15, 2015, the entire SCAB had an ambient 8-hour maximum ozone exposure of 53 ppb. The November 15, 2015 forecast for ambient 24-hour PM2.5 exposure at 38 monitoring stations throughout the SCAB ranged from 10 to 21 μg/m³, with an average of 12.9 μg/m³.

2) There is overwhelming evidence that personal exposure to ozone and PM2.5 among the residents of the SCAB is much lower that the ambient exposure levels cited above. For instance, from June 1995 to May 1996 the average personal exposure of school children was 11.4 ppb in Upland and 13.9 ppb in mountain towns between Crestline and Running Springs (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1637960/pdf/envhper00304-0121.pdf).

3) There is strong evidence that China is the source of a significant portion of the ozone (http://news.sciencemag.org/earth/2014/09/china-blamed-u-s-ozone) and PM2.5 (http://blogs.wsj.com/chinarealtime/2010/12/01/california-pollution-made-in-china/) in the SCAB and throughout California. Sources of ozone and PM2.5 that are outside of the SCAB need to be addressed in the 2016 AQMP.

4) Public hearings need to be held as soon as possible before the SCAQMD Board regarding the latest report and peer review on "the health impacts of particulate matter air pollution in the South Coast Air Basin," in accordance with California Health and Safety Code Section 40471(b)

(http://www.leginfo.ca.gov/cgi-bin/displaycode?section=hsc&group=40001-41000&file=4046040471). Such hearings have been mandated every three years since 2001, but they have never been held before the SCAQMD Board Members. There is strong evidence that the health impacts of particulate matter in the SCAB are very minimal, as I have repeatedly stated to SCAQMD during the past decade.

In order to understand the importance of my request, please read recent comments critical of EPA, CARB, and SCAQMD (http://www.scientificintegrityinstitute.org/BC110115091215.pdf). These comments address both ozone and PM2.5 and have been published in the Wall Street Journal, the Los Angeles Daily News, the Bakersfield Californian, and the San Bernardino Sun. They include an op-ed by an SCAQMD Board Member and statements of concern by San Joaquin Valley Air Pollution Control Officer Seyed Sadredin.

Thank you very much for your prompt attention to my request.

Sincerely yours,

James E. Enstrom, Ph.D., M.P.H.
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu
(310) 472-4274

cc:

Xinqiu Zhang <xzhang@aqmd.gov>
Kalam Cheung <kcheung@aqmd.gov>
Sang-Mi Lee <slee@aqmd.gov>
Chung Liu <cliu@aqmd.gov>
Yifang Zhu <yifang@ucla.edu>

COMMENT LETTER #9—ATTACHMENT B

CONFIDENTIAL November 22, 2015 "PM2.5 is Not Killing Californians" by James E. Enstrom, Ph.D., M.P.H.

Krewski 2000 & 2010 CA CPS II Cohort N=40,408 RR = 0.872 (0.805-0.944) 1982-1989 (N=[18,000 M + 22,408 F]; 4 MSAs; 1979-1983 PM2.5; 44 covariates)

McDonnell 2000 CA AHSMOG Cohort N~3,800 RR ~ 1.00 (0.95 – 1.05) 1977-1992 (N~[1,347 M + 2,422 F]; SC&SD&SF AB; M RR=1.09(0.98-1.21) & F RR~0.98(0.92-1.03))

Jerrett 2005 CPS II Cohort in LA Basin N=22,905 RR = 1.11 (0.99 - 1.25) 1982-2000 (N=22,905 M & F; 267 zip code areas; 1999-2000 PM2.5; 44 cov + max confounders)

Enstrom 2005 CA CPS I Cohort N=35,783 RR = 1.039 (1.010-1.069) 1973-1982 (N=[15,573 M + 20,210 F]; 11 counties; 1979-1983 PM2.5) RR = 0.997 (0.978-1.016) 1983-2002

Enstrom 2006 CA CPS I Cohort N=35,783 RR = 1.061 (1.017-1.106) 1973-1982 (11 counties; 1979-1983 & 1999-2001 PM2.5) RR = 0.995 (0.968-1.024) 1983-2002

Zeger 2008 MCAPS Cohort "West" N=3,100,000 RR = 0.989 (0.970-1.008) 2000-2005 (N=[1.5 M M + 1.6 M F]; Medicare enrollees in CA+OR+WA (CA=73%); 2000-2005 PM2.5)

Jerrett 2010 CA CPS II Cohort N=77,767 RR ~ 0.994 (0.965-1.025) 1982-2000 (N=[34,367 M + 43,400 F]; 54 counties; 2000 PM2.5; KRG ZIP; 20 ind cov+7 eco var; Slide 12)

Krewski 2010 CA CPS II Cohort (4 MSAs; 1979-1983 PM2.5; 44 cov) N=40,408 RR = 0.960 (0.920-1.002) 1982-2000 (7 MSAs; 1999-2000 PM2.5; 44 cov) N=50,930 RR = 0.968 (0.916-1.022) 1982-2000

Jerrett 2011 CA CPS II Cohort N=73,609 RR = 0.994 (0.965-1.024) 1982-2000 (N=[32,509 M + 41,100 F]; 54 counties; 2000 PM2.5; KRG ZIP Model; 20 ind cov+7 eco var; Table 28)

Jerrett 2011 CA CPS II Cohort N=73,609 RR = 1.002 (0.992-1.012) 1982-2000 (N=[32,509 M + 41,100 F]; 54 counties; 2000 PM2.5; Nine Model Ave; 20 ic+7 ev; Fig 22 & Tab 27-32)

Lipsett 2011 CA Teachers Cohort N=73,489 RR = 1.01 (0.95 – 1.09) 2000-2005 (N=[73,489 F]; 2000-2005 PM2.5)

Ostro 2011 CA Teachers Cohort N=43,220 RR = 1.06 (0.96 – 1.16) 2002-2007 (N=[43,220 F]; 2002-2007 PM2.5)

Jerrett 2013 CA CPS II Cohort N=73,711 RR = 1.060 (1.003–1.120) 1982-2000 (N=[~32,550 M + ~41,161 F]; 54 counties; 2000 PM2.5; LUR Conurb Model; 42 ind cov+7 eco var+5 metro; Table 6)

Jerrett 2013 CA CPS II Cohort N=73,711 RR = 1.028 (0.957-1.104) 1982-2000 (same parameters and model as above, except including co-pollutants NO2 and Ozone; Table 5)

Thurston 2015 CA NIH-AARP Cohort N=160,209 RR = 1.02 (0.99 -1.04) 2000-2009 (N=[~95,965 M + ~64,245 F]; full baseline model: PM2.5 by zip code; Table 3)

Enstrom 2015 unpub CA NIH-AARP Cohort N=160,368 RR = 1.001 (0.949-1.055) 2000-2009 (N=[~96,059 M + ~64,309 F]; full baseline model: 2000 PM2.5 by county)

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NOTES FOR COMMENT LETTER #9

The following attachment(s) were included with the comment letter submitted by James Enstrom on January 11, 2016 and were duplicate entries on previous comment letter(s) received:

1. Comment Letter #6
2. Comment Letter #8: Attachment A

Response to Comment Letter #9

Submitted by James Enstrom on January 11, 2016

9-1

Staff has diligently attempted to respond to all comments submitted by the Commenter, even though he has frequently commented outside traditional processes. See e.g., responses to comment letters #6 through #11 submitted to Industrial Economics, Inc. (IEc) and responses to comment letters #12 through #14 submitted to the SCAQMD staff; 2012 AQMP's Responses to Comments can be found here: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/2012-aqmp-response-to-comments/part-1-comment-letters-2012.pdf. The document includes staff responses to the comments submitted by the Commenter for the 2012 AQMP.

With respect to the November 16, 2015 letter that was sent to the SCAQMD's former Rules and Planning Director, Joe Cassmassi. The letter was publicly acknowledged and verbally responded to in detail at the November 17, 2015 meeting of the Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group. The meeting minutes can be found at http://www.aqmd.gov/docs/default-source/Agendas/STMPR-Advisory-Group/november-2015/stmpr_modminutes_111715.pdf.

With respect to the letter sent by the Commenter to former SCAQMD Health Effects Officer Jean Ospital, dated July 31, 2015, please see staff response to Comment 8-1.

9-2

In a response letter to the Commenter dated December 18, 2015 (attached to Comment Letter #7), IEc Principal Henry Roman stated that IEc would consider the information provided by the Commenter and, after doing so, IEc ultimately decided not to include the Commenter's information in their final report. With respect to the claims regarding the health effects of PM and ozone, please see staff response to Comment 12-1. See also staff responses to Comments 5-5 and 5-7 for a discussion of using laboratory studies to uncover the biological mechanisms underlying the correlation between pollutant concentration and population health outcomes observed in epidemiological studies. As health outcomes are influenced by many factors ranging from genetic to environmental, the lower age-adjusted total death rate in the region does not automatically imply that the environmental factor of air pollution has no effect on mortality risks for the residents of this region.

9-3

SCAQMD complies with its obligations under California Health & Safety Code section 40471(b) by preparing Appendix 1 – Health Effects. That document has been prepared in conjunction with a public health organization (the California Office of Environmental Health Hazard Assessment) and it has been peer reviewed through the AQMD Advisory Council. The SCAQMD complies with its obligation to hold a public hearing when the Governing Board holds a public hearing to discuss and decide upon the AQMP.

COMMENT LETTER #10—JAMES ENSTROM EMAIL, FEBRUARY 10, 2016

February 10, 2016

Dear Mr. Roman,

10 - 1

Since no one from IEc or SCAQMD has responded to my January 11, 2016 email letter below, I am resending it to you, Dr. Thurston, and President Schwarz and requesting a response from each of you. You all need to realize that the number of Americans who believe PM2.5 causes premature deaths has just gotten smaller. Please read about SCOTUS and the EPA Clean Power Plan in today's WSJ "Court Blocks Obama's Power-Plant Rule" and today's NYT "Supreme Court Deals Blow to Obama's Efforts to Regulate Coal Emissions." As you know, the primary health benefit from the Clean Power Plan is an alleged reduction in PM2.5-related premature deaths, as I explained in my June 11, 2015 ICCC10 Lecture "EPA's Clean Power Plan and PM2.5-related Co-benefits" (http://climateconferences.heartland.org/james-enstrom-iccc10-panel-8/).

Thank you for a professional response to my request.

Sincerely yours,

James E. Enstrom, Ph.D., M.P.H.

NOTES FOR COMMENT LETTER #10

The following attachment(s) were included with the comment letter submitted by James Enstrom on February 10, 2016 and wer duplicate entries on previous comment letter(s) received:

1. Comment Letter #9 and Attachments

Response to Comment Letter #10

Submitted by James Enstrom on February 10, 2016

10-1

Staff and its expert consultant Industrial Economics, Inc. have fully responded to the Commenter. See letters from IEc dated December 18, 2016 (included as Attachment A to Commenter #7) and January 7, 2016 (included in staff response to Comment 7-1) and staff response to Comment 9-1. In addition, see staff response to Comment Letters Nos. 6-14.

COMMENT LETTER #11—JAMES ENSTROM EMAIL, MARCH 7, 2016

March 7, 2016

IEc President Andrew M. Schwarz
PM2.5 Elicitation Expert Henry A. Roman
PM2.5 Pseudoscience Expert George D. Thurston
SES Pseudoscience Expert Erdak Tekin

Dear Sirs:

11 - 1

In case you have not heard, on Friday, March 4, at 1:30 PM, the new SCAQMD Governing Board fired Executive Officer Barry Russell Wallerstein: http://www.latimes.com/local/lanow/la-me-southern-california-air-board-20160304-story.html.

Thus, beware of what you submit to the new SCAQMD for the upcoming March 16 STMPR Meeting. PM2.5 and Ozone pseudoscience and SES pseudoscience is NO LONGER going to be tolerated by the 17 million residents of the South Coast Air Basin, an area of the world with almost the lowest age-adjusted total death rate. I strongly encourage you to read everything in the email messages below and the attachment by John D. Dunn, M.D., J.D., who is a leader in the growing effort to eliminate pseudoscientific air pollution regulations from the South Coast Air Basin.

Thank you for your attention to this important message.

Sincerely yours,

James E. Enstrom, Ph.D., M.P.H.
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu
(310) 472-4274

COMMENT LETTER #11—ATTACHMENT A

From: John Dunn [mailto:jddmdjd@web-access.net]
Sent: Sunday, March 06, 2016 8:41 PM
To: Undisclosed-Recipient:;
Subject: Fw: March 4 LATimes: SCAQMD Board fired Dictator Wallerstein

People, people,

attached below is my letter to Ms. Shelley, of the Los Angeles Daily News.

I sent her my letter that I wrote and sent to Roman and copied all the South Bay people and Thurston.

You might say, well why—well because I could and I should.

I think I covered it. It's not a pullitzer prize honker, but it will suffice for Southern CA fights on the air pollution scams at the South Bay—anything more complicated or longer would only be read by some compulsive like Jim Enstrom.

From: John Dunn
Sent: Saturday, March 05, 2016 1:45 PM
To: Susan Shelley ; James E. Enstrom ; Stan Young
Subject: Re: March 4 LATimes: SCAQMD Board fired Dictator Wallerstein

Ms. Shelley,

Attached above is my thorough and well referenced takedown of the latest effort by Wallerstein to gin up an air crisis to justify his new proposed regs. Letter is addressed to Roman, consultant on the project for the South Bay District.

I wrote it timely in an effort to cut off a couple of junk scientists named Thurston and Jerrett, but also theconsultant house Wallerstein hired to put together the South Bay scam, lead man Roman.

It all got started when I saw they had dredged up an old Thurston paper and I looked at the abstract—the summary at the front—that admitted they could find no evidence of human health problems from South Bay air pollution, but it goes back to 2010 when Jerrett, from Berkeley admitted at an cage match debate on CARB air pollutin regs, that his research didn't show any deaths from CA air pollution. Then the clown scientist Jerrett "reworks" the project with new models to come up with the "conurbation" scam paper to earn him the CARB appreciation for propping up their house of cards air pollution scare.

Ms. Shelley, I have been fighting lousy CARB and EPA human toxicology epidemiological science for many many years.

This Thurston Wallerstein episode is just another problem created by bad policy and junk science in the service of political agendas. Wallerstein hired Roman to gin up a public relations and political scam to support another round of air regulations to burden business and industry and the public in the South Bay Air District. All of this was to benefit the powermongers at South Bay. staff headquarters. The new Board Members apparently smelled a rat, but the rats have been in charge at South Bay for a long time, head rat John Froines, junk scientist extraordinaire.

I noted when I looked at the paper that Thurston et.al. admitted they found no human death effects, but what's a little lie when in pursuit of a great cause like saving the world. Wallerstein and his staff were deceitful about the critical thing—was another regulation really needed if there was no human health effect measured in the Thurston paper, and Jarrett's earlier research also showed no death effect?

Consider two things, Ms. Shelley, Thurston admitted no death effects in his study, and Wallerstein was ready to promote more burdensome regs in spite of no supportive science.

There's more. The EPA sponsors at UCLA and USC, and 8 other medical schools, human exposure experiments to try to buff up their scientific claims—they expose people, healthy and un healthy, to small particle air pollution, and that is unethical and illegal. They claim small particle air pollution is lethal, toxic, causes cancer, and they expose kids and adults to small particle air pollution. California and US law prohibits human exposure experiments. California adopted the principles of the Nuremberg Code on Human experimentation many years ago, and state universities to exposing people to supposedly lethal and toxic air pollution? Go figure or excuse. Either they are criminals or there are lying about the lethality of small particles when they tell the Congress small particles in the air kill more than 300,000 people in America every year.

I wrote the above attached letter to point out the problem to those interested. The letter has evidence of the scam. Wallerstein knew what I know—air pollution in the South Bay is not killing anyone. The whole scam is bullshit perpetrated by environmental fanatics who want to control things claiming they are saving people and the planet.

Nonsense. They are self serving scam artists.

Who knows, maybe some people read it.

Happy to talk to you anytime. numbers below.

John Dale Dunn MD JD
Consultant Emergency Services/Peer Review
Civilian Faculty, Emergency Medicine Residency
Carl R. Darnall Army Med Center

Fort Hood, Texas
Medical Officer, Sheriff Bobby Grubbs
Brown County, Texas
325 784 6697 (h) 642 5073 (c)

From: Susan Shelley
Sent: Friday, March 04, 2016 7:29 PM
To: James E. Enstrom ; Stan Young ; John D Dunn, MD, JD
Subject: Re: March 4 LATimes: SCAQMD Board fired Dictator Wallerstein

I'd appreciate any on-the-record comments about Wallerstein's peformance in the job and specific actions he took that were unjustified or unreasonable. A quick survey of today's Southern California news coverage of his firing shows only one side of the story, and I think readers deserve to know more.

Thanks,

Susan Shelley

Columnist, Los Angeles Daily News and Los Angeles News Group

On March 4, 2016 at 4:40 PM "James E. Enstrom" <jenstrom@ucla.edu> wrote:

March 4, a day to celebrate: SCAQMD Board fired Dictator Wallerstein at 1:30 PM today. Wallerstein was the number two regulator in California, behind Mary Nichols. There is now Hope for major regulatory reform in Southern California, particularly regarding the 2016 air quality management plan. There will be upcoming opportunities to submit public comments. Please spread the word.

http://www.latimes.com/local/lanow/la-me-southern-california-air-board-20160304-story.html

Sent from my iPhone

NOTES FOR COMMENT LETTER #11

The following attachment(s) were included with the comment letter submitted by James Enstrom on March 7, 2016 and were duplicate entries on previous comment letter(s) received:

1. Comment Letter #5 and Attachments

Response to Comment Letter #11

Submitted by James Enstrom on March 7, 2016

11-1

SCAQMD denies all allegations that it has relied upon "pseudo-science." Thousands of staff hours have gone into the analysis and preparation of the socioeconomic analysis. Moreover, the public health benefits analysis relied on the most recent relevant literature, used a widely adopted and appropriate method, and included the best available data and information. The analysis has also been reviewed through a rigorous public process, including discussion at multiple Scientific, Technical and Modeling Peer Review Advisory Group meetings, AQMP Advisory Group meetings, and the 2016 AQMP Regional Workshops and Hearings. Therefore, staff considers the analysis to be appropriate and based on current best practices in field.

Commenter's core claim that exposure to PM2.5 and ozone has no relationship to total mortality in the Basin lacks merit. See staff response to Comment 12-1 and the December 18, 2016 response by Industrial Economics, Inc. to the Commenter (the latter was included as Attachment A to Comment Letter #7). Moreover, as health outcomes are influenced by many factors ranging from genetic to environmental, the lower age-adjusted total death rate in the region does not automatically imply that the environmental factor of air pollution has no effect on mortality risks for the residents of this region.

The referenced letter from Dr. John Dunn was submitted to IEc on January 23, 2016 and is included as Comment Letter #5.

COMMENT LETTER #12—JAMES ENSTROM EMAIL, JULY 26, 2016

July 26, 2016

Anthony Oliver, Ph.D.
SCAQMD Air Quality Specialist
aoliver@aqmd.gov

Dear Dr. Oliver,

I am an environmental epidemiologist and physicist who has had a long career at UCLA and I am an expert in the health effects of air pollution in California. I am writing regarding your planned presentation "Item #3: Preliminary Public Health Benefits of the Draft 2016 AQMP" at the July 28, 2016 SCAQMD Scientific, Technical & Modeling Peer Review Advisory Group (STMPR) Socioeconomic Meeting (http://www.aqmd.gov/home/library/meeting-agendas-minutes/agenda?title=STMPRSocio_072816). I challenge the validity of your "Preliminary Health Impacts – Mortality" and your selective use of Jerrett 2005, Jerrett 2009, and Jerrett 2013.

Key aspects of my prior criticism of SCAQMD STMPR claims regarding the health impacts of PM2.5 and ozone in the South Coast Air Basin (SCAB) are contained in these three documents:

12 - 1

November 16, 2015 Enstrom Email to Cassmassi and SMTPR Staff re Ozone and PM in SCAB (http://www.scientificintegrityinstitute.org/Cassmassi111615.pdf)
November 22, 2015 Enstrom Table with 2000-2015 Results Showing NO PM2.5 Premature Deaths in CA (http://www.scientificintegrityinstitute.org/NoPMDeaths112215.pdf)
December 15, 2015 Enstrom Email to Roman Requesting NO IEc PM2.5 and Ozone Deaths for 2016 AQMP (http://www.scientificintegrityinstitute.org/Roman121515.pdf)

12 - 2

I strongly recommend that you carefully read all three documents, as well as all the weblinks that they contain. Then I strongly recommend that you discuss these documents with me, as well as with SCAQMD Health Effects Officer Jo Kay Chan Ghosh and IEc Principal Henry A. Roman. Finally, I strongly recommend that you announce during your presentation that several highly qualified doctoral-level scientists, including myself, are challenging the validity of your presentation, particularly your claims of "Premature Mortalities" in the SCAB.

Thank you very much for your attention to this important matter.

Sincerely yours,

James E. Enstrom, Ph.D., M.P.H.
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu

(310) 472-4274

cc: Jo Kay Chan Ghosh <jghosh@aqmd.gov>
Henry A. Roman <har@indecon.com>
George D. Thurston <George.Thurston@nyumc.org>
Elaine Shen <eshen@aqmd.gov>
Philip M. Fine <pfine@aqmd.gov>
Wayne Nastri <wnastri@aqmd.gov>

Response to Comment Letter #12

Submitted by James Enstrom on July 26, 2016

Preface

Staff responses to Dr. James Enstrom's comments that were previously sent to Industrial Economics, Inc. are provided here as this is the first comment letter submitted by Dr. Enstrom directly to the SCAQMD staff regarding the Socioeconomic Report.

12-1

The U.S. EPA is tasked with assessing new and emerging air quality science, including health studies, as part of the process of setting the federal air quality standards. In other words, the U.S. EPA's role is to assess the causal relationships between the pollutants and the different types of health endpoints. It is then SCAQMD's role to describe the public health impacts of poor air quality in our region, as well as to develop and implement an emission reduction strategy to attain the federal and state ambient air quality standards. The Draft Final 2016 AQMP and its related documents summarize the health effects and causal determinations as assessed by U.S. EPA and other scientific agencies, to discuss some recent studies published since the latest U.S. EPA reviews, to give some quantitative estimates of the health impacts of particulate matter air pollution in the South Coast Air Basin, and to present a "local perspective" by highlighting studies conducted in the South Coast Air Basin, Southern California, or California.

The Socioeconomic Report provides an analysis of the socioeconomic impacts of the 2016 AQMP in order to further inform public discussions and the decision-making process associated with the adoption of the 2016 AQMP. However, the SCAQMD is legally required to adopt a plan to attain the National Ambient Air Quality Standards. The legal requirements for the AQMP are described in Chapter 1 of the Draft Final 2016 AQMP.

Similar comments from the Commenter were previously submitted to U.S. EPA and CARB regarding their public documents that contain health effects discussion and/or analysis. Both agencies have provided published responses and stated their disagreements with the claims made in those comments. The U.S. EPA described in its Response to Comments on the 2012 PM Rule how the scientific literature across disciplines supported its causal determination: [1]

> *[…] in the broader evaluation of the evidence from many epidemiological studies, and subsequently during the process of forming causality determinations, the EPA has emphasized the pattern of results across epidemiological studies for drawing conclusions on the relationship between $PM_{2.5}$ and health outcomes, and whether the effects observed are coherent across the scientific disciplines. Thus, in making causality determinations, the EPA did not limit its focus or consideration to just studies that reported positive associations or where the results were statistically significant.*

[1] Response to Significant Comments on the 2012 Proposed Rule on the National Ambient Air Quality Standards for Particulate Matter. June 29, 2012. https://www3.epa.gov/ttn/naaqs/standards/pm/data/20121214rtc.pdf

CARB, during its 2010 rulemaking process, also explained how the bulk of the scientific literature supports the finding of a causal relationship between PM and mortality and notes the strength of the Krewski et al. (2009) study, which was also used in the Draft Final Socioeconomic Report for the 2016 AQMP:[2]

> *We have carefully reviewed all studies that have been performed in the United States on the relationship between long-term PM2.5 exposure and mortality, as has the U.S. EPA in its recent review of the NAAQS for particulate matter. There are a few studies that do not find a relationship between long-term PM2.5 exposure and all-cause mortality, but the majority of studies do report a statistically significant relationship. In addition, U.S. EPA and we have also critically evaluated the methods used in each study so that we can place the most weight on the studies that have used the strongest methodologies. The effect estimate we have used from Krewski et al. (2009) comes from the largest and most rigorously and publically evaluated study in existence. The effect estimate for the relationship between long-term PM2.5 exposure and mortality from this study is being used by multiple agencies worldwide. The Krewski et al. (2009) estimate, though not the lowest in the literature, is toward the lower end of the range of results from American studies.*

As described in Chapter 3 of the Draft Final Socioeconomic Report, SCAQMD staff has worked closely with Industrial Economics Inc. (IEc), our expert consultant, and its scientific advisors to provide an updated health benefits literature review and fine-tune the methodology used to quantify public health benefits and address the associated unertainties in estimates. The Concentration-Response (C-R) functions chosen for quantification of health impacts were determined based on a systematic review of the epidemiological literature, where studies were evaluated for quality and applicability according to numerous criteria (the IEc reports are available on the SCAQMD website at http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/socioeconomic-analysis). These criteria included: peer-review, date of the study, geography and population characteristics, and study design. Thus, the C-R functions applied in this analysis were found from recent, peer-reviewed articles, derived from local studies of the Basin or studies that report separate estimates using sub-samples pertaining to the Basin, where feasible. Studies that were not recommended for quantification of health impacts were those that did not meet all review criteria as determined by the expert consultant.

These study selection criteria and IEc's draft findings and recommendations regarding both C-R and benefits valuation functions were all discussed and reviewed at multiple meetings of the 2016 AQMP Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group, which were open to public participation with advanced meeting notices electronically mailed to all 2016 AQMP interested parties. Moreover, as IEc stated in their December 18, 2015 response to the Commenter (included as Attachment A to Commenter Letter #7), the Commenter has a different interpretation of the air pollution health effects literature than the one presented in IEc's review, and IEc declined the Commenter's request to amend their report to state "that PM2.5 and ozone have NO relationship to total mortality in the SCAB or

[2] Final Statement of Reasons for Rulemaking for On-Road Diesel Vehicles. December, 2010 https://www.arb.ca.gov/regact/2010/truckbus10/tbfsor.pdf

California," a review that was cited in several other comment letters based on the same source of information.

Staff acknowledges that, as with all scientific studies and evaluations, there are various sources of uncertainty surrounding the estimated public health benefits. Staff provided information of this uncertainty in Chapter 3 of the Draft Final Socioeconomic Report. First, staff noted that health impacts shown in Table 3-3 of the Draft Final Socioeconomic Report represent the point estimate of sampling distributions of the estimates; the 95 percent confidence intervals of these distributions are included in Appendix 3-B to quantify uncertainty associated with the estimated health impacts. In addition, staff conducted several sensitivity and uncertainty analyses as they relate to important assumptions in the quantification of public health benefits and found that the results continue to demonstrate the significant contribution of cleaner air to public health improvements.

The methodology used for quantification of health impacts reflects the current best practices in the field, using U.S. EPA's BenMAP-CE Tool. The operations of the BenMAP-CE by SCAQMD staff for estimating public health benefits in this report were reviewed by Dr. Jin Huang, a former project manager for the 2014 Abt review (2014) and the STMPR expert on BenMAP analysis. The operations were found to be appropriate as described in Appendix 3-C.

In summary, the public health benefits analysis relied on the most recent relevant literature, used a widely adopted and appropriate method, and included the best available data and information. The analysis has also been reviewed through a rigorous public process, including discussion at multiple STMPR meetings, AQMP Advisory Group meetings, and the 2016 AQMP Regional Workshops and Hearings. Therefore, staff considers the analysis to be appropriate and based on current best practices in field.

Staff is supportive of continuous research on the health effects of air pollution and welcomes suggestions and references for the latest findings in the epidemiological, health economics, or other related scientific literature. However, it should be reiterated that it is not the SCAQMD's role to make causal determinations between air pollutants and various health effects.

12-2

The receipts of this letter and another letter submitted by Dr. Stanley Young (included as Comment Letter #5 on Appendix I of the Draft Final 2016 AQMP) were acknowledged and the comments summarized at the July 28, 2016 STMPR meeting (see meeting minutes: http://www.aqmd.gov/docs/default-source/Agendas/STMPR-Advisory-Group/July_2016/stmpr_socmin_072816.pdf).

COMMENT LETTER #13—HAND DELIVERED BY ARTHUR KRUGLER, July 28, 2016

Statement to SCAQMD STMPR re 2016 AQMP Socioeconomic Analysis

James E. Enstrom, Ph.D., M.P.H.
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu

July 28, 2016

I am an environmental epidemiologist and physicist who has had a long career at UCLA and I am an expert on the health effects of air pollution in California. I strongly challenge the scientific validity of Dr. Oliver's "Preliminary Public Health Benefits of Draft 2016 AQMP". Specific criticism of his presentation is contained in my attached July 26 email message. I have repeatedly submitted my criticism to AQMD staff and STMPR experts since November 2015. Key aspects of this criticism are contained in my attached July 19 presentation to the Southern California Business Coalition.

13 - 1

For instance, Dr. Oliver's "Preliminary Health Benefits-Mortality and Morbidity" claims that the 2023 Midpoint Health Benefits are $26.8 Billion for Mortality and $0.1 Billion for Morbidity. Alleged PM2.5 premature deaths represent 97% ($26.1 Billion) of the Total Health Benefits ($26.9 Billion). However, overwhelming evidence, including two major AQMD-funded studies, shows there are NO premature deaths in California due to PM2.5 or Ozone. Without the alleged Mortality Benefits, the Preliminary Health Benefits ($0.1 Billion) are far lower than the Preliminary Average Annual Cost of the 2016 AQMP of $2.5 Billion, as stated by Dr. Dabirian.

Instead of focusing on alleged premature deaths due to air pollution, AQMD must explain that the South Coast Air Basin is one of the healthiest areas in the United States. It has an annual age-adjusted total death rate that is lower than the death in every state except Hawaii and it has similarly low death rates for all cancer and all respiratory diseases. The next version of Draft 2016 AQMP must properly incorporate all of the valid criticism that AQMD receives. Thank you.

Presentation to Southern California Business Coalition on SCAQMD and 2016 AQMP

"AQMD Must Reassess Its Air Quality Regulations"

James E. Enstrom, Ph.D., M.P.H.
UCLA and Scientific Integrity Institute
jenstrom@ucla.edu

July 19, 2016

The South Coast Air Quality Management District (AQMD), one of the most powerful regulatory agencies in the United States, has just proposed tightening its regulations. During the past 40 years it has implemented strong air quality regulations in the 11,000 square-mile South Coast Air Basin (SCAB), which includes the 17 million people who live in the populated areas of Los Angeles, Orange, Riverside, and San Bernardino counties. These increasingly aggressive and costly regulations have impacted all sectors of the economy, from utility power plants, oil refineries, the ports, and all manufacturers to restaurants, dry cleaners, printers, and auto repair shops. While these regulations have improved air quality substantially, they have been excessive and have contributed to the loss of more than half of the manufacturing jobs in Southern California.

The regulation of fine particulate matter ($PM_{2.5}$), ozone (O_3), and nitrogen oxides (NO_x) has been largely justified on a cost-benefit basis by the claim that air pollution causes 5,000 premature deaths per year in the SCAB. This claim relies on the implausible and unproven hypothesis that inhalation over a lifetime of about one teaspoon of $PM_{2.5}$ (particles less than 2.5 microns in diameter) causes premature death. For perspective, inhaling this amount of $PM_{2.5}$ is roughly equivalent to smoking two cigarettes a year, certainly not a lethal dose. Moreover, there is overwhelming epidemiological evidence, including two large 2011 AQMD-funded epidemiological studies, that air pollution does not cause any premature deaths in California. Furthermore, the SCAB has an age-adjusted total death rate that is lower than the death rate in every state except Hawaii. It has a similarly low total cancer death rate.

Regarding exposures, the average ambient levels of 8-hour ozone and 24-hour $PM_{2.5}$ in the SCAB, as measured by AQMD monitors, are below the current Environmental Protection Agency (EPA) National Ambient Air Quality Standards (NAAQS) for ozone and $PM_{2.5}$. Furthermore, the average personal exposures to ozone and $PM_{2.5}$ among SCAB residents are much lower than the ambient levels measured by AQMD monitors. These average personal exposure levels are far below the levels associated with adverse health effects. Air pollutants are now at record low levels and close to natural background levels. The last Stage 3 smog alert was in 1974 and the last Stage 2 smog alert was in 1988. Much of the remaining SCAB pollution comes across the Pacific Ocean from China, which ignores air pollution regulations and which does much of the manufacturing that used to be done here.

Unfortunately, the AQMD staff, led since 1997 by Executive Officer Barry R. Wallerstein, has ignored the extremely positive air quality evidence above. Instead of acting in the best public health and socioeconomic interest of the SCAB residents, AQMD staff has implemented scientifically unjustified regulations in conjunction with the EPA, the California Air Resources Board, and powerful environmental activist groups (like Coalition for Clean Air, American Lung Association, Natural Resources Defense Council, and Sierra Club). The AQMD Board justifiably fired Wallerstein on March 4. There is now an opportunity for the remaining AQMD staff to work with numerous qualified experts like myself in order to reassess the scientific validity of all their regulations. The REgional CLean Air Incentives Market (RECLAIM), the Multiple Air Toxics Exposure Study (MATES), and the 2012 Air Quality Management Plan (AQMP) all need to be reassessed. These reassessments must be made before the 2016 AQMP is finalized and, if they are not made, the AQMD Board should not approve the 2016 AQMP. It is time to stop unjustified regulations in Southern California and to bring manufacturing jobs back.

NOTES FOR COMMENT LETTER #13

The following attachments(s) were included with the comment letter submitted by James Enstrom on July 28, 2016 and were duplicate entries on previous comment letter(s) received:

1. Attachment A to Comment Letter #9

Response to Comment Letter #13

Submitted by James Enstrom on July 28, 2016

13-1

See staff response to Comment 12-1. As health outcomes are influenced by many factors ranging from genetic to environmental, the lower age-adjusted total death rate in the region does not automatically imply that the environmental factor of air pollution has no effect on mortality risks for the residents of this region.

COMMENT LETTER #14—JAMES ENSTROM EMAIL, SEPTEMBER 6, 2016

September 6, 2016

Dear Dr. Oliver,

14 - 1

Thank you for your very professional response to my verbal request. My attached January 11, 2016 comments, which include my December 15, 2015 and November 16,2015 comments, regarding the then forthcoming 2016 AQMP Socioeconomic Report were NOT addressed in the August 31, 2016 Draft Socioeconomic Report. These comments were copied to Drs. Shen, Dabirian, Ghosh, Fine, and many others at SCAQMD. I am now sending them to you because I believe that you were not at SCAQMD in January. Also, I will submit these comments, as well as my subsequent comments, to the online comment form shown below. Please confirm that you have received my attached comments. Also, please let me know if Drs. Shen, Dabirian, Ghosh, or Fine ever showed these comments to you.

Sincerely yours,

James E. Enstrom, Ph.D., M.P.H.

NOTES FOR COMMENT LETTER #14

The following attachments(s) were included with the comment letter submitted by James Enstrom on September 6, 2016 and were duplicate entries on previous comment letter(s) received:

1. Comment Letter #9 and Attachments

Response to Comment Letter #14

Submitted by James Enstrom on September 6, 2016

14-1

Staff has received all comment letters referenced by the Commenter. They are included in this document with appropriate staff responses.

COMMENT LETTER # 15—STEVE MILLOY EMAIL, AUGUST 10, 2016

August 10, 2016

Anthony Oliver, PhD
CSAQMD Air Quality Specialist

Dear Dr. Oliver,

I am a biostatistician, researcher and lawyer who has a great deal of experience with air quality issues.

I am submitting the attached comments concerning the Preliminary Public Health Benefits of the Draft 2016 AQMP.

15 - 1

The attachment explains why there is no scientifically established link between outdoor PM2.5 and premature mortality.

Hence, there can be no benefits associated with avoided mortality due to further reductions in ambient PM2.5 levels.

I am happy to discuss this with you further or otherwise participate in the regulatory decision-making process.

Thank you for your attention.

Steve Milloy
Publisher, JunkScience.com
Senior Legal Fellow, Energy & Environment Legal Institute
12309 Briarbush Lane
Potomac, MD 20854
Office: 301.258.9320

NOTES FOR COMMENT LETTER #15

The attached comment letter is identical to Comment Letter #8 in Responses to Comments on the Draft 2016 AQMP.

Response to Comment Letter #15

Submitted by Steve Milloy on August 10, 2016

15-1

See staff response to Comment 12-1 and Response to Comment 8-1 on the Draft 2016 AQMP (available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/response-to-comments/2016-aqmp-rtc-2-of-4.pdf).

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13 August 2016

Anthony Oliver, PhD aoliver@aqmd.gov
SCAQMD Air Quality Specialist

Dear Dr. Oliver and All Others Concerned:

I have been asked by Profesor James E. Enstrom (UCLA) to express my opinion to you-all concerning "particulate matter of the size 2.5 micrometers in diameter (**PM2.5**) as being "***unequivocally the direct cause*** of at least 2,100 deaths per year in Southern California".

16 - 1

By way of introduction, I am author/coauthor of more than 650 per-reviewed scientific publications and among the "640 most-cited authors of all time" by my peers—as determined by **Google Scholar** parameters. My fields of research interest as a physician-scientist include genetics, comparative and evolutionary genomics, gene nomenclature, drug metabolism, pharmacogenetics, adverse drug reactions, personalized medicine, environmental contaminants and disease, pediatrics, developmental biology, teratogenesis, neurobiology, endocrinology and cancer. I am board-qualified in both California and Ohio in the practice of medicine and have been Principal Investigator (PI) on numerous basic science and clinical research projects, some of which are still in preparation for publication. At the University of Cincinnati, I was Founder of the **Center for Environmental Genetics** (1992-98), which is still going strong today in its 25th year (current PI is Professor Shuk-mei Ho); I continue to participate in CEG's Community Outreach and Education Program (COEP) directed by Dr. Erin Haynes. I also have spearheaded the worldwide standardized nomenclature system (based in London) for all genes and gene families in all living organisms.

16 - 2

Particulate matter has been studied extensively—by many scientists, including by one of the leaders in this field, ***Joel Schwartz***, who applied longitudinal data analysis to environmental health. There was a controversy about his work on PM10 and mortality; these findings were therefore re-analyzed twice by the Health Effects Institute (funded 50% from the US EPA and 50% from automotive manufacturers). Whereas the magnitude of the effect was somewhat diminished on this re-analysis, "a small effect" was still seen, although statistically not significant [http://pubs.healtheffects.org/getfile.php?u=21]. Most disturbingly, the variability among and between studies was very substantial. Explanations for this variability were suggested to include "the degree of temporal smoothing used in the original analyses, number of smoothed terms in the models, and degree of nonlinear collinearity (concurvity) among the smoothed terms." The relative importance of these and other explanations remains highly equivocal.

Joel Schwartz also used these methods to examine the relationship of PM2.5 with mortality. He and others have estimated an association to be "a ~10% increase in mortality for every 10 $\mu g/meter^3$—**above** (but not below) 10 $\mu g/meter^3$. At 20 $\mu g/meter^3$, it was possible to measure a slight increase in mortality in a study of 10,000 deaths. However, at levels in the range of 10–15 $\mu g/meter^3$, the study would require a very large cohort in order to gain sufficient statistical power to detect "an unequivocal effect".

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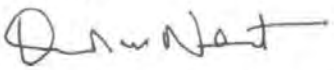
16 - 3

The PM2.5 relationship was assessed considerably before the 21st century, when several cities (*e.g.* Allegheny County, Pittsburgh) suffered from levels above 20 µg/meter^3. ***However, these levels of air pollution no longer exist, anywhere in the United States today***. This is mainly because many of the antiquated power plants have been converted to natural gas or have shut down. Thus, I do not believe that particulate matter air pollution is a major problem any longer in this country—although it remains a challenge in certain cities of China and India.

In conclusion, existing evidence on "the relationship between PM2.5 and total mortality in California" (and indeed, nationally) is ***absolutely underwhelming*** for SCAQMD to claim that "PM2.5 ***causes*** 2,100+ deaths per year in the South Coast Air Basin". It is categorically unethical to use that claim as the primary public health justification for a 2016 Air Quality Management Plan that ***imposes a burden of $38.2 billion in additiional compliance costs*** on the Southern California taxpayers and their economy.

This is yet-another glaring example of "public policy being pushed forward—despite any solid scientific evidence supporting the proposed policy." As a physician-scientist who is proud of scientific integrity in all his published research for more than five decades, I find this behavior despicable and I denounce it. I urge you to take these comments seriously.

Sincerely,



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cc:

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Responses to Comment Letter #16

Submitted by Daniel Nebert on August 13, 2016

16-1

The public health analysis quantifies the effect of reduced PM2.5 concentrations in the South Coast Air Basin on reduced mortality risk which, when aggregated across the affected population, is often expressed as the number of premature deaths avoided. Additionally, staff did not only consider one study but took into account the variance in different estimates by pooling estimates from four local studies (for more information see Appendix 3-B of the Draft Final Socioeconomic Report). Staff presented the point estimates of these results in Chapter 3 of the report, but noted that these represent the point estimate of a sampling distribution and included the 95-percent confidence interval of the distribution for every endpoint estimated in Appendix 3-B of the report.

As with all scientific studies and evaluations, there are various sources of uncertainty surrounding the estimated public health benefits. Staff therefore conducted sensitivity and uncertainty analysis as they relate to important assumptions in the analysis and found that the results continue to demonstrate the significant contribution of cleaner air to public health improvements.

Therefore, contrary to the Commenter's claim, the public health benefits analysis performed in the preliminary, draft, and draft final versions of the Socioeconomic Report of the 2016 AQMP do not state that PM2.5 exposure is "*unequivocally the direct cause* of at least 2,100 deaths per year in Southern California."

16-2

See staff response to Comment 12-1.

16-3

The Commenter's opinions and claims are expressed without evidence. The U.S. EPA's Integrated Science Assessment (2009) and the numerous prominent peer-reviewed articles providing evidence that such a relationship exists, even at very low levels of PM2.5 concentrations.

The analysis of public health benefits associated with implementing the Draft Final 2016 AQMP was conducted for informational purposes. The legal requirements for the AQMP are described in Chapter 1 of the Draft Final 2016 AQMP.

Commenter's claims of impropriety by SCAQMD lack merit. Compliance with the law, transparency, and integrity are demanded of the SCAQMD and its staff. As mentioned in staff response to Comment 12-1, the public health benefits analysis relied on the most recent relevant literature, used a widely adopted and appropriate method, and included the best available data and information. It has also gone through a rigorous public process being discussed at multiple STMPR meetings, AQMP Advisory Group meetings, and the 2016 AQMP Regional Workshops and Hearings. Therefore, staff considers the analysis to be appropriate and based on current best practices in field.

COMMENT LETTER #17—STAN YOUNG EMAIL, SEPTEMBER 6, 2016

Dear Anthony Oliver:

I find no association of acute mortality with either PM2.5 or ozone in the South Coast Air Basin. Literature supports no chronic association in all of California.

17 - 1 I am willing to work with others on analysis of the data set that I have. The mortality data is from a public source.

It seems premature to increase regulations in the air basin until the mortality question is resolved/agreed upon.

Stan

NOTES FOR COMMENT LETTER #17

The following attachment(s) were included with the comment letter submitted by Stanley Young on September 6, 2016 and were duplicate entries on previous comment letter(s) received:

1. Comment Letter #4: Attachment A
2. See the attachments to Comment Letter #23 on Appendix I of the Draft Final 2016 AQMP.

Response to Comment Letter #17

Submitted by Stanley Young on September 6, 2016

17-1

See staff responses to Comments 4-1 and 12-1. The Commenter's opinions and claims are expressed without evidence. The U.S. EPA's Integrated Science Assessment (2009) and the numerous prominent peer-reviewed articles providing evidence that such a relationship exists, even at very low levels of PM2.5 concentrations.

The analysis of public health benefits associated with implementing the Draft Final 2016 AQMP was conducted for informational purposes. The legal requirements for the AQMP are described in Chapter 1 of the Draft Final 2016 AQMP.

COMMENT LETTER #18—MICHAEL SALMAN EMAIL, AUGUST 18, 2016

2533 4th Ave
Los Angeles, CA 90018
salman@history.ucla.edu
323-402-0840
August 18, 2016

Ms. Elaine Shen,
Program Supervisor
Socioeconomic Analysis
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Subject: Comments on Socioeconomic Study Appendix 2A on CMB-03, especially as concerns oil and gas production flaring.

Dear M. Shen

Thank you for this opportunity to send comments on the draft Socioeconomic Study for the 2016 AQMP.

I am writing to comment on the treatment of CMB-03 on "Non-Refinery Flares" contained in Appendix 2-A, pages 56 to 58, especially as concerns oil and gas production flaring.

The discussion of CMB-03 in Appendix 2-A begins by mentioning that beneficial use is the preferred control measure, but then the treatment of the matter examines only low NOx flares, which are not the preferred control method. **18 - 1**

Flares, of course, are not eligible for any incentives. Nor should they be eligible, especially at oil well sites since CAL EPA Secretary Rodriguez's commitment to the World Bank's Zero Routine Flaring Initiative in December 2015 makes the elimination of routine flaring by 2030 into a goal for the State to achieve. Indeed, the commitment should preclude the approval of new flares and diligent movement towards the elimination of existing flares installed for routine use.

But beneficial use technologies <u>are</u> eligible for incentives, and the SCAQMD strategy of achieving emissions reductions through the use of incentives rather than regulatory prohibition makes it imperative that incentives be identified, promoted, and increased. **18 - 2**

There are multiple beneficial use technologies that can be used as control mechanisms ultra-low or near zero emissions, including fuel cells, microturbines[1], gas-to-liquids platforms (GTL), and reformation of

[1] In July 2016 the CPUC revised the SGIP to require increasing admixture t of "renewable" gas (i.e., biogas) with natural gas used in fuel cells or microturbines eligible for SGIP incentives. This is a policy issue which needs to be addressed. CPUC used to have a category for waste gas, but they eliminated it years ago. Gas that is flared is not pipeline gas, but CPUC is treating it as if it is. Part of the problem is the vestigial term "renewable," which dates

gas into hydrogen among other possibilities. By these means the gas that would be flared can be converted into electricity and/or hydrogen and/or liquid fuels. These are by no means the only alternatives to flaring, and all would have lower criteria pollutant emissions than flaring and would lower GHG emissions.

There are existing incentives that can be tapped for all of these beneficial use technologies. Some of the existing incentives include the 30% Federal tax credit for fuel cells, SGIP for fuel cells and microturbines1, and possible support from the CEC, AQMD and other agencies for beneficial use technologies that can produce hydrogen. Fuel cells, GTL, and reformation of gas can produce hydrogen. Companies such as Toyota are helping to finance the build out of hydrogen fuel infrastructure and thus might also support an effort to convert waste gas destined for flares into hydrogen.

18 - 2 (CONT'D)

SoCalGas is being required to fund GHG reduction projects to offset emissions from the Aliso Canyon leak, so they are another company that might assist in beneficial use projects, especially since such projects would meet the criteria of reducing emissions in SoCalGas's service area, helping to solve energy problems, and often would entail supporting improvements in underserved communities. In addition, in 2015 SoCalGas received a Tariff from the CPUC that allows SoCalGas to operate distributed generation equipment on site for commercial or industrial firms. Under this Tariff, SoCalGas can pay the capital expenses and operating expenses, and then turn over the produced power to the contracting company in exchange for payments scheduled over 10 years (or possibly longer, if information I have been given is correct).

Moreover, incentives for the beneficial use of flare gas should be increasing because both the State of California and the U.S. Federal Government have signed onto the World Bank's Zero Routine Flaring Initiative. I understand that the socioeconomic modeling cannot calculate costs based on incentives that do not exist yet, and that is not what I am suggesting. Instead, I think SCAQMD's preference for emissions reductions through incentives makes it more important that incentives should be discussed so as to add SCAQMD's weight to discussions at the State and Federal level about expanding incentives to replace flaring with beneficial use.

18 - 3

Finally, beneficial use technologies produce revenue and usable fuels or energy, while flares produce nothing but emissions. For this reason a 2008 study commissioned by the CEC – "The Off-Gases Project" – recommended policy changes to support the use of microturbines with heat recovery at well sites in place of flares and gas-fired processing equipment, and it argued that microturbine use would be economically beneficial because well sites use large quantities of electricity. Since then improvements in fuel cells and mini GTL platforms have made these options even more attractive from a revenue point of view, and the emergence of hydrogen fuel vehicles makes these options (and also reformation of gas into hydrogen) even more attractive, both in terms of revenues and total emissions reduction.

back to the 1973 oil crisis and ensuing fears of oil shortages. The focus today should be on lowering emissions (GHGs, Criteria Pollutants, etc) rather than renewability.

18 - 4 In sum, the prioritized control measure – beneficial use – should be considered in the socioeconomic analysis, and when it is considered the costs should be offset by available incentives and revenue. The AQMP overall should highlight the revenue gains of beneficial use and the available incentives. If SCAQMD is going to emphasize emission reductions via incentives (rather than prohibitions), then SCAQMD should work to increase incentives that are available for beneficial use.

18 - 5 One more small point: The low NOx flare that is identified for the sake of cost modeling was the "Bekaert Flare." Bekaert was purchased by Aereon Flare Industries in 2012 and the CEB line of flares has been marketed under the Aereon name since then.

Yours

Michael Salman

Responses to Comment Letter #18

Submitted by Michael Salman on August 18, 2016

18-1

Staff acknowledges that the preferred method of control for CMB-03 is beneficial use; however, staff also acknowledges that there may be different technology options and challenges for different source categories. Different approaches may be necessary for different source categories, although the overall goal of reducing NOx and other emissions from non-refinery flares will remain. The cost analysis was based on the possibility that the gas may not be cleaned to be used as a transportation fuel, injected into a pipeline, or directed to equipment that can be converted to power and/or heat and; therefore, will need to install a newer Best Available Control Technology (BACT)-compliant flare to achieve lower NOx emissions. As noted in the control measure, the Zero Routine Flaring by 2030 initiative being undertaken by the World Bank (for oil and gas facilities) will be taken into consideration during rule development. Staff will be pursuing paths to reduce routine flaring at oil and gas facilities and require any flaring that does occur to have the lowest emission limits feasible. While flares would not be eligible for incentives, the beneficial use-related projects such as biogas cleanup and pipeline infrastructure will be eligible for the incentive program.

18-2

Staff thanks the commenter for identifying multiple possible sources of incentive funding. Staff will explore all options for incentive funding. Staff is currently exploring options for using GHG reduction funds for the beneficial use projects.

Incentives for beneficial use are preferred and would be implemented through control measure CMB-01 for biogas cleanup or implementation of pipeline infrastructure. Public working groups or workshops will take place to discuss the guidelines and incentives, including fund distribution.

Staff also appreciates the description of the multiple available/potential technologies noted by the commenter. Once a working group is established, a more detailed discussion on the different methods or alternatives to flaring waste gas from each source category will be determined and addressed.

Please see the Draft Socioeconomic Report Appendix 2-A-8 for a more updated version of the cost and incentive analyses.

18-3

Please see Response to Comment 18-2 regarding a working group. CMB-03 will require conditioning or cleaning of gas to be used in transportation fuel, pipeline injection, or for conversion to power and/or heat. If all these options are infeasible, the installation of newer flares implementing the best available control technology will be required.

18-4

Please see Response to Comment 18-1 and 18-2 regarding cost analysis and incentives, respectively. In addition, please see the Draft Socioeconomic Report Appendix 2-A-8 for a more updated version of the cost and incentive analyses.

18-5

Staff has revised Appendix 2-A in the preliminary Socioeconomic Report. In the revised report, staff does not specify the manufacturer name for the clean enclosed burner (CEB) flare. Any flaring that does occur will have to have the lowest limits feasible. Please see the Draft Socioeconomic Report Appendix 2-A-8 for more details.

Western States Petroleum Association

Credible Solutions • Responsive Service • Since 1907

Sue Gornick
Manager, Southern California Region

31 October 2016

Dr. Philip Fine via email: PFine@aqmd.gov
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comments on the Preliminary Draft Socioeconomic Report for the 2016 Air Quality Management Plan (AQMP)

Dear Dr. Fine:

Western States Petroleum Association (WSPA) is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California, Arizona, Nevada, Oregon and Washington. WSPA has been an active participant in air quality planning issues for over 30 years. WSPA member companies operate petroleum refineries and other facilities in the South Coast Air Basin and thus have a major stake in the Air Quality Management Plan (AQMP) being prepared by the South Coast Air Quality Management District (SCAQMD or District), and any rule developments that might stem from the final AQMP as adopted by the District's Governing Board.

WSPA believes the 2016 AQMP must be scientifically-based and technically accurate and the District's Governing Board needs to have a thorough assessment of the air quality benefits, environmental impacts, and economic costs associated with that plan. This is consistent with Governing Board Resolution (1989) which directs AQMD Staff to prepare an economic analysis that identifies affected industries, the cost effectiveness of emissions controls, and the potential public health benefits of proposed rules.[1]

Our initial comments are as follows:

19 - 1

1. The costs presented for proposed control measure CMB-05 (RECLAIM) are significantly understated. This understatement compromises the quality of the assessment's findings related to industrial sector employment and the regional economy.

1 AQMD, Preliminary Draft Socioeconomic Report for the 2016 AQMP, August 2016. Page 9.

The Preliminary Draft Socioeconomic Report presents a control cost for proposed measure CMB-05 at $13,500 - $21,000 per ton of NO_X reduced. This is reportedly based on information in the Staff Report for the December 2015 amendments to Regulation XX.[2] However, WSPA previously provided information to the District which demonstrated that the cost for refinery sector emission reductions beyond those already required by the December 2015 Regulation XX amendments would be significantly higher.

WSPA, through a third party contractor, had conducted a confidential cost survey of the Southern California refineries related to total capital and operating costs for compliance with the District's proposed NOx RECLAIM shaves.[3] This proprietary information was submitted by refiners on a confidential basis to the third-party contractor who de-identified and aggregated the compliance costs for the overall industry. That forecast suggested the refinery sector compliance costs for the December 2015 shave would be nearly twice the estimate presented by AQMD staff.[4]

19 - 1 (CONT'D)

Furthermore, WSPA's contractor also projected that additional NO_X reductions could cost the refining industry as much as $120,000 per ton, using a 10-year equipment life. Even using AQMD Staff's liberal 25-yr equipment life assumption, the estimated costs for additional reductions came to over $55,000 per ton of NOx. While the proposed CMB-05 measure is short on explaining exactly how any additional reductions from RECLAIM might actually be achieved, it does openly contemplate the imposition of command-and-control overlays that might further increase the compliance costs for RECLAIM sources beyond previous projections.

Such higher costs would significantly reduce the cost effectiveness of the proposed measure, and would likely increase adverse regional employment impacts to the industrial sector. We strongly recommend that cost estimates for proposed control measure CMB-05 should be reexamined and the socioeconomic impacts be reassessed.

2. AQMD's 25-year useful equipment life assumption is not appropriate and results in understated costs for proposed measure CMB-05. A ten-year useful equipment life would be more appropriate due to the frequency of District rulemakings. Given the size of the proposed market shave, stranded asset costs may need to be considered in the socioeconomic assessment.

19 - 2

As previously noted, AbT Associates has recommended that the District's socioeconomic program should ensure that the control costs include the full cost of retrofitting existing controls or installing new controls. This would include consideration of any stranded asset costs, such as when the proposed BARCT determination requires replacement of prior investments for emission control equipment, or effectively mandates the replacement of basic equipment.[5]

[2] AQMD, Preliminary Draft Socioeconomic Report for the 2016 AQMP, August 2016. Page 29.
[3] Stillwater Associates LLC, Refinery NOx RECLAIM Shave – A Confidential Survey for WSPA, January 2015 ("WSPA Survey").
[4] WSPA Survey as compared to slides 28 and 30 presented to AQMD NOx RECLAIM Working Group Meeting (WGM) on 7 January 2015.

19 - 2 (CONT'D)

In the case of the RECLAIM program, the District just last year completed a comprehensive assessment for RECLAIM source categories and imposed reductions which established new BARCT levels. So at this time there are no identified control technologies for these source categories, leaving one to wonder how such a severe market shave would even occur short of basic equipment replacements or forced shutdowns.

For this reason, we believe the use of a 25-year equipment life assumption to compute cost effectiveness is inappropriate and results in a systemic understatement of control costs. Control costs for the RECLAIM program should be computed using a 10-year equipment life assumption as is done by most other California air quality agencies. Furthermore, the District should consider whether proposed measure CMB-05 should consider potential stranded asset costs consistent with Abt Associates' recommendations, or explain why that is not needed.

3. The Preliminary Draft Socioeconomic Report fails to provide the economic analysis required under California Health & Safety Code section 39616.

19 - 3

The Preliminary Draft Socioeconomic Report acknowledges that the California Health & Safety Code section 39616 requires certain economic analyses for market based programs.[6] Yet the assessment does not include such an analysis. We would note the specific requirement to demonstrate that market based programs such as RECLAIM will result in equivalent or greater reduction in emissions at equivalent or less cost compared with command and control regulations and future air quality measures that would otherwise have been adopted as part of the District's plan for attainment. Such analysis is wholly missing and should be incorporated into the economic analysis for proposed measure CMB-05.

4. Given the potential adverse socioeconomic impacts that this AQMP could impose on Southern California's industrial sector workforce, the 2016 AQMP and Socioeconomic Report should consider the potential benefits of extending incentives to reduce costs to industrial stationary sources.

19 - 4

The AQMP notes that Southern California's industrial employment remains an important engine for the regional economy. Despite the industry's shrinking workforce over the last 15 years, economic output per worker in the industrial sector is reported in the Preliminary Draft Socioeconomic Report at $152,000 per worker (2014 data reported in 2015 dollars). [7] And in Riverside County and Orange County, industrial sector jobs pay about 25% more than the average wages for those counties. The difference in Los Angeles County is greater.[8]

Given the importance of industrial sector employment to the regional economy, it would make sense to consider extending financial incentives to large stationary sources as a means of accelerating the deployment of lower emission technologies. This should include major facilities presently subject to the RECLAIM program. Including such an incentive based measure would be consistent with recent discussions at the Ad Hoc Committee on Large Compliance Investments and Future Regulatory Certainty to consider targeted incentives, financing, and funding programs as means for promoting emission reductions and helping businesses remain

[6] H&SC §39616.
[7] AQMD, Preliminary Draft Socioeconomic Report for the 2016 AQMP, August 2016. Page 9.
[8] Ibid.

19 - 4 (CONT'D)

economically viable, especially in environmental justice areas.[9] We would also note that the Socioeconomic Report projects that 80% of manufacturing job losses under this AQMP would occur in Los Angeles County where the industry is concentrated.[10]

19 - 5

5. The Preliminary Draft Socioeconomic Report states that the RECLAIM control measure is 'expected to mainly affect the petroleum and coal products manufacturing industry, including refineries'.[11] WSPA is surprised and concerned to see that statement, especially since this industry is currently subject to a 56% NOx shave per the December 2015 amendments, while other industry categories either have a lower percentage shave or none at all. Also, the BARCT used to determine the recent shave was set more aggressively for refinery sources than for most non-refinery sectors. Perhaps the intention of this statement was simply to say that since refineries have more RECLAIM units than non-refinery sectors; refineries will bear more absolute cost. However, a proportional shave will have financial impacts whether a facility has one RECLAIM unit or 20. WSPA asks for a clearer explanation and justification of the above statement in the draft report.

19 - 6

6. The control cost for FUG-01 is listed as $11,000/ton of emissions reduced[12]. However, as discussed in WSPA's August 18, 2016 letter, there is no factual cost basis for this estimate. This figure should be supported with an actual technical basis or completely removed from the document.

19 - 7

7. WSPA is deeply concerned about the costs and impacts presented in CARB's Mobile Source Strategy for South Coast (Appendix IV-B of the draft 2016 AQMP), including the low- emission diesel standard. The total estimated cost for CARB control measures affecting South Coast is $28.7 billion; $834 million is attributed to the low-emission standard alone[13]. WSPA has submitted initial comments to CARB on the low-emission diesel standard in June 2016 and will provide additional comments to SCAQMD on the mobile source strategy once the remaining sections of the AQMP Socioeconomic Report are released in the coming weeks.

WSPA appreciates the opportunity to submit these comments. We may submit additional comments during this process as the District releases additional 2016 AQMP documents including, but not limited to the Draft Socioeconomic Report.

Please contact me with any questions at (562) 307-6353 or sue@wspa.org.

Sincerely,

Suzanne E. Bonnicle

[9] AQMD Ad Hoc Committee on Large Compliance Investments and Future Regulatory Certainty, September 2, 2016.
[10] AQMD, Preliminary Draft Socioeconomic Report for the 2016 AQMP, August 2016. Page 10.
[11] AQMD, Preliminary Draft Socioeconomic Report for the 2016 AQMP, August 2016. Page 26.
[12] AQMD, Preliminary Draft Socioeconomic Report for the 2016 AQMP, August 2016. Page 29.
[13] AQMD, Preliminary Draft Socioeconomic Report for the 2016 AQMP, August 2016. Page 23.

Responses to Comments Letter #19

Submitted by Western States Petroleum Association (WSPA) on October 30, 2016

19-1

Staff appreciates comments on the Revised Draft 2016 AQMP and continued participation in the AQMP development process.

Staff has prepared the socioeconomic analysis consistent with the 1989 Governing Board Resolution.

The costs presented for control measure CMB-05 are based on costs that resulted from an expansive BARCT assessment conducted for the 2015 NOx RECLAIM Amendments and verified by third party consultants. Furthermore, staff conservatively assumed that, in implementing the proposed CMB-05, the cost per ton of NOx emission reductions could potentially increase from the previous BARCT assessment. Therefore, staff has, based on past rulemaking experience, adjusted the cost estimates upward by one and a half times in the AQMP socioeconomic assessment.

Concerning the Commenter's claim that additional NOx reductions would cost the refining industry as much as $120,000 per ton, beyond the assumption of a shorter equipment life, the claimed cost was based on confidential data and information that the Commenter did not provide staff with access to and as a result staff was unable to review and verify. Previously, such outside analyses have included other ancillary costs for upgrades that are not fully attributable to RECLAIM. Please also see staff response to Comment 19-2 below regarding equipment life.

Details of subsequent NOx RECLAIM amendments to implement CMB-05, including the prospect of transitioning to command and control, would be determined as part of future rulemaking, and staff would conduct further socioeconomic assessment of any future amendments as legally applicable.

19-2

In the cost analysis for CMB-05, staff has used a 25-year equipment useful life assumption. The Commenter suggested that the assumption results in a systemic understatement of AQMP control costs, staff should have used a 10-year life, and that staff should consider including stranded costs consistent with Abt Associates' recommendations.

The considerations listed in the control measure, including a program sunset, allowing structural buyers to exit, command-and-control regulation overlays, additional BARCT requirements, and a full assessment of the differential between RTC holdings and actual emissions are not expected to directly impact recently installed control equipment. In the event that the implementation of the control measure renders obsolete any control equipment added that has not reached a 25-year equipment life, staff would add those stranded costs to the cost of that future amendment or consider a longer compliance schedule to maximize the useful life of the control equipment.

The 25-year equipment life is appropriate consistent with the following facts:

1. The actual profile of SCRs in the SCAQMD: 27% of the refinery combustion equipment in the Basin has SCRs installed more than 25 years ago, and 63% of the refinery combustion equipment has

SCRs installed more than 20 years ago. These units are still in operation and thus support the assumption of a 25-year useful life in the cost analysis.

2. Other air districts have used similar assumption for control equipment life in their cost analyses: a) Some SCRs for refinery heaters in the Bay Area were installed in 1984 and thus the Bay Area air district staff uses a 20-year useful life in rule development. b) The SCRs in the Santa Barbara air district were installed in 1980-1990's and are still in good operating conditions, and thus the Santa Barbara air district staff supports a 25-year useful life of control device. c) Staff found several BACT analyses for the air districts in Florida that used 20- or 25-year useful life for SCRs. (See page 271 of the 2015 Draft Final Staff Report on Proposed Amendments to Regulation XX – NOx RECLAIM.)
3. The EPA OAQPS Costs Guidelines use a 20-year life for control equipment such as SCRs in their cost analysis.
4. Air pollution control manufacturers that staff contacted indicated that 20- or 25-year life is a reasonable assumption for control device such as SCRs, scrubbers, or LoTOx applications. (See page 271 of the 2015 Draft Final Staff Report on Proposed Amendments to Regulation XX – NOx RECLAIM.)

19-3

There is no legal requirement for a socioeconomic analysis of the AQMP.[1] When SCAQMD's 1991 AQMP was approved by CARB, it was subject to §39616 (d)(1) for plans submitted before January 1, 1993. SCAQMD and CARB have not made §39616 findings for subsequent AQMPS. Therefore, Section 39616 does not impose any requirements on this socioeconomic analysis. Although §39616 (d)(2) refers to plans or plan revisions adopted after January 1, 1993, staff believes this refers to the plan or plan revisions that initially adopts the market-based program, not to subsequent amendments to that program. Nevertheless, staff has conservatively estimated the effectiveness of CMB-05 at $13,000-$21,000 per ton of NOx.[2] This is based on the assumption that future BARCT controls would be installed, i.e., is equivalent to the cost of command and control at the covered facilities. If instead some facilities are able to over-control, enabling others to under-control by buying RTCs, this would only occur if costs to do so are less than costs to install BARCT. Therefore, the plan necessarily results in equivalent reductions at no greater than equipment costs. Moreover, the option in CMB-05 is the eventual sunsetting of RECLAIM. §39616 would not apply in such a case. The specific command and control measures potentially encompassed by CMB-05 have not been developed. CMB-05 expressly states: "A working group of stakeholders and experts will convene in the spring of 2017 to examine the future of the RECLAIM program and develop options and timing for the transition to a command-and-control regulatory structure." To the extent any comparison of RECLAIM to command and control regulations is necessary, that analysis will be done during the rulemaking process. At this time, an analysis is neither necessary nor possible.

19-4

Staff agrees that industrial sector employment is a vital part of the regional economy and that Southern California's industrial facilities have dramatically reduced emissions over the last several decades. In order to reach attainment, even with a fair-share approach, further emission reductions are required from stationary sources. To the extent possible, incentive programs are already incorporated into the current

[1] §39616 (d)(2) does potentially apply to plan revisions adopted after January 1, 1993.
[2] Draft Final 2016 AQMP Appendix IV-A.

AQMP strategy. Industrial stationary sources, such as those described in CMB-01, can use incentives for transitioning some of their equipment to near-zero or zero technology. However, RECLAIM facilities are not intended to be included among those eligible to receive incentives under the control measure because these sources currently operate under a cap-and-trade market structure. As such, RECLAIM facilities have the option of installing emission controls and selling excess emission credits, and if economically more advantageous, purchasing RECLAIM trading credits in the open market. If the RECLAIM program is transitioned to command and control, incentives would only be used to support projects that went beyond requirements and were cost-effective.

19-5

The examples of FUG-01 and CMB-05 affecting the petroleum and coal products manufacturers, including refineries, in addition to energy producers, was meant to be illustrative of how control measures may impact a subset of all manufacturers. As noted by the Commenter, petroleum and coal products manufacturers, including refineries, have more RECLAIM units and would bear the greater absolute cost based on the modeling assumptions that a shave would be introduced that is similarly distributed as the 2015 NOx RECALIM Amendments. Socioeconomic impacts will be reassessed during rule development to implement CMB-05 and FUG-01.

19-6

The $11,000 per ton cost-effectiveness cited by the Commenter was based on the cost of implementing traditional LDAR programs. It was assumed that the cost to implement Smart-LDAR would be at worst the same as how much it costs to implement a traditional LDAR program. The estimate reflected an upper bound considering the lower expected cost of Optical Gas Imaging (OGI) techniques. The cost-effectiveness figure has been revised down to $4,000 and is based on the OGI technology as a supplement to conventional LDAR (please see Appendix 2-A of Draft Final Socioeconomic Report). Potential cost savings from alternative technologies or labor reductions if Smart-LDAR can act as a substitute are not included. SCAQMD plans to implement the control measure through a public process. Both the Pilot program to demonstrate feasibility of Smart-LDAR and any rule development to control fugitive emissions will be pursued in a public process allowing interested stakeholders to participate. Rule development will consider aligning requirements with similar efforts from other regulatory agencies.

19-7

The Commenter expressed general concerns regarding the proposed mobile source strategy, specifically for the low-emission diesel standard, and stated that additional comments would be provided to SCAQMD. Staff has received further comments on the proposed low-emission diesel fuel requirement on December 19, 2016 and a response is provided to that letter. Please see the response to Comment 27-9.

COMMENT LETTER #20—PORT OF LONG BEACH

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Port of
LONG BEACH
The Green Port

Mr. Wayne Nastri
Acting Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765

Electronic Submittal Via:
https://onbase-pub.aqmd.gov/sAppNet/UnityForm.aspx?key=UFSessionIDKey

Re: **Port of Long Beach Comments on the Preliminary Draft Socioeconomic Report (SER) for the 2016 Air Quality Management Plan**

Dear Mr. Nastri:

The Port of Long Beach (Port) appreciates the opportunity to participate in the South Coast Air Quality Management District's (SCAQMD's) 2016 Air Quality Management Plan Advisory Committee, and to comment on the Preliminary Draft Socioeconomic Report (SER) for the 2016 Air Quality Management Plan released on August 31, 2016. The Port recognizes the amount of effort that has gone into development of the SER, and acknowledges SCAQMD's efforts to release a plan that seeks to balance "traditional" regulatory measures with innovative incentive-based measures. Accordingly, the Port offers the following comments on the SER.

General Comments

20 - 1

First, the Port requests more time to provide comments on the SER once all chapters have been released. As of the writing of this letter, only Chapters 1-3 and 6 are available and some key analyses are not presented in the August 2016 preliminary draft. Specifically, the following key analyses and related chapters have not been completed and/or presented:

- Employment impact
- Impacts on economic groups and communities
- Impacts on competitiveness
- Small business impact analysis (placeholder on p. 28)
- Cost-effectiveness using discounted and levelized cash flow (DCF and LCF, respectively) for non-AQMD control measures (which account for the greatest reductions in the AQMP)
- Concentration-Response (C-R) sensitivity analyses (p. 41) for premature deaths avoided

20 - 2

Additionally, key papers cited in the SER should be noticed and placed on SCAQMD's website, particularly those related to "Willingness-to-Pay" and "Value of a Statistical Life" (p. 39, footnote 44; see details in minor comments in Attachment 1).

20 - 3 Second, the draft AQMP has control measures that could directly affect the port, including on-road heavy duty truck measures (e.g., proposed federal and state low NO_X standards and further deployment of near-zero/zero emission trucks), freight trains (e.g., more stringent federal standards and further deployment of cleaner locomotives), and ocean-going vessels (e.g., Tier 4 vessel standards, further development and incentives for cleaner OGVs). These measures have, to some extent, costs and emission reductions assigned to them in the SER. Other important port-related measures include MOB-01, MOB-02, and MOB-03, which are "facility-based" mobile source measures for ports, rail yards, and warehouse distribution, respectively. These last measures are not quantified in the preliminary draft SER. The Port requests a full socioeconomic analysis of all control measures, and that the socioeconomic analysis be completed and an adequate opportunity for public comment be provided prior to action on the Draft 2016 AQMP.

20 - 4 The Port appreciates the efforts that AQMD is making to improve the Socioeconomic Analysis and strongly encourages continuing efforts to allow the future assessment of AQMP impacts on small industry sectors and small business, which are key parts of the supply chain. Also, the Port appreciates the discussion throughout the SER on the pivotal part that the goods movement sector plays in the regional economy.

Technical Comments

Chapter 1

20 - 5 The latest scientific evidence relating ozone and $PM_{2.5}$ exposure to public health (p. 4-5) must include information sent to the Scientific Technical Modeling Peer Review Advisory Group (STMPR AG) and comments on Appendix I (Health Effects), in particular, California-specific results of peer-reviewed papers such as those presented by (and/or referenced by) Professor Stanley Young (adjunct professor of statistics at North Carolina State University, the University of Waterloo, and the University of British Columbia, as well as adjunct Professor of biostatistics at Georgia Southern University) that indicate a much lower concentration-response function for $PM_{2.5}$ and mortality.

The Port strongly recommends that median pay rather than average pay also be used in the discussion of the economic outlook for potentially affected industries (pp. 6-11) because using the average would skew salaries in certain sectors with high part-time work forces. We also note that transportation/warehouse jobs pay two to three times more money than restaurant and other lowerskilled jobs (pp. 8-9).

Chapter 2

20 - 6 The SER indicates that there will be no analysis of the unquantified measures that appear in the Draft AQMP, among which is MOB-1, the facility-based measure aimed at ports. This means there will be no comprehensive review of the impacts associated with implementation of a facility-based cap on port emissions, which could have devastating socioeconomic effects. The Port requests a full socioeconomic analysis of all control measures, including those without quantified emission reductions.

20 - 7 Moreover, the Port has concerns about SCAQMD analyzing only the incremental costs associated with the AQMP strategies. Incremental cost analysis is appropriate only if the private industry can upgrade

20 - 7 (CONT'D)

to cleaner equipment as part of its normal replacement schedule; however, the private industry may be forced to accelerate fleet turnover to meet the aggressive attainment deadlines. This situation could be exacerbated by adoption of measures such as MOB-1, although there is no way of knowing because the MOB-1 timeline is not presented in the Draft 2016 AQMP or SER. An accelerated replacement schedule could result in significant private investments in equipment before the end of the equipment's useful life, and using only incremental costs as the basis for analysis could far underestimate the true cost to society.

20 - 8

Additionally, the SER assumes that federal, state, or local governments will be responsible for financing the entire incentive amount (p. 18). SCAQMD has identified the need for nearly $16 billion in incentives to meet the region's attainment goals. Only a small portion of this necessary investment has actually been identified. Indeed, SCAQMD is developing a comprehensive strategy to seek more incentive dollars, but there is no guarantee those dollars will materialize. Because the fleet turnover will be expected to happen with or without government subsidies, the Port strongly urges SCAQMD to analyze the socioeconomic impacts of the Draft 2016 AQMP assuming no additional incentive dollars are available.

Furthermore, it appears the SER does not analyze the socioeconomic impacts associated with the public tax increases necessary to support more incentive funding. The Draft 2016 AQMP clearly states AQMD's intent to seek local and state ballot measures, which would include taxpayer funding (p. 4-68). If tax increases are assumed, the SER must analyze the impact of higher public taxes. If tax increases are not assumed as a strategy to secure more incentive funding, the SCAQMD must identify the funding source and analyze those impacts in the SER.

20 - 9

Also, the Port has concerns related to CARB's Mobile Source SIP assumptions for costs related to truck/vessel replacements (as reflected in Appendix 2-A) and will continue to work with CARB and AQMD to improve the estimates of these costs and scope of needed incentives for accelerated fleet turnover.

20 - 10

The Port reserves the right to make technical comments on the small business analysis and LCF/DCF cost-effectiveness analyses (particularly for the CARB mobile source control measures) when these analyses are finally released.

Chapter 3

20 - 11

The Port requests clarification as to which initiative funding scenario is modeled for Figure 3-1. The reductions for light-duty vehicles (LDV) and heavy-duty vehicles (HDV) in the different incentive funding scenarios do not appear to match the emission reductions for those source categories in draft AQMP Appendix V, Attachment 3. Reductions for the more realistic incentive strategies (focus on larger vehicles/equipment) should reflect relatively small reductions in LDV emissions (and larger reductions for HDVs) than the CARB SIP strategy; this could significantly affect the spatial distribution of $PM_{2.5}$ reductions.

20 - 12

As noted (p. 41), sensitivity analyses of alternative concentration-response (C-R) functions, such as those brought up by Professor Young in our comments on Chapter 1 above, should be conducted, as well as an analysis of health benefits above the health standards only, which would be different from

the similar sensitivity test using the "lowest measured level (LML)" of $PM_{2.5}$ already conducted by SCAQMD staff (see Appendix 3-B, p. 112).

20 - 12 (CONT'D)

The overwhelming majority of premature deaths avoided, which is the main driver of the monetized public health benefits, are reductions of $PM_{2.5}$ occurring in areas that already achieve the $PM_{2.5}$ standards.

We strongly recommend that a complementary analysis of the health effects estimates (Table 3-3) and monetized annual health benefits (Table 3-4) be calculated using the federal standards as cutoffs; this analysis is crucial to understanding the costs and benefits of attaining healthful concentrations (i.e., bringing concentrations to the health standard) compared to the costs and benefits of reducing exposure of healthful air pollutant concentrations.

20 - 13 The Port requests to see the cited 2016 papers related to "Willingness-to-Pay (WTP)" and "Value of a Statistical Life (VSL)" to understand the South Coast per capita WTP used in the analysis.

20 - 14 The Port believes the sensitivity analysis described in Table 3-5 should be revised. The annual real income growth rate was taken as 1.9% per year from 2019 through 2031 (per Appendix 3-B, p. 109), but this rate, which appears to be for California not just the South Coast, may be nonsensical for the vast majority of South Coast workers (particularly those in the Inland Empire). The Port requests that this growth rate be revised based on local forecasts.

The use of income elasticity other than $\varepsilon_I = 0$ should be justified given that the vast majority of South Coast workers do not have discretionary income and that any increase in income growth rate would be preferentially used for necessities and reducing debt.

20 - 15 The Preliminary Discussion of the Health Effects of Unemployment recognizes the need for such an assessment but does not account for several comments proffered by STMPR AG members and others. The insufficiency of the analysis and need for revisions is strikingly clear when a key conclusion is that "as headline unemployment rates went up, public health metrics improve" (p.46). It was strongly suggested that non-headline employment rates be used, such as the Bureau of Labor Statistics (BLS) U6, which includes discouraged workers, all other marginally attached workers, and those workers who are part-time purely for economic reasons, as well as the official BLS U3 unemployed (unemployed and actively searched for work in the past 4 weeks). We strongly suggest that this issue continue to be studied and refined by SCAQMD staff during the development of the incentive funding program and implementation of the 2016 AQMP.

Chapter 6

20 - 16 The Port understands that SCAQMD staff has conducted an Environmental Justice (EJ) working group as a sub-group to the STMPR AG for the purposes of implementing the 2014 Abt Report recommendations for a new analysis—evaluating the distribution of health risks and comparing the differences, if any, between EJ and non-EJ communities of implementing the 2016 AQMP versus not implementing the 2016 AQMP. Tables 6-4 through Tables 6-6 indicate "that, on average, EJ communities are projected to experience greater health benefits as a result of Plan implementation" and that "EJ communities are projected to experience a[sic] larger per capita health benefits."

20 - 16 (CONT'D)

Please update this analysis by modeling an incentives strategy that preferentially incentivizes cleaner HDVs over cleaner LDVs, which should provide greater emission reductions along goods movement corridors. Also, the Port requests an analysis of how tax increases necessary to support incentive funding could adversely affect EJ communities, as many tax mechanisms disproportionately impact low-income residents.

The Port appreciates the opportunity to comment on the Preliminary Draft SER and reserves the right to offer more extensive and fuller comments once all sections are available.

Sincerely,

Heather A. Tomley
Director of Environmental Planning
Port of Long Beach

Responses to Comment Letter #20

Submitted by Port of Long Beach on October 31, 2016

20-1

Staff appreciates the comments on the Socioeconomic Report and the continued participation in the AQMP development process.

The Draft Socioeconomic Report and related Appendices were released in their entirety on November 19, 2016, with a public review and comment period of 30 days that ended on December 19, 2016. Preliminary drafts of several portions of this document had been previously released. In particular, preliminary drafts of Chapters 1-3 and Appendices 2-A, 3-A, and 3-B were released on August 31, 2016. A preliminary draft of Chapter 6 was released on September 23, 2016. Preliminary drafts of Chapters 4, 5, 7, 8 and Appendix 4-A were released on November 2, 2016. Additionally, the information included in these chapters and appendices was discussed at multiple Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group meetings and AQMP Advisory Group meetings. The revised and new chapters included all key analyses referenced in the comment. Specifically,

- Chapter 4 discussed the overall jobs (employment) impact, jobs impact by economic sector, and jobs impact by occupational earnings group. Chapter 6 also discussed the health impacts and distributional effect on community groups.
- Appendix 4-C reported competitiveness impacts based on four macroeconomic indicators, including Industry GDP, Costs of Production, Impacts on Delivered Prices, and Impacts on Imports and Exports.
- Chapter 2 included a small business impact analysis.
- Chapter 2 also has a complete cost-effectiveness analysis, presenting cost-effectiveness for all control measures with quantified costs and using both discounted cash flow (DCF) and levelized cash flow (LCF) methods. A detailed explanation of both cost-effectiveness methodologies (LCF and DCF) is available in Appendix 2-B.
- Chapter 3 has an expanded section of sensitivity analyses. One of the sensitivity analyses examined alternative results of public health benefits based on several sets of alternative concentration-response (C-R) functions. These alternative C-R functions are either based on studies of larger geographies (i.e., California or nationwide studies), or studies of cardiovascular disease-related mortalities as opposed to all-cause mortalities.

20-2

The Draft Socioeconomic Report includes a bibliography section with a comprehensive list of references to all scientific articles and reports cited in the analyses. All consultant reports prepared by Industrial Economics, Inc. (IEc), which include the two health benefits valuation memos on the concept of "willingness-to-pay" (WTP) and the recommended use of value of statistical life (VSL), have all been made available on the SCAQMD's Socioeconomic Analysis webpage at http://www.aqmd.gov/home/library/clean-air-plans/air-quality-mgt-plan/socioeconomic-analysis. Electronic notices of the availability of consultant reports were sent to members and interested parties of

the 2016 AQMP Advisory Group and the Scientific, Technical & Modeling Peer Review (STMPR) Advisory Group.

20-3

The Socioeconomic Report quantifies costs for control measures with quantified emission reductions. As stated in Chapter 4 of the Draft Final 2016 AQMP and reiterated in Appendix 2-A of the Draft Socioeconomic Report, the "facility-based" SCAQMD mobile source measures—MOB-01, MOB-02, and MOB-03—are being proposed to facilitate local implementation of the State Implementation Plan (SIP) Strategy "Further Deployment of Cleaner Technologies" measures. The SCAQMD measures propose a process to also identify measures, including voluntary actions that could potentially result in additional NOx emission reductions beyond the state's emission reduction commitments. Since these actions are not specifically identified at this time, it is not feasible to estimate costs.

20-4

Staff appreciates the Port's acknowledgement of staff's efforts to enhance and enrich the AQMP socioeconomic assessment. Chapter 2 of the Draft Socioeconomic Report includes a discussion on the size of businesses in each of the industry sectors that could be potentially affected by the 2016 AQMP. Staff acknowledges that the descriptive nature of this analysis can always be improved. Staff is making continuous efforts and currently working with expert consultants to identify the latest and most suitable methodologies and tools to improve economic impact assessment for small businesses and in situations where the economic impact is expected to be of a small scale but concentrated in a limited number of specific industries. Staff expects to be able to apply the recommended methods to upcoming rule impact assessments and for future AQMP socioeconomic assessment.

20-5

The concentration-response functions used to estimate public health benefits in the Socioeconomic Report were based on recommendations put forth by expert consultants at IEc and their scientific advisor Dr. George Thurston (Professor and Director of the Program in Exposure Assessment and Human Health Effects at New York University School of Medicine). The basis of IEc recommendations was a thorough literature review using study selection criteria presented to and reviewed by the 2016 AQMP Scientific, Technical & Modeling Peer Review (STMPR) Advisory Group. It should be emphasized that the four Los Angeles-specific concentration-response (C-R) functions—all of which came from published, peer-reviewed, and widely circulated and cited studies and reports—were recommended and used in the estimation of avoided premature deaths associated with long-term exposure to PM2.5. In recognition of the uncertainties inherent in all scientific research and studies, sensitivity tests were additionally conducted using alternative C-R functions recommended by IEc based on peer-reviewed California studies and nationwide studies, respectively. Appendix I (Health Effects) of the 2016 AQMP also includes a discussion on studies within the state of California in order to present a "local perspective" of air pollution-related health effects by highlighting studies conducted in the South Coast Air Basin, Southern California, or California. Please see staff response to Comment 12-1 for further discussion.

Staff appreciates the suggestion to report median in addition to average wage for each potentially affected industry. However, the Quarterly Census of Employment and Wages used to provide average wages in the Socioeconomic Report do not provide median wage statistics and the computation of median wage based on this dataset is not possible. Staff agrees that the average wage does not reflect the underlying wage distribution, and as cautioned in Footnote 12 in Chapter 1 of the Draft Socioeconomic

Report, the average annual pay is affected by the ratio of full-time to part-time workers in an industry. This factor can partially explain the large differential in average wages between transportation/warehousing jobs and restaurant jobs that was noted by the Commenter.

20-6

Please see staff response to Comment 20-3.

20-7

Incremental cost is not necessarily the price difference between the replaced and replacement equipment. As stated in Chapter 2 of the Draft Socioeconomic Report, the incremental costs represent the cost difference between a "business as usual" path and an alternative path as proposed by the Revised Draft 2016 AQMP to reach the attainment targets. In the case of a natural equipment or fleet turnover, the total incremental cost would equal the anticipated price difference between conventional technology and near-zero or zero emission technology, plus additional cost differences in terms of fuel prices and other operation and maintenance costs. The incremental cost estimates are largely based on current price estimates of near-zero or zero emission technology and usually represent an upper bound of anticipated prices, which are expected to decrease over time as advanced clean technologies develop further and their market share increases. In the case of an accelerated turnover of mobile source equipment or fleets, which is of concern to the Commenter, the incremental costs are based on program guidelines and/or observed proxies for incremental costs within the existing incentive programs, such as the Surplus Off-Road Opt-In for NOx (SOON) Program for construction and industrial equipment and the Carl Moyer Program that incentivizes cleaner-than-required heavy-duty engines. For example, Appendix 2-A of the Draft Socioeconomic Report states that the Carl Moyer Program guidelines consider 80 percent of actual cost to be the incremental cost of replacement equipment and 85 percent of actual cost to be the incremental cost of engine repowers; the remainder (20 percent for replacement and 15 percent for repower) is considered the overhaul and maintenance expense that would be incurred to keep the old engine/equipment operational if no upgrades are made (page 2-A-23).

20-8

Chapter 7 of the Draft Socioeconomic Report analyzes CEQA alternatives. Alternative 3—CARB and SCAQMD regulations only—is designed to implement those control strategies that are regulatory in nature only and assumes the remaining emission reductions necessary to attain the NAAQS would be achieved under CAA §182(e)(5) measures, or black box measures. For socioeconomic analysis purposes, no incentives would be available under this CEQA alternative, and all costs were assumed to be incurred by the directly affected entities including private industries, some in the public sector, and consumers. The average annual incremental cost, which amounted to about $850 million a year, and the associated job impact of an average 10,000 jobs foregone per year were very similar to what was projected for the implementation of 2016 AQMP.

In Chapter 4 of the Draft Final Socioeconomic Report, staff evaluated the job impacts of two alternative scenarios with respect to funding of the incentive programs proposed in the Draft Final 2016 AQMP. The scenarios were chosen for economic impact evaluation not because they would be the most likely, as the most likely case cannot yet be surmised, but because they would represent extreme cases which provide the upper and lower bounds of the analysis of projected job impacts.

On one end of the spectrum, staff considered the case where all incentives would be funded by directly reallocating funds from existing state programs within the four-county region to be used for the proposed incentive programs. This scenario is expected to have the largest negative job impact because state government functions and operations exhibit some of the largest employment multipliers according to the REMI model of the regional economy. The large employment multiplier results from the fact that the government sector itself and the sectors to which a large portion of government spending goes to (e.g., construction or healthcare and social assistance) are relatively labor intensive. Therefore, a budget reduction of the existing public programs and services tends to have a greater negative regional job impact than do other fiscal mechanisms, such as levying new taxes on regional residents or introducing new fees for business operations.

In a scenario where incentives are instead financed by new taxes, the resulting decrease in household spending would not be concentrated in labor intensive industries. In addition, a proportion of that spending decrease would impact not only businesses inside the four-county region but also businesses located outside the region (i.e., greater leakage), thereby causing some of the potential negative job impacts from spending decreases to occur outside of this region. Similarly, increases in business operation costs through the introduction of new operation-related fees would affect a variety of industry sectors, but they are less likely to be as labor-intensive as those affected by a state budget reallocation. Moreover, certain fee structures, such as cargo handling fees on containers, would largely affect businesses located outside the region and may or may not indirectly affect their upstream suppliers within the region.

On the other end of the spectrum, staff considers the case where all the incentive programs would be funded from sources outside the region and would therefore have a negligible impact on individuals and businesses within region. This case would then represent the lowest impact funding scenario, an example of which is the scenario where the proposed incentive programs would be fully funded by existing federal revenue sources.

The Draft Financial Incentives Funding Action Plan for the Draft Final 2016 AQMP provides information on many potential funding opportunities, and local and state ballot measures are one of many potential funding opportunities that the SCAQMD would explore as means to securing incentive funding. However, a systematic assessment of these opportunities through the public process is necessary to determine the most likely scenarios. It is therefore premature to examine the socioeconomic impacts of the most likely scenarios. Staff will conduct economic impact evaluations as the most likely scenarios are identified through the public working group process.

20-9

Staff welcomes the Port's suggestions and input to enhance the cost assumptions and estimates related to truck/vessel replacements as included in CARB's Mobile Source Strategy. Staff also would like to emphasize that the cost estimates for CARB's "Further Deployment" measures were revised in the Draft Socioeconomic Report and now reflect the incentive funding scenario in the Draft Final 2016 AQMP Table 4-20. This scenario focuses on incentivizing heavy-duty vehicles and off-road equipment.

20-10

The analyses of small business and cost-effectiveness are now included in Chapter 2 of the Draft Socioeconomic Report. Staff welcomes any comments and suggestions from the Port.

20-11

The changes in pollutant concentrations presented in Figure 3-1 of the Draft Socioeconomic Report correspond to the attainment scenarios described in Chapter 4 of the Revised Draft 2016 AQMP. The figure was revised in the Draft Final Socioeconomic Report based on air quality modeling data presented in the Draft Final 2016 AQMP Appendix V, Attachment 3.

Changes in ozone concentration presented in Figure 3-1 are driven mainly by changes in NOx emissions, whereas changes in PM2.5 are driven by changes in both NOx and direct PM emissions. NOx reacts in the atmosphere with other chemicals and sunlight to produce ozone, whose concentrations generally rise downwind from emission sources. NOx also reacts to form nitric acid that reacts with ammonia in the air to form particulate matter. As in the case of ozone, due to atmospheric dispersion and chemical dynamics, secondary PM is formed downwind from emission sources. Direct PM emissions have a stronger contribution to PM2.5 concentrations near the sources of emissions.

Figures 3-16 and 3-18 in Chapter 3 of the Draft Final 2016 AQMP present the top ten emitters of NOx in the years 2023 and 2031 under the baseline scenario of emission inventory. Heavy-duty trucks emit four to five times more NOx emissions than light-duty vehicles. Therefore, controlling NOx emissions from heavy-duty trucks would tend to reduce emissions of NOx per se along goods movement corridors. However, the associated effect on ozone concentrations would still be spatially distributed in a similar pattern as in the case of controlling NOx emissions from light-duty vehicles, due to the atmospheric dispersion of ozone formation. For similar reasons, the associated effect of reducing NOx emissions on secondary PM formation would not vary much between controlling NOx emissions from heavy-duty and light-duty vehicles.

It should be emphasized that the primary target of the proposed mobile source control measures is NOx emission reductions. In terms of directly emitted PM2.5, its emissions from heavy-duty trucks are already projected to decline substantially over time even without implementation of the 2016 AQMP, or under the baseline scenario of emission inventory (see Figures 3-25, 3-28 and 3-30 in Chapter 3 of the Final 2016 AQMP, which are based on the 2014 EMFAC model results). Any further control of directly emitted PM2.5 from heavy-duty trucks would tend to reduce the impact of primary PM along goods movement corridors. However, the effect of any such controls on reducing secondary PM formation would be as widespread as in the case of controlling direct PM2.5 emissions from light-duty vehicles and may not change substantially the spatial pattern of modeled changes in PM2.5 concentration.

20-12

First, regarding sensitivity analyses using alternative C-R functions, please refer to staff responses to Comments 12-1 and 20-5.

Second, regarding an analysis of health benefits above the federal health standards only, staff reasonably assume that the health standards mentioned by the Commenter refer to the National Ambient Air Quality Standards (NAAQS). Staff conducted the public health benefits analysis based on recommendations of expert consultant IEc. These recommendations reflected the latest scientific evidence, as summarized in U.S. EPA's Integrated Science Assessment (2009) and as used in its regulatory impact analysis (2012), that public health benefits would continue to accrue due to reduced exposure to air pollutants at all levels of pollutant concentration, even at levels below the current NAAQS. Therefore, although the air quality attainment demonstration was performed with respect to the worst air quality site within the South Coast

Air Basin, other areas within the Basin, including those areas with air quality already below the NAAQS, would also benefit from cleaner air and the related public health improvement.

The Socioeconomic Report quantifies the full cost associated with all quantified emission reductions that are expected to lead to attainment of the NAAQS. Similarly, the Report also accounts for all quantifiable public health benefits that are anticipated to occur within the Basin, including the benefits associated with reduced exposure at concentration levels below the NAAQS. Even though the majority of the estimated costs of the Draft Final 2016 AQMP is associated with NOx-reducing control measures for ozone attainment, these measures would also lead to decreased PM2.5 concentrations, as NOx is a precursor to secondary PM2.5 formation. The kind of analysis suggested by the Commenter would exclude many quantifiable benefits of the plan but include all of the estimated cost, so staff does not consider this to be a reasonable or appropriate analysis.

Based on IEc's literature review and recommendation, there is greater uncertainty regarding the health effects at very low levels of pollutant concentration, partly due to a limited number of studies with observed concentration at very low levels. For the purpose of addressing this source of uncertainty, staff conducted an uncertainty analysis using the Lowest Measured Level (LML) of concentrations in the studies used to derive the C-R functions.

20-13

Please see staff response to Comment 20-2. The direct links to the two health benefits valuation memos are:

Review of Mortality Risk Reduction Valuation Estimates for use in 2016 Socioeconomic Assessment – http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/iecmemos_november2016/scmortalityvaluation_112816.pdf

Review of Morbidity Valuation Estimates for Use in 2016 Socioeconomic Assessment – http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/iecmemos_november2016/scmorbidityvaluation_112816.pdf

20-14

Staff appreciates the Port's suggestion and welcomes any reference to a local forecast of personal income. While staff was not able to locate a published and publicly assessable forecast of personal income for the South Coast region or Southern California only, staff will revise the long-term income growth rate to 1.1% in the Draft Final Socioeconomic Report. This revision is still based on statewide forecast published by the California Department of Finance, which now reflects *per capita* instead of *total* income growth, as revised in the Draft Final version of Appendix 3-B.

The income elasticities: 0, 1.1, and 1.4 that were used in the public health benefits analysis are based on the recommendation by IEc and their scientific advisor Lisa Robinson (Senior Research Scientist at the Harvard University Center for Health Decision Science) and derived from existing scientific studies. When income elasticity is assumed to be zero (i.e., the willingness-to-pay for health risk reduction does not increase with income growth), the implied monetized public health benefits can be considered as the lower bound of the estimates. However, according to the economics literature, health risk reductions are usually considered and shown to be a "normal good" in economics jargon, which means that the demand for this good would increase as income grows higher and therefore implies a positive income elasticity.

20-15

In response to stakeholder requests to study the health effects of unemployment, staff contracted with Dr. Erdal Tekin, Professor of Public Policy at the American University, who is also a research associate at the National Bureau of Economic Research (NBER) and a research fellow at the Institute for the Study of Labor (IZA). The report (http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/unemploymentandhealth_dec2015_012616.pdf) is summarized in Chapter 4 of the Draft Final Socioeconomic report. Consistent with findings in several other studies published in peer-reviewed scientific journals, the report found that the average death rates in the four counties decreased as the headline unemployment rates rose. In Dr. Tekin's report and in the journal articles, sensitivity tests were conducted to ensure the robustness of the result. It was hypothesized that phenomena that usually occur during economic downturns may have improved health outcomes for the non-working age population, specifically for children and the elderly. Reduced air pollution due to less travel and less industrial activities could be one factor, and the more abundant supply of skilled labor in the healthcare industry, such as in nursing homes, could also reduce mortality incidence among the physically more fragile population. Staff will continue to review emerging literature on this topic.

20-16

As mentioned by the Commenter, staff has conducted an Environmental Justice (EJ) working group as part of the STMPR Advisory Group to review and provide comments and input to the EJ analysis (Chapter 6 of the Draft Final Socioeconomic Report). Please refer to staff response to Comment 20-11 regarding air pollutant emissions and the spatial distribution of projected changes in ozone and PM2.5 concentrations. Please refer to staff responses to Comment 20-8 regarding alternative sources of incentive funding.

October 31, 2016

Dr. Elaine Shen
Program Supervisor: Socioeconomic Analysis
South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765

Re: Comments on Preliminary Draft Socioeconomic Report of the Draft 2016 Air Quality Management Plan ("AQMP")

Dear Dr. Shen:

21 - 1

On behalf of the undersigned organizations, we submit this comment letter on the preliminary Draft Socioeconomic Report (" Report") of the Draft 2016 Air Quality Management Plan ("AQMP" or "plan"). We understand the Draft 2016 AQMP will be revised to address comments received and thus will affect the socioeconomic modeling and additional draft chapters addressing the macroeconomic impact analysis, the environmental justice analysis, and the CEQA alternatives analysis have yet to be released to the public. These analyses are essential components of the Report, however preliminary it

21 - 1 (CONT'D)

may be, therefore we request the minimum 60-day review period for preliminary draft Report begin after the additional draft chapters and modeling are released to the public.

As we have previously commented (correspondence submitted September 9, 2016), we continue to respectfully request that the South Coast Air Quality Management District (the District, AQMD) provide ample time for stakeholders to review and comment on the revised draft AQMP. The omitted chapters and analysis from the Preliminary draft render the draft wholly incomplete, proper stakeholder engagement and input on these vital socio-economic issues is not feasible until the Report is complete.

I. Economic Outlook for the Potentially Affected Industries by the Draft 2016 AQMP

As clarified in our prior correspondence, the undersigned organizations have joined to ensure all residents, particularly the most vulnerable residents in the region, have the right and ability to breathe clean air. We understand that the right to breathe and the right to living wage employment are not mutually exclusive or competing premises.

21 - 2

We appreciate discussion presented acknowledging regional trends in manufacturing employment simply reflect national trends in the industry. However, we have noted the analysis fails to present any disaggregated analysis on employment growth in the basin's most disadvantaged communities or if this employment growth will contribute to alleviating poverty rates in the most burdened communities. We recommend the socio-economic assessment also provide a targeted analysis not only on affected industries but employment growth projections, as related to each industry, for the most vulnerable communities.

21 - 3

There is no discussion in the plan of targeted incentives for disadvantaged communities or a plan to ensure that the District's most heavily burdened and vulnerable communities have primary access to residential incentives in the plan, particularly those related to cooking and weatherization.

21 - 4

We are also concerned that failure to implement the plan is contextualized in regards to economic consequences, social impacts of increasingly poor health and the inability to fulfil resident's right to breathe clean air have graver consequences than mere economic ones.

II. Evolution of the Socioeconomic Analysis.

21 - 5

The Report touts a dynamic and responsive evolution of the District's ability to analyze complex socio-economic impacts of the Plan. The State of California has developed innovative, reliable and responsive tools, specifically CalEnviroScreen, which are completely omitted from any discussion in the Report. We are concerned with the Districts reliance on a consulting group from out of state and the lack of methodologies tried and tested in California.

We recommend the analysis be further developed with methodologies, research institutions, community based organizations indigenous to California and even more so, the assessment should provide a space for inclusion of community generated data.

III. Analysis of the Impact of Regulations on Business Relocation

21 - 6

In July of 2016, the most recent meeting of the Socio-Economic workgroup, representatives of our organizations requested AQMD staff revise all information related to business leaving the region. We wanted to methodologically assess whether or not the burden of regulations would be substantive enough to drive declines in employment supposedly resulting from alleged mass relocations of business due to an over regulated environment. We were informed by District Staff that when a business leaves the region, AQMD provides a questionnaire to be completed; these forms contain information related to reasons for relocation or abandoning the region. Staff committed to reviewing questionnaires to provide data on primary reasons for business leaving the region, none of this information is included in the Report.

Understanding whether or not Air Quality regulations provide business with an impetus for relocation should be a key component of any analysis related to incremental costs of the Plan. It is not methodologically sound to simply assume increased regulations increment costs so much so that they would impact employment by driving business to relocate.

IV. Draft AQMP Costs

21 - 7

Although there is a clear tabulation of incremental costs per sector it is unclear how these increased costs will actually affect the industry's ability to sustain employment projections. The employment projections in the Socio-Economic Assessment are directly taken from the Southern California Association of Government's (SCAG) Regional Transportation Plan and Sustainable Communities Strategies (the RTP/SCS), a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. The preponderance of data relating to the economic burden on industry could inadvertently lead stakeholders to believe that the costs of the Plan could limit the District's capacity for economic growth, when clearly the projected growth is contingent upon the attainment of environmental goals not in spite of it.

V. Public health Benefits

21 - 8

Although we appreciate the quantification and causal analysis of the Public Health benefits of the Plan, we are concerned that the data was not disaggregated and fails to demonstrate where the majority of these benefits would fall.

It is imperative that the Public Health Analysis include data related to the most polluted and socio-economically disadvantaged communities in the basin. We recommend the Report contain a disaggregated analysis of these benefits per census tract. We appreciate the relationship between health effects and unemployment, but without an analysis of unemployment and health impacts per census tract the information is ambiguous at best.

VI. EJ Analysis of Pollution Impacts

21 - 9

We appreciate the detailed analysis of the EJ impacts using five different definitions of EJ. We also appreciate the analysis of both relative and absolute inequality.

21 - 9 (CONT'D)

For us the issue of absolute inequality is crucial. On page 13, the draft report says:

> In terms of absolute inequality as measured by the Kolm-Pollak Index (see Table 6-9), it also shows greater within- than between-group dispersion. Furthermore, the changes of absolute inequality largely corroborate the results shown for relative inequality: the between-group inequality also increases for the health risk of ozone exposure related asthma ED visits among children, with the only exception when EJ is designated at the top 50 percent of Basin-wide population under Alternative Definition 2. Therefore, the decrease in overall inequality, as measured by the Kolm-Pollak Index for the same morbidity risk shown in Table 6-7, is due to a larger reduction in the absolute within-group inequality, which dominates any increase in the absolute between-group inequality.

We note that Table 6-9 shows slight increases in absolute inequality by 2031 in all cases for Ozone Exposure Related Asthma ED Visits for Asthma (Among Residents Younger than 18) (although it shows slight decreases for PM2.5 and Ozone Exposure Related Mortality Risk (Among Residents 25 Years or Older).

21 - 10

However, the key issue for us is the question of geographical health impacts disparity inflicted on all people living in areas of high mortality. For example, the Ports area is shown in the attached MATES-IV map to be the only area in the Basin with greater than 1200 cases per million. Yet only one of the four EJ maps show any census tract in the top 25% of tracts, and it (Fig. 6-4) shows only one.

The MATES IV and other SCAQMD studies have documented the most polluted areas in the Basin also include within a mile of all freeways.

We understand that this neglect of showing the full impacts of actual air quality risk is due to the admirable attempt to include more than air quality in a comprehensive EJ analysis.

Yet this is an air quality plan. It does not attempt to reduce poverty or address education, linguistic isolation, low birth weight, or unemployment. The hundreds of thousands of people living in the highest risk areas (the Ports, refineries, and within a mile of freeways deserve a separate calculation showing how their actual air quality risk will decrease both relative to now, and compared to the others living in lower risk areas.

21 - 11

We also request that the report present a similar analysis for 2023 because people can't wait to 2031, they are dying now.

* * * * * * * * * * * * *

We welcome the opportunity to discuss the items outlined in this correspondence. Should you have any concerns or clarification, please contact: Michele Hasson: Michele.h@ccaej.org

Sincerely,

Michele Hasson, Center for Community Action ad Environmental Justice

Bahram Fazeli, Communities for a Better Environment

David Petiti, Natural Resources Defense Council

Adrian Martinez, Earth Justice

Taylor Thomas, East Yard Communities for Environmental Justice

Evan Gillespie, Sierra Club

Martha Dina Arguella, Physisicans for Social Responsibility Los Angeles

Response to Comment Letter #21

Submitted by Center for Community Action and Environmental Justice, Communities for a Better Environment, Natural Resources Defense Council, Earth Justice, East Yard Communities for Environmental Justice, Sierra Club, and Physicians for Social Responsibility Los Angeles on October 31, 2016

21-1

In the interest of transparency, meetings were held to discuss the socioeconomic analysis and preliminary draft chapters of the 2016 AQMP Socioeconomic Report were released as they were completed. In particular, preliminary drafts of Chapters 1-3 and Appendices 2-A, 3-A, and 3-B were released on August 31, 2016, with a 60-day public review and comment period that ended on October 31, 2016. These preliminary chapters included cost and benefit analyses that were associated with the proposed control strategies contained in the June 30th version of the Draft 2016 AQMP. A preliminary draft of Chapter 6 containing the environmental justice (EJ) analysis was released on September 23, 2016 and preliminary drafts of Chapters 4, 5, 7 and 8 and Appendix 4-A were released on November 2, 2016.

The Draft Socioeconomic Report—which reflects the October 7th version of the Revised Draft 2016 AQMP and consists of all eight chapters, the associated appendices, and an executive summary—was subsequently released on November 19, 2016, with a public review and comment period of 30 days that ended on December 19, 2016.

It should be noted that there is no legal requirement to prepare a socioeconomic analysis for the AQMP. Similarly, there is no required 60-day comment period. The SCAQMD elects to prepare the document to help inform public discussions and the decision making process. Moreover, information used and analyzed in these chapters and appendices, including data, methodology, and analytical results, was discussed at nine Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group meetings between October 2014 and November 2016, four AQMP Advisory Group meetings in 2015 and 2016, three AQMP Socioeconomic Assessment EJ Working Group meetings in 2016, eight regional public workshops and hearings in 2016, and the information was also contained in additional presentations to various stakeholders. Public meeting notices were sent to all advisory and working group members, as well as all AQMP interested parties.

21-2

Staff agrees that the right to breathe clean air and economic opportunities are not mutually exclusive. As indicated in Figure 1-1 of the Draft Final Socioeconomic Report, advances in technology and the increased utilization of low-emitting and more energy efficient technologies have made it possible to maintain a healthy economy while improving public health through air quality improvements. However, staff reminds the Commenter that the purpose of the AQMP is not to eliminate poverty; it is to clean the air.

Staff makes every attempt to use the latest and most disaggregated local economic data available for socioeconomic assessments. Moreover, the purpose of the Socioeconomic Report is not to present a detailed forecast of regional economic growth, but to assess the socioeconomic impacts of the Draft Final 2016 AQMP. The sub-regional distribution of projected socioeconomic impacts is discussed in Chapter 5 of the Draft Final Socioeconomic Report. The economic outlook presented in Chapter 1 of the Draft Final Socioeconomic Report and referenced by the Commenter is intended to show a general picture and

anticipated trends of the regional economy as a whole. This outlook is based on the Southern California Association of Governments' (SCAG) growth forecast that underlies its 2016 Regional Transportation Plan/Sustainable Communities Strategy. The forecast is available at the jurisdictional level for the entire SCAG region, which encompasses the four counties of Los Angeles, Orange, Riverside and San Bernardino, as well as Ventura and Imperial Counties. Additionally, Appendix 4-A of the Draft Final Socioeconomic Report includes more details on SCAG's growth forecast, such as the county-level and industry specific job growth rates from SCAG's growth forecast. Documentation on SCAG's 2016 Demographic and Growth Forecast can be found at:

http://scagrtpscs.net/Documents/2016/draft/d2016RTPSCS_DemographicsGrowthForecast.pdf.

A jurisdictional level employment forecast can be found in this associated document:

http://www.scag.ca.gov/Documents/2016DraftGrowthForecastByJurisdiction.pdf.

21-3

Based on stakeholder comments on the Revised Draft 2016 AQMP, the Draft Financial Incentives Action Plan was released on December 16, 2016. This Draft Action Plan was prepared to accompany the Draft Final 2016 AQMP and proposed a list of funding principles that include prioritizing incentive funding for disadvantaged communities.

21-4

Staff agrees that failure to achieve federal air quality standards by attainment deadlines would lead to delayed air quality improvements and lost opportunities to improve public health via reduced exposure to air pollutants. Staff assumes here that the Commenter is referring to Chapter 1, page 13 of the Preliminary Draft Socioeconomic Report, regarding the potential loss of federal transportation funding for failure to attain NAAQS not being in the baseline of analysis. This paragraph is not intended to contextualize the Plan only in regards to economic consequences. It is meant to provide a general description of the socioeconomic baseline for analysis that is conducted in the Draft Final Socioeconomic Report. The Baseline Definition section in Chapter 1 was included in the report because it is an important area of improvement as recommended by Abt Associates in 2014 and discussed in multiple meetings of the 2016 AQMP Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group.

21-5

Staff appreciates the Commenter's recommendation to use CalEnviroScreen, which is consistent with the recommendation made by the SCAQMD's expert consultant Industrial Economics, Inc. (IEc) and their scientific advisors. (IEc's final EJ report is available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/scaqmdfinalejreport_113016.pdf.)

Chapter 6 of the Draft Final Socioeconomic Report includes an enhanced and expanded EJ analysis. The first step of the analysis is EJ screening, and it employs the CalEnviroScreen methodology and nearly all data and indicators included in CalEnviroScreen v2.0. The screening analysis was used to designate EJ communities in the South Coast Air Basin under many alternative definitions for purposes of sensitivity testing of results derived from the second step of EJ analysis on health risks and benefits distribution. Since this analysis is only conducted in the Basin, a regional CalEnviroScreen scoring approach was used, as was recommended by IEc and also by EJ researchers at the University of Southern California who co-developed the Environmental Justice Screening Method (EJSM) and had a representative on the 2016

AQMP Socioeconomic Assessment EJ Working Group. The regional scoring approach ensures that whatever EJ community designation threshold is chosen (e.g., worst impacted 25% or 50%), it will directly correspond to that percentage of census tracts in the Basin being designated as EJ communities, which would not be the case with a state-wide scoring approach. The two steps of EJ analysis were also conducted to implement one of the major recommendations by Abt Associates in 2014 to further improve the SCAQMD's socioeconomic assessment.

The EJ analysis is based on state-of-the-science tools and methods for understanding impacts on EJ communities. The tools and methods used followed from recommendations from expert consultants, and were reviewed and commented on by STMPR members, as well as the 2016 AQMP Socioeconomic Assessment EJ Working Group members who represented stakeholders from local EJ communities, EJ researchers from several universities in the region, and EJ analysts at other public agencies. Staff would appreciate the Commenter's assistance with obtaining relevant community generated data that could enhance the SCAQMD's socioeconomic analysis.

21-6

The Draft Final Socioeconomic Report uses the REMI model for quantifying the potential regional macroeconomic impacts of implementing the Draft Final 2016 AQMP. The model does not assume that incremental costs of the proposed control measures would impact jobs and employment through business relocation. Instead, the model simulates the regional macroeconomic impacts of implementing the 2016 AQMP via projected changes in industry production costs, industry demand, labor productivity, and enhanced regional amenities as a result of improved public health. Further explanation of this model can be found in Chapter 4 and the supporting appendices.

In response to one of the Commenters' request at the September 27, 2016 EJ Working Group meeting, staff followed up on the questionnaire/survey referenced in this comment letter. In general, SCAQMD does not maintain a systematic survey of potential business relocations. To do so, when facilities apply to inactivate their operation permits, the SCAQMD would need to require the facilities to report the reason(s) of inactivation in such applications; however, there is no such requirement in District rules.

21-7

Subsequent to the submission of this comment letter, a preliminary Macroeconomic Job Impact analysis was released on November 2, 2016 and included in Chapter 4 of the November 19, 2016 version of the Draft Socioeconomic Report. This analysis used a systematic method to quantify regional job impacts. Staff evaluated four different job impact scenarios and found that the implementation of the 2016 AQMP would have a minimal effect on regional job growth. Therefore, it is unlikely that implementation of the Draft Final 2016 AQMP would significantly constrain or slow down economic growth in the region.

21-8

Staff have made a substantial effort to improve the public health benefits analysis of the 2016 AQMP, as was recommended by Abt Associates in its 2014 review of SCAQMD's socioeconomic assessment. The public health benefits results presented in Chapter 3 of the Draft Socioeconomic Report are mainly summary results for the four-county region, though maps of the spatial distributions of disaggregated air quality improvements and estimated avoided premature deaths are also included at the 4km by 4km grid-cell level.

Further summary results of health benefits based on census tract-level estimates and EJ screening are included in the EJ chapter (Chapter 6). These results are based on an analysis which estimates the benefits for every census tract in the basin. As it is not feasible to report the public health benefits for each of the census tracts in the Basin (about 3,500 in total), all disaggregated health benefit and health risk data utilized for the EJ analysis were made available via the SCAQMD's FTP server to all interested parties as requested by several members of the 2016 AQMP Socioeconomic Assessment EJ Working Group. These data include the benefits estimates for all census tracts in the Basin, as well as the spatial distributions of PM2.5 and ozone-related mortality incidence and ozone-related asthma emergency department visits. Staff contact information was also included in the data dissemination notice for any potential inquiries about the data.

21-9

Staff is pleased that the detailed analysis of EJ impacts by alternative EJ definitions is informative to stakeholders and appreciates the feedback on the detailed EJ analysis. Subsequent to the submission of this comment letter, appendices to the EJ chapter were released as part of the Draft Socioeconomic Report (Appendices 6-A & 6-B). The appendices provide further information and detail of the EJ analysis. As shown in the Draft Final Socioeconomic Report, PM2.5-exposure related mortality risk was projected to decrease across all census tracts, and the inequality of mortality risk would also decrease within the Basin and between the EJ and non-EJ communities. At the same time, the ozone-exposure related risk of asthma ED visit among children was also projected to be reduced in all census tracts and the risk reductions would decrease the overall inequality of this particular health risk in the Basin. However, this decrease in overall inequality is a net outcome of an anticipated decrease in inequality within EJ and non-EJ communities, respectively, in combination with an increased inequality between EJ and non-EJ groups.

This decrease in overall inequality of asthma health risk is a combination of a decrease in within-group inequality and an increase in between-group inequality. The result of increased inequality of ozone-exposure related risk of asthma ED visit among children between EJ and non-EJ communities is primarily due to the chemical mechanism of ozone formation in the Basin. This mechanism and the atmospheric dispersion of precursor pollutants from the emission sources lead to greater reductions in ozone concentrations in the downwind inland areas of the Basin, and smaller reductions in the central Los Angeles areas of the Basin. In the meantime, the central Los Angeles areas have a greater proportion of census tracts designated as EJ communities than the less populous inland areas. (See Table 6-2 of the Draft Socioeconomic Report and note that census tracts are designed to have similar population sizes across all tracts.). As a result, while the ozone-exposure related health risk is projected to decline everywhere in the Basin, it would decline slightly less in many of the EJ communities located around central Los Angeles.

21-10

As mentioned in staff response to Comment 21-5, the CalEnviroScreen methodology and data were used in the EJ screening analysis. This recommendation came out of the public process of the EJ working group of which some of the signatories to this letter participated in. The CalEnviroScreen tool utilizes more than one environmental and socioeconomic indicator for EJ screening. This type of methodology implies that the EJ screening results will never directly correspond to any one indicator, such as the MATES IV data mentioned, but will depend on all indicators included. It should however be noted that the MATES IV toxic cancer risk indicator was included in the CalEnviroScreen method in lieu of diesel PM concentrations

included in default CalEnviroScreen 2.0. In that way, the Commenter's concerns regarding the Port freeway-adjacent communities are incorporated into the analysis, by inclusion of the MATES IV data.

Moreover, the analysis uses four alternative definitions for sensitivity analysis, and Alternative Definition 1 includes only three environmental indicators, all related to air quality. The environmental indicators are combined with sociodemographic indicator(s), as the EJ literature shows the latter affects how vulnerable and susceptible individuals are to environmental burdens.

Any census tract that is not designated as an EJ community under a given alternative EJ definition would imply that, compared to other census tracts designated as EJ communities, it is relatively less impacted by the cumulative environmental burdens in that census tract as collectively defined by the various indicators included under each alternative definition. Staff has made available the EJ impact scores calculated based on CalEnviroScreen methodology for every census tract in the Basin under all four alternative EJ definitions.

The EJ analysis included in the Draft Final Socioeconomic Report indeed shows that EJ communities, designated using any of the four definitions based on CalEnviroScreen data and methods, are projected to see a greater decrease in mortality risk than non-EJ communities, which would lead to a decrease in mortality risk inequality between EJ and non-EJ communities (see Tables 6-4 and 6-7 through 6-9).

21-11

Staff agrees the health effects in every year of the plan 2016 AQMP are important. For this reason, staff has conducted an additional analysis, which examined the correlation in air quality scenarios between two milestone years (2023 and 2031). This analysis showed that air quality scenarios are nearly perfectly correlated across these years, which implies that the distributional effect of the public health benefits will be approximately the same in 2023 as in 2031, but of a smaller magnitude in 2023 because the air quality improvements are projected to be smaller. Chapter 6 has been revised in the Draft Final Socioeconomic Report to include this additional analysis.

Los Angeles County Business Federation

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Asian American Business Women Association
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Asian Business Association
Association of Independent Commercial Producers
Azusa Chamber
Bell Gardens Chamber
Beverly Hills Chamber
Beverly Hills / Greater LA Association of Realtors
Burbank Association of Realtors
Burbank Chamber
Building Industry Association, LA / Ventura Counties
Building Owners & Managers Association, Greater LA
CalAsian Chamber
California Apartment Association, Los Angeles
California Business Roundtable
California Cannabis Industry Association
California Construction Industry and Materials Association
California Contract Cities Association
California Consumer Finance Association
California Fashion Association
California Grocers Association
California Hotel & Lodging Association
California Independent Bankers
California Independent Petroleum Association
California Life Sciences Association
California Metals Coalition
California Restaurant Association
California Small Business Alliance
California Trucking Association
CALInnovates
Carson Dominguez Employers Alliance
Central City Association
Century City Chamber
Citrus Valley Association of Realtors
Coalition for a Prosperous America
Community Associations Institute, Los Angeles
Construction Industry Air and Water Quality Coalitions
Consumer Healthcare Products Association
Council on Trade and Investment for Filipino Americans
Culver City Chamber
Downey Association of Realtors
Downtown Long Beach Associates
El Monte/South El Monte Chamber
Employers Group
Engineering Contractor's Association
Entrepreneurs Organization, Los Angeles
F.A.S.T.-Fixing Angelenos Stuck In Traffic
Filipino American SEC
FilmLA
Foreign Trade Association
FixturePorts
FWD.us
Gateway to LA
Glendale Association of Realtors
Glendale Chamber
Glendora Chamber
Greater Los Angeles Auto Show
Greater Lakewood Chamber
Greater Los Angeles African American Chamber
Greater Los Angeles New Car Dealers Association
Harbor Association of Industry and Commerce
Harbor City / Harbor Gateway Chamber
Harbor Trucking Association
Hollywood Chamber
Hospital Association of Southern California
Hotel Association of Los Angeles
Industry Manufacturers Council
International Warehouse Logistics Association
Inglewood Airport Area Chamber
Irwindale Chamber
Japan Business Association of Southern California
La Canada Flintridge Chamber
LAX Coastal Area Chamber
Leadership for Urban Renewal Network
League of California Cities
Long Beach Area Chamber
Los Angeles Area Chamber
Los Angeles Black MBA Association
Los Angeles Cleantech Incubator
Los Angeles County Bicycle Coalition
Los Angeles County Consumer Affairs
Los Angeles County Waste Management Association
Los Angeles Junior Chamber
Los Angeles Latino Chamber
Los Angeles Metropolitan Hispanic Chamber
Malibu Chamber
Los Angeles Parking Association
Los Angeles Urban League
Los Angeles World Affairs Council
Pacific Palisades Chamber
Pasadena Chamber
Pomona Chamber
Maple Business Council
Motion Picture Association of America
MoveLA
Most Worshipful Hiram Tyre Grand Lodge
NAIOP Southern California Chapter
National Alliance for Jobs and Innovation
National Association of Women Business Owners, LA
Pacific Merchant Shipping Association
Pasadena-Foothills Association of Realtors
Recording Industry Association of America
Redondo Beach Chamber
Regional Black - San Fernando Valley Chamber
Regional Hispanic Chamber
Regional San Gabriel Valley Chamber
Rosemead Chamber
Rotary Club of Los Angeles
San Gabriel Chamber
San Gabriel Valley Civic Alliance
San Gabriel Valley Economic Partnership
Santa Clarita Valley Economic Development Corp.
San Pedro Peninsula Chamber
Santa Monica Chamber
Santa Monica Junior Chamber
Small Business Action Committee
Society of Hispanic Professional Engineers - Los Angeles
South Asian Business Alliance Network
South Bay Association of Chambers
South Bay Association of Realtors
Southern California Golf Association
Southern California Grantmakers
Southern California Minority Supplier Development Council Inc.
Southern California Water Committee
Southland Regional Association of Realtors
South Park Stakeholders Group
Tehaca Lake Chamber
Torrance Area Chamber
Town Hall Los Angeles
Tri-Counties Association of Realtors
United Chambers San Fernando Valley
Universal City North Hollywood Chamber
United States-Mexico Chamber
U.S. Green Building Council-LA
Valley Economic Alliance
Valley Economic Development Center
Valley Industry & Commerce Association
Valley International Trade Association
Vernon Chamber
Vietnamese American Chamber
Water Replenishment District
We Care for Humanity
West Hollywood Chamber
West Los Angeles Chamber
West San Gabriel Valley Association
Western Manufactured Housing Association
Westside Council of Chambers
Western States Petroleum Association
West Valley/Warner Center Chamber
Westwood Village Improvement Association
Wilmington Chamber
Young Professionals in Energy - LA Chapter
Youth Business Alliance
Warner Center Association

October 31, 2016

Dr. Elaine Shen
Program Supervisor,
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

RE: INITIAL COMMENTS ON THE PRELIMINARY DRAFT SOCIOECONOMIC REPORT

Dear Dr. Shen,

On behalf of the Los Angeles County Business Federation (BizFed), a grassroots alliance of more than 160 top business organizations representing 325,000 employers with more than 3 million employees throughout Southern California, we appreciate the opportunity to provide comments on the Preliminary Draft Socioeconomic Report (Report) related to the Draft 2016 Air Quality Management Plan (AQMP or Plan). As you know, BizFed members represent Southern California's broader business community. Our diverse group is comprised of major regional business entities and associations, whose members include large and small employers, minority business owners, and job creators from a wide range of industries.

The South Coast Air Quality Management District (SCAQMD or District) released the Preliminary Draft Socioeconomic Report on August 31 with a deadline of October 31 for the public to comment on it. However, the Draft 2016 AQMP was updated on October 7 with changes based on public input. These updates to the Plan will change the socioeconomic analysis of the 2016 AQMP. Furthermore, not all sections of the Report have been released. Thus, it is impossible to provide thoughtful comments on it. Therefore, we ask that there be additional time (i.e., 60 days) to comment once the Report has incorporated the recent updates to the AQMP.

22 - 1

In this light, we take this opportunity to provide initial comments on the Report with the intent to comment more substantively in the coming weeks.

At its core, the Socioeconomic Report is a comparison of the projected costs of the 2016 AQMP to its projected benefits. Therefore, our comments are grouped below as pertaining primarily to either the costs or the benefits presented in the Report.

- Overall, we find the section of the Report entitled, "Preliminary Discussion of Health Effects of Unemployment" to be inadequately researched. The District must do a better job of measuring the health effects of unemployment that result from its regulations. Simply recognizing "analytical difficulties in conducting a formal analysis on this topic" (p. 45) is insufficient. Additionally, what has been requested over the past four years is to analyze the health effects of poverty and to not limit the analysis to unemployment. Over 25 percent of the children in the region are living in poverty, and this is a crisis that cannot be ignored and that carries significant health impacts. It appears there was no direction to Abt, or to

22 - 2

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anyone, to consider this issue. Obviously, if you do not look, then you will not find the information. Moreover, the District must look at the long-term, cumulative impacts of its regulations on economic growth and on jobs, assessing how such impacts contribute to the inability of low-skilled workers to migrate out of poverty due to job suppression in sectors (logistics, manufacturing, etc.) most hindered by SCAQMD regulations. Only this type of analysis will begin to show the true costs of air quality regulations and display a proper comparison of the costs and the benefits associated with the 2016 AQMP.

22 - 2 (CONT'D)

- We have serious issues with the cost-benefit analysis. The Report indicates the financial costs to comply with the AQMP to be $2.5 billion a year. It also indicates the actual financial health costs saved would be far less at $200 million a year. The only way the benefits get to the $36 billion figure is through the VSL concept, which is not an economic figure, but is supposedly a statement of what people might pay. This does not create a proper economic analysis. Additionally, we dispute the accuracy of the assumption that a one percent increase in income raises VSL by 1.1 percent and believe this greatly overestimates public health benefits of the AQMP.

22 - 3

- There is dispute regarding the SCAQMD's assumption that health benefits continue to be linear for air quality improvements below the NAAQS. There is reportedly no scientific basis for that assumption, but it makes a significant impact on the study's outcome.

22 - 4

- Some commenters have indicated that there is "strong epidemiologic evidence that there is no relationship between PM2.5 and total mortality in California" (See Enstrom and Nebert comment letters on Draft 2016 AQMP). If such comments are valid, then that would significantly impact the socioeconomic analysis since most of the calculated socioeconomic benefits from health are tied to reduced mortality from reductions in PM2.5.

22 - 5

In closing, we appreciate the District's efforts to analyze the economic consequences of the AQMP and continue to encourage the SCAQMD to enhance its analysis to more fully capture the costs and more accurately assess the public health benefits associated with the AQMP. BizFed leadership will continue to help with this endeavor any way we can, and we would like to reorient you to a comment letter that we submitted to the SCAQMD Governing Board on November 6, 2014 regarding the report prepared by Abt Associates (August 14, 2014) following its evaluation of the District's process for socioeconomic assessments. This letter has been attached to these comments for your convenience and provides an overview of our overarching recommendations to enhance SCAQMD's process for preparing socioeconomic assessments.

22 - 6

Thank you for considering our viewpoints on this matter.

Sincerely,

Gilbert F. Ivey
BizFed Chair
Former CAO,
Metropolitan Water District

David Fleming
BizFed Founding Chair

Tracy Hernandez
BizFed Founding CEO
IMPOWER, Inc.

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Trade Associations and Minority Business Groups
AIA Los Angeles
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Construction Industry Air & Water Quality Coalitions
Council on Trade & Investment for Filipino Americans
Employers Group
Engineering Contractor's Association
Entrepreneurs' Organization LA
Fixing Angelenos Stuck In Traffic (FAST)
FuturePorts
Gateway to LA
Glendale Association of Realtors
Greater LA New Car Dealers Association
Harbor Association of Industry & Commerce
Harbor Trucking Association
Hospital Association of Southern California
Hotel Association of Los Angeles
Industry Manufacturers Council
International Warehouse Logistics Association
LA SMARTS
League of California Cities
Los Angeles County Bicycle Coalition
Los Angeles County Economic Development Corp.
Los Angeles County Waste Management Association
Motion Picture Association of America
NAIOP Southern California
National Association of Women Business Owners, LA
National Latina Business Women Association
Pasadena-Foothills Association of Realtors
Recording Industry Association of America
San Gabriel Valley Economic Partnership
Santa Clarita Valley Economic Development Corp.
So Cal Minority Supplier Development Council
South Asian Business Alliance Network
South Bay Association of Realtors
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Southern California Golf Association
Southern California Grantmakers
Southland Regional Association of Realtors
Tri-Counties Association of Realtors
U.S. Green Building Council
Valley Economic Alliance
Valley Economic Development Center
Valley Industry & Commerce Association
Valley International Trade Association
We Care for Humanity
Western Manufactured Housing Association
Western States Petroleum Association
Westwood Village Improvement Association
Young Professionals in Energy - LA

November 6, 2014

Dr. William A. Burke, Chairman, and Members of the Governing Board
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

RE: ABT ASSOCIATES' REVIEW OF SCAQMD SOCIOECONOMIC ASSESSMENTS

Dear Dr. Burke and Members of the Board:

As you know, BizFed is a grassroots alliance of 125 top business organizations representing 268,000 businesses with 3 million employees throughout Southern California. Our diverse group, which reflects the broader business community, is comprised of major regional business entities and associations, whose members include large and small employers, minority business owners, and job creators from a wide range of industries.

BizFed member's have a strong vested interest in environmental regulatory activity as implemented by the District. The District's socioeconomic assessments represent a significant component of our overall interest.

As discussed further below, BizFed offers the following recommendations:

1. The strategy for implementing Abt's recommendations should be discussed with a broader audience of interested stakeholders - not just the Scientific, Technical & Modeling Peer Review Advisory Group (STMPR).
2. Socioeconomic assessments should be performed by independent third parties.
3. The District should formally implement a "look-back" audit process whereby actual implementation costs are compared with Staff's initial projections, with the estimating methodology recalibrated as necessary.
4. Cost effectiveness should be calculated using the Levelized Cash Flow method.
5. Long Term Health Impact Assessment Ignored.

BizFed has provided various comments in regard to the District's socioeconomic assessments since the adoption of the 2012 AQMP in December, 2012. Our comments are focused on the report and recommendations prepared by Abt Associates (August 14, 2014) pursuant to its evaluation of the District's process for preparing socioeconomic assessments.

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BizFed appreciates the leadership of the Governing Board and the District for its responsiveness to our initial suggestion that the District commission an outside party to undertake a thorough review of the process by which the socioeconomic assessments are prepared. We also appreciate the fact that Abt conducted extensive interviews with various stakeholders, including BizFed and some of our members.

BizFed offers the following comments on the Abt report, its recommendations, and the indications of how the recommendations might be implemented:

1. Summary of Abt recommendations and SCAQMD Staff responses. A matrix showing Recommendations and responses has been published. Although the matrix is helpful, in the interest of cooperation with stakeholders, and given our long-standing interest in these issues, the stakeholders should have been given the opportunity to comment on the draft. As part of the open and collaborative process for discussing and understanding Abt's recommendations stakeholders should have had the opportunity to discuss before Staff's determined their responses. In fact, in the "AQMP Timeline" presented by the SCAQMD staff in April of 2014, it is specifically noted that there would be an "Implementation Discussion" that would take place over half a year, the 3rd and 4th quarter of 2014. That has not happened. There is still sufficient time to do so, and we request such a stakeholder process be undertaken. Because much of the language in the Abt's recommendations and Staff responses is subjective, we believe that it will be difficult to assess the degree to which the recommendations are implemented, which makes an "Implementation Discussion" even more important.

2. Preparation of socioeconomic assessments by independent third parties. BizFed has previously suggested that, for the purpose of avoiding even the appearance of a conflict, socioeconomic analyses should be prepared by third parties. We note that at the hearing for the 2012 AQMP several Board members commented that a peer review would be prudent and perhaps there should be independent analysis by professionals outside the agency; as it can appear biased to perform only an internal analysis of the cost-benefit of proposals. We are concerned that this important principle seems to have been discarded. BizFed still believes an independent third party should prepare the analysis.

3. Estimates of the costs for controls. BizFed provided extensive comments to Abt with respect to deficiencies in the manner in which the District typically estimates the cost of implementing proposed rules and control measures. However, few, if any, of our comments seemed to have gained any traction with Abt. One of our comments was that the District should, at the very least, conduct "look-backs" to compare actual, as-built costs to their estimates - and then to refine their estimating methodology as required. Staff has acknowledged the suggestion made at the October 22 meeting of the Home Rule Advisory Group that the District conducts a follow-up audit of actual as-built costs for the purpose of refining their estimating process. We recommend that the District formally implement a "look-back" process.

4. Calculated values for cost-effectiveness. BizFed provided specific comments to Abt with regard to cost-effectiveness but, at the very least, our comments were not understood. For example, Abt failed to address the critical distinction between the Discounted Cash Flow (DCF) method (used by the District) and the Levelized Cash Flow (LCF) method, which is used by US-EPA, Cal-EPA, the Cal-EPA agencies, BAAQMD, etc.). Instead Abt noted that the use of either DCF or LCF produces the same absolute ranking of control measures - an

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observation that is beside the point. What is most important is the dollar cost per ton of emissions reduced that an affected facility actually incurs to implement a rule, and we believe that calculation can only be accurately made using LCF. We recommend the District calculate cost effectiveness with LCF to reflect the true cost effectiveness for implementing a rule or control measure.

5. Implementation of the Abt recommendations. Staff has stated that the District intends to work the Abt recommendations through the Scientific, Technical & Modeling Peer Review Advisory Group (STMPR). We respectfully request that this matter be opened to a broader audience of stakeholders. BizFed has a vital interest in the socioeconomic assessments and we would welcome the opportunity to participate or recommend some new participants for STMPR.

6. Long Term Health Impact Assessment Ignored. A key request made to SCAQMD was for an outside consultant to look at the long term impact of its policies on the ability of the huge share of workers with high school or less educations in Southern California to gain jobs leading them out of poverty. This is vital since the sectors most able to accomplish this vital policy objective are the same ones the agency is and wishes to regulate the most heavily. Unfortunately, the district chose to define Abt's work to only look at best practices by similar agencies none of which is looking at impact of their policies in exacerbating the growth of poverty in their jurisdictions. The result was to define the Abt's work in a way that omitted the consultant looking at the agency's impact on the most important socio-economic issue now facing Southern California. Given the increasing challenge between the need to further clean air for public health and the need to lower poverty for public health, it is our continued request that the agency break important new ground with a study having that specific objective.

We appreciate the opportunity to provide the Board with these comments.

Sincerely,



Don St. Clair
BizFed Chair
Woodbury University

David Fleming
BizFed Founding Chair
Latham & Watkins LLP

Tracy Rafter
BizFed Founding CEO
IMPOWER, Inc.

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Responses to Comment Letter #22

Submitted by Los Angeles County Business Federation (BizFed) on October 31, 2016

22-1

Staff appreciates comments on the Socioeconomic Report for the 2016 AQMP. Please see staff response to Comment 21-1 regarding the releases of Preliminary Draft and Draft Socioeconomic Report and the public review and comment periods.

22-2

Commenter states that SCAQMD staff "must do a better job of measuring the health effects of unemployment that result from its regulations" and "must analyze the health effects of poverty." Staff reminds the Commenter that the purpose of the AQMP is not to eliminate poverty; it is to clean the air. To the extent, the Commenter wants the District to analyze derivative consequences of jobs presumed to be lost by adoption of the AQMP, the SCAQMD staff did, in fact, consider this request.

The 2014 Abt Associates report referenced by the Commenter documented similar comments made during stakeholder interviews that "the SCAQMD should consider such indirect impacts of air regulations on public health, given the emerging literature on how poverty, unemployment, and other socioeconomic conditions tied to new regulations may affect public health." Ultimately, no such analysis was put forth among Abt's final recommendations. At the June 3, 2015 meeting of the Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group, Dr. Jin Huang, Project Manager of the 2014 Abt Review of SCAQMD Socioeconomic Assessment, stated that she did not consider an analysis of health effects of unemployment to be relevant to the SCAQMD socioeconomic assessment (please see the meeting minutes at http://www.aqmd.gov/docs/default-source/Agendas/STMPR-Advisory-Group/stmpr_060315_minutes.pdf).

Similarly, several economists on the U.S. EPA's Science Advisory Board – Economy-Wide Modeling Panel did not support the inclusion of health effects of unemployment and other second-order effects when conducting macroeconomic impact modeling or cost-benefit analysis of environmental policies and regulations, due to the current lack of sufficient empirical evidence, the difficulty in establishing causality, and the anticipated small magnitude of such effects (please see the meeting minutes at https://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCal/7F1209FEB69099EC85257DFD00605B67/$File/Minutes+Oct++22+-+23,+2015-pw.pdf).

Despite the negative recommendations of the experts, the SCAQMD staff nonetheless took the additional step of commissioning an independent study of this topic by Dr. Erdal Tekin, a subject expert on the topics of health and unemployment and Professor of Public Policy at the American University, research associate at the National Bureau of Economic Research (NBER) and research fellow at the Institute for the Study of Labor (IZA). Dr Tekin's final report is available at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/unemploymentandhealth_dec2015_012616.pdf. Dr. Tekin's analysis of the health effects of unemployment in the four-county region found that adverse health effects were generally observed among individuals who recently became unemployed, but the overall mortality risk as a public health indicator decreased when unemployment rate rose in the local economy—a finding corroborated by many published studies. Plausible explanations included reduced air pollution due to less

travel and less industrial activities during economic downturns and that more abundant supply of skilled labor in the healthcare industry, such as in nursing homes, could also reduce mortality incidence among the physically more fragile population.

Ultimately, it must be noted that the predicate fact assumed by the Commenter – i.e. that the AQMP will lead to significant numbers of lost jobs – is not supported by the actual jobs analysis. As shown in Chapter 4 of the Draft Final Socioeconomic Report and summarized in its Executive Summary, the projected jobs impact under each of the four impact scenarios analyzed in the report ranges from an average of 9,000 jobs foregone per year to an average of 29,000 jobs gained per year from 2017 to 2031. These are very small job impacts percentage-wise relative to a baseline regional economy of over 10 million jobs (including both payroll jobs and self-employment). Moreover, it was also shown that, under all four impact scenarios, the projected job impact does not alter the region's long-term job growth in any significant way. The existence of these small impacts on jobs further undermines the Commenter's claims about the derivative consequences.

Given staff's modeling results and based on opinions expressed by expert consultants and prominent economists in the nation, staff found no evidence that air quality policies would suppress long-term job growth and prohibit low-skilled workers from migrating out of poverty, and even if so, how such effects could be quantified given the lack of sufficient data and methods.

However, staff also recognizes that the macroeconomic impact analysis may not reflect potential impacts at the facility level. During the rule development process, staff remains sensitive to any potential effect on plant-level operations and employment while taking necessary steps to protect public health from exposure to air pollutants. These commitments are manifested through the SCAQMD's efforts on many fronts, including public processes to solicit input and comments from all interested parties and continuous outreach to the general public and affected businesses, as well as performing a socioeconomic assessment which the Governing Board must consider whenever the SCAQMD adopts or amends emission reduction rules or regulations.

22-3

The methodology used to quantify and value avoided premature deaths from air quality improvements was recommended by the expert consultant Industrial Economics, Inc. (IEc) and reflects the current best practices in the field. Willingness-to-pay (WTP) is a concept from microeconomic theory, and as explained in the IEc memo (available at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/iecmemos_november2016/scmortalityvaluation_112816.pdf):

> *More generally, economic theory recognizes that, because resources are limited, any decision to use them for one purpose means that they cannot be used for other purposes. Hence the value of a resource can be determined based on the value of its best alternative use; i.e., its opportunity cost. Given this framework, estimates of individual willingness to pay (WTP) provide the conceptually appropriate measure of value for benefits that represent an improvement from the status quo, such as the reductions in mortality risks associated with SCAQMD's 2016 AQMP. WTP is the maximum amount of money an individual would voluntarily exchange to obtain an improvement, given his or her budget constraint. It indicates the point at which the individual would be equally satisfied with having the good and less money, or with spending the money on other things. This framing mimics the actual trade-offs implicit in regulation. If we choose to spend*

more on regulations that reduce air pollution risks, we will have less to spend on other goods or services – including other risk-reducing measures.

For goods such as mortality and morbidity risk reductions, prices do not exist because they are not directly bought and sold in markets. Instead, economists typically use revealed or stated preference studies to estimate WTP. Revealed preference studies rely on observed market behavior to estimate the value of related nonmarket goods. For example, wage-risk (or hedonic-wage) studies examine the compensation associated with jobs that involve differing risks of death, using statistical methods to separate the effects of these risks from the effects of other job and personal characteristics. Stated preference methods typically employ survey techniques to ask respondents about their WTP for the outcome of concern. They may directly elicit WTP for a particular scenario, or may present respondents with two or more scenarios involving different attributes and prices. In the latter case, estimates of WTP are derived from the way in which respondents choose, rank, or rate alternatives.

IEc recommended that public health benefits be monetized using the value of statistical life (VSL), which is derived from WTP estimates, and when WTP estimates are unavailable, then valuation can be based on cost-of-illness (COI) estimates. According to another IEc memo, COI estimates "address the real resource costs of incurred cases of illness, injuries, and deaths, rather than the amount of money an individual is willing to exchange for a risk reduction," and "[…] COI estimates are believed to often understate WTP (e.g., because they ignore the value of averted pain and suffering)," although "it can be difficult to demonstrate the extent to which this is the case." (The memo is available at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/iecmemos_november2016/scmorbidityvaluation_112816.pdf.) Therefore, the portion of monetized public health benefits based on COI estimates (which was phrased as "the actual financial health costs saved" by the Commenter) represents only a small fraction of the avoided real resource costs associated with the air pollution-related health risks, and it represents an even smaller fraction of the overall willingness to pay to avoid both the real resource costs and the pain and suffering associated with the health risks.

Staff used a range of VSL and a range of income elasticities in the public health benefits analysis as recommended by IEc and based on the current economics literature (Robinson and Hammitt, 2016). As discussed in the Draft Final Socioeconomic Report, as with all scientific studies and evaluations, there are various sources of uncertainty surrounding the estimated public health benefits. Staff therefore conducted sensitivity and uncertainty analysis as they relate to important assumptions in the analysis and found that the results continue to demonstrate the significant contribution of cleaner air to public health improvements. This is the case even when staff assumed an income elasticity of zero, or the VSL does not increase with income growth.

Staff considers the analysis used for quantification and valuation of public health benefits to be appropriate and based on current best practices in the field.

22-4

The Commenter stated that there is reportedly no scientific basis that health benefits continue to be linear for air quality improvements below the NAAQS. Contrary to Commenter's claim, and as discussed in

Chapter 3 of the Draft Final Socioeconomic Report, the linear concentration-response (C-R) relationship is based on the latest scientific evidence, as summarized in the latest Integrated Science Assessments for both PM2.5 and ozone published by the U.S. EPA, and it is consistent with the current analytical approach adopted by the U.S. EPA in its regulatory impact analysis. To address the greater degree of statistical uncertainty associated with the linear C-R relationship at very low concentration levels, staff conducted an uncertainty analysis to examine the distribution of PM2.5 mortality-related health benefits above and below the lowest measured level (LML) of PM2.5 concentration in the study where the selected C-R function was estimated. It was found that 68 to 94 percent of the monetized health benefits would come from pollution improvements above the LML.

22-5

Please see staff response to Comment 12-1.

22-6

Staff appreciates the Commenter's recognition of staff efforts in conducting the AQMP socioeconomic assessment and welcomes the Commenter's offer to provide help to enhance future assessments. The implementation of Abt recommendations and the resultant socioeconomic methodology updates and modeling results were discussed in numerous meetings, including but not limited to meetings of the STMPR Advisory Group, the AQMP Advisory Group, the 2016 AQMP Socioeconomic Assessment Environmental Justice Working Group, regional public workshops and hearings for the 2016 AQMP, and at multiple presentations to various stakeholders. Public meeting notices were electronically mailed to all advisory and working group members, as well as all AQMP interested parties. Staff will continue to use our best efforts to implement Abt's recommendations and to incorporate public input, including that of the Commenter, with the goal of continuously enhancing the SCAQMD socioeconomic assessment in a transparent manner.

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To: AQMD Board & Staff Date: November 21, 2016

From: John Husing, Ph.D.
Chief Economist, Inland Empire Economic Partnership

Subject: AQMP

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23 - 1

- As a professional economist, I support the move to incentives as opposed to command and control for meeting AQMP targets. The fact that CARB is using 80% command and control to achieve their results underscores why California has only seen 19.8% of its job growth in blue collar, upwardly mobile sectors from 2011-2016 (*period of recovery & expansion*), while 46.8% of state growth is in sectors paying $31,000 or less.
- The economic analysis of the AQMP raises several disturbing issues:
  - The loss of an average of -11,294 jobs per year for the 15 years from 2017-2031 would total -169,260 jobs destroyed.
    - The AQMP estimate includes 1,256 manufacturing jobs being added each year or 18,840 total. This is due to the <u>belief</u> that the production of devises to clean the air would add such jobs. The contraction is seen in that AQMD has made vast improvements in air quality from 2000-2015. In the four counties that make up the AQMD area, -374,000 manufacturing jobs were lost in this period of substantially cleaner air and regulations to require tools to clean it up. There is absolutely no reason to believe there would suddenly be an increase in manufacturing as more measures are taken to clean the air going forward.

23 - 2

    - The AQMP estimates of job impacts shows only -267 jobs lost per year in wholesale trade (-*25*), warehousing and transportation (-*242*) which collectively are logistics (-*4,005 in 15 years*). Again, this is shows the problems with the modeling given the targeted pressure the AQMP program would place on Inland Empire. Alone, the efforts by AQMD and CARB to stop the construction of the World Logistics Center in Moreno Valley will cost the inland area -20,000 jobs if they are ultimately successful. It also belies the efforts by CARB to use increased costs or caps on the expansion of inland logistics facilities. Those tactics would dramatically slow the sector's job growth.

- The AQMP contends that the -169,260 jobs lost due to the program would be far more than offset by the positive impact of 23,036 jobs per year or a 345,540 job gain because of the positive public health consequences. What is <u>not</u> discussed is the negative health impact of 169,260 jobs lost or never created and the negative health impacts this would cause for the relevant workers and their families. Essentially, the agency only looks at its positive impacts of clean air and totally ignores the increasingly negative impacts its strategies will have on public health through exacerbating poverty.

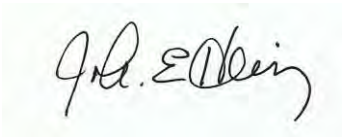
23 - 3

- A look at the logic of AQMP job gains shows it is unlikely they will occur:
  - The AQMP contends that migration of economic activity and workers would occur due to a positive healthy environment. However, there is no reason to believe this would happen. After all, the AQMP is part of a national policy to clean the air. Why would activity migrate to Southern California because of cleaner air in this area if the rest of the U.S. is receiving the same benefits. Also, why would activity move to the area, when the costs of doing business and the regulatory environment in Southern California are so much worse than the rest of the U.S.
  - The AQMP contends there would be greater spending by consumers of money no longer needed for health difficulties. Here, the fundamental myopia of the modeling is again underscored. The modeling shows the unintended consequence of -169,260 jobs lost or not created as a result of the AQMP. It does not look at the resulting pool of families left in poverty with the negative health effects and health costs that would cause for those families and the economy. This omission is particularly acute in light of the fact that health researchers like those at the Robert Woods Johnson Foundation and University of Wisconsin School of Public Health indicate that the health risks caused by poverty far outweigh those caused by the environment.
  - The AQMP contends there would be greater labor productivity with a healthier labor force. However, there are so many factors that go into labor productivity such as business investment in more efficient processes, or lack thereof, it takes considerable gall to believe productivity would greatly enhanced due to AQMD policy. That is particularly true given the share of the labor force left behind in poverty as a result of the agency's actions.

23 - 4

23 - 5

- Unless the Trump Administration fundamentally changes EPA air quality goals, AQMD may continue to be under legal threat to move ahead with its regulatory and incentive programs to clean the environment. However, the agency should quit using biased economic analysis to put the best face on their policy outcomes. Yes, it would accomplish the next iteration of clean air. However, at a minimum the agency should be honest that their actions are increasing coming at the expense of economic activity with the preponderance of the impact on the health of the least educated and poorest families among us. That is the true social justice impact of the rush to meet air qualities goals that delaying another decade would likely see technology accomplish without the pain and suffering.



Responses to Comment Letter #23

Submitted by Inland Empire Economic Partnership on November 21, 2016

23-1

As stated throughout the Draft Final 2016 AQMP and its associated documents including the Draft Final Socioeconomic Report, the 2016 AQMP is a regional blueprint designed to achieve federal air quality standards in the South Coast Air Basin and Coachella Valley by seeking emission reductions from stationary and mobile sources through both command-and-control regulations and financial incentives. The purpose of the incentive programs is to help accelerate the deployment of zero and near-zero emission technologies that will go above and beyond the emission limitations set in existing rules.

The comment claims that it is because of CARB's heavy reliance on command and control that the blue collar job growth rate has only been at 19.8 percent, much slower than in lower-paying sectors. However, the comment does not provide evidence or support of this claim and staff was unable to review and verify the data, assumptions and methodologies used to establish the claimed relationship. The main drivers among all potential factors that could affect the macroeconomic trends can be usually identified by rigorous econometric tests. One of those main drivers is innovation of labor-substituting technologies such as automation. However, staff has not yet been able to identify empirical evidence in the peer-reviewed economics literature that unambiguously shows a causal relationship between clean air regulations and regional job growth trends.

23-2

As pointed out in Comment Letter #26 submitted by Steve Levy, who is a professional economist and Director and Senior Economist of the Center for Continuing Study of the California Economy, the projected changes in regional job counts per year are *not additive*. The non-additivity of projected job impacts was also emphasized by staff at the November 3, 2016 meeting of the Science, Technical and Modeling Peer Review (STMPR) Advisory Group, which was open to public participation and the meeting notice was electronically mailed to all 2016 AQMP interested parties.

REMI is a recursive model that simulates policy impacts year by year. The number of jobs foregone or added for a particular year is the result of a comparison between the job counts in the baseline economy (i.e., baseline scenario) and the job counts in an alternative economy where a policy would take effect (i.e., policy scenario). Let's consider an illustrative example, where the only policy-induced job impact is that five construction jobs that are projected to be added to the baseline economy in 2017 would end up not being created under the policy scenario simulation. And as the policy impact continues, these same five jobs still will not be created under the policy scenario in 2018, 2019, and so on. As it is those same five jobs that are not being created, it would be incorrect to claim that there will be 15 jobs foregone after three years in 2019; instead, the total policy-induced job impact stays at five jobs foregone in 2019. (Moreover, as noted in the Draft Final Socioeconomic Report, the term "jobs foregone" refers to either losses of existing jobs or forecasted jobs not created.)

Similarly, the projected change in the number of jobs per sector is also non-additive across years, and no matter which sector or which policy impact scenario is examined, the change represents a difference of less than one percent from the baseline job forecast. Contrary to the commenter's claim, staff did not

state any "belief" that job increases in the manufacturing sector are solely due to increased demand for cleaner equipment and technologies. As discussed in Chapter 4 of the Draft Final Socioeconomic Report, staff explained that any potential positive job impact due to such demand increases would "highly depend on the location(s) of the potential suppliers." Moreover, the REMI model captures the direct, indirect and induced effects of a proposed policy, and any job impact projected by the REMI model is the net result of all effects.

Regarding manufacturing job losses, Figure 1-3 of the Draft Final Socioeconomic Report clearly shows that the decline in manufacturing employment is not specific to the four-county region but it is exhibited also at the state and national levels. Economic studies have linked the nationwide manufacturing job losses largely to technological changes and global trade. Moreover, as mentioned in the staff response to Comment 23-1, staff has not been able to identify peer-reviewed economic studies that found clean air regulations as a driver of regional job growth trends.

Regarding the Commenter's claim that logistics sector job growth in Inland Empire would be dramatically slowed by SCAQMD and CARB efforts, it should be noted that the many transportation-related industries with on-road fleet operations and other industries that utilize off-road mobile source equipment (e.g., forklifts) are expected to be able to benefit from incentive programs that will reduce mobile source emission reductions by accelerating the deployment of zero and near-zero emission technologies. Moreover, staff agrees with the Commenter's quoted opinion in the December 4, 2016 Los Angeles Times article that "[t]here are a lot of people doing traditional warehouse work, but that will change," as "[e]verything is being automated." (The article is entitled "Warehouses promised lots of jobs, but robot workforce slows hiring.") Indeed, automation will most likely be the driving factor that determines future job growth in the warehousing industry, a key component of the inland region's logistics sector.

23-3

Please see staff response to Comment 23-2 regarding the non-additivity of annual job impacts. Contrary to the Commenter's claim, Chapter 4 of the Draft Final Socioeconomic Report includes a preliminary discussion on existing studies and recent findings regarding the public health effects of unemployment. Regarding the Commenter's claim that clean air regulations would negatively affect public health through exacerbating poverty, please see staff responses to Comments 1-2—submitted by the same commenter—and 22-2 for a detailed response.

23-4

The Commenter claims that the rest of the U.S. would receive the same clean air benefits because the Draft Final 2016 AQMP is part of a national policy to clean the air. However, while the 2016 AQMP is designed to provide a path to clean air goals and address federal Clean Air Act (CAA) requirements for ozone and PM2.5 standards, air quality improvements across the nation would not be made at the same pace. Moreover, as the densely populated South Coast Air Basin still has some of the most polluted air in the nation, the magnitude of clean air benefits as a result of implementing the 2016 AQMP are less likely to occur in the rest of the nation. As the proposed 2016 AQMP control measures are implemented, the region—which has some of the most polluted air in the nation—is expected to catch up, or at least narrow the gap, with the rest of the nation in terms of clean air. In the REMI model, improvements in the region's air quality relative to the rest of the nation were modeled as an increase in regional amenity, parameterized to be relative to the rest of the nation, which, based on peer-reviewed economics literature was shown to increase economic in-migration. It should be also noted that public health benefits

are not the only modeling input in staff's REMI analysis. Other inputs, such as increased production costs that would be incurred by the directly affected industries as a result of implementing the Draft Final 2016 AQMP, were also included, and they produced counteracting effects on the final simulated results. Additionally, in order to provide upper and lower bounds of the job impact assessment, the Draft Final Socioeconomic Report included four different policy impact scenarios, two of which did not take into account public health benefits.

Next, as discussed in the staff response to Comment 23-2, the REMI modeling analysis of the policy impact of the 2016 AQMP did not result in an impact of 169,260 jobs lost as claimed by in the comment. Instead, staff's REMI analysis showed minimal changes in the region's long-term job growth. Moreover, as discussed in staff responses to Comments 1-2 and 22-2, and 23-1, and repeated in responses to many comments contained in this letter, staff relied on the current state of knowledge and evidence in the economics literature. The comment does not provide evidence or support of claims that the 2016 AQMP or environmental regulations in general would affect poverty in the region.

Finally, staff agrees with the Commenter that there are many factors that affect labor productivity in an economy. Epidemiological studies have demonstrated that exposure to air pollution can cause morbidity symptoms and result in work and school absences (Ostro 1987 and Gilliland et al. 2001). Based on these findings, labor productivity or output per job in REMI was modeled to increase as a result of fewer work absences that are related to the workers' own illness or the need to take care of sick children at home. The peer-reviewed economics literature provided additional evidence that better air quality can directly increase worker productivity (e.g., Zivin and Neidell 2012).

23-5

The Commenter's attempts to denigrate the SCAQMD socioeconomic assessment lack merit. The socioeconomic assessment uses the state-of-science methodologies and most current and available data; moreover, local data were used where available. The Draft Final Socioeconomic Report implements many recommendations by the 2014 Abt Associates Review of the SCAQMD socioeconomic assessment, follows detailed recommendations by expert consultants to conduct public health and environmental justice analyses, and to sensitivity test REMI job impacts. It incorporates comments and suggestions by the STMPR advisors who were appointed by the SCAQMD Governing Board, and it also reflects public input to the socioeconomic analysis that were provided to staff at numerous public meetings.

Additionally, as emphasized throughout the Draft Final 2016 AQMP and its related documents, the 2016 AQMP is designed to provide a path to clean air goals and address federal CAA requirements for ozone and PM2.5 standards. The CAA requires attainment of the standard to be achieved as "expeditiously as practicable" but no later than the attainment deadlines (see Table 1-1 of the Draft Final Socioeconomic Report). Failure to submit a plan, comply with required plan provisions, or implement an approved plan to meet health-based standards within the required timeframes could result in sanctions from the federal government, including but not limited to restrictions on federal highway funds granted for the region and more stringent emission offsetting requirements for new businesses and operations in the region. Therefore, delayed attainment of federal standards by a decade, as proposed by the Commenter, would not only be illegal but it would also negatively affect the region's transportation infrastructure and discourage new business activities.

COMMENT LETTER #24—JOHN HUSING EMAIL, DECEMBER 5, 2016

From: John Husing [mailto:john@johnhusing.com]
Sent: Monday, December 5, 2016 12:21 PM
To: Angela Kim <akim@aqmd.gov>
Subject: Re: SCAQMD - Draft Final 2016 Air Quality Management Plan Release

24 - 1

It would be appreciated if you could identify any research showing the downside health care cost impacts of the long term loss of jobs from the accumulation of regulation on blue collar sectors stemming from increased public health difficulties for marginally educated workers. This was not an issue earlier, but increasingly it would appear to be important given that the level of regulation is now increasingly creating a trade off of between ever cleaner air and jobs for this at-risk population.

John Husing

Chief Economist

Inland Empire Economic Partnership

Response to Comment Letter #24

Submitted by Inland Empire Economic Partnership (IEEP) on December 5, 2016

24-1

The Commenter requested staff to "identify any research showing the downside health care cost impacts of the long terms loss of jobs from the accumulation of regulation […]."

However, as shown in Chapter 4 of the Draft Final Socioeconomic Report and summarized in its Executive Summary, the projected jobs impact under each of the four impact scenarios analyzed in the report ranges from an average of 9,000 jobs foregone per year to an average of 29,000 jobs gained per year from 2017 to 2031. These are very small job impacts percentage-wise relative to a baseline regional economy of over 10 million jobs (including both payroll jobs and self-employment). Moreover, it was also shown that, under all four impact scenarios, the projected job impact does not alter the region's long-term job growth in any significant way.

Moreover, Chapter 4 of the Draft Final Socioeconomic Report also discusses the evidence in the existing economics literature, or the lack thereof, on the relationships between environmental regulations and macroeconomic job impacts. Additionally, it includes a preliminary discussion on the health effects of unemployment, whether related to air quality regulations or not.

For further discussion, please see staff response to Comment 1-1.

CENTER FOR CONTINUING STUDY OF THE CALIFORNIA ECONOMY

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DATE: December 3, 2016

TO: **The AQMD Socioeconomic Evaluation Team**

FROM: Stephen Levy

SUBJECT: Review of Socioeconomic Report Draft Released November 16, 2016

1. **Executive Summary**

25 - 1

The key findings are strongly supported by the evidence in the following chapters and appendices. The report has noticeable improvements in accessibility and transparency. My comments focus on increasing clarity and readability.

I have two suggestions that would help me understand the findings better and could help other readers.

In the Executive Summary provide a brief description of what incentives mean, such as cash assistance to convert to lower emission vehicles. Incentives are a large portion of total costs and clarity will help readers understand the concept. It is explained better in later sections but some readers focus on the summary section.

Second, as I am not a scientist, I found the language and connections between ozone, NOx and PM2.5 not always clear.

25 - 2

The remainder of comments in this section relate to the use of historical and forecasted jobs data and related impacts. I offer these suggestions in the hope they will avoid confusion and at the same time underscore that the District used the correct methodology in integrating the SCAG regional growth forecast projections into the analysis.

The first issue deals with the terms “employment” and “jobs”. Often throughout the report the term employment is used when what is meant is jobs. The term employment is a technical term used by the Bureau of labor Statistics (BLS) and the California Employment Development Department (EDD) to describe the number of employed residents

(workers) living in a particular geography. Total employment differs from total jobs in two respects—1) It refers to workers not jobs and does not include the fact that a worker can hold more than one job and 2) it refers to where the worker lives not where he/she works.

25 - 2 (CONT'D)

In most of the draft text and tables there is a correct reference to total jobs and changes in the number of jobs. But in some cases the phrase "total employment" is used instead of the correct usage "total jobs". The first paragraph on page ES-4 is one example. Sometimes it is clear that employment means jobs but there are other places in the draft where it is more ambiguous.

I recommend replacing employment with jobs when that is what is meant.

The second issue relates to clearly explaining the difference between the measure of jobs used in the REMI model and model results and the measure of jobs used by EDD, BLS and SCAG. There is a good explanation on page 4-A-2 in Appendix 4-A. I suggest having a place here or in Chapter 4 referenced in the executive summary that discusses the differences before readers try and understand the various tables and figures.

The REMI job measure is larger than that used by BLS and EDD. For example footnote 10 on page ES-4 states there were more than 10 million jobs in the District area in 2014. This is based on a measure of jobs developed by the Bureau of Economic Analysis (BEA) and used in the REMI model. The EDD estimate of jobs for 2014 is slightly under 8 million. The main difference as explained in Appendix 4-A is the way the two sources measure self-employment.

25 - 3

My recommendation is to use the EDD measure of jobs when describing historical estimates and trends and in describing the SCAG forecast. The EDD measure and used by SCAG is the one familiar to readers, not the REMI/BEA measure.

This will come up in several places in the comments below.

The MIT review, adopted by the District, requires that the SCAG growth forecast is the basis for analyzing job and population impacts as noted in footnote 11 and it has always been the practice of the District to do so.

Appendix 4-A describes how this is accomplished. The REMI model forecast of jobs is adjusted at the industry level to reflect the job growth rates forecast by SCAG. The job impact estimates in Chapter 4 use the REMI job measure embedded in their model **but the relative job impacts and percentage changes from the baseline are an accurate reflection**

25 - 3 (CONT'D)

of the impact of the AQMP and are not affected by the use of the REMI job measure as the growth rates reflect the SCAG forecast.

The transparency and readability of the draft would be improved by providing base year and 2031 estimates and projections of total jobs and population for the District area from SCAG.

The adopted SCAG region growth forecast has total population growing frim 8,075,000 in 2015 to 22,138,000 in 2040 and total jobs growing from 8,006,000 in 2015 to 9,872,000 in 2040. I am sure that SCAG can provide estimates for the AQMD region and projections to 2031 if requested as they have county and small area data already provided to AQMD.

2. **Introduction**

The introduction makes substantial progress in improving transparency and clarity. The sections outlining the model improvements in the 2016 analyses, the incorporation of stakeholder feedback and the use of the latest scientific evidence provide a credible foundation for the findings. The explanation of the concept of the baseline is helpful and clarifies an ambiguity from past analyses.

Figure 1-1 is an important chart and deserves more attention. The remainder of the draft with relation to job impacts is filled with table after table and figure after figure showing job impacts of usually much less than 1% over 15 years.

25 - 4

At a minimum a table showing the %s related to each row on the figure would be a helpful addition to those who cannot quickly understand graphs or are interested in the actual % changes. A multisensory approach is always helpful for transparency and readability.

The figure shows an important relationship—that the region has added people, jobs and output while air quality has improved. This finding is worth a paragraph or more of space in the introduction as it lends credibility to the findings that such progress can be achieved under the 2016 AQMP.

Hopefully the final figure will say total jobs not total employment.

I am guessing that O3 is ozone but it is not labeled in the figure or text.

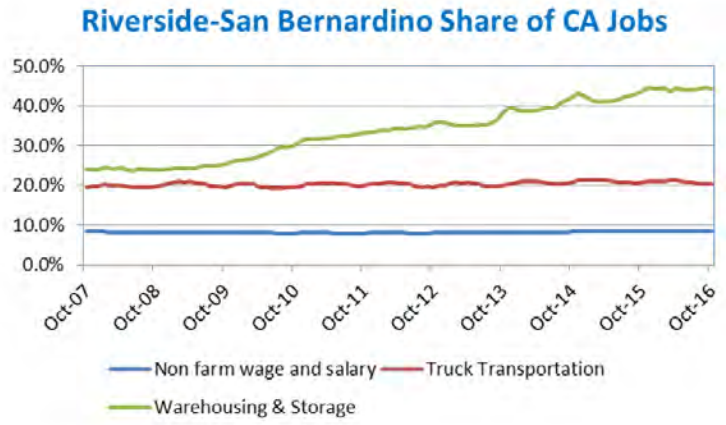
On page 1-2 I see reference to NOx in the text and ozone and PM2.5 in the table. That is confusing to me as to how NOx and ozone/PM2.5 are related.

I have four comments on the section related to industries potentially affected by the AQMP:

1) This is an important subject to discuss
2) The section was written before the findings reported in Chapter 4 that economic impacts are very small. Reference to that finding would be helpful in this Chapter
3) The use of job forecasts from EDD for 2016-2022 should be replaced by the forecasts from SCAG for the period ending on 2031.
4) This would be a good place to insert an historical chart building on figure 1-1. I show one below for illustrative purposes.

25 - 5

There was discussion at an STMPR meeting about the impact of air quality regulations on job trends in the Riverside—San Bernardino metro area. The graph below compares job growth overall and in the trucking and warehouse sectors between the metro area and the state for the past nine years. The metro area share of overall California non-farm wage and salary jobs increased from 8.3% to 8.4% with a gain of 104,300 jobs. The share of trucking jobs increased from 19.5% to 20.4% with a gain of 3,300 jobs. And the metro area share of warehousing jobs grew from 24.0% to 44.6% with an increase of 28,100 jobs or more than double the starting job level.



25 - 6

With regard to point 3 above

SCAG developed industry forecasts that are used in the REMI modeling as explained in Appendix 4. Yes the draft at the top of page 1-5 refers to and uses very old EDD forecasts for 2012-2022. They are out of date, their usage violates the agreement to use SCAG job forecasts and the ending period of 2022 is not helpful in an analysis ending in 2031.

25 - 6 (CONT'D)

I realize these were inserted as a placeholder in early drafts but if staff wishes to inform readers about job growth forecasts in these sectors, the SCAG forecasts are appropriate to use.

The entire text and figures on pages 1-5 and 1-6 should be replaced with SCAG forecasts to 2031 to help readers. Very old forecasts (EDD is now updating) and ending in 2022 are not reflective of the SCAG forecast or helpful.

All discussions of job growth to 2022 in the remainder of the section should be replaced by SCAG forecasts to 2031.

25 - 7

In addition I do not find the wage and output statistics helpful and as in other sections, some streamlining of the text to increase readability would be helpful.

The main point of the section is to identify sectors that are potentially affected by the AQMP and with the inclusion of SCAG job forecasts, this will be achieved.

3. **Incremental Costs**

25 - 8

I submitted a number of clarifying questions to an earlier draft and I find most of them addressed and clarified so a lay reader can better understand the methodology and meaning of terms. Thank you. The clarification of remaining incremental costs and the updated assumptions with regard to CARB mobile source initiatives and their relation to the AQMP analysis are particularly helpful.

After the incremental cost table 2-1 ending on page 2-5, I think it would be helpful to compare the $848.5 million annual costs to the average GDP of the region to show readers a rough idea of what percentage of GDP these costs represent.

25 - 9

Perhaps I missed it in the text but I was looking for a little more detail on how the incentives would work (perhaps owners would be given funds toward the replacement cost of lower emitting vehicles) and where the incentive funding would come from.

25 - 10

While the District is free to make their own assumption as to the incidence of the government incentive spending, I find it doubtful in practice that other programs would be cut or staff reduced. Moreover, the incidence of these cuts if they occur is interesting. So what would be the effect of cutting health or education spending to fund incentives? I think we can do better than assume that the impacts are measured by job cuts in the

25 - 10 (CONT'D) public sector. I expect residents would not like the impact of any service cuts resulting from reallocation of state funds to fund incentives for emission reduction.

25 - 11 On page 2-9 the draft repeats the use of outdated and non SCAG job forecasts from EDD ending in 2022 not 2031. Please correct this reference. Also see the chart presented above re job trends in the goods movement sector.

25 - 12 On page 2-11 there is a figure showing annual incremental costs ranging from $1.4 billion in 2017 to $2.7 billion in 2031. All of these annual costs are above the $848.5 million average costs shown on page 2-5. Can the final text explain how these two measures are related and should be interpreted?

4. **Public Health and Other Benefits**

25 - 13 Thank you for the graphic better explaining the value of a statistical life and how it is aggregated from willingness to pay.

Is there a way to insert county names in Figure 3-1?

25 - 14 I think more explanation of Table 3-3 would helpful. One number that looks strange is that the table appears to say that 2000+ premature deaths will be avoided, more than 100,000 school days protected but only 89-167 fewer hospital admissions. Maybe I am missing something but that looks weird to my eye, especially given the language in the first paragraph on page 3-8 talking about large numbers of avoided hospital admissions.

25 - 15 Figure 3-4 is exactly the right approach to explaining the benefits of avoiding premature death BUT isn't $500 too high and aren't there 18,000,000+ residents in the region? Is there a more realistic example? $500 seems like a lot to most people. Can you make an example that ends up with the estimate on Table 3-4?

25 - 16 The sensitivity analysis is helpful in concept and I hope the idea of a range is used often where applicable.

On page 3-13 you might be lowest measured level in the title as I had to search a bit and the term was not familiar to me.

25 - 17 I support the inclusion of benefit estimates for the items covered on pages 3-14 through 3-16. The omission of these benefits in this analysis does support the report conclusion that benefit estimates were made conservatively.

25 - 18 I would remove the section on unemployment impacts. **The analysis documents that in fact the 2016 has no impact on regional unemployment**. So the inclusion of this section is open to misinterpretation and, while it might be of interest to some stakeholders, it is not helpful to include material that is factually not related to the AQMP in a socioeconomic impact analysis of that plan.

5. **Job and Other Macroeconomic Impacts**

25 - 19 I have reviewed the analysis and support the findings of job impacts mostly well less than 1% of baseline forecast values.

On all relevant tables I would insert the base year job estimate in place of or in addition to the 2023 column. For those who work better with actual numbers than those very small percentages in the final column, a comparison of base year and changes in job levels would be helpful.

Similarly in Figure 4-1 it would be helpful to show data as % changes instead of or in addition to the absolute numbers.

25 - 20 It would also be helpful to explain clearly that the REMI model works in a way that added or foregone jobs change the population slightly and do not affect overall unemployment levels even if the impacts were larger.

25 - 21 Jobs foregone is a difficult concept and readers may need help in understanding this is different than a firm laying off workers.

As a professional economist it is hard for me to judge how well the chapter material will be understood by lay readers. If there is feedback on difficulty understanding some results or concepts, I am happy to work with staff on expanding explanations.

6. **Sub-Regional Distribution of Impacts**

25 - 22 Figure 5-3 is labeled employment and Figure 5-4A is labeled jobs though I think/hope they refer to the same concept.

25 - 23 I am not sure that all of the Figure 5 charts are necessary and may interrupt the flow for the reader but that is a minor point.

On Table 5-1 it is hard to gauge the importance without knowing the base income and income per capital values so the reader can know the % change. Is $44 per capita a lot or like many of the impacts in the less than 1% range?

25 - 23 (CONT'D)

The same comment applies for Figure 5-6. People tend to look at $millions and think that is a lot when the base value it is compared to in many $billions.

The same comments apply to tables 5-2 and 5-3 and Figure 5-7.

Finally in Figure 5-8B the % impacts are shown.

I think readers would be helped if this % impacts estimate were shown generally for all items in Chapter 5.

7. **Environmental Justice**

25 - 24

The major findings on Tables 6-5, 6-6 and 6-7 are powerful and should receive more prominence in the text and summary.

While it is a little counterintuitive one thought is to reverse the order of the chapter. Another approach would be to have a short summary section at the top.

The finding that the AQMP has greater benefits for low-income communities and those susceptible to environmental health risk is an important and positive outcome of the AQMP evaluation.

25 - 25

My preference in language would be to be more quantitative in describing EJ criteria and not use words like disadvantaged or vulnerable, which are subject to misinterpretation.

25 - 26

I think the race/ethnicity criteria should be carefully explained as to why that is important. Is it because of race alone or because African American and Latino residents **on average have lower incomes than the general population, which is true.**

25 - 27

I find the discussion starting on page 6-11 far too technical for me to understand and I have participated in all the STMPR meetings.

8. **CEQA Alternatives**

25 - 28

On Table 7-3 it appears that all of the alternative scenarios have roughly similar and quantitatively small impacts.

I did not see that conclusion stated in the chapter.

9. **Summary**

25 - 29

The summary is excellent.

25 - 29 (CONT'D)

I wonder if in the final draft, points made in Chapter 8 that are not already in the Executive Summary could be included there.

Chapters 1 and 8 cover many similar points and I wonder if they could be combined at the front of the report.

10. **Appendices**

25 - 30

Appendix 4-A REMI Baseline Adjustments for the 2016 AQMP

The 2016 economic analysis follows a longstanding agreement to reflect the regional and sub regional job and population growth forecasts prepared by SCAG.

It would be helpful to readers to show the baseline SCAG forecast in actual numbers instead of just growth rates. That data is available as explained in Appendix the bottom of page 4-A 2.

For the record I assisted SCAG in the preparation of the 2016 regional growth forecast.

The decision to adjust REMI by using SCAG growth rates not actual levels is correct given that REMI uses a different jobs data measure, one not used by BLS, EDD or SCAG. But that is not a reason to withhold reporting of SCAG baseline and forecasted job levels, which would help readers accustomed to seeing jobs reported in the EDD/BLS measure.

25 - 31

Figure 4-A 3 should be of concern to the District staff as it shows a REMI job growth forecast (unadjusted) as virtually no growth until 2031, a level that will be exceeded when the 2016 AQMP is voted on for adoption.

I do not know if the great discrepancy between the baseline (default) REMI forecast and the SCAG job forecasts affects other aspects of the model but it is quite a striking discrepancy.

The REMI job forecast would have the District Area growing much more slowly than the nation to 2031, a finding that is inconsistent with recent history and the SCAG forecast.

25 - 32

On page 4-A 11 it would be helpful to note that both the REMI and SCAG model relate population growth to job growth. Higher job growth levels imply more migration into the region and vice versa.

Given that relationship it is strange to see a REMI population forecast similar to SCAG's given that the REMI model forecasts virtually no job

25 - 32 (CONT'D) [growth and both models are supposed to use similar birth and death rates.

Responses to Comment Letter #25

Submitted by Center for Continuing Study of the California Economy (CCSCE) on December 3, 2016

25-1

Staff appreciates the Commenter's statement regarding the findings and improvements in AQMP socioeconomic assessment, and all suggestions made in this letter to help further increase clarity and readability of the Draft Final Socioeconomic Report.

Regarding the meaning of incentive programs, staff agrees that such incentives could include cash assistance to convert to a lower emission vehicle or piece of equipment. As is mentioned in the beginning of the Executive Summary that the purpose is "to help accelerate the deployment of zero and near-zero emission technologies." And, it was mentioned on the next page that "eligible industries and consumers can use [incentives] to offset the cost of purchasing cleaner technologies." More information on how incentives programs would work and the potential funding sources and opportunities can be found in the Draft Financial Incentives Funding Action Plan for the 2016 AQMP at http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/draftfinancialincentivefunddec2016.pdf.

Finally, a footnote has been added in the beginning of Chapter 1 to clarify that NOx is a precursor to ozone and secondary PM2.5 formation.

25-2

Staff appreciates the Commenter's suggestions and the acknowledgement that staff "used the correct methodology in integrating the SCAG regional growth forecast projections into the analysis." Following the Commenter's suggestions, the Economic Outlook section in Chapter 1 of Draft Final Socioeconomic Report, which previously used California Economic Development Department (EDD)'s long-term projections (2012-2022), has been revised with the SCAG's Growth Forecast from its 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). All job statistics based on EDD's job estimates have been clarified as "payroll jobs," as opposed to "total jobs" that are used in REMI and based on the U.S. Bureau of Economic Analysis data that include both payroll jobs and self-employment. Additionally, "employment" was replaced by "jobs" wherever it refers to job counts as opposed to the number of workers.

25-3

Staff followed the Commenter's suggestion to use the EDD's measure of jobs when describing historical estimates and SCAG's forecast in describing the projected long-term job growth trends. As mentioned in staff response to Comment 25-2, staff also made a clear distinction between total and payroll jobs. Appendix 4-A of the Draft Final Socioeconomic Report includes a detailed description of SCAG's data and figures and tables that provide depictions of SCAG's growth forecast at the more aggregate levels.

25-4

Staff again appreciates the Commenter's acknowledgement of progresses made in the AQMP socioeconomic assessment. For clarity, a note was added below Figure 1-1 to clarify that O3 is the chemical expression of ozone; moreover, as mentioned in staff response to Comment 25-1, a footnote

has been added at the beginning of Chapter 1 to clarify that NOx is a precursor to ozone and secondary PM2.5 formation. Staff believes that Figure 1-1 has been adequately referenced when discussing air quality improvements in the text. Staff also believes that adding an annualized percent change table next to Figure 1-1 could detract from the graph's quick take-away message in the opening paragraph's discussion and therefore did not make this suggested addition.

25-5

Staff agrees with the Commenter that it is important to discuss the economic outlook of the potentially affected industries due to implementation of the Draft Final 2016 AQMP.

The reference to the small job impacts of implementing the proposed control measures, as shown in Chapter 4, is already mentioned in the Executive Summary and reiterated in the summary chapter (Chapter 8).

Please see staff response to Comment 25-2 regarding replacing EDD forecasts with SCAG forecasts.

In order to provide context in the discussion of EDD's current (November 2016) payroll jobs in affected industries (Chapter 1), the industry's share of total payroll jobs in the region has also been added in the text if it is greater than one percent. Additionally, a preliminary discussion of regulations, job impacts, and public health is included at the end of Chapter 4 of the Draft Final Socioeconomic Report.

25-6

Please see staff response to Comment 25-2.

25-7

Staff believes that the inclusion of wage and output statistics provides a better context for the discussion of the potentially affected industries, which was requested by other stakeholders.

25-8

Staff appreciates the Commenter's acknowledgement of staff's efforts to revise earlier versions of the socioeconomic report in response to questions and comments received from the Scientific, Technical and Modeling Peer Review (STMPR) advisors and the public. Additionally, staff agrees that comparing the estimated cost of implementing the Draft Final 2016 AQMP to the region's GDP is useful and has included it in Chapter 2 of the Draft Final Socioeconomic Report.

25-9

Please see staff response to Comment 25-1 regarding the proposed financial incentive programs in the Draft Final 2016 AQMP.

25-10

Please see staff responses to Comment 20-8 regarding the incentive funding scenarios and the potential economic impacts under alternative scenarios.

25-11

Please see staff responses to Comments 25-2 and 25-5.

25-12

Staff has provided more information about Figure 2-1 in Chapter 2 of the Draft Final Socioeconomic Report to enhance clarity.

25-13

Staff appreciates the Commenter's acknowledgement of improved clarity in AQMP socioeconomic assessment. Following the Commenter's suggestion, county names have been included in Figures 3-1 and 3-3 of the Draft Final Socioeconomic Report.

25-14

Further explanation has been added to the text to describe the emergency department visits and hospital admissions as shown in Table 3-3 of the Draft Final Socioeconomic Report. Additionally, for better clarity, Table 3-3 has been revised to group the Hospital Admission (HA) endpoints together for each pollutant.

The total annual estimated amount of avoided hospital admission from all endpoints considered (asthma, cardiovascular, respiratory, and ischemic stroke) is about 700 per year on average.

25-15

A revised example has been created which is similar in scale of the four-county region's population.

25-16

As summarized in Chapter 8 of the Draft Final Socioeconomic Report, sensitivity analyses were conducted for health benefits in Chapter 3, macroeconomic modeling of non-market benefits in Chapter 4, macroeconomic modeling of different incentive funding scenarios in Chapter 4, and EJ community definitions and distributional analysis in Chapter 6. Additionally, the section heading for the Lowest Measured Level (LML) analysis was revised to improve clarity, and the concept of LML is explained on page 3-13 of the report.

25-17

Staff agrees that omission of quantified public welfare benefits of air quality improvements supports the conclusion that benefits estimates were made conservatively. To provide more information on these benefits, they were discussed qualitatively in Chapter 3 of the Draft Final Socioeconomic Report with reference to the benefits quantified in previous AQMP socioeconomic assessments. Staff will work to update the methodologies used for quantification of public welfare benefits for future AQMPs.

25-18

The preliminary discussion on the health effects of unemployment is of interest to stakeholders and was discussed at STMPR meetings leading up to this report. The Commenter correctly stated that, among the four different policy impact scenarios, it was found that implementation of the Draft Final 2016 AQMP will have a minimal effect on long-term job growth in the region. To put this preliminary discussion in a more appropriate context, this section was moved to the end of Chapter 4 and prefaced with the job impact findings.

25-19

Staff appreciates the Commenter's support of analysis findings. Base year job estimates have been added to relevant tables in Chapter 4 of the Draft Final Socioeconomic Report and percent changes have been added to Figure 4-1.

25-20

Chapter 4 and Appendix 4B include discussions of how the REMI model works).

25-21

The concept of "jobs foregone" is explained in Chapter 4 of the Draft Final Socioeconomic Report to include both projected job losses and forecasted jobs not created. Staff appreciates the Commenter's offer to help improve clarity of the report.

25-22

Both Figures 5-3 and 5-4(A) captions have been revised to reference "jobs".

25-23

Staff added a personal income per capita statistic above Table 5-1 in order to provide context for the incremental costs and public health benefits.

25-24

Staff agrees that the results presented in Tables 6-5 through 6-7 are important results. A succinct and more reader-accessible discussion of these results has been included in both the Executive Summary and Chapter 8 to provide main takeaways from the environmental justice (EJ) analysis.

25-25

The words "vulnerable" and "disadvantage" were used for consistency with the current EJ literature in which they are commonly used. This choice of words is also consistent with documentation for the CalEnviroScreen tool, which is a quantitative EJ screening method from which the Draft Final Socioeconomic Report's EJ screening analysis is derived.

25-26

The race/ethnicity indicator is included as an additional indicator in two alternative EJ definitions based on comments and suggestions from the 2016 AQMP Socioeconomic Assessment EJ Working Group. The race/ethnicity indicator is indeed highly correlated with other socioeconomic indicators, but it is also an important indicator in its own right as discussed by Industrial Economics, Inc.'s EJ report available at http://www.aqmd.gov/docs/default-source/clean-air-plans/socioeconomic-analysis/scaqmdfinalejreport_113016.pdf.

25-27

Staff has attempted to make the distributional analysis accessible to all readers by including general discussion and results in the main chapter, while including the more technical details in Appendix 6-B. A summary discussion of the results of the distributional analysis are also included in the Executive Summary and Chapter 8.

25-28

Chapter 7 of the Draft Final Socioeconomic Report includes a discussion of how the CEQA alternatives have quantitatively small job impacts, similar to those projected for implementation of the Draft Final 2016 AQMP.

25-29

Staff appreciates the Commenter's compliment on Chapter 8 of the Draft Final Socioeconomic Report. Staff has added in information from Chapter 8 to the Executive Summary where appropriate.

25-30

Please see staff responses to Comments 25-2 and 25-3.

25-31

The REMI default job forecast does project that the four-county region would grow much more slowly than the nation and than what is projected the SCAG growth forecast (as shown in Figure 4A-3). Therefore, it provides additional justification for performing the REMI employment and population update.

Appendix 4-A of the Draft Socioeconomic Report evaluated the extent to which the large differences between the REMI default forecast and SCAG forecast might have on the key parameter of labor productivity as described in the Results and Implications section. Staff's analysis found that the REMI employment update would have a minimal effect on this parameter and hence on the job impacts simulated.

25-32

Revisions have been made regarding the fact that both REMI and SCAG relate population growth to job growth on page 4-A-10. Staff briefly explains in Appendix 4-A of the Draft Final Socioeconomic Report the discrepancies between the REMI and SCAG job forecasts. However, REMI staff will need to be involved to explain how the job forecast discrepancies are related to the population forecast.

COMMENT LETTER #26—STEVE LEVY EMAIL, DECEMBER 19, 2016

From: Steve Levy [slevy@ccsce.com]
Sent: Monday, December 19, 2016 1:02 PM
To: Elaine Shen
Subject: Re: Comments

I want to clear up some possible confusion regarding a recent post by John Husing on how many jobs were forecast to be forgone in one of the REMI analysis alternatives.

The average jobs forgone in this scenario were just above 11,000 per year. These forgone jobs are not ADDITIVE as John suggested.

To show an example I will round to 11,000 jobs

Then the average pattern would be

2017 11,000
2018 11,000
2019 11,000
2020 11,000
2012 11,000
2022 11,000
2023 11,000
2024 11,000
2025 11,000
2026 11,000
2027 11,000
2028 11,000
2029 11,000
2030 11,000
2031 11,000

26 - 1

These forgone jobs are not cumulative but if they were the pattern would be

2017 11,000
2018 22,000
2019 33,000
2020 44,000
2021 55,000
2022 66,000
2023 77,000
2024 88,000
2025 99,000
2026 110,000
2027 121,000

26 – 1 (CONT'D

2028 132,000
2029 143,000
2030 154,000
2031 165,000

But the REMI analysis does not show 165,000 jobs forgone in 2031 and never shows any of these higher numbers.

The jobs forgone shown on the tables in Chapter 4 are in most cases well below 1% and usually below .5% of the baseline consistent with finding of a net change of 0.1% in total jobs in this alternative.

Similarly the jobs added from better heath are not cumulative but represent an annual average forecast.

26 - 2

One comment mentioned the health impacts of unemployment. It should be noted relative to this comment that the REMI analysis does NOT find an increase in unemployment in the region as a result of the 2016 AQMP.

Responses to Comment Letter #26

Submitted by Center for Continuing Study of the California Economy (CCSCE) on December 19, 2016

26-1

Staff acknowledges the Commenter's response to Comment Letter #23 (Comments 23-2, 23-3 and 23-4). Staff agrees that the projected job impacts are not additive across years.

26-2

Staff acknowledges and concurs the Commenter's statement that the REMI analysis does not find a significant increase in unemployment in the region as a result of the 2016 AQMP.



Western States Petroleum Association
Credible Solutions • Responsive Service • Since 1907

Patty Senecal
Director, Southern California Region

19 December 2016

Via email: PFine@aqmd.gov

Dr. Philip Fine
Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comments on the November 2016 version of the Socioeconomic Report for the 2016 Air Quality Management Plan (AQMP)

Dear Dr. Fine:

Western States Petroleum Association (WSPA) is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California, Arizona, Nevada, Oregon and Washington. WSPA has been an active participant in air quality planning issues for over 30 years. WSPA member companies operate petroleum refineries and other facilities in the South Coast Air Basin and thus have a major stake in the Air Quality Management Plan (AQMP) being prepared by the South Coast Air Quality Management District (SCAQMD or District), and any rule developments that might stem from the final AQMP as adopted by the District's Governing Board.

WSPA believes the 2016 AQMP must be scientifically-based and technically accurate and the District's Governing Board needs to have a thorough assessment of the air quality benefits, environmental impacts, and economic costs associated with that plan. This is consistent with Governing Board Resolution (1989) which directs AQMD Staff to prepare economic analysis that identifies affected industries, the cost effectiveness of emissions controls, and the potential public health benefits of proposed rules.[1]

Our comments on the Draft Socioeconomic Report (dated November 2016) are as follows:

[1] AQMD, Draft Socioeconomic Report for the 2016 AQMP, November 2016. Page 1-4.

1. **The costs for the Final Draft AQMP have been disproportionately targeted against stationary sources. The plan should be adjusted to more fairly align costs with the needed emissions reductions.**

27 - 1

It is well documented that the South Coast region's air quality problem is now overwhelmingly due to emissions from mobile sources. In fact, the AQMP's emission inventory shows that mobile sources are responsible for 85% of regional NOx emissions with the combined emissions from stationary and area sources (e.g., residences) now representing only 15% of those emissions.[2] Yet the AQMP is proposing measures that would impose 36% of the plan's total costs against stationary sources.[3] Given the significant emission reductions from stationary sources made over the previous decades, this plan's measures and associated costs must be adjusted to reflect fair share reductions needed for attainment of the National Ambient Air Quality Standards.

2. **The Final Draft AQMP is proposing a number of control measures for which the Draft Socioeconomic Report presents no costs. Given the Final Draft AQMP's clear demonstration that these measures are unneeded for either the ozone or $PM_{2.5}$ attainment demonstrations, they should be removed from the control strategy.**

27 - 2

The Final Draft AQMP continues to include a large number of proposed control measures which are demonstrated in the plan as unnecessary for reaching the region's "carrying capacity."[4] These additional measures are presented with no quantified emissions benefits and are often vaguely described as to what the proposed measures would even require. Such extraneous measures include:

Number	Title	Emission Reductions (tpd) (2023/2031)
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	N/A
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD
FLX-02	Stationary Source VOC Incentives [VOC]	TBD
BCM-02	Emission Reductions from Cooling Towers [PM]	TBD
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD

[2] AQMD, Revised Draft AQMP, Appendix III, Attachment A, 2016 Annual Average Emissions by Source Category in South Coast Air Basin, comparison of "Total Stationary and Area Sources" NOx emissions to Total NOx emissions.
[3] AQMD, Draft Socioeconomic Report for the 2016 AQMP, November 2016. Table 2-1, comparison of Present Worth Value of Total Incremental Costs for SCAQMD Stationary Sources to Grand Total for all Qualified Costs.
[4] AQMD, Final Draft AQMP, Chapter 4

27 - 2
(CONT'D)

BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD
BCM-08	Further Emission Reductions from Agricultural, Prescribed and Training Burning [PM]	TBD
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD
EGM-01	Emission Reductions from New Development and Redevelopment Projects [All Pollutants]	TBD
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]	TBD
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]	TBD
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	TBD
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	TBD
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	TBD
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	TBD
MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	TBD
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	TBD
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	TBD
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	TBD
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	TBD

In fact, while none of these proposed measures has any quantified emission benefits they would certainly impose additional costs on the Southern California economy. Yet the Draft Socioeconomic Report presents no costs for these measures. Given that the AQMP clearly demonstrates that these measures are unneeded for either the ozone or $PM_{2.5}$ attainment demonstrations, they should all be removed from the control strategy.

3. The AQMP control strategy should prioritize non-regulatory, incentive based approaches to reducing emissions outside the State Strategy. The AQMP should consider the potential benefits of extending incentives to reduce costs to industrial stationary sources.

To the extent they are needed to demonstrate attainment, WSPA is supportive of the Final Draft AQMP's inclusion of control measures based on incentives and other non-regulatory approaches intended to accelerate the transition of vehicles, buildings, and industrial facilities to cleaner technologies. Southern California's industrial facilities (i.e., stationary sources including the region's petroleum refineries) have dramatically reduced their emissions by over 70% for most criteria pollutants over the last two decades, and by 2023 these same industries will have further reduced their NO_X emission by another 45%.[5] With these additional reductions, industrial facilities may not be able to further reduce emissions in a cost effective manner absent financial incentives.

Industrial sector employment is a vital part of the regional economy. The report notes:

27 - 3

> *Despite the industry's shrinking workforce, its output per worker has increased over time, rising from $89,000 to $152,000 (in 2015 dollars) over the 2001 to 2014 time period (see Figure 1-3). Currently, the average pay in the sector ranges from $50,000 in Riverside County to $69,000 in Orange County, paying about a quarter more than the average wages in these counties. Both chemical manufacturers and refineries are expected to be impacted by stationary source measures. Chemical manufacturing pays slightly higher with average pay ranging from $58,000 in Riverside County to $70,000 in Orange County. Petroleum manufacturing pays substantially higher, ranging from $75,000 in Riverside County to $117,000 in Los Angeles County.*[6]

The report notes that Southern California's industrial employment remains an important engine for the regional economy. Despite the outsized economic importance of the industrial sector, both in terms of economic output and average wages, the current AQMP strategy would impose a disproportionate share of costs against industrial employers. The AQMD Staff and Governing Board should consider extending the use of financial incentives to include large stationary sources, including major sources. This could accelerate the deployment of cleaner technologies and would be consistent with recommendations from the Ad Hoc Committee on Large Compliance Investments and Future Regulatory Certainty to consider targeted incentives, financing, and funding programs as means for promoting emission reductions and helping businesses remain economically viable, especially in environmental justice areas.[7] The AQMP as currently presented is in conflict with that direction.

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[5] AQMD, Staff Report for Amendments to the NOx RECLAIM program, Rule 2002, December 2015.
[6] AQMD, Draft Socioeconomic Report, page 1-7.
[7] AQMD Ad Hoc Committee on Large Compliance Investments and Future Regulatory Certainty, September 2, 2016.

4. **The costs presented for proposed control measure CMB-05 (RECLAIM) in Table 2-1 of the Draft Socioeconomic Report are significantly understated. This understatement compromises the Governing Board's ability to make informed policy decisions. Given these uncertainties, proposed measure CMB-05 should be changed to reflect a range of potential emission reductions (e.g., 3-5 TPD NO_X), and the socioeconomic analysis should be revised to reflect the better cost information which was previously supplied to AQMD Staff by industry (e.g., WSPA).**

Draft Socioeconomic Report Table 2-1 presents the cost for proposed measure CMB-05 at $856.4 million. This figure is supposedly based on information in the Staff Report for the December 2015 amendments to Regulation XX. However, as previously noted by WSPA, the District was previously provided information that demonstrated the cost for refinery sector emission reductions beyond those required under the December 2015 amendments would be significantly higher than AQMD Staff estimates.

27 - 4

WSPA, through a third party contractor, conducted a confidential cost survey of the Southern California refineries related to total capital and operating costs for compliance with the District's proposed NO_X RECLAIM shaves. This proprietary information was submitted by refiners on a confidential basis to the third-party contractor who de-identified and aggregated the compliance costs for the overall industry. That forecast suggested the refinery sector compliance costs for the December 2015 shave would be nearly twice the estimate presented by AQMD Staff. Furthermore, WSPA's contractor also projected that additional NO_X reductions could cost the refining industry as much as $120,000 per ton, using a 10-year equipment life. Even using Staff's more liberal 25-yr equipment life assumption, the estimated costs for additional reductions came to over $55,000 per ton of NO_X.

The proposed control measure openly contemplates the imposition of new command-and-control overlays that would increase compliance costs for RECLAIM sources beyond previous projections. But the measure continues to lack a clear explanation of how RECLAIM facilities might actually achieve such reductions or realistic cost bases for them. Given these uncertainties, proposed measure CMB-05 should be changed to reflect a range of potential emission reductions (e.g., 3-5 TPD NO_X), and the socioeconomic analysis should be revised to reflect the better cost information which was previously supplied to AQMD Staff by industry (e.g., WSPA).

5. **The Preliminary Draft Socioeconomic Report fails to provide the economic analysis required under California Health & Safety Code section 39616.**

27 - 5

The Draft Socioeconomic Report acknowledges that the California Health & Safety Code section 39616 requires certain economic analyses for market based programs.

> *Section 39616 requires the SCAQMD to ensure that any market-based incentive strategy it adopts results in equivalent or greater emission reductions at equivalent or less cost and overall job impacts – i.e., no greater job losses or significant shifts from high-paying to low-paying jobs – when compared to command-and-control regulations. Section 40920.6, requires that incremental*

cost effectiveness – i.e., the difference in costs divided by difference in emission reductions – be performed whenever more than one control option is feasible to meet control requirements. [8]

27 - 5 (CONT'D)

Yet the assessment does not include such an analysis. We would note the specific requirement to demonstrate that market-based programs such as RECLAIM will result in equivalent or greater reduction in emissions at equivalent or less cost compared with command and control regulations and future air quality measures that would otherwise have been adopted as part of the District's plan for attainment. Such analysis is wholly missing and should be incorporated into the economic analysis for proposed measure CMB-05.

6. AQMD's 25-year useful equipment life assumption is not appropriate and results in understated costs for proposed measure CMB-05. A ten-year useful equipment life would be more appropriate due to the frequency of District rulemakings and the expected technology replacement. Stranded asset costs may need to be considered in the socioeconomic assessment.

27 - 6

As previously noted, Abt Associates recommended that the District's socioeconomic program should ensure that the control costs include the full cost of retrofitting existing controls or installing new controls. This would include consideration of any stranded asset costs, such as when the proposed BARCT determination requires replacement of prior investments for emission control equipment, or effectively mandates the replacement of basic equipment.[9]

In the case of the CMB-05 program, the District just last year completed a comprehensive assessment for sources covered by Regulation XX and imposed reductions which established new BARCT levels. So at this time there are no identified control technologies for these source categories, and no explanation for how another severe market reduction would occur without basic equipment replacements or forced facility shutdowns.

As such, we believe the use of a 25-year equipment life assumption to compute cost effectiveness is really inappropriate and results in a systemic understatement of AQMP control costs. Control costs for CMB-05 should be re-computed using a 10-year equipment life assumption. Furthermore, the Staff should consider if this measure would cause potential stranded asset costs consistent (with Abt Associates' recommendations), or clearly explain why that is not needed.

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[8] AQMD, Draft Socioeconomic Report, page 1-4.

[9] ABT Associates, Review of the SCAQMD Socioeconomic Assessments, Documentation, Task 1-4 Final, 14 August 2014.

7. For the proposed Advanced Clean Cars 2 measure, the Draft Socioeconomic Report does not provide a basis for cost estimates. Certain assumptions appear questionable, as best. AQMD or CARB must support or adjust these assumptions which are important to the projected costs of the measure.

The proposed Advanced Clean Cars 2 measure assumes that combined passenger vehicle (LDA/LDT2) ZEV/PHEV sales increase from 18% to 40% between 2025 and 2030, medium-duty trucks (MDV) ZEV/PHEV sales beginning 2026, ramping up to 10 percent by 2030, with 100 percent sales of super-ultra-low-emission vehicles certified to the SULEV 20 exhaust emission standards by 2030 for gasoline light-duty automobiles (LDAs). ARB staff also modeled increased fuel efficiency (at approximately 2.9 percent per year) between 2025 and 2035 for gasoline vehicles. Under this scenario of rapidly declining demand for gasoline and diesel, the analysis assumes that gasoline and diesel prices will increase. Conversely, the analysis suggests that prices for electricity and hydrogen will be flat despite transportation related demand for electricity increasing by 200% and hydrogen by over 210%.[10] No basis is offered for why prices for some energy types might increase in the face of declining demand while others remain flat despite radically increasing demand. Yet those assumptions clearly color the results of the economic analysis. AQMD or CARB should explain the reasoning for these assumptions which are important to the financial analysis.

27 - 7

Furthermore, the analysis seems to completely ignore the economic impacts, positive and negative, of forcing a radical shift of transportation related energy demand from petroleum fuels to electricity. Such a transformation would require significant electricity infrastructure investments, and could also create stranded assets in the traditional petroleum fuels supply chain which this analysis appears to completely ignore. These are significant economic factors which must be analyzed. Instead, the Report downplays broader impacts as being limited retail establishments with lower wage employment.

> *The California businesses impacted by this measure concept are largely impacted indirectly, as affiliated businesses such as gasoline service stations, automobile dealers, and automobile repair shops may see changes in the demand for services and goods. These businesses compete within the State and generally are not subject to competition from out-of-state businesses. Therefore, the potential regulations resulting from this measure concept are not expected to impose significant competitive disadvantages on affiliated businesses.*[11]

Given the regional significance of employment in the refining sector, both direct and indirect, these impacts could be regionally important and should be assessed.

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[10] AQMD, Draft Socioeconomic Report, Appendix 2-A, Page 2-A-35.
[11] CARB, Mobile Source Strategy, Economic Analysis, Page A-9

8. The Draft Socioeconomic Report fails to present any costs for the Further Deployment for Cleaner Technologies, On-Road Light Duty control measure. The AQMD's analysis must be revised to include a full assessment of the costs associated with this measure.

A significant amount of the AQMD's proposed emissions reductions are anticipated to come from the control measure entitled Further Deployment for Cleaner Technologies, On-Road Light Duty.[12] The stated goals of this proposed measure are to accelerate the penetration of zero and near-zero emission vehicles and to promote in-use efficiency gains related to vehicle miles travelled (VMT), and through use of autonomous vehicles and advanced transportation systems.[13] To achieve these further reductions associated with early penetration of the zero and near-zero vehicle technologies established under the ZEV regulation, CARB and AQMD Staff estimate that approximately 500,000 to 600,000 of the oldest passenger cars and trucks would need to be turned over to model year vehicles meeting the currently applicable LEV III emission standard or advanced hybrid or zero-emission technology by 2023. To achieve these objectives, which would only apply to the South Coast basin, the agencies suggest they would:

- *Expand and enhance existing incentive and other innovative funding programs for light-duty vehicles in order to accelerate the replacement of older vehicles with vehicles meeting a LEV III or better emissions level. Assuming incentive funding is the primary mechanism to achieve the scope of further technology deployment described above; funding would be required for approximately 70,000 to 85,000 vehicles per year over a seven year period. The incentive funding required for this effort would go beyond the amount currently authorized for existing programs through 2023. This effort could expand upon the current EFMP and EFMP Plus-Up programs, and include increasing the use of these vehicles in underserved communities and by lower-income consumers. Continued incentive funding post-2023 to further accelerate the deployment of zero-emission vehicles would provide additional reductions for 2031.*

  Determination of the needed resources will be based on assessment of the incremental cost of technologies and the type of funding mechanism employed. Funding needs and mechanisms will be identified working in collaboration with the South Coast and other State agencies over the next several months.

- *Continue to support infrastructure investment programs with the California Energy Commission (CEC) to maximize the use of electric vehicles through expanding charging and hydrogen networks.*

27 - 8

The scale of this measure is very large and would represent a significant transformation of the transportation sector, yet the Draft Socioeconomic Report presents no information concerning the potential impacts associated with this measure. The Preliminary Draft version of the Socioeconomic Report actually presented a cost estimate for this measure that totaled $22 billion.[14] The Draft Socioeconomic Report states these costs were omitted for the following reason:

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[12] AQMD, Final Draft AQMP, Table 4-5 and Appendix IV-B, Table 3.
[13] AQMD, Revised Draft AQMP, Appendix IV-B, Page IV-B-17.
[14] AQMD Preliminary Draft Socioeconomic Report, Table 2-1, Present Worth Value of Total Incremented Cost.

This control measure is primarily designed to reduce greenhouse gas emissions and therefore it is recognized as providing NOx and VOC reductions as a co-benefit since it is part of other state programs that are expected to be implemented even if the Revised Draft 2016 AQMP is not adopted. [15]

But this assertion is directly contradicted by the CARB Mobile Source Strategy which states:

> ***This proposed measure is designed to achieve further emission reductions for South Coast attainment in 2023 and 2031 through a suite of additional actions****, including early penetration of zero and near-zero technologies, and emission benefits associated with increased transportation efficiencies, as well as the potential for autonomous vehicles and advanced transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both ARB and the South Coast. These actions reflect an initial assessment of a pathway, recognizing that as funding is allocated and advanced technologies further develop, the balance amongst approaches will necessarily adjust.*[16]

27 - 8 (CONT'D)

So these costs are related to this AQMP and should be included in the analysis. By more than doubling the cost of the AQMP, this would dramatically increase both the cost to consumers and the required incentive funding.[17]

And again, the analysis completely ignores the economic impacts, positive and negative, of forcing a radical shift of transportation related energy demand from petroleum fuels to electricity. Such a market change could create stranded assets in the traditional petroleum fuels supply chain which this analysis completely ignores. These are significant economic factors which must be analyzed.

The AQMD's socioeconomic analysis should be revised to include a full assessment of the costs associated with this measure.

9. The proposed Low-Emission Diesel Fuel Requirement measure is poorly defined and inadequately analyzed.

27 - 9

Under the Low-Emission Diesel Fuel Requirement measure, the portion of the heavy-duty fleet that chooses to continue operating on internal combustion engines, instead of adopting the expectedly more cost-effective zero and near-zero emission technologies, is anticipated to incur additional costs due to the proposed requirement to utilize low-emission diesel fuel.

WSPA continues to have several key questions regarding Low-Emissions Diesel (LED).

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[15] AQMD, Draft Socioeconomic Report, November 2016, Preface, Page 2-1.

[16] CARB, Mobile Source Strategy, May 2016, See description of "Further Deployment of Cleaner Technologies: On-Road Light-Duty Vehicles" found on page 74.

[17] Comparison of "Grand Total Cost for All Quantified Measures" (PWV basis) figure presented in Preliminary Draft Socioeconomic Report, Table 2-1 (August 2016), and the corresponding value presented in Draft Socioeconomic Report, Table 2-1 (November 2016).

- While the Report limits its analysis of this measure to off-road equipment, the discussion suggests this LED requirement would apply to all diesel sales (i.e., on-road and off-road). Is the measure only limited to off-road equipment? If not, the socioeconomic analysis is deficient.
- What is the disposition of conventional gas to liquids (GTL) fuels and other like fuels in this strategy?
- Why add the carbon intensity component to the low emission diesel when the LCFS standard and Cap & Trade program already does this?

By CARB's own projections, later model year trucks equipped with NO_X traps and PM filters would constitute more than 90% of the off-road equipment fleet by 2023. In addition, there is another measure in the Mobile Source Strategy that drives the engine manufacturers to even lower exhaust emission targets. With those two key elements, it is not clear what the benefits of requiring this potentially costly fuel would be.

27 - 9 (CONT'D)

- WSPA would like CARB and AQMD to provide a forecast of market share for legacy on-road diesel vehicles in 2025 as well as the projected off-road fleet. Such analysis should separate the impact of vehicle technology from the emissions impacts of low emission diesel fuel.
- Such analysis should explain the incremental benefit of the low emission diesel fuel over the new technology vehicles.

Creating a new LED fuel standard for off-road equipment would force a separate distribution requirement on the industry which would carry with it significant new costs which have not been analyzed.

Again, the AQMD's socioeconomic analysis completely ignores larger economic impacts, positive and negative, of forcing a radical shift of transportation-related energy demand from petroleum fuels to electricity. Such a market change could create stranded assets in the traditional petroleum fuels supply chain, and also would demand significant new costs for electricity infrastructure which this analysis has completely ignored. These are significant economic impacts which must be analyzed.

WSPA appreciates the opportunity to submit these comments. We may submit additional comments during this process as the District releases additional 2016 AQMP documents. We understand all submissions will be given due consideration by the District staff and the Governing Board.

If you have any questions, please contact me at (310) 808-2144 or by email at psenecal@wspa.org.

Sincerely,

Patty Senecal

Responses to Comment Letter #27

Submitted by Western States Petroleum Association (WSPA) on December 19, 2016

27-1

Staff appreciates comments on the Draft Final 2016 AQMP and continued participation in the AQMP development process.

Staff has prepared the socioeconomic analysis consistent with the 1989 Governing Board Resolution.

SCAQMD and CARB recognize the need for emission reductions from local, state and federal sources. As such, a "fair share" approach to achieving of reductions needs to take place. The percent NOx emission reductions needed to meet the 8-hour ozone standards by 2023 and 2031 at 45 and 55 percent, respectively, would be a guide, although not a limit for collecting fair share reductions. Staff acknowledges that stationary sources are already "well controlled." However, staff recognizes opportunities to transition to cleaner technologies with commercially available, cost-effective equipment. In addition, incentives could assist in accelerating deployment of advanced technologies in some cases faster than a regulatory approach. It is important to recognize the responsibility of the SCAQMD to ensure attainment of the standards in a timely manner and the obligation to exercise authority over the stationary sources that could assist in meeting those required deadlines. As noted numerous times during the development of the 2016 AQMP, eliminating all stationary source emissions would still not result in the standards being met, but that does not remove the responsibility of those sources, when cost-effective and feasible, to further reduce emissions.

Basin residents are exposed to emissions from a multitude of mobile sources each day. Reducing emissions from mobile sources is generally the most cost-effective way to reduce regional and local air pollution health impacts. Two-thirds or about $10 billion of the Draft Final 2016 AQMP's total incremental cost is related to mobile source control strategies, and these strategies are expected to lead to more than 80 percent of the emission reductions needed to attain the 8-hour ozone standard by 2031. The "fair share" approach calls for emissions reductions from local, state and federal sources that reasonably reflect the sources' share of emissions and not the percentage of estimated costs.

27-2

The "TBD" (to be determined) measures require further technical and feasibility evaluations and the attainment demonstration is not dependent on these measures. However, they are included in the 2016 AQMP as part of a comprehensive plan with all feasible measures in case there is a possible need for contingency measures and in the event of a shortfall in reductions requiring the need for contingency measures. As emission reductions are realized and to the extent that the reductions can be SIP creditable, the reductions will be taken as part of future rate-of-progress reporting or as part of future AQMP revisions. For some SCAQMD TBD mobile source measures, emission reductions are accounted for under the CARB SIP Strategy, so emission reductions are not listed to avoid overlap. These emission reductions will take place locally and will be determined when the programs, such as facility-based measures, are implemented.

It is important to note that NAAQS are expected to be attained with the quantified emission reductions alone. For the cost analysis, incremental costs are estimated for the control strategies with quantified

emission reductions only. Some of the control strategies with TBD emission reductions may serve as measures to make up for any unexpected emission reductions shortfall in reaching the goals of the state strategy. Many of these control strategies include emerging technologies. Therefore, their emission-reducing potential may still need to be evaluated and their cost-effectiveness remain highly uncertain or unknown at this time.

27-3

Please see staff response to Comment 19-4 with regards to extending financial incentives to large stationary sources.

27-4

Please see staff response to Comment 19-1 with regards to the costs presented for control measure CMB-05.

27-5

Please see staff response to Comment 19-3 with regards to the economic analysis required under California Health and Safety Cold section 39616.

27-6

Please see staff response to Comment 19-2 with regards to the assumption of equipment life.

27-7

The cost analysis of the proposed Advanced Clean Cars 2 measure was based on cost information and information provided by CARB staff. According to CARB staff, the cost information incorporated the standard estimates of fuel price projections. Price projections for gasoline, diesel and electricity were projected by the U.S. Department of Energy's "Annual Energy Outlook 2015," which is common practice for this type of analysis. The U.S. Department of Energy, however, does not provide price projections for hydrogen, and without complete information, CARB staff employed a constant $6/kg for years 2026-2031. This price estimate was based on the best information currently available.

CARB's economic analysis focuses on direct impacts of the proposed measure. Estimates of indirect and induced impacts will be included in CARB's Advanced Clean Cars 2 Administrative Procedure Act regulatory process, which includes the opportunity for public participation in workshops where CARB staff will present potential costs and benefits of proposed measures on businesses, consumers, and California state agencies. However, it should be noted that the SCAQMD's Draft Final Socioeconomic Report does include the direct, indirect, and induced macroeconomic impacts of this measure as part of overall regional macroeconomic impact assessment of the Draft Final 2016 AQMP (Table 4-1).

27-8

As stated in the preface of Chapter 2 in the November 19, 2016 version of the Draft Socioeconomic Report and quoted by the commenter, the proposed mobile source measure "Further Deployment for Cleaner Technologies: On-Road Light-Duty Vehicles" is primarily designed to reduce greenhouse gas emissions and therefore it is recognized as providing the co-benefit of NOx and VOC reductions that are expected to be implemented even if the Draft Final 2016 AQMP is not adopted. Their costs are therefore not a result of the Draft Final AQMP and are not included in the socioeconomic assessment of the Draft Final 2016 AQMP.

Moreover, according to CARB's economic impact analysis of the state's mobile source strategy, there would be minimal direct costs on program participants from 2017, and at minimum, to 2023. This is because a large portion of the capital costs related to purchasing cleaner vehicles were assumed to be financed by incentive programs during the same period. Incremental costs of capital spending are expected only from 2023 to 2031, when incentives were conservatively assumed to be unavailable in CARB's economic modeling (pages A-9 to A-10; the analysis is available at https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc_appA.pdf).

However, it should be noted that, first, the purchase of cleaner light-duty vehicles will be voluntary and program participants are not expected to make the purchase unless it is economically advantageous to do so. Second, the additional cost estimated by CARB and subsequently analyzed in the Preliminary Draft Socioeconomic Report did not take into account cost-savings, including fuel and operating and maintenance savings for the entire period of 2017 to 2031. As a result, even if the net incremental costs of this measure would have been included in the analysis, they are expected to be significantly lower than the preliminary cost estimate and may result in overall net cost-savings. Whether this "Further Deployment" measure for on-road light-duty vehicles would result in net costs or cost-savings, those cost impacts are expected to occur even if the Draft Final 2016 AQMP is not adopted and therefore they are not a result of implementing the Draft Final 2016 AQMP.

27-9

The commenter claims that the Draft Socioeconomic Report limits its analysis of the proposed low-emission diesel (LED) measure to off-road equipment. However, this is not the case. First, the concept of this measure is not limited to off-road-equipment. Since most NOx and PM reductions are expected to occur in the off-road sector, the NOx and PM emission benefits analysis has been limited to the off-road sector to arrive at the conservative estimates of NOx and PM reductions. CARB's economic analysis and the SCAQMD's Draft Final Socioeconomic Report cover both on-road and off-road LED use.

The commenter also inquired about the disposition of conventional gas to liquids (GTL) fuels and other like fuels in the proposed strategy. All alternative fuels that belong to the diesel pool including GTL are covered under this provision due to their potential to reduce PM and NOx emissions.

Regarding the commenter's question about carbon intensity, CARB staff responded that the updated low-emission diesel measure concept will not require the low emission diesel to meet the carbon intensity thresholds of 30-60 g CO2e/MJ. Nonetheless, any low-emission diesel fuels including GTL sold in California will be subject to the GHG reduction and carbon intensity requirements under the Cap and Trade and the LCFS.

The commenter's statement "By CARB's own projections, later model year trucks equipped with NOX traps and PM filters would constitute more than 90% of the off-road equipment fleet by 2023." is incorrect. The 90% figure does not refer to the off-road equipment fleet.

Based on CARB staff's finding, appreciable NOx emission reductions from the on-road sector under the low-emission diesel measure concept are not expected, although there will still be appreciable reductions in PM. The NOx reductions will mainly come from the off-road sector since this sector is not expected to see a significant penetration of SCR equipped engines. By excluding PM and NOx emissions from the on-road sector, the estimated PM and NOx reduction benefits account for these two key elements.

As mentioned above, a forecast of market share for legacy on-road diesel vehicles in 2025 is not relevant for NOx and PM reductions analysis since the CARB analysis omits NOx and PM reductions from the on-road sector to provide conservative estimates of NOx and PM reductions. This also implies that the NOx and PM estimates are the incremental benefits of the low emission diesel fuel over the new technology vehicles. The estimated benefits do account for the off-road fleet population. Please note that the Vision model provides the "non-SCR" share of the on-road fleet from Vision's heavy duty module. The non-SCR share of the off-road emission inventory model can be obtained from https://www.arb.ca.gov/msei/categories.htm#offroad_motor_vehicles

Regarding the new LED fuel standard for off-road equipment, as mentioned before, the proposed low-emission diesel measure concept applies to low-emission diesel fuels used in the off-road and on-road sectors. Hence this statement is not applicable here.

Also, see the response to the 2016 AQMP Comment 105-3.

Los Angeles County Business Federation

Strengthening the Voice of Business

BizFed's Member Alliance
AIA Los Angeles
Alhambra Chamber
American Beverage Association
Antelope Valley Board of Trade
Apartment Association, California Southern Cities
Apartment Association of Greater Los Angeles
Arcadia Association of Realtors
Arcadia Chamber
Asian American Business Women Association
Asian American Economic Development Enterprise
Asian Business Association
Association of Independent Commercial Producers
Azusa Chamber
Bell Gardens Chamber
Beverly Hills Chamber
Beverly Hills / Greater LA Association of Realtors
Burbank Association of Realtors
Burbank Chamber
Building Industry Association, LA / Ventura Counties
Building Owners & Managers Association, Greater LA
CalAsian Chamber
California Apartment Association, Los Angeles
California Business Roundtable
California Cannabis Industry Association
California Construction Industry and Materials Association
California Contract Cities Association
California Consumer Finance Association
California Fashion Association
California Grocers Association
California Hotel & Lodging Association
California Independent Bankers
California Independent Petroleum Association
California Life Sciences Association
California Metals Coalition
California Restaurant Association
California Small Business Alliance
California Trucking Association
CALInnovates
Carson Dominguez Employers Alliance
Central City Association
Century City Chamber
Citrus Valley Association of Realtors
Coalition for a Prosperous America
Community Associations Institute, Los Angeles
Construction Industry Air and Water Quality Coalitions
Consumer Healthcare Products Association
Council on Trade and Investment for Filipino Americans
Culver City Chamber
Downey Association of Realtors
Downtown Long Beach Associates
El Monte/South El Monte Chamber
Employers Group
Engineering Contractor's Association
Entrepreneurs Organization, Los Angeles
F.A.S.T.-Fixing Angelenos Stuck In Traffic
Filipino American SEC
FilmLA
Foreign Trade Association
FutureForts
FWD.us
Gateway to LA
Glendale Association of Realtors
Glendale Chamber
Glendora Chamber
Greater Los Angeles Auto Show
Greater Lakewood Chamber
Greater Los Angeles African American Chamber
Greater Los Angeles New Car Dealers Association
Harbor Association of Industry and Commerce
Harbor City / Harbor Gateway Chamber
Harbor Trucking Association
Hollywood Chamber
Hospital Association of Southern California
Hotel Association of Los Angeles
Industry Manufacturers Council
International Warehouse Logistics Association
Inglewood Airport Area Chamber
Irwindale Chamber
Japan Business Association of Southern California
La Canada Flintridge Chamber
LAX Coastal Area Chamber
Leadership for Urban Renewal Network
League of California Cities
Long Beach Area Chamber
Los Angeles Area Chamber
Los Angeles Black MBA Association
Los Angeles Cleantech Incubator
Los Angeles County Bicycle Coalition
Los Angeles County Consumer Affairs
Los Angeles County Waste Management Association
Los Angeles Junior Chamber
Los Angeles Latino Chamber
Los Angeles Metropolitan Hispanic Chamber
Malibu Chamber
Los Angeles Parking Association
Los Angeles Urban League
Los Angeles World Affairs Council
Pacific Palisades Chamber
Pasadena Chamber
Pomona Chamber
Maple Business Council
Motion Picture Association of America
MoveLA
Most Worshipful Hiran Tyre Grand Lodge
NAIOP Southern California Chapter
National Alliance for Jobs and Innovation
National Association of Women Business Owners, LA
Pacific Merchant Shipping Association
Pasadena-Foothills Association of Realtors
Recording Industry Association of America
Redondo Beach Chamber
Regional Black - San Fernando Valley Chamber
Regional Hispanic Chamber
Regional San Gabriel Valley Chamber
Rosemead Chamber
Rotary Club of Los Angeles
San Gabriel Chamber
San Gabriel Valley Civic Alliance
San Gabriel Valley Economic Partnership
Santa Clarita Valley Economic Development Corp.
San Pedro Peninsula Chamber
Santa Monica Chamber
Santa Monica Junior Chamber
Small Business Action Committee
Society of Hispanic Professional Engineers - Los Angeles
South Asian Business Alliance Network
South Bay Association of Chambers
South Bay Association of Realtors
Southern California Golf Association
Southern California Grantmakers
Southern California Minority Supplier Development Council Inc.
Southern California Water Committee
Southland Regional Association of Realtors
South Park Stakeholders Group
Toluca Lake Chamber
Torrance Area Chamber
Town Hall Los Angeles
Tri-Counties Association of Realtors
United Chambers San Fernando Valley
Universal City North Hollywood Chamber
United States-Mexico Chamber
U.S. Green Building Council-LA
Valley Economic Alliance
Valley Economic Development Center
Valley Industry & Commerce Association
Valley International Trade Association
Vernon Chamber
Vietnamese American Chamber
Water Replenishment District
We Care for Humanity
West Hollywood Chamber
West Los Angeles Chamber
West San Gabriel Valley Association
Western Manufactured Housing Association
Westside Council of Chambers
Western States Petroleum Association
West Valley/Warner Center Chamber
Westwood Village Improvement Association
Wilmington Chamber
Young Professionals in Energy - LA Chapter
Youth Business Alliance
Warner Center Association

December 19, 2016

Dr. Elaine Shen
Program Supervisor,
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

RE: COMMENTS ON THE DRAFT SOCIOECONOMIC REPORT

Dear Dr. Shen,

On behalf of the Los Angeles County Business Federation (BizFed), a grassroots alliance of more than 160 top business organizations representing 325,000 employers with more than 3 million employees throughout Southern California, we appreciate the opportunity to provide comments on the Draft Socioeconomic Report (Report) related to the Revised Draft 2016 Air Quality Management Plan (AQMP or Plan). As you know, BizFed members represent Southern California's broader business community. Our diverse group is comprised of major regional business entities and associations, whose members include large and small employers, minority business owners, and job creators from a wide range of industries.

At its core, the Socioeconomic Report is a comparison of the projected costs of the 2016 AQMP to its projected benefits. Therefore, our comments are grouped below as pertaining primarily to either the costs or the benefits presented in the Report.

- We have serious issues with the cost-benefit analysis. The Report indicates the financial costs to comply with the AQMP to be $2.5 billion a year. It also indicates the actual financial health costs saved would be far less at $200 million a year. The only way the benefits get to the $36 billion figure is through the VSL concept, which is not an economic figure, but is supposedly a statement of what people might pay. This does not create a proper economic analysis. In fact, if the "willingness-to-pay" figure properly represented a person's desire to pay for cleaner air, then we would be seeing more correlation between the figure and the ability to fund the incentives needed to carry out the AQMP. Additionally, we dispute the accuracy of the assumption that a one percent increase in income raises VSL by 1.1 percent and believe this greatly overestimates public health benefits of the AQMP. **28 - 1**

- The destruction of more than 169,000 jobs between 2017-31 **28 - 2**

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in the South Coast Air Basin from the 2016 AQMP is deeply concerning. The Report claims that this job loss will be offset by positive job gains from the health benefits created by the AQMP; however, we highly doubt these job gains will occur (see Husing comment letter dated November 21, 2016). The long-term, cumulative impacts of this amount of job destruction will contribute to the inability of low-skilled workers to migrate out of poverty due to job suppression in sectors (logistics, manufacturing, etc.) most hindered by SCAQMD regulations. **28 - 2 (CONT'D)**

- Overall, we find the section of the Report entitled, "Preliminary Discussion of Health Effects of Unemployment" to be inadequately researched. The District must do a better job of measuring the health effects of unemployment that result from its regulations. What the business community has requested over the past four years is to analyze the health effects of poverty and to not limit the analysis to unemployment. Over 25 percent of the children in the region are living in poverty, and this is a crisis that cannot be ignored and that carries significant health impacts. It appears there was no direction to Abt, or to anyone, to consider this issue; but only this type of analysis will begin to show the true costs of air quality regulations and display a proper comparison of the costs and the benefits associated with the 2016 AQMP. **28 - 3**

- The District should formally implement a "look-back" audit process whereby actual implementation costs are compared with Staff's initial projections, with the estimating methodology recalibrated as necessary. **28 - 4**

- Small businesses are the backbone of Southern California's economy; yet, the SER/REMI does not capture the economic impacts of the AQMP on small businesses. We continue to urge the District to consider fully the impacts that its regulations have on small businesses as part of the AQMP socioeconomic analysis process. **28 - 5**

- There is dispute regarding the SCAQMD's assumption that health benefits continue to be linear for air quality improvements below the NAAQS. There is reportedly no scientific basis for that assumption, but it makes a significant impact on the study's outcome. **28 - 6**

- Some commenters have indicated that there is "strong epidemiologic evidence that there is no relationship between PM2.5 and total mortality in California" (see Enstrom and Nebert comment letters on Draft 2016 AQMP). If such comments are valid, then that would significantly impact the socioeconomic analysis since most of the calculated socioeconomic benefits from health are tied to reduced mortality from reductions in PM2.5. **28 - 7**

In closing, we appreciate the District's efforts to analyze the economic consequences of the AQMP and continue to encourage the SCAQMD to enhance its analysis to more fully capture the costs and more accurately assess the public health benefits associated with the AQMP. BizFed leadership will continue to help with this endeavor any way we can, and we would like to reorient you to a comment letter that we submitted to the SCAQMD Governing Board on November 6, 2014 regarding the report prepared by Abt Associates (August 14, 2014) following its evaluation of the District's process for socioeconomic assessments. This letter has been attached to these comments for your convenience and provides an overview of our overarching recommendations to enhance SCAQMD's process for preparing **28 - 8**

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socioeconomic assessments.] **28 - 8 (CONT'D)**

Thank you for considering our viewpoints on this matter.

Sincerely,

Gilbert F. Ivey
BizFed Chair
Former CAO,
Metropolitan Water District

David Fleming
BizFed Founding Chair

Tracy Hernandez
BizFed Founding CEO
IMPOWER, Inc.

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NOTES FOR COMMENT LETTER #28

The following attachment(s) were included with the comment letter submitted by BizFed on December 19, 2016 and were duplicate entries on previous comment letter(s) received:

1. Attachment A to Comment Letter #22

Responses to Comment Letter #28

Submitted by Los Angeles County Business Federation (BizFed) on December 19, 2016

28-1

Please see staff response to Comment 22-3.

28-2

The Draft Final Socioeconomic Report modeled four impact scenarios to provide a plausible range of modeling results: from 9,000 jobs foregone to 27,000 jobs gained on average per year between 2017 and 2031. Two of the scenarios did not include the positive job impacts associated with public health benefits-based amenity improvements; moreover, for the interest of transparency and documentation clarity, Chapter 4 of the Draft Final Socioeconomic Report also included a sensitivity test to address the uncertainty of amenity modeling in REMI and discussed the implications of this test. Regarding the claimed impact of the SCAQMD regulations on job suppression and poverty, please see staff responses to Comments 22-2, 23-2 and 23-3.

28-3

Please see staff response to Comment 22-2.

28-4

Staff appreciates the comment regarding implementation of retrospective, or "look-back," analysis. Staff has initiated a preliminary literature review to identify existing retrospective studies and will continue this effort. One of the major challenges of conducting retrospective analysis, as identified by staff and also in the literature, is the difficulty to access and obtain detailed and often confidential firm-level financial information, including the actual compliance costs incurred. Therefore, any help from stakeholders, the commenter included, will be highly appreciated and will greatly mitigate the data limitations that could potentially constrain the scope and extent of any retrospective analysis. Staff also appreciates the Commenter's offer to assist with enhancing the SCAQMD socioeconomic assessment (see Comments 22-6 and 28-8).

28-5

The Small Business Analysis in Chapter 2 of the Draft Final Socioeconomic Report provides information on the potential impacts on small businesses in each industry from implementation of the Draft Final 2016 AQMP. The scope of the analysis was limited due to data limitations. Staff is committed to performing additional refined small business impact analyses during the rulemaking process when more facility-specific data will be available.

Staff is currently working with an expert consultant Industrial Economics, Inc. (IEc) to identify the most updated literature, methodology, and tools to assess socioeconomic impacts that are small in scale, concentrated in a few industry sectors, or mainly affect small businesses. The purpose of such analyses is to complement the REMI simulations of jobs and other macroeconomic impacts currently conducted by staff. Staff will survey stakeholder interest with regards to convening a meeting to discuss IEc's draft findings and recommendations, which are expected to be completed in the second quarter of 2017.

28-6

Please see staff response to Comment 22-4.

28-7

Please see staff response to Comment 12-1.

28-8

Please see staff response to Comment 22-6.

COMMENT LETTER #29—OCTA, DECEMBER 19, 2016

Form Informtion

Date Created	Time Created	AQMP Year
12/19/2016	5:00 PM	2016

Commentor Contact Information

Commentor's Name*	Organization*	City	State	Zip Code
GREG NORD	OCTA			

If not representing a specific organization, please enter "No Affiliation".

Comments (Unlimted Size)

29 - 1

The Orange County Transportation Authority (OCTA) appreciates the opportunity to comment on the Socioeconomic Report for the 2016 Air Quality Management Plan (AQMP), as well as the opportunity to participate on the AQMP Advisory Committee. We also recognize the challenge faced by the South Coast Air Quality Management District's (SCAQMD) to compile a plan that can demonstrate attainment of federal ambient air quality standards, while minimizing potential economic impacts. This letter offers comments focusing on the proposed measure ORHD-04 - Advanced Clean Transit, as well as some general comments on the Socioeconomic Impact Report.

Measure ORHD-04 - Advanced Clean Transit, assumes that transit bus fleets are currently able to implement zero-emission technologies. However, CARB's Mobile Source Strategy document (May 2016) indicated that some of this technology, such as fuel cell buses and battery electric hybrid buses are still very early in the commercialization phases. Additionally, stakeholders, including OCTA, are continuing to work with CARB to refine this proposed regulation and to better understand the costs and potential service impacts. Considering that these issues are still under discussion, we respectfully request that the Socioeconomic Report emphasize that the costs for this measure remain uncertain.

According to Appendix 2-A, Compilation of Incremental Costs of Control Measures, SCAQMD is estimating a net cost savings of $6.6 million annually (2017-2031) from implementation of this measure. This cost estimate is based on the assumption that operating and maintenance costs and fuel savings will more than offset the incremental cost of new electric/CNG or fuel cell urban bus. Even if urban buses are available to meet the 0.02 grams/brake-horsepower hour standard, OCTA contends that it is unlikely that such equipment would only cost an additional $50,000 per bus, as assumed by SCAQMD. This measure further assumes that a bus lifespan is only 12 years, which suggests a fleet turnover in advance of the 14 year cycle OCTA plans for. OCTA has concerns related to these assumptions and will continue to work with CARB and AQMD to improve these cost estimates and the assumptions related to fleet turnover.

29 - 2

It is unclear where SCAQMD's assumptions for "willingness to pay for life" (WTP) and Value of a Statistical Life (VSL) came from. These assumptions form the basis for all cost benefits of the entire clean air plan. Please provide copies of any references used to estimate the $4.2 million - $13.7 million range that someone would pay to live longer. These numbers are, in turn, used by SCAQMD to estimate a $9 billion to $49 billion in total cost savings from the AQMP.

29 - 3

According to Table 3-4 - Monetized Public Health Benefits, about 98 percent of estimated reduction in mortality would result from PM2.5 attainment. Since all of the Basin's monitors (with the exception of Mira Loma) show attainment with ambient PM2.5 standards, it is unclear what additional health benefits, if any, would be derived by potentially lowering an already low concentration. The SCAQMD estimate of $26.8 - 36.7 billion in health benefits from attainment of the PM2.5 standard appears to overstate potential benefits, and overestimates the Basin's population that actually experiences PM2.5 above the federal health-based standard.

Members of the Scientific, Technical, Modeling Peer Review Advisory Group (STMPR) provided comments stating that there is a much lower correlation than the one cited by SCAQMD between PM2.5 concentrations and mortality rates. The previously assessed potential health benefits associated with implementation of the plan should be reevaluated in light of the studies presented by the STMPR members.

Thank you for the opportunity to provide comments.

Upload Additional Comment and Supporting Files (30 Mb Maximum per file)

Socioeconomic Report Comments Files

Attach Socioeconomic Report Comments Files

Note: Supported upload files include all versions of Microsoft Office, jpeg, tiff, PDF, mp3, mp4, and text files.

Commentor Signature*



Responses to Comment Letter #29

Submitted by Orange County Transit Authority (OCTA) on December 19, 2016

29-1

The proposed Advanced Clean Transit control measure is part of the state's mobile source strategy. Cost estimates for this measure were based on data and assumptions provided by CARB staff, which are consistent with those used in CARB's Mobile Source Strategy Appendix A: Economic Impact Analysis, except for the economic impact modeling assumption regarding whether capital spending would be financed. SCAQMD staff has made revisions to Appendix 2-A of the Draft Final Socioeconomic Report to clarify that the estimated overall cost-savings were derived based on currently available information including fuel price projections. Additionally, the comment has been forwarded to CARB for their consideration.

29-2

Please see staff response to Comment 20-2 regarding the availability of reference documents for willingness to pay (WTP) and value of statistical life (VSL) and staff response to Comment 22-3 for a detailed explanation of the WTP concept. VSL is derived from studies that methodically estimated WTP for mortality risk reductions, and as discussed in Chapter 3 of the Draft Final Socioeconomic Report, it reflects a population's aggregated willingness to pay so that the associated risk reductions are statistically equivalent to one case of premature death avoided. The concept of VSL does not place a monetary value on saving a life with certainty, and it was not used in staff's analysis to value life extension.

29-3

Please see staff response to Comment 20-12 regarding the scientific consensus that public health benefits would continue to accrue due to reduced exposure to air pollutants at all levels of pollutant concentration, even at levels below the current NAAQS. Please also see staff response to Comment 12-1 regarding the concentration-response (C-R) relationship between PM2.5 exposure and the risk of premature deaths. It should be clarified that the C-R functions used in the Draft Final Socioeconomic Assessment were recommended by the SCAQMD's expert Industrial Economics, Inc. (IEc) and their scientific advisor, and were discussed and reviewed at multiple meetings of the 2016 AQMP Scientific, Technical and Modeling Peer Review (STMPR) Advisory Group, which were open to public participation with advanced meeting notices electronically mailed to all 2016 AQMP interested parties. Alternative views of the C-R relationship as cited by the Commenter were submitted as public comments and were not provided as comments by STMPR members.

CALIFORNIA Small Business Alliance
Dedicated to Environmental Progress and Economic Growth

December 19, 2016

Mr. Wayne Nastri
Executive Officer
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765

COMMENTS ON THE DRAFT 2016 AIR QUALITY MANAGEMENT PLAN

Dear Mr. Nastri:

30 - 1

The California Small Business Alliance (Alliance) is a non-partisan coalition of California trade associations committed to providing small businesses with a single constructive voice before the South Coast Air Quality Management District (SCAQMD), and other environmental regulatory agencies. As active participants in the development of the Air Quality Management Plan (AQMP), Alliance members have served on the AQMP Advisory Group, Advisory Council, and on many White Paper Working Groups. Alliance members also have been actively engaged in the ongoing dialog with other stakeholders representing a broad cross section of business interests, neighborhood community organizations, and local, state and federal agencies. As the AQMP appears to be in the final stages of development, we want to take this opportunity to comment on the Socioeconomic Report (SER), prior to it being presented to the Governing Board for review and adoption consideration.

General Comments

Just as the Alliance has been a contributing stakeholder in the two-plus years during which the AQMP was being developed, the thousands of small businesses that are represented by our trade association member organizations are also stakeholders contributing to the vitality of region's economy. Both owners and employees have a vested interest in seeing that this regional blueprint is realistically and fairly designed to achieve federal air quality standards in the South Coast Basin, without causing harm to the economy.

We commend the staff for assuring us that the technological and financial impacts on small businesses associated with the ensuing rulemaking process will be assessed in greater detail than it is in the AQMP. We remind staff that as part of their recommendation for undertaking this task, Abt Associates, Inc., urged the use of industry-specific studies, case studies, and surveys, which we take to mean directly involving the small business community and not relying solely on computer modeling and analyses by the REMI model or from outside third parties.

Finally, our participation in past AQMPs has taught us that most of the proposed control strategies, and the ensuing rulemaking activity, are designed to protect the public from the

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30 - 1 (CONT'D)

harmful effects of pollution, and gradually move us toward the ever-elusive goal of "attainment." However, the two sections in every AQMP where profound differences always seem to arise between the Staff and stakeholders, especially the business community, deal with health effects, and socioeconomic impacts. It is our hope that the 2016 AQMP will not be a continuation of this process.

A Discussion About Costs

30 - 2

The SER assumes that the total incremental cost of the AQMP is $15.7 billion with >90 percent, or $14.6 billion, to be used as incentives to offset the cost of purchasing cleaner technologies which are deemed essential to meet our emission reduction targets. Of those numbers, it appears that ~$4.4 billion is the incremental cost attributable to the stationary and mobile sources under SCAQMD's authority with ~$2 billion to be used for providing incentives for these same sources.

During the December meeting of the AQMP Advisory Group it was revealed that the SCAQMD is considering, and has explored, various fund raising strategies, but none have yet materialized to the point of certainty. To add to our concern, most of the strategies that were discussed would require voter and/or legislative approval. Some other fund raising strategies would require establishing public-private partnerships. It is not at all clear to us exactly what this means, what private entities would be involved, and to what extent they would be invited to be equity partners. And finally, we have been made aware that some consideration has been given to obtaining some federal funds from the incoming administration. Considering that the voters of California virtually turned their backs on the new administration in the recent election, it's difficult to imagine that any request for funds to pursue regulatory programs that are likely to be incompatible with their new policies would be given serious consideration.

30 - 3

Another cause for concern among small business owners is that the AQMP is focused solely on accelerating the deployment of zero and near zero emission technologies from the sources under the SCAQMD's authority. There seems to be no consideration that these technologies will be acceptable to the businesses for which they are intended. Because some permitted equipment which is sanctioned for use by small businesses is already so overly controlled, so as to make it inefficient to operate, the Staff should expect to encounter some reluctance by certain owner/operators to voluntarily opt to purchase and install emission reduction technologies that could present them with competitive disadvantages with similar businesses in other regions. We believe that our concerns are justified when the SER clearly states that some businesses would see production costs go up. We do not believe that the SCAQMD should put itself in the position of picking winners and losers and deciding which small businesses will survive and which ones will not.

30 - 4

The subject of cost-effectiveness has been a topic of controversy in many, if not all, AQMPs. The 2016 AQMP is no exception. Some segments of industry have advocated for analyses using the discounted cash flow method while others have advocated for the levelized cash flow (LCF) method. Most industry segments express misgivings about relying solely on an analysis using the REMI model. In their 2014 Socioeconomic Report, Abt Associates, Inc. strongly recommended augmenting the REMI analysis with alternative modeling tools and studies and surveys by

credible industrial organizations, especially when calculating the cost-effectiveness of technologies for small businesses. The Alliance supports this recommendation.

SCAQMD has long favored using the LCF method because, in their opinion, it amortizes all costs incurred at present or in the future, into a yearly expenditure of equal amount over the project life. However, for the past five years, Alliance members have been engaged in a series of frustrating discussions with the SCAQMD staff over cost-effectiveness of Low NOx Burners, as it applies to Rule 1147. The primary reason for our frustration is that the SCAQMD's modeling and methodology does NOT recognize ALL of the costs incurred by the thousands of unique small business owners who are engaged in hundreds of different operations using Low NOx burners. Without conducting individual analyses of the way in which this technology is applied, it is impossible to render an accurate cost-effectiveness analysis. As a result, the "benefits" of this technology is grossly misrepresented. By applying this same approach to the technologies featured in the AQMP, we believe it significantly undermines the accuracy of the claimed cost-effectiveness benefits which are cited therein.

30 - 4 (CONT'D)

A Discussion About Benefits

Alliance members reject many of the assumptions made in the SER about the perceived benefits of the AQMP. In a separate letter, we explained the reasons for our skepticism about the professed adverse health and economic impacts of particulate matter in cases of mortality and morbidity. In our letter, we cited credible research that was conducted by a number of reputable scientists which produced contradictory results to many of the assumptions and claims made by researchers and used by SCAQMD to justify the goals set forth in the 2016 AQMP.

30 - 5

In Chapter 3 of the SER, we strongly question the accuracy of the methodology used to monetize the benefits associated with avoided premature deaths based on a population's "willingness to pay" for a small reduction of mortality risk in one year. When confronted with a medical diagnosis of cancer, a patient may be willing to pay many thousands of dollars to avoid dying prematurely from the disease, but may not have the ability to do so. In those instances, individuals are confronted with a difficult, alternative decision, that being a "willingness to accept" the consequences of an untimely diagnosis. This happens more often than not.

The approach described in the SER to measure an individual's willingness to pay suggests that it is more hypothetical than actual, and therefore subject to all the inherent biases of computer modeling. In a business environment, accurately gauging consumers' willing to pay for a product or service is critical for formulating competitive strategies, conducting value audits, and developing new products. Businesses simply can't afford the uncertainty and inaccuracy of relying on hypothetical assessments of consumers' willingness to pay. We believe the SCAQMD should also avoid relying on this approach to quantify the public health benefits of the AQMP.

30 - 6

A Discussion About Incentives

Contrary to the comments sometimes made about air pollution in Southern California, particularly by those who have little or no sense of our local history, air quality has improved markedly over the decades, and the SCAQMD can rightly claim credit for much of this success. For that matter, so can the sources under its authority. Billions – maybe trillions – of dollars have been invested by commercial and industrial businesses to make this dream a reality. While

30 - 7

30 - 7 (CONT'D)

Alliance members concede that more can be done to make further progress in improving air quality, we also know that stationary sources, particularly small businesses, have few options left to them that would result in meaningful, affordable emission reductions. A point on which stakeholders seem to agree is that if all regulated stationary sources were shut down, the region would still be out of attainment.

30 - 8

Aside from the massive investment in technology and regulation the opportunity to breath the air we enjoy in the present day has come at an even greater price with the loss of thousands of manufacturing businesses and good paying jobs. And this doesn't include the untold numbers of entrepreneurs who have avoided siting their businesses in the state because of the extreme regulation and high operating costs.

30 - 9

For the reasons stated above, the need to offer local businesses meaningful financial incentives to make additional emission reductions is absolutely essential. Because of the continuing uncertainty over the SCAQMD's ability to secure sufficient funding we fear a worst-case scenario whereby thousands of small business owners could be placed in extreme financial and legal jeopardy by being unable to comply with the new mandated emission reduction targets. For this reason, we urge SCAQMD to insert language in the AQMP that will relieve these sources of any liability arising out of circumstances not of their own making. We do not believe that this is analogous to requesting a waiver because these facilities have done all they can afford to do, but because of the influence of emissions from other sources outside the authority of the SCAQMD, the Basin continues to be out of attainment.

The Alliance appreciates the opportunity to submit these comments. We may submit additional comments during this process as the SCAQMD releases additional 2016 AQMP documents between now and the date set for the Governing Board adoption hearing.

Please contact me with any questions at (714) 778-0763 or at: BillLaMarr@msn.com

Sincerely,

Bill La Marr
Executive Director

cc: Philip Fine, Ph.D., Deputy Executive Officer – Planning, Rule Development & Area Sources
Michael Krause, Planning and Rules Manager – Planning, Rule Development & Area Sources

Responses to Comment Letter #30

Submitted by Small Business Alliance on January 4th, 2017

30-1

Staff appreciates the Commenter's continued participation in the 2016 AQMP development process and the input and comments provided during numerous public meetings.

The Small Business Analysis in Chapter 2 of the Draft Final Socioeconomic Report provides information on the potential impacts on small businesses in each industry from implementation of the Draft Final 2016 AQMP. The scope of the analysis was limited due to data limitations. Staff is committed to performing additional refined small business impact analyses during the rulemaking process when more facility-specific data will be available. In order to broaden the scope and to conduct a more in-depth analysis, staff would appreciate any assistance from the Commenter and other stakeholders to obtain additional industry- and facility-specific data and information on the potentially affected small businesses.

Regarding the 2014 Abt recommendation, please see staff response to Comment 28-5 that discusses staff's ongoing efforts to identify the most updated literature, methodology, and tools to assess socioeconomic impact that are small in scale, concentrated in a few industry sectors, or mainly affect small businesses.

30-2

The Draft Financial Incentives Funding Action Plan for the Draft Final 2016 AQMP provides information on many potential funding opportunities. However, a systematic assessment of these opportunities through the public process is necessary to determine the most likely scenarios and most feasible approaches to secure incentive funding. Moreover, the submission process of the State Implementation Plan (SIP) will allow sufficient time for this public process to take place. For further details, please refer to response to Comment 20-8-.

30-3

Contrary to the Commenter's claim, the 2016 AQMP is not focused solely on accelerating the deployment of zero and near-zero emission technologies from the sources under the SCAQMD's authority. Accelerated deployment of advanced clean technologies is proposed for both stationary and mobile sources. Additionally, a regulatory approach is proposed wherever and whenever technically feasible and cost-effective. While regulations will set standards for new equipment installations in some applications, incentive programs can accelerate the change out of existing equipment by increasing market penetration of new technologies, which may in turn help reduce costs for technologies that are currently too high for many owners and operators, if purchased without incentives. The incentive program participants may benefit additionally from increased energy efficiency and reduced maintenance that are characteristic of many of the zero and near-zero emission technologies, thus offsetting increases in their capital spending cost. If and when an advanced clean technology becomes sufficiently cost-effective, a regulatory approach may then be taken to achieve emission reduction targets.

The SCAQMD staff will continue to be sensitive to the financial and other constraints that are faced by small business owners and operators, and their affordability and competitiveness concerns will be carefully considered during rule and program development.

30-4

Since the completion off the 2014 Abt review, staff has implemented many of the Abt recommendations including providing cost-effectiveness values for AQMP and rule development using both discounted cash flow (DCF) and levelized cash flow (LCF) methods. DCF and LCF values for the proposed 2016 AQMP control measures were reported in Table 2-4 of the Draft Final Socioeconomic Report to facilitate comparisons with cost-effectiveness reported by other agencies and organizations. Please see staff response to Comment 28-5 that discusses staff's ongoing efforts to identify the most updated literature, methodology, and tools to assess socioeconomic impact that tends to be small in scale, concentrated in a few industry sectors, or mainly affect small businesses. As mentioned in staff response to Comment 30-3, the SCAQMD staff will continue to carefully consider affordability concerns among small business owners and operators during rule and program development.

The Commenter incorrectly stated that SCAQMD has long favored using the LCF method. SCAQMD staff had previously used the LCF method for the assessment of control measures in earlier AQMPs; however, a decision was made in 1987 to switch to the DCF method for two reasons: first, it was then used extensively in major Fortune 500 companies; second, it was more versatile than the LCF method (SCAQMD 1989). In 1995, SCAQMD began to use DCF in determining compliance of the best available control technology (BACT) for minor sources. Since 1996, DCF has been the cost-effectiveness methodology used for rulemaking. For more details, please refer to Appendix 2-B of the Draft Final Socioeconomic Report.

For the purpose of comparison with other rules adopted and amended by the SCAQMD, staff used the DCF methodology for all of the assessments for Rule 1147. In evaluating the cost-effectiveness in Rule 1147, some stakeholders proposed cost components there were not consistent with the SCAQMD BACT guidelines and U.S. EPA methodology. However, those costs were assessed in the socioeconomic report prepared for the Rule 1147 adoption and amendment. Since 2015, all cost-effectiveness values for both AQMP and rulemaking have been presented using both DCF and LCF methodology.

Finally, SCAQMD and other regulatory agencies evaluate cost-effectiveness based on average costs derived from a range of costs sampled for a variety of equipment and processes that are sufficiently representative of what are used in the region. Contrary to the Commenter's claim that it is impossible to render an accurate cost-effectiveness analysis without an individual evaluation, a representative sample can yield a reliable cost-effectiveness estimate. Moreover, it is impractical to follow the Commenter's suggestion to evaluate the cost-effectiveness for every individual unit potentially subject to a rule requirement. During rule development, staff considers and analyzes outlier cases where compliance costs would be prohibitively high compared to compliance costs expected to be incurred by other potentially affected facilities.

30-5

The response to the comment letter referenced in this comment can be found in "Responses to Comments on Appendix I of the 2016 AQMP," Response to Comment #1. Please also refer to staff response to Comment 12-1 on the Socioeconomic Report.

30-6

Please see staff response to Comment 22-3 for a detailed explanation of the willingness to pay (WTP) concept and the discussion of its theoretical background and the associated empirical evidence used to support the range of value of statistical (VSL) as utilized in the Draft Final Socioeconomic Report. The WTP approach was recommended by expert consultant Industrial Economics, Inc. (IEc) and their scientific advisor. It represents the state-of-science methodology that is also adopted in other regulatory benefit-cost analysis, such as those conducted by the U.S. EPA.

30-7

Staff appreciates the Commenter's acknowledgement of the efforts SCAQMD has made in improving the air quality over the decades. Staff analyzed the proposals in the control strategy to be sure the measures could be feasibly implemented and within an acceptable cost effectiveness range. As a result, it is not expected that each stationary source category can reduce emission by the exact same percentage. In some cases, more technical evaluation will need to take place, and thus reductions are deemed "to be determined" and are not committed to in the SIP. Incentives could assist those stationary measures whereby it is not yet cost effective to transition to cleaner technologies, but financial support will help ensure it is cost-effective for the user to operate cleaner equipment.

It is important to recognize the responsibility of the SCAQMD to ensure attainment of the standards in a timely manner and the District's authority over the stationary sources that could assist in meeting those required deadlines. As noted numerous times during the development of the Plan, eliminating all stationary source emissions would still not result in the standards being met, but that does not remove the responsibility of those sources, when cost-effective and feasible, to contribute to reductions.

30-8

There have been significant improvements in air quality within the Southern California Basin despite significant growth in GDP, jobs, and population, as shown in Figure 1-1 of Draft Final Socioeconomic Report. In fact, economic growth is needed to support investment in cleaning the air. The business community has made great strides in complying with some of the most stringent controls in the nation while remaining competitive. Despite these efforts, California has been one of the nation's silver linings in recent years, and the economy of the four-county region—Los Angeles, Orange, Riverside and San Bernardino—is expanding again, with clearly rebounding jobs and output numbers that have exceeded pre-recession peaks.

Regarding manufacturing job losses, Figure 1-3 of the Draft Final Socioeconomic Report clearly shows that the decline in manufacturing employment is not specific to the four-county region but it is exhibited also at the state and national levels. Economic studies have linked the nationwide manufacturing job losses largely to technological changes and global trade. Moreover, as mentioned in the staff response to Comment 23-1, staff has not been able to identify peer-reviewed economic studies that found clean air regulations as a driver of regional job growth trends.

30-9

The incentive programs will be developed in detail with comprehensive guidelines to be approved by the SCAQMD Governing Board. Public working groups or workshops will take place to discuss the guidelines and incentives, including fund distribution. The SCAQMD will establish working groups to include all

stakeholders and determine the most effective methods, balancing factors such as costs, emissions reductions, small businesses, Environmental Justice (EJ) areas, etc. Facilities that qualify for incentives shall submit applications during an open enrollment period. Projects will be evaluated based on criteria, including, but not limited to, emission reductions, cost-effectiveness, age of equipment, remaining useful life of existing equipment, EJ considerations, and small business status.

It is important to recognize the responsibility of the SCAQMD to ensure attainment of the standards in a timely manner and the District's authority over the stationary sources that could assist in meeting those required deadlines. Furthermore, under Federal Law, SCAQMD is unable to relieve small sources of emissions from mandated emission reductions in various source categories.

Comment Letters Submitted to Multiple AQMP Documents

The following comments were submitted to both 2016 AQMP Appendix I: Health Effects and the Socioeconomic Report (SER).

- Bill La Marr of California Small Business Alliance submitted a comment to both the SER and Appendix I on August 26, 2016. For responses see 20-1 through 20-10 of the Response to Comments for Appendix I.
- Dr. Gordon Fulks submitted a comment to both the SER and Appendix I on August 15, 2016. For response see Response to Comment Letter #6 of the Response to Comments for Appendix I.
- Dr. James Enstrom submitted a comment to both the SER and Appendix I on August 15, 2016. For response see Response to Comment Letter #7 of the Response to Comments for Appendix I.
- Dr. John Dunn submitted a comment to both the SER and Appendix I on August 14, 2016. For response see Response to Comment Letter #5 of the Response to Comments for Appendix I.
- Dr. Stanley Young submitted a comment to both the SER and Appendix I on July 26, 2016. For response see Response to Comment Letter #1 of the Response to Comments for Appendix I.

Comments similar to those listed above were also submitted to the SER. The response to those comments can be found in response 12-1.

An additional comment letter on the Socioeconomic Report submitted by David W. Brown on August 31, 2016 is included as Comment Letter #69 on the Draft 2016 AQMP. The response can be found at http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/response-to-comments/2016-aqmp-rtc-3-of-4.pdf.

BEFORE THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

IN RE THE MATTER OF:	)
	)
PUBLIC HEARING:	)
	)
SCAQMD 2016 AIR QUALITY MANAGEMENT PLAN	)
	)
	)
	)

DATE AND TIME:	TUESDAY, NOVEMBER 15, 2016 2:00 P.M.
PLACE:	DOUBLE TREE BY HILTON HOTEL 3 CIVIC PLAZA CARSON, CALIFORNIA 90745
REPORTER:	KRISTIN RIVERA, CSR CERTIFICATE NO. 11858
BRS FILE NO.:	99071

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CARSON, CALIFORNIA; TUESDAY, NOVEMBER 15, 2016

2:00 P.M.

MR. NASTRI: GOOD AFTERNOON. MY NAME IS WAYNE NASTRI. WE WILL BEGIN SHORTLY. BUT BEFORE WE BEGIN, I JUST WANT TO THOSE HAVE CELL PHONES -- IF YOU COULD MOVE THE RINGER TO SILENT OR TURN IT OFF, WE WOULD GREATLY APPRECIATE THAT. IN THE EVENT OF THE EMERGENCY, WE HAVE EXITS TO THE REAR BOTH DIRECTLY BEHIND US AND TO THE -- I GUESS IT WOULD BE THE EAST SIDE. IF THERE IS AN EARTHQUAKE AND WE NEED TO SHELTER IN PLACE, YOU CAN DUCK AND COVER UNTIL DIRECTED THAT IT'S ALL CLEAR. AND THE RESTROOMS I BELIEVE ARE OUT THE BACK AND TO THE RIGHT NEAR THE MAIN LOBBY.

SO WITH THAT, WHY DON'T WE GO AHEAD AND BEGIN. AND THIS IS PART OF OUR PUBLIC OUTREACH TO THE PUBLIC TO INTERESTED COMMUNITY MEMBERS ON THE STATUS OF OUR AIR QUALITY MANAGEMENT PLAN. TODAY YOU'LL HEAR FROM THE SOUTH COAST AQMD STAFF AND REPRESENTATIVES FROM THE CALIFORNIA AIR RESOURCES BOARD ON THE CHANGES THAT WERE MADE SINCE WE CAME OUT WITH THE INITIAL VERSION AND THE SCHEDULED TIME LINE FOR ACTION.

SO WITH THAT, I'M GOING TO TURN IT OVER TO DR. FINE TO RUN THE MEETING.

DR. FINE: THANKS, WAYNE. AGAIN, WELCOME

EVERYONE. SO THESE ARE REGIONAL HEARINGS AS REQUIRED BY HEALTH AND SAFETY CODE AND BY THE AQMP, WHICH MEANS WE ARE TAKING TRANSCRIPTS, AND THE TRANSCRIPTS WILL BE PROVIDED TO OUR GOVERNING BOARD MEMBERS IN HELPING THEM MAKE THEIR DECISION ON ADOPTION OF THE AQMP WHICH WE EXPECT IN FEBRUARY.

SO MANY OF YOU MAY HAVE BEEN HERE IN THE SUMMER WHEN WE DID A ROUND OF REGIONAL WORKSHOPS. AND THIS SERVES THE SAME PURPOSE IN TERMS OF OUTREACH, BUT THIS IS A LITTLE MORE OFFICIAL MEETING IN TERMS OF TAKING A TRANSCRIPT. SO EVERYTHING WILL BE WRITTEN DOWN. ALL COMMENTS YOU ARE MAKING HERE TODAY WILL BE RECORDED IN THAT TRANSCRIPT AND AGAIN WE WILL RESPONDING IN THE AQMP.

SO WITH THAT, IF ANYONE WOULD LIKE TO SPEAK -- WE'RE GOING TO DO SOME PRESENTATIONS. BUT IF YOU'D LIKE TO SPEAK AFTER THE PRESENTATIONS, WE HAVE THESE BLUE CARDS IN THE BACK AND WE CAN HAND THEM OUT. I ONLY HAVE ONE SO FAR. BUT IF YOU WISH TO SPEAK, PLEASE FILL OUT A BLUE CARD, AND WE'LL CALL YOU. WE DO HAVE SOME PRESENTATIONS TO GET TO. IT'S IN THREE PARTS. I WILL FIRST DISCUSS THE AIR QUALITY MANAGEMENT PLAN AS RELEASED IN OCTOBER, THE REVISED DRAFT, AND THEN WE'LL MOVE AND THEN WE'LL GIVE OUR COLLEAGUES FROM THE CALIFORNIA AIR RESOURCES BOARD A CHANCE TO TALK ABOUT THEIR STATE SIP STRATEGY IN TERMS OF THE REDUCTIONS THEY'RE GOING TO GET

AT THE STATE LEVEL WHICH IS A PART OF OUR AIR QUALITY MANAGEMENT PLAN. AND THEN ALSO REQUIRED BY STATE LAW OUR AQMP INCLUDES A DISCUSSION OF HEALTH EFFECTS OF AIR POLLUTION AND PARTICULATE MATTER ON THE RESIDENTS OF THE SOUTH COAST AIR BASIN, WHICH IS INCLUDED IN OUR APPENDIX 1. AND THESE REGIONAL HEARINGS THAT WE ARE HOLDING ALSO SERVE TO BE REGIONAL HEARINGS ON THAT ANALYSIS.

SO BEFORE I GET STARTED, MAYBE WE CAN HAVE THE OTHER FOLKS UP AT THE FRONT INTRODUCE THEMSELVES. MY NAME IS PHILIP FINE, DEPUTY EXECUTIVE OFFICER PLANNING AND RULES DIVISION.

MS. VANDERSPEK: SILVIA VANDERSPEK, CHIEF OF THE AIR QUALITY MANAGEMENT PLANING AT THE AIR RESOURCES BOARD.

MR. HUGO: GOOD MORNING. I'M HENRY HUGO, ASSISTANT DEPUTY EXECUTIVE OFFICER, MOBILE SOURCE DIVISION, AT THE AQMD.

DR. GHOSH: HI. GOOD AFTERNOON. MY NAME IS JO KAY GHOSH. I'M THE HEALTH EFFECTS OFFICER AT THE SOUTH COAST AQMD.

MR. WONG: GOOD AFTERNOON. MY NAME IS BILL WONG. I'M THE DEPUTY DISTRICT COUNSEL AT THE AQMD.

DR. FINE: OKAY. WITH THAT, WE'LL GET STARTED. AND, AGAIN, OBVIOUSLY THE AIR QUALITY MANAGEMENT PLAN IS A VERY COMPLEX INVOLVED DOCUMENT. WE'VE BEEN WORKING ON

IT FOR OVER THREE YEARS NOW. SO THIS PRESENTATION JUST HIT SOME OF THE HIGHLIGHTS AND HIGHLIGHTS THE CHANGES WE'VE MADE THROUGH THE PUBLIC PROCESS MORE RECENTLY. BUT I'LL GIVE YOU A LITTLE BIT OF BACKGROUND.

AS MANY OF YOU KNOW, CALIFORNIA STILL HAS SOME OF THE WORST AIR QUALITY IN THE NATION. BETWEEN US AND THE SAN JOAQUIN VALLEY, WE DO HAVE THE WORST AIR QUALITY IN TERMS OF PARTICULATE MATTER AND OZONE IN THE COUNTRY. HOWEVER, IN THE PAST MANY, MANY DECADES -- AND THIS JUST SHOWS FROM 1995. -- WE HAVE SEEN TREMENDOUS IMPROVEMENTS IN AIR QUALITY DUE TO RULES AND REGULATIONS PASSED AT THE LOCAL, STATE, AND FEDERAL LEVELS TO REDUCE EMISSIONS.

SO YOU CAN SEE PARTICULATE MATTER HAS DROPPED JUST OVER 15 PERCENT IN THE LAST 15 YEARS AND OZONE IS A LITTLE BIT SLOWER. BUT YOU CAN SEE WE'VE HAD A LOT OF GAINS IN OZONE POLLUTION AS WELL. BUT AS I MENTIONED, DESPITE THAT, OUR CHALLENGES IN TERMS OF MEETING AIR QUALITY STANDARDS STILL REMAIN QUITE GREAT.

SO THE REASON WE DO THESE PLANS IS LARGELY DUE TO THE CLEAN AIR ACT AND ALSO DUE TO THE CALIFORNIA CLEAN AIR ACT. IN GENERAL, U.S. EPA SETS WHAT'S KNOWN AS NATIONAL AMBIENT AIR QUALITY STANDARDS WHICH ALL AREAS OF THE COUNTY ARE OBLIGATED TO MEET. AND BASED ON THE DATA THAT WE MONITOR THROUGHOUT THE REGION, WE GET WHAT OUR AIR QUALITY LEVELS ARE, THEY COMPARE IT TO THESE

STANDARDS, AND THEY WILL DESIGNATE AS ATTAINMENT OR NONATTAINMENT. AS I MENTIONED, WE ARE STILL NONATTAINMENT FOR PARTICULATE MATTER AS WELL AS GROUND LEVEL OZONE.

IF YOU'RE DESIGNATED NONATTAINMENT, A WHOLE SECTION OF THE CLEAN AIR ACT KICKS IN WHERE YOU HAVE TO DO -- YOU SUBMIT WHAT'S KNOWN AS STATE IMPLEMENTATION PLAN. AND THAT PLAN IS A BLUEPRINT HOW YOU'RE GOING TO GET THE EMISSION REDUCTIONS NECESSARY IN ORDER TO MEET THOSE STANDARDS. SO IT'S -- IN SOUTH COAST OUR PORTION OF THE SIP OR THE STATE IMPLEMENTATION PLAN IS THE AIR QUALITY MANAGEMENT PLAN THAT WE'RE GOING TO TALK ABOUT TODAY. AND ALSO UNDER STATE LAW WE ARE ALSO REQUIRED TO DO THESE AIR QUALITY MANAGEMENT PLANS AND UPDATE THEM PERIODICALLY. IT IS THE BLUEPRINT FOR HOW WE'RE GOING TO MEET THE STATE AND FEDERAL AIR QUALITY STANDARDS FOR OUR AREA. THIS WILL BE THE 11TH PLAN THAT SOUTH COAST AQMD HAS WORKED ON SINCE THE LATE '70S.

AS I MENTIONED BEFORE, WE'RE STILL NONATTAINMENT FOR PARTICULATE MATTER OR PM2.5 AS WELL AS GROUND LEVEL OZONE. AND THE CLEAN AIR ACT REQUIRES US TO ATTAIN THESE STANDARDS AS EXPEDITIOUSLY AS PRACTICAL, WHICH IS THE SAME AS AS SOON AS FEASIBLE OR AS SOON AS POSSIBLE, BUT NO LATER THAN THE STATUTORY ATTAINMENT DATES.

I'VE LISTED THOSE HERE. THERE'S FIVE DIFFERENT

STANDARDS; TWO FOR PM2.5 AND THREE FOR OZONE FOR WHICH THE SOUTH COAST AIR BASIN STILL DOES NOT ATTAIN THOSE FEDERAL STANDARDS. AND THE REASON WE LIST THEM ALL HERE, WHEN WE DO AN AIR QUALITY MANAGEMENT PLAN WE TRY TO ADDRESS THESE NONATTAINMENT POLLUTANTS IN AN INTEGRATED FASHION. WE DON'T WANT TO HAVE ONE SET OF ACTIONS TO ATTAIN ONE -- TO MEET ONE STANDARD AND ANOTHER SET OF ACTIONS TO MEET ANOTHER STANDARD. WE WANT TO LOOK AT IT HOLISTICALLY AND INTEGRATE THE STRATEGY SO WE CAN MOST EFFICIENTLY MEET THE STANDARDS AND GET THE EMISSION REDUCTIONS THAT ALLOW US TO MEET ALL THE STANDARDS.

SO YOU CAN SEE HERE WE HAVE THREE OZONE STANDARDS AND TWO PM2.5 STANDARDS. WE HAVE VARIOUS LEVELS, VARIOUS ATTAINMENT YEARS, STATUTORY ATTAINMENT YEARS, AND THEN VARIOUS SIP SUBMITTAL DUE DATES. YOU WILL NOTICE THAT WE ARE LATE ON SOME OF THESE STATE SUBMITTAL DUE DATES HERE, BUT WE'VE BEEN IN CLOSE CONTACT WITH THE CALIFORNIA AIR RESOURCES BOARD AND U.S. EPA ON THE TIMING OF THIS SUBMITTAL. EVERYONE AGREES IT'S MORE IMPORTANT TO GET THIS RIGHT AND HAVE ENOUGH TIME FOR PUBLIC PARTICIPATION THAN TO JUST TO MEET THESE DEADLINES. AND WE DON'T FEEL THERE'S GOING TO BE ANY CONSEQUENCES AS LONG AS WE CAN GET THE PLAN IN CURRENTLY AS SCHEDULED TOWARDS THE BEGINNING OF NEXT YEAR.

SO THE CHALLENGE IN MEETING THESE AIR QUALITY

STANDARDS ALL COMES DOWN TO NITROGEN OXIDE REDUCTIONS OR NOX REDUCTIONS. NOX IS EMITTED FROM ALL COMBUSTION PROCESSES, WHETHER IT'S A MOBILE SOURCE OR GASOLINE ENGINE OR DIESEL ENGINE OR IN YOUR HOUSE OR WHEN BURNING NATURAL GAS FOR HEATING OR WATER HEATING. SO ALL COMBUSTION PROCESSES PRODUCE NOX. ONCE THAT NOX IS EMITTED INTO THE ATMOSPHERE, IT COMBINES WITH OTHER POLLUTANTS AND SUNLIGHT TO FORM NOT ONLY GROUND LEVEL OZONE BUT ALSO A PARTICULATE MATTER. SO WHEN WE DO OUR ANALYSIS, WE KNOW THAT NOX REDUCTIONS ARE THE PATHWAY NOT ONLY TO MEET THE OZONE STANDARDS BUT ALSO TO MEET THE PM2.5 STANDARDS, WHICH IS WHY THIS PLAN FOCUSES HEAVILY ON NOX.

SO WHAT THIS CHART SHOWS IS IN THE BLUE BARS THE TOTAL NOX EMISSIONS IN THE BASIN GOING FROM 2012, WHICH IS OUR BASE HERE, AND GOING FORWARD ALL THE WAY THROUGH 2031, WHICH IS THE LATEST ATTAINMENT YEAR WHICH IS IN THAT CHART THAT I SHOWED EARLIER. AND YOU CAN SEE THAT THE EMISSION DECREASE 50 TO 60 PERCENT OVER THIS TIME PERIOD. AND THE REASON THEY DECREASE IS DUE TO ALREADY ADOPTED RULES AND REGULATIONS THAT CONTINUE TO GET IMPLEMENTED AT THE LOCAL LEVEL AND THE STATE LEVEL AND FEDERAL LEVEL. SO WE WILL SEE AIR QUALITY IMPROVEMENTS GOING FORWARD DUE TO THESE EMISSION REDUCTIONS.

THE CHALLENGE IS THIS IS NOT ENOUGH TO MEET THOSE

STANDARDS I LISTED EARLIER. WE NEED TO SHRINK THESE BLUE BARS DOWN TO THE LEVEL OF WHERE THE RED BARS ARE. SO THAT'S 43 PERCENT OF ADDITIONAL REDUCTION IN 2023 AND A 55-PERCENT ADDITIONAL REDUCTION IN 2031. IF THESE STANDARDS COULD BE MET, WE WILL MEET OUR OTHER OZONE STANDARD IN 2022 WHICH ONLY REQUIRES ABOUT A 17-PERCENT REDUCTION ONE YEAR EARLIER. AND THESE REDUCTIONS IN NOX WILL ALSO ALLOW US TO MEET OUR PM2.5 STANDARDS IN 2019 AS WELL AS IN 2025. SO THAT IS WHY WE HAVE SUCH A FOCUS ON NOX. AND THE MOST CHALLENGING -- THE MOST CHALLENGING STANDARD AND THE ONE THAT'S COMING UP THE SOONEST IS 2023 STANDARD FOR THE EIGHT-HOUR OZONE STANDARD. SO THAT DRIVES A LOT OF THE PLANNING AND THE STRATEGY THAT I'M GOING TO TALK ABOUT.

THE OTHER SIDE OF THIS CHALLENGE IS NOT ONLY DOING SIGNIFICANT NOX REDUCTIONS AS A LOCAL AIR QUALITY DISTRICT IN THE STATE OF CALIFORNIA, WE HAVE PRIMARY AUTHORITY AND JURISDICTION OVER STATIONARY SOURCES. HOWEVER, ONLY ABOUT 12 PERCENT IN 2012 OF THE NOX EMISSIONS COME FROM STATIONARY SOURCES. THE VAST MAJORITY, 88 PERCENT, COME FROM MOBILE SOURCES. GENERALLY THE STATE, THE CALIFORNIA AIR RESOURCES BOARD, AND THE FEDERAL GOVERNMENT, THE U.S. EPA, HAVE THE DIRECT AUTHORITY TO CONTROL THOSE SOURCES. SO THIS IS THE CHALLENGE WE HAVE, YOU KNOW, THE RESPONSIBILITY FOR

DEVELOPING A PLAN TO BRING THE AREA INTO ATTAINMENT, BUT WE HAVE VERY LIMITED AUTHORITY OVER THE SOURCE THAT ARE MOST RESPONSIBLE FOR CONTRIBUTING TO THAT NONATTAINMENT.

SO I WON'T GO INTO DETAILS OF THE PLAN. IT'S OBVIOUSLY A LONG AND COMPLEX DOCUMENT. BUT JUST TO SUM UP SOME THE ASPECTS OF THE PLAN, WHEN WE GO FORWARD WHAT WE'RE SHOWING HERE IS THE TOTAL NOX EMISSION REDUCTIONS NEEDED TO ATTAIN THE STANDARD. SO WE 400 TONS PER DAY REDUCTION BY 2023 AND ALMOST 450 TONS PER DAY REDUCTIONS IN 2031.

SO WE LOOK AT WHERE THOSE REDUCTIONS ARE GOING TO COME FROM. THE BLUE BARS HERE, WHICH IS ABOUT 70 PERCENT, COME FROM AS I MENTIONED BEFORE ALREADY EXISTING RULES AND REGULATIONS THAT CONTINUE TO BE IMPLEMENTED OVER TIME. THAT'S WHY WE SAW THESE BLUE BARS IN THE OTHER CHART DECREASE. SO WHAT WE NEED TO DO IS BUILD UPON THOSE ALREADY EXISTING RULES AND REGULATIONS AND PROGRAMS AND FIGURE OUT HOW WE'RE GOING TO FIND THE ADDITIONAL REDUCTIONS.

SO WHAT WE DO IS WE ADD IN THIS PLAN A NEW MEASURES TO GET THE ADDITIONAL REDUCTIONS. SO THE PURPLE BAR IS WHAT WE'RE SHOWING IS NEW STATE AS WELL AS LOCAL REGULATIONS. IT DOES APPEAR SLIM. BUT, AGAIN, WE UPDATE THE PLAN EVERY THREE TO FOUR YEARS. IT'S ONLY BEEN FOUR YEARS SINCE THE LAST PLAN, WHICH WE'RE REQUIRED TO PUT

EVERY SINGLE FEASIBLE RULE AND REGULATION INTO THAT PLAN, WHICH WE DID. AT THIS TIME WE'RE DOING THE SAME THING, BUT IN ONLY FOUR YEARS WE ONLY HAVE A FEW MORE THINGS THAT ARE FEASIBLE. SO IT IS SLIM HERE. IN 2031 IT GETS QUITE SIGNIFICANT BECAUSE THERE'S MORE TIME FOR TECHNOLOGY. I WOULD JUST MENTION, WE LOOK BACK AT PREVIOUS PLANS IN 2012, 2008, THE MAGNITUDE OF THE EMISSION REDUCTIONS FROM DIRECT RULES AND REGULATIONS IS VERY SIMILAR TO WHAT YOU SEE HERE.

WE ALSO HAVE FEDERAL SOURCES THAT WE'RE GOING TO NEED TO GET REDUCTIONS IN ORDER TO ATTAIN THE STANDARD. WITHIN THE STATE SIP STRATEGY THAT SILVIA WILL BE TALKING ABOUT, WE INCLUDE REDUCTIONS FROM FEDERAL SOURCES. AND THEN TO FILL THAT REMAINING GAP IN THE GREEN IS WHAT WE'RE CALLING INCENTIVES, WHICH IS REALLY WE CAN SEE THE TECHNOLOGIES THAT ARE BEING DEVELOPED NOW OR WILL BE IN THE NEXT FEW YEARS IN ORDER TO MEET THE STANDARDS. AND WE CAN DO REGULATIONS TO SET VERY TIGHT EMISSION STANDARDS ON ALL TYPES OF ON-ROAD AND OFF-ROAD EQUIPMENT ON THE MOBILE SOURCE SIDE. THE PROBLEM IS IT TAKES A LONG TIME FOR THOSE FLEETS AND THOSE EQUIPMENTS TO TURNOVER USING THEIR NORMAL USEFUL LIFE. SO WHERE THE INCENTIVES COME IN IS TO HELP PROVIDE FOR THOSE EQUIPMENT OWNERS TO CHANGE OUT THAT EQUIPMENT MORE RAPIDLY AND ADVANCE THE DEPLOYMENT OF THE CLEANEST TECHNOLOGIES, AND

THAT IS WHY WE HAVE -- INCENTIVES ARE A PORTION OF THIS PLAN.

AS I MENTIONED, AGAIN, WE HAVE LIMITED LEGAL AUTHORITY OVER MOBILE SOURCES, BUT THAT IS WHY WE CANNOT HAVE A VALID ATTAINMENT PLAN UNLESS WE INCLUDE REDUCTIONS AT THE FEDERAL AND STATE LEVEL. SO WE HAVE OUR REGIONAL REDUCTIONS WITHIN THE PLAN. WE INTEGRATE THE STATE SIP STRATEGY, WHICH WE'LL HEAR ABOUT IN A MOMENT, AND WE ALSO HAVE REDUCTIONS ON THE FEDERAL SOURCES. THAT'S THE ONLY WAY WE CAN GET ATTAINMENT ACROSS THE BOARD AND INTEGRATE INTO ONE PLAN.

JUST TO GO BACK TO STATIONARY SOURCES FOR A MOMENT, AGAIN, IT'S A LIMITED PIECE OF THE PIE, BUT WE DO HAVE OUR OBLIGATIONS AND AUTHORITIES IN THAT AREA. SO JUST LIKE EVERY PLAN WE HAVE PASSED IN THE LAST DECADE, WE LOOK AT THE STATIONARY SOURCE CATEGORY. WE LOOKED AT WHERE THE EMISSIONS ARE COMING FROM. WE ANALYZED ALL THE OTHER MEASURES THAT HAVE BEEN ADOPTED WITHIN THE STATE AND OUTSIDE THE STATE ACROSS THE COUNTRY. AND TYPICALLY WE DO HAVE THE MOST STRINGENT REGULATIONS ANYWHERE IN THE COUNTRY ON STATIONARY SOURCES. WE ALSO HAVE A FULL PUBLIC PROCESS. WE HAVE AN ADVISORY GROUP THAT'S MET 14 TIMES. WE HAD A WORKING GROUP WORKING ON A SERIES OF WHITE PAPERS A COUPLE YEARS AGO. WE HAD A CONTROL TECHNOLOGY SYMPOSIUM GATHERING IDEAS AND INPUT ON WHERE

THE AVAILABLE EMISSION REDUCTIONS ARE ON THE STATIONARY SOURCES.

AT THE END OF THE DAY, WE DID FIND SOME FEASIBLE REGULATORY OPTIONS FOR NOX EMISSIONS ON THE STATIONARY SOURCES. WE'RE LOOKING AT REDUCTIONS IN NON-REFINERY FLARES. WE'RE LOOKING AT COMMERCIAL COOKING WHICH HAS LARGELY GONE UNREGULATED. WE'RE LOOKING AT OUR RECLAIM PROGRAM WHICH ARE FOR NOX EMISSIONS. WE HAD A 45-PERCENT REDUCTION THAT WAS ADOPTED LAST YEAR BY OUR GOVERNING BOARD, AND WE'RE COMMITTING TO ANOTHER 45 PERCENT ON TOP OF THAT GOING FORWARD. WE'RE LOOKING AT COMMERCIAL AND RESIDENTIAL APPLIANCES AND EQUIPMENT LOOKING FOR ZERO AND NEAR ZERO EMISSION REDUCTIONS THERE. AND THEN WE'RE LOOKING AT ALTERNATIVES TO DIESEL BACK-UP GENERATORS WHICH STILL PUT OUT A LOT OF EMISSIONS. AND THERE ARE OTHER TECHNOLOGIES THAT ARE EMERGING THAT CAN SERVE THE SAME PURPOSE BUT DON'T HAVE THE SAME AMOUNT OF PM OR NOX EMISSIONS. BUT I DO WANT TO HIGHLIGHT, WE DO HAVE THE AUTHORITY OVER STATIONARY SOURCES. BUT EVEN IF WE BROUGHT ALL THE STATIONARY SOURCES TO ZERO EMISSIONS TOMORROW, WE WOULD STILL BE A LONG WAY FROM MEETING OUR ATTAINMENT GOALS. SO THAT IS WHY MOBILE SOURCES ARE SUCH A LARGE FOCUS OF THE PLAN.

WE DO HAVE SOME LIMITED REGULATORY AUTHORITY OVER MOBILE SOURCE, AND THIS IS DUE TO FEDERAL AND STATE LAW

THAT GIVES US INDIRECT SOURCE AUTHORITY AND THEN IN STATE LAW WE DO HAVE SOME FLEET RULE AUTHORITY. ESSENTIALLY THIS SAYS THAT ANY FACILITY THAT ATTRACTS MOBILE SOURCES, WHETHER YOU'RE AN AIRPORT, A RAIL YARD, A PORT, A WAREHOUSE, OR EVEN A DEVELOPMENT PROJECT OR REDEVELOPMENT CONSTRUCTION PROJECT, WE DO HAVE SOME AUTHORITY ON THAT. SO WHAT WE'RE PLANNING ON DOING IS FORMING WORKING GROUPS AND COLLABORATING WITH THOSE INDUSTRIES AND TRYING TO FIND WHAT THE BEST PRACTICES ARE AND WHAT THEY CAN ACTUALLY DO TO REDUCE EMISSIONS -- MANY ARE ALREADY DOING THESE THINGS TO REDUCE EMISSIONS. -- AND SEE IF WE CAN SET UP ARRANGEMENTS OR AGREEMENTS THAT MAKE THOSE EMISSION REDUCTIONS PERMANENT AND ENFORCEABLE SUCH THAT WE CAN TAKE CREDIT WITHIN OUR STATED IMPLEMENTATION PLAN. WE PLAN TO CONVENE THOSE MEETINGS SOON AFTER ADOPTION OF THE AQMP. WE PLAN TO FORM THOSE WORKING GROUPS TO SEE WHAT PROGRESS WE CAN MAKE. WE WILL REPORT BACK TO OUR GOVERNING BOARD. AND IF WE'RE NOT MAKING PROGRESS, THEN WE CAN PIVOT VERY QUICKLY TO THE SAME PUBLIC PROCESS IN THOSE MEETINGS TO COME BACK TO OUR BOARD AND PERHAPS RECOMMEND REGULATIONS IF WE WEREN'T MAKING ANY PROGRESS. SO WE'RE GIVING OURSELVES A TIME LINE AND SPECIFIC TIMES WHEN WE REPORT BACK TO OUR GOVERNING BOARD COMMITTEES AND OUR GOVERNING BOARD ON THAT.

BUT, AGAIN, ONE THING I WANT TO HIGHLIGHT ON

THESE MEASURES, THE EMISSION REDUCTIONS THAT THESE MEASURES WILL ACHIEVE ARE ALREADY PART OF THE SIP AND ARE ALREADY PART OF THE STATE COMMITMENT FOR EMISSION REDUCTIONS. THIS IS JUST DESIGNED TO HELP -- TO HELP IMPLEMENT THOSE EMISSION REDUCTIONS. THERE'S MANY WAYS WE CAN GET EMISSION REDUCTIONS FOR FURTHER DEPLOYMENT OF ADVANCED TECHNOLOGIES. INCENTIVES IS ONE. THIS IS ANOTHER WAY USING, YOU KNOW, COLLABORATION AND WHATEVER AUTHORITIES WE DO HAVE TO HELP FACILITATE THOSE EMISSION REDUCTIONS.

SO AS I MENTIONED BEFORE, WE HAD A DRAFT PLAN RELEASED IN JUNE, AND WE RECEIVED COMMENTS ON THAT, 69 DIFFERENT COMMENT LETTERS. AND THEN BASED ON THOSE COMMENT LETTERS AND A WIDE RANGE OF MEETINGS AND STAKEHOLDER MEETING AND ADVISORY GROUP MEETINGS, WE DID MAKE REVISIONS TO THE DRAFT THAT WE RELEASED EARLIER IN OCTOBER. AND HERE ARE SOME OF THE HIGHLIGHTS OF THE CHANGES THAT WERE MADE. WE DID ADD PRIORITY ON MAXIMIZING EMISSION REDUCTIONS ON ZERO EMISSION TECHNOLOGY WHEREVER THEY ARE COST EFFECTIVE AND FEASIBLE, AND THEN WHERE THEY'RE NOT COST EFFECTIVE AND FEASIBLE, NEAR ZERO EMISSION TECHNOLOGY, ULTRA LOW NOX, REMAINING APPLICATIONS.

AND WHEN YOU'RE TRYING TO DETERMINE WHAT'S COST EFFECTIVE AND HOW MUCH EMISSION REDUCTIONS, IT'S VERY

IMPORTANT TO LOOK AT THE FULL LIFE CYCLE OF A PARTICULAR TECHNOLOGY NOT JUST THE EMISSION REDUCTIONS COMING OUT OF WHERE THE EQUIPMENT IS BEING USED BUT ALSO THE ENERGY INPUTS THE TRANSMISSION THROUGH AN ELECTRIC POWER LINE OR NATURAL GAS LINE AND HOW THAT ELECTRICITY PERHAPS IS GENERATED.

WE DID ADD ADDITIONAL REGULATORY MEASURES WHEN IT CAME TO DIESEL BACK-UP GENERATORS AND ALSO RESIDENTIAL AND COMMERCIAL APPLIANCES. I MENTIONED THIS EARLIER. BUT EVEN AFTER YOU ADD THESE REGULATORY MEASURES, YOU GET A NOMINAL AMOUNT OF EMISSION REDUCTIONS, BUT YOU STILL NEED THE INCENTIVES TO ADVANCE DEPLOYMENT OF THE TECHNOLOGIES. EVEN THE REGULATIONS IN ALL THESE AREAS, MOBILE SOURCES AND STATIONARY SOURCES, CAN SET THOSE STANDARDS. BUT IN ORDER TO ADVANCE THE DEPLOYMENT BY OUR DEADLINES, YOU STILL NEED SOME INCENTIVES TO GET THE EQUIPMENT OUT THERE.

PART OF RECLAIM -- AND WE RECEIVED COMMENTS ON THIS. -- NOW THAT WE'RE SERIOUSLY GOING TO CONSIDER THE RECLAIM PROGRAM, WE'RE GOING TO REASSESS IT. AND ONE OF THE THINGS THAT IS EMERGING FROM THE DISCUSSIONS IS THERE MIGHT BE A LONG-TERM TRANSITION FROM THE RECLAIM PROGRAM OUT OF A CAP AND TRADE PROGRAM TO A MORE TRADITIONAL COMMAND AND CONTROL PROGRAM.

WE DID ADD CLARITY AND CERTAINTY AND TIME LINES

FOR THE FACILITY-BASED MEASURES. AS I MENTIONED, WE ADDED SOME DISCUSSION ON THE FLEET RULES AND WE ALSO HAD UPDATES ON THE TECHNICAL SIDE IN TERMS OF INVENTORY AND THE MODELING AND THE DATA. THAT'S ALL BEEN INCLUDED IN THIS REVISED DRAFT.

SO WHEN YOU -- IN PREVIOUS PLANS AND UNDER THE CLEAN AIR ACT WE WERE ABLE TO HAVE AN APPROVABLE PLAN TO EPA, BUT IT DOESN'T NECESSARILY HAVE TO SPECIFY EXACTLY WHERE THE EMISSIONS WERE COMING FROM. WE USED TO CALL THIS THE BLACK BOX, SECTION 18285 OF THE CLEAN AIR ACT. AND BECAUSE OUR NEAREST ATTAINMENT DEADLINES ARE ONLY SIX OR SEVEN YEARS AWAY AT THIS POINT, WE DON'T HAVE THE LUXURY OF PUTTING OFF THESE TOUGH DECISIONS. SO ONE FORTUNATE THING IS THAT THE TECHNOLOGY HAS ADVANCED TO THE POINT WHERE WE CAN ACTUALLY ENVISION THE DEPLOYMENT OF THIS TECHNOLOGY AND WHICH TECHNOLOGY IT WILL TAKE TO GET TO THESE ATTAINMENT GOALS IN JUST SIX OR SEVEN YEARS. WE HAVE ULTRA LOW NOX ENGINES EITHER AVAILABLE OR COMING OUT. THERE ARE OTHER TYPES OF TECHNOLOGIES OUT THERE THAT CAN LOWER EMISSIONS DRAMATICALLY. SO WE CAN EXACTLY LAY OUT HOW MANY TRUCKS NEED TO GO TO THESE BETTER TECHNOLOGIES, THESE CLEANER TECHNOLOGIES, HOW MUCH EQUIPMENT. SO WE CAN LAY OUT A PATH TO ATTAINMENT. IN PAST PLANS WE HAVEN'T BEEN ABLE TO DO THAT BECAUSE THE TECHNOLOGY SITUATION WAS JUST TOO UNCERTAIN.

THE OTHER THING WE CAN DO NOW THAT WE CAN LOOK AT THAT NUMBER OF EQUIPMENT, WE CAN PUT A PRICE TAG ON WHAT IT'S GOING TO COST TO INCENTIVIZE THAT ACCELERATED DEPLOYMENT. SO WE HAVE DONE THAT. IT'S PART OF OUR PLAN. AND IT SHOWS US ONLY THE SIGNIFICANT EXPANSION OF THE FINANCIAL INCENTIVE PROGRAMS WE CURRENTLY IMPLEMENT. WE CURRENTLY IMPLEMENT ABOUT 100 TO $150,000 PER YEAR IN INCENTIVE PROGRAMS, BUT OVER THE NEXT 15 YEARS WE'RE GOING TO HAVE TO UP THAT TO ABOUT A BILLION DOLLARS A YEAR. THAT'S ABOUT $14 BILLION OVER A 15-YEAR PERIOD ROUNDED OFF TO ABOUT A BILLION DOLLARS A YEAR. IT'S A VERY EXPENSIVE PROPOSITION, BUT IT REALLY IS, ONCE ALL THE FEASIBLE REGULATORY OPTIONS HAVE BEEN EXHAUSTED WHICH ARE IN THE PLAN AND IN THE STATE SIP STRATEGY WHAT'S LEFT IS HOW DO WE MOVE UP THOSE EMISSION REDUCTIONS TO A POINT WHERE CAN HIT THESE EARLIER ATTAINMENT DEADLINES. SO THAT'S WHERE THE BILLION DOLLARS A YEAR COMES FROM.
AS WITH EVERY AQMP, THERE ARE RELATED DOCUMENTS. WE DO A FULL CEQA ENVIRONMENTAL IMPACT REPORT ON IMPLEMENTATION OF THE PLAN, AND THAT HAS BEEN OUT FOR COMMENT, AND ACTUALLY THE COMMENT PERIOD CLOSES TODAY. WE ALSO DO A FULL SOCIOECONOMIC ASSESSMENT OF THE PLAN, WHICH I'LL TALK ABOUT IN A MOMENT AND RELEASE THOSE CHAPTERS AND THOSE RESULTS AS THEY COME AVAILABLE FOR PUBLIC REVIEW AND COMMENT. AND THEN NEW TO THIS PLAN IS ALSO IN

PARALLEL WITH AQMP BECAUSE THERE IS SUCH A LARGE INCENTIVE PLANNING NEED, WE'RE DEVELOPING AN ACTION PLAN TO PRESENT TO OUR BOARD OF HOW STAFF IS GOING TO MOVE FORWARD IN TERMS OF TRYING TO SECURE THE NECESSARY FUNDING TO FUND IMPLEMENTATION OF THE PLAN.

SO I'M JUST GOING TO TALK ABOUT SOME OF THOSE DOCUMENTS. I WON'T TOUCH ON CEQA TODAY. BUT ON THE SOCIOECONOMIC, WHEN YOU LOOK AT THE COST OF THE PLAN, NOT THE BENEFITS, BUT JUST THE COST OF IMPLEMENTING THE AQMP, YOU CAN SEE HERE THE TOTAL COST IS ABOUT $15.5 BILLION. IT'S A LITTLE BIT HIGHER THAN SOME PREVIOUS PLANS, BUT SAME ORDER OF MAGNITUDE OF PREVIOUS PLANS. WHEN YOU ANNUALIZE THAT, IT'S $1.4 BILLION A YEAR IN TOTAL COST FOR THE PLAN. WHEN YOU BREAK THAT DOWN, A LARGE PORTION OF THAT ACTUALLY IS PUBLIC FINDING FOR INCENTIVES AND THERE ARE OBVIOUSLY SOME COSTS FOR INDUSTRY AS WELL OR FOR RESIDENTS. YOU CAN SEE HERE JUST ON THE STATIONARY SOURCES THERE ARE ALREADY 1.4 BILLION IN INCENTIVES OF ABOUT 4.3 BILLION IN COSTS GOING TO STATIONARY SOURCES. AND HERE YOU HAVE SOME COST SAVINGS FROM SOME OF THE CARB MOBILE SOURCE MEASURES FOR COST SAVINGS THAT COME FROM IN FUEL SAVINGS IF YOU SWITCH FUELS.

BUT WHEN YOU LOOK AT THE PUBLIC HEALTH BENEFITS OF THE PLAN, IT DOES OUTWEIGH THE COSTS. WE HAVE AN OVERALL PUBLIC HEALTH BENEFIT OF $256 BILLION OVER THAT

15-YEAR PERIOD THAT COMES TO ABOUT 24 BILLION A YEAR. NOW, MOST OF THAT PUBLIC HEATH BENEFIT IS DUE TO AVOIDED PREMATURE DEATHS DUE TO PM2.5 EXPOSURE. BUT THE OTHER PORTION OF IT DOES RELATE TO OZONE EXPOSURE. IT DOES RELATE TO REDUCED HOSPITAL VISITS, REDUCED ILLNESSES, REDUCED LOST WORK DAYS DUE TO BETTER AIR QUALITY AND HEALTHIER PEOPLE.

AND GETTING BACK TO THE FUNDING ACTION PLAN, WE ARE DEVELOPING THIS IN PARALLEL WITH THE PLAN. IT'S HOW WE'RE GOING TO SECURE THIS ADDITIONAL INCENTIVE FUNDING. THERE'S AN OUTLINE FOR THE PLAN THAT WE'RE WORKING ON. AND THE AQMP ALREADY INCLUDES A DISCUSSION OF FUNDING LEVELS NEEDED AS I MENTIONED BEFORE. IT COMES TOWARDS THE END OF CHAPTER 4. SO THE OUTLINE, WE HAVE BACKGROUND. WE'LL TALK ABOUT OUR EXISTING FUNDING PROGRAMS AND HOW WE MIGHT BE ABLE TO EXPAND THEM AND THEN POTENTIAL NEW FUNDING OPPORTUNITIES AND THEN THE ACTIVITIES AND ACTIONS THAT AQMD STAFF WILL TAKE IN ORDER TO GO ABOUT TRYING TO SECURE THAT FUNDING ALONG WITH VERY SCHEDULING REPORTING BACK TO OUR BOARD ON PROGRESS.

SO SOME OF OUR EXISTING FUNDING SOURCES ARE LISTED HERE AND SOME POTENTIAL NEW SOURCES OF FUNDING ARE LISTED HERE. BUT I WANT TO MENTION ALL OPTIONS ARE ON THE TABLE. NO ONE HAS DECIDED THAT ONE OF THESE IS GOING TO BE THE ANSWER. IT'S PROBABLY GOING TO BE A

COMBINATION OF EXPANDING EXISTING SOURCES AND A COMBINATION OF POTENTIAL NEW SOURCES AT THE FEDERAL LEVEL, AT THE LOCAL LEVEL, AT THE STATE FEDERAL. BUT THIS IS WHAT IT'S GOING TO TAKE. IT'S GOING TO TAKE AN EFFORT TO FIND THESE NEW REVENUE SOURCES IN ORDER TO IMPLEMENT THE PLAN AND ACHIEVE THE STANDARDS AT SOUTH COAST.

SO WHAT WE'LL BE DOING IS LOOKING AT OUR AUTHORITIES IN TERMS OF THE STATE LEVEL IN TERMS OF BEING ABLE TO RAISE THE FUNDING. WE'LL BE FORMING WORKING GROUPS AND TRY TO BUILD A COALITION OF SUPPORT OF TRYING TO SECURE FUNDING AT THESE OTHER LEVELS. WE'VE ALREADY STARTED. WE'VE CREATED A NATIONAL COLLABORATION. THERE WILL BE A LOT OF OTHER ARES THAT ARE NONATTAINMENT THROUGHOUT THE COUNTRY, AND WE'LL WORK WITH THE NATIONAL ASSOCIATION OF CLEAN AIR AGENCIES TO BUILD A COALITION FOR THE NEED FOR THIS FUNDING. WE HAVE MANY PRIVATE SECTOR MEMBERS WHO HAVE AN INTEREST IN SECURING THE FUNDING AS WELL AS OTHER ENVIRONMENTAL GROUPS AND NGO'S. IF WE ARE GOING TO ACHIEVE CLEAN AIR, THE FUNDING IS ESSENTIAL. WE ALSO AT THE STATE LEVEL WORKING WITH THE CALIFORNIA AIR POLLUTION CONTROL OFFICE ASSOCIATION OF OTHER DISTRICTS AND LOOKING AT PUBLIC/PRIVATE PARTNERSHIPS TO HELP BUILD SUPPORT.

SO WHERE WE ARE IN TERMS OF AQMP DEVELOPMENT, AS

I MENTIONED BEFORE, WE RELEASED A DRAFT IN JUNE. WE RELEASED A REVISED DRAFT IN OCTOBER. A LOT OF THE CHANGES IN THE REVISED DRAFT WE'RE DIRECTLY DUE TO THE COMMENTS WE RECEIVED. WE RECEIVED 30 COMMENT LETTERS ON THAT REVISED DRAFT ALREADY, AND WE'RE TAKING THOSE INTO ACCOUNT IN ANOTHER DRAFT THAT WE'RE WORKING ON THAT WE HOPE TO RELEASE IN EARLY DECEMBER. AND WE HAVE ONGOING STAKEHOLDERS MEETINGS. WE'RE DOING THESE REGIONAL HEARINGS RIGHT NOW. WE'VE HAD OVER 163 MEETINGS OVER THE PAST COUPLE OF YEARS IN TERMS OF THE DEVELOPMENT OF THE AQMP.

THIS IS JUST A SCHEDULE IN GRAPHICAL FORM. THE GOAL HERE IS TO GET -- RELEASE THE DRAFT FINAL IN EARLY DECEMBER SO WE HAVE ABOUT A 60-DAY FINAL COMMENT PERIOD BEFORE OUR BOARD CONSIDERATION IN FEBRUARY. THIS IS JUST A PUBLIC HEARING SCHEDULE. WE'RE RIGHT HERE RIGHT NOW. ON THURSDAY -- WE HAVE ONE IN EACH OF OUR FOUR COUNTIES. SO ON THURSDAY WE'LL GO OUT TO SAN BERNARDINO AND RIVERSIDE. THIS MORNING WE WERE IN ORANGE COUNTY, BUENA PARK.

FOR CONTACT INFORMATION, FEEL FREE TO CONTACT ME OR IN CHARGE OF THE PLAN MICHAEL KRAUSE IS HERE. AND I'D BE HAPPY TO ANSWER ANY QUESTIONS. I KNOW THE COMMENT PERIOD ON THAT REVISED DRAFT ENDED LAST WEEK, BUT WE'LL TAKE ALL THE COMMENTS WE HEAR TODAY INTO CONSIDERATION.

IF ANYONE HAS ANY PRESSING, PLEASE LET US KNOW. THERE'S STILL SOME TIME TO IN INCORPORATE YOUR THOUGHTS.

SO WITH THAT, I'LL TURN IT OVER TO SILVIA VANDERSPEK AT THE CALIFORNIA AIR RESOURCES BOARD TO TALK ABOUT THE STATE SIP STRATEGY.

MS. VANDERSPEK: THANK YOU, PHIL.

ALL RIGHT. MY NAME IS SILVIA VANDERSPEK, AND I'M WITH THE AIR RESOURCES BOARD, AND I'M GOING TO GO OVER AN UPDATE OF OUR ARB STATE SIP STRATEGY AND ALSO PROVIDE YOU SOME INFORMATION ABOUT HOW IT FITS INTO THE SOUTH COAST AQMP.

SO WHAT IS THE STATE SIP STRATEGY? BASICALLY WHAT IT IS IS THE AIR RESOURCE BOARD'S REDUCTIONS FROM MOBILE SOURCES AND CONSUMER PRODUCTS TO MEET AIR QUALITY STANDARDS THROUGHOUT THE STATE AND PROVIDE HEALTHFUL AIR. AS PHIL DISCUSSED EARLIER, MOBILE SOURCES ARE A SIGNIFICANT PART OF THE AIR QUALITY PROBLEM HERE IN THE SOUTH COAST. SO WE NEED TO MAKE SURE WE ADDRESS THIS SOURCE.

SO WHAT DOES THE STATE SIP STRATEGY HAVE? WELL, IT HAS A LIST OF MEASURES AS WELL AS AN AGGREGATE COMMITMENT AT THE END. SO THAT IS OUR COMMITMENT NOT ONLY TO THE SOUTH COAST, BUT OTHER AREAS THROUGHOUT THE STATE ALSO. SO WHAT WE DO IS WE HAVE AN AGGREGATE EMISSION REDUCTION COMMITMENT THAT SPECIFIES THE NUMBER

THAT WE HAVE TO MEET BY A DATE CERTAIN. FOR SOUTH COAST WE ARE COMMITTING TO 97 TONS OF NOX AND 60 TONS OF ROG FOR THE 2031 COMMITMENT. AND THEN THE SECOND PIECE OF THAT COMMITMENT IS THAT WE ARE GOING TO PURSUE A LIST OF MEASURES.

SO THE SECOND PART OF THE COMMITMENT IS ACTUALLY ACTIONS BY A CERTAIN DATE THAT WE ARE COMMITTING TO FOLLOW THROUGH WITH EPA. AND THE REASON THAT WE DO IT THIS WAY IS THAT MANY TIMES AS YOU'RE GOING THROUGH THE REGULATORY PROCESS AND EACH OF THESE MEASURES IN THIS LIST WILL GO THROUGH ITS OWN REGULATORY PROCESS. THINGS CHANGE SO YOU COULD GET MORE OR LESS EMISSION REDUCTIONS THAN IS ORIGINALLY THOUGHT. SO WE'VE GOTTEN THIS PROOF THROUGH EPA, AND IT HAS STOOD THE TEST OF TIME. SO ONCE IT GOES TO EPA AS PART OF THIS AQMP, THEN IT BECOMES FEDERALLY ENFORCEABLE. SO EACH OF THOSE ACTION DATES THAT WE SPECIFY IS TECHNICALLY AN ENFORCEABLE COMMITMENT.

SO WHAT ARE WE DOING HERE? WELL, ARB HAS A LONG HISTORY OF REDUCING EMISSIONS FROM MOBILE SOURCES, AND WE HAVE A WELL-ESTABLISHED BLUEPRINT IN PLACE. FIRST OF ALL, WE ESTABLISHED CLEANER ENGINE STANDARDS. SO ONE OF THE THINGS BEFORE -- I WANT TO STEP BACK JUST ONE SECOND. SO THIS STATE STRATEGY ACTUALLY LOOKS AT ALL OUR SUCCESSFUL PROGRAMS AND THE BLUEPRINT FROM THE PAST, AND WE ARE TARGETING ALL OF THE SOURCE AND MAKING SURE THAT

WE'RE ADDRESSING ALL OF THESE ELEMENTS THAT WE'RE GOING TO BE TALKING ABOUT.

SO, AGAIN, YOU KNOW, CLEANER ENGINE STANDARDS, WE'VE GOT LOW NOX STANDARDS FOR TRUCKS, AND WE'RE ALSO PROPOSING SOME STANDARDS FOR THE FEDERAL SOURCES. THE NEXT THING IS THAT WE'RE TRYING TO INCREASE THE PENETRATION OF ZERO EMISSION TECHNOLOGY WHERE IT'S FEASIBLE. AS YOU KNOW RIGHT NOW, ZERO EMISSION TECHNOLOGY IS HERE. IT'S JUST A MATTER OF GETTING OUT THE FLEET AND GETTING USED IN PRACTICAL APPLICATIONS. ONCE THESE ENGINES THAT ARE OUT THERE WHAT'S REALLY IMPORTANT IS TO ENSURE THAT THEY'RE DURABLE. SO WE HAVE MANY MEASURES IN HERE THAT ENSURE THAT EMISSIONS REMAIN DURABLE THROUGHOUT THE LIFE OF AN ENGINE OR A VEHICLE.

WE'RE PLANNING ON EXPANDING THE USE OF CLEANER FUELS. THERE'S A LOW DIESEL MEASURE IN THIS PLAN. THIS PLAN TARGETS SOME OF THE OLDER TYPE EQUIPMENT THAT -- LIKE FOR FEDERAL SOURCES AND OLDER TRUCKS, AND THAT'S WHAT IT'S REALLY FOCUSING ON.

AND THEN PART OF WHAT WE HAVE DONE FOR MANY YEARS IS PILOT STUDIES. PILOT STUDIES HELP US GAUGE WHETHER A TECHNOLOGY IS FEASIBLE IN AN APPLICATION. AND IT'S VERY IMPORTANT. SO IT'S KEY TO DO WHAT WE'RE DOING HERE. AND THEN FINALLY INCENTIVIZING THE DEPLOYMENT OF THE CLEANEST TECHNOLOGY. WE'RE WORKING THE SOUTH COAST

TO DEVELOP A FUNDING PLAN. AND THEN AS ALSO PART OF IT OUR MOBILE SOURCE ACTIONS. THE STATE SIP STRATEGY INCLUDES FOR FURTHER DEPLOYMENT. AND THEY'RE REALLY JUST FOR THE SOUTH COAST. AS PHIL SAID EARLIER, WHAT WE DON'T HAVE THE -- WE'RE ALLOWED THIS UNDER THE CLEAN AIR ACT. WE DON'T ACTUALLY HAVE THE FUNDING OR THE REGULATIONS IN PLACE, BUT WHAT IT IS THERE'S EMISSION REDUCTIONS THAT WE CAN GO AFTER IF THE TECHNOLOGY BECOMES FEASIBLE WE CAN DEVELOP REGULATIONS FOR IT, WE CAN INCENTIVIZE FOR OTHER TECHNOLOGIES.

SO WHAT ARE THE EMISSION REDUCTIONS FOR THE SOUTH COAST IN THIS PLAN? AS I SAID EARLIER, WE'RE PROVIDING 97 TONS OF NOX EMISSIONS AND 60 TONS OF ROG EMISSIONS. ONE OF THE THINGS THAT WE DO WANT TO SHOW IS THAT ARB IS CURRENTLY IMPLEMENTING MANY PROGRAMS, AND THE IMPLEMENTATION OF THOSE PROGRAMS ARE PROVIDING SIGNIFICANT EMISSION REDUCTIONS. SO, IN FACT, WHEN YOU LOOK AT IMPLEMENTATION OF THE CURRENT PROGRAM AND THE NEW REGULATIONS THAT WE'RE PROPOSING HERE, IT'S 80 PERCENT. SO 80 PERCENT OF THE EMISSION REDUCTIONS FROM TODAY TO 2031 ARE COMING FROM REGULATIONS.

SO WE JUST WANT TO MAKE SURE WE HIGHLIGHT IT IS THE CORE OF STRATEGY AND WHAT INCENTIVES ARE FOR IS FOR THAT LAST INCREMENT TO GET THE EARLY TURNOVER OF TECHNOLOGY. SO WHEN YOU LOOK AT THIS CHART, IT SHOWS

FROM THE LIGHT DUTY VEHICLES THAT 93 PERCENT ARE COMING FROM REGULATIONS. FOR HEAVY DUTY VEHICLES 88 PERCENT. YOU KNOW, UNFORTUNATELY WHEN YOU LOOK FEDERAL SOURCES, THAT'S 46 PERCENT. WE DON'T HAVE CONTROL OVER THE FEDERAL SOURCES, BUT WE DEFINITELY THINK THAT INCENTIVES ARE A VERY ECONOMICAL WAY TO TURN THAT EQUIPMENT OVER. AND THEN OFF-ROAD EQUIPMENT WE HAVE A LITTLE MORE AUTHORITY, SO 71 PERCENT OF THE REDUCTIONS COME FROM THAT.

SO WHAT ARE WE DOING MOVING FORWARD HERE? WELL, BASICALLY WE WILL BE RELEASING A DOCUMENT ALSO IN DECEMBER, AND ACTUALLY WE WILL BE RELEASING TWO DOCUMENTS. ONE IS OUR STATE SIP STRATEGY. AND THEN ALONG WITH THE SOUTH COAST SIP, THERE WILL BE A STATE SIP ELEMENT WITH OUR COMMITMENT FOR THEIR REGION IN THEIR PLAN.

SO THE CHANGES THAT WE'RE CURRENTLY MAKING ARE SOME INVENTORY UPDATES WHERE WE FOUND OUT SOME NEW INFORMATION REGARDING LOCOMOTIVES AND AIRCRAFT. AND WE'VE ALSO GONE THROUGH AN EXTENSIVE PUBLIC PROCESS. WE'VE HAD TWO BOARD MEETINGS, WE'VE HAD A LOT OF STAKEHOLDER WORKSHOPS. SO WE ARE MAKING SOME CHANGES BASED ON THAT STAKEHOLDER ENGAGEMENT. ONE OF OUR MEASURES, ADVANCED CLEAN AIR TRANSIT, WE'RE GOING TO MAKE SURE THAT TRANSIT INFRASTRUCTURE ISSUES ARE ADDRESSED

ESPECIALLY IN DISADVANTAGED COMMUNITIES.

FOR OUR LAST MILE DELIVERY MEASURE, WE PLAN ON ADDRESSING FLEET PURCHASING REQUIREMENTS AND MAKING SURE THAT THESE ELECTRIC VEHICLES FOR THIS SECTOR ARE OUT THERE. FOR THE SMALL OFF-ROAD ENGINES, THINGS LIKE LAWN AND GARDEN EQUIPMENT, WE'RE GOING TO REALLY FOCUS ON ZERO EMISSION FOR THAT SECTOR. AND THEN ALSO FOR CONSUMER PRODUCTS, WE'RE PROVIDING A LITTLE BIT MORE FLEXIBILITY IN HOW TO MEET THAT REQUIREMENT. AND THEN ALSO WE'RE ADDRESSING SOME ISSUES FOR THE SAN JOAQUIN VALLEY. WE'RE GOING TO BE QUANTIFYING MORE REDUCTIONS IN THE FUTURE FOR THE AIR POLLUTION PROBLEM.

SO ONCE WE PUT THIS DRAFT DOWN THE STREET, WE ALSO PLAN ON TAKING THIS TO OUR BOARD. SINCE THE SOUTH COAST BOARD IN THEIR CURRENT SCHEDULE IS GOING IN FEBRUARY, THEN WE WILL BE TAKING THE STATE SIP STRATEGY ALONG WITH OUR COMMITMENT FOR THEM AT THE MARCH HEARING.

SO THAT CONCLUDES MY PRESENTATION. IF YOU WOULD LIKE TO CONTACT ANY OF US, THE STAFF PERSON IN CHARGE IS KIRSTEN CAYABYAB AND THEN CAROL SUTKUS IS THE MANAGER. THIS DOCUMENT CAN BE REACHED ON OUR WEB PAGE. AND, AGAIN, WE WILL BE UPDATING IT AT THE FIRST PART OF DECEMBER.

AND THEN NEXT IS...

DR. FINE: THE FINAL PRESENTATION IS BY JO KAY

GHOSH, OUR HEALTH EFFECTS OFFICER WHO WILL TALK ABOUT APPENDIX 1, THE HEATH EFFECTS OF AIR POLLUTION.

DR. GHOSH: SO MY PRESENTATION IS ON APPENDIX 1, WHICH IS THE HEALTH EFFECTS APPENDIX. SO, NOW, SIMILAR TO THE PREVIOUS YEARS, THE HEALTH EFFECTS APPENDIX IS ORGANIZED FIRST BY CRITERIA. SO OZONE, PARTICULATE MATTER AND SO ON, WITH AN ADDITIONAL SECTION ON AIR TOXICS. AGAIN, SIMILAR TO PREVIOUS RENDITIONS OF THIS APPENDIX 1, IT IS A SUMMARY OF THE HEALTH EFFECTS. IN OTHER WORDS, WHAT WE KNOW BY THE SCIENCE THAT EVALUATED THE HEALTH EFFECTS OF SPECIFIC POLLUTANTS AS ASSESSED BY SCIENTIFIC AGENCIES.

SO THIS APPENDIX DRAWS SUBSTANTIALLY FROM SCIENTIFIC ASSESSMENTS AND REVIEWS PRIMARILY CONDUCTED BY U.S. EPA, BUT ALSO THERE'S SOME OTHER SCIENTIFIC AGENCIES. NOW, RECOGNIZING THAT THE U.S. EPA REVIEWS DON'T COME UP EVERY YEAR, FOR EXAMPLE, THE MOST RECENT PARTICULATE MATTER INTEGRATED SCIENCE ASSESSMENT WAS DONE IN 2009. WE ALSO CONDUCTED A SUPPLEMENTAL LITERATURE REVIEW TO LOOK FOR ARTICLES THAT HAVE BEEN PUBLISHED SINCE THAT TIME?

I WANTED TO TAKE A MOMENT TO TALK A LITTLE BIT ABOUT THE PARTICULATE MATTER SECTION WITHIN THE APPENDIX 1. SO WE ARE REQUIRED BY THE CALIFORNIA HEALTH AND SAFETY CODE TO PREPARE A DOCUMENT ABOUT THE HEALTH

IMPACTS OF PARTICULATE MATTER IN THIS SOUTH COAST AIR BASIN. THIS REPORT IS THE SECTION OF PARTICULATE MATTER THAT'S CONTAINED WITHIN APPENDIX 1. ALTHOUGH, WE DON'T JUST TALK ABOUT PARTICULATE MATTER IN THE APPENDIX. WE TALK ABOUT THE OTHER POLLUTANTS AND AIR TOXICS AS WELL.

AS REQUIRED BY HEALTH AND SAFETY CODE, THE DISCUSSION OF PM AS WELL AS OTHER POLLUTANTS WERE PREPARED IN CONJUNCTION WITH THE PUBLIC HEALTH AGENCY. THIS WAS PREPARED IN CONJUNCTION WITH THE OEHHA, WHICH IS THE OFFICE OF ENVIRONMENTAL HEALTH HAZARDS ASSESSMENT. WE ALSO PREPARED IT IN CONSULTATION WITH THE AIR RESOURCES BOARD. ADDITIONALLY, ALSO AS A REQUIREMENT OF THE HEALTH AND SAFETY CODE THERE IS AN ADVISORY COUNCIL THAT REVIEWS THE APPENDIX 1 DOCUMENT. THIS WAS FORMED IN 2015 WITH MEMBERS CHOSEN BY THE GOVERNING BOARD MEMBERS AND THE ADVISORY GROUPS. THE ADVISORY COUNCIL WAS CONVENED IN AUGUST OF 2016 -- THERE MAY BE A TYPO IN THE PRINT VERSION OF YOUR SLIDES. IT SHOULD BE 2016 NOT 2015. -- WHERE THE ADVISORY COUNCIL REVIEWED AND DISCUSSED THE APPENDIX 1 DRAFT DOCUMENT. AT THE TIME OF THE MEETING WE CERTAINLY RECEIVED MANY COMMENTS FROM THE ADVISORY COUNCIL MEMBERS. THEY WERE ALSO INVITED TO SUBMIT WRITTEN COMMENTS AND WE ALSO RECEIVED COMMENTS FROM THE PUBLIC AS WELL.

SO NEXT SLIDE. OKAY. SO THIS SLIDE PROVIDES A

SUMMARY OF, YOU KNOW, THE PURPOSE OF APPENDIX 1 AND SOME OF THE KEY AREAS THAT WE COVERED HERE. SO THE MAIN PURPOSE WAS TO PROVIDE A VERY BRIEF OVERVIEW OF THE EFFECTS OF THE VARIOUS AIR POLLUTANTS AND PARTICULARLY TO DESCRIBE THE HEALTH IMPACTS OF PM AS REQUIRED BY THE HEALTH AND SAFETY CODE.

BECAUSE AS MENTIONED OUR REGION IS NONATTAINMENT OZONE AND PM, WE CERTAINLY HAD A GREATER ON THOSE TWO POLLUTANTS WITH THE IDEA IN OUR REGION THERE IS MORE POTENTIAL FOR HEALTH IMPACTS OF THIS POLLUTANTS. THERE IS A VERY LARGE BODY OF SCIENTIFIC EVIDENCE THAT SHOWS THE ADVERSE EFFECTS OF AIR POLLUTION ON HUMAN HEALTH. AND THIS INCLUDES TOXICOLOGICAL STUDIES, FOR EXAMPLE, ANIMAL STUDIES; EPIDEMIOLOGICAL STUDIES; AND ALSO HUMAN EXPERIMENTAL STUDIES. AND ALL THREE TYPES OF STUDIES ARE ASSESSED BY THE EPA IN THEIR REVIEWS. THERE IS ALSO A LOT OF INTEREST IN WHETHER THERE ARE CERTAIN POPULATIONS THAT MAY BE MORE SENSITIVE TO THE EFFECTS OF AIR POLLUTION, FOR EXAMPLE, BASED ON AGE; TYPICALLY THE VERY YOUNG OR THE VERY OLD; CERTAIN SPECIFIC GENETIC FACTORS; PEOPLE WITH CERTAIN PRE-EXISTING HEALTH CONDITIONS, FOR EXAMPLE, PEOPLE WITH CERTAIN RESPIRATORY DISEASES SUCH AS ASTHMA OR COPD OR HEART CONDITIONS, AND ALSO WHETHER SOCIOECONOMIC STATUS MIGHT ALSO CONTRIBUTE SENSITIVITY TO AIR POLLUTION IN PEOPLE.

I DID WANT TO MENTION THE MAIN CHANGES SINCE THE PREVIOUS VERSION IN 2012 OF APPENDIX 1. I THINK ONE OF THE MAIN THINGS THAT WE DID IN THIS 2016 VERSION IS TO REALLY CLARIFY THE PURPOSE OF THE DOCUMENT AND THE METHODS THAT WERE USED TO PUT THIS SUMMARY TOGETHER. AND IN ADDITION, ANOTHER THING THAT WE TRIED TO DO WAS HAVE A MORE STANDARDIZED WAY OF PRESENTING THE INFORMATION OF EACH CRITERIA POLLUTANT. SO, FOR EXAMPLE, IN EACH CRITERIA POLLUTANT SECTION WE PRESENT A TABLE THAT COMMUNICATES JUST THIS INFORMATION. SO THIS IS BASED ON THE MOST RECENT INTEGRATED SCIENCE ASSESSMENT FROM U.S. EPA. AND, AGAIN, FOR PM2.5 IT WAS LAST DONE IN 2009.

HERE WE'RE LOOKING AT BOTH SHORT-TERM EXPOSURE EFFECTS AND LONG-TERM EXPOSURE EFFECTS AS WELL AS HEALTH OUTCOMES. SO, FOR EXAMPLE, YOU HAVE THE CAUSAL DETERMINATIONS, RIGHT? SO THE STRONGEST ON THEIR SCALE, THE STRONGEST CAUSAL DETERMINATION, THEY CALL CAUSAL RELATIONSHIP, IN OTHER WORDS, THAT THIS POLLUTANT CAUSES THIS HEALTH OUTCOME. THE NEXT ONE DOWN, SO BASICALLY A SLIGHTLY LESS STRONG RELATIONSHIP, WOULD BE LIKELY TO BE A CAUSAL RELATIONSHIP. SO STILL FAIRLY HIGH ON THE CAUSAL DETERMINATION SCALE. AND THE BELOW THAT WE GO TO SUGGESTIVES. FOR EXAMPLE, HERE FOR PM FOR REPRODUCTIVE AND DEVELOPMENT EFFECTS FOR LONG-TERM EXPOSURE RELATIONSHIP IT IS SUGGESTIVE OF CAUSAL RELATIONSHIP.

AND THEN THERE ARE TWO OTHER CATEGORIES BELOW THAT; INADEQUATE AND BASICALLY NOT CAUSAL.

SO SIMILARLY FOR OZONE, THIS IS THE TABLE AGAIN BASED ON THE LATEST INTEGRATED SCIENCE ASSESSMENT FOR OZONE, WHICH WAS DONE IN 2013. SO HERE YOU CAN SEE OZONE. THERE'S A CAUSAL RELATIONSHIP FOR SHORT-TERM EXPOSURE AND RESPIRATORY EFFECTS AS WELL AS A LIKELY CAUSAL RELATIONSHIP FOR LONG-TERM EXPOSURE AND RESPIRATORY EFFECTS. AND YOU CAN SEE SOME OF THE OTHER CAUSAL DETERMINATIONS AS WELL.

THE U.S. EPA USES A WEIGHT OF EVIDENCE APPROACH. THAT MEANS THAT THEY LOOK AT AGAIN DIFFERENT LINES OF EVIDENCE, DIFFERENT TYPES OF STUDIES, AND STUDIES CONDUCTED IN DIFFERENT AREAS. WHAT THEY'RE LOOKING FOR IS, FOR EXAMPLE, CONSISTENCY, REPRODUCIBILITY OF THE EFFECTS. WE CERTAINLY DON'T WANT TO -- IF SOMETHING IS ONLY SEEN IN ONE AREA BUT NOT SEEN IN ANOTHER, THAT WOULD BE SOMETHING THAT'S PERHAPS NOT AS REPRODUCIBLE. AND, AGAIN, LOOKING AT THE DIFFERENT LINES OF EVIDENCE, TOXICOLOGY, EPIDEMIOLOGY, EXPERIMENTAL STUDIES, AND LOOKING FOR COHERENCE ACROSS THE DIFFERENT SCIENCES.

WE RECEIVED SO FAR 25 COMMENT LETTERS, COMMENTS ON THE APPENDIX 1, AND THAT'S IN ADDITION TO THE COMMENTS RECEIVED DURING THE ADVISORY COUNCIL MEETING. THIS INCLUDE COMMENTS FROM THE ADVISORY COUNCIL MEMBERS AS

WELL AS COMMENTS FROM MEMBERS OF THE PUBLIC. YOU KNOW, WITH 25 COMMENT LETTERS, I'M CERTAINLY NOT SUMMARIZING EVERY COMMENT HERE BUT JUST HIGHLIGHTING SOME OF THE MAIN ONES BY SECTION, AGAIN, NOTING THAT WE CLARIFY THE PURPOSE OF APPENDIX 1 AND THE ROLE OF THE DIFFERENT AGENCIES IN THE ASSESSMENT OF SCIENCE AND IMPLEMENTATION OF THE PLANS TO MEET THE STANDARDS. IN OTHER WORDS, U.S. EPA IS REALLY TASKED WITH ASSESSMENT OF THE SCIENCE IN TERMS OF THE CAUSAL RELATIONSHIPS BETWEEN THESE POLLUTANTS AND SPECIFIC HEALTH EFFECTS. AND OUR ROLE HERE IS SIMPLY TO JUST SUMMARIZE THE REVIEWS AS CONDUCTED BY OTHERS.

WE HAD A FEW COMMENTS ABOUT THE AIR TOXIC SECTION NOTING THAT WE ADDED A SECTION WITHIN THE AIR TOXIC SECTION TO DISCUSS THE HEALTH EFFECTS OF VOC'S. WE ALSO ADDED A LITTLE DISCUSSION IN THE DIESEL PM SECTION HERE ABOUT THE ACES STUDIES.

FOR THE OZONE SECTION, THIS SECTION WAS ACTUALLY REORGANIZED QUITE A BIT AND REALLY FOCUSED ON THE END POINTS THAT ARE VERY HIGH ON THE CAUSAL DETERMINATION SCALE; SO IN OTHER WORDS, THE ONES WITH THE CAUSAL RELATIONSHIP OR LIKELY CAUSAL RELATIONSHIP. AND, AGAIN, WE ALSO EXPANDED THE DISCUSSION OF POPULATION TO MAY BE MORE SENSITIVE TO THE EFFECTS OF OZONE.

IN THE PM SECTION, SO SIMILAR TO THE OZONE

SECTION, WE ALSO FOCUSED ON THE CAUSAL OR LIKELY CAUSAL RELATIONSHIP. HOWEVER, HERE BECAUSE THE MOST RECENT INTEGRATED SCIENCE ASSESSMENT WAS CONDUCTED QUITE A LONG TIME AGO, WE FELT THAT IT WAS STILL WORTHWHILE TO DISCUSS SOME OTHER HEALTH ENDPOINTS THAT WERE MAYBE ON THE SUGGESTIVE LEVEL. AND WE CERTAINLY DISCUSS A LOT OF THE MORE RECENT STUDIES THAT HAVE LOOKED AT THOSE HEALTH ENDPOINTS, AND WE GROUPED THESE INTO EMERGING AREAS OF INTEREST SECTION.

CERTAINLY A LOT OF THE MOST RECENT SCIENCE HAS FOCUSED ON ULTRA FINE PARTICLES AND ALSO MOVED IT TO BE WITHIN THE PM SECTION, WHICH MAKES MORE SENSE. AGAIN, WE EXPANDED THE DISCUSSION OF SENSITIVE POPULATIONS, AGAIN, SENSITIVE TO THE EFFECTS OF PARTICULATE MATTER. AND WE ALSO REWORKED THE SUMMARY AND CREATED A SECTION CALLED "ESTIMATES OF THE HEALTH BURDEN OF SOUTH COAST AIR BASIN." AND THIS IS WHERE WE TALK ABOUT SOME OF THE NUMBERS ESTIMATES OF MORTALITY AND MORBIDITY NUMBERS.

IN ADDITION TO THESE COMMENTS, WE ALSO HAD SOME COMMENTS ABOUT THE HEALTH RISK ASSOCIATED WITH PARTICULATE MATTER IN CALIFORNIA. AND, AGAIN, JUST TO REEMPHASIZE, THE DOCUMENT IS REALLY JUST A SUMMARY OF THE U.S. EPA'S CAUSAL DETERMINATIONS, AND THAT WE, YOU KNOW, DID TALK -- WE DID SUMMARIZE MANY OF THE STUDIES THAT WERE EVALUATED IN THAT EVALUATION INCLUDING STUDIES THAT

WERE CONDUCTED IN CALIFORNIA OR SOUTHERN CALIFORNIA.

WE RECEIVED A COMMENT ABOUT CONCERN THAT POTENTIAL CONFOUNDING BY SMOKING WAS NOT ADDRESSED IN THE STUDIES OF THE PARTICULATE MATTER HEALTH EFFECTS, AND WE ADDED A LOT OF CLARIFICATION IN THE DOCUMENT TO TALK ABOUT HOW THE STUDIES LOOKED AT SMOKING AND HOW THEY ADJUSTED FOR SMOKING IN THESE STUDIES.

ADDITIONALLY, WE RECEIVED A COMMENT THAT ASKS US TO DISCUSS THE HEALTH EFFECTS OF ODORS. AND THIS IS SOMETHING THAT IS NOT PREVIOUSLY INCLUDED IN APPENDIX 1. WE ARE STILL WORKING ON PUTTING TOGETHER THIS SECTION. OBVIOUSLY, THIS SECTION REQUIRES A LOT OF NEW WORK, AND WE ARE HOPING TO HAVE THAT HAVE THAT COMPLETED SOON.

SO, FINALLY, IF THERE ARE ANY FURTHER QUESTIONS, I'M CERTAINLY AVAILABLE. YOU CAN CONTACT ME.

DR. FINE: THAT CONCLUDES THE PRESENTATION. I HAVE THREE CARDS NOW. IF ANYONE ELSE WOULD LIKE TO MAKE A PUBLIC COMMENT, I ENCOURAGE YOU TO GRAB A BLUE CARD AND FILL IT OUT.

SO WE'LL MOVE THROUGH THESE AND HAND THE MIC AROUND. OKAY.

MS. MITCHELL: I'LL JUST SAY GOOD AFTERNOON. I'M JUDY MITCHELL. I'M A CITY COUNCIL MEMBER IN THE CITY OF ROLLING HILLS ESTATES UP THE ROAD HERE, AND I REPRESENT ALL OF YOU AND 51 CITIES IN WESTERN L.A. COUNTY

ON THE SOUTH COAST MANAGEMENT DISTRICT BOARD. I ALSO HAD THE PLEASURE OF REPRESENTING THIS REGION IN THE AIR RESOURCES BOARD. SO I KIND OF WEAR TWO HATS HERE AND TRY TO MAKE THOSE GO TOGETHER REALLY WELL. SO THANK YOU FOR COMING. WELCOME.

DR. FINE: SO WE'LL MOVE INTO PUBLIC COMMENTS. NOW WE HAVE SIX CARDS, SEVEN CARDS. SO THE FIRST IS ELAINE WILSON. AND WE HAVE A MIC RIGHT THERE.

MS. WILSON: THANK YOU. MAY I TURN AROUND? THANK YOU.

FIRST, MY NAME IS ELAINE WILSON, AND I LIVE ON THE FENCE LINE IN TORRANCE, THE FENCE LINE OF THE REFINERY. I'VE LIVED THERE FOR 17 YEARS. I DEEPLY APPRECIATE THE WORK THAT THIS BOARD DOES, AND I DO NOT UNDERSTAND HOW YOU CAN STAND IT WITH THE CONSTANT SHIFTING SANDS THAT YOU DO RESEARCH AND IT SHIFTS OVER AND OVER AGAIN.

I WANT TO SHOW THIS IS THE AIR PARTICULATE MONITOR AT HOME. YOU WOULD THINK I'M RIGHT NEXT TO THE REFINERY. THIS IS AN ABERRATION AS WAS THE EXPLOSION FROM THE EXXON MOBIL REFINERY WITH THE PARTICULATES THAT CAME FROM THAT EXPLOSION THAT WENT WEST. WELL, THE HIGH SPIKES ARE NOT COMING TO ME ONCE MORE. THEY ARE GOING NORTHEAST. SIX MILES, THE RED IS SIX MILES FROM ME.

THE CONSTANT CONCENTRATION OF PARTICULATE

MATTER THAT I WAS BREATHING FOR 15 YEARS GAVE ME A CHRONIC COUGH. SO WHAT DID I DO? I WENT TO URGENT CARE MANY TIMES. I CONTACTED THE AIR QUALITY RESOURCES BOARD. AND THEREBY I DO APPRECIATE YOUR LIMITATIONS AND WHAT MUST BE EXTREME FRUSTRATION. I SAW IT AGAIN ON THESE PAPERS. WHAT I SAW HERE WAS A QUALIFYING REMARK "CLEAN AIR ACT REQUIRES ATTAINMENT OF STANDARD TO BE ACHIEVED AS EXPEDITIOUSLY AS PRACTICABLE." YOU COULD RUN A MACK TRUCK WITHOUT ANY, ANY ENVIRONMENTAL CONTROLS THROUGH THIS STATEMENT. PRACTICABLE.

I NO LONGER HAVE A CHRONIC COUGH. I NO LONGER HAVE CHEST PAIN THAT I THOUGHT I WAS HAVING A HEART ATTACK. I WENT TO THE HOSPITAL. WHY? BECAUSE I PUT ACROSS ALL OF MY WESTERN SIDE WINDOWS SHEET PLASTIC. I GOT AIR FILTERS AND MY MOST RECENT ONE IS $900. NOT EVERYONE CAN AFFORD THIS. I'M A SENIOR. SEVENTY-SEVEN YEARS OLD. I SPENT IT BECAUSE THAT CHEMICAL AIR PURIFIER HAS A 25-POUND CHEMICAL CARBON FILTER IN IT, AND IT IS APPROVED BY THE MILITARY. I HAVE NOT HAD A COUGH. I'M STILL SENSITIVE, BUT I HAVEN'T HAD A COUGH.

I FEEL HORRIBLE FOR THE PEOPLE IN WILMINGTON AND SAN PEDRO. I LIVE RIGHT NEXT TO THE REFINERY. THEY'RE ABOUT TO HAVE A MEGA REFINERY IN THEIR REGION. WHAT I SHOWED YOU WITH THIS GRAPH WILL NOT BE APPLICABLE IN TWO YEARS. THE EPA HAS ALREADY DECIDED THAT THAT 2.5

CONCENTRATION OF PARTICULATE MATTER NO LONGER APPLIES. IT SHOULD BE MUCH LOWER TO BE HARMFUL.

SO AS I SAID, THE CONSTANT SHIFTING SANDS HAS TO BE TERRIBLY DEPRESSING FOR THE SCIENTISTS AND REGULATORS AND THE AIR QUALITY MANAGEMENT BOARD'S LIMITED ABILITY. BUT I AM IN A STATIONARY, STATIONARY, AREA OF A POLLUTER, AND I AM EXTREMELY DISTRESSED.

THANK YOU.

DR. FINE: THANK YOU FOR YOUR COMMENTS.

NEXT IS BRANDON MATSON.

MR. MATSON: GOOD AFTERNOON. I'M BRANDON MATSON HERE TODAY ON BEHALF OF THE L.A. COUNTY BUSINESS FEDERATION, BIZFED, A GRASSROOTS ALLIANCE OF 160 TOP BUSINESS GROUPS REPRESENTING 325,000 EMPLOYERS WITH 3 MILLION EMPLOYEES THROUGHOUT LOS ANGELES COUNTY. WE APPRECIATE THE OPPORTUNITY THAT DISTRICT HAS GIVEN OUR MEMBERS TO PARTICIPATE ON VARIOUS WORKING GROUPS AND COMMITTEES TO PROVIDE INPUT DURING THE DEVELOPMENT OF THE DRAFT 2016 AQMP.

TODAY WE HAVE SUBMITTED WRITTEN COMMENTS ON BOTH THE DRAFT PLAN AND THE REVISED PLAN. SO MY COMMENTS TODAY WILL HIGHLIGHT JUST A FEW OF OUR ARCHING POINTS. FIRST, THIS PLAN MUST BALANCE THE ENVIRONMENT AND ECONOMIC NEEDS OF RESIDENTS IN THE SOUTH COAST AIR BASIN. SO WITH THIS SUPPORTED BALANCED, THOUGHTFUL APPROACH TO

ACHIEVING AIR QUALITY GOALS IN A MANNER THAT ALLOWS FOR FURTHER ECONOMIC GROWTH, AND WE ARE SUPPORTIVE OF AN AQMP THAT PRIORITIZES FRAMEWORK THAT IS HAS NON-REGULATORY INNOVATIVE APPROACHES TO EMISSION REDUCTIONS THAT ARE COST EFFECTIVE AND MINIMIZE OPERATION DISRUPTIONS.

PROGRAMS FOR CONTROL MEASURES SHOULD INCENTIVIZE VOLUNTARY AND COLLABORATIVE APPROACHES TO ACHIEVING AIR QUALITY GOALS THAT DO NOT PUT LOCAL BUSINESSES AT A COMPETITIVE DISADVANTAGE WITH OTHER REGIONS.

WITH RESPECT TO THE REVISED AQMP, THERE ARE A FEW POINTS THAT WE'D LIKE TO HIGHLIGHT. FIRST, WE SUPPORT THE DISTRICT'S LONG-STANDING POLICY OF FUEL AND TECHNOLOGY NEUTRALITY TO ALLOW ALL FUELS AND TECHNOLOGIES TO COMPETE. THERE IS SOME LANGUAGE IN THE REVISED DRAFT PLAN THAT WE ARE CONCERNED ABOUT, AND THIS HAS BEEN HIGHLIGHTED SPECIFICALLY IN THE COMMENT LETTER, AND YOU CAN REFERENCE THAT.

IN ADDITION, WE SUPPORT MAINTAINING THE RECLAIM PROGRAM AND BELIEVE IT WILL CONTINUE TO BE A SUCCESSFUL PROGRAM. UNTIL AN ALTERNATIVE INCENTIVE MARKET-BASED PROGRAM IS DEVELOPED FOR BUSINESSES THAT ALLOWS THE FLEXIBILITY FOR EMISSION REDUCTIONS TO BE ACHIEVED IN THE MOST COST EFFECTIVE MANNER, WE THINK RECLAIM SHOULD BE CONTINUED TO BE SUPPORTED BY THE DISTRICT.

LASTLY, WE CONTINUE TO OPPOSE FACILITY MEASURES

AND EXPANSION OF FLEET RULES AND HAVE SERIOUS CONCERNS ABOUT THE EFFECTS OF THE PROPOSED CONTROL MEASURES OF MOBILE 1 THROUGH MOBILE 4 AND PORTIONS OF MOBILE 8 WHICH WILL EFFECT GOODS MOVING AND MOVING INDEPENDENT INDUSTRIES.

SO IN CLOSING, WE APPRECIATE THE DISTRICT'S ENGAGEMENT OF THE BUSINESS COMMUNITY DURING THE DEVELOPMENT OF THE 2016 AQMP, AND WE REMAIN COMMITTED TO WORKING WITH THE DISTRICT TO ENSURE THE PLAN FULFILLS ITS LEGAL REQUIREMENTS WHILE ALSO PROTECTING JOB CREATION AND ECONOMIC SUCCESS FOR SOUTHERN CALIFORNIA.

THANK YOU.

DR. FINE: NEXT WE HAVE SARAH, SARAH RASCON.

MS. RASCON: GOOD AFTERNOON. MY NAME IS SARAH RASCON, AND I'M HERE ON BEHALF OF OVER 1600 BUSINESS ORGANIZATIONS REPRESENTING OVER 35 INDUSTRY SECTORS. THE LOS ANGELES AREA CHAMBER OF COMMERCE WOULD LIKE TO REAFFIRM ITS COMMITMENT TO WORKING WITH AQMD AND STAKEHOLDERS TO ENSURE THAT THE 2016 AQMP IS COMPREHENSIVE AND MEETS STATE AND FEDERAL REQUIREMENTS WHILE PROMOTING ECONOMIC VITALITY FOR THE SOUTHERN CALIFORNIA REGIONS MEETING THE GOVERNOR'S CALL FOR ECONOMIC COMPETITIVENESS AND GUARANTEEING JOB RETENTION AND CREATION. WE SUPPORT THE INCENTIVE-BASED POLICY FRAMEWORK AND SUPPORT THE DISTRICT'S EFFORTS TO WORK WITH

INDUSTRIES AND STAKEHOLDERS TO ATTAIN EMISSION REDUCTIONS AND CLEAN AIR GOALS.

POSITIVE OUTCOMES ARE BEST ACHIEVED THROUGH INCENTIVES RATHER THAN THROUGH PUNITIVE ACTIONS. WE APPRECIATE YOUR EFFORTS TO CREATE INCENTIVE-BASED PROGRAMS, AND WE REQUEST THAT THE POLICY REFRAIN FROM BEING PENAL IN NATURE AND RATHER PRIORITIZE NON-REGULATORY AND INNOVATIVE AND INCENTIVE-BASED PROGRAMS SUCH AS YOU HAVE. INNOVATIVE METHODOLOGY DEPLOYED TO REDUCE EMISSIONS WITH OUR RND WHILE ACKNOWLEDGING THE REGION HAS MADE VIABLE STRIDES IN REDUCING EMISSIONS FROM STATIONARY SOURCES SHOULD BE INCORPORATED AS WELL.

COST EFFECTIVENESS AND TECHNOLOGY NEUTRAL EQUIPMENT AND RETROFITS SHOULD BE MORE SO SIGNIFICANTLY REFLECTED IN THE AQMP AND OFFERING COST EFFECTIVE ALTERNATIVES SO STAKEHOLDERS ARE NOT ADVERSELY OPERATIONALLY OR FINANCIALLY BURDEN. WE REQUEST THAT THE AQMP BE FUEL NEUTRAL AND IMPARTIAL WHICH WOULD OFFER AN EVEN WIDER ARRAY OF ALTERNATIVES AND TECHNOLOGIES.

WE ARE ALSO OPPOSED TO WHAT IS REFERRED AS THE FACILITY-BASED MEASURES INCLUDING POTENTIAL FACILITY EMISSIONS CAPS WHICH CAN CAUSE SEVERE POTENTIAL LIMITATIONS ON THE NATIONAL SUPPLY CHAIN. THIS REGULATORY ACTION CAN BE AN UNPRECEDENTED EXPANSION TO

REGULATE GOODS TO MOVEMENT FACILITIES AND SHIPPERS AND IS CONTRARY TO EFFICIENCY.

THANK YOU TO THE AGENCY AND STAFF WHO HAVE SHOWN A COMMITMENT TO WORKING WITH STAKEHOLDER GROUPS. WE LOOK FORWARD TO CONTINUED SUPPORT IN CREATING A VIABLE, ATTAINABLE SOLUTION REFLECTING IN THE FINAL AQMP.

THANK YOU.

DR. FINE: THANK YOU. ANTONIE CHURG.

MS. CHURG: THANK YOU. I'M ANTONIE CHURG. I LIVE IN TORRANCE. I'M A PH.D. PHYSICAL CHEMIST, AND I HAVE TO TELL YOU I HAVEN'T DONE ENOUGH STUDYING OF THE REALLY COMPREHENSIVE WORK THAT YOU'VE DONE IN PREPARING THIS, BUT I HAD COME ACROSS A FEW MONTHS AGO IN AUGUST 2016 THE AMERICAN THORACIC SOCIETY REPORT ON THE PARTICULATE PM2.5 AND OZONE. AND THE LEVELS THAT THEY RECOMMEND ARE STRICTER EVEN THAN THE EPA STANDARDS FOR THE EIGHT-HOUR DURATION. THEY'RE 11 MILLIGRAMS PER CUBIC METER FOR PM2.5 AND 60 PARTS PER BILLION FOR OZONE. AND ACCORDING TO THEIR STATISTICAL ANALYSIS, THAT WOULD ELIMINATE ABOUT 1300 DEATHS IN THE L.A. BASIN AND 800 DEATHS IN THE SAN BERNARDINO/RIVERSIDE AREA.

SO I THINK THIS REPORT REALLY -- I AM VERY IMPRESSED THAT THE AQMP STUDY IS ON THE SAME CONCEPT OF THIS REPORT THAT THE HEALTH EFFECTS AND HEALTH BENEFITS EVEN FINANCIALLY FAR, FAR OUTWEIGH THE COSTS OF GETTING

DOWN THERE. BUT I REALLY HAVE TO URGE YOU AS REGULATORS TO TRY TO IMPRESS UPON OUR GOVERNORS AND GOVERNING BOARDS AND OUR POLITICIANS AND THE PUBLIC AND BUSINESS THAT THE COSTS OF NOT COMING DOWN HERE ARE EXTERNALIZED. AND IF IT COSTS A FEW MORE BILLION TO GET DOWN, WELL THEN DO IT.

THAT'S -- YOU HAVE TO HAVE THE COURAGE. AND, BUSINESSES, THEY WILL HAVE REDUCED HEALTH CARE COSTS. SO THE OVERALL COSTS ARE POSITIVE. AND PEOPLE SHOULD STOP BEING INTIMIDATED BY THE FEAR THAT BUSINESSES ARE GOING TO LEAVE CALIFORNIA. WE'RE THE LARGEST STATE IN THE NATION. WE'RE THE SEVENTH LARGEST IN ECONOMY IN THE WORLD. AND IT'S TIME TO JUST ACT LIKE WE HAVE TO TAKE CARE OF OUR PEOPLE.

AND I'M SORRY I HAVEN'T READ ENOUGH. I'LL TRY TO STUDY A LITTLE BIT MORE, BECAUSE I HAVE BEEN WORKING ON OTHER THINGS THAT ARE RELATED. AND I SINCERELY UNDERSTAND THE COMPLEXITY OF ESTIMATING RISKS AND COSTS AND TECHNOLOGIES, BUT MAYBE WE JUST NEED A GAZILLIONS BUSES, ELECTRIC BUSES, BUT SOMETHING TO MAKE FOR A HEALTHIER PUBLIC. ESPECIALLY -- LET'S FACE IT. -- WE JUST HAD AN ELECTION. THERE'S GOING TO BE A DIFFERENT CLIMATE FROM THE FEDERAL GOVERNMENT. WE'RE NOT GOING TO GET HELP FROM THE FEDERAL GOVERNMENT. WE HAVE TO DO IT OURSELVES.

DR. FINE: THANK YOU. IF I CAN ADD ONE THING TO

THAT. I DIDN'T HAVE TIME TO GO INTO DETAIL IN THE PRESENTATION. SO WE SHOWED THE NOX REDUCTIONS NEEDED FOR OZONE STANDARDS. IF WE GET THOSE NOX REDUCTIONS THAT WE ARE GOING TO NEED FOR THE OZONE, OUR PROJECTIONS THAT OUR PM2.5 LEVELS WILL NOT ONLY MEET THE 12 MICROGRAM PER CUBIC METER TARGET, BUT WE'LL BE VERY CLOSE IF NOT BELOW 11 MICROGRAMS IN THOSE SAME TIME FRAMES. SO THAT'S WHY OZONE IS DRIVING THINGS. WE'LL GET ADDITIONAL REDUCTIONS EVEN BEYOND THE STANDARD OF 12 MICROGRAMS PER CUBIC METER.

OKAY. FABI.

MS. LAO: HI. FABI LAO. I'M WITH THE COALITION FOR CLEAN AIR. THANK YOU FOR HAVING THE OPPORTUNITY TO TALK TODAY.

WE APPRECIATE ACKNOWLEDGEMENT IN THE REVISED AQMP THAT SOME INDUSTRIES HAVE USED THE NOX RECLAIM PROGRAM AS A SHIELD FROM INSTALLING LIFESAVING READILY AVAILABLE POLLUTION CONTROLS. PEOPLE IN THE REGION KNOW WE'RE BREATHERS. WE BREATHE AIR. THERE'S NO WAY AROUND IT. AND WE CAN'T WAIT FOR LONG-TERM CHANGE. THERE'S NO REASON WHY IT SHOULD TAKE ANOTHER 15 YEARS FOR THE REFINERIES TO INSTALL EQUIPMENT THAT CAN BE INSTALLED IN THE NEXT TWO OR THREE YEARS, AND THIS IS WHY WE REQUEST A COMMITMENT TO SHIFT TO THE CONTROLS IN A TIME FRAME FOR THE NOX RECLAIM PROGRAM.

AND WE ARE ALSO CONTINUED TO BE DISAPPOINTED THAT THE REVISED PLAN DOESN'T PROPOSE ROBUST REGULATIONS TO ADDRESS THE SIGNIFICANT HEALTH THREATS FROM LARGE DIESEL TRUCKS AT PLACES SUCH AS WAREHOUSES INSTEAD OF A VOLUNTARY PROGRAM WITH THE POSSIBILITY OF PIVOTING TO REGULATIONS YEARS FROM NOW. WE NEED REGULATIONS NOW. WE REQUEST THAT THE AQMD SHOULD DEVELOP A DIRECT SOURCE JUST LIKE THE SAN JOAQUIN VALLEY AIR DISTRICT HAS DONE.

THANK YOU.

DR. FINE: NIDIA.

MS. EREG: I WANT TO COMMEND THE STAFF FOR ALL THE WORK THEY HAVE DONE AND DEFINITELY MAKING YOURSELVES AVAILABLE, ALL THE TALKS, ALL THE CHATS, ALL THE OPEN MEETINGS. TWO THINGS ABOUT THE REVISED PLAN AND ITS PURPOSE TO DRAMATICALLY INCREASE THE ANNUAL CONTRIBUTION OF THE POLLUTING INDUSTRY.

YOU ALL UNDERSTAND THAT RIGHT NOW -- AND I LOVE SEEING THE PUBLIC HEALTH THING. I THINK THAT WAS ONE OF THE FIRST TIMES THAT I HAVE SEEN THAT TYPE OF PRESENTATION. I THINK THAT IS MORE OF THAT IS RELEVANT. YOU KNOW, WE CAN'T ARGUE THE FACT THAT IT'S COSTING LIVES. THE IDEA THAT THE DISTRICT SHOULD TARGET INCENTIVES FOR DISPROPORTIONATE COMMUNITIES I THINK IS WHAT I SEE HIGHLIGHTED MORE. SO I APPRECIATE RIGHT NOW THAT THERE IS MORE OF AN INTEREST TO DEVELOP THE ZERO

TAIL PIPE EMISSIONS. ONE THING THAT I WOULD HOPE YOU WOULD DO IS PROVIDE MORE SUPPORT FOR THE INFRASTRUCTURE WHERE YOU SEE THE REGULATIONS ACTUALLY BE SOMETHING YOU CAN INFLUENCE.

SO FOR THAT, WE THANK YOU.

DR. FINE: THANK YOU.

PILAR.

MS. HOYAS: THANK YOU FOR THE OPPORTUNITY TO SPOKE. PILAR HOYAS. I'M WITH WATSON LAND COMPANY. I'VE HAD THE PLEASURE OF MEETING SOME OF YOU, AND I WANT TO -- I'M NOT GOING TO SPEAK TO THE SCIENCE. I HAVE TO ADMIT THAT CHEMISTRY AND SCIENCE WAS NOT MY AREA OF STRENGTH.

I HAVE BEEN IN THIS COMMUNITY. WE'RE BASED HERE IN CARSON. WE HAVE ABOUT 12 MILLION SQUARE FEET OF MASTER PLAN INDUSTRIAL HEADQUARTERS. AND WHEN I SAY "MASTER PLAN," WE TAKE GREAT CARE TO HAVE -- AND THOSE OF YOU WHO ARE FAMILIAR WITH US WOULD APPRECIATE THIS. IN FACT, WE WERE GIVEN AN AWARD RECENTLY BY THE SOUTH BAY FOR OUR LEADERSHIP AND LEAD CERTIFIED BUILDINGS AND ENERGY. SO WE TAKE GREAT PRIDE IN OUR HISTORY AND IN OUR INTEREST OF WANTING TO DO THE RIGHT THING.

SOMETHING IN MY 30-YEAR HISTORY WATSON LAND COMPANY THAT HAS ALWAYS BEEN AT THE TOP OF OUR PRIORITIES IS JOBS. YESTERDAY I ATTENDED A MEETING WITH SUPERVISOR MARK RIDLEY THOMAS, AND HIS COMMENTS WERE ABOUT JOBS,

JOBS, JOBS AS HE SPOKE ABOUT POVERTY AND HOMELESSNESS. AND I THINK IT'S IMPORTANT FOR US TO BE BALANCED IN HOW WE GO ABOUT ALL OF OUR REGULATORY FRAMEWORK. WHEN WE TALK HEALTH IMPACTS, WHAT ARE THE HEALTH IMPACTS OF POVERTY. I CAN TELL YOU AS THE DAUGHTER OF A LEGAL -- I BETTER EMPHASIZE THAT. --LEGAL IMMIGRANT WHO FIRST LIVED IN SAN PEDRO WITH MY MOTHER WORKING AT THE CANNERY CLEANING FISH, LIVING IN POVERTY IS NO FUN NOT KNOWING WHERE THE MONEY IS COMING FROM TO PAY THE RENT OR FOR FOOD. AND I THINK SOMETIMES WE FORGET THAT WHEN WE TALK UP HERE ABOUT QUALITY OF LIFE.

I RAISED A SON WHO KID IS BEING ALLERGIC TO PLANET EARTH. AT THREE MONTHS HE WAS -- THEY THOUGHT HE HAD HORRIBLE CYSTIC FIBROSIS. IT TURNED OUT HE WAS ALLERGIC, ALLERGIC TO EVERYTHING. I THINK WE NEED TO BE BALANCED IN OUR APPROACH IS THE MESSAGE I WANT TO LEAVE WITH YOU.

IN MY 30-YEAR HISTORY WITH WATSON LAND COMPANY, I JOINED THE COMPANY AT A TIME WHEN THERE WAS ABOUT 80 PERCENT OF OUR BUILDINGS WERE OCCUPIED BY MANUFACTURING. WE WERE MAKING THINGS. BUT SLOWLY -- AND WE CAN TALK ABOUT WHAT DROVE THEM OUT. SO WITH ALL DUE RESPECT TO THE INDIVIDUAL THAT SAID LET'S NOT KID OURSELVES, NO. WE HAVE DRIVEN OUT A LOT OF OUR JOBS. YOU HEARD IT IN THIS ELECTION. IT BECAME A FACTOR IN DECISIONS. WHERE ARE

THOSE BLUE COLLAR JOBS? WE SENT THEM OVERSEAS. WE HAVEN'T REDUCED OUR IMPACTS ON GREENHOUSE GASES, HAVE WE? WE'VE SENT THEM TO COUNTRIES WHERE THEY HAVE LESS ENVIRONMENTAL REGULATIONS.

I DID READ SOMETHING ABOUT ALL OF CALIFORNIA'S EFFORTS REPRESENT, I THINK, LIKE 1 PERCENT OF REDUCTION IN GREENHOUSE GASES. SO LET'S BE BALANCED IN OUR APPROACH. WE TAKE PRIDE IN BEING LEADERS AND WANT TO DO THE RIGHT THING. BUT WHAT IS THAT COST? AND I DON'T BELIEVE IT'S A FINANCIAL COST. AND I TALKED TO MY COLLEAGUES. I'M ON THE BOARD AT THE L.A. CHAMBER. I'M ON THE BOARD OF BIZFED. I CHAIRED THE CARSON/DOMINGUEZ EMPLOYER'S ALLIANCE. I CAN GO ON AND ON. IT'S NOT ABOUT BUSINESS BECAUSE I THINK BUSINESS HAS BEEN SORT OF THIS VILLAINIZED DEEP-POCKETED THING OUT THERE THAT NOBODY LIKES, BUT IT'S ABOUT JOBS.

WHEN MY MOTHER FINALLY GOT A JOB THAT COULD PAY FOR EDUCATION, GUESS WHAT HER PRIORITY WAS? TO SEND US ALL TO SCHOOL SO THAT WE COULD HAVE A GOOD LIFE. AND I'M HERE TO TELL YOU THAT NOT EVERYBODY GETS THOSE OPPORTUNITIES AND A LOT OF PEOPLE ARE HURTING OUT THERE, HURTING WITHOUT JOBS. AND WE NEED TO UNDERSTAND WHAT IS THE IMPACTS ON HEALTH, ON DRUG ABUSE, ON DOMESTIC VIOLENCE. YOU NAME IT. AND I HAVEN'T SEEN THAT RESEARCH DONE WHEN WE TALK ABOUT HOMELESSNESS. THANK GOODNESS.

THAT'S ANOTHER BOARD I SERVE ON, THE DOWNTOWN WOMEN'S CENTER.

WE NEED TO DO SOMETHING ABOUT THESE THINGS, BUT LET'S NOT MAKE THINGS WORSE BY KIDDING OURSELVES THAT THESE REGULATORY SCHEMES THAT ARE MULTIPLIED AND LAYERED UPON LAYER DO NOT HAVE AN EFFECT ON JOBS. WE INVITED CARB REPRESENTATIVES TO TOUR SOME OF OUR, QUOTE, UNQUOTE, WAREHOUSES. THEY'RE INDUSTRIAL BUILDINGS THAT WILL ACCOMMODATE A VARIETY OF USES, OFFICE, CORPORATE HEADQUARTERS, LOGISTICS. WHERE ARE THE JOBS GOING TO COME FROM?

I MENTIONED EARLIER THAT WHEN I CAME TO WATSON LAND COMPANY 30 YEARS AGO WE HAD 80 PERCENT OF OUR BUILDINGS OCCUPIED BY MANUFACTURING. TAKE A WILD GUESS WHAT THAT NUMBER IS TODAY. LESS THAN 5 PERCENT. OUR BUSINESSES HOUSE ALMOST 7,000 JOBS TODAY. BUT GUESS WHAT? THEY'RE ALL TIED TO GOODS MOVEMENT. AND SO LET'S BE CAREFUL HOW WE MOVE FORWARD.

SO THAT'S REALLY MY MESSAGE. THAT WE WANT TO WORK TOGETHER, WE ALL WANT CLEAN AIR, BUT WE ALSO NEED JOBS. THANK YOU VERY MUCH.

DR. FINE: THANK YOU. I HAVE ONE MORE CARD.

MARIA.

MS. VASQUEZ: HELLO. WELL, YOU GUYS DON'T KNOW ME, BUT I'M GOING TO TELL YOU I AM A BUSINESS WOMAN. I

USED TO HAVE GAS STATIONS, MANY GAS STATIONS, AND PARTNERSHIP WITH SHELL OIL COMPANY. I LIVE HERE IN CARSON FOR OVER 50 YEARS. BEFORE I CAME TO CARSON, I USED TO LIVE IN REDONDO BEACH. AND IN ORDER FOR US TO GET A PARTNERSHIP TO SHELL COMPANY, WE HAVE TO SELL OUR HOUSE IN REDONDO BEACH AND BUY A HOUSE HERE IN CARSON.

OKAY. WE DOING FINE. BUT I'M GOING TO TELL YOU NOW I'M RETIRED. AND I USED TO HAVE A MAID WHO TAKES CARE OF MY CHILDREN. BUT NOW THAT I'M AT HOME TAKING CARE OF MY HOME, WHAT I DID I PUT CEMENT ALL OVER AROUND MY HOUSE. GUESS WHAT? I HAVE TO WASH DOWN THE DIRT EVERY DAY. IT'S TERRIBLE. BLACK DIRT ON TOP OF THE CEMENT EVERY DAY. THOSE OIL REFINERIES AND ALL THE TRUCKS WE HAVE.

I LIVE RIGHT HERE DOWN THE STREET, MARTIN STREET, FOR OVER 50 YEARS. I OWN MY HOUSE. BUT I WORK VERY HARD FOR IT. I USED TO GET UP AT 2 O'CLOCK IN THE MORNING IN ORDER TO OPEN MY BUSINESS, WHICH WAS A GAS STATION AND STAY THERE UNTIL 11 O'CLOCK. BUT, ANYWAY, THE REFINERIES REALLY ARE KILLING PEOPLE. IT'S THE ENVIRONMENT. AND THEY HAVE CHANGED OVER THE YEARS. BEFORE WE USED TO SEE FIRES ALL OVER RIGHT HERE IN WILMINGTON, TEXACO AND SHELL, AND ARCO. IT WAS TERRIBLE. IT GOT BETTER OVER THE YEARS.

BUT STILL, LIKE I SAID, THIS MORNING I HAD TO

WASH AROUND MY HOUSE, THE DRIVEWAY, AND THE SIDEWALK ALMOST EVERY DAY BECAUSE IT'S -- I DON'T KNOW WHERE THAT DIRT COMES FROM. BUT IT SURE IS A KILLER. IT'S A KILLER NOT ONLY FOR ME, BUT TO MY CHILDREN. YOU BREATHE -- MY BREATHING IS NOT LIKE IT USED TO BE. I KNOW I'M GETTING OLDER. BUT, YOU KNOW, IF I LIVE IN REDONDO BEACH, I WON'T BE FEELING THE WAY I FEEL BECAUSE OF THE AIR. YOU KNOW, THE OCEAN, THE AIR OF THE OCEAN CLEAN UP THE AIR DOWN TO INSIDE LAND.

AND I MUST TELL YOU I'M GLAD YOU HAVE THE COAST QUALITY CONTROL AIR. THEY USED TO INSPECT MY GAS STATIONS ALL THE TIME. SO I'M GLAD THAT YOU GUYS ARE WATCHING AFTER US. PROTECT US. AND WE NEED MORE OF YOUR HELP FOR THE PEOPLE OF TOMORROW. LIKE I SAID, NOT ONLY THE REFINERY. I HAVE SHELL HERE. I HAVE ARCO HERE AT TESORO OVER THERE. AND AT THE TIME I DIDN'T KNOW IT BECAUSE PROBABLY I WON'T SELL MY HOME IN REDONDO BEACH AND COME. WELL, I SOLD IT AND INVEST MONEY INTO MY BUSINESS. THAT'S THE REASON WE GET IT.

BUT I'M VERY GLAD THAT YOU'RE LOOKING AFTER OUR HEALTH. THANK YOU. I REALLY APPRECIATE IT. AND PLEASE KEEP LOOKING BECAUSE IT'S NECESSARY FOR THE FUTURE CHILDREN IN THE COUNTRY. THANK YOU VERY MUCH.

DR. FINE: THANK YOU. I DON'T HAVE ANY MORE CARDS. IS THERE ANYONE ELSE WHO WOULD LIKE TO MAKE A

COMMENT OR SPEAK? FEEL FREE TO COME UP. SO WE'LL CALL THE MEETING TO A CLOSE. THANK YOU FOR COMING TO THE MEETING. WE'LL BE HERE FOR SOME TIME AFTER. FEEL FREE TO COME UP.

(END OF PUBLIC HEARING.)

160 S. OLD SPRINGS ROAD, SUITE 270, ANAHEIM, CA 92808
PHONE: 714.444.4100 FAX: 714.444.4411 EMAIL: DEPO@DEPO1.COM

BEFORE THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

IN RE THE MATTER OF:	)
	)
PUBLIC HEARING:	)
	)
SCAQMD 2016 AIR QUALITY MANAGEMENT PLAN	)
	)
	)
	)

DATE AND TIME:	TUESDAY, NOVEMBER 15, 2016 9:00 A.M.
PLACE:	BUENA PARK COMMUNITY CENTER 6688 BEACH BOULEVARD BUENA PARK, CALIFORNIA 90621
REPORTER:	KRISTIN RIVERA, CSR CERTIFICATE NO. 11858
BRS FILE NO.:	99070

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160 S. OLD SPRINGS ROAD, SUITE 270, ANAHEIM, CA 92808
PHONE: 714.444.4100 FAX: 714.444.4411 EMAIL: DEPO@DEPO1.COM

BUENA PARK, CALIFORNIA; TUESDAY, NOVEMBER 15, 2016

9:00 A.M.

DR. FINE: GOOD MORNING. THIS IS THE FIRST OF FOUR REGIONAL HEARINGS WE'RE HAVING ON THE PLAN. BEFORE WE GET STARTED, JUST A LITTLE BIT OF HOUSEKEEPING. MAKE SURE YOU PUT YOUR CELL PHONES ON SILENT AND VIBRATE SO THERE'S NO INTERRUPTIONS. RESTROOMS ARE LOCATED JUST BEHIND THIS WALL IN THE HALLWAY THERE. AND THEN IN THE EVENT OF EMERGENCY, WE MAY ASK FOR EVACUATION OR SHELTER IN PLACE IN CASE OF AN EARTHQUAKE.

AGAIN, WELCOME TO THE MEETING. MY NAME IS PHILIP FINE. I'M DEPUTY EXECUTIVE OFFICER WITH SOUTH COAST AQMD IN THE RULES DIVISION. AND LET'S GO AHEAD AND DO INTRODUCTIONS.

MS. VANDERSPEK: I'M SYLVIA VANDERSPEK, AND I'M CHIEF OF THE AIR QUALITY PLANNING BRANCH FOR THE STATE OF CALIFORNIA.

MR. HUGO: GOOD MORNING. I'M HENRY HUGO. I'M ASSISTANT DEPUTY EXECUTIVE OFFICER IN THE MOBILE SOURCE DIVISION.

DR. GHOSH: GOOD MORNING. MY NAME IS JO KAY GHOSH. I'M HEALTH OFFICER FOR AQMD.

DR. FINE: SO AS I MENTIONED, THIS IS A REGIONAL HEARING, AND IT'S SIMILAR TO WHAT WE HAVE IN TERMS OF

BOARD MEETINGS. WE'RE ACTUALLY TAKING A TRANSCRIPT, AND THE TRANSCRIPT OF THIS MEETING WILL BE SHARED WITH OUR BOARD MEMBERS AS REQUIRED FOR STATE LAW. WE DID A PREVIOUS ROUND OF REGIONAL WORKSHOPS. THIS IS A LITTLE MORE FORMAL. WE ARE TAKING COMMENT. IF YOU DO WANT TO MAKE A COMMENT, WE HAVE BLUE CARDS OUT IN THE LOBBY. PLEASE FILL ONE OUT. AND WHEN WE ARE DONE WITH THE PRESENTATION, WE WILL BE ASKING FOR PUBLIC COMMENT.

THERE'S THREE PARTS TO TODAY'S PRESENTATION AND HEARING. THE FIRST IS THE PRESENTATION ON THE 2016 AQMP AND SECOND YOU'LL HEAR FROM OUR CALIFORNIA AIR RESOURCES BOARD ON THE STATEWIDE STATE LIMITATION PLAN FOR PRIMARILY MOBILE SOURCES AND THEN ALSO AS REQUIRED BY STATE LAW THE AQMP INCLUDES A CHAPTER ON THE HEALTH EFFECTS. SO THESE REGIONAL HEARINGS SERVE AS HEARINGS FOR THAT STATE-MANDATED ANALYSIS THAT IS PART OF APPENDIX 1 OF THE AQMP. SO WE'LL HAVE A BRIEF PRESENTATION ON THAT. AM I MISSING ANYTHING?

SO WE'LL GO AHEAD AND GET STARTED WITH THE AQMP ITSELF. AS MANY OF YOU KNOW, WE RELEASED A DRAFT PLAN BACK IN JUNE AND WE REVISED THAT PLAN BASED ON COMMENTS RECEIVED ON AT LEAST THE REVISED DRAFT EARLY IN OCTOBER. SO WE'RE GOING TO TALK ABOUT TODAY THE CONTENTS OF THE REVISED DRAFT AND THEN TOWARDS THE END I'LL TALK ABOUT THE SCHEDULE GOING FORWARD.

MANY OF YOU ARE FAMILIAR WITH THIS, BUT JUST THE CONTEXT WE ALL KNOW THAT AIR QUALITY IN SOUTHERN CALIFORNIA HAS SEEN DRAMATIC IMPROVEMENTS OVER THE PAST SEVEN DECADES BOTH IN TERMS OF OZONE POLLUTION AND PARTICULATE MATTER, PM2.5. HOWEVER, WE STILL EXPERIENCE SOME OF THE WORST AIR QUALITY IN THE NATION BETWEEN SOUTH COAST AIR BASIN AND THE SAN JOAQUIN AND CENTRAL VALLEY WHERE WE DO HAVE THE WORST AIR QUALITY IN THE COUNTRY. SO WE REMAIN IN NONATTAINMENT FOR OZONE AND PM2.5. SO THIS PLAN PRIMARILY ADDRESSES THOSE TWO POLLUTANTS AND A PATHWAY GOING FORWARD FOR ATTAINING THOSE STANDARDS.

JUST BY WAY OF BACKGROUND, THE WAY THAT THE PLANS FIT INTO THE CLEAN AIR ACT AND U.S. EPA IS THAT THE EPA SETS THESE NATIONAL AMBIEN AIR QUALITY STANDARDS FOR WHAT THEY CALL CRITERIA POLLUTANTS, AND THESE INCLUDE OZONE AND PM2.5. AND BASED ON THE DATA THAT IS COLLECTED AND MONITORED IN AREAS AROUND THE COUNTRY, AREAS ARE DESIGNATED AS ATTAINMENT OR NON-ATTAINMENT. IF YOU'RE IN NON-ATTAINMENT, A SERIES OF PLANNING REQUIREMENTS KICK IN INCLUDING STATE LIMITATION PLAN, AND THAT STATE LIMITATION, AS I MENTIONED, IS A BLUEPRINT FOR HOW A CERTAIN AREA IS GOING TO REDUCE EMISSIONS IN ORDER TO ATTAIN STANDARDS BY SPECIFIC CLEAN AIR ACT DEADLINES.

SO IN SOUTHERN CALIFORNIA IN THE SOUTH COAST BASIN WE CALL THAT THE AIR QUALITY MANAGEMENT PLAN WHICH

FEEDS INTO THE STATE LIMITATION PLAN FOR CALIFORNIA. WE'VE -- STATE LAW ALSO REQUIRES THE AIR QUALITY MANAGEMENT PLAN TO ADDRESS NOT ONLY FEDERAL STANDARDS BUT ALSO STATE AMBIENT AIR QUALITY STANDARDS. WE ALSO COVER THE SOUTH COAST AIR BASIN FOR THE COACHELLA VALLEY OUT BY PALM SPRINGS AND INDIO.

AND THIS WILL BE THE AQMD'S 11TH PLAN DATING BACK TO THE LATE '70S. SO THEN AS I MENTIONED, THE TWO NATIONAL AMBIENT AIR QUALITY STANDARDS WHICH WE STILL DO ATTAIN ARE PARTICULATE MATTER AND OZONE. AND THE CLEAN AIR ACT REQUIRES ACHIEVE THOSE AS EXPEDITIOUSLY AS PRACTICABLE, WHICH MEANS AS SOON AS POSSIBLE. AND SO WHAT WE TRY TO DO IS WE HAVE AN INTEGRATED PLAN. WE HAVE POLLUTANTS THAT CONTRIBUTE BOTH TO PM2.5 AND OZONE. SO WE WANT TO HAVE ONE PLAN THAT WILL ALLOW US TO MEET ALL THE STANDARDS AND NOT HAVE A PIECEMEAL EFFORT WHERE WE DO A CERTAIN SET OF ACTIONS TO MEET ONE STANDARD AND A SEPARATE SET OF ACTIONS THAT MEET THE OTHER STANDARDS. THAT WILL BE VERY INEFFICIENT. SO WE TRY TO IN EACH AQMP TO ADDRESS ALL THE STANDARDS FOR WHICH IT IS DESIGNED TO ACHIEVE.

SO YOU CAN SEE HERE ARE THERE DIFFERENT OZONE STANDARDS FOR WHICH WE DO NOT YET ATTAIN, AND YOU CAN SEE THE DIFFERENT LEVELS AND THE ATTAINMENT YEARS OF THE ACT AS WELL AS SUBMITTAL DUE DATE. AND THEN THERE'S TWO

PM2.5 STANDARDS FOR WHICH WE DO NOT YET ATTAIN. AND I WON'T GO INTO DETAIL ON ALL THESE BECAUSE WHAT IS REALLY DRIVING THIS PLAN IS THE OZONE STANDARDS ESPECIALLY THAT 2023 DEADLINE FOR THE EXTREME AREA. AND I'LL TALK ABOUT THAT IN A MOMENT. I WILL MENTION THAT THE SIP SUBMITTAL DUE DATES, A COUPLE HAVE PASSED, BUT WE ARE WORKING CLOSELY WITH EPA, CARB, IN TERMS OF GETTING THE PLAN SUBMITTED IN A TIMELY FASHION. WE DON'T FEEL LIKE THERE'S ANY CONSEQUENCES AT THIS POINT IN BEING A LITTLE BIT LATE, AND WE DID WANT TO TAKE THE TIME TO DO IT RIGHT RATHER THAN FAST AND HAVE PLENTY OF OPPORTUNITY TO HAVE PUBLIC INPUT AND COMMENT. SO THAT IS WHY WE'RE DOING THAT. AND I'LL GET INTO THE SCHEDULE TOWARDS THE END.

SO THE CHALLENGE IN THE BASIN KIND OF CAN BE NARROWED DOWN IN THIS ONE SLIDE. WHAT I'M SHOWING HERE ARE NOX EMISSIONS AND TONS PER DAY FROM 2012 PROJECTED INTO THE FUTURE. AND NOX EMISSIONS COMBINED WITH COMPOUND EMISSIONS ARE WHAT FORM OZONE IN THE ATMOSPHERE. NOX EMISSIONS ALSO REACT TO FORM A LARGE FRACTION OF THE PARTICULATE MATTER THAT'S IN OUR AIR. AS PART OF THE INTEGRATED PLAN WE KNOW THAT WE NEED NOX REDUCTIONS NOT ONLY TO ATTAIN THE OZONE STANDARDS BUT ALSO TO OBTAIN THE PM2.5 STANDARDS.

SO WHAT WE SEE HERE ON THE BLUE BARS IS WHAT WE CALL A BASELINE OR WHAT THE EMISSIONS WILL BE IN THE

BASIN GOING FORWARD. IF WE DO NOT IMPLEMENT THIS PLAN, THERE ARE NO ADDITIONAL RULES AND REGULATIONS DEVELOPING. SO YOU CAN SEE BY THE BLUE BARS THAT WE DO GET 50- TO 60-PERCENT REDUCTION GOING FORWARD IN NOX EMISSIONS. AND THIS IS ALREADY DUE TO RULES AND REGULATIONS ON MOBILE SOURCES AT THE STATE AND FEDERAL LEVEL. SO WE DO GET EMISSION REDUCTIONS AND WE DO EXPECT TO SEE AIR QUALITY IMPROVEMENT. BUT THE CHALLENGE IS THAT'S NOT ENOUGH. WE NEED TO GET DOWN TO THOSE RED BARS BY 2022, 2023, AND 2031 IN ORDER TO ATTAIN THE STANDARDS. SO THAT'S AN ADDITIONAL 43-PERCENT REDUCTION OF NOX EMISSIONS WITH THE NEW RULES AND REGULATIONS BY 2023 AND 55 PERCENT BY 2031. AND THOSE ARE THE TWO OZONE STANDARDS. IF WE'RE ON THAT TRAJECTORY, NOT ONLY WILL WE MEET THE ONE-HOUR STANDARD IN 2022 SHOWN HERE, BUT WE SHOULD ALSO EASILY MEET THE PM2.5 STANDARDS BY OUR DEADLINES IN 2025 AND 2019.

SO THE OTHER PIECE OF THIS CHALLENGE IS WHILE NOX EMISSIONS AS IMPORTANT FOR ATTAINING THE STANDARDS FOR THE LOCAL AIR QUALITY AGENCY IN CALIFORNIA, OUR PRIMARY AUTHORITY IS OVER STATIONARY SOURCES NOT MOBILE SOURCES. SO WHEN WE LOOK BACK TO 2012, 88 PERCENT OF NOX EMISSIONS CAME FROM MOBILE SOURCES WHICH ARE THE PRIMARY AUTHORITY OF THE STATE OF CALIFORNIA AIR RESOURCES BOARD, WHICH YOU'LL HEAR ABOUT THAT IN A MOMENT, AS WELL AS THE FEDERAL GOVERNMENT. SO THE CHALLENGE IS WE HAVE THE

RESPONSIBILITY ON ATTAINING AIR STANDARDS, BUT WE DO HAVE LIMITED AUTHORITY OVER THE MAJORITY OF THE SOURCES CONTRIBUTING TO THE NON-ATTAINMENT PROBLEM.

SO WHEN YOU LOOK AT THE CONTENTS OF THE PLAN -- AND I ENCOURAGE EVERYBODY TO GO ONLINE AND REVIEW THE PLAN. AND WE HAVE LOTS OF SUMMARIES AND PRESENTATIONS. I'M NOT GOING TO GO INTO ALL THE DETAILS TODAY. WHEN WE LOOK AT THE PLAN, WE LOOK AT THE NOX EMISSIONS NEEDED FOR ATTAINMENT GOING FORWARD. SO THIS IS WHAT WE NEED TO REDUCE; ABOUT BETWEEN 350 AND 400 TONS PER DAY IN 2023 AND EVEN MORE IN 2031. YOU CAN SEE THAT THE MAJORITY, ALMOST 70 PERCENT, OF THE EMISSION REDUCTIONS WE NEED FOR ATTAINMENT ARE DUE TO RULES AND REGULATIONS, JUST IMPLEMENTING EXISTING RULES AND REGULATIONS. AND THEN YOU SEE WHAT WE'VE ADDED ON TOP OF THAT ARE WHAT THE NEW REGULATIONS PROPOSED AT THE LOCAL LEVEL AND AT THE STATE LEVEL WITHIN THE PLAN ITSELF, AND IT'S A SMALL SLIVER, BUT WE UPDATE THESE PLANS EVERY THREE TO FOUR YEARS. SO WE INCLUDE WHAT TECHNOLOGY ALLOWS US TO DO IN TERMS OF REGULATORY ACTIONS TO ACHIEVE REDUCTIONS. SO YOU CAN SEE IT'S A SMALL SLIVER, BUT IT'S ACTUALLY A VERY SIMILAR MAGNITUDE TO ALL THE PREVIOUS PLANS WE'VE ADOPTED OVER THE PAST 5 TO 15 TO 20 YEARS.

BEYOND THE NEW RULES AND REGULATIONS, WE NEED REDUCTIONS FROM FEDERAL SOURCES. THESE ARE PRIMARILY THE

TRAINS AND SHIPS AND THE AIRCRAFT. AND THE STATE STRATEGY INCLUDES REDUCTIONS THAT NECESSARILY HAVE TO COME FROM FEDERAL SOURCES. BUT EVEN AFTER THAT WE STILL HAVE A GAP. AND THIS GAP IS SHOWN IN THE GREEN BAR. THESE ARE REDUCTIONS THAT WOULD NOT FEASIBLY BE ACHIEVED THROUGH REGULATORY ACTIONS, BUT CAN BE ACHIEVED IN COMBINATION WITH LONGER TERM REGULATORY ACTIONS BY PROVIDING INCENTIVES TO CHANGE OUT EQUIPMENT IN A CHANGE OUT OF THE EXISTING FLEETS WHETHER IT'S ON-ROAD OR OFF-ROAD FLEETS. SO REGULATIONS CAN WORK TOWARDS REDUCING TAIL PIPE EMISSIONS AND REDUCING EMISSIONS ON ALL THESE EQUIPMENTS, BUT IT TAKES A LONG TIME FOR THOSE STANDARDS TO KICK IN. BUT WHAT INCENTIVES CAN DO IS ACCELERATE THOSE EMISSION REDUCTIONS BY INCENTIVIZING A MORE RAPID FLEET TURNOVER. SO THIS PLAN DOES HAVE A SIGNIFICANT AMOUNT OF REDUCTIONS THAT NEED TO COME NECESSARILY THROUGH THOSE TYPES OF ACTIONS.

AND, AGAIN, AS I MENTIONED BEFORE, WE AS A LOCAL AGENCY, 88 PERCENT OF THE NOX IN 2012 DID COME FROM MOBILE SOURCES. WE HAVE LIMITED AUTHORITY. WE HAVE SOME AUTHORITY, WHICH I'LL TALK ABOUT IN A MOMENT, BUT NECESSARILY A PLAN SUCH AS THIS THAT REQUIRES SO MANY EMISSION REDUCTIONS FROM ALL THE SOURCES NEEDS TO INTEGRATE NOT JUST LOCAL ACTIONS BUT STATE ACTIONS AS WELL AS FEDERAL ACTIONS.

SO JUST BACK TO STATIONARY SOURCES FOR A MOMENT, AS WE DO IN EVERY PLAN, IT'S BEEN A VERY LONG PROCESS DATING BACK OVER THREE YEARS NOW WHERE WE THOROUGHLY EVALUATE ALL THOSE STATIONARY SOURCE CATEGORIES THAT ARE UNDER OUR PRIMARY AUTHORITY. WE LOOK AT THE EMISSION INVENTORY, WE LOOK AT WHERE THE OPPORTUNITIES ARE FOR ADDITIONAL REDUCTIONS, WE LOOK AT OTHER ACTIONS THAT HAVE BEEN TAKEN WITHIN THE STATE AND OUTSIDE THE STATE OF STATIONARY SOURCES IN TERMS OF STRATEGIES AND REGULATIONS. WE HELD MULTIPLE WORKING GROUPS, WE HAD SEVERAL WHITE PAPERS, WE HELD MEETINGS OF OUR ADVISORY GROUP, WE HELD A CONTROL TECHNOLOGY SYMPOSIUM TO SOLICIT IDEAS. AND AFTER WE LOOKED AT ALL THOSE OPTIONS, WE DID COME UP WITH A ROBUST SET OF ADDITIONAL STATIONARY SOURCE CONTROLS. AND THAT LISTS THE MAJOR CATEGORIES HERE. WE'RE LOOKING AT NOX REDUCTIONS FROM NON-REFINERY FLARING, LOOKING AT NOX CONTROLS FOR PRIMARILY COMMERCIAL COOKING APPLIANCES. WE FOUND SOME OPPORTUNITIES THERE. WE'RE LOOKING AT A RECLAIM PROGRAM WHICH IS OUR CAP AND TRADE PROGRAM FOR NOX EMISSIONS FROM 270 LARGEST INDUSTRIAL FACILITIES. AND WE'RE LOOKING FOR FURTHER REDUCTIONS FROM RECLAIM INCLUDING A POTENTIAL COMMAND CONTROL OPTION FOR RECLAIM GOING FORWARD. WE ARE ALSO LOOKING AT COMMERCIAL AND RESIDENTIAL EQUIPMENT ANYWHERE FROM HOT WATER HEATERS TO

SPACE HEATERS TO OTHER TYPES OF EQUIPMENT YOU FIND IN A COMMERCIAL BUILDING OR RESIDENTIAL BUILDING. AND WE'RE ALSO LOOKING TO SEE WHETHER WE CAN REDUCE NOX EMISSIONS FROM DIESEL PUMP GENERATORS WITH SOME ALTERNATIVES THAT HAVE EMERGED FOR BACKUP POWER.

BUT ONE THING I WANT TO MENTION IS EVEN IF WE TOOK ALL OUR STATIONARY SOURCES AND ZEROED OUT THEIR EMISSIONS TOMORROW, WHICH OBVIOUSLY IS NOT POSSIBLE, BUT EVEN IF WE DID THAT, WE'RE STILL A LONG WAY FROM ATTAINMENT. SO THAT IS WHY MOBILE SOURCES ARE THE PRIMARY FOCUS OF THESE PLANS.

SO ALTHOUGH AQMD DOES NOT HAVE PRIMARY REGULATORY AUTHORITY OVER MOBILE SOURCES, WE DO HAVE SOME AUTHORITY UNDER STATE AND FEDERAL LAW, AND THIS IS GENERALLY REFERRED TO AS INDIRECT SOURCE AUTHORITY AND WE DO HAVE SOME FLEET AUTHORITY. AND THE APPROACH WE'RE TAKING TOWARDS THIS IS TO WORK WITH THE DIFFERENT TYPES OF FACILITIES THAT WOULD COME UNDER THIS AUTHORITY.

SO WHAT INDIRECT SOURCE MEANS IS THAT A SOURCE OF A PARTICULAR FACILITY THAT ATTRACTS MOBILE SOURCES SUCH AS THE AIRPORT, A RAIL YARD, A WAREHOUSE DISTRIBUTION CENTER, PORTS, OR EVEN A NEW DEVELOPMENT OR REDEVELOPMENT PROJECTS THAT ATTRACT OFF-ROAD AND ON-ROAD SOURCES WE DO HAVE SOME AUTHORITY OVER THEM. IT'S LIMITED AUTHORITY. IT'S AUTHORITY THAT GETS CHALLENGED

IN THE COURTS ALL THE TIME. SO THE APPROACH WE WANT TO TAKE IS WORK WITH THOSE PARTICULAR INDUSTRIES AND SEE IF WE CAN SET TARGETS AND WORK COLLABORATIVELY TO ACHIEVE NOT ONLY NOX EMISSION REDUCTIONS, BUT NOX EMISSION REDUCTIONS THAT CAN BE CREDITED TO OUR STATE LIMITATION PLAN AND OUR AQMP THROUGH THE COURSE OF THE PLAN.

SO WE WANT TO TAKE ABOUT A YEAR APPROACH TO MEET WITH WORKING GROUPS IN THESE DIFFERENT INDUSTRIES AND IDENTIFY THE BEST PRACTICES AND WHAT CAN BE DONE AND SEE IF WE CAN DEVELOP MECHANISMS TO MAKE THEM CREDITABLE. BUT IF THAT DOESN'T YIELD RESULTS IN THAT TIME FRAME, THEN WE MAY NEED TO PIVOT TO REGULATIONS IF NEEDED.

SO WE HAVE SEVERAL MEASURES IN THE PLAN THAT LOOK AT THIS, BUT I DO WANT TO MENTION THAT THE EMISSION REDUCTIONS THAT THESE TYPES OF MEASURES WOULD ACHIEVE ARE EMISSION REDUCTIONS THAT ARE ALREADY COMMITTED TO BY THE STATE. AND WHAT THESE MEASURES ATTEMPT TO DO IS HELP FACILITATE THOSE EMISSION REDUCTIONS THROUGH HELPING THE STATE IMPLEMENT STRATEGIES TO ACHIEVE THOSE EMISSION REDUCTIONS.

SO AS I MENTIONED BEFORE, WE RELEASED A DRAFT PLAN IN JUNE AND RECEIVED 69 COMMENT LETTERS. AND BASED ON THOSE COMMENTS AND AS WELL AS MEETINGS AND ADVISORY GROUP MEETINGS, WORKING GROUP MEETINGS, WE DID MAKE SOME SIGNIFICANT REVISIONS TO THE PLAN. WE DID ADD ADDITIONAL

PRIORITY ON USING ZERO EMISSION TECHNOLOGY WHERE COST EFFECTIVE AND FEASIBLE BUT IN AREAS WHERE IT'S NOT YET COST EFFECTIVE AND FEASIBLE, NEAR-ZERO EMISSION TECHNOLOGY. AND WE RECOGNIZE THAT DEFINITION OF ZERO AND NEAR ZERO MEANS TO LOOK AT TOTAL LIFE CYCLE EMISSIONS ANALYSIS OF THE DIFFERENT TYPES OF ENERGY OPTIONS AND EMISSIONS OPTION. SO YOU'LL FIND THAT THROUGHOUT THE PLAN IN SEVERAL MEASURES. WE DID ADD ADDITIONAL REGULATORY MEASURES IN TERMS OF INTERNAL COMBUSTION PRIMARILY DIESEL GENERATORS, AS I MENTIONED, AND THEN LONGER TERM REGULATORY ACTIONS FOR RESIDENTIAL AND COMMERCIAL APPLIANCES.

WE DO KNOW THAT INCENTIVES ARE NEEDED TO MEET THE ADVANCEMENT OF THESE TECHNOLOGIES SO WE HAVE A LITTLE BIT OF CLARITY ON WHAT WE MEAN BY THAT. AND THEN AS I MENTIONED BEFORE, WE ARE COMMITTING TO A SIGNIFICANT REDUCTION IN NOX FROM OUR LARGEST STATIONARY SOURCES UP TO 5 TONS PER DAY AND WE INTEND TO VERY SOON ENGAGE IN AN ANALYSIS WHICH WILL HELP US DECIDE WHETHER TO GO FORWARD WITH RECLAIM AND SERIOUSLY CONSIDER WHETHER REPLACING IT WITH A MORE COMMAND AND CONTROL REGULATORY STRUCTURE IS THE MOST EFFICIENT WAY TO ACHIEVE THOSE EMISSION REDUCTIONS.

WE DEFINITELY ADDED CLARITY AND CERTAINTY AND TIME LINES TO THE FACILITY-BASED MEASURES BASED ON

COMMENTS RECEIVED, ADDITIONAL CLARITY ON THE FLEET RULE AUTHORITY THAT WE HAVE AS WELL AS UPDATED DATA, EMISSION INVENTORY MODELING AND ALL THE TECHNICAL DETAILS THAT GO INTO THE PLAN.

SO WHEN WE TALK ABOUT THE INCENTIVES THAT ARE GOING TO BE NEEDED TO ACCELERATE EARLY DEPLOYMENT OF THESE TECHNOLOGIES, THE TECHNOLOGIES THAT HAVE BEEN DEVELOPED RECENTLY ALLOW US TO NOT ONLY SPECIFY SOME SPECIFIC PATHWAYS TO GET THE EMISSION REDUCTIONS THAT WE NEED, IT ALSO ALLOWS US TO MODIFY IT. SO IN PAST PLANS WE'VE USED BLACK BOX. THE CLEAN AIR ACT ALLOWS US NOT TO BE SPECIFIC ABOUT A CERTAIN AMOUNT OF EMISSION REDUCTIONS THAT ARE NEEDED FOR ATTAINMENT. BUT SINCE WE'RE ONLY SIX OR SEVEN YEARS AWAY FROM ATTAINMENT DEADLINES FOR THIS PLAN, WE'RE TRYING TO BE AS SPECIFIC AS POSSIBLE ABOUT THE TECHNOLOGY THAT WE NEED, TECHNOLOGIES THAT EXIST, AND WHAT IT'S GOING TO TAKE TO GET THOSE TECHNOLOGIES OUT THERE.

SO THIS IS ONE OF THE INNOVATIVE PARTS OF THIS PLAN THAT WE'RE NO LONGER PUTTING EVERYTHING IN THE BLACK BOX. WE ARE SPECIFYING EXACTLY WHAT IT'S GOING TO TAKE TO GET TO ATTAINMENT. BUT WHAT IT'S GOING TO TAKE IS A SIGNIFICANT EXPANSION OF THE INCENTIVE PROGRAM TO GET THAT FLEET TURNOVER, AND WE CALCULATE THAT TO BE ROUGHLY ABOUT $14 BILLION OVER THE NEXT 7 TO 15 YEARS. AND

THAT'S ROUGHLY ABOUT A BILLION A YEAR. MOST OF THAT WE KNOW IS GOING TO BE MOST COST EFFECTIVE IN THE MOBILE SOURCE SECTOR. ALTHOUGH WE DO FEEL LIKE THERE WILL BE SOME COST-EFFECTIVE OPPORTUNITIES ON THE STATIONARY SOURCE SECTOR ESPECIALLY RESIDENTIAL, COMMERCIAL, AND SMALL BUSINESSES. AND WE LOOK FORWARD TO THE CAPITAL INVESTMENT TO BE ABLE TO CHANGE OUT TO CLEANER TECHNOLOGY.

IN THE AQMP THERE ARE SOME RELATED DOCUMENTS AS A PROJECT WE DO CREATE A DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT UNDER CEQA. WE RELEASED THAT ON SEPTEMBER 16TH FOR A 60-DAY PUBLIC COMMENT REVIEW PERIOD, WHICH I THINK ENDS TODAY. THAT HAS BEEN OUT, AND WE TALKED ABOUT THAT AT SOME OF THE PREVIOUS MEETINGS. WE ALSO DO A SOCIOECONOMIC PLAN WHICH LOOKS AT THE COST OF THE PLAN AS WELL AS THE BENEFITS OF THE PLAN. SO WE HAVE BEEN WORKING HARD ON THAT, AND WE HAVE BEEN RELEASING CHAPTERS AS WE HAVE BEEN COMPLETING THEM. WE RELEASED THE COST AND BENEFITS ANALYSIS ON AUGUST 31ST. WE RELEASED THE ENVIRONMENTAL JUSTICE IMPACT SECTION IN SEPTEMBER AND THEN WE PUT IT IN A REGIONAL ECONOMIC MODELING OF THE JOB IMPACTS, SUBREGIONAL JOB IMPACTS, AND ALSO IMPACTS FROM CEQA. WE RELEASED THAT AT THE BEGINNING OF THIS MONTH. SO WE'RE UPDATING SOME OF THOSE CHAPTERS AND WILL BE COMPLETING THAT AND HAVE EVERYTHING OUT UPDATED SOMETIME

THIS MONTH.

IN ADDITION, WHAT'S NEW FOR THIS PLAN WE'RE ALSO WORKING ON AN ACTION PLAN FOR SECURING THE NEEDED INCENTIVE FUNDING. AND SO JUST TO TALK A LITTLE ABOUT RELATED DOCUMENTS, I WON'T GO INTO CEQA IN DETAIL. BUT WHEN YOU LOOK AT THE COST AND BENEFITS OF THE PLAN, YOU COULD SEE THAT THE TOTAL INCREMENTAL COST OF THE PLAN IS ABOUT $15 BILLION OVER THAT 15-YEAR PERIOD IN 2031, AND THAT COMES OUT TO BE $1.4 BILLION PER YEAR.

AS YOU CAN SEE, A LARGE PORTION OF THAT IS INCENTIVE FUNDING THAT IS ASSUMED TO COME FROM PUBLIC SOURCES, BUT THERE IS SOME OTHER COST THAT WILL NOT BORN BY PUBLIC INCENTIVE FUNDINGS AS YOU CAN SEE HERE. YOU CAN ALSO SEE SOME OF THE MEASURES THAT ARE BEING PROPOSED WHICH ARE ACTUALLY A COST SAVINGS DUE TO FUEL SAVINGS OF GOING FORWARD.

SO OUR SOCIOECONOMIC PLAN WE CAN GO INTO MORE DETAILS IF THERE'S ANY QUESTIONS. WE HAVE STAFF HERE THAT CAN ANSWER IN MORE DETAIL. BUT WHEN YOU LOOK AT THE HEALTH BENEFITS OF THE PLAN, THEY DO OUTWEIGH THE COSTS LARGELY DUE TO THE AVOIDED PREMATURE DEATHS FROM REDUCTION IN PARTICULATE MATTER. BUT THE OVERALL PUBLIC HEALTH BENEFIT IN THAT TIME PERIOD IN THE FOUR-COUNTY REGION IS ABOUT IS 256 BILLION. OBVIOUSLY A LOT LARGER THAN THE 15 BILLION IN COSTS. IT COMES OUT TO ABOUT 24

BILLION A YEAR IN PUBLIC HEALTH BENEFITS. AS I MENTIONED, IT'S LARGELY ASSOCIATED TO THE LOWERING OF PREMATURE DEATHS DUE TO THE REDUCTION IN PM2.5. BUT IT ALSO INCLUDES MORBIDITY EFFECTS, LESS HOSPITAL VISITS, LESS OFF-WORK DAYS, AND OTHER IMPACTS SUCH AS THAT.

FINALLY, WE ALSO, YOU KNOW, ARE GETTING A LOT OF COMMENTS THAT THIS PLAN, OBVIOUSLY, ATTAINMENT RELIES ON SECURING A LARGE AMOUNT OF INCENTIVE FUNDINGS. SO PEOPLE WANT TO KNOW HOW ARE YOU GOING TO SECURE THAT FUNDING, IS IT REALISTIC? SO WHAT WE'RE DOING IS DEVELOPING AN ACTION PLAN THAT WILL BE COME TO OUR BOARD IN PARALLEL WITH THE AQMP, AND WE'RE IDENTIFYING A PROCESS TO SECURE THAT INCENTIVE FUNDINGS. THAT PROCESS IS ALREADY BEING DONE IN MANY CASES. SO THAT PLAN WILL INCLUDE SOME BACKGROUND, TALK ABOUT EXISTING FUNDING PROGRAMS, POTENTIAL NEW FUNDING OPPORTUNITIES, AND THEN HOW DISTRICT STAFF WILL MOVE FORWARD TRYING TO PURSUE THAT FUNDING AND THEN ALSO SCHEDULE AND REPORTING BACK TO OUR GOVERNING BOARD.

SO WE DO HAVE IN CHAPTER 4 A DISCUSSION OF THE LEVEL OF FUNDING NEEDED. AND I MENTIONED $14 BILLION PER YEAR ALREADY. BUT IT'S NOT ALL GOING TO COME FROM ONE SOURCE. IT'S GOING TO NECESSARILY COME FROM MULTIPLE SOURCES. AND WE HOPE THAT WILL INCLUDE ACTION AT THE LOCAL AND REGIONAL LEVEL AS WELL AS STATE AND NATIONAL

LEVEL.

AND SOME EXAMPLES WE'VE BEEN TALKING ABOUT -- AND, AGAIN, NOTHING IS SET IN STONE. THESE ARE JUST IDEAS. THESE ARE ALL OPTIONS HERE ON THE TABLE. ALL OF THESE OPTIONS ARE BEING EVALUATED, AND THEY INCLUDE THIS LIST OF EXPANDING EXISTING INCENTIVE FUNDING ALL OF WHICH ARE LISTED HERE AND THEN NEW POTENTIAL FUNDING SOURCES AS LISTED BELOW. WE DON'T NEED TO GO INTO DETAIL NOW. BUT IF ANYONE HAS ANY QUESTIONS, WE CAN GO INTO DETAILS.

AND THEN IN TERMS OF ACTIVITIES, WE NEED TO ANALYZE OUR AUTHORITY AND AUTHORITIES AT THE STATE IN TERMS OF SECURING FUNDING THROUGH FEES AND OTHER REVENUE AUTHORITIES. WE WANT TO FORM A STAKEHOLDER WORKING GROUP TO BUILD A COALITION OF SUPPORT FOR SECURING FUNDING. WE'VE ALREADY STARTED THAT AT THE NATIONAL LEVEL IN TERMS OF A NATIONAL COLLABORATIVE WORKING WITH NATIONAL ASSOCIATION OF CLEAN AIR AGENCIES. THERE'S GOING TO BE A LOT OF OTHER AREAS WITH THE NEW OZONE STANDARD THAT ARE GOING TO BE NONATTAINMENT. WE'RE TRYING TO GET PRIVATE SECTOR SUPPORT AS WELL AS OTHER NON-GOVERNMENTAL ORGANIZATIONS AND ENVIRONMENTAL GROUPS AS WELL. AND ALSO AT THE STATE LEVEL WORKING WITH CALIFORNIA AIR POLLUTION CONTROL OFFICE ASSOCIATION AND OTHER PRIVATE PARTNERSHIPS.

JUST AN UPDATE OF WHERE WE ARE IN TERMS OF

MAKING DEVELOPMENT. AS I MENTIONED, WE RELEASED THE DRAFT IN JUNE AND REVISED DRAFT IN OCTOBER. AND THE TECHNICAL APPENDICES HAVE ALL BEEN POSTED ONLINE. AT THIS POINT THERE ARE SOME MINOR TECHNICAL UPDATES THAT WE'RE MAKING AS FAR AS INVENTORY MODELING. AND AS WE DO MAJOR REVISIONS, WE POST THE SUMMARY OF THOSE MAJOR REVISIONS. WE HAVE A DRAFT CHANGES VERSION ONLINE BETWEEN THE REVISED DRAFT AND FINAL DRAFT. SO FAR WE'VE RECEIVED 69 LETTERS ON THE REVISED DRAFT, BUT I THINK THAT'S GONE UP TO -- WE HAD 30 AT THIS POINT. WE DID HAVE A NUMBER OF POSTDATE FOR THOSE COMMENTS. SO WE'RE LOOKING AT THOSE 30 LETTERS AS WE SPEAK. AND OUR PLAN IN EARLY DECEMBER IS TO RELEASE A DRAFT FINAL THAT TAKES INTO ACCOUNT THOSE STATUS COMMENTS THAT WE RECEIVED. WE HAVE ONGOING ADVISORY MEETINGS, REGIONAL STAKEHOLDER MEETINGS. WE'VE HAD OVER 163 ADVISORY STAKEHOLDER MEETINGS THROUGH THIS WHOLE PLANNING PROCESS OVER THE PAST TWO OR THREE YEARS.

JUST TO LOOK AT THE SCHEDULE IN DRAFT FORM, YOU CAN SEE THAT WE'RE SCHEDULING -- WE'RE HOPING TO GET TO OUR BOARD IN FEBRUARY FOR BOARD CONSIDERATION AND WE'RE HOPING TO RELEASE THIS DRAFT FINAL IN THE BEGINNING OF DECEMBER FOR A FINAL 60-DAY REVIEW PERIOD BEFORE OUR BOARD CONSIDERATION.

AND HERE'S OUR PUBLIC WORKSHOP SCHEDULE. THESE

ARE ACTUALLY PUBLIC HEARINGS NOT WORKSHOPS. AS I MENTIONED BEFORE, TRANSCRIPTS ARE ACTUALLY BEING TAKEN. AND THIS IS THE FIRST. AND WE'LL BE GOING TO CARSON THIS AFTERNOON AND THEN ON THURSDAY TWO LOCATIONS IN THE INLAND EMPIRE.

SO IF YOU HAVE ANY QUESTIONS, FEEL FREE TO CONTACT ME, PHILIP FINE. OUR PLANNING MANAGER IN CHARGE OF THE PLAN IS MICHAEL KRAUSE, WHO IS ALSO HERE.

AND THAT WRAPS UP THE PRESENTATION. I THINK -- I'D LIKE TO GO TO THE OTHER PRESENTATION BEFORE WE TAKE COMMENT. SO WITH THAT I'LL HAND IT OVER TO SYLVIA VANDERSPEK FORM THE CALIFORNIA AIR RESOURCES BOARD.

MS. VANDERSPEK: OKAY. THANK YOU. GOOD MORNING. SO QUICKLY MY NAME IS SYLVIA VANDERSPEK, AND I'M WITH THE AIR RESOURCES BOARD. SO TODAY I'M HERE TO UPDATE YOU ON THE AIR RESOURCES BOARD STATE SIP STRATEGY AND HOW IT FITS WITHIN THE AQMP ALONG WITH THE NEXT STEPS THAT WE'RE GOING THROUGH AT THE SAME TIME.

SO WHAT IS THE STATE SIP STRATEGY? BASICALLY WHAT IT IS IS THE AIR RESOURCE BOARD'S REDUCTIONS FROM MOBILE SOURCES AND CONSUMER PRODUCTS TO MEET AIR QUALITY STANDARDS THROUGHOUT THE STATE AND PROVIDE HEALTHFUL AIR. AS PHIL DISCUSSED EARLIER, MOBILE SOURCES ARE A SIGNIFICANT PART OF THE AIR QUALITY PROBLEM HERE IN THE SOUTH COAST. SO WE NEED TO MAKE SURE WE ADDRESS THIS

SOURCE.

SO WHAT DOES THE STATE SIP STRATEGY HAVE? WELL, IT HAS A LIST OF MEASURES AS WELL AS AN AGGREGATE COMMITMENT AT THE END. SO THAT IS OUR COMMITMENT NOT ONLY TO THE SOUTH COAST, BUT OTHER AREAS THROUGHOUT THE STATE ALSO. SO WHAT WE DO IS WE HAVE AN AGGREGATE EMISSION REDUCTION COMMITMENT THAT SPECIFIES THE NUMBER THAT WE HAVE TO MEET BY A DATE CERTAIN. FOR SOUTH COAST WE ARE COMMITTING TO 97 TONS OF NOX AND 60 TONS OF ROG FOR THE 2031 COMMITMENT. AND THEN THE SECOND PIECE OF THAT COMMITMENT IS THAT WE ARE GOING TO PURSUE A LIST OF MEASURES.

SO THE SECOND PART OF THE COMMITMENT IS ACTUALLY ACTIONS BY A CERTAIN DATE THAT WE ARE COMMITTING TO FOLLOW THROUGH WITH EPA. AND THE REASON THAT WE DO IT THIS WAY IS THAT MANY TIMES AS YOU'RE GOING THROUGH THE REGULATORY PROCESS AND EACH OF THESE MEASURES IN THIS LIST WILL GO THROUGH ITS OWN REGULATORY PROCESS. THINGS CHANGE SO YOU COULD GET MORE OR LESS EMISSION REDUCTIONS THAN IS ORIGINALLY THOUGHT. SO WE'VE GOTTEN THIS PROOF THROUGH EPA, AND IT HAS STOOD THE TEST OF TIME. SO ONCE IT GOES TO EPA AS PART OF THIS AQMP, THEN IT BECOMES FEDERALLY ENFORCEABLE. SO EACH OF THOSE ACTION DATES THAT WE SPECIFY IS TECHNICALLY AN ENFORCEABLE COMMITMENT.

SO WHAT ARE WE DOING HERE? WELL, ARB HAS A LONG

HISTORY OF REDUCING EMISSIONS FROM MOBILE SOURCES, AND WE HAVE A WELL-ESTABLISHED BLUEPRINT IN PLACE. FIRST OF ALL, WE ESTABLISHED CLEANER ENGINE STANDARDS. SO ONE OF THE THINGS BEFORE -- I WANT TO STEP BACK JUST ONE SECOND. SO THIS STATE STRATEGY ACTUALLY LOOKS AT ALL OUR SUCCESSFUL PROGRAMS AND THE BLUEPRINT FROM THE PAST, AND WE ARE TARGETING ALL OF THE SOURCE AND MAKING SURE THAT WE'RE ADDRESSING ALL OF THESE ELEMENTS THAT WE'RE GOING TO BE TALKING ABOUT.

SO, AGAIN, YOU KNOW, CLEANER ENGINE STANDARDS, WE'VE GOT LOW NOX STANDARDS FOR TRUCKS, AND WE'RE ALSO PROPOSING SOME STANDARDS FOR THE FEDERAL SOURCES. THE NEXT THING IS THAT WE'RE TRYING TO INCREASE THE PENETRATION OF ZERO EMISSION TECHNOLOGY WHERE IT'S FEASIBLE. AS YOU KNOW RIGHT NOW, ZERO EMISSION TECHNOLOGY IS HERE. IT'S JUST A MATTER OF GETTING OUT THE FLEET AND GETTING USED IN PRACTICAL APPLICATIONS. ONCE THESE ENGINES THAT ARE OUT THERE WHAT'S REALLY IMPORTANT IS TO ENSURE THAT THEY'RE DURABLE. SO WE HAVE MANY MEASURES IN HERE THAT ENSURE THAT EMISSIONS REMAIN DURABLE THROUGHOUT THE LIFE OF AN ENGINE OR A VEHICLE.

WE'RE PLANNING ON EXPANDING THE USE OF CLEANER FUELS. THERE'S A LOW DIESEL MEASURE IN THIS PLAN. THIS PLAN TARGETS SOME OF THE OLDER TYPE EQUIPMENT THAT -- LIKE FOR FEDERAL SOURCES AND OLDER TRUCKS, AND THAT'S

WHAT IT'S REALLY FOCUSING ON.

AND THEN PART OF WHAT WE HAVE DONE FOR MANY YEARS IS PILOT STUDIES. PILOT STUDIES HELP US GAUGE WHETHER A TECHNOLOGY IS FEASIBLE IN AN APPLICATION. AND IT'S VERY IMPORTANT. SO IT'S KEY TO DO WHAT WE'RE DOING HERE. AND THEN FINALLY INCENTIVIZING THE DEPLOYMENT OF THE CLEANEST TECHNOLOGY. WE'RE WORKING THE SOUTH COAST TO DEVELOP A FUNDING PLAN. AND THEN AS ALSO PART OF IT OUR MOBILE SOURCE ACTIONS. THE STATE SIP STRATEGY INCLUDES FOR FURTHER DEPLOYMENT. AND THEY'RE REALLY JUST FOR THE SOUTH COAST. AS PHIL SAID EARLIER, WHAT WE DON'T HAVE THE -- WE'RE ALLOWED THIS UNDER THE CLEAN AIR ACT. WE DON'T ACTUALLY HAVE THE FUNDING OR THE REGULATIONS IN PLACE, BUT WHAT IT IS THERE'S EMISSION REDUCTIONS THAT WE CAN GO AFTER IF THE TECHNOLOGY BECOMES FEASIBLE WE CAN DEVELOP REGULATIONS FOR IT, WE CAN INCENTIVIZE FOR OTHER TECHNOLOGIES.

SO WHAT ARE THE EMISSION REDUCTIONS FOR THE SOUTH COAST IN THIS PLAN? AS I SAID EARLIER, WE'RE PROVIDING 97 TONS OF NOX EMISSIONS AND 60 TONS OF ROGS EMISSIONS. ONE OF THE THINGS THAT WE DO WANT TO SHOW IS THAT ARB IS CURRENTLY IMPLEMENTING MANY PROGRAMS, AND THE IMPLEMENTATION OF THOSE PROGRAMS ARE PROVIDING SIGNIFICANT EMISSION REDUCTIONS. SO, IN FACT, WHEN YOU LOOK AT IMPLEMENTATION OF THE CURRENT PROGRAM AND THE NEW

REGULATIONS THAT WE'RE PROPOSING HERE, IT'S 80 PERCENT. SO 80 PERCENT OF THE EMISSION REDUCTIONS FROM TODAY TO 2031 ARE COMING FROM REGULATIONS.

SO WE JUST WANT TO MAKE SURE WE HIGHLIGHT IT IS THE CORE OF STRATEGY AND WHAT INCENTIVES ARE FOR IS FOR THAT LAST INCREMENT TO GET THE EARLY TURNOVER OF TECHNOLOGY. SO WHEN YOU LOOK AT THIS CHART, IT SHOWS FROM THE LIGHT DUTY VEHICLES THAT 93 PERCENT ARE COMING FROM REGULATIONS. FOR HEAVY DUTY VEHICLES 88 PERCENT. YOU KNOW, UNFORTUNATELY WHEN YOU LOOK FEDERAL SOURCES, THAT'S 46 PERCENT. WE DON'T HAVE CONTROL OVER THE FEDERAL SOURCES, BUT WE DEFINITELY THINK THAT INCENTIVES ARE A VERY ECONOMICAL WAY TO TURN THAT EQUIPMENT OVER. AND THEN OFF-ROAD EQUIPMENT WE HAVE A LITTLE MORE AUTHORITY, SO 71 PERCENT OF THE REDUCTIONS COME FROM THAT.

SO WHAT ARE WE DOING MOVING FORWARD HERE? WELL, BASICALLY WE WILL BE RELEASING A DOCUMENT ALSO IN DECEMBER, AND ACTUALLY WE WILL BE RELEASING TWO DOCUMENTS. ONE IS OUR STATE SIP STRATEGY. AND THEN ALONG WITH THE SOUTH COAST SIP, THERE WILL BE A STATE SIP ELEMENT WITH OUR COMMITMENT FOR THEIR REGION IN THEIR PLAN.

SO THE CHANGES THAT WE'RE CURRENTLY MAKING ARE SOME INVENTORY UPDATES WHERE WE FOUND OUT SOME NEW

INFORMATION REGARDING LOCOMOTIVES AND AIRCRAFT. AND WE'VE ALSO GONE THROUGH AN EXTENSIVE PUBLIC PROCESS. WE'VE HAD TWO BOARD MEETINGS, WE'VE HAD A LOT OF STAKEHOLDER WORKSHOPS. SO WE ARE MAKING SOME CHANGES BASED ON THAT STAKEHOLDER ENGAGEMENT. ONE OF OUR MEASURES, ADVANCED CLEAN AIR TRANSIT, WE'RE GOING TO MAKE SURE THAT TRANSIT INFRASTRUCTURE ISSUES ARE ADDRESSED ESPECIALLY IN DISADVANTAGED COMMUNITIES.

FOR OUR LAST MILE DELIVERY MEASURE, WE PLAN ON ADDRESSING FLEET PURCHASING REQUIREMENTS AND MAKING SURE THAT THESE ELECTRIC VEHICLES FOR THIS SECTOR ARE OUT THERE. FOR THE SMALL OFF-ROAD ENGINES LIKE THINGS LIKE LAWN AND GARDEN EQUIPMENT, WE'RE GOING TO FOCUS ON "ZEBS" ENCOURAGING "ZEBS" TO BE OUT THERE. FOR CONSUMER PRODUCTS WE'RE PROVIDING MORE FLEXIBILITY TO THE CONSUMER PRODUCTS INDUSTRY. AND THEN ALSO WE'RE ADDRESSING SOME ISSUES FOR THE SAN JOAQUIN VALLEY. WE'RE GOING TO BE QUANTIFYING MORE REDUCTIONS IN THE FUTURE FOR THE AIR POLLUTION PROBLEM.

SO ONCE WE PUT THIS DRAFT DOWN THE STREET, WE ALSO PLAN ON TAKING THIS TO OUR BOARD. SINCE THE SOUTH COAST BOARD IN THEIR CURRENT SCHEDULE IS GOING IN FEBRUARY, THEN WE WILL BE TAKING THE STATE SIP STRATEGY ALONG WITH OUR COMMIT FOR THEM AT THE MARCH HEARING.

SO THAT'S CONCLUDES MY PRESENTATION. IF YOU

WOULD LIKE TO CONTACT ANY OF US, THE STAFF PERSON IN CHARGE IS KIRSTEN CAYABYAB AND THEN CAROL SUTKUS IS THE MANAGER. THIS DOCUMENT CAN BE REACHED ON OUR WEB PAGE. AND, AGAIN, WE WILL BE UPDATING IT AT THE FIRST PART OF DECEMBER.

DR. FINE: SO, FINALLY, WE'RE GOING TO HAVE A BRIEF PRESENTATION ON OUR APPENDIX 1 OF OUR AQMP WHICH DEALS WITH HEALTH EFFECTS OF POLLUTION IN THE BASIN.

DR. GHOSH: GOOD MORNING. SO THIS IS THE PRESENTATION ON APPENDIX 1 HEALTH EFFECTS. SO SIMILAR TO PREVIOUS YEARS, THIS APPENDIX INVOLVES SOME HEALTH EFFECTS ORGANIZED BY CRITERIA POLLUTANTS. SO THERE'S A BRIEF SECTION ON OZONE, ON PM, AND SO ON. THERE'S ALSO A BRIEF SECTION ON TOXIC AIR CONTAMINANTS. AND THE MAIN PURPOSE OF THIS HEALTH EFFECTS APPENDIX IS TO PRESENT THIS VERY BRIEF SUMMARY. WE'RE NOT GENERATING NEW SCIENCE HERE. WE'RE REALLY JUST SUMMARIZING REVIEWS CONDUCTED BY OTHERS.

WE PRIMARILY DRAW FROM REVIEWS FROM US EPA AND OTHER SCIENTIFIC AGENCIES. BUT IN ADDITION TO THAT, BECAUSE OBVIOUSLY THESE LARGE REVIEWS DON'T OCCUR EVERY YEAR, WE ALSO CONDUCTED A SUPPLEMENTARY LITERATURE REVIEW TO LOOK SPECIFICALLY FOR ARTICLES THAT WERE PUBLISHED SINCE THE LATEST U.S. EPA REVIEW. FOR EXAMPLE, THE LATEST SCIENCE ASSESSMENT FOR PARTICULATE MATTER DONE BY

THE EPA WAS THIS LAST 2009. ALSO, THERE'S A LOT OF SCIENCE THAT'S COME OUT SINCE THEN. THESE SUPPLEMENTAL LITERATURE REVIEWS TRY TO ADDRESS SOME OF THIS MORE RECENT LITERATURE.

SO THIS SLIDE DISCUSSES SOME OF THE STATUTORY REQUIREMENTS. FIRST THIS APPENDIX WAS PREPARED IN CONJUNCTION WITH THE PUBLIC HEALTH AGENCY, WHICH IS REQUIRED BY THE HEALTH AND SAFETY CODE. THE PUBLIC HEALTH AGENCY THAT THIS WAS PREPARED WITH WAS OEHHA. THAT'S THE CALIFORNIA OFFICE OF HEALTH HAZARD ASSESSMENT. AND OF COURSE WE ALSO PREPARED THIS IN CONSULTATION WITH THE AIR RESOURCES BOARD AS WELL.

FOR THIS APPENDIX AN ADVISORY COUNCIL IS ALSO REQUIRED BY HEALTH AND SAFETY CODE. IT WAS FORMED WITH MEMBERS SELECTED BY THE GOVERNING BOARD AND AQMD ADVISORY GROUPS. THIS ADVISORY COUNCIL CONVENED -- I APOLOGIZE. IT SHOULD BE THE ADVISORY COUNCIL CONVENED ON AUGUST OF 2016. WE HAVE TO GET THAT CORRECTED. AND AT THIS MEETING THE ADVISORY COUNCIL MEMBERS REVIEWED AND DISCUSSED APPENDIX 1. THERE WERE MINUTES TAKEN FROM THIS MEETING. OF COURSE WE CERTAINLY USED THOSE MINUTES AND INCORPORATED COMMENTS THAT WERE MADE AT THAT TIME. WE ALSO RECEIVED PUBLIC COMMENTS DURING THAT MEETING AS WELL.

SO THE PIECE THAT IS REQUIRED BY HEALTH AND

SAFETY CODE REALLY JUST IS THE PIECE ON PARTICULATE MATTER IN THE SOUTH COAST AIR BASIN. BUT IN ADDITION TO THAT, WE ALSO INCLUDE SUMMARY OF HEALTH EFFECTS OF THE OTHER MAJOR POLLUTANTS AS WELL.

SO I WANTED TO GO THROUGH A COUPLE OF THE MAIN CHANGES THAT WERE MADE IN THIS APPENDIX SINCE THE PREVIOUS VERSION OF THE AQMP. AND ONE OF THE MAIN PIECES WAS REALLY JUST CLARIFYING THE PURPOSE OF THE DOCUMENT AND ALSO THE METHODS THAT WE USED TO PUT THIS DOCUMENT TOGETHER. SO THIS IS CLARIFYING THE INTRODUCTORY, THE INTRODUCTION SECTION OF THE APPENDIX.

SO, AGAIN, BRIEFLY THE PURPOSE IS TO PROVIDE A BRIEF OVERVIEW OF THE EFFECTS OBSERVED AND ATTRIBUTED TO THE VARIOUS AIR POLLUTANTS AND THE DESCRIBED HEALTH IMPACTS OF PARTICULATE. AND WE DO HAVE A GREATER FOCUS ON OZONE AND PARTICULATE MATTER SO THE SECTIONS ON OZONE AND PARTICULATE MATTER ARE FAR MORE DETAILED. WE DISCUSS SPECIFIC STUDIES IN MUCH GREATER DETAIL IN TERMS OF THE POTENTIAL HEALTH EFFECTS OF THESE POLLUTANTS. AND THE REASON BEING, OF COURSE, WE ARE NONATTAINMENT FOR THESE POLLUTANTS AND, OF COURSE, THERE MAY BE GREATER CONCERN FOR THE POTENTIAL HEALTH IMPACTS OF THOSE POLLUTANTS IN OUR REGION.

THE EPA REVIEWS A LARGE BODY OF SCIENTIFIC EVIDENCE, AND THIS INCLUDES DIFFERENT KINDS OF STUDIES.

SO THERE'S TOXICOLOGICAL STUDIES, EPIDEMIOLOGICAL STUDIES, AND ALSO HUMAN EXPERIMENTAL STUDIES AS WELL. AND SO IN THEIR INTEGRATED SCIENCE ASSESSMENT THEY LOOK AT ALL THESE DIFFERENT LINES OF EVIDENCE AND ASSESS IT BASED ON THE WEIGHT OF EVIDENCE APPROACH.

ANOTHER IMPORTANT FOCUS OF THE U.S. EPA REVIEWS WHICH HAS BEEN ADDED TO APPENDIX 1 IS A DISCUSSION ABOUT CENSUS POPULATION. SO, OF COURSE, PEOPLE ARE CONCERNED WITH THE IMPACTS TO PEOPLE WHO MAY BE MORE SENSITIVE TO THESE EFFECTS. SO, FOR EXAMPLE, OFTEN TIMES THEY'RE BASED ON AGE, GENERALLY THE VERY YOUNG OR VERY OLD; GENETIC FACTORS, CERTAIN PEOPLE WITH CERTAIN PRE-EXISTING HEALTH CONDITIONS; FOR EXAMPLE, CERTAIN RESPIRATORY CONDITIONS OR CARDIOVASCULAR CONDITIONS AND ALSO PERHAPS A DEGREE IS BASED ON SOCIOECONOMIC STATUS.

ANOTHER ONE OF THE MAIN IMPROVEMENTS IS WE TRIED TO STANDARDIZE OUR APPROACH IN TERMS OF THE WAY THE SUMMARIES ARE PRESENTED FOR EACH POLLUTANT. SO IN EACH SECTION WE DO PRESENT A TABLE SIMILAR TO THIS. IT MAY NOT BE EXACTLY LIKE THIS, BUT IT PRESENTS THE SAME INFORMATION AGAIN BASED ON THE -- WHATEVER IS THE MOST RECENT U.S. EPA REVIEW OR FACTS FOR CRITERIA POLLUTANTS.

SO HERE THIS IS PM2.5, AND IT'S SPLIT BY SHORT-TERM EXPOSURE EFFECTS AND LONG-TERM EXPOSURE EFFECTS. AND, OF COURSE, ARE THE DIFFERENT CATEGORIES OF

HEALTH OUTCOMES. SO, AGAIN, U.S. EPA USES A WEIGHT OF EVIDENCE APPROACH WHICH MEANS IF YOU LOOK AT DIFFERENT KINDS OF EVIDENCE AND ASSESS IT FOR CONSISTENCY AND REPRODUCIBILITY THEY ALSO LOOK AT THE DIFFERENT LINES OF EVIDENCE AND ASSESS WHETHER THESE DIFFERENT LINES OF EVIDENCE TELL A COHERENT STORY IN TERMS OF WHAT IMPACTS THESE POLLUTANTS MAY BE HAVING ON THE POPULATION'S HEALTH.

SO HERE FOR PM2.5 BASED ON THE 2009 ISA YOU CAN SEE, FOR EXAMPLE, CARDIOVASCULAR EFFECTS THERE'S CAUSAL RELATIONSHIP FOR BOTH SHORT-TERM AND LONG-TERM EXPOSURE. SIMILARLY FOR MORTALITY. AGAIN, THESES HEALTH CATEGORIES ARE NOT NECESSARILY MUTUALLY EXCLUSIVE. FOR EXAMPLE, OF COURSE, MUCH OF THE MORTALITY RELATIONSHIP IS BASED ON MORTALITY FROM CARDIOVASCULAR DISEASES.

FOR RESPIRATORY EFFECTS IT IS A SLIGHTLY LOWER CAUSAL DETERMINATION. IT'S LIKELY TO BE A CAUSAL RELATIONSHIP. AND THESE CATEGORIES ARE VERY CLEARLY DEFINED IN THE EPA REVIEW DOCUMENTS AS WELL. AND YOU CAN SEE THEY LOOK AT SOME OTHER CATEGORIES; REPRODUCTIVE AND DEVELOPMENTAL EFFECTS, CARCINOGENICTY. AND FOR PM2.5 THIS IS THE CATEGORY THAT IS ONE CATEGORY LOWER, VERY LIKELY, WHICH IS SUGGESTIVE OF CAUSAL RELATIONSHIP.

SO SIMILARLY FOR OZONE EFFECTS, OZONE WAS REVIEWED BY U.S. EPA IN 2013. AGAIN, YOU CAN LOOK AT

SHORT-TERM VERSUS LONG-TERM EFFECTS. AND HERE YOU CAN SEE VERY CLEARLY THAT FOR OZONE THE STRONGEST CAUSAL RELATIONSHIP IS FOR SHORT-TERM OZONE EXPOSURE AND RESPIRATORY EFFECTS.

SO WE HAVE RECEIVED 25 COMMENT LETTERS ON THE APPENDIX 1. MANY OF THE LETTERS WERE LETTERS FROM MEMBERS OF THE ADVISORY COUNCIL AS WELL AS COMMENTS RECEIVED FROM MEMBERS OF THE PUBLIC. I'M CERTAINLY NOT PRESENTING THE SUMMARY OF EVERY COMMENT RECEIVED HERE, BUT JUST SOME OF THE MAJOR COMMENTS OR MAIN COMMENTS, AND I TRIED TO DIVIDE IT BY THE SECTIONS OF THE DOCUMENT OF THE COMMENTS THAT CAME THROUGH.

SO AS I MENTIONED BEFORE, ONE OF THE MAIN CHANGES BASED ON SOME OF THE COMMENTS WE RECEIVED WAS TO PROVIDE A BETTER CLARITY ABOUT THE PURPOSE OF THIS DOCUMENT AND ALSO THE ROLE OF THE DIFFERENT AGENCIES, FOR EXAMPLE, THE ROLE OF THE AQMD VERSUS THE U.S. EPA IN ASSESSING SCIENCE AND ASSESSING CAUSALITY. IN THE SECTION FOR AIR TOXICS, IT WAS SUGGESTED THAT WE ADD A BRIEF DISCUSSION OF THE HEALTH EFFECTS OF VOC. PARTICULARLY BECAUSE VOC'S ALSO CONTRIBUTE TO THE FORMATION OF OZONE. AND WE HAD A COMMENT THAT ASKED US TO ADDRESS THE ACES STUDY. THAT'S THE ADVANCED COLLABORATE EMISSION STUD ON PM.

IN THE OZONE SECTION, THIS SECTION WAS ACTUALLY

REORGANIZED QUITE A BIT AND REALLY FOCUSED ON THE HEALTH EFFECTS THAT WERE DETERMINED TO HAVE A CAUSAL OR LIKELY CAUSAL RELATIONSHIP. IN OTHER WORDS, THOSE HEALTH POINTS THAT WERE HIGH ON THE CAUSAL DETERMINATION SCALE. AND, OF COURSE, WE ALSO EXPANDED THE DISCUSSION OF THE SENSITIVE POPULATION DESCRIBING WHICH POPULATIONS MAY BE MORE SENSITIVE TO THE EFFECTS OF OZONE.

SIMILARLY, THERE'S ALSO A SECTION FOR PARTICULATE MATTER. AGAIN, SIMILARLY, IT WAS REORGANIZED AND WE FOCUSED ON THE HEALTH ENDPOINTS THAT WERE EITHER CAUSAL OR LIKELY CAUSAL. AND ALSO, YOU KNOW, AGAIN, BECAUSE AIR RESOURCES ASSESSMENT FOR PARTICULATE MATTER WAS CONDUCTED IN 2009 WE ALSO FELT THAT IT WAS IMPORTANT ADDRESS TO SOME OF THE HEALTH ENDPOINTS THAT WERE PERHAPS A LITTLE BIT LOWER IN A SUGGESTIVE CATEGORY. AND WE DISCUSSED THIS IN THE SECTION THAT'S MORE LIKE EMERGING AREAS OF INTEREST. THERE'S SEVERAL COMMENTS ABOUT THE ULTRA FINE PARTICLES. WE MOVED THAT WITHIN THE PARTICULATE MATTER SECTION AND ALSO EXPANDED THAT DISCUSSION.

IN ADDITION, WE REWORKED THE SUMMARY IN THIS SECTION AND ALSO CREATED A SEPARATE SECTION FOR THE ESTIMATES OF HEALTH BURDEN OF PARTICULATE MATTER IN SOUTH COAST AIR BASIN. IN ADDITION, THERE'S SOME ADDITIONAL COMMENTS ON APPENDIX 1. THERE WERE SOME COMMENTS RELATED

TO THE HEALTH RISK ABOUT PM IN CALIFORNIA ASKING ABOUT WHETHER THERE IS AN ASSOCIATION. AND JUST TO, AGAIN, CLARIFY, THE PURPOSE OF THIS DOCUMENT REALLY IS TO SUMMARIZE THE REVIEWS CONDUCTED BY OTHERS AND GET THE OPINION OF U.S. EPA AND SOME OTHER SCIENTIFIC AGENCIES THAT PARTICULATE MATTER IS ASSOCIATED WITH MANY HEALTH EFFECTS, INCLUDING MORTALITY.

THERE WAS A COMMENT ALSO ABOUT POTENTIAL CONFOUNDING BY SMOKING. AGAIN, THIS GENERALLY PERTAINS TO EPIDEMIOLOGICAL STUDIES BECAUSE, OF COURSE, IN EPIDEMIOLOGY YOU REALLY PRIMARILY RELYING ON OBSERVATIONAL STUDIES. SO POTENTIAL FOR CONFOUNDING IS CERTAINLY THERE. AND WE CERTAINLY ADDED QUITE A LOT OF CLARIFICATION TO THE TEXT IN TERMS OF WHICH STUDIES ADDRESSED CONFOUNDING FOR HOW THEY LOOKED AT INDIVIDUAL STUDIES.

WE ALSO HAD A COMMENT ABOUT ADDRESSING THE HEALTH EFFECTS OF ODORS. SO THIS IS WOULD ACTUALLY BE A BRAND-NEW SECTION WITHIN THE APPENDIX, AND THIS WOULD BE SOMETHING THAT REQUIRES NEW WORK AND WORK THAT IS QUITE DIFFERENT FROM THE SUMMARIES OF THE CRITERIA POLLUTANTS. THIS IS SOMETHING THAT WE'RE STILL WORKING TO ADDRESS, BUT WE WILL BE ADDING A SECTION ON HEALTH EFFECTS OF ODORS.

DR. FINE: THANKS, JO KAY. SO THAT CONCLUDES

THE PRESENTATION. WE'RE GOING TO OPEN IT UP FOR PUBLIC COMMENTS. I DO HAVE SOME BLUE CARDS. IF SOMEONE WISHES TO SPEAK, YOU CAN GRAB ONE NOW.

SO WE'LL GO AHEAD AND GET STARTED WITH PUBLIC COMMENT. FIRST IS NOEL MUYCO. OKAY. NOEL LOST HIS CHANCE.

NOEL, YOU'RE UP.

MR. MUYCO: I'M UP. THANK YOU. I'M NOEL MUYCO WITH SOUTHERN CALIFORNIA GAS COMPANY. I WANT TO MAKE A FEW STATEMENTS WITH REGARD TO THE AQMP. THE SOUTH COAST AQMD HAS A LONG-STANDING FUEL POLICY. CONTINUATION OF THIS PRACTICE IS ESSENTIAL IN ORDER TO MAXIMIZE EMISSION REDUCTIONS NEEDED TO DEMONSTRATE ATTAINMENT. I ALSO WANT TO ENCOURAGE THE DEVELOPMENT OF A WORKING GROUP AND A PUBLIC PROCESS OVERSEEING COST EFFECTIVENESS AND FEASIBILITY ASSESSMENTS OF COMPETING TECHNOLOGY.

AND WHILE MOBILE SOURCES ARE RESPONSIBLE FOR THE LARGE MAJORITY OF SMOG FORMING EMISSIONS, MORE THAN 80 PERCENT, SOUTH COAST AQMD SHOULD FOCUS ON ACHIEVING ALL POSSIBLE EMISSION REDUCTIONS FORM THIS SECTOR AND AVOID THIS PORTION IMPACTING SMALL STATIONARY SOURCES OF EMISSIONS. AND WE ENCOURAGE INCENTIVES AS THE MOST COST-EFFECTIVE PLAN TO ACHIEVING EMISSION REDUCTIONS IN THE RESIDENTIAL AND SMALL COMMERCIAL SECTORS. AND SO CAL GAS ALSO ENCOURAGES COLLABORATION AMONG STAKEHOLDERS AND

BROAD PARTICIPANTS TO LEVERAGE THE INCENTIVES TO SECURE FUNDING.

LASTLY, I WANT TO THANK THE SOUTH COAST AQMD FOR THEIR EFFORTS OF THIS PROCESS AND YOUR TRANSPARENCY WORKING WITH THE STAKEHOLDER AND PROTECTING THE PUBLIC HEALTH OF THE COMMUNITIES WE SERVE. THANK YOU.

DR. FINE: EXCELLENT. BEFORE WE GET TO THE NEXT SPEAKER, I JUST WANT RECOGNIZE THE ACTING EXECUTIVE OFFICER OF THE AQMD, WAYNE NASTRI. AND I ALSO WANT TO RECOGNIZE ELIZABETH SWIFT, WHO IS THE MAYOR PRO TEM OF THE CITY OF BUENA PARK WHO HAS JOINED US IN THE AUDIENCE.

THANK YOU FOR COMING.

OKAY. THE NEXT SPEAKER IS ELIZABETH HAWLEY.

MS. HAWLEY: GOOD MORNING. I'M ELIZABETH HAWLEY REPRESENTING THE SAN FERNANDO BUSINESS COMMUNITY. WE WELCOME THE OPPORTUNITY TO COMMENT ON THE REVISED DRAFT 2016 AQMP. WE SUPPORT AN APPROACH THAT FOCUSES ON INCENTIVE BASED MODELS AND WORKING WITH INDUSTRIES TO ACHIEVE ATTAINMENT WHILE SUPPORTING ECONOMIC GROWTH IN LOS ANGELES.

WE HAVE CONCERNS ABOUT AN OVERLY REGULATORY PRESCRIPTIVE APPROACH THAT WILL SIGNIFICANTLY INCREASE COST ESPECIALLY FOR STATIONARY SOURCES WITHOUT BEING A FEASIBLE WAY TO ATTAINMENT. THE BIGGEST CONCERN IS INCREASED REGULATION ON SMALL BUSINESSES, LOCAL

RESIDENCES BY DRIVING UP COSTS MAKING IT LESS ATTRACTIVE TO NEW BUSINESS IN THIS REGION.

WE SUPPORT CONTINUING PROGRESS ON EMISSION REDUCTIONS DURING THE INCENTIVE-BASED FRAME WORKS FOR COST EFFECTIVENESS AND DIFFERENT OPTIONS FOR BUSINESSES. APPROPRIATE INCENTIVES WILL HELP OFFSET THE CAPITAL AND OPERATIONAL COSTS USING TECHNOLOGY. VIKA WOULD URGE THE AQMD TO CONTINUE WITH THE RECLAIM PROGRAM WHICH AS SUCCESSFULLY RESULTED IN SIGNIFICANT AIR QUALITY IMPROVEMENTS.

AND, FINALLY, VIKA SUPPORTS THE FUEL NEUTRAL MOBILE SOURCE PLAN WHICH ALLOWS CONSUMERS CHOICES. THIS FLEXIBLE APPROACH WILL CONTINUE TO ENCOURAGE INNOVATION. WE LOOK FORWARD TO CONTINUING OUR WORK WITH THE AQMD DEVELOPING A PLAN WHICH WILL HELP GROW OUR ECONOMY. THANK YOU FOR ALL OF YOUR HARD WORK AND PRESENTATION TODAY

DR. FINE: THANK YOU. NEXT SPEAKER IS KELSEY BREWER.

MS. BREWER: GOOD MORNING. MY NAME IS KELSEY BREWER. I WORK FOR THE ASSOCIATION OF CALIFORNIA CITIES, ORANGE COUNTY, ACCOC. WE HAVE JUST A FEW COMMENTS ABOUT THE NEW PLAN. THE FIRST ONE DEALS WITH THE POTENTIAL RULES OF PLACING A FEE ON HOUSING AND DEVELOPMENT OF RESIDENTIAL AND COMMERCIAL AREAS. THERE'S ALREADY A VERY

WELL-DOCUMENTED HOUSING AFFORDABILITY CRISIS IN ORANGE COUNTY. AND THE ADDITION OF NEW FEES WILL HAMPER THE CITY TO BUILD NEW FACILITIES TO MEET THIS DEMAND. SO ACCOC IS REQUESTING THAT THIS ORGANIZATION TABLE THE EXPIRATION OF NEW FEES.

ADDITIONALLY, ROUGHLY HALF OF ORANGE COUNTY CITIES OWN DISCHARGE PERMITS WITH THE U.S. EPA AND REGIONAL WATER BOARDS AND THESE ARE EXTREMELY TOUGH PERMITS TO OBTAIN AND RETAIN. AND THE AQMP PROPOSES A MEASURE THAT WOULD ALLOW THE AQMD TO REVIEW AND EVALUATE THE STRENGTHS OF THESE PERMITS, AND WE WOULD ASK THAT THE PROCESSES THAT ARE ALREADY IN PLACE JUST REMAIN.

THE REVISED AQMP INCLUDES LANGUAGE THAT PUTS PRIORITY ON MAXIMIZING EMISSION REDUCTIONS UTILIZING ZERO EMISSION TECHNOLOGY, WHICH IS NEVER COST EFFECTIVE AND FEASIBLE. WHAT WE WOULD ASK IS THAT YOU ALLOW DIFFERENT TECHNOLOGIES TO COMPETE HEAD TO HEAD. AND THE ACCOC STRONGLY ENCOURAGES DEVELOPMENT OF A WORKING GROUP AND A PUBLIC PROCESS THAT WILL REVIEW THE COST EFFECTIVENESS AND FEASIBILITY OF ASSESSMENTS OF COMPETING TECHNOLOGIES.

FOURTH, THE PREVIOUS DRAFT AQMP FOCUSED ON AN INCENTIVE-BASED APPROACH. THE REVISED DRAFT PLACES MORE EMPHASIS ON MORE REGULATORY MEASURES. AND THE ACCOC BELIEVES WE SHOULD FOCUS ON ACHIEVING ALL POSSIBLE EMISSION REDUCTIONS FROM THIS SECTOR TO AVOID

DISPROPORTIONATE IMPACT ON SMALL BUSINESSES AND STATIONARY SOURCES OF EMISSIONS. INCENTIVES ARE THE MOST EFFECTIVE TO ACHIEVING EMISSION REDUCTIONS IN THE RESIDENTIAL AND SMALL COMMERCIAL BUSINESS.

AND, FINALLY AND PROBABLY THE MOST IMPORTANT, THE ACCOC BELIEVES THAT THE DEVELOPMENT OF AND EXECUTION OF THE INCENTIVE FUNDING PLAN IS KEY TO SUCCESSFUL ORIENTATION OF THE AQMP. AND THE REVISED AQMP STILL ESTIMATES THAT APPROXIMATELY $1 BILLION PER YEAR IN INCENTIVES WILL BE NEEDED. AND THE ACCOC URGES COLLABORATION AND BROAD PARTICIPATION TO LEVERAGE ALL POSSIBLE AVENUES TO SECURE FUNDING FOR THE REGION. AND WE ARE WILLING TO HELP PARTNER WITH ALL OF YOU ON THAT. THANK YOU.

DR. FINE: THANK YOU, KELSEY.

ONE MORE CARD. BRANDON.

MR. MATSON: BRANDON MATSON HERE ON BEHALF OF THE LOS ANGELES COUNTY BUSINESS FEDERATION, BIZFED. WE ARE A GRASSROOTS ALLIANCE WITHIN MORE THAN 160 TOP BUSINESS GROUPS REPRESENTING OVER 25,000 EMPLOYERS THROUGHOUT LOS ANGELES COUNTY. WE APPRECIATE THE OPPORTUNITY THE DISTRICT HAS GIVEN OR MEMBERS TO PARTICIPATE ON VARIOUS WORKING GROUPS AND COMMITTEES TO PROVIDE INPUT FOR THE DEVELOPMENT OF THE DRAFT OF THE 2016 AQMP.

AND TODAY WE HAVE SUBMITTED WRITTEN COMMENTS ON BOTH THE DRAFT AND REVISED PLAN. SO MY COMMENTS TODAY WILL HIGHLIGHT SOME OF OUR LARGE POINTS. FIRST, THIS PLAN MUST BALANCE THE ENVIRONMENTAL AND ECONOMIC NEEDS OF THE RESIDENTS OF THE SOUTH COAST AIR BASIN. SO WITH THAT IN MIND, WE SUPPORT A BALANCED APPROACH TO ACHIEVING AIR QUALITY THAT ALLOWS FOR FURTHER ECONOMIC GROWTH. WE ARE SUPPORTIVE OF AN AQMP THAT CREATES THE FRAMEWORK THAT PRIORITIZES NON-REGULATORY INNOVATIVE APPROACHES FOR EMISSION REDUCTIONS THAT ARE COST EFFECTIVE AND MINIMIZE OPERATION DISRUPTION. PROGRAMS FOR CONTROL MEASURES SHOULD INCENTIVIZE VOLUNTARY APPROACHES TO ACHIEVING AIR QUALITY GROWTH AND NOT PUT LOCAL BUSINESSES AT COMPETITIVE DISADVANTAGES WITH OTHER REGIONS.

WITH RESPECT TO THE REVISED AQMP, THERE ARE TWO ADDITIONAL POINTS I'D LIKE TO MAKE. FIRST, WE SUPPORT THE DISTRICT'S POLICY OF FUEL AND TECHNOLOGY. THERE IS SOME LANGUAGE IN THE REVISED PLAN THAT WE ARE CONCERNED ABOUT WITH THIS MATTER AND IT HAS BEEN HIGHLIGHTED SPECIFICALLY IN ONE OF OUR RECENTLY SUBMITTED COMMENT LETTERS. IN ADDITION, WE SUPPORT MAINTAINING THE RECLAIM PROGRAM. WE BELIEVE IT WOULD BE A CONTINUED SUCCESSFUL PROGRAM UNTIL AN ALTERNATIVE INCENTIVE OR MARKET-BASED PROGRAM IS DEVELOPED FOR BUSINESSES TO ALLOW FLEXIBILITY FOR EMISSION REDUCTIONS TO BE ACHIEVED IN THE MOST COST

EFFECTIVE WAY. RECLAIM SHOULD BE CONTINUED TO BE SUPPORTED BY THE DISTRICT.

SO IN CLOSING, WE APPRECIATE THE DISTRICT'S CONTINUED ENGAGEMENT WITH THE BUSINESS COMMUNITY DURING THE DEVELOPMENT OF THE 2016 AQMP AND WE REMAIN COMMITTED TO WORKING WITH THE DISTRICT TO ENSURE THAT THE PLAN FULFILLS THE LEGAL REQUIREMENTS WHILE ALSO PROTECTING CREATION AND ECONOMIC SUCCESS IN SOUTHERN CALIFORNIA.

DR. FINE: THANK YOU. I DON'T HAVE ANY MORE CARDS. DOES ANYONE ELSE WISH TO SPEAK TODAY? OKAY. IF THERE'S NO OTHER COMMENTS, WE CAN CALL THE HEARING TO A CLOSE. BUT WE'LL BE HERE A LITTLE BIT AFTERWARDS IF YOU HAVE ANY QUESTIONS FOR US.

(END OF PUBLIC HEARING.)

BEFORE THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

IN RE THE MATTER OF:	)
	)
PUBLIC HEARING:	)
	)
SCAQMD 2016 AIR QUALITY MANAGEMENT PLAN	)
	)
	)
	)

DATE AND TIME:	THURSDAY, NOVEMBER 17, 2016 2:00 P.M.
PLACE:	HYATT PLACE RIVERSIDE DOWNTOWN 3500 MARKET STREET RIVERSIDE, CALIFORNIA 92501
REPORTER:	KRISTIN RIVERA, CSR CERTIFICATE NO. 11858
BRS FILE NO.:	99073

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160 S. OLD SPRINGS ROAD, SUITE 270, ANAHEIM, CA 92808
PHONE: 714.444.4100 FAX: 714.444.4411 EMAIL: DEPO@DEPO1.COM

RIVERSIDE, CALIFORNIA; THURSDAY, NOVEMBER 17, 2016

2:00 P.M.

MR. NASTRI: GOOD AFTERNOON, EVERYONE. WE'RE GOING TO GO AHEAD AND GET STARTED RIGHT ON TIME. THANK YOU ALL FOR COMING HERE TODAY. LET'S BEGIN THIS PUBLIC HEARING ON OUR REVISED 2016 AIR QUALITY MANAGEMENT PLAN. WE HAVE A VERY DISTINGUISHED PANEL HERE TODAY FROM THE SOUTH COAST AQMD AS WELL AS THE CALIFORNIA AIR RESOURCES BOARD.

SO MY NAME IS WAYNE NASTRI, AND I'M THE ACTING EXECUTIVE OFFICER FROM THE SOUTH COAST AQMD. IT'S MY PLEASURE TO WELCOME YOU, AND I'M GOING TO TURN THIS MEETING OVER TO DR. FINE, WHO IS OUR DEPUTY EXECUTIVE OFFICER FOR PLANNING AND RULES.

DR. FINE: WELCOME. THANKS FOR COMING. BEFORE WE GET STARTED, I WANT TO INTRODUCE EVERYONE HERE AT THE FRONT. YOU'VE GOT OUR NAMES.

BILL, YOU WANT TO START.

MR. WONG: SURE. MY NAME IS WILLIAM WONG. I'M PRINCIPAL DEPUTY DISTRICT COUNSEL WITH THE AQMD.

MS. SUTKUS: AND THEN I'M CAROL SUTKUS. I'M WITH THE AIR RESOURCES BOARD.

DR. GHOSH: MY NAME IS JO KAY GHOSH. I'M THE

HEALTH EFFECTS OFFICER AT THE SOUTH COAST AQMD.

DR. FINE: CAN EVERYONE HEAR US OKAY? WE DON'T HAVE MICS. I KNOW IT'S A SMALL ROOM. WE WILL HAVE TO SPEAK UP.

JUST A COUPLE OF HOUSEKEEPING THINGS. OBVIOUSLY YOU SEE THE EXITS TO MY RIGHT AND THE REAR LEFT. PLEASE SILENCE YOUR CELL PHONES OR PUT THEM ON VIBRATE SO WE DON'T INTERRUPT THE PRESENTATION OR THE PUBLIC COMMENTS. IF WE NEED TO ASK TO EVACUATE OR SHELTER IN PLACE IN CASE OF EMERGENCY, WE WILL DO SO.

THE OTHER THING I DID WANT TO MENTION IS THIS AN OFFICIAL PUBLIC HEARING AS REQUIRED BY STATE LAW. SO WE ARE TAKING TRANSCRIPTS. THESE TRANSCRIPTS WILL BE PROVIDED TO ALL OUR GOVERNING BOARD MEMBERS AS PART OF THE RECORD WHEN THEY MAKE THEIR DECISION, HOPEFULLY, IN FEBRUARY ON ADOPTION OF THE AIR QUALITY MANAGEMENT PLAN.

I HOPE YOU ALL GOT A HANDOUT OF THE AGENDA. FIRST OF ALL, WE'LL START OUT WITH THE PRESENTATION. I'LL GIVE A PRESENTATION ON THE REVISED DRAFT AQMP AS IT STANDS TODAY. WE'LL TALK ABOUT THE SCHEDULE, CONTENT, AND SOME OF THE CHANGES WE'VE MADE THUS FAR IN RESPONSE TO COMMENTS. THEN WE WILL HEAR FROM OUR COLLEAGUES AT THE CALIFORNIA AIR RESOURCES BOARD ABOUT THE STATE SIP STRATEGY BECAUSE THAT IS A PART OF OUR REGIONAL PLAN. AND THEN, FINALLY, WE'LL HEAR FROM DR. GHOSH, WHO IS OUR

HEALTH EFFECTS OFFICER, WHO WILL TALK ABOUT APPENDIX 1 OF THE AIR QUALITY MANAGEMENT PLAN WHICH DEALS WITH THE HEALTH IMPACTS IN THE AIR BASIN ON OUR RESIDENTS. THAT IS ANOTHER THING THAT IS REQUIRED BY STATE LAW TO HAVE HEARINGS ON THAT PART OF THE REPORT. HOPEFULLY THE PRESENTATION WON'T FEEL TOO LONG. IT WILL PROBABLY TAKE US ABOUT 45 MINUTES. AND THEN WE'LL GET INTO PUBLIC COMMENT.

I HAVE FOUR CARDS ALREADY FILLED OUT. IF ANYONE ELSE WOULD LIKE TO MAKE A PUBLIC COMMENT, GET ONE OF THE BLUE CARDS. THERE'S SOME OUTSIDE OR SOMEONE WILL COME OVER TO YOU AND YOU'LL HAVE A CHANCE AT THE END.

OKAY. WITH THAT I'LL GET STARTED. IT'S VERY HARD FOR ME TO SEE, SO I'LL STAND UP ON THE SIDE, AND WE'LL GO OVER THE AQMP.

AGAIN, THIS -- SO AS MANY OF YOU KNOW ESPECIALLY OF THOSE WHO HAVE LIVED IN THE INLAND EMPIRE FOR MANY YEARS AIR QUALITY HAS IMPROVED DRAMATICALLY OVER THE LAST SEVERAL DECADES, AND THIS HAS BEEN DUE TO ACTIONS AT THE LOCAL LEVEL, AT THE STATE LEVEL, AT THE FEDERAL LEVEL TO REDUCE EMISSION REDUCTIONS. SO WE'VE MADE TREMENDOUS PROGRESS. WE USED TO HAVE MANY STAGE 1 SMOG ALERTS WHERE WE WOULD TELL KIDS IN SCHOOL SKIP RECESS, DON'T ENGAGE IN SPORTS. WE DON'T HAVE LEVELS LIKE THERE USED TO BE. YOU CAN SEE THE MOUNTAINS MORE OFTEN THAN YOU USED TO.

HOWEVER, WE STILL HAVE A LONG WAY TO GO. WE STILL HAVE SOME OF THE WORST AIR QUALITY IN THE NATION. WE STILL NEED SIGNIFICANT EMISSION REDUCTIONS IN ORDER TO ATTAIN HEALTH-BASED STANDARDS. SO THAT IS WHAT OUR PLAN IS ABOUT HOW WE'RE GOING TO DO THAT IN THE FUTURE.

SO THE WAY THIS WORKS UNDER THE FEDERAL CLEAN AIR ACT IS THE U.S. EPA WILL SET A NATIONAL AMBIENT AIR QUALITY STANDARD TO PROTECT PUBLIC HEALTH. AND THEN THEY'LL LOOK AT THE DATA THAT'S COLLECTED AT THE MONITORING STATIONS IN THE AREA. WE HAVE ABOUT 36 MONITORING STATIONS THROUGHOUT THE BASIN. AND THEY'LL COMPARE WHAT THE MEASUREMENTS ARE THROUGHOUT THE NATION. AND IF YOU'RE NOT MEETING THE STANDARD OR THE LEVELS ARE ABOVE THE STANDARD, THEN YOU'D BE DESIGNATED AS NONATTAINMENT OF THAT STANDARD. ONCE YOU GET THAT DESIGNATION BY THE U.S. EPA, A LOT OF REQUIREMENTS KICK IN. AND AMONG THOSE ARE PLANNING REQUIREMENTS. AND ONE OF THOSE PLANNING REQUIREMENTS IS A STATE IMPLEMENTATION PLAN. THAT IS REALLY THE BLUEPRINT FOR HOW A PARTICULAR NONATTAINMENT REGION IS GOING TO ATTAIN THE STANDARDS VIA CERTAIN CLEAN AIR ACT DEADLINES.

THE AIR QUALITY MANAGEMENT PLAN, THE AQMP, IS OUR PORTION OF THE STATE SIP OR STATE IMPLEMENTATION PLAN FOR CALIFORNIA. THE STATE LAW, CALIFORNIA HEALTH AND SAFETY CODE, ALSO REQUIRES US TO UPDATE OUR AIR QUALITY

MANAGEMENT PLAN EVERY SO OFTEN. SO THIS SERVES TO SATISFY THAT REQUIREMENT AS WELL. AS I MENTIONED BEFORE, IT REALLY IS A BLUEPRINT ABOUT WHAT MEASURES ARE WE GOING TO TAKE TO REDUCE EMISSIONS THAT WILL RESULT IN MEETING THE AIR QUALITY STANDARDS.

THIS WILL BE THE 11TH PLAN THAT THE AQMD HAS BEEN INVOLVED WITH BACK SINCE THE LATE '70S. SO THE TWO POLLUTANTS WE FOCUS ON ARE THE TWO POLLUTANTS FOR THIS AREA IS STILL IN NONATTAINMENT, AND THAT IS TWO POLLUTANTS; GROUND LEVEL OZONE AND PARTICULATE MATTER OR PM2.5. AND YOU'LL HEAR IN A MOMENT ABOUT THE HEALTH EFFECTS OF THOSE POLLUTANTS. SO WE FOCUS ON THOSE BECAUSE THOSE ARE THE ONES IN WHICH WE HAVE PLANNING REQUIREMENTS BECAUSE WE ARE IN NONATTAINMENT.

YOU CAN SEE HERE THERE ARE FIVE DIFFERENT FEDERAL STANDARDS FOR WHICH WE STILL DO NOT ATTAIN THOSE STANDARDS. THERE'S TWO FOR PM2.5, AN ANNUAL STANDARD AND A DAILY STANDARD; AND THEN THREE DIFFERENT OZONE STANDARDS. AND WHEN WE DO THIS PLANNING PROCESS, WHAT WE DO IS WE WANT TO HAVE ONE SET OF ACTIONS, ONE SET OF INTEGRATED ACTIONS, ONE STRATEGY, ONE SET OF MEASURES TO ATTAIN ALL THE STANDARDS. WE DON'T WANT TO HAVE SEPARATE PLANS FOR EACH BECAUSE THEY MAY CONFLICT. IT DOESN'T GIVE US THE MOST EFFICIENT PATH TO ATTAINMENT. SO THAT'S WHY WE DO THIS ALTOGETHER WHEREVER WE CAN.

YOU'LL SEE FOR EACH STANDARD THERE'S A CERTAIN LEVEL, WE GET A CLASSIFICATION, AND THEN THERE'S LATEST ATTAINMENT YEARS WITHIN THE CLEAN AIR ACT. AND THEN YOU'LL ALSO SEE WE HAVE A DUE DATE FOR THESE PLANNING REQUIREMENTS, AND YOU CAN SEE WE'RE A LITTLE BIT LATE ON A COUPLE OF THEM. BUT THE CONSEQUENCES OF BEING A FEW MONTHS LATE IS NOT TERRIBLY SIGNIFICANT AT THIS POINT. WE'VE BEEN WORKING WITH EPA, WORKING WITH CARB, TO MAKE SURE WE GET THIS PLAN RIGHT, HAVE PLENTY OF TIME FOR PUBLIC INPUT RATHER THAN JUST RUSH IT THROUGH JUST TO MEET THESE DEADLINES. AS LONG AS WE GET IT IN BY THE TIME FRAME THAT WE'RE ON, WE'LL AVOID ANY OF THE POTENTIAL CONSEQUENCES THAT COME WITH BEING A BIT LATE ON THE SUBMITTAL DATE.

SO OUR BIGGEST CHALLENGE IS REDUCING EMISSIONS. AND IT'S REALLY COMES DOWN TO REDUCING NOX EMISSIONS OR NITROGEN OXIDE EMISSIONS. NITROGEN OXIDES ARE EMITTED FROM ANY COMBUSTION PROCESS ANY TIME YOU BURN ANY TYPE OF FUEL WHETHER IT'S NATURAL GAS, DIESEL GASOLINE, JET FUEL, WOOD. WHATEVER IT IS YOU FORM NITROGEN OXIDES TO SOME EXTENT. AND WE KNOW THAT WE NEED THESE REDUCTIONS IN NITROGEN OXIDES TO MEET NOT ONLY THE OZONE STANDARDS BECAUSE NITROGEN OXIDES LEAD TO OZONE FORMATION BUT ALSO THE PM2.5 STANDARDS BECAUSE NITROGEN OXIDES ALSO LEAD TO PM2.5 FORMATION, WHICH IS WHY THIS PLAN IS HEAVILY

FOCUSED ON NOX EMISSION REDUCTIONS.

YOU CAN SEE HERE THE BLUE BARS SHOW THE TOTAL NOX EMISSIONS IN THE SOUTH COAST BASIN IN 2012 AND THEN MOVING FORWARD, THE PROJECTIONS FOR NOX EMISSIONS GOING ALL THE WAY THROUGH 2031. AND THE FIRST THING TO NOTICE IS THE BLUE BARS GET SMALLER JUST BASED ON EXISTING RULES AND REGULATIONS AND CONTINUED IMPLEMENTATION OF THOSE RULES AND REGULATIONS WE'RE GOING TO SEE ABOUT A 50- TO 60-PERCENT REDUCTION IN NOX EMISSIONS GOING FORWARD, AND THAT SHOULD LEAD -- WILL LEAD TO AIR QUALITY IMPROVEMENTS.

THE CHALLENGE IS THAT IS NOT ENOUGH TO MEET THE FEDERAL STANDARDS. WE NEED TO TAKE -- THESE BLUE BARS NEED TO SHRINK DOWN TO WHERE THE RED BARS ARE IN ORDER TO MEET THE STANDARDS BY THOSE DEADLINES. SO NEED ABOUT A 43-PERCENT ADDITIONAL REDUCTION IN 2023 AND ABOUT A 55-PERCENT ADDITIONAL REDUCTION IN 2031. SO THIS IS THE REAL CHALLENGE ESPECIALLY THE 2023 STANDARD BECAUSE THAT'S ONLY SIX OR SEVEN YEARS AWAY. ESSENTIALLY WE NEED TO TAKE ALL THE NOX EMISSION REDUCTIONS THAT WOULD OTHERWISE OCCUR AND CUT THAT IN HALF IN THE NEXT SIX OR SEVEN YEARS. NOW, YOU CAN ALSO SEE HERE THAT IF WE'RE ON THIS TRAJECTORY TO MEET THIS 2023 STANDARD, NOT ONLY WILL WE MORE OR LESS MEET THE 2022 RED BAR STANDARD HERE, WE'LL ALSO BE MUCH CLOSER TO MEETING THE 2031 STANDARD.

SO THIS RIGHT HERE IS REALLY DRIVING THE PLAN. THE OTHER THING TO NOTICE IS IF WE HIT THESE RED BARS, WE WILL MEET THE PM2.5 STANDARDS IN 2019 AND 2025 WITH ROOM TO SPARE. SO THAT IS WHY WE DO THIS INTEGRATED PLANNING BECAUSE WE KNOW IF WE FOCUS ON NOX WE CAN MEET ALL THE STANDARDS BY THE DEADLINES ASSUMING, OF COURSE, WE CAN GET THESE REDUCTIONS.

SO THAT'S -- ONE CHALLENGE IS REDUCING NOX. THE OTHER CHALLENGE IS A LOCAL AIR QUALITY AGENCY WE HAVE LIMITED AUTHORITY FOR MOBILE SOURCES. ABOUT 12 PERCENT OF THE TOTAL EMISSIONS OF THOSE NOX EMISSIONS I JUST SHOWED COME FROM STATIONARY SOURCES, AND THAT'S WHAT WE HAVE PRIMARY JURISDICTION AS A LOCAL DISTRICT IN CALIFORNIA. AND ABOUT 88 PERCENT IN 2012 CAME FROM MOBILE SOURCES. THESE NUMBERS CHANGE A LITTLE BIT WITH TIME. BUT IN GENERAL EVEN GOING FORWARD ABOUT 20 PERCENT AT MOST COME FROM STATIONARY SOURCES. AND, AGAIN, WE HAVE LIMITED AUTHORITY. SO IN ORDER TO ACHIEVE THE STANDARDS, WE'RE GOING TO NEED REDUCTIONS FROM MOBILE SOURCES.

SO I'M NOT GOING TO GO INTO TOO MANY DETAILS ABOUT THE PLAN. IT'S ALL AVAILABLE ONLINE. AND THERE'S MANY MEASURES IN THE PLAN, APPENDICES. IT'S WELL OVER A THOUSAND PAGES IF YOU ADD EVERYTHING UP. BUT JUST TO SUMMARIZE THE APPROACH WE'RE TAKING, SO WHAT I'M SHOWING

HERE IS THE NOX EMISSION REDUCTIONS NEEDED FOR ATTAINMENT IN BOTH THESE YEARS. SO YOU CAN SEE THAT FROM 2012 LEVELS WE NEED ABOUT 400 TONS PER DAY REDUCTIONS BY 2023 AND ABOUT CLOSER TO 450 IN 2031.

WHERE ARE THOSE EMISSION REDUCTIONS COMING FROM? WELL, THE BLUE BARS SHOW THE REDUCTIONS THAT WILL OCCUR THROUGH CONTINUED IMPLEMENTATION OF EXISTING REGULATIONS AT THE LOCAL LEVEL FOR STATIONARY SOURCES AND AT THE FEDERAL AND STATE LEVEL FOR MOBILE SOURCES. ABOUT 70 PERCENT OF THE REDUCTIONS NEEDED ARE COMING FROM CONTINUED IMPLEMENTATION OF REGULATIONS. SO THERE'S STILL ABOUT 30 PERCENT WE NEED. SO THIS PLAN ACCOUNTS FOR THIS EXTRA PIECE.

SOME OF WHAT WE'RE PROPOSING IN THE PLAN ARE NEW STATE AND LOCAL REGULATIONS TO ACHIEVE EMISSION REDUCTIONS, AND THAT'S THIS PURPLE BAR RIGHT HERE, WHICH SEEMS QUITE SLIM. BUT WHEN YOU CONSIDER WE REVISIT THIS PLAN EVERY THREE OR FOUR YEARS AND THAT EVERY THREE OR FOUR YEARS WE ARE LEGALLY REQUIRED TO INCLUDE ALL FEASIBLE MEASURES, ALL FEASIBLE REGULATORY ACTIONS. SO MOST OF THE REGULATIONS ARE ALSO ENCOMPASSED IN THE BLUE BAR. WE CAN BUILD UP THAT WITH WHAT NEW TECHNOLOGY ALLOWS US TO DO, AND THAT'S WHERE WE ADD ONTO THAT BASED ON WHAT WE'VE LEARNED OVER THE LAST THREE OR FOUR YEARS. AND, OF COURSE, GIVEN MORE TIME THOSE REGULATIONS HAVE

MORE TIME TO TAKE EFFECT AND GET MORE REDUCTIONS FURTHER DOWN THE LINE.

WE ALSO NEED REDUCTIONS FROM FEDERAL SOURCES. THE STATE DOESN'T CONTROL OF EMISSIONS FROM AIRCRAFTS, FROM SHIPS, FROM TRAINS, AND FROM INTERSTATE TRUCKING. SO THE PLAN THAT YOU'LL HEAR ABOUT THE STATE LEVEL, THE STATE SIP STRATEGY, INCLUDES REDUCTIONS FROM FEDERAL SOURCES BECAUSE WE CANNOT GET TO ATTAINMENT WITHOUT THOSE REDUCTIONS AS WELL. AND EVEN WITH THAT WE ARE STILL LEFT WITH -- WE ARE STILL LEFT WITH A GAP. SO THIS REMAINING GAP IS WHAT WE ARE LOOKING AT AS ADVANCED DEPLOYMENT OF THESE CLEANER TECHNOLOGIES.

SO REGULATIONS CAN DEFINITELY HELP HAVE MANUFACTURERS PRODUCE THE TECHNOLOGY AND MAKE THEM COMMERCIALLY AVAILABLE, GAIN PUBLIC ACCEPTANCE, BUT THEN IT TAKES A LONG TIME FOR REGULATIONS TO TAKE EFFECT. YOU HAVE TO WAIT FOR THE FLEET TO TURNOVER, WHETHER IT'S A TRUCK, WHETHER IT'S A TRAIN, IN ORDER TO GET FULL -- TAKE FULL ADVANTAGE OF THOSE REGULATIONS. SO WHAT INCENTIVES DO IS HELP ACCELERATE THAT DEPLOYMENT.

SO ONE WAY TO DO THAT IS FINANCIAL INCENTIVES. THERE'S OTHER WAYS TO DO IT. ONE WAY TO DO IT IS IF TECHNOLOGY ADVANCES EVEN FURTHER WE CAN DO ADDITIONAL REGULATIONS AND HELP FILL THAT GAP. BUT FOR NOW WHAT WE'RE LOOKING AT IS A LARGE AMOUNT OF INCENTIVES TO HELP

ACCELERATE THAT FLEET TURNOVER AND GET THE CLEANEST EQUIPMENT OUT IN USE AND REPLACE THE OLDER, DIRTIER EQUIPMENT.

SO AS I MENTIONED BEFORE, IF WE ONLY DID THIS PLAN LOCALLY, WE WOULD NOT GET TO ATTAINMENT. SO WE HAVE TO INTEGRATE OTHER STRATEGIES AT THE STATE AND FEDERAL LEVEL. SO THAT'S EXACTLY WHAT THIS PLAN DOES. YOU'LL HEAR ABOUT CARB'S SIP STRATEGY, AND THAT SIP STRATEGY ALSO INCLUDES REDUCTIONS FROM FEDERAL SOURCES. BUT WE HAVE OUR OWN STATIONARY AND LOCAL MOBILE SOURCE STRATEGY THAT WILL ASSIST ATTAINMENT TAKEN AS A WHOLE.

SO OUR PRIMARY AUTHORITY IS OVER STATIONARY SOURCES. I WANT TO TALK ABOUT THAT FOR A MOMENT. JUST LIKE EVERY PLAN, ALL 11 PLANS WE'VE DONE IN THE PAST, THE FIRST STEP IS WE LOOK AT ALL THE STATIONARY SOURCE CATEGORIES, LOOK AT THE EMISSIONS INVENTORY, WHERE THE NOX EMISSIONS ARE COMING FROM, AND THEN LOOK AT THE CONTROL OPTIONS THAT ARE AVAILABLE TO REDUCE THOSE EMISSIONS. AND WE LOOK AT THAT INTERNALLY, WE LOOK AT THAT -- WHAT HAS BEEN IMPLEMENTED ELSEWHERE IN THE STATE, WHAT HAS BEEN IMPLEMENTED ELSEWHERE IN THE COUNTRY TO SEE WHETHER THERE'S ANYTHING OUT THERE THAT IS MORE STRINGENT THAN WE HAVE ALREADY DONE. TYPICALLY WE HAVE THE MOST STRINGENT REGULATIONS ACROSS THE STATE OR ACROSS THE COUNTRY, SO TYPICALLY WE DON'T FIND A LOT OUT THERE THAT

WE ARE NOT ALREADY DOING. ALTHOUGH, SOMETIMES WE FIND A FEW MEASURES, A FEW REGULATIONS, OUT THERE THAT ARE SLIGHTLY DIFFERENT THAN OURS, AND WE NEED TO ADDRESS THAT BY LAW.

BUT WE ALSO TRY TO PUSH THE ENVELOPE, AND WE HAD A CONTROL TECHNOLOGY SYMPOSIUM BRINGING EXPERTS AND INDUSTRY AND PEOPLE TO SEE IF WE -- IF THERE ARE ANY NEW TECHNOLOGIES THAT WE SHOULD BE CONSIDERING. WE'VE HAD WORKING GROUPS, WE'VE HAD WHITE PAPERS OVER THE PAST THREE OR FOUR YEARS LOOKING FOR NEW EMISSION REDUCTIONS. AND THE AQMP ITSELF HAS AN ADVISORY GROUP THAT'S MET 14 TIMES OVER THE LAST COUPLE YEARS TO PROVIDE INPUT ON THE PLAN AS WELL AS IDEAS FOR ADDITIONAL MEASURES.

AT THE END OF THAT VERY LONG PROCESS, WE HAVE INCLUDED MANY REGULATORY MEASURES IN THE PLAN. IT IS LIMITED, LIMITED AMOUNT OF EMISSION REDUCTIONS. I SHOWED YOU THE SMALL SLIVER THERE. BUT THESE ARE THINGS THAT WE THINK WE CAN MOVE FORWARD WITH. SOME AREAS ARE LOOKING AT NON-REFINERY FLARING AND REDUCING EMISSIONS THERE, LOOKING AT COOKING APPLIANCES ESPECIALLY COMMERCIAL COOKING APPLIANCES BECAUSE THAT IS AN AREA THAT HAS NOT ACTUALLY BEEN REGULATED BEFORE. THERE ARE NO NOX EMISSION LIMITS ON COOKING APPLIANCES. WE'RE LOOKING AT RECLAIM. RECLAIM IS OUR CAP AND TRADE PROGRAM FOR NOX EMISSION SOURCES. ESSENTIALLY OUR 270 LARGEST INDUSTRIAL

FACILITIES ARE WITHIN THIS PROGRAM. AND WE'RE PROPOSING ANOTHER 35-PERCENT REDUCTION BY 2031 ON TOP OF THE 45 PERCENT-REDUCTION THAT OUR BOARD ADOPTED LAST YEAR. WE'RE LOOKING AT COMMERCIAL AND RESIDENTIAL EQUIPMENT. ANYTHING FROM YOUR HOT WATER HEATER, TO YOUR SPACE HEATER, UP TO SOME OF THE BOILERS THAT MIGHT BE IN COMMERCIAL BUILDINGS. WE THINK THERE'S SOME OPPORTUNITIES FOR EITHER VERY LOW NOX EMITTING EQUIPMENT OR ZERO-EMISSION EQUIPMENT IN GOING FORWARD AND THEN LOOKING AT DIESEL BACK-UP GENERATORS. IN SOME APPLICATIONS WE THINK THERE ARE SOME NEWER ALTERNATIVES THAT DON'T INVOLVE THE NOX EMISSIONS THAT COME WITH TESTING DIESEL BACK-UP GENERATORS, YOU KNOW, 20, 30, 40 HOURS A YEAR.

BUT WE DO WAN TO HIGHLIGHT IF WE TOOK ALL THE STATIONARY SOURCES IN THE ENTIRE BASIN DOWN TO ZERO, WE WOULD STILL NOT MEET OUR GOALS. WE STILL NEED MOBILE SOURCE REDUCTIONS. TO THAT END, WE HAVE THE STATE SIP STRATEGY THAT IS LOOKING AT MOBILE SOURCE CONTROL OPTIONS AND DOES PROPOSE REGULATORY MEASURES FOR MOBILE SOURCES. BUT AS I MENTIONED BEFORE, WE ARE LEFT WITH THIS GAP THAT LOOKS AT ADVANCING THE DEPLOYMENT OF THE CLEAN TECHNOLOGIES IN CONJUNCTION WITH THE REGULATIONS.

SO THE STATE HAS A LOT OF DIFFERENT WAYS THEY'RE LOOKING AT DOING THIS. INCENTIVES IS ONE WAY. ANOTHER

WAY IS REGULATIONS AS TECHNOLOGY ALLOWS AND SEVERAL OTHER MEASURES THAT WE CAN TAKE. LOCALLY WE DO HAVE SOME LIMITED MOBILE SOURCE AUTHORITY, AND IT COMES UNDER FEDERAL AND STATE LAW, AND IT IS KNOWN AS INDIRECT SOURCE RULE AUTHORITY. AND THIS LOOKS AT DIFFERENT TYPES OF FACILITIES -- AND THEY'RE LISTED HERE. -- THAT ATTRACT MOBILE SOURCES EITHER ON THE ROAD OR CONSTRUCTION EQUIPMENT COMING IN. SO WE DO HAVE SOME AUTHORITY OVER THOSE TYPES OF FACILITIES. IT IS CONTROVERSIAL AUTHORITY, AND IT OFTEN GETS CHALLENGED IN COURT.

SO WE'RE TAKING AN APPROACH WHERE WE WOULD LIKE TO GET THE PROCESS STARTED AND MEET WITH THE FACILITIES, START THOSE WORKING GROUPS, START WHAT WOULD OTHERWISE BE A RULE-MAKING PROCESS AND SEE IF WE CAN FIND A PATH FORWARD TO ACHIEVE EMISSION REDUCTIONS AT THESE FACILITIES IN A WAY THAT'S VERY SIMILAR TO WHAT HAPPENED IN THE PORTS. THE PORT OF LONG BEACH AND PORT OF L.A. HAD THE CLEAN AIR ACT ABOUT TEN YEARS AGO AND WERE ABLE TO ACHIEVE EMISSION REDUCTIONS ON A VOLUNTARY BASIS THAT WERE VERY SUCCESSFUL IN COLLABORATION WITH THE REGULATORY AGENCIES. SO WE WANT TO SEE IF WE CAN REPEAT THAT, THAT MODEL, IN SOME OF THESE OTHER TYPES OF FACILITIES. AND THE GOAL IS TO FIND A WAY WHERE WE CAN GET ENFORCEABLE EMISSION REDUCTIONS -- IT DOESN'T NECESSARILY HAVE TO BE THROUGH REGULATION. -- THAT WE CAN PUT INTO OUR PLAN AND

GET CREDIT FOR THESE REDUCTIONS WITHIN OUR SIP, WHICH MEANS WE WOULDN'T HAVE TO GO ELSEWHERE TO FIND THOSE EMISSION REDUCTIONS. SO WE WILL SEE WHAT WE CAN DO AND SEE IF WE CAN FIND THAT ENFORCEABLE MECHANISM. AND IF WE CAN'T FIND A WAY OTHER THAN REGULATION, THEN WE MAY HAVE TO MOVE TO REGULATION AS WE GO FORWARD.

SO I WANTED TO TALK A LITTLE BIT ABOUT THE REVISIONS. WE RELEASED OUR FIRST DRAFT PLAN IN JUNE. WE ACTUALLY RELEASED THE CONTROL MEASURES FOR THAT PLAN TOWARDS THE BEGINNING OF THE YEAR IN SEVERAL STEPS WITH OUR WORKING GROUP. BUT WE DID RELEASE THE MAIN BODY OF THE PLAN IN JUNE. WE TOOK COMMENT. WE GOT ABOUT 69 COMMENTS. AND BASED ON THOSE COMMENTS, BASED ON STAKEHOLDER MEETINGS, WE DID MAKE SOME SIGNIFICANT CHANGES, AND THEY'RE KIND OF LISTED HERE.

WE DID PRIORITIZE ZERO-EMISSION TECHNOLOGIES, BUT QUALIFYING THAT BY SAYING WHEREVER IT'S COST EFFECTIVE AND FEASIBLE, AND THEN THAT NEAR ZERO OR ULTRA LOW NOX EMITTING TECHNOLOGY EVERYWHERE ELSE. WE DO RECOGNIZE THAT WHEN WE'RE TALKING ABOUT COST EFFECTIVE AND FEASIBLE, WE DO NEED TO CONSIDER ALL THE EMISSIONS ASSOCIATED WITH DIFFERENT TYPES OF TECHNOLOGIES AND THE ENERGY SUPPLY THAT GOES INTO THAT. SO WE PLAN ON STARTING AN ANALYSIS VERY SOON THAT LOOKS AT ALL THE DIFFERENT TECHNOLOGIES AND COMBINATION OF TECHNOLOGIES,

LOOKING AT THEIR LIFE CYCLE IN BASIN NOX EMISSIONS TO BE ABLE TO PROPERLY COMPARE THEIR COSTS AND BENEFITS.

WE GOT A LOT OF COMMENTS THAT WE SHOULD BE LOOKING MORE SERIOUSLY AT SOME REGULATORY ACTIONS RATHER THAN JUST INCENTIVES. SO WE DID FIND SOME AREAS WHERE WE THINK THERE ARE REGULATORY OPPORTUNITIES IN THE 2030 TIME FRAME, LOOKING AT INTERNAL COMBUSTION ENGINES AND DIESEL BACK-UP GENERATORS AND THEN RESIDENTIAL AND COMMERCIAL APPLIANCES. I'VE ALREADY TALKED ABOUT THESE MEASURES, BUT THOSE WERE IN RESPONSE TO COMMENTS WE HAD RECEIVED. BUT EVEN WITH THESE NEW REGULATORY MEASURES, IT DOES NOT GET US WHERE WE NEED TO GO FAST ENOUGH SO INCENTIVES ARE STILL A MAJOR PART OF THE PLAN IN ORDER TO ADVANCE DEPLOYMENT AND GET THAT EQUIPMENT OUT.

WE ARE ALSO LOOKING AT OUR RECLAIM PROGRAM. AS I MENTIONED, WE HAVE A 5-TON PER DAY OR 35-PERCENT REDUCTION PROJECTED THERE. BUT ONE OF THE WAYS WE ARE LOOKING AT PERHAPS ACHIEVING THAT IS ACTUALLY LOOKING AT SUNSETTING THE PROGRAM AND RETURNING TO MORE OF COMMAND AND CONTROL APPROACH THAN THE CAP AND TRADE APPROACH THAT'S CURRENTLY BEING USED FOR THOSE FACILITIES.

WE ALSO ADDED SOME DISCUSSION ON FACILITY-BASED MEASURES AND FLEET RULES AND THEN A LOT OF TECHNICAL UPDATES ON MODELING AND EMISSION INVENTORY AND AIR QUALITY DATA THAT WE'RE CONSTANTLY TRYING TO GET THE

LATEST DATA AND INFORMATION IN. AND CHANGES ARE USUALLY QUITE SMALL AT THIS POINT, BUT WE DO NEED ALL THE NUMBERS TO ADD UP AT THE END OF THE DAY.

SO WE TALKED ABOUT INCENTIVE FUNDING. SO IN PAST PLANS WHAT WE HAVE DONE IS LOOKED AT ALL THE REGULATORY OPTIONS AND INCLUDED THEM IN THE PLAN. AND THERE'S ALWAYS BEEN THIS GAP IN FRONT OF US THAT WE COULD NOT FILL. WE USED TO PUT THAT INTO WHAT WE CALL THE BLACK BOX. UNDER THE CLEAN AIR ACT WE WERE ALLOWED TO DO THAT AND HAVE AN APPROVABLE PLAN EVEN THOUGH WE DIDN'T HAVE SPECIFICS ABOUT WHAT TECHNOLOGIES AND HOW MANY PIECES OF EQUIPMENT NEEDED TO BE CHANGED OUT OVER A CERTAIN TIME PERIOD. YOU WERE ALLOWED TO RELY ON ADVANCEMENT OF TECHNOLOGY TO GET YOU THERE.

BUT A COUPLE -- FIRST OF ALL, WE'RE ONLY SIX OR SEVEN YEARS WAY FROM THE ATTAINMENT DATE, SO IT'S VERY HARD TO RELY ON A TECHNOLOGICAL ADVANCEMENT TO HAPPEN SOON TO MAKE A BIG DIFFERENCE. NUMBER 2, WE DON'T HAVE TO RELY ON TECHNOLOGICAL ADVANCEMENT BECAUSE OVER THE PAST FIVE YEARS OR SO WE HAVE HAD THOSE ADVANCEMENTS. WE CAN ACTUALLY LAY OUT A PATHWAY TO ATTAINMENT NOW. WE KNOW HOW MANY TRUCKS, HOW MANY OFF-ROAD EQUIPMENT, HOW MANY TRAINS NEED TO BE REPLACED OR TURNED OVER TO A CERTAIN EMISSION STANDARD THAT WILL ACTUALLY GET US TO ATTAINMENT. THAT'S NEW WITH THIS PLAN. NOW THAT WE HAVE

THIS, WE DON'T HAVE TO PUT EVERYTHING IN THE BLACK BOX ANYMORE AND HOPE FOR A NEW TECHNOLOGICAL ADVANCEMENT.

THE OTHER THING THAT IT ALLOWS US TO DO NOW THAT WE KNOW THE TYPES OF VEHICLES AND THE NUMBER OF VEHICLES WE CAN ACTUALLY CALCULATE THE COST OF DOING THAT. AND THE COST -- THE AMOUNT OF INCENTIVES IT WOULD ACTUALLY TAKE TO INCENTIVIZE THE REPLACEMENT OF THAT EQUIPMENT. SO WHEN WE ADD ALL THAT UP, IT IS GOING TO BE A SIGNIFICANT EXPANSION OF OUR CURRENT INCENTIVE PROGRAMS, AND IT COMES OUT TO ABOUT $14 BILLION OVER THIS 15-YEAR PERIOD, WHICH IS ROUGHLY ABOUT A BILLION DOLLARS A YEAR. MOST OF THAT IS ON THE MOBILE SOURCE SIDE, BUT WE DO SEE SOME OPPORTUNITIES ON THE STATIONARY SOURCES SIDE THAT WOULD BE COST EFFECTIVE AS WELL.

SO IN CONJUNCTION WITH THE AQMP ITSELF, THERE ARE RELATED DOCUMENTS. ONE IS THE ENVIRONMENTAL IMPACT REPORT UNDER THE CALIFORNIA QUALITY ACT. THIS IS A PROJECT UNDER CEQA. SO WE DO HAVE TO LOOK AT THE OTHER ENVIRONMENTAL IMPACTS OF THE PLAN. AND THAT'S UNDERGOING A PARALLEL PROCESS. WE JUST CLOSED OUR 60-DAY COMMENT PERIOD AND WILL BE RESPONDING. I THINK GOT EIGHT COMMENTS OR SO. WE'LL BE RESPONDING TO THAT AND REVISING THAT DOCUMENT GOING FORWARD.

IN ADDITION TO THAT, WE ALSO DO A FULL SOCIOECONOMIC ASSESSMENT OF THE PLAN, WHICH LOOKS AT THE

COST OF THE PLAN, LOOKS AT THE BENEFITS OF THE PLAN IN TERMS OF HEALTH, LOOKS AT ENVIRONMENT JUSTICE IMPACTS OF THE PLAN, AND THEN PUTS ALL THAT DATA INTO A REGIONAL ECONOMIC MODEL AND LOOKS AT THE JOB IMPACTS OF THE PLAN, THE IMPACTS TO OTHER ECONOMIC FACTORS, LOOKS AT IT ON A SUBREGIONAL BASIS, AND IT ALSO LOOKS AT SOME OF THE CEQA ALTERNATIVES. SO THAT HAS ALL BEEN RELEASED AND AVAILABLE ON OUR WEBSITE AND BEEN DISCUSSED WITH OUR ADVISORY GROUPS AND SUBCOMMITTEE. AND WE ARE WORKING ON AN UPDATED ASSESSMENT BASED ON COMMENTS WE RECEIVED AND WILL BE RELEASING THAT IN THE COMING DAYS OR WEEKS.

AND, LASTLY -- AND THIS IS NEW IN THIS PLAN -- BECAUSE WE HAVE SUCH A LARGE INCENTIVE NEED, WE ARE PUTTING TOGETHER A DOCUMENT THAT'S ESSENTIALLY AN INCENTIVE FUNDING ACTION PLAN, WHICH IS GOING TO LET OUR GOVERNING BOARD KNOW AND GET FEEDBACK FROM OUR GOVERNING BOARD TO STAFF OF HOW WE'RE GOING TO MOVE FORWARD IN SECURING THE FUNDING THAT WE NEED EITHER AT THE LOCAL LEVEL, AT THE STATE LEVEL, AT THE FEDERAL LEVEL. AND A LOT OF THE NEEDS ARE GOING TO BE LEGISLATIVE IN NATURE. SO WE NEED TO LOOK AT WHAT OUR OPTIONS ARE, LOOK AT WHERE WE WILL HAVE THE BEST CHANCE FOR SUCCESS, GET FEEDBACK, AND HELP BUILD A COALITION TO GET BEHIND RAISING THIS MONEY TO ACHIEVE CLEAN AIR IN SOUTHERN CALIFORNIA.

SO I'LL GO INTO A LITTLE DETAIL IN SOME OF

THESE. AND I WILL CAVEAT THIS BY SAYING THIS IS BEING UPDATED AS WE SPEAK. IN THE NEXT RELEASE SOME OF THESE NUMBERS MAY CHANGE TO SOME DEGREE, BUT THIS IS WHAT IS IN THE CURRENT VERSION, THE DISCUSSION VERSION, THAT'S OUT THERE NOW. SO THE TOTAL COST OF THE PLAN CAN BE SEEN RIGHT HERE. SO OVER THIS 15-YEAR PERIOD, IT'S ABOUT $15 BILLION AS THE INCREMENTAL COST OF THE PLAN. THAT'S THE DIFFERENCE BETWEEN NOT DOING ANYTHING AND THE TOTAL COST TO THE REGION IF THE PLAN IS FULLY IMPLEMENTED, WHICH COMES OUT TO ABOUT $1 AND A HALF BILLION A YEAR.

AND I NOTE THESE NUMBERS -- SOME OF THE LATEST NUMBERS I GOT TODAY. THESE ARE GOING TO CHANGE TO SOME EXTENT. I BELIEVE THIS MAY DROP A BIT, THIS MAY DROP A LITTLE BIT RIGHT HERE. THIS MAY STAY PRETTY SIMILAR. IN ANY CASE, YOU CAN SEE THE COST TO THE STATIONARY SOURCE SECTOR IS ABOUT $4 BILLION OVER THAT TIME PERIOD WITH SOME INCENTIVE FUNDING, AND THAT'S ABOUT 5.7 OVERALL.

ON THE MOBILE SOURCE SIDE, YOU SEE THE INCENTIVE FUNDING HERE, BUT YOU ALSO SEE SOME COST SAVINGS. AND THAT COST SAVINGS IS -- EVEN THOUGH THERE'S SOME COST OF CHANGING OUT EQUIPMENT, THERE'S COST SAVINGS DUE TO FUEL SAVINGS AND THE LOWER COST OF FUEL. SO THAT ALL GETS INCORPORATED INTO THIS ANALYSIS. AND YOU CAN SEE FOR THE TOTAL IT'S ABOUT $15 AND A HALF BILLION.

WE ALSO LOOK AT THE BENEFITS OF THE PLAN, AND

THESE ARE LARGELY THE HEALTH BENEFITS OF THE PLAN. SO LARGELY BASED ON LOWERING THE MORTALITY RATE, WE KNOW THAT PM2.5 AND OZONE TO SOME EXTENT LEADS TO PREMATURE DEATH. IT ALSO LEADS TO MORBIDITY, HOSPITAL VISITS, LOST WORK DAYS, LOST SCHOOL DAYS, AND A WIDE VARIETY OF OTHER IMPACTS. AND SO BY IMPROVING AIR QUALITY, WE GAIN HEALTH BENEFITS. WE CAN QUANTIFY THAT AND MONETIZE THAT. SO IF WE DO THAT, WE GET AN OVERALL BENEFIT OF OVER 256 BILLION IN OUR FOUR-COUNTY REGION WHICH COMES OUT TO ABOUT 24 BILLION A YEAR, WHICH IS MUCH MORE THAN THE BILLION AND A HALF DOLLARS IN THE COST. SO IT FAR OUTWEIGHS THAT.

NOW, MOST OF THAT IS DUE TO PREMATURE DEATHS FROM PM2.5. BUT, YOU KNOW, THE LATEST NUMBERS -- AND, AGAIN, THESE ARE GOING CHANGE TO SOME EXTENT. -- SUGGEST THAT EVEN WITHOUT THIS, EVEN WITHOUT THIS 99 PERCENT FROM -- IT'S ACTUALLY OVER 95 PERCENT FROM JUST PM2.5. EVEN WITH JUST THE BENEFITS FROM NOT MISSING WORK, NOT MISSING SCHOOL, NOT GOING TO THE HOSPITAL, THOSE HEALTHCARE COSTS THAT IT WILL STILL OUTWEIGH THE APPROXIMATE BILLION DOLLARS A YEAR IN COSTS.

JUST LITTLE BIT MORE ON THE FUNDING ACTION PLAN. WE ARE DEVELOPING THIS AND BRINGING THIS TO OUR BOARD IN PARALLEL WITH THE AQMP. ONE ESSENTIAL FEATURE OF THAT IS A SCHEDULE ON REPORTING BACK TO OUR GOVERNING BOARD ON PROGRESS TOWARDS SECURING THE FUNDING AND TALKING ABOUT

WHAT WE WOULD DO NEXT IF WE WEREN'T MAKING PROGRESS. SO WE ARE LOOKING AT ALL SOURCES. EVERYTHING IS ON THE TABLE IN TERMS OF FINDING FUNDING.

THESE ARE OUR EXISTING PROGRAMS. WE CURRENTLY SPEND BETWEEN 100 AND 150 MILLION A YEAR ON THESE INCENTIVE PROGRAMS THROUGH THESE MECHANISMS. WE ARE LOOKING AT A SERIOUS EXPANSION OF SOME OF THESE. BUT WE'RE ALSO LOOKING AT NEW POTENTIAL SOURCES OF FUNDING. AND JUST SOME IDEAS ARE LISTED HERE. IT DOESN'T MEAN EVERYTHING IS LISTED HERE, AND IT DOESN'T MEAN WE HAVE DECIDED ON ALL OR ANY ONE SPECIFIC ONE. THESE ARE UNDER CONSIDERATION. THERE'S A LOT OF WORK THAT NEEDS TO BE DONE TO FIGURE OUT WHERE WE HAVE THE BEST CHANCE OF SUCCESS.

WE WILL BE FORMING A STAKEHOLDER WORKING GROUP TO HELP BUILD A COALITION TO HELP US SECURE THIS FUNDING AT THE NATIONAL AND STATE LEVEL. WE'VE ALREADY STARTED THE NATIONAL LEVEL WITH LOOKING AT THE OTHER STATE AND LOCAL AIR QUALITY AGENCIES ESPECIALLY THOSE STATES THAT ARE GOING TO BE OUT OF ATTAINMENT FOR OZONE STANDARDS. WE'RE WORKING WITH THE ENGINE MANUFACTURERS AND OTHER PRIVATE SECTORS, AND THEN ENVIRONMENTAL GROUPS AND NGO'S. AND AT THE STATE LEVEL WORKING WITH OTHER DISTRICTS WITHIN THE STATE AND OTHER PUBLIC AND PRIVATE PARTNERSHIPS.

JUST A LITTLE BIT ON WHERE WE STAND TODAY. AS I

MENTIONED BEFORE, WE RELEASED THE DRAFT IN JUNE, THE REVISED DRAFT BEGINNING OF OCTOBER. WE HAD 69 COMMENTS ON THE JUNE DRAFT. WE NOW HAVE 30 COMMENTS ON THE OCTOBER DRAFT. AND WE'RE WORKING ON THOSE NOW FOR THE DRAFT FINAL WHICH WILL BE RELEASED IN EARLY DECEMBER. AND WE'LL HAVE ONGOING ADVISORY GROUPS AND ONGOING STAKEHOLDER MEETINGS. WE'VE HAD ABOUT 163 OF THESE SO FAR OVER THE PAST SEVERAL MONTHS TO A YEAR.

THIS IS A SCHEDULE, AGAIN, JUST IN GRAPHICAL FORM, BUT I DO WANT TO HIGHLIGHT THAT WE ARE TARGETING FEBRUARY ARE FEBRUARY GOVERNING BOARD MEETING FOR FULL BOARD CONSIDERATION LEAVING A FULL 60-DAY COMMENT PERIOD AFTER WE RELEASE THE DRAFT FINAL IN EARLY DECEMBER.

THIS IS OUR PUBLIC HEARING SCHEDULE. THIS IS OUR FINAL ONE. WE'VE DONE TWO ON TUESDAY AND THEN THIS IS OUR LAST ONE TODAY FOR REGIONAL PUBLIC HEARINGS. AND THEN IF YOU HAVE ANY QUESTIONS, YOU CAN FEEL TO CONTACT ME OR MICHAEL KRAUSE, WHOSE HERE TODAY. HE'S OUR MANAGER IN CHARGE OF THE EFFORT. AND I ENCOURAGE EVERYONE TO GET INVOLVED AND STAY INVOLVED AND LOOK FOR OUR REVISIONS TO COME OUT.

SO WITH THAT, WE HAVE TWO MORE PRESENTATIONS. SO, FIRST, WE'LL HEAR FROM CAROL SUTKUS AT CALIFORNIA AIR RESOURCES BOARD, WHO WILL TALK A LITTLE BIT ABOUT THE STATE STRATEGY WHICH IS INTEGRATED WITHIN OUR AQMP.

MS. SUTKUS: IF I START MUMBLING, YELL IF YOU CAN'T HEAR ME IN THE BACK. CAN YOU HEAR ME IN THE BACK?

SO I'LL GIVE YOU A BRIEF OVERVIEW OF OUR UPDATE ON OUR STATE SIP STRATEGY THAT WAS ALREADY MENTIONED. WE RELEASED OUR FIRST VERSION OF IT BACK IN MAY, AND WE'RE ABOUT DUE TO RELEASE AN UPDATE BY THE END OF THE MONTH. SO I JUST WANTED TO GIVE YOU A REAL QUICK OVERVIEW OF IT AND THEN AN IDEA OF SOME OF THE CHANGES COMING.

SO WHAT IS THE STATE SIP STRATEGY? IT'S ESSENTIALLY, JUST LIKE YOU HEARD BEFORE, A BLUEPRINT. THIS IS THE BLUEPRINT TO GET REDUCTIONS FROM THE VERSION -- THE AMOUNT OF REDUCTIONS FROM MOBILE SOURCES THAT ARE NEEDED, AND MOBILE SOURCES, AS YOU SAW IN THAT BIG PIE CHART, ARE A VERY SIGNIFICANT SOURCE OF THE EMISSIONS HEAR IN THE SOUTH COAST AIR BASIN. SO THE FAIR SHARE OF EMISSION REDUCTIONS THAT COME FROM MOBILE SOURCES ARE IN THE STATE STRATEGY. IT'S A DOCUMENT WITH A LIST OF MEASURES, REGULATORY INCENTIVE MEASURES, OTHER KIND OF TECHNOLOGY-ORIENTED MEASURES. AND IT ALSO CONTAINS THE COMMITMENT FOR THE STATE FOR ACHIEVING ATTAINMENT IN THE SOUTH COAST, AND THAT COMMITMENT COMES IN TWO FORMS.

FIRST OF ALL, I SAID THERE IS A LIST OF MEASURES WITH AN IMPLEMENTATION SCHEDULE OF WHEN WE WOULD DEVELOP THOSE MEASURES, THOSE PROGRAMS, WHATEVER THEY ARE, BY A

CERTAIN SCHEDULE, AND BRING THEM TO OUR BOARD FOR APPROVAL. AND THE SECOND PART OF IT IS AN AGGREGATE AMOUNT OF EMISSION REDUCTIONS THAT WE WOULD ACHIEVE BY A CERTAIN DATE FROM ALL OF THOSE MEASURES. WE HAVE IN THE DOCUMENT KIND OF EXPECTED EMISSION REDUCTIONS FROM EACH OF THOSE MEASURES. SOME OF THEM WILL GET MORE. SOME OF GET LESS ONCE THEY'RE FULLY FLUSHED OUT IN THE IMPLEMENTATION PROCESS. BUT WE STILL HAVE TO COMMIT TO THAT BOTTOM AMOUNT OF EMISSION REDUCTIONS. AND THEN THE DOCUMENT, WHEN IT IS PULLED ALTOGETHER INTO AN ATTAINMENT STRATEGY OR ATTAINMENT DEMONSTRATION FOR THE AREA GETS SENT TO EPA AND UPON EPA'S APPROVAL IT BECOMES ENFORCEABLE FEDERALLY.

SO I DON'T WANT TO GO THROUGH ALL OF THE MEASURES AND BORE YOU ALL. BUT THE BASIC STRUCTURE IS WE LOOK AT ALL THE MOBILE SOURCE CATEGORIES. AND WE'RE TALKING ABOUT ON-ROAD PASSENGER VEHICLES, ON-ROAD HEAVY DUTY TRUCKS, OFF-ROAD HEAVY DUTY ENGINES, CONSTRUCTION-TYPE EQUIPMENT, AND SMALL OFF-ROAD ENGINES SUCH AS YOUR LAWN AND GARDEN EQUIPMENT, FORKLIFTS, AND SUCH. SO FOR EACH OF THESE CATEGORIES WE BASICALLY LOOK AT GETTING THE CLEANEST ENGINE STANDARDS OUT THERE AND THEN ENSURING THAT THOSE ENGINES WHEN THEY'RE OUT IN USE ARE GETTING -- ARE OPERATING AS CLEAN AS THEY'RE SUPPOSED TO BE OPERATING, AND REMAIN -- THE EMISSION CONTROLS

REMAIN OPERATING THE WAY THEY'RE SUPPOSED TO BE. WE'RE ALSO LOOKING AT WHERE FEASIBLE INCREASING THE PENETRATION OF ZERO-EMISSION TECHNOLOGIES SOME PLACE. WE'LL BE LOOKING FOR NEAR-ZERO TECHNOLOGIES WHERE THAT'S FEASIBLE. THE IDEA IS GETTING THE CLEANEST ENGINES OUT THERE.

WHEN WE FOCUS ON CLEANING UP THE ENGINES AND VEHICLES, WE ALSO WANT TO MAKE SURE THEY'RE OPERATING ON THE CLEANEST FUELS, SO WE HAVE A MEASURE LOOKING AT THE CLEANER DIESEL ENGINE FUEL. AND FOR SOME OF THE ADVANCED TECHNOLOGIES THAT ARE STILL AT THE VERY BEGINNING STAGES, WE ALSO HAVE SOME MEASURES FOR PILOT STUDIES TO GET THEM TO DEMONSTRATE NEW TECHNOLOGIES AND GET THEM INTO THE MARKET. AND, LASTLY, JUST TO DEPLOY THE CLEANEST TECHNOLOGIES, GET THEM OUT THERE A LITTLE EARLIER THAN THEY HAVE WOULD HAVE BEEN, WE HAVE SOME INCENTIVE PROGRAMS AS WELL. SO THAT'S THE ESSENTIAL STRUCTURE FOR ALL OF THOSE CATEGORIES.

SO THE EMISSION REDUCTIONS THAT WOULD BE ACHIEVED THROUGH THIS PROGRAM ARE OUTLINED HERE. AND I JUST WANT TO SAY FROM NOW TO 2031 THE EMISSION REDUCTIONS FROM OUR CURRENT PROGRAMS -- AND WE HAVE A LOT OF CURRENT REGULATION CURRENT PROGRAMS GOING FORWARD. -- AND THE NEW MEASURES AND THE STATE SIP ACHIEVE WHAT'S IN THE PERCENTAGES IN THOSE BOXES. SO LIGHT DUTY, 93 PERCENT; AND HEAVY DUTY, 88 PERCENT BETWEEN NOW AND 2031. IN THE

BARS FOR EACH CATEGORY, THE DARK BLUE IS FOR REGULATORY ACTIONS, AND THEY'RE AT THE CORE OF THE STRATEGY. AND THAT GIVES YOU THE PERCENTAGE OF REGULATORY ACTIONS GOING FORWARD. AND THEN THE LIGHT BLUE IS FOR THAT LAST INCREMENT GETTING THE INCENTIVE PROGRAMS OUT THERE. THE PERCENTAGES ARE FOR THE FULL AMOUNT OF REDUCTIONS WE WOULD GET BOTH FROM EXISTING PROGRAM AND THE NEW MEASURES GOING FORWARD.

ONE THING I WANTED TO MENTION ABOUT THESE MEASURES IS THAT EACH OF THESE MEASURES WILL ALSO GO THROUGH THEIR OWN PUBLIC PLANNING STRUCTURES. THEY'LL ALL HAVE WORKSHOPS AND THE PUBLIC DEVELOPMENT OF THOSE MEASURES, WHETHER THE REGULATIONS OR IMPLEMENTATION PROGRAMS OR INCENTIVE PROGRAMS, WHATEVER THEY WILL BE GOING THROUGH, WILL BE THEIR OWN PROCESS AS WELL.

AND THEN MOVING FORWARD, SO I MENTIONED THAT WE HAD PUT OUT A PLAN IN MAY. WE'RE GOING TO PUT OUT A REVISED STRATEGY BY DECEMBER VERY, VERY SOON HERE. IT WILL INCLUDE SOME INVENTORY UPDATES AND SOME MODELING UPDATES, SOME UPDATES TO THAT IMPLEMENTATION SCHEDULE WHEN WE WOULD ADOPT AND PUT IN PLACE ALL THE MEASURES. AND LET'S SEE. I HAD SPECIFIED SOME EMISSION REDUCTIONS FOR THE SAN JOAQUIN VALLEY IN ADDITION TO THE SOUTH COAST AND THEN REFLECT THE FUNDING PLAN THAT WAS MENTIONED EARLIER. AND THEN IN RESPONSE TO SOME OF OUR PUBLIC

COMMENTS AND INPUT THAT WE RECEIVED ON OUR MEASURES THROUGH WORKSHOPS, THROUGH BOARD HEARINGS, AND PUBLIC COMMENT PERIOD, WE'LL BE WORKING ON SOME OF THE MEASURES. THERE WILL BE SOME CHANGES TO MEASURES AS WELL.

AND I WANTED TO MENTION -- I MENTIONED MOBILE SOURCE FUELS. I ALSO WANTED TO MENTION THERE IS CONSUMER PRODUCTS RESPONSIBLE FOR REDUCTIONS, AND THERE IS A CONSUMER PRODUCTS MEASURES FROM THAT PLAN. AND THEN ONCE WE PUT OUT THIS DRAFT, WE'LL BE HEARING IT. WE'LL BRING IT AGAIN TO OUR BOARD, THE AIR RESOURCES BOARD, ALONG WITH THE AQMP. AND WHEN WE CONSIDER BOTH OF THEM TOGETHER, THEY GO TOGETHER IN A PACKAGE THAT'S THE ATTAINMENT DEMONSTRATION FOR THE AREA AND SEND IT ONTO EPA UPON APPROVAL BY THE AIR RESOURCES BOARD.

AND THEN JUST SOME CONTACT INFORMATION. I'M THE PERSON IN THE MIDDLE. YOU CAN CONTACT ANY OF US FOR FURTHER INFORMATION ON THE STATE STRATEGY OR ARB'S PARTICIPATION IN THE PROCESS FOR THE SOUTH COAST.

DR. FINE: THANK YOU, CAROL.

SO IN OUR FINAL PRESENTATION DR. GHOSH WILL TALK ABOUT OUR APPENDIX 1, THE HEALTH IMPACTS FOR AIR QUALITY.

DR. GHOSH: SO GOOD AFTERNOON. LET ME GO AHEAD AND GET STARTED HERE. SO APPENDIX 1 AS PHIL MENTIONED IS THE HEALTH AND SAFETY APPENDIX. THIS IS SOMETHING THAT IS PREPARED WITH EACH AQMP. IT IS ORGANIZED -- AS IN

PREVIOUS AQMP APPENDIX 1 DOCUMENTS, IT'S ORGANIZED FIRST BY CRITERIA POLLUTANTS, SO OZONE, PARTICULATE MATTER, AND SO ON. AND WE ALSO HAVE A SECTION ON TOXIC AIR CONTAMINANTS. SO FOR EACH OF THESE POLLUTANTS OR GROUP OF POLLUTANTS, WE PRESENT A SUMMARY OF THOSE HEALTH EFFECTS ASSOCIATED WITH EACH OF THESE POLLUTANTS.

NOW, ONE OF THE THINGS I DID WANT TO MENTION, YOU KNOW, IS HERE WE ARE NOT DOING A SYSTEMATIC REVIEW OR ANALYSIS. THIS IS REALLY A VERY BRIEF SUMMARY OF THE HEALTH EFFECTS PRIMARILY DRAWING ON SCIENTIFIC ASSESSMENTS AND REVIEWS CONDUCTED BY U.S. EPA AND OTHER SCIENTIFIC AGENCIES.

NOW, RECOGNIZING THAT THE EPA REVIEWS DON'T COME OUT EVERY YEAR FOR EVERY POLLUTANT, SO, FOR EXAMPLE, OZONE WAS LAST REVIEWED IN 2013, PM WAS LAST REVIEWED IN 2009, WE RECOGNIZE THERE'S A LOT OF SCIENCE THAT HAS HAPPENED SINCE THE LATEST REVIEW DOCUMENT. SO WE CONDUCTED A SUPPLEMENTAL LITERATURE REVIEW TO LOOK FOR THE MORE RECENTLY PUBLISHED STUDIES.

I DID WANT TO TAKE A MOMENT TO MENTION SOME OF THE LEGAL REQUIREMENTS. SO WE -- BY CALIFORNIA HEALTH AND SAFETY CODE WE ARE REQUIRED TO HAVE A REPORT -- TO PRODUCE A REPORT ABOUT THE HEALTH IMPACTS OF PARTICULATE MATTER IN THE SOUTH COAST AIR BASIN. THE REQUIREMENT IS SPECIFIC TO PARTICULATE MATTER, BUT ALTHOUGH IN THE

APPENDIX 1 WE DO ALSO INCLUDE THE HEALTH EFFECTS OF OTHER POLLUTANTS AS WELL. THERE IS A LEGAL REQUIREMENT THAT WE PREPARE THIS REPORT IN CONJUNCTION WITH A PUBLIC HEALTH AGENCY, AND IN THIS INSTANCE WE PREPARED IT WITH THE CALIFORNIA OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT OR OEHHA. AND, OF COURSE, WE ALSO PREPARED THIS REPORT IN CONSULTATION WITH THE AIR RESOURCES BOARD.

ANOTHER ONE OF THE REQUIREMENTS FROM THE HEALTH AND SAFETY CODE IS THAT AN ADVISORY COUNCIL REVIEW AND PROVIDE INPUT AND DISCUSSION ON THE PM REPORT. BUT, AGAIN, SIMILARLY, WE DON'T JUST GIVE THEM THE PM REPORT. WE GIVE THEM THE APPENDIX 1. MEMBERSHIP IN THE ADVISORY COUNCIL IS CHOSEN BY OUR GOVERNING BOARD AND BY OUR ADVISORY GROUPS. IT WAS CONVENED IN AUGUST OF 2016. AND I APOLOGIZE. IN THE PRINT VERSION OF THESE HANDOUTS THERE'S A TYPO. IT SHOULD SAY AUGUST 2016 NOT 2015. BUT THESE SLIDES ARE AVAILABLE ON OUR WEBSITE. SO AT THE TIME THE MEMBERS REVIEWED AND WE DISCUSSED, WE TOOK MINUTES OF THAT MEETING AS WELL, AND WE ARE USING THOSE MINUTES IN THE REVISION TO APPENDIX 1. AND, AGAIN, THE PM SECTION WITHIN APPENDIX 1 IS WHAT SATISFIES THIS CALIFORNIA HEALTH AND SAFETY CODE REQUIREMENT.

THE DRAFT APPENDIX 1 WAS RELEASED IN JULY OF 2016 BECAUSE TO THE ADVISORY COUNCIL MEMBERS AS WELL AS TO THE PUBLIC. IT IS AVAILABLE ON OUR WEBSITE. AND WE

ARE CURRENTLY WORKING ON OUR REVISION, WHICH I'LL TALK A LITTLE BIT ABOUT IN OUR SUBSEQUENT SLIDES.

JUST A REAL QUICK OVERVIEW OF APPENDIX 1. AGAIN, THE PURPOSE IN ADDITION TO SATISFYING LEGAL REQUIREMENTS REALLY THE PURPOSE IS TO PROVIDE A BRIEF OVERVIEW OF THE EFFECTS OF THE DIFFERENT AIR POLLUTANTS AND ALSO TO DESCRIBE HEALTH IMPACTS OF PARTICULATE MATTER IN THE REGION. WE DO PLACE A GREATER EMPHASIS ON THE SECTIONS FOR OZONE AND PARTICULATE MATTER. AGAIN, BECAUSE THESE ARE THE POLLUTANTS WHERE WE ARE IN NONATTAINMENT. THE OTHER POLLUTANTS ARE DISCUSSED IN LESS DETAIL. AND FOR THE OZONE AND PM SECTIONS WE DO GET INTO A LITTLE MORE DETAIL ABOUT SOME SPECIFIC STUDIES THAT MAY BE OF INTEREST TO THE READERS.

THERE IS A VERY LARGE BODY OF SCIENTIFIC EVIDENCE THAT SHOWS THE ADVERSE IMPACTS OF AIR POLLUTION INTO HUMAN HEALTH. THERE ARE DIFFERENT KINDS OF STUDIES THAT ARE INCLUDED IN THIS U.S. EPA REVIEW. AND THESE ARE OFTEN TOXICOLOGICAL STUDIES, OFTEN ANIMAL CELL STUDIES, EPIDEMIOLOGICAL STUDIES, SO STUDIES OF HUMAN POPULATIONS, AND ALSO HUMAN EXPERIMENTATION STUDIES, SO LABORATORY STUDIES ON HUMAN SUBJECTS.

RECENTLY THERE'S BEEN INTEREST IN WHETHER THERE'S CERTAIN POPULATIONS THAT MAY BE MORE SENSITIVE TO THE IMPACT OF AIR POLLUTANTS COMPARED TO OTHER PEOPLE.

AND THIS MAYBE INCLUDES OFTEN TIMES YOUNG CHILDREN OR THE ELDERLY. THERE ARE CERTAIN GENETIC FACTORS AS WELL THAT MAYBE COULD MAKE A PERSON MORE SENSITIVE TO THE EFFECTS. CERTAIN HEALTH CONDITIONS, FOR EXAMPLE, PEOPLE WHO HAVE ASTHMA OR OTHER RESPIRATORY CONDITIONS OR HEART DISEASE. AND THERE'S CERTAINLY A LARGE BODY OF LITERATURE WHETHER SOCIOECONOMIC STATUS MAY ALSO INFLUENCE A PERSON'S SENSITIVITY TO THE AIR POLLUTION.

A COUPLE OF KEY CHANGES THAT WE TRIED TO MAKE IN THIS YEAR'S VERSION OF APPENDIX 1 IS REALLY CLARIFYING THE PURPOSE OF THIS DOCUMENT BASICALLY AS STATED HERE AND ALSO CLARIFYING THE METHODS THAT WE USE AND PUT THIS DOCUMENT TOGETHER, WHERE THE INFORMATION COMES FROM, AND SO ON. WE ALSO TRIED TO MOVE TO A MORE STANDARDIZED WAY OF PRESENTING EACH SECTION. I THINK IT WAS NOTED FROM SOME REVIEWERS THAT THE DOCUMENT WOULD BE -- IT WOULD JUST BE EASIER TO READ IF IT WAS PRESENTED CONSISTENTLY IN EACH SECTION FOR EACH POLLUTANT. SO WE REALLY TRIED TO STANDARDIZE THE PRESENTATION THAT WAY.

WITHIN THE STANDARDIZATION ONE OF THE THINGS WE TRIED TO DO IS PRESENT A TABLE SUCH AS THIS FOR EACH OF THE POLLUTANTS, FOR EACH OF THE CRITERIA POLLUTANTS. SO THIS TABLE IS BASED ON THE INTEGRATED SCIENCE ASSESSMENT FROM U.S. EPA. THIS TABLE IS FOR PM2.5. AND, AGAIN, THE MOST RECENT ISA WAS DONE IN 2009. AND HERE WE PRESENT

SHORT-TERM EXPOSURE EFFECTS AND LONG-TERM EXPOSURE EFFECTS AND DIFFERENT CATEGORIES OF HEALTH OUTCOMES. AND, FOR EXAMPLE, THE HEALTH OUTCOME CATEGORIES INCLUDE CARDIOVASCULAR EFFECTS, RESPIRATORY EFFECTS, MORTALITY, REPRODUCTIVE EFFECTS, AND CARCINOGENIC EFFECTS. AND I DO WANT TO NOTE THAT THESE CATEGORIES ARE NOT MEANT TO BE MUTUALLY EXCLUSIVE. FOR EXAMPLE, A LOT OF THE STUDIES ON MORTALITY LOOK AT CAUSE SPECIFIC MORTALITY, FOR EXAMPLE, MORTALITY FROM CARDIOVASCULAR DISEASE, MORTALITY FROM RESPIRATORY DISEASES, AND SO ON.

THE U.S. EPA USES A WEIGHT OF EVIDENCE APPROACH. IN OTHER WORDS, THEY LOOK AT THE DIFFERENT KINDS OF STUDIES, TOXICOLOGICAL, EPIDEMIOLOGICAL, AND SO ON, AND LOOK FOR CONSISTENCY, LOOK FOR WHETHER THE EFFECTS THAT WERE SEEN FROM ONE STUDY WERE ALSO REPRODUCIBLE IN ANOTHER STUDY, PERHAPS CONDUCTED IN A DIFFERENT AREA, DIFFERENT POPULATION. THEY ALSO ASSESS DIFFERENT LINES OF EVIDENCE AND LOOK FOR COHERENCE ACROSS THE DIFFERENT SCIENCES EVALUATING THE SAME EXPOSURE AND OUTCOME.

SO THEY COME UP WITH CAUSAL DETERMINATIONS. SO THE HIGHEST CATEGORY OF CAUSAL DETERMINATION IS CAUSAL RELATIONSHIP. IN OTHER WORDS EXPOSURE CAUSES THIS EFFECT. THE NEXT CATEGORY DOWN IS CALLED LIKELY TO BE A CAUSAL RELATIONSHIP. SO THESE ARE BOTH PRETTY HIGH ON THE CAUSAL DETERMINATION SCALE. AND THEN FURTHER DOWN ON

THE SCALE IS CALLED SUGGESTIVE OF A CAUSAL RELATIONSHIP. AND IT GOES DOWN FURTHER DOWN, INADEQUATE AND THEN NOT CAUSAL. SO HERE FOR PM2.5 YOU CAN SEE THE STRONGEST RELATIONSHIPS ARE FOR CARDIOVASCULAR EFFECTS AND MORTALITY WITH ALSO A LIKELY CAUSAL RELATIONSHIP WITH RESPIRATORY EFFECTS.

THIS IS THE SAME TABLE BUT FOR OZONE. AGAIN, OZONE WAS REVIEWED IN 2013. AND ALSO LOOKING AT SHORT-TERM AND LONG-TERM EFFECTS HERE AND, AGAIN, FOR OZONE THE STRONGEST EFFECTS WERE RESPIRATORY EFFECTS, BUT THE CAUSAL RELATIONSHIP WITH SHORT-TERM EXPOSURE AND A LIKELY CAUSAL RELATIONSHIP WITH LONG-TERM EXPOSURE. SOME OF THESE OTHER CATEGORIES ARE ALSO LIKELY CAUSAL RIGHT HERE FOR SHORT-TERM EXPOSURES.

WE DID RECEIVE 25 COMMENT LETTERS ON APPENDIX 1 INCLUDING COMMENT LETTERS FROM MEMBERS OF THE ADVISORY COUNCIL AS WELL AS MEMBERS OF THE PUBLIC. WE ARE CURRENTLY WORKING ON ADDRESSING ALL THOSE COMMENTS IN THE REVISED DRAFT DOCUMENT. AND I'M JUST TRYING TO SUMMARIZE SOME OF THE MAIN POINTS THAT WERE BROUGHT TO OUR ATTENTION IN THESE COMMENT LETTERS RECEIVED.

I ALSO TRIED TO GROUP THEM BY CATEGORY. SO STARTING WITH THE INTRODUCTION-TYPE SECTION, THERE WAS SOME QUESTIONS ABOUT THE PURPOSES OF THE DOCUMENT AND WHAT WAS THE ROLE OF AQMD, ARE WE ASSESSING THE SCIENCE

OR ARE WE SUMMARIZING THE SCIENCE AS ASSESSED BY OTHERS. IN THE TOXIC SECTION THERE WAS A REQUEST TO HAVE A BIT MORE OF A DISCUSSION ON VOC'S, VOLATILE ORGANIC COMPOUNDS, SO WE DID ADD A SECTION WITHIN TOXICS, LIKE A SUBSECTION WITHIN TOXICS TO TALK ABOUT THE HEALTH IMPACTS OF VOC'S. WITHIN TOXICS WE ALSO TALK A LOT ABOUT HEALTH IMPACTS ABOUT DIESEL PARTICULATE MATTER. AND WE ADDED A BIT OF DISCUSSION ON THE ADVANCED COLLABORATIVE EMISSION STUDY, ACES STUDY, REGARDING THE IMPACTS OF DIESEL PARTICULATE MATTER AS WELL.

IN THE OZONE AND THE PM SECTION, WE DID SOME REORGANIZATION TO REALLY FOCUS THE DISCUSSION ON THE HEALTH OUTCOMES THAT WERE HIGH ON THE CAUSAL DETERMINATION SCALE. SO THESE ARE CAUSAL OR LIKELY CAUSAL. AND WE ALSO EXPANDED THE DISCUSSION OF THE SENSITIVE POPULATION AND, AGAIN, TRIED TO STANDARDIZE THAT. SO THEY WERE PRETTY CONSISTENT ACROSS THOSE TWO SECTIONS.

FOR THE PM SECTION, ADDITIONALLY, WE -- IN THE PREVIOUS VERSION WE ALREADY HAD A DISCUSSION ON ULTRA FINE PARTICLES. BUT THERE'S CERTAINLY BEEN A LOT OF SCIENCE RECENTLY ON HEALTH IMPACTS OF ULTRA FINE PARTICLES. THIS WAS MOVED TO BE WITHIN THE PM SECTION WHICH MAKES A LITTLE BIT MORE SENSE. AND WE ALSO CLARIFIED THE SUMMARY SECTION AND CREATED A SECTION

CALLED "ESTIMATES OF THE HEALTH BURDENS OF PARTICULATE MATTER IN THE SOUTH COAST AIR BASIN. SO IN THAT PARTICULAR SECTION WE PRESENT ESTIMATES OF MORTALITY AND MORBIDITY NUMBERS. SO, FOR EXAMPLE, WE USE THE ANALYSIS DONE BY THE AIR RESOURCES BOARD LOOKING AT PM2.5 AND CARDIOPULMONARY DEATHS. THEY DID THE ANALYSIS FOR THE ENTIRE STATE AND ALSO SPLIT IT UP BY AIR BASIN. FOR THE SOUTH COAST THE ESTIMATE WAS ABOUT 4,000 CARDIOPULMONARY DEATHS PER YEAR IN THE SOUTH COAST AIR BASIN ATTRIBUTABLE TO PM2.5 LEVELS ABOVE BACKGROUND LEVELS WITH AN ESTIMATE OF BACKGROUND IN THAT ANALYSIS OF 5.8 MICROGRAMS PER CUBIC METER. NOW, IT IS IMPORTANT TO KNOW THAT 5.8 MICROGRAMS PER CUBIC METER IS NOT WHAT WE'RE AIMING FOR IN THIS PLAN OR TO ATTAIN THE FEDERAL AND STATE STANDARDS HERE. SO THE ANALYSIS OF THE IMPACTS OF THE PLAN ARE ACTUALLY PRESENTED IN THE SOCIOECONOMIC REPORT. SO YOU'LL SEE BECAUSE OF THE ANALYSIS IS DIFFERENT AND THE PURPOSE OF THAT ANALYSIS IS DIFFERENT THE NUMBERS ARE GOING TO BE A BIT DIFFERENT AS WELL.

IN ADDITION, SOME OF THE OTHER COMMENTS THAT WE RECEIVED ON APPENDIX 1 WAS SOME CONCERN THAT SOME PEOPLE THINK THERE IS NO HEALTH RISK ASSOCIATED WITH PARTICULATE MATTER IN CALIFORNIA. AND, AGAIN, YOU KNOW, JUST TO REEMPHASIZE, WE ARE JUST SUMMARIZING THE CAUSAL DETERMINATIONS FROM EPA AND ALSO PRESENTING SOME

SUMMARIES OF SOME KEY STUDIES, PARTICULARLY THOSE THAT ARE CONDUCTED IN CALIFORNIA OR SOUTHERN CALIFORNIA.

WE RECEIVED A COMMENT ABOUT WHETHER THE STUDIES OF PM ADDRESSED THE POTENTIAL CONFOUNDED BY SMOKING, WHETHER IT WAS SMOKING OR AIR POLLUTION CAUSING THESE EFFECTS. SO WE CERTAINLY ADDED A LOT OF CLARIFICATION ABOUT WHETHER THESE STUDIES ADDRESSED CONFOUNDING BY SMOKING AND HOW THAT WAS ADDRESSED IN EACH OF THOSE STUDIES. WE ALSO HAD A COMMENT -- RECEIVED A COMMENT ABOUT DISCUSSING THE HEALTH EFFECTS OF ODORS. AND THIS WAS SOMETHING THAT WAS NOT PREVIOUSLY INCLUDED IN THIS APPENDIX, BUT WE ARE WORKING TO WRITE UP A BRIEF DISCUSSION ABOUT HEALTH EFFECTS OF ODORS AS WELL.

THIS IS MY CONTACT INFORMATION. CERTAINLY FEEL FREE TO CONTACT ME IF YOU HAVE ANY QUESTIONS.

DR. FINE: THANK YOU, JO KAY. I THINK WE'RE READY FOR PUBLIC COMMENT. I HAVE FOUR CARDS. IF ANYONE ELSE WOULD LIKE TO MAKE A COMMENT, WE HAVE CARDS UP FRONT. PLEASE COME AND GET ONE. I WILL NOTE ONE MORE TIME THAT WE ARE TAKING A TRANSCRIPT, AND WE'LL BE TRANSCRIBING THAT AND IT WILL BE PROVIDED TO OUR BOARD MEMBERS. SO ANYTHING YOU SAY HERE WILL BE ON THE ADMINISTRATIVE RECORD FOR THE ADOPTION OF THE AQMP. SO IF ANYONE WAS AT PREVIOUS MEETINGS, WHAT YOU HAD SAID IS ALREADY ON THAT ALREADY ON THAT TRANSCRIPT.

ALL RIGHT. SO WE'LL START WITH LEA PETERSON.

MS. PETERSON: GOOD AFTERNOON. YOU ALREADY HEARD ME EARLIER THIS MORNING, SO I'M GOING TO KEEP MY REMARKS BRIEF. SOUTHERN CALIFORNIA GAS COMPANY APPRECIATES THE OPPORTUNITY TO PROVIDE COMMENTS ON THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICTS REVISED DRAFT OF THEIR AIR QUALITY MANAGEMENT PLAN. SO CAL GAS STRONGLY SUPPORTS SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT'S EFFORT TO ATTAIN FEDERAL CLEAN AIR ACT STANDARDS. THE ATTAINMENT OF OZONE AND FINE PARTICULATE MATTER STANDARDS ARE VITALLY IMPORTANT TO OUR COMPANY IN THOSE COMMUNITIES WHERE SOUTHERN CALIFORNIA GAS OPERATES AND PROVIDES SERVICES.

FOR THOSE IN THE AUDIENCE WHO ARE NOT FAMILIAR WITH SO CAL GAS, WE HAVE 22 MILLION CUSTOMERS AND WE OPERATE IN OVER 500 COMMUNITIES. SO WE CONTINUE TO OFFER SUPPORT, EXPERTISE, AND PARTNERSHIP WITH THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT TO CREATE A TECHNICALLY SOUND FUEL TECHNOLOGY NEUTRAL AQMP THAT WILL PROTECT PUBLIC HEALTH BY DEMONSTRATING TIMELY ATTAINMENT OF THE FEDERAL CLEAN AIR ACT STANDARDS WHILE ALSO SUSTAINING VITALITY OF THE SOUTHERN CALIFORNIA ECONOMY. FOLLOWING ADOPTION OF THE PLAN, WE LOOK FORWARD TO CONTINUING TO COLLABORATE WITH SOUTH COAST AIR QUALITY MANAGEMENT ON THE IMPLEMENTATION OF THE CONTROL MEASURES, EFFORTS TO

SECURE INCENTIVE FUNDING, AND THE DEVELOPMENT OF INCENTIVE PROGRAMS.

SO WE RESPECTFULLY SUBMIT THESE COMMENTS AND THANK YOU VERY MUCH FOR THE TIME TO SPEAK TO YOU.

DR. FINE: THANK YOU, LEA.

NEXT IS ANDREW TORRES.

MS. TORRES: IT'S ALISON TORRES.

DR. FINE: I ALSO HAVE AN ANDREW TORRES.

NO RELATION I TAKE IT.

MR. TORRES: I'M A CONCERNED CITIZEN, AND I'M WORRIED ABOUT THE IMPACT TO BUSINESSES HERE AND HOW THESE REGULATIONS MIGHT PREVENT GOOD-PAYING JOBS IN THE INLAND EMPIRE. THE GENTLEMAN WHO PRESENTED IN THE BEGINNING SAID YOU LIKE TO PUSH THE ENVELOPE. YEAH, WE ALREADY HAVE SOME OF THE MOST STRINGENT LAWS AND PROGRAMS ON AIR POLLUTION IN THE NATIONS. ALL WE HAVE PUSHED IS BUSINESSES AND JOBS AWAY. CALIFORNIA NOW RANKS 50TH IN ALL STATES -- THAT'S LAST. -- FOR PLACES TO OPEN A BUSINESS.

PLEASE CONSIDER THIS BEFORE CREATING NEW REGULATIONS. THANK YOU.

DR. FINE: NEXT IS JOSHUA.

MR. NASTRI: I THINK HE TESTIFIED EARLIER TODAY.

DR. FINE: I THINK WE GOT HIS COMMENTS EARLIER AND HE LEFT.

ALISON.

MS. TORRES: THANK YOU. SORRY ABOUT THAT. GOOD AFTERNOON. MY NAME IS ALISON TORRES. I'M FROM THE EASTERN MUNICIPAL WATER DISTRICT. I JUST WANT TO SAY FIRST WE APPRECIATE THE AQMD'S EFFORT IN THE AQMP AND RECOGNIZE THE CHALLENGES FACED TO MEET THE OZONE STANDARDS.

SOME CONCERNS THAT WE HAVE AS MENTIONED IN THE PRESENTATION STATIONARY SOURCES ALONE DO NOT ATTAIN THOSE STANDARDS AND MOBILE SOURCES IS A HUGE PORTION OF THAT. AS SUCH STATIONARY SOURCES, THEY'RE ALREADY HIGHLY REGULATED. AND THAT SMALL SLIVER THERE FROM NEW REGULATIONS CAN CAUSE SIGNIFICANT IMPACTS TO OUR SERVICES. PARTICULARLY EMW IS CONCERNED WITH THE ENGINE REPLACEMENT IN VIEW ONE WITH REGARD TO DIESEL BACK-UP GENERATORS AND OUR ESSENTIAL SERVICES. THEIR RELIABILITY AND FUEL DEPENDENCE OF THE ALTERNATIVE TECHNOLOGIES DISCUSSED IN THOSE MEASURES THAT COULD POTENTIALLY REPLACE THESE ENGINES WILL GREATLY JEOPARDIZE ARE ABILITY TO PROVIDE PUBLIC SERVICES DURING EXTREME EMERGENCIES.

AS A PUBLIC AGENCY, IT'S CRITICAL THAT WE'RE PREPARED FOR WHEN A SIGNIFICANT EMERGENCY OCCURS AND THAT PUBLIC HEALTH IS NOT COMPROMISED DURING AN EXTREME EMERGENCY. IT'S WHEN THAT'S GOING TO HAPPEN, NOT IF IT'S GOING TO HAPPEN. SO WE ASK THAT IN THE AQMP AND FUTURE

RULE MAKING THAT THE IMPORTANCE FOR EXEMPTIONS FOR ESSENTIAL PUBLIC SERVICES WITH REGARD TO THESE REPLACEMENTS AND RETROFITS OF STAND-BY GENERATORS ARE RECOGNIZED.

IN ADDITION, WITH REGARD TO BIOGAS DISCUSSIONS IN THE MEASURES, WE APPRECIATE THE ADDED DISCUSSION RELATED TO INCENTIVE FUNDING FOR BIOGAS PROJECTS. AND OUR AGENCY WILL PARTICIPATE IN ANY FUTURE WORKING GROUPS. HOWEVER, WE DO NOT BELIEVE THAT BIOGAS TECHNOLOGIES ARE TRULY COMMERCIALLY AVAILABLE, RELIABLE, OR COST EFFECTIVE YET. AND WITH THAT BEING SAID, WE REQUEST THAT REDUCTIONS FROM THESE PROJECTS ARE NOT SPECIFICALLY INCLUDED IN THE AQMP. WE GENERATE BIOGAS AT OUR FACILITIES, AND WE DO STRIVE TO UTILIZE THIS RESOURCE AND CONTINUE RESEARCHING AND TESTING COST-EFFECTIVE SOLUTIONS. HOWEVER, THROUGH EXPERIENCE, TECHNOLOGY SOMETIMES OFTEN LOOKS PROMISING, BUT THEY DON'T ALWAYS PERFORM AS EXPECTED.

LASTLY, ALONG THE LINES OF BIOGAS IN PARTICULAR WITH FLARES, THERE'S A MEASURE RELATED TO FLARES. AND AT OUR AGENCY WE UTILIZE THESE FLARES FOR EMERGENCY BACK-UP. SO WE'RE CONCERNED THAT THE INVENTORY FROM THE WASTE WATER SECTOR IS NOT ACCURATELY PORTRAYED IN CMB03 SINCE IT'S LUMPED WITH OTHER CATEGORIES. SO CONSIDERING THAT WASTE WATER FLARES ARE NOT A SOURCE OF NOX, WE WOULD REQUEST THAT THE WASTE WATER SECTOR BE EXCLUDED.

WE THANK YOU FOR YOUR CONSIDERATION. AND WE ALSO DID SUBMIT A COMMENT LETTER.

DR. FINE: THANK YOU. AND JUST TO RESPOND TO ONE OF YOUR POINTS IN TERMS OF THE DIESEL BACK-UP GENERATORS. WE FULLY UNDERSTAND THAT THERE'S MANY APPLICATIONS, ESSENTIAL PUBLIC SERVICES OR EMERGENCY APPLICATIONS, WHERE IT IS ESSENTIALLY THAT OPERATIONS CAN CONTINUE OVER VERY LONG TIME PERIOD OF POWER DISRUPTION OR EVEN FULL SUPPLY DISRUPTION. BUT THERE ARE OTHER APPLICATIONS THAT WE'RE LOOKING AT, SAY, JUST A LARGE COMMERCIAL BUILDING THAT ALSO HAS A DIESEL BACK-UP GENERATOR THAT MAYBE IS ONLY TRY TO GET THROUGH A FEW MINUTES OF A POWER DISRUPTION OR DOESN'T HAVE A NEED TO RUN FOR THREE OR FOUR DAYS IF THERE IS ACTUALLY A REGIONAL EMERGENCY. WE'RE PUTTING OUR EFFORTS INTO THAT, AND FULLY RECOGNIZE WHEN WE GET INTO RULE MAKING THE TECHNOLOGY ASSESSMENTS THAT THERE WILL BE SECTORS THAT WILL NEED SPECIAL CONSIDERATION TO BE ABLE TO OPERATE DURING A REAL EMERGENCY.

MS. TORRES: WE APPRECIATE THAT. THANK YOU.

DR. FINE: I THINK THAT'S IT IN TERMS OF COMMENTS. ANYONE ELSE LIKE TO MAKE A COMMENT?

OKAY. WELL, STAFF WILL BE HERE FOR A FEW MINUTES AFTER IF YOU WANT TO COME UP AND HAVE A PRIVATE DISCUSSION OR HAVE ANY MORE QUESTIONS. BUT, AGAIN, I

THANK YOU FOR COMING. STAY INVOLVED IN THE PROCESS. WE'LL BE RELEASING NEW DRAFTS OVER THE COMING WEEKS AND LOOK FORWARD TO ALL YOUR COMMENTS ON THOSE AS WELL. THANK YOU.

(END OF PUBLIC HEARING.)

160 S. OLD SPRINGS ROAD, SUITE 270, ANAHEIM, CA 92808
PHONE: 714.444.4100 FAX: 714.444.4411 EMAIL: DEPO@DEPO1.COM

BEFORE THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

IN RE THE MATTER OF:	)
	)
PUBLIC HEARING:	)
	)
SCAQMD 2016 AIR QUALITY MANAGEMENT PLAN	)
	)
	)
	)

DATE AND TIME:	THURSDAY, NOVEMBER 17, 2016 9:00 A.M.
PLACE:	NORTON EVENTS CENTER 1601 EAST 3RD STREET SAN BERNARDINO, CALIFORNIA 92408
REPORTER:	KRISTIN RIVERA, CSR CERTIFICATE NO. 11858
BRS FILE NO.:	99072

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SAN BERNARDINO, CALIFORNIA; THURSDAY, NOVEMBER 17, 2016

9:00 A.M.

MR. NASTRI: GOOD MORNING. WE'RE HERE THIS MORNING TO TALK ABOUT OUR REVISED DRAFT AIR QUALITY MANAGEMENT PLAN. AND HERE TODAY TO START US OFF IS MAYOR LARRY MC CALLON, ONE OF OUR GOVERNING BOARD MEMBERS.

MAYOR MC CALLON: THANK YOU VERY MUCH, WAYNE. WELCOME EVERYONE. I'M GLAD TO SEE ALL OF YOU HERE. SO MANY FAMILIAR FACES. I WISH THERE WERE MORE. THEY'RE STRAGGLING IN, I GUESS.

WELL, AS YOU SAID, I'M THE MAYOR OF HIGHLAND, AND I REPRESENT 16 CITIES OF SAN BERNARDINO COUNTY ON THE AIR QUALITY MANAGEMENT DISTRICT BOARD PLUS I'M A MEMBER OF THE SOUTH COAST AIR QUALITY -- I MEAN THE SOUTHERN ASSOCIATION OF GOVERNMENT REPRESENTING HIGHLAND AND SAN BERNARDINO. AND I'M ALSO ON THE MOBILE SOURCE BOARD REPRESENTING SANBAG.

I GUESS I'VE BEEN CALLED TO OPEN THIS PUBLIC MEETING AS TO AIR QUALITY MANAGEMENT PLAN OR AQMP TO GIVE US SOME CONTEXT AS TO THE PROPOSED PLAN THAT WAS PREPARED IN A JOINT EFFORT WITH THE U.S. EPA AT THE FEDERAL LEVEL, THE AIR RESOURCES BOARD AT THE STATE LEVEL, AND SCAG, SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS. WE ALSO HAD AN EXTENSIVE OUTREACH TO STAKEHOLDERS THROUGHOUT THE

REGION AND SOLICITED INPUT THEM FROM INCLUDING OUR STATE AND LOCAL GOVERNMENT BODIES, BUSINESSES AND TRADE ASSOCIATIONS AND RESEARCHERS AND ENVIRONMENTAL HEALTH AND COMMUNITY ORGANIZATIONS. THE PROPOSED PLAN WE'RE SEEING TODAY INCORPORATES POLLUTION CONTROL MEASURES THAT REFLECT THE FULL RANGE OF THE RESPONSE AS WELL AS ALSO ADDRESSING REQUIREMENTS OF STATE AND FEDERAL LAW. AT ITS CORE, THE AIM OF THIS PROPOSED PLAN IS TO ENSURE THAT WE ATTAIN AIR QUALITY STANDARDS BY THE VAST APPROACHING DEADLINES SO THAT OUR REGION WILL NOT HAVE FEDERAL SANCTIONS PUT ON US FOR NOT MEETING OUR OBLIGATIONS IN THE CLEAN AIR ACT. IN PARTICULAR, THIS PLAN HAS DEMONSTRATED BY THE NUMBERS HOW WE'RE GOING TO MEET STANDARDS FOR OZONE AND FINE PARTICULATE IN A TIMELY MANNER.

ALTHOUGH OUR REGIONAL AIR QUALITY HAS DRAMATICALLY IMPROVED IN RECENT DECADES, WE STILL HAVE THE HIGHEST LEVELS OF AIR POLLUTION IN THE COUNTRY. SO THERE ARE TWO POINTS I WANT TO MAKE. FIRST THIS PROPOSED AQMP CONTAINS THE NEXT ROUND OF POLLUTION CONTROL FOR BOTH STATION AND MOBILE EMISSION SOURCES AS WE'VE HAD IN PAST VERSIONS OF THE PLAN. BUT THE PROPOSED PLAN ALSO REFLECTS THE REALITY THAT 88 PERCENT OF OUR REMAINING SMOG EMISSIONS COME FROM MOBILE SOURCES, AND OUR AIR DISTRICT HAS LIMITED AUTHORITY ON THOSE SOURCES. WITHOUT

SIGNIFICANT AND TIMELY REDUCTIONS OF MOBILE SOURCE EMISSIONS, WE CANNOT REACH ATTAINMENT OF FEDERAL CLEAN AIR STANDARDS.

SO AS YOU'LL HEAR, THE PLAN LOOKS TO OUR STATE AND FEDERAL PARTNERS TO DO THEIR FAIR SHARE OF POLLUTION CLEAN-UP AND ASSIST US IN ACQUIRING FINANCIAL RESOURCES TO DO THE JOB. SECOND, I ALSO WANT TO EMPHASIZE THAT THIS HAS BEEN A VERY TRANSPARENT AND INTERACTIVE POLICY-MAKING PROCESS. PUBLIC MEETINGS HAVE BEEN HELD THROUGHOUT THE DEVELOPMENT PROCESS, ALL THE PLANNING ANALYSES HAVE BEEN DOCUMENTED FOR THE PUBLIC RECORD, ALL THE MEETING PRESENTATIONS AND MINUTES ARE AVAILABLE ON LINE. THE MEETINGS FROM THE DIAMOND BAR HEADQUARTERS WERE WEB CAST LIVE AND ARCHIVED SO YOU CAN VIEW THEM ONLINE. YOU CAN ALSO USE GOOGLE TO LOOK UP THE 2016 AQMP COMMENT LETTERS AND READ THE ORIGINALS OF THE COMMENT LETTERS WE RECEIVED.

AS A GOVERNING BOARD MEMBER, MY GOAL TO STRIKE A POSITIVE BALANCE AMONG OUR REGION'S ENVIRONMENTAL PUBLIC HEALTH AND BEING ECONOMIC NEEDS. WE WANT TO ARRIVE AT THE MOST EFFICIENT AND COST-EFFECTIVE PATH TO ACHIEVE MULTIPLE TARGETS. SO TODAY WE'LL BE LISTENING TO YOUR FEEDBACK ON THOSE ASPECTS OF THE PLAN. WE'RE IN A CRITICAL TIME IN INFRASTRUCTURE FOR ECONOMIC GROWTH IN THIS REGION. HOW WELL WE WORK TOGETHER TO DO THAT WILL

AFFECT OUR COMMUNITIES AND OUR FAMILIES FOR MANY YEARS TO COME. THERE'S A LOT AT STAKE IN ARRIVING AT AN EFFECTIVE, LEGALLY APPROVABLE AQMP, BUT WE BELIEVE WE'RE UP TO THE TASK WHEN WE LISTEN AND WE LEARN FROM EACH OTHER.

SO THANK YOU AGAIN FOR COMING. AND AFTER THE PRESENTATION, WE'RE HERE TO LISTEN TO YOUR THOUGHTS ABOUT THIS REVISED PLAN.

THANK YOU, WAYNE.

MR. NASTRI: THANKS, MAYOR. LEADING OUR DISCUSSION TODAY ON THE AIR QUALITY MANAGEMENT PLAN IS DR. PHIL FINE, OUR DEPUTY EXECUTIVE OFFICER.

DR. FINE: THANK YOU, WAYNE, MAYOR. A LITTLE BIT OF HOUSEKEEPING. IF YOU WALKED IN, YOU'VE PROBABLY SEEN THE BATHROOMS OUT IN THE HALLWAY TO THE LEFT OUT THIS DOOR HERE. THE EXITS ARE AT ALL FOUR CORNERS HERE. SO IF THERE'S AN EMERGENCY, WE MAY ASK YOU TO EVACUATE THE ROOM OR SHELTER IN PLACE. AND PLEASE SILENCE YOUR CELL PHONE OR PUT THEM ON VIBRATE SO WE'RE NOT INTERRUPTED IN THE PRESENTATION FOR TAKING PUBLIC COMMENT.

I ALSO WANT TO TALK ABOUT THE AGENDA A LITTLE BIT. WE'RE DOING THIS IN THREE PARTS. I WILL KICK IT OFF WITH A GENERAL OVERVIEW OF THE AIR QUALITY MANAGEMENT PLAN. WE ARE ALSO JOINED TODAY BY OUR COLLEAGUE CAROL

SUTKUS FROM CALIFORNIA AIR RESOURCES BOARD. AND AS YOU'LL HEAR, THERE IS A CRITICAL ROLE OF THE AIR RESOURCES BOARD IN THE DEVELOPMENT OF THESE PLANS. AND THEN FINALLY OUR HEALTH EFFECTS OFFICER, DR. GHOSH WILL TALK ABOUT THE HEALTH EFFECTS OF AIR POLLUTION IN OUR BASIN. THIS IS A PUBLIC HEARING ON THAT PORTION OF THE PLAN AS REQUIRED BY THE HEALTH AND SAFETY CODE.

BEFORE WE GET STARTED, I WANT TO MENTION SOME NAMES AND MENTION EVERYONE UP HERE. ON THE END WE HAVE BILL WONG, WHO IS FROM OUR GENERAL COUNSEL'S OFFICE TO HELP WITH THE PLAN DEVELOPMENT. SO WITH THAT, I'LL GET STARTED ON THE FIRST PRESENTATION.

SO AS YOU'VE HEARD AND PROBABLY KNOW ESPECIALLY LIVING OUT IN THE INLAND EMPIRE WE'VE HAD SIGNIFICANT IMPROVEMENTS IN AIR QUALITY NOT JUST IN THE PAST COUPLE DECADES, BUT OVER THE PAST FIVE OR SIX DECADES. AIR POLLUTION USED TO HAVE OVER A HUNDRED DAYS A YEAR THAT WERE STAGE 1 OR STAGE 2. SMOG ALERTS WE DON'T HAVE ANY MORE. BUT AS THE MAYOR HAS SAID, WE STILL HAVE THE WORST OZONE POLLUTION IN THE COUNTRY AND PROBABLY THE SECOND WORST PARTICULATE MATTER POLLUTION IN THE COUNTRY. THE SAN JOAQUIN VALLEY IN CENTRAL CALIFORNIA HAS THE WORST AIR POLLUTION AND THE SECOND WORST OZONE. SO BETWEEN SOUTHERN CALIFORNIA AND NORTHERN CALIFORNIA WE HAVE BY FAR THE GREATEST AIR QUALITY CHALLENGES IN THE COUNTRY AS

A WHOLE. BUT, AGAIN, WE HAVE MADE GREAT IMPROVEMENTS, BUT THERE'S A LONG WAY TO GO.

SO JUST BY WAY OF BACKGROUND, FIRST LET ME MENTION THAT THIS IS A PUBLIC HEARING SO WE ARE TAKING TRANSCRIPTS TODAY, AND THESE TRANSCRIPTS WILL BE PROVIDED TO ALL GOVERNING BOARD MEMBERS. AND SO ALL THE COMMENTS YOU MAKE TODAY WILL GO INTO THE DECISION-MAKING PROCESS OF THE ADOPTION OF THE AQMP.

SO JUST BY WAY OF BACKGROUND, AND MANY OF YOU KNOW THIS, THE WAY THE REASON WE DEVELOP THESE PLANS IS REQUIRED BY THE FEDERAL LAW AS WELL AS STATE LAW. SO UNDER THE CLEAN AIR ACT, THE U.S. EPA SETS NATIONAL AMBIENT AIR QUALITY STANDARDS, THEN THEY LOOK AT ALL THE DATA WE COLLECTED ON ALL THE MONITORING STATIONS THROUGHOUT OUR AREA. AND IF YOU DON'T MEET THOSE STANDARDS, YOU'RE DESIGNATED AS NONATTAINMENT OF THOSE STANDARDS. WHAT HAPPENS THEN IS IT KICKS IN A WHOLE SERIES OF REQUIREMENTS BUT ALSO PLANNING REQUIREMENTS IN TERMS OF HOW YOU'RE GOING TO MEET THOSE STANDARDS. SO WHAT THIS AIR QUALITY MANAGEMENT PLAN IS IS OUR LIMITATION PLAN UNDER THE FEDERAL CLEAN AIR ACT FOR OUR AREA TO MEET THOSE STANDARDS. IT'S A BLUEPRINT FOR WHAT MEASURES ARE WE GOING TO TAKE AND WHAT ACTIONS WE'RE GOING TO TAKE TO REDUCE EMISSIONS TO IMPROVE AIR QUALITY STANDARDS.

SO WE'VE BEEN DOING THIS FOR MANY YEARS SINCE THE BEGINNING OF THE AQMD IN THE LATE '70S. THIS IS OUR 11TH PLAN THAT WE'LL BE SUBMITTING TO EPA FOR APPROVAL. STATE LAW ALSO REQUIRES PERIODIC UPDATES TO OUR AIR QUALITY MANAGEMENT PLAN AS WELL.

SO THE TWO POLLUTANTS WE FOCUS ON ARE PARTICULATE MATTER OR WHAT WE CALL PM2.5 AND OZONE. AND THESE ARE THE TWO POLLUTANTS UNDER THE FEDERAL CLEAN AIR ACT THAT WE STILL DO NOT ATTAIN THE STANDARDS. AND CURRENTLY THERE'S FIVE STANDARDS ON THE BOOKS FOR WHICH WE DON'T ATTAIN; TWO PM2.5 STANDARDS, ONE AN ANNUAL STANDARD, ONE A DAILY STANDARD; AND THREE DIFFERENT OZONE STANDARDS WHICH WE DO NOT ATTAIN. SO WHAT WE TRY TO DO IN THIS PLANNING PROCESS IS TO INTEGRATE OUR PLANNING SO WE CAN HAVE ONE STRATEGY TO MEET ALL THE STANDARDS. THIS IS THE MOST EFFICIENT PATH RATHER THAN HAVING A SEPARATE STRATEGY MAINLY FOR -- THERE'S INEFFICIENT ACTIONS AND MEASURES AND WE WANT TO MAKE SURE WE HAVE A PLAN TO MEET ALL THE STANDARDS AS THE DEADLINES COME UP.

SO YOU CAN SEE THE DEADLINES THAT WE HAVE HERE. SO THE 2022, 2019, AND THE 2031 IS THE FURTHEST ONE OUT. AND WE ALSO HAVE NEW DATES FOR THE SUBMITTAL OF THIS PLAN. YOU'LL NOTICE THAT WE'RE A LITTLE BIT LATE ON A COUPLE OF THESE. HOWEVER, WE HAVE BEEN TALKING TO CARB, WE'VE BEEN TALKING TO EPA. THE CONSEQUENCES OF BEING A

LITTLE BIT LATE ARE NOT SEVERE AND LESS IMPORTANT THAN GETTING THE PLAN RIGHT AND HAVING A FULL PUBLIC PROCESS AND GETTING INPUTS FOR DEVELOPMENT OF THE PLAN. I'LL TALK ABOUT THE SCHEDULE A LITTLE BIT LATER.

SO THE BIGGEST CHALLENGE WE HAVE IS REDUCING EMISSION OF NITROGEN OXIDE OR NOX. AND NOX IS EMITTED FROM ANY TYPE OF COMBUSTION PROCESS, WHETHER IT'S IN YOUR CAR ENGINE OR TRUCK ENGINE OR IT'S A NATURAL GAS OVEN OR INDUSTRIAL FACILITY OVEN OR PROCESS HEATERS OR ALL THE WAY DOWN TO YOUR HOT WATER HEATER, SPACE HEATER, AT YOUR HOUSE. SO ANY COMBUSTION PROCESS WHERE YOU'RE BURNING ANY TYPE OF FUEL PRODUCES NOX. AND THIS IS OUR BIGGEST CHALLENGE. IF WE CAN REDUCE NOX, WE WILL NOT MEET OUR OZONE STANDARDS, WHICH IS OUR BIGGEST CHALLENGE, WE WILL ALSO MEET THE PM2.5 STANDARDS.

SO YOU KIND OF BOIL DOWN OUR CHALLENGES TO THIS ONE SLOT. WHAT YOU SEE HERE IN THE BLUE BARS IS THE NOX EMISSIONS THAT OCCURRED IN 2012 AND THE PROJECTED NOX EMISSIONS THAT WILL OCCUR ALL THE WAY TO 2031. THE REASON THE BLUE BARS GET SMALLER IS THAT THERE'S ALREADY ADOPTED RULES AND REGULATIONS IMPLEMENTED AT THE LOCAL LEVEL ON STATIONARY SOURCES AND AT THE STATE AND FEDERAL LEVEL FOR MOBILE SOURCES THAT WILL CONTINUE TO REDUCE EMISSIONS GOING FORWARD TO RESULT IN AIR POLLUTION BENEFITS AND GAINS.

THE ISSUE IS THAT THE BLUE BARS DON'T GET LOW ENOUGH FAST ENOUGH IN ORDER TO MEET THE STANDARD DEADLINES OF THE CLEAN AIR ACT. SO WE HAVE THESE DEADLINES IN 2022, 2023, AND 2031, AND WE NEED TO GET THE NOX EMISSIONS DOWN FROM WHERE THE BLUE BARS DOWN TO WHERE THE RED BARS ARE. SO THAT REPRESENTS 43-PERCENT REDUCTION BY 2023 AND 55-PERCENT REDUCTION BY 2031. BUT AS I MENTIONED, THIS IS ONLY SIX OR SEVEN YEARS AWAY. SO THIS IS REALLY WHAT'S DRIVING THE BULK OF THE PLAN BECAUSE IF WE CAN GET DOWN TO THIS LEVEL WE'LL OBVIOUSLY ALREADY -- WE'LL PROBABLY MEET THAT 2022 STANDARD IN TIME AND IT WILL MAKE IT EASIER TO MEET THE SIX YEARS, SIX TO SEVEN YEARS, OUT IN 2023 IS THE MOST CHALLENGING TARGET THAT WE HAVE IN TERMS OF NOX REDUCTIONS. AND THE AIR QUALITY BENEFITS AND HEATH BENEFITS WILL GO ALONG WITH MEETING THAT STANDARD. SORRY ABOUT THIS SLIDE. LAST TIME WE WERE HERE WE HAD THE SAME ISSUE.

AND THIS SLIDE IS TRYING TO SHOW YOU THE SAME THING MAYOR MC CALLON MENTIONED IS THAT SMALL YELLOW SLIVER THERE IS THE EMISSIONS IN 2012 OF NOX FOR STATIONARY SOURCES, TWELVE PERCENT; WHILE 88 PERCENT OF THE EMISSIONS COME FROM MOBILE SOURCES. SO THE CHALLENGE FOR THE AGENCY THAT HAS PRIMARY AUTHORITY OVER STATIONARY SOURCES WE DON'T HAVE AUTHORITY FOR THE MAJORITY OF THE SOURCES THAT ARE LEADING TO THE NONATTAINMENT PROBLEM.

WHEN WE LOOK AT THE OVERALL PLAN STRATEGY -- AND I'M NOT GOING INTO A LOT OF DETAIL MEASURE BY MEASURE. WE JUST DON'T HAVE A ENOUGH TIME. IT'S A VERY COMPLEX DOCUMENT. WHEN YOU LOOK AT THE OVERALL STRATEGY AND WHERE THE EMISSION REDUCTIONS ARE COMING FROM OUR PLAN IN ORDER TO MEET THE STANDARDS, YOU CAN SEE IN ORDER TO MEET THE 2023 STANDARDS WE NEED 400 TONS PER DAY OF NOX REDUCTIONS AND THEN BY 2031 A LITTLE BIT MORE. BUT WHERE THESE REDUCTIONS ARE COMING FROM ARE MOSTLY FROM ALREADY EXISTING REGULATIONS. THAT'S ABOUT 70 PERCENT THAT BIG BLUE SQUARE THERE. AND THAT IS EXACTLY THE SAME REASON THOSE BLUE BARS ARE SHRINKING IN THE PREVIOUS SLIDE IS THAT ALREADY ADOPTED RULES AND REGULATIONS ARE GOING TO GIVE ABOUT 70 PERCENT OF THE REDUCTIONS. SO THIS IS A REGULATORY PLAN. WE'VE PASSED SOME TOUGH AND VERY STRINGENT REGULATIONS UP TO THIS POINT, AND THAT IS GETTING THE BULK OF THE EMISSION REDUCTIONS TO MEET THE STANDARDS.

AS IN EVERY PLAN, WE BUILD UPON THAT. WE DO THESE PLANS EVERY THREE OR FOUR YEARS. WE LOOK AT WHAT TECHNOLOGY ALLOWS US TO DO IN TERMS OF FEASIBILITY OF CONTROL OPTIONS, COST, ALL THOSE THINGS. AND IN ADDITIONS TO THAT, WE HAVE ADDITIONAL MEASURES. THESE ARE THE ADDITIONAL MEASURES IN THIS PLAN. THERE'S NEW REGULATIONS PROPOSED, AND IT DOES LOOK LIKE A SMALL

SLIVER THERE, BUT IT IS ABOUT THE SAME LEVEL OF ADDITIONAL REGULATIONS THAT WE HAVE PROPOSED IN THE LAST THREE OR FOUR PLANS. WE DID EVERYTHING WE COULD IN THE 2012 PLAN. FOUR YEARS LATER THERE'S A FEW MORE OPTIONS AVAILABLE TO US, BUT IT'S ANOTHER, YOU KNOW, EIGHT TO TEN TONS PER DAY, BUT IT'S VERY SIMILAR TO THE PREVIOUS PLANS.

WE ALSO NEED REDUCTIONS IN FEDERAL SOURCES. WHAT WE MEAN BY FEDERAL SOURCES IS THERE ARE FEDERAL SOURCES SUCH AS TRAINS AND SHIPS, INTERSTATE TRUCKS THAT -- AND AIRCRAFT THAT ARE BEYOND THE PURVIEW OF THE STATE TO CONTROL UNDER THE CLEAN AIR ACT AND OTHER LAWS. SO WE NEED COMMENSURATE REDUCTIONS IN THOSE SOURCES AND THAT WILL BECOME THE BIGGER PIECE OF THE PIE. SO THE STATE PLAN, WHICH WE'LL HEAR ABOUT IN A MOMENT, INCLUDES REDUCTIONS, NEEDED REDUCTIONS, IN THE FEDERAL SOURCES. AND, OF COURSE, WE'RE WORKING WITH EPA ON THAT.

AND THE REMAINING PIECE HERE, THE GREEN BAR, IS ONCE THESE REGULATIONS DO GET PASSED ON THE MOBILE SOURCES AND STATIONARY SOURCES, WE NEED TO ACCELERATE DEPLOYMENT OF THIS CLEAN AIR TECHNOLOGY. AND YOU COULD ONLY GO SO FAR WITH REGULATIONS. WHAT YOU NEED TO DO IS INCENTIVIZE THAT RAPID DEPLOYMENT OF THAT CLEAN AIR TECHNOLOGY. SO WHAT YOU'LL HEAR ABOUT IN THE PLAN AND HAVE HEARD ABOUT IN THE PLAN IS A VERY SIGNIFICANT

INCENTIVE PROGRAM TO ACCELERATE FLEET TURNOVER IN ALL SECTORS.

AS YOU GO FURTHER IN THE FUTURE, OBVIOUSLY WE HAVE MORE REGULATORY REDUCTIONS BECAUSE WE HAVE TIME TO IMPLEMENT. AND WE HAVE LESS INCENTIVE VENTURES BECAUSE REGULATIONS WILL TAKE CARE OF A LARGER FRACTION AS THIS REGULATION WILL HAVE THE ADVANTAGE OF REGULATIONS DRIVING FLEET TURNOVER OVER A LONGER PERIOD OF TIME.

BUT AS I MENTIONED, WE'RE ONLY 88 PERCENT FROM THE NOX EMISSIONS FROM MOBILE SOURCES, AND WE HAVE LIMITED AUTHORITY THERE. AND SO OUR PLAN CANNOT BE A LOCAL PLAN. WE'LL HAVE TO INTEGRATE MEASURES AND REDUCTIONS AT STATE LEVEL. CARB HAS RELEASED A DRAFT STATEWIDE SIP STRATEGY OR PLANNING STRATEGY OR PLANNING STRATEGY INCLUDING FEDERAL SOURCE REDUCTIONS. SO YOU'LL HEAR A LITTLE BIT MORE ABOUT THAT FROM THE AIR RESOURCES BOARD.

JUST TO FOCUS ON THE STATIONARY SOURCE STRATEGY FOR A MOMENT, AS WE DO IN EVERY PLAN, THIS IS WHERE WE START. WE CLEARLY EVALUATE ALL THE DIFFERENT SOURCE CATEGORIES, AND THERE'S HUNDREDS OF SOURCE CATEGORIES ON STATIONARY SOURCES. WE LOOK AT WHERE THE EMISSIONS ARE COMING FROM, WE LOOK AT WHERE THE OPPORTUNITIES ARE, AND WHERE TECHNOLOGY HAS ADVANCED TO HAVE FEASIBLE REDUCTIONS. WE'RE ALSO REQUIRED TO LOOK AT ALL THE OTHER

REGULATIONS THAT ARE PASSED THROUGHOUT THE COUNTRY AND THROUGHOUT THE STATE AND MAKE SURE ALL OUR RULES AND REGULATIONS ARE STRINGENT AS THOSE. TYPICALLY WE DO HAVE THE MOST STRINGENT REGULATIONS IN SOUTH COAST GIVEN OUR AIR QUALITY CHALLENGES. BUT FROM TIME TO TIME, WE'LL FIND SLIGHT DIFFERENCES IN ANOTHER AREA.

AND THEN WE HAVE A FULL PUBLIC PROCESS. WE WENT THROUGH A SERIES OF LIGHT PAPERS, WORKING GROUPS. WE HAD A TECHNOLOGIES SYMPOSIUM, AND WE'VE HAD AQMD ADVISORY GROUP MEETINGS FOR THE PAST SEVERAL YEARS THAT HAVE GONE OVER SPECIFIC MEASURES AND TECHNOLOGIES THAT ARE AVAILABLE TO US. AT THE END OF THE DAY WHAT WE LOOK AT WHAT THE REGULATORY OPTIONS ARE, THERE ARE SOME. AND WE FOCUSING ON THE -- WE THINK THERE ARE SOME OPPORTUNITIES FOR REDUCTION IN NON-REFINERY FLARING. WE THING THERE'S OPPORTUNITIES FOR COMMERCIAL COOKING OPERATIONS IN TERMS OF NOX CONTROLS. RIGHT NOW THERE IS NO CONTROLS OR NO STANDARDS AT ALL FOR ANY COOKING OPERATIONS IN COMMERCIAL ESTABLISHMENTS OR RESIDENTIAL HOMES, AND THERE ARE SOME -- THERE'S EQUIPMENT OUT THERE THAT'S ALREADY LOW NOX, AND WE NEED TO FIND A WAY TO ENCOURAGE THAT.

WE HAVE PROPOSED FURTHER REDUCTIONS FROM OUR LARGEST INDUSTRIAL SOURCES. ABOUT 270 OF OUR LARGEST NOX SOURCES COME IN UNDER WHAT WE CALL OUR RECLAIM PROGRAM WHICH IS OUR NOX EMISSION CAP AND TRADE-IN PROGRAM. WE

JUST ADOPTED LAST YEAR A 45-PERCENT REDUCTION IN NOX EMISSIONS FROM THOSE SOURCES, AND WE'RE PROPOSING ANOTHER 35 PERCENT ON TOP OF THAT IN THIS PLAN. WE'RE ALSO LOOKING AT THE COMMERCIAL AND RESIDENTIAL APPLIANCES AND EQUIPMENT. THERE'S SOME OPPORTUNITIES FOR LOW NOX OR ZERO-EMISSION EQUIPMENT THERE AND ALTERNATIVES TO DIESEL BACK-UP GENERATORS. THERE HAVE BEEN ADVANCEMENTS IN POWER SUPPLIES AND BATTERY TECHNOLOGIES AND OTHER TECHNOLOGIES THAT MIGHT MAKE SOME APPLICATIONS OF DIESEL BACK-UP GENERATORS LOW NOX.

BUT AS I MENTIONED BEFORE, THE ONLY 12 PERCENT -- IF WE TOOK ALL OUR STATIONARY SOURCES TO ZERO EMISSIONS TOMORROW, WE WOULD STILL NOT MEET ATTAINMENT STANDARDS. WE WOULD STILL NOT HAVE A PLAN. WE WOULD NOT BE HALFWAY TOWARDS ATTAINMENT UNLESS WE GET EMISSION REDUCTIONS FROM THE MOBILE SOURCES.

I MENTIONED WE DO HAVE LIMITED AUTHORITY OVER MOBILE SOURCES. AND THAT LIMITED AUTHORITY COMES UNDER THE FEDERAL CLEAN AIR ACT AND THE STATE CLEAN AIR ACT, AND IT'S CALLED WHAT WE CALL INDIRECT SOURCE AUTHORITY RULES. AND UNDER STATE LAW WE HAVE SOME AUTHORITY OVER FLEETS. SO WE DO HAVE RULES ON THAT, ON THE FLEETS, IN TERMS OF ISR. WE DO HAVE SOME AUTHORITY. INDIRECT SOURCES ARE LISTED HERE THAT ARE STATIONARY. THEY'RE FACILITIES THAT ATTRACT MOBILE SOURCES THAT LEAD TO

VEHICLE MILES TRAVELED ON THE ROAD BECAUSE MOBILE SOURCES ARE ATTRACTED OR IT CAN BE CONSTRUCTION EQUIPMENT. WE'RE TALKING ABOUT DEVELOPMENT OF PROJECTS.

SO THESE ARE VERY CONTROVERSIAL AUTHORITY, SO WE'RE PLANNING TO TAKE AN APPROACH THAT WORKS IN COLLABORATION WITH THESE FACILITIES AND SEE IF WE CAN SIT DOWN AND FIND ENFORCEABLE MECHANISMS IN ORDER TO BRING ABOUT EMISSION REDUCTIONS IN THESE AREAS. MANY OF THESE FACILITIES HAVE ALREADY GONE THROUGH -- HAVE ALREADY TAKEN ACTION AND REDUCED EMISSIONS. BUT UNTIL WE CAN FIND A WAY TO MAKE IT ENFORCEABLE UNDER FEDERAL LAW, WE WON'T GET CREDIT FOR THOSE UNDER SIP, THEREFORE, WE WOULD HAVE TO DO SOMETHING ELSE TO FIND EMISSION REDUCTIONS ELSEWHERE.

A GOOD EXAMPLE OF THIS IS THE PORTS WHO WORKED SEVERAL YEARS AGO WITH AIR QUALITY AGENCIES AT ALL LEVELS TO DEVELOP A CLEAN AIR ACTION PLAN TO BE ABLE TO ACHIEVE SIGNIFICANT EMISSION REDUCTIONS WITH THE TRUCK PROGRAM AND OTHER PROGRAMS WITHOUT POTENTIAL OVERREGULATION THAT FORCES IT. THERE'S A SYSTEM THAT WILL MAKE THAT ENFORCEABLE UNDER THE CLEAN AIR ACT. THERE ARE SOME GOOD IDEAS. SO OUR PLAN IS TO START THE WORKING GROUPS AND TO START MEETING WITH THESE FACILITIES AND LOOKING AT THE ACTION THAT HAS BEEN TAKEN. AND AT THE END OF THE DAY IF IT TURNS OUT WE CAN IDENTIFY OTHER MECHANISMS THAT WILL

WORK UNDER THE CLEAN AIR ACT TO GET CREDIT FOR THESE EMISSION REDUCTIONS, THEN THAT'S GREAT. BUT IF WE CAN'T DO THAT OR THE COLLABORATIVE PROCESS IS NOT IDENTIFYING PATHWAYS FORWARD, THEN WE DO HAVE THIS REGULATORY AUTHORITY, AND WE CAN MOVE TO DO THAT VERY QUICKLY. SO WE'LL START THE PROCESS. WE'RE GOING TO START IT VERY SOON EARLIER NEXT YEAR TO TRY TO STRUCTURE SOME WAY TO MAKE THESE WORK UNDER THE CLEAN AIR ACT.

SO THIS IS -- WHAT WE'RE TALKING ABOUT TODAY IS THE REVISED DRAFT. WE RELEASED THE DRAFT IN JUNE AND WE RECEIVED ABOUT 69 COMMENT LETTERS. AND THEN BASED ON THOSE COMMENT LETTERS AND MANY, MANY MEETINGS, WE CAME OUT WITH THE REVISED DRAFT IN EARLY OCTOBER. I JUST WANT TO HIGHLIGHT SOME OF THE CHANGES THAT WERE MADE IN THIS REVISED DRAFT. BECAUSE EARLIER THIS YEAR WE WERE IN THE SAME VENUE TALKING ABOUT THE DRAFT.

SO ONE THING ABOUT IT IS PRIORITIZING AND MAXIMIZING EMISSION REDUCTIONS FROM ZERO-EMISSION TECHNOLOGY, BUT WHERE IT'S COST EFFECTIVE AND FEASIBLE BUT THEN LOOKING AT NEAR ZERO OR ULTRA LOW NOX TECHNOLOGY WHERE IT'S NOT FEASIBLE. WHEN WE TALK ABOUT ZERO AND NEAR ZERO EMISSION TECHNOLOGY, WHAT WE NEED TO DO IS REALLY LOOK AT THE FULL LIFE CYCLE ANALYSIS OF WHERE THE FUEL IS COMING FROM WHETHER IT'S ELECTRICITY OR NATURAL GAS OR EMISSION LOSSES AND THE FULL NOX EMISSION

POTENTIAL IN THE BASIN OF THESE DIFFERENT TECHNOLOGIES ALSO LOOKING AT GREENHOUSE GAS EMISSION REDUCTIONS MAKING SURE WE DON'T HAVE ANY UNWANTED TRADE OFFS.

SO WHAT WE PLAN TO DO IS ENGAGE IN A FULL ASSESSMENT OF ALL THESE DIFFERENT TYPES OF TECHNOLOGIES ESPECIALLY IN THE RESIDENTIAL, COMMERCIAL SECTORS TO SEE WHICH TECHNOLOGIES ACTUALLY NEED TO HAVE REDUCTION OF NOT ONLY NOX EMISSIONS, BUT GREENHOUSE GAS EMISSIONS. SO WE'LL BE LAUNCHING AN ANALYSIS. WE'LL DO A PUBLIC PROCESS AND WORKING GROUP VERY SOON FOR THAT.

WE ALSO HAD COMMENTS AND ADDED REGULATORY MEASURES TO THE PLAN. WE HAD A LOT OF INCENTIVE MEASURES ON THE STATIONARY SOURCE SIDE LOOKING ON HOW TO INCENTIVIZE THE REPLACEMENT OF DIESEL BACK-UP GENERATORS, THE ISR ENGINES, INTERNAL COMBUSTION ENGINES, RESIDENTIAL/COMMERCIAL APPLIANCES. BUT WE DID GET COMMENTS AND DID FIND SOME OPPORTUNITIES IN THE LONG TERM. THIS INCLUDED REGULATING THESE SAME TYPES OF EQUIPMENT IN THE PAST THAT, YOU KNOW, IN THE NEXT 10 YEARS, 15 YEARS, IS PASS BASED ON THE ASSESSMENT OF ADDITIONAL NOX EMISSION REDUCTIONS WE DO THINK GOING FORWARD IN THE LONGER TERM. AND THEN ONCE THOSE REGULATIONS ARE SET, THEN WE CAN USE INCENTIVES TO ACCELERATE THE PLAN WITH THESE NEW TECHNOLOGIES.

WE HAVE ALSO TALKED A LITTLE MORE SERIOUSLY

ABOUT THE RECLAIM PROGRAM. WE ARE PROPOSING TO COMMITTING TO ANOTHER 5 TONS PER DAY AT 14 TONS PER DAY IN THAT PROGRAM. THAT'S 35-PERCENT ADDITIONAL REDUCTIONS. AND WE'RE SERIOUSLY CONSIDERING ONE PATHWAY TO ACHIEVE, AND THAT WOULD ACTUALLY BE LOOKING AT THE SUNSET PROGRAM TURNING THE TRADITIONAL COMMAND CONTROL. SO THAT'S ANOTHER ASSESSMENT THAT WE'LL BE LAUNCHING VERY EARLY NEXT YEAR TO SEE THE BEST PATH FORWARD IN TERMS OF ACHIEVING THOSE REDUCTIONS. AND CURRENT THINK IS THAT THE SUNSET PROGRAM MAY BE THE MOST ORDERLY WAY AND COST EFFECT WAY TO DO THAT.

WE ADDED SOME CLARITY AND CERTAINTY ON OUR ISR AND FLEET RULES. WE ADDED A TIME LINE, AS I MENTIONED, TO COME BACK AND REPORT TO THE BOARD ON RECOMMENDATIONS WHETHER WE FOUND OTHER ENFORCEABLE MECHANISMS OR WE NEED TO CONSIDER REGULATIONS. AND THEN OBVIOUSLY WE DO A LOT OF TECHNICAL WORK ON THE PLAN IN TERMS OF EMISSIONS INVENTORY AND CONTINUAL UPDATES ON THAT. AT THIS POINT THEY'RE VERY MINOR UPDATES. ALL THE NUMBERS DO NEED TO ADD UP.

SO WE TALKED ABOUT INCENTIVES. AND WHEN WE'RE TALKING -- WHAT WE'RE DOING WITH INCENTIVES IS WE'RE BASICALLY ACCELERATING THE DEPLOYMENT OF THESE ULTRA LOW EMISSION TECHNOLOGIES OR ZERO-EMISSION TECHNOLOGIES. AND WHEN WE ACCELERATE THE DEPLOYMENT, THERE'S MANY WAYS TO

DO THAT. ISR RULES ARE ONE WAY TO DO IT. REGULATIONS ARE ANOTHER WAY TO DO IT AS TECHNOLOGY ALLOWS. BUT WE ARE LOOKING AT KIND OF WORST CASE SCENARIO. WE NEED INCENTIVES AND FUNDING TO DO, AND THIS IS WHAT WE PRESENTED HERE.

SO FOR THE FIRST TIME IN PREVIOUS PLANS WHEN WE TALKED ABOUT THE ACTIONS NEEDED TO GET TO ATTAINMENT, WE'VE BEEN ABLE TO PUT OFF SOME OF THESE QUESTIONS OF WHAT WE CALL THE BLACK BOX. THESE ARE EMISSION REDUCTIONS THAT WE DON'T KNOW EXACTLY HOW THEY'RE GOING TO OCCUR, BUT WE'RE RELYING ON FUTURE ADVANCEMENT OF TECHNOLOGY TO COME OUT AND THAT WILL ALLOW US TO GET TO ATTAINMENT. BECAUSE AS I MENTIONED, WE'RE ONLY SIX, SEVEN YEARS AWAY FROM THAT FIRST ATTAINMENT DEADLINE. IT'S TOO LATE TO WAIT FOR MAJOR ADVANCEMENT IN TECHNOLOGY.

THE OTHER THING THAT HAS HAPPENED IS THAT TECHNOLOGY HAS ADVANCED OVER THE PAST FIVE YEARS OR SO TO THE POINT WHERE WE CAN ACTUALLY MAP OUT A TECHNOLOGICAL PATHWAY TO ATTAINMENT. WE KNOW HOW MANY TRUCKS WE NEED TO CHANGE OUT AND WHAT STANDARDS THEY WOULD HAVE TO MEET ACROSS ALL THE SECTORS IN ORDER TO GET TO ATTAINMENT NOW. SO WHAT THAT ALLOWS US TO DO IS PUT A PRICE TAG ON THE INCENTIVES THAT WOULD BE REQUIRED TO ACCELERATE THAT DEPLOYMENT IN CONJUNCTION WITH REGULATIONS THAT WILL TAKE

A LONGER TIME TO REALIZE THE BENEFITS.

SO WHEN WE DO THAT CALCULATION, IT COMES OUT TO ROUGHLY ABOUT $14 BILLION A YEAR OVER THE NEXT 15 YEARS, ROUGHLY ABOUT A BILLION DOLLARS A YEAR IN INCENTIVE PROGRAMS, WHICH OBVIOUSLY IS A LARGE NUMBER. BUT THERE ARE CONSEQUENCES TO NOT GETTING TO ATTAINMENT, AND ONE OF THEM IS LOSING FEDERAL TRANSPORTATION FUNDING, WHICH IS APPROXIMATELY 4 TO $6 BILLION A YEAR NOT TO MENTION ALL THE HEATH IMPACTS OF NOT REACHING ATTAINMENT, WHICH I'M GOING TO BE TALKING ABOUT IN A MOMENT. SO A BILLION DOLLARS A YEAR IS A LARGE NUMBER.

WHEN YOU LOOK AT THE AREA, THE SOUTH COAST AREA REGIONAL ECONOMY IS ABOUT A TRILLION DOLLARS A YEAR. WE SPENT ABOUT $20 BILLION A YEAR ON TRANSPORTATION INFRASTRUCTURE, ABOUT $60 BILLION A YEAR ON ENERGY COSTS. SO IT'S JUST A MATTER PRIORITIES AND WHERE SOCIETY WANTS TO SPEND MONEY. IS AIR QUALITY WORTH THAT AMOUNT? THAT'S A QUESTION FOR POLICY MAKERS. AND THEY'LL BE MAKING THOSE DECISIONS IN THE NEXT COMING MONTHS AND YEARS.

IN ADDITION TO THE AQMP, THERE IS RELATED DOCUMENTS. WE DO A FULL ENVIRONMENTAL IMPACT REPORT ON THE PROPOSED AQMP. WE CLOSED COMMENT ON THAT A FEW DAYS AGO AND WE JUST RECEIVED ABOUT EIGHT COMMENT LETTERS.

WE ALSO DO A SOCIOECONOMIC ASSESSMENT OF OUR

PROPOSED MEASURES ON JOBS AND REGIONAL ECONOMY. SO THAT IS ANOTHER DOCUMENT THAT WE RELEASED MOST OF THE CHAPTERS AND HAD ADVISORY GROUP MEETINGS AND COMMITTEE MEETINGS ON THAT. AND YOU CAN FIND ALL THAT ONLINE. WE'RE MAKING CHANGES NOW BASED ON COMMENTS RECEIVED, AND WE'LL BEE RELEASING AN UPDATED VERSION IN THE COMING WEEKS.

COST OF THE PLAN, HEATH BENEFITS OF THE PLAN. IT ALSO LOOKS AT THE IMPACTS ON THE REGIONAL ECONOMY. IT INCLUDES AN ENVIRONMENT JUSTICE ANALYSIS LOOKING AT WHETHER OUR PLAN BENEFITS DISADVANTAGED COMMUNITIES MORE OR LESS THAN NON-DISADVANTAGE COMMUNITIES. IT DOES COME OUT THAT IT DOES BENEFIT DISADVANTAGED COMMUNITIES MORE THAN THE OTHER COMMUNITIES. THE OTHER DOCUMENT WE'RE WORKING ON AND WILL BE RELEASING IN THE COMING WEEKS IS AN ACTION PLAN FOR TRYING TO SECURE THE FUNDING NECESSARY TO IMPLEMENT THE PLAN INCLUDING THE INCENTIVE FUNDING.

SO JUST THE SOCIOECONOMIC ANALYSIS REALLY BRIEFLY. WHEN YOU LOOK AT THE TOTAL COST OF THE PLAN, OVER THIS 15-YEAR PERIOD, IT'S ABOUT $15.5 BILLION COMING TO ABOUT $1.4 BILLION. THIS INCLUDES STATIONARY SOURCE COSTS, $4 BILLION IN THE STATIONARY SOURCE SECTOR AND ABOUT 1.4 BILLION IN INCENTIVES ADDED TO THAT. IT ALSO INCLUDES THE COSTS ON THE MOBILE SOURCE SECTOR, BUT THE MOBILE SOURCE RELIES ON SOME COST SAVINGS IN OUR ANALYSIS BECAUSE IT'S SAVINGS IN FUEL. SO THAT'S A NEGATIVE

NUMBER THERE. AND THEN YOU ALSO SEE THE LARGER AMOUNT OF INCENTIVES ON THE MOBILE SOURCE SIDE TO ACCELERATE THAT DEPLOYMENT. SO AT THE END OF THE DAY IT'S ABOUT $1 AND A HALF BILLION A YEAR IN COST FOR THE REGION TO IMPLEMENT THE PLAN.

WHEN WE LOOK AT PUBLIC HEALTH BENEFITS, WE COULD LOOK TO AVOID PREMATURE DEATHS DUE TO IMPROVEMENT IN AIR QUALITY, AND WE CAN MONETIZE THAT. THAT COMES TO $256 BILLION OVER THAT TIME PERIOD IN THE REGION, WHICH IS ABOUT $24 BILLION A YEAR. THIS WAS LARGELY DRIVEN BY AVOIDING PREMATURE DEATHS FROM EXPOSURE TO PARTICULATE MATTER, BUT THERE ALSO INCLUDES THE BENEFITS FROM LESS LOST WORK DAYS, LESS HOSPITAL VISITS, AND GENERAL IMPROVEMENT IN HEALTH FROM OZONE AND PM AND OTHER AREAS OTHER THAN PREMATURE.

I WILL MENTION IF YOU LOOK AT OUR DOCUMENTATION ONLINE WE HAVE RELEASED OUR REGIONAL ECONOMIC IMPACTS, AND IT HAS -- THERE IS A DOCUMENT PACK ANYWHERE FROM JOBS WERE GONE ABOUT 11,000 PER YEAR TO JOB GAINS ALL THE WAY UP TO 27,000 PER YEAR DEPENDING WHERE THE INCENTIVE FUNDING COMES FROM. BUT ON EITHER SIDE OF THAT IT'S A VERY SMALL NUMBER COMPARED TO THE PROJECTIONS OF THE REGIONAL JOBS. IT'S A VERY SMALL NUMBER COMPARED TO THE TOTAL GROWTH OF THE REGION.

SO WHEN WE LOOK AT THE INCENTIVES, WE ARE

DEVELOPING AN ACTION PLAN FOR INCENTIVES. THEY ARE OUTLINE HERE. WE'RE ALSO LOOKING AT REPORTING BACK TO OUR BOARD ON A FIXED SCHEDULE BUT PROGRESSING WITH FUNDING AND THEN FALLING SHORT ON ALTERNATIVES IN TERMS OF OTHER ACTIONS WE CAN TAKE, OTHER AVENUES WE CAN TAKE IN TERMS OF FUNDING.

WE'VE LOOKED A LOT OF DIFFERENT SOURCES OF FUNDING. EVERYTHING IS ON THE TABLE. NOTHING HAS BEEN DECIDED. WE HAVE LIMITED AUTHORITY TO ENACT SOME OF THESE THINGS. A LOT OF IT IS GOING TO HAVE TO COME FROM STATE LEGISLATURE OR THE FEDERAL GOVERNMENT. WE DO SPEND ABOUT 100 TO $150 MILLION A YEAR NOW IN VERY SIMILAR INCENTIVE PROGRAMS THAT WE WILL NEED FOR THE FUTURE, BUT OBVIOUSLY THAT'S GOING TO GO UP. HERE'S A LIST OF SOME EXISTING FUNDING SOURCES THAT COULD BE EXPANDED AND THEN SOME POTENTIAL NEW SOURCES OF FUNDING THAT WE ARE LOOKING AT.

AND, AGAIN, WE NEED TO LOOK WHO HAS THE AUTHORITY TO ENACT SOME OF THESE REVENUE RAISING ACTIONS. WE WANT TO FORM A WORKING GROUP OF STAKEHOLDERS TO FORM A COALITION HOPEFULLY TO GET SUPPORT FOR GETTING LEGISLATION TO RAISE THE MONEY. NATIONALLY WE'VE ALREADY STARTED FORMING A NATIONAL COLLABORATIVE WITH OTHER STATES WHO HAVE AIR QUALITY ISSUES GOING FORWARD. WE'RE TRYING TO GET SUPPORT AT THE FEDERAL LEVEL AND WE'RE

ALREADY WORKING AT THE STATE LEVEL WITH OUR PARTNERING AIR DISTRICTS AND OTHER PUBLIC AND PRIVATE PARTNERSHIPS.

JUST IN TERMS OF SCHEDULE, I MENTIONED WE RELEASED A DRAFT IN JUNE, A REVISED DRAFT IN OCTOBER. AND PRETTY MUCH ALL THE CHAPTERS AND APPENDICES ARE NOW AVAILABLE ONLINE. ALTHOUGH, WE ARE WORKING ON REVISIONS. WE DID RECEIVE ABOUT 30 COMMENT LETTERS ON THE REVISED DRAFT, SO WE'RE TRYING TO INCORPORATE THAT INTO THE NEXT DRAFT, WHICH WE ARE SCHEDULED FOR RELEASE IN EARLY DECEMBER. WE HAVE ONGOING COMMUNITY ADVISORY GROUP MEETINGS, STAKEHOLDER MEETINGS. UP TO THIS POINT I THINK WE'VE DONE ABOUT 163 PUBLIC MEETINGS OR STAKEHOLDER MEETINGS ON THE AQMP AND SPECIFIC ASPECTS OF THE AQMP.

THIS IS JUST A DEPICTION OF THE SCHEDULE. WE TALKED ABOUT SOME OF THIS, BUT I DO WANT TO HIGHLIGHT WE'RE SCHEDULING A FULL HEARING OF THE AQMP BOARD CONSIDERATION IN FEBRUARY OF NEXT YEAR. THIS IS A WEEK -- A REGIONAL PUBLIC HEARING. SO THIS IS OUR THIRD ONE. ON TUESDAY WE HAD OUR HEARINGS IN L.A. AND ORANGE COUNTY AND THIS AFTERNOON WE'RE GOING TO HAVE OUR REGIONAL HEARING IN RIVERSIDE COUNTY.

IN TERMS OF CONTACT, YOU CAN CONTACT ME, PHIL FINE, OR OUR MANAGER WHO'S LEADING UP THE EFFORT AT THE DISTRICT, MICHAEL KRAUSE. WE ALSO HAVE A WIDE VARIETY OF AQMD STAFF HERE TO TALK ABOUT SPECIFIC ASPECTS OF THE

PLAN, THE CEQA DOCUMENT, THE SOCIOECONOMIC ANALYSIS, OR ANY PARTICULAR MEASURES. AND WE LOOK FORWARD TO EVERYONE'S COMMENTS. BEFORE WE GET TO COMMENTS, WE DO HAVE TWO MORE PRESENTATIONS ON THE PLAN AND ASSOCIATED DOCUMENTS.

SO WITH THAT, I'LL TURN IT OVER TO CAROL SUTKUS FROM THE AIR RESOURCES BOARD TO TALK ABOUT THE STATE SIP STRATEGY.

MS. SUTKUS: OKAY. THANKS. I'M GOING TO GIVE YOU A REALLY BRIEF OVERVIEW OF THE CALIFORNIA STATE SIP STRATEGY. I'M CAROL SUTKUS, AND I'M IN CHARGE OF THE PLAN FOR THE SOUTH PART OF THE STATE FOR THE CLEAN AIR ACT, AND I OVERSAW THE STATE SIP STRATEGY.

SO WHAT IS THE STATE SIP STRATEGY? AS YOU HEARD AND YOU SAW IN THAT PIE CHART, MOBILE SOURCES AND EMISSION REDUCTIONS FROM THOSE MOBILE SOURCES ARE CRITICAL TO THE PLAN GOING FORWARD TO MEET THE AIR QUALITY STANDARDS. SO THIS IS ESSENTIALLY OUR BLUEPRINT OR HOW WE'RE GOING TO GET THERE, HOW WE'RE GOING TO THOSE MOBILE SOURCE SHARE OF THE EMISSION REDUCTIONS THAT THE AIR RESOURCES BOARD IS LOOKING FOR.

IT'S A COMMITMENT TO ACHIEVE EMISSION LEVELS NEEDED FOR ATTAINMENT FOR ALL MOBILE SOURCES. SO WE HAVE TO HAVE FULL COMMITMENT FOR FEDERAL SOURCES AND EVERYTHING IN OUR PLAN. THAT COMMITMENT COMES IN TWO

FORMS. IT'S -- WE HAVE A LIST OF MEASURES IN THE STATE SIP STRATEGY, AND WE COMMIT TO TAKE ACTION ON THOSE MEASURES TO DEVELOP THE REGULATION PROGRAMS, WHATEVER THEY ARE; TAKE ACTIONS ON THOSE; AND BRING THOSE TO OUR GOVERNING BOARD FOR APPROVAL AND ADOPTION. SO WE HAVE A SCHEDULE IN ADDITION TO THAT, AND WE COMMIT TO THAT SCHEDULE AND THEN WE ALSO COMMIT TO AN AGGREGATE AMOUNT ON EMISSION REDUCTIONS IN TOTAL FROM ALL MOBILE SOURCE FUELS AND CONSUMER PRODUCTS AS WELL, SO THAT AGGREGATE EMISSION REDUCTIONS WERE LOOKING FOR. AND WE HAVE KIND OF AN ESTIMATE OF WHAT EACH OF THE MEASURES WILL GET. SOME MEASURES WILL GET MORE. SOME MEASURES WILL GET LESS. AND THEN SINCE WE ALL WORK TOGETHER WITH THE LOCAL MANAGEMENT PLAN, WE ADOPTED AT THE AIR RESOURCES BOARD TOGETHER, AND IT IS THE ATTAINMENT DEMONSTRATION GOING FORWARD TO U.S. EPA. WHEN U.S. EPA ADOPTS IT, IT BECOMES FEDERALLY ENFORCEABLE.

SO MUCH LIKE WAS MENTIONED EARLIER, IT'S A BIG LIST OF MEASURES THAT WE HAVE IN THERE, ACTIVITIES WE NEED TO DO TO ACHIEVE THESE REDUCTIONS. THIS IS KIND OF AN OVERVIEW FOR ALL THE CATEGORIES OF MOBILE SOURCES THAT WE'RE LOOKING AT, WHETHER IT'S ON ROAD, PASSENGER VEHICLES, TRUCKS, OFF-ROAD ENGINES, WHATEVER. WE'RE LOOKING TO HAVE THE CLEANEST ENGINE STANDARDS. AND ONCE WE HAVE THOSE CLEAN AIR STANDARDS, WE WANT TO ENSURE THAT

THEY'RE DURABLE, THAT THEY OPERATE AS CLEAN AS THEY WERE INTENDED TO OPERATE, AND CONTINUE TO DO SO WHILE THEY'RE ON THE ROAD, EXPAND THE USE OF CLEANER FUELS.

SO ONCE WE HAVE THE ENGINES AND THE VEHICLES OPERATING CLEANLY, WE ALSO WANT TO MAKE SURE THEY'RE BURNING THE CLEANEST FUELS. AND THIS ONE WE'RE LOOKING FOR THE CLEANEST TECHNOLOGY POSSIBLE. WE'RE LOOKING FOR NEAR-ZERO REDUCTIONS, BUT WE ALSO WANT TO INCREASE THE PENETRATION OF ZERO-EMISSION TECHNOLOGY WHERE IT MAKES SENSE. AND THERE'S SOME TARGETED TECHNOLOGIES TO DO THAT. AND THEN WE ALSO HAVE PILOT STUDIES. WE HAVE PROGRAMS TO DEMONSTRATE NEW TECHNOLOGIES THAT NEED A LITTLE BIT MORE KICK BEFORE THEY'RE READY TO BE OUT IN THE MARKET. AND THEN, FINALLY, THAT LAST INCREMENT, WE NEED TO GET THESE NEW CLEAN ENGINES AND VEHICLES OUT ON THE ROAD OUT FOR USE SOONER THAN THE ACTUAL TURNOVER. SO WE NEED TO INCENTIVIZE THE DEPLOYMENT OF THOSE NEW TECHNOLOGIES. SO BASICALLY ALL THE MEASURES WE HAVE FALL INTO THESE CATEGORIES.

SO THE EMISSION REDUCTIONS -- WE'LL GET TO THE STRATEGY. THEY COME FROM BOTH THE CURRENT CONTROL PROGRAM, THE REGS WE HAVE IN PLACE, THE PROGRAMS WE HAVE IN PLACE MOVING FORWARD GETTING MORE REDUCTIONS IN THE FUTURE. BY 2031 THESE SQUARES ARE THE PERCENTAGES THERE FOR EACH CATEGORY. THERE'S FEDERAL SOURCES AND

OFF-ROAD EQUIPMENT. THOSE ARE THE PERCENTAGES OF REDUCTIONS WE'RE LOOKING TO GET BETWEEN NOW AND 2031 FOR EACH OF THOSE CATEGORIES. AND I WANTED TO POINT OUT EACH BAR FOR EACH CATEGORY. THE DARK BLUE REPRESENTS THE REGULATORY ACTIONS THAT ARE THE CORE OF THE STRATEGY AND THEN THE LIGHT BLUE IS FOR THAT LAST INCENTIVE PROGRAM TO GET ALL THESE VEHICLES OUT ON THE ROAD. ACROSS THE BOARD WHEN YOU LOOK AT ALL THE CATEGORIES REGULATORY PROGRAMS, ABOUT 80 PERCENT ARE THE REDUCTIONS AND THEN THE REMAINING INCENTIVE-TYPE PROGRAMS WILL BE 20 PERCENT.

SO MOVING FORWARD IN THE STATE SIP STRATEGY, WE'RE COMING OUT WITH A REVISED STRATEGY BY DECEMBER, WHICH IS VERY SOON. WE HAVE -- IN THERE WE HAVE SOME INVENTORY AND MODELING UPDATES WE HAVE FOR THE MEASURES. WE HAVE SOME REDUCTIONS FOR THE SAN JOAQUIN VALLEY THAT HAVEN'T BEEN IN THERE BEFORE. AND THEN ACCORDING TO PUBLIC COMMENTS AND INPUT THAT WE HAVE RECEIVED FROM OUR OWN WORKSHOPS, WORKSHOPS HERE, AND PUBLIC COMMENT PERIODS, WE'LL BE MAKING CHANGES AND ADJUSTMENTS TO SOME OF THE REGULATIONS OR SOME OF THE MEASURES THAT WE HAVE IN THE STRATEGY. AT ONE POINT THERE ALL THE MEASURES IN THE STRATEGY WILL GO THROUGH THEIR OWN PUBLIC PROCESS AS WELL TO START DEVELOPING THEM AND GET THE PLAN IN PLACE. ACTUALLY, WE'RE STARTING SOME OF THEM ALREADY. AND THEN WE WILL CONSIDER THE STATE SIP STRATEGY ALONG WITH THE

AQMP NEXT SPRING. WE'LL BRING ALTOGETHER TO THE BOARD, SEND IT TO EPA, AND THEN EPA DOES ITS APPROVAL.

AND THIS IS JUST ARB CONTACTS INVOLVED IN THE STATE SIP STRATEGY. I'M THE PERSON IN THE MIDDLE. GIVE ME A CALL FOR ANYTHING THAT YOU NEED OR ANY QUESTIONS. AND I THINK THAT WAS IT. I'M SWITCHING IT OVER TO JO KAY.

DR. FINE: I'LL JUST INTRODUCE JO KAY. JOY KAY GHOSH IS OUR HEALTH EFFECTS OFFICER, AND SHE'LL BE TALKING ABOUT THE APPENDIX 1 OF THE AQMP WHICH DESCRIBES THE HEALTH IMPACTS OF AIR POLLUTION IN THE BASIN.

DR. GHOSH: ALL RIGHT. THANK YOU.

SO JUST AS PHIL MENTIONED, APPENDIX 1 IS THE HEALTH EFFECTS APPENDIX. THOSE OF YOU WHO ARE FAMILIAR WITH PREVIOUS VERSION IN PREVIOUS YEARS, THIS APPENDIX IS ORGANIZED IN SECTIONS TYPICALLY BY CRITERIA POLLUTANT FOR OZONE, PARTICULATE MATTER, AND SO ON WITH AN ADDITIONAL SECTION ON TOXIC AIR CONTAMINANTS.

AGAIN, THIS IS A VERY BRIEF SUMMARY OF THE HEALTH EFFECTS. WE ARE NOT CREATING ANY NEW SCIENCE HERE. WE'RE PRIMARILY DRAWING FROM SCIENTIFIC ASSESSMENTS AND REVIEWS CONDUCTED BY OTHER AGENCIES, PRIMARILY U.S. EPA AND OTHER SCIENTIFIC AGENCIES AS WELL.

NOW, RECOGNIZING THAT THE U.S. EPA SCIENTIFIC REVIEWS DON'T COME OUT EVERY YEAR FOR EVERY POLLUTANT,

FOR EXAMPLE, THE MOST RECENT ASSESSMENT OF OZONE WAS DONE IN 2013. THE MOST RECENT ASSESSMENT OF PARTICULATE MATTER WAS CONDUCTED IN 2009. SO THERE'S A LOT OF SCIENCE THAT HAS HAPPENED SINCE THEN. SO THERE WAS A SUPPLEMENTAL REVIEW TO LOOK FOR STUDIES THAT HAVE BEEN PUBLISHED MORE RECENTLY THAN THE LATEST U.S. EPA REVIEW.

I DO WANT TO TALK A LITTLE BIT ABOUT SOME OF THE LEGAL REQUIREMENTS FOR THIS WORK HERE. THERE IS A REQUIREMENT IN THE CALIFORNIA HEALTH AND SAFETY CODE THAT WE HAVE A REPORT ON THE IMPACTS OF PARTICULATE MATTER, HEALTH IMPACTS OF PARTICULATE MATTER IN THE SOUTH COAST AIR BASIN. NOW, THIS PARTICULATE MATTER SECTION WITHIN APPENDIX 1 IS WHAT SATISFIES THIS LEGAL REQUIREMENT. OF COURSE, THE OTHER SECTIONS ARE ALSO INCLUDED. IT'S NOT ONLY PARTICULATE MATTER THAT HAS HEALTH IMPACTS. THE OTHER POLLUTANTS HAVE HEALTH IMPACTS AS WELL. AGAIN, BASED ON THE STATUTORY REQUIREMENT, THIS REPORT WAS PREPARED IN CONJUNCTION WITH THE PUBLIC HEALTH AGENCY, AND THE PUBLIC HEALTH AGENCY HERE WAS COEHHA, CALIFORNIA OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT. AND WE ALSO CONSULTED WITH CARB IN THIS PROCESS AS WELL.

ANOTHER REQUIREMENT OF HEALTH AND SAFETY CODE WAS THAT AN ADVISORY COUNCIL WHOSE MEMBERSHIP IS CHOSEN BY THE GOVERNING BOARD AND AQMP ADVISORY GROUPS WAS TO REVIEW AND DISCUSS AND PROVIDE COMMENTS ON THE REPORT.

ALTHOUGH, OF COURSE, WE PROVIDED THE ENTIRE APPENDIX 1, NOT THE AQMP, TO THE ADVISORY COUNCIL ALSO. THIS GROUP -- THIS COUNCIL WAS FORMED IN LATE 2015. AND THE ADVISORY COUNCIL CONVENED IN AUGUST OF 2016 TO REVIEW AND DISCUSS APPENDIX 1. THIS WAS ALSO A MEETING WHERE MEMBERS OF THE PUBLIC WERE ALSO INVITED TO COMMENT AS WELL. I DO APOLOGIZE. IN THE PRINT VERSION OF THE SLIDES THERE'S A TYPO. IT SHOULD SAY AUGUST OF 2016 NOT AUGUST OF 2015. ALTHOUGH, THE CORRECTED VERSION IS AVAILABLE ONLINE.

SO, YOU KNOW, AGAIN, THE DRAFT OF THE APPENDIX 1 WAS RELEASED IN JULY OF 2016. IT WAS RELEASED BOTH TO THE ADVISORY COUNCIL MEMBERS AND TO THE PUBLIC. WE RECEIVED COMMENTS BOTH FROM THE ADVISORY COUNCIL AND MEMBERS OF THE PUBLIC. WE'LL TALK A LITTLE BIT ABOUT THE COMMENTS RECEIVED AND WHAT WE'VE DONE IN THE MEANTIME AND WE'LL MODIFY THE REPORT BASED ON THE COMMENTS RECEIVED.

SO JUST A BRIEF SUMMARY APPENDIX 1. THE PURPOSE OF APPENDIX 1 IS, AGAIN, TO PROVIDE A BRIEF OVERVIEW OF THE EFFECTS OF THE VARIOUS AIR POLLUTANTS AND ALSO TO DESCRIBE THE HEALTH IMPACTS OF PARTICULATE MATTER. WE DO HAVE A GREATER FOCUS ON OZONE AND PARTICULATE MATTER. IN OTHER WORDS, THE SECTIONS ON OZONE AND PARTICULATE MATTER ARE FAR MORE DETAILED COMPARED TO OTHER SECTIONS. AND SO THE REASON FOR THAT IS BECAUSE THESE ARE THE POLLUTANTS

WHERE WE ARE IN NONATTAINMENT. SO THE IDEA IN OUR AREA THERE IS PERHAPS GREATER POTENTIAL AND GREATER CONCERN AMONG THE PUBLIC ABOUT THE HEALTH EFFECTS OF THESE TWO POLLUTANTS.

THERE IS A LARGE BODY OF SCIENTIFIC EVIDENCE THAT SHOWS THE ADVERSE EFFECTS AIR POLLUTION ON HUMAN HEALTH. THIS DRAWS FROM DIFFERENT TYPES OF STUDIES INCLUDING TOXICOLOGY, EPIDEMIOLOGY, AND HUMAN EXPERIMENTAL STUDIES. AND THESE TYPES OF STUDIES ARE REVIEWED BY THE U.S. EPA.

AND ALSO MORE RECENTLY THERE IS A LOT OF CONCERN ABOUT CERTAIN GROUPS OR CERTAIN POPULATIONS THAT MAY BE MORE SENSITIVE TO THE EFFECTS OF CERTAIN AIR POLLUTANTS. SO WE'VE ALSO INCLUDED SOME DISCUSSION ABOUT POTENTIAL SENSITIVE POPULATIONS. THESE ARE TYPICALLY DEFINED PARTICULARLY BY AGE. TYPICALLY WE'RE TALKING ABOUT CHILDREN OR ELDERLY. THERE ARE CERTAIN GENETIC FACTORS AND CERTAIN PEOPLE ARE MORE SUSCEPTIBLE TO THE EFFECTS. PEOPLE WITH CERTAIN CONDITIONS SUCH AS RESPIRATORY CONDITIONS OR HEART CONDITIONS. AND THERE'S ALSO SOME RESEARCH ON WHETHER A SOCIOECONOMIC STATUS MAY BE CONTRIBUTE TO THE EFFECTS OF AIR POLLUTION.

I WANT TO NOTE A COUPLE MAJOR CHANGES SINCE THE LAST AQMP APPENDIX 1. WE REALLY PUT A LOT OF EFFORT IN CLARIFYING THE PURPOSE OF THIS DOCUMENTS AND ALSO THE

METHODS THAT WE USED TO PUT THIS DOCUMENT TOGETHER IN THE INTRODUCTORY SECTION OF THIS APPENDIX 1. WE ALSO TRIED TO PRESENT EACH SECTION IN A STANDARDIZED WAY, AND I'LL TALK A LITTLE BIT MORE ABOUT THAT IN THESE NEXT SLIDES.

SO IN THE U.S. EPA SCIENCE ASSESSMENT, THE -- THOSE REPORTS DESCRIBE WHAT'S CALLED THE CAUSAL DETERMINATION. IN OTHER WORDS, BASED ON THEIR ASSESSMENT OF THE SCIENCE, THEY LOOK AT THE SHORT-TERM AND LONG-TERM EXPOSURE EFFECTS, AND THEY LOOK AT VARIOUS HEALTH EFFECTS. SO HERE, FOR EXAMPLE, FOR PM2.5 AND BASED ON THE 2009 ISA, WE LOOK AT CARDIOVASCULAR EFFECTS, RESPIRATORY EFFECTS, MORTALITY, REPRODUCTIVE EFFECTS, AND ALSO CANCER, AND, AGAIN, SPLIT SHORT-TERM AND LONG-TERM EXPOSURE. AND FOR EACH OF THESE CATEGORIES, GROUPS OF HEALTH EFFECTS, THE EFFECTS WHETHER IT'S CAUSAL RELATIONSHIP, LIKELY CAUSAL RELATIONSHIP. AND THERE ARE SOME KIND OF WEAKER CATEGORIES SUCH AS SUGGESTIVE OF CAUSAL RELATIONSHIP AND FURTHER DOWN BELOW. OKAY. THIS IS BASED ON THE WEIGHT OF EVIDENCE APPROACH, AND THIS IS -- THE CRITERIA ARE DESCRIBED IN GREAT DETAIL IN THE U.S. EPA DOCUMENTS AND DESCRIBED JUST BRIEFLY IN APPENDIX 1.

SO, AGAIN, THE STRONGEST RELATIONSHIP IS CALLED A CAUSAL RELATIONSHIP. SO HERE FOR PM2.5 YOU CAN SEE THAT THE CAUSAL DETERMINATION WAS THAT THERE WAS A CAUSAL

RELATIONSHIP BETWEEN BOTH SHORT-TERM AND LONG-TERM PM2.5 EXPOSURE AND CARDIOVASCULAR EFFECTS AND SIMILARLY FOR MORBIDITY AS LIKELY CAUSAL RELATIONSHIP FOR RESPIRATORY EFFECTS. OKAY. NOW, THESE CATEGORIES ARE NOT MEANT TO BE MUTUALLY EXCLUSIVELY. FOR EXAMPLE, STUDIES ON MORTALITY LOOK SPECIFICALLY AT MORTALITY FROM CARDIOVASCULAR DISEASE.

OKAY. SO THIS IS THE SAME TABLE BUT FOR OZONE. AND HERE AGAIN OZONE WAS LAST REVIEWED IN 2013 AND HERE AGAIN A SHORT-TERM AND LONG-TERM EFFECTS WOULD BE STRONGEST RELATIONSHIPS FOR RESPIRATORY EFFECTS AND SHORT-TERM EXPOSURES TO OZONE THERE'S A CAUSAL RELATIONSHIP. OF COURSE, THERE'S LIKELY CAUSAL RELATIONSHIP FOR SEVERAL OF THESE OTHER CATEGORIES AS WELL.

WE DID RECEIVE A NUMBER OF WRITTEN COMMENTS. THERE WERE 25 COMMENT LETTERS RECEIVED, AND THIS INCLUDES COMMENT LETTERS FROM MEMBERS OF THE ADVISORY COUNCIL AS WELL AS COMMENT LETTERS FROM MEMBERS OF THE PUBLIC. HERE I -- I'M SORRY. SORRY ABOUT THAT.

SO HERE I'M GOING TO JUST PRESENT A BRIEF SUMMARY OF SOME OF THE MAIN MAJOR COMMENTS THAT WERE RECEIVED. I TRIED TO ORGANIZE THEM BY THE SECTION OF THE DOCUMENT THAT IT PERTAINS TO. SO, FOR EXAMPLE, WE HAD SEVERAL COMMENTS ABOUT CLARIFYING THE PURPOSE OF THE

APPENDIX 1, SO WE PUT WHAT MORE EFFORT TO PROVIDE CLARITY IN THAT AREA AS WELL. WE RECEIVED SOME COMMENTS ON THE AIR TOXIC SECTION. SPECIFICALLY THERE WAS A REQUEST TO DISCUSS VOC'S, TO ADD A SECTION DISCUSSION VOC'S WITHIN THE AIR TOXIC SECTION, SO THAT IS BEING ADDED. AND IN ADDITION, WE ALSO HAD A COMMENT TO ADD SOME DISCUSSION OF THE ADVANCED COLLABORATIVE EMISSIONS STUDY, ALSO CALLED ACES STUDY. THIS IS THE SECTION WHERE WE DISCUSS THE HEALTH EFFECTS OF DIESEL PARTICULATE MATTER. SO THAT WAS ALSO DONE.

IN THE OZONE SECTION AND ALSO THE PM SECTION, WE RECEIVED SEVERAL COMMENTS ABOUT, YOU KNOW, THE WAY THAT IT REPRESENTED DIFFERENT HEALTH OUTCOMES. SO WE REALLY ORGANIZED THE SECTION SO THAT WE'RE REALLY FOCUSING ON THOSE HEALTH OUTCOMES WHERE THE U.S. EPA HAS DETERMINED THERE WAS A CAUSAL OR LIKELY CAUSAL RELATIONSHIP. IN OTHER WORDS, THOSE HEALTH ENDPOINTS ARE HIGH ON THE CAUSAL DETERMINATION SCALE. HOWEVER, FOR PARTICULATE MATTER, YOU KNOW, AGAIN, RECOGNIZING THAT THE INTEGRATED SCIENCE ASSESSMENT WAS DONE IN 2009 AND THERE'S BEEN A LOT OF LITERATURE IN THE MEANTIME, WE ALSO INCLUDED A DISCUSSION ABOUT HEALTH ENDPOINTS THAT WERE A LITTLE BIT LOWER ON THE CAUSAL DETERMINATION SCALE AND THE EMERGING AREAS OF INTEREST IN THAT SECTION.

WE ALSO EXPANDED THE SECTION ON THE SENSITIVE

POPULATIONS FOR BOTH OZONE AND PARTICULATE MATTER BECAUSE THERE'S A LOT OF INTEREST IN WHETHER CERTAIN PEOPLE ARE MORE SENSITIVE TO THESE EFFECTS. WE ALSO, AGAIN, PROVIDED SOME ORGANIZATION AND CLARITY ISSUES WITH THE SUMMARY AND THE ESTIMATES OF THE HEALTH BURDEN OF PARTICULATE MATTER IN THE SOUTH COAST AIR BASIN, SO WE SEPARATED THESE SECTIONS OUT TO PROVIDE MORE CLARITY.

I DID WANT TO NOTE IN THE HEALTH BURDEN ESTIMATES WE'RE USING ESTIMATES FROM THE CALIFORNIA AIR RESOURCES BOARD WHERE THEY LOOK AT PM2.5 AND CARDIOPULMONARY DEATHS IN CALIFORNIA, AND WE ALSO SPLIT IT UP BY BASIN. SO THE SOUTH COAST AIR BASIN, THEIR ESTIMATE WAS 4,000 DEATHS, ANNUAL DEATHS, DUE TO PM2.5 ABOVE BACKGROUND LEVELS, WHICH IS ESTIMATED IN THEIR ANALYSIS TO BE 5.8 MICROGRAMS BY CUBIC METER. I DO WANT TO MENTION THAT IN THIS PLAN WE ARE NOT REDUCING LEVELS OF 5.8 MICROGRAMS PER CUBIC METER. AND BASED ON THE PLAN, THE IMPACTS OF THE -- PUBLIC HEALTH IMPACTS, THE PLAN IS ASSOCIATED WITH THE SOCIOECONOMIC REPORTS. SO YOU CAN FIND THOSE NUMBERS THERE. I KNOW, AGAIN, THESE ANALYSES WE'RE DONE FOR DIFFERENT PURPOSES AND, THEREFORE, THE NUMBERS ARE A LITTLE DIFFERENT.

SO IN ADDITION, WE RECEIVED SOME COMMENTS, ADDITIONAL COMMENTS, ON APPENDIX 1. SOME COMMENTS ABOUT SOME DOUBT IN TERMS OF THE HEALTH RISKS ASSOCIATED WITH

PARTICULATE MATTER IN CALIFORNIA. AND, AGAIN, JUST REEMPHASIZING THIS IS A SUMMARY OF, YOU KNOW, REVIEWS AND CAUSAL DETERMINATIONS BY U.S. EPA AS SUMMARIZED AND NOTED IN THEIR REVIEW DOCUMENTS. I DO WANT TO NOTE THAT WE DO DISCUSS STUDIES THAT WERE CONDUCTED IN CALIFORNIA AND SOUTHERN CALIFORNIA SO THAT WE TRY TO DRAW THAT FOCUS IN THE DOCUMENT. ALTHOUGH, THERE ARE STUDIES CONDUCTED IN MANY OTHER PLACES AND ARE ALSO PART OF THE U.S. EPA ASSESSMENT.

WE RECEIVED A COMMENT ABOUT POTENTIAL CONFOUNDING EFFECT OF SMOKING AND WHETHER THIS WAS ADDRESSED IN THE STUDIES OF PARTICULATE MATTER AND HEALTH EFFECTS. SO WE CERTAINLY RECOGNIZE THAT SMOKING IS AN IMPORTANT CONFOUNDER WHEN IT COMES TO EPIDEMIOLOGICAL STUDIES OF PARTICULATE MATTER EFFECTS INCLUDING PARTICULATE MATTER AND MORTALITY EFFECTS. SO WE CERTAINLY ADDED A LOT OF CLARITY ABOUT SMOKING AND HOW THEY WERE ADJUSTED FOR SMOKING IN THEIR STUDIES.

WE ALSO RECEIVED A COMMENT LETTER ABOUT DISCUSSING THE HEALTH EFFECTS OF ODORS. AND THIS WAS SOMETHING THAT WAS NOT PREVIOUSLY DISCUSSED IN APPENDIX 1, SO WE ARE ADDING A SECTION ON ODORS. AND THIS WAS SOMETHING THAT WAS NOT PREVIOUSLY DISCUSSED IN APPENDIX 1. SO THIS WILL BE AN ADDED SECTION ON ODORS AND HEALTH EFFECTS OF ODORS. THIS IS SOMETHING WE HAD NOT DONE WORK

FOR, SO THIS SOMETHING THAT REQUIRES SUBSTANTIAL NEW WORK. WE DON'T HAVE THE SAME SORT OF U.S. EPA REVIEW TO RELY ON, SO THIS IS SOMETHING THAT WE'RE STILL CURRENTLY WORKING ON.

IF YOU HAVE ANY QUESTIONS, I'M CERTAINLY AVAILABLE. THIS IS MY CONTACT INFORMATION HERE. AND THAT IS THE END OF MY PRESENTATION.

DR. FINE: OKAY. SO WE WILL MOVE INTO PUBLIC COMMENTS. AND I HAVE ABOUT FIVE CARDS HERE. IF ANYONE ELSE WOULD LIKE TO SPEAK, PLEASE BRING YOUR BLUE CARD UP AND WE'LL HEAR FROM EVERYONE.

SO THE FIRST SPEAKER IS JOSHUA.

MR. TADRES: THANK YOU FOR THE OPPORTUNITY TO SPEAK. I AM HERE TO ASK THE AIR BOARD TO CONSIDER THE IMPACTS UPON THE LOCAL ECONOMY AND THE ABILITY TO FIND JOBS IN SOUTHERN CALIFORNIA. JOB GROWTH IN THE INLAND EMPIRE CONTINUES TO STRUGGLE BEHIND LOS ANGELES AND COASTAL AREAS. AND OPPORTUNITIES FOR YOUNG PEOPLE IN PARTICULAR OUR SCARCE.

I UNDERSTAND THAT CALIFORNIA HAS THE TOUGHEST AIR QUALITY RULES AND REGULATIONS IN THE COUNTY. IF THAT IS TRUE, WE SHOULD CONSIDER THAT WE ALSO HAVE SOME OF THE HIGHEST POVERTY RATES AND WHETHER MAKING THE RULES EVEN TOUGHER WILL HELP US FIND JOBS. HELPING PEOPLE GET BACK TO WORK ISN'T JUST ABOUT HAVING JOBS. IT IS ALSO

IMPORTANT TO HEALTH, WHICH IS AN IMPORTANT TOPIC TODAY.

THERE HAVE BEEN STUDIES THAT SHOW THAT POVERTY HAS MUCH GREATER PUBLIC HEALTH IMPACTS THAN ENVIRONMENT CAUSES. THERE IS NO REASON WE CAN'T HAVE BOTH, AND IT IS THE AIR BOARD'S JOB TO FIND BALANCE. PLEASE CONSIDER THESE ISSUES AS YOU FINALIZE YOUR PLAN.

THANK YOU.

DR. FINE: THANK YOU, JOSHUA.

NEXT WE HAVE ANDREW.

MR. TORRES: WHAT I'M HERE TO TALK ABOUT TODAY IS THE VERY DIVERSE REGION IN SOUTHERN CALIFORNIA. I'M WORRIED ABOUT THE IMPACT OF BUSINESS HERE AND HOW THESE NEW REGULATIONS MIGHT PREVENT GOOD PAYING JOBS IN THE INLAND EMPIRE. I WOULD LIKE TO ASK WHAT KIND OF RESEARCH HAS GONE INTO THE ECONOMIC IMPACTS OF THESE PROPOSALS AND WHETHER THESE HAVE BEEN TRIED ANYWHERE ELSE AND WHAT THE RESULTS WERE.

I ALSO WANT TO NOTE THAT THE INLAND EMPIRE IS DIFFERENT FROM L.A. AND ORANGE COUNTY AND IS NOT SO DENSE THAT WE CAN SOLVE OUR TRANSPORTATION ISSUES WITH MASS TRANSIT. WE NEED OPTIONS TO GET TO WORK OR WHEREVER WE'RE GOING. RIDE SHARING IS ONE WAY TO HELP US WITH PUTTING FEW CARS ON THE ROAD AND REDUCE EMISSIONS FROM TRAFFIC. DOES THIS PLAN ACCOUNT FOR THE DIFFERENCES BETWEEN THE AREAS OF THE REGION AND THE INLAND EMPIRE IN

HOW PEOPLE CHOOSE WITHOUT PENALIZING THEM FOR DRIVING.

THANK YOU.

DR. FINE: JUST TO ADDRESS A COUPLE OF YOUR QUESTIONS. THE -- IN TERMS OF HOW THE PLAN IS DEVELOPED, WE ACTUALLY TAKE THE REGIONAL TRANSPORTATION PLAN THAT THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS DEVELOPS, AND THAT'S KIND OF THE BASELINE OF OUR PLAN. AND WE TAKE THAT INFORMATION WHERE THEY PROJECT THE CARS TO BE DRIVING OR THE TRUCKS TO BE DRIVING AND DIFFERENT PUBLIC TRANSPORTATION OPTIONS. THAT ALSO GOES INTO OUR PLANNING PROCESS. SO IN TERMS OF DIFFERENCES BETWEEN REGIONS, THAT'S ALL HASHED OUT IN THE REGIONAL TRANSPORTATION PLAN. AND WHERE THERE'S OPPORTUNITIES FOR PUBLIC TRANSIT, THEY HAVE LOOKED AT RIDE SHARING AS ONE OF THE MODES THAT'S GOING TO HELP AT LEAST THE TRAFFIC ISSUES THAT WE HAVE.

MR. TORRES: THANK YOU.

DR. FINE: OKAY. NEXT WE HAVE LEA PETERSON.

MS. PETERSON: GOOD MORNING. GOOD MORNING. MY NAME IS LEA PETERSON. I'M A PUBLIC AFFAIRS MANAGER WITH SOUTHERN CALIFORNIA GAS COMPANY. SOUTHERN CALIFORNIA GAS COMPANY, AS YOU MAY KNOW, WE ARE A NATURAL GAS DISTRIBUTION COMPANY. WE ARE THE LARGEST IN NORTH AMERICA, AND WE SERVICE THE SOUTHERN CALIFORNIA AREA WITH OVER 500 COMMUNITIES AND OVER 22 MILLION CUSTOMERS.

SO A FEW ITEMS I WOULD LIKE TO SHARE WITH YOU. SOUTHERN GAS COMPANY APPRECIATES THE OPPORTUNITY TO PROVIDE COMMENTS ON YOUR AQMP PLAN, AND PARTICULARLY, THE REVISED DRAFT. WE STRONGLY SUPPORT YOUR EFFORTS TO ATTAIN THE FEDERAL CLEAN AIR ACT STANDARDS AND THE ATTAINMENT OF OZONE AND FINE PARTICULATE MATTERS STANDARDS IN THOSE COMMUNITIES WE PROVIDE SERVICES.

WE CONTINUE TO OFFER OUR SUPPORT, EXPERTISE, AND PARTNERSHIP WITH THE SOUTH COAST DISTRICT TO CREATE A TECHNICALLY SOUND AND TECHNOLOGICAL AQMP THAT WOULD PROTECT PUBLIC HEALTH BY DEMONSTRATING TIMELY ATTAINMENT OF THE FEDERAL CLEAN AIR ACT STANDARDS WHILE ALSO SUSTAINING THE VITALITY OF SOUTHERN CALIFORNIA' ECONOMY. FOLLOWING THE ADOPTION OF THE PLAN, WE LOOK FORWARD TO COLLABORATING WITH THE SOUTH COAST AIR DISTRICT ON THE IMPLEMENTATION OF THE CONTROL MEASURES, EFFORTS TO SECURE INCENTIVE FUNDING, AND THE DEVELOPMENT OF INCENTIVE PROGRAMS.

SO SOME ADDITIONAL ITEMS, SO CAL GAS SUPPORTS MAXIMIZING EMISSION REDUCTIONS BY ALLOWING TECHNOLOGY TO COMPETE HEAD TO HEAD. WE ENCOURAGE THE DEVELOPMENT OF A WORKING GROUP AND THE PUBLIC PROCESS TO OVERSEE COST EFFECTIVENESS AND FEASIBILITY ASSESSMENTS OF COMPETING TECHNOLOGIES. SO CAL GAS ENCOURAGES AN INCENTIVE-BASED APPROACH AS THE ONLY VIABLE PATH WITH NEAR TURN EMISSION

REDUCTIONS AS THE MOST COST-EFFECTIVE APPROACH. THE DEVELOPMENT OF THE EXECUTION OF THE INCENTIVE FUNDING PLAN IS KEY TO THIS SUCCESSFUL IMPLEMENTATION OF THE AQMP, AND WE URGE COLLABORATION AMONG STAKEHOLDERS AND A BROAD PARTICIPATION OF POSSIBLE AVENUES TO SECURE THE FUNDING FOR OUR REGION.

WE WOULD LIKE TO ENSURE SENSIBLE AIR QUALITY REGULATIONS THAT DO NOT ADVERSELY IMPACT OUR CUSTOMERS AND OBVIOUSLY OUR OPERATIONS TO PROVIDE NATURAL GAS. SO CAL GAS SEEKS A LONG-TERM ROLE IN THE SOUTH COAST AIR BASIN THROUGH THE CONTINUATION OF FUEL AND TECHNOLOGY NEUTRAL POLICY. AND WE URGE THE INCENTIVE-BASED APPROACHED AS THE MOST COST-EFFECTIVE PATH NECESSARY FOR EMISSION REDUCTIONS TO ATTAIN THE FEDERAL OZONE STANDARDS.

THANK YOU VERY MUCH FOR THIS OPPORTUNITY TO SPEAK BEFORE YOU. THANK YOU.

DR. FINE: DR. HUSING IS NEXT.

DR. HUSING: DR. JOHN HUSING, CHIEF ECONOMIST OF THE INLAND EMPIRE ECONOMIC PARTNERSHIP, AN ORGANIZATION WHOSE PRIMARY WORK IS FOCUSED ON THE ISSUE OF POVERTY IN THE INLAND EMPIRE.

A COUPLE OF COMMENTS. FIRST OF ALL, I WANT TO THANK WAYNE NASTRI AND HIS STAFF FOR COMING AND TALKING TO OUR LOGISTICS COUNCIL AND TALKING ABOUT INCENTIVES.

AS AN ECONOMIST, I THINK INCENTIVES ARE THE WAY TO GO TO ACHIEVE THE BEST WAY THESE THINGS WITHIN THE MARKET. I WISH, FRANKLY, THAT CARB HAD AS MUCH INCENTIVES RATHER THAN COMMAND AND CONTROL AND WHAT IT IS YOU'RE DOING, FIRST.

SECOND, I SPENT A LOT OF TIME LOOKING AT THE ECONOMIC ANALYSIS OF THE IMPACT, AND I HAVE SOME SERIOUS QUESTIONS ABOUT PART OF IT. ONE OF THE COMMENTS WITHIN THE ANALYSIS IS THAT LOCAL DEMAND WILL BE CREATED IN THE MANUFACTURING SECTOR. BUT ALSO SAID, WE DON'T REALLY HAVE UNDERSTAND IT, SO WE'RE JUST USING THE DATA WITHIN THE MODEL.

I HAVE INTERVIEWED COMPANY AND COMPANY AFTER COMPANY, AND ALMOST UNIVERSALLY THEY SAY NOTHING THEY BUY FOR AIR QUALITY IS MADE IN THE STATE OF CALIFORNIA. SPECIFIC EXAMPLE, I DID ALL THE WORK TO BRING FORWARD ON THE ECONOMIC SIDE THE CLEAN TRUCK PROGRAM FOR THE PORTS OF L.A. AND LONG BEACH. I WAS THEIR CONSULTANTS. WHEN I MEET WITH THE TRUCKING INDUSTRY ABOUT LNG TRUCKS, I ASKED, "IF WE CHANGE THE WAY IN WHICH THEY'RE FUNDED WOULD YOU MAKE THEM IN CALIFORNIA SO THEY WOULD BE COMPETITIVE WITH CLEAN DIESEL." THEIR ANSWER WAS "IN CALIFORNIA'S REGULATORY ENVIRONMENT, WE WOULD NEVER COME TO CALIFORNIA TO MAKE THOSE TRUCKS," WHICH I THINK HIGHLIGHTS A DIFFICULTY IN YOUR MODELING.

SECOND, YOU ESTIMATE 11,000 JOBS, ROUND FIGURES, LOSS PER YEAR AS A CONSEQUENCE OF THE REGULATORY AND INCENTIVE SYSTEM THAT YOU'RE SETTING UP INCLUDING A LOSS OF 267 LOGISTICS. THAT'S WAREHOUSING, DISTRIBUTION, AND WHOLESALE TRADE WITHIN THE MODELING PER YEAR. JUST ONE PROJECT THAT THIS AGENCY HAS WORKED HARD TO STOP WOULD COST 20,000 JOBS, WHICH IS THE PROJECT OVER IN MORENO VALLEY. SO I STRONGLY QUESTION THE ACCURACY OF THAT.

THE OTHER PIECE OF THE PROBLEM THAT I SEE IS A METHODOLOGICAL ONE. AND THAT IS YOU PUT HEAVY EMPHASIS ON THE HEALTH EFFECTS AND THE ECONOMIC IMPACT OF THOSE HEALTH EFFECTS THROUGH ONE INCREASED MIGRATION TO THE REGION; TWO, LESS HOSPITALIZATIONS; THREE, GREATER PRODUCTIVITY. HOWEVER, IF YOU'RE GOING TO LOSE 11,000 JOBS, WHICH AS I INDICATE I BELIEVE IS AN UNDERESTIMATE, THERE IS NO CONSIDERATION OF THE HEALTH EFFECTS ON THE PEOPLE WHOSE JOBS ARE NOT CREATED. IT IS AS IF THAT'S NOT THERE.

AND AS ONE OF THE OTHER GENTLEMAN JUST SAID, THE WORK THAT THE ROBERTS WOODS JOHNSON FOUNDATION TOGETHER WITH THE UNIVERSITY OF WISCONSIN SCHOOL OF PUBLIC HEALTH HAS SHOWN THAT 90 PERCENT OF PUBLIC HEALTH EFFECTS ARE NOT ENVIRONMENTAL. THEY ARE IN FACT RELATED DIRECTLY AND INDIRECTLY TO POVERTY. TO LEAVE THAT OUT AND SAY WE HAVE ALL THESE WONDERFUL HEALTH EFFECTS WHILE EXECUTING THE

PLAN AND TREATING AS ZERO THE IMPACT THAT THE PLAN WOULD HAVE FOR PEOPLE WHO DON'T GET TO GO TO WORK AND THE HEALTH EFFECTS OF THAT, TO ME, I PERSONALLY FIND OUTRAGEOUS BECAUSE IT WAY OVERESTIMATES THE POSITIVE AND BY ELIMINATING ANY NEGATIVE AT ALL WHEN IN FACT THAT IS A MAJOR PIECE OF WHAT OCCURS HERE.

I THANK YOU VERY MUCH FOR YOUR CONSIDERATION.

DR. FINE: THANK YOU. MARY JANE.

MS. O'MASSO: GOOD MORNING. THANK YOU EVERYBODY FOR COMING OUT THE CITY OF SAN BERNARDINO. MARY JANE O'MASSO FROM THE COUNTY OF SAN BERNARDINO. I HAVE OVER 25 YEARS OF ECONOMIC DEVELOPMENT EXPERIENCE HERE IN REGION. NOWHERE ELSE.

I HAVE BEEN THE RECIPIENT OF THE COMMENTS OF "CALIFORNIA IS THE LAST PLACE WE'LL DO BUSINESS. NO, MARY JANE, WE CANNOT PUT CALIFORNIA ON OUR SPREADSHEET AND PRESENT TO OUR CLIENT. IT IS OVERREGULATED AND TOO COSTLY." THAT'S HARD TO SWALLOW WHEN I'M WORKING IN ONE OF THE LARGEST STATES IN THE ENTIRE COUNTRY. ALL I ASK -- AND I UNDERSTAND THAT THE FEDERAL AND STATE ENVIRONMENTAL REGULATION IS WHAT WE HAVE TO ATTAIN.

HOWEVER, HERE'S MY CONCERN. WHEN WE PUT UP A SLIDE THAT SAYS WE NEED A BILLION DOLLARS A YEAR IN INCENTIVE MONEY TO HELP BUSINESS COMPLY, EXISTING BUSINESS COMPLY, THOSE FUNDS AREN'T IDENTIFIED YET, AND

WE HAVE HAD TROUBLE COMPETING ON EVERY LEVEL ESPECIALLY WITH CAP AND TRADE DOLLARS THAT ARE GOING TO THE BAY AREA AND SOME TO L.A. FINALLY AND NONE TO OUR COUNTY. I HAVE A BIG PROBLEM WITH THAT FUNDING SOURCE NOT BEING IDENTIFIED. AT THE END OF THE DAY I'M A CPA AND I LOOK FOR MONEY. I FOLLOW THE MONEY.

WE'VE GOT TO IDENTIFY THE FUNDING SOURCES AND VOLUNTEER FOR THE AD HOC COMMITTEE, BUT THEY HAVE TO BE REALISTIC BECAUSE OTHERWISE THE FOLKS ON THE ENVIRONMENTAL SIDE OF THE HOUSE ARE PARTNERS IN ALL OF THIS ARE VERY QUICK TO SAY AND HAVE ALREADY SAID IN HEARINGS "IT'S OKAY. WE'LL GO STRAIGHT TO RULE MAKING AND START FINING THOSE BUSINESSES WHO ARE NOT COMPLYING." THAT WAS A DIRECT QUOTE FROM THE SHOP. SO THAT SCARES ME TO DEATH. BECAUSE IF WE DON'T IDENTIFY A BILLION DOLLARS A YEAR, WE GO STRAIGHT TO RULE MAKING AND FINES ON BUSINESSES. WE WILL NOT SURVIVE THAT.

THANK YOU VERY MUCH.

DR. FINE: NEXT IS DEBORAH BARMACK.

MS. BARMACK: GOOD MORNING. I'M DEBORAH BARMACK, PRESIDENT OF INLAND ACTION, WHICH IS A GROUP OF COMMUNITY LEADERS AND BUSINESSES THAT WORK TO IMPROVE THE ECONOMY IN THE INLAND EMPIRE AREA. I WANT TO THANK YOU VERY MUCH, FIRST OF ALL, FOR HOLDING THIS HEARING IN SAN BERNARDINO COUNTY SO THAT WE CAN PROVIDE MEANINGFUL INPUT

INTO THE DEVELOPMENT PLAN. AND I ALSO WANT TO THANK DR. FINE FOR MEETING WITH OUR BOARD OF DIRECTORS TO HELP US UNDERSTAND THE PLAN.

INLAND ACTION AND THE BUSINESS COMMUNITY IS COMMITTED TO WORKING WITH SOUTH COAST AIR MAN MANAGEMENT DISTRICT TO ENSURE THAT THE 2016 AQMP FULFILLS ITS LEGAL REQUIREMENTS WHILE ALSO PROTECTING AND PROMOTING JOB CREATION AND ECONOMIC SUCCESS FOR OUR INLAND COUNTIES. INLAND ACTION IS SUPPORTIVE OF AN AQMP ESTABLISHING A POLICY FRAMEWORK THAT PRIORITIZES NON-REGULATORY INNOVATIVE APPROACHES TO EMISSION REDUCTIONS THAT ARE COST EFFECTIVE AND MINIMIZE OPERATIONAL DISRUPTION.

WE SUPPORT A BALANCED, THOUGHTFUL APPROACH TO ACHIEVING AIR QUALITY GOALS IN A MANNER THAT FURTHERS ECONOMIC GROWTH WHILE ALSO AVOIDING AN OVERREGULATORY APPROACH THAT SIGNIFICANTLY DRIVES THE COST OF ACHIEVING EMISSION REDUCTIONS. INLAND ACTION BELIEVES THAT CONTROL MEASURES MUST ALLOW FOR AND INCENTIVIZE VOLUNTARY AND COLLABORATIVE APPROACHES TO ACHIEVING AIR QUALITY GOALS. WE SUPPORT THE ACCELERATED DEPLOYMENT OF AVAILABLE CLEANER TECHNOLOGIES THROUGHOUT INCENTIVE PROGRAMS THAT LEVERAGE AVAILABLE FUNDING SOURCES BUT DO NOT PUT LOCAL BUSINESSES AT COMPETITIVE DISADVANTAGE WITH SIMILAR BUSINESSES IN OTHER REGIONS.

SO, AGAIN, I WANT TO THANK YOU FOR ALLOWING THIS

INPUT AND WISH YOU LUCK IN THE DEVELOPMENT OF THAT. THANK YOU.

DR. FINE: THANK YOU. CHRIS SHIMODA.

MR. SHIMODA: GOOD MORNING. CHRIS SHIMODA OF CALIFORNIA TRUCKING ASSOCIATION. FIRST, I JUST WANTED TO ADD THANKS TO STAFF FOR THE DIALOGUE LEADING UP TO THE DEVELOPMENT OF THE PLAN AND COMING OUT TO SAN BERNARDINO COUNTY TO HEAR THE CONCERNS OF THE COMMUNITY AS WELL AS THE BUSINESS FOLKS THAT ARE GOING TO BE IMPACTED BY THE PLAN.

WE WANTED TO, AGAIN, JUST RELAY THE STRONG CONCERN OVER THE FACILITY-BASED REGULATIONS BOTH FROM OUR INDUSTRY. AND THE CONCERN IS ALSO SHARED BY THE BROADER LOGISTICS IN THE MOVING GOODS COMMUNITY PRETTY MUCH UNIVERSALLY. I NOTED IN CARB'S PRESENTATION, THE EXISTING REGULATIONS WE ALREADY HAVE IN PLACE ARE GOING GET TO AN OVER 80-PERCENT, 88-PERCENT REDUCTION IN NOX EMISSIONS IN TODAY'S LEVELS FROM TRUCKS. AND WHAT WE'RE REALLY LOOKING TO DO IS SECURE INCENTIVES TO GET THAT REMAINING INCREMENT TO SEE THE REDUCTION FOR THE FEW EMISSIONS THAT REMAIN.

AND ALSO I WANTED TO NOTE SINCE WE WERE DISCUSSING HEALTH EFFECTS, ALTHOUGH THIS IS AN OZONE-FOCUSED PLAN, ON THE PARTICULATE MATTER SIDE OF REDUCTIONS IT'S AN EVEN BETTER STORY WITH OVER 99-PERCENT

REDUCTION IN PM FROM TRUCKS WHICH HAS RESULTED IN A DRAMATIC DECREASE IN LOCALIZED HEALTH RISKS. SO BECAUSE OF THIS PROGRESS, WHICH I HAVE TELL YOU HAS COME AT GREAT COSTS TO OUR INDUSTRY TO THE TUNE OF ABOUT BILLION DOLLARS A YEAR SINCE 2008, WE DON'T BELIEVE THAT NOW IS THE TIME TO DOUBLE DOWN ON A REGULATORY APPROACH.

WE DO SUPPORT AND HAVE EXPRESSED THIS ON MULTIPLE OCCASIONS TO STAFF IN PUBLIC FORUMS AN INCENTIVE-BASED APPROACHED TO FURTHER ADVANCEMENT OF CLEANER AIR TECHNOLOGY AND ALSO HAVE NOTED THAT GETTING ADDITIONAL MONIES IS GOING TO REQUIRE A LOT COLLABORATION FROM OUR ENVIRONMENTAL PARTNERS, THE INDUSTRY, AS WELL AS OUR PUBLIC AGENCY PARTNERS. SO WE LOOK FORWARD TO COLLABORATION. THERE HAVE BEEN SUCCESSES IN THE PAST, THE VERY RECENT PAST, WITH REAUTHORIZATION OF THE CARL MOYER PROGRAM AND WOULD THINK A SIMILAR EFFORT OF COLLABORATION TO GET THE ADDITIONAL FUNDS WE'RE TALKING ABOUT TODAY.

SO THANK YOU VERY MUCH.

DR. FINE: THANKS, CHRIS.

CAROL BANNER.

MS. BANNER: GOOD MORNING. AND I, TOO, THANK YOU FOR THIS OPPORTUNITY. I REPRESENT THE REALTOR COMMUNITY ON AIR QUALITY REPRESENTING 35 ASSOCIATES OF REALTORS IN THE SOUTH COAST BASIN. WE HAVE PARTICIPATED

IN DEVELOPING EVERY AQMP SINCE 1991.

THE RCAQ STRONGLY SUPPORTS THE NEED FOR INCENTIVES TO ACCELERATE THE IMPLEMENTATION OF THE AIR QUALITY MANAGEMENT PLAN. THE DISTRICT HAS MADE THE PROPOSED AQMP MORE REGULATORY IN NATURE IN THE MOST RECENT DRAFT, BUT REGULATIONS ARE NOT SUFFICIENT TO REACH THE FEDERAL AIR QUALITY STANDARD, AND THEY'RE ALSO NOT APPROPRIATE FOR EVERY SECTOR.

RCAQ BELIEVES THAT THE EMISSIONS RELATED TO HOUSING AND RESIDENTIAL USE MUST CONTINUE TO BE IMPLEMENTED THROUGH INCENTIVES. AN INCENTIVE APPROACH IS NECESSARY TO AVOID DAMAGING IMPACTS TO THE COST AND AVAILABILITY OF HOUSING FOR FAMILIES OF ALL INCOME LEVELS. THE AQMP NEEDS TO FIND A WIN-WIN OUTCOME FOR AIR QUALITY IN CONCERT WITH AFFORDABLE HOUSING TO PREVENT FURTHER EXACERBATING AFFORDABLE HOUSING AND OUR REGION'S HOUSING CRISIS.

THE AQMP NEEDS TO PROVIDE INCENTIVES COMMENSURATE TO THE AMOUNT OF EMISSION REDUCTIONS COMMITTED FOR OUR MEASURE. TO THAT END, WE SUPPORT THE DISTRICT'S EFFORTS TO PREPARE AN INCENTIVE ACTION PLAN THAT IDENTIFIES REAL ESTATE SOURCES FOR THE NEEDED INCENTIVE FUNDS. THE DISTRICT ALSO NEEDS TO CLEARLY IDENTIFY THE COSTS THAT INDIVIDUAL HOUSEHOLDS MUST BEAR TO COMPLY WITH CONTROL MEASURES SUCH AS CMP02, WHICH SEEKS TO CHANGE OUT

EXISTING SPACE AND WATER HEATERS FOR NEW SOLAR AND ZERO WATER HEATERS.

WE LOOK FORWARD TO AN EXPLICIT DISCUSSION OF THESE IMPACTS IN THE FINAL SOCIOECONOMIC ANALYSIS ESPECIALLY NOW THAT THE SCOPE OF THIS MEASURE HAS BEEN DRAMATICALLY EXPANDED. AND, AGAIN, I THANK YOU, AND I CERTAINLY CONCUR WITH OTHER SPEAKERS HERE ON THE ECONOMIC IMPACT ON THE PLAN IN OUR COMMUNITIES THAT REALLY SPANS ALL SECTORS. THANK YOU.

DR. FINE: THANK YOU. I JUST WANT TO CLARIFY ONE POINT THAT WAS BROUGHT UP ON CMP02 COMMERCIAL AND RESIDENTIAL APPLIANCE MEASURE. IN TERMS OF CHANGING OUT THE EXISTING EQUIPMENT BEFORE THE END OF USEFUL LIFE, THAT'S WHERE WE FEEL LIKE INCENTIVES CAN BE PROVIDED. TYPICALLY WHEN WE REGULATE THOSE TYPES OF EQUIPMENT WHICH WE DO NOW, IT IS WHEN EQUIPMENT IS SOLD. SO SOMEONE WHO NEEDS TO GET A NEW HOT WATER HEATER OR ALREADY NEEDS TO GET A SPACE HEATER. THAT'S WHEN THOSE REQUIREMENTS WOULD APPLY. BUT THAT MAY NOT BE FAST ENOUGH SO WE MAY WANT TO INCENTIVIZE PEOPLE TO GET THAT NEW EQUIPMENT EVEN BEFORE THEIR HOT WATER HEATER BREAKS DOWN. THAT'S WHAT WE INTENDED TO CLARIFY IN THAT MEASURE.

MS. BANNER: WE APPRECIATE THAT. SO AT POINT OF SALE IT IS ENFORCEABLE.

DR. FINE: GENERALLY BY THE MANUFACTURES WHO ARE

SELLING THE EQUIPMENT.

CARLA.

MS. WALECKA: I'M CARLA WALECKA, AND I WORK WITH CAROL BANNER. AND I'M GOING BANG ON THAT NAIL ABOUT CMP02 A LITTLE BIT MORE. THE PUBLIC MAY NOT REALIZE, BUT THIS IS WHERE THE MORE DRAMATIC CHANGE IS IN THE PLAN IN REGARDS TO THAT. IT HAS A BROADER SCOPE AND EFFECTS ALL COMMERCIAL AND RESIDENTIAL AND MULTI-FAMILY HOUSING PRIMARILY. SO IT AFFECTS MANY MORE STRUCTURES THROUGHOUT THE REGION THAN PREVIOUSLY AND IT HAS A NEW NAME, TOO, BECAUSE IT DOES HAVE A BROADER SCOPE. AND IT NOW DEALS WITH REPLACING EXISTING NOX APPLIANCES WITH ZERO OR NEAR-ZERO APPLIANCES.

WE THINK IT'S VERY IMPORTANT TO RECOGNIZE THAT THE EMISSION INCREASES ASSOCIATED WITH THIS MEASURE HAVE ALSO GONE UP DRAMATICALLY. THERE'S A 90-PERCENT INCREASE IN NOX REDUCTIONS ATTRIBUTED TO THIS MEASURE IN 2031. SO IT'S A BIG-TICKET ITEM FOR PROPERTY BUILDERS AS WELL AS RENTERS. WE BELIEVE THIS MEASURE NEEDS TO REMAIN NEUTRAL. THERE'S NO ONE-SIZE-FITS-ALL SOLUTION FOR HOUSING. OUR HOUSING IS TOO DIVERSE SO FUEL NEUTRALITY IS GOING TO BE IMPORTANT IN FINDING OPTIONS FOR HOMEOWNERS AND RENTERS TO COMPLY.

WE ALSO NEED TIME LINES THAT ARE SYNCED UP WITH THE COMMERCIAL AVAILABILITY OF THESE NEW TYPES OF AREA

AND SPACE HEATERS, DISHWASHERS, ET CETERA. AND THIS IS LITTLE BIT OF A STICKING POINT IN THE PAST. BUT WE FEEL AS THIS MEASURE GETS FURTHER, IT'S IMPORTANT TO LOOK AT THAT.

CAROL ALREADY MENTIONED THE IMPORTANCE OF INCENTIVES TO AVOID INCREASING HOUSING AND WORSENING HOUSING SHORTAGE AND THE AFFORDABILITY CRISIS. HAVING SAID THAT, WE DO BELIEVE THAT THE NEED FOR INCENTIVES MUST BE CLEARLY IDENTIFIED IN THE ACTION PLAN TO AVOID PRESSURE FOR THIS PURELY REGULATORY MEASURE IN THE FUTURE. AND IT'S WORTH NOTING THAT THE INCENTIVES REQUIRED FOR THIS MEASURE HAVE INCREASE FROM 440 TO 520 MILLION. SO IT'S EVEN MORE IMPORTANT TO US THERE BE CLARITY ON THAT. WE DO HAVE HOPE THAT THESE INCREASED COSTS AND INCREASED INCENTIVES WILL BE ANALYZED IN THE FINAL VERSION OF THE SOCIOECONOMIC ANALYSIS SPECIFICALLY HOW MUCH OF AN ADDITIONAL BURDEN THIS WOULD PLACE ON THE AVERAGE HOUSEHOLD IN THE REGION.

AND, FINALLY, WE HOPE YOU'LL FORM A STAKEHOLDER GROUP TO WORK ON IMPLEMENTATION OF THIS CONTROL MEASURE AND THE RCAQ WOULD BE VERY HAPPY TO PARTICIPATE. WE, TOO, WANT TO STRIKE A BALANCE IN TERMS OF COMPETING ENVIRONMENTAL HOUSING AND AFFORDABLE HOUSING NEEDED IN THE REGION. SO WE LOOK FORWARD TO WORKING WITH YOU. THANK YOU ALL FOR BEING HERE.

DR. FINE: ALL RIGHT. I HAVE ONE MORE CARD. HARVEY EDER.

MR. EDER: GOOD MORNING. I'M HARVEY EDER SPEAKING FOR MYSELF AND AS EXECUTIVE DIRECTOR OF THE PUBLIC SOLAR POWER COALITION. WE'VE BEEN AROUND FOR -- SINCE THE LATE '70S AND SOLD SOLAR FINANCING MODELS. I WAS THE SOLAR PERSON FOR SANTA CRUZ COUNTY '77 TO '78.

WHAT WE NEED IS IMMEDIATE TOTAL SOLAR ENERGY. THE SOLAR INDUSTRY STARTED HERE IN SOUTHERN CALIFORNIA OVER A HUNDRED YEARS AGO. IN 1910 30 PERCENT OF THE PERMITS FOR PASADENA ON NEW HOMES HAD SOLAR HOT WATER. THE GAS COMPANY WANTING TO DISBAND AND PUT IN THEIR LINES, GAVE THREE GAS WATER HEATERS AND HOOK-UPS TO COMPETE WITH THE SOLAR INDUSTRY. IT MOVED TO FLORIDA AND THEN THERE WAS NEED FOR COPPER DURING WORLD WAR II. IT WAS IN ISRAEL IN THE LATE '40S AND '50S. AND THEN WITH THE ENERGY CRISIS IN THE EARLY '70S IT STARTED UP AGAIN AS WELL PHOTOVOLTAIC, WHICH STARTED IN THE 50S WHICH WAS USED ON SATELLITES AND RESPONSES TO SPUTNIK.

WITHIN THE LAST SIX YEARS OR SO, THE PRICE OF SOLAR HAS COME DOWN, PHOTOVOLTAIC HAS COME DOWN 50 OR 60 PERCENT OR MORE.

THERE'S A PROGRAM CALLED "SUNSHINE" THROUGH THE DEPARTMENT OF ENERGY WHICH IS BASED ON THE MOON SHOT PROGRAM WITH KENNEDY IN THE '60S. THIS IS THROUGH THE

DEPARTMENT OF ENERGY THAT BROUGHT IT DOWN TO 600 KILOWATT AN HOUR ANYWHERE IN THE COUNTRY WITH NO INCENTIVES BY 2020. THERE WERE INTERIM REPORTS ON THE PATHWAY TO SUN SHOT THAT CAME OUT AND THE ADVISORY GROUP, ALL THOSE STUDIES IN THE RECORD OF THE SPECIAL IMPORTANCE ARE THE ONES ON HEALTH AND THE ONES ON AFFORDABLE TAX AND ON CONCENTRATING SOLAR POWER.

THE ISRAELIS CAME HERE IN THE LATE '70S AND EARLY '80S, AND THEY DEVELOPED A SERIES OF POWER PLANTS OUT IN DAGGETT WHERE A SOLAR POWER TOWER WAS BUILT. THEY BUILT A 14 MEGAWATT LINE FOCUS CONCENTRATOR AND THEN WENT ON TO BUILD AT EDWARDS AIR FORCE BASE AND IN THE AREA A SERIES OF 30 MEGAWATTS AND 80 MEGAWATTS PLANTS. THESE PLANTS WERE PUT IN AT THE SAME TIME WIND WAS PUT IN BY RIVERSIDE AND WHATNOT AND THEIR 354 MEGAWATTS HAVE BEEN OPERATING FOR 25, 35 YEARS FROM NOW. AND THEY PROVE THAT THIS CONCEPT HAS BEEN AROUND.

WE'VE BEEN COMING TO YOU FOLKS FOR THE LAST 30 YEARS, AND YOU HAD THIS INFORMATION ABOUT THEIR LOOPS. NOW THEY'RE CALLED SEGS, SOLAR ENERGY GENERATOR SESSIONS. AND THEY DO HAVE SOME NATURAL GAS. YOU HAD TO HAVE 80 PERCENT SOLAR. YOU CAN ONLY USE 20-PERCENT NATURAL GAS UNDER PURA, THE PUBLIC UTILITIES REGULATORY AUTHORITY. THEY ALSO USE SHORT-TIME STORAGE.

CONCENTRATED SOLAR IS NOW LESS EXPENSE THAN

NATURAL GAS BECAUSE THEY USE THERMAL ENERGY SOURCE TO RUN 24 HOURS. THIS -- THERE'S A STUDY IN NOVEMBER OF '09 IN "SCIENTIFIC AMERICAN" -- THERE WAS A YEAR -- A MONTH BEFORE COPENHAGEN WAS CONVERTING THE WORLD TO WIND, WATER, AND SOLAR RENEWABLES BY 2030. IT WAS WRITTEN BY PROFESSOR MARK JACOBSON AT STANFORD UNIVERSITY AND A DR. VALUCCI WHO IS AT UC BERKELEY. THEY'VE GONE ON AND MADE STUDIES FOR ALL 50 STATES AND FOR A 139 COUNTRIES. THEY'VE MADE -- IN '14 THEY MADE A STUDY IN CALIFORNIA THAT WOULD CONVERT 88-PERCENT SOLAR RENEWABLES BY 2030. THIS IS IN THE RECORD. I GAVE IT AT THE BOARD MEETING FOR THE ADVISORY COUNCIL. AND THERE WAS NO MENTION IN THIS. THERE WAS A ONE PAGE -- WE ASKED THAT THERE BE AN ALTERNATIVE DONE IN THE ENVIRONMENTAL DOCUMENT THAT LOOKED AT SOLAR ENERGY.

WE'VE LITIGATED WITH YOU STARTING IN '92. WE INCORPORATED THE RECORD IN THIS PROCEEDING IN OUR CASE EDER VERSUS WALLERSTEIN, ET AL., ET AL, ON THE 12TH PLAN. AND INCLUDED IN THAT RECORD IS '92 LITIGATION. SO WE'RE NOW INVOLVED IN REVIEWING PARTICULATE MATTER WHICH WAS PUBLISHED ON THE 3RD OF THIS MONTH THROUGH PPN AND THE 9TH CIRCUIT. THIS HAS TO DO WITH RACK AS WELL. COMMENTS TO OUR LITIGATION AND WHATNOT HAD TO BE RACKED. THAT EPA WOULDN'T ACCEPT THAT THIS AVAILABLE CONTROL TECHNOLOGY AND MORE IMPORTANTLY THIS RETROFIT CONTROL TECHNOLOGY,

WHICH IS IN THE 2012 CASE IN DISTRICT 1 AS A SUPREME COURT CASE HERE IN CALIFORNIA WITH THE -- THE CODING ASSOCIATION. AND THEY SAID THAT THIS IS THE DISTRICT'S ARGUMENT THAT THIS AVAILABLE RETROFIT CONTROL TECHNOLOGY IS A TECHNOLOGY FORCING RULE. IT'S IN THE HEALTH AND SAFETY CODE. ALSO WE PUT IN, QUOTING FROM THE REPORT, IT DIDN'T SAY WHERE IT CAME FROM HEALTH AND SAFETY CODE 40404.5 THAT SAYS "THOU SHALL USE THE DISTRICT FROM THE STATE SOLAR WHERE IT'S COST EFFECTIVE IN THE PLAN." AND IT IS. IT'S BEEN IGNORED. AND I'M ASKING THERE BE A STUDY DONE ON THIS. YOU PUT ONE PAGE ON A SOLAR ALTERNATIVE ON PAGE 6 AND JUST IGNORED ALL THIS INFORMATION, IGNORED -- YOU STATED "WE'VE COVERED ALL STATIONARY SOURCES FROM SOLAR, AND WE CANNOT MEET OUR GOALS." THE STATIONARY SOURCES GENERATE ELECTRICITY THAT ELON MUSK SOLAR CITY NOW WITH TESLA AND THE BATTERY FACTORY WITH PANASONIC. THIS STUFF IS COST EFFECTIVE. THE STATIONARY SOURCES OF SOLAR AND WIND WILL GENERATE ELECTRICITY TO RUN THE ELECTRIC VEHICLES. THIS IS TOTALLY IGNORED IN YOUR COMMENTS AND YOU KEEP ON HARPING ON INDUSTRIALIZING THE DESERT. THERE'S A LOT OF LAND AVAILABLE AROUND HERE, AROUND L.A. COUNTY, AROUND RIVERSIDE. THERE'S ROOFTOPS. THERE'S COVERED PARKING LOTS. YOU'VE GOT TO BE IMAGINATIVE. ALSO THERE'S PUBLIC POWER IN YOUR OWN DISTRICT, AND THIS NEEDS TO BE

COORDINATED AND PURSUED WITH THE PLAN.

L.A. COUNTY IS GOING THROUGH A JPA, JOINT POWERS AUTHORITY, FOR COMMUNITY CHOICE AGGREGATION COMMUNITY CHOICE ENERGY. THIS IS ALSO HAPPENING IN THE INLAND EMPIRE RIGHT NOW. BUT THERE'S AN OUTFIT BOTH IN SAN BERNARDINO AND RIVERSIDE. THERE'S AN OUTFIT THAT'S COME FROM BACK EAST, AND THEY'RE EMPHASIZING MORE THAN JUST SAVINGS LIKE THE MODELS BACK EAST AND YOU ACTUALLY OWN THAT SYSTEM AND IT'S PART OF THE COMMUNITY AND OWNED BY INDIVIDUALS AS WELL. THERE'S A LOT OF MONEY OUT THERE IN TAX CREDITS. WE USE TAX CREDITS AND WRITE-OFFS AS AN INCENTIVE. THEY'VE BEEN EXTENDED. THEY WERE EXTENDED FOR ANOTHER FIVE YEARS UNTIL '22. AND THEY STEPPED DOWN 33 PERCENT IN INVESTOR TAX CREDIT FOR RESIDENCE, COMMERCIAL, AND INDUSTRIAL. THERE'S AN ACCELERATED DEPRECIATION IN THE HIGH GRAPHICS. SO YOU GET IT LIKE AT PERCENT. THIS SHOULD BE WORKED AT ALSO FOR LOW INCOME PEOPLE. IN CALIFORNIA WE HAVE A REFUNDABLE TAX CREDIT. WE HAD IT BEFORE THE FEDERALS DID. AND WE HAD A 55 PERCENT IN '76 AND IN '78 IT WAS 40 PERCENT. YOU USED TO BE ABLE TO STACK THEM BOTH. THE CREDIT FOR -- IN CALIFORNIA IS A REFUNDABLE CREDIT SO LOW INCOME PEOPLE CAN USE THIS, TOO.

THIS STUFF ABOUT USING NATURAL GAS -- AND THE HEALTH AND SAFETY CODE 53002(B) SAYS IN THE HEALTH AND

SAFETY CODE THAT IT'S AGAINST THE LAW. IT'S AGAINST THE POLICY IN THE STATE OF CALIFORNIA TO USE NON-RENEWABLE FOSSIL FUELS. NINETY PERCENT OF OUR NATURAL GAS IS IMPORTED INTO THIS STATE. IT'S FRACKED IN TEXAS, OKLAHOMA, COLORADO. THERE WERE STUDIES THAT I BROUGHT TO THE DISTRICT SIX TO EIGHT YEARS AGO FROM CORNELL UNIVERSITY SAYING THERE'S A 104 TIMES THE GLOBAL WARMING POTENTIAL. THE DISTRICT AND THE STATE -- THE FEDERAL GOVERNMENT IS STILL USING 21 AND 22 TIMES GLOBAL WARMING POTENTIAL FOR NATURAL GAS. YOU HAVE TO USE THE BEST EVIDENCE AND BEST SCIENCE. THE BEST SCIENCE IS USED BY DR. AARON KATSENSTEIN IN CHAPTER 10-2. IT SAYS MORE THAN A 30-PERCENT INCREASE IN METHANE OVER THE LAST 12 YEARS.

THERE'S NO FOOTNOTES IN THIS PLAN. YOU GOT TO HAVE FOOTNOTES. YOU CAN'T RESEARCH THIS STUFF AND COME UP WITH CONSTRUCTIVE CRITICISM. YOU'RE REQUIRED TO HAVE FOOTNOTES. THE COMMENTS SHOULD HAVE RESPONSES IN THE REVISED DOCUMENT. THIS IS ALSO ILLEGAL. WE GOT TO SEE EXACTLY WHERE YOU'VE DONE YOUR WRITE-OUTS AND THIS KIND OF THING. THERE WAS A STUDY THEY REFERRED TO TED TURNER WHO'S AT HARVARD WHO DID A STUDY IN MARCH OF '16 ABOUT THIS 30-PERCENT INCREASE.

THE TUNDRA IS MELTING. THERE'S STUFF IN THE RECORD FROM A DR. KELLY, UNIVERSITY OF ALASKA WHO SPECIALIZES IN THAT ON AIR, LAND, AND WATER AND THE

EMISSIONS FROM METHANE RELEASE AND CARBON DIOXIDE. TWENTY-FIVE PERCENT OF NORTH AMERICA IS ARCTIC. THEY'RE HAVING TWO TO THREE TIMES THE WARMING UP THERE. THEY'RE HAVING FIRES. NOW THEY'RE SAYING, "OH, WE'VE GOT RENEWABLE NATURAL GAS." WELL, WE HAVE N2BE2 AND NOW WE'VE GOT 70 PERCENT OF OUR ANTIBIOTICS GO TO ANIMALS AND WE WANT TO TAKE THAT WASTE AND PUT IT INTO THE AIR AND SPIT IT OUT ALL OVER. THEY'VE HAD HUNDREDS OF DEATHS IN THE HOSPITAL IN L.A. FROM SUPER BUGS DRUG RESISTANT SPECIES. AND THERE'S BEEN A SERIES OF ARTICLES ABOUT THAT IN THE L.A. TIMES AND SOME FIGURES MORE RECENTLY ARE AS HIGH AS 300 TO 400,000 DEATHS. THIS IS WHAT YOU GET WITH LANDFILL AND USING THE FECES WASTE FROM BOVINES, ET CETERA. THIS HAS TO BE IN THE HEALTH DOCUMENT. IT HAS TO BE QUANTIFIED AT $9 MILLION A YEAR LIKE THOSE OTHER 2,000 DEATHS -- I HEARD THIS TODAY FOR THE FIRST TIME. YOU SAID 4,000 DEATHS WHICH DOUBLES TO 26 BILLION A YEAR NOW TO 52 BILLION.

DR. FINE: HARVEY, I DID WANT TO MENTION THAT A LOT OF THE COMMENTS YOU'RE MAKING ARE ALREADY ON RECORD, AND WE ARE RESPONDING TO ALL THOSE COMMENTS. BY THE TIME THE PLAN IS CONSIDERED BY OUR BOARD, WE WILL HAVE A FULL APPENDIX 1 ALL WITH ALL OF OUR RESPONSES. THE COMMENTS ON CHAPTER 10 ABOUT FOOTNOTES, THERE'S SEVERAL PAGES OF REFERENCES.

MR. EDER: THAT'S THE ONLY CHAPTER.

DR. FINE: BUT IT'S THE SAME WHETHER YOU PUT THEM ON THE BOTTOM OF THE PAGE.

MR. EDER: THAT'S GOOD. BUT OTHER DOCUMENTS DIDN'T HAVE THEM. AND YOU LEAVE NO RESULT OTHER THAN AS STATED BY JIM MORRISON PETITIONING -- HE WAS TALKING ABOUT ANOTHER KIND PETITIONING. BUT PETITIONING THE GOVERNMENT AND THEN ACCUSE LITIGATION. AND IF WE HAVE TO GO AND GET AN INJUNCTION AND TEMPORARY RESTRAINING ORDER ON THIS WHOLE PROCESS UNTIL YOU STUDY AND IMPLEMENT A SOLAR CONVERSION PLAN THAT IS COST EFFECTIVE WILL HELP THE ECONOMY AND PUT PEOPLE TO WORK. THERE'S 220,000 JOBS IN SOLAR AND HALF OF THOSE ARE IN THE DISTRICT.

AND I HAVEN'T TALKED WITH YOU, WAYNE. I'D LIKE TO TALK TO YOU SOMETIME.

MR. NASTRI: I LOOK FORWARD TO IT. THANK YOU.

MR. EDER: ALL RIGHT.

MR. NASTRI: WERE THERE ANY OTHER PEOPLE THAT WOULD LIKE TO HAVE COMMENTS? IF YOU WOULD LIKE TO SUBMIT A BLUE CARD AND COME FORWARD. LET ME JUST THANK EVERYONE FOR BEING HERE TODAY TO PROVIDING COMMENTS. WE'RE VERY FORTUNATE TO HAVE EVERYBODY OUT HERE.

I'D LIKE TO INTRODUCE SUPERVISOR JANICE RUTHERFORD.

MS. RUTHERFORD: THANK YOU. I'M SORRY I WAS

LATE THIS MORNING. BEFORE THIS I SCHEDULED TO ATTEND THE CALIFORNIA RESOURCE CONSERVATION DISTRICT'S ANNUAL CONFERENCE THAT WAS HELD IN ONTARIO. AND IT WAS A REALLY HONOR TO BE ABLE TO WELCOME SAN BERNARDINO COUNTY AND SHARE WITH THEM THE BALANCE THAT WE WORK TO STRIKE HERE WITH THE INCREDIBLE NATURAL RESOURCES THAT WE HAVE BEEN GIVEN STEWARDSHIP OVER. AND WE HAVE FOUND CREATIVE COLLABORATIVE WAYS TO DO THAT HERE IN SAN BERNARDINO COUNTY, AND I THINK THAT THE COMMENTS THAT I WILL HEAR TODAY CERTAINLY REFLECT THAT.

OUR RESIDENTS HAVE A DESIRE FOR CLEAN AIR AND CLEAN WATER AND NATURE BEING TAKEN CARE. THEY ALSO HAVE A DESIRE TO INTERACT WITH IT BOTH FOR REACTION AND FOR EMPLOYMENT FOR PROSPERITY. AND IT'S BODIES LIKE SOUTH COAST AQMD TO TAKE THAT INTO CONSIDERATION AND TO UNDERSTAND THAT IT'S NOT ALL OR NONE ON EITHER SIDE. WE CAN BE PROSPEROUS, AND WE CAN TAKE CARE OF OUR ENVIRONMENT AND OUR RESPONSIBILITIES. AND I HOPE THIS PLAN IN ITS FINAL FORM STRIKES THAT BALANCE AND RECOGNIZES THE NEED TO MEET THAT BECAUSE OF OUR GEOGRAPHY. I LOOK FORWARD TO CONTINUING TO READ AND STUDY COMMENTS FROM AROUND THE REGION AND LOOKING AT THE FINAL PLAN IN A COUPLE MONTHS AND COMING UP WITH SOMETHING THAT HOPEFULLY RESULTS IN GOOD OUTCOMES FOR ALL OF THIS.

THANK YOU FOR YOUR PARTICIPATION TODAY

DR. FINE: THANK YOU. IF THERE'S NO OTHER COMMENTS, WE'LL CALL THE MEETING TO A CLOSE. WE'LL TALK, HARVEY.

MR. EDER: I'VE BEEN TALKING.

DR. FINE: YEAH. AND IF ANYONE WANTS TO COME UP, THE AQMP STAFF IS HERE FOR ANY QUESTIONS. SO THANK YOU, EVERYONE, FOR COMING. AND WE'LL SEE SOME OF YOU IN RIVERSIDE IN A FEW HOURS.

(END OF PUBLIC HEARING.)

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2016 Air Quality Management Plan

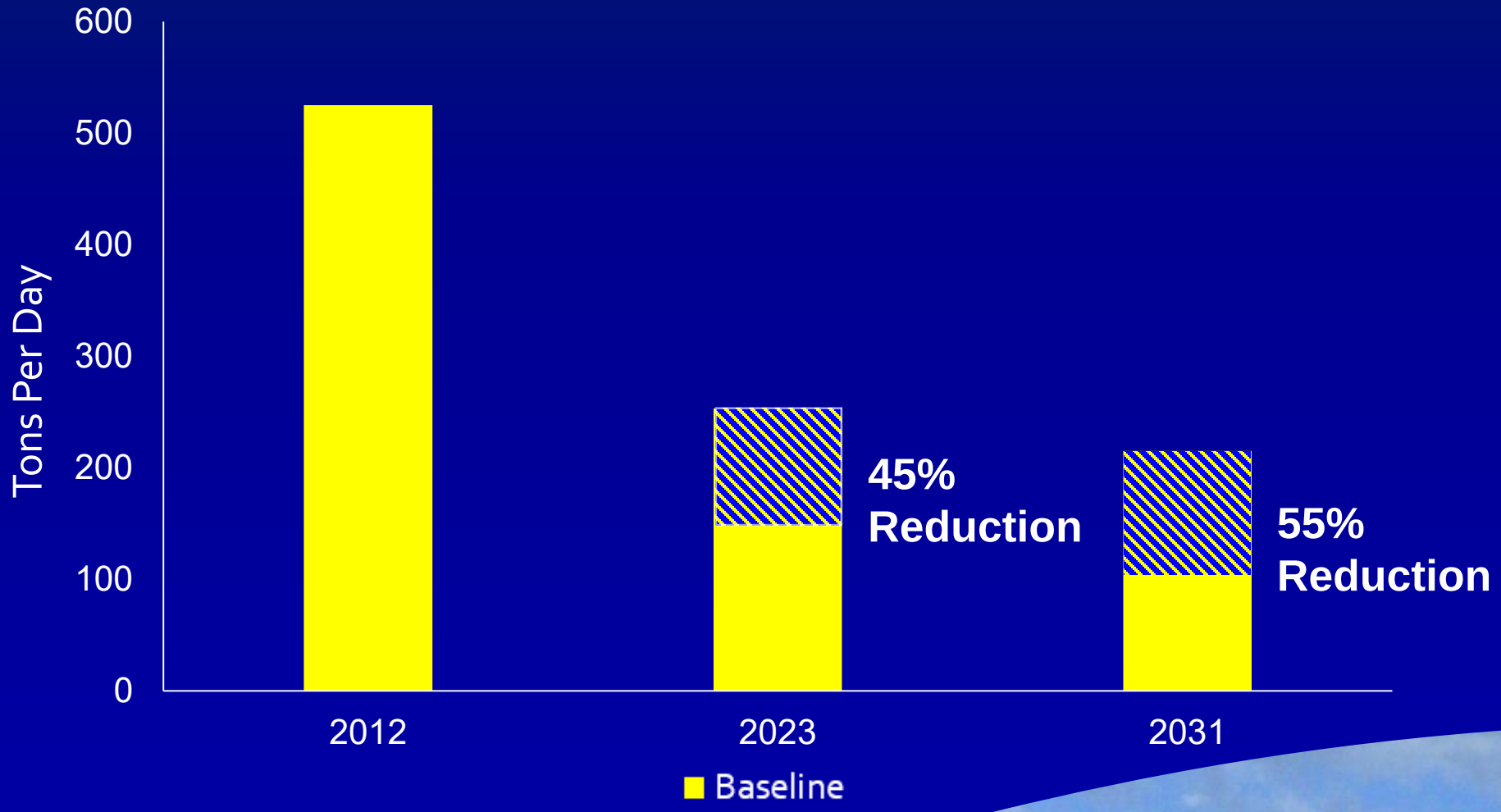


2016 AQMP Final Public Hearing

February 3, 2017

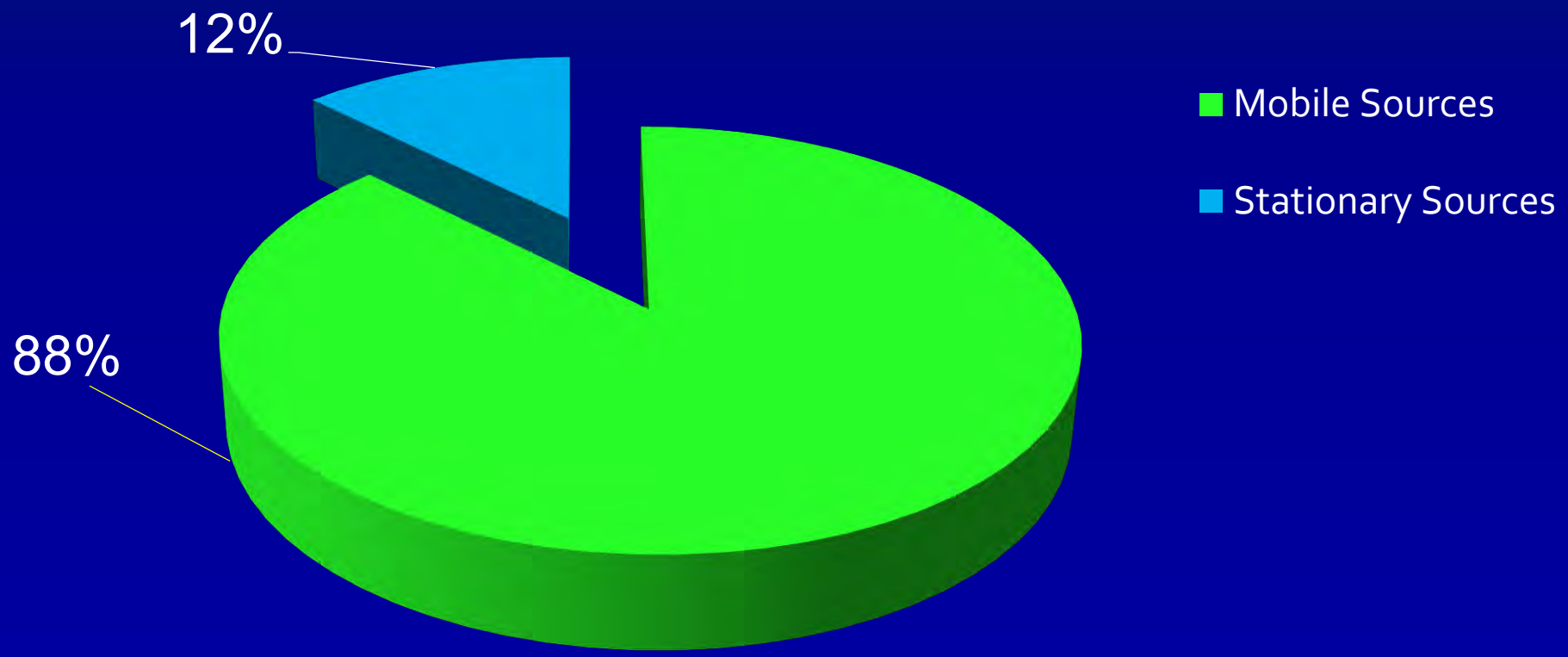


Basin Total NO_x Emissions



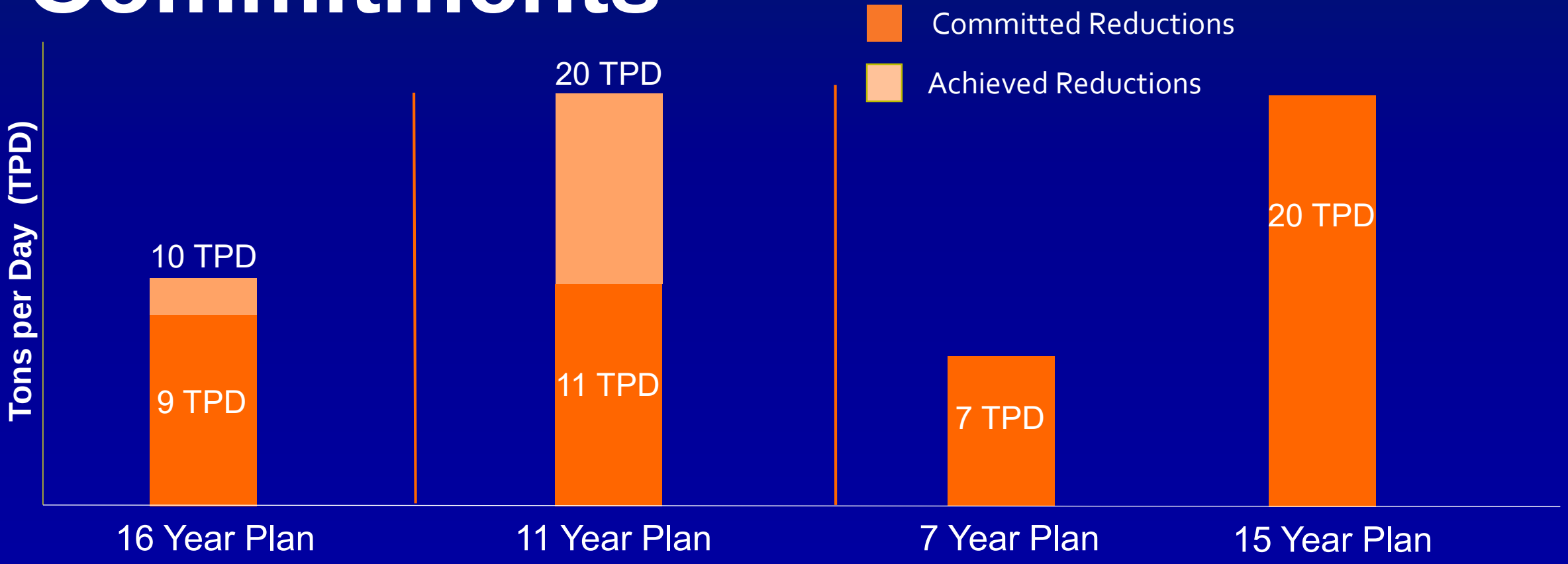
8-hour Ozone strategy targeting 2023 will ensure 1-hour attainment in 2022 as well as 24-hour and annual attainment in 2019 and 2025, respectively

Sources of NOx: Mobile and Stationary (2012)



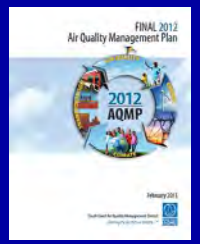
522 Tons per Day

SCAQMD NOx Reduction Commitments

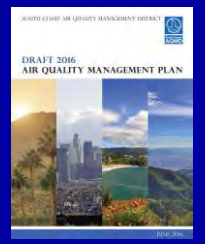




2007 AQMP

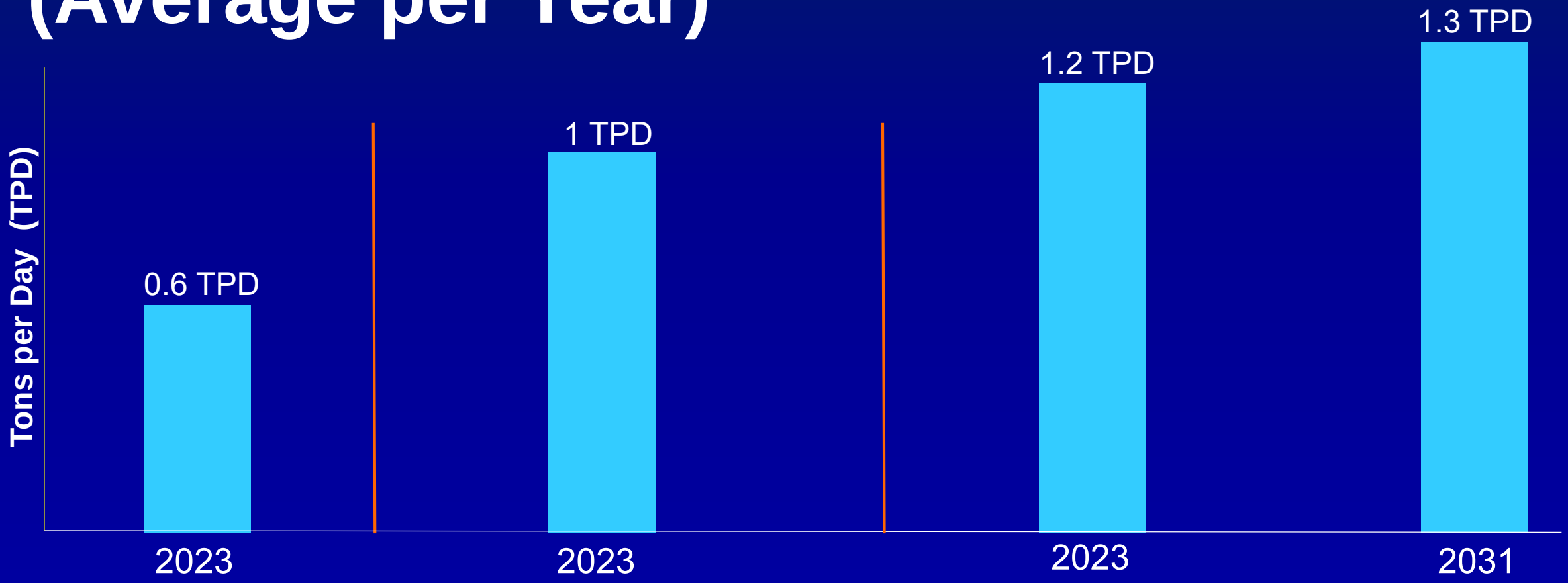


2012 AQMP



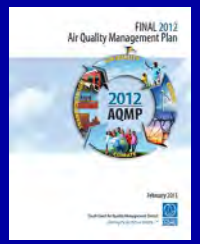
2016 AQMP

SCAQMD NOx Reduction Commitments (Average per Year)

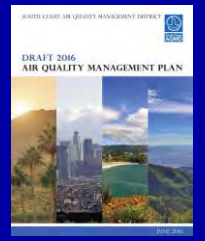




2007 AQMP

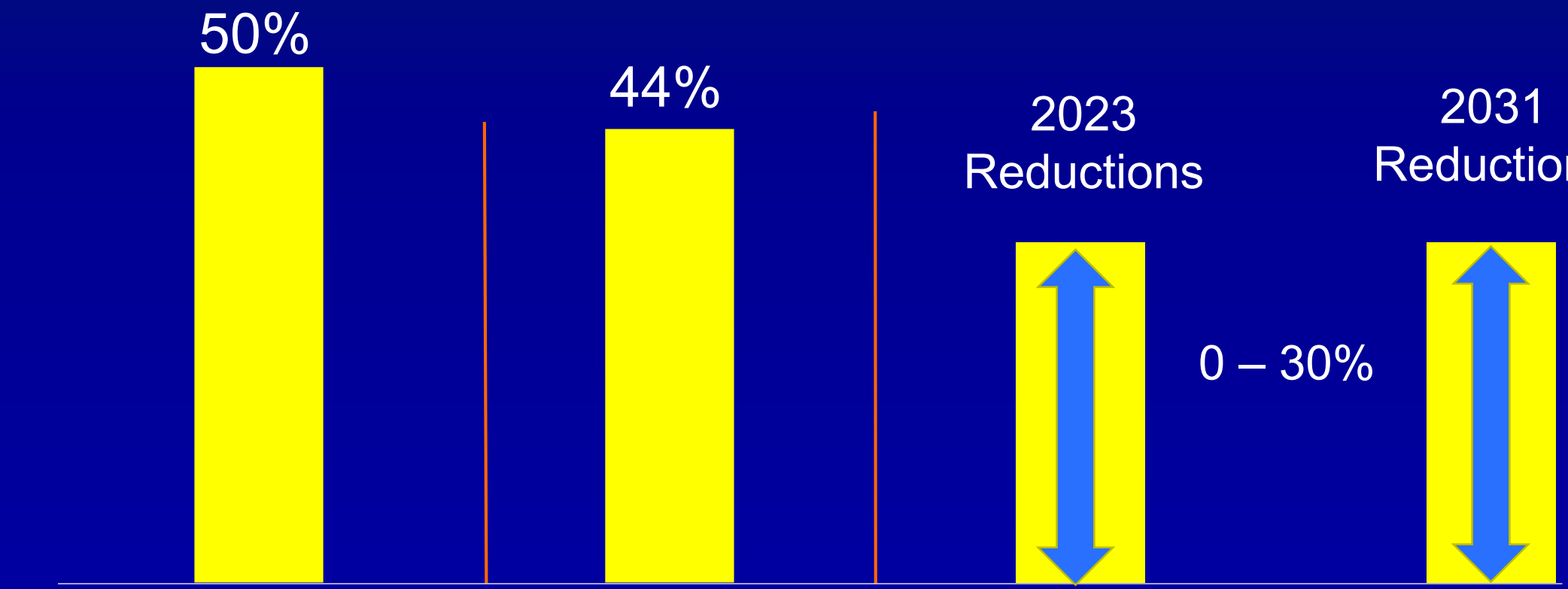


2012 AQMP



2016 AQMP

Long-Term/Further Deployment Measures



Socioeconomic Assessment

- Preliminary analysis released in August 2016
- Extensive public process
- Total implementation costs ~$16 billion
- Job impact ranges from 9,000 forgone to 29,000 gained annually



Public Health Benefits



~2,500 fewer annual asthma-related emergency room visits



~700 fewer annual hospital admissions related to asthma, cardiovascular, or respiratory conditions



>200,000 fewer annual person-days of work and school absences



An annual average of 1,600 premature deaths avoided

Public health benefits estimated to be $173 billion cumulatively (2017-2031)

Solar Technologies

- Plan promotes and integrates zero emission technologies such as solar, electric, fuel cells
- Solar technology cannot achieve AQMP's attainment goals alone, but will serve to make zero-emission technologies more cost-effective and feasible



The 2016 AQMP Developed Through an Extensive Public Process



10 policy White Papers



10 Regional Workshops



15 Advisory Group Meetings





Control Strategy Symposium





109 comment letters

200+ Meetings

Environmental and community groups, faith groups, local government, public health advocates, business, and academia

The 2016 AQMP Developed Through an Extensive Public Process



Comments and input were critical for Plan development

Key Issues



NOx RECLAIM



Facility-Based Measures



Incentives and Sources of Funding



NO_x RECLAIM

- **Proposed Measure (CMB-05)**
  - Additional 5 tons per day NOx reduction by 2031
  - Working group of stakeholders - Spring 2017
  - Seriously considering sunset of program
  - Develop options and timing for transition to command and control
- **Comments**
  - Support for market-based program
  - Commit to command-and-control
  - Timing of reductions

Facility-Based Measures

- **Proposal**
  - Ports, Warehouses, Airports, Railyards, Development
  - Reduction commitment is part of the CARB State SIP Strategy
  - Measures intended to locally implement State SIP commitment
  - Work with **all** stakeholders to identify reduction targets and achieve **enforceable** NOx reductions
  - Progress reports to Board with recommendation within one year
  - Process identical to Rulemaking, pivot quickly if no progress
- **Comments**
  - Commit to targets and rulemaking
  - Remove all facility-based (TBD) measures





Incentives and Sources of Funding

Recommended Actions

- Certify the Final Program EIR
- Adopt the 2016 AQMP in accordance with Resolution

